

Bijlagelijst ZW380kv Gemeente Kapelle, d.d. 29 april 2015						
Map	Titel	Datum	Versie	Tekening/documentnummer	Vergunning	Opmerkingen
1	Overzichtskaart en mastenlijst					
	Overzicht Zuid-West 380 kV Borssele-Rilland	feb-15		150227p_zw380_ZW-W_zeeland_A2	Wabo bouwen, in- en uitrit, werk of werkzaamheden uitvoeren en strijdigheid RO	
	Tracé ZW380kV Gemeente Kapelle	12-2-2014		151105p_zw-w380_Kapelle_A0	Wabo bouwen, in- en uitrit, werk of werkzaamheden uitvoeren en strijdigheid RO	
	Mastenlijst Wabo Kapelle DT1				Wabo bouwen	
	Mastenlijst Wabo Kapelle DT2	20-2-2015			Wabo bouwen	
2	Vergunningenkaarten					
	150428 vergunningenkaarten DT1 VKA 20	28-4-2015	6	315112-T001-C-verg	Wabo bouwen, in- en uitrit	Blad 1042 t/m 1050
	150428 vergunningenkaarten DT2 VKA 2.1	28-4-2015	3	315112-T002-C-verg	Wabo bouwen, in- en uitrit	Blad 1050 ab t/m 1061
3	Kadastrale Gegevens					
	Lijst met kadastrale gegevens	29-4-2015	1.0	-	Wabo bouwen, in- en uitrit, werk of werkzaamheden uitvoeren en strijdigheid RO	
4	Lengteprofielen					
	Preliminary Line Drawings Section DT1 (Structure 1001 to 1050)	19-8-2014	P9	ZW380 LPD DT1-P9	Wabo bouwen	Blad 11 tot en met 14 van 14
	Section DT2 Krabbendijke Alternative 4 (Structure 1050 - 1104)	20-2-2015	P2	ZW380 LPD DT2-P2 ALT-4	Wabo bouwen	Blad 1, 2 en 3 van 15
5	Vergunningendocumenten					
	Engineering Verbinding ZW380 Deelgebied Borssele - WAP Vergunningendocumentatie	16-12-2014	9	74102194-ETD/POL 13-0155	Wabo bouwen	Inclusief tekeningen en berekeningen van tijdelijke masten en jukken in de onderliggende mappen.
	Engineering Verbinding ZW380 Deelgebied2: WAP - Rilland Vergunningendocumentatie	17-3-2014	9.0	13-0891	Wabo bouwen	Inclusief tekeningen en berekeningen van tijdelijke masten en jukken in de onderliggende mappen.
6	Ontwerpgegevens Wintrackmasten					
A	<u>Ontwerpdossier Mastenfamilie</u>	17-3-2015	12.0	13-3149	Wabo bouwen	Inclusief berekeningen en tekeningen van masten en fundaties in de onderliggende mappen
B	Beton Hybride					
	Constructieberekening hybride masten	6-3-2014	4	74102194-ETD/POL 13-2623	Wabo bouwen	
	Constructieberekening betonnen masten	6-3-2014	4	74102194-ETD/POL 13-2622	Wabo bouwen	
	Constructieberekening funderingen voor betonnen en hybride masten	22-4-2015	6	74102194-ETD/POL 13-3180	Wabo bouwen	
C	Sondeergegevens					
7	Gegevens Station WAP					
	Opstijgpunt wit met lijn en zwart met kabel	27-1-2012		BSL-RLL150-00-31-0004	Wabo bouwen	blad 001
	Overgang 4x380 op 2x380	21-10-2011		BSL-TVL-TLB380-00-31-0003	Wabo bouwen	blad 001
	Overgang 4x380 op bestaande lijn	10-7-2012		BSL-GT380-00-31-0003	Wabo bouwen	blad 001
8	Constructieve veiligheid					
	Basisnota constructieve veiligheid	2-12-2014	2.0	14-3185	Wabo bouwen	

9	Rapport Archeologie					
	Bureauonderzoek Archeologie; Hoogspanningsverbinding Zuid-West 380 kV; Deeltracé 2	8-2-2013	concept	076922603:0.2	Wabo bouwen, in- en uitrit, werk of werkzaamheden uitvoeren en strijdigheid RO	Definitieve versie wordt later aangeleverd, conform gemaakte afspraken met gemeente op 27 augustus 2014.
	ZuidWest 380kV Hoogspanningsverbinding Borssele-Tilburg; Deelrapportage Zeeland, inventariserend veldonderzoek door middel van verkennende boringen	10-6-2014	revisie 1	GM-0135317	Wabo bouwen, in- en uitrit, werk of werkzaamheden uitvoeren en strijdigheid RO	Definitieve versie wordt later aangeleverd, conform gemaakte afspraken met gemeente op 27 augustus 2014.
10	Bodemrapporten					
	Grondonderzoeken ZW380kV Deeltracé 1	28-4-2015	D1	GM-0159550	Wabo bouwen, in- en uitrit, werk of werkzaamheden uitvoeren en strijdigheid RO	
	Grondonderzoeken ZW380kV Deeltracé 2 Verkennend (water)bodem- en asbestonderzoek	28-4-2015	D1	GM-0159560	Wabo bouwen, in- en uitrit, werk of werkzaamheden uitvoeren en strijdigheid RO	
11	Beeldkwaliteitsplan					
	Beeldkwaliteitsplan Wintrack II	dec-14			Wabo bouwen, in- en uitrit, werk of werkzaamheden uitvoeren en strijdigheid RO	
12	CRA Advies Wintrackmasten					
	Advies Esthetisch Concept Wintrackmasten	2-10-2014		RBM-20140102	Wabo bouwen	
	Reactie TenneT TSO op Advies CRA	8-1-2015		LP-2015-001	Wabo bouwen	
13	Situatietekeningen					
	VKA 2.0/2.1 Gemeente Kapelle	14-4-2015	VKA 2.0/2.1	150414p_zw-w380_Kapelle	Wabo bouwen, in- en uitrit, werk of werkzaamheden uitvoeren en strijdigheid RO	
14	Ontwerpgegevens Hekwerken					



Bijlage 5
Vergunningendocumenten

Funderingsadvies t.b.v.:

Tijdelijke steigerconstructie over Rijksweg A12 te Bleiswijk

In opdracht van:

Opgesteld door: Ing. F.M. van den Broeke
Gezien: Ing. S. Sansaar
Revisie: 0
Project: 0-10-0131

Datum: 15 juli 2010

Inhoudsopgave:

1. Inleiding
2. Projectgegevens
 - 2.1 Algemeen
 - 2.2 Gegevens steiger
3. Onderzoek bodemopbouw
4. Bodemopbouw
 - 4.1 Hoogteligging
 - 4.2 Grondwater
 - 4.3 Beschrijving bodemopbouw
5. Funderingsontwerp
 - 5.1 Funderingstype
 - 5.2 Ontwerp fundering op staal
 - 5.2.1 Eisen ten aanzien van veiligheid (Uiterste grenstoestand)
 - 5.2.2 Eisen ten aanzien van bruikbaarheid (Bruikbaarheidstoestand 2)
 - 5.3 Aanlegniveau
 - 5.4 Draagkracht, zetting en vervorming

Bijlagen:

Sonderingsrapport firma Lankelma;
Berekening fundering onder steigerpoort noordzijde;
Berekening fundering over duiker noordzijde;
Berekening fundering onder steigerpoort zuidzijde;
Berekening fundering over duiker zuidzijde;
Berekening fundering onder steigerpoort zuidzijde in talud.

1. Inleiding

Op verzoek van Spie Infra is ten behoeve van een te realiseren tijdelijke steiger over rijksweg A12 te Bleiswijk, welke dient als noodopvang van aan te brengen hoogspanningleidingen, een funderingsadvies opgesteld. Als uitgangspunt dienen de aangeleverde sonderingen met boorstaten van de firma Lankelma. Hierbij is voor de noordzijde gebruik gemaakt van sondering DKM1 en voor de zuidzijde van sondering DKM5.

Onder de steiger bevinden zich diverse type funderingen, alle verschillende situaties voor zowel de noordzijde als de zuidzijde zijn berekend.

2. Projectgegevens

Algemeen

De steiger zal gefundeerd worden d.m.v. een prefabbetonfunderingen op 'staal'.

Gegevens steiger

Zie rapport "Ingenieur- & Sachverständigen-Burö für den Gerüstbau dd. 13 juli 2010 voor de steiger aan de noordzijde en het rapport "Ingenieur- & Sachverständigen-Burö für den Gerüstbau dd. 14 juni 2010 voor de steiger aan de zuidzijde

3. Onderzoek bodemopbouw

Het bodemonderzoek is uitgevoerd door middel van een diepsondering. De sondering is uitgevoerd volgens NEN 5140, gebruik makend van een elektrische kleefmantelconus waarbij zowel de conusweerstand als de plaatselijk wrijving continu is gemeten en geregistreerd.

Op basis van de conusweerstand en wrijvingsweerstand is bepaald welke grondsoort op een bepaalde diepte wordt aangetroffen. De eerste 1,2 tot 1,8 mtr van de sondering is d.m.v. een handboring voorgeboord. Hierdoor zijn in het eerste deel geen grondgegevens in de sondering opgenomen. Lankelma heeft de uit de boring vrijgekomen grond separaat geanalyseerd en in het rapport verwerkt. De bij deze grondsoort(en) behorende parameters zijn door TKT handmatig in de analyse van de sondering ingevoerd alvorens de berekening uit te voeren. In de bijlage waarin de draagkracht van de fundering wordt berekend is dit zichtbaar gemaakt.

De sondeergrafieken en het boorprofiel is als bijlage toegevoegd.

De waterpassing van de sondeerpunten en het boorpunt is uitgevoerd ten opzichte van NAP.

De ligging van de sondeerpunten is weergegeven op de situatietekening.

Voor het talud zijn geen grondgegevens bekend. Uit informatie verkregen van Ballast Nedam en Spie Infra is bekend dat het talud bestaat uit een pakket schoon en zeer dicht gepakt zand. Voor de berekening van het talud is een aangepaste grondanalyse van sondering DKM 5 gemaakt waarin een pakket van 2 mtr verdicht zand is toegevoegd.

4. Bodemopbouw

Hoogteligging

De sondering is uitgevoerd ter plekke van de te plaatsen steiger. De hoogteligging is hierbij vastgesteld vanaf maaiveld (DKM 1= -2,10 mtr. NAP en DKM 5 = -0,62 mtr. NAP).

Grondwater

Ten tijde van het grondonderzoek werd grondwater aangetroffen. Er wordt op gewezen dat deze waarneming een momentopname is en dat afhankelijk o.a. het jaargetijde het grondwaterniveau zal variëren.

Beschrijving bodemopbouw.

Als bijlage is een omschrijving gegeven van de bodemopbouw op basis van de sondering.

5. Funderingsontwerp

Funderingstype

De steiger wordt gefundeerd d.m.v. prefabfunderingselementen op staal. Afhankelijk van het situatie is de afmeting en het type van het funderingselemente bepaald.

Ontwerp fundering op staal

Aan de hand van informatie wordt het bouwproject, volgens NEN 6740, art. 6.2.3, ingedeeld in de geotechnische categorie 2 (GC 2).

Dit rapport is verder gebaseerd op de "Berekeningsmethode voor funderingen op staal" – NEN 6744 waarbij het ontwerp dient te voldoen aan de eisen van veiligheid en bruikbaarheid.

5.2.1 Eisen ten aanzien van veiligheid (Uiterste grenstoestand)

Nagegaan dient te worden of er voldoende veiligheid bestaat tegen het optreden van bezwijkmechanismen (uiterste grenstoelstanden) in de ondergrond en voor de constructie als geheel.

Voor de onderhavige situatie betreft het te toetsten bezwijkmechanisme: het bezwijken van het funderingselement en de ondergrond onder invloed van de vanuit de constructie optredende belasting.

Voor de funderingselementen welke in het talud worden aangebracht zijn aanvullende berekeningen gemaakt volgens NEN 6744, artikel 5.2.3.2 waarin factoren voor de reductie van de toelaatbare grondspanning worden bepaald.

5.2.2. Eisen ten aanzien van bruikbaarheid (Bruikbaarheidstoestand 2)

Wanneer er sprake is van een te grote vervorming van de constructie (bijvoorbeeld zakking of rotatie, dan kan dit leiden tot ongewenst verlies aan bruikbaarheid, schade of hoge onderhoudskosten. De vervormingseisen dienen te worden vast gesteld en getoetst middels de in dit rapport bepaalde last- en zakkingsgegevens.

Bijlage 1:

- Geotechnische rapport Lankelma;

Opdrachtgever:

**Ballast Nedam Engineering
Postbus 1555
3430 BN Nieuwegein**

Rapportkenmerk:

EMO/VN-30389

Status rapport :

Definitief

Datum rapport :

16 juni 2010

Geotechnisch onderzoek HSM jukken in Bleiswijk

Lankelma Geotechniek Almelo B.V.
Einsteinstraat 12a
7601 PR ALMELO
Tel: 0546 - 532074
Fax: 0546 - 531659
E-mail: info@lankelma-almelo.nl

Ingenieursbureau voor
geo- en funderingstechniek

*"onderzoek, metingen en advies voor
vastgoed, bouw, bodem en milieu"*

Inhoudsopgave

1	Inleiding	1
2	Veldwerkzaamheden.....	2
2.1	Sonderingen.....	2
2.2	Handboringen / voorboringen.....	2
2.3	Bepaling coördinaten en NAP-hoogte.....	2
3	Resultaten.....	3
3.1	Bijzonderheden tijdens de uitvoering	3
3.2	Sonderingen.....	3
3.3	Handboringen / voorboringen.....	3
3.4	Bepaling coördinaten en NAP-hoogte.....	3

Bijlagen:


- 1) Situatietekening met sondeer- en boorlocaties
- 2) Sondeergrafieken
- 3) Boorstaten

Auteur rapport: Dhr. E. Morsink

Paraaf: 

Datum: 16 juni 2010

Kwaliteitscontrole: Dhr. G.J. Bremmer

Paraaf: 

Datum: 16 juni 2010

1 INLEIDING

In opdracht van Ballast Nedam Engineering is een geotechnisch grondonderzoek uitgevoerd aan de HSM jukken in Bleiswijk.

Aanleiding voor het onderzoek is de aanleg van de jukken voor de nieuwe hoogspanningslijnen.

Het onderzoek is gebaseerd op de door de opdrachtgever verstrekte situatietekening. De tekening is ontvangen per mail 29 april 2010.

Voorliggend rapport presenteert het onderzoeksprogramma (hoofdstuk 2) en de resultaten van het onderzoek (hoofdstuk 3).

2 VELDWERKZAAMHEDEN

2.1 Sonderingen

Tijdens het grondonderzoek, dat is uitgevoerd op 26 mei 2010, zijn in totaal 5 sonderingen tot een diepte van maximaal 20 m - maaiveld verricht (DKM1 t/m DKM5). Bij de sonderingen (DKM1 t/m DKM5) is naast de conusweerstand tevens de plaatselijke mantelwrijving gemeten. De sonderingen zijn weergegeven op de situatietekening in bijlage 1.

De sonderingen zijn uitgevoerd met een elektrische conus overeenkomstig de norm NEN 5140. Met de elektrische conus vindt een meting plaats van zowel de weerstand aan de conuspunt als van de wrijving langs de klefmantel. Zodoende is een beeld verkregen van zowel de vastheid van de grond als van de aanwezige grondsoorten. De verhouding tussen de wrijvingsweerstand en de conusweerstand, het zogenaamde wrijvingsgetal, geeft beneden de grondwaterstand namelijk een indicatie van de aangetroffen grondsoort. Het wrijvingsgetal is het quotiënt van de plaatselijke wrijving en de conusweerstand en geeft een indicatie van de laagopbouw weer, zie onderstaande tabel.

Tabel 1: Indicatie van de grondsoorten op basis van het wrijvingsgetal

Grondsoort	Wrijvingsgetal (%)
grind en grof zand	0,2 - 0,6
zand	0,6 - 1,2
silt, leem, löss	1,2 - 4,0
klei	3,0 - 5,0
potklei	5,0 - 7,0
veen	5,0 - 10,0

2.2 Handboringen / voorboringen

Ter plaatse van de sonderingen (DKM1 t/m DKM4) zijn tevens handboringen (B1 t/m B4) uitgevoerd ten behoeve van de classificatie van de grond en bepaling van de grondwaterstand. De opgeboorde grond is geclassificeerd conform NEN 5104. De situering van de handboringen is eveneens op de situatietekening in bijlage 1 weergegeven.

2.3 Bepaling coördinaten en NAP-hoogte

De onderzoekspunten zijn in het terrein uitgezet in RD-coördinaten. De RD-coördinaten en de NAP-hoogte zijn ingemeten met een 06-GPS-unit met een maximale afwijking van 2 à 3 cm.

3 RESULTATEN

3.1 Bijzonderheden tijdens de uitvoering

Tijdens de uitvoering van de werkzaamheden waren er geen beperkingen of bijzonderheden.

3.2 Sonderingen

De sondeerresultaten zijn grafisch weergegeven in bijlage 2, waarbij het maaiveld is uitgezet ten opzichte van NAP.

3.3 Handboringen / voorboringen

Het resultaat is gepresenteerd op de boorprofielbeschrijving in bijlage 3.

De grondwaterstanden zijn opgenomen in onderstaande tabel. Afhankelijk van de waterdoorlatendheid van de bodem bestaat de mogelijkheid dat het grondwater zich tijdens de uitvoering van het grondonderzoek zich niet volledig heeft ingesteld. De gemeten grondwaterstand is een momentopname en is onder andere afhankelijk van lokale omstandigheden en het jaargetijde.

Tabel 2: Grondwaterstand

Handboring	Grondwaterstand (in m -mv)
1	niet aangetroffen
2	niet aangetroffen
3	niet aangetroffen
4	0.95

3.4 Bepaling coördinaten en NAP-hoogte

De inmeet- en waterpasresultaten zijn alleen bedoeld om de bodemopbouw te refereren aan NAP en zijn niet geschikt voor andere doeleinden dan dit onderzoek.

Tabel 3: Coördinaten en NAP-hoogte

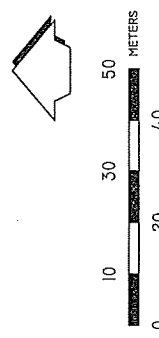
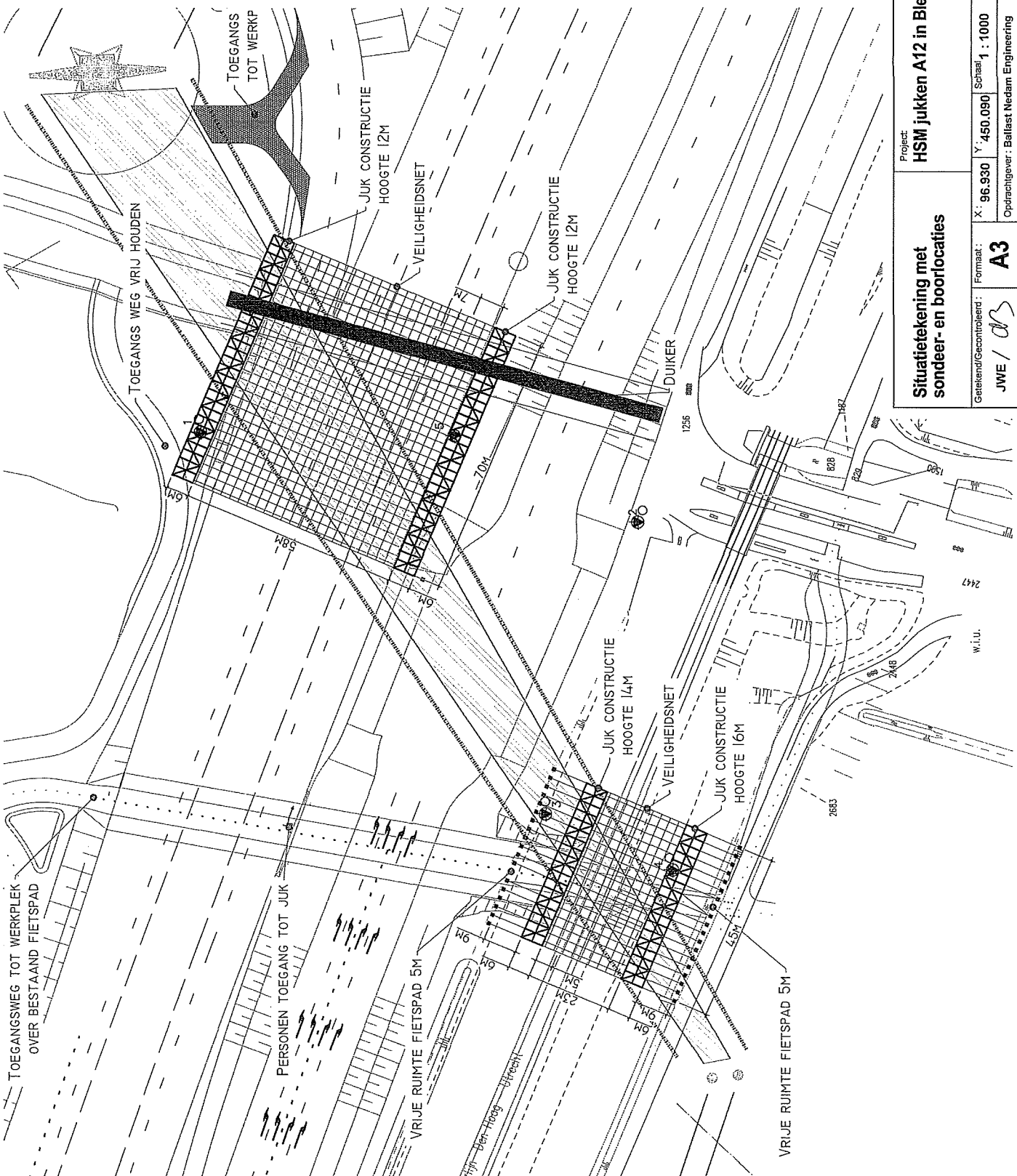
sondering	X-coördinaat	Y-coördinaat	Maaiveldhoogte (t.o.v. NAP)
DKM1	96977.278	450157.197	-2,10
DKM2	96953.044	450039.844	-4,64
DKM3	96874.547	450064.783	-0,79
DKM4	96859.480	450030.657	-0,42
DKM5	96976.155	450089.040	-0,62

De onderzoekslocaties zijn ingemeten middels een GPS-unit

BIJLAGE 1

Situatietekening met sondeer- en boorlocaties

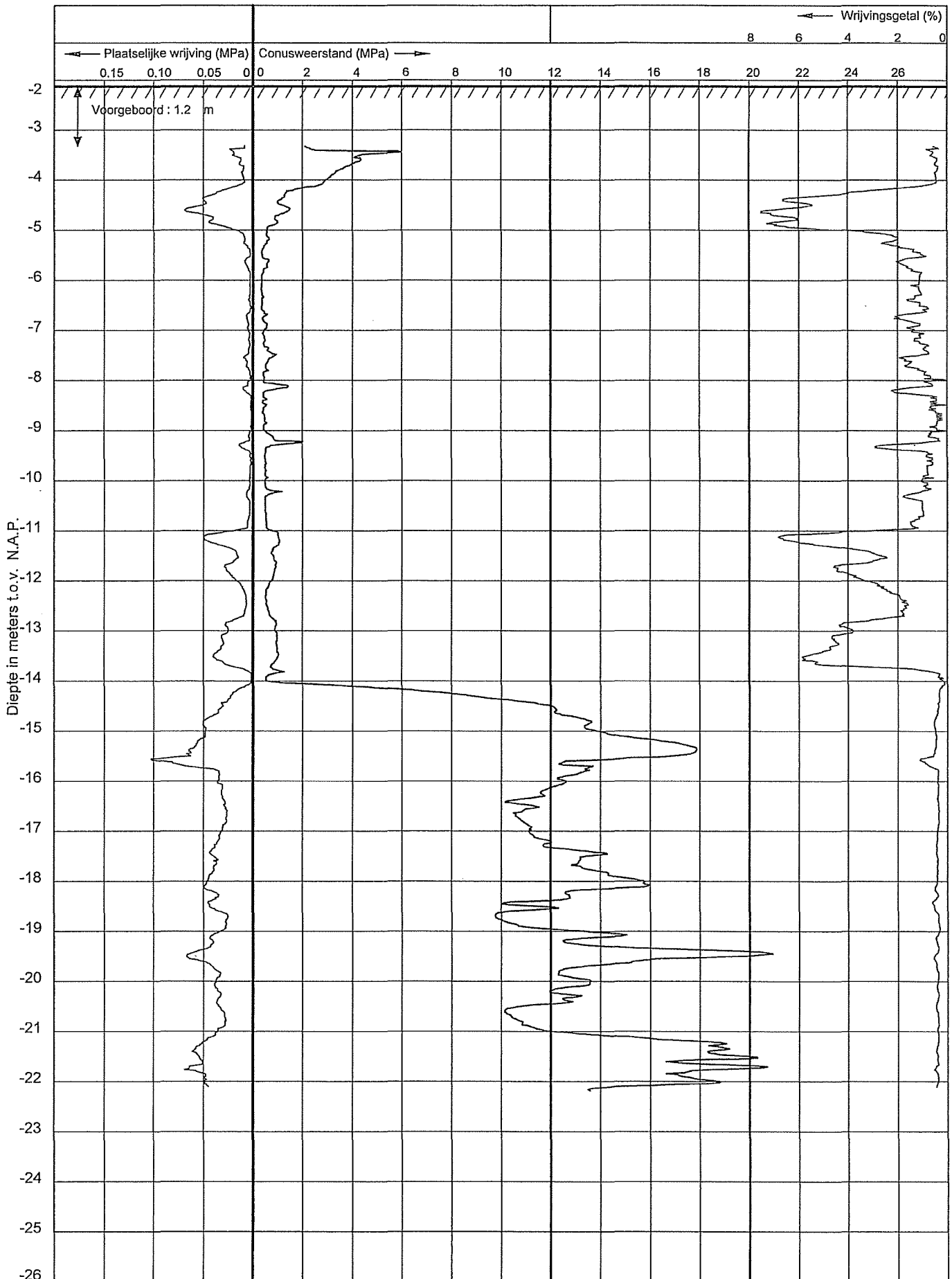
- Legenda**
- ☉ sondering met kleefmeting (DKM)
 - boring

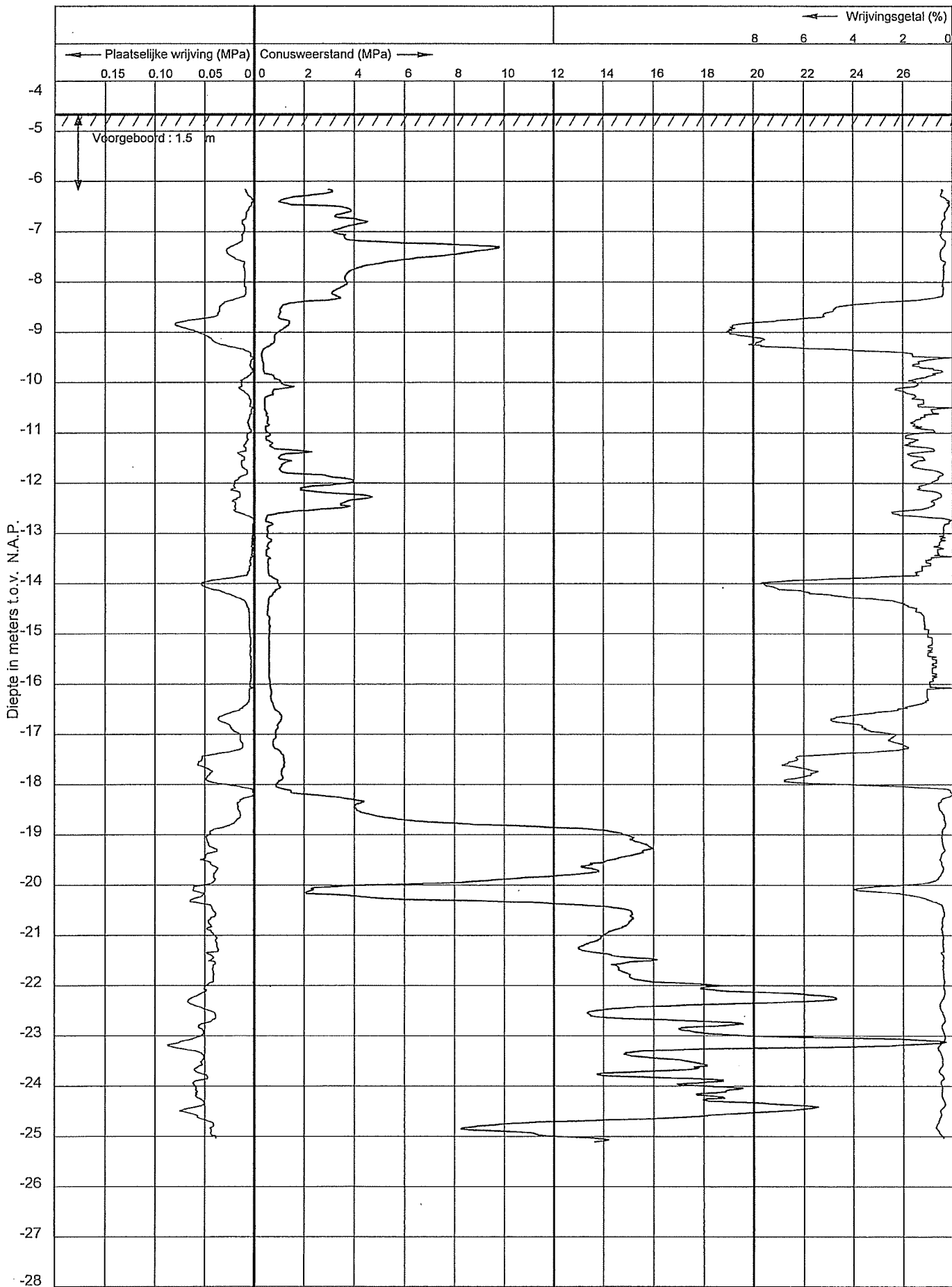


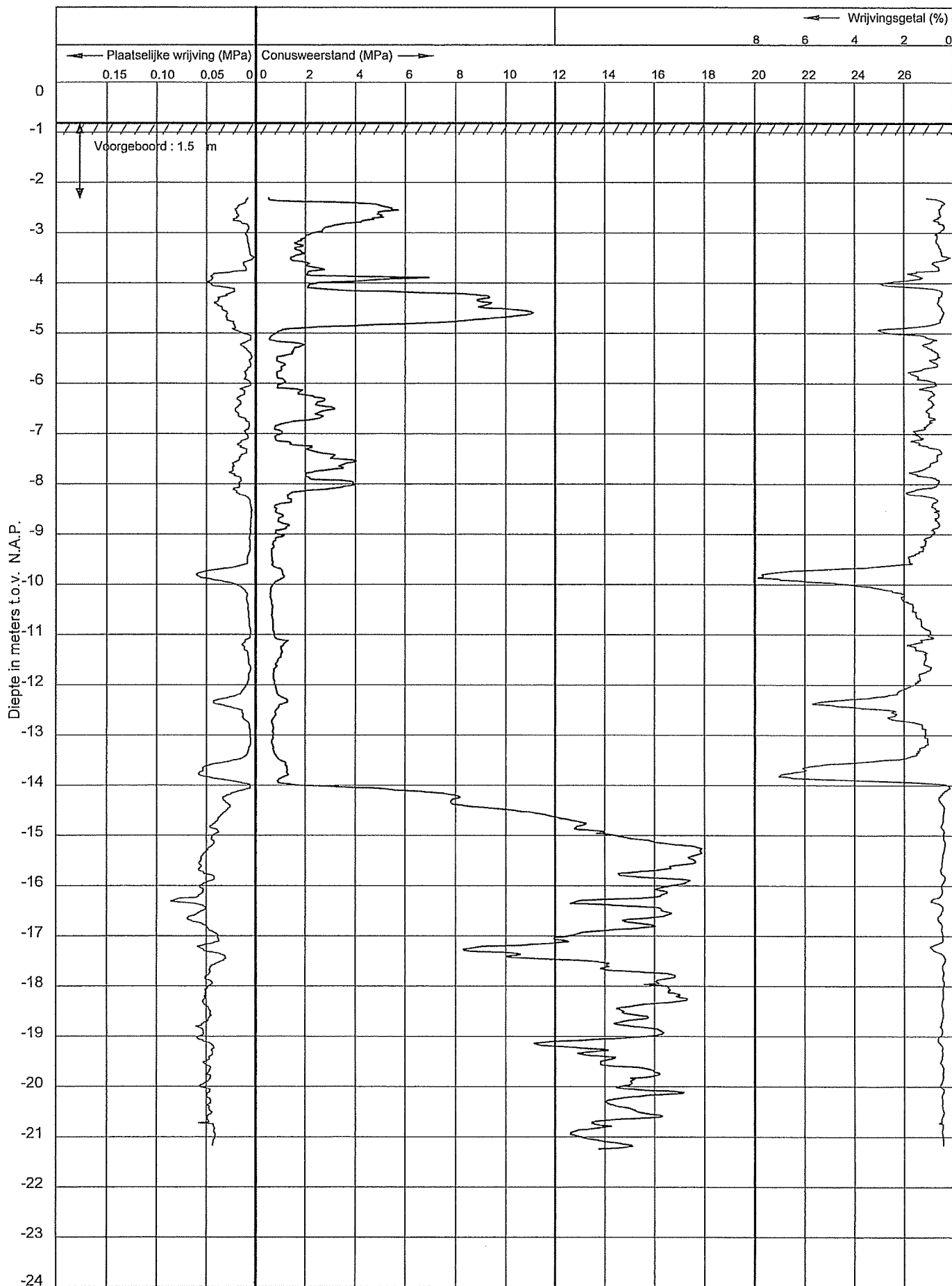
Situatietekening met sondeer- en boorlocaties		Project: HSM jukken A12 in Bleiswijk		Biljage: 1	
Gedeelend/Gecontroleerd: JWE / <i>ORS</i>		Formaat: A3		Tekening: A01	
X: 96.930		Y: 450.090		Projectnr.: 30389	
Schaal: 1 : 1000		Datum: 03-06-2010		Oprachgever: Ballast Nedam Engineering	

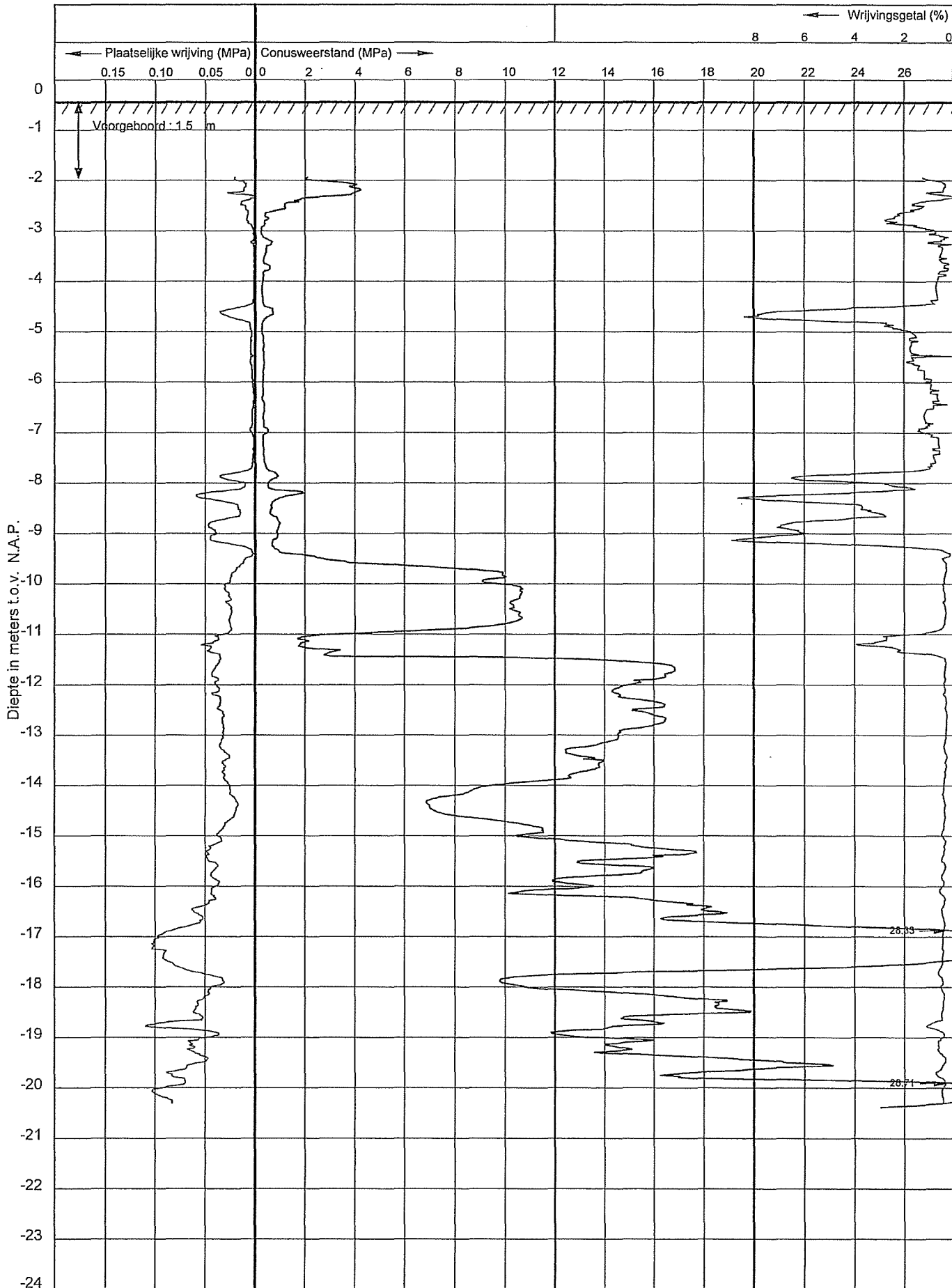


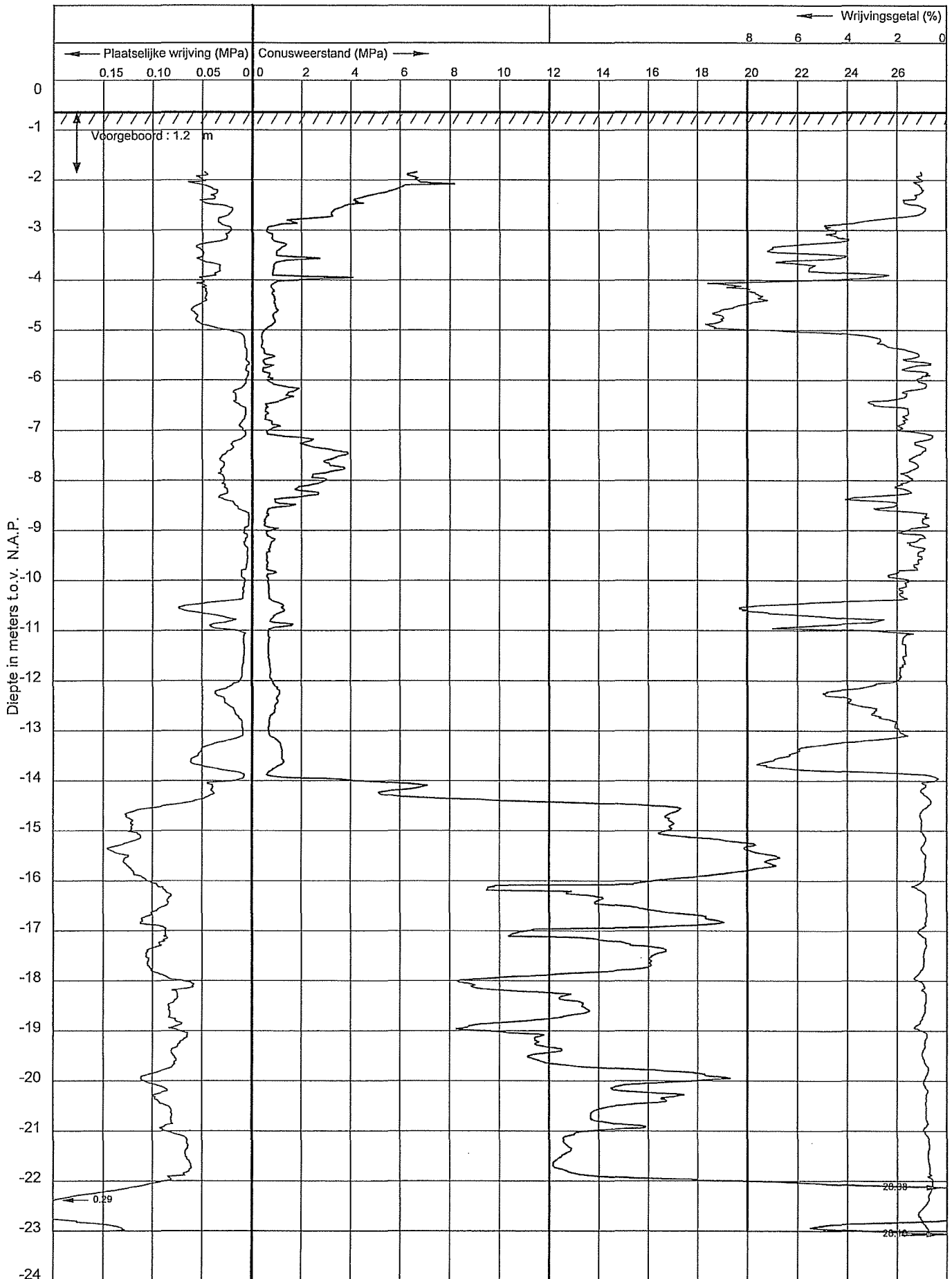
BIJLAGE 2
Sondeergrafieken









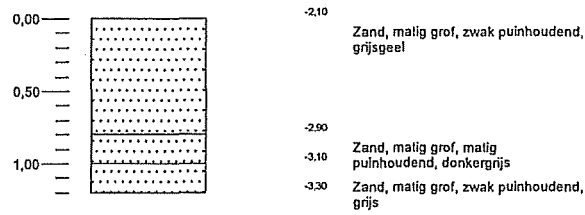


BIJLAGE 3

Boorstaten

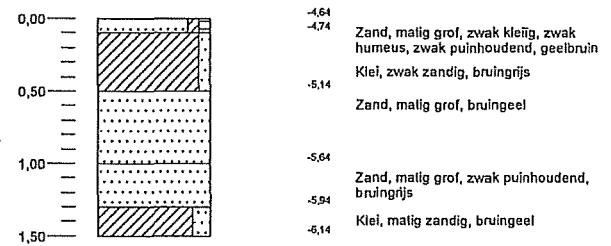
Voorboring 1

Maaiveldhoogte in meters t.o.v. NAP: -2,1
GWS: cm -mv



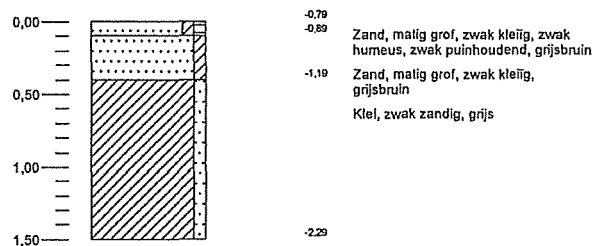
Voorboring 2

Maaiveldhoogte in meters t.o.v. NAP: -4,64
GWS: cm -mv



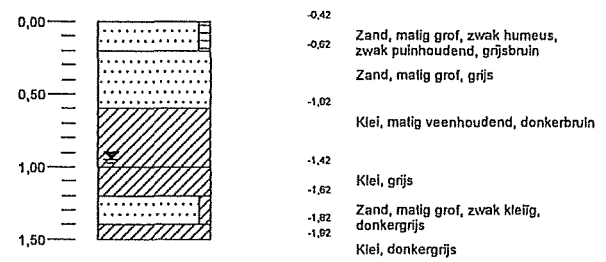
Voorboring 3

Maaiveldhoogte in meters t.o.v. NAP: -0,79
GWS: cm -mv



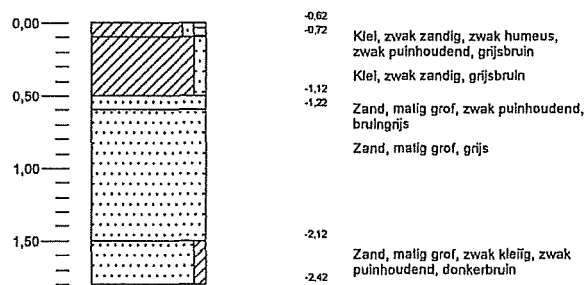
Voorboring 4

Maaiveldhoogte in meters t.o.v. NAP: -0,42
GWS: 95 cm -mv



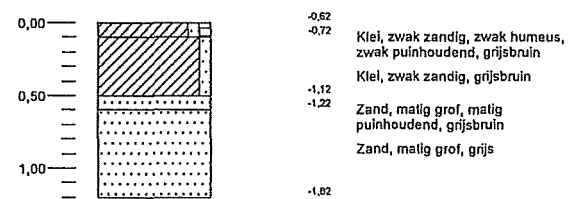
Voorboring 5

Maaiveldhoogte in meters t.o.v. NAP: -0,62
GWS: cm -mv



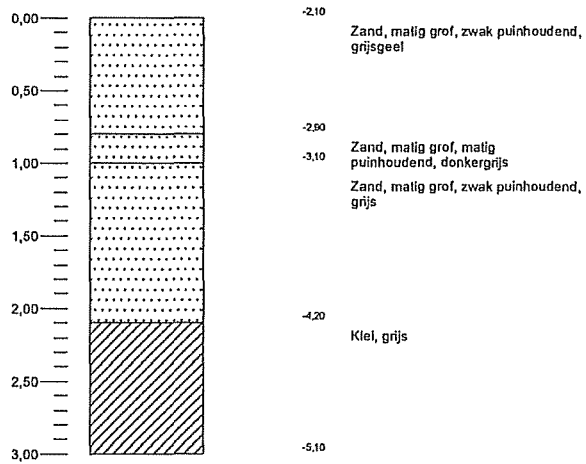
Voorboring 6

Maaiveldhoogte in meters t.o.v. NAP: -0,62
GWS: cm -mv



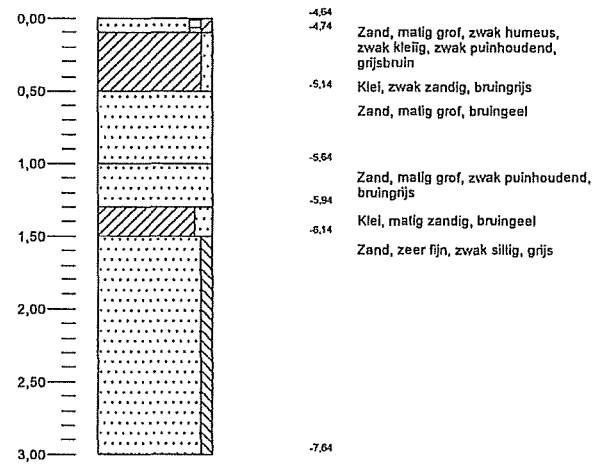
Boring 1

Maaiveldhoogte in meters t.o.v. NAP: -2,1
GWS: cm -mv



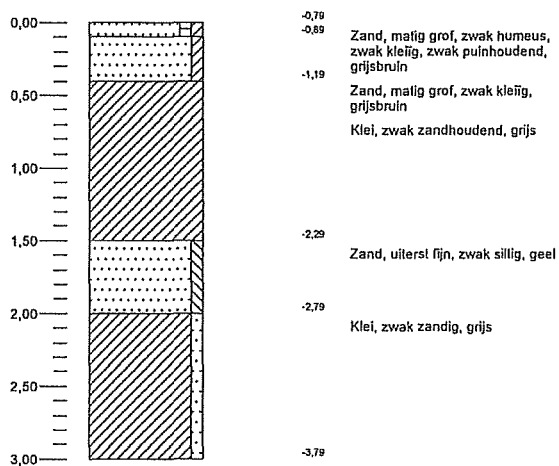
Boring 2

Maaiveldhoogte in meters t.o.v. NAP: -4,64
GWS: cm -mv



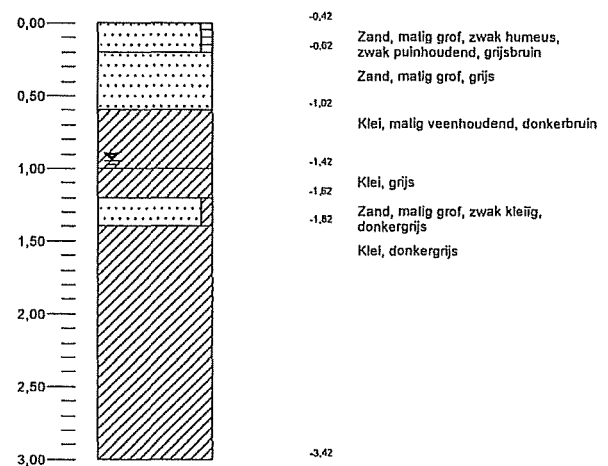
Boring 3

Maaiveldhoogte in meters t.o.v. NAP: -0,79
GWS: cm -mv



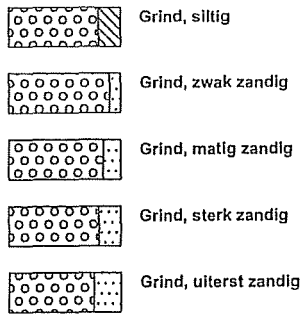
Boring 4

Maaiveldhoogte in meters t.o.v. NAP: -0,42
GWS: 95 cm -mv

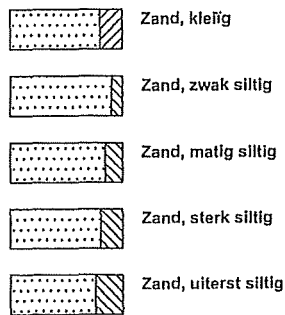


Legenda (conform NEN 5104)

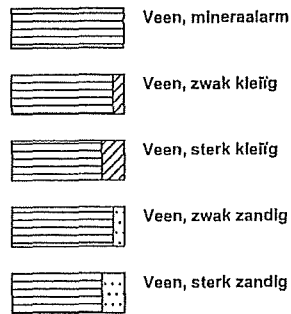
grind



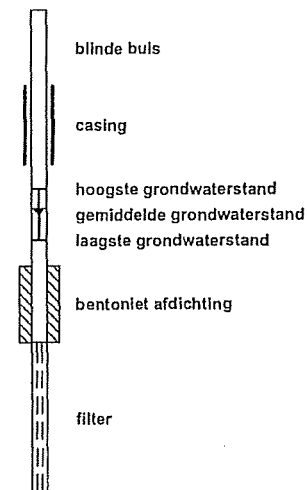
zand



veen



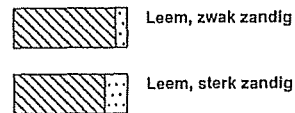
peilbuis



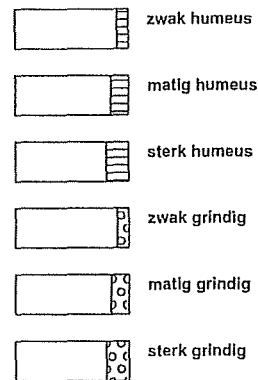
klei



leem



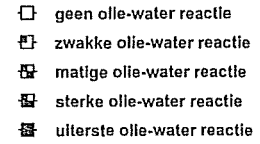
overige toevoegingen



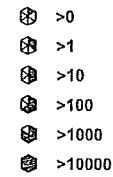
geur



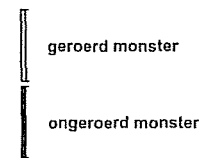
olie



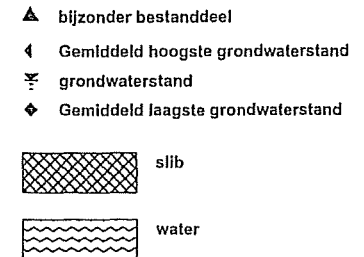
p.i.d.-waarde



monsters



overig



Bijlage 2:

- Geotechnische berekening funderingselement op staal onder poten steiger noordzijde;
- FEM berekening van prefab betonfunderingselement;

Fundering op staal Fundering onder steiger Noordzijde A12

grondopbouw (uit analyse op basis van conuswaarden) regio: standaard instellingen

nr	naam	bijmengsel	cons.	van	tot	γ_{dr}	γ_{sat}	c'	f_{undr}	ϕ'	$\delta'_{\sigma_{v,k}}$	$\sigma'_{v,k}$	OCR
1	zand	schoon	matig	-2,10	-2,80	18,0	20,0	0,0	0,0	32,5	7,0	7,0	1
2	zand	sterk siltig/kleiig	--	-2,80	-3,45	18,0	20,0	0,0	0,0	25,0	6,5	13,5	1
3	zand	zwak siltig/kleiig	--	-3,45	-3,50	18,0	20,0	0,0	0,0	27,0	0,5	14,0	1
4	zand	sterk siltig/kleiig	--	-3,50	-4,25	18,0	20,0	0,0	0,0	25,0	7,5	21,5	1
5	leem	zwak zandig	vast	-4,25	-4,40	21,0	21,0	5,0200,0		27,5	1,7	23,2	1
6	klei	zwak zandig	vast	-4,40	-4,45	20,0	20,0	25,0120,0		22,5	0,5	23,7	1
7	klei	schoon	vast	-4,45	-4,50	19,0	19,0	25,0100,0		17,5	0,5	24,1	1
8	leem	zwak zandig	vast	-4,50	-4,70	21,0	21,0	5,0200,0		27,5	2,2	26,3	1
9	klei	schoon	vast	-4,70	-5,05	19,0	19,0	25,0100,0		17,5	3,2	29,5	1
10	klei	schoon	matig	-5,05	-5,15	17,0	17,0	10,0 50,0		17,5	0,7	30,2	1
11	klei	schoon	vast	-5,15	-5,25	19,0	19,0	25,0100,0		17,5	0,9	31,1	1
12	klei	schoon	matig	-5,25	-5,60	17,0	17,0	10,0 50,0		17,5	2,4	33,5	1
13	klei	schoon	vast	-5,60	-5,65	19,0	19,0	25,0100,0		17,5	0,5	34,0	1
14	klei	schoon	matig	-5,65	-7,45	17,0	17,0	10,0 50,0		17,5	12,6	46,6	1
15	klei	schoon	vast	-7,45	-7,55	19,0	19,0	25,0100,0		17,5	0,9	47,5	1
16	klei	schoon	matig	-7,55	-8,10	17,0	17,0	10,0 50,0		17,5	3,9	51,3	1
17	klei	schoon	vast	-8,10	-8,20	19,0	19,0	25,0100,0		17,5	0,9	52,2	1
18	klei	schoon	matig	-8,20	-9,15	17,0	17,0	10,0 50,0		17,5	6,6	58,9	1
19	klei	schoon	vast	-9,15	-9,25	19,0	19,0	25,0100,0		17,5	0,9	59,8	1
20	klei	zwak zandig	vast	-9,25	-9,30	20,0	20,0	25,0120,0		22,5	0,5	60,3	1
21	klei	schoon	matig	-9,30	-11,05	17,0	17,0	10,0 50,0		17,5	12,3	72,5	1
22	klei	schoon	vast	-11,05	-11,30	19,0	19,0	25,0100,0		17,5	2,2	74,8	1
23	klei	schoon	matig	-11,30	-13,95	17,0	17,0	10,0 50,0		17,5	18,6	93,3	1
24	klei	organisch	matig	-13,95	-14,05	15,0	15,0	0,0 25,0		15,0	0,5	93,8	1
25	klei	schoon	vast	-14,05	-14,10	19,0	19,0	25,0100,0		17,5	0,4	94,2	1
26	zand	sterk siltig/kleiig	--	-14,10	-14,70	18,0	20,0	0,0 0,0		25,0	6,0	100,3	1
27	zand	zwak siltig/kleiig	--	-14,70	-15,60	18,0	20,0	0,0 0,0		27,0	9,0	109,3	1
28	zand	sterk siltig/kleiig	--	-15,60	-15,70	18,0	20,0	0,0 0,0		25,0	1,0	110,3	1
29	zand	zwak siltig/kleiig	--	-15,70	-15,75	18,0	20,0	0,0 0,0		27,0	0,5	110,8	1
30	zand	sterk siltig/kleiig	--	-15,75	-18,00	18,0	20,0	0,0 0,0		25,0	22,5	133,3	1
31	zand	zwak siltig/kleiig	--	-18,00	-18,15	18,0	20,0	0,0 0,0		27,0	1,5	134,8	1
32	zand	sterk siltig/kleiig	--	-18,15	-19,40	18,0	20,0	0,0 0,0		25,0	12,5	147,3	1
33	zand	zwak siltig/kleiig	--	-19,40	-19,60	18,0	20,0	0,0 0,0		27,0	2,0	149,3	1
34	zand	sterk siltig/kleiig	--	-19,60	-21,25	18,0	20,0	0,0 0,0		25,0	16,5	165,8	1
35	zand	zwak siltig/kleiig	--	-21,25	-21,30	18,0	20,0	0,0 0,0		27,0	0,5	166,3	1
36	zand	sterk siltig/kleiig	--	-21,30	-21,35	18,0	20,0	0,0 0,0		25,0	0,5	166,8	1
37	zand	zwak siltig/kleiig	--	-21,35	-21,40	18,0	20,0	0,0 0,0		27,0	0,5	167,3	1
38	zand	sterk siltig/kleiig	--	-21,40	-21,50	18,0	20,0	0,0 0,0		25,0	1,0	168,3	1
39	zand	zwak siltig/kleiig	--	-21,50	-21,60	18,0	20,0	0,0 0,0		27,0	1,0	169,3	1
40	zand	sterk siltig/kleiig	--	-21,60	-21,70	18,0	20,0	0,0 0,0		25,0	1,0	170,3	1
41	zand	zwak siltig/kleiig	--	-21,70	-21,80	18,0	20,0	0,0 0,0		27,0	1,0	171,3	1
42	zand	sterk siltig/kleiig	--	-21,80	-22,15	18,0	20,0	0,0 0,0		25,0	3,5	174,8	1
43	zand	sterk siltig/kleiig	--	-22,15	-23,15	18,0	20,0	0,0 0,0		25,0	10,0	184,8	1

algemene gegevens

sondering
maten ten opzichte van

30389_1-aangepast.SNX
N.A.P.

maaiveld	-2,10 m	N.A.P.
grondwaterstand	0,00 m	N.A.P.
geotechnische categorie	GC2	

afmetingen funderingselement

strookbreedte	1,50 m	
strooklengte	1,50 m	
aanlegdiepte	-2,01 m	N.A.P.
maximale gronddekking	-0,09 m	

belastingen

uiterste grenstoestanden 1A, 1B	$F_{s,v;d}$	86,58	kN
	$F_{s,h;d}$	2,66	kN
	$p_{sur;d}$	0,00	kN/m ²
bruikbaarheidsgrenstoestand 2	$F_{s,v;d}$	75,69	kN
	$F_{s,h;d}$	2,42	kN
	$p_{sur;d}$	0,00	kN/m ²
aangrijpingspunt hor.kracht		0,00	m maaiveld
excentriciteit (5.2.1)	eB	0,00	m
	eL	0,00	m

toetsing grenstoestanden 1A, 1B en 2

ongedraineerde situatie	NEN-EN1997 NEN6744 art. 5.2.2
gedraineerde situatie	NEN-EN1997 NEN6744 art. 5.2.3
zakking bovenzijde funderingselement	NEN-EN1997 NEN6744 art. 6

grenstoestand 1A: max draagvermogen NEN-EN1997|NEN6744 art. 5.2.6

ongedraineerde situatie vlgs 5.2.2.1 geval c
doorponzen bij gelaagde grond; 8° spreiding

z	sct	B'_z	L'_z	$\sigma'_{v;z;0;d}$	$f_{und;r;d}$	s_c	i_c	$\sigma'_{max;d}$	$F_{r,v;d}$	$F_{v;d}$	opm
-4,45	7	2,10	2,19	23,65	74,07	1,19	1,00	476,63	2182,73	137,77	-
-4,70	9	2,16	2,26	26,30	74,07	1,19	1,00	479,24	2335,31	143,73	-
-5,05	10	2,25	2,35	29,45	37,04	1,19	1,00	255,51	1353,85	150,82	-
-5,15	11	2,28	2,38	30,15	74,07	1,19	1,00	483,02	2619,48	152,39	-
-5,25	12	2,30	2,41	31,05	37,04	1,19	1,00	257,11	1426,96	154,42	-
-5,60	13	2,39	2,51	33,50	74,07	1,19	1,00	486,32	2919,54	159,93	-
-5,65	14	2,41	2,52	33,95	37,04	1,19	1,00	260,02	1578,37	160,94	-
-7,45	15	2,88	3,03	46,55	74,07	1,19	1,00	499,33	4354,13	189,29	-
-7,55	16	2,91	3,06	47,45	37,04	1,19	1,00	273,62	2430,58	191,32	-
-8,10	17	3,05	3,21	51,30	74,07	1,19	1,00	504,13	4941,95	199,98	-
-8,20	18	3,08	3,24	52,20	37,04	1,19	1,00	278,42	2777,62	202,01	-
-9,15	19	3,33	3,51	58,85	74,07	1,19	1,00	511,78	5983,85	216,97	-
-9,30	21	3,38	3,55	60,25	37,04	1,19	1,00	286,56	3432,51	220,12	-
-11,05	22	3,85	4,04	72,50	74,07	1,19	1,00	525,64	8175,19	247,68	-
-11,30	23	3,92	4,11	74,75	37,04	1,19	1,00	301,22	4851,49	252,74	-
-13,95	24	4,64	4,86	93,30	18,52	1,19	1,00	206,54	4655,82	294,48	-
-14,05	25	4,67	4,88	93,80	74,07	1,19	1,00	547,30	12481,26	295,61	-
-	-	m	m	kN/m ²	kN/m ²	-	-	kN/m ²	kN	kN	

in alle lagen wordt voldaan aan de ponstoetsing

grenstoestand 1A: max schuifweerstand NEN-EN1997|NEN6744 art. 5.3.1

ongedraineerde situatie

controle voor ieder grensvlak

eenzijdige ontgraving tot aanlegniveau mogelijk (met betrekking tot afschuiving).

$$F_{r,p;ea,h;d} = 0 \quad F_{s;a;ea,h;d} = 0$$

z	$F_{s;v;d}$	$F_{s;v;d;a}$	$F_{s;v;d;z}$	$F_{s;h;d;z}$	xB	B'_z	L'_z	$f_{undr;d}$	$S_{r;h;d}$	$F_{h;d}$
-4,25	86,58	64,94	106,65	2,66	0,05	2,02	2,13	148,15	638,06	2,66
-4,40	86,58	64,94	109,99	2,66	0,06	2,06	2,17	88,89	397,78	2,66
-4,45	86,58	64,94	111,00	2,66	0,06	2,07	2,19	74,07	335,68	2,66
-4,50	86,58	64,94	111,92	2,66	0,06	2,09	2,20	148,15	679,79	2,66
-4,70	86,58	64,94	116,37	2,66	0,06	2,14	2,26	74,07	357,18	2,66
-5,05	86,58	64,94	122,75	2,66	0,06	2,23	2,35	37,04	194,17	2,66
-5,15	86,58	64,94	124,17	2,66	0,07	2,25	2,38	74,07	397,44	2,66
-5,25	86,58	64,94	125,99	2,66	0,07	2,28	2,41	37,04	203,36	2,66
-5,60	86,58	64,94	130,95	2,66	0,07	2,37	2,51	74,07	439,91	2,66
-5,65	86,58	64,94	131,86	2,66	0,07	2,38	2,52	37,04	222,40	2,66
-7,45	86,58	64,94	157,38	2,66	0,09	2,85	3,03	74,07	639,08	2,66
-7,55	86,58	64,94	159,20	2,66	0,09	2,88	3,06	37,04	325,54	2,66
-8,10	86,58	64,94	167,00	2,66	0,10	3,02	3,21	74,07	718,64	2,66
-8,20	86,58	64,94	168,82	2,66	0,10	3,05	3,24	37,04	365,71	2,66
-9,15	86,58	64,94	182,28	2,66	0,10	3,30	3,51	74,07	857,55	2,66
-9,25	86,58	64,94	184,11	2,66	0,10	3,33	3,54	88,89	1045,88	2,66
-9,30	86,58	64,94	185,12	2,66	0,10	3,34	3,55	37,04	439,32	2,66
-11,05	86,58	64,94	209,93	2,66	0,11	3,81	4,04	74,07	1141,70	2,66
-11,30	86,58	64,94	214,48	2,66	0,11	3,88	4,11	37,04	591,27	2,66
-13,95	86,58	64,94	252,05	2,66	0,13	4,61	4,86	18,52	414,21	2,66
-14,05	86,58	64,94	253,06	2,66	0,13	4,63	4,88	74,07	1676,20	2,66

aan afschuivingseis in ongedraineerde situatie voldaan

grenstoestand 1A: max draagvermogen NEN-EN1997|NEN6744 art. 5.2.3

gedraineerde situatie art. 5.2.3.1 geval c

invloedsgebied loopt van	-2,01	tot -4,01 m
gewogen parameters (5.2.4.3) (1A)	$\phi_{e,d}$	25,55 °
(1A)	$c_{e,d}$	0,00 kN/m ²
(1A)	$\gamma_{e,d}$	8,18 kN/m ³

$\sigma'_{v,z;0;d}$	(z= -2,01 m)	0,90 kN/m ²
xB	$2,66 \cdot (0,00 + -0,09) / 86,58$	0,00 m
B'_z	$1,50 - 2 \cdot 0,00 + 0,00 $	1,49 m
L'_z	$1,50 - 2 \cdot 0,00 + 0,00 $	1,50 m
N_q		11,30 -
N_c		21,54 -
N_γ		9,84 -
i_q	$(1 - 0,70 \cdot 2,66 / (86,58 + 0,00))^3$	0,94 -
i_c	$(0,94 \cdot 11,30 - 1) / (11,30 - 1)$	0,93 -
i_γ	$(1 - 1,0 \cdot 2,66 / (86,58 + 0,00))^3$	0,91 -
s_q	$(1 + 1,49 / 1,50 \cdot 0,43)$	1,43 -
s_c	$(1,43 \cdot 11,30 - 1) / (11,30 - 1)$	1,47 -

$$s\gamma = 1 - 0,30 * 1,49 / 1,50 = 0,70$$

$$\sigma'_{\max;d} = 0,00 + 13,62 + 38,42 = 52,04 \text{ kN/m}^2$$

$$F_{r,v;d} = 1,50 * 1,49 * 52,04 = 116,66 \text{ kN}$$

$$F_{s,v;d} \leq F_{r,v;d} \text{ want } 86,58 \leq 116,66 \text{ kN}$$

aan de eis in gedraineerde toestand is voldaan

grenstoestand 1A: max draagvermogen NEN-EN1997|NEN6744 art. 5.2.6

gedraineerde situatie art. 5.2.3.1 geval c
 doorpensen bij gelaagde grond; 8° spreiding

z	sct	B' _z	L' _z	σ' _{v;z;o;d}	φ' _{e;d}	c' _{e;d}	γ' _{e;d}	σ' _{\max;d}	F _{r,v;d}	F _{v;d}	opm
-4,45	7	2,10	2,19	23,65	25,34	0,00	8,18	408,56	1871,03	137,77	-
-4,70	9	2,16	2,26	26,30	25,34	0,00	8,18	450,94	2197,42	143,73	-
-5,05	10	2,25	2,35	29,45	25,23	0,00	8,18	494,29	2619,03	150,82	-
-5,15	11	2,28	2,38	30,15	25,20	0,00	8,18	503,65	2731,34	152,39	-
-5,25	12	2,30	2,41	31,05	25,17	0,01	8,18	516,12	2864,40	154,42	-
-5,60	13	2,39	2,51	33,50	25,07	0,02	8,19	549,33	3297,85	159,93	-
-5,65	14	2,41	2,52	33,95	25,06	0,03	8,19	555,58	3372,43	160,94	-
-7,45	15	2,88	3,03	46,55	24,57	0,43	8,21	723,41	6308,11	189,29	-
-7,55	16	2,91	3,06	47,45	24,54	0,47	8,21	735,05	6529,54	191,32	-
-8,10	17	3,05	3,21	51,30	24,36	0,69	8,20	782,32	7669,01	199,98	-
-8,20	18	3,08	3,24	52,20	24,32	0,73	8,20	793,33	7914,58	202,01	-
-9,15	19	3,33	3,51	58,85	24,00	1,10	8,17	867,45	1,0E+04	216,97	-
-9,30	21	3,38	3,55	60,25	23,95	1,15	8,17	883,74	1,1E+04	220,12	-
-11,05	22	3,85	4,04	72,50	23,12	1,94	8,03	978,77	1,5E+04	247,68	-
-11,30	23	3,92	4,11	74,75	22,98	2,06	8,00	994,16	1,6E+04	252,74	-
-13,95	24	4,64	4,86	93,30	21,48	3,16	7,61	1057,91	2,4E+04	294,48	-
-14,05	25	4,67	4,88	93,80	21,42	3,21	7,59	1056,63	2,4E+04	295,61	-
-	-	m	m	kN/m ²	kN/m ²	-	-	kN/m ²	kN	kN	

in alle lagen wordt voldaan aan de ponstoetsing

grenstoestand 1A: max schuifweerstand NEN-EN1997|NEN6744 art. 5.3.2

gedraineerde situatie
 controle op diepte funderingselement
 eenzijdige ontgraving tot aanlegniveau mogelijk (met betrekking tot afschuiving).
 $F_{r,p;ea,h;d} = 0$ $F_{s;a;ea,h;d} = 0$

z	F _{s,v;d}	F _{s,v;d;a}	F _{s,v;d;z}	F _{s,h;d;z}	B' _z	L' _z	φ' _d	δ _{s;d}	S _{r,h;d}	F _{h;d}
-2,01	86,58	64,94	64,94	2,66	1,49	1,50	28,26	18,84	22,16	2,66
m	kN	kN	kN	kN	m	m	°	°	kN	kN

aan afschuivingseis in gedraineerde situatie voldaan

grenstoestand 2: zakking vlg's grenstoestand 2: zakking vlg's NEN-EN1997|NEN6744 art. 6

tgv momentane belastingcombinatie
 (NEN-EN1990:2007 art. 6.5.3c)
 spanningstoename vlg's NEN-EN1997|NEN6744 art 6.4

lg	sct	H _{lg}	z _{mid}	e	σ' _{v, mid; z; o; d}	Δσ' _{v, mid; z; d}	w _{1;d}	w _{2;d}	Σw _{1;d}	Σw _{2;d}	Σw _d
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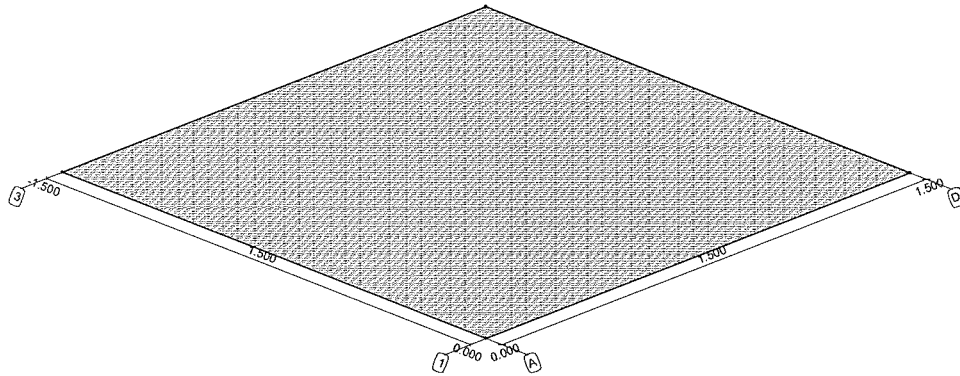
aanleg			-2,01				33,76					
1	1	0,79	-2,41	0,65	3,05	31,10	0,0030	0,0000	0,0030	0,0000	0,0030	
2	2	0,65	-3,13	0,65	10,25	16,52	0,0031	0,0000	0,0061	0,0000	0,0061	
3	3	0,05	-3,48	0,65	13,75	11,72	0,0001	0,0000	0,0062	0,0000	0,0062	
4	4	0,75	-3,88	0,65	17,75	8,19	0,0014	0,0000	0,0076	0,0000	0,0076	
5	5	0,15	-4,33	0,50	22,33	5,75	0,0005	0,0006	0,0081	0,0006	0,0087	
6	6	0,05	-4,43	0,65	23,40	5,35	0,0003	0,0006	0,0085	0,0012	0,0097	
7	7	0,05	-4,48	0,83	23,88	5,16	0,0004	0,0008	0,0088	0,0020	0,0108	
8	8	0,20	-4,60		25,20	4,73	< 20%					

- - m m - kN/m² kN/m² m m m m m

zetting na 10000 dagen 0,0088 0,0020 0,0108

aan zettingseis uit NEN-EN1997|NEN6740 art. 5.3 is voldaan

Projectnaam	Funderingsplaat steiger	Projectnummer	-
Omschrijving	Funderingsplaat onder poten noordzijde	Constructeur	FvdB
Opdrachtgever	Spie	Eenheden	Eenheden
Bestand	N:\Projecten I.U\SPIE\Hoogspanning\Bleiswijk\Berekening\Funderingsplaat poten noordzijde.mxf		



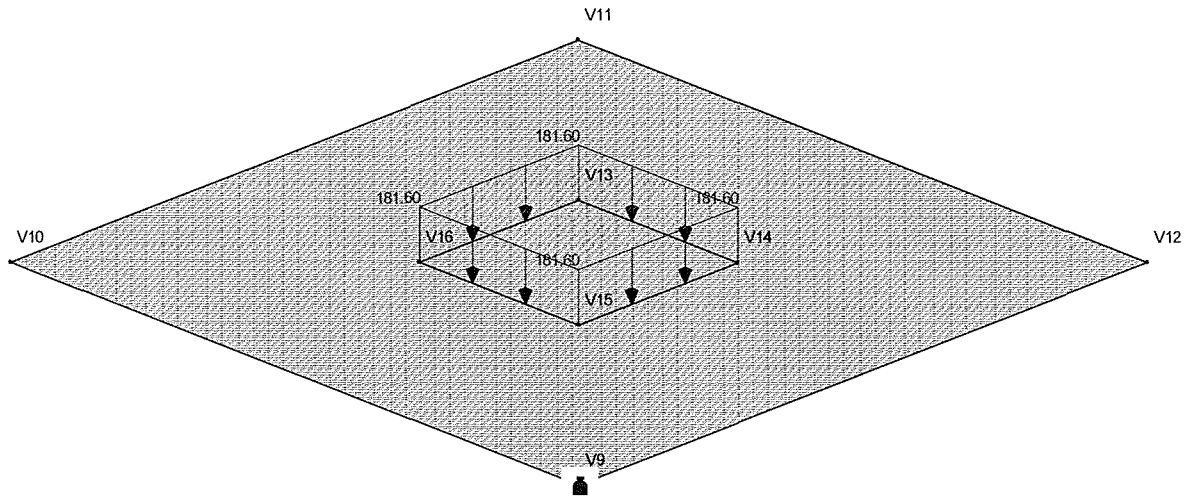
Afb. Geometrie

Geometrie

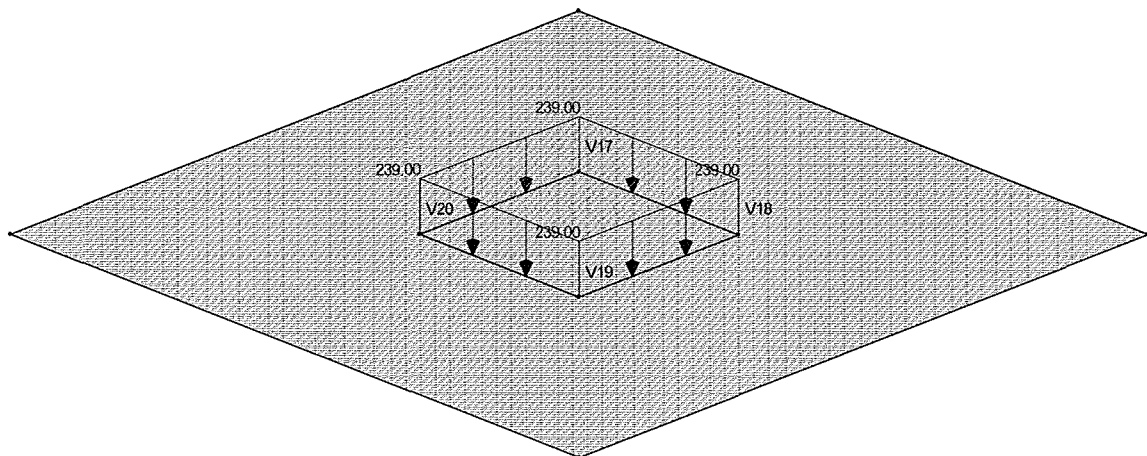
Gebied/Polylijn	Sparing	Materiaal	Dikte	Elasticiteit	Poisson	Dichtheid	Uitzetting
R1	Nee	C20/25	0.140	2.8500e+07	0.20	24.00	10.0000e-06
-	-	-	m	kN/m ²	-	kN/m ³	°m

Constructieve punten

Gebieden	Punt	X	Y	Z	Ref.
R1	V1	0.000	0.000	0.000	A,1
R1	V2	0.000	-1.500	0.000	A,3
R1	V3	1.500	-1.500	0.000	D,3
R1	V4	1.500	0.000	0.000	D,1
-	-	m	m	m	-



Afb. Lasten B.G.1 Permanent



Afb. Lasten B.G.2 Wind

Belastingsgevallen

Gebied/Polylijn	Type	Type	Richting
B.G.1: Permanent			
R3	Gebied	qG	Z
R4	Gebied	q	Z
B.G.2: Wind			
R5	Gebied	q	Z
-	-	-	-

Lasten vertices

Gebieden	Punt	X	Y	Z	Lastwaarde
R3	V9	0.000	0.000	0.000	1,00
R3	V10	0.000	-1.500	0.000	1,00
R3	V11	1.500	-1.500	0.000	1,00
R3	V12	1.500	0.000	0.000	1,00
R4	V13	0.960	-0.960	0.000	181,60
R4	V14	0.960	-0.540	0.000	181,60

--	--	--

R4	V15	0.540	-0.540	0.000	181,60
R4	V16	0.540	-0.960	0.000	181,60
R5	V17	0.960	-0.960	0.000	239,00
R5	V18	0.960	-0.540	0.000	239,00
R5	V19	0.540	-0.540	0.000	239,00
R5	V20	0.540	-0.960	0.000	239,00
-	-	m	m	m	-

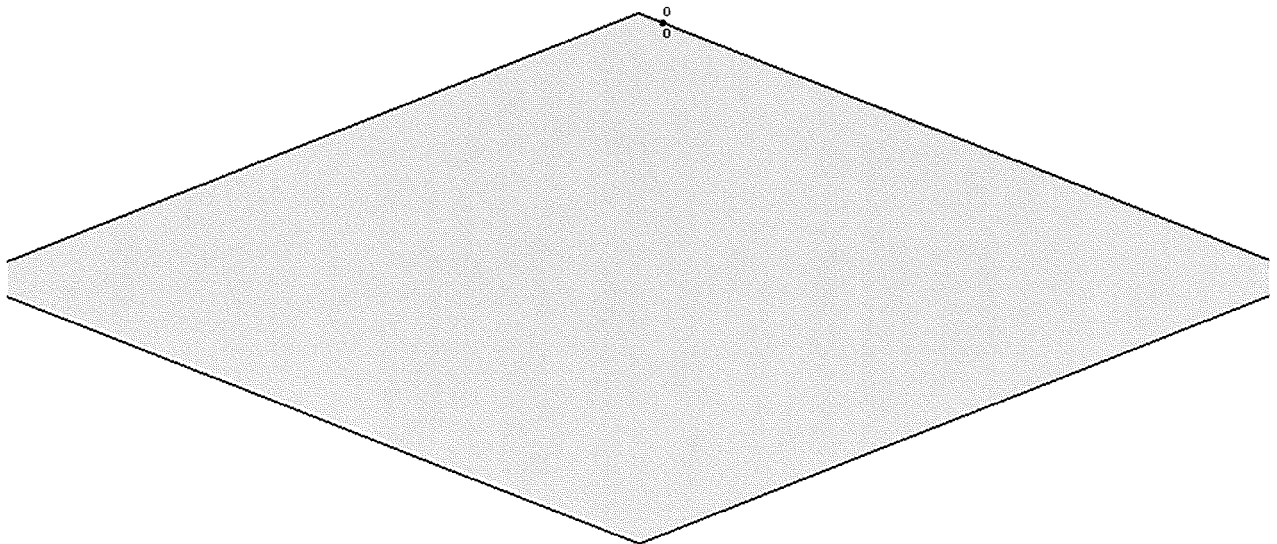
Fundamenteel Belastingscombinaties

B.G.	Omschrijving	Fu.C.1	Fu.C.2
B.G.1	Permanent	1.20	1.35
B.G.2	Wind	1.07	-

Incidenteel Belastingscombinaties

B.G.	Omschrijving	In.C.on	In.C.1
B.G.1	Permanent	1.00	1.00
B.G.2	Wind	-	0.82

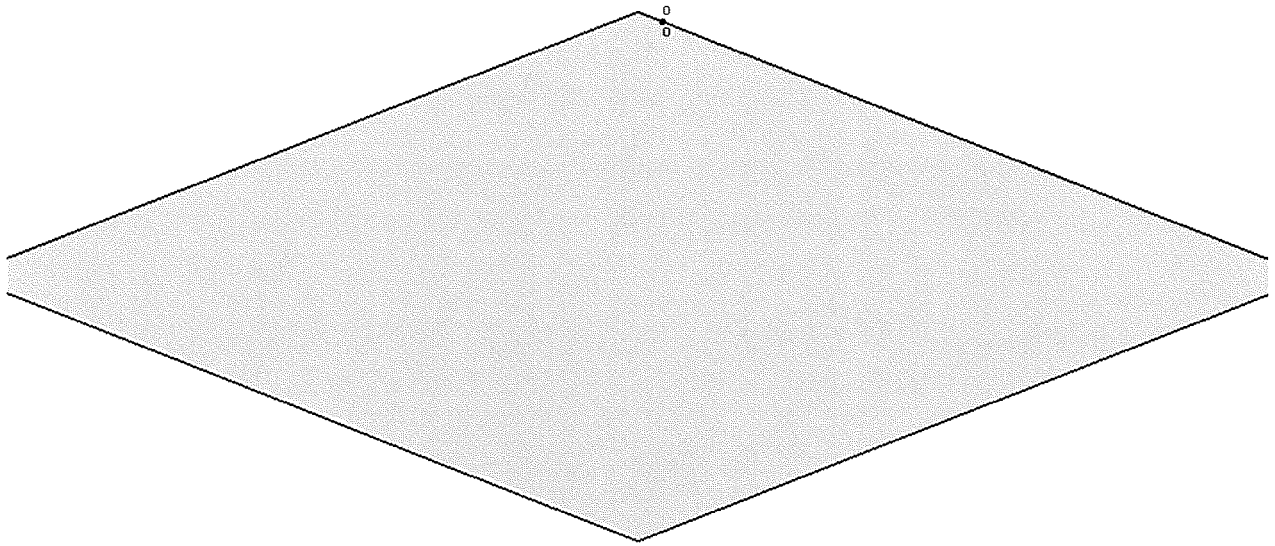
L. E. berekeningsresultaten



Afb. FEM Oplegreacties Fu.C.1



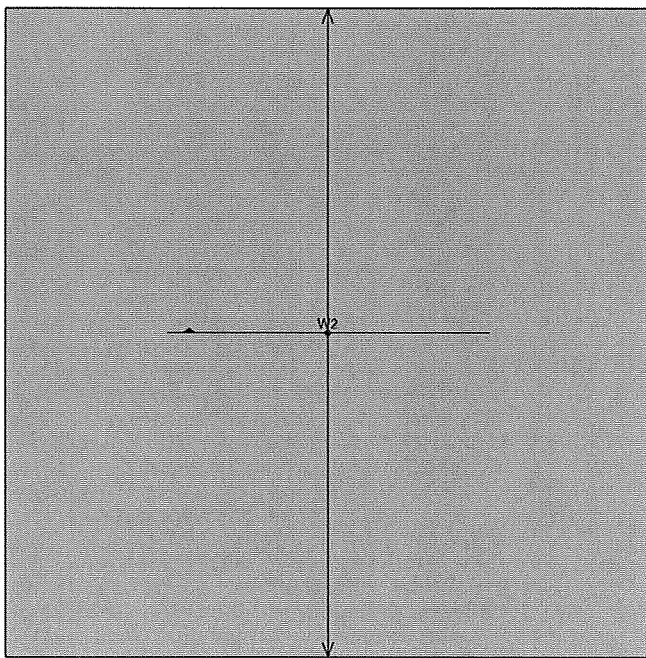
L. E. berekeningsresultaten



Afb. FEM Oplegreacties Fu.C.2



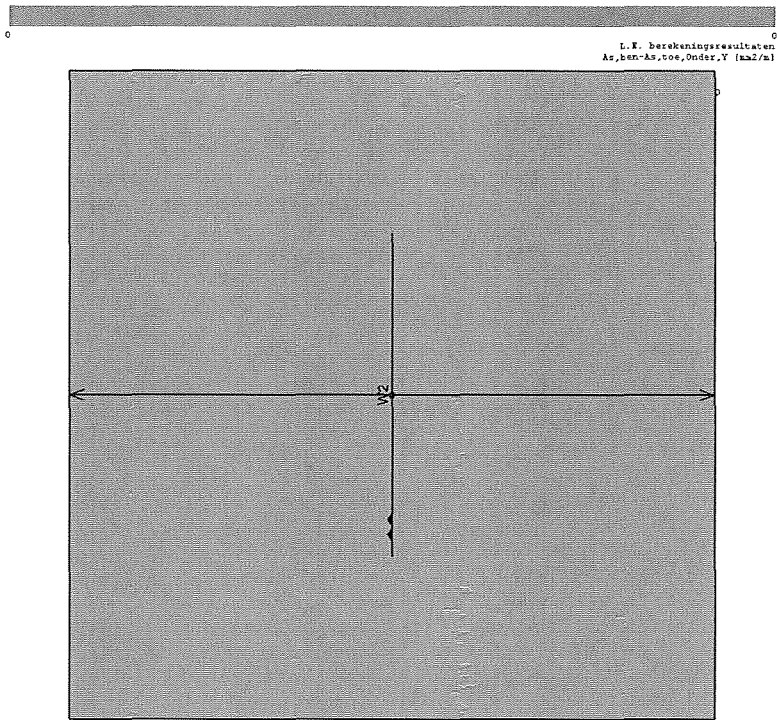
L. E. berekeningsresultaten
As,ben-As,toe,Onder,X [aa2/a1]



Afb. FEM As;ben onder X Fu.C. Omhullende

Wapening

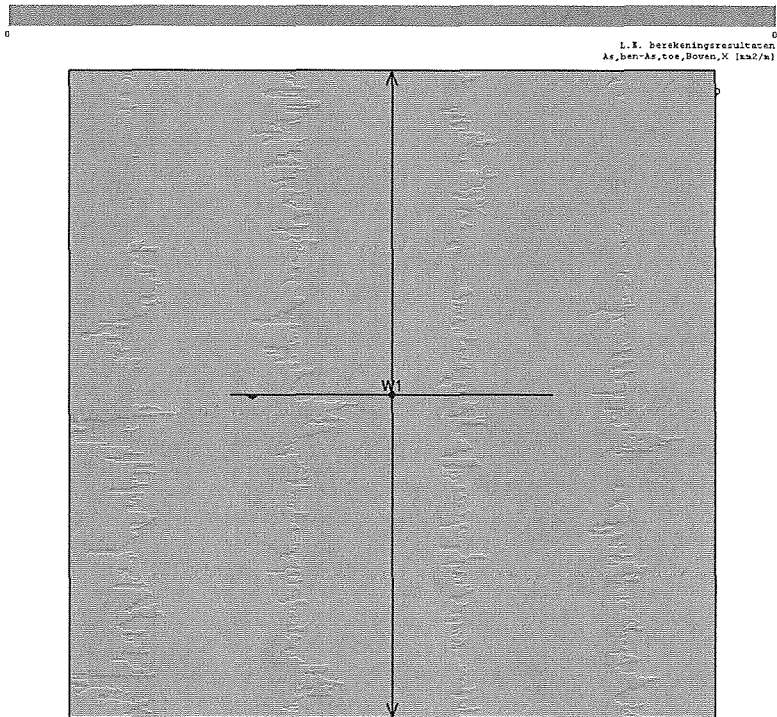
Oplegg.	Staven	Net	Staal	h-d	Omschr.	As;toe
W2	B8-150	Ja	FeB500HK	29	R8.0-150	335
-	-	-	-	mm	-	mm2/m



Afb. FEM As;ben onder Y Fu.C. Omhullende

Wapening

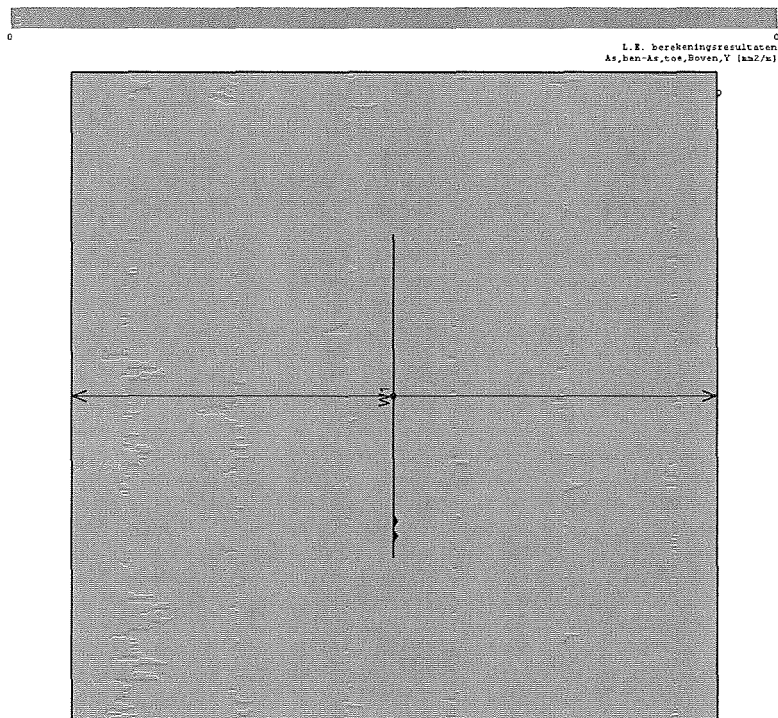
Oplegg. Staven	Net	Staal	h-d	Omschr.	As;toe	
W2	B8-150	Ja	FeB500HK	37	R8.0-150	335
-	-	-	-	mm	-	mm2/m



Afb. FEM As;ben boven X Fu.C. Omhullende

Wapening

Oplegg. Staven	Net	Staal	h-d	Omschr.	As;toe	
W1	B8-150	Ja	FeB500HK	29	R8.0-150	335
-	-	-	mm	-	-	mm2/m



Afb. FEM As;ben boven Y Fu.C. Omhullende

Wapening

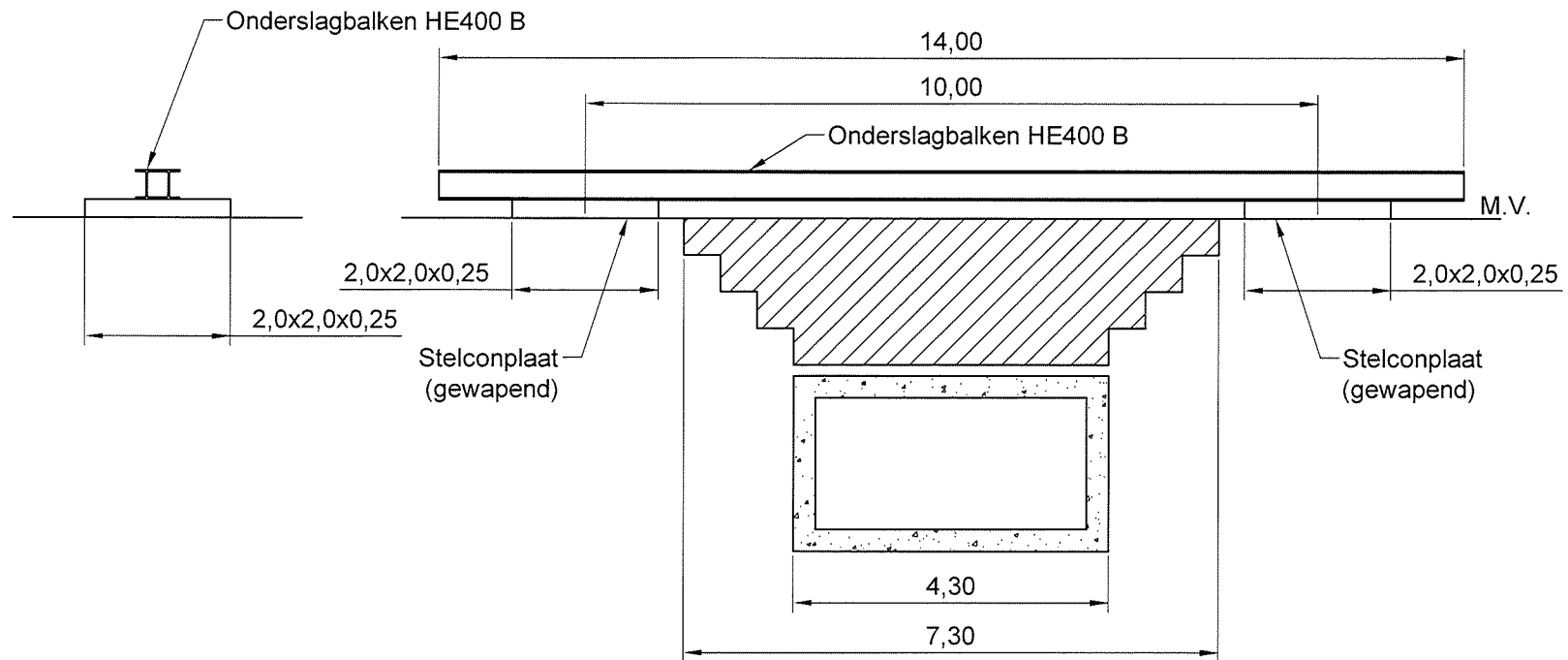
Oplegg. Staven	Net	Staal	h-d	Omschr.	As;toe	
W1	B8-150	Ja	FeB500HK	37	R8.0-150	335
-	-	-	mm	-	-	mm2/m

Doorsnedeberkening (uitgebreid)

Gebied/Polyl ijn	Profiel	Materiaal	Dikte	Mr	Positie	Ontwerp moment	h-d	As,ben	As,toe	Wapening
1	P1	C20/25	0,14	10,31	Onderkant X	0,23	29	0	335	W2
					Onderkant Y	0,51	37	0	335	W2
					Bovenkant X	-0,13	29	0	335	W1
					Bovenkant Y	0,00	37	0	335	W1
				kNm/m		kNm/m	mm	mm2/m	mm2/m	

Bijlage 3:

- Schets overbrugging duiker noordzijde d.m.v. stalen balk en funderingselementen;
- Berekening stalen ligger HE400b;
- Geotechnische berekening funderingselement op staal onder ligger steiger noordzijde;
- FEM berekening van prefab betonfunderingselement;



Situatieschets overbrugging duiker t.b.v. steigerconstructie
Noordzijde

Projectnaam	Steigerconstructie Noordzijde	Projectnummer	-
Omschrijving	Onderslagbalk	Constructeur	FvdB
Opdrachtgever	Spie Infra	Eenheden	Eenheden
Bestand	N:\Projecten I.U\SPIE\Hoogspanning\Bleiswijk\Berekening\Onderslagbalk noordzijde.mxf		

Constructiegegevens

Projecttype	Knopen	Staven	Opleggingen	Profielen	Bel.gev.	Bel.comb.
3D-Raamwerk	9	8	2	1	2	10

Staven

Staf	Knoop B	Scharnier B E	Knoop E	Profiel	X-B	Y-B	Z-B	X-E	Y-E	Z-E	Lengte	
S1	K1	XYZXrYrZr	XYZXrYrZr	K2	P1	0,000	0,000	0,000	2,000	0,000	0,000	2,000
S2	K2	XYZXrYrZr	XYZXrYrZr	K3	P1	2,000	0,000	0,000	3,000	0,000	0,000	1,000
S3	K3	XYZXrYrZr	XYZXrYrZr	K4	P1	3,000	0,000	0,000	4,500	0,000	0,000	1,500
S4	K4	XYZXrYrZr	XYZXrYrZr	K5	P1	4,500	0,000	0,000	7,000	0,000	0,000	2,500
S5	K5	XYZXrYrZr	XYZXrYrZr	K6	P1	7,000	0,000	0,000	9,500	0,000	0,000	2,500
S6	K6	XYZXrYrZr	XYZXrYrZr	K7	P1	9,500	0,000	0,000	11,000	0,000	0,000	1,500
S7	K7	XYZXrYrZr	XYZXrYrZr	K8	P1	11,000	0,000	0,000	12,000	0,000	0,000	1,000
S8	K8	XYZXrYrZr	XYZXrYrZr	K9	P1	12,000	0,000	0,000	14,000	0,000	0,000	2,000
-	-	-	-	-	-	m	m	m	m	m	m	m

Profielen

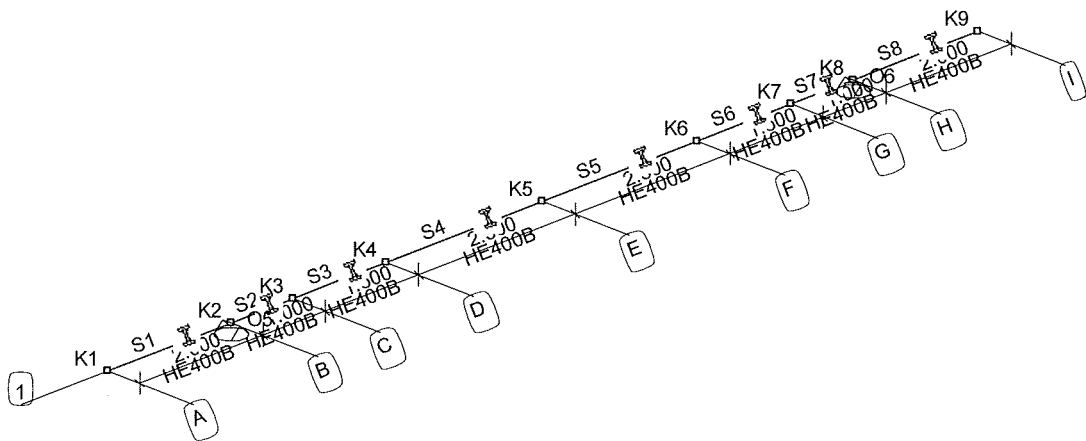
Profiel	Profielnaam	Oppervlakte	It	ly	Iz	Materiaal	Hoek
P1	HE400B	1.9778e-02	3.5575e-06	5.7681e-04	1.0819e-04	S235	0
-	-	m2	m4	m4	m4	-	°

Materialen

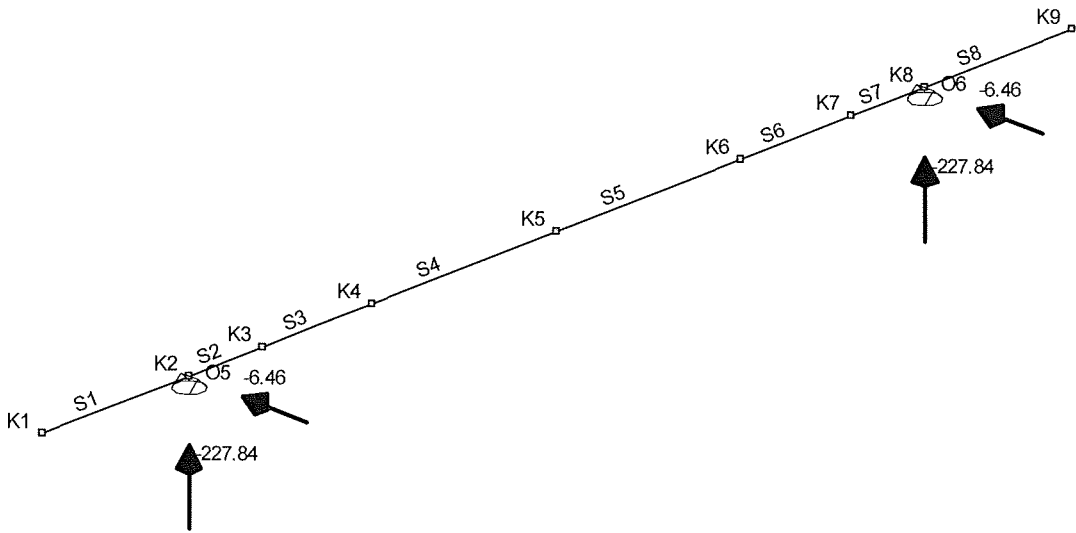
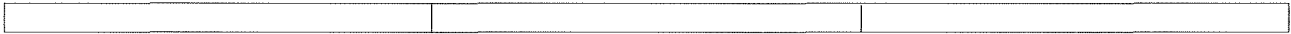
Materiaalnaam	Poison	Dichtheid	E-Modulus	Uitzettingcoeff
S235	0.30	78.50	2.1000e+08	12.0000e-06
-	-	kN/m3	kN/m2	C°m

Opleggingen

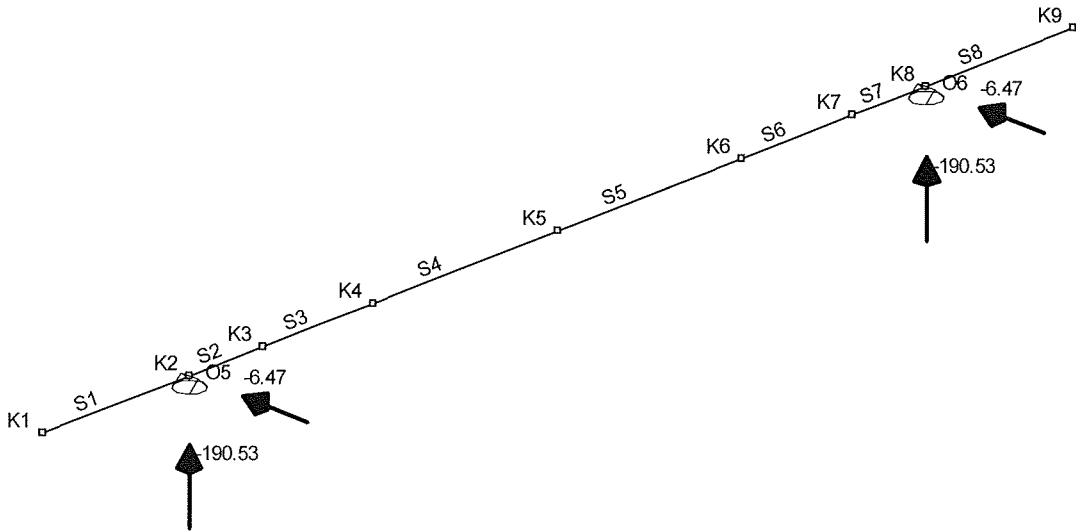
Oplegging	Knopen	X	Y	Z	Xr	Yr	Zr	HoekXr	HoekYr	HoekZr
O5	K2	vast	vast	vast	vast	vrij	vrij	0	0	0
O6	K8	vast	vast	vast	vast	vrij	vrij	0	0	0
-	-	kN/m	kN/m	kN/m	kNmrad	kNmrad	kNmrad	°	°	°



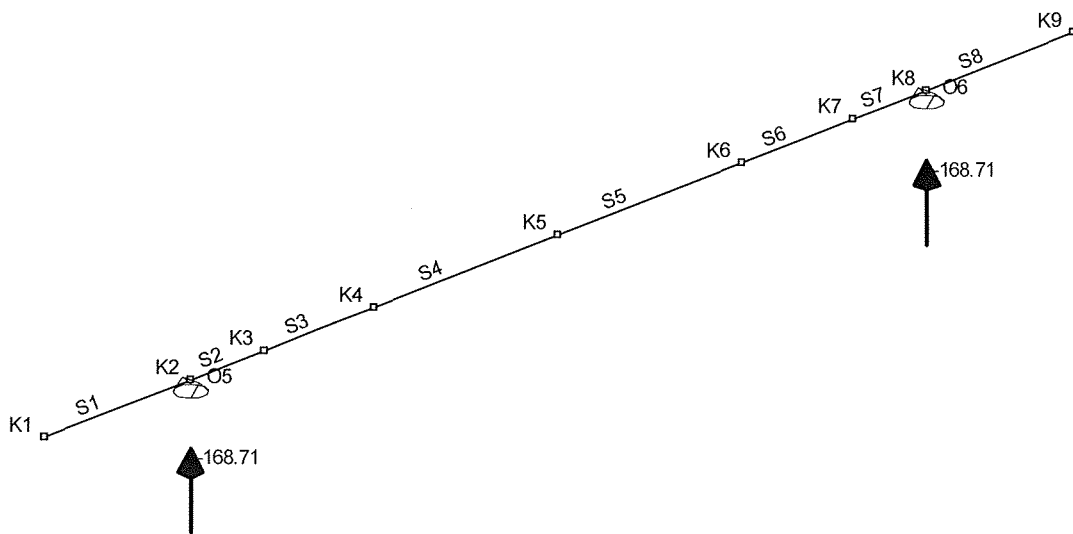
Afb. Geometrie 1



Afb. Fu.C.1 Oplegreacties



Afb. Fu.C.2 Oplegreacties



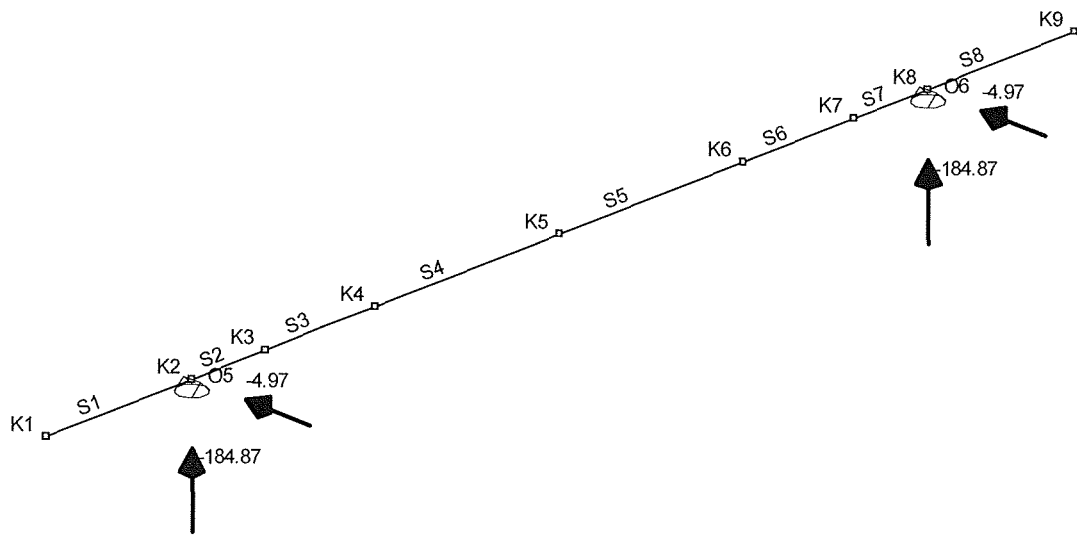
Afb. Fu.C.3 Oplegreacties

Fu.C. Extreme oplegreacties

Oplegging	Knoop	B.C.	Xmax	Y	Z B.C.	Ymax	X	Z B.C.	Zmax	X	Y
O5	K2				Fu.C.2	-6.47	0.00	-190.53 Fu.C.1	-227.84	0.00	-6.4€
O6	K8				Fu.C.2	-6.47	0.00	-190.53 Fu.C.1	-227.84	0.00	-6.4€
Globale extreme waarden											
O5	K2				Fu.C.2	-6.47	0.00	-190.53			
O6	K8							Fu.C.1	-227.84	0.00	-6.4€
-	-	-	kN	kN	kN	-	kN	kN	-	kN	kN

Fu.C. Extreme oplegreacties (Momenten)

Oplegging	Knoop	B.C.	Mxmax	MY	MZ B.C.	Mymax	MX	MZ B.C.	Mzmax	MX	MY
Globale extreme waarden											
-	-	-	kN	kN	kN	-	kN	kN	-	kN	kN



Afb. In.C.1 Oplegreacties

In.C. Oplegreacties

B.C.	Oplegging	Knoop	X	Y	Z	Mx	My	Mz
In.C.on	O5	K2	0.00	0.00	-124.97	0.00	0.00	0.00
	O6	K8	0.00	0.00	-124.97	0.00	0.00	0.00
	Som Reacties		0.00	0.00	-249.94			
	Som Lasten		0.00	0.00	249.94			
In.C.1	O5	K2	0.00	-4.97	-184.87	0.00	0.00	0.00
	O6	K8	0.00	-4.97	-184.87	0.00	0.00	0.00
	Som Reacties		0.00	-9.94	-369.75			
	Som Lasten		0.00	9.94	369.75			
-	-	-	kN	kN	kN	kNm	kNm	kNm

Unity Check

Staalcontrole volgens NEN6770/6771

Veld	Toetsing	Combinatie	Formule	Max Unity Check
C1-V1 (0.000-2.000)	Doorsnede	Fu.C.3	NEN6770(11.3-1)	0,01
C1-V1 (0.000-2.000)	Kiptoetsing	Fu.C.3	NEN6771(12.2-3)	0,00
C1-V1 (0.000-2.000)	Doorbuigingstoetsing	In.C.1	NEN6702(10.4)	0,00
C2-V1 (0.000-1.000)	Doorsnede	Fu.C.3	NEN6770(11.3-1)	0,13
C2-V1 (0.000-1.000)	Doorbuigingstoetsing	In.C.1	NEN6702(10.4)	0,01
C3-V1 (0.000-1.500)	Doorsnede	Fu.C.3	NEN6770(11.3-1)	0,32
C3-V1 (0.000-1.500)	Kiptoetsing	Fu.C.3	NEN6771(12.2-3)	0,00
C3-V1 (0.000-1.500)	Doorbuigingstoetsing	In.C.1	NEN6702(10.4)	0,07
C4-V1 (0.000-2.500)	Doorsnede	Fu.C.1	NEN6770(11.3-31)	0,44
C4-V1 (0.000-2.500)	Kiptoetsing	Fu.C.3	NEN6771(12.2-3)	0,00
C4-V1 (0.000-2.500)	Doorbuigingstoetsing	In.C.1	NEN6702(10.4)	0,20
C5-V1 (0.000-2.500)	Doorsnede	Fu.C.1	NEN6770(11.3-31)	0,44
C5-V1 (0.000-2.500)	Kiptoetsing	Fu.C.3	NEN6771(12.2-3)	0,00
C5-V1 (0.000-2.500)	Doorbuigingstoetsing	In.C.1	NEN6702(10.4)	0,20
C6-V1 (0.000-1.500)	Doorsnede	Fu.C.3	NEN6770(11.3-1)	0,32
C6-V1 (0.000-1.500)	Kiptoetsing	Fu.C.3	NEN6771(12.2-3)	0,00
C6-V1 (0.000-1.500)	Doorbuigingstoetsing	In.C.1	NEN6702(10.4)	0,07
C7-V1 (0.000-1.000)	Doorsnede	Fu.C.3	NEN6770(11.3-1)	0,13

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Veld	Toetsing	Combinatie	Formule	Max Unity Check
C7-V1 (0.000-1.000)	Doorbuigingstoetsing	In.C.1	NEN6702(10.4)	0,01
C8-V1 (0.000-2.000)	Doorsnede	Fu.C.3	NEN6770(11.3-1)	0,01
C8-V1 (0.000-2.000)	Kiptoetsing	Fu.C.3	NEN6771(12.2-3)	0,00
C8-V1 (0.000-2.000)	Doorbuigingstoetsing	In.C.1	NEN6702(10.4)	0,00

Fundering op staal Betonplaten 2,0 x 2,0 onder HE 400 ligger noordzijde, inclusief ballast

grondopbouw (uit analyse op basis van conuswaarden) regio: standaard instellingen

nr	naam	bijmengsel	cons.	van	tot	γ_{dr}	γ_{sat}	c'	f_{undr}	ϕ'	$\delta'_{\sigma'_{v;k}}$	$\sigma'_{v;k}$	OCR
1	zand	schoon	matig	-2,10	-2,80	18,0	20,0	0,0	0,0	32,5	7,0	7,0	1
2	zand	sterk siltig/kleiig	--	-2,80	-3,45	18,0	20,0	0,0	0,0	25,0	6,5	13,5	1
3	zand	zwak siltig/kleiig	--	-3,45	-3,50	18,0	20,0	0,0	0,0	27,0	0,5	14,0	1
4	zand	sterk siltig/kleiig	--	-3,50	-4,25	18,0	20,0	0,0	0,0	25,0	7,5	21,5	1
5	leem	zwak zandig	vast	-4,25	-4,40	21,0	21,0	5,0	200,0	27,5	1,7	23,2	1
6	klei	zwak zandig	vast	-4,40	-4,45	20,0	20,0	25,0	120,0	22,5	0,5	23,7	1
7	klei	schoon	vast	-4,45	-4,50	19,0	19,0	25,0	100,0	17,5	0,5	24,1	1
8	leem	zwak zandig	vast	-4,50	-4,70	21,0	21,0	5,0	200,0	27,5	2,2	26,3	1
9	klei	schoon	vast	-4,70	-5,05	19,0	19,0	25,0	100,0	17,5	3,2	29,5	1
10	klei	schoon	matig	-5,05	-5,15	17,0	17,0	10,0	50,0	17,5	0,7	30,2	1
11	klei	schoon	vast	-5,15	-5,25	19,0	19,0	25,0	100,0	17,5	0,9	31,1	1
12	klei	schoon	matig	-5,25	-5,60	17,0	17,0	10,0	50,0	17,5	2,4	33,5	1
13	klei	schoon	vast	-5,60	-5,65	19,0	19,0	25,0	100,0	17,5	0,5	34,0	1
14	klei	schoon	matig	-5,65	-7,45	17,0	17,0	10,0	50,0	17,5	12,6	46,6	1
15	klei	schoon	vast	-7,45	-7,55	19,0	19,0	25,0	100,0	17,5	0,9	47,5	1
16	klei	schoon	matig	-7,55	-8,10	17,0	17,0	10,0	50,0	17,5	3,9	51,3	1
17	klei	schoon	vast	-8,10	-8,20	19,0	19,0	25,0	100,0	17,5	0,9	52,2	1
18	klei	schoon	matig	-8,20	-9,15	17,0	17,0	10,0	50,0	17,5	6,6	58,9	1
19	klei	schoon	vast	-9,15	-9,25	19,0	19,0	25,0	100,0	17,5	0,9	59,8	1
20	klei	zwak zandig	vast	-9,25	-9,30	20,0	20,0	25,0	120,0	22,5	0,5	60,3	1
21	klei	schoon	matig	-9,30	-11,05	17,0	17,0	10,0	50,0	17,5	12,3	72,5	1
22	klei	schoon	vast	-11,05	-11,30	19,0	19,0	25,0	100,0	17,5	2,2	74,8	1
23	klei	schoon	matig	-11,30	-13,95	17,0	17,0	10,0	50,0	17,5	18,6	93,3	1
24	klei	organisch	matig	-13,95	-14,05	15,0	15,0	0,0	25,0	15,0	0,5	93,8	1
25	klei	schoon	vast	-14,05	-14,10	19,0	19,0	25,0	100,0	17,5	0,4	94,2	1
26	zand	sterk siltig/kleiig	--	-14,10	-14,70	18,0	20,0	0,0	0,0	25,0	6,0	100,3	1
27	zand	zwak siltig/kleiig	--	-14,70	-15,60	18,0	20,0	0,0	0,0	27,0	9,0	109,3	1
28	zand	sterk siltig/kleiig	--	-15,60	-15,70	18,0	20,0	0,0	0,0	25,0	1,0	110,3	1
29	zand	zwak siltig/kleiig	--	-15,70	-15,75	18,0	20,0	0,0	0,0	27,0	0,5	110,8	1
30	zand	sterk siltig/kleiig	--	-15,75	-18,00	18,0	20,0	0,0	0,0	25,0	22,5	133,3	1
31	zand	zwak siltig/kleiig	--	-18,00	-18,15	18,0	20,0	0,0	0,0	27,0	1,5	134,8	1
32	zand	sterk siltig/kleiig	--	-18,15	-19,40	18,0	20,0	0,0	0,0	25,0	12,5	147,3	1
33	zand	zwak siltig/kleiig	--	-19,40	-19,60	18,0	20,0	0,0	0,0	27,0	2,0	149,3	1
34	zand	sterk siltig/kleiig	--	-19,60	-21,25	18,0	20,0	0,0	0,0	25,0	16,5	165,8	1
35	zand	zwak siltig/kleiig	--	-21,25	-21,30	18,0	20,0	0,0	0,0	27,0	0,5	166,3	1
36	zand	sterk siltig/kleiig	--	-21,30	-21,35	18,0	20,0	0,0	0,0	25,0	0,5	166,8	1
37	zand	zwak siltig/kleiig	--	-21,35	-21,40	18,0	20,0	0,0	0,0	27,0	0,5	167,3	1
38	zand	sterk siltig/kleiig	--	-21,40	-21,50	18,0	20,0	0,0	0,0	25,0	1,0	168,3	1
39	zand	zwak siltig/kleiig	--	-21,50	-21,60	18,0	20,0	0,0	0,0	27,0	1,0	169,3	1
40	zand	sterk siltig/kleiig	--	-21,60	-21,70	18,0	20,0	0,0	0,0	25,0	1,0	170,3	1
41	zand	zwak siltig/kleiig	--	-21,70	-21,80	18,0	20,0	0,0	0,0	27,0	1,0	171,3	1
42	zand	sterk siltig/kleiig	--	-21,80	-22,15	18,0	20,0	0,0	0,0	25,0	3,5	174,8	1
43	zand	sterk siltig/kleiig	--	-22,15	-23,15	18,0	20,0	0,0	0,0	25,0	10,0	184,8	1

algemene gegevens

sondering

30389_1-aangepast.SNX

maten ten opzichte van maaiveld	N.A.P.
grondwaterstand	-2,10 m N.A.P.
geotechnische categorie	0,00 m N.A.P. GC2

afmetingen funderingselement

strookbreedte	2,00 m
strooklengte	2,00 m
aanlegdiepte	-2,20 m N.A.P.
maximale gronddekking	0,00 m

belastingen

uiterste grenstoestanden 1A, 1B	$F_{s,v;d}$ 227,84 kN
	$F_{s,h;d}$ 6,46 kN
	$p_{sur;d}$ 0,00 kN/m ²
bruikbaarheidsgrenstoestand 2	$F_{s,v;d}$ 125,00 kN
	$F_{s,h;d}$ 6,05 kN
	$p_{sur;d}$ 0,00 kN/m ²
aangrijpingspunt hor.kracht	0,14 m maaiveld
excentriciteit (5.2.1)	eB 0,00 m
	eL 0,00 m

toetsing grenstoestanden 1A, 1B en 2

ongedraineerde situatie	NEN-EN1997 NEN6744 art. 5.2.2
gedraineerde situatie	NEN-EN1997 NEN6744 art. 5.2.3
zakking bovenzijde funderingselement	NEN-EN1997 NEN6744 art. 6

grenstoestand 1A: max draagvermogen NEN-EN1997|NEN6744 art. 5.2.6

ongedraineerde situatie vlg 5.2.2.1 geval c
doorpensen bij gelaagde grond; 8° spreiding

z	sct	B'_z	L'_z	$\sigma'_{v,z;0;d}$	$f_{undr;d}$	s_c	i_c	$\sigma'_{max;d}$	$F_{r,v;d}$	$F_{v;d}$	opm
-4,45	7	2,53	2,63	23,65	74,07	1,19	1,00	476,27	3173,73	318,44	-
-4,70	9	2,60	2,70	26,30	74,07	1,19	1,00	478,88	3358,80	329,04	-
-5,05	10	2,68	2,80	29,45	37,04	1,19	0,99	255,05	1917,68	341,64	-
-5,15	11	2,71	2,83	30,15	74,07	1,19	1,00	482,66	3700,00	344,44	-
-5,25	12	2,74	2,86	31,05	37,04	1,19	0,99	256,66	2005,88	348,04	-
-5,60	13	2,82	2,96	33,50	74,07	1,19	1,00	485,96	4056,56	357,84	-
-5,65	14	2,84	2,97	33,95	37,04	1,19	0,99	259,59	2187,17	359,64	-
-7,45	15	3,30	3,48	46,55	74,07	1,19	1,00	498,93	5727,24	410,04	-
-7,55	16	3,33	3,50	47,45	37,04	1,19	1,00	273,22	3187,01	413,64	-
-8,10	17	3,47	3,66	51,30	74,07	1,19	1,00	503,70	6400,71	429,04	-
-8,20	18	3,50	3,69	52,20	37,04	1,19	1,00	278,02	3587,39	432,64	-
-9,15	19	3,75	3,95	58,85	74,07	1,19	1,00	511,32	7583,12	459,24	-
-9,30	21	3,79	4,00	60,25	37,04	1,19	1,00	286,17	4335,51	464,84	-
-11,05	22	4,26	4,49	72,50	74,07	1,19	1,00	525,13	10036,69	513,84	-
-11,30	23	4,33	4,56	74,75	37,04	1,19	1,00	300,83	5933,06	522,84	-
-13,95	24	5,04	5,30	93,30	18,52	1,19	1,00	206,26	5515,86	597,04	-
-14,05	25	5,07	5,33	93,80	74,07	1,19	1,00	546,74	14777,04	599,04	-
-	-	m	m	kN/m ²	kN/m ²	-	-	kN/m ²	kN	kN	

in alle lagen wordt voldaan aan de ponstoetsing

grenstoestand 1A: max schuifweerstand NEN-EN1997|NEN6744 art. 5.3.1

ongedraineerde situatie

controle voor ieder grensvlak

eenzijdige ontgraving tot aanlegniveau mogelijk (met betrekking tot afschuiving).

$$F_{r,p;ea,h;d} = 0 \quad F_{s;a;ea,h;d} = 0$$

z	$F_{s;v;d}$	$F_{s;v;d;a}$	$F_{s;v;d;z}$	$F_{s;h;d;z}$	xB	B'_z	L'_z	$f_{undr;d}$	$S_{r;h;d}$	$F_{h;d}$
-4,25	227,84	170,88	244,68	6,46	0,06	2,46	2,58	148,15	937,09	6,46
-4,40	227,84	170,88	250,62	6,46	0,06	2,49	2,62	88,89	580,14	6,46
-4,45	227,84	170,88	252,42	6,46	0,06	2,50	2,63	74,07	488,46	6,46
-4,50	227,84	170,88	254,04	6,46	0,06	2,52	2,65	148,15	986,97	6,46
-4,70	227,84	170,88	261,96	6,46	0,07	2,57	2,70	74,07	514,03	6,46
-5,05	227,84	170,88	273,30	6,46	0,07	2,66	2,80	37,04	275,44	6,46
-5,15	227,84	170,88	275,82	6,46	0,07	2,68	2,83	74,07	561,60	6,46
-5,25	227,84	170,88	279,06	6,46	0,08	2,70	2,86	37,04	286,26	6,46
-5,60	227,84	170,88	287,88	6,46	0,08	2,79	2,96	74,07	611,35	6,46
-5,65	227,84	170,88	289,50	6,46	0,08	2,81	2,97	37,04	308,53	6,46
-7,45	227,84	170,88	334,86	6,46	0,11	3,26	3,48	74,07	840,31	6,46
-7,55	227,84	170,88	338,10	6,46	0,11	3,29	3,50	37,04	426,97	6,46
-8,10	227,84	170,88	351,96	6,46	0,11	3,43	3,66	74,07	930,31	6,46
-8,20	227,84	170,88	355,20	6,46	0,11	3,46	3,69	37,04	472,35	6,46
-9,15	227,84	170,88	379,14	6,46	0,12	3,71	3,95	74,07	1086,05	6,46
-9,25	227,84	170,88	382,38	6,46	0,12	3,74	3,98	88,89	1322,01	6,46
-9,30	227,84	170,88	384,18	6,46	0,12	3,75	4,00	37,04	554,78	6,46
-11,05	227,84	170,88	428,28	6,46	0,14	4,21	4,49	74,07	1400,58	6,46
-11,30	227,84	170,88	436,38	6,46	0,14	4,28	4,56	37,04	722,73	6,46
-13,95	227,84	170,88	503,16	6,46	0,15	4,99	5,30	18,52	490,49	6,46
-14,05	227,84	170,88	504,96	6,46	0,15	5,02	5,33	74,07	1982,86	6,46

m kN kN kN kN m m m kN/m² kN kN

aan afschuivingseis in ongedraineerde situatie voldaan

grenstoestand 1A: max draagvermogen NEN-EN1997|NEN6744 art. 5.2.3

gedraineerde situatie art. 5.2.3.1 geval c

invloedsgebied loopt van

gewogen parameters (5.2.4.3) (1A)

(1A)

(1A)

-2,20 tot -4,76 m

$\phi_{e,d}$ 24,49 °

$c_{e,d}$ 0,25 kN/m²

$\gamma_{e,d}$ 8,20 kN/m³

$\sigma'_{v;z;0;d}$	(z= -2,20 m)	1,00 kN/m ²
xB	$6,46 \cdot (0,14 + 0,10) / 227,84$	0,01 m
B'_z	$2,00 - 2 \cdot 0,00 + 0,01 $	1,99 m
L'_z	$2,00 - 2 \cdot 0,00 + 0,00 $	2,00 m
N_q		10,11 -
N_c		19,99 -
N_γ		8,30 -
i_q	$(1 - 0,70 \cdot 6,46 / (227,84 + 0,00))^{0,5}$	0,94 -
i_c	$(0,94 \cdot 10,11 - 1) / (10,11 - 1)$	0,94 -
i_γ	$(1 - 1,0 \cdot 6,46 / (227,84 + 0,00))^{0,5}$	0,92 -
s_q	$(1 + 1,99 / 2,00 \cdot 0,41)$	1,41 -

s_c	$(1,41*10,11-1)/(10,11-1)$	1,46	-
s_γ	$1-0,30*1,99/2,00$	0,70	-
$\sigma'_{max;d}$	$6,87+13,44+43,58$	63,89	kN/m ²
$F_{r,v;d}$	$2,00 * 1,99 * 63,89$	253,83	kN
$F_{s,v;d} \leq F_{r,v;d}$	want $227,84 \leq 253,83$ kN		

aan de eis in gedraineerde toestand is voldaan

grenstoestand 1A: max draagvermogen NEN-EN1997|NEN6744 art. 5.2.6

gedraineerde situatie art. 5.2.3.1 geval c
doorponsen bij gelaagde grond; 8° spreiding

z	sct	B' _z	L' _z	$\sigma'_{v,z;o;d}$	$\phi'_{e;d}$	c' _{e;d}	$\gamma'_{e;d}$	$\sigma'_{max;d}$	F _{r,v;d}	F _{v;d}	opm
-4,45	7	2,53	2,63	23,65	24,47	0,27	8,21	384,74	2563,85	318,44	-
-4,70	9	2,60	2,70	26,30	24,48	0,26	8,20	422,68	2964,60	329,04	-
-5,05	10	2,68	2,80	29,45	24,39	0,36	8,21	465,59	3500,66	341,64	-
-5,15	11	2,71	2,83	30,15	24,36	0,39	8,21	474,99	3641,14	344,44	-
-5,25	12	2,74	2,86	31,05	24,33	0,42	8,21	487,05	3806,37	348,04	-
-5,60	13	2,82	2,96	33,50	24,23	0,55	8,21	519,27	4334,67	357,84	-
-5,65	14	2,84	2,97	33,95	24,22	0,57	8,21	525,16	4424,84	359,64	-
-7,45	15	3,30	3,48	46,55	23,63	1,28	8,16	675,50	7754,18	410,04	-
-7,55	16	3,33	3,50	47,45	23,59	1,31	8,15	685,58	7997,11	413,64	-
-8,10	17	3,47	3,66	51,30	23,41	1,51	8,13	725,88	9224,04	429,04	-
-8,20	18	3,50	3,69	52,20	23,37	1,54	8,12	735,47	9489,92	432,64	-
-9,15	19	3,75	3,95	58,85	23,05	1,87	8,06	799,14	1,2E+04	459,24	-
-9,30	21	3,79	4,00	60,25	23,00	1,91	8,05	813,02	1,2E+04	464,84	-
-11,05	22	4,26	4,49	72,50	22,19	2,59	7,86	895,78	1,7E+04	513,84	-
-11,30	23	4,33	4,56	74,75	22,07	2,68	7,83	910,31	1,8E+04	522,84	-
-13,95	24	5,04	5,30	93,30	20,77	3,60	7,46	984,65	2,6E+04	597,04	-
-14,05	25	5,07	5,33	93,80	20,72	3,64	7,44	984,38	2,7E+04	599,04	-
-	-	m	m	kN/m ²	kN/m ²	-	-	kN/m ²	kN	kN	

in alle lagen wordt voldaan aan de ponstoetsing

grenstoestand 1A: max schuifweerstand NEN-EN1997|NEN6744 art. 5.3.2

gedraineerde situatie
controle op diepte funderingselement
eenzijdige ontgraving tot aanlegniveau mogelijk (met betrekking tot afschuiving).

$$F_{r,p;ea,h;d} = 0 \quad F_{s,a;ea,h;d} = 0$$

z	F _{s,v;d}	F _{s,v;d;a}	F _{s,v;d;z}	F _{s,h;d;z}	B' _z	L' _z	ϕ'_d	$\delta_{s;d}$	S _{r,h;d}	F _{h;d}
-2,20	227,84	170,88	170,88	6,46	1,98	2,00	28,26	18,84	58,31	6,46
m	kN	kN	kN	kN	m	m	°	°	kN	kN

aan afschuivingseis in gedraineerde situatie voldaan

grenstoestand 2: zakking vlg's grenstoestand 2: zakking vlg's NEN-EN1997|NEN6744 art. 6

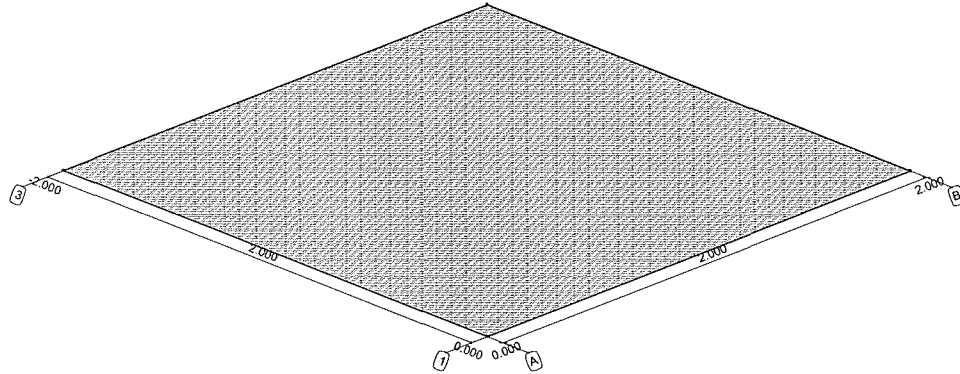
tgV momentane belastingcombinatie
(NEN-EN1990:2007 art. 6.5.3c)
spanningstoename vlg's NEN-EN1997|NEN6744 art 6.4

lg	sct	H _{lg}	z _{mid}	e	σ' _{v;mid;z;0;d}	Δσ' _{v;mid;z;d}	w _{1;d}	w _{2;d}	Σw _{1;d}	Σw _{2;d}	Σw _d
aanleg			-2,20			31,46					
1	1	0,60	-2,50	0,65	4,00	30,89	0,0021	0,0000	0,0021	0,0000	0,0021
2	2	0,65	-3,13	0,65	10,25	23,23	0,0038	0,0000	0,0059	0,0000	0,0059
3	3	0,05	-3,48	0,65	13,75	18,03	0,0001	0,0000	0,0060	0,0000	0,0060
4	4	0,75	-3,88	0,65	17,75	13,35	0,0021	0,0000	0,0081	0,0000	0,0081
5	5	0,15	-4,33	0,50	22,33	9,67	0,0008	0,0006	0,0089	0,0006	0,0095
6	6	0,05	-4,43	0,65	23,40	9,04	0,0005	0,0006	0,0094	0,0012	0,0106
7	7	0,05	-4,48	0,83	23,88	8,74	0,0006	0,0008	0,0100	0,0020	0,0120
8	8	0,20	-4,60	0,50	25,20	8,05	0,0008	0,0008	0,0108	0,0028	0,0136
9	9	0,35	-4,88	0,83	27,88	6,78	0,0030	0,0056	0,0138	0,0084	0,0222
10	10	0,10	-5,10		29,80	5,93	< 20%				
-	-	m	m	-	kN/m ²	kN/m ²	m	m	m	m	m

zetting na 10000 dagen -----
0,0138 0,0084 0,0222

aan zettingseis uit NEN-EN1997|NEN6740 art. 5.3 is voldaan

Projectnaam	Funderingsplaat steiger noordzijde	Projectnummer	-
Omschrijving	Funderingsplaat bij HE400 onderslagbalk	Constructeur	FvdB
Opdrachtgever	Spie	Eenheden	Eenheden
Bestand	N:\Projecten I.U\SPIE\Hoogspanning\Bleiswijk\Berekening\Funderingsplaat onderslagbalk noordzijde.mxf		



Afb. Geometrie

Geometrie

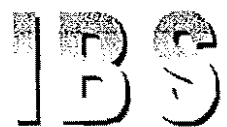
Gebied/Polylijn	Sparing	Materiaal	Dikte	Elasticiteit	Poisson	Dichtheid	Uitzetting
R1	Nee	C45/55	0.250	3.6000e+07	0.20	24.00	10.0000e-06
-	-	-	m	kN/m ²	-	kN/m ³	°m

Constructieve punten

Gebieden	Punt	X	Y	Z	Ref.
R1	V1	0.000	0.000	0.000	A,1
R1	V2	0.000	-2.000	0.000	A,3
R1	V3	2.000	-2.000	0.000	B,3
R1	V4	2.000	0.000	0.000	B,1
-	-	m	m	m	-

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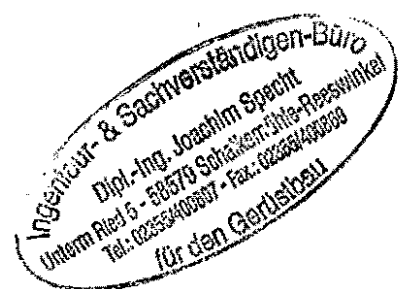
Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schaiksmühle
Tel. + (49) 02355-400867
Fax. + (49) 02355-400869
Mail: IBSPECHT1@AOL.COM
Homepage: www.geruestbau-stalik.de



Statische Berechnung

Projekt: Freileitungs-Schutzgerüst 2
Rux-Variant-Modulgerüst H= 12,00 m
bei Bleiswijk

Auftraggeber: Firma
Gerüstbau Witte GmbH
Fuggerstr. 25
Köln



Ingenieur- & Sachverständigen-Büro für den Gerüstbau

Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schalksmühle
Tel. +(49) 02355-400867
Fax. +(49) 02355-400869
Mail: IBSPECHT1@AOL.COM
Homepage: www.geruestbau-statik.de



Vorbemerkungen:

Diese Berechnung führt die erforderlichen Nachweise für ein Stahlrohrschutzgerüst im Hochspannungs- und Freileitungsbau.

Es wird das Rux-Variant.Modulgerüst in Kombination mit systemfreien Gerüstbauteilen verwendet.

Die Konstruktion besteht aus zwei Gerüstkonstruktionen, die

in einem Abstand von $\leq 58,00$ m parallel zueinander errichtet werden.

Zwischen den Gerüsten werden im Abstand von 2,50m, entsprechend

den verwendeten Gerüstfeldlängen, Parafilseile gespannt. Die Zwischenräume

werden mit Kunststoffnetzen geschlossen.

Die Gerüste werden ballastiert. Die Ballastierung wird auf Stahl-Gitterträger, die im Gerüst eingebaut werden, aufgelagert.

Die abgestuften Gerüstscheiben haben eine Grundfläche von ca.

6,00 m Gerüstbreite

und einer Länge von 70,00 m.

Die Gerüstfeldlängen betragen 2,50 m.

Die maximale Gerüsthöhe ist 12,00 m.

Das Gerüst wird abgestuft errichtet.

Nachgewiesen werden nur Details, die von der jeweiligen Aufbau-

und Verwendungsanweisung des Gerüstsystems abweichen.

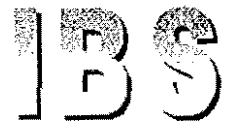
Nicht explizit untersuchte Detaillösungen werden in handwerksgerechter

Ausführung gem. den geltenden Normen und Sicherheitsvorschriften

ausgeführt und vorausgesetzt.

Ingenieur- & Sachverständigen-Büro für den Gerüstbau

Dipl.-Ing. Joachim Specht
Unterm Fled 5
D-58579 Schalksmühle
Tel. + (49) 02355-400867
Fax. + (49) 02355-400869
Mail: IBSPECHT1@AOL.COM
Homepage: www.geruestbau-statik.de



Die Nachweise basieren auf eingeführten bauaufsichtlichen Bestimmungen, z.T. aber

auch auf Normen-Entwürfen, die damit den letzten Stand der Technik dokumentieren.

Die Nachweisführung erfolgt mit üblichen Näherungen und Ansätzen, die das Tragverhalten

ausreichend genau wiedergeben.

In einer der Gerüstscheiben werden auf dem Boden liegende Lastverteilungen aus HEB 400 Stahlträgern

eingebaut um eine Überbrückung eines Dükers zu entlasten. Die Träger werden plan auf dem Untergrund aufgelegt.

Auf der sicheren Seite liegend wird der Nachweis der Träger als Einfeldträger mit 12,50m Stützweite erbracht.

Die Träger werden unter den Innenständern und den Außenständern der Rüstung verlegt. Unter den Innenständern

wird 1 Träger und unter den Außenständern werden 2 Träger verlegt.

Vorschriften:

DIN 1055

DIN 4420

DIN 4425

DIN 4427

EN 74

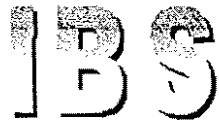
DIN 18800

DIN 1052

DIN EN 12810/12811ff

Ingenieur- & Sachverständigen-Büro für den Gerüstbau

Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schalksmühle
Tel. +(49) 02355-400867
Fax. +(49) 02355-400869
Mail: IBSPECHT1@AOL.COM
Homepage: www.geruestbau-statik.de



Zulassungen:


für das Modulgerüst Rux-Variant

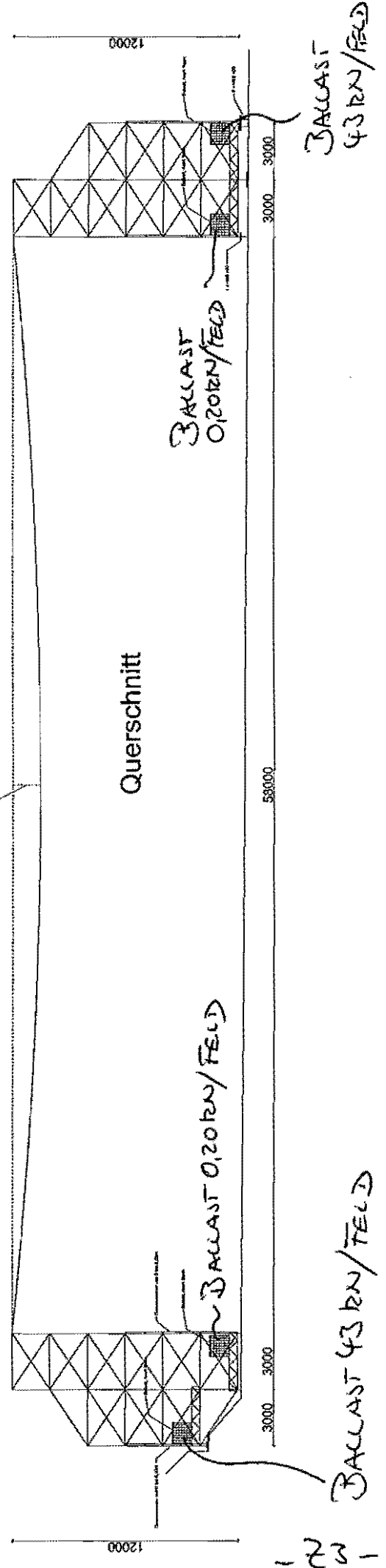
Rux-Preislisten als Grundlage für die Ermittlung der Eigengewichte

Zeichnungssatz

IBS

Ingenieur- & Sachverständigen-Büro für den Gerüstbau
 Dipl.-Ing. Joachim Specht
 Unterm Ried 5
 58579 Schalksmühle
 Tel. 02355-400867 - Fax 400869
 info@geruestbau-statik.de

Auftraggeber: Firma Gerüstbau Witte GmbH Fuggerstr. 25 51149 Köln	Anlage: zur Statik Blatt Nr.: Projekt Nr.: 201006142				
Bauvorhaben: 380 kV Krimpen - Bleiswijk Bauwerk: Freileitungs-Schutzgerüst 2	Datum	Zeichen			
Mastabstand < 350m; Einfach-Leitenseil			gezeichnet	14.06.2010	J. Specht
			geprüft		
			geändert A		
Material: Rux-Variant-Modulgerüst Gerüstrohre RuRo 48.3x4 (S235) Gerüst-Kupplungen nach DIN EN 74 Parafinseile, gem. Statik Stahl-Gitterträger Typ Rux BH45 Ballast, nach Statik	Bemerkungen/Vermerke <div style="text-align: center;">  <p> Ingenieur- & Sachverständigen-Büro Dipl.-Ing. Joachim Specht Unterm Ried 5 - 58579 Schalksmühle-Reeswinkel Tel.: 02355/400867 - Fax.: 02355/400869 für den Gerüstbau </p> </div> <p>HINWEISE IN DER STATIK BEACHTEN!</p>				



Querschnitt

12000

12000

3000

58000

3000

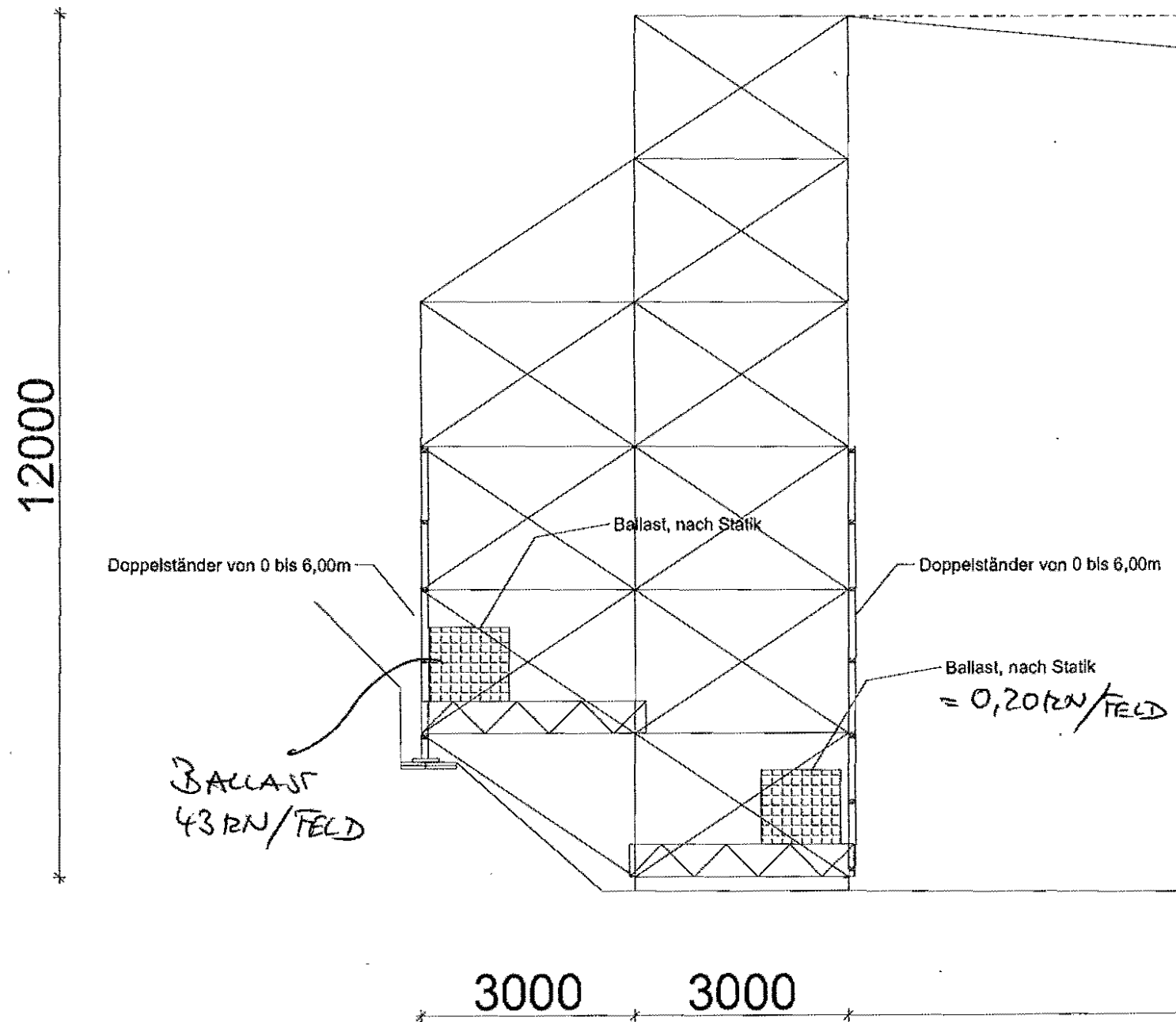
BALLAST
0,20 RN/FELD

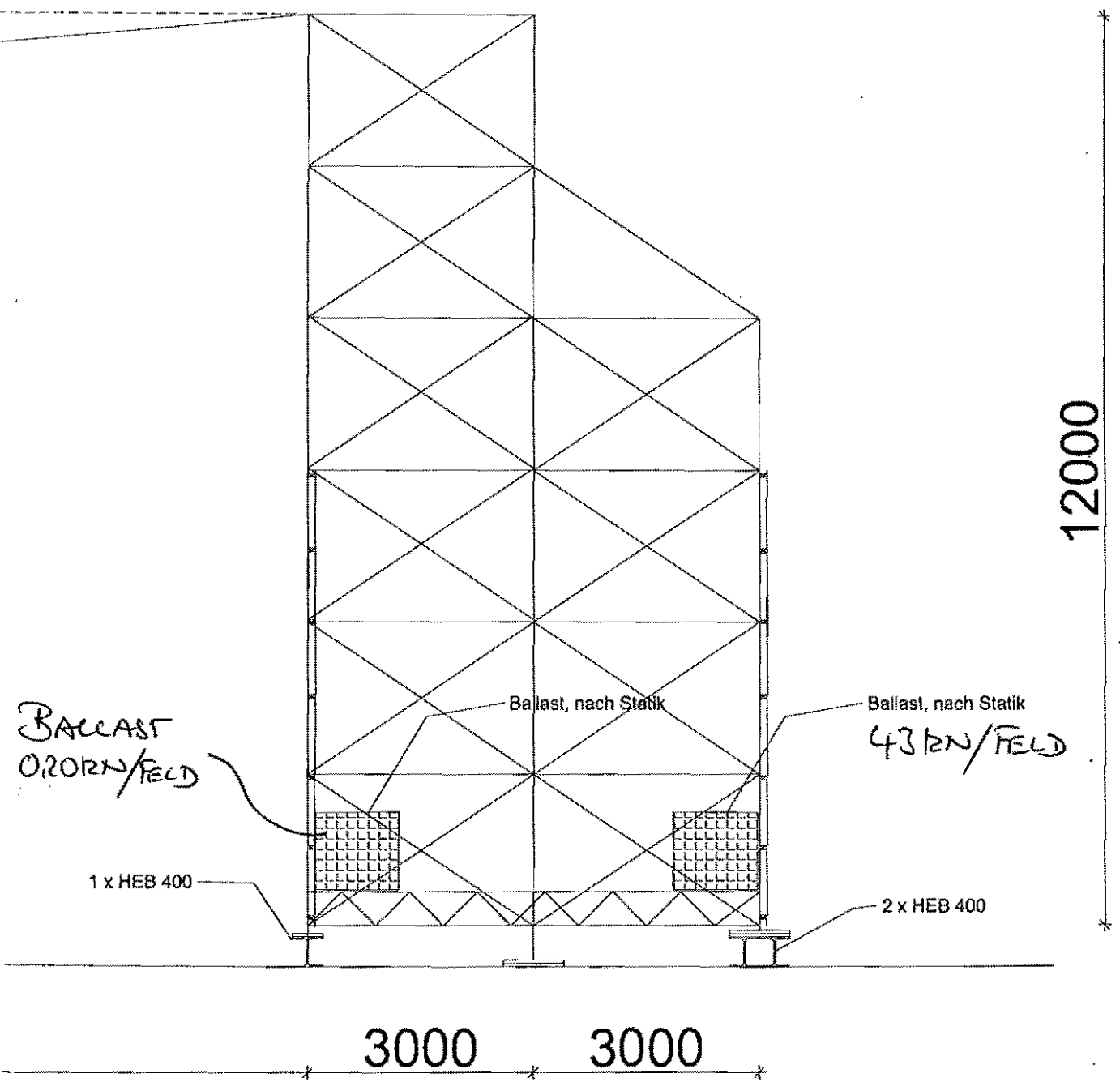
BALLAST 0,20 RN/FELD

BALLAST
43 RN/FELD

BALLAST 43 RN/FELD

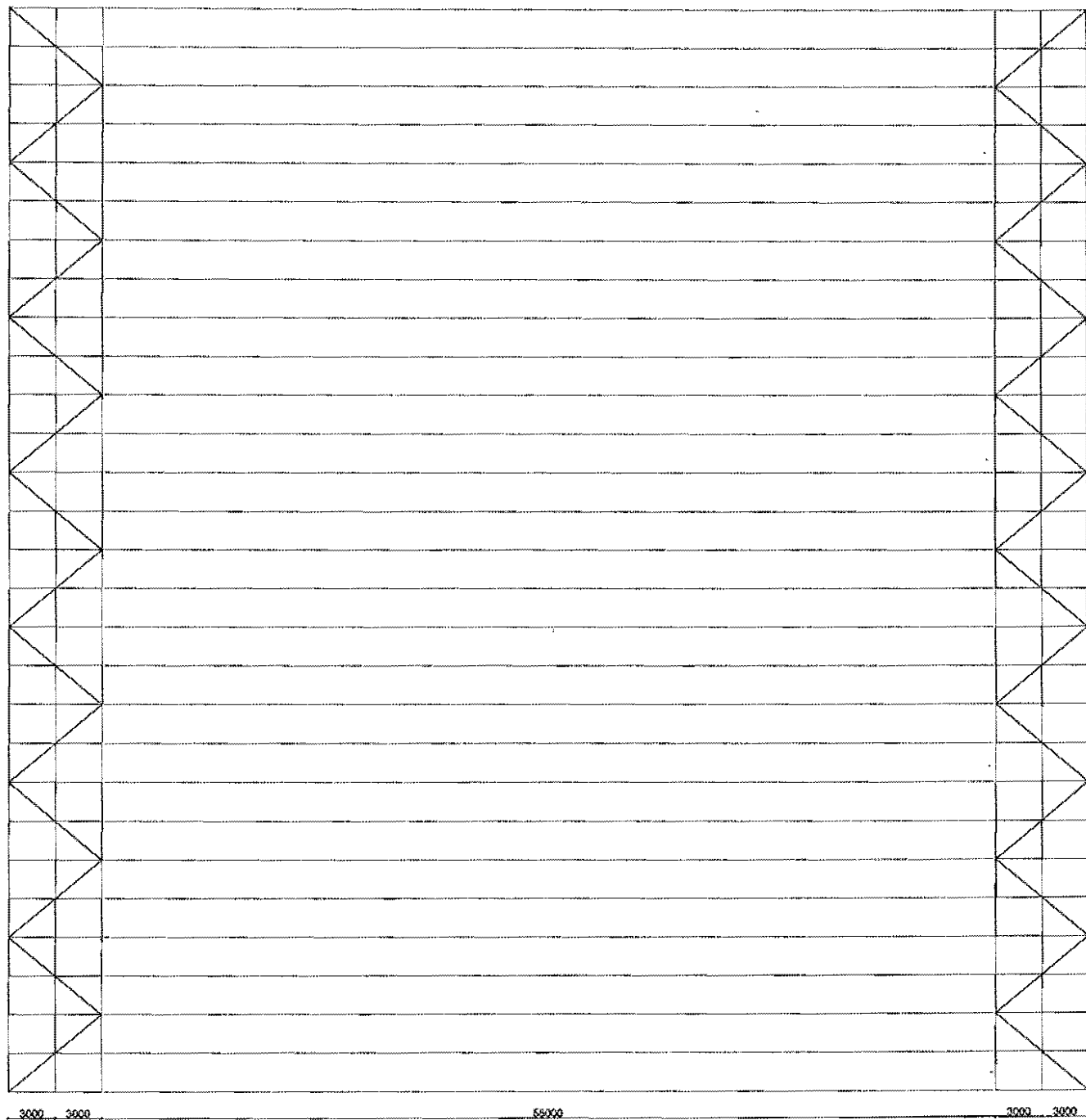
1221





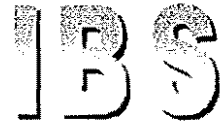
2300 2350 2400 2450 2500 2550 2600 2650 2700 2750 2800 2850 2900 2950 3000 3050 3100 3150 3200 3250 3300 3350 3400 3450 3500 3550 3600 3650 3700 3750 3800 3850 3900 3950 4000 4050 4100 4150 4200 4250 4300 4350 4400 4450 4500 4550 4600 4650 4700 4750 4800 4850 4900 4950 5000 5050 5100 5150 5200 5250 5300 5350 5400 5450 5500 5550 5600 5650 5700 5750 5800 5850 5900 5950 6000 6050 6100 6150 6200 6250 6300 6350 6400 6450 6500 6550 6600 6650 6700 6750 6800 6850 6900 6950 7000 7050 7100 7150 7200 7250 7300 7350 7400 7450 7500 7550 7600 7650 7700 7750 7800 7850 7900 7950 8000 8050 8100 8150 8200 8250 8300 8350 8400 8450 8500 8550 8600 8650 8700 8750 8800 8850 8900 8950 9000 9050 9100 9150 9200 9250 9300 9350 9400 9450 9500 9550 9600 9650 9700 9750 9800 9850 9900 9950 10000

Draufsicht



Ingenieur- & Sachverständigen-Büro für den Gerüstbau

Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schalksmühle
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Nachweisführung:

Angaben zur Freileitung:

maximaler Abstand der Masten: \leq 350,00 m

Belegung: Leiterself einfach

AL/St 265/35

ungünstigst $998,00 \text{ kg/km} = 0,00998 \text{ kN/m}$ gerundet = 0,01 kN/m

belastende Seillänge:

$L_s = 350,00 \times 2 / 3 = 233,33 \text{ m}$

(ungünstigster Fall)

Reibbeiwert: Holz/Stahl $\nu = 0,50$

Stoßfaktor, wegen freiem Fall = 1,50

horizontale Last durch das Schleifen der Seile:

$H_s = 1,75 \text{ kN}$

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Windlasten und Staudrücke infolge von Zugverkehr (120 km/h)

Ermittlung der Windangriffsfläche je Gerüstfeldlänge aus 1,00 Rux-Variant-Gerüstscheibe

Feldlänge: FL= 2,50 m je Etage mit 2,00m Höhe

Rohre mit D= 48,30 mm

aus: Aw=

6,00 m Ständer: 0,29 m²

7,50 m Längsriegel 0,36 m²

4,00 m Querdiagonale 0,19 m²

3,60 m Längsdiagonale (anteilig) 0,17 m²

Summe Aw= 1,02 m² je Gerüstfeld x 2,00m Höhe

Aerodynam. Faktor: cf= 1,30

cf x Aw= 1,32 m² je Gerüstfeld x 2,00m Höhe

je m² Gerüstfläche ergibt sich somit eine Windangriffsfläche von

cf x aw= 0,26 m²/m²

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Staudrücke gem. Europäischer Windlastkarte:

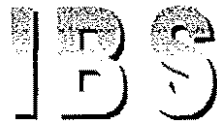


Fig. 7 Europäische Windkarte

Aufbauhöhe h [m]	Winddrücke für geographische Regionen [N/m ²]			
	A/B	C	D	E
$0 < h \leq 10$	544	741	968	1225
$10 < h \leq 20$	627	853	1114	1410
$20 < h \leq 50$	757	1031	1347	1704
$50 < h \leq 100$	879	1196	1562	1977
$100 < h \leq 150$	960	1306	1706	2159

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z= 12,00 m

Bereich C: max. qz= 0,85 kN/m²

Wegen einer Standzeit von < 1Jahr darf ein statistischer Faktor k= 0,60 berücksichtigt werden.

somit ergibt sich je m² Gerüstfläche eine Windlast von

max. hw= 0,14 kN/m²

sh= 0,34 kN/m Gerüsthöhe und Ständerjoch

Die Rüstung befindet sich neben einem Eisenbahngleis. Die maximale Geschwindigkeit der Züge beträgt 120 km/h.

Die Entfernung zum Gleis ist $\geq 5,00$ m.

Auf der sicheren Seiteliegend, wird ein Staudruck infolge des Zugverkehrs von qzug= 0,10 kN/m²

in Rechnung gestellt.

Somit ergibt sich eine H-Last infolge des Verkehrs von hzug= 0,03 kN/m²

entspricht je m Gerüsthöhe x Joch shzug= 0,07 kN/m

Summe der H-Lasten aus Wind und Zugverkehr: ssh= 0,40 kN/m Gerüsthöhe und Ständerjoch

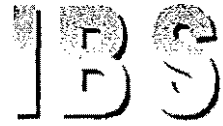
Ermittlung der Schnittgrößen je Gerüstfeld mit H= 12,00 m x L= 2,50 m infolge von Wind

Summe Hw= 4,85 kN/Feld maximaler Wert

Summe Mkw= 9,70 kNm/Feld maximaler Wert

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D-58579 Schalksmühle
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Fax. + (49) 02355-400869
Mail: IBSPECHT1@AOL.COM
Homepage: www.geruestbau-stalik.de



Ermittlung der Eigengewichte der Rüstung:

Ermittlung des Eigengewichtes je Gerüstfeld L= 2,50 x B= 6,00 m x H= 2,00

aus:	Gf=
6,00 m Ständer á 0,05kN/m	0,30 kN
7,50 m Längsriegel á 0,05kN/m	0,38 kN
6,00 m Querriegel á 0,05 kN/m	0,30 kN
6,40 m Querdiagonale á 0,04kN/m	0,26 kN
3,60 m Längsdiagonale (anteilig) á 0,04kN/m	0,14 kN
Summe Gf=	1,38 kN / Gerüstfeld

Somit ergibt sich ein Eigengewicht der Konstruktion je m³ Gerüstvolumen von

gf= 0,05 kN/m³

Ermittlung der Horizontallasten aus dem Netz und den Tragseilen:

Eigengewichte:

Netz: gn=	0,004 kN/m ²
=	0,01 kN/m
Seil: gs=	0,01 kN/m
Netz + Seil: gns=	0,02 kN/m

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Die Seile werden so montiert, dass sich in Feldmitte ein Durchhang bei einer

Länge von 58,00 von ca. 1,50 m ergibt.

H-Last infolge gns: $H_{gns} = q \times l^2 / (8 \times f)$ vgl. Petersen "Stahlbau"
= 5,61 kN

Windlast parallel zum Netz:

Es wird ein aerodynamischer Beiwert von

$c_w = 0,05$

bezogen auf die Netzfläche in Ansatz gebracht.

Netzfläche je Feld: $A_n = F_l \times L = 145,00 \text{ m}^2$

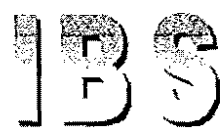
$c_w \times A_n = 7,25 \text{ m}^2$

W-Last aus Netz je Feld: $q_w \times k \times c_f = 0,66 \text{ kN/m}^2$

$H_{wn} = 4,81 \text{ kN / Feld}$

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Nachweiseführung:

e. Vertikale Verstreben:

Im ungünstigsten Fall werden Gerüstrohrdiagonalen mit Normalkupplungen montiert.

Die zulässige Belastung eines Normalkupplung beträgt

zul. +N= 9,09 kN

Die Länge der Diagonalen ist 3,20 m in einem

2,50 m langen Feld.

Es ergibt sich somit eine zulässige H-Last je Strebe von:

zul.+H= 7,10 kN

Es werden 4,00 Strebe in den maßgebenden Bereichen montiert.

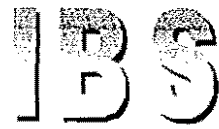
Somit ergibt sich zul.s H= 28,41 kN

Summe der H-Lasten aus Wind : aus Wind auf Gerüst und Netz, aus Staudruck aus Zugverkehr, aus Schleifen
der Seite, aus Durchhang

Summe Hw= 17,01 kN < zul. H= 28,41 kN

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Knicknachweis der Querstreben:

je Strebe: Neigung: 2/3

maßgebende Schnittgrößen: vorh. N= 5,10 kN

Stahlgüte= St 37,00

Abmessungen:

D_a= 48,30 mm

t= 2,40 mm

d_i= 43,50 mm

A= 3,46 cm²

W= 3,78 cm³

I= 9,14 cm⁴

i= 1,63 cm

f_{y,k}= 24,00 kN/cm²

Plastische Grenzschnittgrößen:

N_{pl}= 83,06 kN

γ_m= 1,10

N_{pl,d}= 75,51 kN

γ_f= 1,50

zul.+N= 50,34 kN

freie Rohrlänge:

l= 3,60 m

β= 1,00

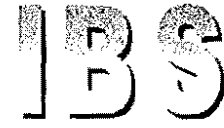
s_k= 360,00 cm

i= 1,63 cm

λ= 221,53

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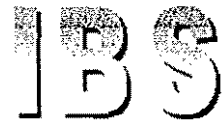
Dipl.-Ing. Joachim Specht
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bezogene $\lambda=$	2,38	BSG=	92,90
gem.Knicklinie b	$\kappa=$		0,15
	k=		3,71
	zul.-N=		-7,67 kN
	vorh.-N=		5,10 kN

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Gerüstständer:

Ermittlung des Eigengewichtes je Ständer (Innenständer ist maßgebend) :

anteilige Feldlänge: 2,50 m

anteilige Gerüstbreite: 1,50 m

anteilige Gerüsthöhe: 12,00 m ergibt $dV=$ 45,00 m³

aus $g=$ 0,05 kN/m³ ergibt sich somit $G=$ 2,06 kN

aus dem Eigengewicht der Netze und Seile: $G_n=$ 1,45 kN

aus dem Kippmoment / Basisbreite

aus Netzen, Seilen und Wind: $ssH=$ 12,16 kN

mit 12,00 m Gerüsthöhe ergibt ein Moment von 145,96 kNm

aus Wind und H-Last aus Zugverkehr auf Gerüst $ssh=$ 0,40 kN/m bei 12,00 m Gerüsthöhe

ergibt ein zusätzliches Moment von $M_w=$ 29,09 kNm

Summe $M=$ 175,06 kNm

Basisbreite der Rüstung, 6,00 m

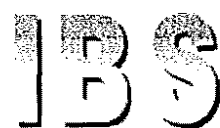
Somit ergibt sich eine anteilige Normalkraft im Ständer von $+N_m=$ 29,18 kN

zzgl. $-N$ infolge von $g=$ $-N_g=$ 3,51 kN

Summe $-N=$ 32,69 kN

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Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schalksmühle
Tel. + (49) 02355-400867
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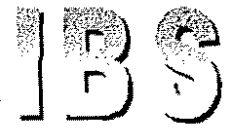
Knicknachweis der Ständer:

Die Gerüstständer innen und außen werden mittels zusätzlicher paralleler Gerüstrohre mit Kupplungsverbindungen im Höhenabstand von 1,00m als Doppelständer ausgeführt. Dadurch reduziert sich die Knicklänge der Systemständer auf $s_k = 1,00\text{m}$.

Summe	N=	-32,69 kN
	Stahlgüte=	St 37,00 mit erhöhter $f_{s, \text{gem.}}$ Zulassung
	Ständer	Da= 48,30 mm
		t= 3,25 mm
		di= 41,80 mm
		A= 4,60 cm ²
		W= 4,86 cm ³
		I= 11,73 cm ⁴
		i= 1,60 cm
Druckstab:	-N=	32,69 kN
Fließgrenze:	$f_{y,k}$ =	32,00 kN/cm ²
Plastische Grenzschnittgrößen	N _{pl} =	147,19 kN
	γ_m =	1,10
	N _{pl,d} =	133,81 kN
	γ_f =	1,50
	zul.+N=	89,20 kN
Die freie Knicklänge des Stabes ist	a=	1,00 m

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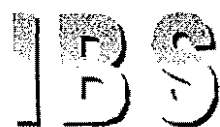
Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schalksmühle
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	$\beta=$		1,00
	$sk=$		100,00 cm
	$i=$		1,60 cm
	$\lambda=$		62,62
bezogene $\lambda=$	0,78	BSG=	80,50
gem.Knicklinie b	$k=$		0,74
	$\kappa=$		0,90
	zul.-N=		65,83 kN
	vorh. -N=		32,69 kN

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Zugverbindung der Ständerstöße:

Vorlast aus Moment:		29,18 kN
Vorlast aus Eigengewicht:	-	3,51 kN
	Summe:	25,66 kN
Je Ständer somit:	+Ns=	25,66 kN

Für den Nachweis der Ständer wird die zugfeste Verbindung der Ständerstöße mittels

Verschraubung mit M12 er Schrauben maßgebend.

Eine Schraube je Stoß (vgl. Aufbauanleitung des Herstellers)

Beanspruchungen und Beanspruchbarkeiten der

Verbindung, gemäß DIN 18800 Teil 1

vorh. N=	25,66 kN
Schrauben je Stoß und Seite	1,00 Stück
vorh V je Schraube =	25,66 kN

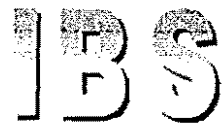
Kennwerte der einzelnen Bauteile:

Querschnittswerte des Ständers:

Stahlgüte	St 37
d aussen	4,83 cm
d innen =	4,19 cm
t gurtrohr =	0,32 cm
f _{y,k} =	32,00 kN/cm ²
erhöhte Streckgrenze gem. Zulassung	
f _{u,k} =	36,00 kN/cm ²

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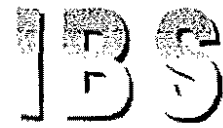


Querschnittswerte des Rohrverbinders:

Stahlgüte	St 37
d RV aussen =	3,80 cm
d RV innen =	3,16 cm
t RV =	0,32 cm
f _{y,k} =	32,00 kN/cm ²
f _{u,k} =	36,00 kN/cm ²

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Einzelnachweise:

1.) Zug des geschwächten Ständers:

vorh. N = 25,66 kN
N_d = vorh N * 1,5 = 38,50 kN
N_{R,d} = Anetto Gurtrrohr * f_{u,k} / (1,25 * gamma_M)
Anetto Gurtrrohr = $(3,1415 * (d_a * d_a - d_i^2) / 4) - 2 * d_L * t_{\text{Gurtrrohr}}$
Anetto Gurtrrohr = 3,64 cm²
N_{R,d} = Anetto Gurtrrohr * f_{u,k} / (1,25 * gamma_M) =
95,24 kN

Nachweis auf Zug

$N_d / N_{R,d} < 1,00$
 $0,40 < 1,00$

Nachweis erfüllt!

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Dipl.-Ing. Joachim Specht
Unterm Ried 5
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Tel. +(49) 02355-400867
Fax. +(49) 02355-400869
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2.) Zug des Rohrverbinders:

$$\text{vorh. } N = 25,66 \text{ kN}$$

$$N_d = \text{vorh } N \cdot 1,5 = 38,50 \text{ kN}$$

$$N_{R,d} = \text{Anetto RV} \cdot f_{u,k} / (1,25 \cdot \gamma_M)$$

$$\text{Anetto RV} = (3,1415 \cdot (d_a \cdot d_a - d_i \cdot d_i) / 4) \cdot 2 \cdot d_L \cdot t_{RV}$$

$$\text{Anetto RV} = 2,60 \text{ cm}^2$$

$$N_{R,d} = \text{Anetto RV} \cdot f_{u,k} / (1,25 \cdot \gamma_M) = 60,56 \text{ kN}$$

Nachweis auf Zug

$$N_d / N_{R,d} < 1,00$$

$$0,64 < 1,00$$

Nachweis erfüllt!

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3.) Abscheren und Lochleibung

Grenzabscherkraft für 2-schnittige Verbindung

$$V_{a,R,d} = (A \cdot a \cdot f_{u,b,k}) / \gamma_{M}$$

mit $a = 0,60$

$$A = A_{sch} = 1,13 \text{ cm}^2$$

$$A = A_{sp} = 0,84 \text{ cm}^2$$

entweder A_{sch} = Schaftquerschnitt

oder A_{sp} = Gewindequerschnitt

$$\gamma_{M} = 1,10$$

bzw. $1,25$

wenn es sich um eine

einschnittige ungestützte

Verbindung handelt.

$f_{u,b,k}$ = Zugfestigkeit der Schraube

Festigkeit 10.9 100,00 kN/cm²

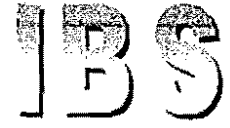
$$\text{vorh } V = 25,66 \text{ kN}$$

$$V_{a,d} = 38,50 \text{ kN}$$

$$V_{a,R,d} \text{ für Klasse 10.9} = 123,27 \text{ kN}$$

Ingenieur- & Sachverständigen-Büro für den Gerüstbau

Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schalksmühle
Tel. +(49) 02355-400867
Fax. +(49) 02355-400869
Mail: IBSPECHT1@AOL.COM
Homepage: www.geruestbau-statik.de



Nachweis auf Abscheren:

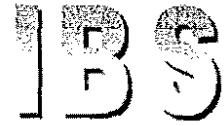
$$V_{a,d} / V_{a,R,d} < 1,00$$

$$= 0,31 < 1,00$$

erfüllt

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Unterm Ried 5
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4.) Lochleibung

Grenzlochleibungskraft

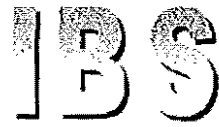
$V_{l,R,d}$	=	$(t \cdot d_{sch} \cdot \alpha_1 \cdot f_{y,k}) / \gamma_{M}$	
	mit	$d_{sch} =$	1,20 cm
		$d_L =$	1,40 cm
		$e_1 =$	4,20 cm
		$e =$	4,00 cm
		$3,5 \cdot d_L =$	4,90 cm
		$e_3 =$	5,02 cm
		$> 3,0 \cdot 1,4 =$	4,20 cm
α_1	=	$(1,1 \cdot e_1 / d_L) - 0,3 =$	3,00
α_1	=	$(1,08 \cdot e / d_L) - 0,77 =$	2,32
		$\min t = 2 \cdot 0,4 =$	0,80 cm
St 37	$f_{y,k} =$		32,00 kN/cm ²
St 37	$V_{l,R,d} =$		64,67 kN

Nachweis braucht hier nicht mehr geführt zu werden,

da die Grenzlochleibungskraft $V_{l,R,d} > V_{a,R,d}$ ist

Ingenieur- & Sachverständigen-Büro für den Gerüstbau

Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schalksmühle
Tel. +(49) 02355-400867
Fax. +(49) 02355-400869
Mail: IBSPECHT1@AOL.COM
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5.) Grenzbiegemoment im Bolzen

Diese Ermittlung gilt für Bolzen

mit einem Lochspiel von 0,1 bis max 3,0 mm

$$M_{R,d} = W_{sch} \cdot (f_{y,b,k}) / (1,25 \cdot \gamma_M)$$

mit

$$W_{sch} = r^3 \cdot \pi / 4 = 0,17 \text{ cm}^3$$

$$r = 0,60 \text{ cm}$$

$$\gamma_M = 1,10$$

$$10,9 \quad f_{y,b,k} = 90,00 \text{ kN/cm}^2$$

$$M_{R,d} = 11,10 \text{ kNcm}$$

$$\text{vorh } M = (V/2) \cdot ((t_1/2) + s + t_2) - (t_2/2)$$

$$M_d = 1,5 \cdot (V/2) \cdot ((t_1/2) + s + t_2) - (t_2/2)$$

mit

$$q_2 = V_d / (2 \cdot t_2) = 60,15 \text{ kNcm}$$

$$q_1 = V_d / (2 \cdot t_1) = 60,15 \text{ kN/cm}$$

$$t_1 = t\text{-Rohrverbinder} = 0,32 \text{ cm}$$

$$t_2 = t_{\text{gurt}} = 0,32 \text{ cm}$$

$$d_{RV} = d\text{-Rohrverbinder} = 3,80 \text{ cm}$$

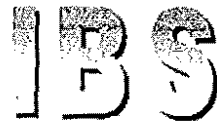
$$s = 48,3 - 2 \cdot t - d_{RV} = 0,20 \text{ cm}$$

$$\text{innen} = d_{RV} \text{ innen} = 3,16 \text{ cm}$$

$$M_d = 9,91 \text{ kNcm}$$

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Dipl.-Ing. Joachim Specht
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Fax. +(49) 02355-400869
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Nachweis Biegung:

	$M_d / M_{R,d}$	<	1,00
10.9	0,89	<	1,00
			erfüllt

Auf Interaktion darf verzichtet werden, wenn

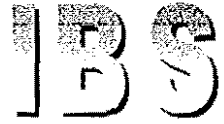
	$V_{a,d} / V_{a,R,d}$	<	0,25
	oder		
	$M_d / M_{R,d}$	<	0,25

Nachweis der Interaktion:

	$(M_d / M_{R,d})^2 + (V_{a,d} / V_{a,R,d})^2$	<	1,00
Schraube 10.9 :	0,89	<	1,00 alle Nachweise erfüllt.

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Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schalksmühle
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Fax. + (49) 02355-400869
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Homepage: www.geruestbau-statik.de



Ermittlung der Ballastierung zur Aufnahme der abhebenden Lasten in den jeweiligen Gerüstständern:

Ermittlung der Ballastierung im Bereich der Außenständer:

aus Summe der Kippmomente: $M_{kw} = 175,06 \text{ kNm/Feld}$

Bei einer Basisbreite der Rüstung von $6,00 \text{ m}$ ergibt sich eine abhebende Lastkomponente von

maßgebende abhebende Last: $-V = 29,18 \text{ kN}$

abzgl. Eigengewicht nur Außenstände $G_a = 1,13 \text{ kN}$

$-V + G_a = 28,05 \text{ kN}$

Unter Berücksichtigung einer Sicherheit von $\gamma = 1,5$ gegen Kippen ergibt sich eine erforderliche Ballastierung der

Außenständer von $\text{erf. Ballast, außen} = 42,08 \text{ kN Ballast je } 2,50 \text{ m Feld}$

Zur Ermittlung der erforderlichen Ballastierung an den Innenständern wird der Lastfall Montage maßgebend!

Die H-Lasten aus Zugverkehr und Wind auf die Standgerüste wird maßgebend!

Moment infolge von Wind und Zugverkehr: $M_w = 9,70 \text{ kNm}$

Bei einer Basisbreite von $6,00 \text{ m}$ ergeben sich abhebende Lasten von

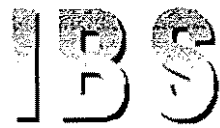
$-V = 1,62 \text{ kN}$

Eigengewicht Innenständer: $G_i = 2,25 \text{ kN}$

erf. Ballast = $1,5 \times V_i - G_i = 0,17 \text{ kN/ Gerüstfeld}$

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Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schaalksmühle
Tel. +(49) 02355-400867
Fax. +(49) 02355-400869
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Homepage: www.geruestbau-statik.de



Nachweis der Bodenpressung unter den Gerüstfußplatten:

Unter jedem Gerüstständer werden 1,00m lange und $2 \times 0,29 \text{ cm} = 0,58\text{m}$ breite, dreifache Gerüstbohlen zur Lastverteilung unterlegt.

Die maximale Vorlast in den Rahmenständern beträgt, gem. vorheriger Berechnung:

max. $V=$ 32,69 kN

aus Ballast zusätzlich 43,00 kN

Summe der Lasten in den Fußpunkten: $\Sigma V=$ 75,69 kN

Die Fußplatten der Gerüstfüße haben die Abmessung: 15cm x 15 cm.

Unter ungünstigster Annahme einer Lastverteilung in der Holzpallung mit 13,5cm Dicke

von 45 Grad ergibt sich somit eine Verteilungsfläche von

$dB=$ 15,00 + $2 \times 13,50 =$ 42,00 cm

$dL=$ 15,00 + $2 \times 13,50 =$ 42,00 cm

somit $A=$ 1764,00 $\text{cm}^2 =$ 0,18 m^2

Somit ergibt sich unter der Lastverteilungsbohle eine Bodenpressung

von $\frac{75,69 \text{ kN}}{0,18 \text{ m}^2} = 429,07 \text{ kN/m}^2$

Dies entspricht 42,91 MN/m^2

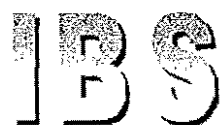
Die Tragfähigkeit des Aufstellgrundes muss bauseitig untersucht werden, sofern dessen Tragfähigkeit

von der Gerüstbaufirma nicht allein nach fachlicher Erfahrung beurteilt werden kann.

Ggf. sind Bodenverbesserungsmaßnahmen erforderlich, oder die Lastverteilung unter den Fußpunkten muss vergrößert werden.

Ingenieur- & Sachverständigen-Büro für den Gerüstbau

Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schalksmühle
Tel. + (49) 02355-400867
Fax. + (49) 02355-400869
Mail: IBSPECHT1@AOL.COM
Homepage: www.geruestbau-statik.de



Nachweis der HEB 400-Träger im Bereich des Dükers als Lastverteilung:

a. Innere Träger = 1 HEB 400:

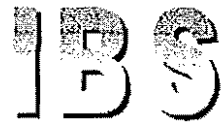
Vorlasten aus dem Gerüst:	32,69 kN/ 2,50m =	13,08 kN/m
aus Eigengewicht der Träger:		1,55 kN/m
	Summe v=	14,63 kN/m
angenommene frei Stützweite der Träger (Annahme deutlich auf der sicheren Seite): L=		12,50 m
Schnittgrößen im Träger: M=	285,65 kNm	
	Q=	91,41 kN
vorh. W=	2880,00 cm ³	
vorh. sy x ts=	48,20 cm ²	
Biegespannung im Träger: SIGMA=	9,92 kN/cm ² << 16,00	
Schubspannung im Träger: TAU=	1,90 kN/cm ² << 9,50 kN/cm ²	

b. äußere Träger = 2 HEB 400:

Vorlasten aus dem Gerüst: Ständerlast + Bal	75,69 kN/ 2,50m =	30,28 kN/m
Eigengewicht von 2 HEB 400:		3,10 kN/m
	Summe v=	33,38 kN/m
je Träger somit	dSv=	16,69 kN/m
angenommene frei Stützweite der Träger (Annahme deutlich auf der sicheren Seite): L=		12,50 m
Schnittgrößen im Träger: M=	325,93 kNm	
	Q=	104,30 kN
vorh. W=	2880,00 cm ³	

Ingenieur- & Sachverständigen-Büro für den Gerüstbau

Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schalksmühle
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Fax. +(49) 02355-400869
Mail: IBSPECHT1@AOL.COM
Homepage: www.geruestbau-statik.de



vorh. $s_y \times t_s =$ 48,20 cm²
Biegespannung im Träger: SIGMA= 11,32 kN/cm² << 16,00
Schubspannung im Träger: TAU= 2,16 kN/cm² << 9,50 kN/cm²

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Dipl.-Ing. Joachim Specht
Unterm Ried 5
D-58579 Schalksmühle
Tel. +(49) 02355-400867
Fax. +(49) 02355-400869
Mail: IBSPECHT1@AOL.COM
Homepage: www.geruestbau-statik.de

IBS

Hinweis:

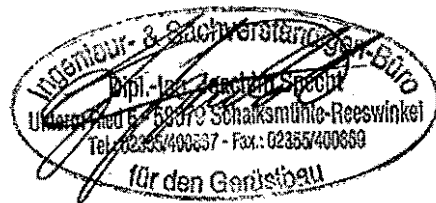
Weitere Nachweise dürfen entfallen.

Alle nicht explizit nachgewiesene Bauteile und Bauteilkombinationen werden von der Gerüstbau-Fachfirma Witte in handwerksgerechter Ausführung unter Beachtung der geltenden Normen und Vorschriften ausgeführt.

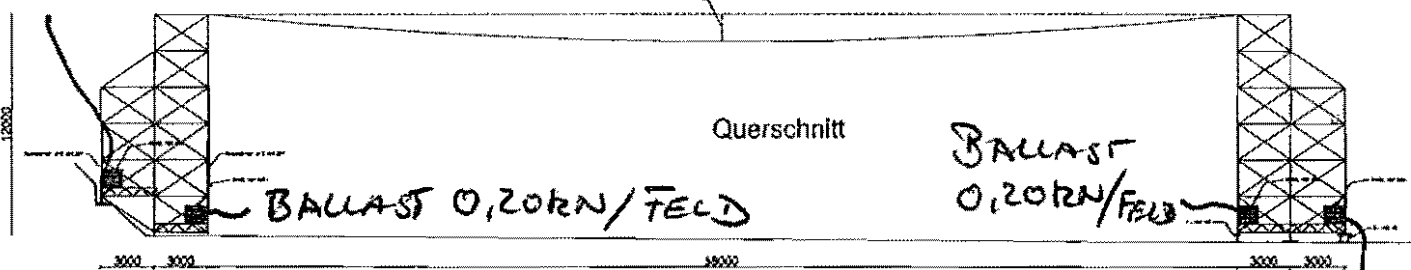
Da die Firma Witte Gerüstbau seit über 30 Jahren derartige Freileitungsgerüste errichtet, darf davon ausgegangen werden, dass diese Firma über ausreichende Erfahrung in der Erstellung derartiger Gerüst-Sonderkonstruktionen verfügt.

aufgestellt, Schalksmühle, den 14.06.2010

Dipl.-Ing. Joachim Specht



BALLAST 43 KN/FELD

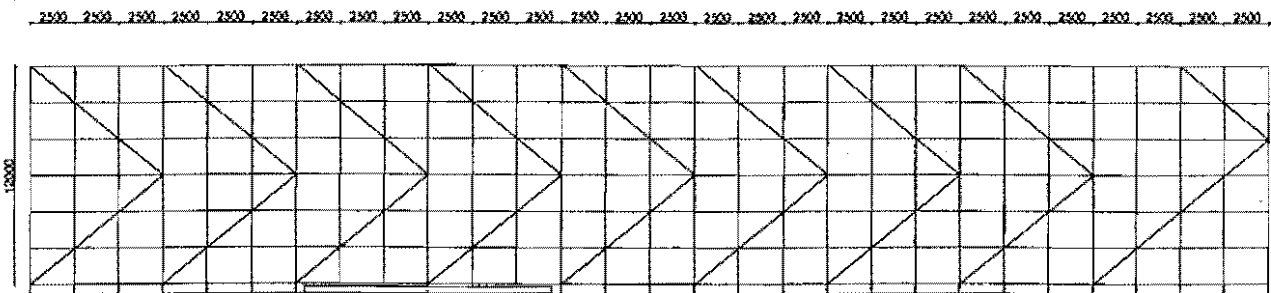
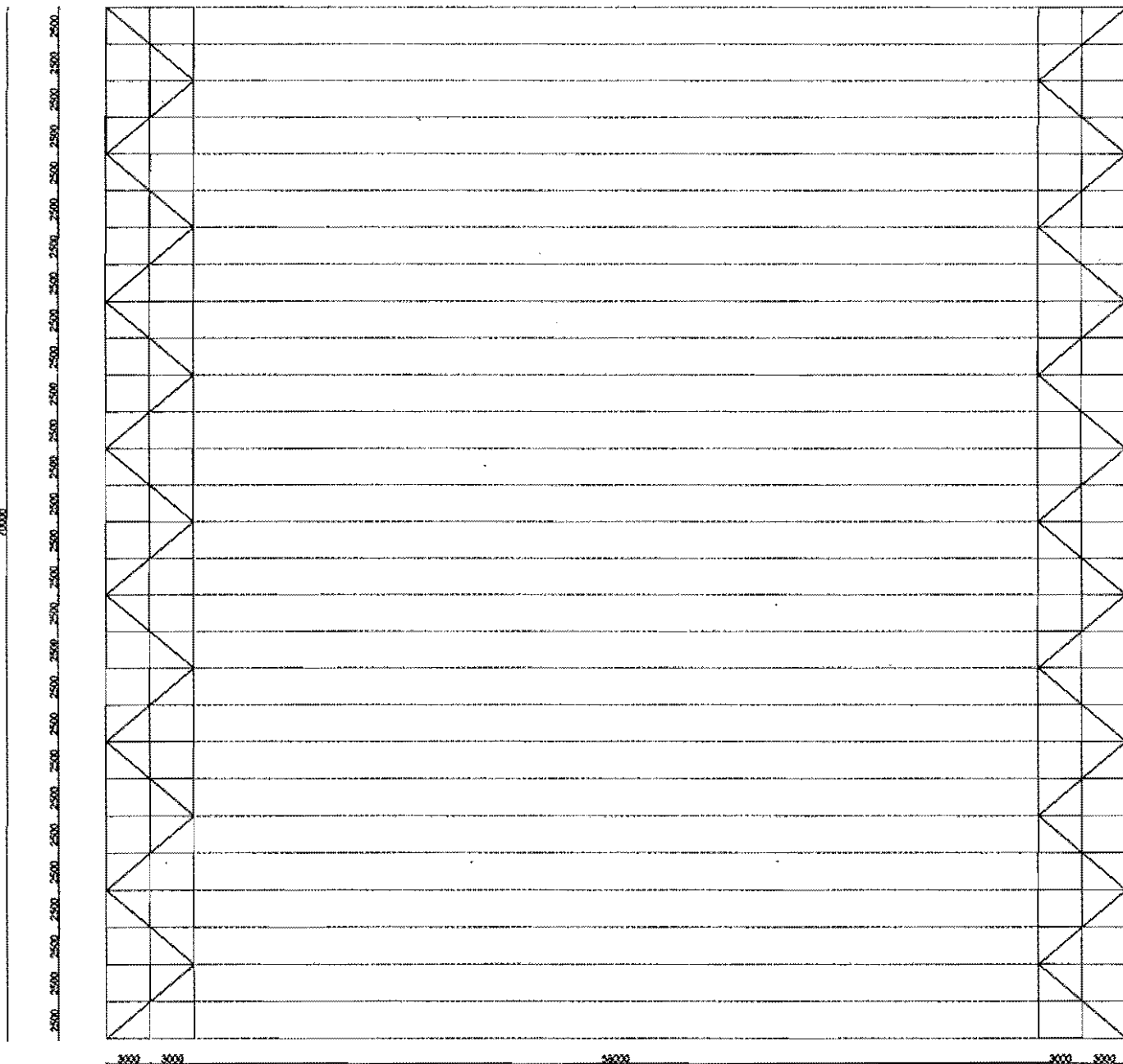


Querschnitt

BALLAST 0,20 KN/FELD

BALLAST 43 KN/FELD

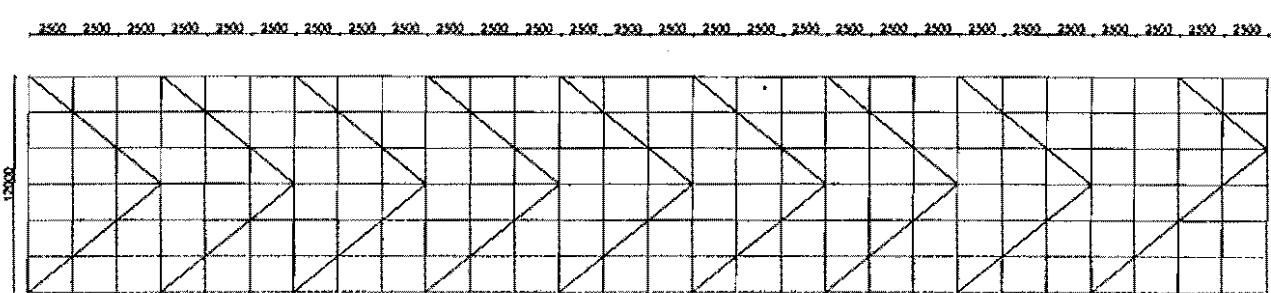
Draufsicht



Ansicht linke Seite

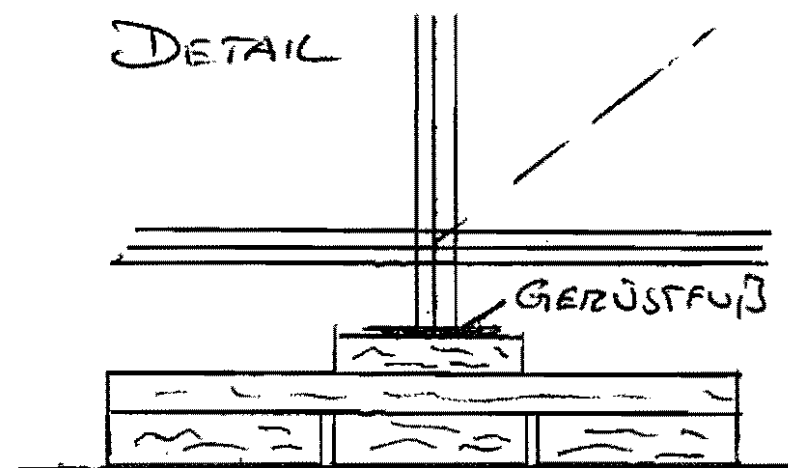
Lastverteilung mit
HEB 400 im
Bereich des
Daches

BALLAST 43 KN/FELD



Ansicht rechte Seite

DETAIL



LASTVERTEILUNG AUS
3-FACHEN UNTERLEGBOHLEN

Zeichnungssatz

IBS

Ingenieur- & Sachverständigen-Büro für den Gerüstbau
Dipl.-Ing. Joachim Specht
Unterm Ried 5
58579 Schalksmühle
Tel. 02355-400887 - Fax 400869
Info@geruestbau-stafik.de

Auftraggeber Firma Gerüstbau Villeri Gredl Fuggenstr. 29 51149 Köln		Anlage zur Kalkül	
Bevorhaben 300 HV Krippen -Bauteile Baueinteil Erreifeungs-Schutzgerüst 2		Blatt Nr.	Projekt Nr. 20200127
Mastabstand c 350m Einfach-Laternast		Datum	Erstellt
Material Rux-Variant-Modulgerüst Gerüstrohre R/Ro (R3x4 (S235)) Gerüst-Kuppelungen nach DIN EN 74 Parafinsätze, gen. Statik Stahl-Geländerträger Typ Rux D113 Belast. nach Statik		gezeichnet	14.06.2010 J. Specht
		geprüft	
		gezeichnet	
		geprüft	
		gezeichnet	
		geprüft	

Ingenieur- & Sachverständigen-Büro
Dipl.-Ing. Joachim Specht
Unterm Ried 5 - 58579 Schalksmühle
Tel. 02355-400887 - Fax: 400869
für den Gerüstbau

14-06-2010

[Signature]

22



06/14/2006































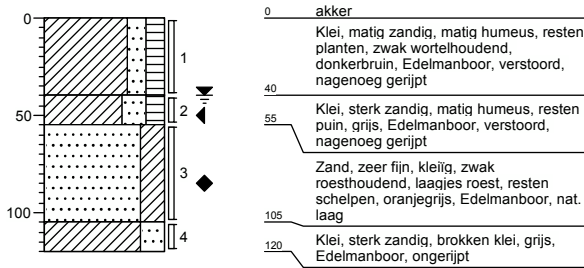
Projectnummer: 315112_DL_1
 Projectnaam: Tennet Borsele - Tilburg
 Boormeester: W. van Hemert

Opdrachtgever: Tennet
 Projectleider: V. de Lange

Boring: 016.B12

Datum: 27-1-2012
 X-coördinaat:
 Y-coördinaat:

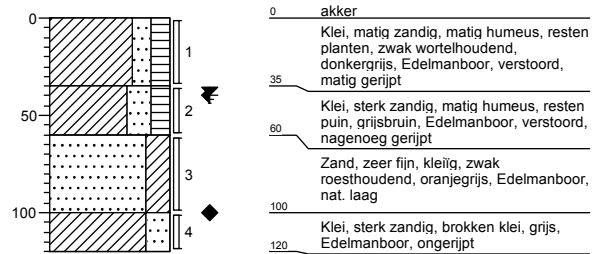
Opmerking: groenbemester



Boring: 016.B13

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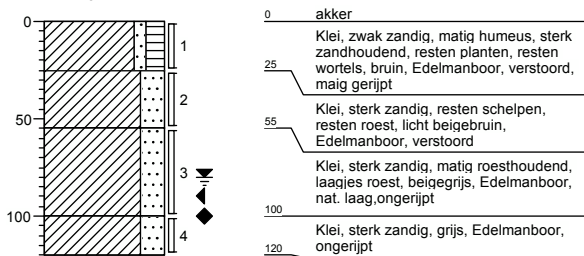
Opmerking: groenbemester



Boring: 016.B14

Datum: 26-1-2012
 X-coördinaat:
 Y-coördinaat:

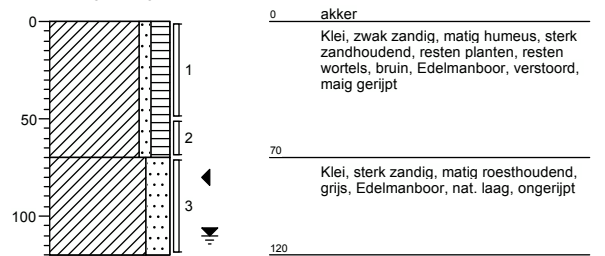
Opmerking: braak



Boring: 016.B15

Datum: 26-1-2012
 X-coördinaat:
 Y-coördinaat:

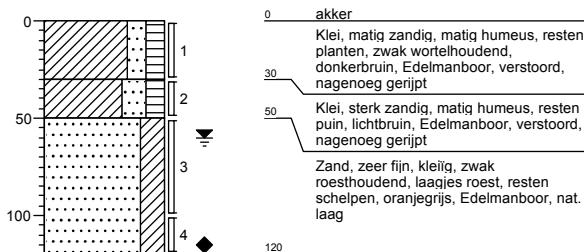
Opmerking: groenbemester



Boring: 016.B16

Datum: 27-1-2012
 X-coördinaat:
 Y-coördinaat:

Opmerking: groenbemester



Boring: 016.MMB

Datum: 26-1-2012
 X-coördinaat:
 Y-coördinaat:

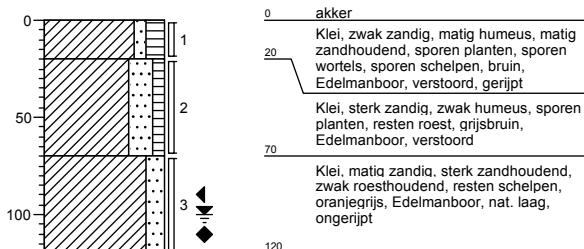
Opmerking: groenbemester



Boring: 017.B01

Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

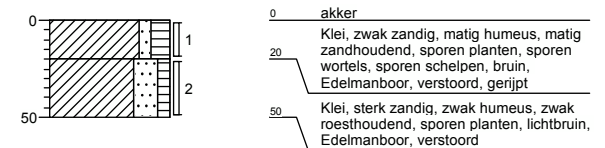
Opmerking:



Boring: 017.B02

Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

Opmerking:

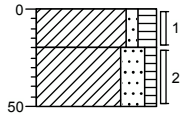


Projectnummer: 315112_DL_1
 Projectnaam: Tennet Borsele - Tilburg
 Boormeester: W. van Hemert

Opdrachtgever: Tennet
 Projectleider: V. de Lange

Boring: 017.B03
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

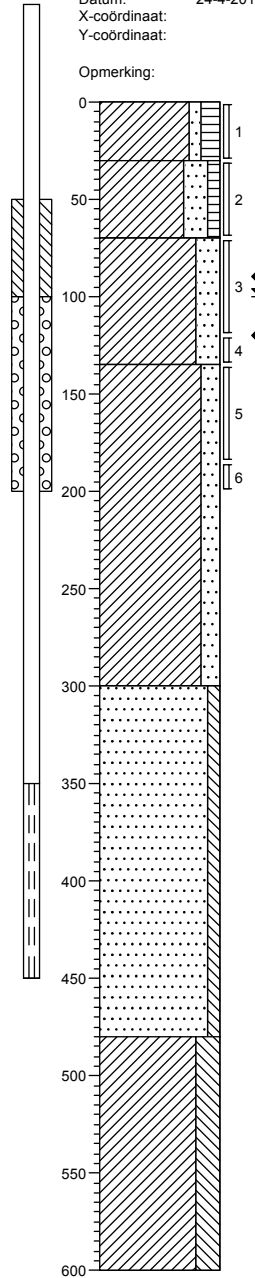
Opmerking:



0 akker
 Klei, zwak zandig, matig humeus, matig zandhoudend, sporen planten, sporen wortels, sporen schelpen, bruin, Edelmanboor, verstoord, gerijpt
 20
 Klei, sterk zandig, zwak humeus, zwak roesthoudend, sporen planten, lichtbruin, Edelmanboor, verstoord
 50

Boring: 017.B04
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

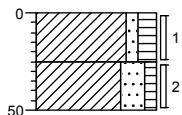
Opmerking:



0 akker
 Klei, zwak zandig, matig humeus, matig zandhoudend, sporen planten, sporen wortels, sporen schelpen, bruin, Edelmanboor, verstoord, gerijpt
 30
 Klei, sterk zandig, zwak humeus, sporen planten, resten roest, grijsbruin, Edelmanboor, verstoord
 70
 Klei, sterk zandig, laagjes roest, matig roesthoudend, resten schelpen, lichtbruin, Edelmanboor, nat laag
 135
 Klei, matig zandig, sterk zandhoudend, zwak roesthoudend, resten schelpen, oranjebruin, Edelmanboor, nat laag, ongerijpt

Boring: 017.B05
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

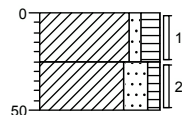
Opmerking:



0 akker
 Klei, zwak zandig, matig humeus, matig zandhoudend, sporen planten, sporen wortels, sporen schelpen, bruin, Edelmanboor, verstoord, gerijpt
 25
 Klei, sterk zandig, zwak humeus, zwak roesthoudend, sporen planten, lichtbruin, Edelmanboor, verstoord
 50

Boring: 017.B06
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

Opmerking:



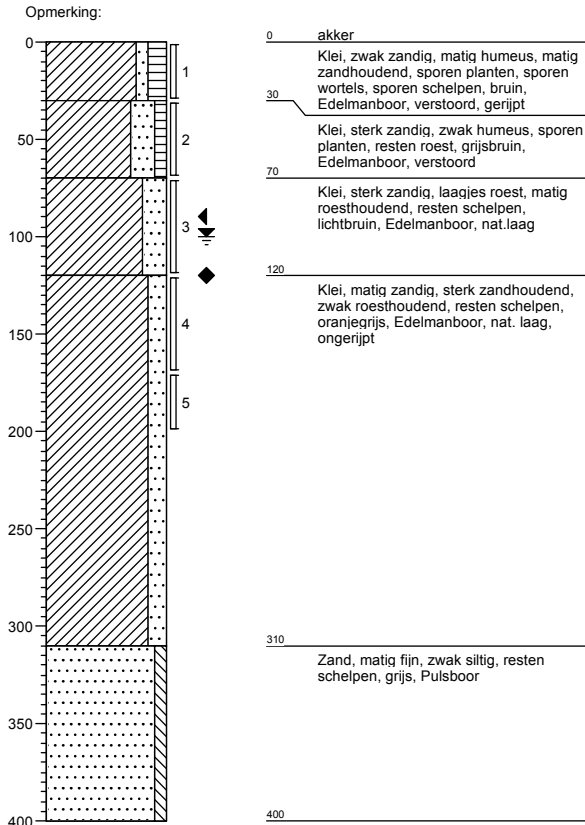
0 akker
 Klei, zwak zandig, matig humeus, matig zandhoudend, sporen planten, sporen wortels, sporen schelpen, bruin, Edelmanboor, verstoord, gerijpt
 25
 Klei, sterk zandig, zwak humeus, zwak roesthoudend, sporen planten, lichtbruin, Edelmanboor, verstoord
 50

300
 Zand, matig fijn, zwak siltig, resten schelpen, grijs, Pulsboor
 480
 Klei, sterk siltig, zwak zandhoudend, donkergrijs, Edelmanboor
 600

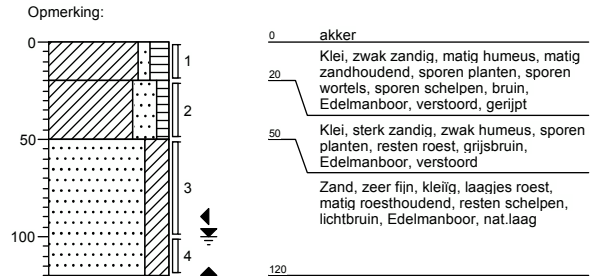
Projectnummer: 315112_DL_1
 Projectnaam: Tennet Borsele - Tilburg
 Boormeester: W. van Hemert

Opdrachtgever: Tennet
 Projectleider: V. de Lange

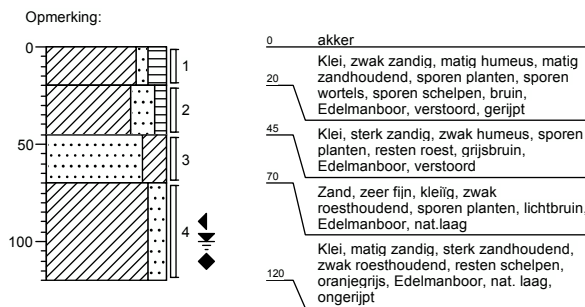
Boring: 017.B07
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



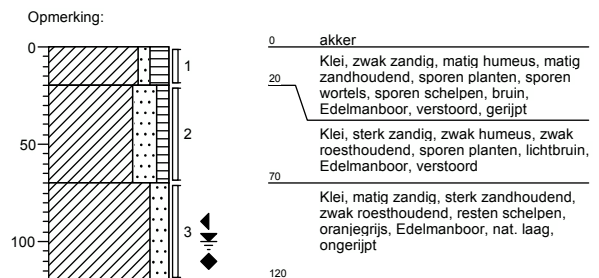
Boring: 017.B08
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



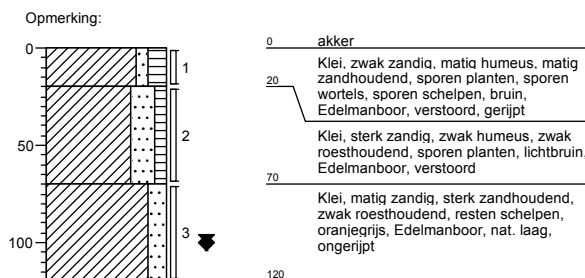
Boring: 017.B09
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



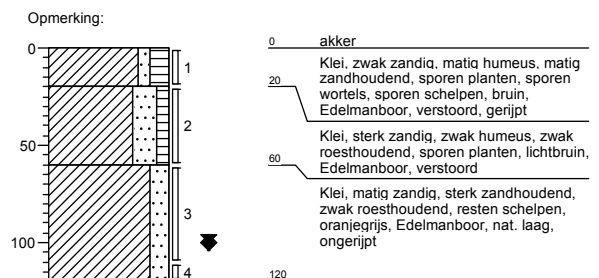
Boring: 017.B10
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



Boring: 017.B11
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



Boring: 017.B12
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

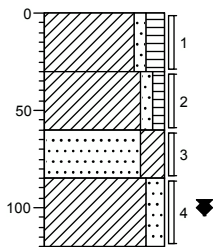


Projectnummer: 315112_DL_1
 Projectnaam: Tennet Borsele - Tilburg
 Boormeester: W. van Hemerrt

Opdrachtgever: Tennet
 Projectleider: V. de Lange

Boring: 017.B13
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

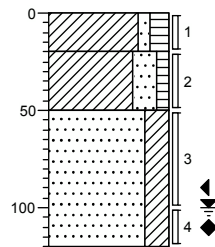
Opmerking:



0 akker
 Klei, zwak zandig, matig humeus, matig zandhoudend, sporen planten, sporen wortels, sporen schelpen, bruin, Edelmanboor, verstoord, gerijpt
 30 Klei, zwak zandig, zwak humeus, matig zandhoudend, sporen planten, sporen wortels, resten schelpen, bruingrijs, Edelmanboor, verstoord, bijna gerijpt
 60 Zand, zeer fijn, kleiig, zwak roesthoudend, lichtbruin, Edelmanboor, nat. laag
 85 Klei, matig zandig, sterk zandhoudend, zwak roesthoudend, resten schelpen, oranje grijs, Edelmanboor, nat. laag, ongerijpt
 120

Boring: 017.B14
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

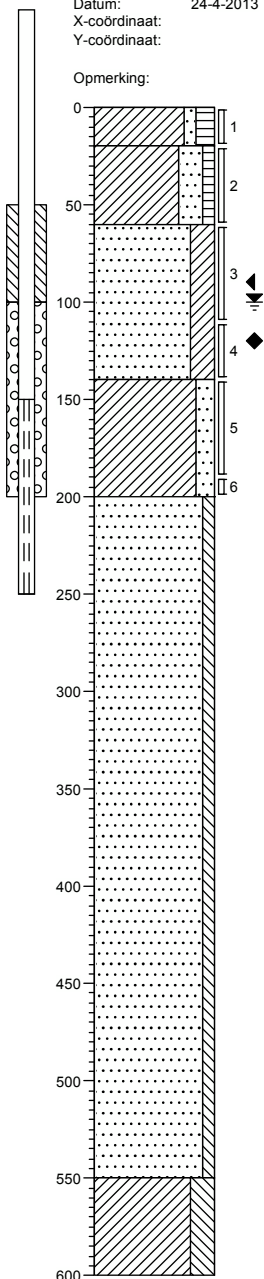
Opmerking:



0 akker
 Klei, zwak zandig, matig humeus, matig zandhoudend, sporen planten, sporen wortels, sporen schelpen, bruin, Edelmanboor, verstoord, gerijpt
 20 Klei, sterk zandig, zwak humeus, sporen planten, resten roest, grijsbruin, Edelmanboor, verstoord
 50 Zand, zeer fijn, kleiig, zwak roesthoudend, sporen planten, lichtbruin, Edelmanboor, nat. laag
 120

Boring: 017.B15
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

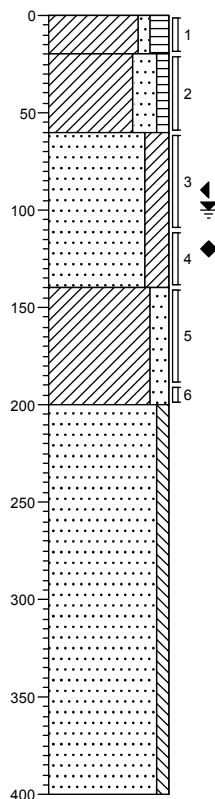
Opmerking:



0 akker
 Klei, zwak zandig, matig humeus, matig zandhoudend, sporen planten, sporen wortels, sporen schelpen, bruin, Edelmanboor, verstoord, gerijpt
 20 Klei, sterk zandig, zwak humeus, sporen planten, resten roest, grijsbruin, Edelmanboor, verstoord
 60 Zand, zeer fijn, kleiig, laagjes roest, matig roesthoudend, lichtbruin, Edelmanboor, nat. laag
 140 Klei, matig zandig, sterk zandhoudend, zwak roesthoudend, resten schelpen, oranje grijs, Edelmanboor, nat. laag, ongerijpt
 200 Zand, matig fijn, zwak siltig, resten schelpen, grijs, Pulsboor
 550 Klei, sterk siltig, zwak zandhoudend, donkergrijs, Edelmanboor
 600

Boring: 017.B16
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

Opmerking:

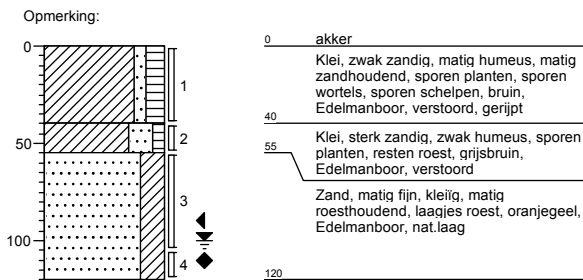


0 akker
 Klei, zwak zandig, matig humeus, matig zandhoudend, sporen planten, sporen wortels, sporen schelpen, bruin, Edelmanboor, verstoord, gerijpt
 20 Klei, sterk zandig, zwak humeus, sporen planten, resten roest, grijsbruin, Edelmanboor, verstoord
 60 Zand, zeer fijn, kleiig, laagjes roest, matig roesthoudend, lichtbruin, Edelmanboor, nat. laag
 140 Klei, matig zandig, sterk zandhoudend, zwak roesthoudend, resten schelpen, oranje grijs, Edelmanboor, nat. laag, ongerijpt
 200 Zand, matig fijn, zwak siltig, resten schelpen, grijs, Pulsboor
 400

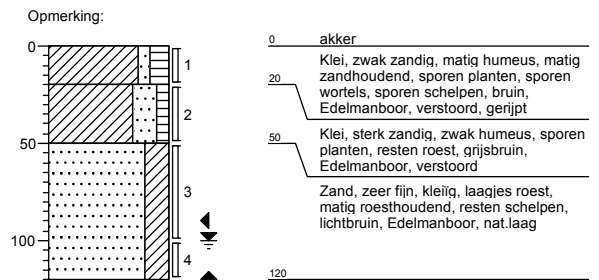
Projectnummer: 315112_DL_1
 Projectnaam: Tennet Borsele - Tilburg
 Boormeester: W. van Hemert

Opdrachtgever: Tennet
 Projectleider: V. de Lange

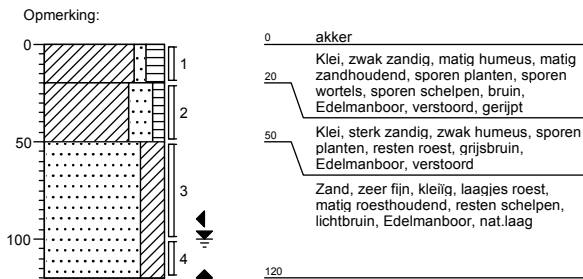
Boring: 017.B17
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



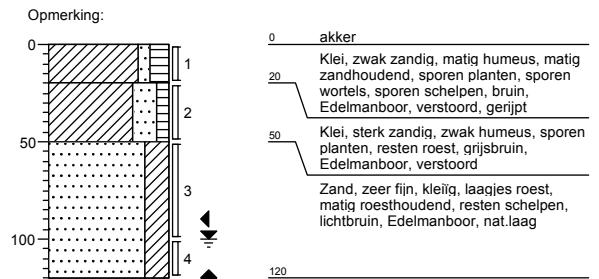
Boring: 017.B18
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



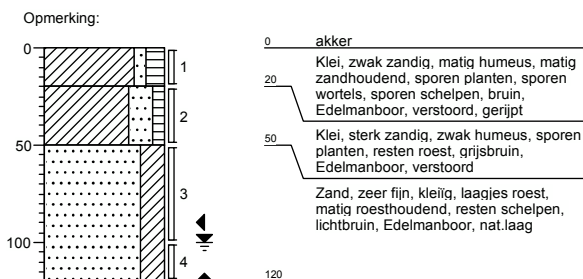
Boring: 017.B19
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



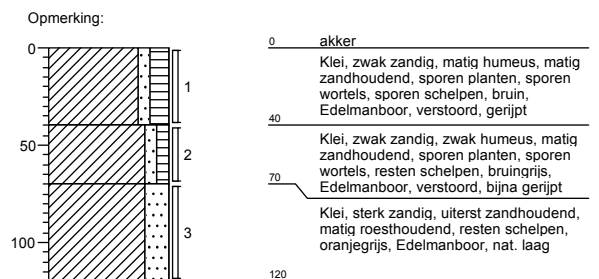
Boring: 017.B20
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



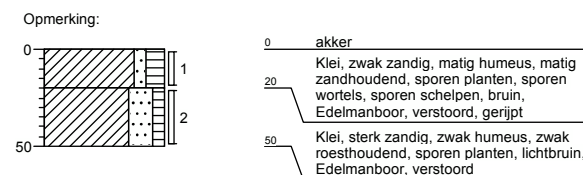
Boring: 017.B21
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



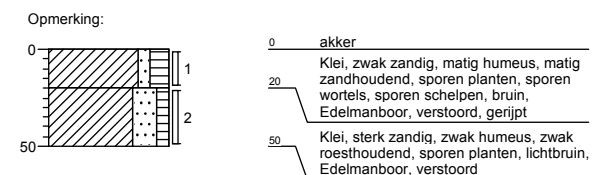
Boring: 017.B22
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



Boring: 017.B24
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



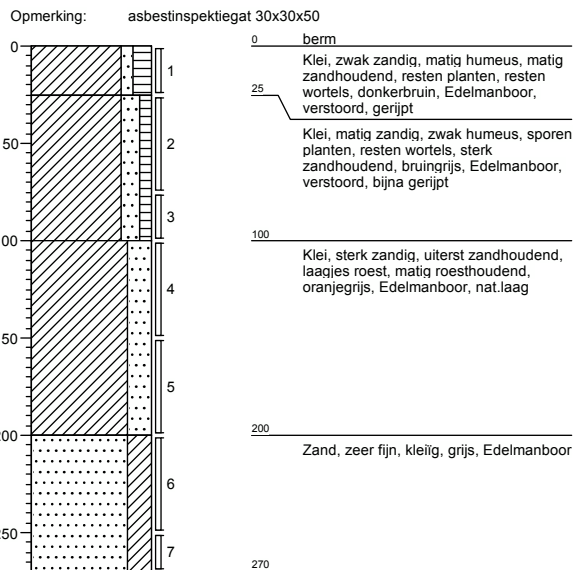
Boring: 017.B25
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



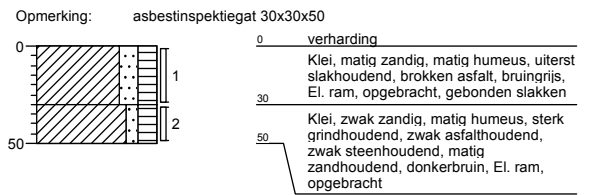
Projectnummer: 315112_DL_1
 Projectnaam: Tennet Borsele - Tilburg
 Boormeester: W. van Hemert

Opdrachtgever: Tennet
 Projectleider: V. de Lange

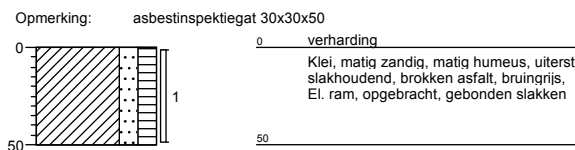
Boring: 017.B26
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



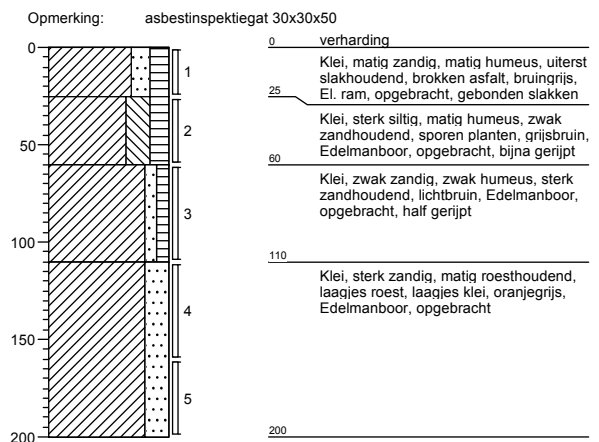
Boring: 017.G01
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



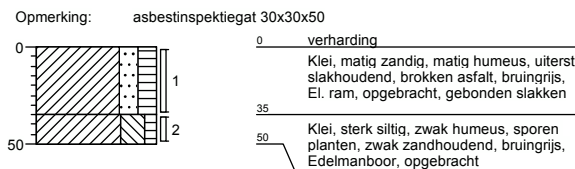
Boring: 017.G02
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



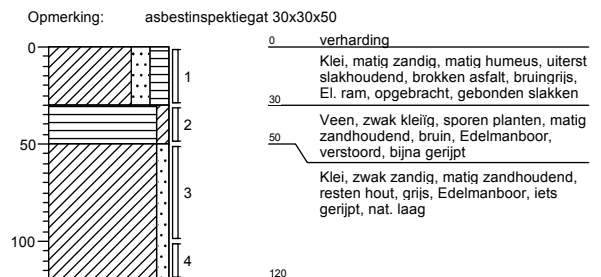
Boring: 017.G03
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



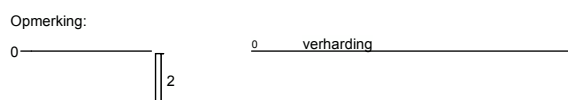
Boring: 017.G04
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



Boring: 017.G05
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



Boring: 017.MM1
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



Boring: 017.MMB
 Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:

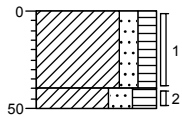


Projectnummer: 315112_DL_1
 Projectnaam: Tennet Borsele - Tilburg
 Boormeester: W. van Hemert

Opdrachtgever: Tennet
 Projectleider: V. de Lange

Boring: 018.B02
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

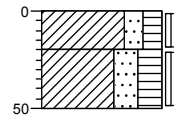
Opmerking:



0 akker
 Klei, matig zandig, matig humeus, sterk zandhoudend, sporen planten, resten wortels, resten schelpen, bruin, Edelmanboor, gerijp, verstoord
 40
 Klei, sterk zandig, sterk humeus, uiterst zandhoudend, resten schelpen, resten roest, bruingrijs, Edelmanboor, verstoord

Boring: 018.B03
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

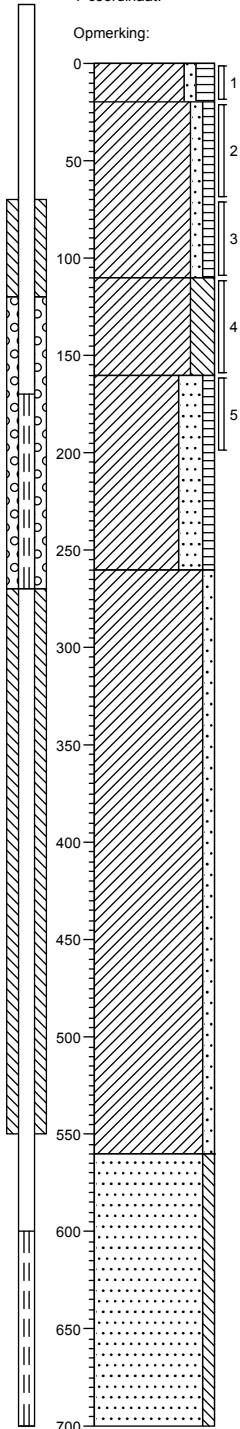
Opmerking:



0 akker
 Klei, matig zandig, matig humeus, sterk zandhoudend, sporen planten, resten wortels, resten schelpen, bruin, Edelmanboor, gerijp, verstoord
 20
 Klei, sterk zandig, sterk humeus, uiterst zandhoudend, resten schelpen, resten roest, bruingrijs, Edelmanboor, verstoord

Boring: 018.B04
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

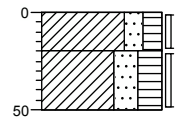
Opmerking:



0 akker
 Klei, zwak zandig, matig humeus, sterk zandhoudend, sporen planten, resten schelpen, sporen wortels, bruin, Edelmanboor, verstoord, bijna gerijp
 20
 Klei, zwak zandig, zwak humeus, resten schelpen, matig roesthoudend, uiterst zandhoudend, licht oranjebruin, Edelmanboor, verstoord, iets gerijp
 110
 Klei, sterk siltig, resten zand, sporen slib, sporen planten, grijs, Edelmanboor, nat. laag, ongerijp
 160
 Klei, sterk zandig, zwak humeus, uiterst zandhoudend, resten slib, sporen planten, zwak schelphoudend, grijs, Edelmanboor, ongerijp
 260
 Klei, zwak zandig, sterk zandhoudend, laagjes klei, grijs, Edelmanboor, ongerijp
 560
 Zand, zeer fijn, zwak siltig, grijs, Edelmanboor
 700

Boring: 018.B05
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

Opmerking:



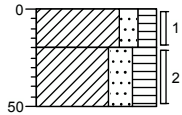
0 akker
 Klei, matig zandig, matig humeus, sterk zandhoudend, sporen planten, resten wortels, resten schelpen, bruin, Edelmanboor, gerijp, verstoord
 20
 Klei, sterk zandig, sterk humeus, uiterst zandhoudend, resten schelpen, resten roest, bruingrijs, Edelmanboor, verstoord

Projectnummer: 315112_DL_1
 Projectnaam: Tennet Borsele - Tilburg
 Boormeester: W. van Hemert

Opdrachtgever: Tennet
 Projectleider: V. de Lange

Boring: 018.B06
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

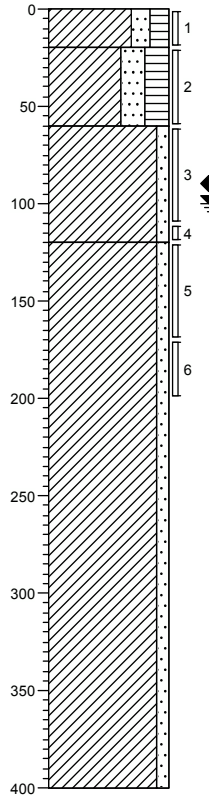
Opmerking:



0 akker
 Klei, matig zandig, matig humeus, sterk zandhoudend, sporen planten, resten wortels, resten schelpen, bruin, Edelmanboor, gerijp, verstoord
 20
 Klei, sterk zandig, sterk humeus, uiterst zandhoudend, resten schelpen, resten roest, bruingrijs, Edelmanboor, verstoord
 50

Boring: 018.B07
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

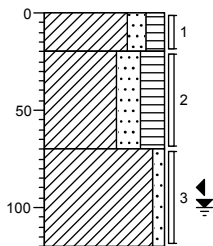
Opmerking:



0 akker
 Klei, matig zandig, matig humeus, sterk zandhoudend, sporen planten, resten wortels, resten schelpen, bruin, Edelmanboor, gerijp, verstoord
 20
 Klei, sterk zandig, sterk humeus, uiterst zandhoudend, resten schelpen, resten roest, bruingrijs, Edelmanboor, verstoord
 60
 Klei, zwak zandig, matig zandhoudend, resten schelpen, resten roest, laagjes roest, oranje grijs, Edelmanboor, nat.laag, ongerijpt
 120
 Klei, zwak zandig, sterk zandhoudend, resten schelpen, grijs, Edelmanboor, ongerijpt
 400

Boring: 018.B08
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

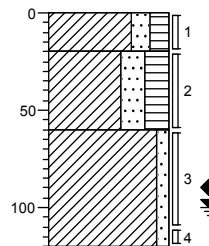
Opmerking:



0 akker
 Klei, matig zandig, matig humeus, sterk zandhoudend, sporen planten, resten wortels, resten schelpen, bruin, Edelmanboor, gerijp, verstoord
 20
 Klei, sterk zandig, sterk humeus, uiterst zandhoudend, resten schelpen, resten roest, bruingrijs, Edelmanboor, verstoord
 70
 Klei, zwak zandig, matig zandhoudend, resten schelpen, resten roest, laagjes roest, oranje grijs, Edelmanboor, nat.laag, ongerijpt
 120

Boring: 018.B09
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

Opmerking:



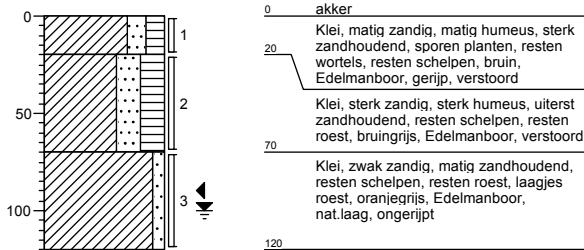
0 akker
 Klei, matig zandig, matig humeus, sterk zandhoudend, sporen planten, resten wortels, resten schelpen, bruin, Edelmanboor, gerijp, verstoord
 20
 Klei, sterk zandig, sterk humeus, uiterst zandhoudend, resten schelpen, resten roest, bruingrijs, Edelmanboor, verstoord
 60
 Klei, zwak zandig, matig zandhoudend, resten schelpen, resten roest, laagjes roest, oranje grijs, Edelmanboor, nat.laag, ongerijpt
 120

Projectnummer: 315112_DL_1
 Projectnaam: Tennet Borsele - Tilburg
 Boormeester: W. van Hemert

Opdrachtgever: Tennet
 Projectleider: V. de Lange

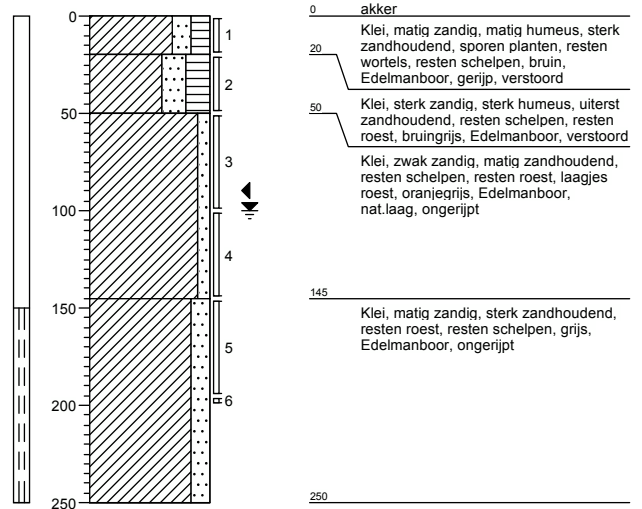
Boring: 018.B10
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

Opmerking:



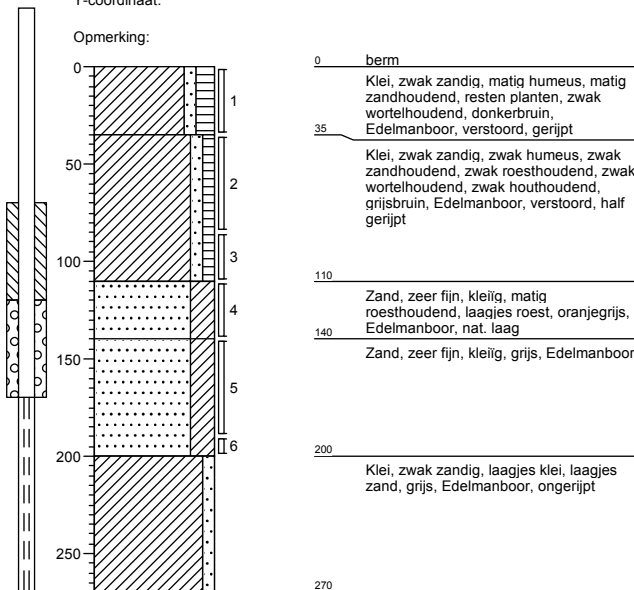
Boring: 018.B11
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

Opmerking:



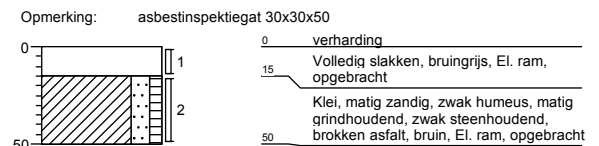
Boring: 018.B14
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

Opmerking:



Boring: 018.G01
 Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:

Opmerking:

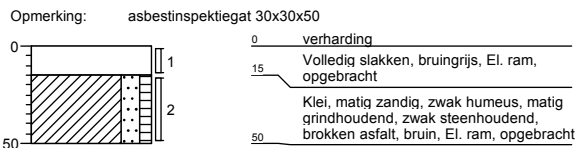


Projectnummer: 315112_DL_1
 Projectnaam: Tennet Borsele - Tilburg
 Boormeester: W. van Hemert

Opdrachtgever: Tennet
 Projectleider: V. de Lange

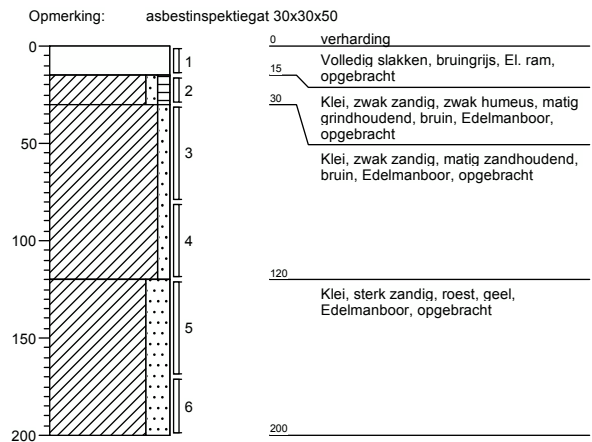
Boring: 018.G02

Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:



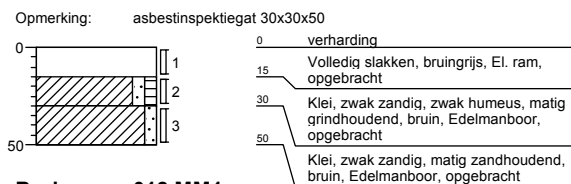
Boring: 018.G03

Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:



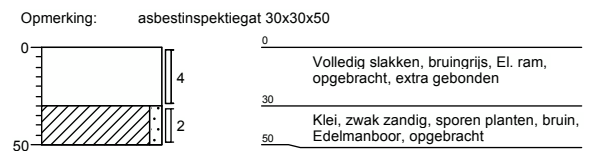
Boring: 018.G04

Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:



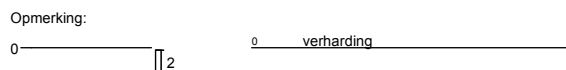
Boring: 018.G05

Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:



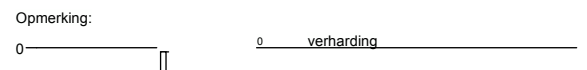
Boring: 018.MM1

Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:



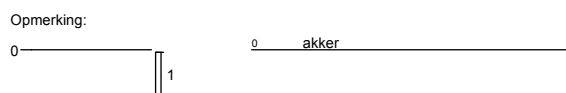
Boring: 018.MM2

Datum: 25-4-2013
 X-coördinaat:
 Y-coördinaat:



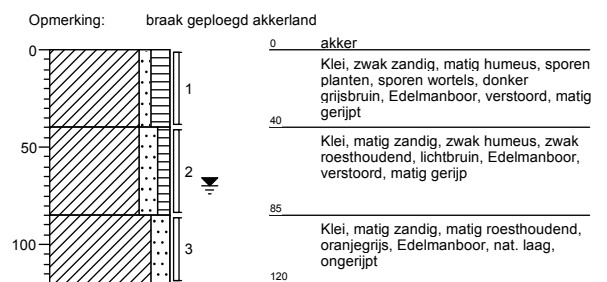
Boring: 018.MB

Datum: 24-4-2013
 X-coördinaat:
 Y-coördinaat:



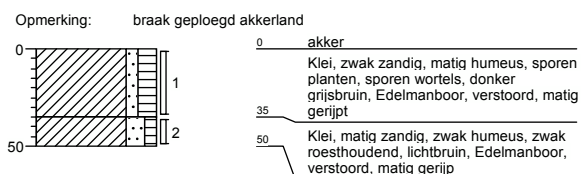
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Datum: 31-1-2012
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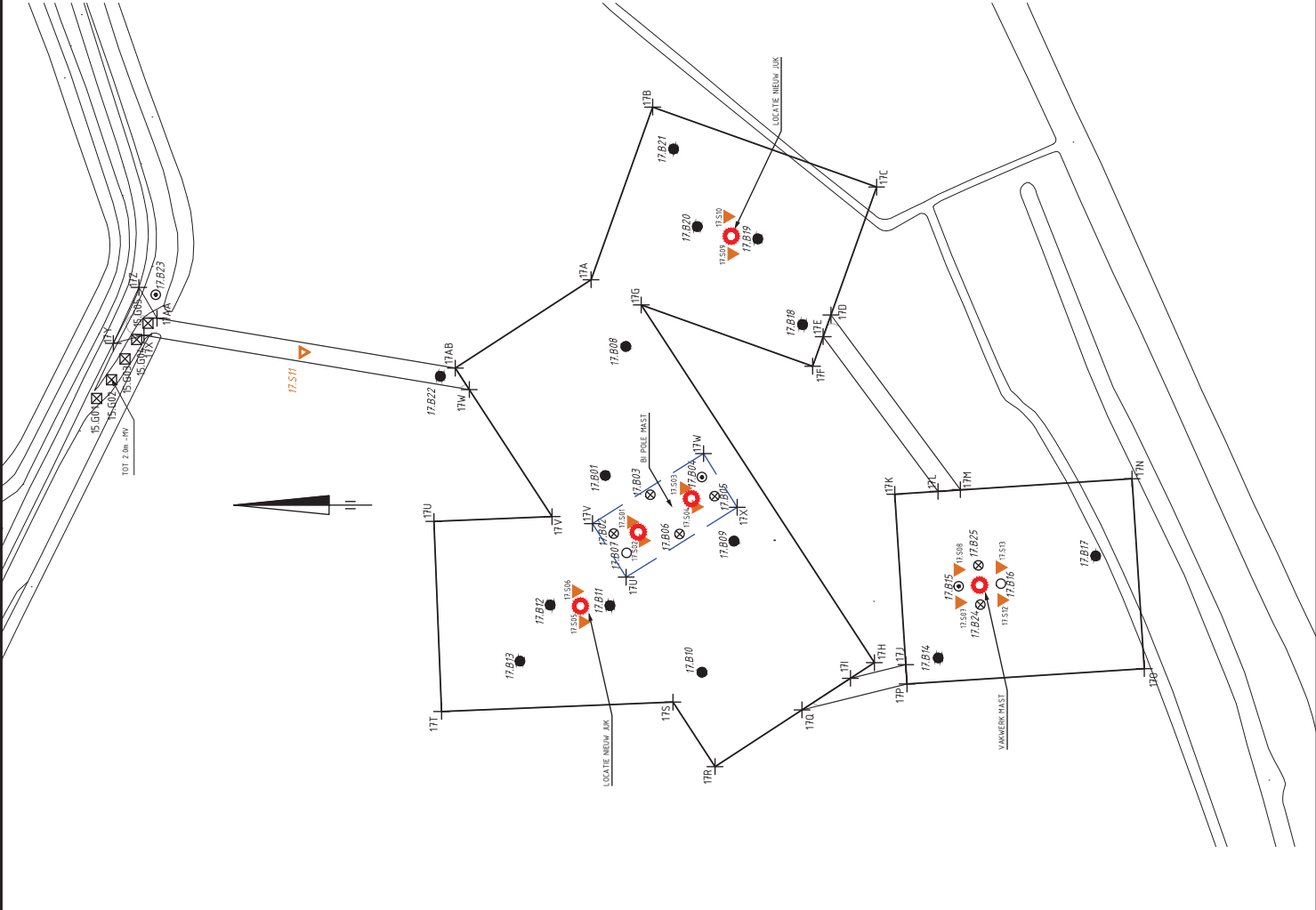
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 X-coördinaat:
 Y-coördinaat:






Boring: 019.B03










Datum: 31-1-2012
 X-coördinaat:
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Verklaring

-  Werkterrein + toegangsweg
-  Bouwput
-  Masten

-  Locatie sondering tot 40 m-mv of 16 ton
-  Locatie sondering tot 20 m-mv
-  Locatie boring tot 0.5 m-mv
-  Locatie boring tot 1.2 m-mv
-  Locatie boring tot 2.0 m-mv
-  Locatie boring tot 4.0 m-mv
-  Locatie boring + peilbuis tot watervoerende zandlaag of max. 6 m-mv
-  Locatie asbestinspectiegat (0,3mx0,3m) tot 0.5 m-mv
-  Locatie asbestinspectiegat tot min. 1.2 m-mv max. 2.2m-mv

Maaiveldhoogte in m t.o.v. N.A.P.



Gronddepot: locatie voor gescheiden opslag van
 feelaarde, B- en C-grond

hb Hor. bronnering vb Vert. bronnering ob Open bemaling dp Diepwell bemaling

Gekeurd door	TBI	Gecontroleerd door		Goedgekeurd		Besteknummer		Bld	17	Aantal	...	Taal	NL	Documentstatus	CONCEPT
Projectnummer	315112	Tekeningnummer	315112-RMD-316-T001-17			Schaal	1:1500	Formaat	A3	Documenttype	Tekening	Datum van uitgave	05-01-2012	315112-RMD-316-T001	

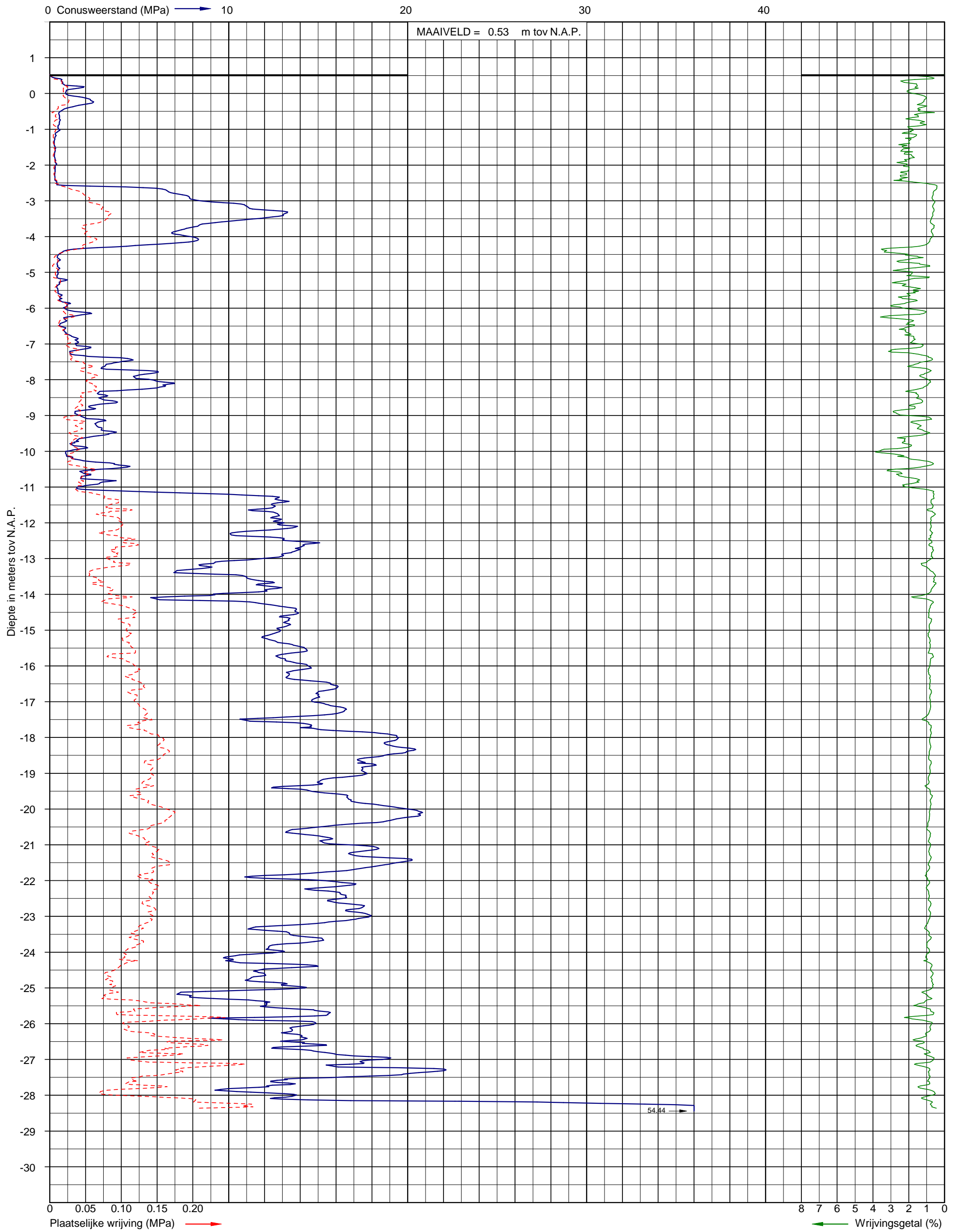
Project
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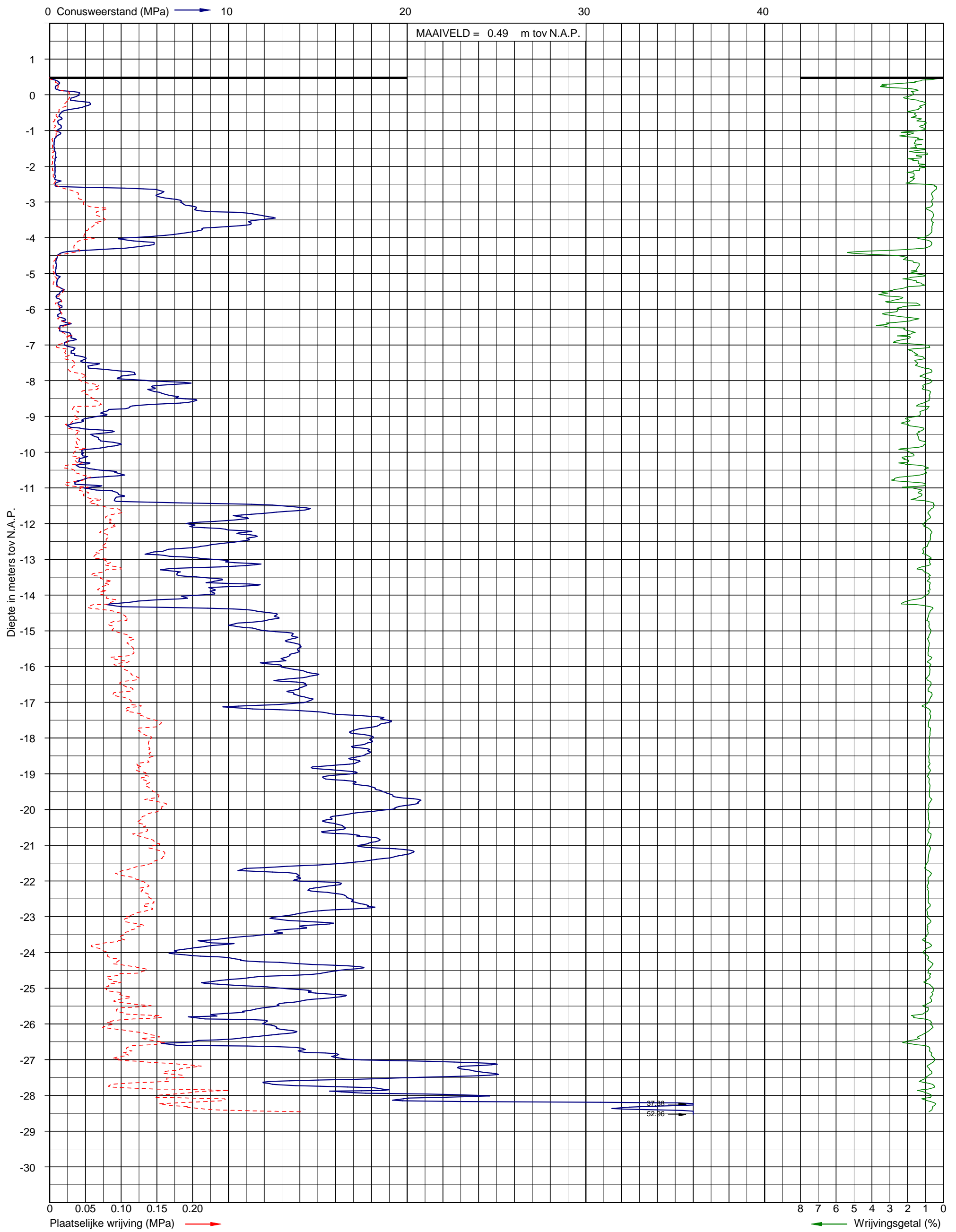
Opdrachtgever
TENNET TSO B.V.
 Onderdeel

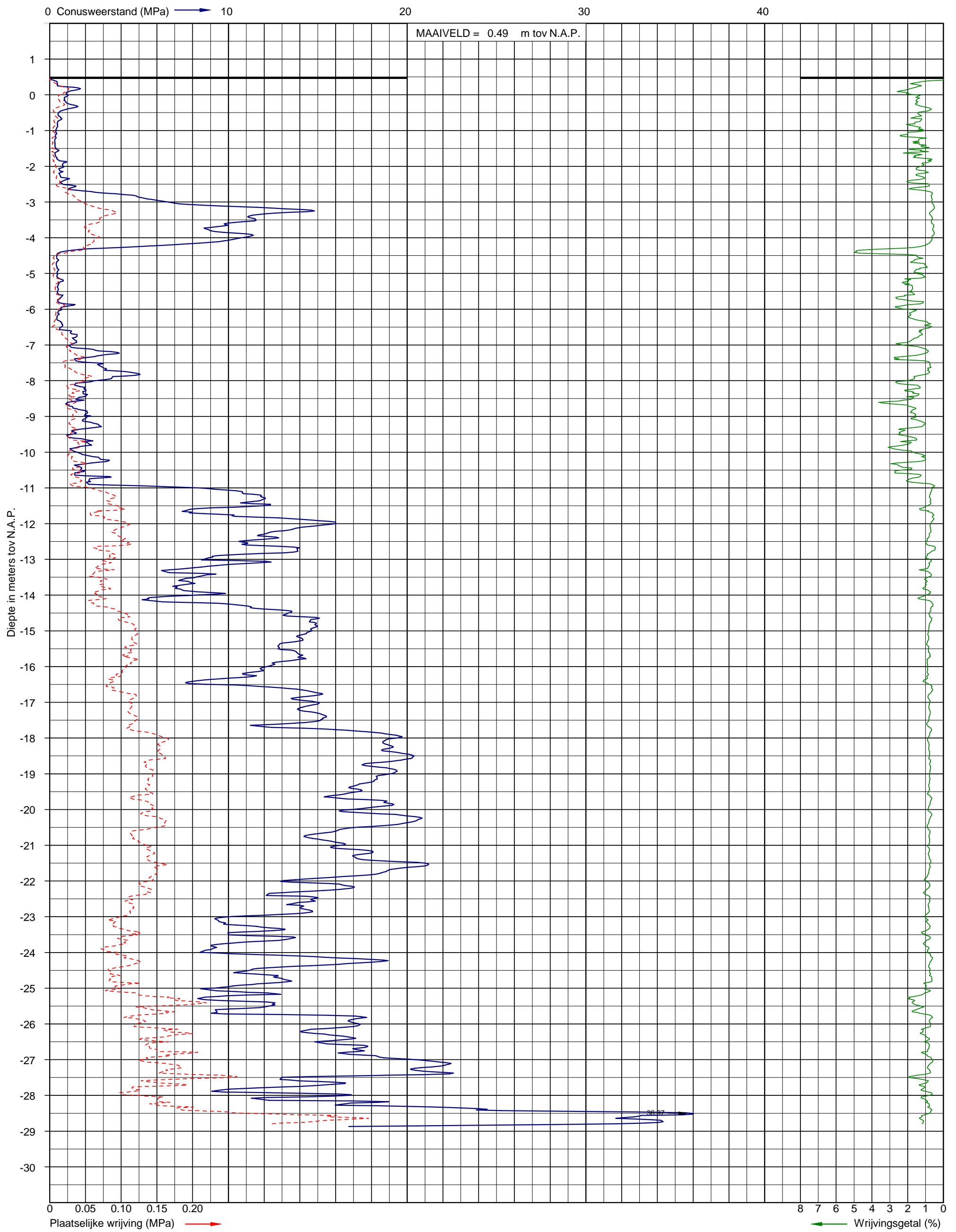
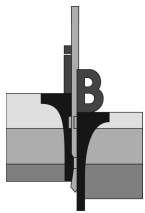
CULTUURTECHNISCHE KAART MAST 17

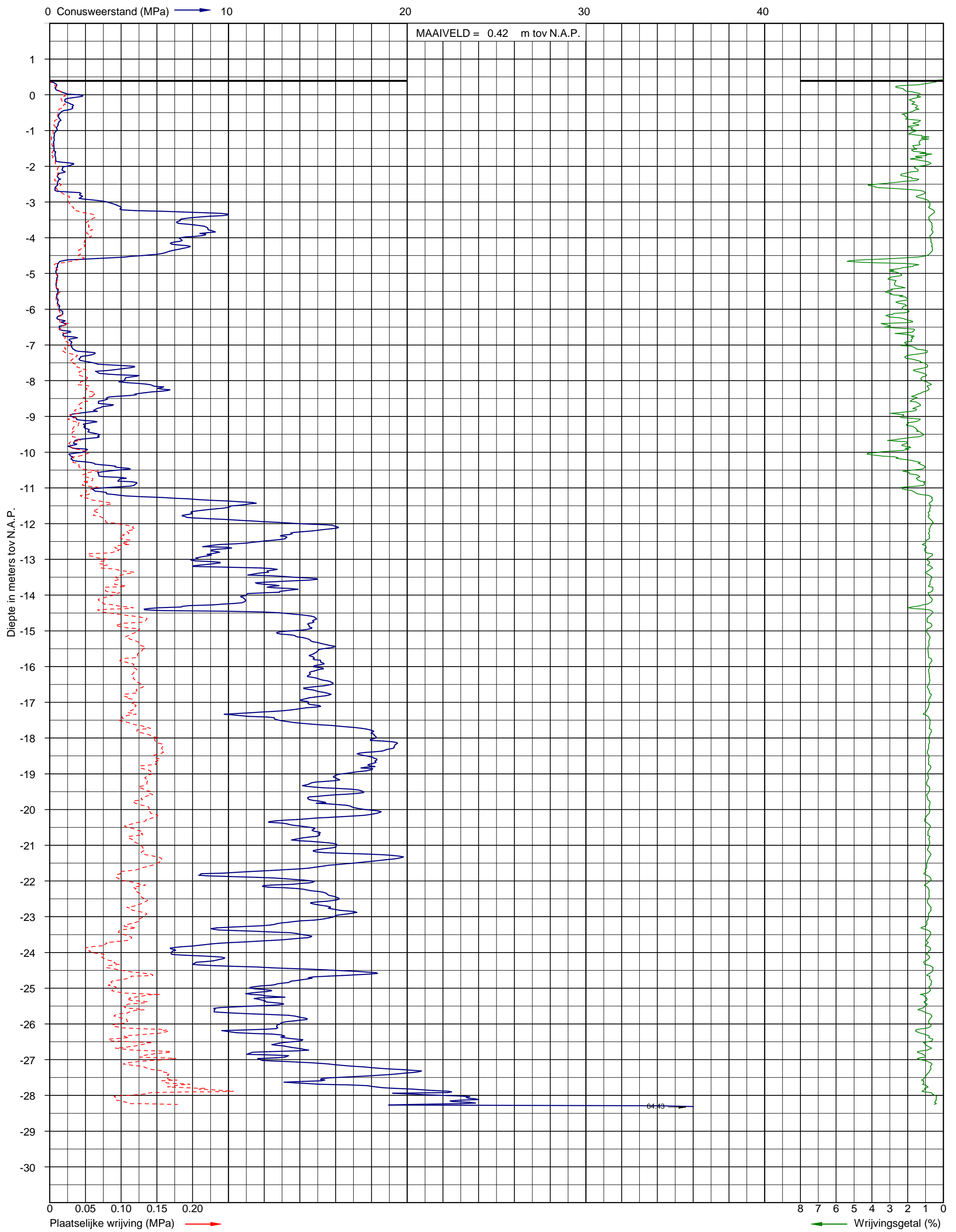


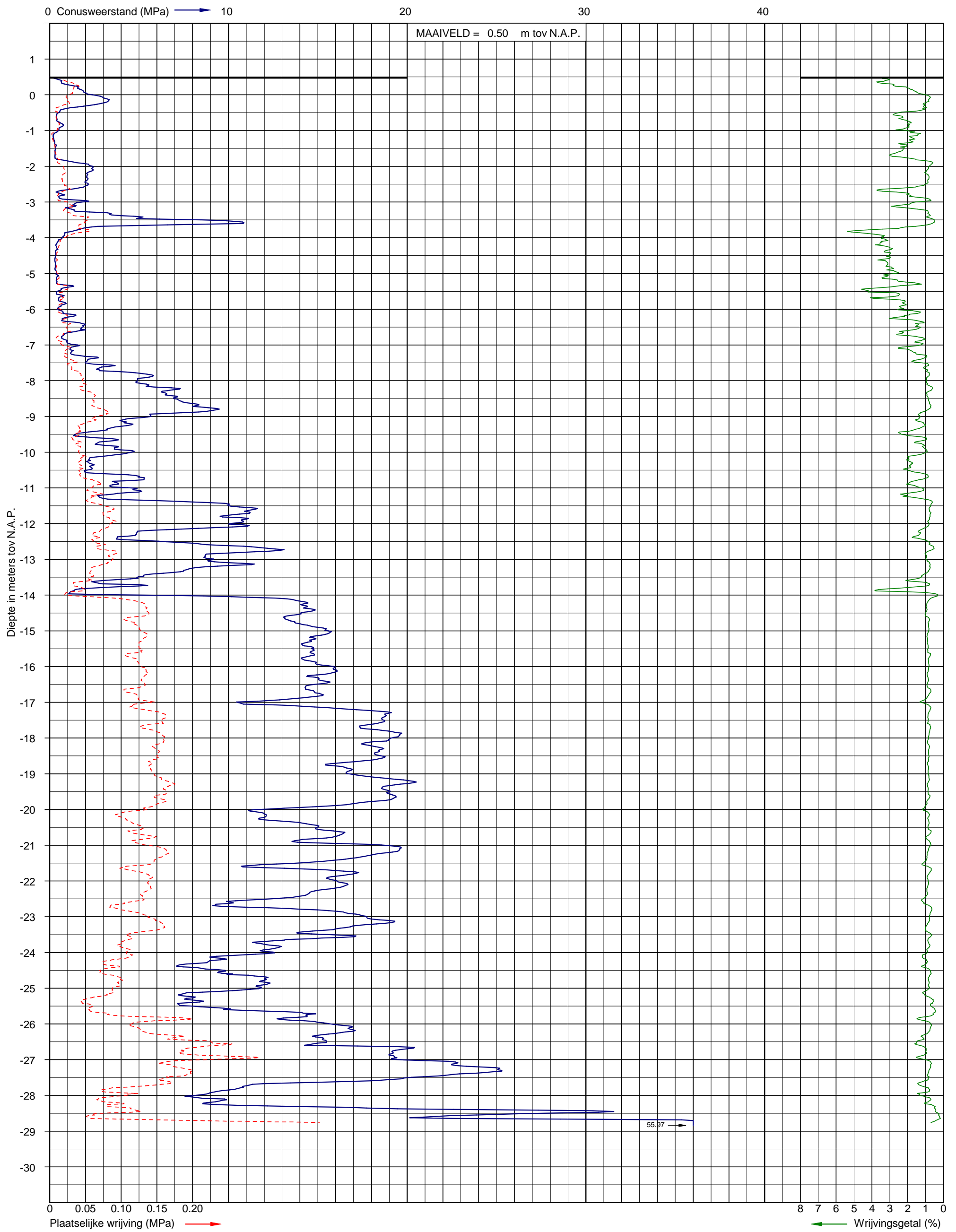
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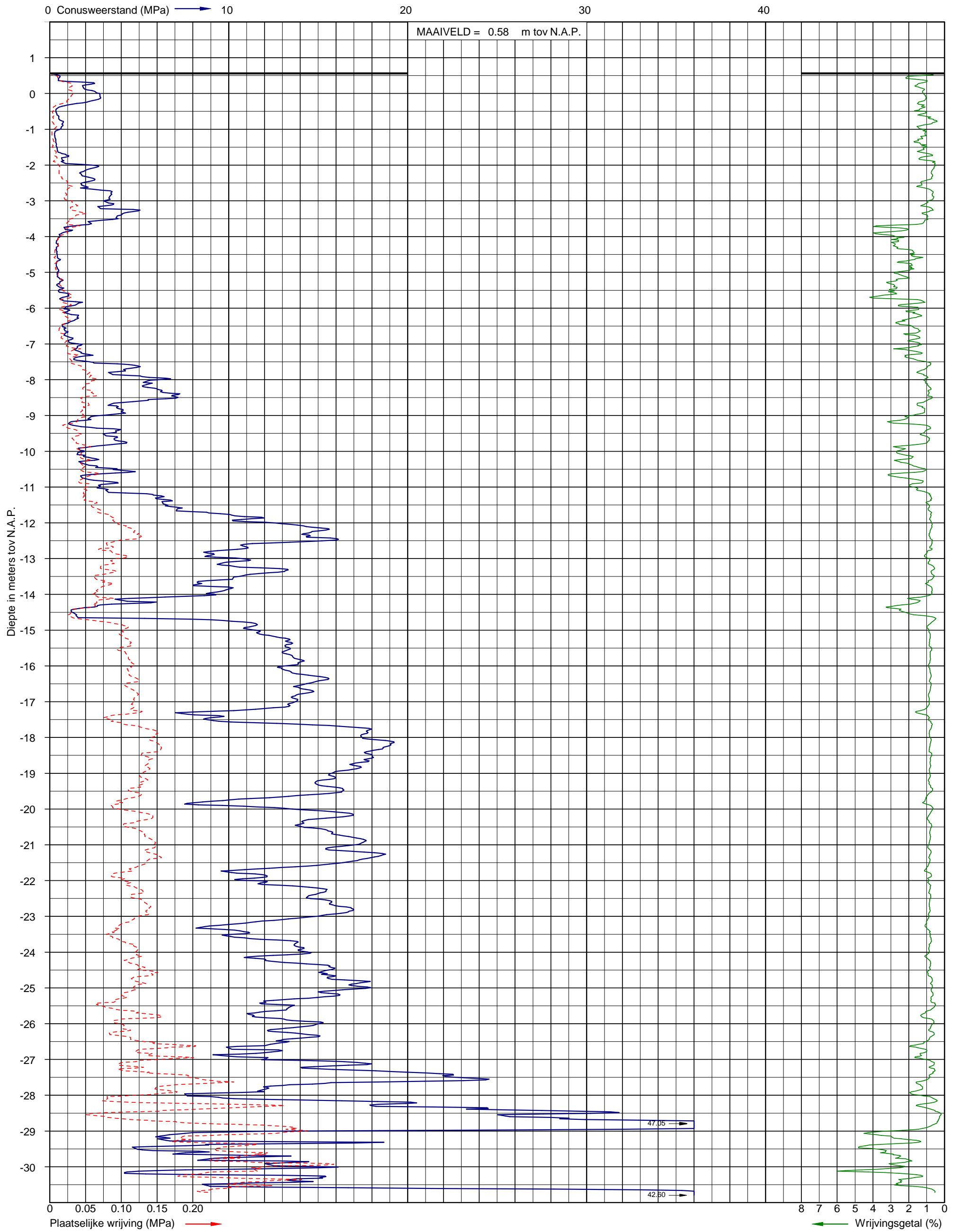


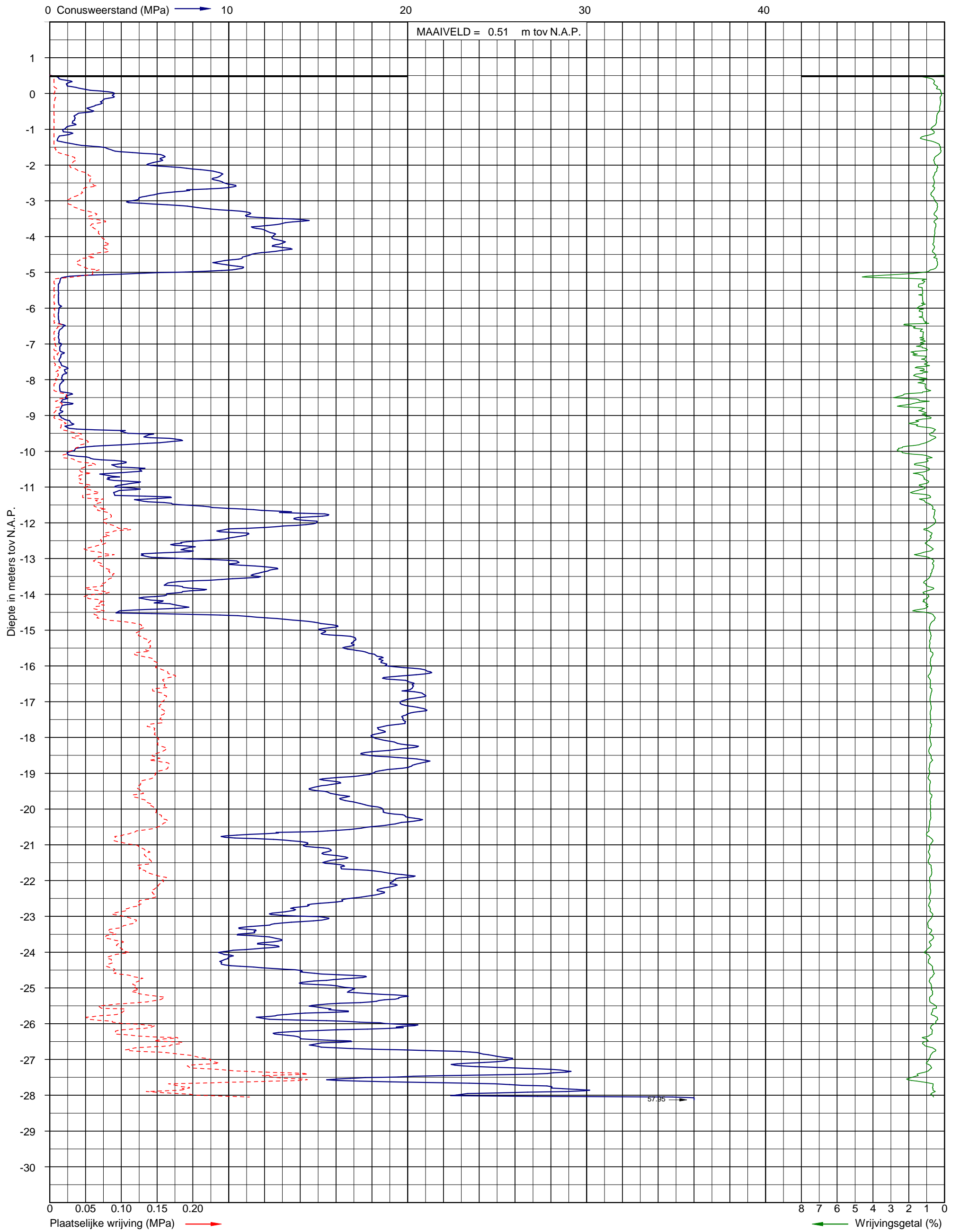
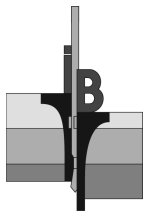


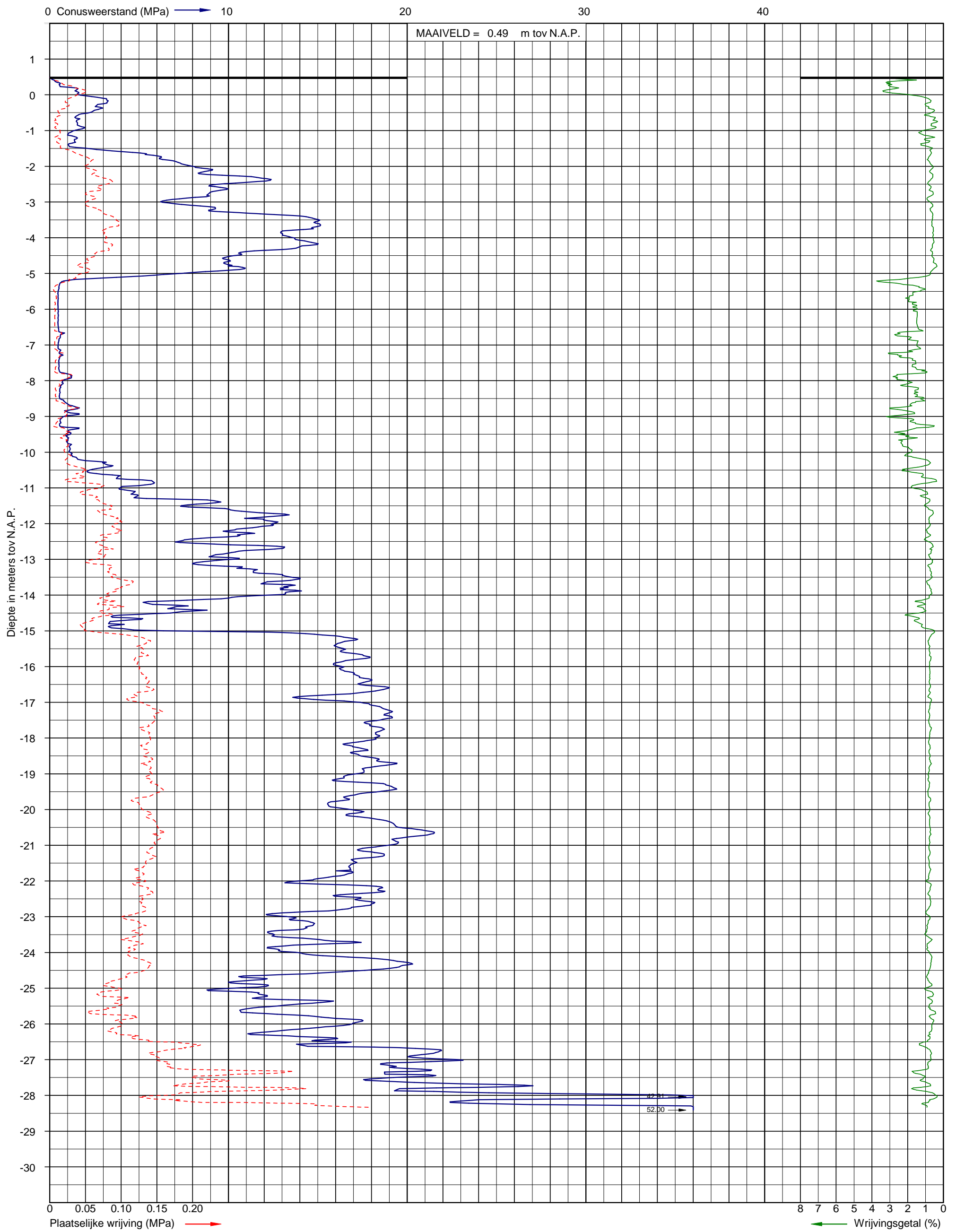


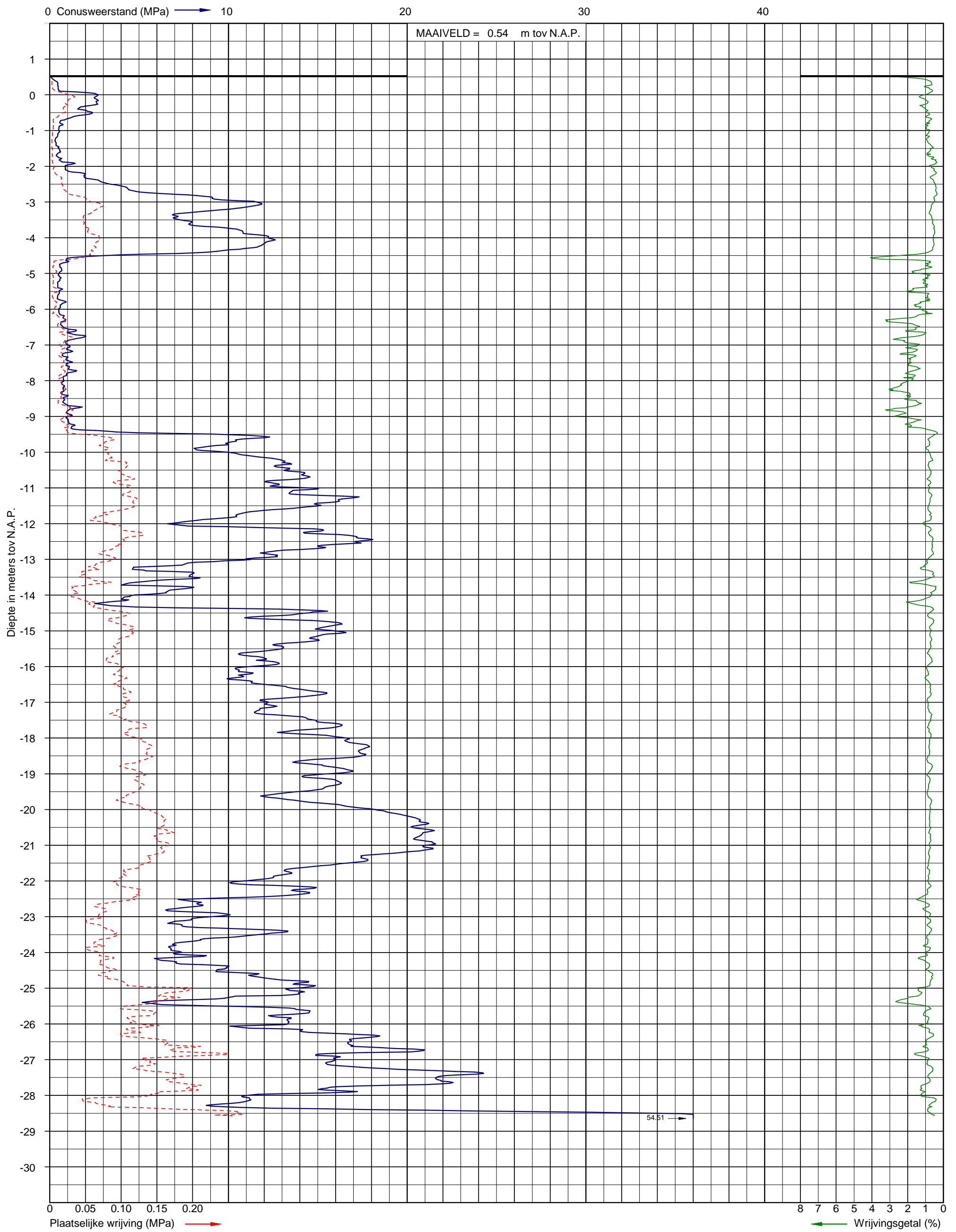


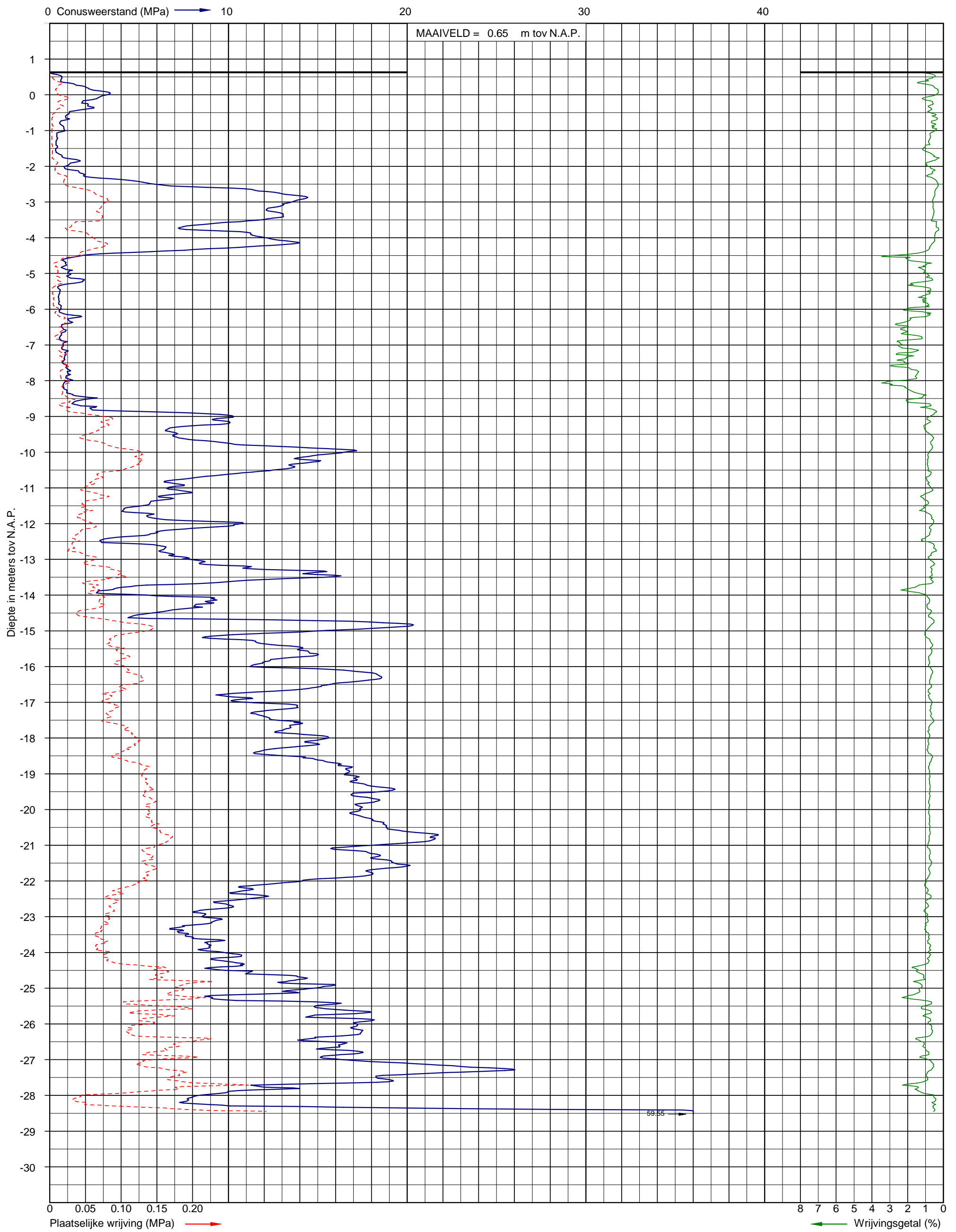


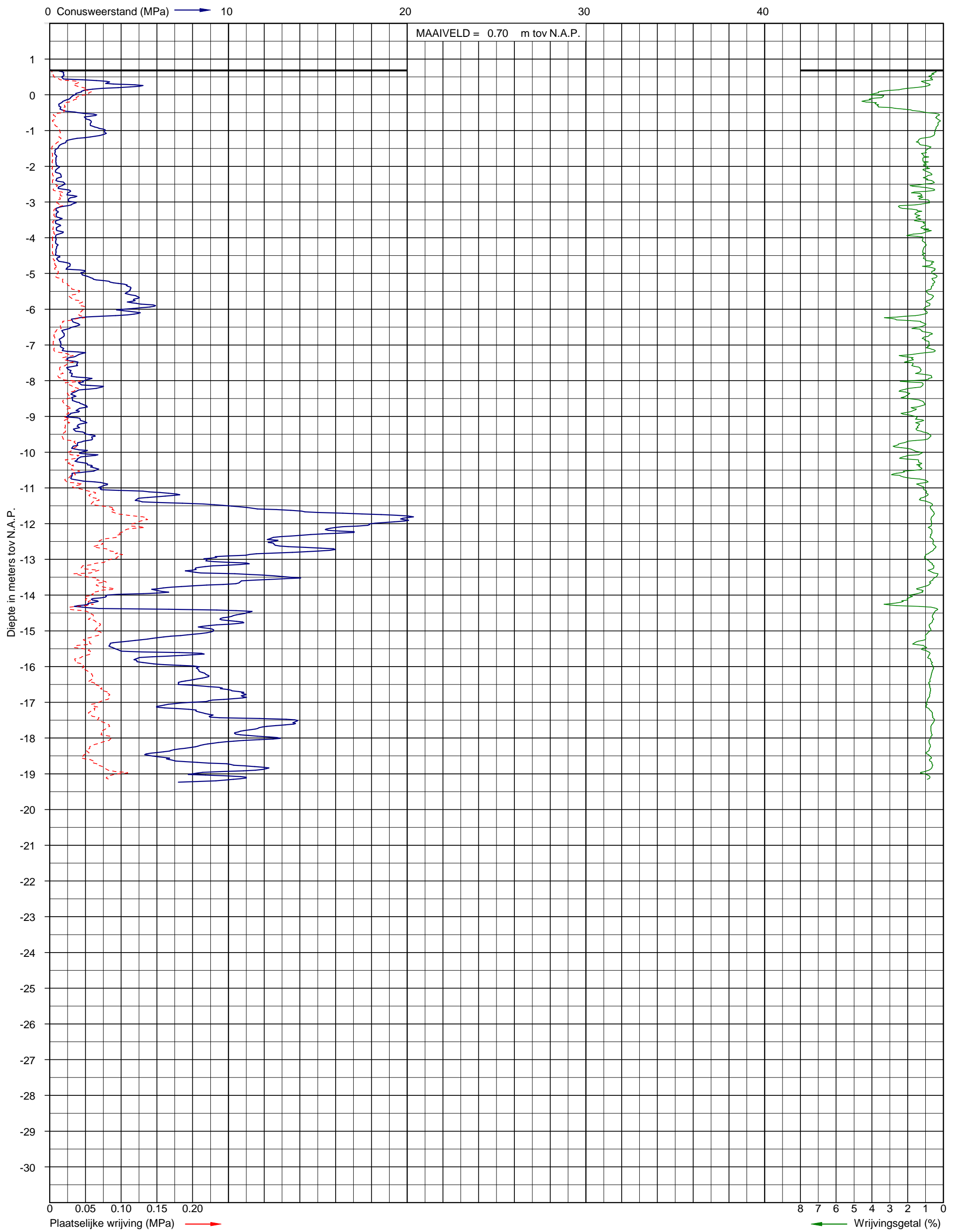
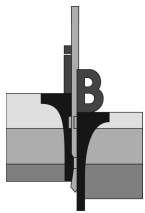


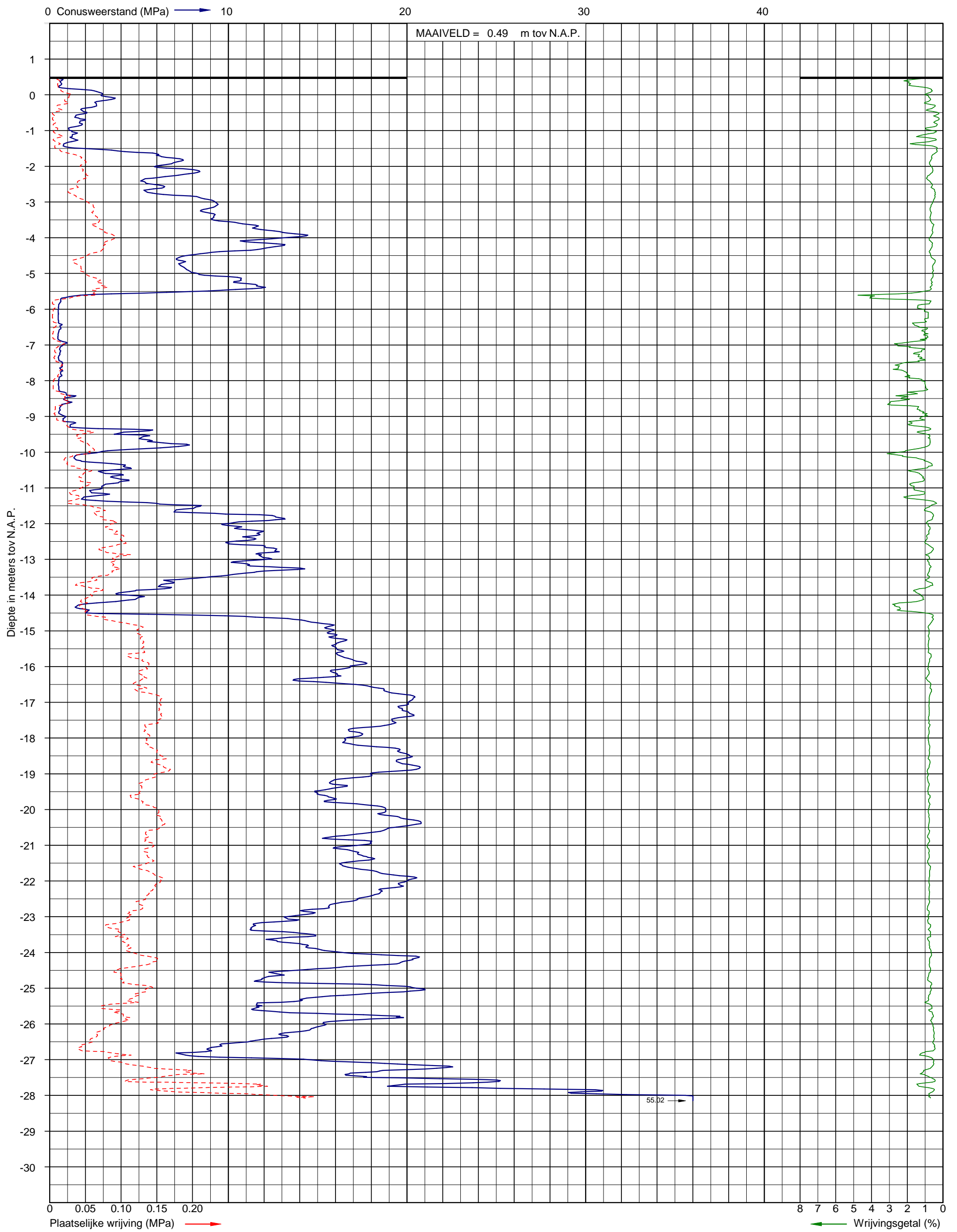


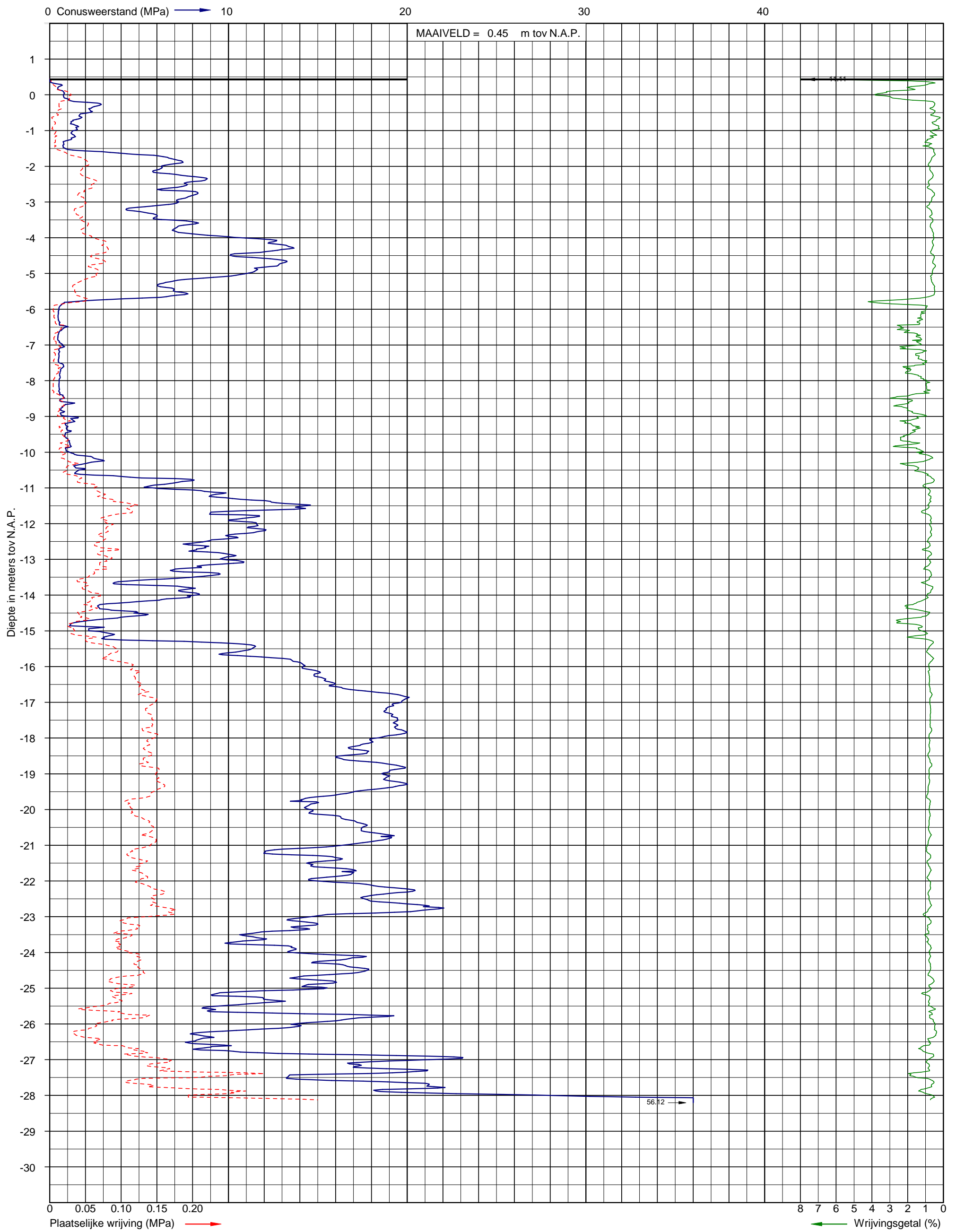


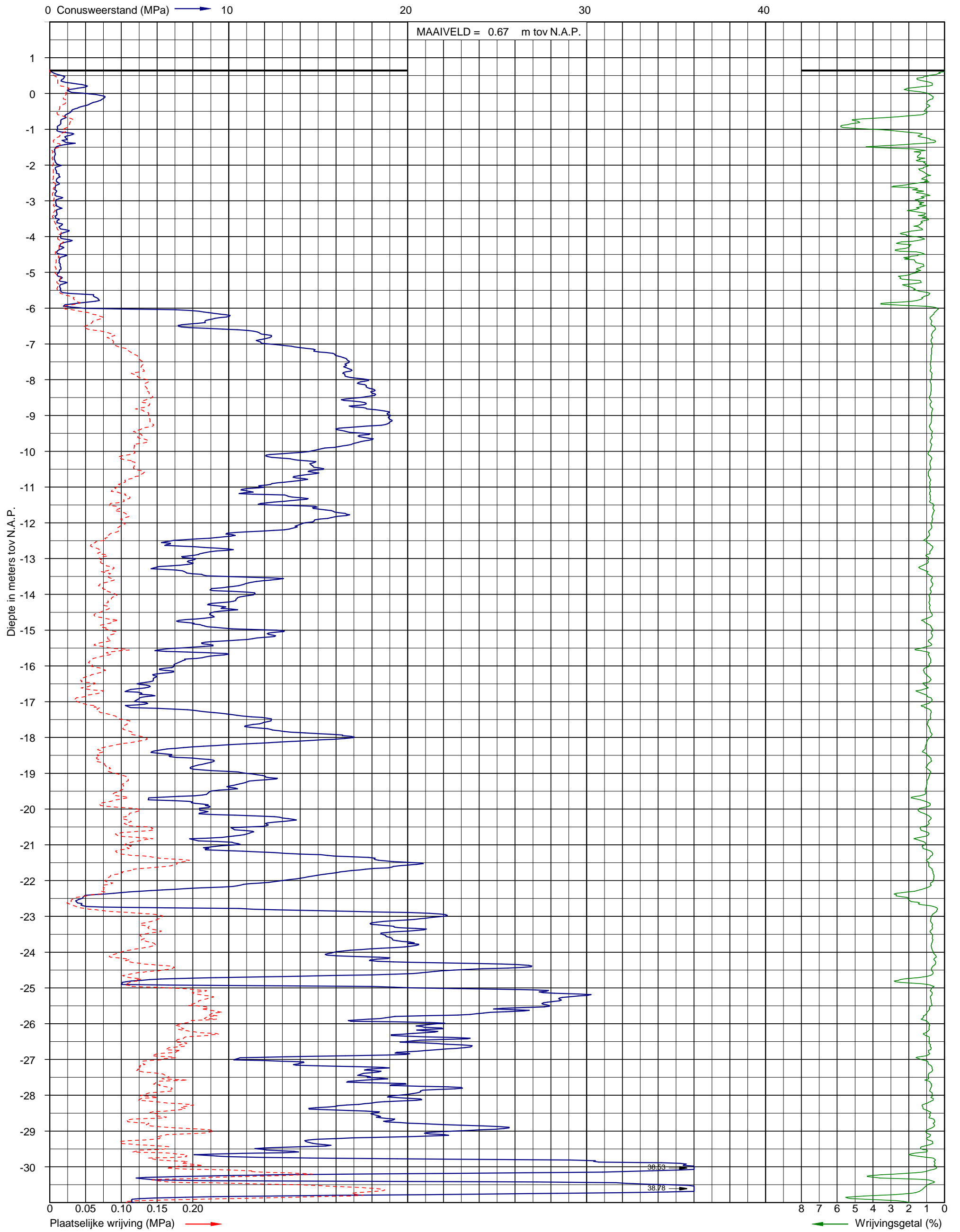


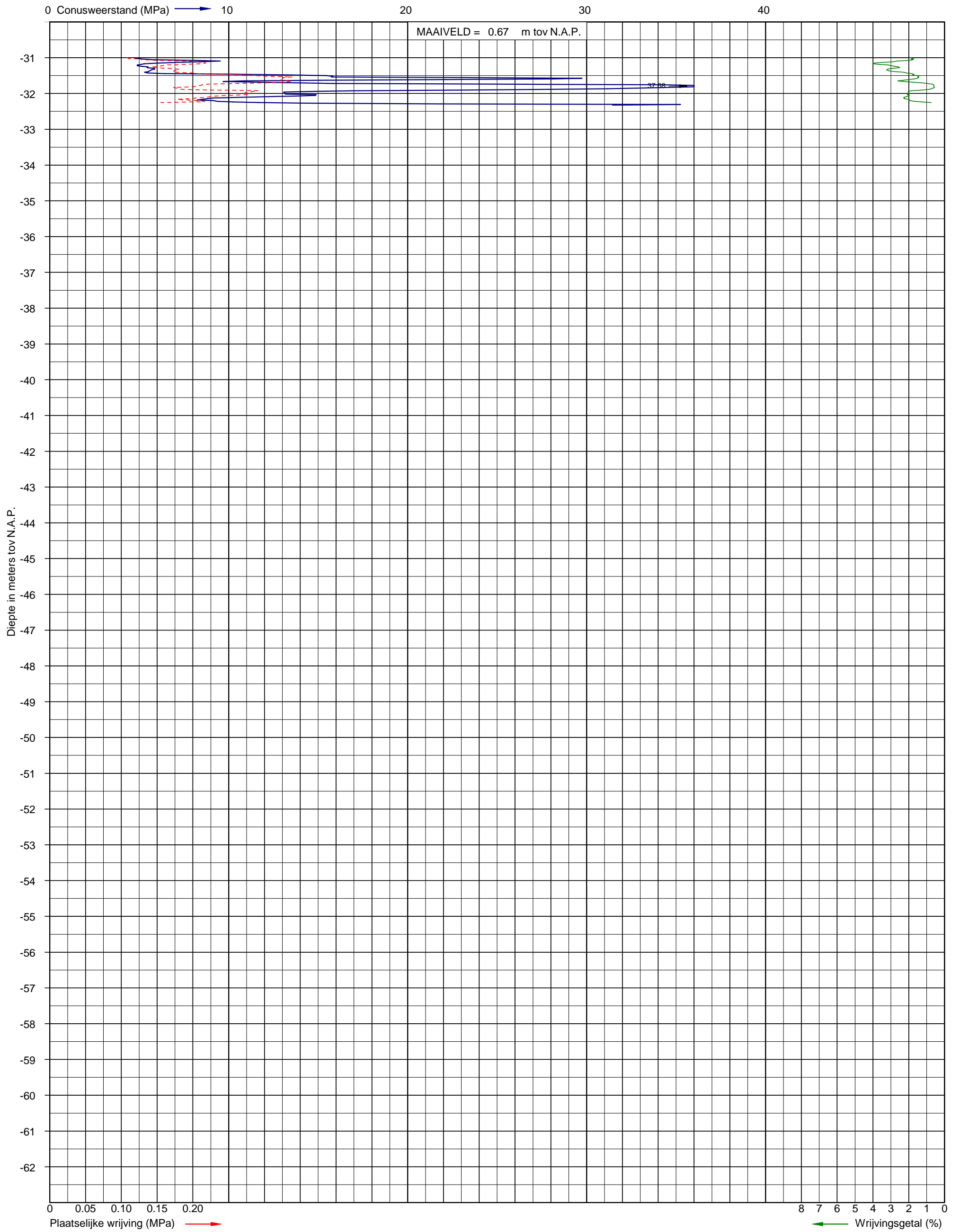
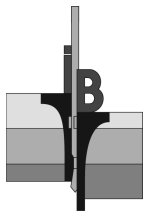


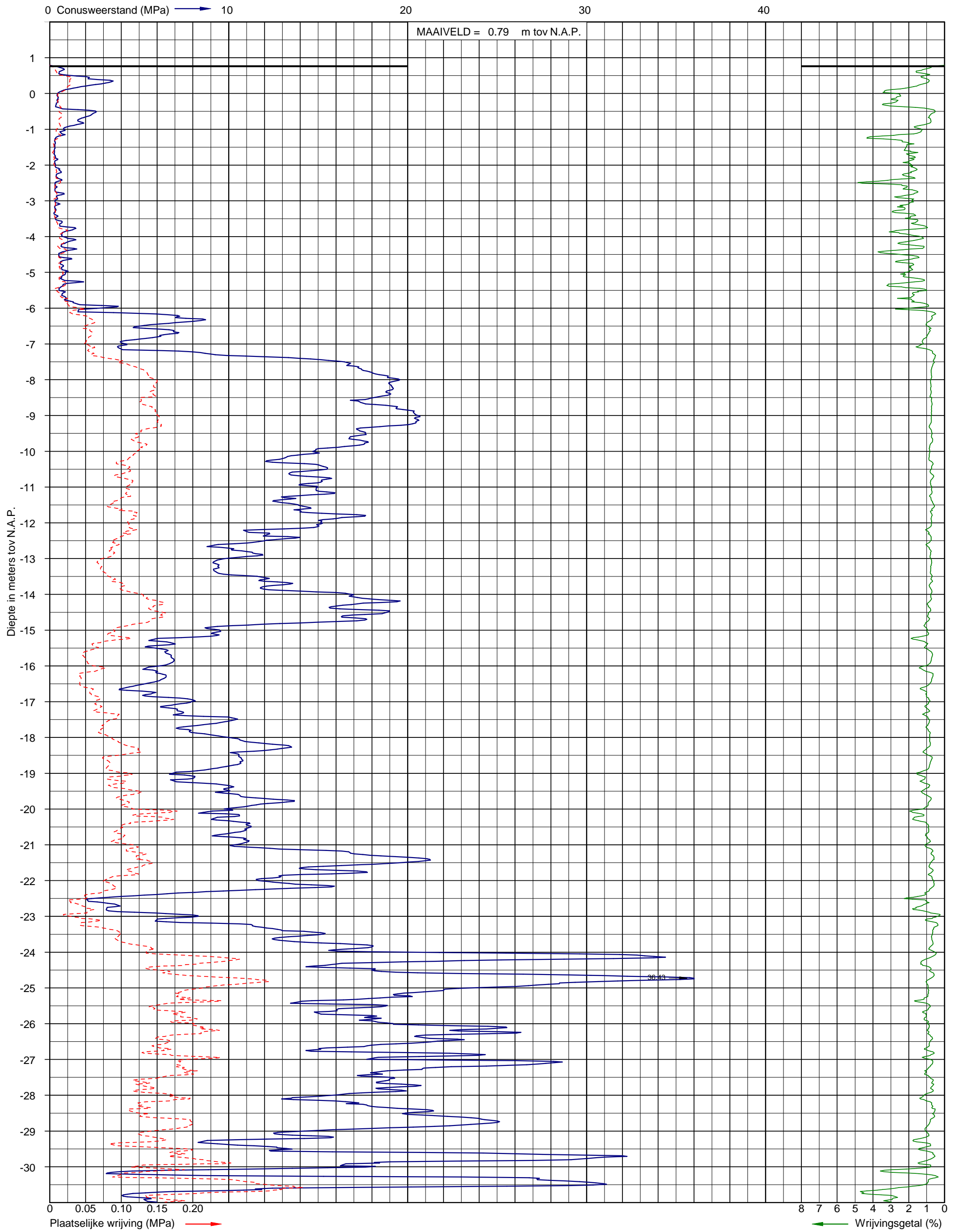


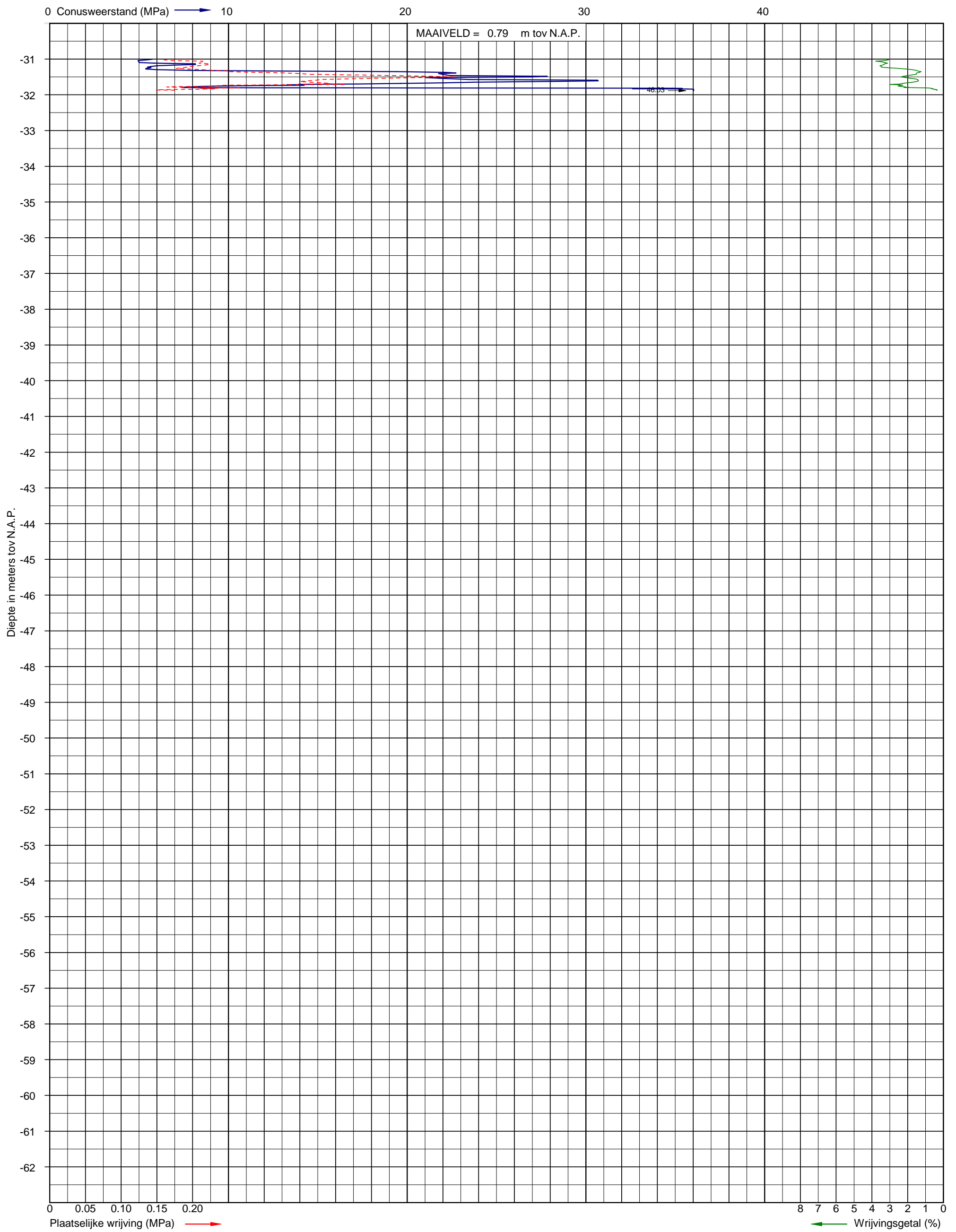


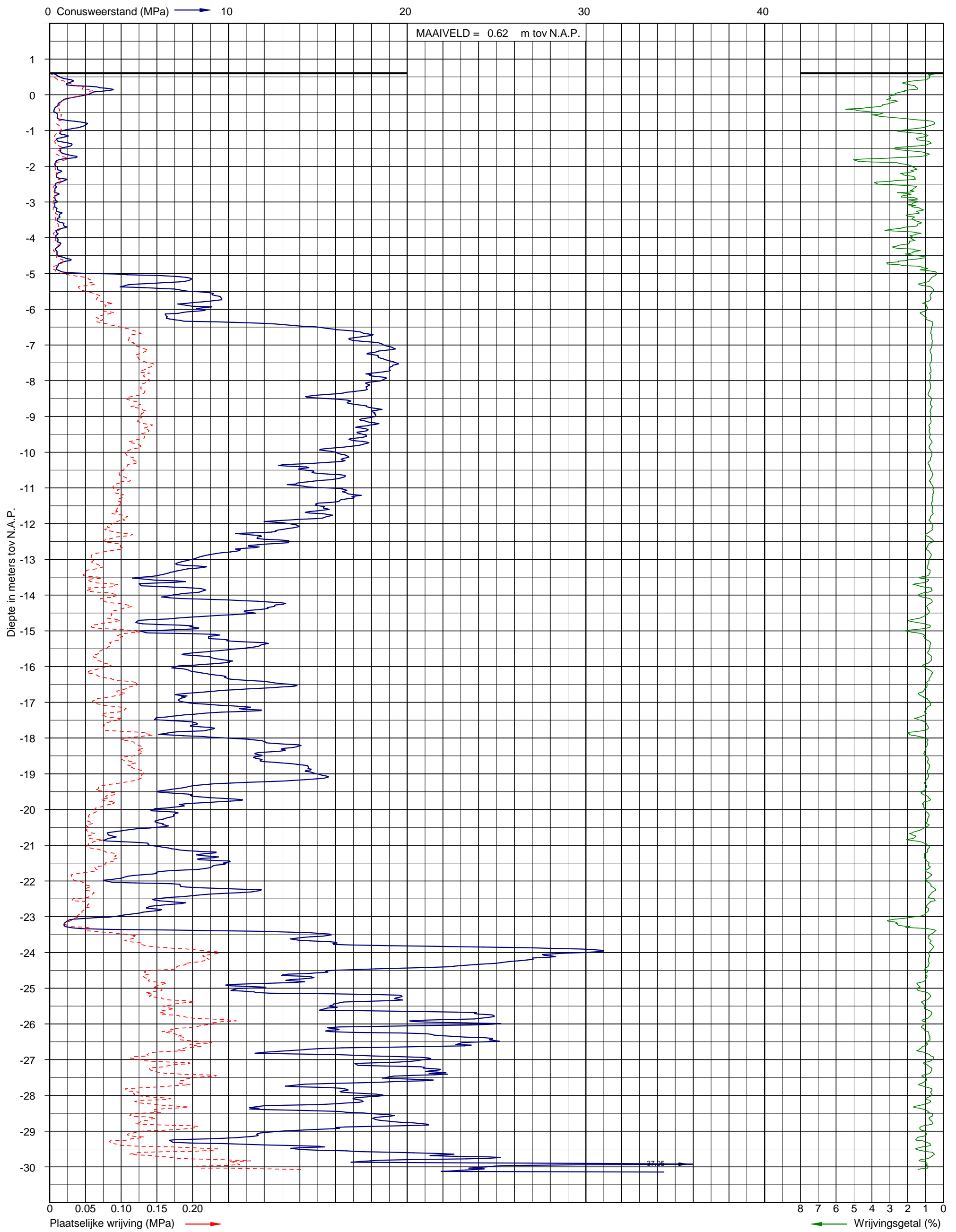


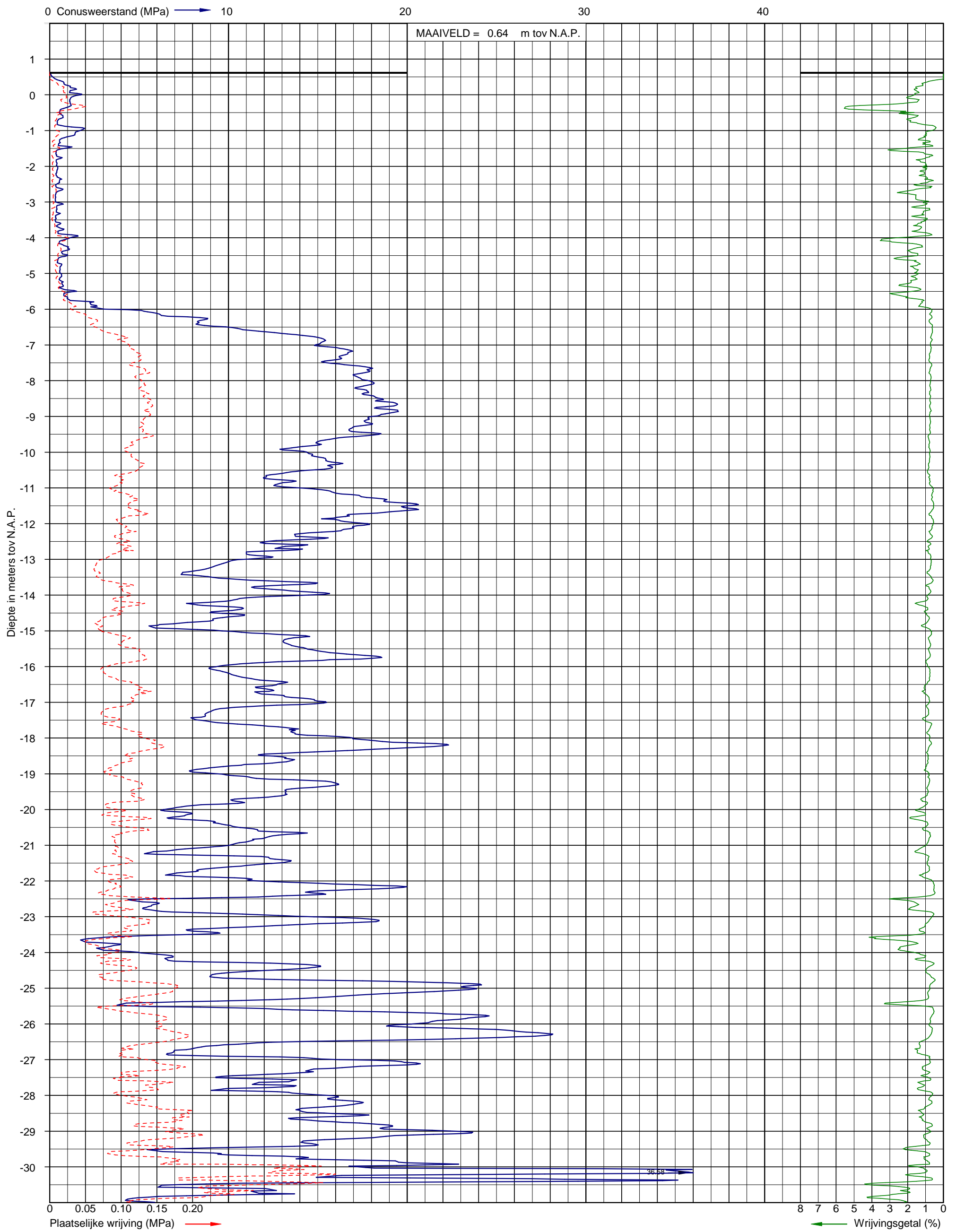
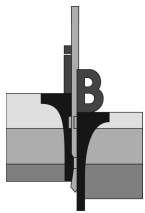


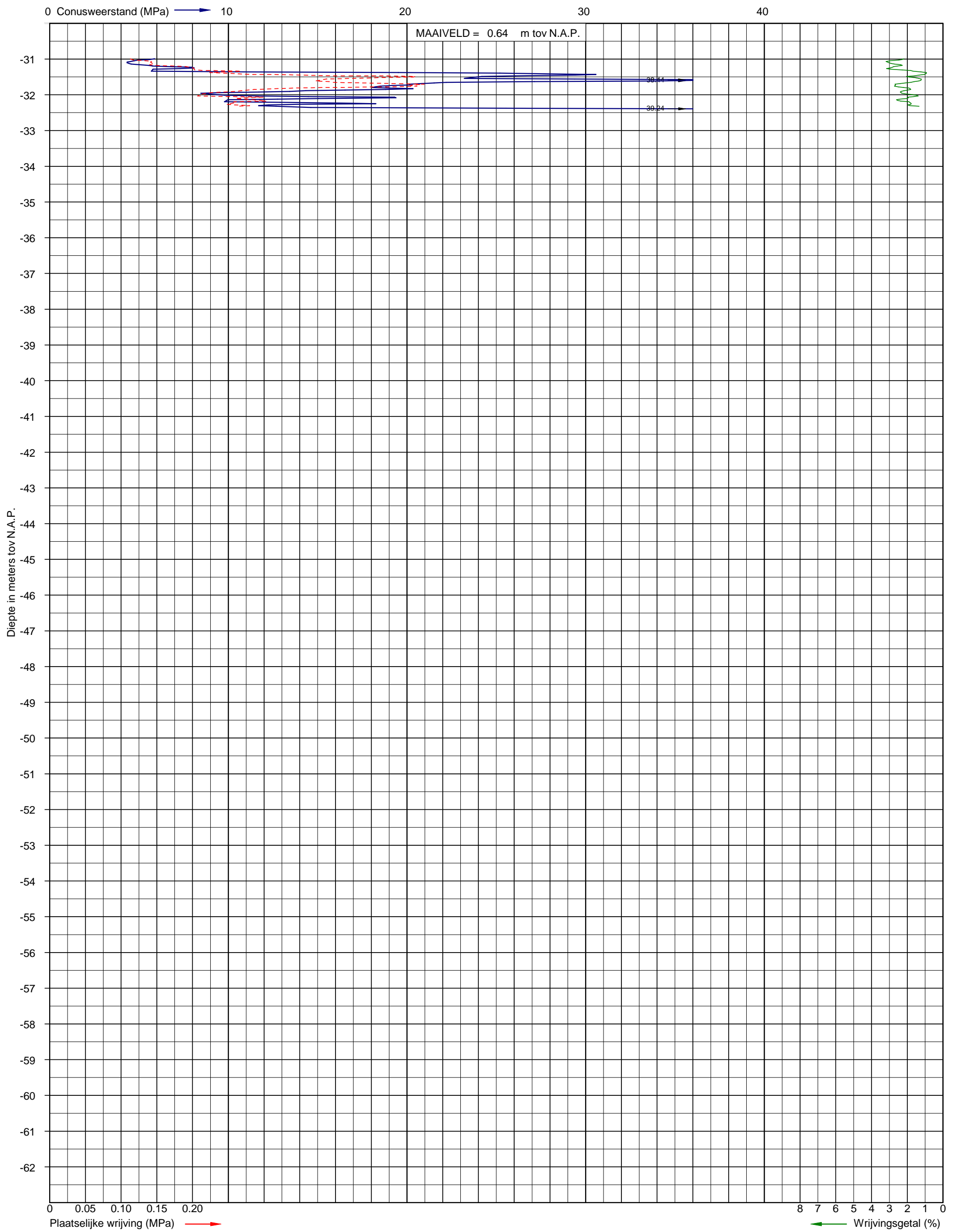


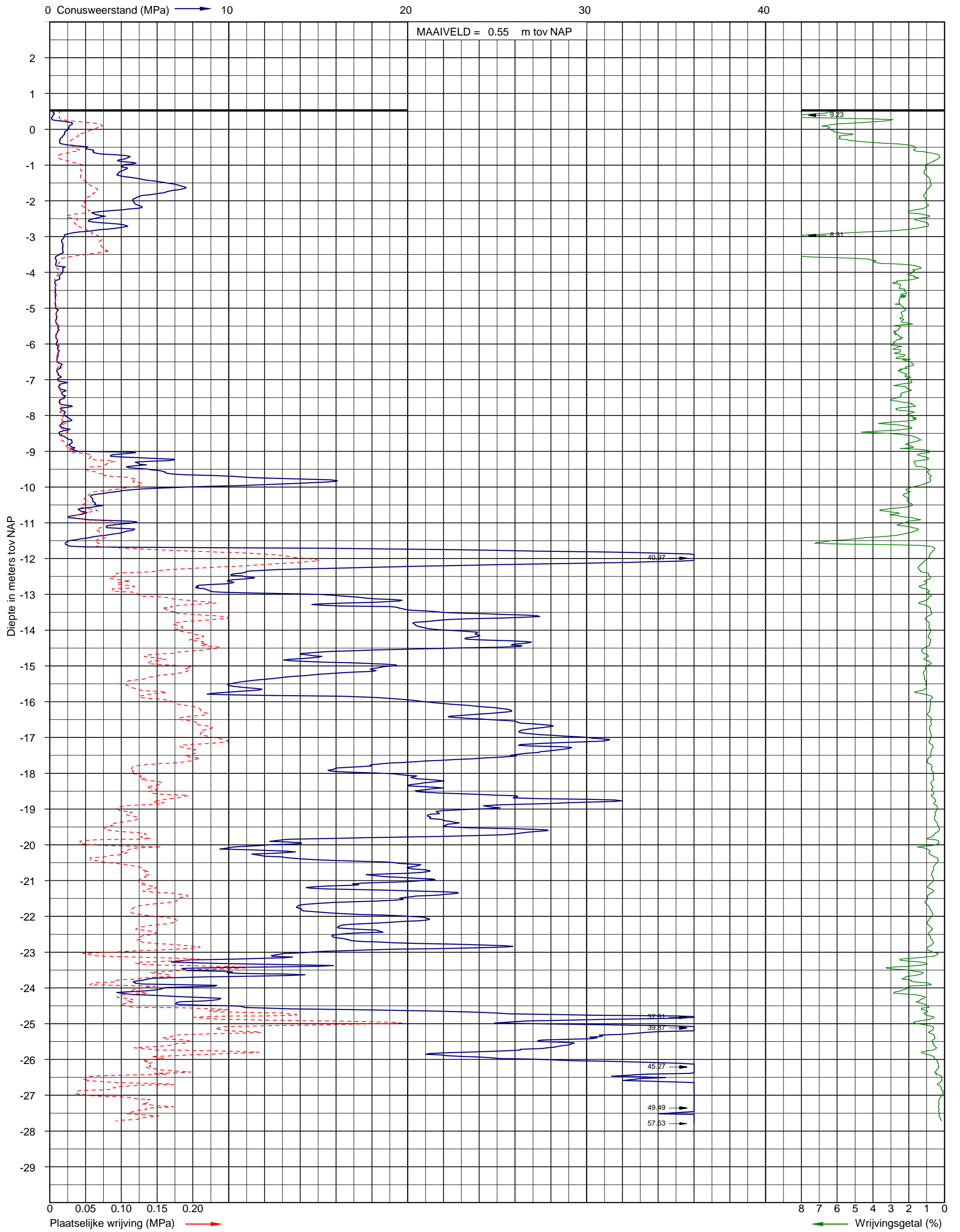


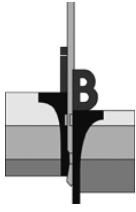




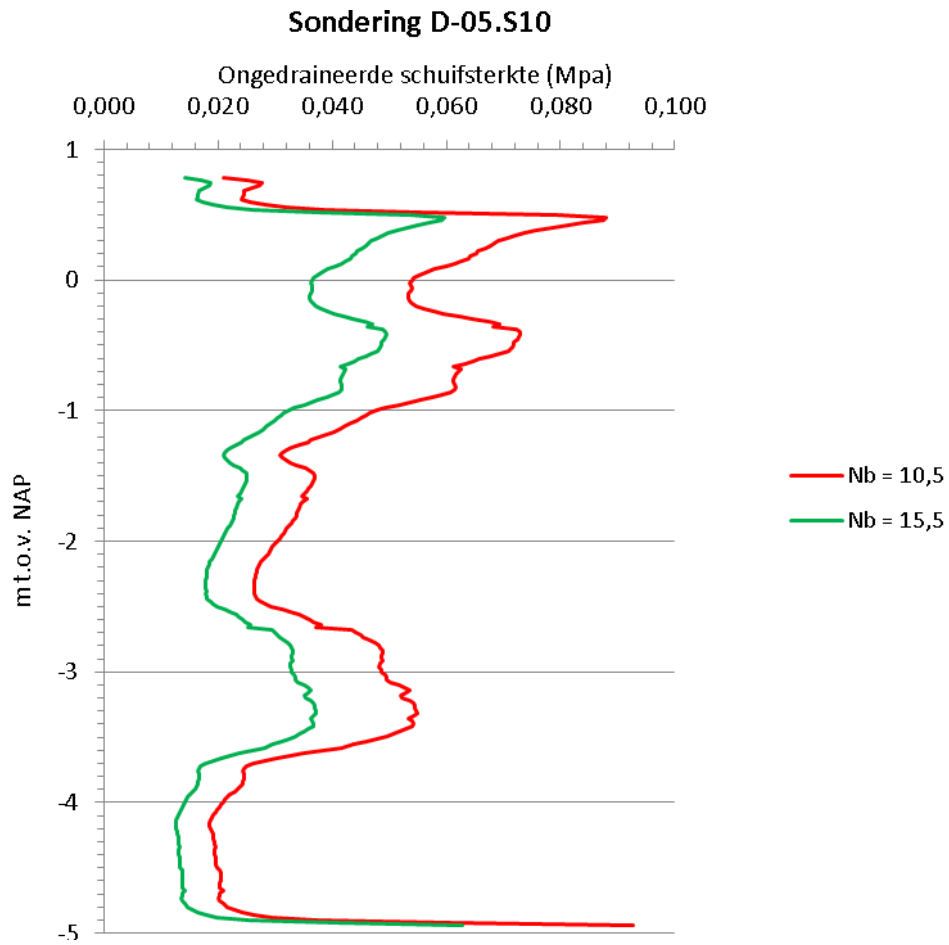


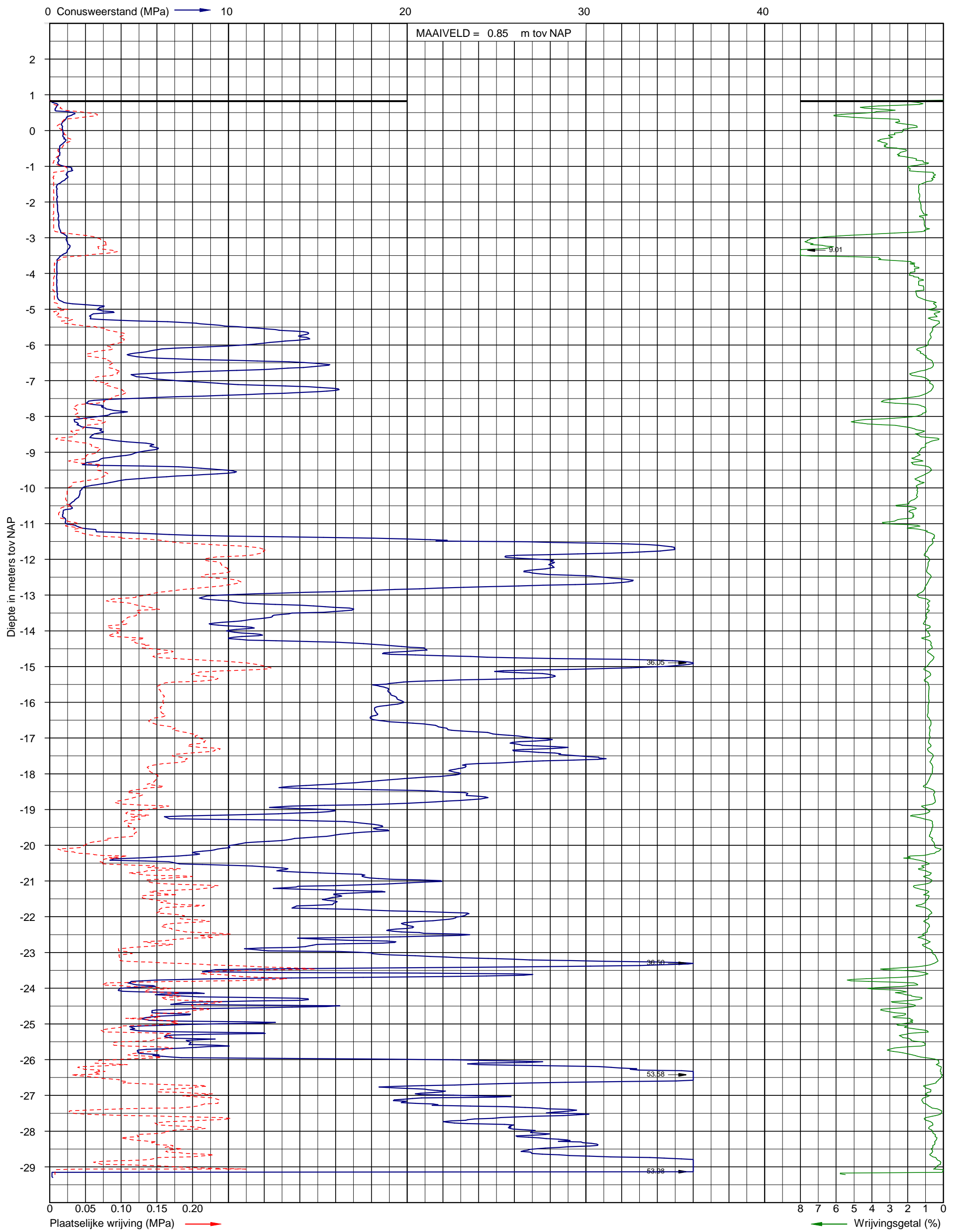
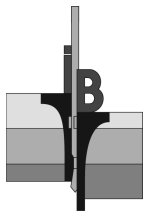


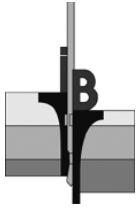




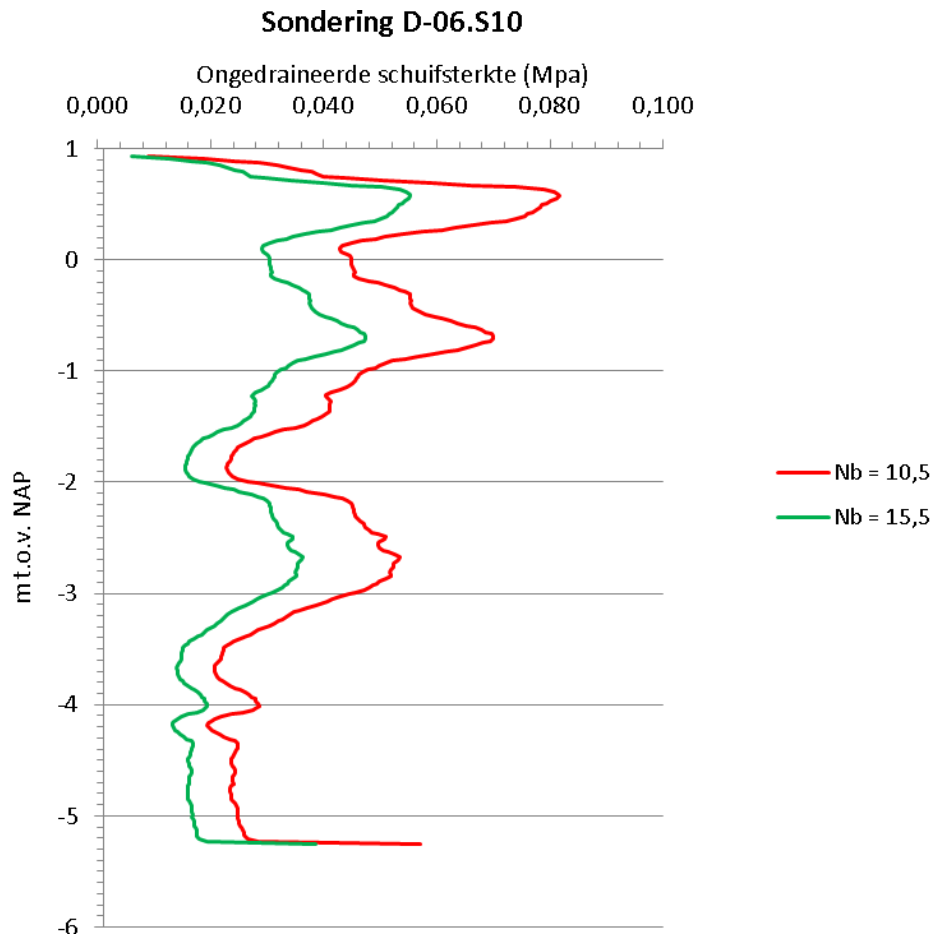
Opdracht : 02P001595
Project : Geotechnisch onderzoek aanleg hsp masten trace Borsele-Tilburg
Fase 1

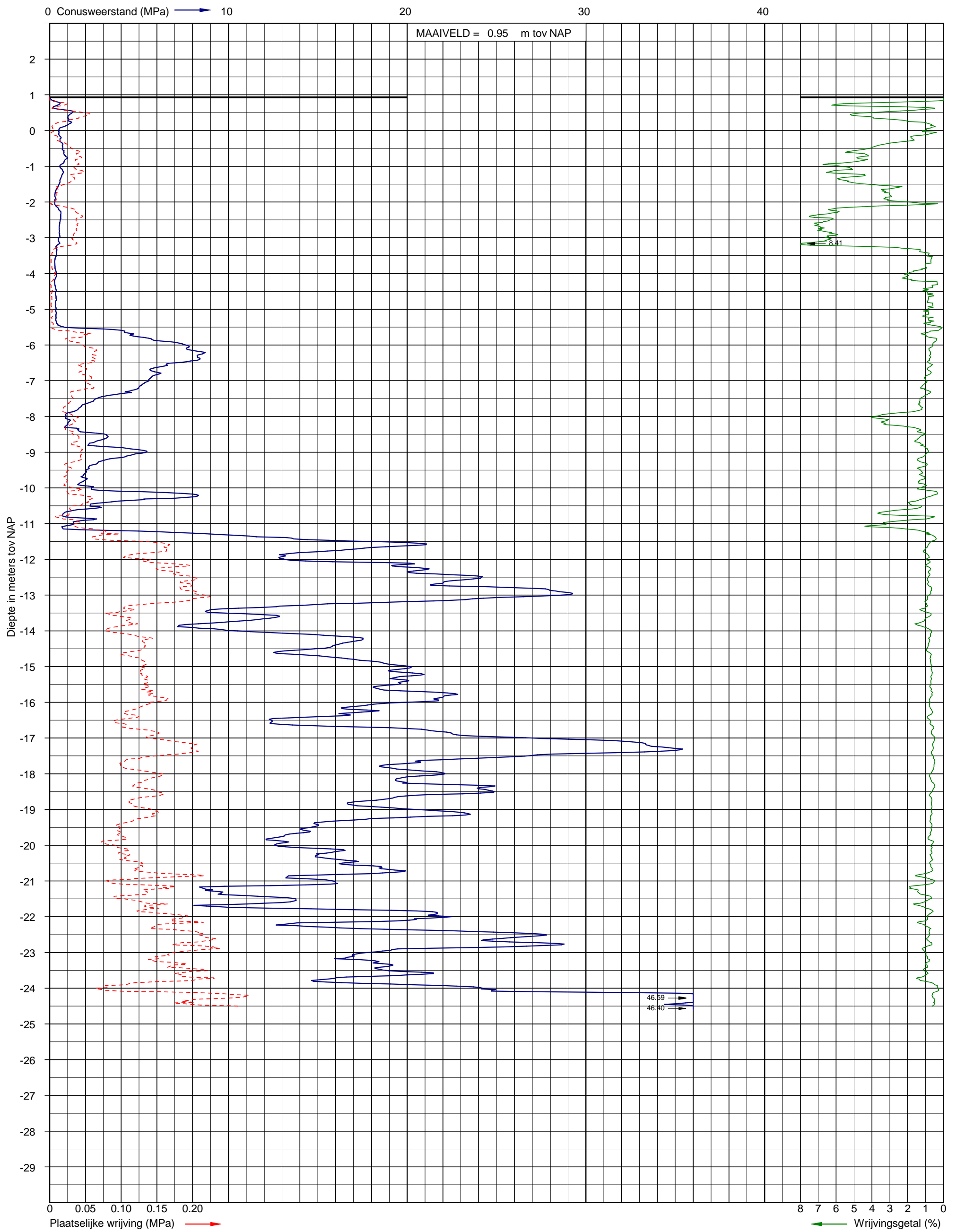


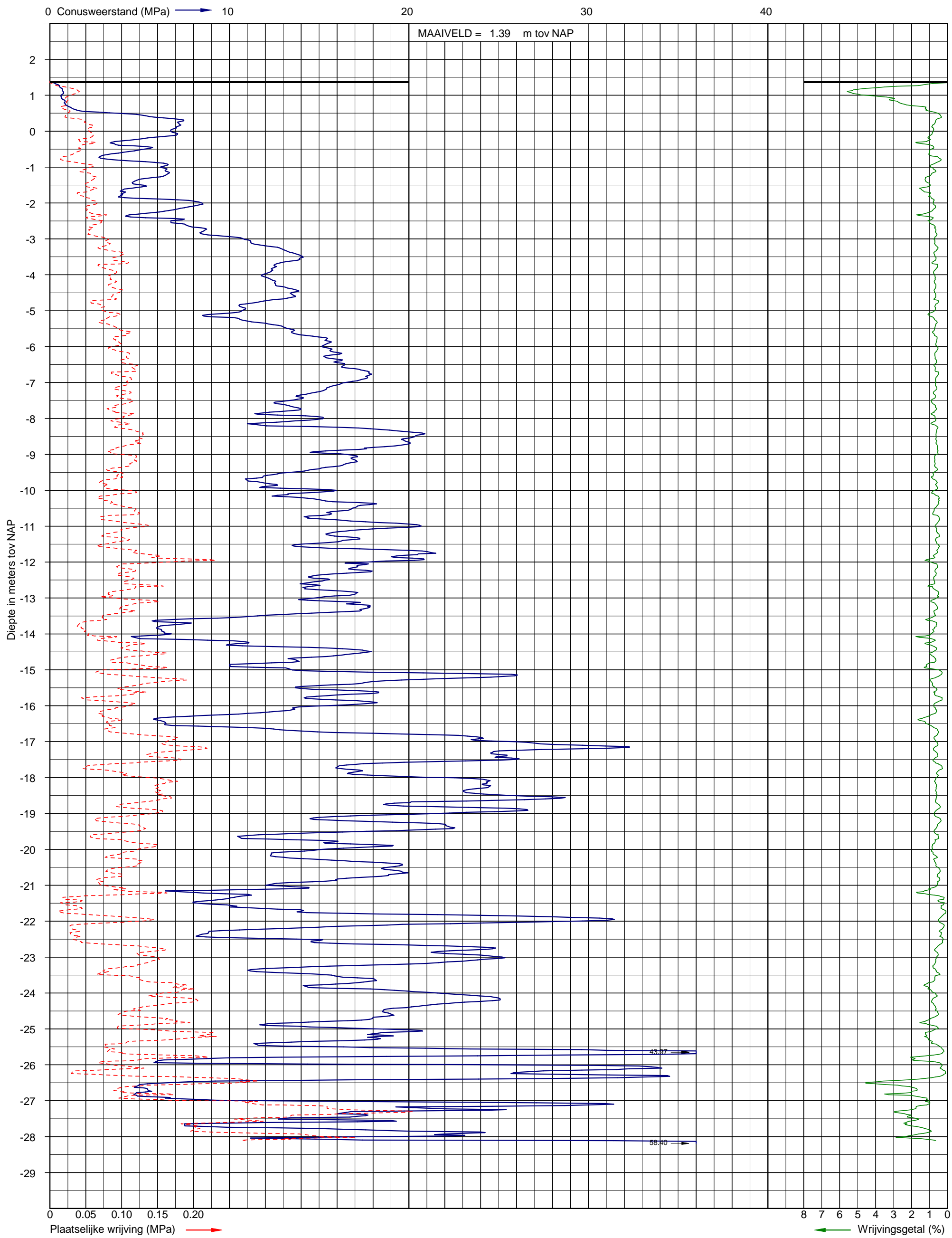


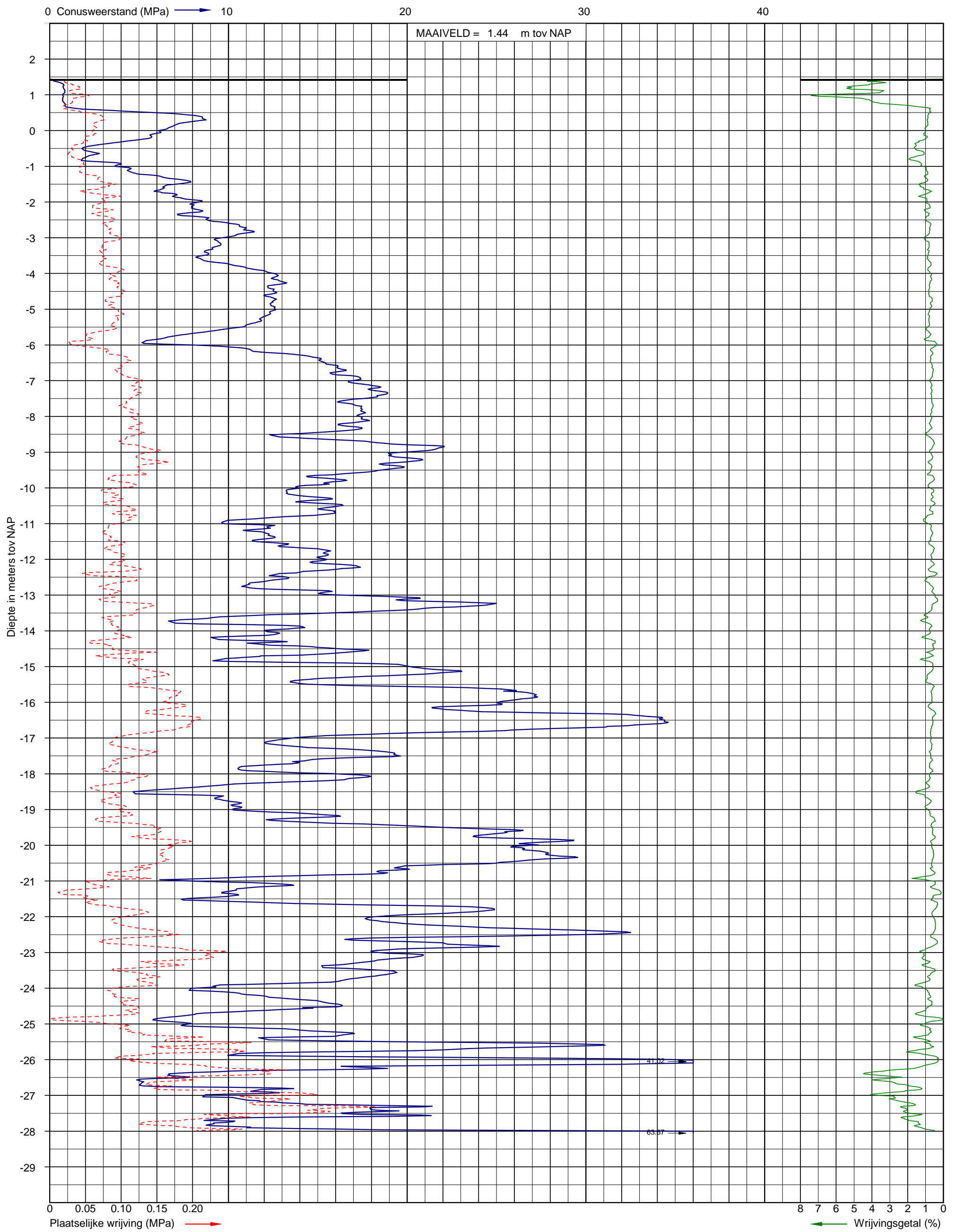


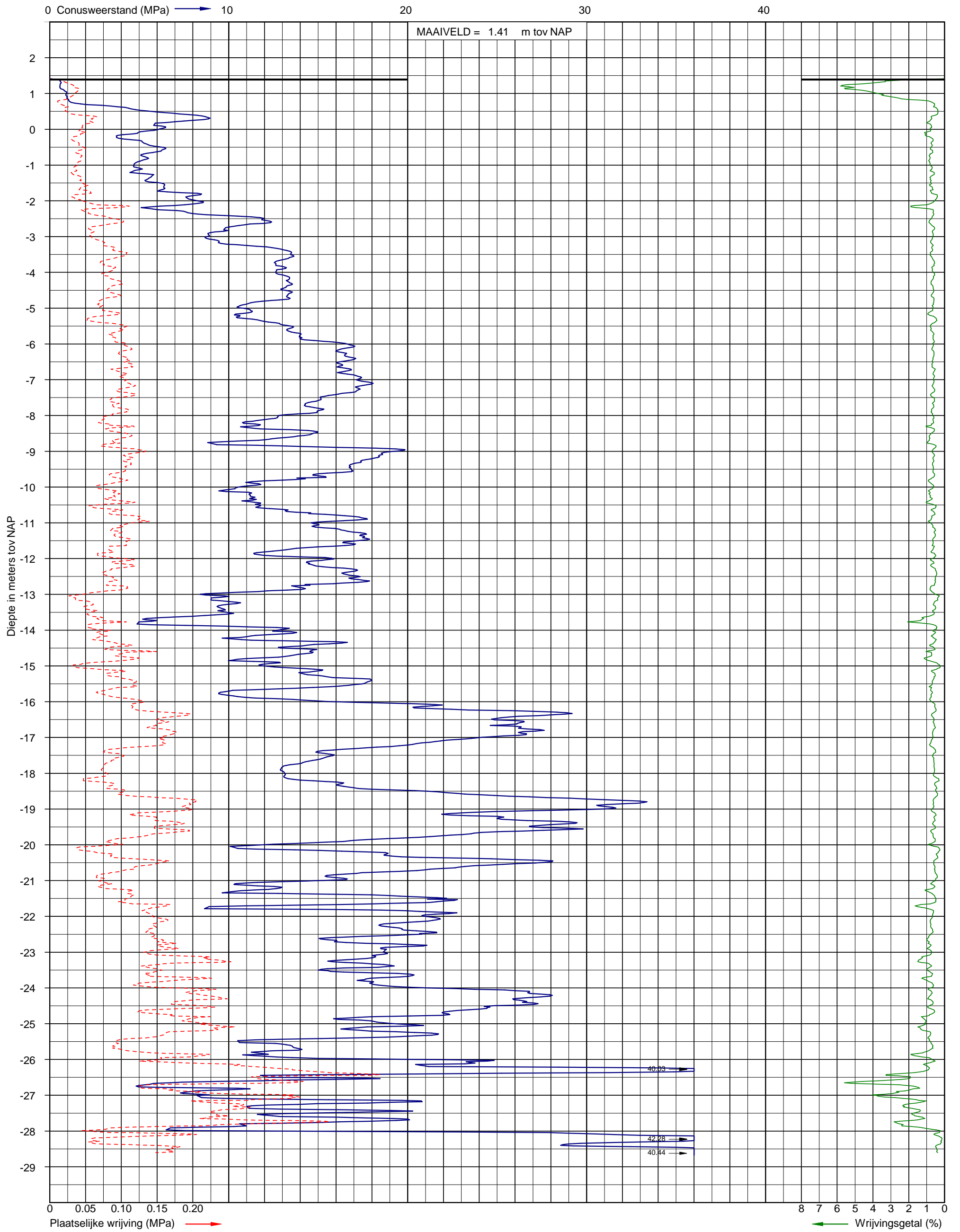
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Fase 1

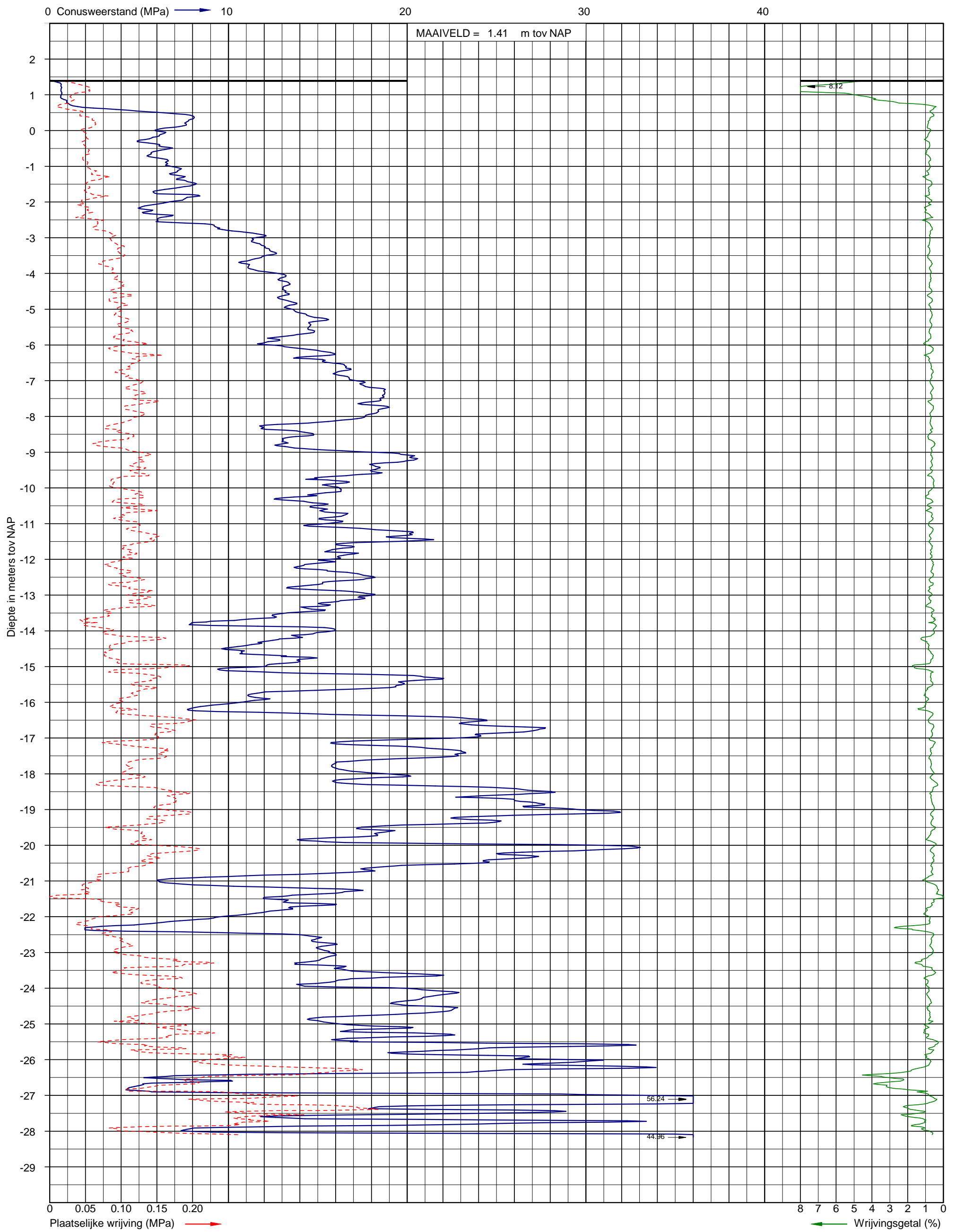


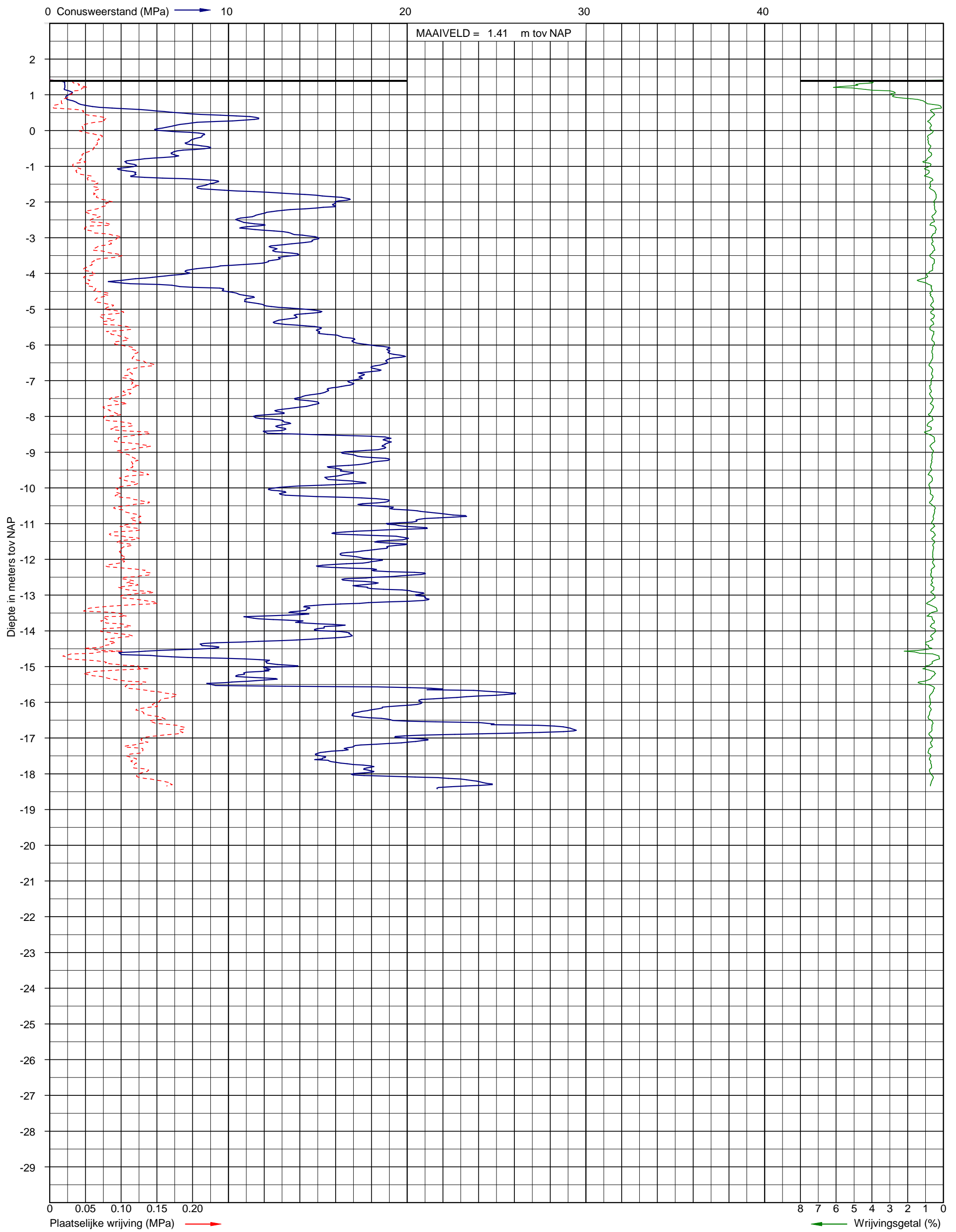
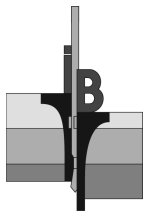


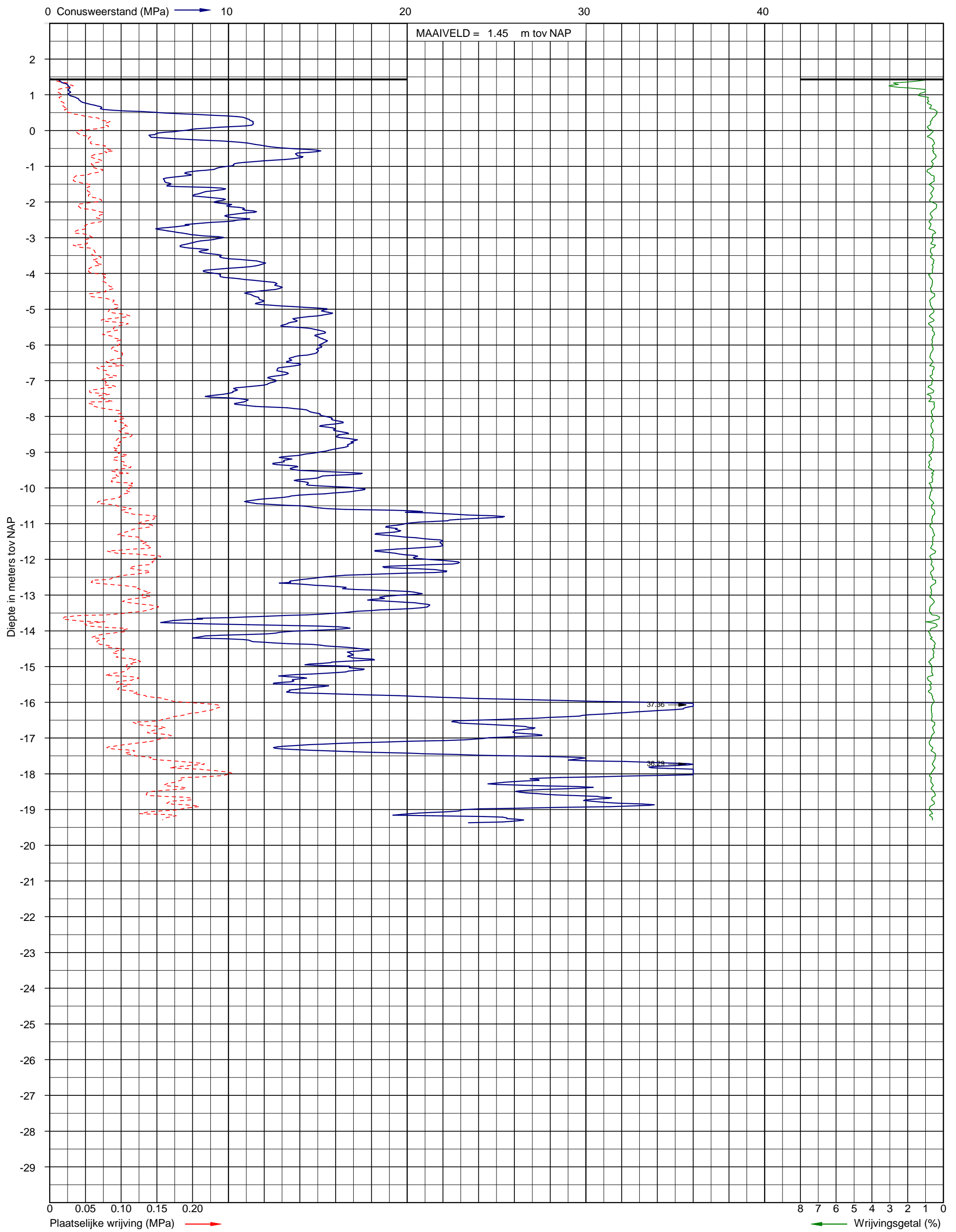


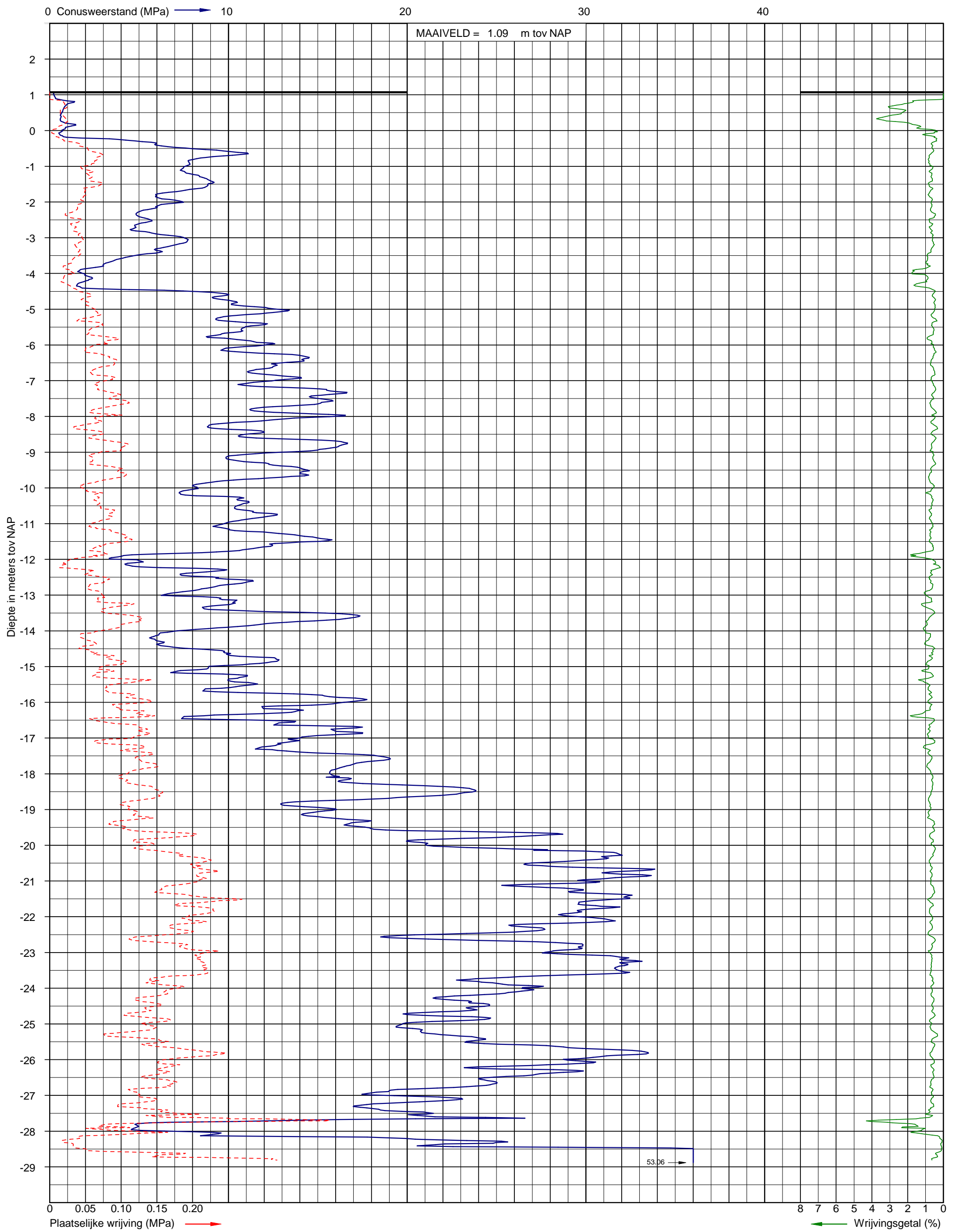


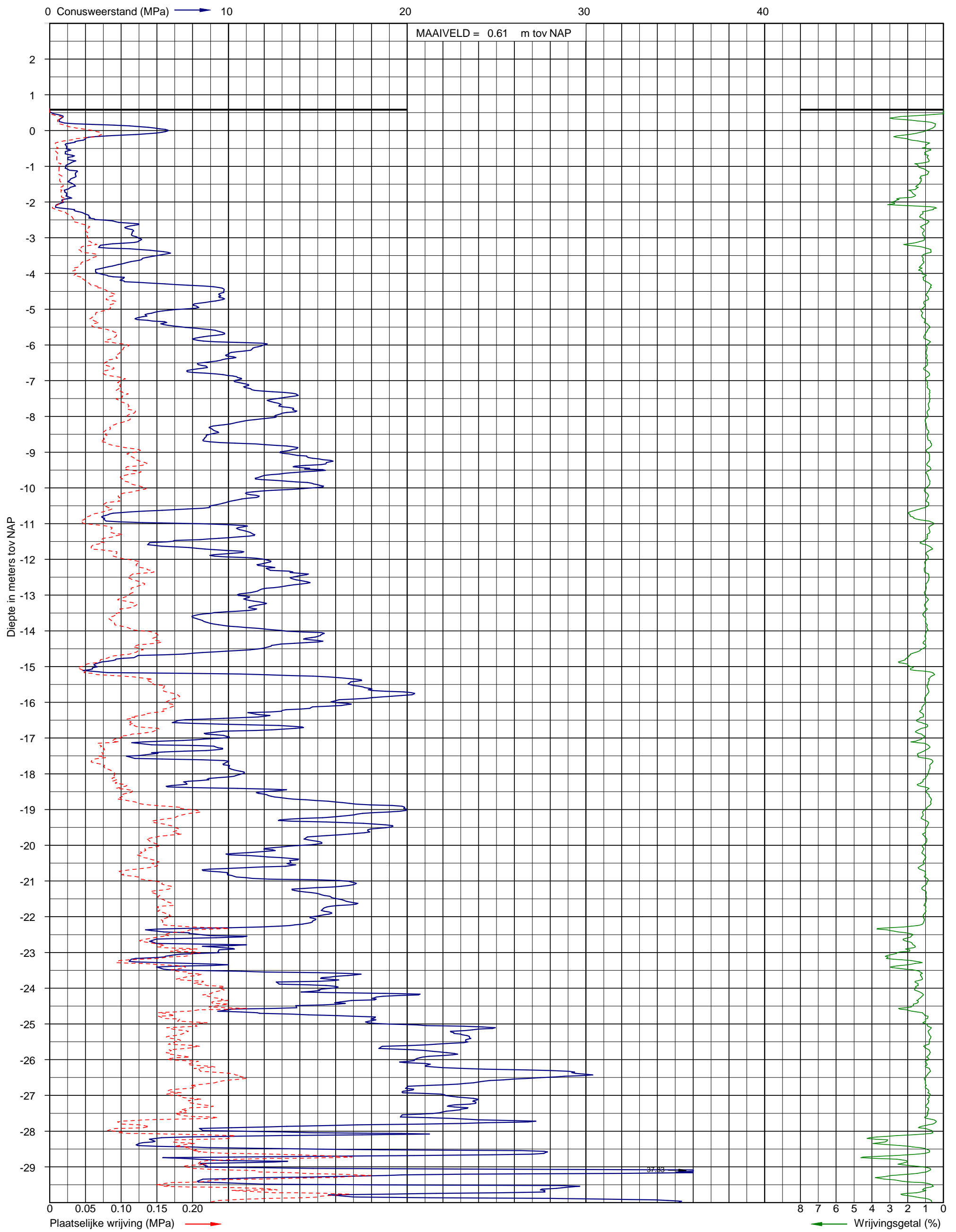


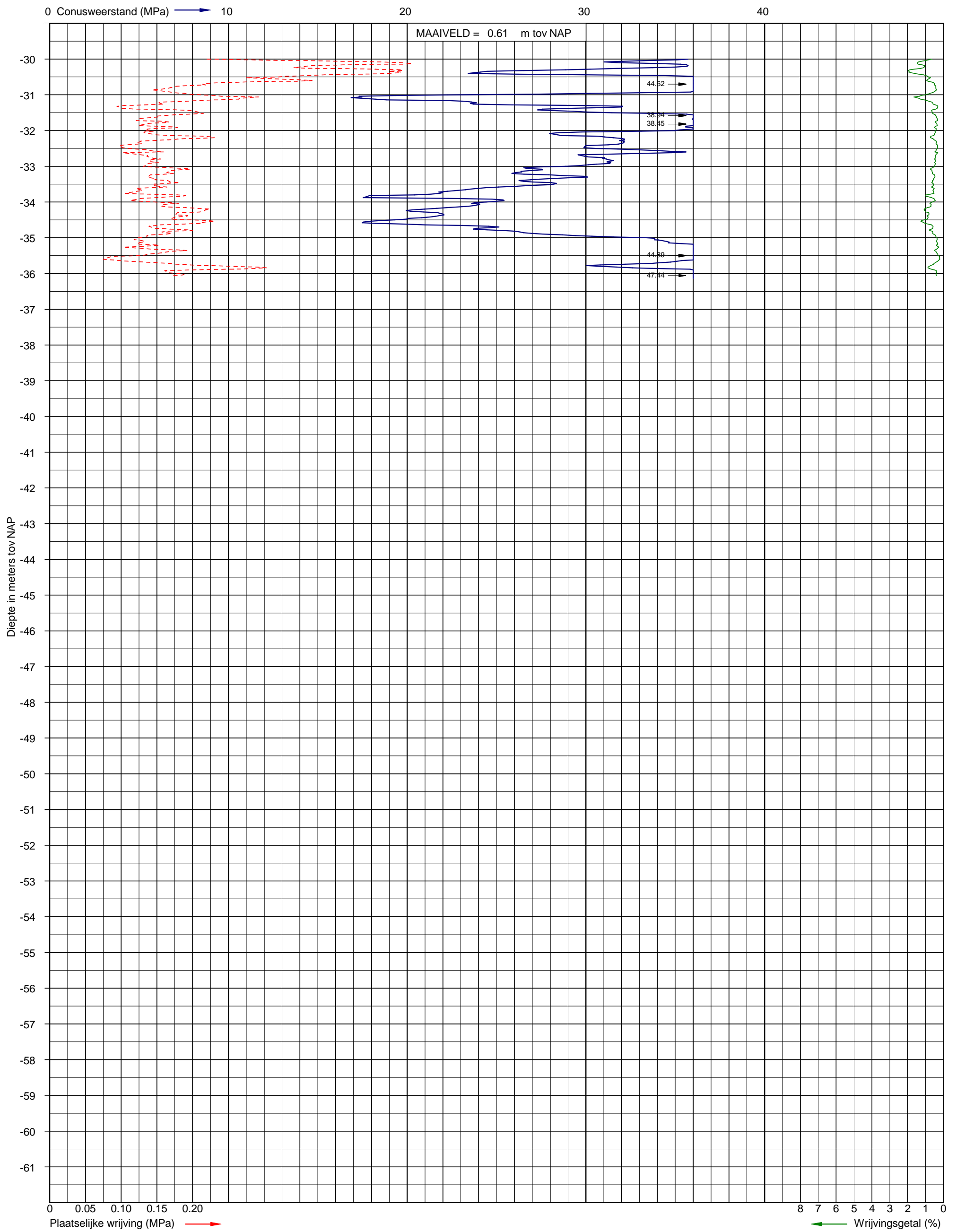


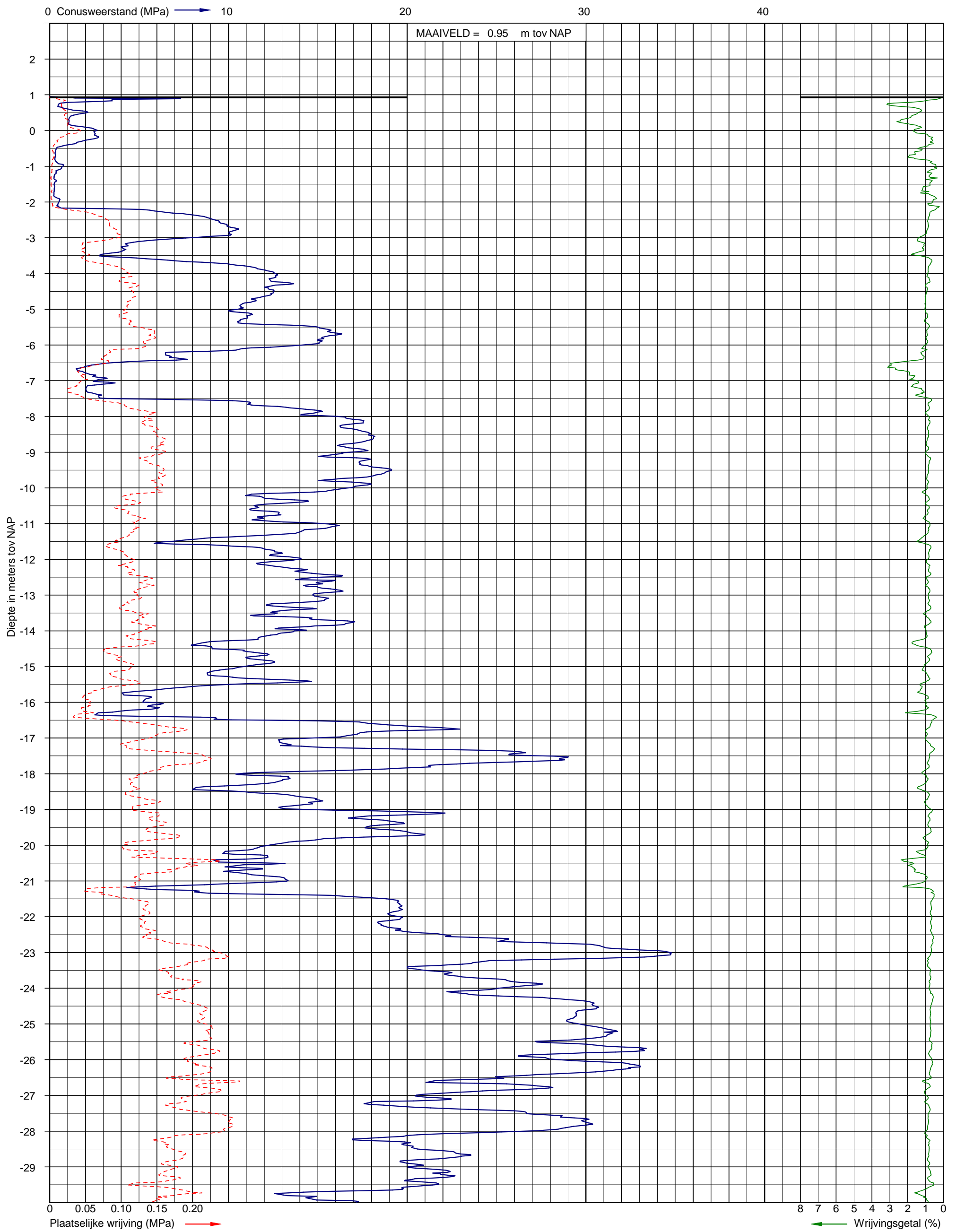


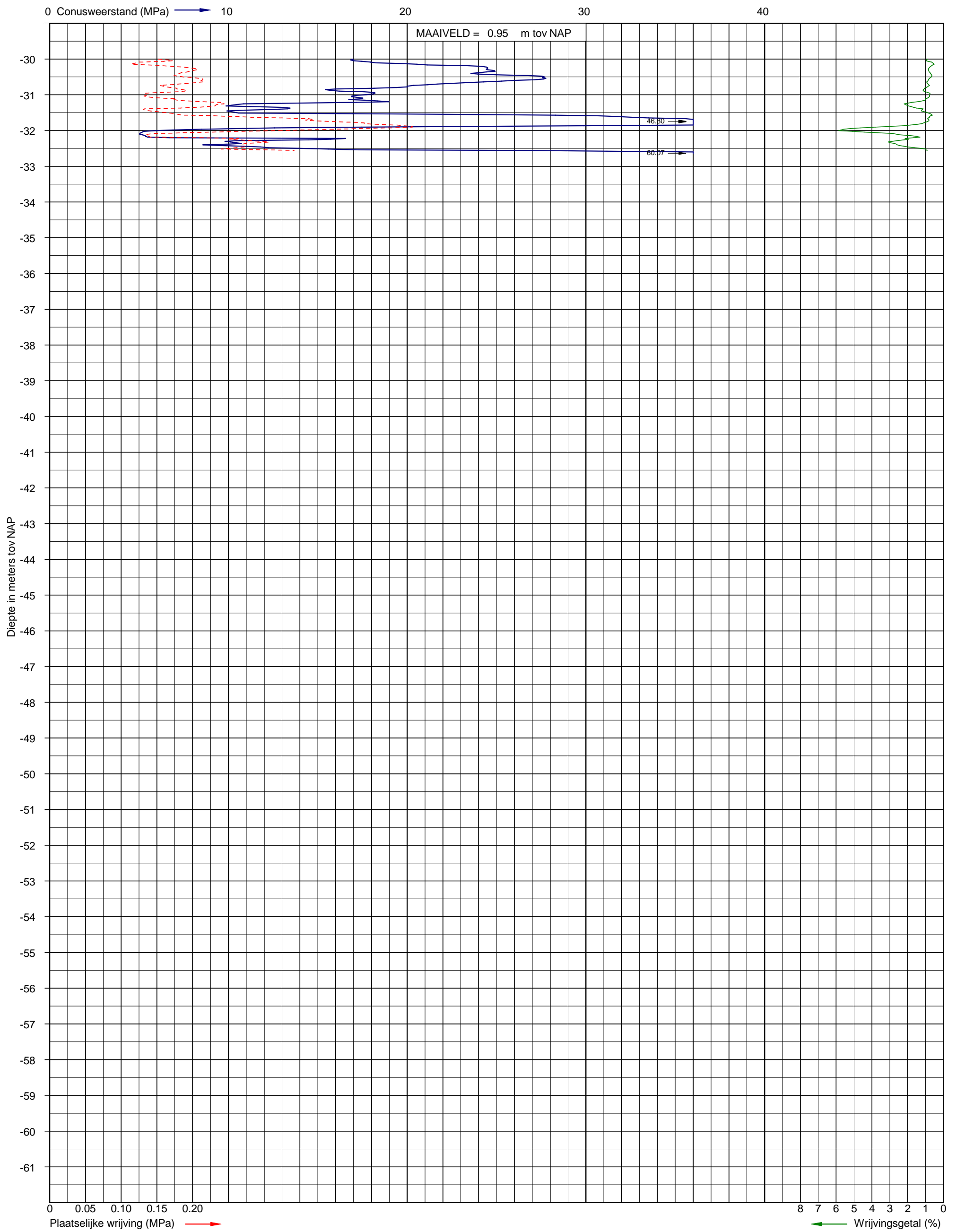


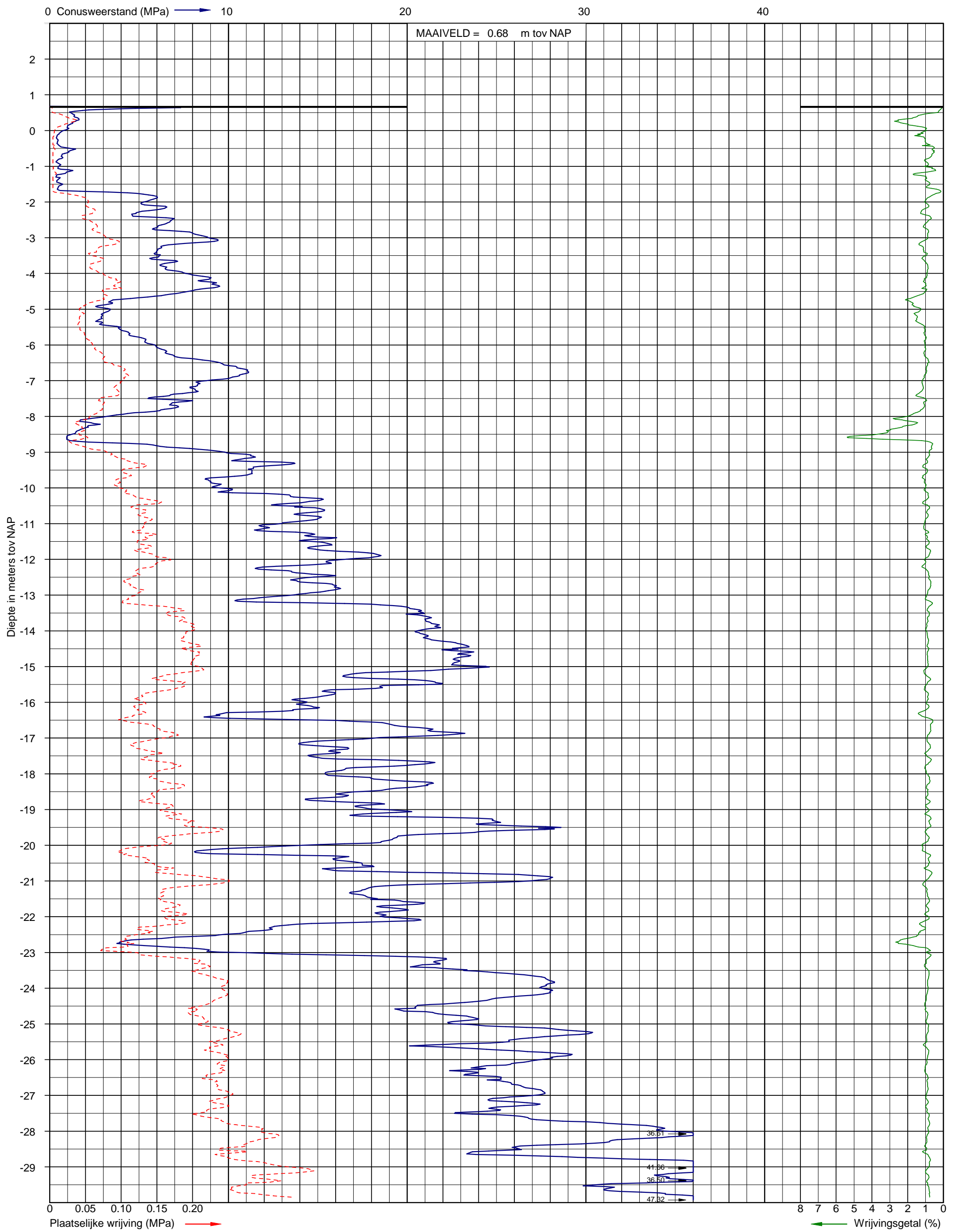
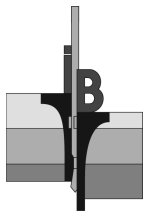


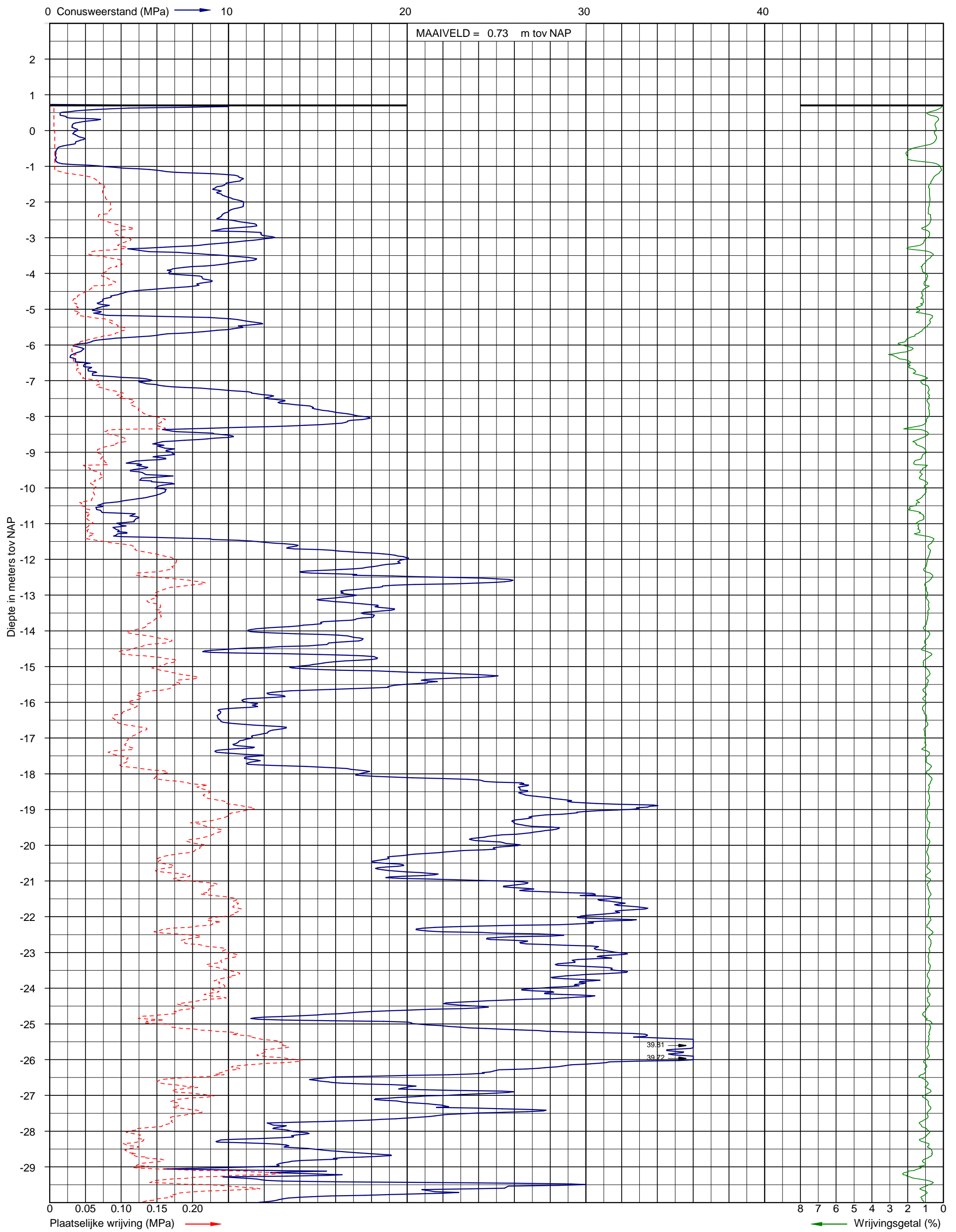


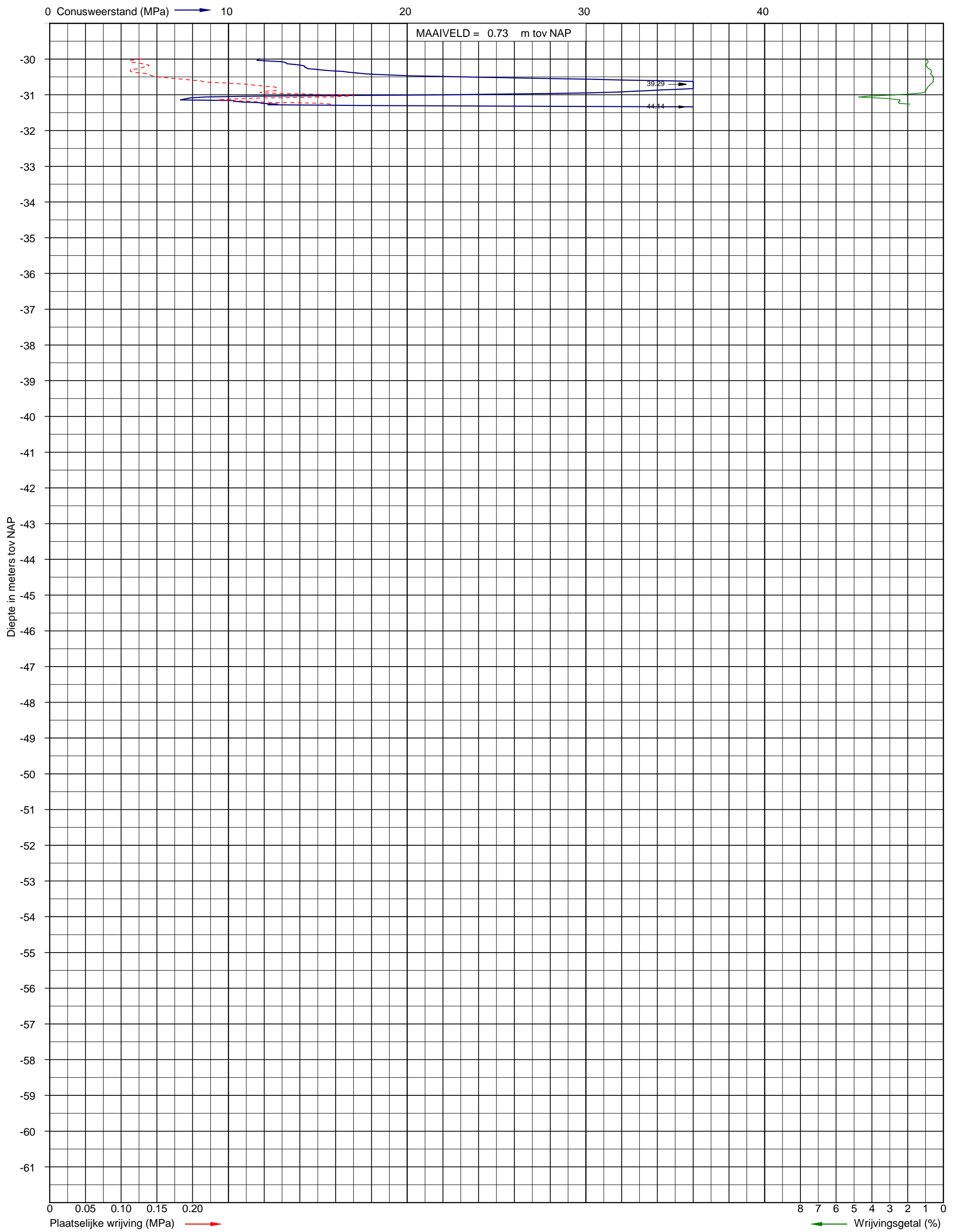


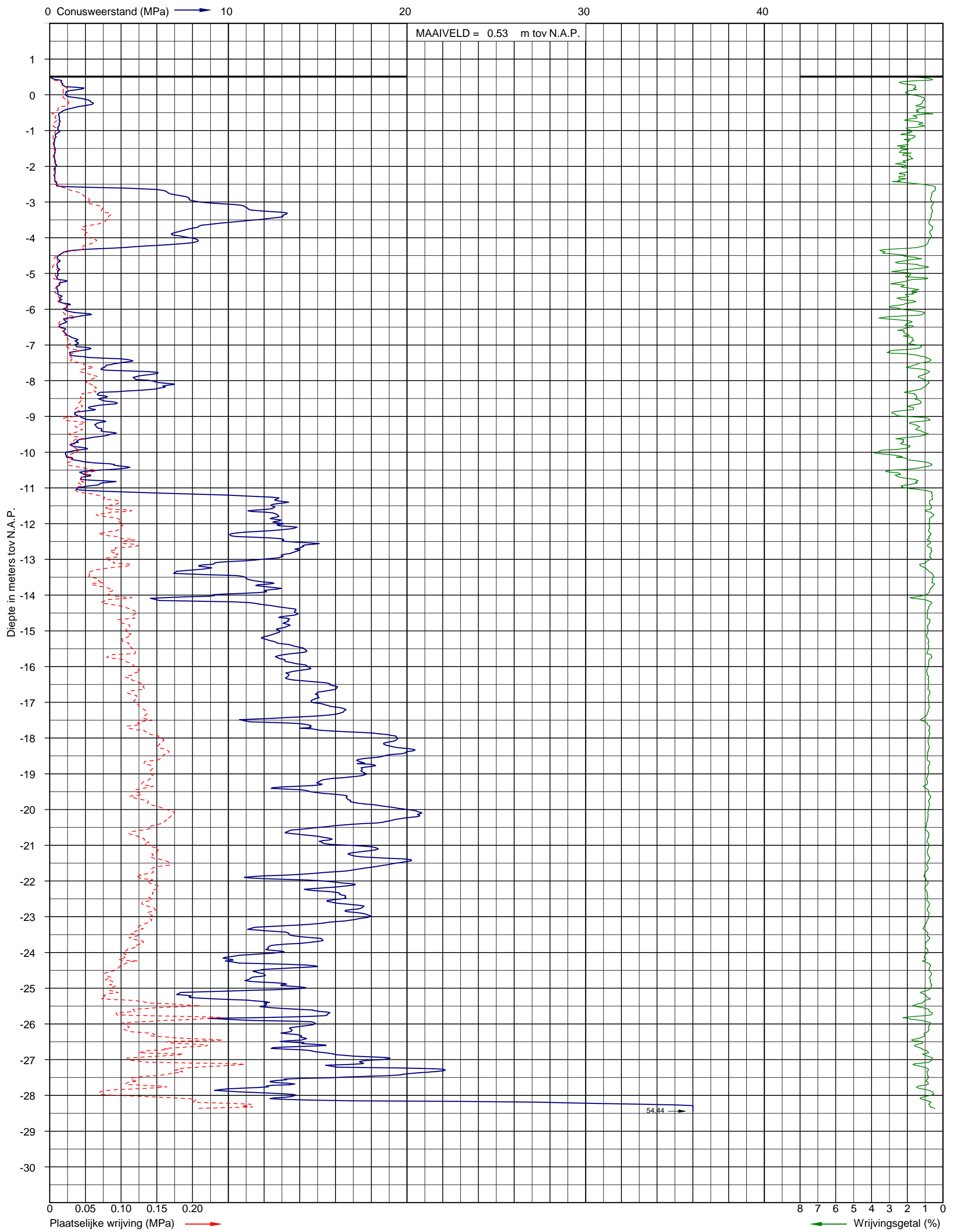


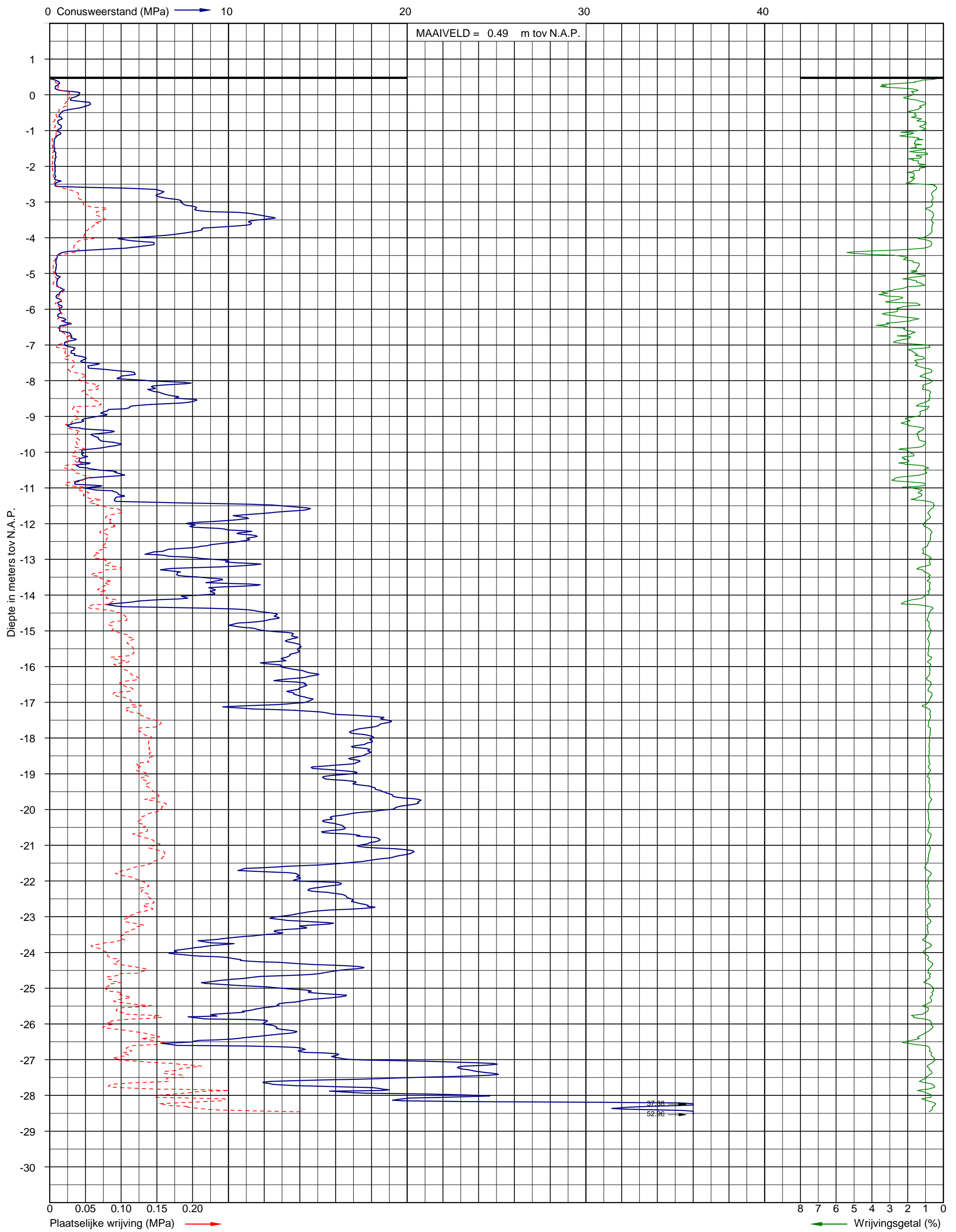


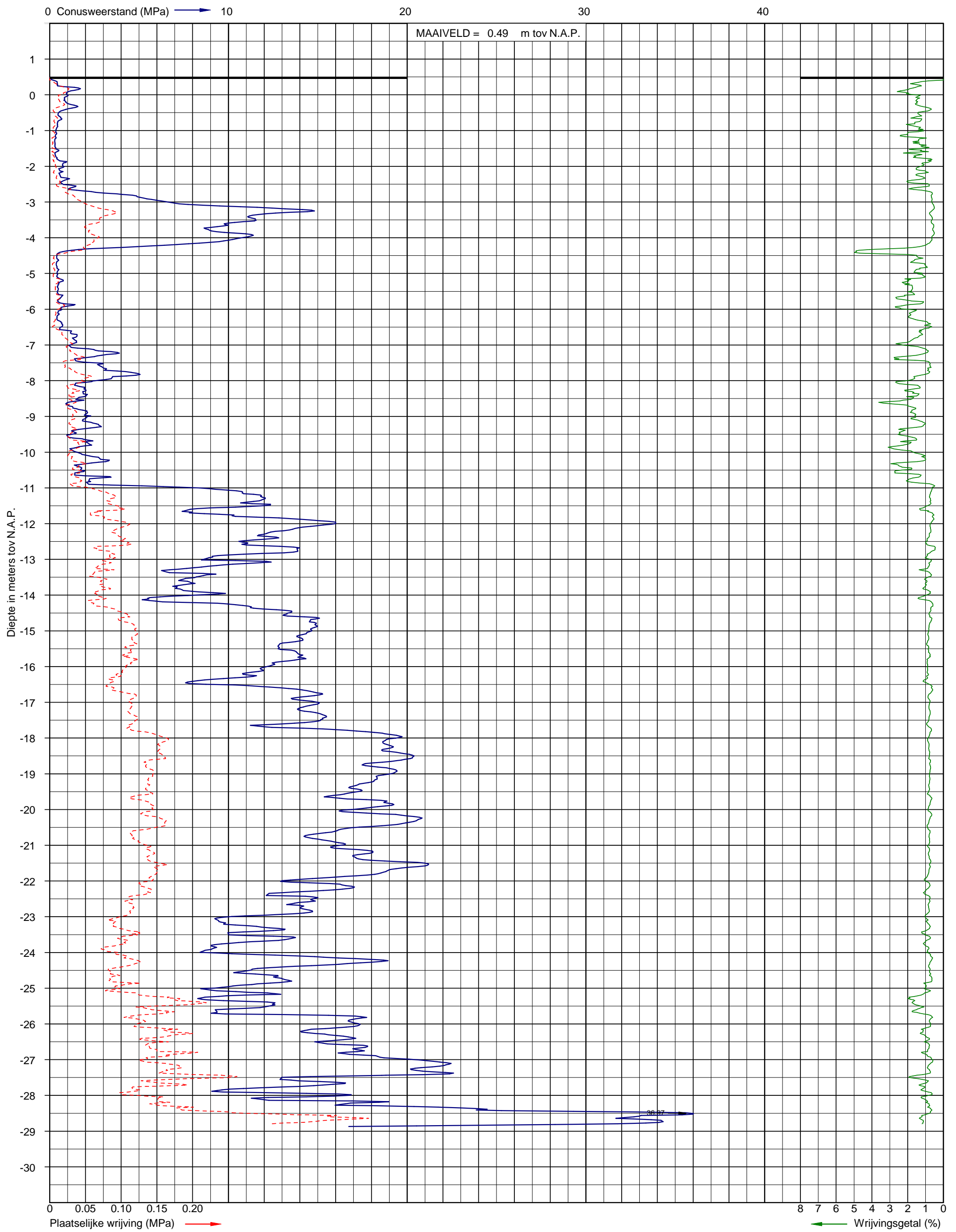


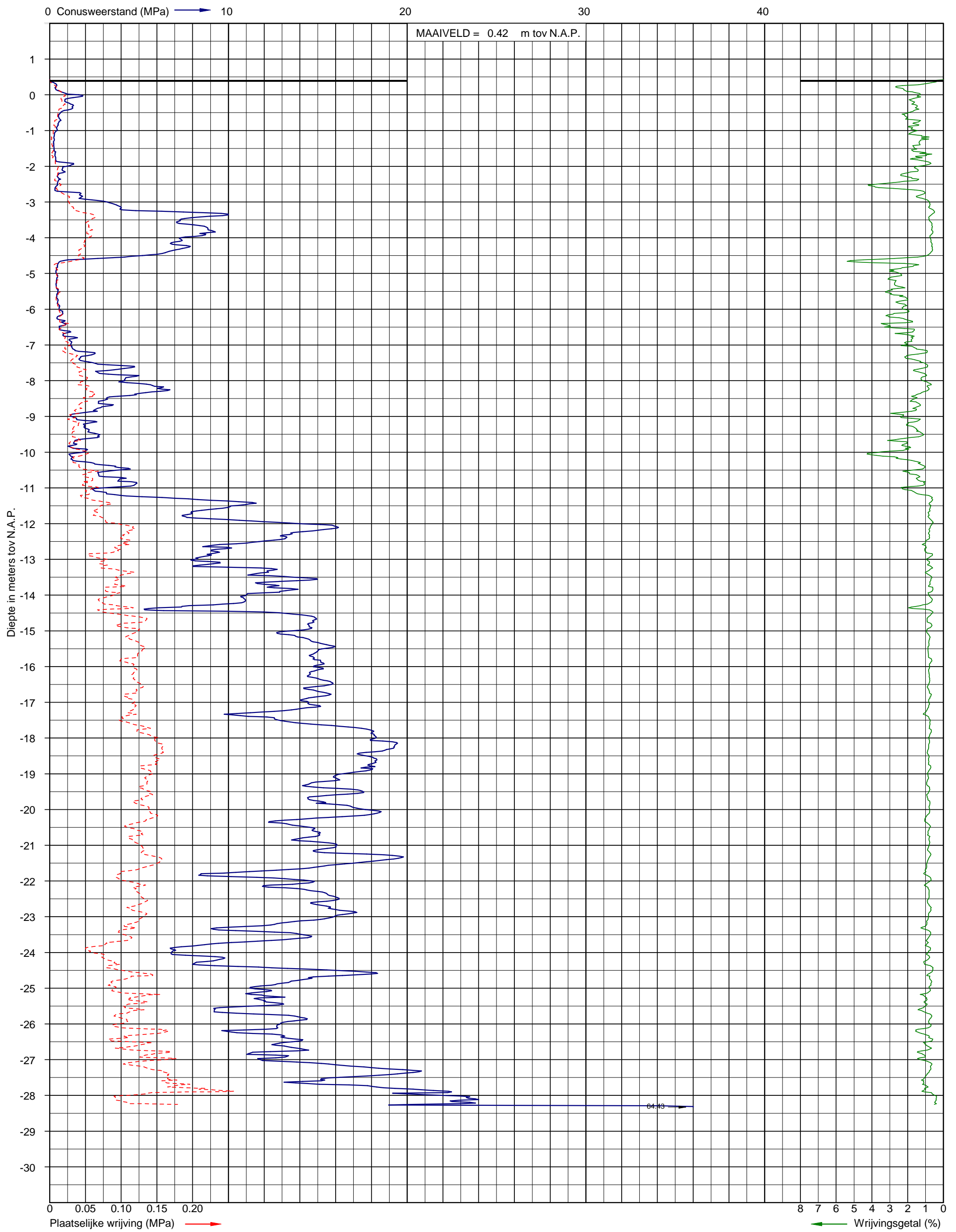


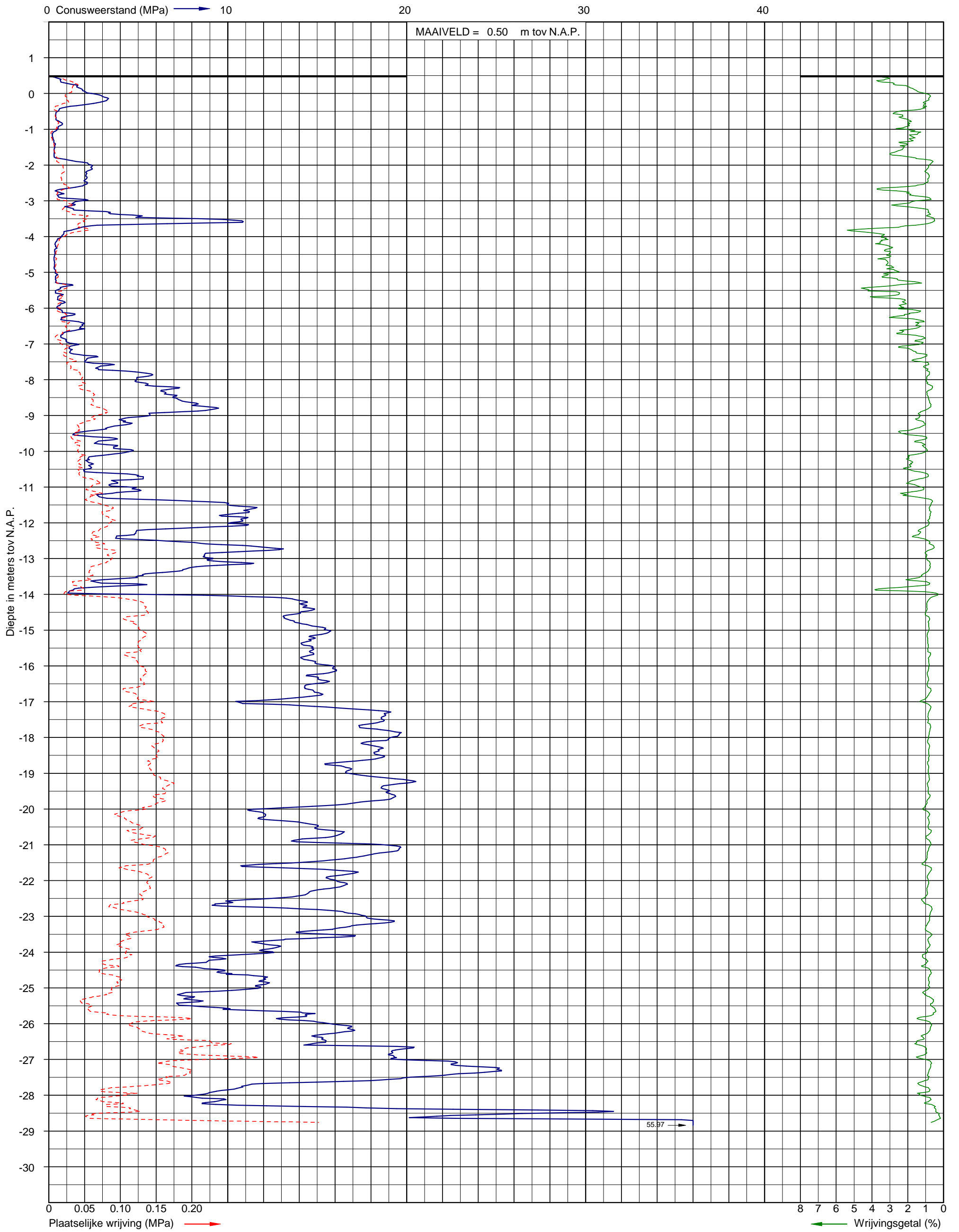
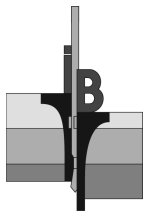


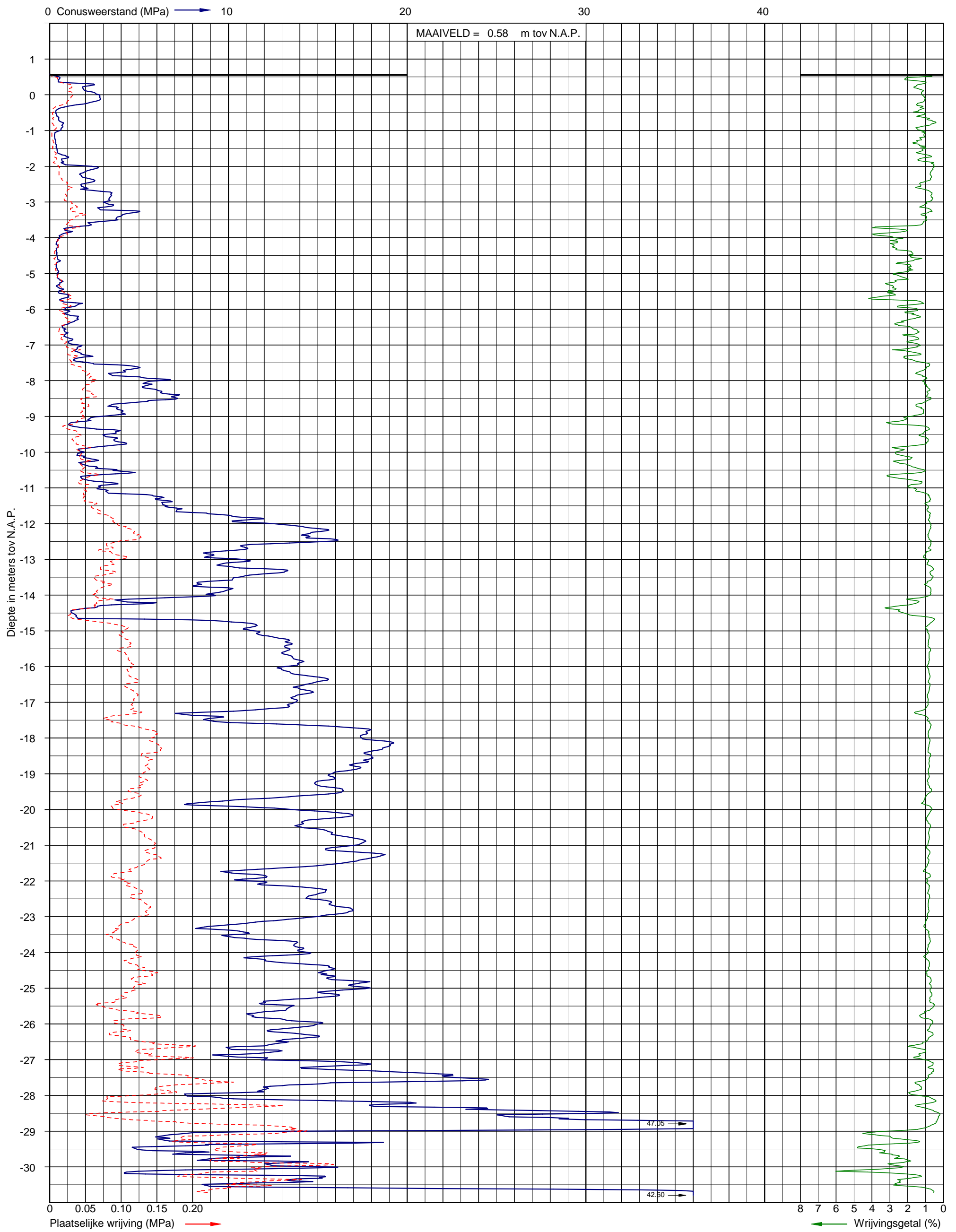


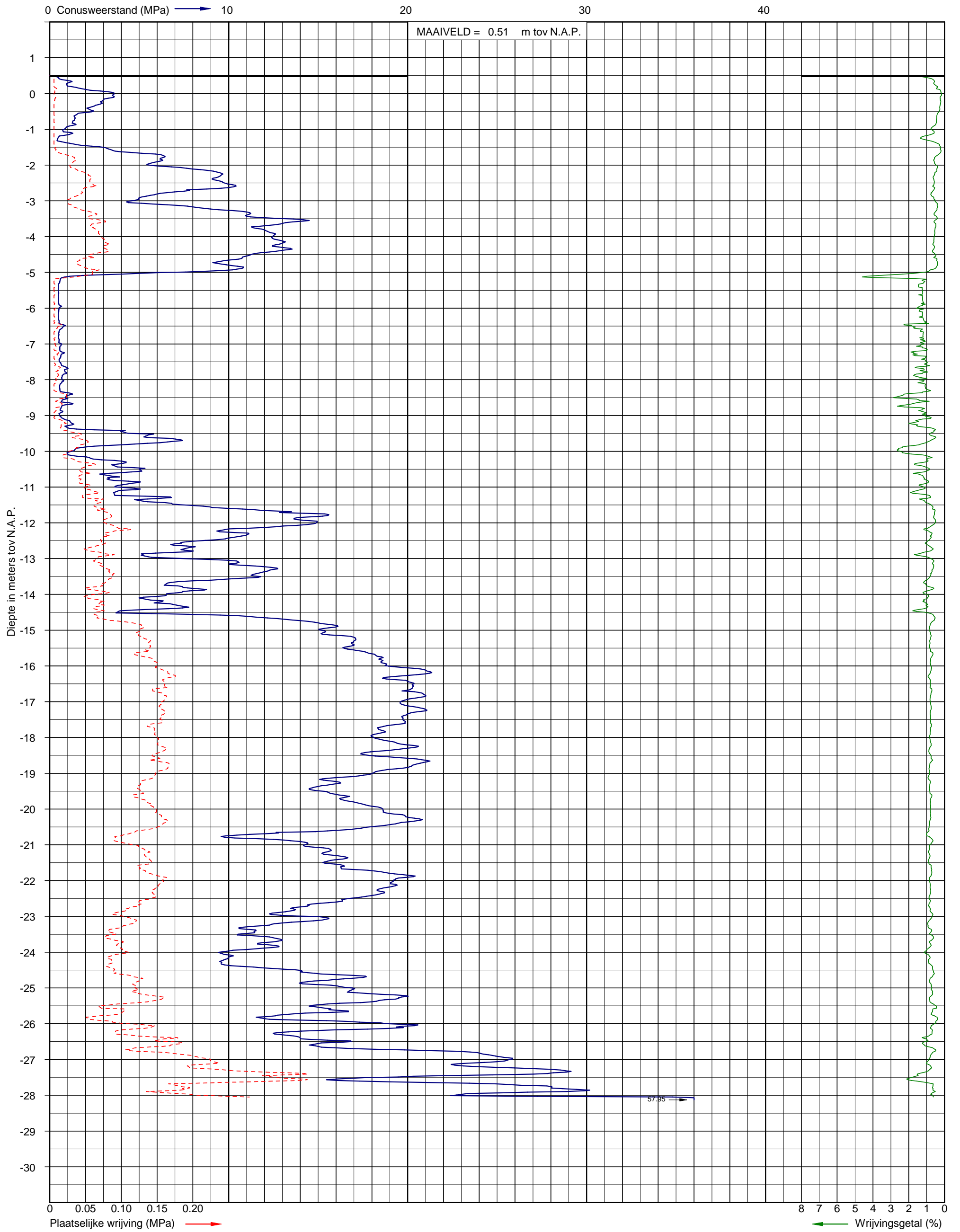


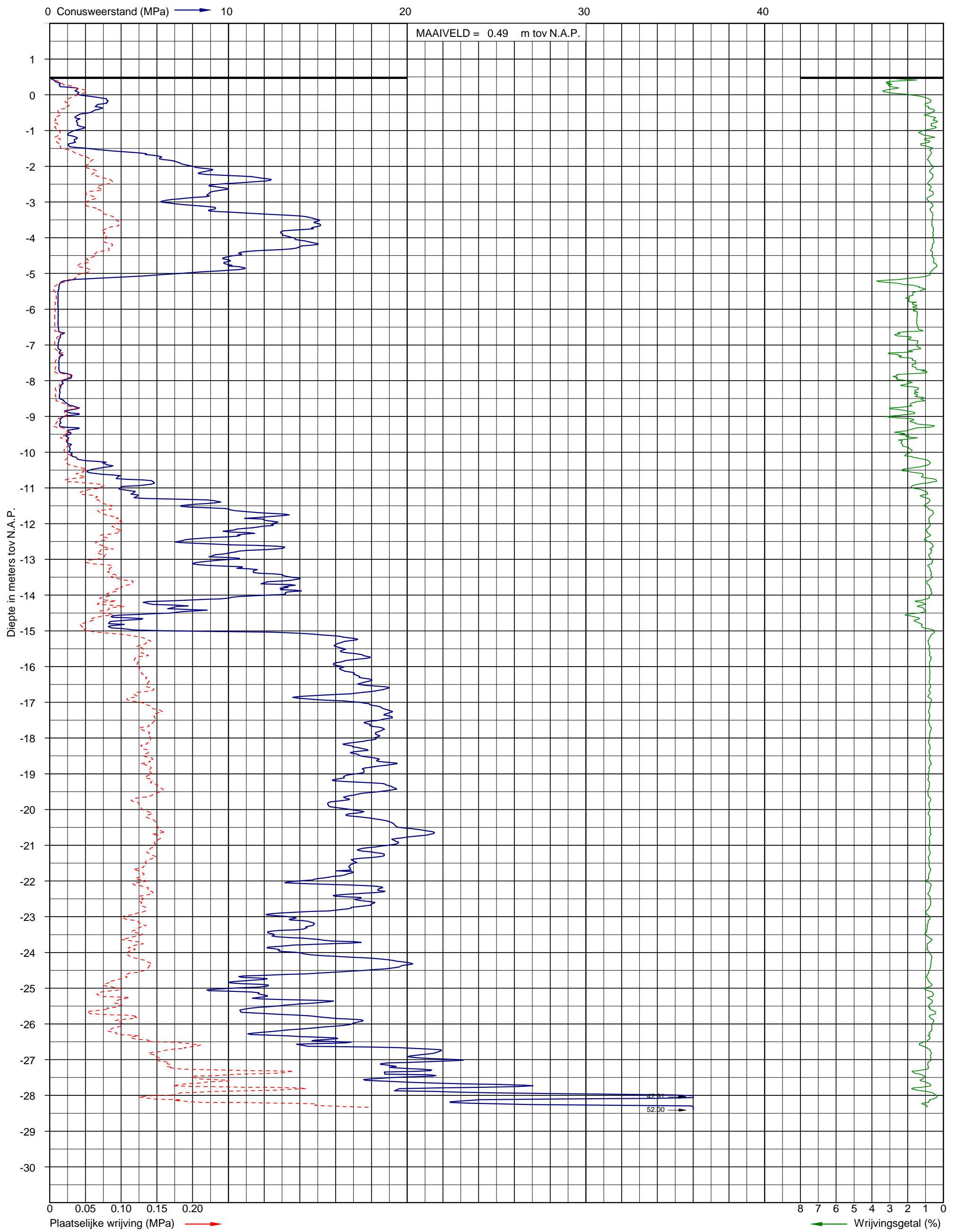


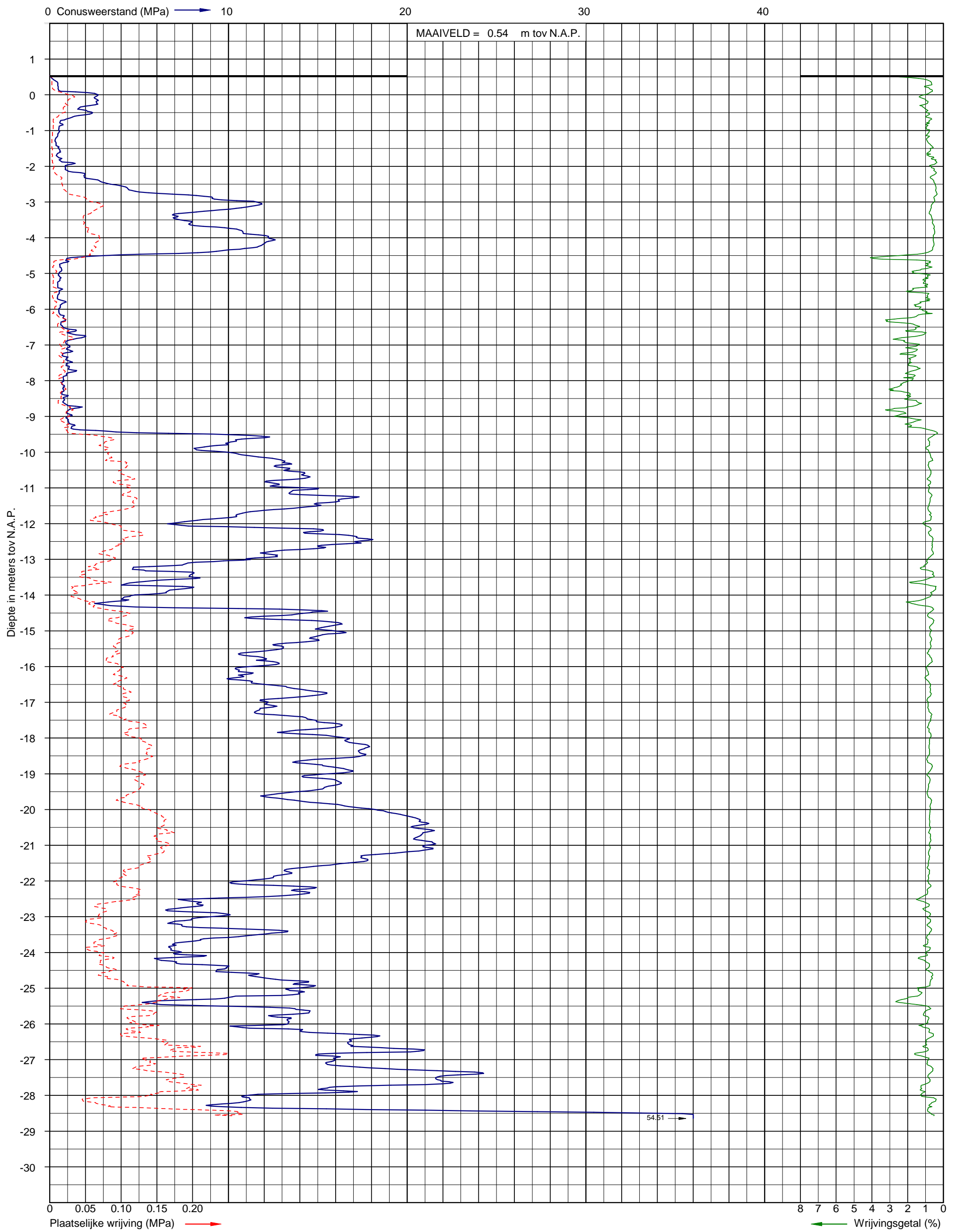
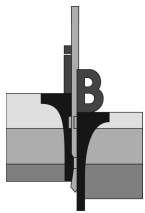


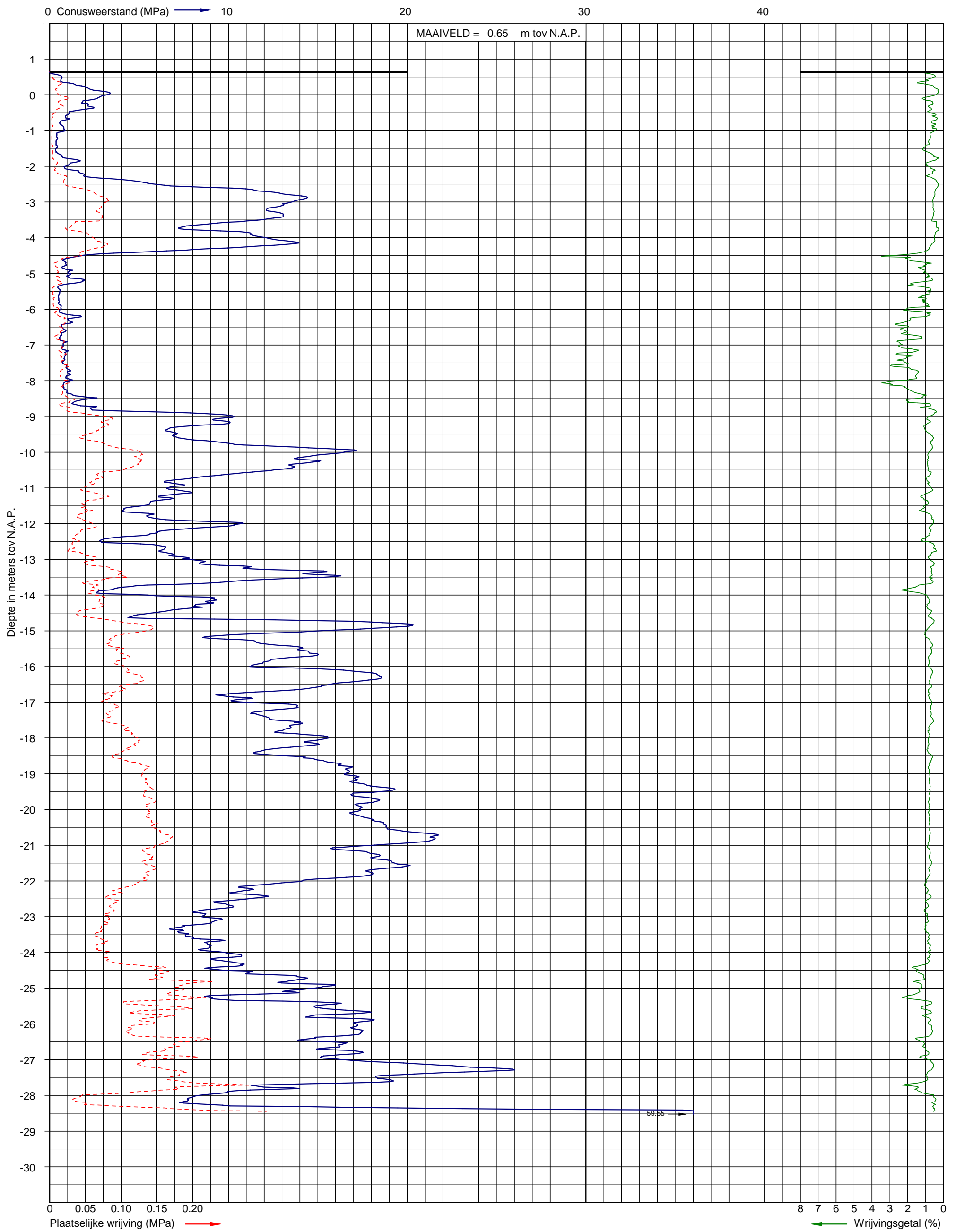


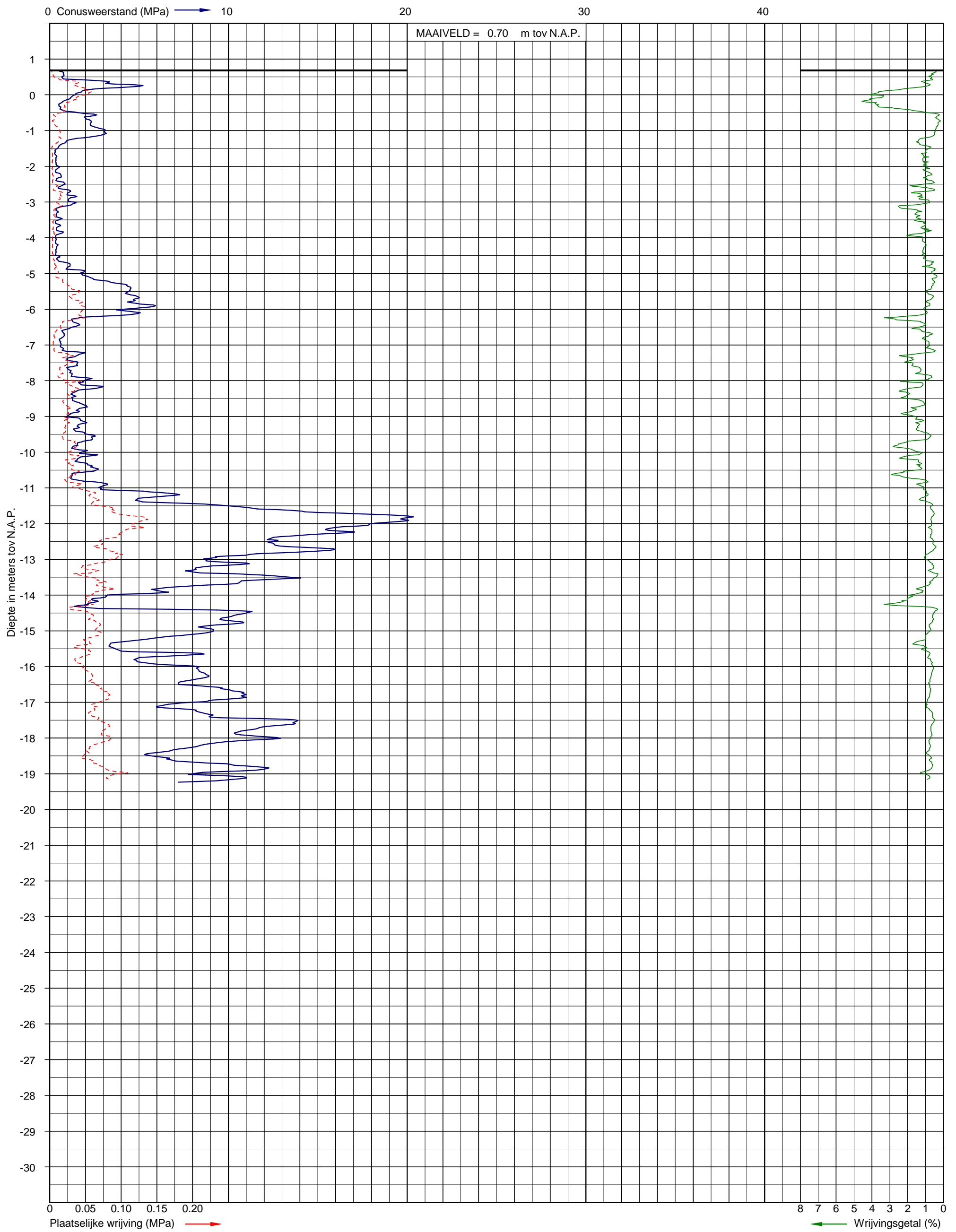


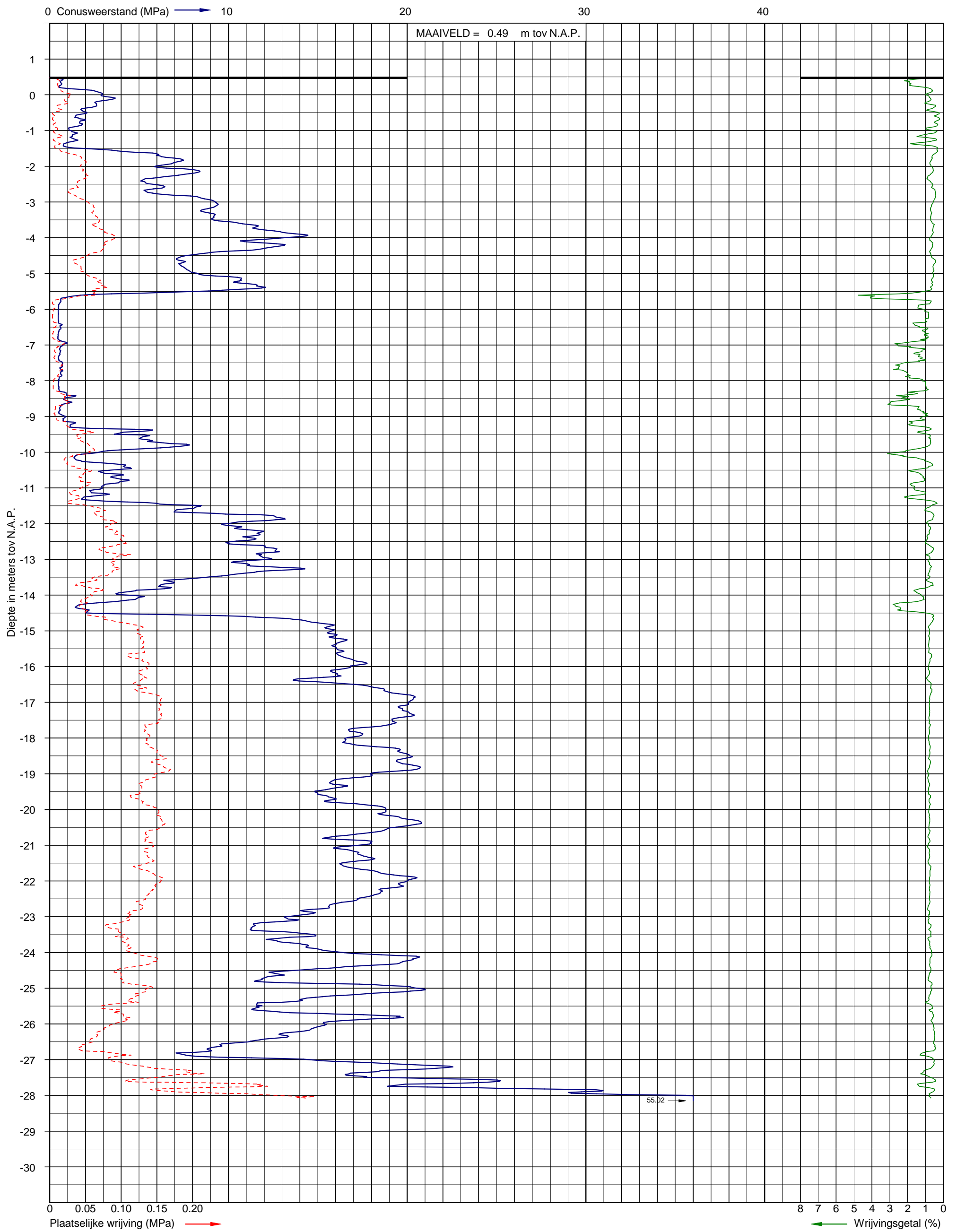


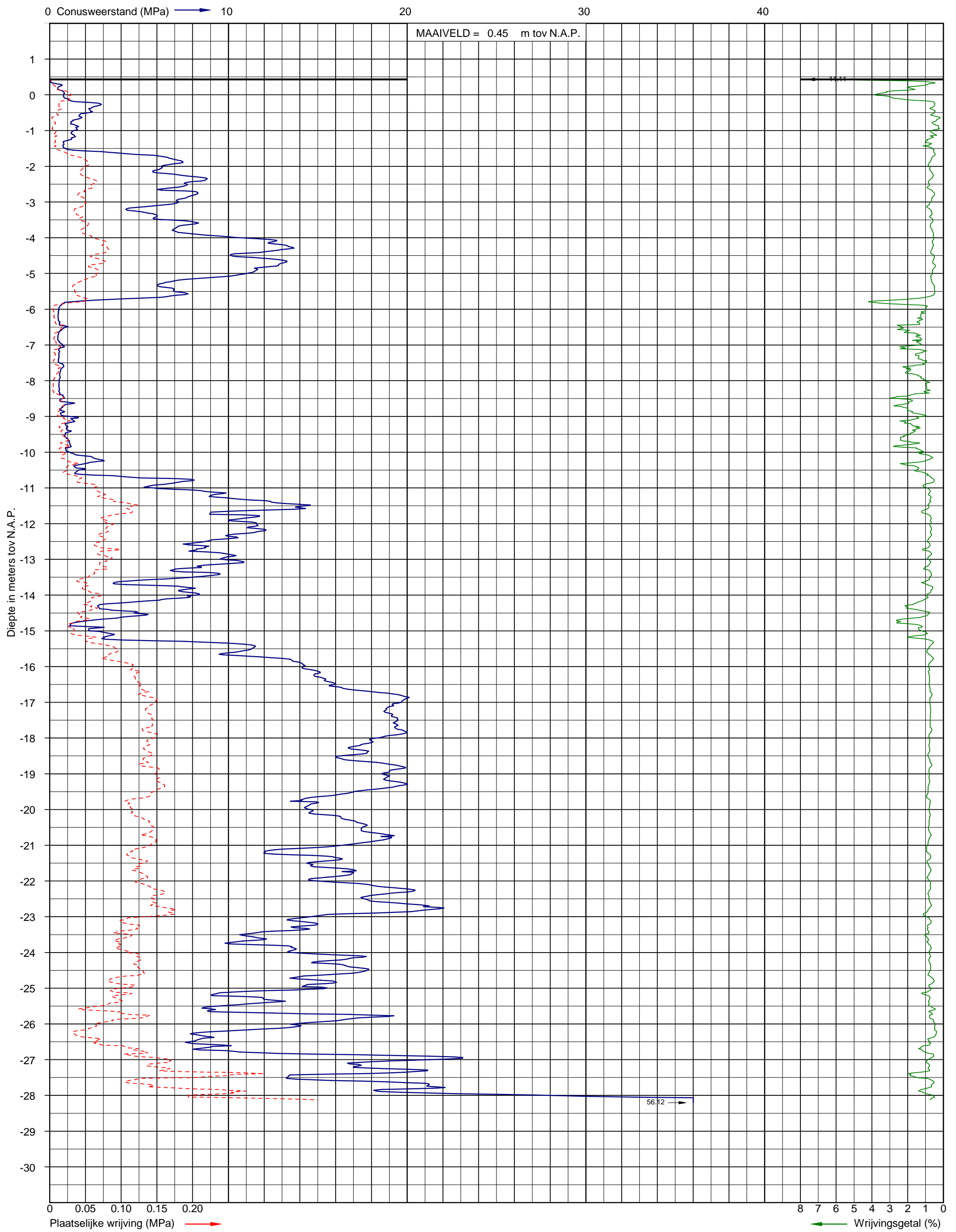
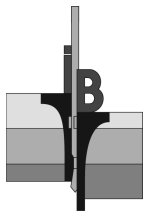


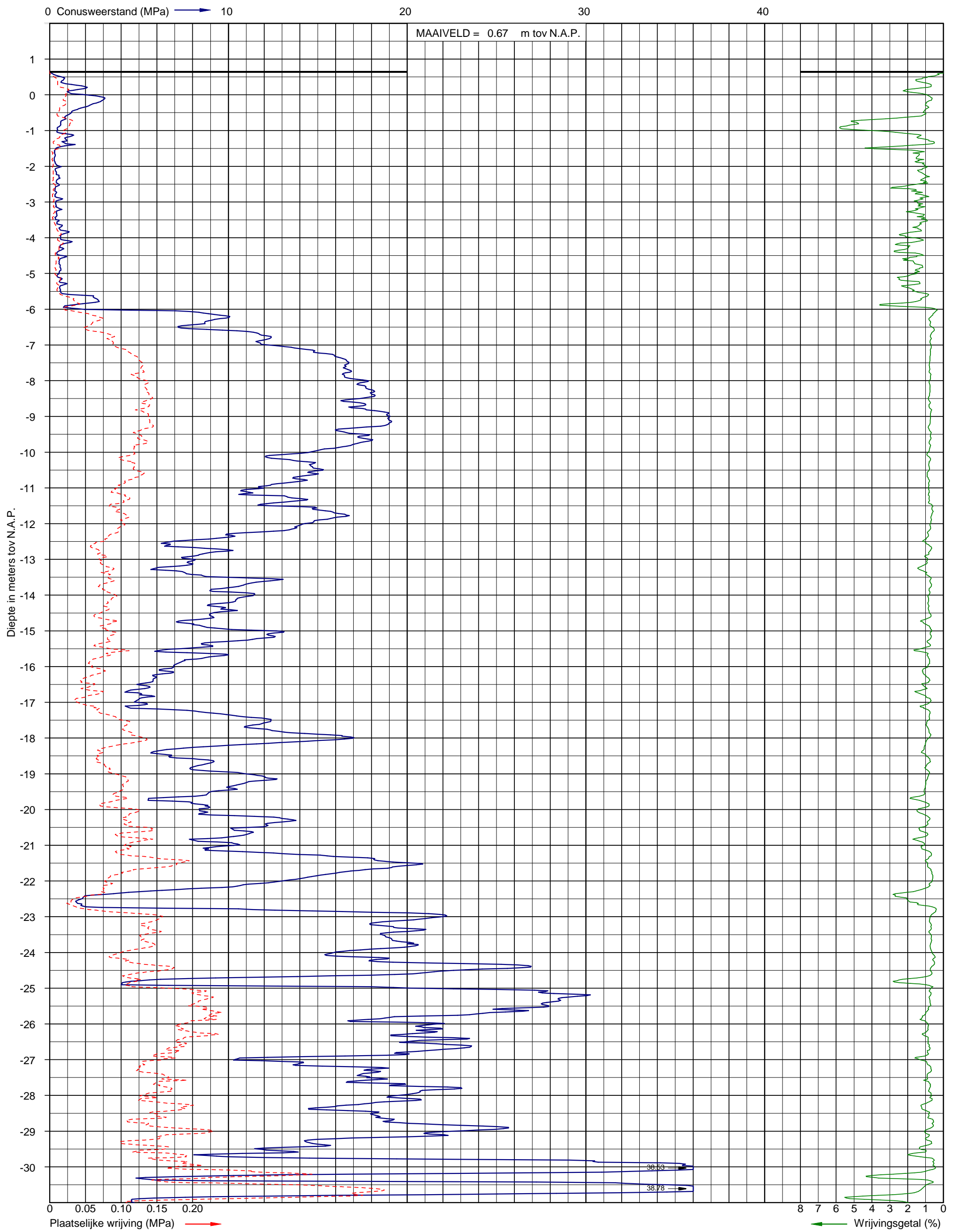


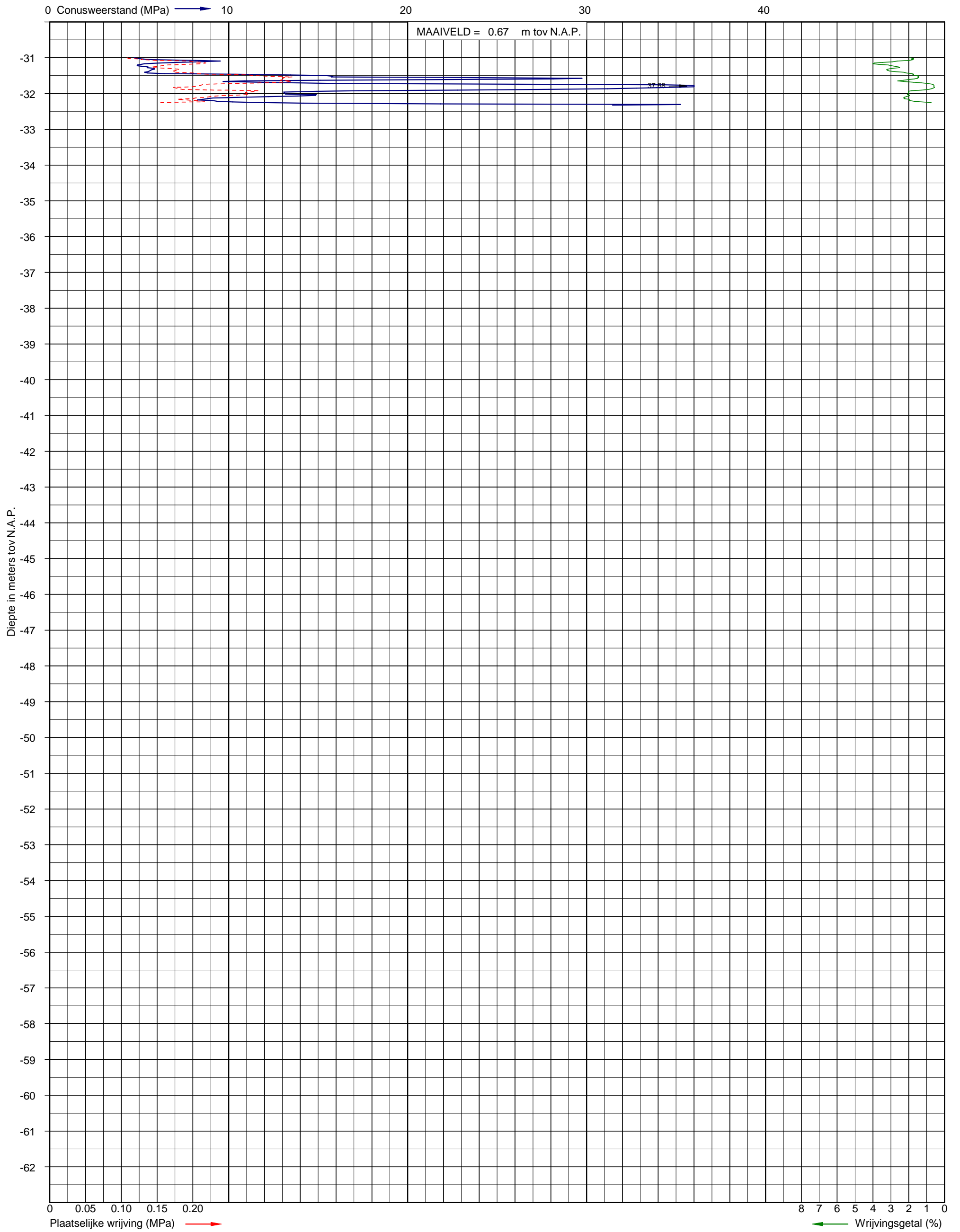


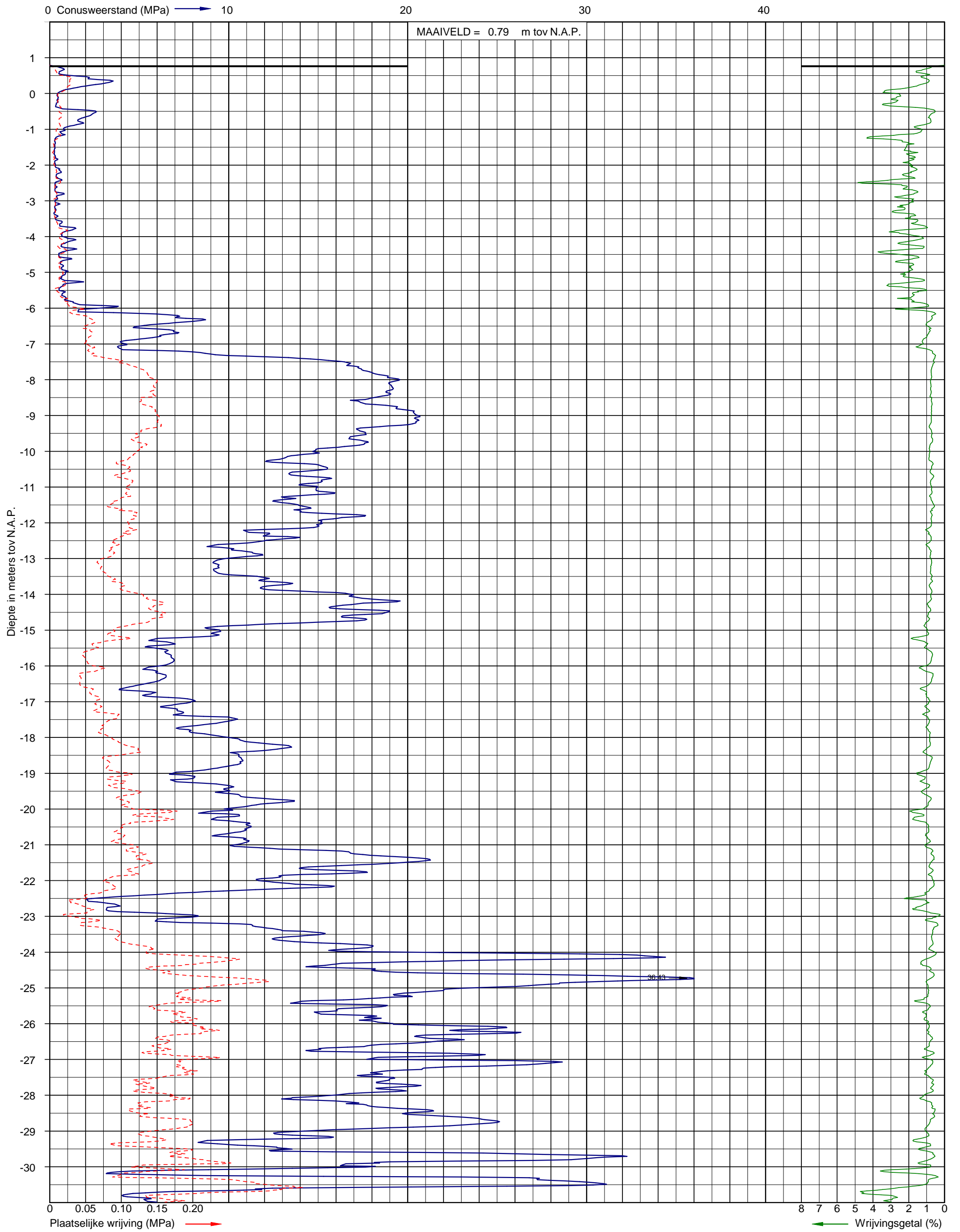


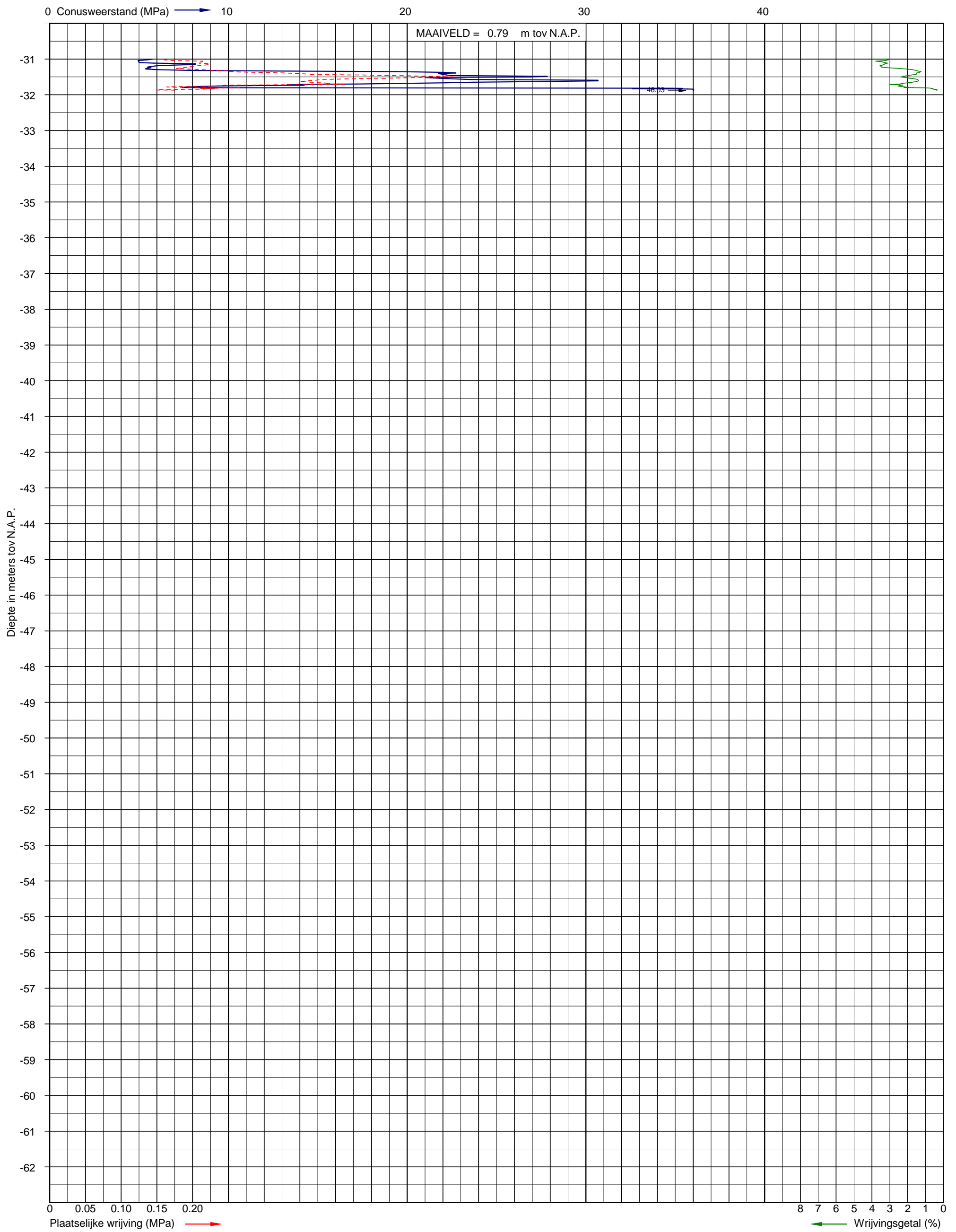
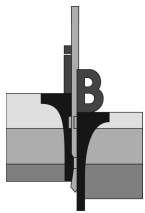


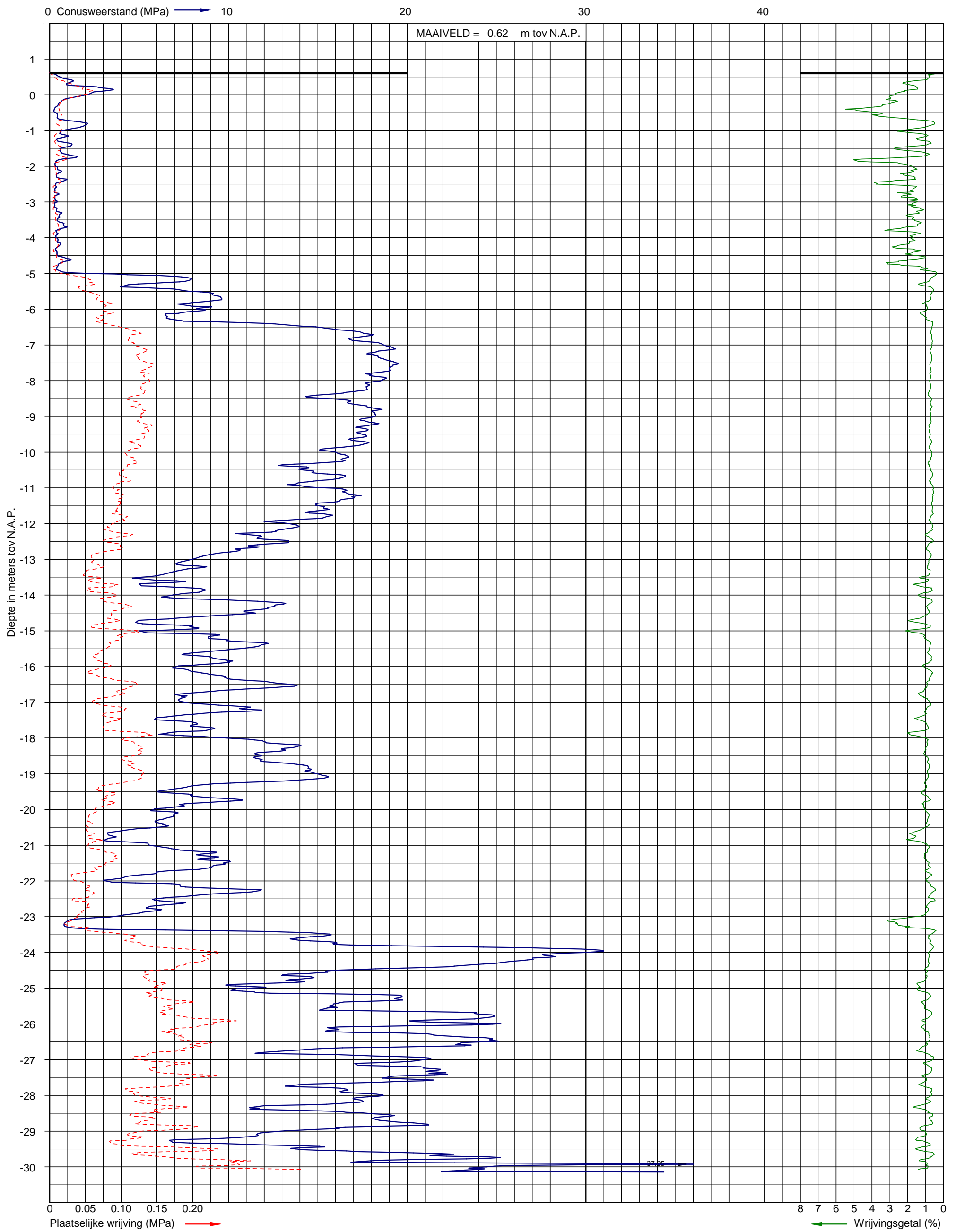


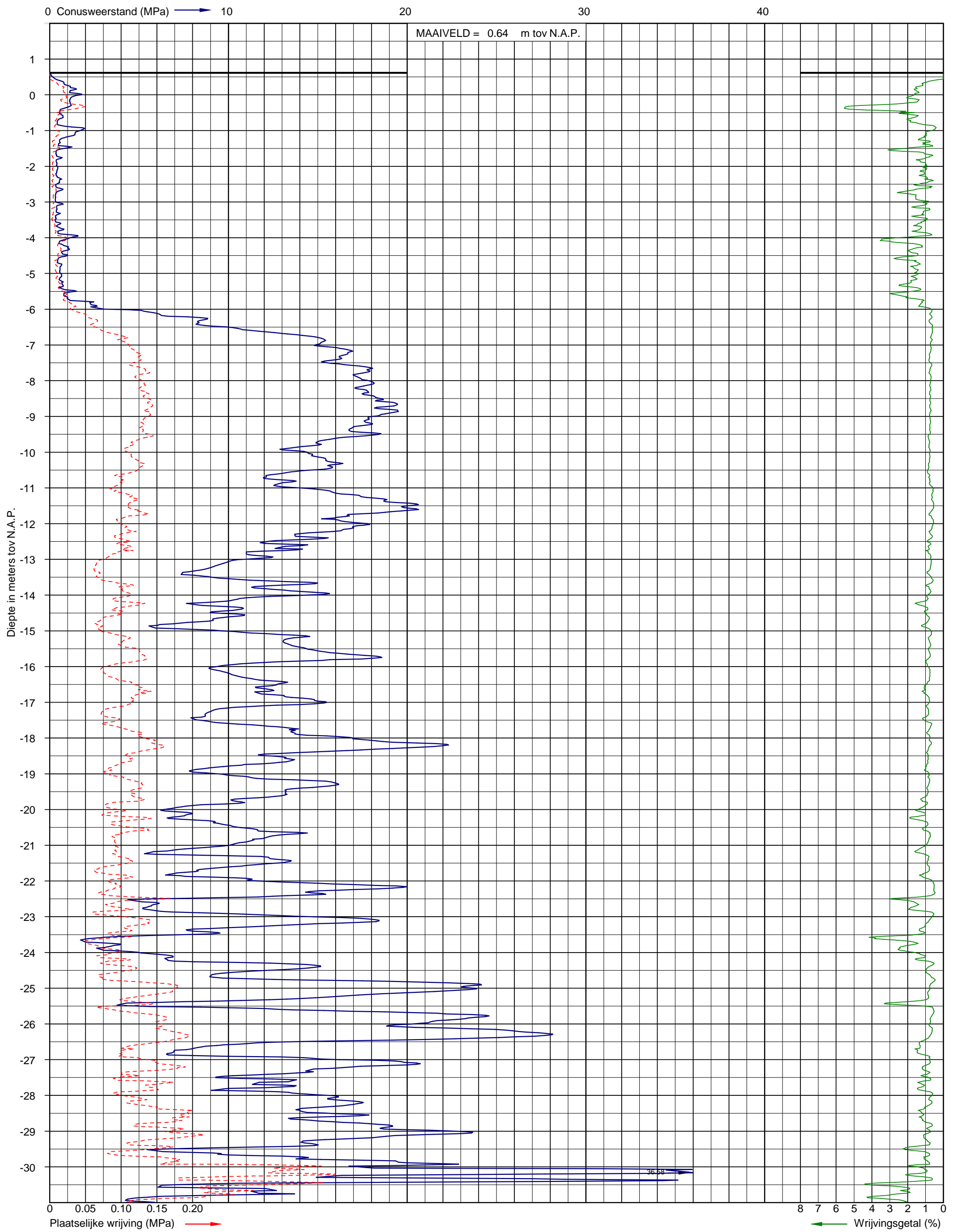


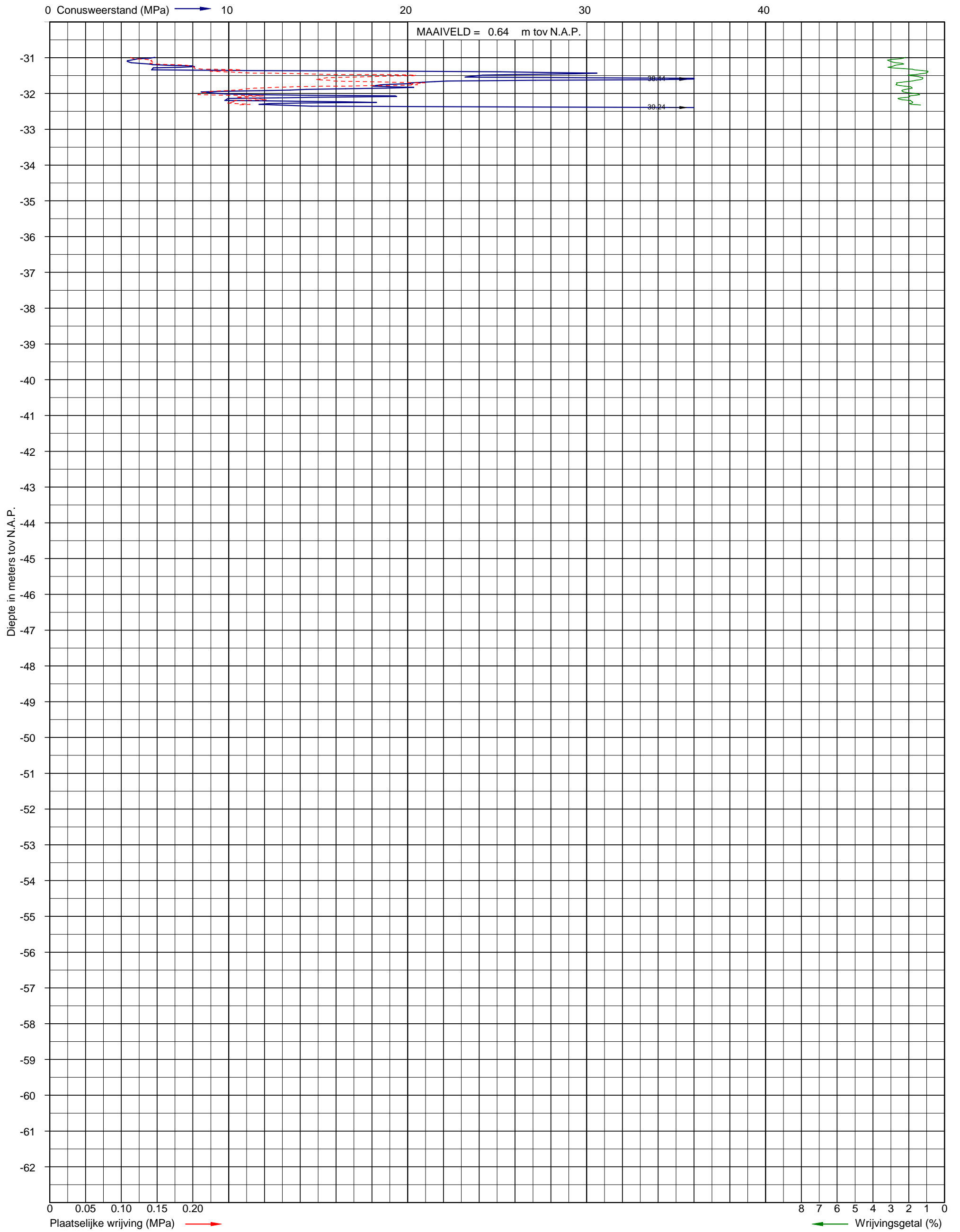


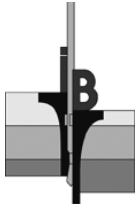






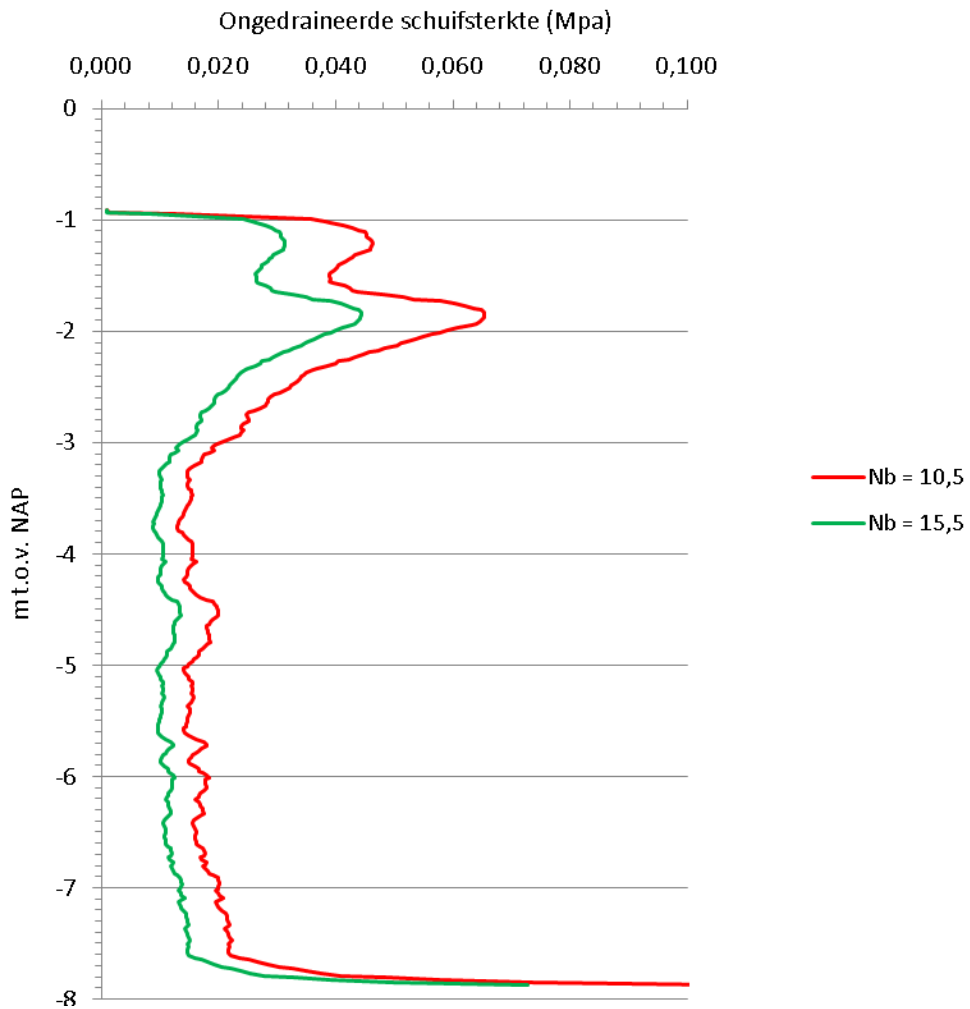


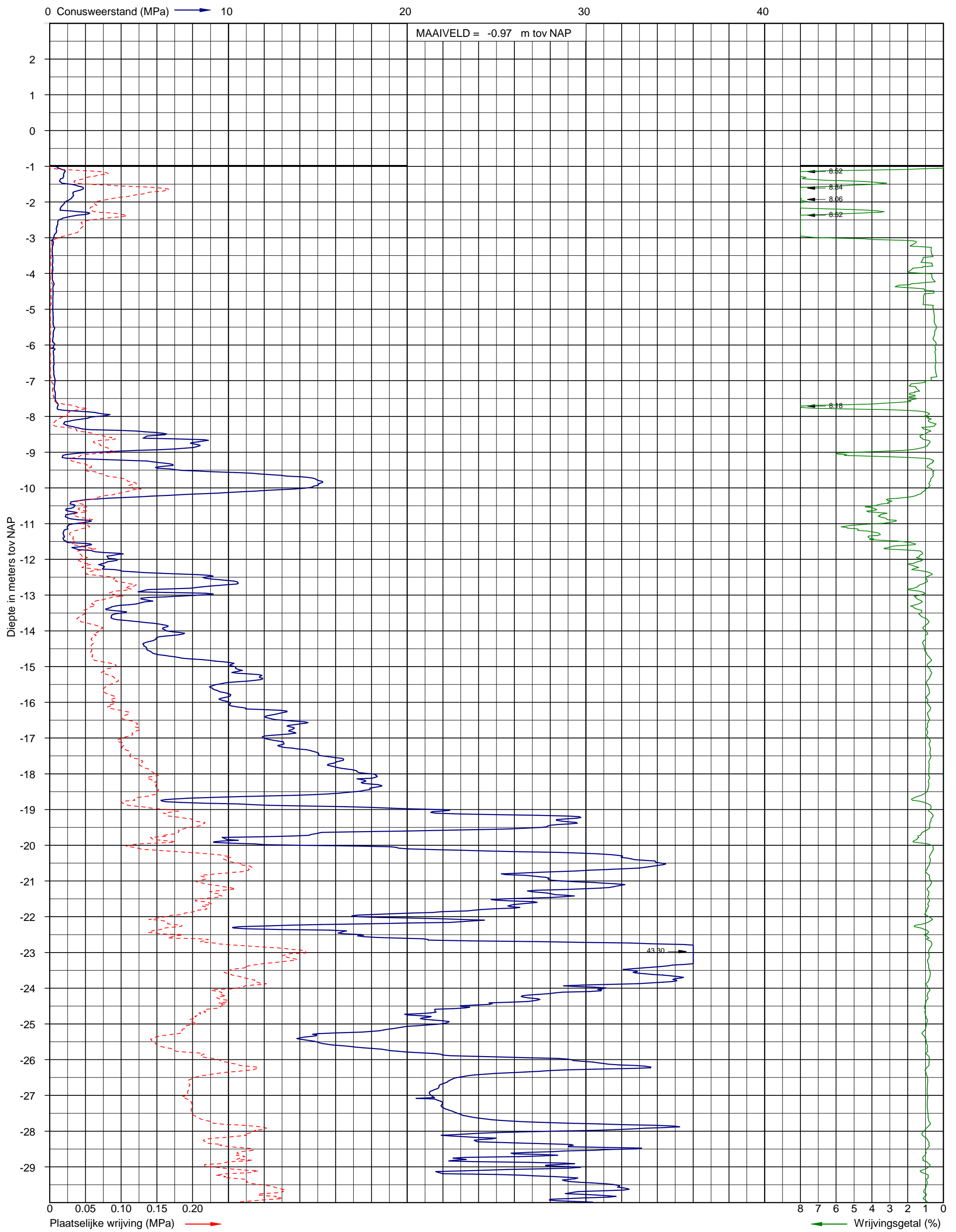


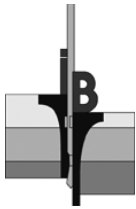


Opdracht : 02P001595
Project : Geotechnisch onderzoek aanleg hsp masten trace Borsele-Tilburg
Fase 1

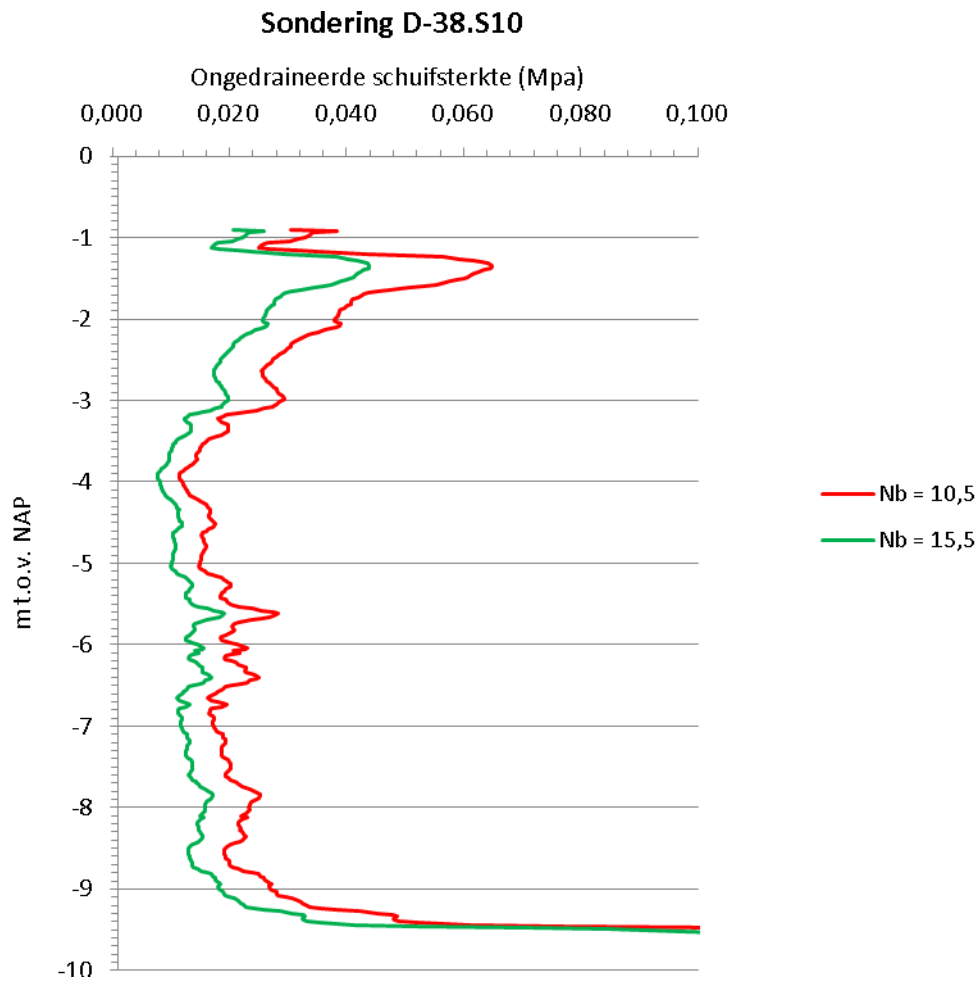
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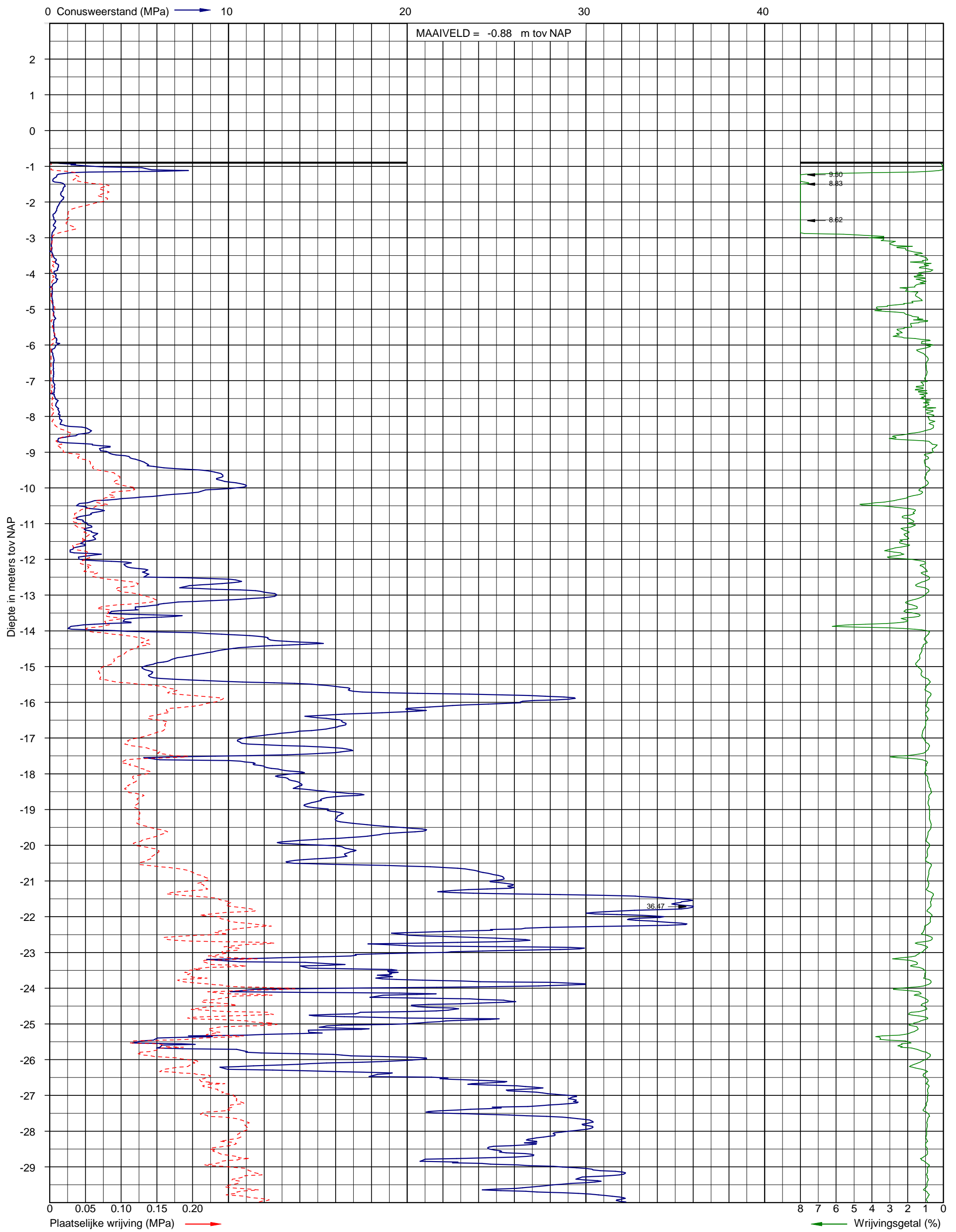


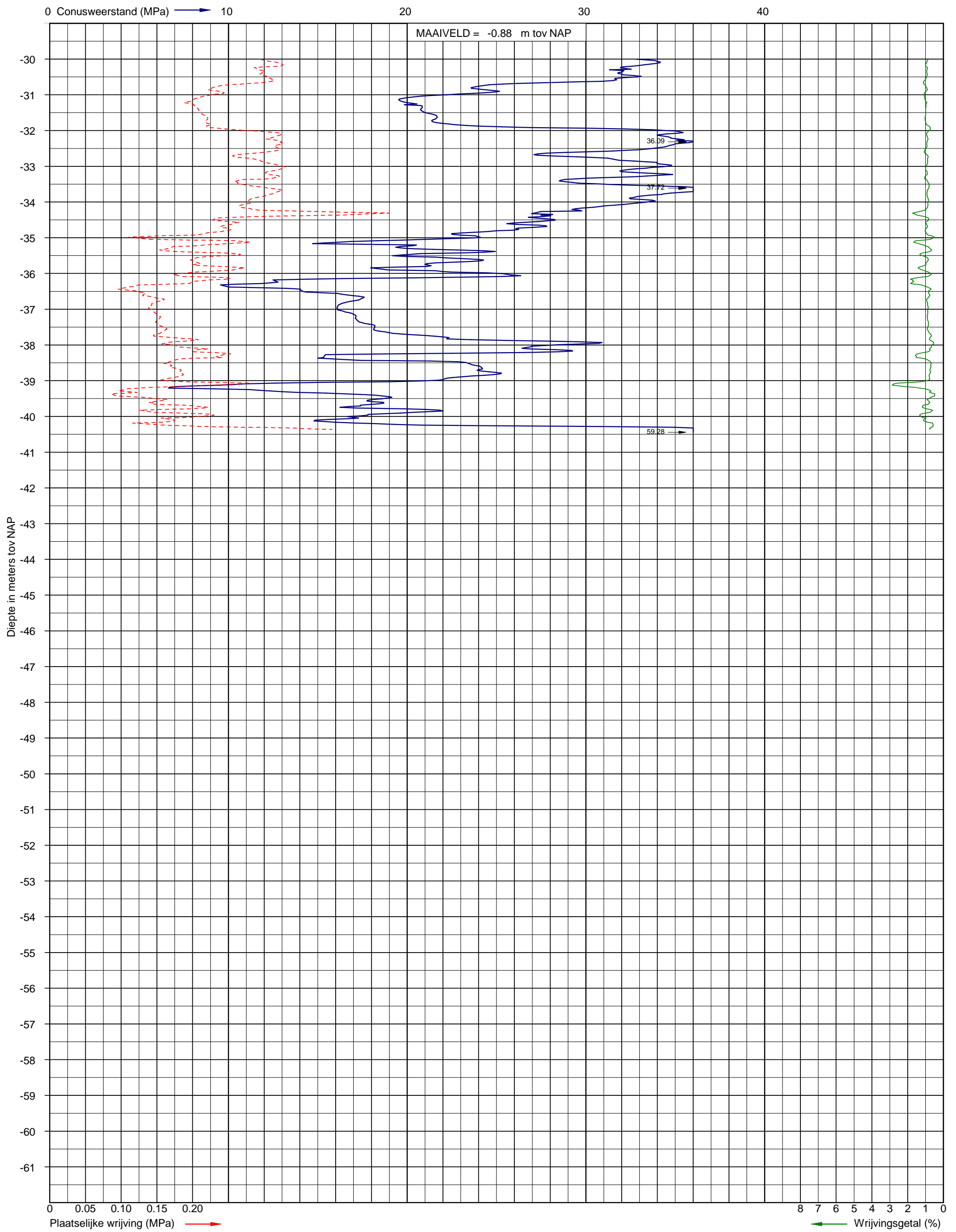
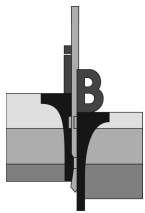


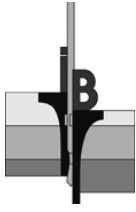


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Fase 1



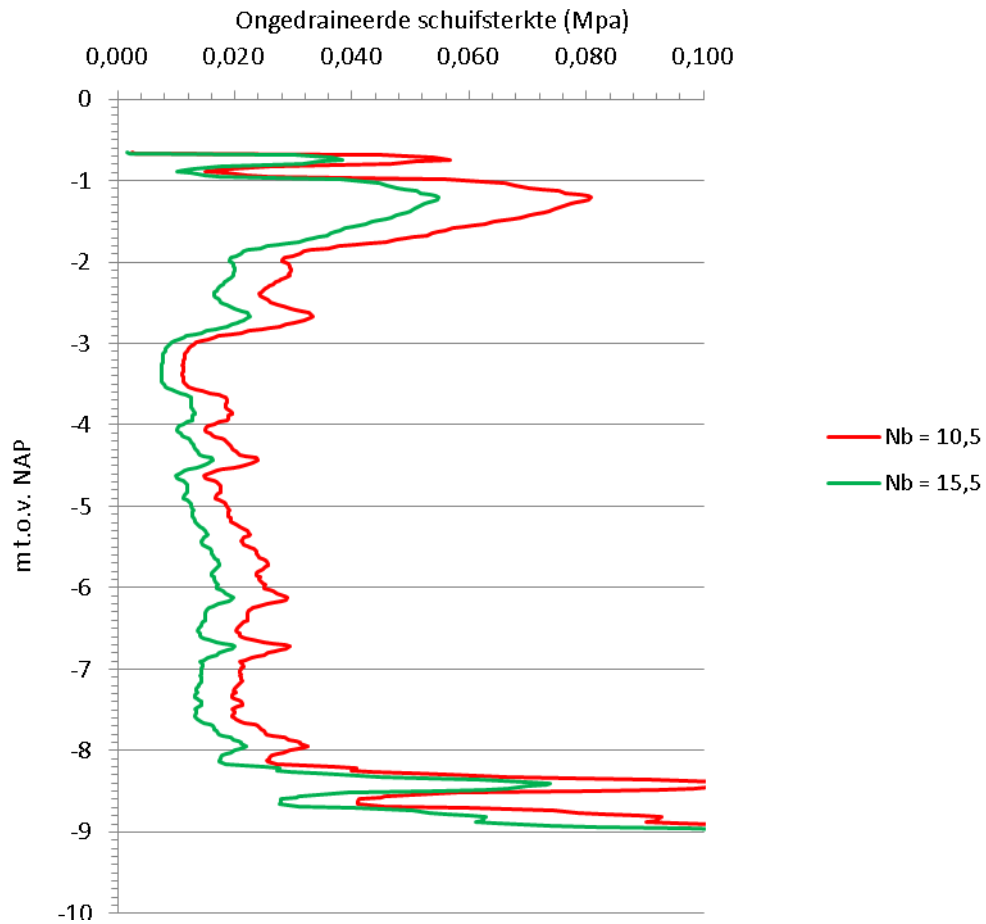


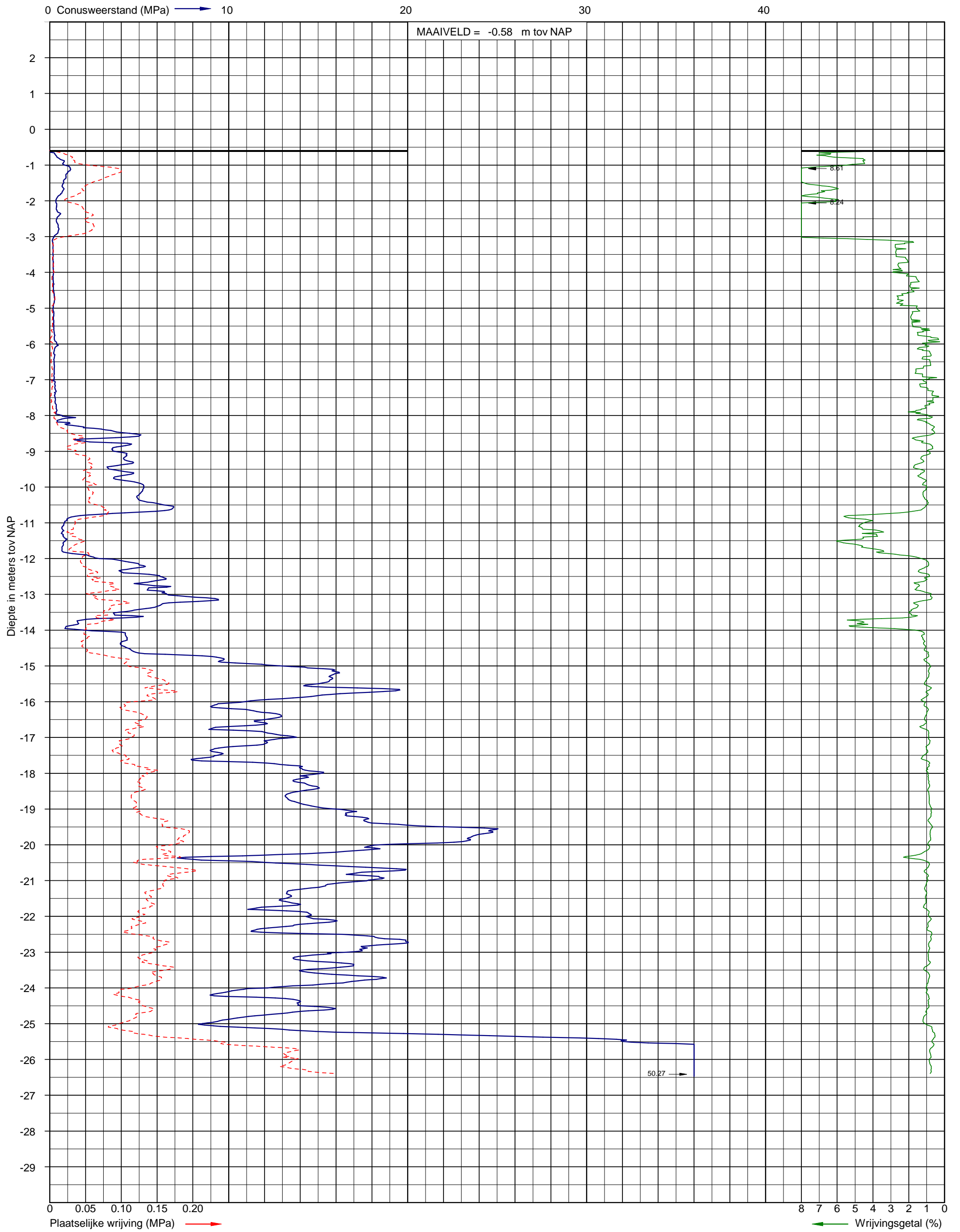


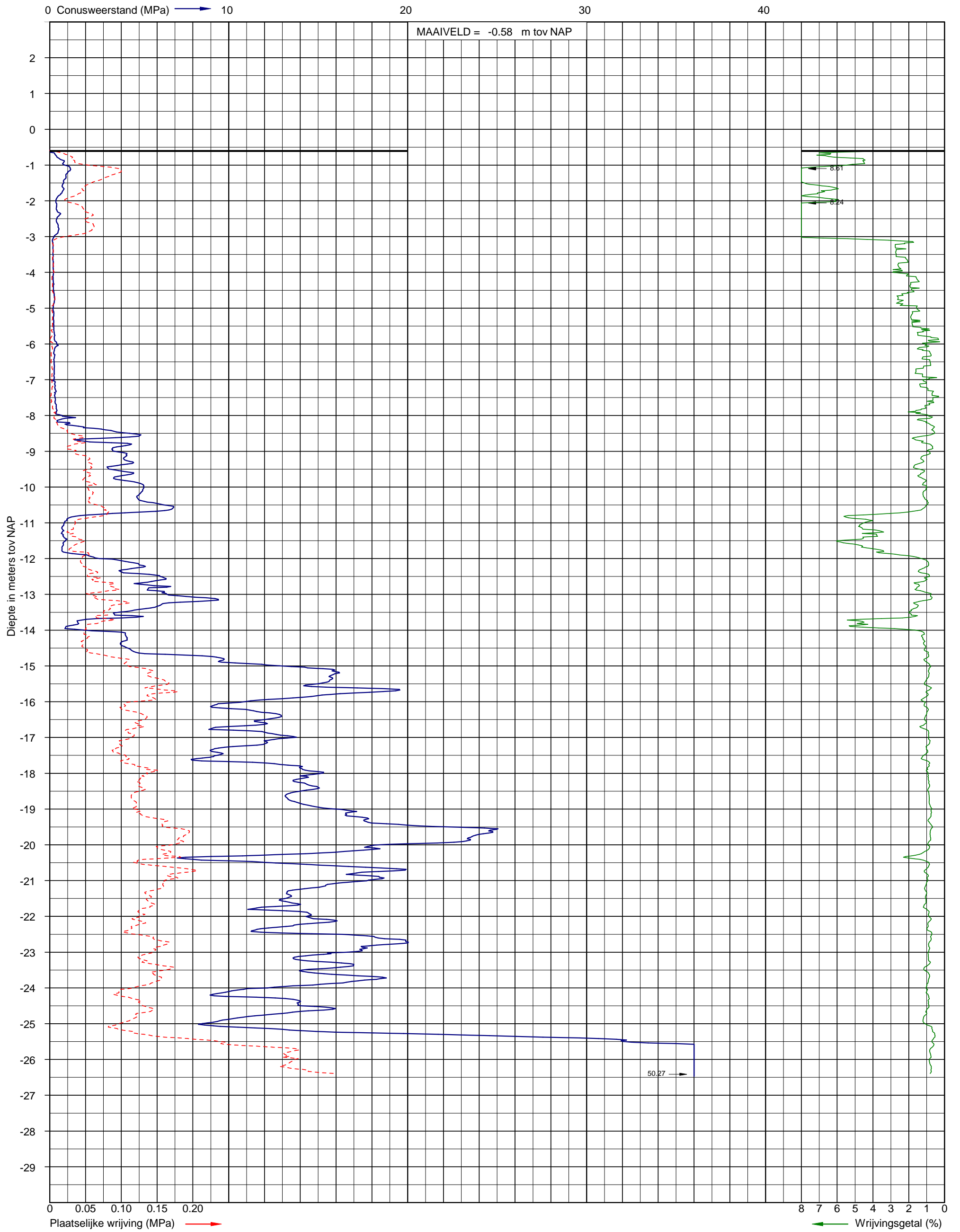


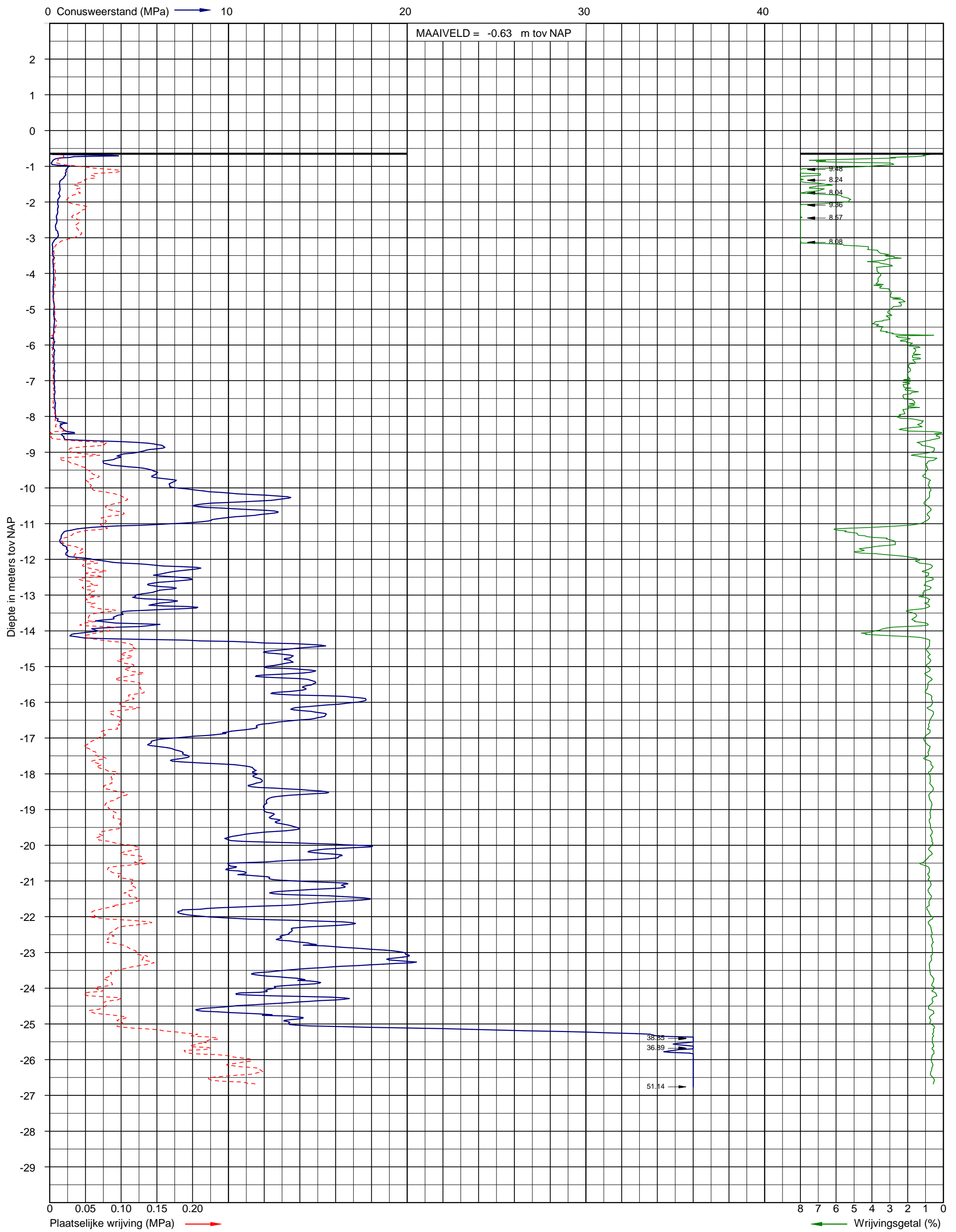
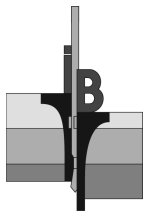
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Project : Geotechnisch onderzoek aanleg hsp masten trace Borsele-Tilburg
Fase 1

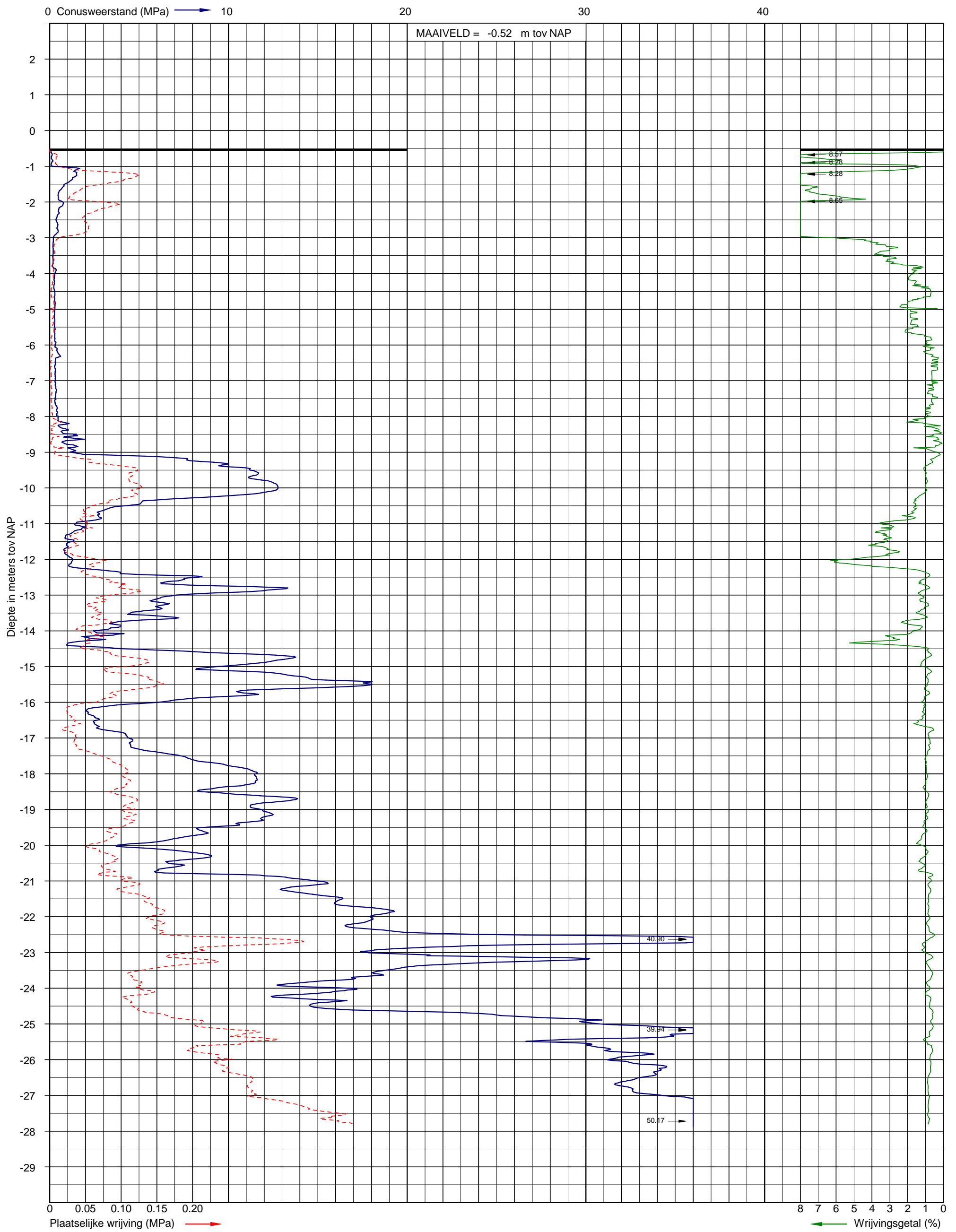
Sondering D-39.S10

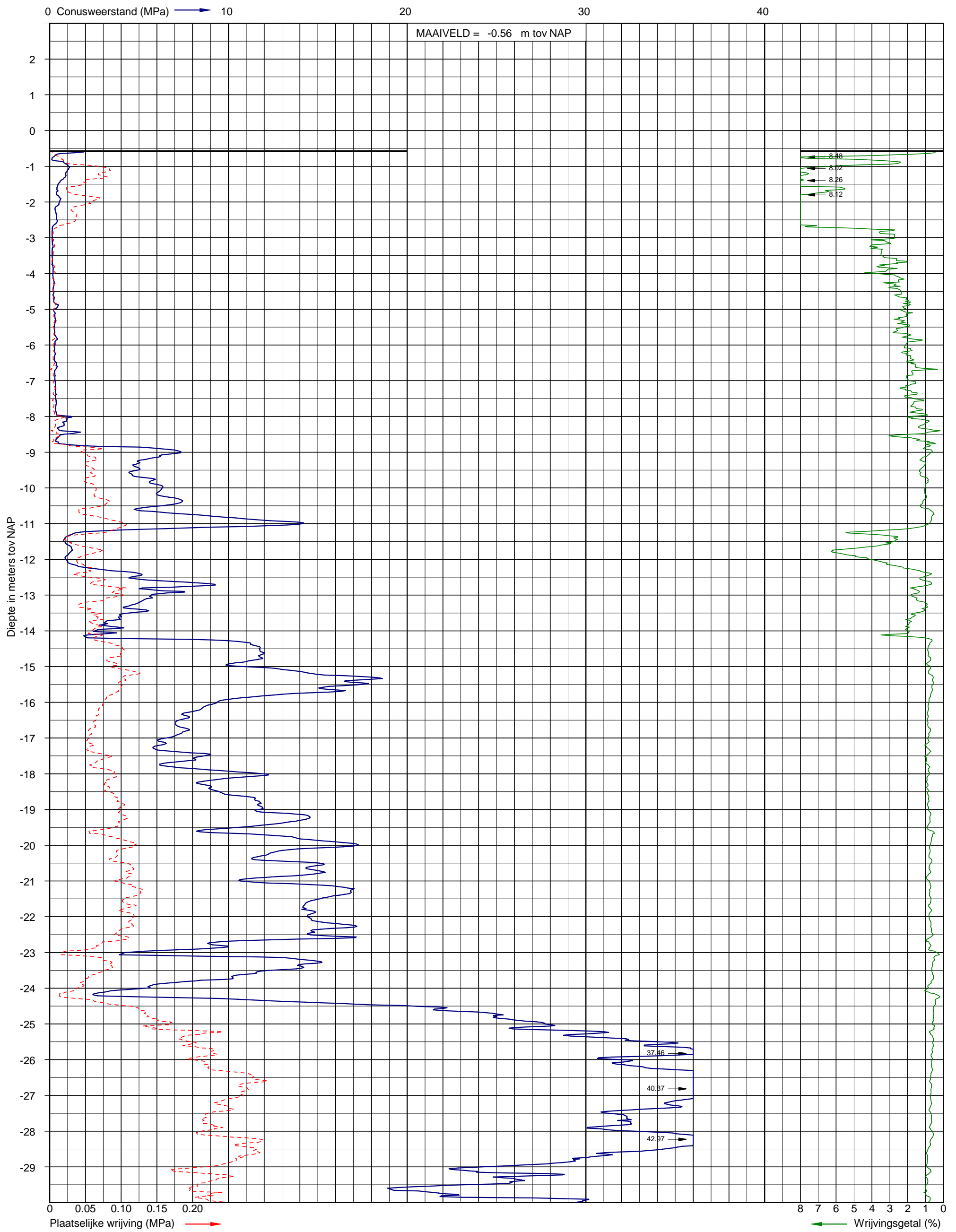


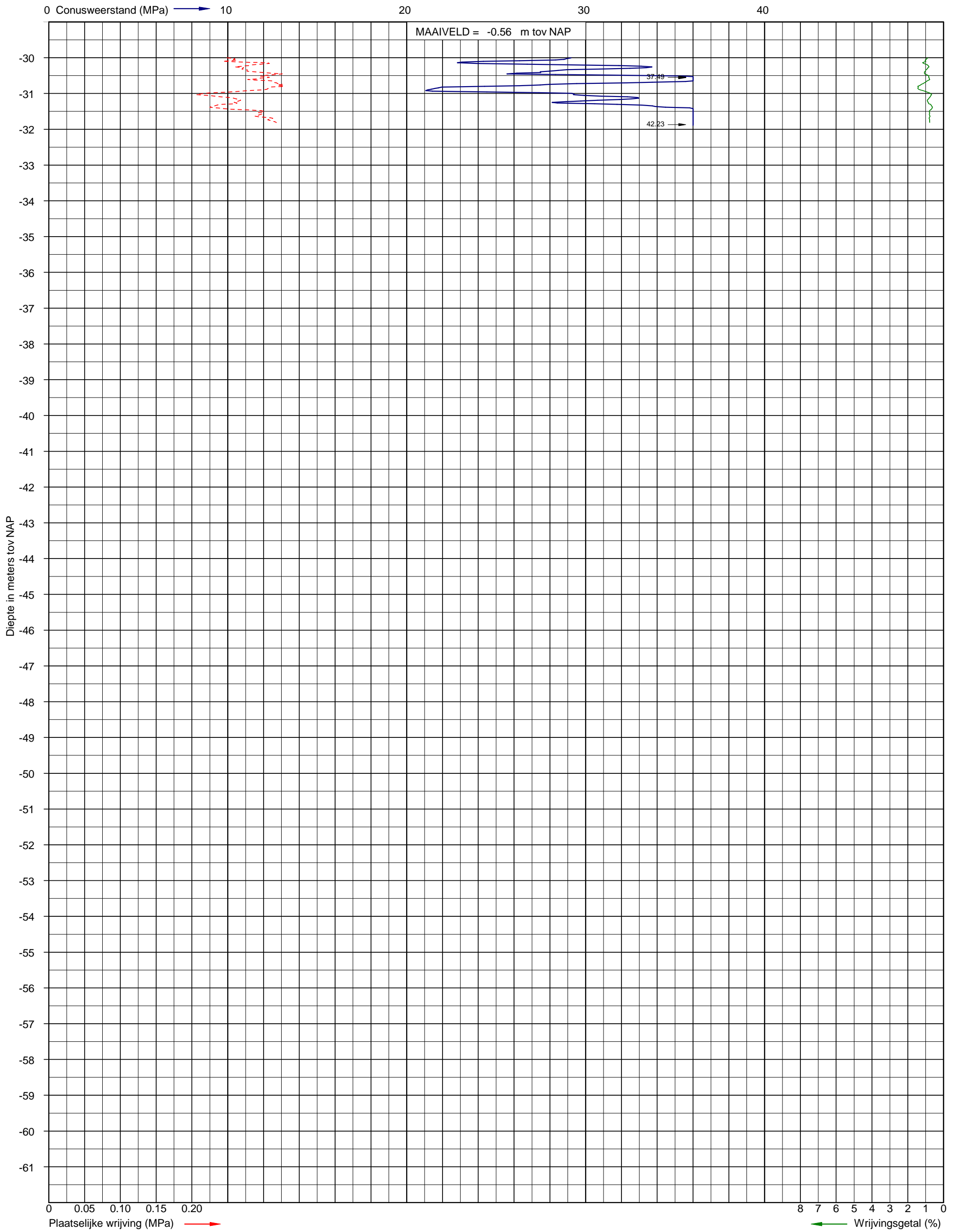








































Bijlage 6
Ontwerpgegevens Wintrackmasten

Engineering verbinding ZW380 Mastenfamilie ZW380 Ontwerpdossier

TenneT TSO B.V.

Rapport nr.: 13-3149, revisie 12.0

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Mastenfamilie ZW380
Ontwerpdossier
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DNV GL - Energy
KEMA Nederland B.V.
Postbus 9035
6800 ET ARNHEM

Tel: +31 26 356 9111
KvK 09080262

Auteur:

Beoordeeld:

Goedgekeurd:

B.J.T. Jansen



A. Peroz



A. van der Wal



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Versie	Datum	Reden voor uitgave	Auteur	Beoordeeld	Goedgekeurd
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Inhoud

VERSIEBEHEER.....	1	
1	INLEIDING.....	2
2	ONTWERP MASTENFAMILIE.....	2
2.1	Uitgangspunten	2
2.2	Gebruikte normen	3
2.3	Ontwerprapporten	3
2.4	Mastcodering	3
2.5	Indeling mastcodering	5
2.6	Mastafmetingen	5
3	ONTWERP FUNDERINGFAMILIE.....	5
4	SPECIALS	6
4.1	Mast 1054	6
4.2	Vakwerkmast ZWV4S400+33	6
Appendix A	Mastgegevens	
Appendix B	Fundatiegegevens	

VERSIEBEHEER

Versie	Datum	Auteur	Wijziging
1.0	16-10-2014	AJP	Eerste versie
2.0	31-01-2014	AJP/BJT	Aanpassingen indeling dossier, toevoegen masten
3.0	17-02-2014	AJP/BJT	Aanpassingen indeling dossier, toevoegen masten
4.0	28-03-2014	AJP/BJT	Aanpassen masten deeltracé 2
5.0	12-06-2014	AJP/BJT	Verwerken RFA, aanvulling DT3-DT5
6.0	16-06-2014	AJP/BJT	Aanpassingen masten
7.0	27-06-2014	AJP/BJT	Kleine aanpassingen verschillende masten
8.0	17-07-2014	AJP/BJT	Aanpassing mast 408
9.0	26-08-2014	AJP/BJT	Bijlage 158 toegevoegd mast type ZWW6HK400+10
10.0	08-12-2014	AJP/BJT	Mast- en fundatietekeningen opstijgmasten gewijzigd
11.0	17-03-2015	AJP/BJT	Mast ZWW4HL450 toegevoegd
12.0	09-04-2015	AJP/BJT	Wijziging bijlage

1 INLEIDING

Het project Zuid West 380 omvat de realisatie van de nieuwe verbinding tussen Borssele en Tilburg en de reconstructie van bestaande 150 en 380 kV verbindingen. Ook de nieuwbouw en aanpassing van 150 en 380 kV stations, aanleg van de nieuwe 150 kV kabel en het amoveren van de bestaande verbindingen nadat de nieuwbouw gereed is.

Dit document benoemt alle voorkomende Wintrack masten voor de verbinding ZW380 en daarin de volgende onderdelen:

- ontwerp mastenfamilie
- ontwerp funderingsfamilie.

Het dossier bevat in appendix A en appendix B tabellen met de belangrijkste afmetingen van de mast en fundering. In deze tabellen staan ook per mast en fundering de gebruikte krachtsberekeningen en tekeningnummers. Voor elk type mast wordt er een map digitaal geleverd met het bijbehorende tekeningnummer waarin alle bijlages opgedeeld zijn in mast- en funderings mappen.

2 ONTWERP MASTENFAMILIE

De ontwerpbelastingen voor de Wintrack II masten voor de nieuwe verbinding tussen Borssele en Tilburg (ZW380) zijn gebaseerd op het DNV KEMA document 74102018-ETD/POL 12-01908 Geleiderhoogte ZW380 versie 1.1.

Voor alle masten zijn de ontwerpbelastingen bepaald. De belastingen zijn zo opgesteld dat deze niet locatiespecifiek worden bepaald maar generiek per masttype.

2.1 Uitgangspunten

De in dit document gepresenteerde belastingen zijn niet bepaald op basis van analyse van alle door NEN-EN 50341 voorgeschreven belastingsgevallen maar door DNV GL zijn die belastingsgevallen, of combinaties daarvan, geselecteerd die de hoogste belastingen veroorzaken. In een latere fase, onder andere als de exacte lijnhoeken bekend zijn, worden de definitieve belastingen opgesteld aan de hand van NEN-EN 50341.

Voor het project ZW380 is een onderscheid gemaakt tussen een aantal veldlengten. Er wordt onderscheid gemaakt in de onderstaande veldlengtes:

- 240
- 350
- 400
- 450

Voor steunmasten met een verhoging tot maximaal 10 meter geldt verder dat deze berekend worden voor een maximale lijnhoek van $2 \times 2.5^\circ$. Voor verhoging hoger dan 10 meter worden in het mastontwerp belastingen beschouwd zonder lijnhoek. Als er masten zijn met een verhoging van meer dan 10 meter, maar waarbij toch sprake is van een lijnhoek dan worden deze als specials beschouwd. Voor hoekmasten wordt er een onderscheid gemaakt in de maximaal toelaatbare hoek op de mast.

De mastcodering wordt verder toegelicht in paragraaf 2.4 van dit rapport.

Overige uitgangspunten en aannames zijn:

- trekparameter bij 10 °C : 1800 m
- geleider 380 kV : 4 bundel AMS620
- geleider 150 kV : 2 bundel AMS620
- bliksemgeleider/OPGW : 1 bundel BRUGG OPGW 226-AL3/38-A20SA
- retour stroomgeleider : 2 bundel WDI AACSR 242-39 Hawk
- hoogte mast en ophangpunten conform tekening
- belastingen zijn inclusief belastingfactoren volgens de NEN-EN 50341
- er wordt plooi in rekening gebracht volgens NEN-EN 50341 par. 7.4.5.4.

2.2 Gebruikte normen

- NEN - EN50341-1, 'Bovengrondse elektrische lijnen boven 45 kV wisselspanning – Deel 1: Algemene eisen - Gemeenschappelijke specificaties'
- NEN - EN50341-1-3, 'Bovengrondse elektrische lijnen boven 45 kV wisselspanning - Deel 3: Verzameling van nationale normatieve aspecten'
- NEN-EN 1990:2002, 'Eurocode - Grondslagen van het constructief ontwerp'
- NEN-EN 1993, 'Ontwerp en berekening van staalconstructies'
- NEN-EN 1994, 'Ontwerp en berekening van betonconstructies'
- NEN-EN 1997: 'Geotechnisch ontwerp - Deel 1: Algemene regels'
- CUR2001-4, 'Ontwerpregels voor trekpalen'
- Werkomschrijving engineering bovengrondse verbindingen ZW380 versie 1.0 d.d. juni 2012.
- Rapportage 'ZW380 matrices' met als kenmerk 12-01997
- Rapportage 'Uitgangspuntendocument ZW 380' met als kenmerk 12-01483.

2.3 Ontwerprapporten

Dit mast- en fundatie ontwerpdocument is van toepassing op de volgende documenten:

- DT1 12-01842 Engineering ZW380 MOR
- DT2 12-01845 Engineering ZW380 MOR
- DT3 12-01848 Engineering ZW380 MOR
- DT4 12-01986 Engineering ZW380 MOR
- DT5 12-01989 Engineering ZW380 MOR.

2.4 Mastcodering

De benaming van de Wintrack masten is als volgt opgebouwd:

Tracé	Aantal pylonen	Circuit	Type mast	Veldlengte	Special
(ZW)	(X)	(X)	(X)	(XXX)	(X)



Tracé benaming

ZW = Zuid-West 380 kV, deze aanduiding wordt op de tekeningen gebruikt.

Aantal pylonen

Het betreft de volgende aanduidingen:

W = Bipole (twee pylonen per locatie)

M = Monopole (één pylon per locatie)

V = Vakwerkmast.

Circuit

Het betreft de volgende aanduidingen:

2 = 2 x 380 kV

4 = 2 x 150 kV + 2x380 kV

6 = 4 x 380 kV.

Type mast

Het betreft de volgende aanduidingen:

HM = Hoekmast 120-130 graden

HL = Hoekmast 130-150 graden

HK = Hoekmast 150-180 graden

S = Steunmast 175-180 graden

E = Eindmast

AA = Opstijgpunt 150 kV ten behoeve van aftakking (380 kV hoekmast; 150 kV aftakking)

AE = Opstijgpunt 150 kV ten behoeve van inlusing (380 kV eindmast; 150 kV eindmast)

AI = Opstijgpunt 150 kV ten behoeve van inlusing (380 kV hoekmast; 150 kV eindmast).

Veldlengtes

De masten van ZW380 hebben verschillende veldlengtes:

- 240
- 350
- 400
- 450.

Special

Voor speciale masten zie hoofdstuk 4

Voorbeelden voor twee verschillende masten zijn opgenomen in onderstaande tabel:

Tabel 1 Masttypen

Mastcodering	Aantal pylonen	Circuit	Type mast	Veldlengte (m)	Max lijnhoek (deg)
ZWW6S400	Bipole	4 x 380 kV	Steunmast	400	2 x 2.5
ZWW4HL240	Bipole	2x150 kV + 2x380 kV	Hoekmast	240	2 x 25

2.5 Indeling mastcodering

Onderstaande tabel geeft een overzicht van de bijlage per mast type en de bijbehorende masttekening. Om de maximale belasting te bepalen zijn er verschillende belastingsituaties berekend. NL1 is de maximale optredende belastingen inclusief belastingsfactoren. NL3 is de situatie waarin rekening wordt gehouden met het afvallen van circuits. NL4 wordt gebruikt om de vervorming van de mast te bepalen en hier worden geen belastingsfactoren toegepast.

Tabel 2 Bijlage referentie

Mastcodering	NL1. Uiterste grenstoestand	NL3. Speciale grenstoestand	NL4. Bruikbaarheids- grenstoestand	Tekening nummer:
ZWW6S400	AA	-	AA2	74102194-035-141

2.6 Mastafmetingen

De mastafmetingen van de ZW380 masten zijn bepaald voor de verschillende masttypen. In appendix A zijn de afmetingen, het mastgewicht en de bijlagecodering voor de krachten gegeven. De resultaten van de berekening dienen als input voor het ontwerp van de fundering.

3 ONTWERP FUNDERINGFAMILIE

Voor alle funderingen zijn de ontwerpbelastingen bepaald. De belastingen zijn zo opgesteld dat deze niet locatie specifiek worden bepaald maar generiek per masttype.

Voor alle ZW380 Wintrack masten zijn tekeningen gemaakt, terug te vinden in appendix B. De gegeven waarden zijn per pylon. Er zijn per mastlocatie 2 pylonen voorzien, dit betekent dat er per mastlocatie 2 funderingen gemaakt dienen te worden, met uitzondering van de 2 circuit eind- hoekmasten en monopoles.



4 SPECIALS

In het tracé ZW380 komt een aantal speciale masten voor. Deze masten wijken af van standaard Wintrackmasten. In dit hoofdstuk wordt een toelichting gegeven op deze masten.

4.1 Mast 1054

De nieuwe 380 kV lijn wordt vlak achter 150 kV station Willem Anna Polder (WAP150) gecombineerd met de bestaande 150 kV lijn RLL-GSP150. De aansluiting van de 150 kV lijn op de nieuwe combi-lijn wordt aangesloten door middel van de toepassing van jukken. Om de bliksembescherming tussen de jukken en de Wintrackmast 1054 te garanderen, worden er meerdere bliksemdraden getrokken tussen het portaal en mast 1054. Voor het verloop van de bliksemdraden wordt verwezen naar tekening nummer 74102194-031-305 "verloop bliksemdraden WAP". Het gaat in dit geval om een ZWW4HK400S +5. Voor verdere details wordt verwezen naar het ontwerpdocument 12-01845 Engineering ZW380.

4.2 Vakwerkmast ZWV4S400+33

Voor de kruising met het Zuid Beveland kanaal ter hoogte van masten 1061 en 1062 zijn hoge vakwerkmasten masten vereist. Voor verdere details wordt verwezen naar het document 74102194-ETD-POL 13-4380.

APPENDIX A

Mastgegevens

Type Mast	Diameter top (m)	Diameter voet (m)	Hoogte mast (m)	Wanddikte mast (mm)	Gewicht pole (kN)	NL1. Uiterste grenstoest.	NL3. Speciale grenstoest.	NL4. Bruikbaarheids-grenstoest.	Mastdim.	Mast (vergunnings) aanvraag tekening	Revisie
ZWW2S350	0.5	1.9	51.5	16	237	AN	-	AN2	BAN	74102194-035-001	5.0
ZWW2HK350	0.8	3	55.5	18	458.7	BR	BR1	BR2	BBR	74102194-035-011	3.0
ZWW2HM350	0.8	3	55.5	24	609.6	AV	AV1	AV2	BAV	74102194-035-013	2.0
ZWW2E350	0.8	3	55.5	24	609.6	AP	-	AP2	BAP	74102194-035-014	4.0
ZWW2S400	0.5	2.1	56.8	16	283	W	-	W2	BW	74102194-035-021	4.0
ZWW2S400+5	0.5	2.2	61.8	18	360	BS	-	BS2	BBS	74102194-035-022	5.0
ZWW2S400+10	0.5	2.4	66.8	18	419	X	-	X2	BX	74102194-035-023	5.0
ZWW2HK400	0.8	3.3	63.2	18	564.7	H	H1	H2	BH	74102194-035-031	6.0
ZWW2HM400	0.8	3.3	63.2	24	750.7	AO	AO1	AO2	BAO	74102194-035-033	6.0
ZWW2E400	0.8	3.3	63.2	24	750.7	Z	-	Z2	BZ	74102194-035-035	3.0
ZWW4S240	0.5	1.7	42.6	16	179.2	AJ	-	AJ2	BAJ	74102194-035-041	3.0
ZWW4S240+5	0.5	1.8	47.6	18	235.7	CD	-	CD2	BCD	74102194-035-042	2.0
ZWW4S240+10	0.5	2	52.6	18	283.8	CE	-	CE2	BCE	74102194-035-043	1.0
ZWW4HK240	0.8	2.4	40.7	24	374.1	AK	AK1	AK2	BAK	74102194-035-051	3.0
ZWW4HL240	0.8	2.4	40.7	26	404.7	AL	AL1	AL2	BAL	74102194-035-052	2.0
ZWW4HK240+5	0.8	2.6	45.7	26	484.1	CA	CA1	CA2	BCA	74102194-035-054	2.0
ZWW4HL240+5	0.8	2.6	45.7	28	521	CB	CB1	CB2	BCB	74102194-035-055	3.0
ZWW4S350	0.5	2.1	55.6	20	346.6	AB	-	AB2	BAB	74102194-035-061	3.0
ZWW4S350+5	0.5	2.2	60.6	20	392.9	AC	-	AC2	BAC	74102194-035-063	4.0
ZWW4S350+10	0.5	2.3	65.6	22	485.2	BW	-	BW2	BBW	74102194-035-064	2.0
ZWW4S350+15	0.5	2.5	70.6	18	464.5	CG	-	CG2	BCG	74102194-035-065	1.0
ZWW4HL350	0.8	3	55.5	28	709.7	AG	AG1	AG2	BAG	74102194-035-074	4.0
ZWW4HL350+10	0.8	3.4	65.5	28	928.6	BU	BU1	BU2	BBU	74102194-035-077	3.0
ZWW4S400	0.5	2.3	63.3	20	426.1	N	-	N2	BN	74102194-035-081	5.0
ZWW4S400+5	0.5	2.4	68.3	22	524	R	-	R2	BR	74102194-035-082	5.0
ZWW4S400+10	0.5	2.6	73.3	24	656.2	O	-	O2	BO	74102194-035-083	8.0
ZWW4S400+15	0.5	2.7	78.3	20	604.7	CH	-	CH2	BCH	74102194-035-084	1.0
ZWW4HK400	0.8	3.3	63.2	24	750.7	I	I1	I2	BI	74102194-035-091	5.0
ZWW4HK400+5	0.8	3.5	68.2	24	850.6	BE	BE1	BE2	BBE	74102194-035-092	3.0
ZWW4HL400	0.8	3.3	63.2	28	874	J	J1	J2	BJ	74102194-035-094	5.0
ZWW4HM400+5	0.8	3.5	68.2	32	1129.9	L	L1	L2	BL	74102194-035-096	5.0
ZWW4E400+5	0.8	3.5	68.2	30	1060.3	BY	-	BY2	BBY	74102194-035-098	1.0
ZWW4HL400+5	0.8	3.5	68.2	28	991	CC	CC1	CC2	BCC	74102194-035-099	1.0

Type Mast	Diameter top (m)	Diameter voet (m)	Hoogte mast (m)	Wanddikte mast (mm)	Gewicht pole (kN)	NL1. Uiterste grenstoest.	NL3. Speciale grenstoest.	NL4. Bruikbaarheids-grenstoest.	Mastdim.	Mast (vergunnings) aanvraag tekening	Revisie
ZWW4HK400S+5	0.8	3.5	68.2	26	920.6	BZ	BZ1	BZ2	BBZ	74102194-035-100	2.0
ZWW4S450	0.5	2.5	71.2	22	565.3	S	-	S2	BS	74102194-035-101	4.0
ZWW4S450+5	0.5	2.6	76.2	24	681.9	T	-	T2	BT	74102194-035-102	4.0
ZWW4HK450	0.8	3.6	71.1	24	908	M	M1	M2	BM	74102194-035-111	5.0
ZWW4HL450	0.8	3.6	71.1	28	1057	CN	CN1	CN2	BCN	74102194-035-112	2.0
ZWW4HK450+5	0.8	3.8	76.1	24	1017.1	BT	BT1	BT2	BBT	74102194-035-114	3.0
ZWW4HL450+5	0.8	3.8	76.1	30	1268	BV	BV1	BV2	BBV	74102194-035-115	3.0
ZWW6S350	0.8	2.3	53.3	20	396.9	BQ	-	BQ2	BBQ	74102194-035-121	5.0
ZWW6HK350	0.8	2.9	52.7	28	663	BP	BP1	BP2	BBP	74102194-035-131	5.0
ZWW6S400	0.8	2.5	59.9	22	523	A	-	A2	BA	74102194-035-141	4.0
ZWW6S400+5	0.8	2.6	64.9	22	584.5	B	-	B2	BB	74102194-035-142	5.0
ZWW6S400+10	0.8	2.8	69.9	22	667.5	CI	-	CI2	BCI	74102194-035-143	2.0
ZWW6HK400	0.8	3.2	59.3	28	807.5	C	C1	C2	BC	74102194-035-151	5.0
ZWW6HL400	0.8	3.5	59.3	30	930.1	D	D1	D2	BD	74102194-035-152	5.0
ZWW6HK400+5	0.8	3.4	64.3	28	920	BN	BN1	BN2	BBN	74102194-035-154	5.0
ZWW6HL400+5	0.8	3.7	64.3	30	1056.1	BM	BM1	BM2	BBM	74102194-035-157	5.0
ZWW6HK400+10	0.8	3.6	69.3	28	1039	CM	CM1	CM2	BCM	74102194-035-158	1.0
ZWM6S400	0.8	2.5	59.9	22	522.9	E	-	E2	BE	74102194-035-161	4.0
ZWM6HK400	0.8	3.2	59.3	30	864.3	AZ	AZ1	AZ2	BAZ	74102194-035-171	4.0
ZWM6HL400+15	0.8	4.2	74.3	32	1447.1	AW	AW1	AW2	BAW	74102194-035-174	3.0
ZWM6HK400+5	0.8	3.4	64.3	30	984.7	CF	CF1	CF2	BCF	74102194-035-175	3.0
ZWM6S350	0.8	2.3	53.3	20	396.9	BB	-	BB2	BBB	74102194-035-181	3.0
ZWM6E350	0.8	3.5	52.7	30	826.6	BO	BO1	BO2	BBO	74102194-035-191	5.0
ZWW6E400	0.8	3.8	59.3	30	995.9	F	-	F2	BF	74102194-035-192	5.0
ZWM6E400	0.8	3.8	59.3	30	995.9	G	G1	G2	BG	74102194-035-193	6.0
ZWW4AA400	0.8	3.3	63.2	24	750.7	AY	AY1	AY2	BAY	74102194-035-401	2.0
ZWW4AI400	0.8	3.3	63.2	24	750.7	AT	AT1	AT2	BAT	74102194-035-402	2.0
ZWW4AE400	0.8	3.3	63.2	28	874	AR	-	AR2	BAR	74102194-035-403	2.0
ZWM2HK400	0.8	3.3	63.2	18	564.7	Y	Y1	Y2	BY	74102194-035-407	4.0
ZWM2E400	0.8	3.3	63.2	26	812	AA	-	AA2	BAA	74102194-035-408	5.0
ZWW4AA400+5	0.8	3.5	68.2	24	850.6	CJ	CJ1	CJ2	BCJ	74102194-035-409	3.0
ZWW4AI240	0.8	2.4	40.7	24	374.1	AQ	AQ1	AQ2	BAQ	74102194-035-410	2.0
ZWW4AI400+15	0.8	3.9	78.2	28	1244	CK	CK1	CK2	BCK	74102194-035-411	3.0
ZWW4AE400+15	0.8	3.9	78.2	30	1332	BG	-	BG2	BBG	74102194-035-413	2.0
ZVW4S400+33	nvt	nvt	98,0	nvt	990,1	CL	-	CL2	nvt	74102194-035-670	2.0

APPENDIX B

Fundatiegegevens

Type Mast	Diameter opstort (m)	Diameter funderingplaat (m)	Dikte funderingplaat (m)	Aantal fundering palen (per mastlocatie)	Funderingdim.	Fundatie (vergunning) aanvraag tekening	Revisie
ZWW2S350	3.4	8	1	16	CAN	74102194-032-001	7.0
ZWW2HK350	5	19 x 11	0.9	22	CBR	74102194-032-011	3.0
ZWW2HM350	5	19 x 11	0.9	26	CAV	74102194-032-013	4.0
ZWW2E350	5	19 x 11	0.9	30	CAP	74102194-032-014	4.0
ZWW2S400	3.6	8	1	16	CW	74102194-032-021	6.0
ZWW2S400+5	3.7	9	1	20	CBS	74102194-032-022	5.0
ZWW2S400+10	3.9	9	1	20	CX	74102194-032-023	7.0
ZWW2HK400	5.3	19 x 11	0.9	24	CH	74102194-032-031	8.0
ZWW2HM400	5.3	19 x 11	0.9	32	CAO	74102194-032-033	6.0
ZWW2E400	5.3	19 x 11	0.9	34	CZ	74102194-032-035	7.0
ZWW4S240	3.2	7	1	16	CAJ	74102194-032-041	4.0
ZWW4S240+5	3.3	8	1	16	CCD	74102194-032-042	1.0
ZWW4S240+10	3.5	9	1	16	CCE	74102194-032-043	1.0
ZWW4HK240	4.4	10	1	28	CAK	74102194-032-051	4.0
ZWW4HL240	4.4	10	1	36	CAL	74102194-032-052	4.0
ZWW4HK240+5	4.6	11	1.1	28	CCA	74102194-032-054	1.0
ZWW4HL240+5	4.6	11	1.1	32	CCB	74102194-032-055	1.0
ZWW4S350	3.6	8	1	24	CAB	74102194-032-061	5.0
ZWW4S350+5	3.7	9	1	20	CAC	74102194-032-063	6.0
ZWW4S350+10	3.8	9	1	24	CBW	74102194-032-064	3.0
ZWW4S350+15	4	9	1	20	CCG	74102194-032-065	1.0
ZWW4HL350	5	12	1.2	36	CAG	74102194-032-074	5.0
ZWW4HL350+10	5.4	13	1.3	44	CBU	74102194-032-077	1.0
ZWW4S400	3.8	9	1	24	CN	74102194-032-081	10.0
ZWW4S400+5	3.9	10	1	24	CR	74102194-032-082	10.0
ZWW4S400+10	4.1	10	1	28	CO	74102194-032-083	8.0
ZWW4S400+15	4.2	10	1	24	CCH	74102194-032-084	1.0
ZWW4HK400	5.3	12	1.2	36	CI	74102194-032-091	7.0
ZWW4HK400+5	5.5	12	1.2	40	CBE	74102194-032-092	3.0
ZWW4HL400	5.3	13	1.3	40	CJ	74102194-032-094	8.0
ZWW4HM400+5	5.5	14	1.4	48	CL	74102194-032-096	6.0
ZWW4E400+5	5.5	14	1.4	48	CBY	74102194-032-098	1.0

Type Mast	Diameter opstort (m)	Diameter funderingplaat (m)	Dikte funderingplaat (m)	Aantal fundering palen (per mastlocatie)	Funderingdim.	Fundatie (vergunnings) aanvraag tekening	Revisie
ZWW4HL400+5	5.5	14	1.4	44	CCC	74102194-032-099	2.0
ZWW4HK400S+5	5.5	13	1.3	40	CBZ	74102194-032-100	2.0
ZWW4S450	4	10	1	24	CS	74102194-032-101	8.0
ZWW4S450+5	4.1	10	1	28	CT	74102194-032-102	8.0
ZWW4HK450	5.6	13	1.3	40	CM	74102194-032-111	6.0
ZWW4HL450	5.6	13	1.3	44	CCN	74102194-032-112	2.0
ZWW4HK450+5	5.8	14	1.4	44	CBT	74102194-032-114	1.0
ZWW4HL450+5	5.8	14	1.4	48	CBV	74102194-032-115	2.0
ZWW6S350	3.8	9	1	20	CBQ	74102194-032-121	3.0
ZWW6HK350	4.9	13	1.3	36	CBP	74102194-032-131	4.0
ZWW6S400	4	10	1	24	CA	74102194-032-141	9.0
ZWW6S400+5	4.1	10	1	28	CB	74102194-032-142	9.0
ZWW6S400+10	4.3	10	1	32	CCI	74102194-032-143	1.0
ZWW6HK400	5.2	13	1.3	40	CC	74102194-032-151	9.0
ZWW6HL400	5.5	14	1.4	48	CD	74102194-032-152	8.0
ZWW6HK400+5	5.4	14	1.4	44	CBN	74102194-032-154	3.0
ZWW6HL400+5	5.7	14	1.4	48	CBM	74102194-032-157	3.0
ZWW6HK400+10	5.6	14	1.4	44	CCM	74102194-032-158	1.0
ZWM6S400	4	9	1	16	CE	74102194-032-161	6.0
ZWM6HK400	5.2	13	1.3	20	CAZ	74102194-032-171	4.0
ZWM6HL400+15	6.2	16	1.6	30	CAW	74102194-032-174	3.0
ZWM6HK400+5	5.4	14	1.4	22	CCF	74102194-032-175	1.0
ZWM6S350	3.8	9	1	12	CBB	74102194-032-181	4.0
ZWM6E350	5.5	14	1.4	24	CBO	74102194-032-191	3.0
ZWW6E400	5.8	15	1.5	52	CF	74102194-032-192	7.0
ZWM6E400	5.8	15	1.5	26	CG	74102194-032-193	8.0
ZWW4AA400	5.3	12	1.2	36	CAY	74102194-032-401	7.0
ZWW4AI400	5.3	12	1.2	36	CAT	74102194-032-402	3.0
ZWW4AE400	5.3	13	1.3	40	CAR	74102194-032-403	3.0
ZWM2HK400	5.3	11	1.1	14	CY	74102194-032-407	5.0
ZWM2E400	5.3	12	1.2	20	CAA	74102194-032-408	5.0
ZWW4AA400+5	5.5	12	1.2	40	CCJ	74102194-032-409	4.0
ZWW4AI240	4.4	10	1	28	CAQ	74102194-032-410	2.0
ZWW4AI400+15	5.9	14	1.4	48	CCK	74102194-032-411	2.0
ZWW4AE400+15	5.9	15	1.5	52	CBG	74102194-032-413	2.0
ZWV4S400+33	nvt	nvt	nvt	8	nvt	74102194-032-670	2.0



ABOUT DNV GL

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping our customers make the world safer, smarter and greener.

ZWW2S400+5

Bijlage CBS

Fundatie berekening

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m
schoorstand		8	:1
α		7.125	graden

Opstort	Diameter	3.7	m
	Hoogte	1.8	m
	Inhoud	19.4	m ³
	e.g.	464	kN

Onderplaat	Diameter	9.0	m
	Hoogte	1.0	m
	Inhoud	64	m ³
	e.g.	1527	kN

Hart paal tov rand fund.	0.6	m
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Optreden krachten

e.g. mast	360	kN
Fgeleiders	122	kN
Maximale dwarskracht	378	kN
Fmax vert (druk)	554	kN
Fmin vert (trek)	415	kN
Maximale moment	16185	kNm

Moment

F_{diag}	2228	kN
F_{hor}	378	kN
F_{ver}	2211	kN
M_{hor} (tgv F_{hor})	1057	kNm
M_{tot}	17242	kNm
$F=M/a$	2211	kN

Verticaal reactiekracht

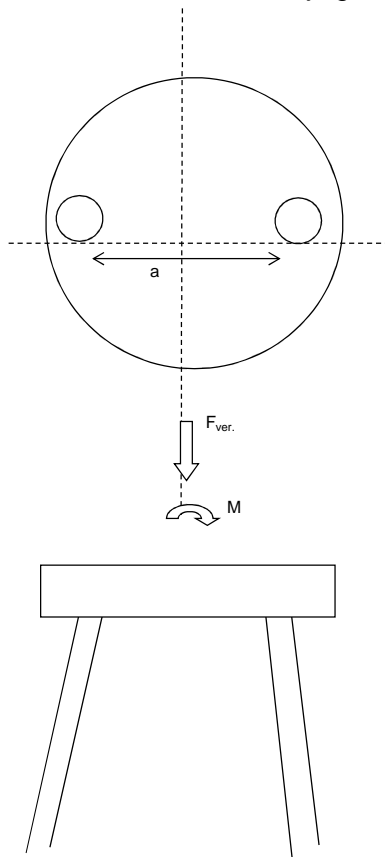
F_{water} (trek)	830	kN
F_{grond} (druk)	1427	kN
F_{grond} (trek)	1189	kN

F_{dmax} (druk)	2328	kN
F_{tmax} (trek)	1141	kN

F_{dtot} (druk)	4539	kN
F_{ttot} (trek)	1069	kN

Palen druk	5	(-)
Palen trek	4	(-)

Totaal palen	10	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW2S400+5

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CBS

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0.40 m
	b	0.40 m
omtrek paal	$O_{p;gem}$	1.60 m
paalfactor	αt	0.007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0.75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11.25 MPa
materiaalfactor	$\gamma_{m,b4}$	1.4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1.5
	$q_{c;z,d}$	5.36 MPa
	$P_{r;z,d}$	37.5 kN/m ²
	$F_{r;trek,d,i}$	60.0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0.007	0.00	0.00	0
	-1	-2	0	0.007	0.00	0.00	0
	-2	-3	0	0.007	0.00	0.00	0
	-3	-4	0	0.007	0.00	0.00	0
	-4	-5	0	0.007	0.00	0.00	0
	-5	-6	0	0.007	0.00	0.00	0
	-6	-7	0	0.007	0.00	0.00	0
	-7	-8	0	0.007	0.00	0.00	0
	-8	-9	1	0.007	2.50	4.00	4
	-9	-10	3	0.007	7.50	12.00	16
	-10	-11	2	0.007	5.00	8.00	24
	-11	-12	0	0.007	0.00	0.00	24
	-12	-13	3	0.007	7.50	12.00	36
	-13	-14	2	0.007	5.00	8.00	44
	-14	-15	4	0.007	10.00	16.00	60
	-15	-16	10	0.007	25.00	40.00	100
	-16	-17	9	0.007	22.50	36.00	136
	-17	-18	8	0.007	20.00	32.00	168
	-18	-19	12	0.007	30.00	48.00	216
	-19	-20	12	0.007	30.00	48.00	264
	-20	-21	10	0.007	25.00	40.00	304
	-21	-22	11	0.007	27.50	44.00	348
	-22	-23	11	0.007	27.50	44.00	392
	-23	-24	12	0.007	30.00	48.00	440
	-24	-25	12	0.007	30.00	48.00	488
	-25	-26	12	0.007	30.00	48.00	536
	-26	-27	15	0.007	37.50	60.00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27.00 m
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Paalgroep factor 10%

$F_{trek,d}$	536.4 kN
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ZWW2S400+5

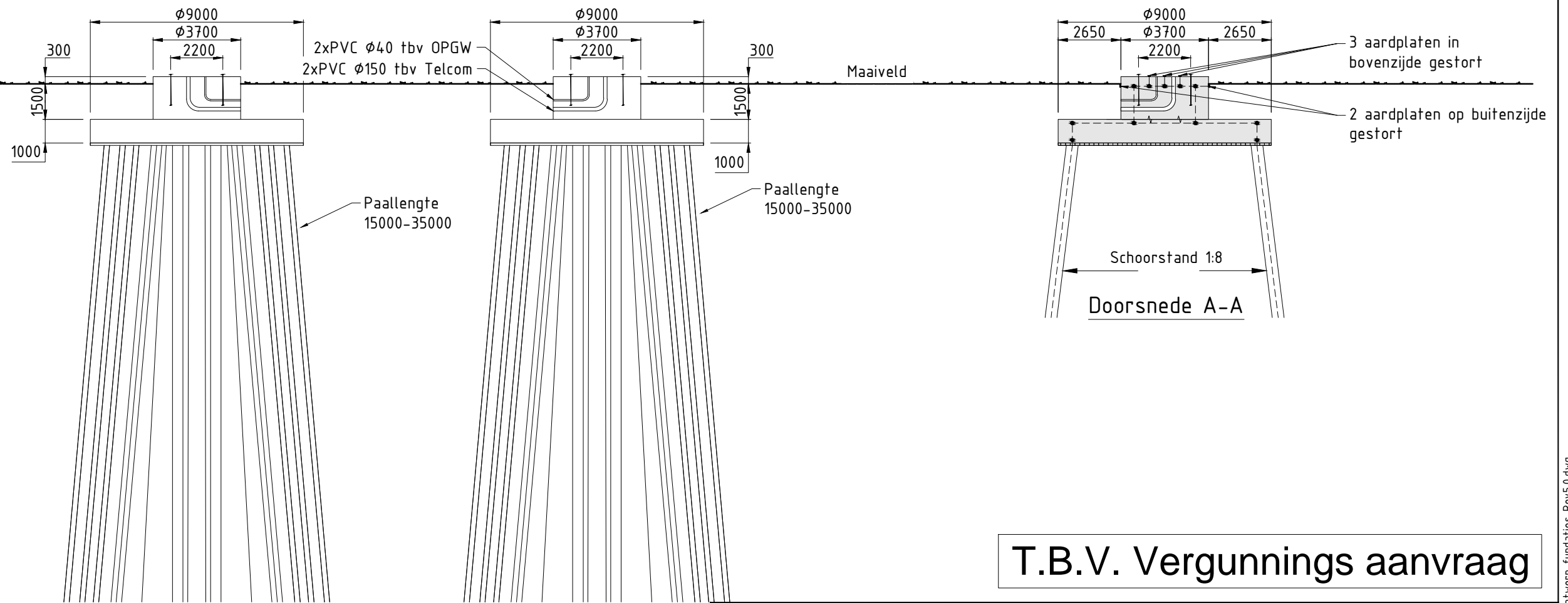
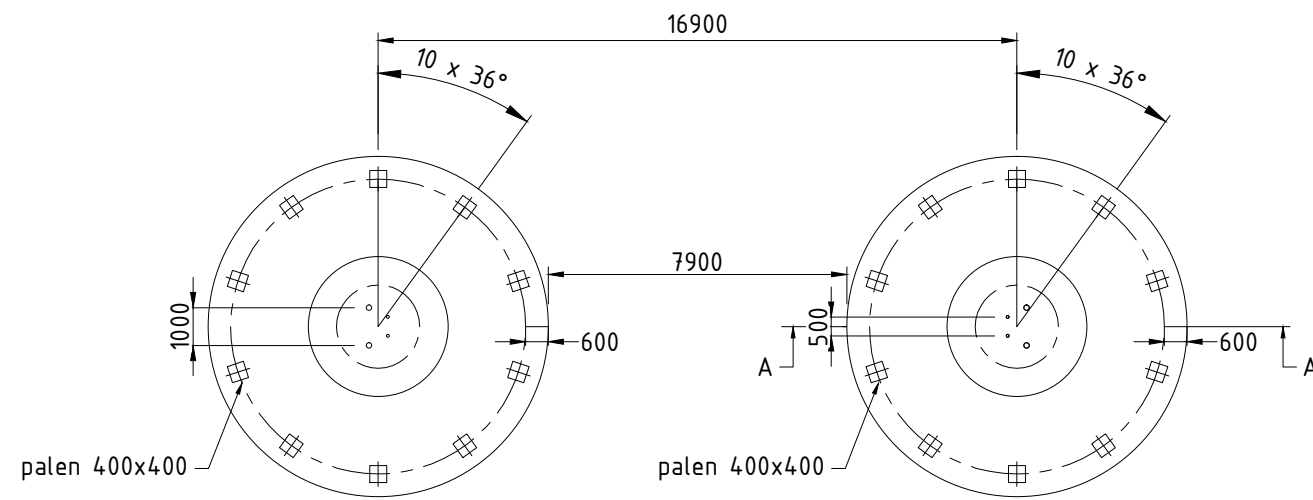
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CBS

Bepaling opneembare paalbelasting op druk

heipaal			
	diameter	v a	2 mm 2 mm
	Deq		0.001808
maximale puntweerstand			
$P_{r,max;punt;i}$			11.25 MN/m ²
paalklasse factor	α_p		1.00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1.00
minimale waarde neergaande deel	$q_{c,II;gem}$		9.00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$		14.00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$		11.00 MN/m ²
maximale paalschachtwrijving			
$P_{r,max;schacht;i}$			0.05 MN/m ²
waarin:			
paalfactor	α_s		0.010
conusweerstand over wrijvingstraject	$q_{c,z;a}$		5.00 MN/m ²
maximale draagkracht alleenstaande paal			
$F_{r,max;i}$			0.00 MN
waarin:			
$F_{r,max;punt;i}$			0.00 MN
paalpunt oppervlak	A_{punt}		0.00 m ²
$F_{r,max;schacht;i}$			0.00 MN
gemiddelde paalomtrek	$O_{p;gem}$		0.01 m
lengte schachtwrijving	Δl		15.00 m
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max;d}$		MN	0.00 MN
materiaalfactor grond	γ_{mb}		1.20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$		0.75
$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27.00 m



T.B.V. Vergunnings aanvraag

Verklaring


- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding Ø16mm (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

5.0	21-03-2014	Paal-paal afstand aangepast
4.0	14-03-2014	Diverse aanpassingen
3.0	11-02-2014	Diverse aanpassingen
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Scale: 1:200
Drawn by: RBE 21-03-2014		Units: mm
Checked by: AJP 21-03-2014		Project no: 000.145
Approved by: AW 21-03-2014		Company: TenneT
Description: Principe ontwerp fundatie steunmast ZW2S400+5 masten familie		Revision: 5.0
		Format: A3
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		



ZWW2S400+5

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h		61.8	m
Diameter voet		d voet		2.2	m
top		d top		0.5	m
gem		d gem		1.4	m
wanddikte		t		18	mm
Oppervlakte aan voet		A		123389	mm ²
Traagheidsmoment aan voet		W _x		6.68E+07	mm ⁴
Weerstandsmoment aan voet		I _x		7.26E+10	mm ⁶
Mast: Gewicht		2 ^{de} orde		10.0	%
		F _{rep,ver}		360	kN

Bijlage BBS

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	60.9	4.8	14.8	0.0	14.8	901	kNm
RTG	27.9	9.7	22.0	0.0	22.0	615	kNm
380C1F1	53.6	35.6	86.9	0.0	86.9	4660	kNm
380C1F2	43.4	35.7	80.6	0.0	80.6	3498	kNm
380C1F3	33.2	35.9	72.5	0.0	72.5	2406	kNm

Stuwdruk	F _{hor.}	24.0	kN
	M _{d,wind}	656	kNm
Totaal	M _{d,tot}	14714	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	16185	kNm

Normaalkracht;

Optredende normaalkracht			
N _{d,geleiders}		122	kN
N _{d, e.g. mast}		432	kN
N _{s,d,totaal}		554	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA
β _a	0.64
A _{eff}	79119 mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{yd} /γ _{m1}	7	N/mm ²
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Moment;

Optredende moment in de voet:		
M _{d,tot}	16185	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA
β _a	0.94
W _{eff}	6.28E+07 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	258	N/mm ²
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Totale spanning:

σ _d	265	N/mm ²	< 284 N/mm ² = ACCOORD
σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	60.9	4.0	10.2	0.0	10.2	620	kNm
RTG	27.9	8.2	15.3	0.0	15.3	426	kNm
380C1F1	53.6	30.0	60.2	0.0	60.2	3229	kNm
380C1F2	43.4	30.1	56.0	0.0	56.0	2430	kNm
380C1F3	33.2	30.3	50.5	0.0	50.5	1678	kNm

Stuwdruk	F _{hor.}	642	kN
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Verplaatsing		1.44	m
Percentage van de verplaatsing		2.32%	
Hoek		2.65	graden
Kromming		0.58%	
Fundatie rotatiestijfheid		0.005	rad

3.35	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

150C1F2	NL1	(factor transverse N	5563,876	5102,12	12950,19	43024,16	28571,5	32349,58	12867,02	9195,025	21706,19	17749,61	9014,523	9785,192
150C1F2	NL1	(factor longitudine N	-127434	-116858	-150576	-254620	-246353	-259793	-148757	-143824	-163187	-219974	-139731	-144590
150C1F2	NL3	Vertical N	15804,07	21220,75	21476,43	18296,96	21528,9	30366,66	19056,6	21540,87	18715,19	21894,95	19143,68	21533,47
150C1F2	NL3	transverse N	5563,876	7092,279	12604,31	24959,79	23286,24	27867,26	12737,64	9688,314	14504,57	14549,48	9790,063	10150,07
150C1F2	NL3	longitudine N	-127434	-162440	-171843	-191832	-207001	-253376	-174961	-168469	-158553	-184029	-170829	-168842
150C1F2	NL3	(factor Vertical N	15804,07	14249,71	16810,53	13604,17	16814	25700,02	14345,47	16893,07	14012,74	17213,03	14462,19	16883,39
150C1F2	NL3	(factor transverse N	5563,876	5102,12	11364,67	24152,72	22333,69	26936,96	11418,06	8395,497	13338,81	13334,2	8392,237	8863,399
150C1F2	NL3	(factor longitudine N	-127434	-116858	-143474	-173397	-185234	-232127	-144763	-138869	-131885	-156224	-138825	-139385
150C1F2	NL4	Vertical N	15804,07	15804,07	17959,02	15003	24523,43	25388,68	15960,87	18014,32	15480,56	24784,06	16036,63	18007,97
150C1F2	NL4	transverse N	5563,876	5563,876	10745,11	30119,82	21188,18	23641,75	10929,07	8308,703	16202,92	14109,43	8463,862	8694,201
150C1F2	NL4	longitudine N	-127434	-127434	-148750	-202842	-213326	-220819	-153016	-145783	-148487	-198805	-149361	-146111
150C1F3	NL1	Insulator w N	0	0	0	0	0	0	0	0	0	0	0	0
150C1F3	NL1	Wind on in N	0	0	0	0	0	0	0	0	0	0	0	0
150C1F3	NL1	Vertical N	15804,07	21220,75	22108,55	17867,32	31917,75	33243,87	19024,2	22189,26	18442,85	32265	19136	22179,92
150C1F3	NL1	transverse N	5563,876	7092,279	13584,79	40300,77	27847,93	31258,98	13561,82	10220,88	21179,76	18133,31	10149,78	10752,86
150C1F3	NL1	longitudine N	-127434	-162440	-177032	-252042	-263116	-274129	-176583	-172771	-178417	-243995	-171178	-173244
150C1F3	NL1	(factor Vertical N	15804,07	14249,71	17441,84	13282,01	27255,73	28586,13	14304,22	17543,62	13732,75	27641,88	14451,53	17531,54
150C1F3	NL1	(factor transverse N	5563,876	5102,12	12371,51	39810,68	26901,91	30370,25	12270,64	8943,953	20254,41	17030,31	8758,952	9483,363
150C1F3	NL1	(factor longitudine N	-127434	-116858	-149269	-240870	-241507	-253838	-147039	-143537	-157269	-218763	-139337	-144183
150C1F3	NL3	Vertical N	15804,07	21220,75	21488,79	18357,48	21588,02	30428,76	19073,13	21543,66	18741,36	21914,79	19147,5	21537,4
150C1F3	NL3	transverse N	5563,876	7092,279	12157,87	23346,86	21936,26	26319,62	12285,1	9491,39	13812,93	13970,32	9591,804	9914,108
150C1F3	NL3	longitudine N	-127434	-162440	-171177	-185978	-202787	-249426	-174150	-168329	-156920	-182971	-170656	-168643
150C1F3	NL3	(factor Vertical N	15804,07	14249,71	16826,06	13656,03	16873,01	25765,38	14366,96	16896,74	14043,16	17237,29	14467,53	16888,52
150C1F3	NL3	(factor transverse N	5563,876	5102,12	10908,11	22491,49	20943,24	25359,98	10950,87	8196,253	12622,47	12739,9	8190,484	8624,174
150C1F3	NL3	(factor longitudine N	-127434	-116858	-142574	-166436	-180092	-227502	-143615	-138676	-129685	-154818	-138572	-139111
150C1F3	NL4	Vertical N	15804,07	15804,07	17969,63	15059,27	24569,11	25442,49	15975,26	18016,72	15519,81	24796,76	16039,95	18011,34
150C1F3	NL4	transverse N	5563,876	5563,876	10371,81	27991,48	20096,39	22343,89	10550,2	8144,34	15275,99	13637,43	8298,277	8497,192
150C1F3	NL4	longitudine N	-127434	-127434	-148164	-193965	-210573	-217333	-152299	-145660	-145473	-198168	-149208	-145936
380C2F1	NL1	Insulator w N	0	0	0	0	0	0	0	0	0	0	0	0
380C2F1	NL1	Wind on in N	0	0	0	0	0	0	0	0	0	0	0	0
380C2F1	NL1	Vertical N	15804,07	21220,75	22129,75	17957,39	32001,35	33341,87	19053,14	22194,12	18516	32288,69	19142,87	22186,74
380C2F1	NL1	transverse N	5563,876	7092,279	12864,79	36232,85	25758,96	28778,55	12829,16	9904,057	19389,74	17227,13	9830,091	10373,05
380C2F1	NL1	longitudine N	-127434	-162440	-175879	-235677	-258135	-267863	-175132	-172528	-172503	-242834	-170865	-172898
380C2F1	NL1	(factor Vertical N	15804,07	14249,71	17468,02	13344,02	27345,31	28688,46	14341,01	17549,93	13802,22	27669,67	14461,07	17540,35
380C2F1	NL1	(factor transverse N	5563,876	5102,12	11634,94	35679,55	24775,84	27848,49	11512,63	8623,256	18402,53	16113,16	8433,002	9098,125
380C2F1	NL1	(factor longitudine N	-127434	-116858	-147735	-223058	-235671	-246620	-145004	-143204	-149936	-217348	-138879	-143711
380C2F1	NL3	Vertical N	15804,07	21220,75	21503,38	18438,36	21663,61	30506,36	19092,74	21546,91	18773,1	21938,4	19151,95	21541,97
380C2F1	NL3	transverse N	5563,876	7092,279	11588,33	21291,2	20218,05	24348,8	11708,38	9239,417	12932,69	13232,23	9338,289	9612,348
380C2F1	NL3	longitudine N	-127434	-162440	-170402	-178796	-197710	-244712	-173204	-168169	-154996	-181735	-170457	-168413
380C2F1	NL3	(factor Vertical N	15804,07	14249,71	16844,56	13728,61	16951,24	25848,77	14392,83	16901,02	14081,06	17266,58	14473,77	16894,52
380C2F1	NL3	(factor transverse N	5563,876	5102,12	10326,58	20369,59	19172,24	23352,09	10356,65	7941,583	11711,86	11983,66	7932,899	8318,613
380C2F1	NL3	(factor longitudine N	-127434	-116858	-141522	-157734	-173803	-221934	-142265	-138453	-127062	-153163	-138279	-138793
380C2F1	NL4	Vertical N	15804,07	15804,07	17982,15	15139,91	24625,43	25509,71	15992,31	18019,5	15569,56	24811,7	16043,83	18015,27
380C2F1	NL4	transverse N	5563,876	5563,876	9895,71	25268,27	18706,71	20691,83	10067,56	7934,063	14097,2	13034,97	8086,591	8245,295
380C2F1	NL4	longitudine N	-127434	-127434	-147483	-182762	-207306	-213174	-151462	-145518	-141855	-197428	-149032	-145734

25116,36	19444,09	9616,508	6213,532	5162,815	9298,98	6004,372	6213,532	5162,815	9298,98	6004,372	6213,532	5162,815	9298,98	6004,372	5656,892	4425,747
-177479	-223155	-140774	-142035	-116856	-212204	-137245	-142035	-116856	-212204	-137245	-142035	-116856	-212204	-137245	-129564	-101366
18650,35	21844,36	19133,57	21558,83	18903,37	22030,49	19168,36	21558,83	18903,37	22030,49	19168,36	21558,83	18903,37	22030,49	19168,36	19069,89	15496,55
16137,44	15914,81	10255,39	7328,419	6483,965	7765,107	7422,174	7328,418	6483,965	7765,107	7422,174	7328,418	6483,965	7765,107	7422,174	7057,384	4425,747
-162785	-186805	-171289	-167626	-147783	-177228	-169773	-167626	-147783	-177228	-169773	-167626	-147783	-177228	-169773	-161641	-101366
13940,36	17152,56	14448,18	16916,82	14249,7	17385,45	14496,97	16916,82	14249,7	17385,45	14496,97	16916,82	14249,7	17385,45	14496,97	14403,4	15496,55
15031,57	14737,69	8866,779	6020,861	5133,669	6444,823	6001,947	6020,861	5133,669	6444,823	6001,947	6020,861	5133,669	6444,823	6001,947	5656,892	4425,747
-137493	-159878	-139499	-137678	-146989	-137245	-116857	-137678	-146989	-137245	-116857	-137678	-146989	-137245	-116857	-129564	-101366
15389,54	24751,05	16027,83	18029,73	15804,06	24868,19	16058,1	18029,73	15804,06	24868,19	16058,1	18029,73	15804,06	24868,19	16058,1	15962,63	15496,55
18391,35	15219,9	8852,62	6340,606	5604,329	8527,487	6488,402	6340,606	5604,329	8527,487	6488,402	6340,606	5604,329	8527,487	6488,402	6137,463	4425,747
-156085	-200492	-149768	-145038	-127432	-194793	-148423	-145038	-127432	-194793	-148423	-145038	-127432	-194793	-148423	-140571	-101366
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18325,02	32220,43	19122,83	22212,03	18903,36	32379,34	19168,36	22212,03	18903,36	32379,34	19168,36	22212,03	18903,36	32379,34	19168,36	19069,89	15496,55
24202,66	19659,31	10687,28	7507,412	6508,138	10451,95	7423,608	7507,412	6508,138	10451,95	7423,608	7507,412	6508,138	10451,95	7423,608	7057,384	4425,747
-189063	-246227	-171785	-171692	-147783	-238675	-169773	-171692	-147783	-238675	-169773	-171692	-147783	-238675	-169773	-161641	-101366
13627,97	27590,15	14433,43	17573,41	14249,69	27777,9	14496,97	17573,41	14249,69	27777,9	14496,97	17573,41	14249,69	27777,9	14496,97	14403,4	15496,55
23373,33	18576,88	9308,425	6212,54	5157,846	9296,206	6003,38	6212,539	5157,846	9296,206	6003,38	6212,539	5157,846	9296,206	6003,38	5656,892	4425,747
-170118	-221471	-140220	-142035	-116856	-212204	-137245	-142035	-116856	-212204	-137245	-142035	-116856	-212204	-137245	-129564	-101366
18683,99	21870,87	19138,93	21558,83	18903,37	22030,49	19168,36	21558,83	18903,37	22030,49	19168,36	21558,83	18903,37	22030,49	19168,36	19069,89	15496,55
15301,22	15215,89	10017,53	7327,624	6481,383	7762,889	7421,38	7327,624	6481,383	7762,889	7421,38	7327,624	6481,383	7762,889	7421,38	7057,384	4425,747
-160555	-185336	-171044	-167626	-147783	-177228	-169773	-167626	-147783	-177228	-169773	-167626	-147783	-177228	-169773	-161641	-101366
13977,4	17184	14455,6	16916,82	14249,7	17385,45	14496,97	16916,82	14249,7	17385,45	14496,97	16916,82	14249,7	17385,45	14496,97	14403,4	15496,55
14164,5	14018,86	8624,032	6020,067	5131,087	6442,605	6001,153	6020,067	5131,087	6442,605	6001,153	6020,067	5131,087	6442,605	6001,153	5656,892	4425,747
-134555	-157951	-139141	-137678	-116857	-146989	-137245	-137678	-116857	-146989	-137245	-137678	-116857	-146989	-137245	-129564	-101366
15435,72	24768,46	16032,5	18029,73	15804,06	24868,19	16058,1	18029,73	15804,06	24868,19	16058,1	18029,73	15804,06	24868,19	16058,1	15962,63	15496,55
17270,78	14651,81	8653,876	6339,945	5601,019	8525,638	6487,741	6339,944	5601,019	8525,638	6487,741	6339,944	5601,019	8525,638	6487,741	6137,463	4425,747
-152118	-199597	-149551	-145038	-127432	-194793	-148423	-145038	-127432	-194793	-148423	-145038	-127432	-194793	-148423	-140571	-101366
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18408,36	32252,83	19132,43	22212,03	18903,37	32379,35	19168,36	22212,03	18903,37	32379,35	19168,36	22212,03	18903,37	32379,35	19168,36	19069,89	15496,55
22042,61	18569,25	10303,43	7506,138	6501,763	10448,39	7422,334	7506,138	6501,763	10448,39	7422,334	7506,138	6501,763	10448,39	7422,334	7057,384	4425,747
-181380	-244598	-171341	-171692	-147783	-238675	-169773	-171692	-147783	-238675	-169773	-171692	-147783	-238675	-169773	-161641	-101366
13701,22	27627,69	14446,61	17573,41	14249,69	27777,9	14496,97	17573,41	14249,69	27777,9	14496,97	17573,41	14249,69	27777,9	14496,97	14403,4	15496,55
21145,81	17471,88	8915,848	6211,266	5151,469	9292,647	6002,107	6211,265	5151,469	9292,647	6002,107	6211,265	5151,469	9292,647	6002,107	5656,892	4425,747
-160888	-219496	-139575	-142035	-116856	-212204	-137245	-142035	-116856	-212204	-137245	-142035	-116856	-212204	-137245	-129564	-101366
18725,41	21902,74	19145,19	21558,83	18903,37	22030,49	19168,36	21558,83	18903,37	22030,49	19168,36	21558,83	18903,37	22030,49	19168,36	19069,89	15496,55
14237,39	14325,82	9713,568	7326,605	6478,069	7760,042	7420,362	7326,605	6478,069	7760,042	7420,362	7326,605	6478,069	7760,042	7420,362	7057,384	4425,747
-157910	-183612	-170761	-167626	-147784	-177228	-169773	-167626	-147784	-177228	-169773	-167626	-147784	-177228	-169773	-161641	-101366
14024,54	17222,51	14464,3	16916,82	14249,7	17385,46	14496,97	16916,82	14249,7	17385,46	14496,97	16916,82	14249,7	17385,46	14496,97	14403,4	15496,55
13062,03	13104,62	8314,362	6019,048	5127,774	6439,758	6000,135	6019,048	5127,774	6439,758	6000,135	6019,048	5127,774	6439,758	6000,135	5656,892	4425,747
-131022	-155670	-138725	-137678	-116857	-146989	-137245	-137678	-116857	-146989	-137245	-137678	-116857	-146989	-137245	-129564	-101366
15495,71	24789,06	16037,94	18029,73	15804,07	24868,19	16058,1	18029,73	15804,07	24868,19	16058,1	18029,73	15804,07	24868,19	16058,1	15962,63	15496,55
15844,81	13927,23	8399,97	6339,095	5596,769	8523,265	6486,892	6339,095	5596,769	8523,265	6486,892	6339,095	5596,769	8523,265	6486,892	6137,463	4425,747
-147306	-198554	-149300	-145038	-127433	-194793	-148423	-145038	-127433	-194793	-148423	-145038	-127433	-194793	-148423	-140571	-101366

5563,876	5102,12	12950,19	43024,16	28571,5	32349,58	12867,02
127433,7	116857,8	150575,8	254620,3	246352,6	259792,5	148756,7
15804,07	21220,75	21476,43	18296,96	21528,9	30366,66	19056,6
5563,876	7092,279	12604,31	24959,79	23286,24	27867,26	12737,64
127433,7	162439,9	171842,5	191832	207000,8	253375,7	174960,9
15804,07	14249,71	16810,53	13604,17	16814	25700,02	14345,47
5563,876	5102,12	11364,67	24152,72	22333,69	26936,96	11418,06
127433,7	116857,8	143473,8	173397	185234,4	232126,7	144762,6
15804,07	15804,07	17959,02	15003	24523,43	25388,68	15960,87
5563,876	5563,876	10745,11	30119,82	21188,18	23641,75	10929,07
127433,7	127433,7	148749,9	202842,4	213325,5	220818,7	153016,2
0	0	0	0	0	0	0
0	0	0	0	0	0	0
15804,07	21220,75	22108,55	17867,32	31917,75	33243,87	19024,2
5563,876	7092,279	13584,79	40300,77	27847,93	31258,98	13561,82
127433,7	162439,9	177031,6	252041,7	263116,2	274129,1	176583
15804,07	14249,71	17441,84	13282,01	27255,73	28586,13	14304,22
5563,876	5102,12	12371,51	39810,68	26901,91	30370,25	12270,64
127433,7	116857,8	149269,5	240870,1	241506,5	253837,6	147038,5
15804,07	21220,75	21488,79	18357,48	21588,02	30428,76	19073,13
5563,876	7092,279	12157,87	23346,86	21936,26	26319,62	12285,1
127433,7	162439,9	171176,6	185978,1	202787,4	249425,6	174150,1
15804,07	14249,71	16826,06	13656,03	16873,01	25765,38	14366,96
5563,876	5102,12	10908,11	22491,49	20943,24	25359,98	10950,87
127433,7	116857,8	142574,2	166435,7	180092	227501,7	143614,5
15804,07	15804,07	17969,63	15059,27	24569,11	25442,49	15975,26
5563,876	5563,876	10371,81	27991,48	20096,39	22343,89	10550,2
127433,7	127433,7	148164,4	193965,2	210572,9	217333	152299,1
0	0	0	0	0	0	0
0	0	0	0	0	0	0
15804,07	21220,75	22129,75	17957,39	32001,35	33341,87	19053,14
5563,876	7092,279	12864,79	36232,85	25758,96	28778,55	12829,16
127433,7	162439,9	175879,1	235677,3	258134,9	267862,7	175131,9
15804,07	14249,71	17468,02	13344,02	27345,31	28688,46	14341,01
5563,876	5102,12	11634,94	35679,55	24775,84	27848,49	11512,63
127433,7	116857,8	147734,8	223058,3	235671,1	246620,1	145003,9

Constructi ahead	Wind, 10°C ahead	Wind + ice, ahead	Wind, -20°i ahead	Constructi ahead	Wind, 10°C ahead	Wind + ice, ahead	Wind, -20°i ahead	Constructi ahead	Wind, 10°C ahead	Wind + ice, ahead	Wind, -20°i ahead	Constructi ahead	Wind, 10°C ahead	Wind + ice, ahead	Wind, -20°i ahead	Constructi ahead	Wind, 10°C ahead	Wind + ice, ahead	Wind, -20°i ahead	#N/B	#N/B	
135°	135°	135°	135°	45°	45°	45°	45°	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°	0°	
4_wa135	1a_wa135	3_wa135	1b_wa135	4_wa45	1a_wa45	3_wa45	1b_wa45	4_wa0	1a_wa0	3_wa0	1b_wa0	4_wa0	1a_wa0	3_wa0	1b_wa0	4_wa0	1a_wa0	3_wa0	1b_wa0	7a_wa0	7b_wa0	
	4 1a		3 1b		4 1a		3 1b		4 1a		3 1b		4 1a		3 1b		4 1a		3 1b	7a	7b	
	wind angle 135°, LC_ 4 Construction/maintenance +5 °C (ahead)					wind angle 45°, LC_ 4 Construction/maintenance +5 °C (ahead)					wind angle 0°, LC_ 4 Construction/maintenance +5 °C (ahead)					wind angle 0°, LC_ 4 Construction/maintenance +5 °C (ahead)					#N/B	#N/B
	wind angle 135°, LC_ 1a Wind, 10°C (ahead)					wind angle 45°, LC_ 1a Wind, 10°C (ahead)					wind angle 0°, LC_ 1a Wind, 10°C (ahead)					wind angle 0°, LC_ 1a Wind, 10°C (ahead)					#N/B	#N/B
	wind angle 135°, LC_ 3 Wind + ice, -5°C (ahead)					wind angle 45°, LC_ 3 Wind + ice, -5°C (ahead)					wind angle 0°, LC_ 3 Wind + ice, -5°C (ahead)					wind angle 0°, LC_ 3 Wind + ice, -5°C (ahead)					#N/B	#N/B
	wind angle 135°, LC_ 1b Wind, -20°C (ahead)					wind angle 45°, LC_ 1b Wind, -20°C (ahead)					wind angle 0°, LC_ 1b Wind, -20°C (ahead)					wind angle 0°, LC_ 1b Wind, -20°C (ahead)					#N/B	#N/B
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3381,877	2454,678	10057,11	2587,13	3383,964	2472,838	10070,6	2590,343	3389,103	2566,351	10105,73	2598,437	3389,103	2566,351	10105,73	2598,437	3389,103	2566,351	10105,73	2598,437	2586,613	2106,611	
1741,934	4319,432	5876,661	1621,164	1640,467	3734,181	5350,75	1517,44	1125,271	888,9371	2690,312	996,7948	1125,271	888,9371	2690,312	996,7948	1125,271	888,9371	2690,312	996,7948	952,0141	613,4128	
26088,9	29871,94	63606,22	23331,55	25978,91	27546,63	62945,32	23168,5	25724,6	20118,4	61369,81	22782,06	25724,6	20118,4	61369,81	22782,06	25724,6	20118,4	61369,81	22782,06	21804,71	14049,46	
2751,038	1823,452	9437,676	1947,729	2753,624	1837,414	9452,029	1951,966	2760,089	1933,672	9489,811	1963,051	2760,089	1933,672	9489,811	1963,051	2760,089	1933,672	9489,811	1963,051	1952,052	2106,611	
1573,341	4230,215	5762,796	1434,289	1470,43	3631,061	5234,551	1327,547	951,6984	701,7802	2568,179	799,2005	951,6984	701,7802	2568,179	799,2005	951,6984	701,7802	2568,179	799,2005	757,6205	613,4128	
22229,96	27835,11	61006,88	19054,18	22086,53	25191,17	60291,32	18821,59	21749,16	15831,85	58572,55	18256,41	21749,16	15831,85	58572,55	18256,41	21749,16	15831,85	58572,55	18256,41	17352,36	14049,46	
3220,911	2516,213	4209,714	2591,065	3222,347	2528,129	4227,965	2593,187	3225,855	2566,354	4285,26	2598,437	3225,855	2566,354	4285,26	2598,437	3225,855	2566,354	4285,26	2598,437	2586,613	2106,611	
1572,029	2589,061	4060,958	1491,966	1491,425	2298,506	3611,832	1410,096	1080,683	883,8777	1404,663	996,3737	1080,683	883,8777	1404,663	996,3737	1080,683	883,8777	1404,663	996,3737	952,0141	613,4128	
24959,6	23399,38	36290,56	23132,39	24884,54	22501,94	35101	23027,31	24713,05	20118,49	31973,58	22782,07	24713,05	20118,49	31973,58	22782,07	24713,05	20118,49	31973,58	22782,07	21804,71	14049,46	
2589,826	1875,679	3574,949	1952,93	2591,64	1887,8	3594,045	1955,793	2596,121	1933,675	3659,085	1963,051	2596,121	1933,675	3659,085	1963,051	2596,121	1933,675	3659,085	1963,051	1952,052	2106,611	
1399,398	2449,993	3934,175	1301,391	1317,729	2148,739	3476,557	1217,506	904,4095	696,7195	1241,635	798,7795	904,4095	696,7195	1241,635	798,7795	904,4095	696,7195	1241,635	798,7795	757,6205	613,4128	
21007,75	20219,54	33394,44	18769,75	20907,97	19076,54	32009,58	18618,18	20675,73	15831,89	28239,65	18256,43	20675,73	15831,89	28239,65	18256,43	20675,73	15831,89	28239,65	18256,43	17352,36	14049,46	
2692,873	2069,353	7169,629	2169,011	2694,103	2083,853	7179,022	2170,843	2697,104	2144,978	7203,237	2175,375	2697,104	2144,978	7203,237	2175,375	2697,104	2144,978	7203,237	2175,375	2164,061	2106,611	
1342,972	3027,248	4214,113	1280,004	1275,665	2638,633	3862,583	1211,564	933,0791	762,1697	2087,429	866,2987	933,0791	762,1697	2087,429	866,2987	933,0791	762,1697	2087,429	866,2987	824,2152	613,4128	
21555,77	23310,05	49223,3	20118,83	21489,85	21791,66	48756,1	20026,13	21338,81	17295,5	47644,46	19809,31	21338,81	17295,5	47644,46	19809,31	21338,81	17295,5	47644,46	19809,31	18877,63	14049,46	
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6763,017	4968,932	20186,92	5173,096	6765,236	5000,821	20201,81	5176,537	6770,623	5125,445	20239,04	5184,994	6770,623	5125,445	20239,04	5184,994	6770,623	5125,445	20239,04	5184,994	5163,179	4210,784	
3128,261	6606,574	9919,587	2863,868	2983,964	5778,886	9175,14	2717,169	2246,206	1770,007	5381,33	1973,786	2246,206	1770,007	5381,33	1973,786	2246,206	1770,007	5381,33	1973,786	1891,969	1238,792	
51748,53	51803,36	125194,3	45705,1	51634,4	48807,51	124499,8	45534,04	51376,92	40191,61	122895,7	45137,51	51376,92	40191,61	122895,7	45137,51	51376,92	40191,61	122895,7	45137,51	43333,21	28372,99	
5504,613	3694,464	18952,65	3899,66	5507,394	3722,669	18968,63	3904,325	5514,2	3861,691	19008,81	3916,026	5514,2	3861,691	19008,81	3916,026	5514,2	3861,691	19008,81	3916,026	3895,826	4210,784	
2786,076	6375,976	9683,769	2480,672	2640,236	5521,742	8936,756	2330,663	1898,789	1395,413	5136,766	1579,138	1898,789	1395,413	5136,766	1579,138	1898,789	1395,413	5136,766	1579,138	1503,562	1238,792	
43914,79	46533,91	119805,9	36932,51	43764,77	42929,31	119050,6	36685,02	43419,78	31612,06	117294,3	36098,6	43419,78	31612,06	117294,3	36098,6	43419,78	31612,06	117294,3	36098,6	34437,23	28372,99	
6438,887	5066,067	8481,753	5177,304	6440,403	5081,593	8504,968	5179,544	6444,069	5125,447	8569,574	5184,994	6444,069	5125,447	8569,574	5184,994	6444,069	5125,447	8569,574	5184,994	5163,179	4210,784	
2860,59	4170,498	6548,417	2681,081	2745,762	3763,647	5919,467	2564,927	2157,055	1762,718	2798,978	1973,179	2157,055	1762,718	2798,978	1973,179	2157,055	1762,718	2798,978	1973,179	1891,969	1238,792	
49598,72	43783,55	68489,03	45496,33	49521,26	42761,46	67152,43	45387,04	49348,96	40191,8	63821,91	45137,54	49348,96	40191,8	63821,91	45137,54	49348,96	40191,8	63821,91	45137,54	43333,21	28372,99	
5179,582	3788,461	7217,815	3905,371	5181,514	3806,143	7243,555	3908,445	5186,211	3861,694	7318,86	3916,026	5186,211	3861,694	7318,86	3916,026	5186,211	3861,694	7318,86	3916,026	3895,826	4210,784	
2511,602	3854,949	6265,187	2293,836	2395,647	3433,249	5625,048	2175,517	1804,263	1388,123	2472,789	1578,531	1804,263	1388,123	2472,789	1578,531	1804,263	1388,123	2472,789	1578,531	1503,562	1238,792	
41608,53	36564,91	62014,17	36630,22	41504,77	35201,69	60419,78	36470,85	41268,7	31612,2	56351,01	36098,63	41268,7	31612,2	56351,01	36098,63	41268,7	31612,2	56351,01	36098,63	34437,23	28372,99	
5383,17	4184,476	14387,11	4333,427	5384,467	4207,137	14397,38	4335,358	5387,602	4283,76	14422,94	4340,055	5387,602	4283,76	14422,94	4340,055	5387,602	4283,76	14422,94	4340,055	4319,242	4210,784	
2448,408	4706,145	7199,799	2304,114	2352,579	4160,356	6702,66	2207,099	1861,698	1518,232	4172,341	1713,483	1861,698	1518,232	4172,341	1713,483	1861,698	1518,232	4172,341	1713,483	1636,573	1238,792	
42813,54	41463,03	96945,9	39515,96	42745,48	39599,25	96456,19	39419,56	42593,46	34541,12	95324,47	39198,8	42593,46	34541,12	95324,47	39198,8	42593,46	34541,12	95324,47	39198,8	37483,68	28372,99	
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22174,08	18263,14	32193,23	19114,63	22185,09	18386,99	32244,95	19130,11	22212,03	18903,36	32379,34	19168,36	22212,03	18903,36	32379,34	19168,36	22212,03	18903,36	32379,34	19168,36	19069,89	15496,55	
11050,05	25896,89	20514,01	10987,94	10468,64	22585,49	18843,34	10399,99	7508,405	6513,106	10454,73	7424,6	7508,405	6513,106	10454,73	7424,6	7508,405	6513,106	10454,73	7424,6	7057,384	4425,747	
173543,3	195305,4	247621,1	172167,4	172981,1	183277,9	244991,1	171448	171692,3	147782,6	238674,8	169773	171692,3	147782,6	238674,8	169773	171692,3	147782,6	238674,8	169773	161640,7	101366,3	
17524,03	13576,02	27558,89	14422,26	17538,22	13682,05	27618,52	14443,42	17573,41	14249,69	27777,9	14496,97	17573,41	14249,69	27777,9	14496,97	17573,41	14249,69	27777,9	14496,97	14403,4	15496,55	

ZWW2S400+5

Appendix BS / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL1/1a	GW / opgw	2566	889	20118	2566	889	-20118
Wind, 10°C	150C1F1	5125	1770	40192	5125	1770	-40192
Permanent loads yg= 1.2	150C1F2	18903	6513	147783	18903	6513	-147783
Wind angle: 0°	150C1F3	18903	6508	147783	18903	6508	-147783
	380C2F1	18903	6502	147783	18903	6502	-147783
NL1/1b	GW / opgw	2598	997	22782	2598	997	-22782
Wind, -20°C	150C1F1	5185	1974	45138	5185	1974	-45138
Permanent loads yg= 1.2	150C1F2	19168	7425	169773	19168	7425	-169773
Wind angle: 0°	150C1F3	19168	7424	169773	19168	7424	-169773
	380C2F1	19168	7422	169773	19168	7422	-169773
NL1/3	GW / opgw	10106	2690	61370	10106	2690	-61370
Wind, -5°C	150C1F1	20239	5381	122896	20239	5381	-122896
Permanent loads yg= 1.2	150C1F2	32379	10455	238675	32379	10455	-238675
Wind angle: 0°	150C1F3	32379	10452	238675	32379	10452	-238675
	380C2F1	32379	10448	238675	32379	10448	-238675
NL1/4	GW / opgw	3389	1125	25725	3389	1125	-25725
Construction/maintenance, +5°C	150C1F1	6771	2246	51377	6771	2246	-51377
Permanent loads yg= 1.2	150C1F2	22212	7508	171692	22212	7508	-171692
Wind angle: 0°	150C1F3	22212	7507	171692	22212	7507	-171692
	380C2F1	22212	7506	171692	22212	7506	-171692
NL1/6	GW / opgw	2881	967	22156	2881	967	-22156
Permanent, +10°C	150C1F1	5755	1933	44271	5755	1933	-44271
Permanent loads yg= 1.35	150C1F2	21221	7092	162440	21221	7092	-162440
	150C1F3	21221	7092	162440	21221	7092	-162440
	380C2F1	21221	7092	162440	21221	7092	-162440
NL1/1a	GW / opgw	2473	3734	27547	2455	4319	-29872
Wind, 10°C	150C1F1	5001	5779	48808	4969	6607	-51803
Permanent loads yg= 1.2	150C1F2	18387	22585	183278	18263	25897	-195305
Wind angle: 45°	150C1F3	18443	21180	178417	18325	24203	-189063
	380C2F1	18516	19390	172503	18408	22043	-181380
NL1/1b	GW / opgw	2590	1517	23169	2587	1621	-23332
Wind, -20°C	150C1F1	5177	2717	45534	5173	2864	-45705
Permanent loads yg= 1.2	150C1F2	19130	10400	171448	19115	10988	-172167
Wind angle: 45°	150C1F3	19136	10150	171178	19123	10687	-171785
	380C2F1	19143	9830	170865	19132	10303	-171341
NL1/3	GW / opgw	10071	5351	62945	10057	5877	-63606
Wind, -5°C	150C1F1	20202	9175	124500	20187	9920	-125194
Permanent loads yg= 1.2	150C1F2	32245	18843	244991	32193	20514	-247621
Wind angle: 45°	150C1F3	32265	18133	243995	32220	19659	-246227
	380C2F1	32289	17227	242834	32253	18569	-244598
NL1/4	GW / opgw	3384	1640	25979	3382	1742	-26089
Construction/maintenance, +5°C	150C1F1	6765	2984	51634	6763	3128	-51749
Permanent loads yg= 1.2	150C1F2	22185	10469	172981	22174	11050	-173543
Wind angle: 45°	150C1F3	22189	10221	172771	22180	10753	-173244
	380C2F1	22194	9904	172528	22187	10373	-172898
NL1/1a	GW / opgw	2396	7397	42538	2396	7397	-42538
Wind, 10°C	150C1F1	4845	11018	69550	4845	11018	-69550
Permanent loads yg= 1.2	150C1F2	17807	43472	264834	17807	43472	-264834
Wind angle: 90°	150C1F3	17867	40301	252042	17867	40301	-252042
	380C2F1	17957	36233	235677	17957	36233	-235677
NL1/1b	GW / opgw	2564	2180	24585	2564	2180	-24585
Wind, -20°C	150C1F1	5147	3649	47057	5147	3649	-47057
Permanent loads yg= 1.2	150C1F2	19000	14137	177820	19000	14137	-177820
Wind angle: 90°	150C1F3	19024	13562	176583	19024	13562	-176583
	380C2F1	19053	12829	175132	19053	12829	-175132
NL1/3	GW / opgw	9968	8686	68552	9968	8686	-68552
Wind, -5°C	150C1F1	20080	13881	130608	20080	13881	-130608
Permanent loads yg= 1.2	150C1F2	31851	29488	267288	31851	29488	-267288
Wind angle: 90°	150C1F3	31918	27848	263116	31918	27848	-263116
	380C2F1	32001	25759	258135	32001	25759	-258135
NL1/4	GW / opgw	3366	2284	26957	3366	2284	-26957
Construction/maintenance, +5°C	150C1F1	6746	3895	52667	6746	3895	-52667
Permanent loads yg= 1.2	150C1F2	22091	14150	178018	22091	14150	-178018
Wind angle: 90°	150C1F3	22109	13585	177032	22109	13585	-177032
	380C2F1	22130	12865	175879	22130	12865	-175879
NL1/1a	GW / opgw	2455	4319	29872	2473	3734	-27547
Wind, 10°C	150C1F1	4969	6607	51803	5001	5779	-48808
Permanent loads yg= 1.2	150C1F2	18263	25897	195305	18387	22585	-183278
Wind angle: -45°	150C1F3	18325	24203	189063	18443	21180	-178417
	380C2F1	18408	22043	181380	18516	19390	-172503

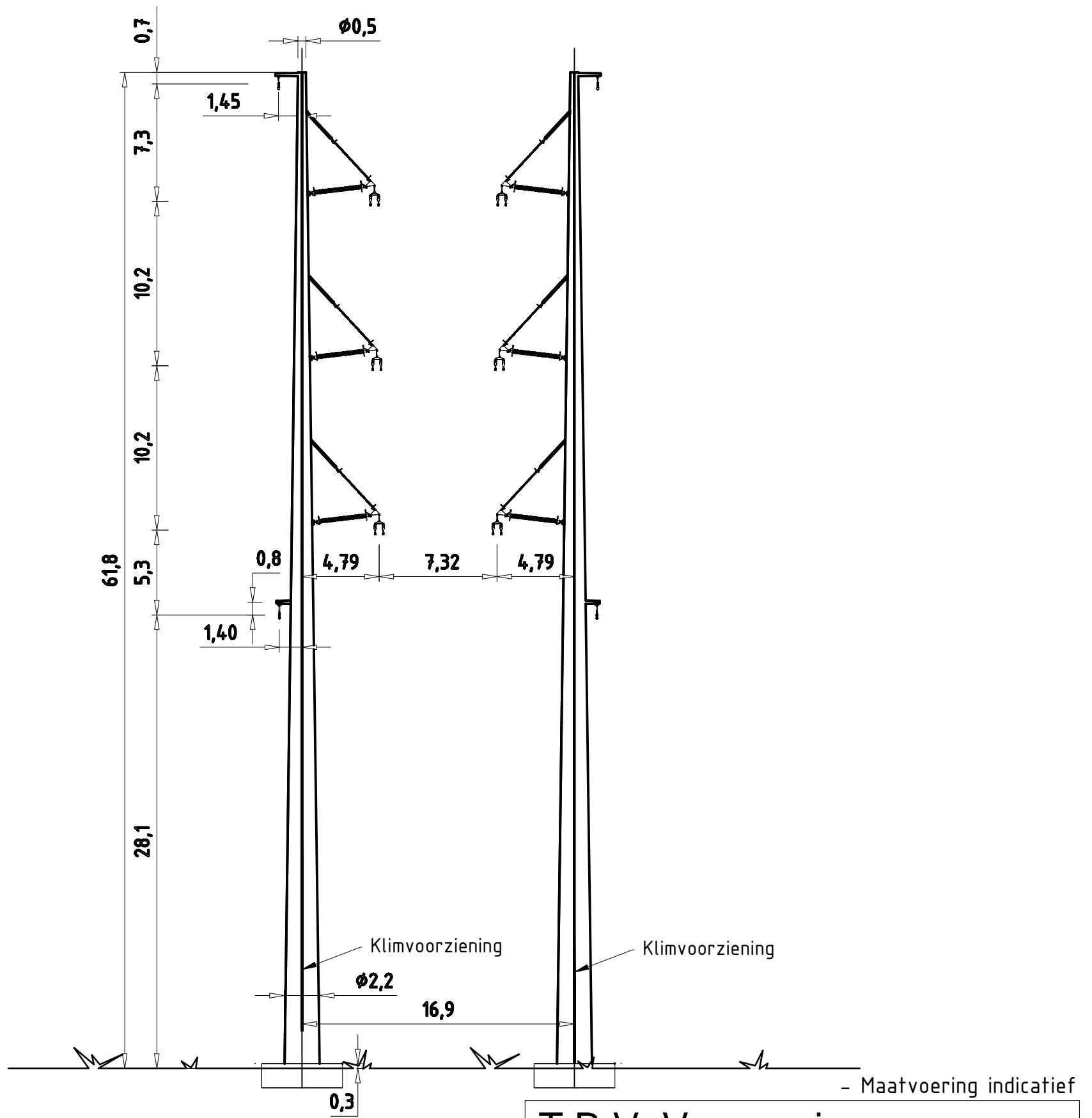
NL1/1b	GW / opgw	2587	1621	23332	2590	1517	-23169
Wind, -20°C	150C1F1	5173	2864	45705	5177	2717	-45534
Permanent loads yg= 1.2	150C1F2	19115	10988	172167	19130	10400	-171448
Wind angle: -45°	150C1F3	19123	10687	171785	19136	10150	-171178
	380C2F1	19132	10303	171341	19143	9830	-170865
NL1/3	GW / opgw	10057	5877	63606	10071	5351	-62945
Wind, -5°C	150C1F1	20187	9920	125194	20202	9175	-124500
Permanent loads yg= 1.2	150C1F2	32193	20514	247621	32245	18843	-244991
Wind angle: -45°	150C1F3	32220	19659	246227	32265	18133	-243995
	380C2F1	32253	18569	244598	32289	17227	-242834
NL1/4	GW / opgw	3382	1742	26089	3384	1640	-25979
Construction/maintenance, +5°C	150C1F1	6763	3128	51749	6765	2984	-51634
Permanent loads yg= 1.2	150C1F2	22174	11050	173543	22185	10469	-172981
Wind angle: -45°	150C1F3	22180	10753	173244	22189	10221	-172771
	380C2F1	22187	10373	172898	22194	9904	-172528
NL1//1a	GW / opgw	1934	702	15832	1934	702	-15832
Wind, 10°C	150C1F1	3862	1395	31612	3862	1395	-31612
Permanent loads yg= 0.9	150C1F2	14250	5163	116856	14250	5163	-116856
Wind angle: 0°	150C1F3	14250	5158	116856	14250	5158	-116856
	380C2F1	14250	5151	116856	14250	5151	-116856
NL1/1b	GW / opgw	1963	799	18256	1963	799	-18256
Wind, -20°C	150C1F1	3916	1579	36099	3916	1579	-36099
Permanent loads yg= 0.9	150C1F2	14497	6004	137245	14497	6004	-137245
Wind angle: 0°	150C1F3	14497	6003	137245	14497	6003	-137245
	380C2F1	14497	6002	137245	14497	6002	-137245
NL1/3	GW / opgw	9490	2568	58573	9490	2568	-58573
Wind, -5°C	150C1F1	19009	5137	117294	19009	5137	-117294
Permanent loads yg= 0.9	150C1F2	27778	9299	212204	27778	9299	-212204
Wind angle: 0°	150C1F3	27778	9296	212204	27778	9296	-212204
	380C2F1	27778	9293	212204	27778	9293	-212204
NL1/4	GW / opgw	2760	952	21749	2760	952	-21749
Construction/maintenance, +5°C	150C1F1	5514	1899	43420	5514	1899	-43420
Permanent loads yg= 0.9	150C1F2	17573	6214	142035	17573	6214	-142035
Wind angle: 0°	150C1F3	17573	6213	142035	17573	6213	-142035
	380C2F1	17573	6211	142035	17573	6211	-142035
NL1/6	GW / opgw	1934	691	15832	1934	691	-15832
Permanent, +10°C	150C1F1	3862	1380	31612	3862	1380	-31612
Permanent loads yg= 0.9	150C1F2	14250	5102	116858	14250	5102	-116858
	150C1F3	14250	5102	116858	14250	5102	-116858
	380C2F1	14250	5102	116858	14250	5102	-116858
NL1/1a	GW / opgw	1837	3631	25191	1823	4230	-27835
Wind, 10°C	150C1F1	3723	5522	42929	3694	6376	-46534
Permanent loads yg= 0.9	150C1F2	13682	21706	163187	13576	25116	-177479
Wind angle: 45°	150C1F3	13733	20254	157269	13628	23373	-170118
	380C2F1	13802	18403	149936	13701	21146	-160888
NL1/1b	GW / opgw	1952	1328	18822	1948	1434	-19054
Wind, -20°C	150C1F1	3904	2331	36685	3900	2481	-36933
Permanent loads yg= 0.9	150C1F2	14443	9015	139731	14422	9617	-140774
Wind angle: 45°	150C1F3	14452	8759	139337	14433	9308	-140220
	380C2F1	14461	8433	138879	14447	8916	-139575
NL1/3	GW / opgw	9452	5235	60291	9438	5763	-61007
Wind, -5°C	150C1F1	18969	8937	119051	18953	9684	-119806
Permanent loads yg= 0.9	150C1F2	27619	17750	219974	27559	19444	-223155
Wind angle: 45°	150C1F3	27642	17030	218763	27590	18577	-221471
	380C2F1	27670	16113	217348	27628	17472	-219496
NL1/4	GW / opgw	2754	1470	22087	2751	1573	-22230
Construction/maintenance, +5°C	150C1F1	5507	2640	43765	5505	2786	-43915
Permanent loads yg= 0.9	150C1F2	17538	9195	143824	17524	9785	-144590
Wind angle: 45°	150C1F3	17544	8944	143537	17532	9483	-144183
	380C2F1	17550	8623	143204	17540	9098	-143711
NL1/1a	GW / opgw	1784	7349	41448	1784	7349	-41448
Wind, 10°C	150C1F1	3601	10881	66434	3601	10881	-66434
Permanent loads yg= 0.9	150C1F2	13242	43024	254620	13242	43024	-254620
Wind angle: 90°	150C1F3	13282	39811	240870	13282	39811	-240870
	380C2F1	13344	35680	223058	13344	35680	-223058
NL1/1b	GW / opgw	1920	2013	20779	1920	2013	-20779
Wind, -20°C	150C1F1	3866	3290	38843	3866	3290	-38843
Permanent loads yg= 0.9	150C1F2	14274	12867	148757	14274	12867	-148757
Wind angle: 90°	150C1F3	14304	12271	147039	14304	12271	-147039
	380C2F1	14341	11513	145004	14341	11513	-145004

NL1/3	GW / opgw	9345	8587	66309	9345	8587	-66309
Wind, -5°C	150C1F1	18839	13664	125652	18839	13664	-125652
Permanent loads yg= 0.9	150C1F2	27186	28571	246353	27186	28571	-246353
Wind angle: 90°	150C1F3	27256	26902	241507	27256	26902	-241507
	380C2F1	27345	24776	235671	27345	24776	-235671
NL1/4	GW / opgw	2732	2126	23343	2732	2126	-23343
Construction/maintenance, +5°C	150C1F1	5484	3565	45108	5484	3565	-45108
Permanent loads yg= 0.9	150C1F2	17420	12950	150576	17420	12950	-150576
Wind angle: 90°	150C1F3	17442	12372	149269	17442	12372	-149269
	380C2F1	17468	11635	147735	17468	11635	-147735
NL1/1a	GW / opgw	1823	4230	27835	1837	3631	-25191
Wind, 10°C	150C1F1	3694	6376	46534	3723	5522	-42929
Permanent loads yg= 0.9	150C1F2	13576	25116	177479	13682	21706	-163187
Wind angle: -45°	150C1F3	13628	23373	170118	13733	20254	-157269
	380C2F1	13701	21146	160888	13802	18403	-149936
NL1/1b	GW / opgw	1948	1434	19054	1952	1328	-18822
Wind, -20°C	150C1F1	3900	2481	36933	3904	2331	-36685
Permanent loads yg= 0.9	150C1F2	14422	9617	140774	14443	9015	-139731
Wind angle: -45°	150C1F3	14433	9308	140220	14452	8759	-139337
	380C2F1	14447	8916	139575	14461	8433	-138879
NL1/3	GW / opgw	9438	5763	61007	9452	5235	-60291
Wind, -5°C	150C1F1	18953	9684	119806	18969	8937	-119051
Permanent loads yg= 0.9	150C1F2	27559	19444	223155	27619	17750	-219974
Wind angle: -45°	150C1F3	27590	18577	221471	27642	17030	-218763
	380C2F1	27628	17472	219496	27670	16113	-217348
NL1/4	GW / opgw	2751	1573	22230	2754	1470	-22087
Construction/maintenance, +5°C	150C1F1	5505	2786	43915	5507	2640	-43765
Permanent loads yg= 0.9	150C1F2	17524	9785	144590	17538	9195	-143824
Wind angle: -45°	150C1F3	17532	9483	144183	17544	8944	-143537
	380C2F1	17540	9098	143711	17550	8623	-143204

ZWW2S400+5

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	2145	762	17296	2145	762	-17296
	150C1F1	4284	1518	34541	4284	1518	-34541
	150C1F2	15804	5604	127432	15804	5604	-127432
	150C1F3	15804	5601	127432	15804	5601	-127432
	380C2F1	15804	5597	127433	15804	5597	-127433
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	2175	866	19809	2175	866	-19809
	150C1F1	4340	1713	39199	4340	1713	-39199
	150C1F2	16058	6488	148423	16058	6488	-148423
	150C1F3	16058	6488	148423	16058	6488	-148423
	380C2F1	16058	6487	148423	16058	6487	-148423
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	7203	2087	47644	7203	2087	-47644
	150C1F1	14423	4172	95324	14423	4172	-95324
	150C1F2	24868	8527	194793	24868	8527	-194793
	150C1F3	24868	8526	194793	24868	8526	-194793
	380C2F1	24868	8523	194793	24868	8523	-194793
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	2697	933	21339	2697	933	-21339
	150C1F1	5388	1862	42593	5388	1862	-42593
	150C1F2	18030	6341	145038	18030	6341	-145038
	150C1F3	18030	6340	145038	18030	6340	-145038
	380C2F1	18030	6339	145038	18030	6339	-145038
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	2084	2639	21792	2069	3027	-23310
	150C1F1	4207	4160	39599	4184	4706	-41463
	150C1F2	15481	16203	148487	15390	18391	-156085
	150C1F3	15520	15276	145473	15436	17271	-152118
	380C2F1	15570	14097	141855	15496	15845	-147306
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	2171	1212	20026	2169	1280	-20119
	150C1F1	4335	2207	39420	4333	2304	-39516
	150C1F2	16037	8464	149361	16028	8853	-149768
	150C1F3	16040	8298	149208	16032	8654	-149651
	380C2F1	16044	8087	149032	16038	8400	-149300
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	7179	3863	48756	7170	4214	-49223
	150C1F1	14397	6703	96456	14387	7200	-96946
	150C1F2	24784	14109	198805	24751	15220	-200492
	150C1F3	24797	13637	198168	24768	14652	-199597
	380C2F1	24812	13035	197428	24789	13927	-198554
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	2694	1276	21490	2693	1343	-21556
	150C1F1	5384	2353	42745	5383	2448	-42814
	150C1F2	18014	8309	145783	18008	8694	-146111
	150C1F3	18017	8144	145660	18011	8497	-145936
	380C2F1	18020	7934	145518	18015	8245	-145734
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2016	5092	32077	2016	5092	-32077
	150C1F1	4083	7642	53218	4083	7642	-53218
	150C1F2	15003	30120	202842	15003	30120	-202842
	150C1F3	15059	27991	193965	15059	27991	-193965
	380C2F1	15140	25268	182762	15140	25268	-182762
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2155	1648	20846	2155	1648	-20846
	150C1F1	4319	2822	40287	4319	2822	-40287
	150C1F2	15961	10929	153016	15961	10929	-153016
	150C1F3	15975	10550	152299	15975	10550	-152299
	380C2F1	15992	10068	151462	15992	10068	-151462
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7106	6095	52747	7106	6095	-52747
	150C1F1	14312	9849	100779	14312	9849	-100779
	150C1F2	24523	21188	213326	24523	21188	-213326
	150C1F3	24569	20096	210573	24569	20096	-210573
	380C2F1	24625	18707	207306	24625	18707	-207306
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2684	1702	22082	2684	1702	-22082
	150C1F1	5373	2957	43365	5373	2957	-43365
	150C1F2	17959	10745	148750	17959	10745	-148750
	150C1F3	17970	10372	148164	17970	10372	-148164
	380C2F1	17982	9896	147483	17982	9896	-147483
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2069	3027	23310	2084	2639	-21792
	150C1F1	4184	4706	41463	4207	4160	-39599
	150C1F2	15390	18391	156085	15481	16203	-148487
	150C1F3	15436	17271	152118	15520	15276	-145473
	380C2F1	15496	15845	147306	15570	14097	-141855
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2169	1280	20119	2171	1212	-20026
	150C1F1	4333	2304	39516	4335	2207	-39420
	150C1F2	16028	8853	149768	16037	8464	-149361
	150C1F3	16032	8654	149551	16040	8298	-149208
	380C2F1	16038	8400	149300	16044	8087	-149032
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7170	4214	49223	7179	3863	-48756
	150C1F1	14387	7200	96946	14397	6703	-96456
	150C1F2	24751	15220	200492	24784	14109	-198805
	150C1F3	24768	14652	199597	24797	13637	-198168
	380C2F1	24789	13927	198554	24812	13035	-197428
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2693	1343	21556	2694	1276	-21490
	150C1F1	5383	2448	42814	5384	2353	-42745
	150C1F2	18008	8694	146111	18014	8309	-145783
	150C1F3	18011	8497	145936	18017	8144	-145660
	380C2F1	18015	8245	145734	18020	7934	-145518



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW2S400+5

- Trekparameter 1800m
- 2x380 Steunmast
- 400m Veldlengte
- 175°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

5.0	11-03-2014	Modified poles length
4.0	04-03-2014	Increased space between poles
3.0	03-02-2014	Modified top/bottom diameter and added new braced-V
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection:
Drawn by: RBE 11-03-2014		Drawing no.: 74102194-035-022V
Checked by: AJP 11-03-2014		Description: Wintrack Masttype ZWW2S400+5
Approved by: AW 11-03-2014		
Scale: 1:300		Revision: 5.0
Units: m		Format: A3
Project no: 000.145		
Company: TenneT		

ZWW2HK400

Fundatie berekening

Fundatie ontwerp:

Heipaal

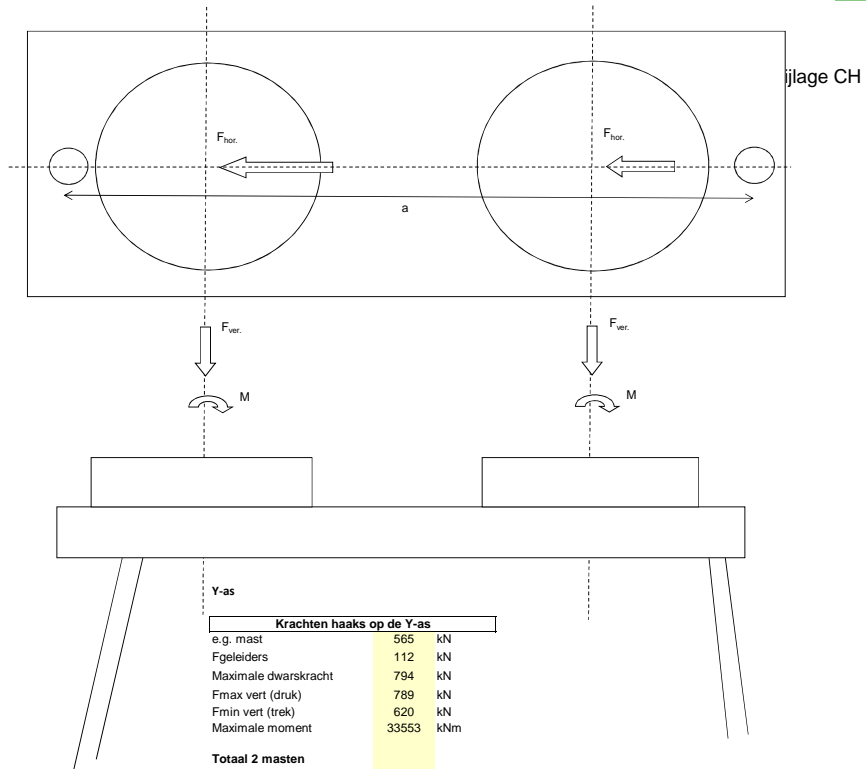
Afmetingen	b	400	mm
	d	400	mm
omtrek paal	O_{ogen}	1.6	m

schoorstand	α	8	:1
		7.125	graden

Opstort (enkel)	Diameter	5.3	m
	Hoogte	1.8	m
	Inhoud	40	m ³
	e.g.	953	kN

Onderplaat	Lengte	19.0	m
	Breedte	11.0	m
	Hoogte	0.9	m
	Inhoud	188	m ³
	e.g.	4514	kN

Hart paal tov rand fund.		0.6	m
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X-as

Kracht haaks op de x-as	
e.g. mast	565 kN
Fgeleiders	112 kN
Maximale dwarskracht	758 kN
Fmax vert (druk)	789 kN
Fmin vert (trek)	620 kN
Maximale moment	33938 kNm

Totaal 2 masten	
e.g. mast	1129 kN
Fgeleiders	223 kN
Maximale dwarskracht	1516 kN
Fmax vert (druk)	1578 kN
Fmin vert (trek)	1240 kN
Totaal moment (UGT)	67877 kNm

Moment

F_{slag}	7822	kN
F_{hor}	1516	kN
F_{ver}	7762	kN
M_{hor} (tgv F_{hor})	4094	kNm
M_{tot}	76065	kNm
$F=M/a$	7762	kN

Verticaal reactiekracht

F_{water} (trek)	5016	kN	
F_{grond} (druk)	4452	kN	
F_{grond} (trek)	3710	kN	
F_{dmax} (druksituatie) (UGT)	15074	kN	(Per kant)
F_{dmin} (treksituatie) (UGT)	5593	kN	(Per kant)
Palen druk	10	(-)	
Palen trek	12	(-)	
Totaal palen	24	(-)	Per fundering

Krachten haaks op de Y-as	
e.g. mast	565 kN
Fgeleiders	112 kN
Maximale dwarskracht	794 kN
Fmax vert (druk)	789 kN
Fmin vert (trek)	620 kN
Maximale moment	33553 kNm

Totaal 2 masten	
e.g. mast	1129 kN
Fgeleiders	223 kN
Maximale dwarskracht	1588 kN
Fmax vert (druk)	1578 kN
Fmin vert (trek)	1240 kN
Totaal moment (UGT)	67106 kNm

Moment

F_{slag}	4252	kN
F_{hor}	1588	kN
F_{ver}	4252	kN
M_{hor} (tgv F_{hor})	4287	kNm
M_{tot}	75680	kNm
$F=M/a$	4252	kN

Verticaal reactiekracht

F_{water} (trek)	5016	kN	
F_{grond} (druk)	4452	kN	
F_{grond} (trek)	3710	kN	
F_{dmax} (druksituatie) (UGT)	8856	kN	(Per kant)
F_{dmin} (treksituatie) (UGT)	4114	kN	(Per kant)
Palen druk	7	(-)	
Palen trek	11	(-)	
Totaal palen	22	(-)	Per fundering



ZWW2HK400

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r,trek;d} = \int_0^L O_{p;gem} \times p_{r;:;d} \times dz$$

Bijlage CH

Bepaling opneembare paalbelasting op druk

heipaal

Afmeting paal	b	0.40 m
	b	0.40 m
omtrek paal	O _{p;gem}	1.60 m

paalfactor	α t	0.007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0.75

conusweerstand over wrijvingstraject q_{c,z,max} 15 MPa

q_{c,z,rep} 11.25 MPa

materiaalfactor γ_{m,b4} 1.4

factor, wisselende belastingen γ_{m,var,qc} 1.5

q_{c,z,d} 5.36 MPa

p_{r,z,d} 37.5 kN/m²

F_{r,trek;d,i} 60,0 kN/m¹

F_{trek,d} 596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		q _{c,z}		P _{r,max,z} (schacht)	F _{r,trek;d,i}	F _{trek,d}
	m	m	MPa	α t			
	0	-1	0	0.007	0.00	0.00	0
	-1	-2	0	0.007	0.00	0.00	0
	-2	-3	0	0.007	0.00	0.00	0
	-3	-4	0	0.007	0.00	0.00	0
	-4	-5	0	0.007	0.00	0.00	0
	-5	-6	0	0.007	0.00	0.00	0
	-6	-7	0	0.007	0.00	0.00	0
	-7	-8	0	0.007	0.00	0.00	0
	-8	-9	1	0.007	2.50	4.00	4
	-9	-10	3	0.007	7.50	12.00	16
	-10	-11	2	0.007	5.00	8.00	24
	-11	-12	0	0.007	0.00	0.00	24
	-12	-13	3	0.007	7.50	12.00	36
	-13	-14	2	0.007	5.00	8.00	44
	-14	-15	4	0.007	10.00	16.00	60
	-15	-16	10	0.007	25.00	40.00	100
	-16	-17	9	0.007	22.50	36.00	136
	-17	-18	8	0.007	20.00	32.00	168
	-18	-19	12	0.007	30.00	48.00	216
	-19	-20	12	0.007	30.00	48.00	264
	-20	-21	10	0.007	25.00	40.00	304
	-21	-22	11	0.007	27.50	44.00	348
	-22	-23	11	0.007	27.50	44.00	392
	-23	-24	12	0.007	30.00	48.00	440
	-24	-25	12	0.007	30.00	48.00	488
	-25	-26	12	0.007	30.00	48.00	536
	-26	-27	15	0.007	37.50	60.00	596

F _{trek,d}	596 kN	paalafmeting	400 mm, paalpuntnivo	-27.00 m
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Paalgroep factor 10%

F _{trek,d}	536.4 kN
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ZWW2HK400

DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CH

Bepaling opneembare paalbelasting op druk

heipaal			
	diameter	v	2 mm
		a	2 mm
	Deq		0.001808

maximale puntweerstand

$P_{r,max(punt)}$			11.25 MN/m ²
paalklasse factor	α_P		1.00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1.00
minimale waarde neergaande deel	$q_{c,lgem}$		9.00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,lgem}$		14.00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,lgem}$		11.00 MN/m ²

maximale paalschachtwrijving

$P_{r,max(schacht)}$			0.05 MN/m ²
waarin:			
paalfactor	α_s		0.010
conusweerstand over wrijvingstraject	$q_{c,z,a}$		5.00 MN/m ²

maximale draagkracht alleenstaande paal

$F_{r,max}$ 0.00 MN

waarin:

$F_{r,max(punt)}$ 0.00 MN

paalpunt oppervlak A_{punt} 0.00 m²

$F_{r,max(schacht)}$ 0.00 MN

gemiddelde paalomtrek $O_{p,lgem}$ 0.01 m

lengte schachtwrijving Δl 15.00 m

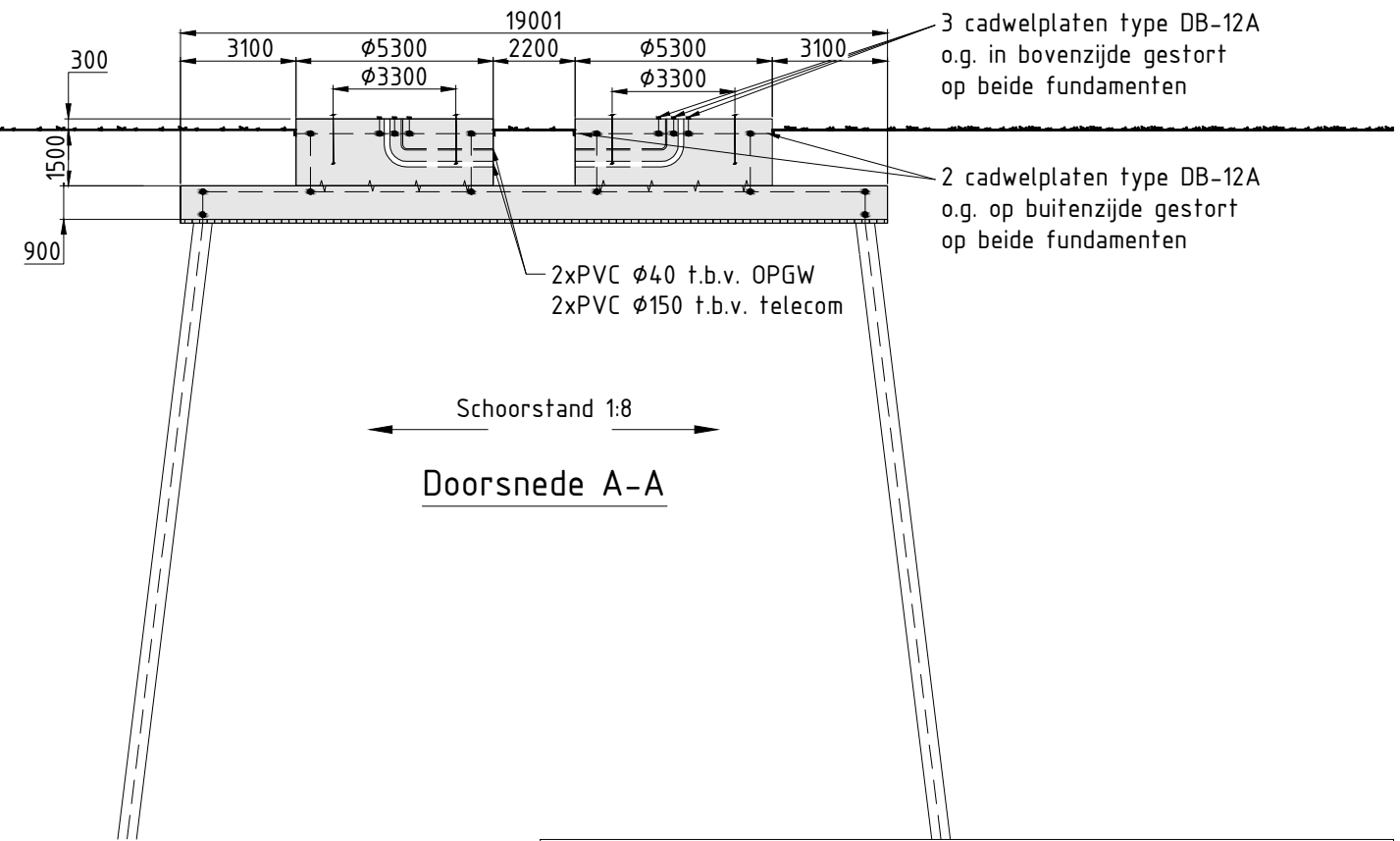
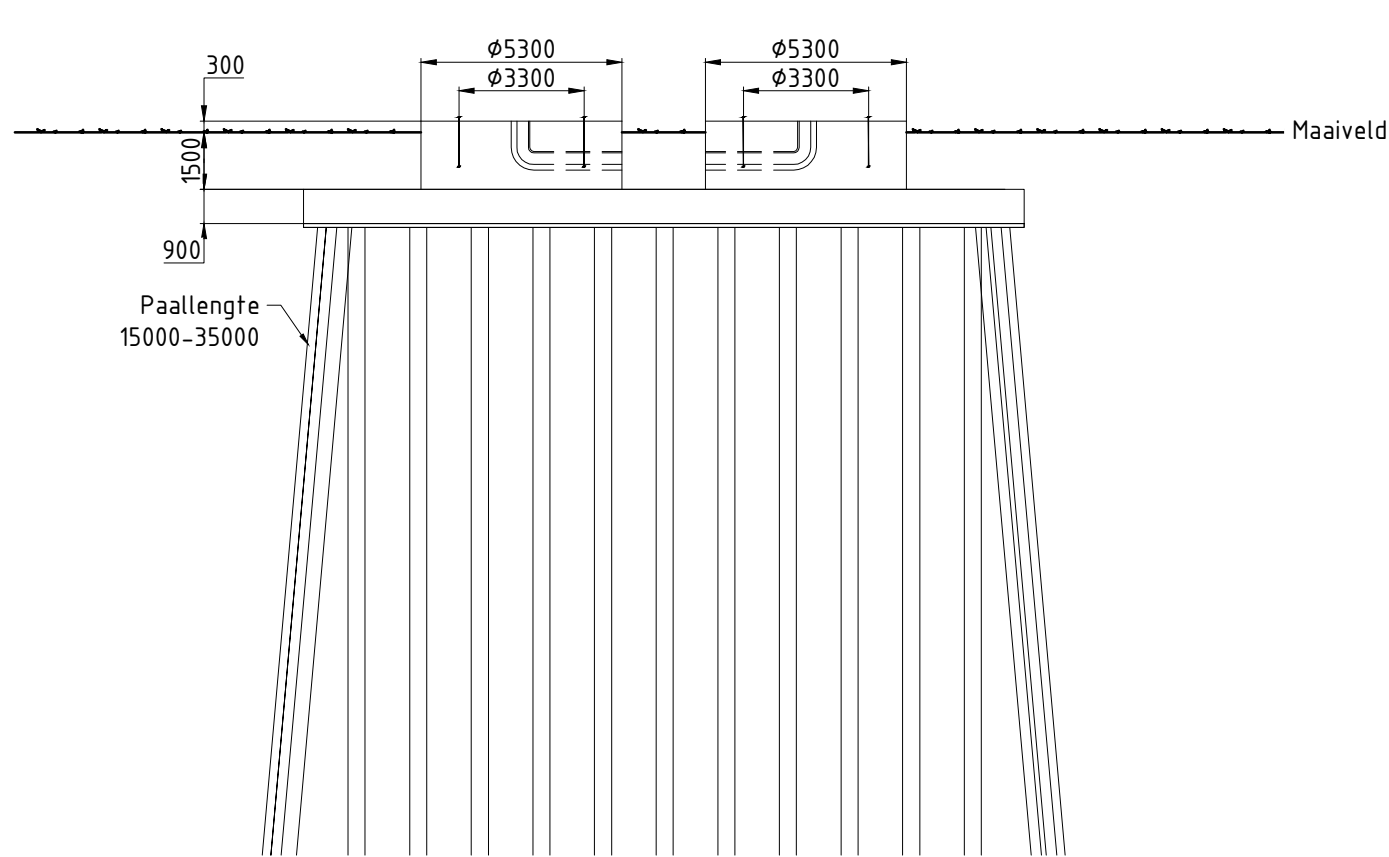
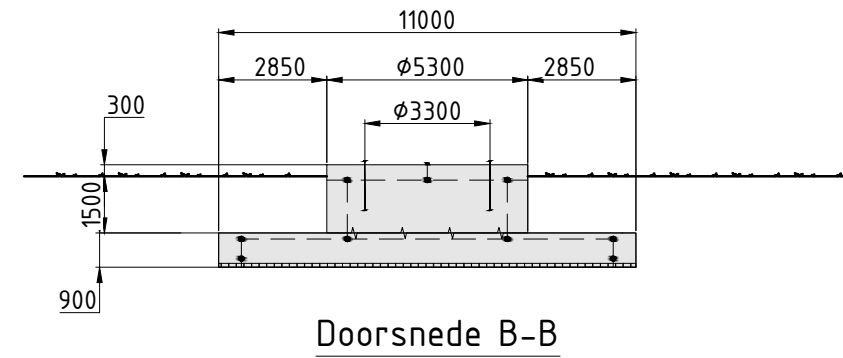
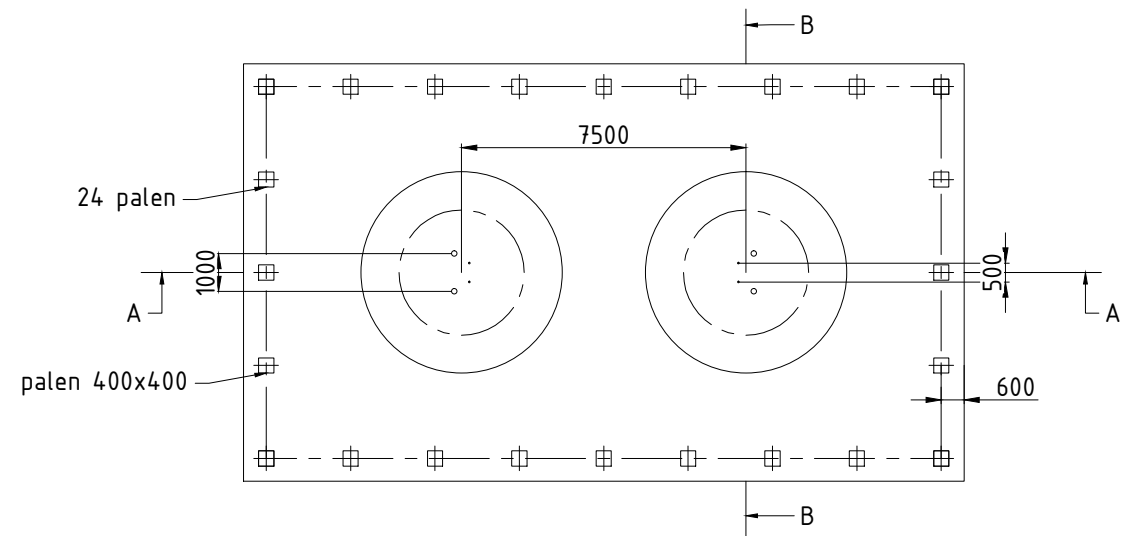
Bepaling rekenwaarde van de maximale draagkracht

$F_{r,paal,max,d}$ MN 0.00 MN

materiaalfactor grond γ_{mb} 1.20

waarde afhankelijk van aantal palen en aantal sonderingen $\xi_{1,N}$ 0.75

$F_{r,paal,max,d}$	3 kN	mm, paalpuntivo	-27.00 m
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T.B.V. Vergunnings aanvraag

Verklaring


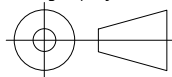
- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding $\phi 16\text{mm}$ (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

8.0	14-03-2014	Diverse aanpassingen		
7.0	13-02-2014	Diverse aanpassingen		
6.0	26-07-2013	Diverse aanpassingen		
		Projectname: Engineering verbinding ZW380		
		Third angle projection: 	Drawing no.: 74102194-032-031V	
Design state: Definitief		Scale: 1:200	Description: Principe ontwerp fundatie hoekmast ZWW2HK400 masten familie	
Drawn by: RBE 14-03-2014		Units: mm		
Checked by: AJP 14-03-2014		Project no: 000.145		
Approved by: AW 14-03-2014		Company: TenneT	Revision: 8.0	
			Format: A3	



ZWW2HK400

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte			h	63.2	m
Diameter voet			d voet	3.3	m
top			d top	0.8	m
gem			d gem	2.1	m
wanddikte			t	18	mm
Oppervlakte aan voet			A	185593	mm ²
Traagheidsmoment aan voet			W _x	1.51E+08	mm ⁴
Weerstandsmoment aan voet			I _x	2.47E+11	mm ⁶
Mast: Gewicht			2 ^{de} orde F _{rep,ver}	10.0 565	% kN

Bijlage BH

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	62.6	3.9	15.6	-41.1	43.9	2751	kNm
380C1F1	52.6	19.8	66.0	-194.4	205.3	10799	kNm
380C1F2	42.4	19.8	64.0	-191.1	201.5	8544	kNm
380C1F3	32.2	19.8	61.5	-187.1	196.9	6342	kNm
RTG	22.1	7.8	24.9	-71.1	75.3	1664	kNm

Stuwdruk	F _{hor.}	37.6	kN
	M _{d,wind}	1063	kNm
Totaal	M _{d,tot}	30913	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	34004	kNm

Normaalkracht;

Optredende normaalkracht					
N _{d,geleiders}				71	kN
N _{d, e.g. mast}				678	kN
N _{s,d,totaal}				789	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA
A _{eff}	97896 mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{y,d} /Y _{m1}	8	N/mm ²
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Moment;

Optredende moment in de voet:					
M _{d,tot}				34004	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA
W _{eff}	1.25E+08 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{y,d} /Y _{m1}	279	N/mm ²
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Totale spanning:

S _d	279	N/mm ²	< 284 N/mm ² = ACCOORD
S _{d,toegeestaan}	284	N/mm ²	=> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	62.6	13.2	34.4	0.0	34.4	2151	kNm
380C1F1	52.6	44.8	131.4	0.0	131.4	6913	kNm
380C1F2	42.4	44.8	128.5	0.0	128.5	5447	kNm
380C1F3	32.2	44.8	124.8	0.0	124.8	4019	kNm
RTG	22.1	13.2	30.4	-95.1	99.8	2206	kNm

Stuwdruk	F _{hor.}	303	kN
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Verplaatsing	0.99	m	3.44	EIS TENNET VISUEE
Percentage van de verplaatsing	1.56%		5.5%	NEN-EN-50341
Hoek	1.63	graden		
Kromming	0.33%		1%	NEN-EN-50341
Fundatie rotatiestijfheid	0.005	rad		

ZWW2HK400

Bijlage H / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5642	19572	2313	5642	-19572
	380C1F1	17045	40618	143247	17045	40618	-143247
	380C1F2	17045	40417	143152	17045	40417	-143152
	380C1F3	17045	40164	143048	17045	40164	-143048
	RTG	0	0	0	4620	10939	-38915
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5979	22016	2312	5979	-22016
	380C1F1	17036	44409	164069	17036	44409	-164069
	380C1F2	17036	44375	164072	17036	44375	-164072
	380C1F3	17036	44331	164076	17036	44331	-164076
	RTG	0	0	0	4618	11791	-43623
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	9331	16292	59274	9331	16292	-59274
	380C1F1	29376	63038	230599	29376	63038	-230599
	380C1F2	29376	62940	230602	29376	62940	-230602
	380C1F3	29376	62816	230608	29376	62816	-230608
	RTG	0	0	0	18688	32337	-118727
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3065	6740	24858	3065	6740	-24858
	380C1F1	20053	44905	165920	20053	44905	-165920
	380C1F2	20053	44871	165924	20053	44871	-165924
	380C1F3	20053	44828	165930	20053	44828	-165930
	RTG	0	0	0	6124	13407	-49654
NL1/6 Permanent, +10°C Permanent loads yg= 1.35	GW / opgw	2603	5740	21422	2603	5740	-21422
	380C1F1	19177	42083	157056	19177	42083	-157056
	380C1F2	19177	42083	157056	19177	42083	-157056
	380C1F3	19177	42083	157056	19177	42083	-157056
	RTG	0	0	0	5198	11469	-42804
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2314	7341	21850	2315	13636	-34239
	380C1F1	17046	49298	152854	17055	82509	-214495
	380C1F2	17046	48224	151293	17054	78286	-206083
	380C1F3	17046	46898	149466	17052	72950	-195550
	RTG	0	0	0	4622	20280	-54290
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6214	22081	2312	7032	-22918
	380C1F1	17036	45681	164262	17036	49913	-167610
	380C1F2	17036	45537	164214	17036	49359	-167011
	380C1F3	17036	45356	164162	17036	48672	-166322
	RTG	0	0	0	4618	13016	-44300
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	9332	17469	59491	9333	21392	-62725
	380C1F1	29376	66719	231608	29380	79451	-244332
	380C1F2	29376	66297	231398	29379	77771	-242163
	380C1F3	29376	65767	231166	29378	75688	-239630
	RTG	0	0	0	18690	38360	-121234
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3066	6965	24884	3066	7701	-25412
	380C1F1	20053	46149	166005	20053	50147	-168475
	380C1F2	20053	46010	165975	20053	49632	-168019
	380C1F3	20053	45834	165943	20053	48990	-167500
	RTG	0	0	0	6124	14552	-50029
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2316	16038	39137	2316	16038	-39137
	380C1F1	17058	95743	241062	17058	95743	-241062
	380C1F2	17057	90427	230369	17057	90427	-230369
	380C1F3	17055	83663	216802	17055	83663	-216802
	RTG	0	0	0	4623	23333	-60459
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	7388	23436	2312	7388	-23436
	380C1F1	17037	51718	169791	17037	51718	-169791
	380C1F2	17037	50979	168860	17037	50979	-168860
	380C1F3	17036	50066	167782	17036	50066	-167782
	RTG	0	0	0	4618	13411	-44734
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	9334	23040	64696	9334	23040	-64696
	380C1F1	29381	84919	252000	29381	84919	-252000
	380C1F2	29381	82685	248768	29381	82685	-248768
	380C1F3	29380	79915	244949	29380	79915	-244949
	RTG	0	0	0	18691	40243	-122907
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3066	8012	25760	3066	8012	-25760
	380C1F1	20053	51818	170153	20053	51818	-170153
	380C1F2	20053	51136	169433	20053	51136	-169433
	380C1F3	20053	50290	168606	20053	50290	-168606
	RTG	0	0	0	6124	14905	-50305

NL1/1a	GW / opgw	2315	13636	34239	2314	7341	-21850
Wind, 10°C	380C1F1	17055	82509	214495	17046	49298	-152854
Permanent loads yg= 1.2	380C1F2	17054	78286	206083	17046	48224	-151293
Wind angle: -45°	380C1F3	17052	72950	195550	17046	46898	-149466
	RTG	0	0	0	4620	12848	-40820
NL1/1b	GW / opgw	2312	7032	22918	2312	6214	-22081
Wind, -20°C	380C1F1	17036	49913	167610	17036	45681	-164262
Permanent loads yg= 1.2	380C1F2	17036	49359	167011	17036	45537	-164214
Wind angle: -45°	380C1F3	17036	48672	166322	17036	45356	-164162
	RTG	0	0	0	4618	12078	-43652
NL1/3	GW / opgw	9333	21392	62725	9332	17469	-59491
Wind, -5°C	380C1F1	29380	79451	244332	29376	66719	-231608
Permanent loads yg= 1.2	380C1F2	29379	77771	242163	29376	66297	-231398
Wind angle: -45°	380C1F3	29378	75688	239630	29376	65767	-231166
	RTG	0	0	0	18688	33785	-118778
NL1/4	GW / opgw	3066	7701	25412	3066	6965	-24884
Construction/maintenance, +5°C	380C1F1	20053	50147	168475	20053	46149	-166005
Permanent loads yg= 1.2	380C1F2	20053	49632	168019	20053	46010	-165975
Wind angle: -45°	380C1F3	20053	48990	167500	20053	45834	-165943
	RTG	0	0	0	6124	13686	-49651
NL1//1a	GW / opgw	1735	4557	15520	1735	4557	-15520
Wind, 10°C	380C1F1	12781	32712	113743	12781	32712	-113743
Permanent loads yg= 0.9	380C1F2	12781	32495	113589	12781	32495	-113589
Wind angle: 0°	380C1F3	12781	32224	113416	12781	32224	-113416
	RTG	0	0	0	3464	8737	-30698
NL1/1b	GW / opgw	1734	4807	17644	1734	4807	-17644
Wind, -20°C	380C1F1	12774	35986	132635	12774	35986	-132635
Permanent loads yg= 0.9	380C1F2	12774	35951	132635	12774	35951	-132635
Wind angle: 0°	380C1F3	12774	35907	132637	12774	35907	-132637
	RTG	0	0	0	3463	9450	-34887
NL1/3	GW / opgw	8751	15568	56573	8751	15568	-56573
Wind, -5°C	380C1F1	25109	56188	205038	25109	56188	-205038
Permanent loads yg= 0.9	380C1F2	25109	56089	205035	25109	56089	-205035
Wind angle: 0°	380C1F3	25109	55964	205036	25109	55964	-205036
	RTG	0	0	0	17529	30887	-113313
NL1/4	GW / opgw	2487	5711	21016	2487	5711	-21016
Construction/maintenance, +5°C	380C1F1	15788	37224	137256	15788	37224	-137256
Permanent loads yg= 0.9	380C1F2	15788	37190	137258	15788	37190	-137258
Wind angle: 0°	380C1F3	15788	37146	137262	15788	37146	-137262
	RTG	0	0	0	4968	11346	-41962
NL1/6	GW / opgw	1735	4102	15307	1735	4102	-15307
Permanent, +10°C	380C1F1	12781	30274	112983	12781	30274	-112983
Permanent loads yg= 0.9	380C1F2	12781	30274	112983	12781	30274	-112983
	380C1F3	12781	30274	112983	12781	30274	-112983
	RTG	0	0	0	3464	8190	-30564
NL1/1a	GW / opgw	1735	6484	18653	1736	13263	-32850
Wind, 10°C	380C1F1	12782	42505	127508	12790	79014	-201459
Permanent loads yg= 0.9	380C1F2	12782	41278	125374	12789	74519	-192033
Wind angle: 45°	380C1F3	12782	39762	122840	12788	68790	-180036
	RTG	0	0	0	3466	19144	-50054
NL1/1b	GW / opgw	1734	5057	17763	1734	5982	-19000
Wind, -20°C	380C1F1	12774	37319	133056	12774	42032	-138204
Permanent loads yg= 0.9	380C1F2	12774	37165	132971	12774	41402	-137318
Wind angle: 45°	380C1F3	12774	36973	132876	12774	40624	-136288
	RTG	0	0	0	3463	10783	-35969
NL1/3	GW / opgw	8751	16756	56833	8753	20763	-60379
Wind, -5°C	380C1F1	25109	59981	206465	25112	73517	-222195
Permanent loads yg= 0.9	380C1F2	25109	59541	206188	25112	71717	-219580
Wind angle: 45°	380C1F3	25109	58990	205878	25111	69489	-216500
	RTG	0	0	0	17531	36995	-116144
NL1/4	GW / opgw	2487	5942	21067	2487	6730	-21790
Construction/maintenance, +5°C	380C1F1	15788	38506	137480	15788	42807	-141084
Permanent loads yg= 0.9	380C1F2	15788	38360	137427	15788	42242	-140444
Wind angle: 45°	380C1F3	15788	38177	137369	15788	41542	-139707
	RTG	0	0	0	4968	12541	-42527
NL1/1a	GW / opgw	1737	15745	38044	1737	15745	-38044
Wind, 10°C	380C1F1	12793	92929	230566	12793	92929	-230566
Permanent loads yg= 0.9	380C1F2	12791	87366	218954	12791	87366	-218954
Wind angle: 90°	380C1F3	12790	80237	204024	12790	80237	-204024
	RTG	0	0	0	3467	22399	-56976
NL1/1b	GW / opgw	1734	6393	19722	1734	6393	-19722
Wind, -20°C	380C1F1	12775	44101	141369	12775	44101	-141369
Permanent loads yg= 0.9	380C1F2	12775	43253	140028	12775	43253	-140028
Wind angle: 90°	380C1F3	12775	42207	138457	12775	42207	-138457
	RTG	0	0	0	3463	11234	-36607
NL1/3	GW / opgw	8754	22451	62501	8754	22451	-62501
Wind, -5°C	380C1F1	25114	79372	231311	25114	79372	-231311
Permanent loads yg= 0.9	380C1F2	25113	76981	227490	25113	76981	-227490
Wind angle: 90°	380C1F3	25113	74015	222935	25113	74015	-222935
	RTG	0	0	0	17532	38920	-117975
NL1/4	GW / opgw	2487	7070	22246	2487	7070	-22246

Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	380C1F1	15789	44650	143406	15789	44650	-143406
	380C1F2	15789	43896	142416	15789	43896	-142416
	380C1F3	15788	42963	141268	15788	42963	-141268
	RTG	0	0	0	4968	12922	-42903
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1736	13263	32850	1735	6484	-18653
	380C1F1	12790	79014	201459	12782	42505	-127508
	380C1F2	12789	74519	192033	12782	41278	-125374
	380C1F3	12788	68790	180036	12782	39762	-122840
	RTG	0	0	0	3465	10877	-33467
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	5982	19000	1734	5057	-17763
	380C1F1	12774	42032	138204	12774	37319	-133056
	380C1F2	12774	41402	137318	12774	37165	-132971
	380C1F3	12774	40624	136288	12774	36973	-132876
	RTG	0	0	0	3463	9749	-34960
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	8753	20763	60379	8751	16756	-56833
	380C1F1	25112	73517	222195	25109	59981	-206465
	380C1F2	25112	71717	219580	25109	59541	-206188
	380C1F3	25111	69489	216500	25109	58990	-205878
	RTG	0	0	0	17529	32344	-113401
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2487	6730	21790	2487	5942	-21067
	380C1F1	15788	42807	141084	15788	38506	-137480
	380C1F2	15788	42242	140444	15788	38360	-137427
	380C1F3	15788	41542	139707	15788	38177	-137369
	RTG	0	0	0	4968	11630	-41979

ZWW2HK400

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / opgw	2313	5421	19460	0	0	0
Wind, 10°C	380C1F1	17045	39437	142845	0	0	0
Permanent loads yg= 1.2	380C1F2	17045	39342	142830	0	0	0
Wind angle: 0°	380C1F3	17045	39221	142815	0	0	0
	RTG	4620	10674	38843	0	0	0
NL3/1b	GW / opgw	2312	5963	22016	0	0	0
Wind, -20°C	380C1F1	17036	44322	164077	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	44295	164081	0	0	0
Wind angle: 0°	380C1F3	17036	44260	164085	0	0	0
	RTG	4618	11771	43625	0	0	0
NL3/3	GW / opgw	3883	8610	30911	0	0	0
Wind, -5°C	380C1F1	19802	46887	171259	0	0	0
Permanent loads yg= 1.2	380C1F2	19802	46808	171256	0	0	0
Wind angle: 0°	380C1F3	19802	46707	171253	0	0	0
	RTG	7767	16943	61667	0	0	0
NL3/4	GW / opgw	2915	6463	23882	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	43765	162000	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	43738	162004	0	0	0
Wind angle: 0°	380C1F3	19451	43704	162010	0	0	0
	RTG	5823	12862	47696	0	0	0
NL3/1a	GW / opgw	2313	6149	20066	0	0	0
Wind, 10°C	380C1F1	17045	43248	145217	0	0	0
Permanent loads yg= 1.2	380C1F2	17045	42794	144795	0	0	0
Wind angle: 45°	380C1F3	17045	42229	144312	0	0	0
	RTG	4620	11522	39293	0	0	0
NL3/1b	GW / opgw	2312	6146	22050	0	0	0
Wind, -20°C	380C1F1	17036	45318	164152	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	45207	164127	0	0	0
Wind angle: 45°	380C1F3	17036	45066	164100	0	0	0
	RTG	4618	11997	43633	0	0	0
NL3/3	GW / opgw	3883	9707	31669	0	0	0
Wind, -5°C	380C1F1	19803	49966	172566	0	0	0
Permanent loads yg= 1.2	380C1F2	19803	49606	172319	0	0	0
Wind angle: 45°	380C1F3	19803	49157	172039	0	0	0
	RTG	7767	18232	62203	0	0	0
NL3/4	GW / opgw	2915	6640	23894	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	44747	162016	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	44637	162000	0	0	0
Wind angle: 45°	380C1F3	19451	44499	161985	0	0	0
	RTG	5823	13083	47686	0	0	0
NL3/1a	GW / opgw	2314	10178	27217	0	0	0
Wind, 10°C	380C1F1	17050	63935	178185	0	0	0
Permanent loads yg= 1.2	380C1F2	17049	61390	173439	0	0	0
Wind angle: 90°	380C1F3	17048	58219	167668	0	0	0
	RTG	4621	16077	46164	0	0	0
NL3/1b	GW / opgw	2312	7025	22909	0	0	0
Wind, -20°C	380C1F1	17036	49879	167572	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	49328	166979	0	0	0
Wind angle: 90°	380C1F3	17036	48646	166297	0	0	0
	RTG	4618	13008	44292	0	0	0
NL3/3	GW / opgw	3885	15569	41090	0	0	0
Wind, -5°C	380C1F1	19806	66003	194414	0	0	0
Permanent loads yg= 1.2	380C1F2	19806	64014	191070	0	0	0
Wind angle: 90°	380C1F3	19805	61548	187080	0	0	0
	RTG	7769	24883	71068	0	0	0
NL3/4	GW / opgw	2915	7446	24476	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	49100	164657	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	48582	164186	0	0	0
Wind angle: 90°	380C1F3	19451	47938	163647	0	0	0
	RTG	5823	14030	48105	0	0	0
NL3/1a	GW / opgw	2314	8980	24860	0	0	0
Wind, 10°C	380C1F1	17048	57685	166717	0	0	0
Permanent loads yg= 1.2	380C1F2	17048	55754	163327	0	0	0
Wind angle: -45°	380C1F3	17047	53358	159262	0	0	0
	RTG	4621	14690	43701	0	0	0
NL3/1b	GW / opgw	2312	6761	22572	0	0	0
Wind, -20°C	380C1F1	17036	48532	166189	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	48117	165814	0	0	0
Wind angle: -45°	380C1F3	17036	47600	165386	0	0	0
	RTG	4618	12712	44021	0	0	0
NL3/3	GW / opgw	3884	13833	37952	0	0	0
Wind, -5°C	380C1F1	19805	61135	186431	0	0	0
Permanent loads yg= 1.2	380C1F2	19805	59641	184137	0	0	0
Wind angle: -45°	380C1F3	19804	57794	181432	0	0	0
	RTG	7768	22876	67855	0	0	0
NL3/4	GW / opgw	2915	7208	24240	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	47830	163562	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	47436	163268	0	0	0
Wind angle: -45°	380C1F3	19451	46945	162935	0	0	0
	RTG	5823	13758	47923	0	0	0

NL3/1a	GW / opgw	1735	4318	15341	0	0	0
Wind, 10°C	380C1F1	12781	31454	113052	0	0	0
Permanent loads yg= 0.9	380C1F2	12781	31354	113020	0	0	0
Wind angle: 0°	380C1F3	12781	31229	112987	0	0	0
	RTG	3464	8457	30569	0	0	0
NL3/1b	GW / opgw	1734	4791	17643	0	0	0
Wind, -20°C	380C1F1	12774	35897	132637	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	35870	132639	0	0	0
Wind angle: 0°	380C1F3	12774	35835	132641	0	0	0
	RTG	3463	9430	34888	0	0	0
NL3/3	GW / opgw	3304	7647	27318	0	0	0
Wind, -5°C	380C1F1	15538	39068	142079	0	0	0
Permanent loads yg= 0.9	380C1F2	15538	38986	142066	0	0	0
Wind angle: 0°	380C1F3	15538	38883	142054	0	0	0
	RTG	6610	15011	54458	0	0	0
NL3/4	GW / opgw	2336	5417	19980	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	36009	133052	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	35981	133054	0	0	0
Wind angle: 0°	380C1F3	15186	35946	133059	0	0	0
	RTG	4667	10769	39885	0	0	0
NL3/1a	GW / opgw	1735	5126	16245	0	0	0
Wind, 10°C	380C1F1	12781	35619	116750	0	0	0
Permanent loads yg= 0.9	380C1F2	12781	35110	116122	0	0	0
Wind angle: 45°	380C1F3	12781	34481	115397	0	0	0
	RTG	3464	9375	31283	0	0	0
NL3/1b	GW / opgw	1734	4983	17711	0	0	0
Wind, -20°C	380C1F1	12774	36933	132858	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	36815	132809	0	0	0
Wind angle: 45°	380C1F3	12774	36666	132755	0	0	0
	RTG	3463	9663	34924	0	0	0
NL3/3	GW / opgw	3304	8802	28293	0	0	0
Wind, -5°C	380C1F1	15539	42338	144103	0	0	0
Permanent loads yg= 0.9	380C1F2	15539	41948	143742	0	0	0
Wind angle: 45°	380C1F3	15539	41464	143329	0	0	0
	RTG	6610	16350	55181	0	0	0
NL3/4	GW / opgw	2336	5599	20009	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	37015	133164	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	36902	133132	0	0	0
Wind angle: 45°	380C1F3	15186	36759	133099	0	0	0
	RTG	4667	10994	39889	0	0	0
NL3/1a	GW / opgw	1736	9613	25111	0	0	0
Wind, 10°C	380C1F1	12786	58962	159635	0	0	0
Permanent loads yg= 0.9	380C1F2	12785	56147	153879	0	0	0
Wind angle: 90°	380C1F3	12784	52610	146746	0	0	0
	RTG	3465	14539	40424	0	0	0
NL3/1b	GW / opgw	1734	5974	18987	0	0	0
Wind, -20°C	380C1F1	12774	41993	138148	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	41367	137270	0	0	0
Wind angle: 90°	380C1F3	12774	40594	136250	0	0	0
	RTG	3463	10775	35958	0	0	0
NL3/3	GW / opgw	3306	15037	39110	0	0	0
Wind, -5°C	380C1F1	15542	60198	172755	0	0	0
Permanent loads yg= 0.9	380C1F2	15542	57987	168588	0	0	0
Wind angle: 90°	380C1F3	15541	55238	163537	0	0	0
	RTG	6612	23468	65790	0	0	0
NL3/4	GW / opgw	2336	6466	20820	0	0	0
Construction/maintenance, +5°C	380C1F1	15187	41708	137072	0	0	0
Permanent loads yg= 0.9	380C1F2	15187	41137	136404	0	0	0
Wind angle: 90°	380C1F3	15186	40431	135633	0	0	0
	RTG	4667	11994	40507	0	0	0
NL3/1a	GW / opgw	1735	8312	22368	0	0	0
Wind, 10°C	380C1F1	12784	52013	145554	0	0	0
Permanent loads yg= 0.9	380C1F2	12784	49840	141264	0	0	0
Wind angle: -45°	380C1F3	12783	47130	136026	0	0	0
	RTG	3465	12977	37311	0	0	0
NL3/1b	GW / opgw	1734	5671	18504	0	0	0
Wind, -20°C	380C1F1	12774	40465	136087	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	39998	135518	0	0	0
Wind angle: -45°	380C1F3	12774	39420	134861	0	0	0
	RTG	3463	10442	35549	0	0	0
NL3/3	GW / opgw	3305	13212	35636	0	0	0
Wind, -5°C	380C1F1	15541	54776	162707	0	0	0
Permanent loads yg= 0.9	380C1F2	15541	53105	159750	0	0	0
Wind angle: -45°	380C1F3	15540	51036	156216	0	0	0
	RTG	6611	21321	62052	0	0	0
NL3/4	GW / opgw	2336	6206	20501	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	40313	135511	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	39884	135085	0	0	0
Wind angle: -45°	380C1F3	15186	39352	134597	0	0	0
	RTG	4667	11702	40251	0	0	0

ZWW2HK400

Appendix H1 / NL3

Loadcases for tower strength (Special limit state)

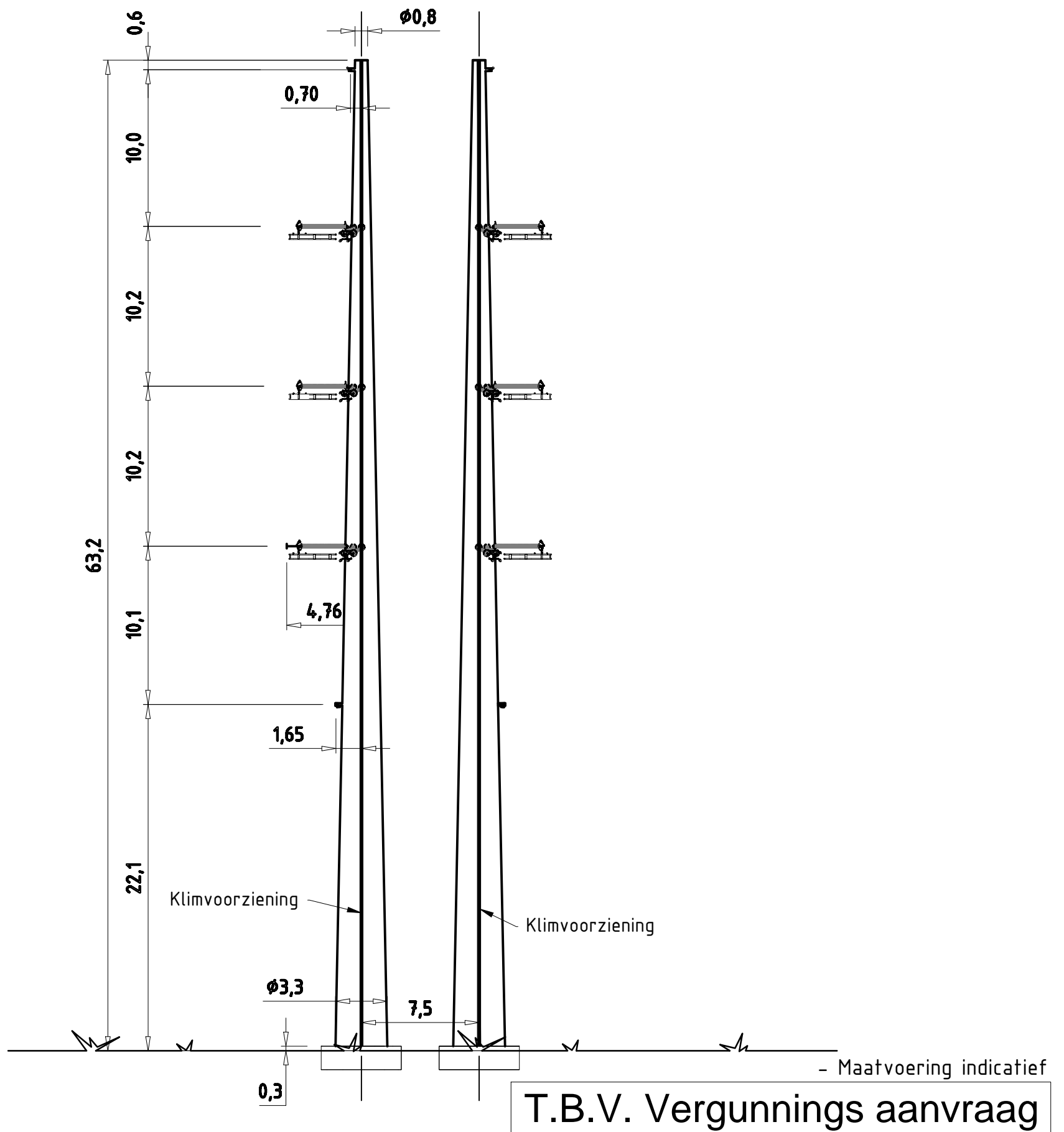
Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2313	5421	-19460
	380C1F1	0	0	0	17045	39437	-142845
	380C1F2	0	0	0	17045	39342	-142830
	380C1F3	0	0	0	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2312	5963	-22016
	380C1F1	0	0	0	17036	44322	-164077
	380C1F2	0	0	0	17036	44295	-164081
	380C1F3	0	0	0	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3883	8610	-30911
	380C1F1	0	0	0	19802	46887	-171259
	380C1F2	0	0	0	19802	46808	-171256
	380C1F3	0	0	0	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2915	6463	-23882
	380C1F1	0	0	0	19451	43765	-162000
	380C1F2	0	0	0	19451	43738	-162004
	380C1F3	0	0	0	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2314	8980	-24860
	380C1F1	0	0	0	17048	57685	-166717
	380C1F2	0	0	0	17048	55754	-163327
	380C1F3	0	0	0	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2312	8761	-22572
	380C1F1	0	0	0	17036	48532	-166189
	380C1F2	0	0	0	17036	48117	-165814
	380C1F3	0	0	0	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3884	13833	-37952
	380C1F1	0	0	0	19805	61135	-186431
	380C1F2	0	0	0	19805	59641	-184137
	380C1F3	0	0	0	19804	57794	-181432
	RTG	0	0	0	7768	22876	-67855
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2915	7208	-24240
	380C1F1	0	0	0	19451	47830	-163562
	380C1F2	0	0	0	19451	47436	-163268
	380C1F3	0	0	0	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2314	10178	-27217
	380C1F1	0	0	0	17050	63935	-178185
	380C1F2	0	0	0	17049	61390	-173439
	380C1F3	0	0	0	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2312	7025	-22909
	380C1F1	0	0	0	17036	49879	-167572
	380C1F2	0	0	0	17036	49328	-166979
	380C1F3	0	0	0	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	3885	15569	-41090
	380C1F1	0	0	0	19806	66003	-194414
	380C1F2	0	0	0	19806	64014	-191070
	380C1F3	0	0	0	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2915	7446	-24476
	380C1F1	0	0	0	19451	49100	-164657
	380C1F2	0	0	0	19451	48582	-164186
	380C1F3	0	0	0	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2313	6149	-20066
	380C1F1	0	0	0	17045	43248	-145217
	380C1F2	0	0	0	17045	42794	-144795
	380C1F3	0	0	0	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2312	6146	-22050
	380C1F1	0	0	0	17036	45318	-164152
	380C1F2	0	0	0	17036	45207	-164127
	380C1F3	0	0	0	17036	45066	-164100
	RTG	0	0	0	4618	11997	-43633
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	3883	9707	-31669
	380C1F1	0	0	0	19803	49966	-172566
	380C1F2	0	0	0	19803	49606	-172319
	380C1F3	0	0	0	19803	49157	-172039
	RTG	0	0	0	7767	18232	-62203
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2915	6640	-23894
	380C1F1	0	0	0	19451	44747	-162016
	380C1F2	0	0	0	19451	44637	-162000
	380C1F3	0	0	0	19451	44499	-161985
	RTG	0	0	0	5823	13083	-47686

NL3/1a	GW / opgw	0	0	0	1735	4318	-15341
Wind, 10°C	380C1F1	0	0	0	12781	31454	-113052
Permanent loads yg= 0.9	380C1F2	0	0	0	12781	31354	-113020
Wind angle: 0°	380C1F3	0	0	0	12781	31229	-112987
	RTG	0	0	0	3464	8457	-30569
NL3/1b	GW / opgw	0	0	0	1734	4791	-17643
Wind, -20°C	380C1F1	0	0	0	12774	35897	-132637
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	35870	-132639
Wind angle: 0°	380C1F3	0	0	0	12774	35835	-132641
	RTG	0	0	0	3463	9430	-34888
NL3/3	GW / opgw	0	0	0	3304	7647	-27318
Wind, -5°C	380C1F1	0	0	0	15538	39068	-142079
Permanent loads yg= 0.9	380C1F2	0	0	0	15538	38986	-142066
Wind angle: 0°	380C1F3	0	0	0	15538	38883	-142054
	RTG	0	0	0	6610	15011	-54458
NL3/4	GW / opgw	0	0	0	2336	5417	-19980
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	36009	-133052
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	35981	-133054
Wind angle: 0°	380C1F3	0	0	0	15186	35946	-133059
	RTG	0	0	0	4667	10769	-39885
NL3/1a	GW / opgw	0	0	0	1735	8312	-22368
Wind, 10°C	380C1F1	0	0	0	12784	52013	-145554
Permanent loads yg= 0.9	380C1F2	0	0	0	12784	49840	-141264
Wind angle: 45°	380C1F3	0	0	0	12783	47130	-136026
	RTG	0	0	0	3465	12977	-37311
NL3/1b	GW / opgw	0	0	0	1734	5671	-18504
Wind, -20°C	380C1F1	0	0	0	12774	40465	-136087
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	39998	-135518
Wind angle: 45°	380C1F3	0	0	0	12774	39420	-134861
	RTG	0	0	0	3463	10442	-35549
NL3/3	GW / opgw	0	0	0	3305	13212	-35636
Wind, -5°C	380C1F1	0	0	0	15541	54776	-162707
Permanent loads yg= 0.9	380C1F2	0	0	0	15541	53105	-159750
Wind angle: 45°	380C1F3	0	0	0	15540	51036	-156216
	RTG	0	0	0	6611	21321	-62052
NL3/4	GW / opgw	0	0	0	2336	6206	-20501
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	40313	-135511
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	39884	-135085
Wind angle: 45°	380C1F3	0	0	0	15186	39352	-134597
	RTG	0	0	0	4667	11702	-40251
NL3/1a	GW / opgw	0	0	0	1736	9613	-25111
Wind, 10°C	380C1F1	0	0	0	12786	58962	-159635
Permanent loads yg= 0.9	380C1F2	0	0	0	12785	56147	-153879
Wind angle: 90°	380C1F3	0	0	0	12784	52610	-146746
	RTG	0	0	0	3465	14539	-40424
NL3/1b	GW / opgw	0	0	0	1734	5974	-18987
Wind, -20°C	380C1F1	0	0	0	12774	41993	-138148
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	41367	-137270
Wind angle: 90°	380C1F3	0	0	0	12774	40594	-136250
	RTG	0	0	0	3463	10775	-35958
NL3/3	GW / opgw	0	0	0	3306	15037	-39110
Wind, -5°C	380C1F1	0	0	0	15542	60198	-172755
Permanent loads yg= 0.9	380C1F2	0	0	0	15542	57987	-168588
Wind angle: 90°	380C1F3	0	0	0	15541	55238	-163537
	RTG	0	0	0	6612	23468	-65790
NL3/4	GW / opgw	0	0	0	2336	6466	-20820
Construction/maintenance, +5°C	380C1F1	0	0	0	15187	41708	-137072
Permanent loads yg= 0.9	380C1F2	0	0	0	15187	41137	-136404
Wind angle: 90°	380C1F3	0	0	0	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40507
NL3/1a	GW / opgw	0	0	0	1735	5126	-16245
Wind, 10°C	380C1F1	0	0	0	12781	35619	-116750
Permanent loads yg= 0.9	380C1F2	0	0	0	12781	35110	-116122
Wind angle: -45°	380C1F3	0	0	0	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b	GW / opgw	0	0	0	1734	4983	-17711
Wind, -20°C	380C1F1	0	0	0	12774	36933	-132858
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	36815	-132809
Wind angle: -45°	380C1F3	0	0	0	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3	GW / opgw	0	0	0	3304	8802	-28293
Wind, -5°C	380C1F1	0	0	0	15539	42338	-144103
Permanent loads yg= 0.9	380C1F2	0	0	0	15539	41948	-143742
Wind angle: -45°	380C1F3	0	0	0	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4	GW / opgw	0	0	0	2336	5599	-20009
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	37015	-133164
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	36902	-133132
Wind angle: -45°	380C1F3	0	0	0	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

ZWW2HK400


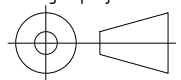
Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1928	4761	16779	1928	4761	-16779
	380C1F1	14202	34542	123352	14202	34542	-123352
	380C1F2	14202	34412	123304	14202	34412	-123304
	380C1F3	14202	34248	123251	14202	34248	-123251
	RTG	0	0	0	3850	9294	-33413
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1927	5183	19144	1927	5183	-19144
	380C1F1	14194	38734	143446	14194	38734	-143446
	380C1F2	14194	38711	143449	14194	38711	-143449
	380C1F3	14194	38682	143453	14194	38682	-143453
	RTG	0	0	0	3848	10220	-37886
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	6603	12605	46025	6603	12605	-46025
	380C1F1	22419	51266	188221	22419	51266	-188221
	380C1F2	22419	51201	188223	22419	51201	-188223
	380C1F3	22419	51119	188228	22419	51119	-188228
	RTG	0	0	0	13222	25028	-92102
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	2429	5579	20622	2429	5579	-20622
	380C1F1	16206	37857	140173	16206	37857	-140173
	380C1F2	16206	37835	140176	16206	37835	-140176
	380C1F3	16206	37806	140181	16206	37806	-140181
	RTG	0	0	0	4852	11099	-41168
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1928	5835	18079	1928	9991	-26190
	380C1F1	14203	40052	128727	14207	61624	-167718
	380C1F2	14203	39375	127830	14206	58806	-162097
	380C1F3	14202	38537	126788	14206	55274	-155165
	RTG	0	0	0	3850	15277	-42756
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1927	5336	19175	1927	5857	-19641
	380C1F1	14194	39569	143525	14195	42282	-145357
	380C1F2	14194	39475	143501	14195	41930	-145022
	380C1F3	14194	39357	143476	14194	41493	-144639
	RTG	0	0	0	3848	11011	-38244
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	6603	13394	46187	6604	16051	-48504
	380C1F1	22419	53704	188833	22420	62096	-196970
	380C1F2	22419	53425	188703	22420	60987	-195564
	380C1F3	22419	53074	188559	22420	59614	-193930
	RTG	0	0	0	13222	29079	-93915
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	2429	5727	20634	2429	6206	-20942
	380C1F1	16206	38678	140198	16207	41273	-141585
	380C1F2	16206	38586	140183	16206	40941	-141323
	380C1F3	16206	38471	140168	16206	40527	-141027
	RTG	0	0	0	4852	11850	-41375
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1929	11643	29647	1929	11643	-29647
	380C1F1	14209	70565	185882	14209	70565	-185882
	380C1F2	14208	66956	178504	14208	66956	-178504
	380C1F3	14207	62398	169272	14207	62398	-169272
	RTG	0	0	0	3851	17307	-46852
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1927	6082	19940	1927	6082	-19940
	380C1F1	14195	43426	146590	14195	43426	-146590
	380C1F2	14195	42959	146062	14195	42959	-146062
	380C1F3	14195	42379	145453	14195	42379	-145453
	RTG	0	0	0	3848	11262	-38485
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	6604	17177	49924	6604	17177	-49924
	380C1F1	22421	65715	201986	22421	65715	-201986
	380C1F2	22421	64234	199863	22421	64234	-199863
	380C1F3	22420	62403	197371	22420	62403	-197371
	RTG	0	0	0	13223	30355	-95112
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2429	6407	21151	2429	6407	-21151
	380C1F1	16207	42348	142557	16207	42348	-142557
	380C1F2	16207	41910	142139	16207	41910	-142139
	380C1F3	16207	41365	141660	16207	41365	-141660
	RTG	0	0	0	4852	12080	-41537
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1928	9991	26190	1928	5835	-18079
	380C1F1	14207	61624	167718	14203	40052	-128727
	380C1F2	14206	58806	162097	14203	39375	-127830
	380C1F3	14206	55274	155165	14202	38537	-126788
	RTG	0	0	0	3850	10507	-34462
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1927	5857	19641	1927	5336	-19175
	380C1F1	14195	42282	145357	14194	39569	-143525
	380C1F2	14195	41930	145022	14194	39475	-143501
	380C1F3	14194	41493	144639	14194	39357	-143476
	RTG	0	0	0	3848	10408	-37895
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	6604	16051	48504	6603	13394	-46187
	380C1F1	22420	62096	196970	22419	53704	-188833
	380C1F2	22420	60987	195564	22419	53425	-188703
	380C1F3	22420	59614	193930	22419	53074	-188559
	RTG	0	0	0	13222	25996	-92151
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2429	6206	20942	2429	5727	-20634
	380C1F1	16207	41273	141585	16206	38678	-140198
	380C1F2	16206	40941	141323	16206	38586	-140183
	380C1F3	16206	40527	141027	16206	38471	-140168
	RTG	0	0	0	4852	11284	-41161



Wintrack
Masttype: ZWW2HK400

- Trekparameter 1800m
- 2x380 Hoekmast
- 400m Veldlengte
- 150°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

6.0	11-03-2014	Modified botom diameter	
5.0	04-03-2014	Small modification	
4.0	03-02-2014	Modified top/botom diameter	
		Projectname: Engineering verbinding ZW380	
Design state: Definitief		Third angle projection: 	
Drawn by: RBE 11-03-2014	Scale: 1:300	Drawing no.: 74102194-035-031V	
Checked by: AJP 11-03-2014	Units: m		
Approved by: AW 11-03-2014	Project no: 000.145 Company: TenneT		
		Description: Wintrack Masttype ZWW2HK400	Revision: 6.0
			Format: A3
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com			

© 2014 - Filename: 74102194-035-031 - ZWW2HK400 Rev6.0.dwg

ZWW4S350+10

Fundatie berekening

Bijlag CBW

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m
schoorstand		8	:1
α		7.125	graden

Opstort	Diameter	3.8	m
	Hoogte	1.8	m
	Inhoud	20.4	m ³
	e.g.	490	kN

Onderplaat	Diameter	9.0	m
	Hoogte	1.0	m
	Inhoud	64	m ³
	e.g.	1527	kN

Hart paal tov rand fund.		0.6	m
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Optreden krachten

e.g. mast		485	kN
Fgeleiders		163	kN
Maximale dwarskracht		483	kN
Fmax vert (druk)		746	kN
Fmin vert (trek)		559	kN
Maximale moment		22551	kNm

Moment

F_{diag}		3088	kN
F_{hor}		483	kN
F_{ver}		3065	kN
M_{hor} (tgv F_{hor})		1352	kNm
M_{tot}		23903	kNm
$F=M/a$		3065	kN

Verticaal reactiekracht

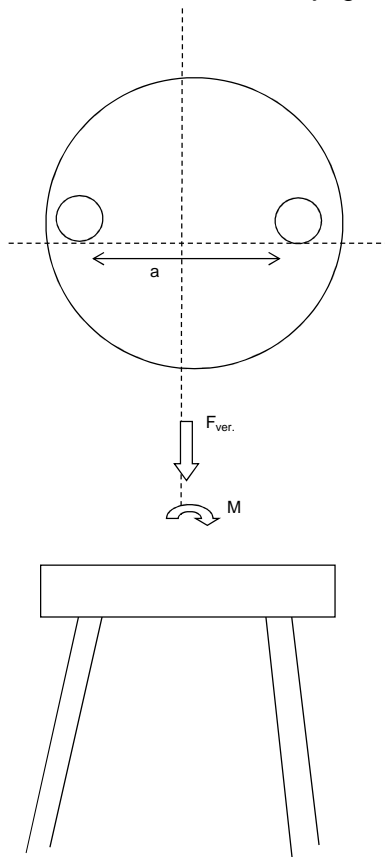
F_{water} (trek)		840	kN
F_{grond} (druk)		1411	kN
F_{grond} (trek)		1176	kN

F_{dmax} (druk)		2430	kN
F_{tmax} (trek)		1212	kN

F_{dtot} (druk)		5494	kN
F_{ttot} (trek)		1852	kN

Palen druk		5	(-)
Palen trek		6	(-)

Totaal palen		12	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4S350+10

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlag CBW

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0.40 m
	b	0.40 m
omtrek paal	$O_{p;gem}$	1.60 m
paalfactor	αt	0.007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0.75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11.25 MPa
materiaalfactor	$\gamma_{m,b4}$	1.4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1.5
	$q_{c;z,d}$	5.36 MPa
	$P_{rz,d}$	37.5 kN/m ²
	$F_{r;trek,d,i}$	60.0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0.007	0.00	0.00	0
	-1	-2	0	0.007	0.00	0.00	0
	-2	-3	0	0.007	0.00	0.00	0
	-3	-4	0	0.007	0.00	0.00	0
	-4	-5	0	0.007	0.00	0.00	0
	-5	-6	0	0.007	0.00	0.00	0
	-6	-7	0	0.007	0.00	0.00	0
	-7	-8	0	0.007	0.00	0.00	0
	-8	-9	1	0.007	2.50	4.00	4
	-9	-10	3	0.007	7.50	12.00	16
	-10	-11	2	0.007	5.00	8.00	24
	-11	-12	0	0.007	0.00	0.00	24
	-12	-13	3	0.007	7.50	12.00	36
	-13	-14	2	0.007	5.00	8.00	44
	-14	-15	4	0.007	10.00	16.00	60
	-15	-16	10	0.007	25.00	40.00	100
	-16	-17	9	0.007	22.50	36.00	136
	-17	-18	8	0.007	20.00	32.00	168
	-18	-19	12	0.007	30.00	48.00	216
	-19	-20	12	0.007	30.00	48.00	264
	-20	-21	10	0.007	25.00	40.00	304
	-21	-22	11	0.007	27.50	44.00	348
	-22	-23	11	0.007	27.50	44.00	392
	-23	-24	12	0.007	30.00	48.00	440
	-24	-25	12	0.007	30.00	48.00	488
	-25	-26	12	0.007	30.00	48.00	536
	-26	-27	15	0.007	37.50	60.00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27.00 m
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Paalgroep factor 10%

$F_{trek,d}$	536.4 kN
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ZWW4S350+10

DRUKPALEN

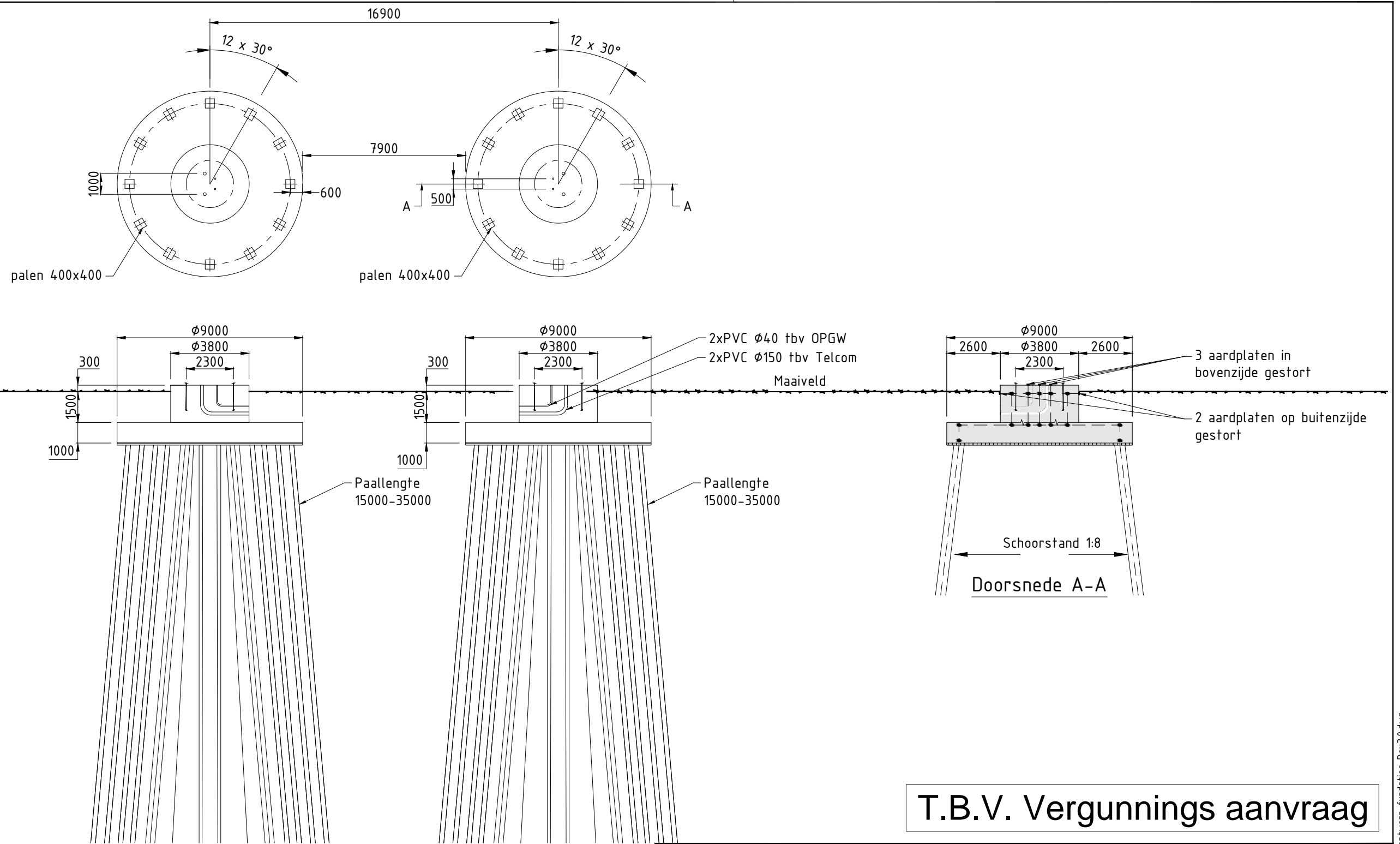
FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlag CBW

Bepaling opneembare paalbelasting op druk

heipaal			
	diameter	v a	2 mm 2 mm
	Deq		0.001808
maximale puntweerstand			
$P_{r,max;punt;i}$			11.25 MN/m ²
paalklasse factor	α_p		1.00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1.00
minimale waarde neergaande deel	$q_{c,II;gem}$		9.00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$		14.00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$		11.00 MN/m ²
maximale paalschachtwrijving			
$P_{r,max;schacht;i}$			0.05 MN/m ²
waarin:			
paalfactor	α_s		0.010
conusweerstand over wrijvingstraject	$q_{c,z;a}$		5.00 MN/m ²
maximale draagkracht alleenstaande paal			
$F_{r,max;i}$			0.00 MN
waarin:			
$F_{r,max;punt;i}$			0.00 MN
paalpunt oppervlak	A_{punt}		0.00 m ²
$F_{r,max;schacht;i}$			0.00 MN
gemiddelde paalomtrek	$O_{p;gem}$		0.01 m
lengte schachtwrijving	Δl		15.00 m
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max;d}$		MN	0.00 MN
materiaalfactor grond	γ_{mb}		1.20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$		0.75

$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27.00 m
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T.B.V. Vergunnings aanvraag

Verklaring


- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding ø16mm (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

3.0	21-03-2014	Paal-paal afstand aangepast
2.0	12-03-2014	Diverse aanpassingen
1.0	13-02-2014	Eerste uitgaven
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Scale: 1:200
Drawn by: RBE 21-03-2014		Units: mm
Checked by: AJP 21-03-2014		Project no: 000.145
Approved by: AW 21-03-2014		Company: TenneT
Description: Principe ontwerp fundatie steunmast ZWW4S350+10 masten familie		Revision: 3.0
		Format: A3



ZWW4S350+10

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h		65.6	m
Diameter voet		d voet		2.3	m
top		d top		0.5	m
gem		d gem		1.4	m
wanddikte		t		22	mm
Oppervlakte aan voet		A		157444	mm ²
Traagheidsmoment aan voet		W _x		8.88E+07	mm ⁴
Weerstandsmoment aan voet		I _x		1.01E+11	mm ⁶
Mast: Gewicht		2 ^{de} orde		10.0	%
		F _{rep,ver}		485	kN

Bijlage BBW

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	64.9	4.4	13.8	0.0	13.8	894	kNm
150C1F1	56.1	16.5	39.9	0.0	39.9	2239	kNm
150C1F2	47.1	16.6	37.5	0.0	37.5	1768	kNm
150C1F3	38.1	16.8	34.6	0.0	34.6	1318	kNm
380C2F1	56.1	33.1	79.8	0.0	79.8	4479	kNm
380C2F2	47.1	33.3	75.1	0.0	75.1	3536	kNm
380C2F3	38.1	33.6	69.2	0.0	69.2	2637	kNm
RTG	29.2	9.1	20.2	0.0	20.2	589	kNm

Stuwdruk		F _{hor.}	27.0	kN
		M _{d,wind}	781	kNm
Totaal		M _{d,tot}	20501	kNm
Totaal moment incl. 2 ^{de} orde effect		M _{d,tot}	22551	kNm

Normaalkracht;

Optredende normaalkracht					
N _{d,geluiders}				163	kN
N _{d, e.g. mast}				582	kN
N _{s,d,totaal}				746	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

		JA		
		β _a	0.70	
Optredende spanning tgv normaalkracht		A _{eff}	110039	mm ²
N _d /A _{eff} = f _{yd} /γ _{m1}			7	N/mm ²

Moment;

Optredende moment in de voet:				
M _{d,tot}			22551	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

		JA		
		β _a	1.00	
Optredende spanning tgv moment:		W _{eff}	8.87E+07	mm ³
M _d /W _{eff} = f _{yd} /γ _{m1}			254	N/mm ²

Totale spanning: σ_d 261 N/mm² < 284 N/mm² = ACCOORD
σ_{d,toegestaan} 284 N/mm² ==> 80% van 355 N/mm²

Special limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	64.9	3.7	9.5	0.0	9.5	619	kNm
150C1F1	56.1	14.2	27.8	0.0	27.8	1561	kNm
150C1F2	47.1	14.3	26.2	0.0	26.2	1235	kNm
150C1F3	38.1	14.4	24.2	0.0	24.2	924	kNm
380C2F1	56.1	28.3	55.6	0.0	55.6	3121	kNm
380C2F2	47.1	28.5	52.4	0.0	52.4	2469	kNm
380C2F3	38.1	28.8	48.5	0.0	48.5	1848	kNm
RTG	29.2	7.8	14.1	0.0	14.1	411	kNm

Stuwdruk		F _{hor.}	720	kN
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Verplaatsing			1.64	m
Percentage van de verplaatsing			2.51%	
Hoek			2.80	graden
Kromming			0.63%	
Fundatie rotatiestijfheid			0.005	rad

3.57	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4S350+10

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2597	882	19975	2597	882	-19975
	150C1F1	9561	3229	73328	9561	3229	-73328
	150C1F2	9561	3227	73328	9561	3227	-73328
	150C1F3	9561	3225	73328	9561	3225	-73328
	380C2F1	19122	6458	146656	19122	6458	-146656
	380C2F2	19122	6454	146656	19122	6454	-146656
	380C2F3	19122	6449	146656	19122	6449	-146656
	RTG	5187	1756	39906	5187	1756	-39906
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2691	1019	23302	2691	1019	-23302
	150C1F1	9947	3803	86986	9947	3803	-86986
	150C1F2	9947	3803	86986	9947	3803	-86986
	150C1F3	9947	3802	86986	9947	3802	-86986
	380C2F1	19893	7607	173971	19893	7607	-173971
	380C2F2	19893	7606	173972	19893	7606	-173972
	380C2F3	19893	7605	173972	19893	7605	-173972
	RTG	5362	2015	46079	5362	2015	-46079
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	9850	2568	58601	9850	2568	-58601
	150C1F1	16213	5129	117114	16213	5129	-117114
	150C1F2	16213	5128	117114	16213	5128	-117114
	150C1F3	16213	5126	117114	16213	5126	-117114
	380C2F1	32426	10257	234229	32426	10257	-234229
	380C2F2	32426	10255	234229	32426	10255	-234229
	380C2F3	32426	10252	234229	32426	10252	-234229
	RTG	19726	5137	117334	19726	5137	-117334
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3523	1138	26032	3523	1138	-26032
	150C1F1	11438	3775	86342	11438	3775	-86342
	150C1F2	11438	3775	86342	11438	3775	-86342
	150C1F3	11438	3774	86342	11438	3774	-86342
	380C2F1	22877	7550	172683	22877	7550	-172683
	380C2F2	22877	7550	172683	22877	7550	-172683
	380C2F3	22877	7549	172684	22877	7549	-172684
	RTG	7039	2273	51990	7039	2273	-51990
NL1/6 Permanent, +10°C Permanent loads yg= 1.35	GW / opgw	2906	956	21899	2906	956	-21899
	150C1F1	10692	3502	80220	10692	3502	-80220
	150C1F2	10692	3502	80220	10692	3502	-80220
	150C1F3	10692	3502	80220	10692	3502	-80220
	380C2F1	21384	7005	160440	21384	7005	-160440
	380C2F2	21384	7005	160440	21384	7005	-160440
	380C2F3	21384	7005	160440	21384	7005	-160440
	RTG	5804	1911	43762	5804	1911	-43762
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2369	3509	27458	2326	4051	-29749
	150C1F1	8937	10493	90699	8791	11995	-96513
	150C1F2	8992	9963	88734	8851	11356	-94003
	150C1F3	9061	9317	86415	8929	10576	-91014
	380C2F1	17874	20986	181398	17583	23990	-193026
	380C2F2	17984	19926	177469	17703	22713	-188007
	380C2F3	18121	18633	172831	17857	21153	-182027
	RTG	4888	5357	48300	4813	6103	-51189
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2669	1496	23696	2661	1592	-23862
	150C1F1	9897	5139	87803	9877	5404	-88152
	150C1F2	9903	5046	87693	9886	5291	-87997
	150C1F3	9910	4931	87569	9896	5154	-87821
	380C2F1	19794	10278	175606	19753	10807	-176305
	380C2F2	19806	10091	175386	19771	10583	-175994
	380C2F3	19821	9863	175137	19792	10308	-175641
	RTG	5340	2678	46467	5331	2809	-46633
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	9764	5003	60187	9731	5485	-60848
	150C1F1	16049	8897	120193	15987	9650	-121469
	150C1F2	16070	8631	119788	16014	9330	-120904
	150C1F3	16093	8307	119328	16046	8939	-120259
	380C2F1	32099	17794	240386	31973	19300	-242939
	380C2F2	32139	17263	239577	32028	18660	-241808
	380C2F3	32186	16614	238656	32092	17878	-240518
	RTG	19639	8519	118874	19604	9184	-119537
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3511	1609	26281	3506	1702	-26389
	150C1F1	11406	5103	86961	11393	5364	-87231
	150C1F2	11410	5011	86877	11399	5253	-87111
	150C1F3	11415	4898	86782	11405	5118	-86975
	380C2F1	22812	10206	173923	22785	10729	-174461
	380C2F2	22820	10021	173754	22797	10507	-174221
	380C2F3	22830	9795	173563	22811	10235	-173950
	RTG	7026	2930	52231	7021	3059	-52337

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2194	6891	42038	2194	6891	-42038
	150C1F1	8266	19958	129740	8266	19958	-129740
	150C1F2	8322	18766	124693	8322	18766	-124693
	150C1F3	8401	17302	118494	8401	17302	-118494
	380C2F1	16531	39917	259480	16531	39917	-259480
	380C2F2	16645	37532	249386	16645	37532	-249386
	380C2F3	16802	34604	236989	16802	34604	-236989
	RTG	4526	10080	68125	4526	10080	-68125
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2601	2107	25129	2601	2107	-25129
	150C1F1	9729	6824	90891	9729	6824	-90891
	150C1F2	9755	6608	90391	9755	6608	-90391
	150C1F3	9785	6345	89819	9785	6345	-89819
	380C2F1	19458	13647	181782	19458	13647	-181782
	380C2F2	19510	13216	180782	19510	13216	-180782
	380C2F3	19570	12689	179637	19570	12689	-179637
	RTG	5266	3513	47944	5266	3513	-47944
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	9519	8066	65756	9519	8066	-65756
	150C1F1	15576	13700	130968	15576	13700	-130968
	150C1F2	15642	13084	129292	15642	13084	-129292
	150C1F3	15722	12333	127344	15722	12333	-127344
	380C2F1	31152	27400	261936	31152	27400	-261936
	380C2F2	31284	26168	258583	31284	26168	-258583
	380C2F3	31444	24666	254688	31444	24666	-254688
	RTG	19356	12725	124697	19356	12725	-124697
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3468	2200	27236	3468	2200	-27236
	150C1F1	11293	6759	89371	11293	6759	-89371
	150C1F2	11311	6547	88977	11311	6547	-88977
	150C1F3	11331	6290	88527	11331	6290	-88527
	380C2F1	22585	13518	178742	22585	13518	-178742
	380C2F2	22621	13095	177953	22621	13095	-177953
	380C2F3	22662	12579	177055	22662	12579	-177055
	RTG	6981	3743	53193	6981	3743	-53193
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2326	4051	29749	2369	3509	-27458
	150C1F1	8791	11995	96513	8937	10493	-90699
	150C1F2	8851	11356	94003	8992	9963	-88734
	150C1F3	8929	10576	91014	9061	9317	-86415
	380C2F1	17583	23990	193026	17874	20986	-181398
	380C2F2	17703	22713	188007	17984	19926	-177469
	380C2F3	17857	21153	182027	18121	18633	-172831
	RTG	4813	6103	51189	4888	5357	-48300
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2661	1592	23862	2669	1496	-23696
	150C1F1	9877	5404	88152	9897	5139	-87803
	150C1F2	9886	5291	87997	9903	5046	-87693
	150C1F3	9896	5154	87821	9910	4931	-87569
	380C2F1	19753	10807	176305	19794	10278	-175606
	380C2F2	19771	10583	175994	19806	10091	-175386
	380C2F3	19792	10308	175641	19821	9863	-175137
	RTG	5331	2809	46633	5340	2678	-46467
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	9731	5485	60848	9764	5003	-60187
	150C1F1	15987	9650	121469	16049	8897	-120193
	150C1F2	16014	9330	120904	16070	8631	-119788
	150C1F3	16046	8939	120259	16093	8307	-119328
	380C2F1	31973	19300	242939	32099	17794	-240386
	380C2F2	32028	18660	241808	32139	17263	-239577
	380C2F3	32092	17878	240518	32186	16614	-238656
	RTG	19604	9184	119537	19639	8519	-118874
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3506	1702	26389	3511	1609	-26281
	150C1F1	11393	5364	87231	11406	5103	-86961
	150C1F2	11399	5253	87111	11410	5011	-86877
	150C1F3	11405	5118	86975	11415	4898	-86782
	380C2F1	22785	10729	174461	22812	10206	-173923
	380C2F2	22797	10507	174222	22820	10021	-173754
	380C2F3	22811	10235	173950	22830	9795	-173563
	RTG	7021	3059	52337	7026	2930	-52231
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1974	704	15899	1974	704	-15899
	150C1F1	7275	2590	58697	7275	2590	-58697
	150C1F2	7275	2588	58697	7275	2588	-58697
	150C1F3	7275	2586	58697	7275	2586	-58697
	380C2F1	14550	5180	117394	14550	5180	-117394
	380C2F2	14550	5176	117394	14550	5176	-117394
	380C2F3	14550	5172	117394	14550	5172	-117394
	RTG	3942	1400	31746	3942	1400	-31746

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2063	834	19056	2063	834	-19056
	150C1F1	7649	3145	71913	7649	3145	-71913
	150C1F2	7649	3145	71913	7649	3145	-71913
	150C1F3	7649	3144	71913	7649	3144	-71913
	380C2F1	15298	6290	143826	15298	6290	-143826
	380C2F2	15298	6290	143826	15298	6290	-143826
	380C2F3	15298	6289	143826	15298	6289	-143826
	RTG	4107	1643	37580	4107	1643	-37580
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	9268	2456	56026	9268	2456	-56026
	150C1F1	13993	4593	104840	13993	4593	-104840
	150C1F2	13993	4592	104840	13993	4592	-104840
	150C1F3	13993	4590	104840	13993	4590	-104840
	380C2F1	27986	9185	209680	27986	9185	-209680
	380C2F2	27986	9183	209680	27986	9183	-209680
	380C2F3	27986	9181	209680	27986	9181	-209680
	RTG	18563	4912	112175	18563	4912	-112175
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2911	977	22336	2911	977	-22336
	150C1F1	9175	3171	72514	9175	3171	-72514
	150C1F2	9175	3171	72514	9175	3171	-72514
	150C1F3	9175	3171	72514	9175	3171	-72514
	380C2F1	18350	6343	145028	18350	6343	-145028
	380C2F2	18350	6342	145028	18350	6342	-145028
	380C2F3	18350	6341	145028	18350	6341	-145028
	RTG	5814	1950	44590	5814	1950	-44590
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1974	694	15900	1974	694	-15900
	150C1F1	7275	2563	58698	7275	2563	-58698
	150C1F2	7275	2563	58698	7275	2563	-58698
	150C1F3	7275	2563	58698	7275	2563	-58698
	380C2F1	14550	5126	117395	14550	5126	-117395
	380C2F2	14550	5126	117395	14550	5126	-117395
	380C2F3	14550	5126	117395	14550	5126	-117395
	RTG	3942	1386	31746	3942	1386	-31746
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1739	3416	25324	1707	3971	-27917
	150C1F1	6586	10087	81433	6461	11637	-88332
	150C1F2	6635	9539	79047	6512	10979	-85382
	150C1F3	6700	8869	76186	6578	10174	-81812
	380C2F1	13171	20175	162867	12923	23273	-176665
	380C2F2	13270	19078	158093	13023	21958	-170763
	380C2F3	13399	17738	152373	13156	20347	-163625
	RTG	3606	5117	42820	3540	5889	-46298
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2033	1319	19637	2021	1418	-19875
	150C1F1	7577	4498	73128	7549	4770	-73637
	150C1F2	7586	4402	72968	7562	4654	-73411
	150C1F3	7597	4286	72786	7576	4513	-73155
	380C2F1	15155	8996	146257	15098	9539	-147274
	380C2F2	15173	8805	145936	15123	9308	-146823
	380C2F3	15194	8571	145571	15152	9027	-146309
	RTG	4076	2315	38156	4064	2450	-38399
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	9175	4896	57755	9141	5381	-58470
	150C1F1	13797	8392	108632	13725	9156	-110177
	150C1F2	13821	8122	108139	13756	8831	-109494
	150C1F3	13849	7793	107578	13794	8434	-108712
	380C2F1	27595	16783	217264	27449	18312	-220354
	380C2F2	27642	16245	216279	27513	17662	-218988
	380C2F3	27698	15587	215155	27587	16868	-217424
	RTG	18469	8300	113861	18432	8967	-114583
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2895	1452	22666	2888	1546	-22805
	150C1F1	9132	4510	73372	9115	4775	-73738
	150C1F2	9138	4416	73257	9123	4662	-73575
	150C1F3	9144	4301	73127	9132	4524	-73391
	380C2F1	18265	9019	146744	18231	9550	-147476
	380C2F2	18276	8832	146514	18246	9324	-147151
	380C2F3	18288	8602	146253	18263	9049	-146782
	RTG	5799	2610	44910	5792	2740	-45050
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1618	6849	41077	1618	6849	-41077
	150C1F1	6077	19756	125127	6077	19756	-125127
	150C1F2	6115	18548	119717	6115	18548	-119717
	150C1F3	6168	17061	113008	6168	17061	-113008
	380C2F1	12155	39512	250253	12155	39512	-250253
	380C2F2	12230	37096	239434	12230	37096	-239434
	380C2F3	12337	34123	226017	12337	34123	-226017
	RTG	3324	9955	65277	3324	9955	-65277

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1948	1954	21619	1948	1954	-21619
	150C1F1	7354	6239	77510	7354	6239	-77510
	150C1F2	7387	6015	76816	7387	6015	-76816
	150C1F3	7425	5741	76015	7425	5741	-76015
	380C2F1	14708	12478	155021	14708	12478	-155021
	380C2F2	14773	12029	153632	14773	12029	-153632
	380C2F3	14851	11483	152029	14851	11483	-152029
	RTG	3978	3177	40263	3978	3177	-40263
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	8920	7977	63727	8920	7977	-63727
	150C1F1	13275	13280	121380	13275	13280	-121380
	150C1F2	13345	12653	119435	13345	12653	-119435
	150C1F3	13430	11887	117160	13430	11887	-117160
	380C2F1	26551	26560	242760	26551	26560	-242760
	380C2F2	26690	25306	238870	26690	25306	-238870
	380C2F3	26860	23775	234319	26860	23775	-234319
	RTG	18169	12526	120155	18169	12526	-120155
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2843	2053	23886	2843	2053	-23886
	150C1F1	8990	6201	76597	8990	6201	-76597
	150C1F2	9012	5984	76076	9012	5984	-76076
	150C1F3	9037	5719	75480	9037	5719	-75480
	380C2F1	17979	12401	153195	17979	12401	-153195
	380C2F2	18023	11968	152153	18023	11968	-152153
	380C2F3	18074	11439	150960	18074	11439	-150960
	RTG	5743	3436	46156	5743	3436	-46156
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1707	3971	27917	1739	3416	-25324
	150C1F1	6461	11637	88332	6586	10087	-81433
	150C1F2	6512	10979	85382	6635	9539	-79047
	150C1F3	6578	10174	81812	6700	8869	-76186
	380C2F1	12923	23273	176665	13171	20175	-162867
	380C2F2	13023	21958	170763	13270	19078	-158093
	380C2F3	13156	20347	163625	13399	17738	-152373
	RTG	3540	5889	46298	3606	5117	-42820
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2021	1418	19875	2033	1319	-19637
	150C1F1	7549	4770	73637	7577	4498	-73128
	150C1F2	7562	4654	73411	7586	4402	-72968
	150C1F3	7576	4513	73155	7597	4286	-72786
	380C2F1	15098	9539	147274	15155	8996	-146257
	380C2F2	15123	9308	146823	15173	8805	-145936
	380C2F3	15152	9027	146309	15194	8571	-145571
	RTG	4064	2450	38399	4076	2315	-38156
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	9141	5381	58470	9175	4896	-57755
	150C1F1	13725	9156	110177	13797	8392	-108632
	150C1F2	13756	8831	109494	13821	8122	-108139
	150C1F3	13794	8434	108712	13849	7793	-107578
	380C2F1	27449	18312	220354	27595	16783	-217264
	380C2F2	27513	17662	218988	27642	16245	-216279
	380C2F3	27587	16868	217424	27698	15587	-215155
	RTG	18432	8967	114583	18469	8300	-113861
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2888	1546	22805	2895	1452	-22666
	150C1F1	9115	4775	73738	9132	4510	-73372
	150C1F2	9123	4662	73575	9138	4416	-73257
	150C1F3	9132	4524	73391	9144	4301	-73127
	380C2F1	18231	9550	147476	18265	9019	-146744
	380C2F2	18246	9324	147151	18276	8832	-146514
	380C2F3	18263	9049	146782	18288	8602	-146253
	RTG	5792	2740	45050	5799	2610	-44910

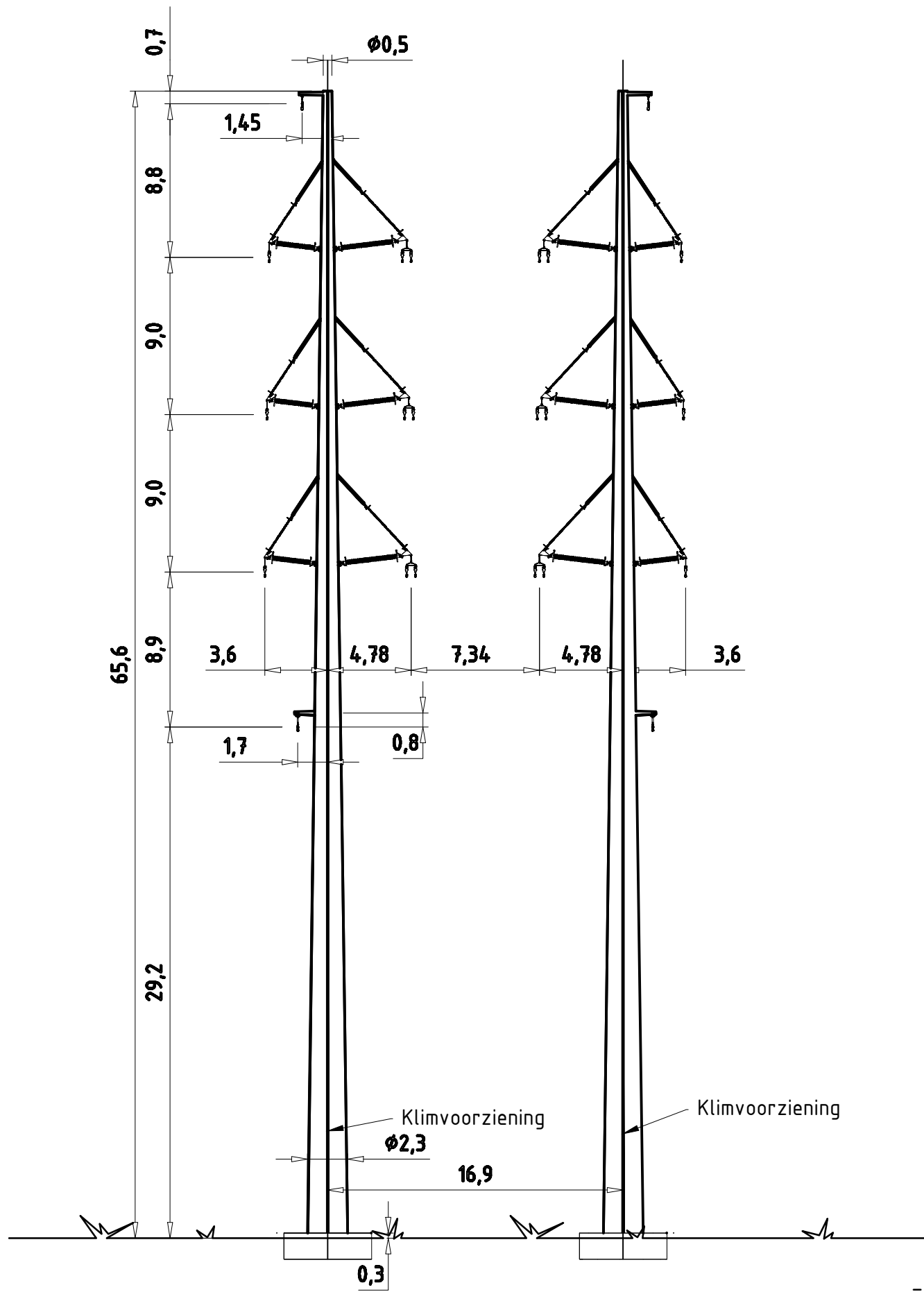
ZWW4S350+10

Appendix BW2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2183	762	17296	2183	762	-17296
Wind, 10°C	150C1F1	8041	2800	63716	8041	2800	-63716
Permanent loads yg= 1.0	150C1F2	8041	2799	63716	8041	2799	-63716
Wind angle: 0°	150C1F3	8041	2797	63716	8041	2797	-63716
	380C2F1	16082	5600	127433	16082	5600	-127433
	380C2F2	16082	5598	127433	16082	5598	-127433
	380C2F3	16082	5595	127433	16082	5595	-127433
	RTG	4359	1517	34541	4359	1517	-34541
NL4/1b	GW / opgw	2274	897	20517	2274	897	-20517
Wind, -20°C	150C1F1	8420	3370	77101	8420	3370	-77101
Permanent loads yg= 1.0	150C1F2	8420	3370	77101	8420	3370	-77101
Wind angle: 0°	150C1F3	8420	3369	77101	8420	3369	-77101
	380C2F1	16839	6740	154201	16839	6740	-154201
	380C2F2	16839	6739	154201	16839	6739	-154201
	380C2F3	16839	6739	154201	16839	6739	-154201
	RTG	4528	1770	40504	4528	1770	-40504
NL4/3	GW / opgw	7098	2013	45951	7098	2013	-45951
Wind, -5°C	150C1F1	12584	4234	96748	12584	4234	-96748
Permanent loads yg= 1.0	150C1F2	12584	4234	96748	12584	4234	-96748
Wind angle: 0°	150C1F3	12584	4233	96748	12584	4233	-96748
	380C2F1	25167	8468	193495	25167	8468	-193495
	380C2F2	25167	8467	193495	25167	8467	-193495
	380C2F3	25167	8465	193496	25167	8465	-193496
	RTG	14210	4022	91914	14210	4022	-91914
NL4/4	GW / opgw	2811	949	21716	2811	949	-21716
Construction/maintenance, +5°C	150C1F1	9322	3210	73438	9322	3210	-73438
Permanent loads yg= 1.0	150C1F2	9322	3210	73438	9322	3210	-73438
Wind angle: 0°	150C1F3	9322	3209	73438	9322	3209	-73438
	380C2F1	18644	6420	146876	18644	6420	-146876
	380C2F2	18644	6420	146876	18644	6420	-146876
	380C2F3	18644	6419	146876	18644	6419	-146876
	RTG	5614	1894	43342	5614	1894	-43342
NL4/1a	GW / opgw	2031	2495	21879	1996	2856	-23396
Wind, 10°C	150C1F1	7644	7590	74112	7535	8584	-77824
Permanent loads yg= 1.0	150C1F2	7684	7240	72880	7581	8161	-76210
Wind angle: 45°	150C1F3	7732	6814	71442	7638	7645	-74310
	380C2F1	15288	15180	148224	15070	17167	-155647
	380C2F2	15367	14481	145760	15162	16322	-152420
	380C2F3	15464	13628	142883	15276	15290	-148620
	RTG	4173	3890	39512	4119	4383	-41328
NL4/1b	GW / opgw	2261	1213	20740	2256	1276	-20835
Wind, -20°C	150C1F1	8391	4257	77560	8379	4431	-77759
Permanent loads yg= 1.0	150C1F2	8395	4195	77498	8385	4357	-77670
Wind angle: 45°	150C1F3	8399	4119	77427	8390	4266	-77570
	380C2F1	16782	8513	155120	16759	8863	-155517
	380C2F2	16789	8390	154995	16769	8714	-155340
	380C2F3	16798	8238	154854	16781	8533	-155140
	RTG	4515	2211	40721	4510	2297	-40815
NL4/3	GW / opgw	7038	3638	47073	7015	3960	-47542
Wind, -5°C	150C1F1	12479	6742	98714	12439	7243	-99537
Permanent loads yg= 1.0	150C1F2	12492	6566	98454	12456	7030	-99172
Wind angle: 45°	150C1F3	12507	6350	98158	12477	6770	-98756
	380C2F1	24959	13484	197428	24877	14485	-199073
	380C2F2	24985	13131	196907	24913	14060	-198343
	380C2F3	25015	12699	196317	24954	13540	-197513
	RTG	14149	6279	93004	14125	6723	-93473
NL4/4	GW / opgw	2803	1263	21867	2800	1324	-21932
Construction/maintenance, +5°C	150C1F1	9303	4093	73801	9295	4266	-73960
Permanent loads yg= 1.0	150C1F2	9306	4032	73751	9299	4193	-73889
Wind angle: 45°	150C1F3	9308	3957	73695	9303	4103	-73809
	380C2F1	18606	8186	147601	18591	8532	-147919
	380C2F2	18611	8063	147502	18598	8385	-147778
	380C2F3	18617	7913	147390	18606	8205	-147618
	RTG	5607	2332	43486	5604	2417	-43551
NL4/1a	GW / opgw	1873	4766	32004	1873	4766	-32004
Wind, 10°C	150C1F1	7081	13908	100391	7081	13908	-100391
Permanent loads yg= 1.0	150C1F2	7135	13106	96853	7135	13106	-96853
Wind angle: 90°	150C1F3	7207	12123	92552	7207	12123	-92552
	380C2F1	14163	27817	200782	14163	27817	-200782
	380C2F2	14270	26213	193706	14270	26213	-193706
	380C2F3	14414	24247	185105	14414	24247	-185105
	RTG	3880	7035	52660	3880	7035	-52660

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2220	1615	21575	2220	1615	-21575
	150C1F1	8291	5367	79339	8291	5367	-79339
	150C1F2	8307	5225	79047	8307	5225	-79047
	150C1F3	8325	5052	78716	8325	5052	-78716
	380C2F1	16582	10734	158677	16582	10734	-158677
	380C2F2	16614	10450	158095	16614	10450	-158095
	380C2F3	16650	10104	157431	16650	10104	-157431
	RTG	4472	2761	41568	4472	2761	-41568
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	6862	5690	51053	6862	5690	-51053
	150C1F1	12160	9937	105772	12160	9937	-105772
	150C1F2	12206	9527	104658	12206	9527	-104658
	150C1F3	12262	9027	103371	12262	9027	-103371
	380C2F1	24320	19875	211543	24320	19875	-211543
	380C2F2	24413	19054	209316	24413	19054	-209316
	380C2F3	24523	18054	206742	24523	18054	-206742
	RTG	13950	9092	97139	13950	9092	-97139
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2777	1654	22453	2777	1654	-22453
	150C1F1	9236	5189	75236	9236	5189	-75236
	150C1F2	9246	5049	75000	9246	5049	-75000
	150C1F3	9259	4879	74731	9259	4879	-74731
	380C2F1	18471	10378	150473	18471	10378	-150473
	380C2F2	18493	10099	149999	18493	10099	-149999
	380C2F3	18518	9757	149462	18518	9757	-149462
	RTG	5580	2871	44072	5580	2871	-44072
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1996	2856	23396	2031	2495	-21879
	150C1F1	7535	8584	77824	7644	7590	-74112
	150C1F2	7581	8161	76210	7684	7240	-72880
	150C1F3	7638	7645	74310	7732	6814	-71442
	380C2F1	15070	17167	155647	15288	15180	-148224
	380C2F2	15162	16322	152420	15367	14481	-145760
	380C2F3	15276	15290	148620	15464	13628	-142883
	RTG	4119	4383	41328	4173	3890	-39512
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2256	1276	20835	2261	1213	-20740
	150C1F1	8379	4431	77759	8391	4257	-77560
	150C1F2	8385	4357	77670	8395	4195	-77498
	150C1F3	8390	4266	77570	8399	4119	-77427
	380C2F1	16759	8863	155517	16782	8513	-155120
	380C2F2	16769	8714	155340	16789	8390	-154995
	380C2F3	16781	8533	155140	16798	8238	-154854
	RTG	4510	2297	40815	4515	2211	-40721
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7015	3960	47542	7038	3638	-47073
	150C1F1	12439	7243	99537	12479	6742	-98714
	150C1F2	12456	7030	99172	12492	6566	-98454
	150C1F3	12477	6770	98756	12507	6350	-98158
	380C2F1	24877	14485	199073	24959	13484	-197428
	380C2F2	24913	14060	198343	24985	13131	-196907
	380C2F3	24954	13540	197513	25015	12699	-196317
	RTG	14125	6723	93473	14149	6279	-93004
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2800	1324	21932	2803	1263	-21867
	150C1F1	9295	4266	73960	9303	4093	-73801
	150C1F2	9299	4193	73889	9306	4032	-73751
	150C1F3	9303	4103	73809	9308	3957	-73695
	380C2F1	18591	8532	147919	18606	8186	-147601
	380C2F2	18598	8385	147778	18611	8063	-147502
	380C2F3	18606	8205	147618	18617	7913	-147390
	RTG	5604	2417	43551	5607	2332	-43486



- Maatvoering indicatief

T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4S350+10

- Trekparameter 1800m
- 2x380 / 2x150 Steunmast
- 350m Veldlengte
- 175°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

2.0	03-03-2014	Increased space between poles	Projectname: Engineering verbinding ZW380	
1.0	11-02-2014	First edition	Third angle projection: 	Drawing no.: 74102194-035-064 V
Design state: Definitief		Scale: 1:300	Description: Wintrack Masttype ZWW4S350+10	
Drawn by: BJT 03-03-2014		Units: m	Revision: 2.0	
Checked by: AJP 03-03-2014		Project no: 000.145	Format: A3	
Approved by: AW 03-03-2014		Company: TenneT		

ZWW4HL350+10

Bijlage CBU

Fundatie berekening

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1,6	m
schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	5,4	m
	Hoogte	1,8	m
	Inhoud	41,2	m ³
	e.g.	989	kN

Onderplaat	Diameter	13,0	m
	Hoogte	1,3	m
	Inhoud	173	m ³
	e.g.	4141	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		929	kN
Fgeleiders		318	kN
Maximale dwarskracht		1304	kN
Fmax vert (druk)		1432	kN
Fmin vert (trek)		1074	kN
Maximale moment		64544	kNm

Moment

F_{diag}		5858	kN
F_{hor}		1304	kN
F_{ver}		5812	kN
M_{hor} (tgv F_{hor})		4043	kNm
M_{tot}		68586	kNm
$F=M/a$		5812	kN

Verticaal reactiekracht

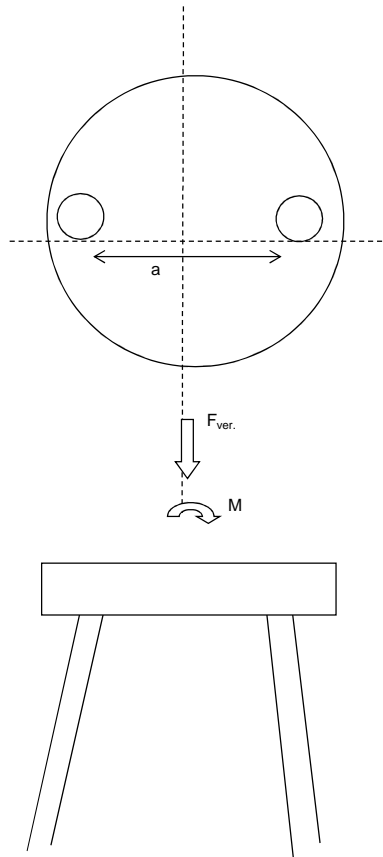
F_{water} (trek)		2138	kN
F_{grond} (druk)		2965	kN
F_{grond} (trek)		2471	kN

F_{dmax} (druk)		5574	kN
F_{tmax} (trek)		2675	kN

F_{dtot} (druk)		11386	kN
F_{ttot} (trek)		3137	kN

Palen druk		11	(-)
Palen trek		10	(-)

Totaal palen		22	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4HL350+10

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CBU

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	$O_{p,gem}$	1,60 m
paalfactor	αt	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11,25 MPa
materiaalfactor	$\gamma_{m,b4}$	1,4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1,5
	$q_{c;z,d}$	5,36 MPa
	$P_{r,z,d}$	37,5 kN/m ²
	$F_{r;trek,d,i}$	60,0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

$F_{trek,d}$	536,4 kN
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ZWW4HL350+10

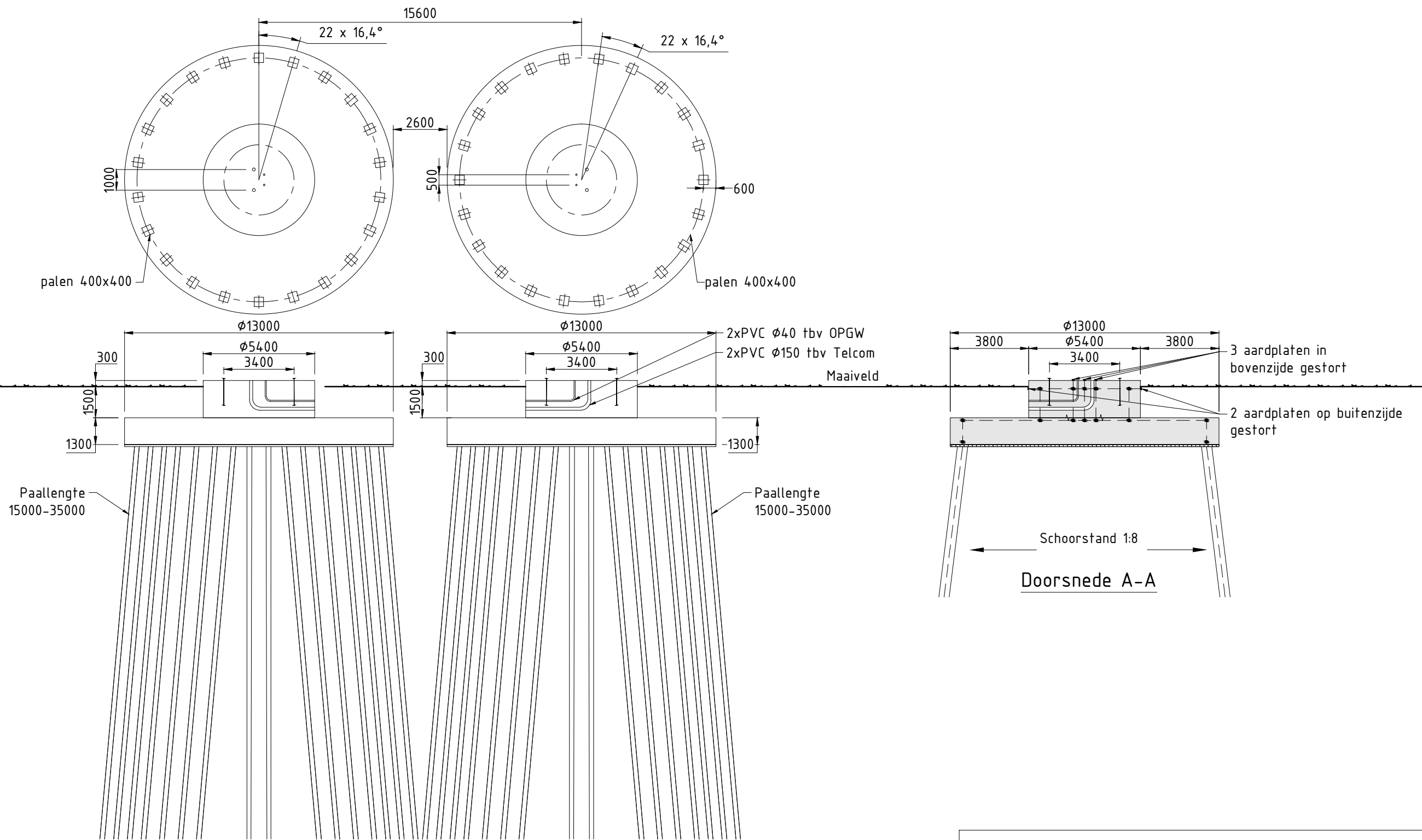
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CBU

Bepaling opneembare paalbelasting op druk

heipaal	v		
diameter	a	2 mm	
		2 mm	
Deq		0,001808	
maximale puntweerstand			
$P_{r,max;punt;i}$			11,25 MN/m ²
paalklasse factor	α_p	1,00	
factor paalvoet	β	1	
hoek van inwendige vrijwing van paalvoet	ϕ	40	
factor dwarsdoorsnede paalvoet	s	1,00	
minimale waarde neergaande deel	$q_{c,II;gem}$	9,00 MN/m ²	
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14,00 MN/m ²	
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11,00 MN/m ²	
maximale paalschachtwrijving			
$P_{r,max;schacht;i}$			0,05 MN/m ²
waarin:			
paalfactor	α_s	0,010	
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5,00 MN/m ²	
maximale draagkracht alleenstaande paal			
$F_{r,max;i}$			0,00 MN
waarin:			
$F_{r,max;punt;i}$			0,00 MN
paalpunt oppervlak	A_{punt}	0,00 m ²	
$F_{r,max;schacht;i}$			0,00 MN
gemiddelde paalomtrek	$O_{p;gem}$	0,01 m	
lengte schachtwrijving	Δl	15,00 m	
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max;d}$		MN	0,00 MN
materiaalfactor grond	γ_{mb}	1,20	
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0,75	
$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27,00 m



T.B.V. Vergunnings aanvraag

Verklaring


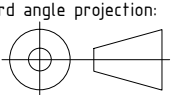
- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding $\phi 16\text{mm}$ (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

1.0	10-03-2014	Eerste uitgave	Projectname: Engineering verbinding ZW380	
		Third angle projection:	Drawing no.: 74102194-032-077V	
				
Design state: Definitief		Scale: 1:200	Description: Principe ontwerp fundatie hoekmast ZWW4HL350+10 masten familie	
Drawn by: RBE	10-03-2014	Units: mm		
Checked by: AJP	10-03-2014	Project no: 000.145		
Approved by: AW	10-03-2014	Company: TenneT	Revision: 1.0	
			Format: A3	

ZWW4HL350+10

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte			h	65.5	m
Diameter voet			d voet	3.4	m
top			d top	0.8	m
gem			d gem	2.1	m
wanddikte			t	28	mm
Oppervlakte aan voet			A	296617	mm ²
Traagheidsmoment aan voet			W _x	2.48E+08	mm ⁴
Weerstandsmoment aan voet			I _x	4.17E+11	mm ⁶
Mast: Gewicht			2 ^{de} orde F _{rep,ver}	10.0	%
				929	kN

Bijlage BBU

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	64.9	19.2	61.7	0.0	61.7	2706 kNm
150C1F1	56.1	31.5	119.4	0.0	119.4	5649 kNm
150C1F2	47.1	31.6	117.5	0.0	117.5	4676 kNm
150C1F3	38.1	31.7	115.4	0.0	115.4	3719 kNm
380C2F1	56.1	63.0	238.8	0.0	238.8	11299 kNm
380C2F2	47.1	63.2	235.1	0.0	235.1	9351 kNm
380C2F3	38.1	63.4	230.7	0.0	230.7	7437 kNm
RTG	29.2	14.4	7.0	-134.9	135.1	2007 kNm

Stuwdruk				F _{hor.}	40.2	kN
				M _{d,wind}	1177	kNm
Totaal				M _{d,tot}	58676	kNm
Totaal moment incl. 2 ^{de} orde effect				M _{d,tot}	64544	kNm

Normaalkracht;

Optredende normaalkracht						
N _{d,geleiders}					318	kN
N _{d, e.g. mast}					1114	kN
N _{s,d,totaal}					1432	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	0.64	
	A _{eff}	190857 mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{y,d} /γ _{m1}	8	N/mm ²
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Moment;

Optredende moment in de voet:		
M _{d,tot}	64544	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	0.94	
	W _{eff}	2.34E+08 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{y,d} /γ _{m1}	276	N/mm ²
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Totale spanning:

	σ _d	283	N/mm ²	< 284 N/mm ² = ACCOORD
	σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	64.9	13.9	47.1	0.0	47.1	3059 kNm
150C1F1	56.1	24.6	95.2	0.0	95.2	5342 kNm
150C1F2	47.1	24.6	94.0	0.0	94.0	4428 kNm
150C1F3	38.1	24.7	92.6	0.0	92.6	3527 kNm
380C2F1	56.1	49.1	190.4	0.0	190.4	10684 kNm
380C2F2	47.1	49.3	188.0	0.0	188.0	8855 kNm
380C2F3	38.1	49.4	185.1	0.0	185.1	7053 kNm
RTG	29.2	10.0	4.7	-103.4	103.5	3022 kNm

Stuwdruk				F _{hor.}	324	kN
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Verplaatsing					1.35	m
Percentage van de verplaatsing					2.05%	
Hoek					2.23	graden
Kromming					0.48%	
Fundatie rotatiestijfheid					0.005	rad

3.57	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4HL350+10

Appendix BU / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2537	9890	19072	2537	9890	-19072
	150C1F1	9422	34677	68322	9422	34677	-68322
	150C1F2	9439	34348	68029	9439	34348	-68029
	150C1F3	9458	33960	67700	9458	33960	-67700
	380C2F1	18843	69353	136644	18843	69353	-136644
	380C2F2	18877	68697	136058	18877	68697	-136058
	380C2F3	18916	67920	135400	18916	67920	-135400
	RTG	0	0	0	3346	0	-40400
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2688	10048	21122	2688	10048	-21122
	150C1F1	9939	37318	78822	9939	37318	-78822
	150C1F2	9940	37280	78821	9940	37280	-78821
	150C1F3	9941	37233	78820	9941	37233	-78820
	380C2F1	19878	74637	157644	19878	74637	-157644
	380C2F2	19880	74559	157641	19880	74559	-157641
	380C2F3	19882	74465	157641	19882	74465	-157641
	RTG	0	0	0	3273	0	-44634
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	9836	25741	53004	9836	25741	-53004
	150C1F1	16187	51047	106096	16187	51047	-106096
	150C1F2	16190	50931	106076	16190	50931	-106076
	150C1F3	16194	50792	106059	16194	50792	-106059
	380C2F1	32373	102095	212191	32373	102095	-212191
	380C2F2	32380	101863	212153	32380	101863	-212153
	380C2F3	32388	101584	212117	32388	101584	-212117
	RTG	0	0	0	14153	0	-126712
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3521	11193	23576	3521	11193	-23576
	150C1F1	11433	37031	78204	11433	37031	-78204
	150C1F2	11434	36993	78206	11434	36993	-78206
	150C1F3	11435	36948	78210	11435	36948	-78210
	380C2F1	22867	74061	156407	22867	74061	-156407
	380C2F2	22868	73987	156412	22868	73987	-156412
	380C2F3	22869	73896	156420	22869	73896	-156420
	RTG	0	0	0	4626	0	-53360
NL1/6 Permanent, +10°C Permanent loads yg= 1.35	GW / opgw	2906	9264	19866	2906	9264	-19866
	150C1F1	10692	33934	72771	10692	33934	-72771
	150C1F2	10692	33934	72771	10692	33934	-72771
	150C1F3	10692	33934	72771	10692	33934	-72771
	380C2F1	21384	67868	145542	21384	67868	-145542
	380C2F2	21384	67868	145542	21384	67868	-145542
	380C2F3	21384	67868	145542	21384	67868	-145542
	RTG	0	0	0	3779	0	-44620
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2569	9261	18461	2218	20609	-33624
	150C1F1	9498	33123	67075	8366	62937	-105078
	150C1F2	9506	32944	66960	8425	60256	-101362
	150C1F3	9515	32731	66833	8507	56976	-96823
	380C2F1	18996	66246	134150	16731	125874	-210157
	380C2F2	19012	65888	133920	16851	120512	-202724
	380C2F3	19030	65461	133666	17014	113952	-193647
	RTG	0	0	0	3533	3411	-50619
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2690	9976	21115	2618	11295	-22111
	150C1F1	9943	37126	78827	9772	40433	-80737
	150C1F2	9944	37103	78829	9793	40106	-80442
	150C1F3	9944	37074	78833	9818	39719	-80111
	380C2F1	19887	74253	157653	19545	80866	-161474
	380C2F2	19888	74205	157659	19587	80212	-160884
	380C2F3	19889	74147	157667	19636	79439	-160222
	RTG	0	0	0	3285	682	-45141
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	9844	25387	53003	9576	31449	-56578
	150C1F1	16202	50479	106042	15688	60740	-113564
	150C1F2	16203	50409	106043	15745	59720	-112512
	150C1F3	16205	50325	106046	15813	58509	-111308
	380C2F1	32403	100958	212083	31375	121479	-227129
	380C2F2	32406	100819	212085	31489	119440	-225023
	380C2F3	32410	100650	212093	31626	117017	-222615
	RTG	0	0	0	14214	3495	-128846
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3523	11126	23581	3479	12238	-24131
	150C1F1	11436	36846	78224	11322	39863	-79512
	150C1F2	11436	36823	78229	11337	39573	-79295
	150C1F3	11437	36794	78234	11353	39228	-79054
	380C2F1	22872	73691	156449	22645	79726	-159024
	380C2F2	22873	73645	156457	22674	79145	-158590
	380C2F3	22874	73589	156469	22707	78456	-158108
	RTG	0	0	0	4635	682	-53689

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2232	19615	32232	2232	19615	-32232
	150C1F1	8427	60183	101261	8427	60183	-101261
	150C1F2	8488	57697	97820	8488	57697	-97820
	150C1F3	8571	54662	93633	8571	54662	-93633
	380C2F1	16854	120366	202521	16854	120366	-202521
	380C2F2	16977	115394	195639	16977	115394	-195639
	380C2F3	17143	109325	187266	17143	109325	-187266
	RTG	0	0	0	3728	6824	-70426
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2627	11158	21965	2627	11158	-21965
	150C1F1	9794	40097	80434	9794	40097	-80434
	150C1F2	9813	39803	80181	9813	39803	-80181
	150C1F3	9834	39455	79898	9834	39455	-79898
	380C2F1	19588	80195	160869	19588	80195	-160869
	380C2F2	19625	79606	160362	19625	79606	-160362
	380C2F3	19669	78910	159795	19669	78910	-159795
	RTG	0	0	0	3321	1364	-46612
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	9607	30846	56045	9607	30846	-56045
	150C1F1	15746	59692	112484	15746	59692	-112484
	150C1F2	15798	58771	111564	15798	58771	-111564
	150C1F3	15860	57679	110516	15860	57679	-110516
	380C2F1	31492	119385	224968	31492	119385	-224968
	380C2F2	31596	117543	223128	31596	117543	-223128
	380C2F3	31719	115357	221032	31719	115357	-221032
	RTG	0	0	0	14373	6990	-134899
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3485	12127	24040	3485	12127	-24040
	150C1F1	11337	39565	79289	11337	39565	-79289
	150C1F2	11350	39303	79105	11350	39303	-79105
	150C1F3	11364	38991	78901	11364	38991	-78901
	380C2F1	22674	79130	158579	22674	79130	-158579
	380C2F2	22700	78605	158209	22700	78605	-158209
	380C2F3	22729	77982	157801	22729	77982	-157801
	RTG	0	0	0	4658	1364	-54660
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2218	20609	33624	2569	9261	-18461
	150C1F1	8366	62937	105078	9498	33123	-67075
	150C1F2	8425	60256	101362	9506	32944	-66960
	150C1F3	8507	56976	96823	9515	32731	-66833
	380C2F1	16731	125874	210157	18996	66246	-134150
	380C2F2	16851	120512	202724	19012	65888	-133920
	380C2F3	17014	113952	193647	19030	65461	-133666
	RTG	0	0	0	3533	3411	-50619
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2618	11295	22111	2690	9976	-21115
	150C1F1	9772	40433	80737	9943	37126	-78827
	150C1F2	9793	40106	80442	9944	37103	-78829
	150C1F3	9818	39719	80111	9944	37074	-78833
	380C2F1	19545	80866	161474	19887	74253	-157653
	380C2F2	19587	80212	160884	19888	74205	-157659
	380C2F3	19636	79439	160222	19889	74147	-157667
	RTG	0	0	0	3285	682	-45141
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	9576	31449	56578	9844	25387	-53003
	150C1F1	15688	60740	113564	16202	50479	-106042
	150C1F2	15745	59720	112512	16203	50409	-106043
	150C1F3	15813	58509	111308	16205	50325	-106046
	380C2F1	31375	121479	227129	32403	100958	-212083
	380C2F2	31489	119440	225023	32406	100819	-212085
	380C2F3	31626	117017	222615	32410	100650	-212093
	RTG	0	0	0	14214	3495	-128846
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3479	12238	24131	3523	11126	-23581
	150C1F1	11322	39863	79512	11436	36846	-78224
	150C1F2	11337	39573	79295	11436	36823	-78229
	150C1F3	11353	39228	79054	11437	36794	-78234
	380C2F1	22645	79726	159024	22872	73691	-156449
	380C2F2	22674	79145	158590	22873	73645	-156457
	380C2F3	22707	78456	158108	22874	73589	-156469
	RTG	0	0	0	4635	682	-53689
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1898	8408	15895	1898	8408	-15895
	150C1F1	7091	29046	56249	7091	29046	-56249
	150C1F2	7113	28652	55814	7113	28652	-55814
	150C1F3	7137	28187	55320	7137	28187	-55320
	380C2F1	14183	58092	112498	14183	58092	-112498
	380C2F2	14225	57304	111629	14225	57304	-111629
	380C2F3	14275	56373	110641	14275	56373	-110641
	RTG	0	0	0	2488	0	-31566

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2058	8266	17298	2058	8266	-17298
	150C1F1	7638	30970	65208	7638	30970	-65208
	150C1F2	7639	30928	65199	7639	30928	-65199
	150C1F3	7641	30877	65190	7641	30877	-65190
	380C2F1	15276	61940	130416	15276	61940	-130416
	380C2F2	15279	61855	130398	15279	61855	-130398
	380C2F3	15282	61753	130381	15282	61753	-130381
	RTG	0	0	0	2423	0	-35310
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	9252	24661	50690	9252	24661	-50690
	150C1F1	13961	45905	95068	13961	45905	-95068
	150C1F2	13965	45783	95035	13965	45783	-95035
	150C1F3	13970	45636	95002	13970	45636	-95002
	380C2F1	27922	91810	190136	27922	91810	-190136
	380C2F2	27930	91565	190071	27930	91565	-190071
	380C2F3	27940	91271	190004	27940	91271	-190004
	RTG	0	0	0	13243	0	-120798
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2908	9635	20235	2908	9635	-20235
	150C1F1	9168	31197	65695	9168	31197	-65695
	150C1F2	9169	31158	65693	9169	31158	-65693
	150C1F3	9170	31111	65692	9170	31111	-65692
	380C2F1	18337	62395	131390	18337	62395	-131390
	380C2F2	18338	62316	131386	18338	62316	-131386
	380C2F3	18340	62221	131384	18340	62221	-131384
	RTG	0	0	0	3756	0	-45185
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1974	6726	14424	1974	6726	-14424
	150C1F1	7275	24831	53249	7275	24831	-53249
	150C1F2	7275	24831	53249	7275	24831	-53249
	150C1F3	7275	24831	53249	7275	24831	-53249
	380C2F1	14550	49661	106499	14550	49661	-106499
	380C2F2	14550	49661	106499	14550	49661	-106499
	380C2F3	14550	49661	106499	14550	49661	-106499
	RTG	0	0	0	2488	0	-31566
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1937	7653	15013	1633	20141	-32621
	150C1F1	7189	27191	54354	6144	60713	-100311
	150C1F2	7200	26979	54170	6186	57866	-96239
	150C1F3	7212	26729	53964	6243	54356	-91206
	380C2F1	14379	54381	108708	12288	121426	-200623
	380C2F2	14400	53959	108340	12371	115733	-192479
	380C2F3	14424	53459	107928	12487	108712	-182413
	RTG	0	0	0	2691	3411	-44759
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2061	8186	17276	1967	9755	-18809
	150C1F1	7644	30763	65180	7409	34635	-68305
	150C1F2	7645	30737	65179	7437	34240	-67864
	150C1F3	7646	30707	65180	7469	33774	-67362
	380C2F1	15289	61525	130360	14818	69271	-136611
	380C2F2	15290	61475	130359	14873	68481	-135728
	380C2F3	15292	61414	130360	14938	67548	-134724
	RTG	0	0	0	2440	682	-36036
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	9261	24302	50676	8979	30550	-54653
	150C1F1	13979	45309	94954	13393	56491	-104456
	150C1F2	13981	45236	94949	13455	55372	-103190
	150C1F3	13983	45149	94946	13529	54041	-101729
	380C2F1	27958	90617	189908	26786	112982	-208911
	380C2F2	27962	90473	189898	26909	110744	-206380
	380C2F3	27966	90298	189892	27058	108082	-203458
	RTG	0	0	0	13308	3495	-123113
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2910	9566	20234	2856	10792	-21031
	150C1F1	9172	31004	65696	9026	34370	-67734
	150C1F2	9173	30980	65699	9044	34036	-67424
	150C1F3	9173	30951	65702	9065	33641	-67075
	380C2F1	18344	62007	131393	18052	68741	-135468
	380C2F2	18345	61959	131397	18088	68073	-134847
	380C2F3	18346	61901	131405	18130	67282	-134149
	RTG	0	0	0	3766	682	-45608
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1642	19108	31143	1642	19108	-31143
	150C1F1	6187	57789	96128	6187	57789	-96128
	150C1F2	6230	55130	92317	6230	55130	-92317
	150C1F3	6290	51858	87621	6290	51858	-87621
	380C2F1	12373	115577	192255	12373	115577	-192255
	380C2F2	12460	110261	184635	12460	110261	-184635
	380C2F3	12581	103716	175242	12581	103716	-175242
	RTG	0	0	0	2842	6824	-67093

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1978	9589	18600	1978	9589	-18600
	150C1F1	7437	34230	67852	7437	34230	-67852
	150C1F2	7462	33875	67469	7462	33875	-67469
	150C1F3	7491	33456	67034	7491	33456	-67034
	380C2F1	14874	68459	135705	14874	68459	-135705
	380C2F2	14924	67750	134938	14924	67750	-134938
	380C2F3	14982	66912	134067	14982	66912	-134067
	RTG	0	0	0	2485	1364	-38089
	NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	9010	29927	54075	9010	29927
150C1F1		13456	55342	103156	13456	55342	-103156
150C1F2		13513	54330	102041	13513	54330	-102041
150C1F3		13581	53128	100760	13581	53128	-100760
380C2F1		26913	110684	206312	26913	110684	-206312
380C2F2		27026	108660	204083	27026	108660	-204083
380C2F3		27162	106257	201520	27162	106257	-201520
RTG		0	0	0	13477	6990	-129638
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	2863	10666	20909	2863	10666
	150C1F1	9045	34027	67415	9045	34027	-67415
	150C1F2	9061	33727	67148	9061	33727	-67148
	150C1F3	9079	33371	66849	9079	33371	-66849
	380C2F1	18089	68055	134831	18089	68055	-134831
	380C2F2	18121	67454	134297	18121	67454	-134297
	380C2F3	18158	66742	133698	18158	66742	-133698
	RTG	0	0	0	3795	1364	-46844
	NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1633	20141	32621	1937	7653
150C1F1		6144	60713	100311	7189	27191	-54354
150C1F2		6186	57866	96239	7200	26979	-54170
150C1F3		6243	54356	91206	7212	26279	-53964
380C2F1		12288	121426	200623	14379	54381	-108708
380C2F2		12371	115733	192479	14400	53959	-108340
380C2F3		12487	108712	182413	14424	53459	-107928
RTG		0	0	0	2691	3411	-44759
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	1967	9755	18809	2061	8186
	150C1F1	7409	34635	68305	7644	30763	-65180
	150C1F2	7437	34240	67864	7645	30737	-65179
	150C1F3	7469	33774	67362	7646	30707	-65180
	380C2F1	14818	69271	136611	15289	61525	-130360
	380C2F2	14873	68481	135728	15290	61475	-130359
	380C2F3	14938	67548	134724	15292	61414	-130360
	RTG	0	0	0	2440	682	-36036
	NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	8979	30550	54653	9261	24302
150C1F1		13393	56491	104456	13979	45309	-94954
150C1F2		13455	55372	103190	13981	45236	-94949
150C1F3		13529	54041	101729	13983	45149	-94946
380C2F1		26786	112982	208911	27958	90617	-189908
380C2F2		26909	110744	206380	27962	90473	-189898
380C2F3		27058	108082	203458	27966	90298	-189892
RTG		0	0	0	13308	3495	-123113
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	2856	10792	21031	2910	9566
	150C1F1	9026	34370	67734	9172	31004	-65696
	150C1F2	9044	34036	67424	9173	30980	-65699
	150C1F3	9065	33641	67075	9173	30951	-65702
	380C2F1	18052	68741	135468	18344	62007	-131393
	380C2F2	18088	68073	134847	18345	61959	-131397
	380C2F3	18130	67282	134149	18346	61901	-131405
	RTG	0	0	0	3766	682	-45608

ZWW4HL350+10

Appendix BU1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2579	9051	-18298
	150C1F1	0	0	0	9521	32595	-66759
	150C1F2	0	0	0	9526	32465	-66693
	150C1F3	0	0	0	9532	32310	-66622
	380C2F1	0	0	0	19041	65191	-133518
	380C2F2	0	0	0	19052	64930	-133387
	380C2F3	0	0	0	19063	64619	-133244
	RTG	0	0	0	3346	0	-40400
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2689	10006	-21116
	150C1F1	0	0	0	9942	37205	-78821
	150C1F2	0	0	0	9942	37176	-78823
	150C1F3	0	0	0	9943	37139	-78825
	380C2F1	0	0	0	19883	74411	-157642
	380C2F2	0	0	0	19885	74351	-157645
	380C2F3	0	0	0	19886	74278	-157651
	RTG	0	0	0	3273	0	-44634
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4273	14196	-28687
	150C1F1	0	0	0	11176	38730	-80357
	150C1F2	0	0	0	11179	38629	-80325
	150C1F3	0	0	0	11184	38509	-80292
	380C2F1	0	0	0	22352	77460	-160714
	380C2F2	0	0	0	22359	77259	-160650
	380C2F3	0	0	0	22367	77018	-160584
	RTG	0	0	0	5682	0	-64570
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3341	10700	-22605
	150C1F1	0	0	0	11072	36008	-76253
	150C1F2	0	0	0	11072	35979	-76256
	150C1F3	0	0	0	11073	35944	-76261
	380C2F1	0	0	0	22144	72016	-152506
	380C2F2	0	0	0	22144	71958	-152513
	380C2F3	0	0	0	22145	71888	-152523
	RTG	0	0	0	4367	0	-50971
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2367	13792	-24082
	150C1F1	0	0	0	8932	44513	-79922
	150C1F2	0	0	0	8987	43262	-78295
	150C1F3	0	0	0	9056	41765	-76382
	380C2F1	0	0	0	17864	89026	-159844
	380C2F2	0	0	0	17974	86524	-156590
	380C2F3	0	0	0	18113	83531	-152765
	RTG	0	0	0	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2642	10916	-21719
	150C1F1	0	0	0	9831	39502	-79935
	150C1F2	0	0	0	9846	39265	-79752
	150C1F3	0	0	0	9862	38984	-79549
	380C2F1	0	0	0	19663	79003	-159869
	380C2F2	0	0	0	19692	78530	-159503
	380C2F3	0	0	0	19725	77969	-159097
	RTG	0	0	0	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3949	20876	-36088
	150C1F1	0	0	0	10688	47605	-88740
	150C1F2	0	0	0	10741	46660	-87621
	150C1F3	0	0	0	10804	45537	-86328
	380C2F1	0	0	0	21376	95209	-177480
	380C2F2	0	0	0	21481	93320	-175242
	380C2F3	0	0	0	21609	91075	-172656
	RTG	0	0	0	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3311	11494	-22959
	150C1F1	0	0	0	10996	38148	-77029
	150C1F2	0	0	0	11006	37932	-76891
	150C1F3	0	0	0	11018	37675	-76738
	380C2F1	0	0	0	21993	76296	-154059
	380C2F2	0	0	0	22013	75864	-153781
	380C2F3	0	0	0	22035	75350	-153477
	RTG	0	0	0	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2384	13296	-23402
	150C1F1	0	0	0	8989	43228	-78252
	150C1F2	0	0	0	9041	42091	-76795
	150C1F3	0	0	0	9106	40733	-75090
	380C2F1	0	0	0	17977	86456	-156503
	380C2F2	0	0	0	18082	84182	-153590
	380C2F3	0	0	0	18212	81467	-150180
	RTG	0	0	0	3543	3548	-51324
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2648	10817	-21626
	150C1F1	0	0	0	9846	39259	-79747
	150C1F2	0	0	0	9859	39045	-79591
	150C1F3	0	0	0	9873	38792	-79419
	380C2F1	0	0	0	19692	78517	-159494
	380C2F2	0	0	0	19718	78091	-159183
	380C2F3	0	0	0	19747	77584	-158838
	RTG	0	0	0	3304	1091	-45915

NL3/3	GW / opgw	0	0	0	3976	20179	-35199
Wind, -5°C	150C1F1	0	0	0	10742	46634	-87591
Permanent loads yg= 1.2	150C1F2	0	0	0	10790	45781	-86605
Wind angle: 90°	150C1F3	0	0	0	10849	44768	-85469
	380C2F1	0	0	0	21484	93269	-175183
	380C2F2	0	0	0	21581	91562	-173209
	380C2F3	0	0	0	21698	89536	-170937
	RTG	0	0	0	5982	5588	-79111
NL3/4	GW / opgw	0	0	0	3315	11411	-22898
Construction/maintenance, +5°C	150C1F1	0	0	0	11007	37926	-76887
Permanent loads yg= 1.2	150C1F2	0	0	0	11015	37731	-76770
Wind angle: 90°	150C1F3	0	0	0	11025	37498	-76642
	380C2F1	0	0	0	22013	75852	-153774
	380C2F2	0	0	0	22030	75462	-153540
	380C2F3	0	0	0	22050	74996	-153284
	RTG	0	0	0	4388	1091	-51869
NL3/1a	GW / opgw	0	0	0	2589	8804	-18153
Wind, 10°C	150C1F1	0	0	0	9543	31968	-66498
Permanent loads yg= 1.2	150C1F2	0	0	0	9546	31894	-66478
Wind angle: -45°	150C1F3	0	0	0	9548	31804	-66458
	380C2F1	0	0	0	19087	63936	-132996
	380C2F2	0	0	0	19091	63787	-132956
	380C2F3	0	0	0	19096	63608	-132915
	RTG	0	0	0	3413	1774	-43521
NL3/1b	GW / opgw	0	0	0	2690	9951	-21116
Wind, -20°C	150C1F1	0	0	0	9945	37057	-78836
Permanent loads yg= 1.2	150C1F2	0	0	0	9945	37038	-78839
Wind angle: -45°	150C1F3	0	0	0	9945	37016	-78844
	380C2F1	0	0	0	19889	74114	-157672
	380C2F2	0	0	0	19890	74077	-157678
	380C2F3	0	0	0	19890	74032	-157687
	RTG	0	0	0	3281	546	-44960
NL3/3	GW / opgw	0	0	0	4288	13835	-28520
Wind, -5°C	150C1F1	0	0	0	11192	38242	-80241
Permanent loads yg= 1.2	150C1F2	0	0	0	11193	38182	-80235
Wind angle: -45°	150C1F3	0	0	0	11195	38111	-80229
	380C2F1	0	0	0	22383	76483	-160482
	380C2F2	0	0	0	22386	76365	-160469
	380C2F3	0	0	0	22390	76222	-160459
	RTG	0	0	0	5782	2793	-68689
NL3/4	GW / opgw	0	0	0	3341	10648	-22611
Construction/maintenance, +5°C	150C1F1	0	0	0	11074	35863	-76276
Permanent loads yg= 1.2	150C1F2	0	0	0	11074	35845	-76280
Wind angle: -45°	150C1F3	0	0	0	11074	35823	-76286
	380C2F1	0	0	0	22147	71727	-152553
	380C2F2	0	0	0	22148	71691	-152561
	380C2F3	0	0	0	22148	71646	-152572
	RTG	0	0	0	4372	546	-51198
NL3/1a	GW / opgw	0	0	0	1950	7402	-14763
Wind, 10°C	150C1F1	0	0	0	7220	26572	-53842
Permanent loads yg= 0.9	150C1F2	0	0	0	7227	26420	-53731
Wind angle: 0°	150C1F3	0	0	0	7235	26241	-53608
	380C2F1	0	0	0	14439	53143	-107683
	380C2F2	0	0	0	14453	52841	-107462
	380C2F3	0	0	0	14469	52482	-107216
	RTG	0	0	0	2488	0	-31566
NL3/1b	GW / opgw	0	0	0	2060	8219	-17283
Wind, -20°C	150C1F1	0	0	0	7642	30847	-65187
Permanent loads yg= 0.9	150C1F2	0	0	0	7643	30815	-65183
Wind angle: 0°	150C1F3	0	0	0	7644	30776	-65181
	380C2F1	0	0	0	15284	61695	-130373
	380C2F2	0	0	0	15286	61631	-130366
	380C2F3	0	0	0	15288	61553	-130361
	RTG	0	0	0	2423	0	-35310
NL3/3	GW / opgw	0	0	0	3661	12776	-25643
Wind, -5°C	150C1F1	0	0	0	8894	32832	-67710
Permanent loads yg= 0.9	150C1F2	0	0	0	8899	32721	-67654
Wind angle: 0°	150C1F3	0	0	0	8905	32588	-67594
	380C2F1	0	0	0	17789	65665	-135421
	380C2F2	0	0	0	17798	65442	-135309
	380C2F3	0	0	0	17809	65175	-135188
	RTG	0	0	0	4805	0	-56773
NL3/4	GW / opgw	0	0	0	2726	9111	-19198
Construction/maintenance, +5°C	150C1F1	0	0	0	8803	30100	-63582
Permanent loads yg= 0.9	150C1F2	0	0	0	8803	30069	-63583
Wind angle: 0°	150C1F3	0	0	0	8804	30032	-63584
	380C2F1	0	0	0	17605	60199	-127165
	380C2F2	0	0	0	17607	60138	-127165
	380C2F3	0	0	0	17608	60065	-127168
	RTG	0	0	0	3499	0	-42667
NL3/1a	GW / opgw	0	0	0	1738	12894	-22157
Wind, 10°C	150C1F1	0	0	0	6581	40609	-71551
Permanent loads yg= 0.9	150C1F2	0	0	0	6631	39179	-69541
Wind angle: 45°	150C1F3	0	0	0	6695	37452	-67135
	380C2F1	0	0	0	13163	81217	-143102
	380C2F2	0	0	0	13262	78357	-139081
	380C2F3	0	0	0	13391	74905	-134270
	RTG	0	0	0	2571	1773	-35842
NL3/1b	GW / opgw	0	0	0	1997	9295	-18244
Wind, -20°C	150C1F1	0	0	0	7487	33512	-67091
Permanent loads yg= 0.9	150C1F2	0	0	0	7507	33228	-66807
Wind angle: 45°	150C1F3	0	0	0	7529	32893	-66486
	380C2F1	0	0	0	14974	67024	-134181
	380C2F2	0	0	0	15013	66456	-133613
	380C2F3	0	0	0	15058	65786	-132973
	RTG	0	0	0	2434	545	-35777

NL3/3	GW / opgw	0	0	0	3327	20044	-34304
Wind, -5°C	150C1F1	0	0	0	8325	43108	-79100
Permanent loads yg= 0.9	150C1F2	0	0	0	8380	42022	-77676
Wind angle: 45°	150C1F3	0	0	0	8448	40724	-76007
	380C2F1	0	0	0	16650	86217	-158200
	380C2F2	0	0	0	16759	84043	-155353
	380C2F3	0	0	0	16896	81448	-152014
	RTG	0	0	0	4921	2793	-61748
NL3/4	GW / opgw	0	0	0	2688	9990	-19734
Construction/maintenance, +5°C	150C1F1	0	0	0	8704	32484	-64883
Permanent loads yg= 0.9	150C1F2	0	0	0	8717	32236	-64676
Wind angle: 45°	150C1F3	0	0	0	8731	31942	-64445
	380C2F1	0	0	0	17408	64968	-129766
	380C2F2	0	0	0	17434	64472	-129352
	380C2F3	0	0	0	17463	63884	-128890
	RTG	0	0	0	3506	546	-42962
NL3/1a	GW / opgw	0	0	0	1751	12344	-21362
Wind, 10°C	150C1F1	0	0	0	6632	39140	-69486
Permanent loads yg= 0.9	150C1F2	0	0	0	6681	37830	-67658
Wind angle: 90°	150C1F3	0	0	0	6744	36252	-65481
	380C2F1	0	0	0	13265	78280	-138972
	380C2F2	0	0	0	13362	75659	-135316
	380C2F3	0	0	0	13487	72504	-130961
	RTG	0	0	0	2700	3547	-45604
NL3/1b	GW / opgw	0	0	0	2005	9175	-18105
Wind, -20°C	150C1F1	0	0	0	7507	33221	-66799
Permanent loads yg= 0.9	150C1F2	0	0	0	7524	32966	-66554
Wind angle: 90°	150C1F3	0	0	0	7544	32664	-66279
	380C2F1	0	0	0	15014	66441	-133598
	380C2F2	0	0	0	15049	65931	-133108
	380C2F3	0	0	0	15089	65329	-132557
	RTG	0	0	0	2465	1091	-37125
NL3/3	GW / opgw	0	0	0	3352	19301	-33317
Wind, -5°C	150C1F1	0	0	0	8381	41992	-77638
Permanent loads yg= 0.9	150C1F2	0	0	0	8433	41006	-76367
Wind angle: 90°	150C1F3	0	0	0	8497	39830	-74882
	380C2F1	0	0	0	16762	83985	-155276
	380C2F2	0	0	0	16865	82012	-152733
	380C2F3	0	0	0	16994	79661	-149764
	RTG	0	0	0	5126	5587	-73758
NL3/4	GW / opgw	0	0	0	2693	9896	-19649
Construction/maintenance, +5°C	150C1F1	0	0	0	8717	32229	-64671
Permanent loads yg= 0.9	150C1F2	0	0	0	8728	32006	-64494
Wind angle: 90°	150C1F3	0	0	0	8741	31741	-64297
	380C2F1	0	0	0	17434	64458	-129341
	380C2F2	0	0	0	17457	64012	-128987
	380C2F3	0	0	0	17483	63482	-128594
	RTG	0	0	0	3526	1091	-43832
NL3/1a	GW / opgw	0	0	0	1963	7114	-14528
Wind, 10°C	150C1F1	0	0	0	7251	25852	-53382
Permanent loads yg= 0.9	150C1F2	0	0	0	7254	25768	-53342
Wind angle: -45°	150C1F3	0	0	0	7257	25667	-53298
	380C2F1	0	0	0	14501	51703	-106764
	380C2F2	0	0	0	14508	51535	-106683
	380C2F3	0	0	0	14515	51335	-106597
	RTG	0	0	0	2571	1773	-35842
NL3/1b	GW / opgw	0	0	0	2062	8159	-17273
Wind, -20°C	150C1F1	0	0	0	7646	30689	-65180
Permanent loads yg= 0.9	150C1F2	0	0	0	7647	30670	-65182
Wind angle: -45°	150C1F3	0	0	0	7647	30646	-65184
	380C2F1	0	0	0	15292	61378	-130361
	380C2F2	0	0	0	15293	61339	-130363
	380C2F3	0	0	0	15294	61292	-130368
	RTG	0	0	0	2434	545	-35777
NL3/3	GW / opgw	0	0	0	3679	12386	-25413
Wind, -5°C	150C1F1	0	0	0	8916	32295	-67490
Permanent loads yg= 0.9	150C1F2	0	0	0	8918	32231	-67473
Wind angle: -45°	150C1F3	0	0	0	8920	32155	-67455
	380C2F1	0	0	0	17831	64590	-134979
	380C2F2	0	0	0	17835	64463	-134945
	380C2F3	0	0	0	17840	64309	-134911
	RTG	0	0	0	4921	2793	-61748
NL3/4	GW / opgw	0	0	0	2726	9057	-19199
Construction/maintenance, +5°C	150C1F1	0	0	0	8805	29949	-63592
Permanent loads yg= 0.9	150C1F2	0	0	0	8806	29930	-63595
Wind angle: -45°	150C1F3	0	0	0	8806	29907	-63599
	380C2F1	0	0	0	17611	59898	-127185
	380C2F2	0	0	0	17611	59860	-127190
	380C2F3	0	0	0	17612	59814	-127198
	RTG	0	0	0	3506	546	-42962

ZWW4HL350+10

Appendix BU1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2579	9051	18298	0	0	0
	150C1F1	9521	32595	66759	0	0	0
	150C1F2	9526	32465	66693	0	0	0
	150C1F3	9532	32310	66622	0	0	0
	380C2F1	19041	65191	133518	0	0	0
	380C2F2	19052	64930	133387	0	0	0
	380C2F3	19063	64619	133244	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2689	10006	21116	0	0	0
	150C1F1	9942	37205	78821	0	0	0
	150C1F2	9942	37176	78823	0	0	0
	150C1F3	9943	37139	78825	0	0	0
	380C2F1	19883	74411	157642	0	0	0
	380C2F2	19885	74351	157645	0	0	0
	380C2F3	19886	74278	157651	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4273	14196	28687	0	0	0
	150C1F1	11176	38730	80357	0	0	0
	150C1F2	11179	38629	80325	0	0	0
	150C1F3	11184	38509	80292	0	0	0
	380C2F1	22352	77460	160714	0	0	0
	380C2F2	22359	77259	160650	0	0	0
	380C2F3	22367	77018	160584	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3341	10700	22605	0	0	0
	150C1F1	11072	36008	76253	0	0	0
	150C1F2	11072	35979	76256	0	0	0
	150C1F3	11073	35944	76261	0	0	0
	380C2F1	22144	72016	152506	0	0	0
	380C2F2	22144	71958	152513	0	0	0
	380C2F3	22145	71888	152523	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2589	8804	18153	0	0	0
	150C1F1	9543	31968	66498	0	0	0
	150C1F2	9546	31894	66478	0	0	0
	150C1F3	9548	31804	66458	0	0	0
	380C2F1	19087	63936	132996	0	0	0
	380C2F2	19091	63787	132956	0	0	0
	380C2F3	19096	63608	132915	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2690	9951	21116	0	0	0
	150C1F1	9945	37057	78836	0	0	0
	150C1F2	9945	37038	78839	0	0	0
	150C1F3	9945	37016	78844	0	0	0
	380C2F1	19889	74114	157672	0	0	0
	380C2F2	19890	74077	157678	0	0	0
	380C2F3	19890	74032	157687	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4288	13835	28520	0	0	0
	150C1F1	11192	38242	80241	0	0	0
	150C1F2	11193	38182	80235	0	0	0
	150C1F3	11195	38111	80229	0	0	0
	380C2F1	22383	76483	160482	0	0	0
	380C2F2	22386	76365	160469	0	0	0
	380C2F3	22390	76222	160459	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3341	10648	22611	0	0	0
	150C1F1	11074	35863	76276	0	0	0
	150C1F2	11074	35845	76280	0	0	0
	150C1F3	11074	35823	76286	0	0	0
	380C2F1	22147	71727	152553	0	0	0
	380C2F2	22148	71691	152561	0	0	0
	380C2F3	22148	71646	152572	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2384	13296	23402	0	0	0
	150C1F1	8989	43228	78252	0	0	0
	150C1F2	9041	42091	76795	0	0	0
	150C1F3	9106	40733	75090	0	0	0
	380C2F1	17977	86456	156503	0	0	0
	380C2F2	18082	84182	153590	0	0	0
	380C2F3	18212	81467	150180	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2648	10817	21626	0	0	0
	150C1F1	9846	39259	79747	0	0	0
	150C1F2	9859	39045	79591	0	0	0
	150C1F3	9873	38792	79419	0	0	0
	380C2F1	19692	78517	159494	0	0	0
	380C2F2	19718	78091	159183	0	0	0
	380C2F3	19747	77584	158838	0	0	0
	RTG	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3976	20179	35199	0	0	0
	150C1F1	10742	46634	87591	0	0	0
	150C1F2	10790	45781	86605	0	0	0
	150C1F3	10849	44768	85469	0	0	0
	380C2F1	21484	93269	175183	0	0	0
	380C2F2	21581	91562	173209	0	0	0
	380C2F3	21698	89536	170937	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3315	11411	22898	0	0	0
	150C1F1	11007	37926	76887	0	0	0
	150C1F2	11015	37731	76770	0	0	0
	150C1F3	11025	37498	76642	0	0	0
	380C2F1	22013	75852	153774	0	0	0
	380C2F2	22030	75462	153540	0	0	0
	380C2F3	22050	74996	153284	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2367	13792	24082	0	0	0
	150C1F1	8932	44513	79922	0	0	0
	150C1F2	8987	43262	78295	0	0	0
	150C1F3	9056	41765	76382	0	0	0
	380C2F1	17864	89026	159844	0	0	0
	380C2F2	17974	86524	156590	0	0	0
	380C2F3	18113	83531	152765	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2642	10916	21719	0	0	0
	150C1F1	9831	39502	79935	0	0	0
	150C1F2	9846	39265	79752	0	0	0
	150C1F3	9862	38984	79549	0	0	0
	380C2F1	19663	79003	159869	0	0	0
	380C2F2	19692	78530	159503	0	0	0
	380C2F3	19725	77969	159097	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3949	20876	36088	0	0	0
	150C1F1	10688	47605	88740	0	0	0
	150C1F2	10741	46660	87621	0	0	0
	150C1F3	10804	45537	86328	0	0	0
	380C2F1	21376	95209	177480	0	0	0
	380C2F2	21481	93320	175242	0	0	0
	380C2F3	21609	91075	172656	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3311	11494	22959	0	0	0
	150C1F1	10996	38148	77029	0	0	0
	150C1F2	11006	37932	76891	0	0	0
	150C1F3	11018	37675	76738	0	0	0
	380C2F1	21993	76296	154059	0	0	0
	380C2F2	22013	75864	153781	0	0	0
	380C2F3	22035	75350	153477	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1950	7402	14763	0	0	0
	150C1F1	7220	26572	53842	0	0	0
	150C1F2	7227	26420	53731	0	0	0
	150C1F3	7235	26241	53608	0	0	0
	380C2F1	14439	53143	107683	0	0	0
	380C2F2	14453	52841	107462	0	0	0
	380C2F3	14469	52482	107216	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2060	8219	17283	0	0	0
	150C1F1	7642	30847	65187	0	0	0
	150C1F2	7643	30815	65183	0	0	0
	150C1F3	7644	30776	65181	0	0	0
	380C2F1	15284	61695	130373	0	0	0
	380C2F2	15286	61631	130366	0	0	0
	380C2F3	15288	61553	130361	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3661	12776	25643	0	0	0
	150C1F1	8894	32832	67710	0	0	0
	150C1F2	8899	32721	67654	0	0	0
	150C1F3	8905	32588	67594	0	0	0
	380C2F1	17789	65665	135421	0	0	0
	380C2F2	17798	65442	135309	0	0	0
	380C2F3	17809	65175	135188	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2726	9111	19198	0	0	0
	150C1F1	8803	30100	63582	0	0	0
	150C1F2	8803	30069	63583	0	0	0
	150C1F3	8804	30032	63584	0	0	0
	380C2F1	17605	60199	127165	0	0	0
	380C2F2	17607	60138	127165	0	0	0
	380C2F3	17608	60065	127168	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7114	14528	0	0	0
	150C1F1	7251	25852	53382	0	0	0
	150C1F2	7254	25768	53342	0	0	0
	150C1F3	7257	25667	53298	0	0	0
	380C2F1	14501	51703	106764	0	0	0
	380C2F2	14508	51535	106683	0	0	0
	380C2F3	14515	51335	106597	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2062	8159	17273	0	0	0
	150C1F1	7646	30689	65180	0	0	0
	150C1F2	7647	30670	65182	0	0	0
	150C1F3	7647	30646	65184	0	0	0
	380C2F1	15292	61378	130361	0	0	0
	380C2F2	15293	61339	130363	0	0	0
	380C2F3	15294	61292	130368	0	0	0
	RTG	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3679	12386	25413	0	0	0
	150C1F1	8916	32295	67490	0	0	0
	150C1F2	8918	32231	67473	0	0	0
	150C1F3	8920	32155	67455	0	0	0
	380C2F1	17831	64590	134979	0	0	0
	380C2F2	17835	64463	134945	0	0	0
	380C2F3	17840	64309	134911	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2726	9057	19199	0	0	0
	150C1F1	8805	29949	63592	0	0	0
	150C1F2	8806	29930	63595	0	0	0
	150C1F3	8806	29907	63599	0	0	0
	380C2F1	17611	59898	127185	0	0	0
	380C2F2	17611	59860	127190	0	0	0
	380C2F3	17612	59814	127198	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1751	12344	21362	0	0	0
	150C1F1	6632	39140	69486	0	0	0
	150C1F2	6681	37830	67658	0	0	0
	150C1F3	6744	36252	65481	0	0	0
	380C2F1	13265	78280	138972	0	0	0
	380C2F2	13362	75659	135316	0	0	0
	380C2F3	13487	72504	130961	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2005	9175	18105	0	0	0
	150C1F1	7507	33221	66799	0	0	0
	150C1F2	7524	32966	66554	0	0	0
	150C1F3	7544	32664	66279	0	0	0
	380C2F1	15014	66441	133598	0	0	0
	380C2F2	15049	65931	133108	0	0	0
	380C2F3	15089	65329	132557	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3352	19301	33317	0	0	0
	150C1F1	8381	41992	77638	0	0	0
	150C1F2	8433	41006	76367	0	0	0
	150C1F3	8497	39830	74882	0	0	0
	380C2F1	16762	83985	155276	0	0	0
	380C2F2	16865	82012	152733	0	0	0
	380C2F3	16994	79661	149764	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2693	9896	19649	0	0	0
	150C1F1	8717	32229	64671	0	0	0
	150C1F2	8728	32006	64494	0	0	0
	150C1F3	8741	31741	64297	0	0	0
	380C2F1	17434	64458	129341	0	0	0
	380C2F2	17457	64012	128987	0	0	0
	380C2F3	17483	63482	128594	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1738	12894	22157	0	0	0
	150C1F1	6581	40609	71551	0	0	0
	150C1F2	6631	39179	69541	0	0	0
	150C1F3	6695	37452	67135	0	0	0
	380C2F1	13163	81217	143102	0	0	0
	380C2F2	13262	78357	139081	0	0	0
	380C2F3	13391	74905	134270	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1997	9295	18244	0	0	0
	150C1F1	7487	33512	67091	0	0	0
	150C1F2	7507	33228	66807	0	0	0
	150C1F3	7529	32893	66486	0	0	0
	380C2F1	14974	67024	134181	0	0	0
	380C2F2	15013	66456	133613	0	0	0
	380C2F3	15058	65786	132973	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3327	20044	34304	0	0	0
	150C1F1	8325	43108	79100	0	0	0
	150C1F2	8380	42022	77676	0	0	0
	150C1F3	8448	40724	76007	0	0	0
	380C2F1	16650	86217	158200	0	0	0
	380C2F2	16759	84043	155353	0	0	0
	380C2F3	16896	81448	152014	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2688	9990	19734	0	0	0
	150C1F1	8704	32484	64883	0	0	0
	150C1F2	8717	32236	64676	0	0	0
	150C1F3	8731	31942	64445	0	0	0
	380C2F1	17408	64968	129766	0	0	0
	380C2F2	17434	64472	129352	0	0	0
	380C2F3	17463	63884	128890	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HL350+10

Appendix BU1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2579	9051	18298	2579	9051	-18298
	150C1F1	9521	32595	66759	9521	32595	-66759
	150C1F2	9526	32465	66693	9526	32465	-66693
	150C1F3	9532	32310	66622	9532	32310	-66622
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2689	10006	21116	2689	10006	-21116
	150C1F1	9942	37205	78821	9942	37205	-78821
	150C1F2	9942	37176	78823	9942	37176	-78823
	150C1F3	9943	37139	78825	9943	37139	-78825
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4273	14196	28687	4273	14196	-28687
	150C1F1	11176	38730	80357	11176	38730	-80357
	150C1F2	11179	38629	80325	11179	38629	-80325
	150C1F3	11184	38509	80292	11184	38509	-80292
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3341	10700	22605	3341	10700	-22605
	150C1F1	11072	36008	76253	11072	36008	-76253
	150C1F2	11072	35979	76256	11072	35979	-76256
	150C1F3	11073	35944	76261	11073	35944	-76261
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2589	8804	18153	2367	13792	-24082
	150C1F1	9543	31968	66498	8932	44513	-79922
	150C1F2	9546	31894	66478	8987	43262	-78295
	150C1F3	9548	31804	66458	9056	41765	-76382
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2690	9951	21116	2642	10916	-21719
	150C1F1	9945	37057	78836	9831	39502	-79935
	150C1F2	9945	37038	78839	9846	39265	-79752
	150C1F3	9945	37016	78844	9862	38984	-79549
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4288	13835	28520	3949	20876	-36088
	150C1F1	11192	38242	80241	10688	47605	-88740
	150C1F2	11193	38182	80235	10741	46660	-87621
	150C1F3	11195	38111	80229	10804	45537	-86328
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3341	10648	22611	3311	11494	-22959
	150C1F1	11074	35863	76276	10996	38148	-77029
	150C1F2	11074	35845	76280	11006	37932	-76891
	150C1F3	11074	35823	76286	11018	37675	-76738
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2384	13296	23402	2384	13296	-23402
	150C1F1	8989	43228	78252	8989	43228	-78252
	150C1F2	9041	42091	76795	9041	42091	-76795
	150C1F3	9106	40733	75090	9106	40733	-75090
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2648	10817	21626	2648	10817	-21626
	150C1F1	9846	39259	79747	9846	39259	-79747
	150C1F2	9859	39045	79591	9859	39045	-79591
	150C1F3	9873	38792	79419	9873	38792	-79419
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3976	20179	35199	3976	20179	-35199
	150C1F1	10742	46634	87591	10742	46634	-87591
	150C1F2	10790	45781	86605	10790	45781	-86605
	150C1F3	10849	44768	85469	10849	44768	-85469
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3315	11411	22898	3315	11411	-22898
	150C1F1	11007	37926	76887	11007	37926	-76887
	150C1F2	11015	37731	76770	11015	37731	-76770
	150C1F3	11025	37498	76642	11025	37498	-76642
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2367	13792	24082	2589	8804	-18153
	150C1F1	8932	44513	79922	9543	31968	-66498
	150C1F2	8987	43262	78295	9546	31894	-66478
	150C1F3	9056	41765	76382	9548	31804	-66458
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2642	10916	21719	2690	9951	-21116
	150C1F1	9831	39502	79935	9945	37057	-78836
	150C1F2	9846	39265	79752	9945	37038	-78839
	150C1F3	9862	38984	79549	9945	37016	-78844
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3949	20876	36088	4288	13835	-28520
	150C1F1	10688	47605	88740	11192	38242	-80241
	150C1F2	10741	46660	87621	11193	38182	-80235
	150C1F3	10804	45537	86328	11195	38111	-80229
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3311	11494	22959	3341	10648	-22611
	150C1F1	10996	38148	77029	11074	35863	-76276
	150C1F2	11006	37932	76891	11074	35845	-76280
	150C1F3	11018	37675	76738	11074	35823	-76286
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1950	7402	14763	1950	7402	-14763
	150C1F1	7220	26572	53842	7220	26572	-53842
	150C1F2	7227	26420	53731	7227	26420	-53731
	150C1F3	7235	26241	53608	7235	26241	-53608
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2060	8219	17283	2060	8219	-17283
	150C1F1	7642	30847	65187	7642	30847	-65187
	150C1F2	7643	30815	65183	7643	30815	-65183
	150C1F3	7644	30776	65181	7644	30776	-65181
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3661	12776	25643	3661	12776	-25643
	150C1F1	8894	32832	67710	8894	32832	-67710
	150C1F2	8899	32721	67654	8899	32721	-67654
	150C1F3	8905	32588	67594	8905	32588	-67594
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2726	9111	19198	2726	9111	-19198
	150C1F1	8803	30100	63582	8803	30100	-63582
	150C1F2	8803	30069	63583	8803	30069	-63583
	150C1F3	8804	30032	63584	8804	30032	-63584
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7114	14528	1738	12894	-22157
	150C1F1	7251	25852	53382	6581	40609	-71551
	150C1F2	7254	25768	53342	6631	39179	-69541
	150C1F3	7257	25667	53298	6695	37452	-67135
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2062	8159	17273	1997	9295	-18244
	150C1F1	7646	30689	65180	7487	33512	-67091
	150C1F2	7647	30670	65182	7507	33228	-66807
	150C1F3	7647	30646	65184	7529	32893	-66486
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: 45°	GW / opgw	3679	12386	25413	3327	20044	-34304
	150C1F1	8916	32295	67490	8325	43108	-79100
	150C1F2	8918	32231	67473	8380	42022	-77676
	150C1F3	8920	32155	67455	8448	40724	-76007
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: 45°	GW / opgw	2726	9057	19199	2688	9990	-19734
	150C1F1	8805	29949	63592	8704	32484	-64883
	150C1F2	8806	29930	63595	8717	32236	-64676
	150C1F3	8806	29907	63599	8731	31942	-64445
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	1751	12344	21362	1751	12344	-21362
	150C1F1	6632	39140	69486	6632	39140	-69486
	150C1F2	6681	37830	67658	6681	37830	-67658
	150C1F3	6744	36252	65481	6744	36252	-65481
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	2005	9175	18105	2005	9175	-18105
	150C1F1	7507	33221	66799	7507	33221	-66799
	150C1F2	7524	32966	66554	7524	32966	-66554
	150C1F3	7544	32664	66279	7544	32664	-66279
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	3352	19301	33317	3352	19301	-33317
	150C1F1	8381	41992	77638	8381	41992	-77638
	150C1F2	8433	41006	76367	8433	41006	-76367
	150C1F3	8497	39830	74882	8497	39830	-74882
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	2693	9896	19649	2693	9896	-19649
	150C1F1	8717	32229	64671	8717	32229	-64671
	150C1F2	8728	32006	64494	8728	32006	-64494
	150C1F3	8741	31741	64297	8741	31741	-64297
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	1738	12894	22157	1963	7114	-14528
	150C1F1	6581	40609	71551	7251	25852	-53382
	150C1F2	6631	39179	69541	7254	25768	-53342
	150C1F3	6695	37452	67135	7257	25667	-53298
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	1997	9295	18244	2062	8159	-17273
	150C1F1	7487	33512	67091	7646	30689	-65180
	150C1F2	7507	33228	66807	7647	30670	-65182
	150C1F3	7529	32893	66486	7647	30646	-65184
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	3327	20044	34304	3679	12386	-25413
	150C1F1	8325	43108	79100	8916	32295	-67490
	150C1F2	8380	42022	77676	8918	32231	-67473
	150C1F3	8448	40724	76007	8920	32155	-67455
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	2688	9990	19734	2726	9057	-19199
	150C1F1	8704	32484	64883	8805	29949	-63592
	150C1F2	8717	32236	64676	8806	29930	-63595
	150C1F3	8731	31942	64445	8806	29907	-63599
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HL350+10

Appendix BU1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19041	65191	133518	19041	65191	-133518
	380C2F2	19052	64930	133387	19052	64930	-133387
	380C2F3	19063	64619	133244	19063	64619	-133244
	RTG	0	0	0	3346	0	-40400
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19883	74411	157642	19883	74411	-157642
	380C2F2	19885	74351	157645	19885	74351	-157645
	380C2F3	19886	74278	157651	19886	74278	-157651
	RTG	0	0	0	3273	0	-44634
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22352	77460	160714	22352	77460	-160714
	380C2F2	22359	77259	160650	22359	77259	-160650
	380C2F3	22367	77018	160584	22367	77018	-160584
	RTG	0	0	0	5682	0	-64570
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22144	72016	152506	22144	72016	-152506
	380C2F2	22144	71958	152513	22144	71958	-152513
	380C2F3	22145	71888	152523	22145	71888	-152523
	RTG	0	0	0	4367	0	-50971
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19087	63936	132996	17864	89026	-159844
	380C2F2	19091	63787	132956	17974	88524	-156590
	380C2F3	19096	63608	132915	18113	83531	-152765
	RTG	0	0	0	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19889	74114	157672	19663	79003	-159869
	380C2F2	19890	74077	157678	19692	78530	-159503
	380C2F3	19890	74032	157687	19725	77969	-159097
	RTG	0	0	0	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22383	76483	160482	21376	95209	-177480
	380C2F2	22386	76365	160469	21481	93320	-175242
	380C2F3	22390	76222	160459	21609	91075	-172656
	RTG	0	0	0	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22147	71727	152553	21993	76296	-154059
	380C2F2	22148	71691	152561	22013	75864	-153781
	380C2F3	22148	71646	152572	22035	75350	-153477
	RTG	0	0	0	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17977	86456	156503	17977	86456	-156503
	380C2F2	18082	84182	153590	18082	84182	-153590
	380C2F3	18212	81467	150180	18212	81467	-150180
	RTG	0	0	0	3543	3548	-51324
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19692	78517	159494	19692	78517	-159494
	380C2F2	19718	78091	159183	19718	78091	-159183
	380C2F3	19747	77584	158838	19747	77584	-158838
	RTG	0	0	0	3304	1091	-45915

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17831	64590	134979	16650	86217	-158200	
	380C2F2	17835	64463	134945	16759	84043	-155353	
	380C2F3	17840	64309	134911	16896	81448	-152014	
	RTG	0	0	0	4921	2793	-61748	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17611	59898	127185	17408	64968	-129766	
	380C2F2	17611	59860	127190	17434	64472	-129352	
	380C2F3	17612	59814	127198	17463	63884	-128890	
	RTG	0	0	0	3506	546	-42962	
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	13265	78280	138972	13265	78280	-138972	
	380C2F2	13362	75659	135316	13362	75659	-135316	
	380C2F3	13487	72504	130961	13487	72504	-130961	
	RTG	0	0	0	2700	3547	-45604	
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	15014	66441	133598	15014	66441	-133598	
	380C2F2	15049	65931	133108	15049	65931	-133108	
	380C2F3	15089	65329	132557	15089	65329	-132557	
	RTG	0	0	0	2465	1091	-37125	
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	16762	83985	155276	16762	83985	-155276	
	380C2F2	16865	82012	152733	16865	82012	-152733	
	380C2F3	16994	79661	149764	16994	79661	-149764	
	RTG	0	0	0	5126	5587	-73758	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17434	64458	129341	17434	64458	-129341	
	380C2F2	17457	64012	128987	17457	64012	-128987	
	380C2F3	17483	63482	128594	17483	63482	-128594	
	RTG	0	0	0	3526	1091	-43832	
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	13163	81217	143102	14501	51703	-106764	
	380C2F2	13262	78357	139081	14508	51535	-106683	
	380C2F3	13391	74905	134270	14515	51335	-106597	
	RTG	0	0	0	2571	1773	-35842	
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	14974	67024	134181	15292	61378	-130361	
	380C2F2	15013	66456	133613	15293	61339	-130363	
	380C2F3	15058	65786	132973	15294	61292	-130368	
	RTG	0	0	0	2434	545	-35777	
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	16650	86217	158200	17831	64590	-134979	
	380C2F2	16759	84043	155353	17835	64463	-134945	
	380C2F3	16896	81448	152014	17840	64309	-134911	
	RTG	0	0	0	4921	2793	-61748	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17408	64968	129766	17611	59898	-127185	
	380C2F2	17434	64472	129352	17611	59860	-127190	
	380C2F3	17463	63884	128890	17612	59814	-127198	
	RTG	0	0	0	3506	546	-42962	

ZWW4HL350+10

Appendix BU1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19041	65191	133518	19041	65191	-133518
	380C2F2	19052	64930	133387	19052	64930	-133387
	380C2F3	19063	64619	133244	19063	64619	-133244
	RTG	0	0	0	3346	0	-40400
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19883	74411	157642	19883	74411	-157642
	380C2F2	19885	74351	157645	19885	74351	-157645
	380C2F3	19886	74278	157651	19886	74278	-157651
	RTG	0	0	0	3273	0	-44634
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22352	77460	160714	22352	77460	-160714
	380C2F2	22359	77259	160650	22359	77259	-160650
	380C2F3	22367	77018	160584	22367	77018	-160584
	RTG	0	0	0	5682	0	-64570
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22144	72016	152506	22144	72016	-152506
	380C2F2	22144	71958	152513	22144	71958	-152513
	380C2F3	22145	71888	152523	22145	71888	-152523
	RTG	0	0	0	4367	0	-50971
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19087	63936	132996	17864	89026	-159844
	380C2F2	19091	63787	132956	17974	88524	-156590
	380C2F3	19096	63608	132915	18113	83531	-152765
	RTG	0	0	0	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19889	74114	157672	19663	79003	-159869
	380C2F2	19890	74077	157678	19692	78530	-159503
	380C2F3	19890	74032	157687	19725	77969	-159097
	RTG	0	0	0	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22383	76483	160482	21376	95209	-177480
	380C2F2	22386	76365	160469	21481	93320	-175242
	380C2F3	22390	76222	160459	21609	91075	-172656
	RTG	0	0	0	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22147	71727	152553	21993	76296	-154059
	380C2F2	22148	71691	152561	22013	75864	-153781
	380C2F3	22148	71646	152572	22035	75350	-153477
	RTG	0	0	0	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17977	86456	156503	17977	86456	-156503
	380C2F2	18082	84182	153590	18082	84182	-153590
	380C2F3	18212	81467	150180	18212	81467	-150180
	RTG	0	0	0	3543	3548	-51324
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19692	78517	159494	19692	78517	-159494
	380C2F2	19718	78091	159183	19718	78091	-159183
	380C2F3	19747	77584	158838	19747	77584	-158838
	RTG	0	0	0	3304	1091	-45915

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17831	64590	134979	16650	86217	-158200
	380C2F2	17835	64463	134945	16759	84043	-155353
	380C2F3	17840	64309	134911	16896	81448	-152014
	RTG	0	0	0	4921	2793	-61748
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0
150C1F1	0	0	0	0	0	0	
150C1F2	0	0	0	0	0	0	
150C1F3	0	0	0	0	0	0	
380C2F1	17611	59898	127185	17408	64968	-129766	
380C2F2	17611	59860	127190	17434	64472	-129352	
380C2F3	17612	59814	127198	17463	63884	-128890	
RTG	0	0	0	3506	546	-42962	
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	13265	78280	138972	13265	78280	-138972
	380C2F2	13362	75659	135316	13362	75659	-135316
	380C2F3	13487	72504	130961	13487	72504	-130961
	RTG	0	0	0	2700	3547	-45604
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		15014	66441	133598	15014	66441	-133598
380C2F2		15049	65931	133108	15049	65931	-133108
380C2F3		15089	65329	132557	15089	65329	-132557
RTG		0	0	0	2465	1091	-37125
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16762	83985	155276	16762	83985	-155276
	380C2F2	16865	82012	152733	16865	82012	-152733
	380C2F3	16994	79661	149764	16994	79661	-149764
	RTG	0	0	0	5126	5587	-73758
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		17434	64458	129341	17434	64458	-129341
380C2F2		17457	64012	128987	17457	64012	-128987
380C2F3		17483	63482	128594	17483	63482	-128594
RTG		0	0	0	3526	1091	-43832
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	13163	81217	143102	14501	51703	-106764
	380C2F2	13262	78357	139081	14508	51535	-106683
	380C2F3	13391	74905	134270	14515	51335	-106597
	RTG	0	0	0	2571	1773	-35842
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		14974	67024	134181	15292	61378	-130361
380C2F2		15013	66456	133613	15293	61339	-130363
380C2F3		15058	65786	132973	15294	61292	-130368
RTG		0	0	0	2434	545	-35777
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16650	86217	158200	17831	64590	-134979
	380C2F2	16759	84043	155353	17835	64463	-134945
	380C2F3	16896	81448	152014	17840	64309	-134911
	RTG	0	0	0	4921	2793	-61748
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		17408	64968	129766	17611	59898	-127185
380C2F2		17434	64472	129352	17611	59860	-127190
380C2F3		17463	63884	128890	17612	59814	-127198
RTG		0	0	0	3506	546	-42962

ZWW4HL350+10

Appendix BU1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2579	9051	18298	0	0	0
	150C1F1	9521	32595	66759	0	0	0
	150C1F2	9526	32465	66693	0	0	0
	150C1F3	9532	32310	66622	0	0	0
	380C2F1	0	0	0	19041	65191	-133518
	380C2F2	0	0	0	19052	64930	-133387
	380C2F3	0	0	0	19063	64619	-133244
	RTG	0	0	0	3346	0	-40400
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2689	10006	21116	0	0	0
	150C1F1	9942	37205	78821	0	0	0
	150C1F2	9942	37176	78823	0	0	0
	150C1F3	9943	37139	78825	0	0	0
	380C2F1	0	0	0	19883	74411	-157642
	380C2F2	0	0	0	19885	74351	-157645
	380C2F3	0	0	0	19886	74278	-157651
	RTG	0	0	0	3273	0	-44634
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4273	14196	28687	0	0	0
	150C1F1	11176	38730	80357	0	0	0
	150C1F2	11179	38629	80325	0	0	0
	150C1F3	11184	38509	80292	0	0	0
	380C2F1	0	0	0	22352	77460	-160714
	380C2F2	0	0	0	22359	77259	-160650
	380C2F3	0	0	0	22367	77018	-160584
	RTG	0	0	0	5682	0	-64570
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3341	10700	22605	0	0	0
	150C1F1	11072	36008	76253	0	0	0
	150C1F2	11072	35979	76256	0	0	0
	150C1F3	11073	35944	76261	0	0	0
	380C2F1	0	0	0	22144	72016	-152506
	380C2F2	0	0	0	22144	71958	-152513
	380C2F3	0	0	0	22145	71888	-152523
	RTG	0	0	0	4367	0	-50971
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2589	8804	18153	0	0	0
	150C1F1	9543	31968	66498	0	0	0
	150C1F2	9546	31894	66478	0	0	0
	150C1F3	9548	31804	66458	0	0	0
	380C2F1	0	0	0	17864	89026	-159844
	380C2F2	0	0	0	17974	88524	-156590
	380C2F3	0	0	0	18113	83531	-152765
	RTG	0	0	0	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2690	9951	21116	0	0	0
	150C1F1	9945	37057	78836	0	0	0
	150C1F2	9945	37038	78839	0	0	0
	150C1F3	9945	37016	78844	0	0	0
	380C2F1	0	0	0	19663	79003	-159869
	380C2F2	0	0	0	19692	78530	-159503
	380C2F3	0	0	0	19725	77969	-159097
	RTG	0	0	0	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4288	13835	28520	0	0	0
	150C1F1	11192	38242	80241	0	0	0
	150C1F2	11193	38182	80235	0	0	0
	150C1F3	11195	38111	80229	0	0	0
	380C2F1	0	0	0	21376	95209	-177480
	380C2F2	0	0	0	21481	93320	-175242
	380C2F3	0	0	0	21609	91075	-172656
	RTG	0	0	0	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3341	10648	22611	0	0	0
	150C1F1	11074	35863	76276	0	0	0
	150C1F2	11074	35845	76280	0	0	0
	150C1F3	11074	35823	76286	0	0	0
	380C2F1	0	0	0	21993	76296	-154059
	380C2F2	0	0	0	22013	75864	-153781
	380C2F3	0	0	0	22035	75350	-153477
	RTG	0	0	0	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2384	13296	23402	0	0	0
	150C1F1	8989	43228	78252	0	0	0
	150C1F2	9041	42091	76795	0	0	0
	150C1F3	9106	40733	75090	0	0	0
	380C2F1	0	0	0	17977	86456	-156503
	380C2F2	0	0	0	18082	84182	-153590
	380C2F3	0	0	0	18212	81467	-150180
	RTG	0	0	0	3543	3548	-51324
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2648	10817	21626	0	0	0
	150C1F1	9846	39259	79747	0	0	0
	150C1F2	9859	39045	79591	0	0	0
	150C1F3	9873	38792	79419	0	0	0
	380C2F1	0	0	0	19692	78517	-159494
	380C2F2	0	0	0	19718	78091	-159183
	380C2F3	0	0	0	19747	77584	-158838
	RTG	0	0	0	3304	1091	-45915

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3976	20179	35199	0	0	0
	150C1F1	10742	46634	87591	0	0	0
	150C1F2	10790	45781	86605	0	0	0
	150C1F3	10849	44768	85469	0	0	0
	380C2F1	0	0	0	21484	93269	-175183
	380C2F2	0	0	0	21581	91562	-173209
	380C2F3	0	0	0	21698	89536	-170937
	RTG	0	0	0	5982	5588	-79111
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3315	11411	22898	0	0	0
	150C1F1	11007	37926	76887	0	0	0
	150C1F2	11015	37731	76770	0	0	0
	150C1F3	11025	37498	76642	0	0	0
	380C2F1	0	0	0	22013	75852	-153774
	380C2F2	0	0	0	22030	75462	-153540
	380C2F3	0	0	0	22050	74996	-153284
	RTG	0	0	0	4388	1091	-51869
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2367	13792	24082	0	0	0
	150C1F1	8932	44513	79922	0	0	0
	150C1F2	8987	43262	78295	0	0	0
	150C1F3	9056	41765	76382	0	0	0
	380C2F1	0	0	0	19087	63936	-132996
	380C2F2	0	0	0	19091	63787	-132956
	380C2F3	0	0	0	19096	63608	-132915
	RTG	0	0	0	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2642	10916	21719	0	0	0
	150C1F1	9831	39502	79935	0	0	0
	150C1F2	9846	39265	79752	0	0	0
	150C1F3	9862	38984	79549	0	0	0
	380C2F1	0	0	0	19889	74114	-157672
	380C2F2	0	0	0	19890	74077	-157678
	380C2F3	0	0	0	19890	74032	-157687
	RTG	0	0	0	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3949	20876	36088	0	0	0
	150C1F1	10688	47605	88740	0	0	0
	150C1F2	10741	46660	87621	0	0	0
	150C1F3	10804	45537	86328	0	0	0
	380C2F1	0	0	0	22383	76483	-160482
	380C2F2	0	0	0	22386	76365	-160469
	380C2F3	0	0	0	22390	76222	-160459
	RTG	0	0	0	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3311	11494	22959	0	0	0
	150C1F1	10996	38148	77029	0	0	0
	150C1F2	11006	37932	76891	0	0	0
	150C1F3	11018	37675	76738	0	0	0
	380C2F1	0	0	0	22147	71727	-152553
	380C2F2	0	0	0	22148	71691	-152561
	380C2F3	0	0	0	22148	71646	-152572
	RTG	0	0	0	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1950	7402	14763	0	0	0
	150C1F1	7220	26572	53842	0	0	0
	150C1F2	7227	26420	53731	0	0	0
	150C1F3	7235	26241	53608	0	0	0
	380C2F1	0	0	0	14439	53143	-107683
	380C2F2	0	0	0	14453	52841	-107462
	380C2F3	0	0	0	14469	52482	-107216
	RTG	0	0	0	2488	0	-31566
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2060	8219	17283	0	0	0
	150C1F1	7642	30847	65187	0	0	0
	150C1F2	7643	30815	65183	0	0	0
	150C1F3	7644	30776	65181	0	0	0
	380C2F1	0	0	0	15284	61695	-130373
	380C2F2	0	0	0	15286	61631	-130366
	380C2F3	0	0	0	15288	61553	-130361
	RTG	0	0	0	2423	0	-35310
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3661	12776	25643	0	0	0
	150C1F1	8894	32832	67710	0	0	0
	150C1F2	8899	32721	67654	0	0	0
	150C1F3	8905	32588	67594	0	0	0
	380C2F1	0	0	0	17789	65665	-135421
	380C2F2	0	0	0	17798	65442	-135309
	380C2F3	0	0	0	17809	65175	-135188
	RTG	0	0	0	4805	0	-56773
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2726	9111	19198	0	0	0
	150C1F1	8803	30100	63582	0	0	0
	150C1F2	8803	30069	63583	0	0	0
	150C1F3	8804	30032	63584	0	0	0
	380C2F1	0	0	0	17605	60199	-127165
	380C2F2	0	0	0	17607	60138	-127165
	380C2F3	0	0	0	17608	60065	-127168
	RTG	0	0	0	3499	0	-42667
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7114	14528	0	0	0
	150C1F1	7251	25852	53382	0	0	0
	150C1F2	7254	25768	53342	0	0	0
	150C1F3	7257	25667	53298	0	0	0
	380C2F1	0	0	0	13163	81217	-143102
	380C2F2	0	0	0	13262	78357	-139081
	380C2F3	0	0	0	13391	74905	-134270
	RTG	0	0	0	2571	1773	-35842
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2062	8159	17273	0	0	0
	150C1F1	7646	30689	65180	0	0	0
	150C1F2	7647	30670	65182	0	0	0
	150C1F3	7647	30646	65184	0	0	0
	380C2F1	0	0	0	14974	67024	-134181
	380C2F2	0	0	0	15013	66456	-133613
	380C2F3	0	0	0	15058	65786	-132973
	RTG	0	0	0	2434	545	-35777

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3679	12386	25413	0	0	0
	150C1F1	8916	32295	67490	0	0	0
	150C1F2	8918	32231	67473	0	0	0
	150C1F3	8920	32155	67455	0	0	0
	380C2F1	0	0	0	16650	86217	-158200
	380C2F2	0	0	0	16759	84043	-155353
	380C2F3	0	0	0	16896	81448	-152014
	RTG	0	0	0	4921	2793	-61748
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2726	9057	19199	0	0	0
	150C1F1	8805	29949	63592	0	0	0
	150C1F2	8806	29930	63595	0	0	0
	150C1F3	8806	29907	63599	0	0	0
	380C2F1	0	0	0	17408	64968	-129766
	380C2F2	0	0	0	17434	64472	-129352
	380C2F3	0	0	0	17463	63884	-128890
	RTG	0	0	0	3506	546	-42962
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1751	12344	21362	0	0	0
	150C1F1	6632	39140	69486	0	0	0
	150C1F2	6681	37830	67658	0	0	0
	150C1F3	6744	36252	65481	0	0	0
	380C2F1	0	0	0	13265	78280	-138972
	380C2F2	0	0	0	13362	75659	-135316
	380C2F3	0	0	0	13487	72504	-130961
	RTG	0	0	0	2700	3547	-45604
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2005	9175	18105	0	0	0
	150C1F1	7507	33221	66799	0	0	0
	150C1F2	7524	32966	66554	0	0	0
	150C1F3	7544	32664	66279	0	0	0
	380C2F1	0	0	0	15014	66441	-133598
	380C2F2	0	0	0	15049	65931	-133108
	380C2F3	0	0	0	15089	65329	-132557
	RTG	0	0	0	2465	1091	-37125
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3352	19301	33317	0	0	0
	150C1F1	8381	41992	77638	0	0	0
	150C1F2	8433	41006	76367	0	0	0
	150C1F3	8497	39830	74882	0	0	0
	380C2F1	0	0	0	16762	83985	-155276
	380C2F2	0	0	0	16865	82012	-152733
	380C2F3	0	0	0	16994	79661	-149764
	RTG	0	0	0	5126	5587	-73758
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2693	9896	19649	0	0	0
	150C1F1	8717	32229	64671	0	0	0
	150C1F2	8728	32006	64494	0	0	0
	150C1F3	8741	31741	64297	0	0	0
	380C2F1	0	0	0	17434	64458	-129341
	380C2F2	0	0	0	17457	64012	-128987
	380C2F3	0	0	0	17483	63482	-128594
	RTG	0	0	0	3526	1091	-43832
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1738	12894	22157	0	0	0
	150C1F1	6581	40609	71551	0	0	0
	150C1F2	6631	39179	69541	0	0	0
	150C1F3	6695	37452	67135	0	0	0
	380C2F1	0	0	0	14501	51703	-106764
	380C2F2	0	0	0	14508	51535	-106683
	380C2F3	0	0	0	14515	51335	-106597
	RTG	0	0	0	2571	1773	-35842
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1997	9295	18244	0	0	0
	150C1F1	7487	33512	67091	0	0	0
	150C1F2	7507	33228	66807	0	0	0
	150C1F3	7529	32893	66486	0	0	0
	380C2F1	0	0	0	15292	61378	-130361
	380C2F2	0	0	0	15293	61339	-130363
	380C2F3	0	0	0	15294	61292	-130368
	RTG	0	0	0	2434	545	-35777
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3327	20044	34304	0	0	0
	150C1F1	8325	43108	79100	0	0	0
	150C1F2	8380	42022	77676	0	0	0
	150C1F3	8448	40724	76007	0	0	0
	380C2F1	0	0	0	17831	64590	-134979
	380C2F2	0	0	0	17835	64463	-134945
	380C2F3	0	0	0	17840	64309	-134911
	RTG	0	0	0	4921	2793	-61748
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2688	9990	19734	0	0	0
	150C1F1	8704	32484	64883	0	0	0
	150C1F2	8717	32236	64676	0	0	0
	150C1F3	8731	31942	64445	0	0	0
	380C2F1	0	0	0	17611	59898	-127185
	380C2F2	0	0	0	17611	59860	-127190
	380C2F3	0	0	0	17612	59814	-127198
	RTG	0	0	0	3506	546	-42962

ZWW4HL350+10

Appendix BU1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	2579	9051	-18298
	150C1F1	0	0	0	9521	32595	-66759
	150C1F2	0	0	0	9526	32465	-66693
	150C1F3	0	0	0	9532	32310	-66622
	380C2F1	19041	65191	133518	19041	65191	-133518
	380C2F2	19052	64930	133387	19052	64930	-133387
	380C2F3	19063	64619	133244	19063	64619	-133244
	RTG	2897	0	39944	3346	0	-40400
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	2689	10006	-21116
	150C1F1	0	0	0	9942	37205	-78821
	150C1F2	0	0	0	9942	37176	-78823
	150C1F3	0	0	0	9943	37139	-78825
	380C2F1	19883	74411	157642	19883	74411	-157642
	380C2F2	19885	74351	157645	19885	74351	-157645
	380C2F3	19886	74278	157651	19886	74278	-157651
	RTG	2719	0	46126	3273	0	-44634
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	4273	14196	-28687
	150C1F1	0	0	0	11176	38730	-80357
	150C1F2	0	0	0	11179	38629	-80325
	150C1F3	0	0	0	11184	38509	-80292
	380C2F1	22352	77460	160714	22352	77460	-160714
	380C2F2	22359	77259	160650	22359	77259	-160650
	380C2F3	22367	77018	160584	22367	77018	-160584
	RTG	4994	0	62775	5682	0	-64570
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	3341	10700	-22605
	150C1F1	0	0	0	11072	36008	-76253
	150C1F2	0	0	0	11072	35979	-76256
	150C1F3	0	0	0	11073	35944	-76261
	380C2F1	22144	72016	152506	22144	72016	-152506
	380C2F2	22144	71958	152513	22144	71958	-152513
	380C2F3	22145	71888	152523	22145	71888	-152523
	RTG	3815	0	49881	4367	0	-50971
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	2367	13792	-24082
	150C1F1	0	0	0	8932	44513	-79922
	150C1F2	0	0	0	8987	43262	-78295
	150C1F3	0	0	0	9056	41765	-76382
	380C2F1	19087	63936	132996	17864	89026	-159844
	380C2F2	19091	63787	132956	17974	88524	-156590
	380C2F3	19096	63608	132915	18113	83531	-152765
	RTG	3022	1848	43030	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	2642	10916	-21719
	150C1F1	0	0	0	9831	39502	-79935
	150C1F2	0	0	0	9846	39265	-79752
	150C1F3	0	0	0	9862	38984	-79549
	380C2F1	19889	74114	157672	19663	79003	-159869
	380C2F2	19890	74077	157678	19692	78530	-159503
	380C2F3	19890	74032	157687	19725	77969	-159097
	RTG	2736	568	46445	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	3949	20876	-36088
	150C1F1	0	0	0	10688	47605	-88740
	150C1F2	0	0	0	10741	46660	-87621
	150C1F3	0	0	0	10804	45537	-86328
	380C2F1	22383	76483	160482	21376	95209	-177480
	380C2F2	22386	76365	160469	21481	93320	-175242
	380C2F3	22390	76222	160459	21609	91075	-172656
	RTG	5178	2911	66741	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	3311	11494	-22959
	150C1F1	0	0	0	10996	38148	-77029
	150C1F2	0	0	0	11006	37932	-76891
	150C1F3	0	0	0	11018	37675	-76738
	380C2F1	22147	71727	152553	21993	76296	-154059
	380C2F2	22148	71691	152561	22013	75864	-153781
	380C2F3	22148	71646	152572	22035	75350	-153477
	RTG	3825	569	50104	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	2384	13296	-23402
	150C1F1	0	0	0	8989	43228	-78252
	150C1F2	0	0	0	9041	42091	-76795
	150C1F3	0	0	0	9106	40733	-75090
	380C2F1	17977	86456	156503	17977	86456	-156503
	380C2F2	18082	84182	153590	18082	84182	-153590
	380C2F3	18212	81467	150180	18212	81467	-150180
	RTG	3253	3697	50594	3543	3548	-51324
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	2648	10817	-21626
	150C1F1	0	0	0	9846	39259	-79747
	150C1F2	0	0	0	9859	39045	-79591
	150C1F3	0	0	0	9873	38792	-79419
	380C2F1	19692	78517	159494	19692	78517	-159494
	380C2F2	19718	78091	159183	19718	78091	-159183
	380C2F3	19747	77584	158838	19747	77584	-158838
	RTG	2783	1137	47381	3304	1091	-45915

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	3976	20179	-35199
	150C1F1	0	0	0	10742	46634	-87591
	150C1F2	0	0	0	10790	45781	-86605
	150C1F3	0	0	0	10849	44768	-85469
	380C2F1	21484	93269	175183	21484	93269	-175183
	380C2F2	21581	91562	173209	21581	91562	-173209
	380C2F3	21698	89536	170937	21698	89536	-170937
	RTG	5530	5824	76614	5982	5588	-79111
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	3315	11411	-22898
	150C1F1	0	0	0	11007	37926	-76887
	150C1F2	0	0	0	11015	37731	-76770
	150C1F3	0	0	0	11025	37498	-76642
	380C2F1	22013	75852	153774	22013	75852	-153774
	380C2F2	22030	75462	153540	22030	75462	-153540
	380C2F3	22050	74996	153284	22050	74996	-153284
	RTG	3855	1137	50761	4388	1091	-51869
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2589	8804	-18153
	150C1F1	0	0	0	9543	31968	-66498
	150C1F2	0	0	0	9546	31894	-66478
	150C1F3	0	0	0	9548	31804	-66458
	380C2F1	17864	89026	159844	19087	63936	-132996
	380C2F2	17974	86524	156590	19091	63787	-132956
	380C2F3	18113	83531	152765	19096	63608	-132915
	RTG	3022	1848	43030	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2690	9951	-21116
	150C1F1	0	0	0	9945	37057	-78836
	150C1F2	0	0	0	9945	37038	-78839
	150C1F3	0	0	0	9945	37016	-78844
	380C2F1	19663	79003	159869	19889	74114	-157672
	380C2F2	19692	78530	159503	19890	74077	-157678
	380C2F3	19725	77969	159097	19890	74032	-157687
	RTG	2736	568	46445	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	4288	13835	-28520
	150C1F1	0	0	0	11192	38242	-80241
	150C1F2	0	0	0	11193	38182	-80235
	150C1F3	0	0	0	11195	38111	-80229
	380C2F1	21376	95209	177480	22383	76483	-160482
	380C2F2	21481	93320	175242	22386	76365	-160469
	380C2F3	21609	91075	172656	22390	76222	-160459
	RTG	5178	2911	66741	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	3341	10648	-22611
	150C1F1	0	0	0	11074	35863	-76276
	150C1F2	0	0	0	11074	35845	-76280
	150C1F3	0	0	0	11074	35823	-76286
	380C2F1	21993	76296	154059	22147	71727	-152553
	380C2F2	22013	75864	153781	22148	71691	-152561
	380C2F3	22035	75350	153477	22148	71646	-152572
	RTG	3825	569	50104	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	1950	7402	-14763
	150C1F1	0	0	0	7220	26572	-53842
	150C1F2	0	0	0	7227	26420	-53731
	150C1F3	0	0	0	7235	26241	-53608
	380C2F1	14439	53143	107683	14439	53143	-107683
	380C2F2	14453	52841	107462	14453	52841	-107462
	380C2F3	14469	52482	107216	14469	52482	-107216
	RTG	2120	0	31777	2488	0	-31566
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	2060	8219	-17283
	150C1F1	0	0	0	7642	30847	-65187
	150C1F2	0	0	0	7643	30815	-65183
	150C1F3	0	0	0	7644	30776	-65181
	380C2F1	15284	61695	130373	15284	61695	-130373
	380C2F2	15286	61631	130366	15286	61631	-130366
	380C2F3	15288	61553	130361	15288	61553	-130361
	RTG	1953	0	37619	2423	0	-35310
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	3661	12776	-25643
	150C1F1	0	0	0	8894	32832	-67710
	150C1F2	0	0	0	8899	32721	-67654
	150C1F3	0	0	0	8905	32588	-67594
	380C2F1	17789	65665	135421	17789	65665	-135421
	380C2F2	17798	65442	135309	17798	65442	-135309
	380C2F3	17809	65175	135188	17809	65175	-135188
	RTG	4183	0	55802	4805	0	-56773
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	2726	9111	-19198
	150C1F1	0	0	0	8803	30100	-63582
	150C1F2	0	0	0	8803	30069	-63583
	150C1F3	0	0	0	8804	30032	-63584
	380C2F1	17605	60199	127165	17605	60199	-127165
	380C2F2	17607	60138	127165	17607	60138	-127165
	380C2F3	17608	60065	127168	17608	60065	-127168
	RTG	3020	0	42334	3499	0	-42667
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	1738	12894	-22157
	150C1F1	0	0	0	6581	40609	-71551
	150C1F2	0	0	0	6631	39179	-69541
	150C1F3	0	0	0	6695	37452	-67135
	380C2F1	14501	51703	106764	13163	81217	-143102
	380C2F2	14508	51535	106683	13262	78357	-139081
	380C2F3	14515	51335	106597	13391	74905	-134270
	RTG	2278	1848	36057	2571	1773	-35842
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	1997	9295	-18244
	150C1F1	0	0	0	7487	33512	-67091
	150C1F2	0	0	0	7507	33228	-66807
	150C1F3	0	0	0	7529	32893	-66486
	380C2F1	15292	61378	130361	14974	67024	-134181
	380C2F2	15293	61339	130363	15013	66456	-133613
	380C2F3	15294	61292	130368	15058	65786	-132973
	RTG	1976	568	38085	2434	545	-35777

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	3327	20044	-34304
	150C1F1	0	0	0	8325	43108	-79100
	150C1F2	0	0	0	8380	42022	-77676
	150C1F3	0	0	0	8448	40724	-76007
	380C2F1	17831	64590	134979	16650	86217	-158200
	380C2F2	17835	64463	134945	16759	84043	-155353
	380C2F3	17840	64309	134911	16896	81448	-152014
	RTG	4397	2911	60612	4921	2793	-61748
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	2688	9990	-19734
	150C1F1	0	0	0	8704	32484	-64883
	150C1F2	0	0	0	8717	32236	-64676
	150C1F3	0	0	0	8731	31942	-64445
	380C2F1	17611	59898	127185	17408	64968	-129766
	380C2F2	17611	59860	127190	17434	64472	-129352
	380C2F3	17612	59814	127198	17463	63884	-128890
	RTG	3034	569	42628	3506	546	-42962
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	1751	12344	-21362
	150C1F1	0	0	0	6632	39140	-69486
	150C1F2	0	0	0	6681	37830	-67658
	150C1F3	0	0	0	6744	36252	-65481
	380C2F1	13265	78280	138972	13265	78280	-138972
	380C2F2	13362	75659	135316	13362	75659	-135316
	380C2F3	13487	72504	130961	13487	72504	-130961
	RTG	2507	3697	45546	2700	3547	-45604
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	2005	9175	-18105
	150C1F1	0	0	0	7507	33221	-66799
	150C1F2	0	0	0	7524	32966	-66554
	150C1F3	0	0	0	7544	32664	-66279
	380C2F1	15014	66441	133598	15014	66441	-133598
	380C2F2	15049	65931	133108	15049	65931	-133108
	380C2F3	15089	65329	132557	15089	65329	-132557
	RTG	2040	1137	39424	2465	1091	-37125
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	3352	19301	-33317
	150C1F1	0	0	0	8381	41992	-77638
	150C1F2	0	0	0	8433	41006	-76367
	150C1F3	0	0	0	8497	39830	-74882
	380C2F1	16762	83985	155276	16762	83985	-155276
	380C2F2	16865	82012	152733	16865	82012	-152733
	380C2F3	16994	79661	149764	16994	79661	-149764
	RTG	4760	5823	71990	5126	5587	-73758
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	2693	9896	-19649
	150C1F1	0	0	0	8717	32229	-64671
	150C1F2	0	0	0	8728	32006	-64494
	150C1F3	0	0	0	8741	31741	-64297
	380C2F1	17434	64458	129341	17434	64458	-129341
	380C2F2	17457	64012	128987	17457	64012	-128987
	380C2F3	17483	63482	128594	17483	63482	-128594
	RTG	3071	1137	43488	3526	1091	-43832
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	1963	7114	-14528
	150C1F1	0	0	0	7251	25852	-53382
	150C1F2	0	0	0	7254	25768	-53342
	150C1F3	0	0	0	7257	25667	-53298
	380C2F1	13163	81217	143102	14501	51703	-106764
	380C2F2	13262	78357	139081	14508	51535	-106683
	380C2F3	13391	74905	134270	14515	51335	-106597
	RTG	2278	1848	36057	2571	1773	-35842
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	2062	8159	-17273
	150C1F1	0	0	0	7646	30689	-65180
	150C1F2	0	0	0	7647	30670	-65182
	150C1F3	0	0	0	7647	30646	-65184
	380C2F1	14974	67024	134181	15292	61378	-130361
	380C2F2	15013	66456	133613	15293	61339	-130363
	380C2F3	15058	65786	132973	15294	61292	-130368
	RTG	1976	568	38085	2434	545	-35777
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	3679	12386	-25413
	150C1F1	0	0	0	8916	32295	-67490
	150C1F2	0	0	0	8918	32231	-67473
	150C1F3	0	0	0	8920	32155	-67455
	380C2F1	16650	86217	158200	17831	64590	-134979
	380C2F2	16759	84043	155353	17835	64463	-134945
	380C2F3	16896	81448	152014	17840	64309	-134911
	RTG	4397	2911	60612	4921	2793	-61748
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	2726	9057	-19199
	150C1F1	0	0	0	8805	29949	-63592
	150C1F2	0	0	0	8806	29930	-63595
	150C1F3	0	0	0	8806	29907	-63599
	380C2F1	17408	64968	129766	17611	59898	-127185
	380C2F2	17434	64472	129352	17611	59860	-127190
	380C2F3	17463	63884	128890	17612	59814	-127198
	RTG	3034	569	42628	3506	546	-42962

ZWW4HL350+10

Appendix BU1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2579	9051	18298	2579	9051	-18298
	150C1F1	9521	32595	66759	9521	32595	-66759
	150C1F2	9526	32465	66693	9526	32465	-66693
	150C1F3	9532	32310	66622	9532	32310	-66622
	380C2F1	0	0	0	19041	65191	-133518
	380C2F2	0	0	0	19052	64930	-133387
	380C2F3	0	0	0	19063	64619	-133244
	RTG	0	0	0	3346	0	-40400
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2689	10006	21116	2689	10006	-21116
	150C1F1	9942	37205	78821	9942	37205	-78821
	150C1F2	9942	37176	78823	9942	37176	-78823
	150C1F3	9943	37139	78825	9943	37139	-78825
	380C2F1	0	0	0	19883	74411	-157642
	380C2F2	0	0	0	19885	74351	-157645
	380C2F3	0	0	0	19886	74278	-157651
	RTG	0	0	0	3273	0	-44634
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4273	14196	28687	4273	14196	-28687
	150C1F1	11176	38730	80357	11176	38730	-80357
	150C1F2	11179	38629	80325	11179	38629	-80325
	150C1F3	11184	38509	80292	11184	38509	-80292
	380C2F1	0	0	0	22352	77460	-160714
	380C2F2	0	0	0	22359	77259	-160650
	380C2F3	0	0	0	22367	77018	-160584
	RTG	0	0	0	5682	0	-64570
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3341	10700	22605	3341	10700	-22605
	150C1F1	11072	36008	76253	11072	36008	-76253
	150C1F2	11072	35979	76256	11072	35979	-76256
	150C1F3	11073	35944	76261	11073	35944	-76261
	380C2F1	0	0	0	22144	72016	-152506
	380C2F2	0	0	0	22144	71958	-152513
	380C2F3	0	0	0	22145	71888	-152523
	RTG	0	0	0	4367	0	-50971
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2589	8804	18153	2367	13792	-24082
	150C1F1	9543	31968	66498	8932	44513	-79922
	150C1F2	9546	31894	66478	8987	43262	-78295
	150C1F3	9548	31804	66458	9056	41765	-76382
	380C2F1	0	0	0	17864	89026	-159844
	380C2F2	0	0	0	17974	88524	-156590
	380C2F3	0	0	0	18113	83531	-152765
	RTG	0	0	0	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2690	9951	21116	2642	10916	-21719
	150C1F1	9945	37057	78836	9831	39502	-79935
	150C1F2	9945	37038	78839	9846	39265	-79752
	150C1F3	9945	37016	78844	9862	38984	-79549
	380C2F1	0	0	0	19663	79003	-159869
	380C2F2	0	0	0	19692	78530	-159503
	380C2F3	0	0	0	19725	77969	-159097
	RTG	0	0	0	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4288	13835	28520	3949	20876	-36088
	150C1F1	11192	38242	80241	10688	47605	-88740
	150C1F2	11193	38182	80235	10741	46660	-87621
	150C1F3	11195	38111	80229	10804	45537	-86328
	380C2F1	0	0	0	21376	95209	-177480
	380C2F2	0	0	0	21481	93320	-175242
	380C2F3	0	0	0	21609	91075	-172656
	RTG	0	0	0	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3341	10648	22611	3311	11494	-22959
	150C1F1	11074	35863	76276	10996	38148	-77029
	150C1F2	11074	35845	76280	11006	37932	-76891
	150C1F3	11074	35823	76286	11018	37675	-76738
	380C2F1	0	0	0	21993	76296	-154059
	380C2F2	0	0	0	22013	75864	-153781
	380C2F3	0	0	0	22035	75350	-153477
	RTG	0	0	0	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2384	13296	23402	2384	13296	-23402
	150C1F1	8989	43228	78252	8989	43228	-78252
	150C1F2	9041	42091	76795	9041	42091	-76795
	150C1F3	9106	40733	75090	9106	40733	-75090
	380C2F1	0	0	0	17977	86456	-156503
	380C2F2	0	0	0	18082	84182	-153590
	380C2F3	0	0	0	18212	81467	-150180
	RTG	0	0	0	3543	3548	-51324
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2648	10817	21626	2648	10817	-21626
	150C1F1	9846	39259	79747	9846	39259	-79747
	150C1F2	9859	39045	79591	9859	39045	-79591
	150C1F3	9873	38792	79419	9873	38792	-79419
	380C2F1	0	0	0	19692	78517	-159494
	380C2F2	0	0	0	19718	78091	-159183
	380C2F3	0	0	0	19747	77584	-158838
	RTG	0	0	0	3304	1091	-45915

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3976	20179	35199	3976	20179	-35199
	150C1F1	10742	46634	87591	10742	46634	-87591
	150C1F2	10790	45781	86605	10790	45781	-86605
	150C1F3	10849	44768	85469	10849	44768	-85469
	380C2F1	0	0	0	21484	93269	-175183
	380C2F2	0	0	0	21581	91562	-173209
	380C2F3	0	0	0	21698	89536	-170937
	RTG	0	0	0	5982	5588	-79111
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3315	11411	22898	3315	11411	-22898
	150C1F1	11007	37926	76887	11007	37926	-76887
	150C1F2	11015	37731	76770	11015	37731	-76770
	150C1F3	11025	37498	76642	11025	37498	-76642
	380C2F1	0	0	0	22013	75852	-153774
	380C2F2	0	0	0	22030	75462	-153540
	380C2F3	0	0	0	22050	74996	-153284
	RTG	0	0	0	4388	1091	-51869
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2367	13792	24082	2589	8804	-18153
	150C1F1	8932	44513	79922	9543	31968	-66498
	150C1F2	8987	43262	78295	9546	31894	-66478
	150C1F3	9056	41765	76382	9548	31804	-66458
	380C2F1	0	0	0	19087	63936	-132996
	380C2F2	0	0	0	19091	63787	-132956
	380C2F3	0	0	0	19096	63608	-132915
	RTG	0	0	0	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2642	10916	21719	2690	9951	-21116
	150C1F1	9831	39502	79935	9945	37057	-78836
	150C1F2	9846	39265	79752	9945	37038	-78839
	150C1F3	9862	38984	79549	9945	37016	-78844
	380C2F1	0	0	0	19889	74114	-157672
	380C2F2	0	0	0	19890	74077	-157678
	380C2F3	0	0	0	19890	74032	-157687
	RTG	0	0	0	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3949	20876	36088	4288	13835	-28520
	150C1F1	10688	47605	88740	11192	38242	-80241
	150C1F2	10741	46660	87621	11193	38182	-80235
	150C1F3	10804	45537	86328	11195	38111	-80229
	380C2F1	0	0	0	22383	76483	-160482
	380C2F2	0	0	0	22386	76365	-160469
	380C2F3	0	0	0	22390	76222	-160459
	RTG	0	0	0	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3311	11494	22959	3341	10648	-22611
	150C1F1	10996	38148	77029	11074	35863	-76276
	150C1F2	11006	37932	76891	11074	35845	-76280
	150C1F3	11018	37675	76738	11074	35823	-76286
	380C2F1	0	0	0	22147	71727	-152553
	380C2F2	0	0	0	22148	71691	-152561
	380C2F3	0	0	0	22148	71646	-152572
	RTG	0	0	0	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1950	7402	14763	1950	7402	-14763
	150C1F1	7220	26572	53842	7220	26572	-53842
	150C1F2	7227	26420	53731	7227	26420	-53731
	150C1F3	7235	26241	53608	7235	26241	-53608
	380C2F1	0	0	0	14439	53143	-107683
	380C2F2	0	0	0	14453	52841	-107462
	380C2F3	0	0	0	14469	52482	-107216
	RTG	0	0	0	2488	0	-31566
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2060	8219	17283	2060	8219	-17283
	150C1F1	7642	30847	65187	7642	30847	-65187
	150C1F2	7643	30815	65183	7643	30815	-65183
	150C1F3	7644	30776	65181	7644	30776	-65181
	380C2F1	0	0	0	15284	61695	-130373
	380C2F2	0	0	0	15286	61631	-130366
	380C2F3	0	0	0	15288	61553	-130361
	RTG	0	0	0	2423	0	-35310
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3661	12776	25643	3661	12776	-25643
	150C1F1	8894	32832	67710	8894	32832	-67710
	150C1F2	8899	32721	67654	8899	32721	-67654
	150C1F3	8905	32588	67594	8905	32588	-67594
	380C2F1	0	0	0	17789	65665	-135421
	380C2F2	0	0	0	17798	65442	-135309
	380C2F3	0	0	0	17809	65175	-135188
	RTG	0	0	0	4805	0	-56773
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2726	9111	19198	2726	9111	-19198
	150C1F1	8803	30100	63582	8803	30100	-63582
	150C1F2	8803	30069	63583	8803	30069	-63583
	150C1F3	8804	30032	63584	8804	30032	-63584
	380C2F1	0	0	0	17605	60199	-127165
	380C2F2	0	0	0	17607	60138	-127165
	380C2F3	0	0	0	17608	60065	-127168
	RTG	0	0	0	3499	0	-42667
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7114	14528	1738	12894	-22157
	150C1F1	7251	25852	53382	6581	40609	-71551
	150C1F2	7254	25768	53342	6631	39179	-69541
	150C1F3	7257	25667	53298	6695	37452	-67135
	380C2F1	0	0	0	13163	81217	-143102
	380C2F2	0	0	0	13262	78357	-139081
	380C2F3	0	0	0	13391	74905	-134270
	RTG	0	0	0	2571	1773	-35842
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2062	8159	17273	1997	9295	-18244
	150C1F1	7646	30689	65180	7487	33512	-67091
	150C1F2	7647	30670	65182	7507	33228	-66807
	150C1F3	7647	30646	65184	7529	32893	-66486
	380C2F1	0	0	0	14974	67024	-134181
	380C2F2	0	0	0	15013	66456	-133613
	380C2F3	0	0	0	15058	65786	-132973
	RTG	0	0	0	2434	545	-35777

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3679	12386	25413	3327	20044	-34304
	150C1F1	8916	32295	67490	8325	43108	-79100
	150C1F2	8918	32231	67473	8380	42022	-77676
	150C1F3	8920	32155	67455	8448	40724	-76007
	380C2F1	0	0	0	16650	86217	-158200
	380C2F2	0	0	0	16759	84043	-155353
	380C2F3	0	0	0	16896	81448	-152014
	RTG	0	0	0	4921	2793	-61748
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2726	9057	19199	2688	9990	-19734
	150C1F1	8805	29949	63592	8704	32484	-64883
	150C1F2	8806	29930	63595	8717	32236	-64676
	150C1F3	8806	29907	63599	8731	31942	-64445
	380C2F1	0	0	0	17408	64968	-129766
	380C2F2	0	0	0	17434	64472	-129352
	380C2F3	0	0	0	17463	63884	-128890
	RTG	0	0	0	3506	546	-42962
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1751	12344	21362	1751	12344	-21362
	150C1F1	6632	39140	69486	6632	39140	-69486
	150C1F2	6681	37830	67658	6681	37830	-67658
	150C1F3	6744	36252	65481	6744	36252	-65481
	380C2F1	0	0	0	13265	78280	-138972
	380C2F2	0	0	0	13362	75659	-135316
	380C2F3	0	0	0	13487	72504	-130961
	RTG	0	0	0	2700	3547	-45604
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2005	9175	18105	2005	9175	-18105
	150C1F1	7507	33221	66799	7507	33221	-66799
	150C1F2	7524	32966	66554	7524	32966	-66554
	150C1F3	7544	32664	66279	7544	32664	-66279
	380C2F1	0	0	0	15014	66441	-133598
	380C2F2	0	0	0	15049	65931	-133108
	380C2F3	0	0	0	15089	65329	-132557
	RTG	0	0	0	2465	1091	-37125
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3352	19301	33317	3352	19301	-33317
	150C1F1	8381	41992	77638	8381	41992	-77638
	150C1F2	8433	41006	76367	8433	41006	-76367
	150C1F3	8497	39830	74882	8497	39830	-74882
	380C2F1	0	0	0	16762	83985	-155276
	380C2F2	0	0	0	16865	82012	-152733
	380C2F3	0	0	0	16994	79661	-149764
	RTG	0	0	0	5126	5587	-73758
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2693	9896	19649	2693	9896	-19649
	150C1F1	8717	32229	64671	8717	32229	-64671
	150C1F2	8728	32006	64494	8728	32006	-64494
	150C1F3	8741	31741	64297	8741	31741	-64297
	380C2F1	0	0	0	17434	64458	-129341
	380C2F2	0	0	0	17457	64012	-128987
	380C2F3	0	0	0	17483	63482	-128594
	RTG	0	0	0	3526	1091	-43832
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1738	12894	22157	1963	7114	-14528
	150C1F1	6581	40609	71551	7251	25852	-53382
	150C1F2	6631	39179	69541	7254	25768	-53342
	150C1F3	6695	37452	67135	7257	25667	-53298
	380C2F1	0	0	0	14501	51703	-106764
	380C2F2	0	0	0	14508	51535	-106683
	380C2F3	0	0	0	14515	51335	-106597
	RTG	0	0	0	2571	1773	-35842
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1997	9295	18244	2062	8159	-17273
	150C1F1	7487	33512	67091	7646	30689	-65180
	150C1F2	7507	33228	66807	7647	30670	-65182
	150C1F3	7529	32893	66486	7647	30646	-65184
	380C2F1	0	0	0	15292	61378	-130361
	380C2F2	0	0	0	15293	61339	-130363
	380C2F3	0	0	0	15294	61292	-130368
	RTG	0	0	0	2434	545	-35777
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3327	20044	34304	3679	12386	-25413
	150C1F1	8325	43108	79100	8916	32295	-67490
	150C1F2	8380	42022	77676	8918	32231	-67473
	150C1F3	8448	40724	76007	8920	32155	-67455
	380C2F1	0	0	0	17831	64590	-134979
	380C2F2	0	0	0	17835	64463	-134945
	380C2F3	0	0	0	17840	64309	-134911
	RTG	0	0	0	4921	2793	-61748
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2688	9990	19734	2726	9057	-19199
	150C1F1	8704	32484	64883	8805	29949	-63592
	150C1F2	8717	32236	64676	8806	29930	-63595
	150C1F3	8731	31942	64445	8806	29907	-63599
	380C2F1	0	0	0	17611	59898	-127185
	380C2F2	0	0	0	17611	59860	-127190
	380C2F3	0	0	0	17612	59814	-127198
	RTG	0	0	0	3506	546	-42962

ZWW4HL350+10

Appendix BU1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2579	9051	18298	0	0	0
	150C1F1	9521	32595	66759	0	0	0
	150C1F2	9526	32465	66693	0	0	0
	150C1F3	9532	32310	66622	0	0	0
	380C2F1	19041	65191	133518	19041	65191	-133518
	380C2F2	19052	64930	133387	19052	64930	-133387
	380C2F3	19063	64619	133244	19063	64619	-133244
	RTG	0	0	0	3346	0	-40400
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2689	10006	21116	0	0	0
	150C1F1	9942	37205	78821	0	0	0
	150C1F2	9942	37176	78823	0	0	0
	150C1F3	9943	37139	78825	0	0	0
	380C2F1	19883	74411	157642	19883	74411	-157642
	380C2F2	19885	74351	157645	19885	74351	-157645
	380C2F3	19886	74278	157651	19886	74278	-157651
	RTG	0	0	0	3273	0	-44634
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4273	14196	28687	0	0	0
	150C1F1	11176	38730	80357	0	0	0
	150C1F2	11179	38629	80325	0	0	0
	150C1F3	11184	38509	80292	0	0	0
	380C2F1	22352	77460	160714	22352	77460	-160714
	380C2F2	22359	77259	160650	22359	77259	-160650
	380C2F3	22367	77018	160584	22367	77018	-160584
	RTG	0	0	0	5682	0	-64570
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3341	10700	22605	0	0	0
	150C1F1	11072	36008	76253	0	0	0
	150C1F2	11072	35979	76256	0	0	0
	150C1F3	11073	35944	76261	0	0	0
	380C2F1	22144	72016	152506	22144	72016	-152506
	380C2F2	22144	71958	152513	22144	71958	-152513
	380C2F3	22145	71888	152523	22145	71888	-152523
	RTG	0	0	0	4367	0	-50971
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2589	8804	18153	0	0	0
	150C1F1	9543	31968	66498	0	0	0
	150C1F2	9546	31894	66478	0	0	0
	150C1F3	9548	31804	66458	0	0	0
	380C2F1	19087	63936	132996	17864	89026	-159844
	380C2F2	19091	63787	132956	17974	88524	-156590
	380C2F3	19096	63608	132915	18113	83531	-152765
	RTG	0	0	0	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2690	9951	21116	0	0	0
	150C1F1	9945	37057	78836	0	0	0
	150C1F2	9945	37038	78839	0	0	0
	150C1F3	9945	37016	78844	0	0	0
	380C2F1	19889	74114	157672	19663	79003	-159869
	380C2F2	19890	74077	157678	19692	78530	-159503
	380C2F3	19890	74032	157687	19725	77969	-159097
	RTG	0	0	0	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4288	13835	28520	0	0	0
	150C1F1	11192	38242	80241	0	0	0
	150C1F2	11193	38182	80235	0	0	0
	150C1F3	11195	38111	80229	0	0	0
	380C2F1	22383	76483	160482	21376	95209	-177480
	380C2F2	22386	76365	160469	21481	93320	-175242
	380C2F3	22390	76222	160459	21609	91075	-172656
	RTG	0	0	0	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3341	10648	22611	0	0	0
	150C1F1	11074	35863	76276	0	0	0
	150C1F2	11074	35845	76280	0	0	0
	150C1F3	11074	35823	76286	0	0	0
	380C2F1	22147	71727	152553	21993	76296	-154059
	380C2F2	22148	71691	152561	22013	75864	-153781
	380C2F3	22148	71646	152572	22035	75350	-153477
	RTG	0	0	0	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2384	13296	23402	0	0	0
	150C1F1	8989	43228	78252	0	0	0
	150C1F2	9041	42091	76795	0	0	0
	150C1F3	9106	40733	75090	0	0	0
	380C2F1	17977	86456	156503	17977	86456	-156503
	380C2F2	18082	84182	153590	18082	84182	-153590
	380C2F3	18212	81467	150180	18212	81467	-150180
	RTG	0	0	0	3543	3548	-51324
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2648	10817	21626	0	0	0
	150C1F1	9846	39259	79747	0	0	0
	150C1F2	9859	39045	79591	0	0	0
	150C1F3	9873	38792	79419	0	0	0
	380C2F1	19692	78517	159494	19692	78517	-159494
	380C2F2	19718	78091	159183	19718	78091	-159183
	380C2F3	19747	77584	158838	19747	77584	-158838
	RTG	0	0	0	3304	1091	-45915

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3976	20179	35199	0	0	0
	150C1F1	10742	46634	87591	0	0	0
	150C1F2	10790	45781	86605	0	0	0
	150C1F3	10849	44768	85469	0	0	0
	380C2F1	21484	93269	175183	21484	93269	-175183
	380C2F2	21581	91562	173209	21581	91562	-173209
	380C2F3	21698	89536	170937	21698	89536	-170937
	RTG	0	0	0	5982	5588	-79111
	0	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3315	11411	22898	0	0	0
	150C1F1	11007	37926	76887	0	0	0
	150C1F2	11015	37731	76770	0	0	0
	150C1F3	11025	37498	76642	0	0	0
	380C2F1	22013	75852	153774	22013	75852	-153774
	380C2F2	22030	75462	153540	22030	75462	-153540
	380C2F3	22050	74996	153284	22050	74996	-153284
	RTG	0	0	0	4388	1091	-51869
	0	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2367	13792	24082	0	0	0
	150C1F1	8932	44513	79922	0	0	0
	150C1F2	8987	43262	78295	0	0	0
	150C1F3	9056	41765	76382	0	0	0
	380C2F1	17864	89026	159844	19087	63936	-132996
	380C2F2	17974	86524	156590	19091	63787	-132956
	380C2F3	18113	83531	152765	19096	63608	-132915
	RTG	0	0	0	3413	1774	-43521
	0	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2642	10916	21719	0	0	0
	150C1F1	9831	39502	79935	0	0	0
	150C1F2	9846	39265	79752	0	0	0
	150C1F3	9862	38984	79549	0	0	0
	380C2F1	19663	79003	159869	19889	74114	-157672
	380C2F2	19692	78530	159503	19890	74077	-157678
	380C2F3	19725	77969	159097	19890	74032	-157687
	RTG	0	0	0	3281	546	-44960
	0	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3949	20876	36088	0	0	0
	150C1F1	10688	47605	88740	0	0	0
	150C1F2	10741	46660	87621	0	0	0
	150C1F3	10804	45537	86328	0	0	0
	380C2F1	21376	95209	177480	22383	76483	-160482
	380C2F2	21481	93320	175242	22386	76365	-160469
	380C2F3	21609	91075	172656	22390	76222	-160459
	RTG	0	0	0	5782	2793	-68689
	0	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3311	11494	22959	0	0	0
	150C1F1	10996	38148	77029	0	0	0
	150C1F2	11006	37932	76891	0	0	0
	150C1F3	11018	37675	76738	0	0	0
	380C2F1	21993	76296	154059	22147	71727	-152553
	380C2F2	22013	75864	153781	22148	71691	-152561
	380C2F3	22035	75350	153477	22148	71646	-152572
	RTG	0	0	0	4372	546	-51198
	0	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1950	7402	14763	0	0	0
	150C1F1	7220	26572	53842	0	0	0
	150C1F2	7227	26420	53731	0	0	0
	150C1F3	7235	26241	53608	0	0	0
	380C2F1	14439	53143	107683	14439	53143	-107683
	380C2F2	14453	52841	107462	14453	52841	-107462
	380C2F3	14469	52482	107216	14469	52482	-107216
	RTG	0	0	0	2488	0	-31566
	0	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2060	8219	17283	0	0	0
	150C1F1	7642	30847	65187	0	0	0
	150C1F2	7643	30815	65183	0	0	0
	150C1F3	7644	30776	65181	0	0	0
	380C2F1	15284	61695	130373	15284	61695	-130373
	380C2F2	15286	61631	130366	15286	61631	-130366
	380C2F3	15288	61553	130361	15288	61553	-130361
	RTG	0	0	0	2423	0	-35310
	0	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3661	12776	25643	0	0	0
	150C1F1	8894	32832	67710	0	0	0
	150C1F2	8899	32721	67654	0	0	0
	150C1F3	8905	32588	67594	0	0	0
	380C2F1	17789	65665	135421	17789	65665	-135421
	380C2F2	17798	65442	135309	17798	65442	-135309
	380C2F3	17809	65175	135188	17809	65175	-135188
	RTG	0	0	0	4805	0	-56773
	0	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2726	9111	19198	0	0	0
	150C1F1	8803	30100	63582	0	0	0
	150C1F2	8803	30069	63583	0	0	0
	150C1F3	8804	30032	63584	0	0	0
	380C2F1	17605	60199	127165	17605	60199	-127165
	380C2F2	17607	60138	127165	17607	60138	-127165
	380C2F3	17608	60065	127168	17608	60065	-127168
	RTG	0	0	0	3499	0	-42667
	0	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7114	14528	0	0	0
	150C1F1	7251	25852	53382	0	0	0
	150C1F2	7254	25768	53342	0	0	0
	150C1F3	7257	25667	53298	0	0	0
	380C2F1	14501	51703	106764	13163	81217	-143102
	380C2F2	14508	51535	106683	13262	78357	-139081
	380C2F3	14515	51335	106597	13391	74905	-134270
	RTG	0	0	0	2571	1773	-35842
	0	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2062	8159	17273	0	0	0
	150C1F1	7646	30689	65180	0	0	0
	150C1F2	7647	30670	65182	0	0	0
	150C1F3	7647	30646	65184	0	0	0
	380C2F1	15292	61378	130361	14974	67024	-134181
	380C2F2	15293	61339	130363	15013	66456	-133613
	380C2F3	15294	61292	130368	15058	65786	-132973
	RTG	0	0	0	2434	545	-35777
	0	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3679	12386	25413	0	0	0
	150C1F1	8916	32295	67490	0	0	0
	150C1F2	8918	32231	67473	0	0	0
	150C1F3	8920	32155	67455	0	0	0
	380C2F1	17831	64590	134979	16650	86217	-158200
	380C2F2	17835	64463	134945	16759	84043	-155353
	380C2F3	17840	64309	134911	16896	81448	-152014
	RTG	0	0	0	4921	2793	-61748
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2726	9057	19199	0	0	0
	150C1F1	8805	29949	63592	0	0	0
	150C1F2	8806	29930	63595	0	0	0
	150C1F3	8806	29907	63599	0	0	0
	380C2F1	17611	59898	127185	17408	64968	-129766
	380C2F2	17611	59860	127190	17434	64472	-129352
	380C2F3	17612	59814	127198	17463	63884	-128890
	RTG	0	0	0	3506	546	-42962
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1751	12344	21362	0	0	0
	150C1F1	6632	39140	69486	0	0	0
	150C1F2	6681	37830	67658	0	0	0
	150C1F3	6744	36252	65481	0	0	0
	380C2F1	13265	78280	138972	13265	78280	-138972
	380C2F2	13362	75659	135316	13362	75659	-135316
	380C2F3	13487	72504	130961	13487	72504	-130961
	RTG	0	0	0	2700	3547	-45604
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2005	9175	18105	0	0	0
	150C1F1	7507	33221	66799	0	0	0
	150C1F2	7524	32966	66554	0	0	0
	150C1F3	7544	32664	66279	0	0	0
	380C2F1	15014	66441	133598	15014	66441	-133598
	380C2F2	15049	65931	133108	15049	65931	-133108
	380C2F3	15089	65329	132557	15089	65329	-132557
	RTG	0	0	0	2465	1091	-37125
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3352	19301	33317	0	0	0
	150C1F1	8381	41992	77638	0	0	0
	150C1F2	8433	41006	76367	0	0	0
	150C1F3	8497	39830	74882	0	0	0
	380C2F1	16762	83985	155276	16762	83985	-155276
	380C2F2	16865	82012	152733	16865	82012	-152733
	380C2F3	16994	79661	149764	16994	79661	-149764
	RTG	0	0	0	5126	5587	-73758
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2693	9896	19649	0	0	0
	150C1F1	8717	32229	64671	0	0	0
	150C1F2	8728	32006	64494	0	0	0
	150C1F3	8741	31741	64297	0	0	0
	380C2F1	17434	64458	129341	17434	64458	-129341
	380C2F2	17457	64012	128987	17457	64012	-128987
	380C2F3	17483	63482	128594	17483	63482	-128594
	RTG	0	0	0	3526	1091	-43832
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1738	12894	22157	0	0	0
	150C1F1	6581	40609	71551	0	0	0
	150C1F2	6631	39179	69541	0	0	0
	150C1F3	6695	37452	67135	0	0	0
	380C2F1	13163	81217	143102	14501	51703	-106764
	380C2F2	13262	78357	139081	14508	51535	-106683
	380C2F3	13391	74905	134270	14515	51335	-106597
	RTG	0	0	0	2571	1773	-35842
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1997	9295	18244	0	0	0
	150C1F1	7487	33512	67091	0	0	0
	150C1F2	7507	33228	66807	0	0	0
	150C1F3	7529	32893	66486	0	0	0
	380C2F1	14974	67024	134181	15292	61378	-130361
	380C2F2	15013	66456	133613	15293	61339	-130363
	380C2F3	15058	65786	132973	15294	61292	-130368
	RTG	0	0	0	2434	545	-35777
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3327	20044	34304	0	0	0
	150C1F1	8325	43108	79100	0	0	0
	150C1F2	8380	42022	77676	0	0	0
	150C1F3	8448	40724	76007	0	0	0
	380C2F1	16650	86217	158200	17831	64590	-134979
	380C2F2	16759	84043	155353	17835	64463	-134945
	380C2F3	16896	81448	152014	17840	64309	-134911
	RTG	0	0	0	4921	2793	-61748
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2688	9990	19734	0	0	0
	150C1F1	8704	32484	64883	0	0	0
	150C1F2	8717	32236	64676	0	0	0
	150C1F3	8731	31942	64445	0	0	0
	380C2F1	17408	64968	129766	17611	59898	-127185
	380C2F2	17434	64472	129352	17611	59860	-127190
	380C2F3	17463	63884	128890	17612	59814	-127198
	RTG	0	0	0	3506	546	-42962

ZWW4HL350+10

Appendix BU1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2579	9051	18298	2579	9051	-18298
	150C1F1	9521	32595	66759	9521	32595	-66759
	150C1F2	9526	32465	66693	9526	32465	-66693
	150C1F3	9532	32310	66622	9532	32310	-66622
	380C2F1	19041	65191	133518	19041	65191	-133518
	380C2F2	19052	64930	133387	19052	64930	-133387
	380C2F3	19063	64619	133244	19063	64619	-133244
	RTG	0	0	0	3346	0	-40400
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2689	10006	21116	2689	10006	-21116
	150C1F1	9942	37205	78821	9942	37205	-78821
	150C1F2	9942	37176	78823	9942	37176	-78823
	150C1F3	9943	37139	78825	9943	37139	-78825
	380C2F1	19883	74411	157642	19883	74411	-157642
	380C2F2	19885	74351	157645	19885	74351	-157645
	380C2F3	19886	74278	157651	19886	74278	-157651
	RTG	0	0	0	3273	0	-44634
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4273	14196	28687	4273	14196	-28687
	150C1F1	11176	38730	80357	11176	38730	-80357
	150C1F2	11179	38629	80325	11179	38629	-80325
	150C1F3	11184	38509	80292	11184	38509	-80292
	380C2F1	22352	77460	160714	22352	77460	-160714
	380C2F2	22359	77259	160650	22359	77259	-160650
	380C2F3	22367	77018	160584	22367	77018	-160584
	RTG	0	0	0	5682	0	-64570
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3341	10700	22605	3341	10700	-22605
	150C1F1	11072	36008	76253	11072	36008	-76253
	150C1F2	11072	35979	76256	11072	35979	-76256
	150C1F3	11073	35944	76261	11073	35944	-76261
	380C2F1	22144	72016	152506	22144	72016	-152506
	380C2F2	22144	71958	152513	22144	71958	-152513
	380C2F3	22145	71888	152523	22145	71888	-152523
	RTG	0	0	0	4367	0	-50971
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2589	8804	18153	2367	13792	-24082
	150C1F1	9543	31968	66498	8932	44513	-79922
	150C1F2	9546	31894	66478	8987	43262	-78295
	150C1F3	9548	31804	66458	9056	41765	-76382
	380C2F1	19087	63936	132996	17864	89026	-159844
	380C2F2	19091	63787	132956	17974	88524	-156590
	380C2F3	19096	63608	132915	18113	83531	-152765
	RTG	0	0	0	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2690	9951	21116	2642	10916	-21719
	150C1F1	9945	37057	78836	9831	39502	-79935
	150C1F2	9945	37038	78839	9846	39265	-79752
	150C1F3	9945	37016	78844	9862	38984	-79549
	380C2F1	19889	74114	157672	19663	79003	-159869
	380C2F2	19890	74077	157678	19692	78530	-159503
	380C2F3	19890	74032	157687	19725	77969	-159097
	RTG	0	0	0	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4288	13835	28520	3949	20876	-36088
	150C1F1	11192	38242	80241	10688	47605	-88740
	150C1F2	11193	38182	80235	10741	46660	-87621
	150C1F3	11195	38111	80229	10804	45537	-86328
	380C2F1	22383	76483	160482	21376	95209	-177480
	380C2F2	22386	76365	160469	21481	93320	-175242
	380C2F3	22390	76222	160459	21609	91075	-172656
	RTG	0	0	0	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3341	10648	22611	3311	11494	-22959
	150C1F1	11074	35863	76276	10996	38148	-77029
	150C1F2	11074	35845	76280	11006	37932	-76891
	150C1F3	11074	35823	76286	11018	37675	-76738
	380C2F1	22147	71727	152553	21993	76296	-154059
	380C2F2	22148	71691	152561	22013	75864	-153781
	380C2F3	22148	71646	152572	22035	75350	-153477
	RTG	0	0	0	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2384	13296	23402	2384	13296	-23402
	150C1F1	8989	43228	78252	8989	43228	-78252
	150C1F2	9041	42091	76795	9041	42091	-76795
	150C1F3	9106	40733	75090	9106	40733	-75090
	380C2F1	17977	86456	156503	17977	86456	-156503
	380C2F2	18082	84182	153590	18082	84182	-153590
	380C2F3	18212	81467	150180	18212	81467	-150180
	RTG	0	0	0	3543	3548	-51324
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2648	10817	21626	2648	10817	-21626
	150C1F1	9846	39259	79747	9846	39259	-79747
	150C1F2	9859	39045	79591	9859	39045	-79591
	150C1F3	9873	38792	79419	9873	38792	-79419
	380C2F1	19692	78517	159494	19692	78517	-159494
	380C2F2	19718	78091	159183	19718	78091	-159183
	380C2F3	19747	77584	158838	19747	77584	-158838
	RTG	0	0	0	3304	1091	-45915

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3976	20179	35199	3976	20179	-35199
	150C1F1	10742	46634	87591	10742	46634	-87591
	150C1F2	10790	45781	86605	10790	45781	-86605
	150C1F3	10849	44768	85469	10849	44768	-85469
	380C2F1	21484	93269	175183	21484	93269	-175183
	380C2F2	21581	91562	173209	21581	91562	-173209
	380C2F3	21698	89536	170937	21698	89536	-170937
	RTG	0	0	0	5982	5588	-79111
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3315	11411	22898	3315	11411	-22898
	150C1F1	11007	37926	76887	11007	37926	-76887
	150C1F2	11015	37731	76770	11015	37731	-76770
	150C1F3	11025	37498	76642	11025	37498	-76642
	380C2F1	22013	75852	153774	22013	75852	-153774
	380C2F2	22030	75462	153540	22030	75462	-153540
	380C2F3	22050	74996	153284	22050	74996	-153284
	RTG	0	0	0	4388	1091	-51869
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2367	13792	24082	2589	8804	-18153
	150C1F1	8932	44513	79922	9543	31968	-66498
	150C1F2	8987	43262	78295	9546	31894	-66478
	150C1F3	9056	41765	76382	9548	31804	-66458
	380C2F1	17864	89026	159844	19087	63936	-132996
	380C2F2	17974	86524	156590	19091	63787	-132956
	380C2F3	18113	83531	152765	19096	63608	-132915
	RTG	0	0	0	3413	1774	-43521
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2642	10916	21719	2690	9951	-21116
	150C1F1	9831	39502	79935	9945	37057	-78836
	150C1F2	9846	39265	79752	9945	37038	-78839
	150C1F3	9862	38984	79549	9945	37016	-78844
	380C2F1	19663	79003	159869	19889	74114	-157672
	380C2F2	19692	78530	159503	19890	74077	-157678
	380C2F3	19725	77969	159097	19890	74032	-157687
	RTG	0	0	0	3281	546	-44960
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3949	20876	36088	4288	13835	-28520
	150C1F1	10688	47605	88740	11192	38242	-80241
	150C1F2	10741	46660	87621	11193	38182	-80235
	150C1F3	10804	45537	86328	11195	38111	-80229
	380C2F1	21376	95209	177480	22383	76483	-160482
	380C2F2	21481	93320	175242	22386	76365	-160469
	380C2F3	21609	91075	172656	22390	76222	-160459
	RTG	0	0	0	5782	2793	-68689
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3311	11494	22959	3341	10648	-22611
	150C1F1	10996	38148	77029	11074	35863	-76276
	150C1F2	11006	37932	76891	11074	35845	-76280
	150C1F3	11018	37675	76738	11074	35823	-76286
	380C2F1	21993	76296	154059	22147	71727	-152553
	380C2F2	22013	75864	153781	22148	71691	-152561
	380C2F3	22035	75350	153477	22148	71646	-152572
	RTG	0	0	0	4372	546	-51198
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1950	7402	14763	1950	7402	-14763
	150C1F1	7220	26572	53842	7220	26572	-53842
	150C1F2	7227	26420	53731	7227	26420	-53731
	150C1F3	7235	26241	53608	7235	26241	-53608
	380C2F1	14439	53143	107683	14439	53143	-107683
	380C2F2	14453	52841	107462	14453	52841	-107462
	380C2F3	14469	52482	107216	14469	52482	-107216
	RTG	0	0	0	2488	0	-31566
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2060	8219	17283	2060	8219	-17283
	150C1F1	7642	30847	65187	7642	30847	-65187
	150C1F2	7643	30815	65183	7643	30815	-65183
	150C1F3	7644	30776	65181	7644	30776	-65181
	380C2F1	15284	61695	130373	15284	61695	-130373
	380C2F2	15286	61631	130366	15286	61631	-130366
	380C2F3	15288	61553	130361	15288	61553	-130361
	RTG	0	0	0	2423	0	-35310
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3661	12776	25643	3661	12776	-25643
	150C1F1	8894	32832	67710	8894	32832	-67710
	150C1F2	8899	32721	67654	8899	32721	-67654
	150C1F3	8905	32588	67594	8905	32588	-67594
	380C2F1	17789	65665	135421	17789	65665	-135421
	380C2F2	17798	65442	135309	17798	65442	-135309
	380C2F3	17809	65175	135188	17809	65175	-135188
	RTG	0	0	0	4805	0	-56773
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2726	9111	19198	2726	9111	-19198
	150C1F1	8803	30100	63582	8803	30100	-63582
	150C1F2	8803	30069	63583	8803	30069	-63583
	150C1F3	8804	30032	63584	8804	30032	-63584
	380C2F1	17605	60199	127165	17605	60199	-127165
	380C2F2	17607	60138	127165	17607	60138	-127165
	380C2F3	17608	60065	127168	17608	60065	-127168
	RTG	0	0	0	3499	0	-42667
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7114	14528	1738	12894	-22157
	150C1F1	7251	25852	53382	6581	40609	-71551
	150C1F2	7254	25768	53342	6631	39179	-69541
	150C1F3	7257	25667	53298	6695	37452	-67135
	380C2F1	14501	51703	106764	13163	81217	-143102
	380C2F2	14508	51535	106683	13262	78357	-139081
	380C2F3	14515	51335	106597	13391	74905	-134270
	RTG	0	0	0	2571	1773	-35842
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2062	8159	17273	1997	9295	-18244
	150C1F1	7646	30689	65180	7487	33512	-67091
	150C1F2	7647	30670	65182	7507	33228	-66807
	150C1F3	7647	30646	65184	7529	32893	-66486
	380C2F1	15292	61378	130361	14974	67024	-134181
	380C2F2	15293	61339	130363	15013	66456	-133613
	380C2F3	15294	61292	130368	15058	65786	-132973
	RTG	0	0	0	2434	545	-35777

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3679	12386	25413	3327	20044	-34304
	150C1F1	8916	32295	67490	8325	43108	-79100
	150C1F2	8918	32231	67473	8380	42022	-77676
	150C1F3	8920	32155	67455	8448	40724	-76007
	380C2F1	17831	64590	134979	16650	86217	-158200
	380C2F2	17835	64463	134945	16759	84043	-155353
	380C2F3	17840	64309	134911	16896	81448	-152014
	RTG	0	0	0	4921	2793	-61748
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2726	9057	19199	2688	9990
150C1F1		8805	29949	63592	8704	32484	-64883
150C1F2		8806	29930	63595	8717	32236	-64676
150C1F3		8806	29907	63599	8731	31942	-64445
380C2F1		17611	59898	127185	17408	64968	-129766
380C2F2		17611	59860	127190	17434	64472	-129352
380C2F3		17612	59814	127198	17463	63884	-128890
RTG		0	0	0	3506	546	-42962
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	1751	12344	21362	1751	12344
	150C1F1	6632	39140	69486	6632	39140	-69486
	150C1F2	6681	37830	67658	6681	37830	-67658
	150C1F3	6744	36252	65481	6744	36252	-65481
	380C2F1	13265	78280	138972	13265	78280	-138972
	380C2F2	13362	75659	135316	13362	75659	-135316
	380C2F3	13487	72504	130961	13487	72504	-130961
	RTG	0	0	0	2700	3547	-45604
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2005	9175	18105	2005	9175
150C1F1		7507	33221	66799	7507	33221	-66799
150C1F2		7524	32966	66554	7524	32966	-66554
150C1F3		7544	32664	66279	7544	32664	-66279
380C2F1		15014	66441	133598	15014	66441	-133598
380C2F2		15049	65931	133108	15049	65931	-133108
380C2F3		15089	65329	132557	15089	65329	-132557
RTG		0	0	0	2465	1091	-37125
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	3352	19301	33317	3352	19301
	150C1F1	8381	41992	77638	8381	41992	-77638
	150C1F2	8433	41006	76367	8433	41006	-76367
	150C1F3	8497	39830	74882	8497	39830	-74882
	380C2F1	16762	83985	155276	16762	83985	-155276
	380C2F2	16865	82012	152733	16865	82012	-152733
	380C2F3	16994	79661	149764	16994	79661	-149764
	RTG	0	0	0	5126	5587	-73758
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2693	9896	19649	2693	9896
150C1F1		8717	32229	64671	8717	32229	-64671
150C1F2		8728	32006	64494	8728	32006	-64494
150C1F3		8741	31741	64297	8741	31741	-64297
380C2F1		17434	64458	129341	17434	64458	-129341
380C2F2		17457	64012	128987	17457	64012	-128987
380C2F3		17483	63482	128594	17483	63482	-128594
RTG		0	0	0	3526	1091	-43832
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	1738	12894	22157	1963	7114
	150C1F1	6581	40609	71551	7251	25852	-53382
	150C1F2	6631	39179	69541	7254	25768	-53342
	150C1F3	6695	37452	67135	7257	25667	-53298
	380C2F1	13163	81217	143102	14501	51703	-106764
	380C2F2	13262	78357	139081	14508	51535	-106683
	380C2F3	13391	74905	134270	14515	51335	-106597
	RTG	0	0	0	2571	1773	-35842
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1997	9295	18244	2062	8159
150C1F1		7487	33512	67091	7646	30689	-65180
150C1F2		7507	33228	66807	7647	30670	-65182
150C1F3		7529	32893	66486	7647	30646	-65184
380C2F1		14974	67024	134181	15292	61378	-130361
380C2F2		15013	66456	133613	15293	61339	-130363
380C2F3		15058	65786	132973	15294	61292	-130368
RTG		0	0	0	2434	545	-35777
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	3327	20044	34304	3679	12386
	150C1F1	8325	43108	79100	8916	32295	-67490
	150C1F2	8380	42022	77676	8918	32231	-67473
	150C1F3	8448	40724	76007	8920	32155	-67455
	380C2F1	16650	86217	158200	17831	64590	-134979
	380C2F2	16759	84043	155353	17835	64463	-134945
	380C2F3	16896	81448	152014	17840	64309	-134911
	RTG	0	0	0	4921	2793	-61748
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2688	9990	19734	2726	9057
150C1F1		8704	32484	64883	8805	29949	-63592
150C1F2		8717	32236	64676	8806	29930	-63595
150C1F3		8731	31942	64445	8806	29907	-63599
380C2F1		17408	64968	129766	17611	59898	-127185
380C2F2		17434	64472	129352	17611	59860	-127190
380C2F3		17463	63884	128890	17612	59814	-127198
RTG		0	0	0	3506	546	-42962

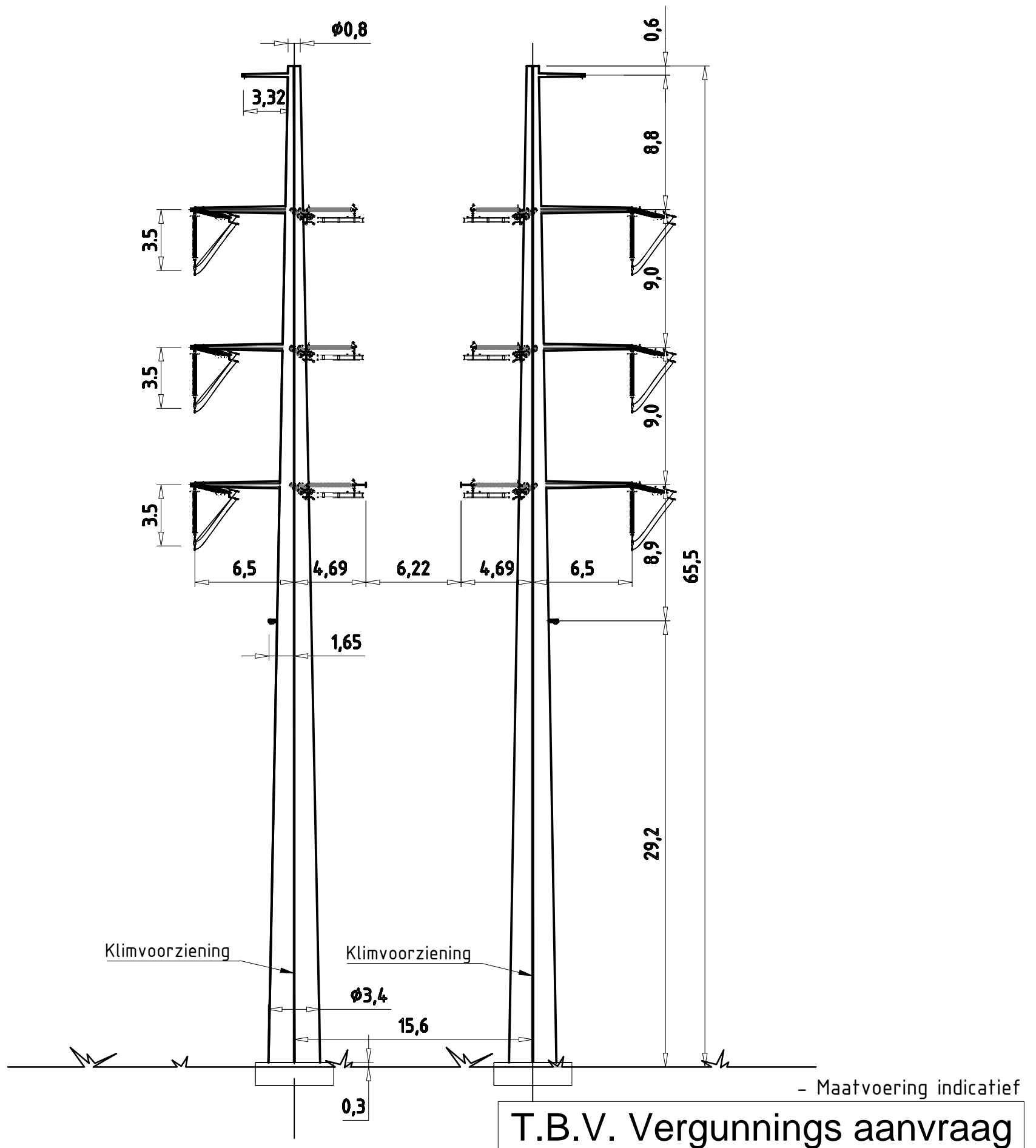
ZWW4HL350+10

Appendix BU2/ NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2148	8219	16201	2148	8219	-16201
Wind, 10°C	150C1F1	7962	29263	58727	7962	29263	-58727
Permanent loads yg= 1.0	150C1F2	7972	29059	58564	7972	29059	-58564
Wind angle: 0°	150C1F3	7983	28818	58383	7983	28818	-58383
	380C2F1	15923	58526	117454	15923	58526	-117454
	380C2F2	15943	58119	117129	15943	58119	-117129
	380C2F3	15966	57637	116767	15966	57637	-116767
	RTG	0	0	0	2773	0	-34574
NL4/1b	GW / opgw	2272	8804	18596	2272	8804	-18596
Wind, -20°C	150C1F1	8415	32959	69875	8415	32959	-69875
Permanent loads yg= 1.0	150C1F2	8416	32934	69876	8416	32934	-69876
Wind angle: 0°	150C1F3	8417	32903	69877	8417	32903	-69877
	380C2F1	16831	65917	139750	16831	65917	-139750
	380C2F2	16832	65867	139752	16832	65867	-139752
	380C2F3	16833	65806	139755	16833	65806	-139755
	RTG	0	0	0	2705	0	-38499
NL4/3	GW / opgw	7088	20076	41590	7088	20076	-41590
Wind, -5°C	150C1F1	12567	41924	87657	12567	41924	-87657
Permanent loads yg= 1.0	150C1F2	12569	41848	87646	12569	41848	-87646
Wind angle: 0°	150C1F3	12572	41756	87636	12572	41756	-87636
	380C2F1	25134	83848	175313	25134	83848	-175313
	380C2F2	25138	83695	175291	25138	83695	-175291
	380C2F3	25143	83511	175272	25143	83511	-175272
	RTG	0	0	0	9879	0	-97633
NL4/4	GW / opgw	2810	9306	19672	2810	9306	-19672
Construction/maintenance, +5°C	150C1F1	9319	31400	66533	9319	31400	-66533
Permanent loads yg= 1.0	150C1F2	9319	31376	66535	9319	31376	-66535
Wind angle: 0°	150C1F3	9320	31346	66539	9320	31346	-66539
	380C2F1	18638	62801	133066	18638	62801	-133066
	380C2F2	18639	62752	133071	18639	62752	-133071
	380C2F3	18640	62693	133078	18640	62693	-133078
	RTG	0	0	0	3616	0	-43815
NL4/1a	GW / opgw	2167	7830	15859	1896	15355	-25884
Wind, 10°C	150C1F1	8006	28297	58046	7175	47718	-82413
Permanent loads yg= 1.0	150C1F2	8010	28185	57985	7229	45887	-79840
Wind angle: 45°	150C1F3	8015	28052	57919	7302	43664	-76735
	380C2F1	16012	56594	116092	14350	95436	-164825
	380C2F2	16021	56370	115970	14459	91774	-159679
	380C2F3	16031	56103	115837	14603	87328	-153470
	RTG	0	0	0	2888	2274	-40590
NL4/1b	GW / opgw	2273	8758	18595	2231	9583	-19143
Wind, -20°C	150C1F1	8418	32834	69885	8318	34916	-70897
Permanent loads yg= 1.0	150C1F2	8418	32818	69888	8330	34713	-70732
Wind angle: 45°	150C1F3	8418	32799	69891	8345	34472	-70548
	380C2F1	16836	65668	139770	16635	69831	-141793
	380C2F2	16836	65637	139775	16661	69425	-141463
	380C2F3	16837	65599	139782	16690	68944	-141096
	RTG	0	0	0	2712	455	-38784
NL4/3	GW / opgw	7093	19838	41584	6904	23984	-44197
Wind, -5°C	150C1F1	12576	41549	87628	12238	48305	-92467
Permanent loads yg= 1.0	150C1F2	12577	41503	87630	12277	47630	-91774
Wind angle: 45°	150C1F3	12578	41447	87633	12323	46830	-90986
	380C2F1	25153	83098	175257	24476	96611	-184934
	380C2F2	25155	83006	175260	24554	95260	-183548
	380C2F3	25157	82894	175266	24647	93659	-181973
	RTG	0	0	0	9920	2329	-99126
NL4/4	GW / opgw	2810	9262	19676	2784	9981	-19996
Construction/maintenance, +5°C	150C1F1	9321	31279	66551	9254	33217	-67251
Permanent loads yg= 1.0	150C1F2	9321	31264	66554	9262	33032	-67126
Wind angle: 45°	150C1F3	9321	31245	66558	9272	32813	-66988
	380C2F1	18641	62558	133101	18507	66434	-134503
	380C2F2	18642	62528	133108	18525	66065	-134252
	380C2F3	18642	62491	133116	18544	65626	-133977
	RTG	0	0	0	3620	455	-44012
NL4/1a	GW / opgw	1911	14662	24889	1911	14662	-24889
Wind, 10°C	150C1F1	7231	45837	79770	7231	45837	-79770
Permanent loads yg= 1.0	150C1F2	7285	44151	77413	7285	44151	-77413
Wind angle: 90°	150C1F3	7357	42109	74581	7357	42109	-74581
	380C2F1	14462	91674	159540	14462	91674	-159540
	380C2F2	14571	88302	154826	14571	88302	-154826
	380C2F3	14714	84218	149162	14714	84218	-149162
	RTG	0	0	0	3042	4548	-53536

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2236	9498	19059	2236	9498	-19059
	150C1F1	8331	34707	70727	8331	34707	-70727
	150C1F2	8342	34524	70587	8342	34524	-70587
	150C1F3	8355	34307	70431	8355	34307	-70431
	380C2F1	16661	69414	141455	16661	69414	-141455
	380C2F2	16684	69049	141174	16684	69049	-141174
	380C2F3	16709	68615	140861	16709	68615	-140861
	RTG	0	0	0	2732	909	-39621
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	6926	23568	43809	6926	23568	-43809
	150C1F1	12278	47612	91756	12278	47612	-91756
	150C1F2	12313	47003	91154	12313	47003	-91154
	150C1F3	12355	46282	90471	12355	46282	-90471
	380C2F1	24556	95223	183512	24556	95223	-183512
	380C2F2	24627	94006	182307	24627	94006	-182307
	380C2F3	24709	92564	180942	24709	92564	-180942
	RTG	0	0	0	10030	4658	-103389
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2787	9909	19941	2787	9909	-19941
	150C1F1	9263	33027	67123	9263	33027	-67123
	150C1F2	9270	32861	67017	9270	32861	-67017
	150C1F3	9279	32662	66901	9279	32662	-66901
	380C2F1	18525	66055	134246	18525	66055	-134246
	380C2F2	18540	65721	134034	18540	65721	-134034
	380C2F3	18557	65325	133802	18557	65325	-133802
	RTG	0	0	0	3634	909	-44598
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1896	15355	25884	2167	7830	-15859
	150C1F1	7175	47718	82413	8006	28297	-58046
	150C1F2	7229	45887	79840	8010	28185	-57985
	150C1F3	7302	43664	76735	8015	28052	-57919
	380C2F1	14350	95436	164825	16012	56594	-116092
	380C2F2	14459	91774	159679	16021	56370	-115970
	380C2F3	14603	87328	153470	16031	56103	-115837
	RTG	0	0	0	2888	2274	-40590
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2231	9583	19143	2273	8758	-18595
	150C1F1	8318	34916	70897	8418	32834	-69885
	150C1F2	8330	34713	70732	8418	32818	-69888
	150C1F3	8345	34472	70548	8418	32799	-69891
	380C2F1	16635	69831	141793	16836	65668	-139770
	380C2F2	16661	69425	141463	16836	65637	-139775
	380C2F3	16690	68944	141096	16837	65599	-139782
	RTG	0	0	0	2712	455	-38784
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	6904	23984	44197	7093	19838	-41584
	150C1F1	12238	48305	92467	12576	41549	-87628
	150C1F2	12277	47630	91774	12577	41503	-87630
	150C1F3	12323	46830	90986	12578	41447	-87633
	380C2F1	24476	96611	184934	25153	83098	-175257
	380C2F2	24554	95260	183548	25155	83006	-175260
	380C2F3	24647	93659	181973	25157	82894	-175266
	RTG	0	0	0	9920	2329	-99126
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2784	9981	19996	2810	9262	-19676
	150C1F1	9254	33217	67251	9321	31279	-66551
	150C1F2	9262	33032	67126	9321	31264	-66554
	150C1F3	9272	32813	66988	9321	31245	-66558
	380C2F1	18507	66434	134503	18641	62558	-133101
	380C2F2	18525	66065	134252	18642	62528	-133108
	380C2F3	18544	65626	133977	18642	62491	-133116
	RTG	0	0	0	3620	455	-44012



T.B.V. Vergunnings aanvraag

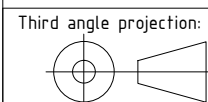
Wintrack
Masttype: ZWW4HL350+10

- Trekparameter 1800m
- 2x380 / 2x150 Hoekmast
- 350m Veldlengte
- 130°-150° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement: Ral 9018 Papyrus white
- Kleurstelling Appendages: Ral 7021 Black grey

3.0	12-06-2014	Edit post in bretel
2.0	05-03-2014	Modified botom diameter and increased traverse length
1.0	03-02-2014	First edition



Projectname:
Engineering verbinding ZW380



Drawing no.:
74102194-035-077V

Design state: Definitief	Scale: 1:300	Description: Wintrack Masttype ZWW4HL350+10	Revision: 3.0
Drawn by: RBE 12-06-2014	Units: m		Format: A3
Checked by: AJP 12-06-2014	Project no: 000.145		
Approved by: AW 12-06-2014	Company: TenneT		

ZWW4S400

Fundatie berekening

Bijlage CN

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p, gem}$	1,6	m
schoorstand		8	:1
α		7,125	graden
Opstort	Diameter	3,8	m
	Hoogte	1,8	m
	Inhoud	20,4	m ³
	e.g.	490	kN
Onderplaat	Diameter	9,0	m
	Hoogte	1,0	m
	Inhoud	64	m ³
	e.g.	1527	kN
Hart paal tov rand fund.		0,6	m

Optreden krachten

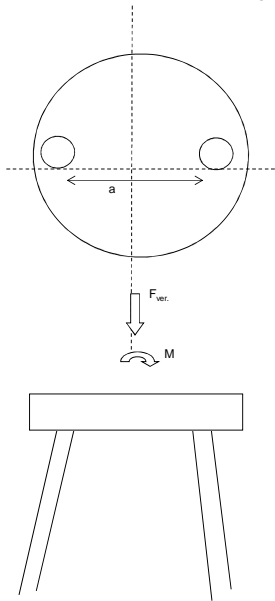
e.g. mast	468	kN
Fgeleiders	167	kN
Maximale dwarskracht	508	kN
Fmax vert (druk)	729	kN
Fmin vert (trek)	547	kN
Maximale moment	21889	kNm

Moment

F_{slag}	3012	kN
F_{hor}	508	kN
F_{ver}	2989	kN
M_{hor} (tgv F_{hor})	1423	kNm
M_{tot}	23312	kNm
$F=W/a$	2989	kN

Verticaal reactiekracht

F_{water} (trek)	840	kN
F_{grond} (druk)	1411	kN
F_{grond} (trek)	1176	kN
F_{dmax} (druk)	2421	kN
F_{tmax} (trek)	1206	kN
F_{dtot} (druk)	5410	kN
F_{ttot} (trek)	1783	kN
Palen druk	5	(-)
Palen trek	6	(-)
Totaal palen	12	(-)



reductie door opwaarste kracht water

Per fundering



ZWW4S400

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r,trek;d} = \int_0^L O_{p;gem} \times p_{r;d} \times dz$$

Bijlage CN

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	O _{p;gem}	1,60 m
paalfactor	α t	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	q _{c,z,max}	15 MPa
	q _{c,z,rep}	11,25 MPa
materiaalfactor	γ _{m,b4}	1,4
factor, wisselende belastingen	γ _{m,var,qc}	1,5
	q _{c,z,d}	5,36 MPa
	p _{r,z,d}	37,5 kN/m ²
	F _{r,trek;d,i}	60,0 kN/m ¹
	F _{trek,d}	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		q _{c,z}		P _{r,max,z} (schacht)	F _{r,trek;d,i}	F _{trek,d}
	m	m	MPa	α t			
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

F _{trek,d}	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

F _{trek,d}	536,4 kN
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ZWW4S400

DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CN

Bepaling opneembare paalbelasting op druk

heipaal	diameter	v a	2 mm 2 mm
	Deq		0,001808
maximale puntweerstand			
$P_{r,max,punt}$			11,25 MN/m ²
paalklasse factor	α_p		1,00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1,00
minimale waarde neergaande deel	$q_{c,lgem}$		9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,lgem}$		14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,lgem}$		11,00 MN/m ²
maximale paalschachtwrijving			
$P_{r,max,schacht}$			0,05 MN/m ²
waarin:			
paalfactor	α_s		0,010
conusweerstand over wrijvingstraject	$q_{c,z,a}$		5,00 MN/m ²
maximale draagkracht alleenstaande paal			
$F_{r,max}$			0,00 MN
waarin:			
$F_{r,max,punt}$			0,00 MN
paalpunt oppervlak	A_{punt}		0,00 m ²
$F_{r,max,schacht}$			0,00 MN
gemiddelde paalomtrek	$O_{p,lgem}$		0,01 m
lengte schachtwrijving	Δl		15,00 m
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max,d}$		MN	0,00 MN
materiaalfactor grond	γ_{mb}		1,20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$		0,75
$F_{r,paal,max,d}$	3 kN	mm, paalpuntniveau	-27,00 m



ZWW4S400

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h		63.3	m
Diameter voet		d voet		2.3	m
top		d top		0.5	m
gem		d gem		1.4	m
wanddikte		t		20	mm
Oppervlakte aan voet		A		143257	mm ²
Traagheidsmoment aan voet		W _x		8.10E+07	mm ⁴
Weerstandsmoment aan voet		I _x		9.20E+10	mm ⁶
Mast: Gewicht		2 ^{de} orde		10.0	%
		F _{rep,ver}		426	kN

Bijlage BN

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	62.6	4.6	15.3	0.0	15.3	957	kNm
150C1F1	52.6	17.1	43.9	0.0	43.9	2307	kNm
150C1F2	42.4	17.1	40.8	0.0	40.8	1729	kNm
150C1F3	32.2	17.1	36.8	0.0	36.8	1186	kNm
380C2F1	52.6	34.1	87.7	0.0	87.7	4613	kNm
380C2F2	42.4	34.1	81.5	0.0	81.5	3458	kNm
380C2F3	32.2	34.1	73.7	0.0	73.7	2373	kNm
RTG	22.1	9.2	20.6	0.0	20.6	454	kNm

Stuwdruk	F _{hor.}	25.8	kN
	M _{d,wind}	719	kNm
Totaal	M _{d,tot}	19900	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	21889	kNm

Normaalkracht;

Optredende normaalkracht					
N _{d,geluiders}				167	kN
N _{d, e.g. mast}				511	kN
N _{s,d,totaal}				679	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	β _a	0.66
	A _{eff}	94928 mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _y /γ _{m1}	7	N/mm ²
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Moment;

Optredende moment in de voet:			
M _{d,tot}	21889	kNm	

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	β _a	0.96
	W _{eff}	7.79E+07 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _y /γ _{m1}	281	N/mm ²
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Totale spanning:

	σ _d	288	N/mm ²	SPANNING TE GROEC < 284 N/mm ² = ACCOORD => 80% van 355 N/mm ²
	σ _{d,toegestaan}	284	N/mm ²	

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	62.6	3.9	10.5	0.0	10.5	658	kNm
150C1F1	52.6	14.2	30.4	0.0	30.4	1598	kNm
150C1F2	42.4	14.2	28.3	0.0	28.3	1200	kNm
150C1F3	32.2	14.2	25.7	0.0	25.7	827	kNm
380C2F1	52.6	28.4	60.7	0.0	60.7	3195	kNm
380C2F2	42.4	28.4	56.6	0.0	56.6	2401	kNm
380C2F3	32.2	28.4	51.4	0.0	51.4	1654	kNm
RTG	22.1	7.7	14.3	0.0	14.3	316	kNm

Stuwdruk	F _{hor.}	687	kN
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Verplaatsing		1.56	m
Percentage van de verplaatsing		2.46%	
Hoek		2.70	graden
Kromming		0.60%	
Fundatie rotatiestijfheid		0.005	rad

3.44	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4S400

Appendix N / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2313	889	20118	2313	889	-20118
Wind, 10°C	150C1F1	8522	3257	73892	8522	3257	-73892
Permanent loads yg= 1.2	150C1F2	8522	3254	73892	8522	3254	-73892
Wind angle: 0°	150C1F3	8522	3251	73892	8522	3251	-73892
	380C2F1	17045	6514	147783	17045	6514	-147783
	380C2F2	17045	6509	147784	17045	6509	-147784
	380C2F3	17045	6503	147784	17045	6503	-147784
	RTG	4620	1769	40192	4620	1769	-40192
NL1/1b	GW / opgw	2312	997	22782	2312	997	-22782
Wind, -20°C	150C1F1	8518	3712	84885	8518	3712	-84885
Permanent loads yg= 1.2	150C1F2	8518	3712	84885	8518	3712	-84885
Wind angle: 0°	150C1F3	8518	3711	84885	8518	3711	-84885
	380C2F1	17036	7425	169770	17036	7425	-169770
	380C2F2	17036	7424	169770	17036	7424	-169770
	380C2F3	17036	7422	169770	17036	7422	-169770
	RTG	4618	1974	45137	4618	1974	-45137
NL1/3	GW / opgw	9331	2691	61372	9331	2691	-61372
Wind, -5°C	150C1F1	14688	5228	119339	14688	5228	-119339
Permanent loads yg= 1.2	150C1F2	14688	5226	119339	14688	5226	-119339
Wind angle: 0°	150C1F3	14688	5225	119339	14688	5225	-119339
	380C2F1	29376	10455	238678	29376	10455	-238678
	380C2F2	29376	10453	238678	29376	10453	-238678
	380C2F3	29376	10449	238678	29376	10449	-238678
	RTG	18688	5380	122900	18688	5380	-122900
NL1/4	GW / opgw	3065	1125	25725	3065	1125	-25725
Construction/maintenance, +5°C	150C1F1	10026	3754	85847	10026	3754	-85847
Permanent loads yg= 1.2	150C1F2	10026	3754	85847	10026	3754	-85847
Wind angle: 0°	150C1F3	10026	3753	85847	10026	3753	-85847
	380C2F1	20053	7509	171694	20053	7509	-171694
	380C2F2	20053	7508	171694	20053	7508	-171694
	380C2F3	20053	7506	171694	20053	7506	-171694
	RTG	6124	2246	51377	6124	2246	-51377
NL1/6	GW / opgw	2603	967	22156	2603	967	-22156
Permanent, +10°C	150C1F1	9589	3546	81221	9589	3546	-81221
Permanent loads yg= 1.35	150C1F2	9589	3546	81221	9589	3546	-81221
	150C1F3	9589	3546	81221	9589	3546	-81221
	380C2F1	19177	7092	162441	19177	7092	-162441
	380C2F2	19177	7092	162441	19177	7092	-162441
	380C2F3	19177	7092	162441	19177	7092	-162441
	RTG	5198	1933	44272	5198	1933	-44272
NL1/1a	GW / opgw	2314	3846	27983	2314	4453	-30414
Wind, 10°C	150C1F1	8525	11377	91937	8525	13050	-98033
Permanent loads yg= 1.2	150C1F2	8524	10695	89566	8525	12228	-94992
Wind angle: 45°	150C1F3	8524	9830	86686	8525	11184	-91258
	380C2F1	17049	22754	183874	17051	26100	-196067
	380C2F2	17049	21389	179132	17050	24455	-189985
	380C2F3	17048	19659	173373	17049	22368	-182517
	RTG	4621	5455	47696	4621	6215	-50363
NL1/1b	GW / opgw	2312	1537	23197	2312	1645	-23372
Wind, -20°C	150C1F1	8518	5215	85739	8518	5512	-86106
Permanent loads yg= 1.2	150C1F2	8518	5093	85607	8518	5366	-85919
Wind angle: 45°	150C1F3	8518	4939	85454	8518	5181	-85701
	380C2F1	17036	10430	171479	17036	11024	-172212
	380C2F2	17036	10187	171214	17036	10732	-171837
	380C2F3	17036	9878	170907	17036	10361	-171402
	RTG	4618	2659	45474	4618	2795	-45620
NL1/3	GW / opgw	9332	5451	63066	9332	5997	-63774
Wind, -5°C	150C1F1	14689	9464	122560	14689	10308	-123899
Permanent loads yg= 1.2	150C1F2	14689	9120	122071	14689	9893	-123216
Wind angle: 45°	150C1F3	14688	8682	121502	14689	9367	-122418
	380C2F1	29377	18929	245119	29378	20617	-247798
	380C2F2	29377	18239	244142	29378	19787	-246432
	380C2F3	29377	17364	243004	29377	18734	-244836
	RTG	18689	8882	124262	18689	9568	-124857
NL1/4	GW / opgw	3066	1660	25999	3066	1765	-26117
Construction/maintenance, +5°C	150C1F1	10026	5249	86504	10026	5543	-86791
Permanent loads yg= 1.2	150C1F2	10026	5129	86401	10026	5399	-86644
Wind angle: 45°	150C1F3	10026	4976	86282	10026	5215	-86474
	380C2F1	20053	10498	173009	20053	11086	-173582
	380C2F2	20053	10258	172802	20053	10797	-173288
	380C2F3	20053	9952	172564	20053	10430	-172949
	RTG	6124	2927	51595	6124	3060	-51693

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2316	7643	43545	2316	7643	-43545
	150C1F1	8530	21926	133184	8530	21926	-133184
	150C1F2	8529	20387	126978	8529	20387	-126978
	150C1F3	8528	18424	119074	8528	18424	-119074
	380C2F1	17059	43851	266368	17059	43851	-266368
	380C2F2	17058	40774	253956	17058	40774	-253956
	380C2F3	17056	36848	238148	17056	36848	-238148
	RTG	4623	10281	66499	4623	10281	-66499
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	2226	24712	2312	2226	-24712
	150C1F1	8518	7103	88986	8518	7103	-88986
	150C1F2	8518	6824	88380	8518	6824	-88380
	150C1F3	8518	6470	87669	8518	6470	-87669
	380C2F1	17037	14206	177971	17037	14206	-177971
	380C2F2	17037	13647	176759	17037	13647	-176759
	380C2F3	17036	12939	175338	17036	12939	-175338
	RTG	4618	3517	46781	4618	3517	-46781
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	9335	8915	69042	9335	8915	-69042
	150C1F1	14691	14842	133903	14691	14842	-133903
	150C1F2	14691	14046	131864	14691	14046	-131864
	150C1F3	14690	13037	129432	14690	13037	-129432
	380C2F1	29382	29685	267807	29382	29685	-267807
	380C2F2	29381	28092	263728	29381	28092	-263728
	380C2F3	29380	26074	258864	29380	26074	-258864
	RTG	18691	13216	129523	18691	13216	-129523
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3066	2328	27047	3066	2328	-27047
	150C1F1	10027	7109	89071	10027	7109	-89071
	150C1F2	10027	6834	88588	10027	6834	-88588
	150C1F3	10027	6487	88023	10027	6487	-88023
	380C2F1	20054	14217	178143	20054	14217	-178143
	380C2F2	20053	13669	177175	20053	13669	-177175
	380C2F3	20053	12973	176046	20053	12973	-176046
	RTG	6124	3766	52479	6124	3766	-52479
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2314	4453	30414	2314	3846	-27983
	150C1F1	8525	13050	98033	8525	11377	-91937
	150C1F2	8525	12228	94992	8524	10695	-89566
	150C1F3	8525	11184	91258	8524	9830	-86686
	380C2F1	17051	26100	196067	17049	22754	-183874
	380C2F2	17050	24455	189985	17049	21389	-179132
	380C2F3	17049	22368	182517	17048	19659	-173373
	RTG	4621	6215	50363	4621	5455	-47696
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	1645	23372	2312	1537	-23197
	150C1F1	8518	5512	86106	8518	5215	-85739
	150C1F2	8518	5366	85919	8518	5093	-85607
	150C1F3	8518	5181	85701	8518	4939	-85454
	380C2F1	17036	11024	172212	17036	10430	-171479
	380C2F2	17036	10732	171837	17036	10187	-171214
	380C2F3	17036	10361	171402	17036	9878	-170907
	RTG	4618	2795	45620	4618	2659	-45474
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	9332	5997	63774	9332	5451	-63066
	150C1F1	14689	10308	123899	14689	9464	-122560
	150C1F2	14689	9893	123216	14689	9120	-122071
	150C1F3	14689	9367	122418	14688	8682	-121502
	380C2F1	29378	20617	247798	29377	18929	-245119
	380C2F2	29378	19787	246432	29377	18239	-244142
	380C2F3	29377	18734	244836	29377	17364	-243004
	RTG	18689	9568	124857	18689	8882	-124262
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3066	1765	26117	3066	1660	-25999
	150C1F1	10026	5543	86791	10026	5249	-86504
	150C1F2	10026	5399	86644	10026	5129	-86401
	150C1F3	10026	5215	86474	10026	4976	-86282
	380C2F1	20053	11086	173582	20053	10498	-173009
	380C2F2	20053	10797	173288	20053	10258	-172802
	380C2F3	20053	10430	172949	20053	9952	-172564
	RTG	6124	3060	51693	6124	2927	-51595
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1735	702	15832	1735	702	-15832
	150C1F1	6390	2582	58428	6390	2582	-58428
	150C1F2	6390	2579	58428	6390	2579	-58428
	150C1F3	6390	2576	58428	6390	2576	-58428
	380C2F1	12781	5163	116856	12781	5163	-116856
	380C2F2	12781	5159	116856	12781	5159	-116856
	380C2F3	12781	5152	116856	12781	5152	-116856
	RTG	3464	1394	31612	3464	1394	-31612

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	799	18256	1734	799	-18256
	150C1F1	6387	3002	68620	6387	3002	-68620
	150C1F2	6387	3002	68620	6387	3002	-68620
	150C1F3	6387	3001	68620	6387	3001	-68620
	380C2F1	12774	6004	137240	12774	6004	-137240
	380C2F2	12774	6003	137240	12774	6003	-137240
	380C2F3	12774	6002	137240	12774	6002	-137240
	RTG	3463	1579	36098	3463	1579	-36098
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	8751	2569	58574	8751	2569	-58574
	150C1F1	12554	4650	106103	12554	4650	-106103
	150C1F2	12554	4648	106103	12554	4648	-106103
	150C1F3	12554	4647	106103	12554	4647	-106103
	380C2F1	25109	9299	212206	25109	9299	-212206
	380C2F2	25109	9297	212206	25109	9297	-212206
	380C2F3	25109	9293	212206	25109	9293	-212206
	RTG	17529	5136	117298	17529	5136	-117298
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2487	952	21749	2487	952	-21749
	150C1F1	7894	3107	71017	7894	3107	-71017
	150C1F2	7894	3106	71017	7894	3106	-71017
	150C1F3	7894	3106	71017	7894	3106	-71017
	380C2F1	15788	6214	142035	15788	6214	-142035
	380C2F2	15788	6213	142035	15788	6213	-142035
	380C2F3	15788	6211	142035	15788	6211	-142035
	RTG	4968	1899	43420	4968	1899	-43420
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1735	691	15832	1735	691	-15832
	150C1F1	6390	2551	58429	6390	2551	-58429
	150C1F2	6390	2551	58429	6390	2551	-58429
	150C1F3	6390	2551	58429	6390	2551	-58429
	380C2F1	12781	5102	116857	12781	5102	-116857
	380C2F2	12781	5102	116857	12781	5102	-116857
	380C2F3	12781	5102	116857	12781	5102	-116857
	RTG	3464	1380	31612	3464	1380	-31612
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1735	3745	25694	1736	4367	-28441
	150C1F1	6393	10940	81952	6393	12662	-89184
	150C1F2	6392	10235	79072	6393	11817	-85605
	150C1F3	6392	9341	75512	6393	10741	-81132
	380C2F1	12785	21880	163905	12786	25325	-178368
	380C2F2	12785	20471	158144	12786	23633	-171210
	380C2F3	12784	18682	151023	12785	21482	-162265
	RTG	3465	5186	41561	3465	5973	-44814
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	1348	18863	1734	1459	-19112
	150C1F1	6387	4522	69888	6387	4827	-70420
	150C1F2	6387	4398	69695	6387	4677	-70148
	150C1F3	6387	4241	69470	6387	4487	-69832
	380C2F1	12774	9045	139775	12774	9653	-140839
	380C2F2	12774	8797	139389	12774	9354	-140296
	380C2F3	12774	8482	138940	12774	8975	-139663
	RTG	3463	2272	36598	3463	2410	-36810
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	8752	5335	60421	8752	5884	-61187
	150C1F1	12555	8918	110064	12555	9774	-111683
	150C1F2	12555	8569	109470	12555	9353	-110859
	150C1F3	12555	8126	108777	12555	8819	-109892
	380C2F1	25110	17836	220127	25111	19548	-223366
	380C2F2	25110	17138	218940	25110	18706	-221717
	380C2F3	25110	16251	217553	25110	17638	-219783
	RTG	17530	8643	118791	17530	9331	-119438
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2487	1490	22112	2487	1597	-22266
	150C1F1	7894	4613	71930	7894	4911	-72320
	150C1F2	7894	4491	71789	7894	4764	-72121
	150C1F3	7894	4336	71626	7894	4578	-71889
	380C2F1	15788	9225	143860	15788	9821	-144641
	380C2F2	15788	8981	143578	15788	9528	-144242
	380C2F3	15788	8672	143251	15788	9156	-143778
	RTG	4968	2583	43713	4968	2717	-43841
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1737	7598	42499	1737	7598	-42499
	150C1F1	6397	21704	128130	6397	21704	-128130
	150C1F2	6396	20145	121468	6396	20145	-121468
	150C1F3	6395	18152	112882	6395	18152	-112882
	380C2F1	12794	43408	256259	12794	43408	-256259
	380C2F2	12792	40291	242936	12792	40291	-242936
	380C2F3	12791	36305	225764	12791	36305	-225764
	RTG	3467	10133	63126	3467	10133	-63126

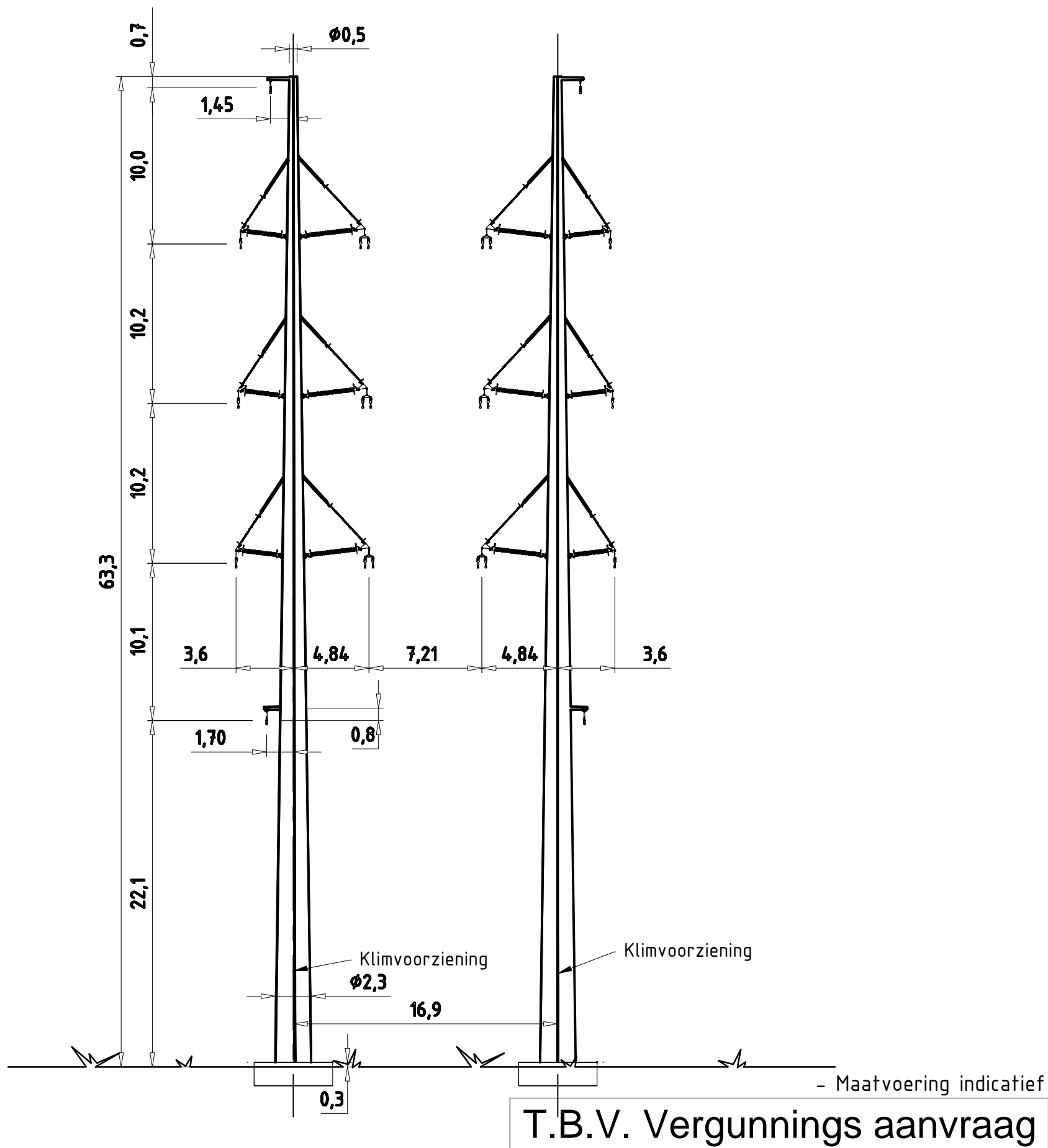
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	2061	20947	1734	2061	-20947
	150C1F1	6387	6469	74483	6387	6469	-74483
	150C1F2	6387	6180	73642	6387	6180	-73642
	150C1F3	6387	5813	72647	6387	5813	-72647
	380C2F1	12775	12938	148965	12775	12938	-148965
	380C2F2	12775	12359	147284	12775	12359	-147284
	380C2F3	12775	11626	145294	12775	11626	-145294
	RTG	3463	3153	38459	3463	3153	-38459
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	8754	8818	66829	8754	8818	-66829
	150C1F1	12557	14386	123475	12557	14386	-123475
	150C1F2	12557	13575	121109	12557	13575	-121109
	150C1F3	12557	12548	118263	12557	12548	-118263
	380C2F1	25115	28772	246951	25115	28772	-246951
	380C2F2	25114	27151	242218	25114	27151	-242218
	380C2F3	25113	25096	236526	25113	25096	-236526
	RTG	17532	12995	124484	17532	12995	-124484
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2487	2171	23456	2487	2171	-23456
	150C1F1	7894	6510	75369	7894	6510	-75369
	150C1F2	7894	6229	74729	7894	6229	-74729
	150C1F3	7894	5873	73978	7894	5873	-73978
	380C2F1	15789	13020	150738	15789	13020	-150738
	380C2F2	15789	12458	149459	15789	12458	-149459
	380C2F3	15788	11746	147956	15788	11746	-147956
	RTG	4968	3433	44864	4968	3433	-44864
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1736	4367	28441	1735	3745	-25694
	150C1F1	6393	12662	89184	6393	10940	-81952
	150C1F2	6393	11817	85605	6392	10235	-79072
	150C1F3	6393	10741	81132	6392	9341	-75512
	380C2F1	12786	25325	178368	12785	21880	-163905
	380C2F2	12786	23633	171210	12785	20471	-158144
	380C2F3	12785	21482	162265	12784	18682	-151023
	RTG	3465	5973	44814	3465	5186	-41561
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	1459	19112	1734	1348	-18863
	150C1F1	6387	4827	70420	6387	4522	-69888
	150C1F2	6387	4677	70148	6387	4398	-69695
	150C1F3	6387	4487	69832	6387	4241	-69470
	380C2F1	12774	9653	140839	12774	9045	-139775
	380C2F2	12774	9354	140296	12774	8797	-139389
	380C2F3	12774	8975	139663	12774	8482	-138940
	RTG	3463	2410	36810	3463	2272	-36598
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	8752	5884	61187	8752	5335	-60421
	150C1F1	12555	9774	111683	12555	8918	-110064
	150C1F2	12555	9353	110859	12555	8569	-109470
	150C1F3	12555	8819	109892	12555	8126	-108777
	380C2F1	25111	19548	223366	25110	17836	-220127
	380C2F2	25110	18706	221717	25110	17138	-218940
	380C2F3	25110	17638	219783	25110	16251	-217553
	RTG	17530	9331	119438	17530	8643	-118791
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2487	1597	22266	2487	1490	-22112
	150C1F1	7894	4911	72320	7894	4613	-71930
	150C1F2	7894	4764	72121	7894	4491	-71789
	150C1F3	7894	4578	71889	7894	4336	-71626
	380C2F1	15788	9821	144641	15788	9225	-143860
	380C2F2	15788	9528	144242	15788	8981	-143578
	380C2F3	15788	9156	143779	15788	8672	-143251
	RTG	4968	2717	43841	4968	2583	-43713

ZWW4S400

Loadcases for tower strength (serviceability limit state)


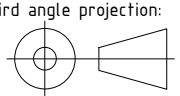
Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1928	762	17295	1928	762	-17295
	150C1F1	7101	2802	63716	7101	2802	-63716
	150C1F2	7101	2801	63716	7101	2801	-63716
	150C1F3	7101	2799	63716	7101	2799	-63716
	380C2F1	14202	5605	127432	14202	5605	-127432
	380C2F2	14202	5602	127432	14202	5602	-127432
	380C2F3	14202	5597	127433	14202	5597	-127433
	RTG	3850	1517	34541	3850	1517	-34541
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1927	866	19809	1927	866	-19809
	150C1F1	7097	3244	74210	7097	3244	-74210
	150C1F2	7097	3244	74210	7097	3244	-74210
	150C1F3	7097	3243	74210	7097	3243	-74210
	380C2F1	14194	6488	148419	14194	6488	-148419
	380C2F2	14194	6488	148419	14194	6488	-148419
	380C2F3	14194	6487	148419	14194	6487	-148419
	RTG	3848	1713	39198	3848	1713	-39198
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	6603	2088	47646	6603	2088	-47646
	150C1F1	11209	4264	97397	11209	4264	-97397
	150C1F2	11209	4263	97397	11209	4263	-97397
	150C1F3	11209	4262	97397	11209	4262	-97397
	380C2F1	22419	8528	194794	22419	8528	-194794
	380C2F2	22419	8526	194794	22419	8526	-194794
	380C2F3	22419	8524	194794	22419	8524	-194794
	RTG	13222	4172	95327	13222	4172	-95327
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	2429	933	21339	2429	933	-21339
	150C1F1	8103	3170	72519	8103	3170	-72519
	150C1F2	8103	3170	72519	8103	3170	-72519
	150C1F3	8103	3170	72519	8103	3170	-72519
	380C2F1	16206	6341	145038	16206	6341	-145038
	380C2F2	16206	6340	145038	16206	6340	-145038
	380C2F3	16206	6339	145038	16206	6339	-145038
	RTG	4852	1862	42594	4852	1862	-42594
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1928	2713	22074	1928	3116	-23669
	150C1F1	7102	8157	74429	7102	9263	-78286
	150C1F2	7102	7707	72957	7102	8719	-76350
	150C1F3	7102	7137	71192	7102	8030	-74006
	380C2F1	14204	16314	148858	14205	18526	-156572
	380C2F2	14204	15414	145913	14205	17438	-152700
	380C2F3	14204	14275	142383	14204	16059	-148012
	RTG	3850	3947	38920	3850	4448	-40561
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1927	1225	20042	1927	1296	-20142
	150C1F1	7097	4242	74688	7097	4438	-74896
	150C1F2	7097	4161	74613	7097	4342	-74789
	150C1F3	7097	4059	74527	7097	4219	-74666
	380C2F1	14194	8484	149376	14194	8876	-149792
	380C2F2	14194	8323	149226	14194	8683	-149579
	380C2F3	14194	8118	149053	14194	8438	-149332
	RTG	3848	2169	39385	3848	2258	-39468
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	6603	3930	48841	6603	4295	-49341
	150C1F1	11210	7083	99443	11210	7644	-100302
	150C1F2	11210	6854	99131	11210	7368	-99864
	150C1F3	11209	6563	98768	11210	7018	-99352
	380C2F1	22419	14166	198886	22419	15288	-200605
	380C2F2	22419	13708	198261	22419	14736	-199727
	380C2F3	22419	13126	197536	22419	14036	-198705
	RTG	13222	6507	96289	13222	6965	-96707
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	2429	1288	21502	2429	1358	-21572
	150C1F1	8103	4164	72899	8103	4359	-73066
	150C1F2	8103	4084	72839	8103	4263	-72981
	150C1F3	8103	3983	72769	8103	4142	-72881
	380C2F1	16206	8328	145798	16206	8718	-146133
	380C2F2	16206	8169	145678	16206	8527	-145961
	380C2F3	16206	7966	145539	16206	8283	-145763
	RTG	4852	2315	42722	4852	2403	-42780
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1929	5258	32797	1929	5258	-32797
	150C1F1	7105	15187	101956	7105	15187	-101956
	150C1F2	7104	14154	97643	7104	14154	-97643
	150C1F3	7104	12840	92220	7104	12840	-92220
	380C2F1	14210	30374	203912	14210	30374	-203912
	380C2F2	14209	28309	195286	14209	28309	-195286
	380C2F3	14208	25679	184440	14208	25679	-184440
	RTG	3851	7149	51129	3851	7149	-51129

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1927	1678	20920	1927	1678	-20920
	150C1F1	7097	5487	76551	7097	5487	-76551
	150C1F2	7097	5303	76199	7097	5303	-76199
	150C1F3	7097	5070	75789	7097	5070	-75789
	380C2F1	14195	10974	153102	14195	10974	-153102
	380C2F2	14195	10606	152399	14195	10606	-152399
	380C2F3	14195	10140	151579	14195	10140	-151579
	RTG	3848	2735	40128	3848	2735	-40128
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	6605	6249	53098	6605	6249	-53098
	150C1F1	11211	10660	106834	11211	10660	-106834
	150C1F2	11211	10129	105487	11211	10129	-105487
	150C1F3	11210	9458	103891	11210	9458	-103891
	380C2F1	22422	21319	213668	22422	21319	-213668
	380C2F2	22421	20259	210974	22421	20259	-210974
	380C2F3	22421	18916	207782	22421	18916	-207782
	RTG	13223	9403	100008	13223	9403	-100008
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2429	1731	22136	2429	1731	-22136
	150C1F1	8103	5395	74412	8103	5395	-74412
	150C1F2	8103	5214	74124	8103	5214	-74124
	150C1F3	8103	4984	73791	8103	4984	-73791
	380C2F1	16207	10790	148823	16207	10790	-148823
	380C2F2	16207	10427	148249	16207	10427	-148249
	380C2F3	16207	9967	147581	16207	9967	-147581
	RTG	4852	2871	43252	4852	2871	-43252
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1928	3116	23669	1928	2713	-22074
	150C1F1	7102	9263	78286	7102	8157	-74429
	150C1F2	7102	8719	76350	7102	7707	-72957
	150C1F3	7102	8030	74006	7102	7137	-71192
	380C2F1	14205	18526	156572	14204	16314	-148858
	380C2F2	14205	17438	152700	14204	15414	-145913
	380C2F3	14204	16059	148012	14204	14275	-142383
	RTG	3850	4448	40561	3850	3947	-38920
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1927	1296	20142	1927	1225	-20042
	150C1F1	7097	4438	74896	7097	4242	-74688
	150C1F2	7097	4342	74789	7097	4161	-74613
	150C1F3	7097	4219	74666	7097	4059	-74527
	380C2F1	14194	8876	149792	14194	8484	-149376
	380C2F2	14194	8683	149579	14194	8323	-149226
	380C2F3	14194	8438	149332	14194	8118	-149053
	RTG	3848	2258	39468	3848	2169	-39385
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	6603	4295	49341	6603	3930	-48841
	150C1F1	11210	7644	100302	11210	7083	-99443
	150C1F2	11210	7368	99864	11210	6854	-99131
	150C1F3	11210	7018	99352	11209	6563	-98768
	380C2F1	22419	15288	200605	22419	14166	-198886
	380C2F2	22419	14736	199727	22419	13708	-198261
	380C2F3	22419	14036	198705	22419	13126	-197536
	RTG	13222	6965	96707	13222	6507	-96289
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2429	1358	21572	2429	1288	-21502
	150C1F1	8103	4359	73066	8103	4164	-72899
	150C1F2	8103	4263	72981	8103	4084	-72839
	150C1F3	8103	4142	72881	8103	3983	-72769
	380C2F1	16206	8718	146133	16206	8328	-145798
	380C2F2	16206	8527	145961	16206	8169	-145678
	380C2F3	16206	8283	145763	16206	7966	-145539
	RTG	4852	2403	42780	4852	2315	-42722



Wintrack
Masttype: ZWW4S400

- Trekparameter 1800m
- 2x380 / 2x150 Steunmast
- 400m Veldlengte
- 175°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

5.0	03-03-2014	Increased space between poles
4.0	11-02-2014	Modified top/botom diameter and added new braced-V
3.0	11-03-2013	Small modification
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection: 
Drawn by: BJT 03-03-2014		Drawing no.: 74102194-035-081
Checked by: AJP 03-03-2014		Description: Wintrack Masttype ZWW4S400
Approved by: AW 03-03-2014		
Scale: 1:300		Revision: 5.0
Units: m		Format: A3
Project no: 000.145		
Company: TenneT		
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		

ZWW4S400+5

Fundatie berekening

Bijlage CR

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p, gem}$	1,6	m

schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	3,9	m
	Hoogte	1,8	m
	Inhoud	21,5	m ³
	e.g.	516	kN

Onderplaat	Diameter	10,0	m
	Hoogte	1,0	m
	Inhoud	79	m ³
	e.g.	1885	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		524	kN
Fgeleiders		175	kN
Maximale dwarskracht		532	kN
Fmax vert (druk)		804	kN
Fmin vert (trek)		603	kN
Maximale moment		25322	kNm

Moment

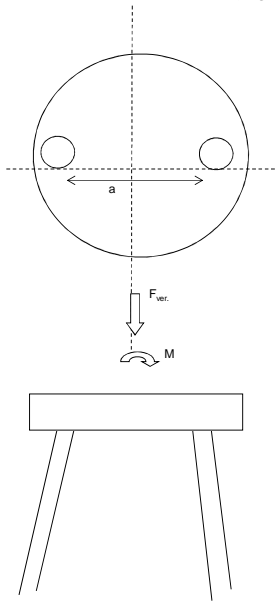
F_{slag}		3070	kN
F_{hor}		532	kN
F_{ver}		3047	kN
M_{hor} (tgv F_{hor})		1489	kNm
M_{tot}		26811	kNm
$F=M/a$		3047	kN

Verticaal reactiekracht

F_{water} (trek)		1000	kN
F_{grond} (druk)		1798	kN
F_{grond} (trek)		1498	kN
F_{dmax} (druk)		2921	kN
F_{tmax} (trek)		1456	kN
F_{dtot} (druk)		5968	kN
F_{ttot} (trek)		1591	kN

Palen druk	6	(-)
Palen trek	5	(-)

Totaal palen	12	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4S400+5

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r,trek;d} = \int_0^L O_{p;gem} \times p_{r,z;d} \times dz$$

Bijlage CR

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	$O_{p;gem}$	1,60 m
paalfactor	α_t	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	$q_{c,z,max}$	15 MPa
	$q_{c,z,ep}$	11,25 MPa
materiaalfactor	$\gamma_{m,b4}$	1,4
factor, wisselende belastingen	$\gamma_{m,var,qe}$	1,5
	$q_{c,z,d}$	5,36 MPa
	$p_{r,z,d}$	37,5 kN/m ²
	$F_{r,trek;d,i}$	60,0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c,z}$		$P_{r,max,z,achtig}$	$F_{r,trek;d,i}$	$F_{trek,d}$
	m	m	MPa	α_t			
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596
$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m			
Paalgroep factor	10%						
$F_{trek,d}$	536,4 kN						



ZWW4S400+5

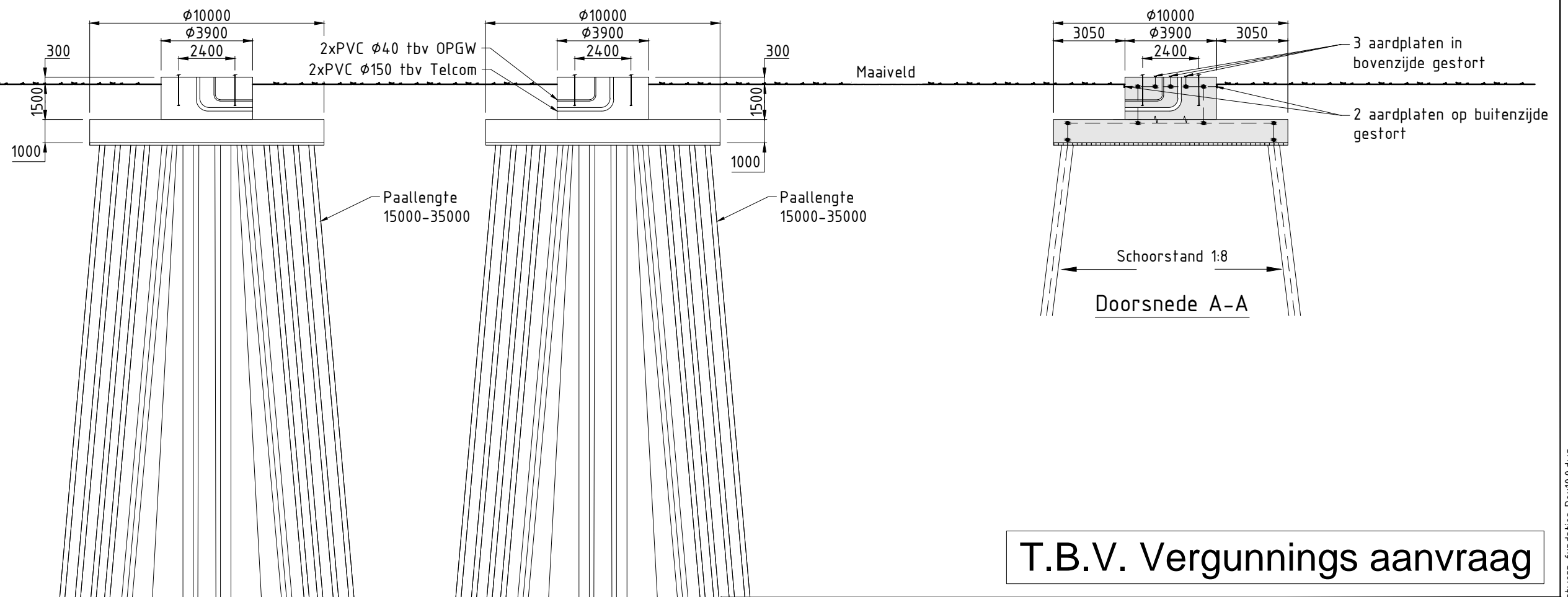
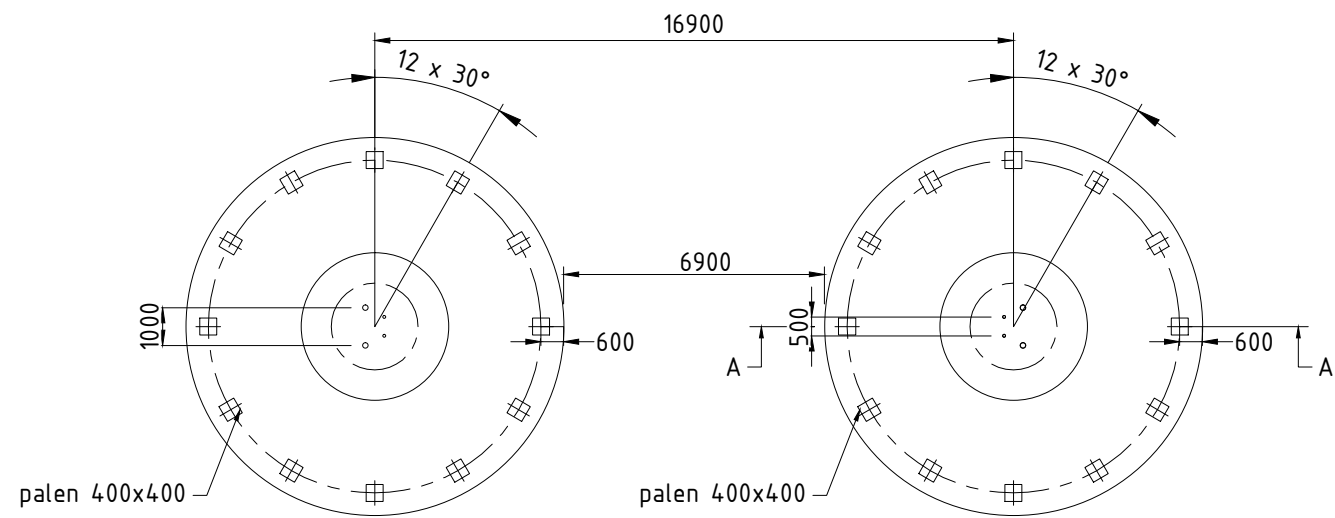
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CR

Bepaling opneembare paalbelasting op druk

heipaal	diameter	v a	2 mm 2 mm
	Deq		0,001808
maximale puntweerstand			
$P_{r,max,punt}$			11,25 MN/m ²
paalklasse factor	α_p		1,00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1,00
minimale waarde neergaande deel	$q_{c,lgem}$		9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,lgem}$		14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,lgem}$		11,00 MN/m ²
maximale paalschachtwrijving			
$P_{r,max,schacht}$			0,05 MN/m ²
waarin:			
paalfactor	α_s		0,010
conusweerstand over wrijvingstraject	$q_{c,z,a}$		5,00 MN/m ²
maximale draagkracht alleenstaande paal			
$F_{r,max}$			0,00 MN
waarin:			
$F_{r,max,punt}$			0,00 MN
paalpunt oppervlak	A_{punt}		0,00 m ²
$F_{r,max,schacht}$			0,00 MN
gemiddelde paalomtrek	$O_{p,lgem}$		0,01 m
lengte schachtwrijving	Δl		15,00 m
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max,d}$		MN	0,00 MN
materiaalfactor grond	γ_{mb}		1,20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$		0,75
$F_{r,paal,max,d}$	3 kN	mm, paalpuntniveau	-27,00 m



T.B.V. Vergunnings aanvraag

Verklaring

- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding $\phi 16\text{mm}$ (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

10.0	21-03-2014	Paal-Paal afstand aangepast
9.0	14-03-2014	Diverse aanpassingen
8.0	13-02-2014	Opstort afmeting gewijzigd
		Projectname: Engineering verbindingen ZW380
Design state: Definitief		Scale: 1:200
Drawn by: RBE 21-03-2014		Units: mm
Checked by: AJP 21-03-2014		Project no: 000.145
Approved by: AW 21-03-2014		Company: TenneT
Description: Principe ontwerp fundatie steunmast ZWW4S400+5 masten familie		Drawing no.: 74102194-032-082V
		Revision: 10.0
		Format: A3



ZWW4S400+5

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h		68.3	m
Diameter voet		d voet		2.4	m
top		d top		0.5	m
gem		d gem		1.5	m
wanddikte		t		22	mm
Oppervlakte aan voet		A		164356	mm ²
Traagheidsmoment aan voet		W _x		9.68E+07	mm ⁴
Weerstandsmoment aan voet		I _x		1.15E+11	mm ⁶
Mast: Gewicht		2 ^{de} orde		10.0	%
		F _{rep,ver}		524	kN

Bijlage BR

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	67.6	4.8	15.5	0.0	15.5	1046	kNm
150C1F1	57.6	17.8	44.5	0.0	44.5	2564	kNm
150C1F2	47.4	17.8	41.6	0.0	41.6	1971	kNm
150C1F3	37.2	17.9	37.9	0.0	37.9	1409	kNm
380C2F1	57.6	35.6	89.0	0.0	89.0	5128	kNm
380C2F2	47.4	35.7	83.2	0.0	83.2	3942	kNm
380C2F3	37.2	35.8	75.8	0.0	75.8	2819	kNm
RTG	27.1	9.7	21.6	0.0	21.6	586	kNm

Stuwdruk	F _{hor.}	29.3	kN
	M _{d,wind}	882	kNm
Totaal	M _{d,tot}	23020	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	25322	kNm

Normaalkracht;

Optredende normaalkracht					
N _{d,geluiders}				175	kN
N _{d, e.g. mast}				626	kN
N _{s,d,totaal}				804	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	0.68	
	A _{eff}	112138 mm ²

Optredende spanning tgv normaalkracht

N _{d,d/A_{eff}} = f _{yd} /γ _{m1}	7	N/mm ²
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Moment;

Optredende moment in de voet:		
M _{d,tot}	25322	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	0.98	
	W _{eff}	9.51E+07 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	266	N/mm ²
---	-----	-------------------

Totale spanning:

σ _d	273	N/mm ²	< 284 N/mm ² = ACCOORD
σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	67.6	4.0	10.6	0.0	10.6	720	kNm
150C1F1	57.6	15.0	30.8	0.0	30.8	1775	kNm
150C1F2	47.4	15.0	28.8	0.0	28.8	1367	kNm
150C1F3	37.2	15.1	26.4	0.0	26.4	981	kNm
380C2F1	57.6	30.0	61.6	0.0	61.6	3550	kNm
380C2F2	47.4	30.1	57.7	0.0	57.7	2735	kNm
380C2F3	37.2	30.2	52.8	0.0	52.8	1962	kNm
RTG	27.1	8.2	15.0	0.0	15.0	407	kNm

Stuwdruk	F _{hor.}	782	kN
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Verplaatsing		1.73	m
Percentage van de verplaatsing		2.54%	
Hoek		2.84	graden
Kromming		0.64%	
Fundatie rotatiestijfheid		0.005	rad

3.72	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4S400+5

Appendix R / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2566	889	20118	2566	889	-20118
Wind, 10°C	150C1F1	9452	3257	73892	9452	3257	-73892
Permanent loads yg= 1.2	150C1F2	9452	3255	73892	9452	3255	-73892
Wind angle: 0°	150C1F3	9452	3252	73892	9452	3252	-73892
	380C2F1	18903	6515	147783	18903	6515	-147783
	380C2F2	18903	6510	147783	18903	6510	-147783
	380C2F3	18903	6504	147783	18903	6504	-147783
	RTG	5125	1770	40192	5125	1770	-40192
NL1/1b	GW / opgw	2598	997	22782	2598	997	-22782
Wind, -20°C	150C1F1	9584	3712	84885	9584	3712	-84885
Permanent loads yg= 1.2	150C1F2	9584	3712	84885	9584	3712	-84885
Wind angle: 0°	150C1F3	9584	3711	84885	9584	3711	-84885
	380C2F1	19168	7425	169771	19168	7425	-169771
	380C2F2	19168	7424	169771	19168	7424	-169771
	380C2F3	19168	7423	169771	19168	7423	-169771
	RTG	5185	1974	45137	5185	1974	-45137
NL1/3	GW / opgw	10106	2691	61371	10106	2691	-61371
Wind, -5°C	150C1F1	16190	5228	119339	16190	5228	-119339
Permanent loads yg= 1.2	150C1F2	16190	5227	119339	16190	5227	-119339
Wind angle: 0°	150C1F3	16190	5225	119339	16190	5225	-119339
	380C2F1	32379	10456	238677	32379	10456	-238677
	380C2F2	32379	10453	238677	32379	10453	-238677
	380C2F3	32379	10450	238677	32379	10450	-238677
	RTG	20239	5381	122899	20239	5381	-122899
NL1/4	GW / opgw	3389	1125	25725	3389	1125	-25725
Construction/maintenance, +5°C	150C1F1	11106	3754	85847	11106	3754	-85847
Permanent loads yg= 1.2	150C1F2	11106	3754	85847	11106	3754	-85847
Wind angle: 0°	150C1F3	11106	3753	85847	11106	3753	-85847
	380C2F1	22212	7509	171693	22212	7509	-171693
	380C2F2	22212	7508	171693	22212	7508	-171693
	380C2F3	22212	7507	171693	22212	7507	-171693
	RTG	6771	2246	51377	6771	2246	-51377
NL1/6	GW / opgw	2881	967	22156	2881	967	-22156
Permanent, +10°C	150C1F1	10610	3546	81220	10610	3546	-81220
Permanent loads yg= 1.35	150C1F2	10610	3546	81220	10610	3546	-81220
	150C1F3	10610	3546	81220	10610	3546	-81220
	380C2F1	21221	7092	162441	21221	7092	-162441
	380C2F2	21221	7092	162441	21221	7092	-162441
	380C2F3	21221	7092	162441	21221	7092	-162441
	RTG	5755	1933	44272	5755	1933	-44272
NL1/1a	GW / opgw	2468	3889	28154	2450	4505	-30625
Wind, 10°C	150C1F1	9184	11525	92459	9122	13228	-98699
Permanent loads yg= 1.2	150C1F2	9210	10873	90177	9150	12442	-95778
Wind angle: 45°	150C1F3	9243	10058	87432	9187	11460	-92229
	380C2F1	18369	23049	184918	18243	26455	-197399
	380C2F2	18420	21745	180353	18300	24884	-191557
	380C2F3	18486	20116	174863	18374	22920	-184459
	RTG	5004	5687	48489	4973	6496	-51392
NL1/1b	GW / opgw	2590	1545	23209	2586	1654	-23388
Wind, -20°C	150C1F1	9564	5241	85770	9556	5543	-86149
Permanent loads yg= 1.2	150C1F2	9567	5125	85641	9560	5404	-85967
Wind angle: 45°	150C1F3	9570	4980	85493	9564	5230	-85757
	380C2F1	19128	10482	171540	19112	11087	-172298
	380C2F2	19134	10250	171282	19120	10808	-171933
	380C2F3	19140	9960	170986	19129	10459	-171513
	RTG	5177	2701	45516	5174	2844	-45680
NL1/3	GW / opgw	10067	5490	63112	10053	6044	-63838
Wind, -5°C	150C1F1	16119	9539	122669	16092	10398	-124052
Permanent loads yg= 1.2	150C1F2	16129	9210	122195	16105	10002	-123389
Wind angle: 45°	150C1F3	16140	8798	121646	16120	9506	-122621
	380C2F1	32238	19077	245338	32184	20796	-248105
	380C2F2	32257	18419	244389	32210	20003	-246779
	380C2F3	32279	17595	243293	32240	19012	-245241
	RTG	20203	9092	124433	20189	9820	-125098
NL1/4	GW / opgw	3383	1667	26006	3381	1774	-26128
Construction/maintenance, +5°C	150C1F1	11092	5275	86528	11086	5574	-86824
Permanent loads yg= 1.2	150C1F2	11094	5160	86427	11089	5436	-86681
Wind angle: 45°	150C1F3	11096	5016	86312	11092	5264	-86517
	380C2F1	22184	10550	173055	22172	11148	-173648
	380C2F2	22188	10321	172854	22178	10873	-173363
	380C2F3	22192	10033	172624	22184	10527	-173035
	RTG	6765	2968	51623	6763	3109	-51733

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2392	7739	43932	2392	7739	-43932
	150C1F1	8894	22257	134519	8894	22257	-134519
	150C1F2	8921	20790	128600	8921	20790	-128600
	150C1F3	8959	18944	121163	8959	18944	-121163
	380C2F1	17788	44514	269039	17788	44514	-269039
	380C2F2	17842	41579	257201	17842	41579	-257201
	380C2F3	17919	37888	242327	17919	37888	-242327
	RTG	4849	10809	68688	4849	10809	-68688
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2561	2243	24762	2561	2243	-24762
	150C1F1	9496	7164	89122	9496	7164	-89122
	150C1F2	9507	6897	88534	9507	6897	-88534
	150C1F3	9521	6563	87851	9521	6563	-87851
	380C2F1	18992	14327	178244	18992	14327	-178244
	380C2F2	19015	13793	177069	19015	13793	-177069
	380C2F3	19042	13126	175702	19042	13126	-175702
	RTG	5149	3611	46977	5149	3611	-46977
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	9957	9004	69233	9957	9004	-69233
	150C1F1	15914	15015	134356	15914	15015	-134356
	150C1F2	15945	14254	132386	15945	14254	-132386
	150C1F3	15984	13303	130056	15984	13303	-130056
	380C2F1	31829	30029	268712	31829	30029	-268712
	380C2F2	31891	28508	264772	31891	28508	-264772
	380C2F3	31968	26607	260112	31968	26607	-260112
	RTG	20086	13693	130296	20086	13693	-130296
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3364	2346	27082	3364	2346	-27082
	150C1F1	11042	7168	89180	11042	7168	-89180
	150C1F2	11051	6906	88711	11051	6906	-88711
	150C1F3	11061	6579	88167	11061	6579	-88167
	380C2F1	22085	14336	178360	22085	14336	-178360
	380C2F2	22102	13812	177421	22102	13812	-177421
	380C2F3	22121	13157	176333	22121	13157	-176333
	RTG	6747	3859	52613	6747	3859	-52613
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2450	4505	30625	2468	3889	-28154
	150C1F1	9122	13228	98699	9184	11525	-92459
	150C1F2	9150	12442	95778	9210	10873	-90177
	150C1F3	9187	11460	92229	9243	10058	-87432
	380C2F1	18243	26455	197399	18369	23049	-184918
	380C2F2	18300	24884	191557	18420	21745	-180353
	380C2F3	18374	22920	184459	18486	20116	-174863
	RTG	4973	6496	51392	5004	5687	-48489
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2586	1654	23388	2590	1545	-23209
	150C1F1	9556	5543	86149	9564	5241	-85770
	150C1F2	9560	5404	85967	9567	5125	-85641
	150C1F3	9564	5230	85757	9570	4980	-85493
	380C2F1	19112	11087	172298	19128	10482	-171540
	380C2F2	19120	10808	171933	19134	10250	-171282
	380C2F3	19129	10459	171513	19140	9960	-170986
	RTG	5174	2844	45680	5177	2701	-45516
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	10053	6044	63838	10067	5490	-63112
	150C1F1	16092	10398	124052	16119	9539	-122669
	150C1F2	16105	10002	123389	16129	9210	-122195
	150C1F3	16120	9506	122621	16140	8798	-121646
	380C2F1	32184	20796	248105	32238	19077	-245338
	380C2F2	32210	20003	246779	32257	18419	-244389
	380C2F3	32240	19012	245241	32279	17595	-243293
	RTG	20189	9820	125098	20203	9092	-124433
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3381	1774	26128	3383	1667	-26006
	150C1F1	11086	5574	86824	11092	5275	-86528
	150C1F2	11089	5436	86681	11094	5160	-86427
	150C1F3	11092	5264	86517	11096	5016	-86312
	380C2F1	22172	11148	173648	22184	10550	-173055
	380C2F2	22178	10873	173363	22188	10321	-172854
	380C2F3	22184	10527	173035	22192	10033	-172624
	RTG	6763	3109	51733	6765	2968	-51623
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1934	702	15832	1934	702	-15832
	150C1F1	7125	2582	58428	7125	2582	-58428
	150C1F2	7125	2580	58428	7125	2580	-58428
	150C1F3	7125	2577	58428	7125	2577	-58428
	380C2F1	14250	5164	116856	14250	5164	-116856
	380C2F2	14250	5160	116856	14250	5160	-116856
	380C2F3	14250	5154	116856	14250	5154	-116856
	RTG	3862	1395	31612	3862	1395	-31612

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	799	18256	1963	799	-18256
	150C1F1	7248	3002	68621	7248	3002	-68621
	150C1F2	7248	3002	68621	7248	3002	-68621
	150C1F3	7248	3001	68621	7248	3001	-68621
	380C2F1	14497	6005	137241	14497	6005	-137241
	380C2F2	14497	6004	137241	14497	6004	-137241
	380C2F3	14497	6002	137241	14497	6002	-137241
	RTG	3916	1579	36098	3916	1579	-36098
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	9490	2569	58574	9490	2569	-58574
	150C1F1	13889	4650	106103	13889	4650	-106103
	150C1F2	13889	4649	106103	13889	4649	-106103
	150C1F3	13889	4647	106103	13889	4647	-106103
	380C2F1	27778	9300	212205	27778	9300	-212205
	380C2F2	27778	9297	212205	27778	9297	-212205
	380C2F3	27778	9294	212206	27778	9294	-212206
	RTG	19009	5137	117297	19009	5137	-117297
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2760	952	21749	2760	952	-21749
	150C1F1	8787	3107	71017	8787	3107	-71017
	150C1F2	8787	3106	71017	8787	3106	-71017
	150C1F3	8787	3106	71017	8787	3106	-71017
	380C2F1	17573	6214	142035	17573	6214	-142035
	380C2F2	17573	6213	142035	17573	6213	-142035
	380C2F3	17573	6212	142035	17573	6212	-142035
	RTG	5514	1899	43420	5514	1899	-43420
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1934	691	15832	1934	691	-15832
	150C1F1	7125	2551	58429	7125	2551	-58429
	150C1F2	7125	2551	58429	7125	2551	-58429
	150C1F3	7125	2551	58429	7125	2551	-58429
	380C2F1	14250	5102	116857	14250	5102	-116857
	380C2F2	14250	5102	116857	14250	5102	-116857
	380C2F3	14250	5102	116857	14250	5102	-116857
	RTG	3862	1380	31612	3862	1380	-31612
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1833	3790	25889	1820	4420	-28676
	150C1F1	6833	11092	82581	6780	12845	-89961
	150C1F2	6856	10419	79818	6803	12038	-86535
	150C1F3	6887	9577	76440	6835	11025	-82305
	380C2F1	13666	22184	165162	13560	25690	-179922
	380C2F2	13712	20839	159636	13607	24075	-173071
	380C2F3	13773	19154	152881	13671	22051	-164610
	RTG	3726	5427	42539	3698	6262	-46045
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1951	1356	18879	1946	1468	-19135
	150C1F1	7220	4549	69932	7209	4859	-70481
	150C1F2	7224	4431	69744	7214	4716	-70218
	150C1F3	7229	4283	69528	7221	4538	-69913
	380C2F1	14441	9099	139864	14418	9718	-140963
	380C2F2	14448	8862	139488	14429	9432	-140435
	380C2F3	14457	8565	139056	14441	9075	-139825
	RTG	3905	2314	36659	3900	2461	-36896
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	9448	5374	60472	9433	5931	-61257
	150C1F1	13805	8993	110197	13774	8865	-111868
	150C1F2	13816	8660	109621	13789	9463	-111068
	150C1F3	13829	8243	108953	13806	8960	-110138
	380C2F1	27611	17987	220394	27548	19730	-223736
	380C2F2	27633	17320	219241	27578	18926	-222137
	380C2F3	27659	16486	217906	27613	17921	-220276
	RTG	18970	8854	118977	18955	9584	-119701
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2753	1498	22122	2750	1606	-22280
	150C1F1	8768	4639	71962	8761	4942	-72365
	150C1F2	8771	4523	71825	8764	4802	-72171
	150C1F3	8774	4377	71667	8768	4627	-71948
	380C2F1	17536	9278	143924	17521	9885	-144731
	380C2F2	17541	9045	143650	17529	9605	-144343
	380C2F3	17547	8754	143334	17537	9255	-143896
	RTG	5508	2624	43750	5505	2767	-43893
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1782	7694	42903	1782	7694	-42903
	150C1F1	6615	22039	129555	6615	22039	-129555
	150C1F2	6632	20553	123215	6632	20553	-123215
	150C1F3	6659	18681	115164	6659	18681	-115164
	380C2F1	13229	44078	259111	13229	44078	-259111
	380C2F2	13265	41106	246431	13265	41106	-246431
	380C2F3	13317	37362	230329	13317	37362	-230329
	RTG	3604	10670	65501	3604	10670	-65501

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1917	2080	21014	1917	2080	-21014
	150C1F1	7132	6532	74671	7132	6532	-74671
	150C1F2	7146	6255	73857	7146	6255	-73857
	150C1F3	7163	5910	72902	7163	5910	-72902
	380C2F1	14264	13064	149342	14264	13064	-149342
	380C2F2	14292	12510	147714	14292	12510	-147714
	380C2F3	14326	11820	145805	14326	11820	-145805
	RTG	3868	3251	38731	3868	3251	-38731
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	9334	8907	67032	9334	8907	-67032
	150C1F1	13581	14561	123999	13581	14561	-123999
	150C1F2	13614	13787	121716	13614	13787	-121716
	150C1F3	13655	12819	118996	13655	12819	-118996
	380C2F1	27163	29122	247998	27163	29122	-247998
	380C2F2	27227	27574	243432	27227	27574	-243432
	380C2F3	27309	25639	237993	27309	25639	-237993
	RTG	18846	13474	125317	18846	13474	-125317
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2730	2189	23501	2730	2189	-23501
	150C1F1	8706	6571	75513	8706	6571	-75513
	150C1F2	8717	6302	74892	8717	6302	-74892
	150C1F3	8729	5967	74170	8729	5967	-74170
	380C2F1	17413	13141	151025	17413	13141	-151025
	380C2F2	17433	12604	149785	17433	12604	-149785
	380C2F3	17458	11934	148340	17458	11934	-148340
	RTG	5485	3527	45037	5485	3527	-45037
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1820	4420	28676	1833	3790	-25889
	150C1F1	6780	12845	89961	6833	11092	-82581
	150C1F2	6803	12038	86535	6856	10419	-79818
	150C1F3	6835	11025	82305	6887	9577	-76440
	380C2F1	13560	25690	179922	13666	22184	-165162
	380C2F2	13607	24075	173071	13712	20839	-159636
	380C2F3	13671	22051	164610	13773	19154	-152881
	RTG	3698	6262	46045	3726	5427	-42539
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1946	1468	19135	1951	1356	-18879
	150C1F1	7209	4859	70481	7220	4549	-69932
	150C1F2	7214	4716	70218	7224	4431	-69744
	150C1F3	7221	4538	69913	7229	4283	-69528
	380C2F1	14418	9718	140963	14441	9099	-139864
	380C2F2	14429	9432	140435	14448	8862	-139488
	380C2F3	14441	9075	139825	14457	8565	-139056
	RTG	3900	2461	36896	3905	2314	-36659
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	9433	5931	61257	9448	5374	-60472
	150C1F1	13774	9865	111868	13805	8993	-110197
	150C1F2	13789	9463	111068	13816	8660	-109621
	150C1F3	13806	8960	110138	13829	8243	-108953
	380C2F1	27548	19730	223736	27611	17987	-220394
	380C2F2	27578	18926	222137	27633	17320	-219241
	380C2F3	27613	17921	220276	27659	16486	-217906
	RTG	18955	9584	119701	18970	8854	-118977
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2750	1606	22280	2753	1498	-22122
	150C1F1	8761	4942	72365	8768	4639	-71962
	150C1F2	8764	4802	72171	8771	4523	-71825
	150C1F3	8768	4627	71948	8774	4377	-71667
	380C2F1	17521	9885	144731	17536	9278	-143924
	380C2F2	17529	9605	144343	17541	9045	-143650
	380C2F3	17537	9255	143896	17547	8754	-143334
	RTG	5505	2767	43893	5508	2624	-43750

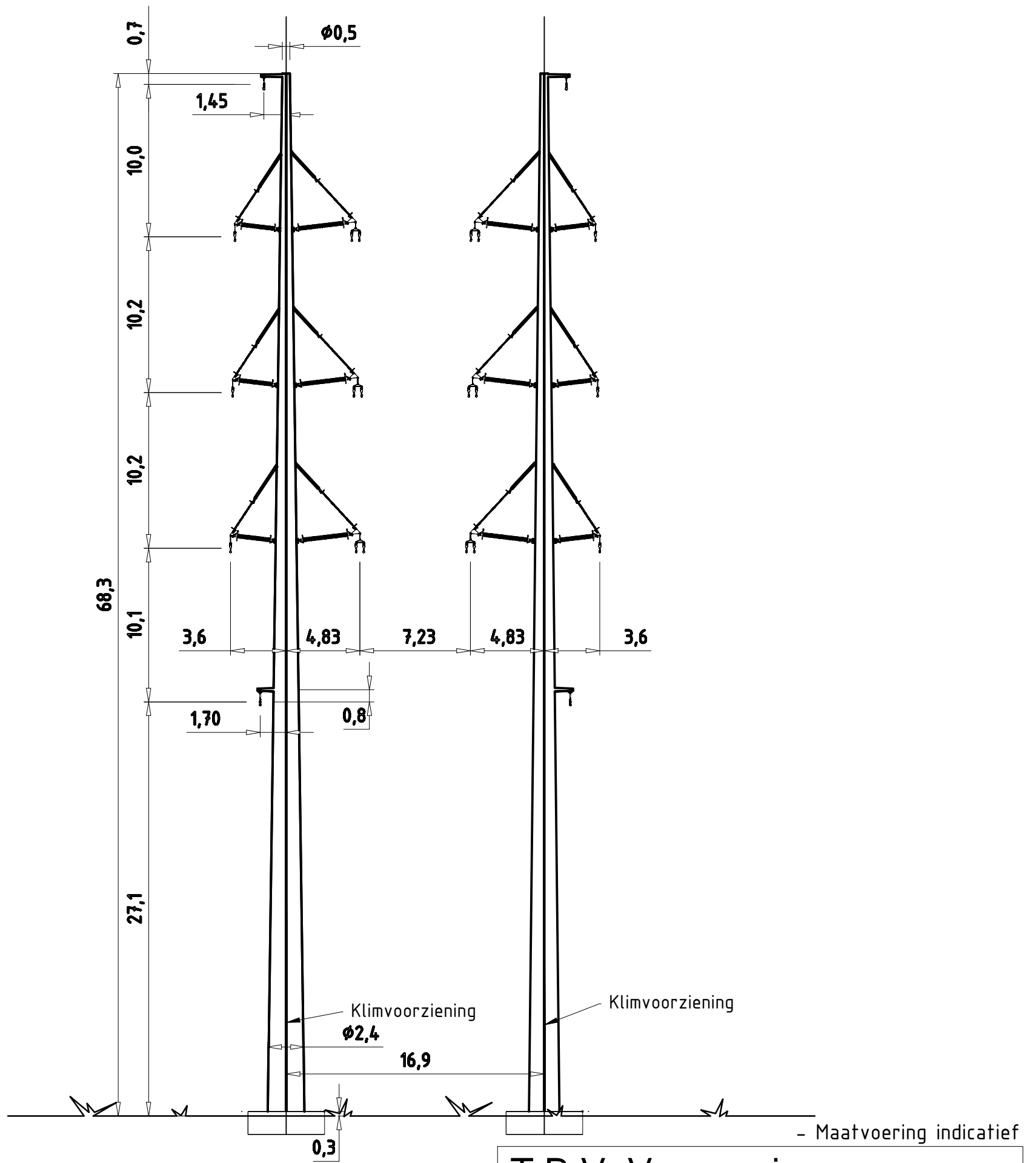
ZWW4S400+5

Appendix R2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2145	763	17295	2145	763	-17295
Wind, 10°C	150C1F1	7902	2803	63716	7902	2803	-63716
Permanent loads yg= 1.0	150C1F2	7902	2801	63716	7902	2801	-63716
Wind angle: 0°	150C1F3	7902	2799	63716	7902	2799	-63716
	380C2F1	15804	5605	127432	15804	5605	-127432
	380C2F2	15804	5602	127432	15804	5602	-127432
	380C2F3	15804	5598	127433	15804	5598	-127433
	RTG	4284	1518	34541	4284	1518	-34541
NL4/1b	GW / opgw	2175	866	19809	2175	866	-19809
Wind, -20°C	150C1F1	8029	3244	74210	8029	3244	-74210
Permanent loads yg= 1.0	150C1F2	8029	3244	74210	8029	3244	-74210
Wind angle: 0°	150C1F3	8029	3244	74210	8029	3244	-74210
	380C2F1	16058	6488	148420	16058	6488	-148420
	380C2F2	16058	6488	148420	16058	6488	-148420
	380C2F3	16058	6487	148420	16058	6487	-148420
	RTG	4340	1713	39198	4340	1713	-39198
NL4/3	GW / opgw	7203	2088	47645	7203	2088	-47645
Wind, -5°C	150C1F1	12434	4264	97397	12434	4264	-97397
Permanent loads yg= 1.0	150C1F2	12434	4263	97397	12434	4263	-97397
Wind angle: 0°	150C1F3	12434	4262	97397	12434	4262	-97397
	380C2F1	24868	8528	194794	24868	8528	-194794
	380C2F2	24868	8526	194794	24868	8526	-194794
	380C2F3	24868	8524	194794	24868	8524	-194794
	RTG	14423	4172	95326	14423	4172	-95326
NL4/4	GW / opgw	2697	933	21339	2697	933	-21339
Construction/maintenance, +5°C	150C1F1	9015	3170	72519	9015	3170	-72519
Permanent loads yg= 1.0	150C1F2	9015	3170	72519	9015	3170	-72519
Wind angle: 0°	150C1F3	9015	3170	72519	9015	3170	-72519
	380C2F1	18030	6341	145038	18030	6341	-145038
	380C2F2	18030	6340	145038	18030	6340	-145038
	380C2F3	18030	6339	145038	18030	6339	-145038
	RTG	5388	1862	42594	5388	1862	-42594
NL4/1a	GW / opgw	2080	2741	22184	2065	3151	-23810
Wind, 10°C	150C1F1	7734	8254	74756	7687	9380	-78713
Permanent loads yg= 1.0	150C1F2	7752	7824	73334	7709	8861	-76848
Wind angle: 45°	150C1F3	7775	7288	71646	7736	8212	-74612
	380C2F1	15468	16509	149511	15375	18761	-157426
	380C2F2	15504	15649	146669	15417	17721	-153696
	380C2F3	15549	14575	143292	15471	16423	-149224
	RTG	4210	4100	39404	4187	4633	-41204
NL4/1b	GW / opgw	2170	1230	20049	2168	1302	-20151
Wind, -20°C	150C1F1	8018	4259	74705	8013	4459	-74920
Permanent loads yg= 1.0	150C1F2	8019	4182	74633	8015	4367	-74817
Wind angle: 45°	150C1F3	8021	4086	74549	8018	4252	-74698
	380C2F1	16035	8518	149411	16026	8918	-149841
	380C2F2	16039	8365	149265	16031	8734	-149634
	380C2F3	16042	8172	149098	16036	8503	-149396
	RTG	4336	2196	39409	4334	2291	-39501
NL4/3	GW / opgw	7177	3956	48874	7166	4326	-49387
Wind, -5°C	150C1F1	12390	7132	99513	12373	7704	-100401
Permanent loads yg= 1.0	150C1F2	12396	6914	99210	12381	7440	-99975
Wind angle: 45°	150C1F3	12403	6640	98860	12390	7111	-99482
	380C2F1	24780	14265	199027	24745	15407	-200802
	380C2F2	24792	13827	198420	24762	14880	-199950
	380C2F3	24806	13280	197720	24781	14222	-198965
	RTG	14398	6647	96409	14389	7133	-96878
NL4/4	GW / opgw	2694	1293	21506	2692	1364	-21579
Construction/maintenance, +5°C	150C1F1	9007	4181	72913	9003	4380	-73086
Permanent loads yg= 1.0	150C1F2	9008	4105	72854	9005	4288	-73002
Wind angle: 45°	150C1F3	9009	4010	72787	9007	4174	-72907
	380C2F1	18013	8363	145825	18007	8759	-146172
	380C2F2	18016	8211	145708	18010	8577	-146005
	380C2F3	18018	8020	145574	18014	8348	-145813
	RTG	5385	2342	42739	5383	2436	-42804
NL4/1a	GW / opgw	2012	5323	33075	2012	5323	-33075
Wind, 10°C	150C1F1	7493	15410	102890	7493	15410	-102890
Permanent loads yg= 1.0	150C1F2	7518	14424	98766	7518	14424	-98766
Wind angle: 90°	150C1F3	7553	13188	93645	7553	13188	-93645
	380C2F1	14986	30820	205779	14986	30820	-205779
	380C2F2	15036	28849	197533	15036	28849	-197533
	380C2F3	15106	26375	187291	15106	26375	-187291
	RTG	4087	7503	52625	4087	7503	-52625


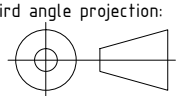
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2154	1689	20950	2154	1689	-20950
	150C1F1	7978	5527	76631	7978	5527	-76631
	150C1F2	7985	5351	76289	7985	5351	-76289
	150C1F3	7993	5132	75894	7993	5132	-75894
	380C2F1	15956	11054	153261	15956	11054	-153261
	380C2F2	15970	10702	152579	15970	10702	-152579
	380C2F3	15986	10263	151789	15986	10263	-151789
	RTG	4319	2797	40241	4319	2797	-40241
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7099	6309	53235	7099	6309	-53235
	150C1F1	12254	10774	107134	12254	10774	-107134
	150C1F2	12275	10268	105831	12275	10268	-105831
	150C1F3	12301	9635	104300	12301	9635	-104300
	380C2F1	24508	21548	214268	24508	21548	-214268
	380C2F2	24551	20535	211662	24551	20535	-211662
	380C2F3	24603	19271	208599	24603	19271	-208599
	RTG	14316	9723	100557	14316	9723	-100557
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2682	1743	22158	2682	1743	-22158
	150C1F1	8978	5434	74476	8978	5434	-74476
	150C1F2	8983	5261	74197	8983	5261	-74197
	150C1F3	8989	5045	73875	8989	5045	-73875
	380C2F1	17955	10868	148953	17955	10868	-148953
	380C2F2	17965	10522	148395	17965	10522	-148395
	380C2F3	17977	10089	147751	17977	10089	-147751
	RTG	5374	2933	43332	5374	2933	-43332
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2065	3151	23810	2080	2741	-22184
	150C1F1	7687	9380	78713	7734	8254	-74756
	150C1F2	7709	8861	76848	7752	7824	-73334
	150C1F3	7736	8212	74612	7775	7288	-71646
	380C2F1	15375	18761	157426	15468	16509	-149511
	380C2F2	15417	17721	153696	15504	15649	-146669
	380C2F3	15471	16423	149224	15549	14575	-143292
	RTG	4187	4633	41204	4210	4100	-39404
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2168	1302	20151	2170	1230	-20049
	150C1F1	8013	4459	74920	8018	4259	-74705
	150C1F2	8015	4367	74817	8019	4182	-74633
	150C1F3	8018	4252	74698	8021	4086	-74549
	380C2F1	16026	8918	149841	16035	8518	-149411
	380C2F2	16031	8734	149634	16039	8365	-149265
	380C2F3	16036	8503	149396	16042	8172	-149098
	RTG	4334	2291	39501	4336	2196	-39409
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7166	4326	49387	7177	3956	-48874
	150C1F1	12373	7704	100401	12390	7132	-99513
	150C1F2	12381	7440	99975	12396	6914	-99210
	150C1F3	12390	7111	99482	12403	6640	-98860
	380C2F1	24745	15407	200802	24780	14265	-199027
	380C2F2	24762	14880	199950	24792	13827	-198420
	380C2F3	24781	14222	198965	24806	13280	-197720
	RTG	14389	7133	96878	14398	6647	-96409
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2692	1364	21579	2694	1293	-21506
	150C1F1	9003	4380	73086	9007	4181	-72913
	150C1F2	9005	4288	73002	9008	4105	-72854
	150C1F3	9007	4174	72907	9009	4010	-72787
	380C2F1	18007	8759	146172	18013	8363	-145825
	380C2F2	18010	8577	146005	18016	8211	-145708
	380C2F3	18014	8348	145813	18018	8020	-145574
	RTG	5383	2436	42804	5385	2342	-42739



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4S400+5

- Trekparameter 1800m
- 2x380 / 2x150 Steunmast
- 400m Veldlengte
- 175°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

5.0	03-03-2014	Increased space between poles	
4.0	11-02-2014	Modified top/botom diameter and added new braced-V	
3.0	11-03-2013	Small modification	
		Projectname: Engineering verbinding ZW380	
Design state: Definitief		Scale: 1:300	Description: Wintrack Masttype ZWW4S400+5 Revision: 5.0 Format: A3
Drawn by: RBE	03-03-2014	Units: m	
Checked by: AJP	03-03-2014	Project no: 000.145	
Approved by: AW	03-03-2014	Company: TenneT	
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		Drawing no.: 74102194-035-082V Third angle projection: 	

ZWW4S400+10

Fundatie berekening

Bijlage CO

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p, gem}$	1,6	m

schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	4,1	m
	Hoogte	1,8	m
	Inhoud	23,8	m ³
	e.g.	570	kN

Onderplaat	Diameter	10,0	m
	Hoogte	1,0	m
	Inhoud	79	m ³
	e.g.	1885	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		602	kN
Fgeleiders		183	kN
Maximale dwarskracht		560	kN
Fmax vert (druk)		905	kN
Fmin vert (trek)		679	kN
Maximale moment		28966	kNm

Moment

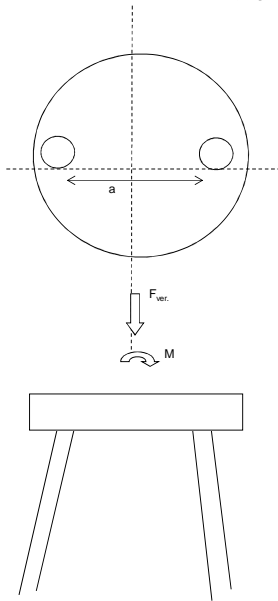
F_{slag}		3497	kN
F_{hor}		560	kN
F_{ver}		3470	kN
M_{hor} (tgv F_{hor})		1569	kNm
M_{tot}		30535	kNm
$F=M/a$		3470	kN

Verticaal reactiekracht

F_{water} (trek)		1023	kN
F_{grond} (druk)		1764	kN
F_{grond} (trek)		1470	kN
F_{dmax} (druk)		2984	kN
F_{tmax} (trek)		1492	kN
F_{dtot} (druk)		6454	kN
F_{ttot} (trek)		1978	kN

Palen druk	6	(-)
Palen trek	7	(-)

Totaal palen	14	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4S400+10

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r,trek;d} = \int_0^L O_{p;gem} \times p_{r,z;d} \times dz$$

Bijlage CO

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	O _{p;gem}	1,60 m
paalfactor	α t	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	q _{c,z,max}	15 MPa
	q _{c,z,rep}	11,25 MPa
materiaalfactor	γ _{m,b4}	1,4
factor, wisselende belastingen	γ _{m,var,qc}	1,5
	q _{c,z,d}	5,36 MPa
	p _{r,z,d}	37,5 kN/m ²
	F _{r,trek;d,i}	60,0 kN/m ¹
	F _{trek,d}	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		q _{c,z}		P _{r,max,z} (schacht)	F _{r,trek;d,i} F _{trek,d}	
	m	m	MPa	α t		kPa	kN
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

F _{trek,d}	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

F _{trek,d}	536,4 kN
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ZWW4S400+10

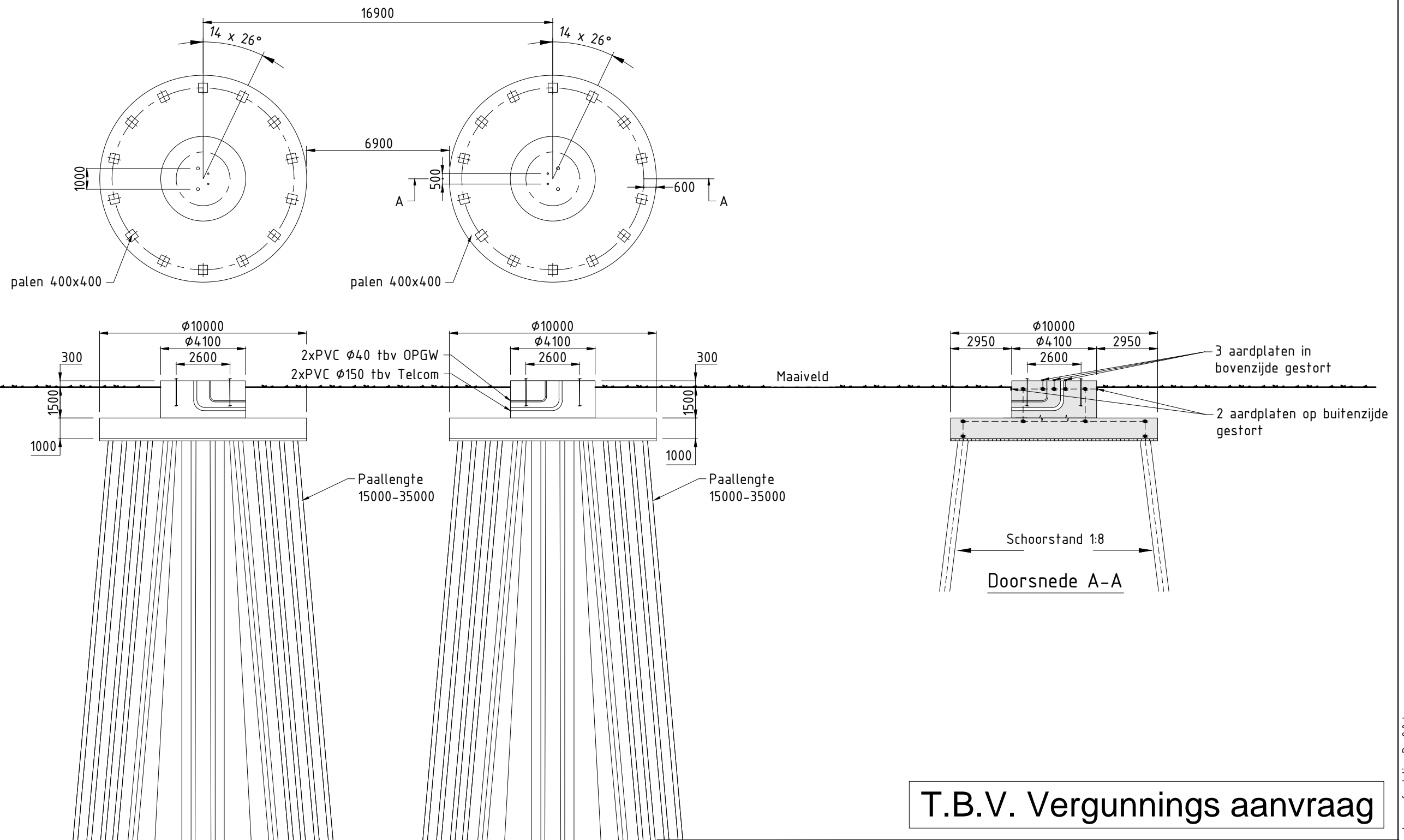
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CO

Bepaling opneembare paalbelasting op druk

heipaal	diameter	v a	2 mm 2 mm
	Deq		0,001808
maximale puntweerstand			
$P_{r,max,punt}$			11,25 MN/m ²
paalklasse factor	α_p		1,00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1,00
minimale waarde neergaande deel	$q_{c,lgem}$		9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,lgem}$		14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,lgem}$		11,00 MN/m ²
maximale paalschachtwrijving			
$P_{r,max,schacht}$			0,05 MN/m ²
waarin:			
paalfactor	α_s		0,010
conusweerstand over wrijvingstraject	$q_{c,z,a}$		5,00 MN/m ²
maximale draagkracht alleenstaande paal			
$F_{r,max}$			0,00 MN
waarin:			
$F_{r,max,punt}$			0,00 MN
paalpunt oppervlak	A_{punt}		0,00 m ²
$F_{r,max,schacht}$			0,00 MN
gemiddelde paalomtrek	$O_{p,lgem}$		0,01 m
lengte schachtwrijving	Δl		15,00 m
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max,d}$		MN	0,00 MN
materiaalfactor grond			
waarde afhankelijk van aantal palen en aantal sonderingen	γ_{mb} $\xi_{1,N}$		1,20 0,75
$F_{r,paal,max,d}$	3 kN	mm, paalpunt-nivo	-27,00 m



T.B.V. Vergunnings aanvraag

Verklaring


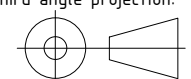
- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding Ø16mm (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

8.0	21-03-2014	Paal-Paal afstand aangepast
7.0	13-03-2014	Diverse aanpassingen
6.0	13-02-2014	Diverse aanpassingen
		Projectname: Engineering verbinding ZW380
		Drawing no.: 74102194-032-083V
Design state: Definitief		Scale: 1:200
Drawn by: RBE 21-03-2014		Units: mm
Checked by: AJP 21-03-2014		Project no: 000.145
Approved by: AW 21-03-2014		Company: TenneT
		Description: Principe ontwerp fundatie hoekmast ZWW4S400+10 masten familie
		Revision: 8.0
		Format: A3



ZWW4S400+10

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h		73.3	m
Diameter voet		d voet		2.6	m
top		d top		0.5	m
gem		d gem		1.6	m
wanddikte		t		24	mm
Oppervlakte aan voet		A		194226	mm ²
Traagheidsmoment aan voet		W _x		1.24E+08	mm ⁴
Weerstandsmoment aan voet		I _x		1.59E+11	mm ⁶
Mast: Gewicht		2 ^{de} orde		10.0	%
		F _{rep,ver}		656	kN

Bijlage BO

Ultimate limit state	hoogte	F _{ver}	F _{tloodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	72.6	4.9	15.7	0.0	15.7	1136	kNm
150C1F1	62.6	18.5	45.1	0.0	45.1	2825	kNm
150C1F2	52.4	18.6	42.3	0.0	42.3	2218	kNm
150C1F3	42.2	18.7	38.9	0.0	38.9	1641	kNm
380C2F1	62.6	37.0	90.3	0.0	90.3	5650	kNm
380C2F2	52.4	37.2	84.7	0.0	84.7	4437	kNm
380C2F3	42.2	37.5	77.8	0.0	77.8	3282	kNm
RTG	32.1	10.1	22.6	0.0	22.6	725	kNm

Stuwdruk	F _{hor.}	34.1	kN
	M _{d,wind}	1097	kNm
Totaal	M _{d,tot}	26333	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	28966	kNm

Normaalkracht;

Optredende normaalkracht			
N _{d,geleiders}		183	kN
N _{d, e.g. mast}		787	kN
N _{s,d,totaal}		969	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	β _a	0.68
	A _{eff}	133037 mm ²

Optredende spanning tgv normaalkracht

N _{d,d/eff} = f _{yd} /γ _{m1}	7	N/mm ²
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Moment;

Optredende moment in de voet:		
M _{d,tot}	28966	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	β _a	0.98
	W _{eff}	1.22E+08 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	237	N/mm ²
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Totale spanning:

	σ _d	245	N/mm ²	< 284 N/mm ² = ACCOORD
	σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{tloodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	72.6	4.2	10.8	0.0	10.8	781	kNm
150C1F1	62.6	15.7	31.2	0.0	31.2	1955	kNm
150C1F2	52.4	15.8	29.4	0.0	29.4	1538	kNm
150C1F3	42.2	16.0	27.0	0.0	27.0	1141	kNm
380C2F1	62.6	31.5	62.5	0.0	62.5	3910	kNm
380C2F2	52.4	31.7	58.7	0.0	58.7	3077	kNm
380C2F3	42.2	31.9	54.1	0.0	54.1	2282	kNm
RTG	32.1	8.6	15.6	0.0	15.6	502	kNm

Stuwdruk	F _{hor.}	908	kN
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Verplaatsing		1.74	m
Percentage van de verplaatsing		2.38%	
Hoek		2.70	graden
Kromming		0.61%	
Fundatie rotatiestijfheid		0.005	rad

3.99	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4S400+10

Appendix O / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2820	890	20118	2820	890	-20118
Wind, 10°C	150C1F1	10382	3258	73891	10382	3258	-73891
Permanent loads yg= 1.2	150C1F2	10382	3256	73891	10382	3256	-73891
Wind angle: 0°	150C1F3	10382	3253	73891	10382	3253	-73891
	380C2F1	20765	6516	147783	20765	6516	-147783
	380C2F2	20765	6511	147783	20765	6511	-147783
	380C2F3	20765	6506	147783	20765	6506	-147783
	RTG	5632	1770	40192	5632	1770	-40192
NL1/1b	GW / opgw	2885	997	22782	2885	997	-22782
Wind, -20°C	150C1F1	10652	3713	84887	10652	3713	-84887
Permanent loads yg= 1.2	150C1F2	10652	3712	84887	10652	3712	-84887
Wind angle: 0°	150C1F3	10652	3712	84887	10652	3712	-84887
	380C2F1	21304	7425	169773	21304	7425	-169773
	380C2F2	21304	7424	169773	21304	7424	-169773
	380C2F3	21304	7423	169773	21304	7423	-169773
	RTG	5753	1974	45138	5753	1974	-45138
NL1/3	GW / opgw	10882	2691	61370	10882	2691	-61370
Wind, -5°C	150C1F1	17694	5228	119337	17694	5228	-119337
Permanent loads yg= 1.2	150C1F2	17694	5227	119337	17694	5227	-119337
Wind angle: 0°	150C1F3	17694	5225	119337	17694	5225	-119337
	380C2F1	35387	10456	238675	35387	10456	-238675
	380C2F2	35387	10454	238675	35387	10454	-238675
	380C2F3	35387	10451	238675	35387	10451	-238675
	RTG	21793	5382	122896	21793	5382	-122896
NL1/4	GW / opgw	3713	1125	25725	3713	1125	-25725
Construction/maintenance, +5°C	150C1F1	12187	3754	85846	12187	3754	-85846
Permanent loads yg= 1.2	150C1F2	12187	3754	85846	12187	3754	-85846
Wind angle: 0°	150C1F3	12187	3753	85846	12187	3753	-85846
	380C2F1	24375	7509	171692	24375	7509	-171692
	380C2F2	24375	7508	171692	24375	7508	-171692
	380C2F3	24375	7507	171692	24375	7507	-171692
	RTG	7418	2246	51377	7418	2246	-51377
NL1/6	GW / opgw	3161	967	22156	3161	967	-22156
Permanent, +10°C	150C1F1	11634	3546	81220	11634	3546	-81220
Permanent loads yg= 1.35	150C1F2	11634	3546	81220	11634	3546	-81220
	150C1F3	11634	3546	81220	11634	3546	-81220
	380C2F1	23267	7092	162440	23267	7092	-162440
	380C2F2	23267	7092	162440	23267	7092	-162440
	380C2F3	23267	7092	162440	23267	7092	-162440
	RTG	6313	1933	44271	6313	1933	-44271
NL1/1a	GW / opgw	2619	3929	28310	2582	4553	-30818
Wind, 10°C	150C1F1	9835	11662	92947	9708	13393	-99320
Permanent loads yg= 1.2	150C1F2	9884	11040	90757	9761	12644	-96523
Wind angle: 45°	150C1F3	9945	10277	88155	9830	11724	-93168
	380C2F1	19670	23323	185894	19415	26785	-198640
	380C2F2	19767	22081	181514	19522	25289	-193047
	380C2F3	19891	20553	176309	19660	23447	-186337
	RTG	5372	5899	49230	5307	6752	-52348
NL1/1b	GW / opgw	2867	1552	23220	2860	1663	-23404
Wind, -20°C	150C1F1	10610	5266	85799	10593	5573	-86190
Permanent loads yg= 1.2	150C1F2	10616	5155	85674	10601	5440	-86013
Wind angle: 45°	150C1F3	10622	5019	85532	10610	5277	-85812
	380C2F1	21220	10531	171598	21187	11146	-172380
	380C2F2	21231	10310	171349	21202	10880	-172027
	380C2F3	21244	10038	171065	21219	10553	-171624
	RTG	5735	2739	45557	5728	2890	-45738
NL1/3	GW / opgw	10802	5525	63154	10772	6087	-63897
Wind, -5°C	150C1F1	17548	9608	122772	17492	10481	-124196
Permanent loads yg= 1.2	150C1F2	17566	9294	122312	17517	10104	-123555
Wind angle: 45°	150C1F3	17587	8908	121787	17546	9639	-122819
	380C2F1	35095	19216	245543	34983	20962	-248392
	380C2F2	35132	18589	244625	35033	20207	-247109
	380C2F3	35175	17817	243574	35091	19278	-245638
	RTG	21713	9284	124594	21682	10050	-125327
NL1/4	GW / opgw	3702	1674	26013	3697	1782	-26138
Construction/maintenance, +5°C	150C1F1	12158	5299	86549	12146	5603	-86855
Permanent loads yg= 1.2	150C1F2	12162	5190	86452	12151	5472	-86717
Wind angle: 45°	150C1F3	12166	5055	86341	12158	5310	-86559
	380C2F1	24316	10598	173098	24292	11206	-173710
	380C2F2	24324	10380	172904	24303	10943	-173433
	380C2F3	24332	10110	172682	24315	10620	-173118
	RTG	7406	3005	51650	7402	3153	-51770

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2467	7826	44286	2467	7826	-44286
	150C1F1	9249	22565	135757	9249	22565	-135757
	150C1F2	9299	21168	130126	9299	21168	-130126
	150C1F3	9370	19441	123160	9370	19441	-123160
	380C2F1	18498	45129	271513	18498	45129	-271513
	380C2F2	18599	42336	260251	18599	42336	-260251
	380C2F3	18740	38881	246321	18740	38881	-246321
	RTG	5056	11290	70681	5056	11290	-70681
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2809	2260	24808	2809	2260	-24808
	150C1F1	10470	7220	89251	10470	7220	-89251
	150C1F2	10492	6965	88683	10492	6965	-88683
	150C1F3	10518	6653	88030	10518	6653	-88030
	380C2F1	20940	14439	178502	20940	14439	-178502
	380C2F2	20984	13931	177367	20984	13931	-177367
	380C2F3	21035	13305	176059	21035	13305	-176059
	RTG	5673	3698	47164	5673	3698	-47164
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	10576	9085	69408	10576	9085	-69408
	150C1F1	17127	15175	134780	17127	15175	-134780
	150C1F2	17186	14450	132883	17186	14450	-132883
	150C1F3	17259	13559	130664	17259	13559	-130664
	380C2F1	34253	30349	269560	34253	30349	-269560
	380C2F2	34373	28899	265766	34373	28899	-265766
	380C2F3	34518	27117	261329	34518	27117	-261329
	RTG	21455	14128	131028	21455	14128	-131028
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3662	2361	27115	3662	2361	-27115
	150C1F1	12056	7223	89282	12056	7223	-89282
	150C1F2	12072	6973	88828	12072	6973	-88828
	150C1F3	12091	6666	88307	12091	6666	-88307
	380C2F1	24111	14446	178564	24111	14446	-178564
	380C2F2	24144	13947	177656	24144	13947	-177656
	380C2F3	24182	13333	176615	24182	13333	-176615
	RTG	7366	3943	52741	7366	3943	-52741
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2582	4553	30818	2619	3929	-28310
	150C1F1	9708	13393	99320	9835	11662	-92947
	150C1F2	9761	12644	96523	9884	11040	-90757
	150C1F3	9830	11724	93168	9945	10277	-88155
	380C2F1	19415	26785	198640	19670	23323	-185894
	380C2F2	19522	25289	193047	19767	22081	-181514
	380C2F3	19660	23447	186337	19891	20553	-176309
	RTG	5307	6752	52348	5372	5899	-49230
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2860	1663	23404	2867	1552	-23220
	150C1F1	10593	5573	86190	10610	5266	-85799
	150C1F2	10601	5440	86013	10616	5155	-85674
	150C1F3	10610	5277	85812	10622	5019	-85532
	380C2F1	21187	11146	172380	21220	10531	-171598
	380C2F2	21202	10880	172027	21231	10310	-171349
	380C2F3	21219	10553	171624	21244	10038	-171065
	RTG	5728	2890	45738	5735	2739	-45557
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	10772	6087	63897	10802	5525	-63154
	150C1F1	17492	10481	124196	17548	9608	-122772
	150C1F2	17517	10104	123555	17566	9294	-122312
	150C1F3	17546	9639	122819	17587	8908	-121787
	380C2F1	34983	20962	248392	35095	19216	-245543
	380C2F2	35033	20207	247109	35132	18589	-244625
	380C2F3	35091	19278	245638	35175	17817	-243574
	RTG	21682	10050	125327	21713	9284	-124594
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3697	1782	26138	3702	1674	-26013
	150C1F1	12146	5603	86855	12158	5299	-86549
	150C1F2	12151	5472	86717	12162	5190	-86452
	150C1F3	12158	5310	86559	12166	5055	-86341
	380C2F1	24292	11206	173710	24316	10598	-173098
	380C2F2	24303	10943	173433	24324	10380	-172904
	380C2F3	24315	10620	173118	24332	10110	-172682
	RTG	7402	3153	51770	7406	3005	-51650
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2133	702	15832	2133	702	-15832
	150C1F1	7860	2583	58428	7860	2583	-58428
	150C1F2	7860	2581	58428	7860	2581	-58428
	150C1F3	7860	2578	58428	7860	2578	-58428
	380C2F1	15721	5165	116856	15721	5165	-116856
	380C2F2	15721	5161	116856	15721	5161	-116856
	380C2F3	15721	5156	116856	15721	5156	-116856
	RTG	4260	1396	31612	4260	1396	-31612

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2193	799	18256	2193	799	-18256
	150C1F1	8111	3002	68622	8111	3002	-68622
	150C1F2	8111	3002	68622	8111	3002	-68622
	150C1F3	8111	3001	68622	8111	3001	-68622
	380C2F1	16222	6005	137245	16222	6005	-137245
	380C2F2	16222	6004	137245	16222	6004	-137245
	380C2F3	16222	6003	137245	16222	6003	-137245
	RTG	4370	1579	36099	4370	1579	-36099
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	10230	2569	58572	10230	2569	-58572
	150C1F1	15226	4650	106102	15226	4650	-106102
	150C1F2	15226	4649	106102	15226	4649	-106102
	150C1F3	15226	4647	106102	15226	4647	-106102
	380C2F1	30451	9300	212204	30451	9300	-212204
	380C2F2	30451	9298	212204	30451	9298	-212204
	380C2F3	30451	9295	212204	30451	9295	-212204
	RTG	20491	5137	117294	20491	5137	-117294
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3034	952	21749	3034	952	-21749
	150C1F1	9681	3107	71017	9681	3107	-71017
	150C1F2	9681	3107	71017	9681	3107	-71017
	150C1F3	9681	3106	71017	9681	3106	-71017
	380C2F1	19361	6214	142035	19361	6214	-142035
	380C2F2	19361	6213	142035	19361	6213	-142035
	380C2F3	19361	6212	142035	19361	6212	-142035
	RTG	6061	1899	43420	6061	1899	-43420
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	2133	691	15832	2133	691	-15832
	150C1F1	7860	2551	58429	7860	2551	-58429
	150C1F2	7860	2551	58429	7860	2551	-58429
	150C1F3	7860	2551	58429	7860	2551	-58429
	380C2F1	15721	5102	116858	15721	5102	-116858
	380C2F2	15721	5102	116858	15721	5102	-116858
	380C2F3	15721	5102	116858	15721	5102	-116858
	RTG	4260	1380	31612	4260	1380	-31612
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1930	3830	26067	1902	4468	-28891
	150C1F1	7265	11234	83167	7158	13014	-90684
	150C1F2	7308	10593	80525	7202	12246	-87414
	150C1F3	7365	9803	77337	7261	11297	-83433
	380C2F1	14530	22467	166334	14316	26029	-181367
	380C2F2	14617	21185	161049	14404	24491	-174828
	380C2F3	14730	19607	154674	14522	22595	-166866
	RTG	3972	5646	43444	3915	6525	-47178
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2168	1363	18895	2158	1477	-19156
	150C1F1	8053	4574	69975	8030	4889	-70541
	150C1F2	8060	4461	69793	8040	4753	-70285
	150C1F3	8069	4322	69586	8052	4586	-69993
	380C2F1	16106	9149	139949	16060	9778	-141081
	380C2F2	16121	8923	139586	16080	9506	-140571
	380C2F3	16138	8645	139171	16104	9171	-139987
	RTG	4345	2352	36719	4335	2507	-36980
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	10144	5410	60517	10112	5974	-61321
	150C1F1	15053	9063	110322	14988	9950	-112041
	150C1F2	15074	8746	109765	15017	9566	-111269
	150C1F3	15099	8355	109125	15050	9095	-110379
	380C2F1	30105	18127	220643	29977	19899	-224082
	380C2F2	30148	17491	219529	30034	19133	-222537
	380C2F3	30198	16710	218251	30101	18190	-220758
	RTG	20406	9046	119153	20372	9814	-119950
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3019	1505	22132	3014	1614	-22293
	150C1F1	9642	4663	71992	9627	4972	-72408
	150C1F2	9647	4552	71859	9634	4838	-72220
	150C1F3	9653	4416	71708	9642	4674	-72006
	380C2F1	19285	9327	143984	19254	9943	-144816
	380C2F2	19295	9105	143719	19268	9677	-144440
	380C2F3	19306	8832	143416	19284	9349	-144012
	RTG	6047	2661	43785	6041	2812	-43944
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1825	7782	43272	1825	7782	-43272
	150C1F1	6826	22350	130875	6826	22350	-130875
	150C1F2	6860	20937	124855	6860	20937	-124855
	150C1F3	6907	19185	117337	6907	19185	-117337
	380C2F1	13653	44701	261749	13653	44701	-261749
	380C2F2	13719	41874	249710	13719	41874	-249710
	380C2F3	13815	38370	234674	13815	38370	-234674
	RTG	3728	11157	67651	3728	11157	-67651

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2098	2097	21076	2098	2097	-21076
	150C1F1	7872	6590	74849	7872	6590	-74849
	150C1F2	7899	6326	74064	7899	6326	-74064
	150C1F3	7931	6003	73153	7931	6003	-73153
	380C2F1	15743	13180	149698	15743	13180	-149698
	380C2F2	15797	12653	148129	15797	12653	-148129
	380C2F3	15862	12005	146306	15862	12005	-146306
	RTG	4265	3341	38990	4265	3341	-38990
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	9910	8989	67218	9910	8989	-67218
	150C1F1	14593	14724	124489	14593	14724	-124489
	150C1F2	14655	13986	122294	14655	13986	-122294
	150C1F3	14732	13079	119709	14732	13079	-119709
	380C2F1	29186	29448	248977	29186	29448	-248977
	380C2F2	29310	27972	244589	29310	27972	-244589
	380C2F3	29464	26158	239419	29464	26158	-239419
	RTG	20132	13912	126104	20132	13912	-126104
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2972	2205	23542	2972	2205	-23542
	150C1F1	9515	6627	75648	9515	6627	-75648
	150C1F2	9535	6371	75049	9535	6371	-75049
	150C1F3	9558	6057	74358	9558	6057	-74358
	380C2F1	19030	13254	151295	19030	13254	-151295
	380C2F2	19070	12742	150097	19070	12742	-150097
	380C2F3	19116	12114	148716	19116	12114	-148716
	RTG	5996	3613	45202	5996	3613	-45202
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1902	4468	28891	1930	3830	-26067
	150C1F1	7158	13014	90684	7265	11234	-83167
	150C1F2	7202	12246	87414	7308	10593	-80525
	150C1F3	7261	11297	83433	7365	9803	-77337
	380C2F1	14316	26029	181367	14530	22467	-166334
	380C2F2	14404	24491	174828	14617	21185	-161049
	380C2F3	14522	22595	166866	14730	19607	-154674
	RTG	3915	6525	47178	3972	5646	-43444
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2158	1477	19156	2168	1363	-18895
	150C1F1	8030	4889	70541	8053	4574	-69975
	150C1F2	8040	4753	70285	8060	4461	-69793
	150C1F3	8052	4586	69993	8069	4322	-69586
	380C2F1	16060	9778	141081	16106	9149	-139949
	380C2F2	16080	9506	140571	16121	8923	-139586
	380C2F3	16104	9171	139987	16138	8645	-139171
	RTG	4335	2507	36980	4345	2352	-36719
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	10112	5974	61321	10144	5410	-60517
	150C1F1	14988	9950	112041	15053	9063	-110322
	150C1F2	15017	9566	111269	15074	8746	-109765
	150C1F3	15050	9095	110379	15099	8355	-109125
	380C2F1	29977	19899	224082	30105	18127	-220643
	380C2F2	30034	19133	222537	30148	17491	-219529
	380C2F3	30101	18190	220758	30198	16710	-218251
	RTG	20372	9814	119950	20406	9046	-119153
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3014	1614	22293	3019	1505	-22132
	150C1F1	9627	4972	72408	9642	4663	-71992
	150C1F2	9634	4838	72220	9647	4552	-71859
	150C1F3	9642	4674	72006	9653	4416	-71708
	380C2F1	19254	9943	144816	19285	9327	-143984
	380C2F2	19268	9677	144440	19295	9105	-143719
	380C2F3	19284	9349	144012	19306	8832	-143416
	RTG	6041	2812	43944	6047	2661	-43785

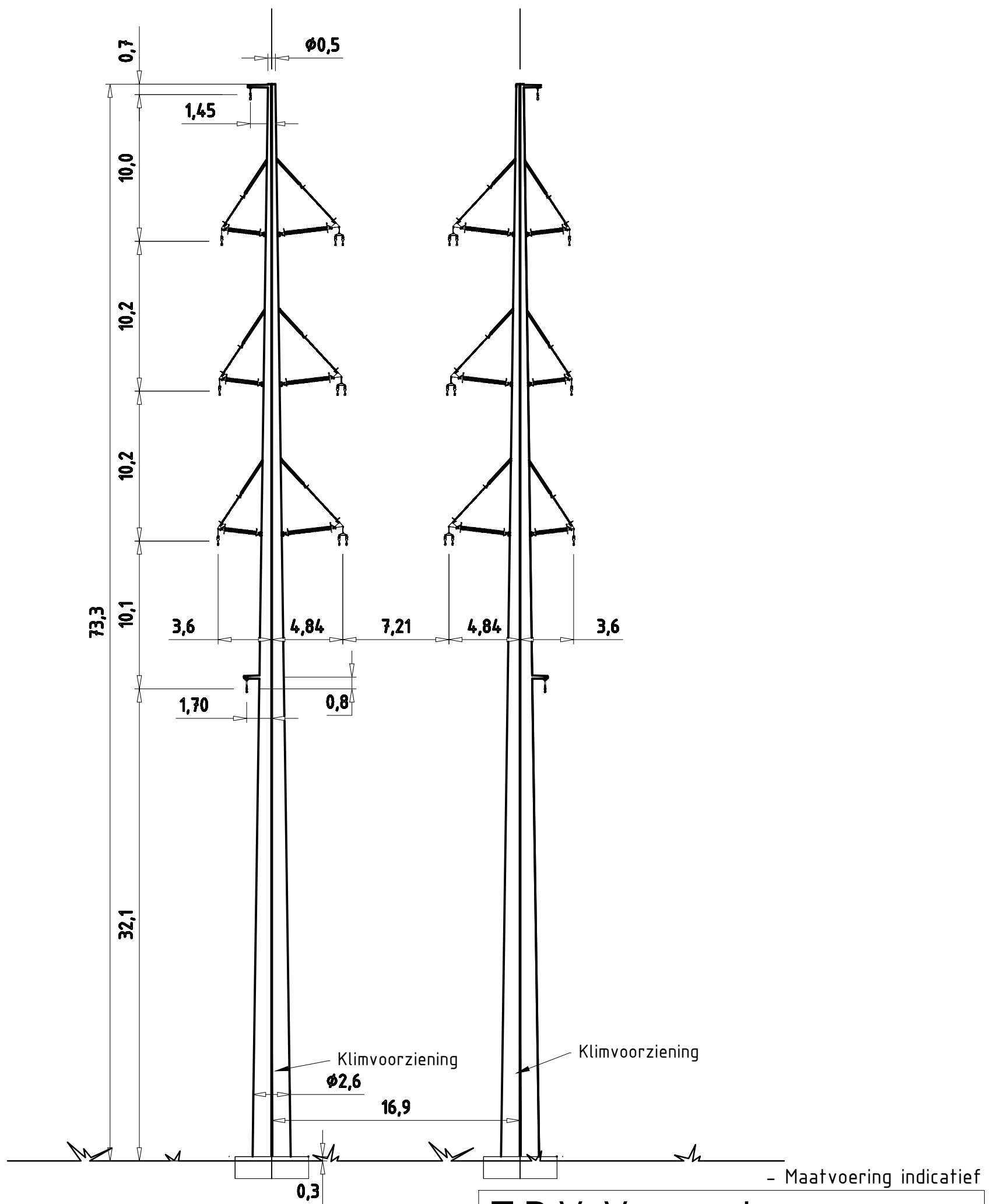
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Appendix O2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2363	763	17295	2363	763	-17295
Wind, 10°C	150C1F1	8704	2803	63716	8704	2803	-63716
Permanent loads yg= 1.0	150C1F2	8704	2802	63716	8704	2802	-63716
Wind angle: 0°	150C1F3	8704	2800	63716	8704	2800	-63716
	380C2F1	17408	5606	127432	17408	5606	-127432
	380C2F2	17408	5603	127432	17408	5603	-127432
	380C2F3	17408	5600	127432	17408	5600	-127432
	RTG	4719	1519	34541	4719	1519	-34541
NL4/1b	GW / opgw	2424	866	19809	2424	866	-19809
Wind, -20°C	150C1F1	8962	3244	74212	8962	3244	-74212
Permanent loads yg= 1.0	150C1F2	8962	3244	74212	8962	3244	-74212
Wind angle: 0°	150C1F3	8962	3244	74212	8962	3244	-74212
	380C2F1	17924	6489	148423	17924	6489	-148423
	380C2F2	17924	6488	148423	17924	6488	-148423
	380C2F3	17924	6487	148424	17924	6487	-148424
	RTG	4833	1714	39199	4833	1714	-39199
NL4/3	GW / opgw	7805	2088	47644	7805	2088	-47644
Wind, -5°C	150C1F1	13661	4264	97397	13661	4264	-97397
Permanent loads yg= 1.0	150C1F2	13661	4263	97397	13661	4263	-97397
Wind angle: 0°	150C1F3	13661	4262	97397	13661	4262	-97397
	380C2F1	27321	8528	194793	27321	8528	-194793
	380C2F2	27321	8527	194793	27321	8527	-194793
	380C2F3	27321	8525	194793	27321	8525	-194793
	RTG	15626	4173	95324	15626	4173	-95324
NL4/4	GW / opgw	2966	933	21339	2966	933	-21339
Construction/maintenance, +5°C	150C1F1	9928	3170	72519	9928	3170	-72519
Permanent loads yg= 1.0	150C1F2	9928	3170	72519	9928	3170	-72519
Wind angle: 0°	150C1F3	9928	3170	72519	9928	3170	-72519
	380C2F1	19856	6341	145038	19856	6341	-145038
	380C2F2	19856	6340	145038	19856	6340	-145038
	380C2F3	19856	6340	145038	19856	6340	-145038
	RTG	5924	1862	42593	5924	1862	-42593
NL4/1a	GW / opgw	2230	2768	22285	2200	3183	-23938
Wind, 10°C	150C1F1	8359	8345	75061	8264	9490	-79112
Permanent loads yg= 1.0	150C1F2	8394	7935	73695	8305	8995	-77322
Wind angle: 45°	150C1F3	8436	7432	72089	8355	8386	-75200
	380C2F1	16718	16690	150123	16528	18980	-158225
	380C2F2	16787	15870	147389	16609	17989	-154644
	380C2F3	16873	14863	144178	16711	16772	-150401
	RTG	4558	4240	39859	4511	4802	-41806
NL4/1b	GW / opgw	2414	1234	20055	2410	1307	-20160
Wind, -20°C	150C1F1	8939	4275	74723	8929	4478	-74945
Permanent loads yg= 1.0	150C1F2	8942	4202	74652	8933	4391	-74844
Wind angle: 45°	150C1F3	8945	4112	74572	8938	4283	-74730
	380C2F1	17877	8551	149446	17858	8957	-149889
	380C2F2	17884	8404	149305	17867	8781	-149689
	380C2F3	17891	8224	149144	17877	8565	-149460
	RTG	4823	2221	39433	4819	2321	-39535
NL4/3	GW / opgw	7750	3979	48903	7729	4354	-49429
Wind, -5°C	150C1F1	13569	7178	99579	13533	7759	-100494
Permanent loads yg= 1.0	150C1F2	13581	6970	99286	13549	7508	-100081
Wind angle: 45°	150C1F3	13594	6713	98950	13568	7199	-99610
	380C2F1	27138	14357	199159	27067	15518	-200987
	380C2F2	27162	13940	198571	27099	15016	-200163
	380C2F3	27189	13427	197900	27136	14398	-199219
	RTG	15572	6775	96522	15550	7287	-97040
NL4/4	GW / opgw	2959	1298	21511	2956	1370	-21585
Construction/maintenance, +5°C	150C1F1	9911	4197	72925	9904	4399	-73104
Permanent loads yg= 1.0	150C1F2	9913	4125	72869	9907	4312	-73023
Wind angle: 45°	150C1F3	9916	4035	72804	9911	4205	-72931
	380C2F1	19822	8395	145851	19808	8797	-146208
	380C2F2	19827	8250	145737	19815	8624	-146046
	380C2F3	19832	8071	145609	19822	8409	-145863
	RTG	5917	2367	42755	5915	2465	-42827
NL4/1a	GW / opgw	2094	5382	33330	2094	5382	-33330
Wind, 10°C	150C1F1	7872	15617	103757	7872	15617	-103757
Permanent loads yg= 1.0	150C1F2	7919	14678	99826	7919	14678	-99826
Wind angle: 90°	150C1F3	7983	13520	95014	7983	13520	-95014
	380C2F1	15743	31233	207514	15743	31233	-207514
	380C2F2	15838	29357	199651	15838	29357	-199651
	380C2F3	15966	27040	190028	15966	27040	-190028
	RTG	4305	7825	53997	4305	7825	-53997


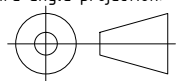
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2380	1700	20977	2380	1700	-20977
	150C1F1	8857	5564	76706	8857	5564	-76706
	150C1F2	8870	5397	76376	8870	5397	-76376
	150C1F3	8885	5191	75998	8885	5191	-75998
	380C2F1	17713	11128	153413	17713	11128	-153413
	380C2F2	17740	10793	152753	17740	10793	-152753
	380C2F3	17770	10381	151997	17770	10381	-151997
	RTG	4788	2854	40349	4788	2854	-40349
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7590	6363	53361	7590	6363	-53361
	150C1F1	13290	10881	107416	13290	10881	-107416
	150C1F2	13331	10398	106160	13331	10398	-106160
	150C1F3	13380	9805	104699	13380	9805	-104699
	380C2F1	26580	21761	214831	26580	21761	-214831
	380C2F2	26662	20796	212319	26662	20796	-212319
	380C2F3	26761	19610	209398	26761	19610	-209398
	RTG	15392	10014	101078	15392	10014	-101078
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2935	1753	22178	2935	1753	-22178
	150C1F1	9851	5470	74537	9851	5470	-74537
	150C1F2	9861	5306	74267	9861	5306	-74267
	150C1F3	9872	5103	73959	9872	5103	-73959
	380C2F1	19702	10941	149074	19702	10941	-149074
	380C2F2	19722	10611	148535	19722	10611	-148535
	380C2F3	19744	10205	147918	19744	10205	-147918
	RTG	5893	2988	43410	5893	2988	-43410
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2200	3183	23938	2230	2768	-22285
	150C1F1	8264	9490	79112	8359	8345	-75061
	150C1F2	8305	8995	77322	8394	7935	-73695
	150C1F3	8355	8386	75200	8436	7432	-72089
	380C2F1	16528	18980	158225	16718	16690	-150123
	380C2F2	16609	17989	154644	16787	15870	-147389
	380C2F3	16711	16772	150401	16873	14863	-144178
	RTG	4511	4802	41806	4558	4240	-39859
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2410	1307	20160	2414	1234	-20055
	150C1F1	8929	4478	74945	8939	4275	-74723
	150C1F2	8933	4391	74844	8942	4202	-74652
	150C1F3	8938	4283	74730	8945	4112	-74572
	380C2F1	17858	8957	149889	17877	8551	-149446
	380C2F2	17867	8781	149689	17884	8404	-149305
	380C2F3	17877	8565	149460	17891	8224	-149144
	RTG	4819	2321	39535	4823	2221	-39433
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7729	4354	49429	7750	3979	-48903
	150C1F1	13533	7759	100494	13569	7178	-99579
	150C1F2	13549	7508	100081	13581	6970	-99286
	150C1F3	13568	7199	99610	13594	6713	-98950
	380C2F1	27067	15518	200987	27138	14357	-199159
	380C2F2	27099	15016	200163	27162	13940	-198571
	380C2F3	27136	14398	199219	27189	13427	-197900
	RTG	15550	7287	97040	15572	6775	-96522
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2956	1370	21585	2959	1298	-21511
	150C1F1	9904	4399	73104	9911	4197	-72925
	150C1F2	9907	4312	73023	9913	4125	-72869
	150C1F3	9911	4205	72931	9916	4035	-72804
	380C2F1	19808	8797	146208	19822	8395	-145851
	380C2F2	19815	8624	146046	19827	8250	-145737
	380C2F3	19822	8409	145863	19832	8071	-145609
	RTG	5915	2465	42827	5917	2367	-42755



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4S400+10

- Trekparameter 1800m
- 2x380 / 2x150 Steunmast
- 400m Veldlengte
- 175°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

6.0	11-03-2014	Modified top diameter
5.0	03-03-2014	Modified bottom diameter
4.0	28-02-2014	Modified top/bottom diameter
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection: 
Drawn by: RBE 11-03-2014	Scale: 1:300	Drawing no.: 74102194-035-083V
Checked by: AJP 11-03-2014	Units: m	Description: Wintrack Masttype ZWW4S400+10
Approved by: AW 11-03-2014	Project no: 000.145 Company: TenneT	
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		Revision: 6.0 Format: A3

ZWW4HK400

Fundatie berekening

Bijlage CI

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1,6	m
schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	5,3	m
	Hoogte	1,8	m
	Inhoud	39,7	m ³
	e.g.	953	kN

Onderplaat	Diameter	12,0	m
	Hoogte	1,2	m
	Inhoud	136	m ³
	e.g.	3257	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		936	kN
Fgeleiders		163	kN
Maximale dwarskracht		1064	kN
Fmax vert (druk)		1285	kN
Fmin vert (trek)		964	kN
Maximale moment		47979	kNm

Moment

F_{diag}		4775	kN
F_{hor}		1064	kN
F_{ver}		4738	kN
M_{hor} (tgv F_{hor})		3191	kNm
M_{tot}		51170	kNm
$F=M/a$		4738	kN

Verticaal reactiekracht

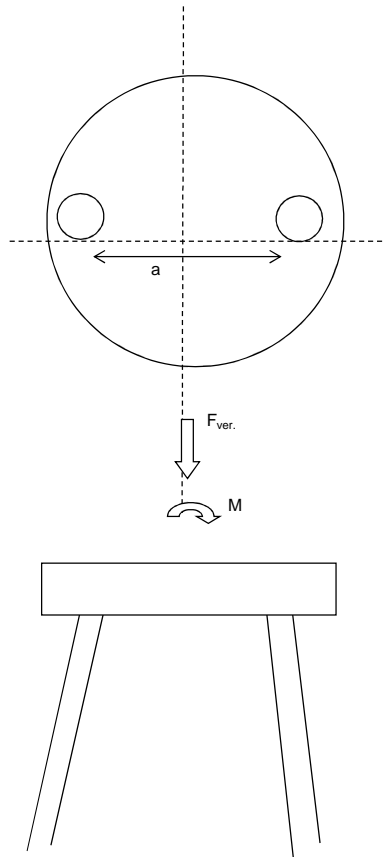
F_{water} (trek)		1754	kN
F_{grond} (druk)		2458	kN
F_{grond} (trek)		2048	kN

F_{dmax} (druk)		4644	kN
F_{tmax} (trek)		2246	kN

F_{dtot} (druk)		9382	kN
F_{ttot} (trek)		2492	kN

Palen druk		9	(-)
Palen trek		8	(-)

Totaal palen		18	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4HK400

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CI

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	$O_{p,gem}$	1,60 m
paalfactor	αt	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11,25 MPa
materiaalfactor	$\gamma_{m,b4}$	1,4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1,5
	$q_{c;z,d}$	5,36 MPa
	$P_{r,z,d}$	37,5 kN/m ²
	$F_{r,trek,d,i}$	60,0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r,trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

$F_{trek,d}$	536,4 kN
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ZWW4HK400

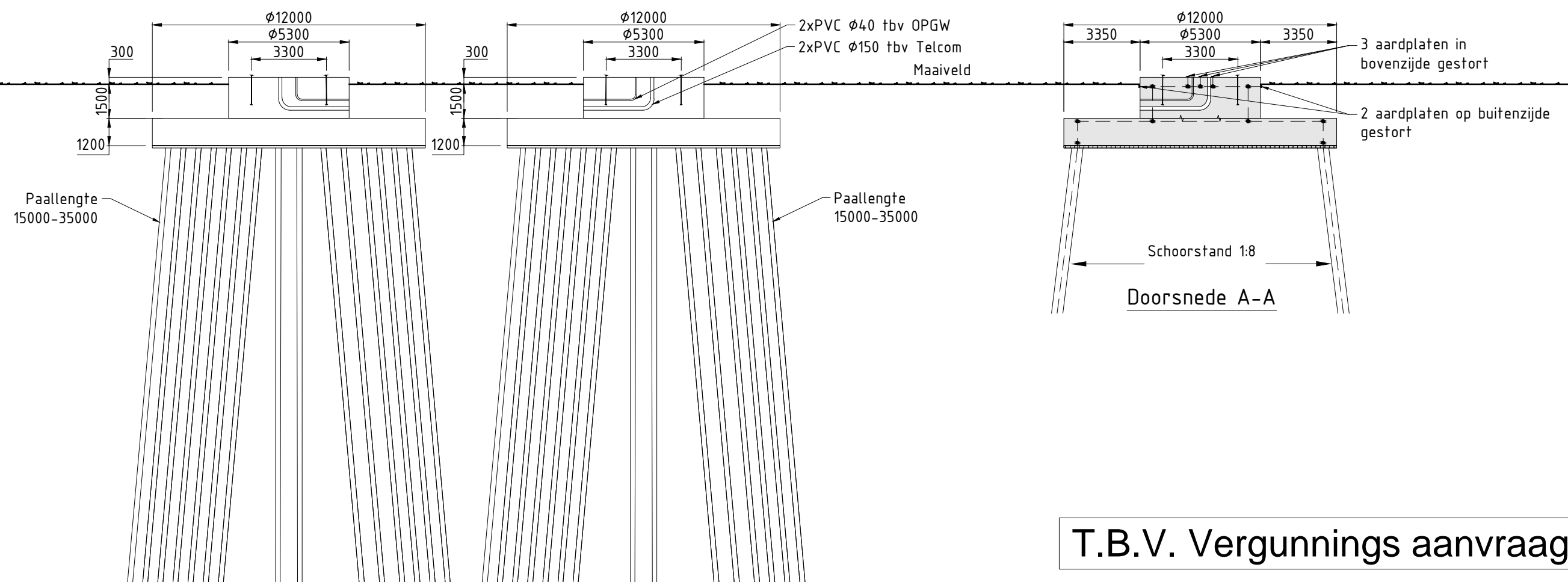
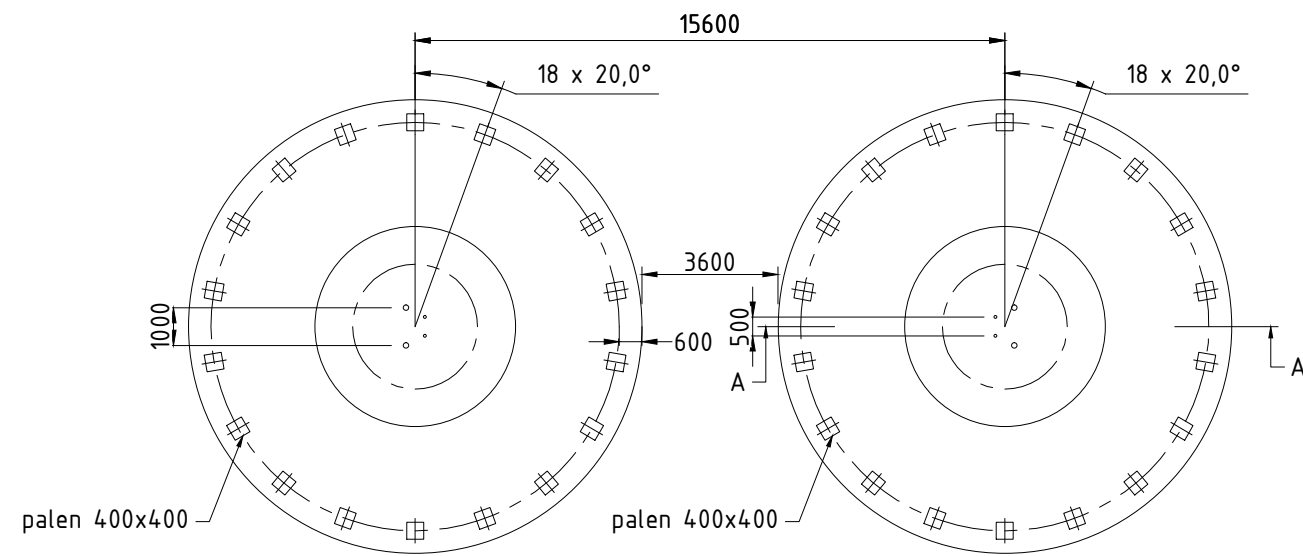
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CI

Bepaling opneembare paalbelasting op druk

heipaal	v	
diameter	a	2 mm
		2 mm
Deq		0,001808
maximale puntweerstand		
$P_{r,max;punt;i}$		11,25 MN/m ²
paalklasse factor	α_p	1,00
factor paalvoet	β	1
hoek van inwendige vrijwing van paalvoet	ϕ	40
factor dwarsdoorsnede paalvoet	s	1,00
minimale waarde neergaande deel	$q_{c,II;gem}$	9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11,00 MN/m ²
maximale paalschachtwrijving		
$P_{r,max;schacht;i}$		0,05 MN/m ²
waarin:		
paalfactor	α_s	0,010
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5,00 MN/m ²
maximale draagkracht alleenstaande paal		
$F_{r,max;i}$		0,00 MN
waarin:		
$F_{r,max;punt;i}$		0,00 MN
paalpunt oppervlak	A_{punt}	0,00 m ²
$F_{r,max;schacht;i}$		0,00 MN
gemiddelde paalomtrek	$O_{p;gem}$	0,01 m
lengte schachtwrijving	Δl	15,00 m
Bepaling rekenwaarde van de maximale draagkracht		
$F_{r,paal,max;d}$	MN	0,00 MN
materiaalfactor grond	γ_{mb}	1,20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0,75
$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo -27,00 m



T.B.V. Vergunnings aanvraag

Verklaring


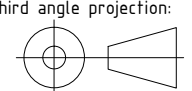
- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding ø16mm (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

7.0	10-03-2014	Diverse aanpassingen
6.0	25-06-2013	Diverse aanpassingen
5.0	13-02-2014	Diverse aanpassingen
		Projectname: Engineering verbinding ZW380
		Drawing no.: 74102194-032-091V
Design state: Definitief		Scale: 1:200
Drawn by: RBE 10-03-2014		Units: mm
Checked by: AJP 10-03-2014		Project no: 000.145
Approved by: AW 10-03-2014		Company: TenneT
		Description: Principe ontwerp fundatie hoekmast ZWW4HK400 masten familie
		Revision: 7.0
		Format: A3



ZWW4HK400

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte			h	63.2	m
Diameter voet			d voet	3.3	m
top			d top	0.8	m
gem			d gem	2.1	m
wanddikte			t	24	mm
Oppervlakte aan voet			A	247005	mm ²
Traagheidsmoment aan voet			W _x	2.01E+08	mm ⁴
Weerstandsmoment aan voet			I _x	3.28E+11	mm ⁶
Mast: Gewicht			2 ^{de} orde F _{rep/ver}	10.0 751	% kN

Bijlage BI

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	62.6	3.9	15.6	-41.1	43.9	2751	kNm
150C1F1	52.6	9.9	33.0	-97.2	102.7	5400	kNm
150C1F2	42.4	9.9	32.0	-95.5	100.8	4272	kNm
150C1F3	32.2	9.9	30.8	-93.5	98.5	3171	kNm
380C2F1	52.6	19.8	66.0	-194.4	205.3	10799	kNm
380C2F2	42.4	19.8	64.0	-191.1	201.5	8544	kNm
380C2F3	32.2	19.8	61.5	-187.1	196.9	6342	kNm
RTG	22.1	7.8	24.9	-71.1	75.3	1664	kNm

Stuwdruk			F _{hor.}	37.6	kN
			M _{d,wind}	1063	kNm
Totaal			M _{d,tot}	43617	kNm
Totaal moment incl. 2 ^{de} orde effect			M _{d,tot}	47979	kNm

Normaalkracht;

Optredende normaalkracht							
N _{d,geleiders}						101	kN
N _{d, e.g. mast}						901	kN
N _{s,d,totaal}						1064	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA	
A _{eff}	0.60	
	149019	mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{yd} /γ _{m1}	7	N/mm ²
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Moment;

Optredende moment in de voet:							
M _{d,tot}						47979	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA	
W _{eff}	0.90	
	1.81E+08	mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	271	N/mm ²
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Totale spanning:

S _d	271	N/mm ²	< 284 N/mm ² = ACCOORD
S _{d,toegeestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	62.6	3.9	23.3	0.0	23.3	1458	kNm
150C1F1	52.6	14.2	70.6	0.0	70.6	3712	kNm
150C1F2	42.4	14.2	67.0	0.0	67.0	2839	kNm
150C1F3	32.2	14.2	62.4	0.0	62.4	2009	kNm
380C2F1	52.6	28.4	141.1	0.0	141.1	7423	kNm
380C2F2	42.4	28.4	133.9	0.0	133.9	5678	kNm
380C2F3	32.2	28.4	124.8	0.0	124.8	4018	kNm
RTG	22.1	3.9	17.3	-46.9	49.9	1104	kNm

Stuwdruk			F _{hor.}	1010	kN
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Verplaatsing				1.06	m
Percentage van de verplaatsing				1.67%	
Hoek				1.72	graden
Kromming				0.35%	
Fundatie rotatiestijfheid				0.005	rad

3.44	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4HK400

Appendix I / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2313	5642	19572	2313	5642	-19572
Wind, 10°C	150C1F1	8522	20309	71623	8522	20309	-71623
Permanent loads yg= 1.2	150C1F2	8522	20208	71576	8522	20208	-71576
Wind angle: 0°	150C1F3	8522	20082	71524	8522	20082	-71524
	380C2F1	17045	40618	143247	17045	40618	-143247
	380C2F2	17045	40417	143152	17045	40417	-143152
	380C2F3	17045	40164	143048	17045	40164	-143048
	RTG	0	0	0	4620	10939	-38915
NL1/1b	GW / opgw	2312	5979	22016	2312	5979	-22016
Wind, -20°C	150C1F1	8518	22204	82034	8518	22204	-82034
Permanent loads yg= 1.2	150C1F2	8518	22187	82036	8518	22187	-82036
Wind angle: 0°	150C1F3	8518	22165	82038	8518	22165	-82038
	380C2F1	17036	44409	164069	17036	44409	-164069
	380C2F2	17036	44375	164072	17036	44375	-164072
	380C2F3	17036	44331	164076	17036	44331	-164076
	RTG	0	0	0	4618	11791	-43623
NL1/3	GW / opgw	9331	16292	59274	9331	16292	-59274
Wind, -5°C	150C1F1	14688	31519	115300	14688	31519	-115300
Permanent loads yg= 1.2	150C1F2	14688	31470	115301	14688	31470	-115301
Wind angle: 0°	150C1F3	14688	31408	115304	14688	31408	-115304
	380C2F1	29376	63038	230599	29376	63038	-230599
	380C2F2	29376	62940	230602	29376	62940	-230602
	380C2F3	29376	62816	230608	29376	62816	-230608
	RTG	0	0	0	18688	32337	-118727
NL1/4	GW / opgw	3065	6740	24858	3065	6740	-24858
Construction/maintenance, +5°C	150C1F1	10026	22453	82960	10026	22453	-82960
Permanent loads yg= 1.2	150C1F2	10026	22436	82962	10026	22436	-82962
Wind angle: 0°	150C1F3	10026	22414	82965	10026	22414	-82965
	380C2F1	20053	44905	165920	20053	44905	-165920
	380C2F2	20053	44871	165924	20053	44871	-165924
	380C2F3	20053	44828	165930	20053	44828	-165930
	RTG	0	0	0	6124	13407	-49654
NL1/6	GW / opgw	2603	5740	21422	2603	5740	-21422
Permanent, +10°C	150C1F1	9589	21041	78528	9589	21041	-78528
Permanent loads yg= 1.35	150C1F2	9589	21041	78528	9589	21041	-78528
	150C1F3	9589	21041	78528	9589	21041	-78528
	380C2F1	19177	42083	157056	19177	42083	-157056
	380C2F2	19177	42083	157056	19177	42083	-157056
	380C2F3	19177	42083	157056	19177	42083	-157056
	RTG	0	0	0	5198	11469	-42804
NL1/1a	GW / opgw	2314	7341	21850	2315	13636	-34239
Wind, 10°C	150C1F1	8523	24649	76427	8527	41255	-107248
Permanent loads yg= 1.2	150C1F2	8523	24112	75647	8527	39143	-103042
Wind angle: 45°	150C1F3	8523	23449	74733	8526	36475	-97775
	380C2F1	17046	49298	152854	17055	82509	-214495
	380C2F2	17046	48224	151293	17054	78286	-206083
	380C2F3	17046	46898	149466	17052	72950	-195550
	RTG	0	0	0	4622	20280	-54290
NL1/1b	GW / opgw	2312	6214	22081	2312	7032	-22918
Wind, -20°C	150C1F1	8518	22840	82131	8518	24956	-83805
Permanent loads yg= 1.2	150C1F2	8518	22769	82107	8518	24680	-83505
Wind angle: 45°	150C1F3	8518	22678	82081	8518	24336	-83161
	380C2F1	17036	45681	164262	17036	49913	-167610
	380C2F2	17036	45537	164214	17036	49359	-167011
	380C2F3	17036	45356	164162	17036	48672	-166322
	RTG	0	0	0	4618	13016	-44300
NL1/3	GW / opgw	9332	17469	59491	9333	21392	-62725
Wind, -5°C	150C1F1	14688	33360	115804	14690	39726	-122166
Permanent loads yg= 1.2	150C1F2	14688	33148	115699	14689	38885	-121082
Wind angle: 45°	150C1F3	14688	32883	115583	14689	37844	-119815
	380C2F1	29376	66719	231608	29380	79451	-244332
	380C2F2	29376	66297	231398	29379	77771	-242163
	380C2F3	29376	65767	231166	29378	75688	-239630
	RTG	0	0	0	18690	38360	-121234
NL1/4	GW / opgw	3066	6965	24884	3066	7701	-25412
Construction/maintenance, +5°C	150C1F1	10026	23075	83003	10027	25074	-84237
Permanent loads yg= 1.2	150C1F2	10026	23005	82987	10027	24816	-84010
Wind angle: 45°	150C1F3	10026	22917	82972	10026	24495	-83750
	380C2F1	20053	46149	166005	20053	50147	-168475
	380C2F2	20053	46010	165975	20053	49632	-168019
	380C2F3	20053	45834	165943	20053	48990	-167500
	RTG	0	0	0	6124	14552	-50029

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2316	16038	39137	2316	16038	-39137
	150C1F1	8529	47872	120531	8529	47872	-120531
	150C1F2	8528	45214	115185	8528	45214	-115185
	150C1F3	8527	41832	108401	8527	41832	-108401
	380C2F1	17058	95743	241062	17058	95743	-241062
	380C2F2	17057	90427	230369	17057	90427	-230369
	380C2F3	17055	83663	216802	17055	83663	-216802
	RTG	0	0	0	4623	23333	-60459
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	7388	23436	2312	7388	-23436
	150C1F1	8518	25859	84895	8518	25859	-84895
	150C1F2	8518	25490	84430	8518	25490	-84430
	150C1F3	8518	25033	83891	8518	25033	-83891
	380C2F1	17037	51718	169791	17037	51718	-169791
	380C2F2	17037	50979	168860	17037	50979	-168860
	380C2F3	17036	50066	167782	17036	50066	-167782
	RTG	0	0	0	4618	13411	-44734
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	9334	23040	64696	9334	23040	-64696
	150C1F1	14691	42459	126000	14691	42459	-126000
	150C1F2	14690	41342	124384	14690	41342	-124384
	150C1F3	14690	39958	122475	14690	39958	-122475
	380C2F1	29381	84919	252000	29381	84919	-252000
	380C2F2	29381	82685	248768	29381	82685	-248768
	380C2F3	29380	79915	244949	29380	79915	-244949
	RTG	0	0	0	18691	40243	-122907
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3066	8012	25760	3066	8012	-25760
	150C1F1	10027	25909	85076	10027	25909	-85076
	150C1F2	10027	25568	84717	10027	25568	-84717
	150C1F3	10027	25145	84303	10027	25145	-84303
	380C2F1	20053	51818	170153	20053	51818	-170153
	380C2F2	20053	51136	169433	20053	51136	-169433
	380C2F3	20053	50290	168606	20053	50290	-168606
	RTG	0	0	0	6124	14905	-50305
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2315	13636	34239	2314	7341	-21850
	150C1F1	8527	41255	107248	8523	24649	-76427
	150C1F2	8527	39143	103042	8523	24112	-75647
	150C1F3	8526	36475	97775	8523	23449	-74733
	380C2F1	17055	82509	214495	17046	49298	-152854
	380C2F2	17054	78286	206083	17046	48224	-151293
	380C2F3	17052	72950	195550	17046	46898	-149466
	RTG	0	0	0	4620	12848	-40820
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	7032	22918	2312	6214	-22081
	150C1F1	8518	24956	83805	8518	22840	-82131
	150C1F2	8518	24680	83505	8518	22769	-82107
	150C1F3	8518	24336	83161	8518	22678	-82081
	380C2F1	17036	49913	167610	17036	45681	-164262
	380C2F2	17036	49359	167011	17036	45537	-164214
	380C2F3	17036	48672	166322	17036	45356	-164162
	RTG	0	0	0	4618	12078	-43652
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	9333	21392	62725	9332	17469	-59491
	150C1F1	14690	39726	122166	14688	33360	-115804
	150C1F2	14689	38885	121082	14688	33148	-115699
	150C1F3	14689	37844	119815	14688	32883	-115583
	380C2F1	29380	79451	244332	29376	66719	-231608
	380C2F2	29379	77771	242163	29376	66297	-231398
	380C2F3	29378	75688	239630	29376	65767	-231166
	RTG	0	0	0	18688	33785	-118778
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3066	7701	25412	3066	6965	-24884
	150C1F1	10027	25074	84237	10026	23075	-83003
	150C1F2	10027	24816	84010	10026	23005	-82987
	150C1F3	10026	24495	83750	10026	22917	-82972
	380C2F1	20053	50147	168475	20053	46149	-166005
	380C2F2	20053	49632	168019	20053	46010	-165975
	380C2F3	20053	48990	167500	20053	45834	-165943
	RTG	0	0	0	6124	13686	-49651
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1735	4557	15520	1735	4557	-15520
	150C1F1	6390	16356	56872	6390	16356	-56872
	150C1F2	6390	16247	56795	6390	16247	-56795
	150C1F3	6390	16112	56708	6390	16112	-56708
	380C2F1	12781	32712	113743	12781	32712	-113743
	380C2F2	12781	32495	113589	12781	32495	-113589
	380C2F3	12781	32224	113416	12781	32224	-113416
	RTG	0	0	0	3464	8737	-30698

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	4807	17644	1734	4807	-17644
	150C1F1	6387	17993	66318	6387	17993	-66318
	150C1F2	6387	17976	66318	6387	17976	-66318
	150C1F3	6387	17953	66318	6387	17953	-66318
	380C2F1	12774	35986	132635	12774	35986	-132635
	380C2F2	12774	35951	132635	12774	35951	-132635
	380C2F3	12774	35907	132637	12774	35907	-132637
	RTG	0	0	0	3463	9450	-34887
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	8751	15568	56573	8751	15568	-56573
	150C1F1	12554	28094	102519	12554	28094	-102519
	150C1F2	12554	28045	102518	12554	28045	-102518
	150C1F3	12554	27982	102518	12554	27982	-102518
	380C2F1	25109	56188	205038	25109	56188	-205038
	380C2F2	25109	56089	205035	25109	56089	-205035
	380C2F3	25109	55964	205036	25109	55964	-205036
	RTG	0	0	0	17529	30887	-113313
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2487	5711	21016	2487	5711	-21016
	150C1F1	7894	18612	68628	7894	18612	-68628
	150C1F2	7894	18595	68629	7894	18595	-68629
	150C1F3	7894	18573	68631	7894	18573	-68631
	380C2F1	15788	37224	137256	15788	37224	-137256
	380C2F2	15788	37190	137258	15788	37190	-137258
	380C2F3	15788	37146	137262	15788	37146	-137262
	RTG	0	0	0	4968	11346	-41962
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1735	4102	15307	1735	4102	-15307
	150C1F1	6390	15137	56492	6390	15137	-56492
	150C1F2	6390	15137	56492	6390	15137	-56492
	150C1F3	6390	15137	56492	6390	15137	-56492
	380C2F1	12781	30274	112983	12781	30274	-112983
	380C2F2	12781	30274	112983	12781	30274	-112983
	380C2F3	12781	30274	112983	12781	30274	-112983
	RTG	0	0	0	3464	8190	-30564
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1735	6484	18653	1736	13263	-32850
	150C1F1	6391	21253	63754	6395	39507	-100730
	150C1F2	6391	20639	62687	6394	37259	-96016
	150C1F3	6391	19881	61420	6394	34395	-90018
	380C2F1	12782	42505	127508	12790	79014	-201459
	380C2F2	12782	41278	125374	12789	74519	-192033
	380C2F3	12782	39762	122840	12788	68790	-180036
	RTG	0	0	0	3466	19144	-50054
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	5057	17763	1734	5982	-19000
	150C1F1	6387	18659	66528	6387	21016	-69102
	150C1F2	6387	18583	66485	6387	20701	-68659
	150C1F3	6387	18486	66438	6387	20312	-68144
	380C2F1	12774	37319	133056	12774	42032	-138204
	380C2F2	12774	37165	132971	12774	41402	-137318
	380C2F3	12774	36973	132876	12774	40624	-136288
	RTG	0	0	0	3463	10783	-35969
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	8751	16756	56833	8753	20763	-60379
	150C1F1	12555	29991	103232	12556	36758	-111097
	150C1F2	12554	29771	103094	12556	35859	-109790
	150C1F3	12554	29495	102939	12556	34744	-108250
	380C2F1	25109	59981	206465	25112	73517	-222195
	380C2F2	25109	59541	206188	25112	71717	-219580
	380C2F3	25109	58990	205878	25111	69489	-216500
	RTG	0	0	0	17531	36995	-116144
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2487	5942	21067	2487	6730	-21790
	150C1F1	7894	19253	68740	7894	21403	-70542
	150C1F2	7894	19180	68714	7894	21121	-70222
	150C1F3	7894	19089	68685	7894	20771	-69853
	380C2F1	15788	38506	137480	15788	42807	-141084
	380C2F2	15788	38360	137427	15788	42242	-140444
	380C2F3	15788	38177	137369	15788	41542	-139707
	RTG	0	0	0	4968	12541	-42527
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1737	15745	38044	1737	15745	-38044
	150C1F1	6396	46464	115283	6396	46464	-115283
	150C1F2	6396	43683	109477	6396	43683	-109477
	150C1F3	6395	40118	102012	6395	40118	-102012
	380C2F1	12793	92929	230566	12793	92929	-230566
	380C2F2	12791	87366	218954	12791	87366	-218954
	380C2F3	12790	80237	204024	12790	80237	-204024
	RTG	0	0	0	3467	22399	-56976

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	6393	19722	1734	6393	-19722
	150C1F1	6387	22050	70684	6387	22050	-70684
	150C1F2	6387	21626	70014	6387	21626	-70014
	150C1F3	6387	21103	69228	6387	21103	-69228
	380C2F1	12775	44101	141369	12775	44101	-141369
	380C2F2	12775	43253	140028	12775	43253	-140028
	380C2F3	12775	42207	138457	12775	42207	-138457
	RTG	0	0	0	3463	11234	-36607
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	8754	22451	62501	8754	22451	-62501
	150C1F1	12557	39686	115656	12557	39686	-115656
	150C1F2	12557	38491	113745	12557	38491	-113745
	150C1F3	12556	37007	111468	12556	37007	-111468
	380C2F1	25114	79372	231311	25114	79372	-231311
	380C2F2	25113	76981	227490	25113	76981	-227490
	380C2F3	25113	74015	222935	25113	74015	-222935
	RTG	0	0	0	17532	38920	-117975
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2487	7070	22246	2487	7070	-22246
	150C1F1	7894	22325	71703	7894	22325	-71703
	150C1F2	7894	21948	71208	7894	21948	-71208
	150C1F3	7894	21482	70634	7894	21482	-70634
	380C2F1	15789	44650	143406	15789	44650	-143406
	380C2F2	15789	43896	142416	15789	43896	-142416
	380C2F3	15788	42963	141268	15788	42963	-141268
	RTG	0	0	0	4968	12922	-42903
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1736	13263	32850	1735	6484	-18653
	150C1F1	6395	39507	100730	6391	21253	-63754
	150C1F2	6394	37259	96016	6391	20639	-62687
	150C1F3	6394	34395	90018	6391	19881	-61420
	380C2F1	12790	79014	201459	12782	42505	-127508
	380C2F2	12789	74519	192033	12782	41278	-125374
	380C2F3	12788	68790	180036	12782	39762	-122840
	RTG	0	0	0	3465	10877	-33467
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	5982	19000	1734	5057	-17763
	150C1F1	6387	21016	69102	6387	18659	-66528
	150C1F2	6387	20701	68659	6387	18583	-66485
	150C1F3	6387	20312	68144	6387	18486	-66438
	380C2F1	12774	42032	138204	12774	37319	-133056
	380C2F2	12774	41402	137318	12774	37165	-132971
	380C2F3	12774	40624	136288	12774	36973	-132876
	RTG	0	0	0	3463	9749	-34960
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	8753	20763	60379	8751	16756	-56833
	150C1F1	12556	36758	111097	12555	29991	-103232
	150C1F2	12556	35859	109790	12554	29771	-103094
	150C1F3	12556	34744	108250	12554	29495	-102939
	380C2F1	25112	73517	222195	25109	59981	-206465
	380C2F2	25112	71717	219580	25109	59541	-206188
	380C2F3	25111	69489	216500	25109	58990	-205878
	RTG	0	0	0	17529	32344	-113401
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2487	6730	21790	2487	5942	-21067
	150C1F1	7894	21403	70542	7894	19253	-68740
	150C1F2	7894	21121	70222	7894	19180	-68714
	150C1F3	7894	20771	69853	7894	19089	-68685
	380C2F1	15788	42807	141084	15788	38506	-137480
	380C2F2	15788	42242	140444	15788	38360	-137427
	380C2F3	15788	41542	139707	15788	38177	-137369
	RTG	0	0	0	4968	11630	-41979

ZWW4HK400

Appendix I1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / opgw	0	0	0	2313	5421	-19460
Wind, 10°C	150C1F1	0	0	0	8522	19719	-71422
Permanent loads yg= 1.2	150C1F2	0	0	0	8522	19671	-71415
Wind angle: 0°	150C1F3	0	0	0	8522	19611	-71408
	380C2F1	0	0	0	17045	39437	-142845
	380C2F2	0	0	0	17045	39342	-142830
	380C2F3	0	0	0	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b	GW / opgw	0	0	0	2312	5963	-22016
Wind, -20°C	150C1F1	0	0	0	8518	22161	-82039
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	22147	-82040
Wind angle: 0°	150C1F3	0	0	0	8518	22130	-82043
	380C2F1	0	0	0	17036	44322	-164077
	380C2F2	0	0	0	17036	44295	-164081
	380C2F3	0	0	0	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3	GW / opgw	0	0	0	3883	8610	-30911
Wind, -5°C	150C1F1	0	0	0	9901	23444	-85630
Permanent loads yg= 1.2	150C1F2	0	0	0	9901	23404	-85628
Wind angle: 0°	150C1F3	0	0	0	9901	23354	-85627
	380C2F1	0	0	0	19802	46887	-171259
	380C2F2	0	0	0	19802	46808	-171256
	380C2F3	0	0	0	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4	GW / opgw	0	0	0	2915	6463	-23882
Construction/maintenance, +5°C	150C1F1	0	0	0	9725	21883	-81000
Permanent loads yg= 1.2	150C1F2	0	0	0	9725	21869	-81002
Wind angle: 0°	150C1F3	0	0	0	9725	21852	-81005
	380C2F1	0	0	0	19451	43765	-162000
	380C2F2	0	0	0	19451	43738	-162004
	380C2F3	0	0	0	19451	43704	-162010
	RTG	0	0	0	5823	12662	-47696
NL3/1a	GW / opgw	0	0	0	2314	8980	-24860
Wind, 10°C	150C1F1	0	0	0	8524	28843	-83359
Permanent loads yg= 1.2	150C1F2	0	0	0	8524	27877	-81663
Wind angle: 45°	150C1F3	0	0	0	8524	26679	-79631
	380C2F1	0	0	0	17048	57685	-166717
	380C2F2	0	0	0	17048	57554	-163327
	380C2F3	0	0	0	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b	GW / opgw	0	0	0	2312	6761	-22572
Wind, -20°C	150C1F1	0	0	0	8518	24266	-83095
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	24058	-82907
Wind angle: 45°	150C1F3	0	0	0	8518	23800	-82693
	380C2F1	0	0	0	17036	48532	-166189
	380C2F2	0	0	0	17036	48117	-165814
	380C2F3	0	0	0	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3	GW / opgw	0	0	0	3884	13833	-37952
Wind, -5°C	150C1F1	0	0	0	9902	30568	-93216
Permanent loads yg= 1.2	150C1F2	0	0	0	9902	29821	-92068
Wind angle: 45°	150C1F3	0	0	0	9902	28897	-90716
	380C2F1	0	0	0	19805	61135	-186431
	380C2F2	0	0	0	19805	59641	-184137
	380C2F3	0	0	0	19804	57794	-181432
	RTG	0	0	0	7768	22676	-67855
NL3/4	GW / opgw	0	0	0	2915	7208	-24240
Construction/maintenance, +5°C	150C1F1	0	0	0	9726	23915	-81781
Permanent loads yg= 1.2	150C1F2	0	0	0	9725	23718	-81634
Wind angle: 45°	150C1F3	0	0	0	9725	23473	-81468
	380C2F1	0	0	0	19451	47830	-163562
	380C2F2	0	0	0	19451	47436	-163268
	380C2F3	0	0	0	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a	GW / opgw	0	0	0	2314	10178	-27217
Wind, 10°C	150C1F1	0	0	0	8525	31968	-89093
Permanent loads yg= 1.2	150C1F2	0	0	0	8525	30695	-86719
Wind angle: 90°	150C1F3	0	0	0	8524	29109	-83834
	380C2F1	0	0	0	17050	63935	-178185
	380C2F2	0	0	0	17049	61390	-173439
	380C2F3	0	0	0	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164
NL3/1b	GW / opgw	0	0	0	2312	7025	-22909
Wind, -20°C	150C1F1	0	0	0	8518	24939	-83786
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	24664	-83489
Wind angle: 90°	150C1F3	0	0	0	8518	24323	-83149
	380C2F1	0	0	0	17036	49879	-167572
	380C2F2	0	0	0	17036	49328	-166979
	380C2F3	0	0	0	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3	GW / opgw	0	0	0	3885	15569	-41090
Wind, -5°C	150C1F1	0	0	0	9903	33002	-97207
Permanent loads yg= 1.2	150C1F2	0	0	0	9903	32007	-95535
Wind angle: 90°	150C1F3	0	0	0	9903	30774	-93540
	380C2F1	0	0	0	19806	66003	-194414
	380C2F2	0	0	0	19806	64014	-191070
	380C2F3	0	0	0	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4	GW / opgw	0	0	0	2915	7446	-24476
Construction/maintenance, +5°C	150C1F1	0	0	0	9726	24550	-82329
Permanent loads yg= 1.2	150C1F2	0	0	0	9726	24291	-82093
Wind angle: 90°	150C1F3	0	0	0	9726	23969	-81824
	380C2F1	0	0	0	19451	49100	-164657
	380C2F2	0	0	0	19451	48582	-164186
	380C2F3	0	0	0	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a	GW / opgw	0	0	0	2313	6149	-20666
Wind, 10°C	150C1F1	0	0	0	8523	21624	-72609
Permanent loads yg= 1.2	150C1F2	0	0	0	8523	21397	-72397
Wind angle: -45°	150C1F3	0	0	0	8523	21115	-72156
	380C2F1	0	0	0	17045	43248	-145217
	380C2F2	0	0	0	17045	42794	-144795
	380C2F3	0	0	0	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293

NL3/1b	GW / opgw	0	0	0	2312	6146	-22050
Wind, -20°C	150C1F1	0	0	0	8518	22659	-82076
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	22603	-82063
Wind angle: -45°	150C1F3	0	0	0	8518	22533	-82050
	380C2F1	0	0	0	17036	45318	-164152
	380C2F2	0	0	0	17036	45207	-164127
	380C2F3	0	0	0	17036	45066	-164100
	RTG	0	0	0	4618	11997	-43633
NL3/3	GW / opgw	0	0	0	3883	9707	-31669
Wind, -5°C	150C1F1	0	0	0	9901	24983	-86283
Permanent loads yg= 1.2	150C1F2	0	0	0	9901	24803	-86159
Wind angle: -45°	150C1F3	0	0	0	9901	24579	-86020
	380C2F1	0	0	0	19803	49966	-172566
	380C2F2	0	0	0	19803	49606	-172319
	380C2F3	0	0	0	19803	49157	-172039
	RTG	0	0	0	7767	18232	-62203
NL3/4	GW / opgw	0	0	0	2915	6640	-23894
Construction/maintenance, +5°C	150C1F1	0	0	0	9725	22373	-81008
Permanent loads yg= 1.2	150C1F2	0	0	0	9725	22319	-81000
Wind angle: -45°	150C1F3	0	0	0	9725	22250	-80992
	380C2F1	0	0	0	19451	44747	-162016
	380C2F2	0	0	0	19451	44637	-162000
	380C2F3	0	0	0	19451	44499	-161985
	RTG	0	0	0	5823	13083	-47686
NL3/1a	GW / opgw	0	0	0	1735	4318	-15341
Wind, 10°C	150C1F1	0	0	0	6390	15727	-56526
Permanent loads yg= 0.9	150C1F2	0	0	0	6390	15677	-56510
Wind angle: 0°	150C1F3	0	0	0	6390	15614	-56493
	380C2F1	0	0	0	12781	31454	-113052
	380C2F2	0	0	0	12781	31354	-113020
	380C2F3	0	0	0	12781	31229	-112987
	RTG	0	0	0	3464	8457	-30569
NL3/1b	GW / opgw	0	0	0	1734	4791	-17643
Wind, -20°C	150C1F1	0	0	0	6387	17949	-66319
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	17935	-66319
Wind angle: 0°	150C1F3	0	0	0	6387	17917	-66321
	380C2F1	0	0	0	12774	35897	-132637
	380C2F2	0	0	0	12774	35870	-132639
	380C2F3	0	0	0	12774	35835	-132641
	RTG	0	0	0	3463	9430	-34888
NL3/3	GW / opgw	0	0	0	3304	7647	-27318
Wind, -5°C	150C1F1	0	0	0	7769	19534	-71039
Permanent loads yg= 0.9	150C1F2	0	0	0	7769	19493	-71033
Wind angle: 0°	150C1F3	0	0	0	7769	19441	-71027
	380C2F1	0	0	0	15538	39068	-142079
	380C2F2	0	0	0	15538	38986	-142066
	380C2F3	0	0	0	15538	38883	-142054
	RTG	0	0	0	6610	15011	-54458
NL3/4	GW / opgw	0	0	0	2336	5417	-19980
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	18004	-66526
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	17991	-66527
Wind angle: 0°	150C1F3	0	0	0	7593	17973	-66529
	380C2F1	0	0	0	15186	36009	-133052
	380C2F2	0	0	0	15186	35981	-133054
	380C2F3	0	0	0	15186	35946	-133059
	RTG	0	0	0	4667	10769	-39885
NL3/1a	GW / opgw	0	0	0	1735	8312	-22368
Wind, 10°C	150C1F1	0	0	0	6392	26006	-72777
Permanent loads yg= 0.9	150C1F2	0	0	0	6392	24920	-70632
Wind angle: 45°	150C1F3	0	0	0	6392	23565	-68013
	380C2F1	0	0	0	12784	52013	-145554
	380C2F2	0	0	0	12784	49840	-141264
	380C2F3	0	0	0	12783	47130	-136026
	RTG	0	0	0	3465	12977	-37311
NL3/1b	GW / opgw	0	0	0	1734	5671	-18504
Wind, -20°C	150C1F1	0	0	0	6387	20232	-68043
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	19999	-67759
Wind angle: 45°	150C1F3	0	0	0	6387	19710	-67430
	380C2F1	0	0	0	12774	40465	-136087
	380C2F2	0	0	0	12774	39998	-135518
	380C2F3	0	0	0	12774	39420	-134861
	RTG	0	0	0	3463	10442	-35549
NL3/3	GW / opgw	0	0	0	3305	13212	-35636
Wind, -5°C	150C1F1	0	0	0	7771	27388	-81353
Permanent loads yg= 0.9	150C1F2	0	0	0	7770	26553	-79875
Wind angle: 45°	150C1F3	0	0	0	7770	25518	-78108
	380C2F1	0	0	0	15541	54776	-162707
	380C2F2	0	0	0	15541	53105	-159750
	380C2F3	0	0	0	15540	51036	-156216
	RTG	0	0	0	6611	21321	-62052
NL3/4	GW / opgw	0	0	0	2336	6206	-20501
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	20156	-67755
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	19942	-67542
Wind angle: 45°	150C1F3	0	0	0	7593	19676	-67299
	380C2F1	0	0	0	15186	40313	-135511
	380C2F2	0	0	0	15186	39884	-135085
	380C2F3	0	0	0	15186	39352	-134597
	RTG	0	0	0	4667	11702	-40251
NL3/1a	GW / opgw	0	0	0	1736	9613	-25111
Wind, 10°C	150C1F1	0	0	0	6393	29481	-79817
Permanent loads yg= 0.9	150C1F2	0	0	0	6393	28073	-76939
Wind angle: 90°	150C1F3	0	0	0	6392	26305	-73373
	380C2F1	0	0	0	12786	58962	-159635
	380C2F2	0	0	0	12785	56147	-153879
	380C2F3	0	0	0	12784	52610	-146746
	RTG	0	0	0	3465	14539	-40424
NL3/1b	GW / opgw	0	0	0	1734	5974	-18987
Wind, -20°C	150C1F1	0	0	0	6387	20997	-69074
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	20683	-68635
Wind angle: 90°	150C1F3	0	0	0	6387	20297	-68125
	380C2F1	0	0	0	12774	41993	-138148
	380C2F2	0	0	0	12774	41367	-137270
	380C2F3	0	0	0	12774	40594	-136250
	RTG	0	0	0	3463	10775	-35958

NL3/3	GW / opgw	0	0	0	3306	15037	-39110
Wind, -5°C	150C1F1	0	0	0	7771	30099	-86377
Permanent loads yg= 0.9	150C1F2	0	0	0	7771	28994	-84294
Wind angle: 90°	150C1F3	0	0	0	7771	27619	-81769
	380C2F1	0	0	0	15542	60198	-172755
	380C2F2	0	0	0	15542	57987	-168588
	380C2F3	0	0	0	15541	55238	-163537
	RTG	0	0	0	6612	23468	-65790
NL3/4	GW / opgw	0	0	0	2336	6466	-20820
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	20854	-68536
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	20569	-68202
Wind angle: 90°	150C1F3	0	0	0	7593	20216	-67817
	380C2F1	0	0	0	15187	41708	-137072
	380C2F2	0	0	0	15187	41137	-136404
	380C2F3	0	0	0	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40507
NL3/1a	GW / opgw	0	0	0	1735	5126	-16245
Wind, 10°C	150C1F1	0	0	0	6391	17810	-58375
Permanent loads yg= 0.9	150C1F2	0	0	0	6391	17555	-58061
Wind angle: -45°	150C1F3	0	0	0	6391	17240	-57698
	380C2F1	0	0	0	12781	35619	-116750
	380C2F2	0	0	0	12781	35110	-116122
	380C2F3	0	0	0	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b	GW / opgw	0	0	0	1734	4983	-17711
Wind, -20°C	150C1F1	0	0	0	6387	18466	-66429
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	18407	-66405
Wind angle: -45°	150C1F3	0	0	0	6387	18333	-66378
	380C2F1	0	0	0	12774	36933	-132858
	380C2F2	0	0	0	12774	36815	-132809
	380C2F3	0	0	0	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3	GW / opgw	0	0	0	3304	8802	-28293
Wind, -5°C	150C1F1	0	0	0	7769	21169	-72052
Permanent loads yg= 0.9	150C1F2	0	0	0	7769	20974	-71871
Wind angle: -45°	150C1F3	0	0	0	7769	20732	-71665
	380C2F1	0	0	0	15539	42338	-144103
	380C2F2	0	0	0	15539	41948	-143742
	380C2F3	0	0	0	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4	GW / opgw	0	0	0	2336	5599	-20009
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	18508	-66582
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	18451	-66566
Wind angle: -45°	150C1F3	0	0	0	7593	18380	-66549
	380C2F1	0	0	0	15186	37015	-133164
	380C2F2	0	0	0	15186	36902	-133132
	380C2F3	0	0	0	15186	36759	-133099
	RTG	0	0	0	4667	10994	-38889

ZWW4HK400

Loadcases for tower strength (Special limit state)

Appendix I1 / NL3

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5421	19460	0	0	0
	150C1F1	8522	19719	71422	0	0	0
	150C1F2	8522	19671	71415	0	0	0
	150C1F3	8522	19611	71408	0	0	0
	380C2F1	17045	39437	142845	0	0	0
	380C2F2	17045	39342	142830	0	0	0
	380C2F3	17045	39221	142815	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5963	22016	0	0	0
	150C1F1	8518	22161	82039	0	0	0
	150C1F2	8518	22147	82040	0	0	0
	150C1F3	8518	22130	82043	0	0	0
	380C2F1	17036	44322	164077	0	0	0
	380C2F2	17036	44295	164081	0	0	0
	380C2F3	17036	44260	164085	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8610	30911	0	0	0
	150C1F1	9901	23444	85630	0	0	0
	150C1F2	9901	23404	85628	0	0	0
	150C1F3	9901	23354	85627	0	0	0
	380C2F1	19802	46887	171259	0	0	0
	380C2F2	19802	46808	171256	0	0	0
	380C2F3	19802	46707	171253	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6463	23882	0	0	0
	150C1F1	9725	21883	81000	0	0	0
	150C1F2	9725	21869	81002	0	0	0
	150C1F3	9725	21852	81005	0	0	0
	380C2F1	19451	43765	162000	0	0	0
	380C2F2	19451	43738	162004	0	0	0
	380C2F3	19451	43704	162010	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6149	20066	0	0	0
	150C1F1	8523	21624	72609	0	0	0
	150C1F2	8523	21397	72397	0	0	0
	150C1F3	8523	21115	72156	0	0	0
	380C2F1	17045	43248	145217	0	0	0
	380C2F2	17045	42794	144795	0	0	0
	380C2F3	17045	42229	144312	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6146	22050	0	0	0
	150C1F1	8518	22659	82076	0	0	0
	150C1F2	8518	22603	82063	0	0	0
	150C1F3	8518	22533	82050	0	0	0
	380C2F1	17036	45318	164152	0	0	0
	380C2F2	17036	45207	164127	0	0	0
	380C2F3	17036	45066	164100	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9707	31669	0	0	0
	150C1F1	9901	24983	86283	0	0	0
	150C1F2	9901	24803	86159	0	0	0
	150C1F3	9901	24579	86020	0	0	0
	380C2F1	19803	49966	172566	0	0	0
	380C2F2	19803	49606	172319	0	0	0
	380C2F3	19803	49157	172039	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6640	23894	0	0	0
	150C1F1	9725	22373	81008	0	0	0
	150C1F2	9725	22319	81000	0	0	0
	150C1F3	9725	22250	80992	0	0	0
	380C2F1	19451	44747	162016	0	0	0
	380C2F2	19451	44637	162000	0	0	0
	380C2F3	19451	44499	161985	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	10178	27217	0	0	0
	150C1F1	8525	31968	89093	0	0	0
	150C1F2	8525	30695	86719	0	0	0
	150C1F3	8524	29109	83834	0	0	0
	380C2F1	17050	63935	178185	0	0	0
	380C2F2	17049	61390	173439	0	0	0
	380C2F3	17048	58219	167668	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	7025	22909	0	0	0
	150C1F1	8518	24939	83786	0	0	0
	150C1F2	8518	24664	83489	0	0	0
	150C1F3	8518	24323	83149	0	0	0
	380C2F1	17036	49879	167572	0	0	0
	380C2F2	17036	49328	166979	0	0	0
	380C2F3	17036	48646	166297	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	15569	41090	0	0	0
	150C1F1	9903	33002	97207	0	0	0
	150C1F2	9903	32007	95535	0	0	0
	150C1F3	9903	30774	93540	0	0	0
	380C2F1	19806	66003	194414	0	0	0
	380C2F2	19806	64014	191070	0	0	0
	380C2F3	19805	61548	187080	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	7446	24476	0	0	0
	150C1F1	9726	24550	82329	0	0	0
	150C1F2	9726	24291	82093	0	0	0
	150C1F3	9726	23969	81824	0	0	0
	380C2F1	19451	49100	164657	0	0	0
	380C2F2	19451	48582	164186	0	0	0
	380C2F3	19451	47938	163647	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2314	8980	24860	0	0	0
	150C1F1	8524	28843	83359	0	0	0
	150C1F2	8524	27877	81663	0	0	0
	150C1F3	8524	26679	79631	0	0	0
	380C2F1	17048	57685	166717	0	0	0
	380C2F2	17048	55754	163327	0	0	0
	380C2F3	17047	53358	159262	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b	GW / opgw	2312	6761	22572	0	0	0
Wind, -20°C	150C1F1	8518	24266	83095	0	0	0
Permanent loads yg= 1.2	150C1F2	8518	24058	82907	0	0	0
Wind angle: -45°	150C1F3	8518	23800	82693	0	0	0
	380C2F1	17036	48532	166189	0	0	0
	380C2F2	17036	48117	165814	0	0	0
	380C2F3	17036	47600	165386	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3884	13833	37952	0	0	0
Wind, -5°C	150C1F1	9902	30568	93216	0	0	0
Permanent loads yg= 1.2	150C1F2	9902	29821	92068	0	0	0
Wind angle: -45°	150C1F3	9902	28897	90716	0	0	0
	380C2F1	19805	61135	186431	0	0	0
	380C2F2	19805	59641	184137	0	0	0
	380C2F3	19804	57794	181432	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2915	7208	24240	0	0	0
Construction/maintenance, +5°C	150C1F1	9726	23915	81781	0	0	0
Permanent loads yg= 1.2	150C1F2	9725	23718	81634	0	0	0
Wind angle: -45°	150C1F3	9725	23473	81468	0	0	0
	380C2F1	19451	47830	163562	0	0	0
	380C2F2	19451	47436	163268	0	0	0
	380C2F3	19451	46945	162935	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1735	4318	15341	0	0	0
Wind, 10°C	150C1F1	6390	15727	56526	0	0	0
Permanent loads yg= 0.9	150C1F2	6390	15677	56510	0	0	0
Wind angle: 0°	150C1F3	6390	15614	56493	0	0	0
	380C2F1	12781	31454	113052	0	0	0
	380C2F2	12781	31354	113020	0	0	0
	380C2F3	12781	31229	112987	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	4791	17643	0	0	0
Wind, -20°C	150C1F1	6387	17949	66319	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	17935	66319	0	0	0
Wind angle: 0°	150C1F3	6387	17917	66321	0	0	0
	380C2F1	12774	35897	132637	0	0	0
	380C2F2	12774	35870	132639	0	0	0
	380C2F3	12774	35835	132641	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3304	7647	27318	0	0	0
Wind, -5°C	150C1F1	7769	19534	71039	0	0	0
Permanent loads yg= 0.9	150C1F2	7769	19493	71033	0	0	0
Wind angle: 0°	150C1F3	7769	19441	71027	0	0	0
	380C2F1	15538	39068	142079	0	0	0
	380C2F2	15538	38986	142066	0	0	0
	380C2F3	15538	38883	142054	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	5417	19980	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	18004	66526	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	17991	66527	0	0	0
Wind angle: 0°	150C1F3	7593	17973	66529	0	0	0
	380C2F1	15186	36009	133052	0	0	0
	380C2F2	15186	35981	133054	0	0	0
	380C2F3	15186	35946	133059	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1735	5126	16245	0	0	0
Wind, 10°C	150C1F1	6391	17810	58375	0	0	0
Permanent loads yg= 0.9	150C1F2	6391	17555	58061	0	0	0
Wind angle: 45°	150C1F3	6391	17240	57698	0	0	0
	380C2F1	12781	35619	116750	0	0	0
	380C2F2	12781	35110	116122	0	0	0
	380C2F3	12781	34481	115397	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	4983	17711	0	0	0
Wind, -20°C	150C1F1	6387	18466	66429	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	18407	66405	0	0	0
Wind angle: 45°	150C1F3	6387	18333	66378	0	0	0
	380C2F1	12774	36933	132858	0	0	0
	380C2F2	12774	36815	132809	0	0	0
	380C2F3	12774	36666	132755	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3304	8802	28293	0	0	0
Wind, -5°C	150C1F1	7769	21169	72052	0	0	0
Permanent loads yg= 0.9	150C1F2	7769	20974	71871	0	0	0
Wind angle: 45°	150C1F3	7769	20732	71665	0	0	0
	380C2F1	15539	42338	144103	0	0	0
	380C2F2	15539	41948	143742	0	0	0
	380C2F3	15539	41464	143329	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	5599	20009	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	18508	66582	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	18451	66566	0	0	0
Wind angle: 45°	150C1F3	7593	18380	66549	0	0	0
	380C2F1	15186	37015	133164	0	0	0
	380C2F2	15186	36902	133132	0	0	0
	380C2F3	15186	36759	133099	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1736	9613	25111	0	0	0
Wind, 10°C	150C1F1	6393	29481	79817	0	0	0
Permanent loads yg= 0.9	150C1F2	6393	28073	76939	0	0	0
Wind angle: 90°	150C1F3	6392	26305	73373	0	0	0
	380C2F1	12786	58962	159635	0	0	0
	380C2F2	12785	56147	153879	0	0	0
	380C2F3	12784	52610	146746	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	5974	18987	0	0	0
Wind, -20°C	150C1F1	6387	20997	69074	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	20683	68635	0	0	0
Wind angle: 90°	150C1F3	6387	20297	68125	0	0	0
	380C2F1	12774	41993	138148	0	0	0
	380C2F2	12774	41367	137270	0	0	0
	380C2F3	12774	40594	136250	0	0	0
	RTG	0	0	0	0	0	0

NL3/3	GW / opgw	3306	15037	39110	0	0	0
Wind, -5°C	150C1F1	7771	30099	86377	0	0	0
Permanent loads yg= 0.9	150C1F2	7771	28994	84294	0	0	0
Wind angle: 90°	150C1F3	7771	27619	81769	0	0	0
	380C2F1	15542	60198	172755	0	0	0
	380C2F2	15542	57987	168588	0	0	0
	380C2F3	15541	55238	163537	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	6466	20820	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20854	68536	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	20569	68202	0	0	0
Wind angle: 90°	150C1F3	7593	20216	67817	0	0	0
	380C2F1	15187	41708	137072	0	0	0
	380C2F2	15187	41137	136404	0	0	0
	380C2F3	15186	40431	135633	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1735	8312	22368	0	0	0
Wind, 10°C	150C1F1	6392	26006	72777	0	0	0
Permanent loads yg= 0.9	150C1F2	6392	24920	70632	0	0	0
Wind angle: -45°	150C1F3	6392	23565	68013	0	0	0
	380C2F1	12784	52013	145554	0	0	0
	380C2F2	12784	49840	141264	0	0	0
	380C2F3	12783	47130	136026	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	5671	18504	0	0	0
Wind, -20°C	150C1F1	6387	20232	68043	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	19999	67759	0	0	0
Wind angle: -45°	150C1F3	6387	19710	67430	0	0	0
	380C2F1	12774	40465	136087	0	0	0
	380C2F2	12774	39998	135518	0	0	0
	380C2F3	12774	39420	134861	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3305	13212	35636	0	0	0
Wind, -5°C	150C1F1	7771	27388	81353	0	0	0
Permanent loads yg= 0.9	150C1F2	7770	26553	79875	0	0	0
Wind angle: -45°	150C1F3	7770	25518	78108	0	0	0
	380C2F1	15541	54776	162707	0	0	0
	380C2F2	15541	53105	159750	0	0	0
	380C2F3	15540	51036	156216	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	6206	20501	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20156	67755	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	19942	67542	0	0	0
Wind angle: -45°	150C1F3	7593	19676	67299	0	0	0
	380C2F1	15186	40313	135511	0	0	0
	380C2F2	15186	39884	135085	0	0	0
	380C2F3	15186	39352	134597	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HK400

Loadcases for tower strength (Special limit state)

Appendix I1 / NL3

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5421	19460	2313	5421	-19460
	150C1F1	8522	19719	71422	8522	19719	-71422
	150C1F2	8522	19671	71415	8522	19671	-71415
	150C1F3	8522	19611	71408	8522	19611	-71408
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5963	22016	2312	5963	-22016
	150C1F1	8518	22161	82039	8518	22161	-82039
	150C1F2	8518	22147	82040	8518	22147	-82040
	150C1F3	8518	22130	82043	8518	22130	-82043
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8610	30911	3883	8610	-30911
	150C1F1	9901	23444	85630	9901	23444	-85630
	150C1F2	9901	23404	85628	9901	23404	-85628
	150C1F3	9901	23354	85627	9901	23354	-85627
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6463	23882	2915	6463	-23882
	150C1F1	9725	21883	81000	9725	21883	-81000
	150C1F2	9725	21869	81002	9725	21869	-81002
	150C1F3	9725	21852	81005	9725	21852	-81005
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6149	20066	2314	8980	-24860
	150C1F1	8523	21624	72609	8524	28843	-83359
	150C1F2	8523	21397	72397	8524	27877	-81663
	150C1F3	8523	21115	72156	8524	26679	-79631
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6146	22050	2312	6761	-22572
	150C1F1	8518	22659	82076	8518	24266	-83095
	150C1F2	8518	22603	82063	8518	24058	-82907
	150C1F3	8518	22533	82050	8518	23800	-82693
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9707	31669	3884	13833	-37952
	150C1F1	9901	24983	86283	9902	30568	-93216
	150C1F2	9901	24803	86159	9902	29821	-92068
	150C1F3	9901	24579	86020	9902	28897	-90716
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6640	23894	2915	7208	-24240
	150C1F1	9725	22373	81008	9726	23915	-81781
	150C1F2	9725	22319	81000	9725	23718	-81634
	150C1F3	9725	22250	80992	9725	23473	-81468
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	10178	27217	2314	10178	-27217
	150C1F1	8525	31968	89093	8525	31968	-89093
	150C1F2	8525	30695	86719	8525	30695	-86719
	150C1F3	8524	29109	83834	8524	29109	-83834
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	7025	22909	2312	7025	-22909
	150C1F1	8518	24939	83786	8518	24939	-83786
	150C1F2	8518	24664	83489	8518	24664	-83489
	150C1F3	8518	24323	83149	8518	24323	-83149
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	15569	41090	3885	15569	-41090
	150C1F1	9903	33002	97207	9903	33002	-97207
	150C1F2	9903	32007	95535	9903	32007	-95535
	150C1F3	9903	30774	93540	9903	30774	-93540
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	7446	24476	2915	7446	-24476
	150C1F1	9726	24550	82329	9726	24550	-82329
	150C1F2	9726	24291	82093	9726	24291	-82093
	150C1F3	9726	23969	81824	9726	23969	-81824
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2314	8980	24860	2313	6149	-20066
	150C1F1	8524	28843	83359	8523	21624	-72609
	150C1F2	8524	27877	81663	8523	21397	-72397
	150C1F3	8524	26679	79631	8523	21115	-72156
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2312 6761 22572 8518 24266 83095 8518 24058 82907 8518 23800 82693 0 0 0 0 0 0 0 0 0 0 0 0	2312 6146 -22050 8518 22659 -82076 8518 22603 -82063 8518 22533 -82050 0 0 0 0 0 0 0 0 0 0 0 0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	3884 13833 37952 9902 30568 93216 9902 29821 92068 9902 28897 90716 0 0 0 0 0 0 0 0 0 0 0 0	3883 9707 -31669 9901 24983 -86283 9901 24803 -86159 9901 24579 -86020 0 0 0 0 0 0 0 0 0 0 0 0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2915 7208 24240 9726 23915 81781 9725 23718 81634 9725 23473 81468 0 0 0 0 0 0 0 0 0 0 0 0	2915 6640 -23894 9725 22373 -81008 9725 22319 -81000 9725 22250 -80992 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1735 4318 15341 6390 15727 56526 6390 15677 56510 6390 15614 56493 0 0 0 0 0 0 0 0 0 0 0 0	1735 4318 -15341 6390 15727 -56526 6390 15677 -56510 6390 15614 -56493 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1734 4791 17643 6387 17949 66319 6387 17935 66319 6387 17917 66321 0 0 0 0 0 0 0 0 0 0 0 0	1734 4791 -17643 6387 17949 -66319 6387 17935 -66319 6387 17917 -66321 0 0 0 0 0 0 0 0 0 0 0 0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	3304 7647 27318 7769 19534 71039 7769 19493 71033 7769 19441 71027 0 0 0 0 0 0 0 0 0 0 0 0	3304 7647 -27318 7769 19534 -71039 7769 19493 -71033 7769 19441 -71027 0 0 0 0 0 0 0 0 0 0 0 0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2336 5417 19980 7593 18004 66526 7593 17991 66527 7593 17973 66529 0 0 0 0 0 0 0 0 0 0 0 0	2336 5417 -19980 7593 18004 -66526 7593 17991 -66527 7593 17973 -66529 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1735 5126 16245 6391 17810 58375 6391 17555 58061 6391 17240 57698 0 0 0 0 0 0 0 0 0 0 0 0	1735 8312 -22368 6392 26006 -72777 6392 24920 -70632 6392 23565 -68013 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1734 4983 17711 6387 18466 66429 6387 18407 66405 6387 18333 66378 0 0 0 0 0 0 0 0 0 0 0 0	1734 5671 -18504 6387 20232 -68043 6387 19999 -67759 6387 19710 -67430 0 0 0 0 0 0 0 0 0 0 0 0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	3304 8802 28293 7769 21169 72052 7769 20974 71871 7769 20732 71665 0 0 0 0 0 0 0 0 0 0 0 0	3305 13212 -35636 7771 27388 -81353 7770 26553 -79875 7770 25518 -78108 0 0 0 0 0 0 0 0 0 0 0 0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2336 5599 20009 7593 18508 66582 7593 18451 66566 7593 18380 66549 0 0 0 0 0 0 0 0 0 0 0 0	2336 6206 -20501 7593 20156 -67755 7593 19942 -67542 7593 19676 -67299 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1736 9613 25111 6393 29481 79817 6393 28073 76939 6392 26305 73373 0 0 0 0 0 0 0 0 0 0 0 0	1736 9613 -25111 6393 29481 -79817 6393 28073 -76939 6392 26305 -73373 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1734 5974 18987 6387 20997 69074 6387 20683 68635 6387 20297 68125 0 0 0 0 0 0 0 0 0 0 0 0	1734 5974 -18987 6387 20997 -69074 6387 20683 -68635 6387 20297 -68125 0 0 0 0 0 0 0 0 0 0 0 0

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3306	15037	39110	3306	15037	-39110
	150C1F1	7771	30099	86377	7771	30099	-86377
	150C1F2	7771	28994	84294	7771	28994	-84294
	150C1F3	7771	27619	81769	7771	27619	-81769
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2336	6466	20820	2336	6466
150C1F1		7593	20854	68536	7593	20854	-68536
150C1F2		7593	20569	68202	7593	20569	-68202
150C1F3		7593	20216	67817	7593	20216	-67817
380C2F1		0	0	0	0	0	0
380C2F2		0	0	0	0	0	0
380C2F3		0	0	0	0	0	0
RTG		0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	1735	8312	22368	1735	5126
	150C1F1	6392	26006	72777	6391	17810	-58375
	150C1F2	6392	24920	70632	6391	17555	-58061
	150C1F3	6392	23565	68013	6391	17240	-57698
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	5671	18504	1734	4983
150C1F1		6387	20232	68043	6387	18466	-66429
150C1F2		6387	19999	67759	6387	18407	-66405
150C1F3		6387	19710	67430	6387	18333	-66378
380C2F1		0	0	0	0	0	0
380C2F2		0	0	0	0	0	0
380C2F3		0	0	0	0	0	0
RTG		0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	3305	13212	35636	3304	8802
	150C1F1	7771	27388	81353	7769	21169	-72052
	150C1F2	7770	26553	79875	7769	20974	-71871
	150C1F3	7770	25518	78108	7769	20732	-71665
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2336	6206	20501	2336	5599
150C1F1		7593	20156	67755	7593	18508	-66582
150C1F2		7593	19942	67542	7593	18451	-66566
150C1F3		7593	19676	67299	7593	18380	-66549
380C2F1		0	0	0	0	0	0
380C2F2		0	0	0	0	0	0
380C2F3		0	0	0	0	0	0
RTG		0	0	0	0	0	0

ZWW4HK400

Loadcases for tower strength (Special limit state)

Appendix I1 / NL3

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / oppw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0
	380C2F1	17045	39437	142845	17045	39437	-142845
	380C2F2	17045	39342	142830	17045	39342	-142830
	380C2F3	17045	39221	142815	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b	GW / oppw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0
	380C2F1	17036	44322	164077	17036	44322	-164077
	380C2F2	17036	44295	164081	17036	44295	-164081
	380C2F3	17036	44260	164085	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3	GW / oppw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0
	380C2F1	19802	46887	171259	19802	46887	-171259
	380C2F2	19802	46808	171256	19802	46808	-171256
	380C2F3	19802	46707	171253	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4	GW / oppw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0
	380C2F1	19451	43765	162000	19451	43765	-162000
	380C2F2	19451	43738	162004	19451	43738	-162004
	380C2F3	19451	43704	162010	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a	GW / oppw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0
	380C2F1	17045	43248	145217	17048	57685	-166717
	380C2F2	17045	42794	144795	17048	55754	-163327
	380C2F3	17045	42229	144312	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b	GW / oppw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0
	380C2F1	17036	45318	164152	17036	48532	-166189
	380C2F2	17036	45207	164127	17036	48117	-165814
	380C2F3	17036	45066	164100	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3	GW / oppw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0
	380C2F1	19803	49966	172566	19805	61135	-186431
	380C2F2	19803	49606	172319	19805	59641	-184137
	380C2F3	19803	49157	172039	19804	57794	-181432
	RTG	0	0	0	7768	22676	-67855
NL3/4	GW / oppw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0
	380C2F1	19451	44747	162016	19451	47830	-163562
	380C2F2	19451	44637	162000	19451	47436	-163268
	380C2F3	19451	44499	161985	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a	GW / oppw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	17050	63935	178185	17050	63935	-178185
	380C2F2	17049	61390	173439	17049	61390	-173439
	380C2F3	17048	58219	167668	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164
NL3/1b	GW / oppw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	17036	49879	167572	17036	49879	-167572
	380C2F2	17036	49328	166979	17036	49328	-166979
	380C2F3	17036	48646	166297	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3	GW / oppw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	19806	66003	194414	19806	66003	-194414
	380C2F2	19806	64014	191070	19806	64014	-191070
	380C2F3	19805	61548	187080	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4	GW / oppw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	19451	49100	164657	19451	49100	-164657
	380C2F2	19451	48582	164186	19451	48582	-164186
	380C2F3	19451	47938	163647	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a	GW / oppw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	17048	57685	166717	17045	43248	-145217
	380C2F2	17048	55754	163327	17045	42794	-144795
	380C2F3	17047	53358	159262	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293

NL3/1b	GW / oppw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17036	48532	166189	17036	45318	-164152	
	380C2F2	17036	48117	165814	17036	45207	-164127	
	380C2F3	17036	47600	165386	17036	45066	-164100	
	RTG	0	0	0	4618	11997	-43633	
NL3/3	GW / oppw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19805	61135	186431	19803	49966	-172566	
	380C2F2	19805	59641	184137	19803	49606	-172319	
	380C2F3	19804	57794	181432	19803	49157	-172039	
	RTG	0	0	0	7767	18232	-62203	
NL3/4	GW / oppw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19451	47830	163562	19451	44747	-162016	
	380C2F2	19451	47436	163268	19451	44637	-162000	
	380C2F3	19451	46945	162935	19451	44499	-161985	
	RTG	0	0	0	5823	13083	-47686	
NL3/1a	GW / oppw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12781	31454	113052	12781	31454	-113052	
	380C2F2	12781	31354	113020	12781	31354	-113020	
	380C2F3	12781	31229	112987	12781	31229	-112987	
	RTG	0	0	0	3464	8457	-30569	
NL3/1b	GW / oppw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	35897	132637	12774	35897	-132637	
	380C2F2	12774	35870	132639	12774	35870	-132639	
	380C2F3	12774	35835	132641	12774	35835	-132641	
	RTG	0	0	0	3463	9430	-34888	
NL3/3	GW / oppw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15538	39068	142079	15538	39068	-142079	
	380C2F2	15538	38986	142066	15538	38986	-142066	
	380C2F3	15538	38883	142054	15538	38883	-142054	
	RTG	0	0	0	6610	15011	-54458	
NL3/4	GW / oppw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	36009	133052	15186	36009	-133052	
	380C2F2	15186	35981	133054	15186	35981	-133054	
	380C2F3	15186	35946	133059	15186	35946	-133059	
	RTG	0	0	0	4667	10769	-39885	
NL3/1a	GW / oppw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12781	35619	116750	12784	52013	-145554	
	380C2F2	12781	35110	116122	12784	49840	-141264	
	380C2F3	12781	34481	115397	12783	47130	-136026	
	RTG	0	0	0	3465	12977	-37311	
NL3/1b	GW / oppw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	36933	132858	12774	40465	-136087	
	380C2F2	12774	36815	132809	12774	39998	-135518	
	380C2F3	12774	36666	132755	12774	39420	-134861	
	RTG	0	0	0	3463	10442	-35549	
NL3/3	GW / oppw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15539	42338	144103	15541	54776	-162707	
	380C2F2	15539	41948	143742	15541	53105	-159750	
	380C2F3	15539	41464	143329	15540	51036	-156216	
	RTG	0	0	0	6611	21321	-62052	
NL3/4	GW / oppw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	37015	133164	15186	40313	-135511	
	380C2F2	15186	36902	133132	15186	39884	-135085	
	380C2F3	15186	36759	133099	15186	39352	-134597	
	RTG	0	0	0	4667	11702	-40251	
NL3/1a	GW / oppw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12786	58962	159635	12786	58962	-159635	
	380C2F2	12785	56147	153879	12785	56147	-153879	
	380C2F3	12784	52610	146746	12784	52610	-146746	
	RTG	0	0	0	3465	14539	-40424	
NL3/1b	GW / oppw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	41993	138148	12774	41993	-138148	
	380C2F2	12774	41367	137270	12774	41367	-137270	
	380C2F3	12774	40594	136250	12774	40594	-136250	
	RTG	0	0	0	3463	10775	-35958	

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15542	60198	172755	15542	60198	-172755	
	380C2F2	15542	57987	168588	15542	57987	-168588	
	380C2F3	15541	55238	163537	15541	55238	-163537	
	RTG	0	0	0	6612	23468	-65790	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15187	41708	137072	15187	41708	-137072	
	380C2F2	15187	41137	136404	15187	41137	-136404	
	380C2F3	15186	40431	135633	15186	40431	-135633	
	RTG	0	0	0	4667	11994	-40607	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12784	52013	145554	12781	35619	-116750	
	380C2F2	12784	49840	141264	12781	35110	-116122	
	380C2F3	12783	47130	136026	12781	34481	-115397	
	RTG	0	0	0	3464	9375	-31283	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	40465	136087	12774	36933	-132858	
	380C2F2	12774	39998	135518	12774	36815	-132809	
	380C2F3	12774	39420	134861	12774	36666	-132755	
	RTG	0	0	0	3463	9663	-34924	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15541	54776	162707	15539	42338	-144103	
	380C2F2	15541	53105	159750	15539	41948	-143742	
	380C2F3	15540	51036	156216	15539	41464	-143329	
	RTG	0	0	0	6610	16350	-55181	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	40313	135511	15186	37015	-133164	
	380C2F2	15186	39884	135085	15186	36902	-133132	
	380C2F3	15186	39352	134597	15186	36759	-133099	
	RTG	0	0	0	4667	10994	-39889	

ZWW4HK400

Loadcases for tower strength (Special limit state)

Appendix I1 / NL3

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / oppw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0
	380C2F1	17045	39437	142845	17045	39437	-142845
	380C2F2	17045	39342	142830	17045	39342	-142830
	380C2F3	17045	39221	142815	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b	GW / oppw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0
	380C2F1	17036	44322	164077	17036	44322	-164077
	380C2F2	17036	44295	164081	17036	44295	-164081
	380C2F3	17036	44260	164085	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3	GW / oppw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0
	380C2F1	19802	46887	171259	19802	46887	-171259
	380C2F2	19802	46808	171256	19802	46808	-171256
	380C2F3	19802	46707	171253	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4	GW / oppw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0
	380C2F1	19451	43765	162000	19451	43765	-162000
	380C2F2	19451	43738	162004	19451	43738	-162004
	380C2F3	19451	43704	162010	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a	GW / oppw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0
	380C2F1	17045	43248	145217	17048	57685	-166717
	380C2F2	17045	42794	144795	17048	55754	-163327
	380C2F3	17045	42229	144312	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b	GW / oppw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0
	380C2F1	17036	45318	164152	17036	48532	-166189
	380C2F2	17036	45207	164127	17036	48117	-165814
	380C2F3	17036	45066	164100	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3	GW / oppw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0
	380C2F1	19803	49966	172566	19805	61135	-186431
	380C2F2	19803	49606	172319	19805	59641	-184137
	380C2F3	19803	49157	172039	19804	57794	-181432
	RTG	0	0	0	7768	22676	-67855
NL3/4	GW / oppw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0
	380C2F1	19451	44747	162016	19451	47830	-163562
	380C2F2	19451	44637	162000	19451	47436	-163268
	380C2F3	19451	44499	161985	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a	GW / oppw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	17050	63935	178185	17050	63935	-178185
	380C2F2	17049	61390	173439	17049	61390	-173439
	380C2F3	17048	58219	167668	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164
NL3/1b	GW / oppw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	17036	49879	167572	17036	49879	-167572
	380C2F2	17036	49328	166979	17036	49328	-166979
	380C2F3	17036	48646	166297	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3	GW / oppw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	19806	66003	194414	19806	66003	-194414
	380C2F2	19806	64014	191070	19806	64014	-191070
	380C2F3	19805	61548	187080	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4	GW / oppw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	19451	49100	164657	19451	49100	-164657
	380C2F2	19451	48582	164186	19451	48582	-164186
	380C2F3	19451	47938	163647	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a	GW / oppw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	17048	57685	166717	17045	43248	-145217
	380C2F2	17048	55754	163327	17045	42794	-144795
	380C2F3	17047	53358	159262	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293

NL3/1b	GW / oppw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17036	48532	166189	17036	45318	-164152	
	380C2F2	17036	48117	165814	17036	45207	-164127	
	380C2F3	17036	47600	165386	17036	45066	-164100	
	RTG	0	0	0	4618	11997	-43633	
NL3/3	GW / oppw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19805	61135	186431	19803	49966	-172566	
	380C2F2	19805	59641	184137	19803	49606	-172319	
	380C2F3	19804	57794	181432	19803	49157	-172039	
	RTG	0	0	0	7767	18232	-62203	
NL3/4	GW / oppw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19451	47830	163562	19451	44747	-162016	
	380C2F2	19451	47436	163268	19451	44637	-162000	
	380C2F3	19451	46945	162935	19451	44499	-161985	
	RTG	0	0	0	5823	13083	-47686	
NL3/1a	GW / oppw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12781	31454	113052	12781	31454	-113052	
	380C2F2	12781	31354	113020	12781	31354	-113020	
	380C2F3	12781	31229	112987	12781	31229	-112987	
	RTG	0	0	0	3464	8457	-30569	
NL3/1b	GW / oppw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	35897	132637	12774	35897	-132637	
	380C2F2	12774	35870	132639	12774	35870	-132639	
	380C2F3	12774	35835	132641	12774	35835	-132641	
	RTG	0	0	0	3463	9430	-34888	
NL3/3	GW / oppw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15538	39068	142079	15538	39068	-142079	
	380C2F2	15538	38986	142066	15538	38986	-142066	
	380C2F3	15538	38883	142054	15538	38883	-142054	
	RTG	0	0	0	6610	15011	-54458	
NL3/4	GW / oppw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	36009	133052	15186	36009	-133052	
	380C2F2	15186	35981	133054	15186	35981	-133054	
	380C2F3	15186	35946	133059	15186	35946	-133059	
	RTG	0	0	0	4667	10769	-39885	
NL3/1a	GW / oppw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12781	35619	116750	12784	52013	-145554	
	380C2F2	12781	35110	116122	12784	49840	-141264	
	380C2F3	12781	34481	115397	12783	47130	-136026	
	RTG	0	0	0	3465	12977	-37311	
NL3/1b	GW / oppw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	36933	132858	12774	40465	-136087	
	380C2F2	12774	36815	132809	12774	39998	-135518	
	380C2F3	12774	36666	132755	12774	39420	-134861	
	RTG	0	0	0	3463	10442	-35549	
NL3/3	GW / oppw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15539	42338	144103	15541	54776	-162707	
	380C2F2	15539	41948	143742	15541	53105	-159750	
	380C2F3	15539	41464	143329	15540	51036	-156216	
	RTG	0	0	0	6611	21321	-62052	
NL3/4	GW / oppw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	37015	133164	15186	40313	-135511	
	380C2F2	15186	36902	133132	15186	39884	-135085	
	380C2F3	15186	36759	133099	15186	39352	-134597	
	RTG	0	0	0	4667	11702	-40251	
NL3/1a	GW / oppw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12786	58962	159635	12786	58962	-159635	
	380C2F2	12785	56147	153879	12785	56147	-153879	
	380C2F3	12784	52610	146746	12784	52610	-146746	
	RTG	0	0	0	3465	14539	-40424	
NL3/1b	GW / oppw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	41993	138148	12774	41993	-138148	
	380C2F2	12774	41367	137270	12774	41367	-137270	
	380C2F3	12774	40594	136250	12774	40594	-136250	
	RTG	0	0	0	3463	10775	-35958	

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15542	60198	172755	15542	60198	-172755	
	380C2F2	15542	57987	168588	15542	57987	-168588	
	380C2F3	15541	55238	163537	15541	55238	-163537	
	RTG	0	0	0	6612	23468	-65790	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15187	41708	137072	15187	41708	-137072	
	380C2F2	15187	41137	136404	15187	41137	-136404	
	380C2F3	15186	40431	135633	15186	40431	-135633	
	RTG	0	0	0	4667	11994	-40607	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12784	52013	145554	12781	35619	-116750	
	380C2F2	12784	49840	141264	12781	35110	-116122	
	380C2F3	12783	47130	136026	12781	34481	-115397	
	RTG	0	0	0	3464	9375	-31283	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	40465	136087	12774	36933	-132858	
	380C2F2	12774	39998	135518	12774	36815	-132809	
	380C2F3	12774	39420	134861	12774	36666	-132755	
	RTG	0	0	0	3463	9663	-34924	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15541	54776	162707	15539	42338	-144103	
	380C2F2	15541	53105	159750	15539	41948	-143742	
	380C2F3	15540	51036	156216	15539	41464	-143329	
	RTG	0	0	0	6610	16350	-55181	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	40313	135511	15186	37015	-133164	
	380C2F2	15186	39884	135085	15186	36902	-133132	
	380C2F3	15186	39352	134597	15186	36759	-133099	
	RTG	0	0	0	4667	10994	-39889	

ZWW4HK400

Loadcases for tower strength (Special limit state)

Appendix I1 / NL3

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / opgw	2313	5421	19460	0	0	0
Wind, 10°C	150C1F1	8522	19719	71422	0	0	0
Permanent loads yg= 1.2	150C1F2	8522	19671	71415	0	0	0
Wind angle: 0°	150C1F3	8522	19611	71408	0	0	0
	380C2F1	0	0	0	17045	39437	-142845
	380C2F2	0	0	0	17045	39342	-142830
	380C2F3	0	0	0	17045	39221	-142815
	RTG	0	0	0	4620	11074	-38843
NL3/1b	GW / opgw	2312	5963	22016	0	0	0
Wind, -20°C	150C1F1	8518	22161	82039	0	0	0
Permanent loads yg= 1.2	150C1F2	8518	22147	82040	0	0	0
Wind angle: 0°	150C1F3	8518	22130	82043	0	0	0
	380C2F1	0	0	0	17036	44322	-164077
	380C2F2	0	0	0	17036	44295	-164081
	380C2F3	0	0	0	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3	GW / opgw	3883	8610	30911	0	0	0
Wind, -5°C	150C1F1	9901	23444	85630	0	0	0
Permanent loads yg= 1.2	150C1F2	9901	23404	85628	0	0	0
Wind angle: 0°	150C1F3	9901	23354	85627	0	0	0
	380C2F1	0	0	0	19802	46887	-171259
	380C2F2	0	0	0	19802	46808	-171256
	380C2F3	0	0	0	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4	GW / opgw	2915	6463	23882	0	0	0
Construction/maintenance, +5°C	150C1F1	9725	21883	81000	0	0	0
Permanent loads yg= 1.2	150C1F2	9725	21869	81002	0	0	0
Wind angle: 0°	150C1F3	9725	21852	81005	0	0	0
	380C2F1	0	0	0	19451	43765	-162000
	380C2F2	0	0	0	19451	43738	-162004
	380C2F3	0	0	0	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a	GW / opgw	2313	6149	20066	0	0	0
Wind, 10°C	150C1F1	8523	21624	72609	0	0	0
Permanent loads yg= 1.2	150C1F2	8523	21397	72397	0	0	0
Wind angle: 45°	150C1F3	8523	21115	72156	0	0	0
	380C2F1	0	0	0	17048	57685	-166717
	380C2F2	0	0	0	17048	57554	-163327
	380C2F3	0	0	0	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b	GW / opgw	2312	6146	22050	0	0	0
Wind, -20°C	150C1F1	8518	22659	82076	0	0	0
Permanent loads yg= 1.2	150C1F2	8518	22603	82063	0	0	0
Wind angle: 45°	150C1F3	8518	22533	82050	0	0	0
	380C2F1	0	0	0	17036	48532	-166189
	380C2F2	0	0	0	17036	48117	-165814
	380C2F3	0	0	0	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3	GW / opgw	3883	9707	31669	0	0	0
Wind, -5°C	150C1F1	9901	24983	86283	0	0	0
Permanent loads yg= 1.2	150C1F2	9901	24803	86159	0	0	0
Wind angle: 45°	150C1F3	9901	24579	86020	0	0	0
	380C2F1	0	0	0	19805	61135	-186431
	380C2F2	0	0	0	19805	59641	-184137
	380C2F3	0	0	0	19804	57794	-181432
	RTG	0	0	0	7768	22676	-67855
NL3/4	GW / opgw	2915	6640	23894	0	0	0
Construction/maintenance, +5°C	150C1F1	9725	22373	81008	0	0	0
Permanent loads yg= 1.2	150C1F2	9725	22319	81000	0	0	0
Wind angle: 45°	150C1F3	9725	22250	80992	0	0	0
	380C2F1	0	0	0	19451	47830	-163562
	380C2F2	0	0	0	19451	47436	-163268
	380C2F3	0	0	0	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a	GW / opgw	2314	10178	27217	0	0	0
Wind, 10°C	150C1F1	8525	31968	89093	0	0	0
Permanent loads yg= 1.2	150C1F2	8525	30695	86719	0	0	0
Wind angle: 90°	150C1F3	8524	29109	83834	0	0	0
	380C2F1	0	0	0	17050	63935	-178185
	380C2F2	0	0	0	17049	61390	-173439
	380C2F3	0	0	0	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164
NL3/1b	GW / opgw	2312	7025	22909	0	0	0
Wind, -20°C	150C1F1	8518	24939	83786	0	0	0
Permanent loads yg= 1.2	150C1F2	8518	24664	83489	0	0	0
Wind angle: 90°	150C1F3	8518	24323	83149	0	0	0
	380C2F1	0	0	0	17036	49879	-167572
	380C2F2	0	0	0	17036	49328	-166979
	380C2F3	0	0	0	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3	GW / opgw	3885	15569	41090	0	0	0
Wind, -5°C	150C1F1	9903	33002	97207	0	0	0
Permanent loads yg= 1.2	150C1F2	9903	32007	95535	0	0	0
Wind angle: 90°	150C1F3	9903	30774	93540	0	0	0
	380C2F1	0	0	0	19806	66003	-194414
	380C2F2	0	0	0	19806	64014	-191070
	380C2F3	0	0	0	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4	GW / opgw	2915	7446	24476	0	0	0
Construction/maintenance, +5°C	150C1F1	9726	24550	82329	0	0	0
Permanent loads yg= 1.2	150C1F2	9726	24291	82093	0	0	0
Wind angle: 90°	150C1F3	9726	23969	81824	0	0	0
	380C2F1	0	0	0	19451	49100	-164657
	380C2F2	0	0	0	19451	48582	-164186
	380C2F3	0	0	0	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a	GW / opgw	2314	8980	24860	0	0	0
Wind, 10°C	150C1F1	8524	28843	83359	0	0	0
Permanent loads yg= 1.2	150C1F2	8524	27877	81663	0	0	0
Wind angle: -45°	150C1F3	8524	26679	79631	0	0	0
	380C2F1	0	0	0	17045	43248	-145217
	380C2F2	0	0	0	17045	42794	-144795
	380C2F3	0	0	0	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293

NL3/1b	GW / opgw	2312	6761	22572	0	0	0
Wind, -20°C	150C1F1	8518	24266	83095	0	0	0
Permanent loads yg= 1.2	150C1F2	8518	24058	82907	0	0	0
Wind angle: -45°	150C1F3	8518	23800	82693	0	0	0
	380C2F1	0	0	0	17036	45318	-164152
	380C2F2	0	0	0	17036	45207	-164127
	380C2F3	0	0	0	17036	45066	-164100
	RTG	0	0	0	4618	11997	-43633
NL3/3	GW / opgw	3884	13833	37952	0	0	0
Wind, -5°C	150C1F1	9902	30568	93216	0	0	0
Permanent loads yg= 1.2	150C1F2	9902	29821	92068	0	0	0
Wind angle: -45°	150C1F3	9902	28897	90716	0	0	0
	380C2F1	0	0	0	19803	49966	-172566
	380C2F2	0	0	0	19803	49606	-172319
	380C2F3	0	0	0	19803	49157	-172039
	RTG	0	0	0	7767	18232	-62203
NL3/4	GW / opgw	2915	7208	24240	0	0	0
Construction/maintenance, +5°C	150C1F1	9726	23915	81781	0	0	0
Permanent loads yg= 1.2	150C1F2	9725	23718	81634	0	0	0
Wind angle: -45°	150C1F3	9725	23473	81468	0	0	0
	380C2F1	0	0	0	19451	44747	-162016
	380C2F2	0	0	0	19451	44637	-162000
	380C2F3	0	0	0	19451	44499	-161985
	RTG	0	0	0	5823	13083	-47686
NL3/1a	GW / opgw	1735	4318	15341	0	0	0
Wind, 10°C	150C1F1	6390	15727	56526	0	0	0
Permanent loads yg= 0.9	150C1F2	6390	15677	56510	0	0	0
Wind angle: 0°	150C1F3	6390	15614	56493	0	0	0
	380C2F1	0	0	0	12781	31454	-113052
	380C2F2	0	0	0	12781	31354	-113020
	380C2F3	0	0	0	12781	31229	-112987
	RTG	0	0	0	3464	8457	-30569
NL3/1b	GW / opgw	1734	4791	17643	0	0	0
Wind, -20°C	150C1F1	6387	17949	66319	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	17935	66319	0	0	0
Wind angle: 0°	150C1F3	6387	17917	66321	0	0	0
	380C2F1	0	0	0	12774	35897	-132637
	380C2F2	0	0	0	12774	35870	-132639
	380C2F3	0	0	0	12774	35835	-132641
	RTG	0	0	0	3463	9430	-34888
NL3/3	GW / opgw	3304	7647	27318	0	0	0
Wind, -5°C	150C1F1	7769	19534	71039	0	0	0
Permanent loads yg= 0.9	150C1F2	7769	19493	71033	0	0	0
Wind angle: 0°	150C1F3	7769	19441	71027	0	0	0
	380C2F1	0	0	0	15538	39068	-142079
	380C2F2	0	0	0	15538	38986	-142066
	380C2F3	0	0	0	15538	38883	-142054
	RTG	0	0	0	6610	15011	-54458
NL3/4	GW / opgw	2336	5417	19980	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	18004	66526	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	17991	66527	0	0	0
Wind angle: 0°	150C1F3	7593	17973	66529	0	0	0
	380C2F1	0	0	0	15186	36009	-133052
	380C2F2	0	0	0	15186	35981	-133054
	380C2F3	0	0	0	15186	35946	-133059
	RTG	0	0	0	4667	10769	-39885
NL3/1a	GW / opgw	1735	5126	16245	0	0	0
Wind, 10°C	150C1F1	6391	17810	58375	0	0	0
Permanent loads yg= 0.9	150C1F2	6391	17555	58061	0	0	0
Wind angle: 45°	150C1F3	6391	17240	57698	0	0	0
	380C2F1	0	0	0	12784	52013	-145554
	380C2F2	0	0	0	12784	49840	-141264
	380C2F3	0	0	0	12783	47130	-136026
	RTG	0	0	0	3465	12977	-37311
NL3/1b	GW / opgw	1734	4983	17711	0	0	0
Wind, -20°C	150C1F1	6387	18466	66429	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	18407	66405	0	0	0
Wind angle: 45°	150C1F3	6387	18333	66378	0	0	0
	380C2F1	0	0	0	12774	40465	-136087
	380C2F2	0	0	0	12774	39998	-135518
	380C2F3	0	0	0	12774	39420	-134861
	RTG	0	0	0	3463	10442	-35549
NL3/3	GW / opgw	3304	8802	28293	0	0	0
Wind, -5°C	150C1F1	7769	21169	72052	0	0	0
Permanent loads yg= 0.9	150C1F2	7769	20974	71871	0	0	0
Wind angle: 45°	150C1F3	7769	20732	71665	0	0	0
	380C2F1	0	0	0	15541	54776	-162707
	380C2F2	0	0	0	15541	53105	-159750
	380C2F3	0	0	0	15540	51036	-156216
	RTG	0	0	0	6611	21321	-62052
NL3/4	GW / opgw	2336	5599	20009	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	18508	66582	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	18451	66566	0	0	0
Wind angle: 45°	150C1F3	7593	18380	66549	0	0	0
	380C2F1	0	0	0	15186	40313	-135511
	380C2F2	0	0	0	15186	39884	-135085
	380C2F3	0	0	0	15186	39352	-134597
	RTG	0	0	0	4667	11702	-40251
NL3/1a	GW / opgw	1736	9613	25111	0	0	0
Wind, 10°C	150C1F1	6393	29481	79817	0	0	0
Permanent loads yg= 0.9	150C1F2	6393	28073	76939	0	0	0
Wind angle: 90°	150C1F3	6392	26305	73373	0	0	0
	380C2F1	0	0	0	12786	58962	-159635
	380C2F2	0	0	0	12785	56147	-153879
	380C2F3	0	0	0	12784	52610	-146746
	RTG	0	0	0	3465	14539	-40424
NL3/1b	GW / opgw	1734	5974	18987	0	0	0
Wind, -20°C	150C1F1	6387	20997	69074	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	20683	68635	0	0	0
Wind angle: 90°	150C1F3	6387	20297	68125	0	0	0
	380C2F1	0	0	0	12774	41993	-138148
	380C2F2	0	0	0	12774	41367	-137270
	380C2F3	0	0	0	12774	40594	-136250
	RTG	0	0	0	3463	10775	-35958

NL3/3	GW / opgw	3306	15037	39110	0	0	0
Wind, -5°C	150C1F1	7771	30099	86377	0	0	0
Permanent loads yg= 0.9	150C1F2	7771	28994	84294	0	0	0
Wind angle: 90°	150C1F3	7771	27619	81769	0	0	0
	380C2F1	0	0	0	15542	60198	-172755
	380C2F2	0	0	0	15542	57987	-168588
	380C2F3	0	0	0	15541	55238	-163537
	RTG	0	0	0	6612	23468	-65790
NL3/4	GW / opgw	2336	6466	20820	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20854	68536	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	20569	68202	0	0	0
Wind angle: 90°	150C1F3	7593	20216	67817	0	0	0
	380C2F1	0	0	0	15187	41708	-137072
	380C2F2	0	0	0	15187	41137	-136404
	380C2F3	0	0	0	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40507
NL3/1a	GW / opgw	1735	8312	22368	0	0	0
Wind, 10°C	150C1F1	6392	26006	72777	0	0	0
Permanent loads yg= 0.9	150C1F2	6392	24920	70632	0	0	0
Wind angle: -45°	150C1F3	6392	23565	68013	0	0	0
	380C2F1	0	0	0	12781	35619	-116750
	380C2F2	0	0	0	12781	35110	-116122
	380C2F3	0	0	0	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b	GW / opgw	1734	5671	18504	0	0	0
Wind, -20°C	150C1F1	6387	20232	68043	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	19999	67759	0	0	0
Wind angle: -45°	150C1F3	6387	19710	67430	0	0	0
	380C2F1	0	0	0	12774	36933	-132858
	380C2F2	0	0	0	12774	36815	-132809
	380C2F3	0	0	0	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3	GW / opgw	3305	13212	35636	0	0	0
Wind, -5°C	150C1F1	7771	27388	81353	0	0	0
Permanent loads yg= 0.9	150C1F2	7770	26553	79875	0	0	0
Wind angle: -45°	150C1F3	7770	25518	78108	0	0	0
	380C2F1	0	0	0	15539	42338	-144103
	380C2F2	0	0	0	15539	41948	-143742
	380C2F3	0	0	0	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4	GW / opgw	2336	6206	20501	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20156	67755	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	19942	67542	0	0	0
Wind angle: -45°	150C1F3	7593	19676	67299	0	0	0
	380C2F1	0	0	0	15186	37015	-133164
	380C2F2	0	0	0	15186	36902	-133132
	380C2F3	0	0	0	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

ZWW4HK400

Loadcases for tower strength (Special limit state)

Appendix I1 / NL3

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / oppw	0	0	0	2313	5421	-19460
Wind, 10°C	150C1F1	0	0	0	8522	19719	-71422
Permanent loads yg= 1.2	150C1F2	0	0	0	8522	19671	-71415
Wind angle: 0°	150C1F3	0	0	0	8522	19611	-71408
	380C2F1	17045	39437	142845	17045	39437	-142845
	380C2F2	17045	39342	142830	17045	39342	-142830
	380C2F3	17045	39221	142815	17045	39221	-142815
	RTG	4620	10674	38843	4620	10674	-38843
NL3/1b	GW / oppw	0	0	0	2312	5963	-22016
Wind, -20°C	150C1F1	0	0	0	8518	22161	-82039
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	22147	-82040
Wind angle: 0°	150C1F3	0	0	0	8518	22130	-82043
	380C2F1	17036	44322	164077	17036	44322	-164077
	380C2F2	17036	44295	164081	17036	44295	-164081
	380C2F3	17036	44260	164085	17036	44260	-164085
	RTG	4618	11771	43625	4618	11771	-43625
NL3/3	GW / oppw	0	0	0	3883	8610	-30911
Wind, -5°C	150C1F1	0	0	0	9901	23444	-85630
Permanent loads yg= 1.2	150C1F2	0	0	0	9901	23404	-85628
Wind angle: 0°	150C1F3	0	0	0	9901	23354	-85627
	380C2F1	19802	46887	171259	19802	46887	-171259
	380C2F2	19802	46808	171256	19802	46808	-171256
	380C2F3	19802	46707	171253	19802	46707	-171253
	RTG	7767	16943	61667	7767	16943	-61667
NL3/4	GW / oppw	0	0	0	2915	6463	-23882
Construction/maintenance, +5°C	150C1F1	0	0	0	9725	21883	-81000
Permanent loads yg= 1.2	150C1F2	0	0	0	9725	21869	-81002
Wind angle: 0°	150C1F3	0	0	0	9725	21852	-81005
	380C2F1	19451	43765	162000	19451	43765	-162000
	380C2F2	19451	43738	162004	19451	43738	-162004
	380C2F3	19451	43704	162010	19451	43704	-162010
	RTG	5823	12862	47696	5823	12862	-47696
NL3/1a	GW / oppw	0	0	0	2314	8980	-24860
Wind, 10°C	150C1F1	0	0	0	8524	28843	-83359
Permanent loads yg= 1.2	150C1F2	0	0	0	8524	27877	-81663
Wind angle: 45°	150C1F3	0	0	0	8524	26679	-79631
	380C2F1	17045	43248	145217	17048	57685	-166717
	380C2F2	17045	42794	144795	17048	55754	-163327
	380C2F3	17045	42229	144312	17047	53358	-159262
	RTG	4620	11522	39293	4621	14690	-43701
NL3/1b	GW / oppw	0	0	0	2312	6761	-22572
Wind, -20°C	150C1F1	0	0	0	8518	24266	-83095
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	24058	-82907
Wind angle: 45°	150C1F3	0	0	0	8518	23800	-82693
	380C2F1	17036	45318	164152	17036	48532	-166189
	380C2F2	17036	45207	164127	17036	48117	-165814
	380C2F3	17036	45066	164100	17036	47600	-165386
	RTG	4618	11997	43633	4618	12712	-44021
NL3/3	GW / oppw	0	0	0	3884	13833	-37952
Wind, -5°C	150C1F1	0	0	0	9902	30568	-93216
Permanent loads yg= 1.2	150C1F2	0	0	0	9902	29821	-92068
Wind angle: 45°	150C1F3	0	0	0	9902	28897	-90716
	380C2F1	19803	49966	172566	19805	61135	-186431
	380C2F2	19803	49606	172319	19805	59641	-184137
	380C2F3	19803	49157	172039	19804	57794	-181432
	RTG	7767	18232	62203	7768	22676	-67855
NL3/4	GW / oppw	0	0	0	2915	7208	-24240
Construction/maintenance, +5°C	150C1F1	0	0	0	9726	23915	-81781
Permanent loads yg= 1.2	150C1F2	0	0	0	9725	23718	-81634
Wind angle: 45°	150C1F3	0	0	0	9725	23473	-81468
	380C2F1	19451	44747	162016	19451	47830	-163562
	380C2F2	19451	44637	162000	19451	47436	-163268
	380C2F3	19451	44499	161985	19451	46945	-162935
	RTG	5823	13083	47686	5823	13758	-47923
NL3/1a	GW / oppw	0	0	0	2314	10178	-27217
Wind, 10°C	150C1F1	0	0	0	8525	31968	-89093
Permanent loads yg= 1.2	150C1F2	0	0	0	8525	30695	-86719
Wind angle: 90°	150C1F3	0	0	0	8524	29109	-83834
	380C2F1	17050	63935	178185	17050	63935	-178185
	380C2F2	17049	61390	173439	17049	61390	-173439
	380C2F3	17048	58219	167668	17048	58219	-167668
	RTG	4621	16077	46164	4621	16077	-46164
NL3/1b	GW / oppw	0	0	0	2312	7025	-22909
Wind, -20°C	150C1F1	0	0	0	8518	24939	-83786
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	24664	-83489
Wind angle: 90°	150C1F3	0	0	0	8518	24323	-83149
	380C2F1	17036	49879	167572	17036	49879	-167572
	380C2F2	17036	49328	166979	17036	49328	-166979
	380C2F3	17036	48646	166297	17036	48646	-166297
	RTG	4618	13008	44292	4618	13008	-44292
NL3/3	GW / oppw	0	0	0	3885	15569	-41090
Wind, -5°C	150C1F1	0	0	0	9903	33002	-97207
Permanent loads yg= 1.2	150C1F2	0	0	0	9903	32007	-95535
Wind angle: 90°	150C1F3	0	0	0	9903	30774	-93540
	380C2F1	19806	66003	194414	19806	66003	-194414
	380C2F2	19806	64014	191070	19806	64014	-191070
	380C2F3	19805	61548	187080	19805	61548	-187080
	RTG	7769	24883	71068	7769	24883	-71068
NL3/4	GW / oppw	0	0	0	2915	7446	-24476
Construction/maintenance, +5°C	150C1F1	0	0	0	9726	24550	-82329
Permanent loads yg= 1.2	150C1F2	0	0	0	9726	24291	-82093
Wind angle: 90°	150C1F3	0	0	0	9726	23969	-81824
	380C2F1	19451	49100	164657	19451	49100	-164657
	380C2F2	19451	48582	164186	19451	48582	-164186
	380C2F3	19451	47938	163647	19451	47938	-163647
	RTG	5823	14030	48105	5823	14030	-48105
NL3/1a	GW / oppw	0	0	0	2313	6149	-20066
Wind, 10°C	150C1F1	0	0	0	8523	21624	-72609
Permanent loads yg= 1.2	150C1F2	0	0	0	8523	21397	-72397
Wind angle: -45°	150C1F3	0	0	0	8523	21115	-72156
	380C2F1	17048	57685	166717	17045	43248	-145217
	380C2F2	17048	55754	163327	17045	42794	-144795
	380C2F3	17047	53358	159262	17045	42229	-144312
	RTG	4621	14690	43701	4620	11522	-39293

NL3/1b	GW / opgw	0	0	0	2312	6146	-22050
Wind, -20°C	150C1F1	0	0	0	8518	22659	-82076
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	22603	-82063
Wind angle: -45°	150C1F3	0	0	0	8518	22533	-82050
	380C2F1	17036	48532	166189	17036	45318	-164152
	380C2F2	17036	48117	165814	17036	45207	-164127
	380C2F3	17036	47600	165386	17036	45066	-164100
	RTG	4618	12712	44021	4618	11997	-43633
NL3/3	GW / opgw	0	0	0	3883	9707	-31669
Wind, -5°C	150C1F1	0	0	0	9901	24983	-86283
Permanent loads yg= 1.2	150C1F2	0	0	0	9901	24803	-86159
Wind angle: -45°	150C1F3	0	0	0	9901	24579	-86020
	380C2F1	19805	61135	186431	19803	49966	-172566
	380C2F2	19805	59641	184137	19803	49606	-172319
	380C2F3	19804	57794	181432	19803	49157	-172039
	RTG	7768	22876	67855	7767	18232	-62203
NL3/4	GW / opgw	0	0	0	2915	6640	-23894
Construction/maintenance, +5°C	150C1F1	0	0	0	9725	22373	-81008
Permanent loads yg= 1.2	150C1F2	0	0	0	9725	22319	-81000
Wind angle: -45°	150C1F3	0	0	0	9725	22250	-80992
	380C2F1	19451	47830	163562	19451	44747	-162016
	380C2F2	19451	47436	163268	19451	44637	-162000
	380C2F3	19451	46945	162935	19451	44499	-161985
	RTG	5823	13758	47923	5823	13083	-47686
NL3/1a	GW / opgw	0	0	0	1735	4318	-15341
Wind, 10°C	150C1F1	0	0	0	6390	15727	-56526
Permanent loads yg= 0.9	150C1F2	0	0	0	6390	15677	-56510
Wind angle: 0°	150C1F3	0	0	0	6390	15614	-56493
	380C2F1	12781	31454	113052	12781	31454	-113052
	380C2F2	12781	31354	113020	12781	31354	-113020
	380C2F3	12781	31229	112987	12781	31229	-112987
	RTG	3464	8457	30569	3464	8457	-30569
NL3/1b	GW / opgw	0	0	0	1734	4791	-17643
Wind, -20°C	150C1F1	0	0	0	6387	17949	-66319
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	17935	-66319
Wind angle: 0°	150C1F3	0	0	0	6387	17917	-66321
	380C2F1	12774	35897	132637	12774	35897	-132637
	380C2F2	12774	35870	132639	12774	35870	-132639
	380C2F3	12774	35835	132641	12774	35835	-132641
	RTG	3463	9430	34888	3463	9430	-34888
NL3/3	GW / opgw	0	0	0	3304	7647	-27318
Wind, -5°C	150C1F1	0	0	0	7769	19534	-71039
Permanent loads yg= 0.9	150C1F2	0	0	0	7769	19493	-71033
Wind angle: 0°	150C1F3	0	0	0	7769	19441	-71027
	380C2F1	15538	39068	142079	15538	39068	-142079
	380C2F2	15538	38986	142066	15538	38986	-142066
	380C2F3	15538	38883	142054	15538	38883	-142054
	RTG	6610	15011	54458	6610	15011	-54458
NL3/4	GW / opgw	0	0	0	2336	5417	-19980
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	18004	-66526
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	17991	-66527
Wind angle: 0°	150C1F3	0	0	0	7593	17973	-66529
	380C2F1	15186	36009	133052	15186	36009	-133052
	380C2F2	15186	35981	133054	15186	35981	-133054
	380C2F3	15186	35946	133059	15186	35946	-133059
	RTG	4667	10769	39885	4667	10769	-39885
NL3/1a	GW / opgw	0	0	0	1735	8312	-22368
Wind, 10°C	150C1F1	0	0	0	6392	26006	-72777
Permanent loads yg= 0.9	150C1F2	0	0	0	6392	24920	-70632
Wind angle: 45°	150C1F3	0	0	0	6392	23565	-68013
	380C2F1	12781	35619	116750	12784	52013	-145554
	380C2F2	12781	35110	116122	12784	49840	-141264
	380C2F3	12781	34481	115397	12783	47130	-136026
	RTG	3464	9375	31283	3465	12977	-37311
NL3/1b	GW / opgw	0	0	0	1734	5671	-18504
Wind, -20°C	150C1F1	0	0	0	6387	20232	-68043
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	19999	-67759
Wind angle: 45°	150C1F3	0	0	0	6387	19710	-67430
	380C2F1	12774	36933	132858	12774	40465	-136087
	380C2F2	12774	36815	132809	12774	39998	-135518
	380C2F3	12774	36666	132755	12774	39420	-134861
	RTG	3463	9663	34924	3463	10442	-35549
NL3/3	GW / opgw	0	0	0	3305	13212	-35636
Wind, -5°C	150C1F1	0	0	0	7771	27388	-81353
Permanent loads yg= 0.9	150C1F2	0	0	0	7770	26553	-79875
Wind angle: 45°	150C1F3	0	0	0	7770	25518	-78108
	380C2F1	15539	42338	144103	15541	54776	-162707
	380C2F2	15539	41948	143742	15541	53105	-159750
	380C2F3	15539	41464	143329	15540	51036	-156216
	RTG	6610	16350	55181	6611	21321	-62052
NL3/4	GW / opgw	0	0	0	2336	6206	-20501
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	20156	-67755
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	19942	-67542
Wind angle: 45°	150C1F3	0	0	0	7593	19676	-67299
	380C2F1	15186	37015	133164	15186	40313	-135511
	380C2F2	15186	36902	133132	15186	39884	-135085
	380C2F3	15186	36759	133099	15186	39352	-134597
	RTG	4667	10994	39889	4667	11702	-40251
NL3/1a	GW / opgw	0	0	0	1736	9613	-25111
Wind, 10°C	150C1F1	0	0	0	6393	29481	-79817
Permanent loads yg= 0.9	150C1F2	0	0	0	6393	28073	-76939
Wind angle: 90°	150C1F3	0	0	0	6392	26305	-73373
	380C2F1	12786	58962	159635	12786	58962	-159635
	380C2F2	12785	56147	153879	12785	56147	-153879
	380C2F3	12784	52610	146746	12784	52610	-146746
	RTG	3465	14539	40424	3465	14539	-40424
NL3/1b	GW / opgw	0	0	0	1734	5974	-18987
Wind, -20°C	150C1F1	0	0	0	6387	20997	-69074
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	20683	-68635
Wind angle: 90°	150C1F3	0	0	0	6387	20297	-68125
	380C2F1	12774	41993	138148	12774	41993	-138148
	380C2F2	12774	41367	137270	12774	41367	-137270
	380C2F3	12774	40594	136250	12774	40594	-136250
	RTG	3463	10775	35958	3463	10775	-35958

NL3/3	GW / opgw	0	0	0	3306	15037	-39110
Wind, -5°C	150C1F1	0	0	0	7771	30099	-86377
Permanent loads yg= 0.9	150C1F2	0	0	0	7771	28994	-84294
Wind angle: 90°	150C1F3	0	0	0	7771	27619	-81769
	380C2F1	15542	60198	172755	15542	60198	-172755
	380C2F2	15542	57987	168588	15542	57987	-168588
	380C2F3	15541	55238	163537	15541	55238	-163537
	RTG	6612	23468	65790	6612	23468	-65790
NL3/4	GW / opgw	0	0	0	2336	6466	-20820
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	20854	-68536
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	20569	-68202
Wind angle: 90°	150C1F3	0	0	0	7593	20216	-67817
	380C2F1	15187	41708	137072	15187	41708	-137072
	380C2F2	15187	41137	136404	15187	41137	-136404
	380C2F3	15186	40431	135633	15186	40431	-135633
	RTG	4667	11994	40507	4667	11994	-40507
NL3/1a	GW / opgw	0	0	0	1735	5126	-16245
Wind, 10°C	150C1F1	0	0	0	6391	17810	-58375
Permanent loads yg= 0.9	150C1F2	0	0	0	6391	17555	-58061
Wind angle: -45°	150C1F3	0	0	0	6391	17240	-57698
	380C2F1	12784	52013	145554	12781	35619	-116750
	380C2F2	12784	49840	141264	12781	35110	-116122
	380C2F3	12783	47130	136026	12781	34481	-115397
	RTG	3465	12977	37311	3464	9375	-31283
NL3/1b	GW / opgw	0	0	0	1734	4983	-17711
Wind, -20°C	150C1F1	0	0	0	6387	18466	-66429
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	18407	-66405
Wind angle: -45°	150C1F3	0	0	0	6387	18333	-66378
	380C2F1	12774	40465	136087	12774	36933	-132858
	380C2F2	12774	39998	135518	12774	36815	-132809
	380C2F3	12774	39420	134861	12774	36666	-132755
	RTG	3463	10442	35549	3463	9663	-34924
NL3/3	GW / opgw	0	0	0	3304	8802	-28293
Wind, -5°C	150C1F1	0	0	0	7769	21169	-72052
Permanent loads yg= 0.9	150C1F2	0	0	0	7769	20974	-71871
Wind angle: -45°	150C1F3	0	0	0	7769	20732	-71665
	380C2F1	15541	54776	162707	15539	42338	-144103
	380C2F2	15541	53105	159750	15539	41948	-143742
	380C2F3	15540	51036	156216	15539	41464	-143329
	RTG	6611	21321	62052	6610	16350	-55181
NL3/4	GW / opgw	0	0	0	2336	5599	-20009
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	18508	-66582
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	18451	-66566
Wind angle: -45°	150C1F3	0	0	0	7593	18380	-66549
	380C2F1	15186	40313	135511	15186	37015	-133164
	380C2F2	15186	39884	135085	15186	36902	-133132
	380C2F3	15186	39352	134597	15186	36759	-133099
	RTG	4667	11702	40251	4667	10994	-39889

ZWW4HK400

Appendix I1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5421	19460	2313	5421	-19460
	150C1F1	8522	19719	71422	8522	19719	-71422
	150C1F2	8522	19671	71415	8522	19671	-71415
	150C1F3	8522	19611	71408	8522	19611	-71408
	380C2F1	0	0	0	17045	39437	-142845
	380C2F2	0	0	0	17045	39342	-142830
	380C2F3	0	0	0	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5963	22016	2312	5963	-22016
	150C1F1	8518	22161	82039	8518	22161	-82039
	150C1F2	8518	22147	82040	8518	22147	-82040
	150C1F3	8518	22130	82043	8518	22130	-82043
	380C2F1	0	0	0	17036	44322	-164077
	380C2F2	0	0	0	17036	44295	-164081
	380C2F3	0	0	0	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8610	30911	3883	8610	-30911
	150C1F1	9901	23444	85630	9901	23444	-85630
	150C1F2	9901	23404	85628	9901	23404	-85628
	150C1F3	9901	23354	85627	9901	23354	-85627
	380C2F1	0	0	0	19802	46887	-171259
	380C2F2	0	0	0	19802	46808	-171256
	380C2F3	0	0	0	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6463	23882	2915	6463	-23882
	150C1F1	9725	21883	81000	9725	21883	-81000
	150C1F2	9725	21869	81002	9725	21869	-81002
	150C1F3	9725	21852	81005	9725	21852	-81005
	380C2F1	0	0	0	19451	43765	-162000
	380C2F2	0	0	0	19451	43738	-162004
	380C2F3	0	0	0	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6149	20066	2314	8980	-24860
	150C1F1	8523	21624	72609	8524	28843	-83359
	150C1F2	8523	21397	72397	8524	27877	-81663
	150C1F3	8523	21115	72156	8524	26679	-79631
	380C2F1	0	0	0	17048	57685	-166717
	380C2F2	0	0	0	17048	55754	-163327
	380C2F3	0	0	0	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6146	22050	2312	6761	-22572
	150C1F1	8518	22659	82076	8518	24266	-83095
	150C1F2	8518	22603	82063	8518	24058	-82907
	150C1F3	8518	22533	82050	8518	23800	-82693
	380C2F1	0	0	0	17036	48532	-166189
	380C2F2	0	0	0	17036	48117	-165814
	380C2F3	0	0	0	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9707	31669	3884	13833	-37952
	150C1F1	9901	24983	86283	9902	30568	-93216
	150C1F2	9901	24803	86159	9902	29821	-92068
	150C1F3	9901	24579	86020	9902	28897	-90716
	380C2F1	0	0	0	19805	61135	-186431
	380C2F2	0	0	0	19805	59641	-184137
	380C2F3	0	0	0	19804	57794	-181432
	RTG	0	0	0	7768	22676	-67855
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6640	23894	2915	7208	-24240
	150C1F1	9725	22373	81008	9726	23915	-81781
	150C1F2	9725	22319	81000	9725	23718	-81634
	150C1F3	9725	22250	80992	9725	23473	-81468
	380C2F1	0	0	0	19451	47830	-163562
	380C2F2	0	0	0	19451	47436	-163268
	380C2F3	0	0	0	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	10178	27217	2314	10178	-27217
	150C1F1	8525	31968	89093	8525	31968	-89093
	150C1F2	8525	30695	86719	8525	30695	-86719
	150C1F3	8524	29109	83834	8524	29109	-83834
	380C2F1	0	0	0	17050	63935	-178185
	380C2F2	0	0	0	17049	61390	-173439
	380C2F3	0	0	0	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	7025	22909	2312	7025	-22909
	150C1F1	8518	24939	83786	8518	24939	-83786
	150C1F2	8518	24664	83489	8518	24664	-83489
	150C1F3	8518	24323	83149	8518	24323	-83149
	380C2F1	0	0	0	17036	49879	-167572
	380C2F2	0	0	0	17036	49328	-166979
	380C2F3	0	0	0	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	15569	41090	3885	15569	-41090
	150C1F1	9903	33002	97207	9903	33002	-97207
	150C1F2	9903	32007	95535	9903	32007	-95535
	150C1F3	9903	30774	93540	9903	30774	-93540
	380C2F1	0	0	0	19806	66003	-194414
	380C2F2	0	0	0	19806	64014	-191070
	380C2F3	0	0	0	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	7446	24476	2915	7446	-24476
	150C1F1	9726	24550	82329	9726	24550	-82329
	150C1F2	9726	24291	82093	9726	24291	-82093
	150C1F3	9726	23969	81824	9726	23969	-81824
	380C2F1	0	0	0	19451	49100	-164657
	380C2F2	0	0	0	19451	48582	-164186
	380C2F3	0	0	0	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2314	8980	24860	2313	6149	-20066
	150C1F1	8524	28843	83359	8523	21624	-72609
	150C1F2	8524	27877	81663	8523	21397	-72397
	150C1F3	8524	26679	79631	8523	21115	-72156
	380C2F1	0	0	0	17045	43248	-145217
	380C2F2	0	0	0	17045	42794	-144795
	380C2F3	0	0	0	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2312 6761 22572 8518 24266 83095 8518 24058 82907 8518 23800 82693 0 0 0 0 0 0 0 0 0 0 0 0	2312 6146 -22050 8518 22659 -82076 8518 22603 -82063 8518 22533 -82050 17036 45318 -164152 17036 45207 -164127 17036 45066 -164100 4618 11997 -43633
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	3884 13833 37952 9902 30568 93216 9902 29821 92068 9902 28897 90716 0 0 0 0 0 0 0 0 0 0 0 0	3883 9707 -31669 9901 24983 -86283 9901 24803 -86159 9901 24579 -86020 19803 49966 -172566 19803 49606 -172319 19803 49157 -172039 7767 18232 -62203
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2915 7208 24240 9726 23915 81781 9725 23718 81634 9725 23473 81468 0 0 0 0 0 0 0 0 0 0 0 0	2915 6640 -23894 9725 22373 -81008 9725 22319 -81000 9725 22250 -80992 19451 44747 -162016 19451 44637 -162000 19451 44499 -161985 5823 13083 -47686
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1735 4318 15341 6390 15727 56526 6390 15677 56510 6390 15614 56493 0 0 0 0 0 0 0 0 0 0 0 0	1735 4318 -15341 6390 15727 -56526 6390 15677 -56510 6390 15614 -56493 12781 31454 -113052 12781 31354 -113020 12781 31229 -112987 3464 8457 -30569
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1734 4791 17643 6387 17949 66319 6387 17935 66319 6387 17917 66321 0 0 0 0 0 0 0 0 0 0 0 0	1734 4791 -17643 6387 17949 -66319 6387 17935 -66319 6387 17917 -66321 12774 35897 -132637 12774 35870 -132639 12774 35835 -132641 3463 9430 -34888
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	3304 7647 27318 7769 19534 71039 7769 19493 71033 7769 19441 71027 0 0 0 0 0 0 0 0 0 0 0 0	3304 7647 -27318 7769 19534 -71039 7769 19493 -71033 7769 19441 -71027 15538 39068 -142079 15538 38986 -142066 15538 38883 -142054 6610 15011 -54458
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2336 5417 19980 7593 18004 66526 7593 17991 66527 7593 17973 66529 0 0 0 0 0 0 0 0 0 0 0 0	2336 5417 -19980 7593 18004 -66526 7593 17991 -66527 7593 17973 -66529 15186 36009 -133052 15186 35981 -133054 15186 35946 -133059 4667 10769 -39885
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1735 5126 16245 6391 17810 58375 6391 17555 58061 6391 17240 57698 0 0 0 0 0 0 0 0 0 0 0 0	1735 8312 -22368 6392 26006 -72777 6392 24920 -70632 6392 23565 -68013 12784 52013 -145554 12784 49840 -141264 12783 47130 -136026 3465 12977 -37311
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1734 4983 17711 6387 18466 66429 6387 18407 66405 6387 18333 66378 0 0 0 0 0 0 0 0 0 0 0 0	1734 5671 -18504 6387 20232 -68043 6387 19999 -67759 6387 19710 -67430 12774 40465 -136087 12774 39998 -135518 12774 39420 -134861 3463 10442 -35549
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	3304 8802 28293 7769 21169 72052 7769 20974 71871 7769 20732 71665 0 0 0 0 0 0 0 0 0 0 0 0	3305 13212 -35636 7771 27388 -81353 7770 26553 -79875 7770 25518 -78108 15541 54776 -162707 15541 53105 -159750 15540 51036 -156216 6611 21321 -62052
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2336 5599 20009 7593 18508 66582 7593 18451 66566 7593 18380 66549 0 0 0 0 0 0 0 0 0 0 0 0	2336 6206 -20501 7593 20156 -67755 7593 19942 -67542 7593 19676 -67299 15186 40313 -135511 15186 39884 -135085 15186 39352 -134597 4667 11702 -40251
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1736 9613 25111 6393 29481 79817 6393 28073 76939 6392 26305 73373 0 0 0 0 0 0 0 0 0 0 0 0	1736 9613 -25111 6393 29481 -79817 6393 28073 -76939 6392 26305 -73373 12786 58962 -159635 12785 56147 -153879 12784 52610 -146746 3465 14539 -40424
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1734 5974 18987 6387 20997 69074 6387 20683 68635 6387 20297 68125 0 0 0 0 0 0 0 0 0 0 0 0	1734 5974 -18987 6387 20997 -69074 6387 20683 -68635 6387 20297 -68125 12774 41993 -138148 12774 41367 -137270 12774 40594 -136250 3463 10775 -35958

NL3/3	GW / opgw	3306	15037	39110	3306	15037	-39110
Wind, -5°C	150C1F1	7771	30099	86377	7771	30099	-86377
Permanent loads yg= 0.9	150C1F2	7771	28994	84294	7771	28994	-84294
Wind angle: 90°	150C1F3	7771	27619	81769	7771	27619	-81769
	380C2F1	0	0	0	15542	60198	-172755
	380C2F2	0	0	0	15542	57987	-168588
	380C2F3	0	0	0	15541	55238	-163537
	RTG	0	0	0	6612	23468	-65790
NL3/4	GW / opgw	2336	6466	20820	2336	6466	-20820
Construction/maintenance, +5°C	150C1F1	7593	20854	68536	7593	20854	-68536
Permanent loads yg= 0.9	150C1F2	7593	20569	68202	7593	20569	-68202
Wind angle: 90°	150C1F3	7593	20216	67817	7593	20216	-67817
	380C2F1	0	0	0	15187	41708	-137072
	380C2F2	0	0	0	15187	41137	-136404
	380C2F3	0	0	0	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40607
NL3/1a	GW / opgw	1735	8312	22368	1735	5126	-16245
Wind, 10°C	150C1F1	6392	26006	72777	6391	17810	-58375
Permanent loads yg= 0.9	150C1F2	6392	24920	70632	6391	17555	-58061
Wind angle: -45°	150C1F3	6392	23565	68013	6391	17240	-57698
	380C2F1	0	0	0	12781	35619	-116750
	380C2F2	0	0	0	12781	35110	-116122
	380C2F3	0	0	0	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b	GW / opgw	1734	5671	18504	1734	4983	-17711
Wind, -20°C	150C1F1	6387	20232	68043	6387	18466	-66429
Permanent loads yg= 0.9	150C1F2	6387	19999	67759	6387	18407	-66405
Wind angle: -45°	150C1F3	6387	19710	67430	6387	18333	-66378
	380C2F1	0	0	0	12774	36933	-132858
	380C2F2	0	0	0	12774	36815	-132809
	380C2F3	0	0	0	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3	GW / opgw	3305	13212	35636	3304	8802	-28293
Wind, -5°C	150C1F1	7771	27388	81353	7769	21169	-72052
Permanent loads yg= 0.9	150C1F2	7770	26553	79875	7769	20974	-71871
Wind angle: -45°	150C1F3	7770	25518	78108	7769	20732	-71665
	380C2F1	0	0	0	15539	42338	-144103
	380C2F2	0	0	0	15539	41948	-143742
	380C2F3	0	0	0	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4	GW / opgw	2336	6206	20501	2336	5599	-20009
Construction/maintenance, +5°C	150C1F1	7593	20156	67755	7593	18508	-66582
Permanent loads yg= 0.9	150C1F2	7593	19942	67542	7593	18451	-66566
Wind angle: -45°	150C1F3	7593	19676	67299	7593	18380	-66549
	380C2F1	0	0	0	15186	37015	-133164
	380C2F2	0	0	0	15186	36902	-133132
	380C2F3	0	0	0	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

ZWW4HK400

Appendix I1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / opgw	2313	5421	19460	0	0	0
Wind, 10°C	150C1F1	8522	19719	71422	0	0	0
Permanent loads yg= 1.2	150C1F2	8522	19671	71415	0	0	0
Wind angle: 0°	150C1F3	8522	19611	71408	0	0	0
	380C2F1	17045	39437	142845	17045	39437	-142845
	380C2F2	17045	39342	142830	17045	39342	-142830
	380C2F3	17045	39221	142815	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b	GW / opgw	2312	5963	22016	0	0	0
Wind, -20°C	150C1F1	8518	22161	82039	0	0	0
Permanent loads yg= 1.2	150C1F2	8518	22147	82040	0	0	0
Wind angle: 0°	150C1F3	8518	22130	82043	0	0	0
	380C2F1	17036	44322	164077	17036	44322	-164077
	380C2F2	17036	44295	164081	17036	44295	-164081
	380C2F3	17036	44260	164085	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3	GW / opgw	3883	8610	30911	0	0	0
Wind, -5°C	150C1F1	9901	23444	85630	0	0	0
Permanent loads yg= 1.2	150C1F2	9901	23404	85628	0	0	0
Wind angle: 0°	150C1F3	9901	23354	85627	0	0	0
	380C2F1	19802	46887	171259	19802	46887	-171259
	380C2F2	19802	46808	171256	19802	46808	-171256
	380C2F3	19802	46707	171253	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4	GW / opgw	2915	6463	23882	0	0	0
Construction/maintenance, +5°C	150C1F1	9725	21883	81000	0	0	0
Permanent loads yg= 1.2	150C1F2	9725	21869	81002	0	0	0
Wind angle: 0°	150C1F3	9725	21852	81005	0	0	0
	380C2F1	19451	43765	162000	19451	43765	-162000
	380C2F2	19451	43738	162004	19451	43738	-162004
	380C2F3	19451	43704	162010	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a	GW / opgw	2313	6149	20066	0	0	0
Wind, 10°C	150C1F1	8523	21624	72609	0	0	0
Permanent loads yg= 1.2	150C1F2	8523	21397	72397	0	0	0
Wind angle: 45°	150C1F3	8523	21115	72156	0	0	0
	380C2F1	17045	43248	145217	17048	57685	-166717
	380C2F2	17045	42794	144795	17048	55754	-163327
	380C2F3	17045	42229	144312	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b	GW / opgw	2312	6146	22050	0	0	0
Wind, -20°C	150C1F1	8518	22659	82076	0	0	0
Permanent loads yg= 1.2	150C1F2	8518	22603	82063	0	0	0
Wind angle: 45°	150C1F3	8518	22533	82050	0	0	0
	380C2F1	17036	45318	164152	17036	48532	-166189
	380C2F2	17036	45207	164127	17036	48117	-165814
	380C2F3	17036	45066	164100	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3	GW / opgw	3883	9707	31669	0	0	0
Wind, -5°C	150C1F1	9901	24983	86283	0	0	0
Permanent loads yg= 1.2	150C1F2	9901	24803	86159	0	0	0
Wind angle: 45°	150C1F3	9901	24579	86020	0	0	0
	380C2F1	19803	49966	172566	19805	61135	-186431
	380C2F2	19803	49606	172319	19805	59641	-184137
	380C2F3	19803	49157	172039	19804	57794	-181432
	RTG	0	0	0	7768	22676	-67855
NL3/4	GW / opgw	2915	6640	23894	0	0	0
Construction/maintenance, +5°C	150C1F1	9725	22373	81008	0	0	0
Permanent loads yg= 1.2	150C1F2	9725	22319	81000	0	0	0
Wind angle: 45°	150C1F3	9725	22250	80992	0	0	0
	380C2F1	19451	44747	162016	19451	47830	-163562
	380C2F2	19451	44637	162000	19451	47436	-163268
	380C2F3	19451	44499	161985	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a	GW / opgw	2314	10178	27217	0	0	0
Wind, 10°C	150C1F1	8525	31968	89093	0	0	0
Permanent loads yg= 1.2	150C1F2	8525	30695	86719	0	0	0
Wind angle: 90°	150C1F3	8524	29109	83834	0	0	0
	380C2F1	17050	63935	178185	17050	63935	-178185
	380C2F2	17049	61390	173439	17049	61390	-173439
	380C2F3	17048	58219	167668	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164
NL3/1b	GW / opgw	2312	7025	22909	0	0	0
Wind, -20°C	150C1F1	8518	24939	83786	0	0	0
Permanent loads yg= 1.2	150C1F2	8518	24664	83489	0	0	0
Wind angle: 90°	150C1F3	8518	24323	83149	0	0	0
	380C2F1	17036	49879	167572	17036	49879	-167572
	380C2F2	17036	49328	166979	17036	49328	-166979
	380C2F3	17036	48646	166297	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3	GW / opgw	3885	15569	41090	0	0	0
Wind, -5°C	150C1F1	9903	33002	97207	0	0	0
Permanent loads yg= 1.2	150C1F2	9903	32007	95535	0	0	0
Wind angle: 90°	150C1F3	9903	30774	93540	0	0	0
	380C2F1	19806	66003	194414	19806	66003	-194414
	380C2F2	19806	64014	191070	19806	64014	-191070
	380C2F3	19805	61548	187080	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4	GW / opgw	2915	7446	24476	0	0	0
Construction/maintenance, +5°C	150C1F1	9726	24550	82329	0	0	0
Permanent loads yg= 1.2	150C1F2	9726	24291	82093	0	0	0
Wind angle: 90°	150C1F3	9726	23969	81824	0	0	0
	380C2F1	19451	49100	164657	19451	49100	-164657
	380C2F2	19451	48582	164186	19451	48582	-164186
	380C2F3	19451	47938	163647	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a	GW / opgw	2314	8980	24860	0	0	0
Wind, 10°C	150C1F1	8524	28843	83359	0	0	0
Permanent loads yg= 1.2	150C1F2	8524	27877	81663	0	0	0
Wind angle: -45°	150C1F3	8524	26679	79631	0	0	0
	380C2F1	17048	57685	166717	17045	43248	-145217
	380C2F2	17048	55754	163327	17045	42794	-144795
	380C2F3	17047	53358	159262	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	6761	22572	0	0	0
	150C1F1	8518	24266	83095	0	0	0
	150C1F2	8518	24058	82907	0	0	0
	150C1F3	8518	23800	82693	0	0	0
	380C2F1	17036	48532	166189	17036	45318	-164152
	380C2F2	17036	48117	165814	17036	45207	-164127
	380C2F3	17036	47600	165386	17036	45066	-164100
	RTG	0	0	0	4618	11997	-43633
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3884	13833	37952	0	0	0
	150C1F1	9902	30568	93216	0	0	0
	150C1F2	9902	29821	92068	0	0	0
	150C1F3	9902	28897	90716	0	0	0
	380C2F1	19805	61135	186431	19803	49966	-172566
	380C2F2	19805	59641	184137	19803	49606	-172319
	380C2F3	19804	57794	181432	19803	49157	-172039
	RTG	0	0	0	7767	18232	-62203
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2915	7208	24240	0	0	0
	150C1F1	9726	23915	81781	0	0	0
	150C1F2	9725	23718	81634	0	0	0
	150C1F3	9725	23473	81468	0	0	0
	380C2F1	19451	47830	163562	19451	44747	-162016
	380C2F2	19451	47436	163268	19451	44637	-162000
	380C2F3	19451	46945	162935	19451	44499	-161985
	RTG	0	0	0	5823	13083	-47686
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1735	4318	15341	0	0	0
	150C1F1	6390	15727	56526	0	0	0
	150C1F2	6390	15677	56510	0	0	0
	150C1F3	6390	15614	56493	0	0	0
	380C2F1	12781	31454	113052	12781	31454	-113052
	380C2F2	12781	31354	113020	12781	31354	-113020
	380C2F3	12781	31229	112987	12781	31229	-112987
	RTG	0	0	0	3464	8457	-30569
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	4791	17643	0	0	0
	150C1F1	6387	17949	66319	0	0	0
	150C1F2	6387	17935	66319	0	0	0
	150C1F3	6387	17917	66321	0	0	0
	380C2F1	12774	35897	132637	12774	35897	-132637
	380C2F2	12774	35870	132639	12774	35870	-132639
	380C2F3	12774	35835	132641	12774	35835	-132641
	RTG	0	0	0	3463	9430	-34888
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3304	7647	27318	0	0	0
	150C1F1	7769	19534	71039	0	0	0
	150C1F2	7769	19493	71033	0	0	0
	150C1F3	7769	19441	71027	0	0	0
	380C2F1	15538	39068	142079	15538	39068	-142079
	380C2F2	15538	38986	142066	15538	38986	-142066
	380C2F3	15538	38883	142054	15538	38883	-142054
	RTG	0	0	0	6610	15011	-54458
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2336	5417	19980	0	0	0
	150C1F1	7593	18004	66526	0	0	0
	150C1F2	7593	17991	66527	0	0	0
	150C1F3	7593	17973	66529	0	0	0
	380C2F1	15186	36009	133052	15186	36009	-133052
	380C2F2	15186	35981	133054	15186	35981	-133054
	380C2F3	15186	35946	133059	15186	35946	-133059
	RTG	0	0	0	4667	10769	-39885
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1735	5126	16245	0	0	0
	150C1F1	6391	17810	58375	0	0	0
	150C1F2	6391	17555	58061	0	0	0
	150C1F3	6391	17240	57698	0	0	0
	380C2F1	12781	35619	116750	12784	52013	-145554
	380C2F2	12781	35110	116122	12784	49840	-141264
	380C2F3	12781	34481	115397	12783	47130	-136026
	RTG	0	0	0	3465	12977	-37311
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	4983	17711	0	0	0
	150C1F1	6387	18466	66429	0	0	0
	150C1F2	6387	18407	66405	0	0	0
	150C1F3	6387	18333	66378	0	0	0
	380C2F1	12774	36933	132858	12774	40465	-136087
	380C2F2	12774	36815	132809	12774	39998	-135518
	380C2F3	12774	36666	132755	12774	39420	-134861
	RTG	0	0	0	3463	10442	-35549
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3304	8802	28293	0	0	0
	150C1F1	7769	21169	72052	0	0	0
	150C1F2	7769	20974	71871	0	0	0
	150C1F3	7769	20732	71665	0	0	0
	380C2F1	15539	42338	144103	15541	54776	-162707
	380C2F2	15539	41948	143742	15541	53105	-159750
	380C2F3	15539	41464	143329	15540	51036	-156216
	RTG	0	0	0	6611	21321	-62052
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2336	5599	20009	0	0	0
	150C1F1	7593	18508	66582	0	0	0
	150C1F2	7593	18451	66566	0	0	0
	150C1F3	7593	18380	66549	0	0	0
	380C2F1	15186	37015	133164	15186	40313	-135511
	380C2F2	15186	36902	133132	15186	39884	-135085
	380C2F3	15186	36759	133099	15186	39352	-134597
	RTG	0	0	0	4667	11702	-40251
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1736	9613	25111	0	0	0
	150C1F1	6393	29481	79817	0	0	0
	150C1F2	6393	28073	76939	0	0	0
	150C1F3	6392	26305	73373	0	0	0
	380C2F1	12786	58962	159635	12786	58962	-159635
	380C2F2	12785	56147	153879	12785	56147	-153879
	380C2F3	12784	52610	146746	12784	52610	-146746
	RTG	0	0	0	3465	14539	-40424
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	5974	18987	0	0	0
	150C1F1	6387	20997	69074	0	0	0
	150C1F2	6387	20683	68635	0	0	0
	150C1F3	6387	20297	68125	0	0	0
	380C2F1	12774	41993	138148	12774	41993	-138148
	380C2F2	12774	41367	137270	12774	41367	-137270
	380C2F3	12774	40594	136250	12774	40594	-136250
	RTG	0	0	0	3463	10775	-35958

NL3/3	GW / opgw	3306	15037	39110	0	0	0
Wind, -5°C	150C1F1	7771	30099	86377	0	0	0
Permanent loads yg= 0.9	150C1F2	7771	28994	84294	0	0	0
Wind angle: 90°	150C1F3	7771	27619	81769	0	0	0
	380C2F1	15542	60198	172755	15542	60198	-172755
	380C2F2	15542	57987	168588	15542	57987	-168588
	380C2F3	15541	55238	163537	15541	55238	-163537
	RTG	0	0	0	6612	23468	-65790
NL3/4	GW / opgw	2336	6466	20820	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20854	68536	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	20569	68202	0	0	0
Wind angle: 90°	150C1F3	7593	20216	67817	0	0	0
	380C2F1	15187	41708	137072	15187	41708	-137072
	380C2F2	15187	41137	136404	15187	41137	-136404
	380C2F3	15186	40431	135633	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40607
NL3/1a	GW / opgw	1735	8312	22368	0	0	0
Wind, 10°C	150C1F1	6392	26006	72777	0	0	0
Permanent loads yg= 0.9	150C1F2	6392	24920	70632	0	0	0
Wind angle: -45°	150C1F3	6392	23565	68013	0	0	0
	380C2F1	12784	52013	145554	12781	35619	-116750
	380C2F2	12784	49840	141264	12781	35110	-116122
	380C2F3	12783	47130	136026	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b	GW / opgw	1734	5671	18504	0	0	0
Wind, -20°C	150C1F1	6387	20232	68043	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	19999	67759	0	0	0
Wind angle: -45°	150C1F3	6387	19710	67430	0	0	0
	380C2F1	12774	40465	136087	12774	36933	-132858
	380C2F2	12774	39998	135518	12774	36815	-132809
	380C2F3	12774	39420	134861	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3	GW / opgw	3305	13212	35636	0	0	0
Wind, -5°C	150C1F1	7771	27388	81353	0	0	0
Permanent loads yg= 0.9	150C1F2	7770	26553	79875	0	0	0
Wind angle: -45°	150C1F3	7770	25518	78108	0	0	0
	380C2F1	15541	54776	162707	15539	42338	-144103
	380C2F2	15541	53105	159750	15539	41948	-143742
	380C2F3	15540	51036	156216	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4	GW / opgw	2336	6206	20501	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20156	67755	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	19942	67542	0	0	0
Wind angle: -45°	150C1F3	7593	19676	67299	0	0	0
	380C2F1	15186	40313	135511	15186	37015	-133164
	380C2F2	15186	39884	135085	15186	36902	-133132
	380C2F3	15186	39352	134597	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

ZWW4HK400

Appendix 11 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5421	19460	2313	5421	-19460
	150C1F1	8522	19719	71422	8522	19719	-71422
	150C1F2	8522	19671	71415	8522	19671	-71415
	150C1F3	8522	19611	71408	8522	19611	-71408
	380C2F1	17045	39437	142845	17045	39437	-142845
	380C2F2	17045	39342	142830	17045	39342	-142830
	380C2F3	17045	39221	142815	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5963	22016	2312	5963	-22016
	150C1F1	8518	22161	82039	8518	22161	-82039
	150C1F2	8518	22147	82040	8518	22147	-82040
	150C1F3	8518	22130	82043	8518	22130	-82043
	380C2F1	17036	44322	164077	17036	44322	-164077
	380C2F2	17036	44295	164081	17036	44295	-164081
	380C2F3	17036	44260	164085	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8610	30911	3883	8610	-30911
	150C1F1	9901	23444	85630	9901	23444	-85630
	150C1F2	9901	23404	85628	9901	23404	-85628
	150C1F3	9901	23354	85627	9901	23354	-85627
	380C2F1	19802	46887	171259	19802	46887	-171259
	380C2F2	19802	46808	171256	19802	46808	-171256
	380C2F3	19802	46707	171253	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6463	23882	2915	6463	-23882
	150C1F1	9725	21883	81000	9725	21883	-81000
	150C1F2	9725	21869	81002	9725	21869	-81002
	150C1F3	9725	21852	81005	9725	21852	-81005
	380C2F1	19451	43765	162000	19451	43765	-162000
	380C2F2	19451	43738	162004	19451	43738	-162004
	380C2F3	19451	43704	162010	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6149	20066	2314	8980	-24860
	150C1F1	8523	21624	72609	8524	28843	-83359
	150C1F2	8523	21397	72397	8524	27877	-81663
	150C1F3	8523	21115	72156	8524	26679	-79631
	380C2F1	17045	43248	145217	17048	57685	-166717
	380C2F2	17045	42794	144795	17048	55754	-163327
	380C2F3	17045	42229	144312	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6146	22050	2312	6761	-22572
	150C1F1	8518	22659	82076	8518	24266	-83095
	150C1F2	8518	22603	82063	8518	24058	-82907
	150C1F3	8518	22533	82050	8518	23800	-82693
	380C2F1	17036	45318	164152	17036	48532	-166189
	380C2F2	17036	45207	164127	17036	48117	-165814
	380C2F3	17036	45066	164100	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9707	31669	3884	13833	-37952
	150C1F1	9901	24983	86283	9902	30568	-93216
	150C1F2	9901	24803	86159	9902	29821	-92068
	150C1F3	9901	24579	86020	9902	28897	-90716
	380C2F1	19803	49966	172566	19805	61135	-186431
	380C2F2	19803	49606	172319	19805	59641	-184137
	380C2F3	19803	49157	172039	19804	57794	-181432
	RTG	0	0	0	7768	22676	-67855
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6640	23894	2915	7208	-24240
	150C1F1	9725	22373	81008	9726	23915	-81781
	150C1F2	9725	22319	81000	9725	23718	-81634
	150C1F3	9725	22250	80992	9725	23473	-81468
	380C2F1	19451	44747	162016	19451	47830	-163562
	380C2F2	19451	44637	162000	19451	47436	-163268
	380C2F3	19451	44499	161985	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	10178	27217	2314	10178	-27217
	150C1F1	8525	31968	89093	8525	31968	-89093
	150C1F2	8525	30695	86719	8525	30695	-86719
	150C1F3	8524	29109	83834	8524	29109	-83834
	380C2F1	17050	63935	178185	17050	63935	-178185
	380C2F2	17049	61390	173439	17049	61390	-173439
	380C2F3	17048	58219	167668	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	7025	22909	2312	7025	-22909
	150C1F1	8518	24939	83786	8518	24939	-83786
	150C1F2	8518	24664	83489	8518	24664	-83489
	150C1F3	8518	24323	83149	8518	24323	-83149
	380C2F1	17036	49879	167572	17036	49879	-167572
	380C2F2	17036	49328	166979	17036	49328	-166979
	380C2F3	17036	48646	166297	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	15569	41090	3885	15569	-41090
	150C1F1	9903	33002	97207	9903	33002	-97207
	150C1F2	9903	32007	95535	9903	32007	-95535
	150C1F3	9903	30774	93540	9903	30774	-93540
	380C2F1	19806	66003	194414	19806	66003	-194414
	380C2F2	19806	64014	191070	19806	64014	-191070
	380C2F3	19805	61548	187080	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	7446	24476	2915	7446	-24476
	150C1F1	9726	24550	82329	9726	24550	-82329
	150C1F2	9726	24291	82093	9726	24291	-82093
	150C1F3	9726	23969	81824	9726	23969	-81824
	380C2F1	19451	49100	164657	19451	49100	-164657
	380C2F2	19451	48582	164186	19451	48582	-164186
	380C2F3	19451	47938	163647	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2314	8980	24860	2313	6149	-20066
	150C1F1	8524	28843	83359	8523	21624	-72609
	150C1F2	8524	27877	81663	8523	21397	-72397
	150C1F3	8524	26679	79631	8523	21115	-72156
	380C2F1	17048	57685	166717	17045	43248	-145217
	380C2F2	17048	55754	163327	17045	42794	-144795
	380C2F3	17047	53358	159262	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	6761	22572	2312	6146	-22050
	150C1F1	8518	24266	83095	8518	22659	-82076
	150C1F2	8518	24058	82907	8518	22603	-82063
	150C1F3	8518	23800	82693	8518	22533	-82050
	380C2F1	17036	48532	166189	17036	45318	-164152
	380C2F2	17036	48117	165814	17036	45207	-164127
	380C2F3	17036	47600	165386	17036	45066	-164100
	RTG	0	0	0	4618	11997	-43633
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3884	13833	37952	3883	9707	-31669
	150C1F1	9902	30568	93216	9901	24983	-86283
	150C1F2	9902	29821	92068	9901	24803	-86159
	150C1F3	9902	28897	90716	9901	24579	-86200
	380C2F1	19805	61135	186431	19803	49966	-172566
	380C2F2	19805	59641	184137	19803	49606	-172319
	380C2F3	19804	57794	181432	19803	49157	-172039
	RTG	0	0	0	7767	18232	-62203
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2915	7208	24240	2915	6640	-23894
	150C1F1	9726	23915	81781	9725	22373	-81008
	150C1F2	9725	23718	81634	9725	22319	-81000
	150C1F3	9725	23473	81468	9725	22250	-80992
	380C2F1	19451	47830	163562	19451	44747	-162016
	380C2F2	19451	47436	163268	19451	44637	-162000
	380C2F3	19451	46945	162935	19451	44499	-161985
	RTG	0	0	0	5823	13083	-47686
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1735	4318	15341	1735	4318	-15341
	150C1F1	6390	15727	56526	6390	15727	-56526
	150C1F2	6390	15677	56510	6390	15677	-56510
	150C1F3	6390	15614	56493	6390	15614	-56493
	380C2F1	12781	31454	113052	12781	31454	-113052
	380C2F2	12781	31354	113020	12781	31354	-113020
	380C2F3	12781	31229	112987	12781	31229	-112987
	RTG	0	0	0	3464	8457	-30569
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	4791	17643	1734	4791	-17643
	150C1F1	6387	17949	66319	6387	17949	-66319
	150C1F2	6387	17935	66319	6387	17935	-66319
	150C1F3	6387	17917	66321	6387	17917	-66321
	380C2F1	12774	35897	132637	12774	35897	-132637
	380C2F2	12774	35870	132639	12774	35870	-132639
	380C2F3	12774	35835	132641	12774	35835	-132641
	RTG	0	0	0	3463	9430	-34888
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3304	7647	27318	3304	7647	-27318
	150C1F1	7769	19534	71039	7769	19534	-71039
	150C1F2	7769	19493	71033	7769	19493	-71033
	150C1F3	7769	19441	71027	7769	19441	-71027
	380C2F1	15538	39068	142079	15538	39068	-142079
	380C2F2	15538	38986	142066	15538	38986	-142066
	380C2F3	15538	38883	142054	15538	38883	-142054
	RTG	0	0	0	6610	15011	-54458
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2336	5417	19980	2336	5417	-19980
	150C1F1	7593	18004	66526	7593	18004	-66526
	150C1F2	7593	17991	66527	7593	17991	-66527
	150C1F3	7593	17973	66529	7593	17973	-66529
	380C2F1	15186	36009	133052	15186	36009	-133052
	380C2F2	15186	35981	133054	15186	35981	-133054
	380C2F3	15186	35946	133059	15186	35946	-133059
	RTG	0	0	0	4667	10769	-39885
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1735	5126	16245	1735	8312	-22368
	150C1F1	6391	17810	58375	6392	26006	-72777
	150C1F2	6391	17555	58061	6392	24920	-70632
	150C1F3	6391	17240	57698	6392	23565	-68013
	380C2F1	12781	35619	116750	12784	52013	-145554
	380C2F2	12781	35110	116122	12784	49840	-141264
	380C2F3	12781	34481	115397	12783	47130	-136026
	RTG	0	0	0	3465	12977	-37311
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	4983	17711	1734	5671	-18504
	150C1F1	6387	18466	66429	6387	20232	-68043
	150C1F2	6387	18407	66405	6387	19999	-67759
	150C1F3	6387	18333	66378	6387	19710	-67430
	380C2F1	12774	36933	132858	12774	40465	-136087
	380C2F2	12774	36815	132809	12774	39998	-135518
	380C2F3	12774	36666	132755	12774	39420	-134861
	RTG	0	0	0	3463	10442	-35549
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3304	8802	28293	3305	13212	-35636
	150C1F1	7769	21169	72052	7771	27388	-81353
	150C1F2	7769	20974	71871	7770	26553	-79875
	150C1F3	7769	20732	71665	7770	25518	-78108
	380C2F1	15539	42338	144103	15541	54776	-162707
	380C2F2	15539	41948	143742	15541	53105	-159750
	380C2F3	15539	41464	143329	15540	51036	-156216
	RTG	0	0	0	6611	21321	-62052
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2336	5599	20009	2336	6206	-20501
	150C1F1	7593	18508	66582	7593	20156	-67755
	150C1F2	7593	18451	66566	7593	19942	-67542
	150C1F3	7593	18380	66549	7593	19676	-67299
	380C2F1	15186	37015	133164	15186	40313	-135511
	380C2F2	15186	36902	133132	15186	39884	-135085
	380C2F3	15186	36759	133099	15186	39352	-134597
	RTG	0	0	0	4667	11702	-40251
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1736	9613	25111	1736	9613	-25111
	150C1F1	6393	29481	79817	6393	29481	-79817
	150C1F2	6393	28073	76939	6393	28073	-76939
	150C1F3	6392	26305	73373	6392	26305	-73373
	380C2F1	12786	58962	159635	12786	58962	-159635
	380C2F2	12785	56147	153879	12785	56147	-153879
	380C2F3	12784	52610	146746	12784	52610	-146746
	RTG	0	0	0	3465	14539	-40424
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	5974	18987	1734	5974	-18987
	150C1F1	6387	20997	69074	6387	20997	-69074
	150C1F2	6387	20683	68635	6387	20683	-68635
	150C1F3	6387	20297	68125	6387	20297	-68125
	380C2F1	12774	41993	138148	12774	41993	-138148
	380C2F2	12774	41367	137270	12774	41367	-137270
	380C2F3	12774	40594	136250	12774	40594	-136250
	RTG	0	0	0	3463	10775	-35958

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3306	15037	39110	3306	15037	-39110
	150C1F1	7771	30099	86377	7771	30099	-86377
	150C1F2	7771	28994	84294	7771	28994	-84294
	150C1F3	7771	27619	81769	7771	27619	-81769
	380C2F1	15542	60198	172755	15542	60198	-172755
	380C2F2	15542	57987	168588	15542	57987	-168588
	380C2F3	15541	55238	163537	15541	55238	-163537
	RTG	0	0	0	6612	23468	-65790
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2336	6466	20820	2336	6466	-20820
	150C1F1	7593	20854	68536	7593	20854	-68536
	150C1F2	7593	20569	68202	7593	20569	-68202
	150C1F3	7593	20216	67817	7593	20216	-67817
	380C2F1	15187	41708	137072	15187	41708	-137072
	380C2F2	15187	41137	136404	15187	41137	-136404
	380C2F3	15186	40431	135633	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40607
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1735	8312	22368	1735	5126	-16245
	150C1F1	6392	26006	72777	6391	17810	-58375
	150C1F2	6392	24920	70632	6391	17555	-58061
	150C1F3	6392	23565	68013	6391	17240	-57698
	380C2F1	12784	52013	145554	12781	35619	-116750
	380C2F2	12784	49840	141264	12781	35110	-116122
	380C2F3	12783	47130	136026	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	5671	18504	1734	4983	-17711
	150C1F1	6387	20232	68043	6387	18466	-66429
	150C1F2	6387	19999	67759	6387	18407	-66405
	150C1F3	6387	19710	67430	6387	18333	-66378
	380C2F1	12774	40465	136087	12774	36933	-132858
	380C2F2	12774	39998	135518	12774	36815	-132809
	380C2F3	12774	39420	134861	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3305	13212	35636	3304	8802	-28293
	150C1F1	7771	27388	81353	7769	21169	-72052
	150C1F2	7770	26553	79875	7769	20974	-71871
	150C1F3	7770	25518	78108	7769	20732	-71665
	380C2F1	15541	54776	162707	15539	42338	-144103
	380C2F2	15541	53105	159750	15539	41948	-143742
	380C2F3	15540	51036	156216	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2336	6206	20501	2336	5599	-20009
	150C1F1	7593	20156	67755	7593	18508	-66582
	150C1F2	7593	19942	67542	7593	18451	-66566
	150C1F3	7593	19676	67299	7593	18380	-66549
	380C2F1	15186	40313	135511	15186	37015	-133164
	380C2F2	15186	39884	135085	15186	36902	-133132
	380C2F3	15186	39352	134597	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

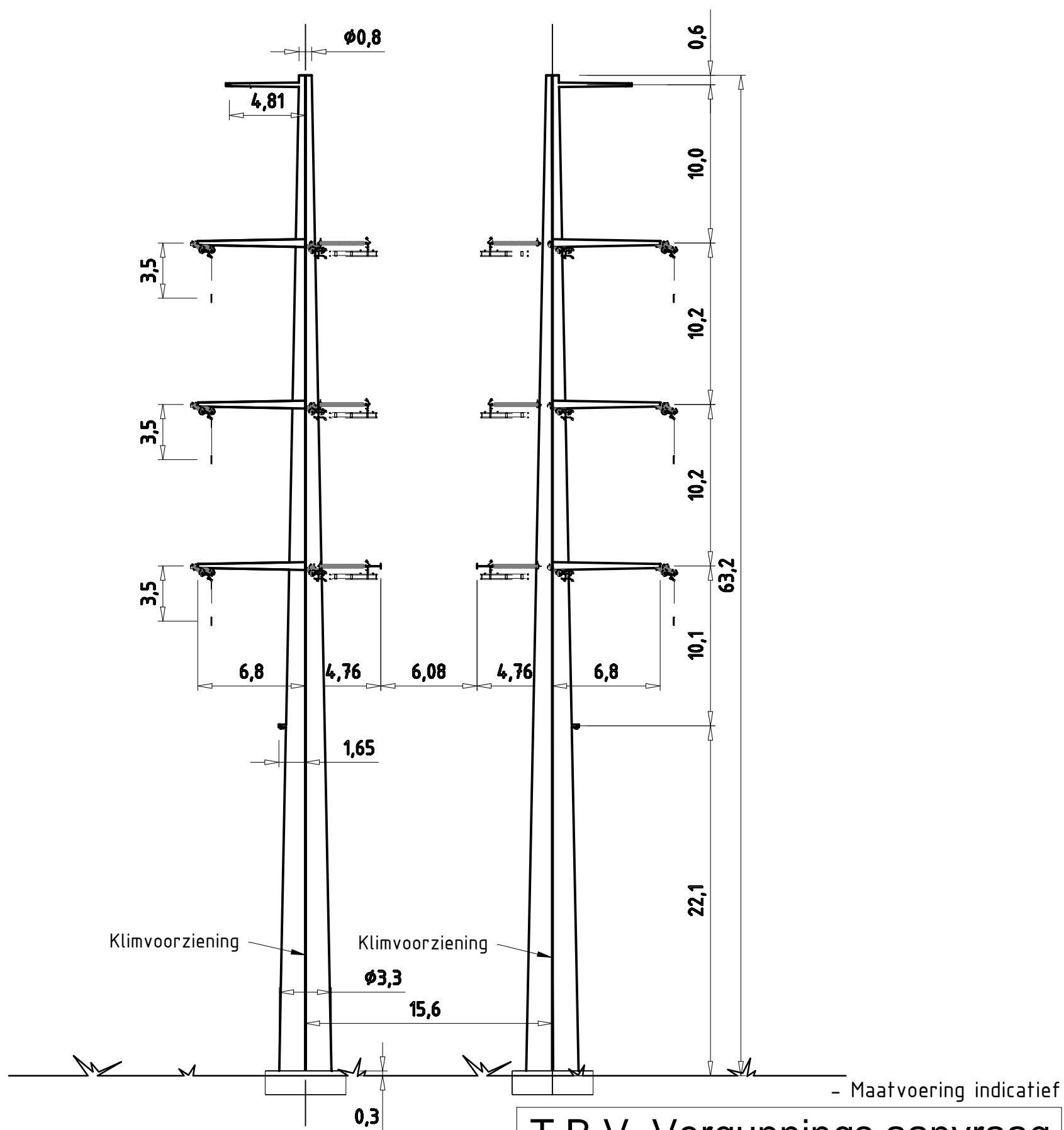
ZWW4HK400

Appendix I2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	1928	4761	16779	1928	4761	-16779
Wind, 10°C	150C1F1	7101	17271	61676	7101	17271	-61676
Permanent loads yg= 1.0	150C1F2	7101	17206	61652	7101	17206	-61652
	150C1F3	7101	17124	61626	7101	17124	-61626
Wind angle: 0°	380C2F1	14202	34542	123352	14202	34542	-123352
	380C2F2	14202	34412	123304	14202	34412	-123304
	380C2F3	14202	34248	123251	14202	34248	-123251
	RTG	0	0	0	3850	9294	-33413
NL4/1b	GW / opgw	1927	5183	19144	1927	5183	-19144
Wind, -20°C	150C1F1	7097	19367	71723	7097	19367	-71723
Permanent loads yg= 1.0	150C1F2	7097	19356	71724	7097	19356	-71724
	150C1F3	7097	19341	71726	7097	19341	-71726
Wind angle: 0°	380C2F1	14194	38734	143446	14194	38734	-143446
	380C2F2	14194	38711	143449	14194	38711	-143449
	380C2F3	14194	38682	143453	14194	38682	-143453
	RTG	0	0	0	3848	10220	-37886
NL4/3	GW / opgw	6603	12605	46025	6603	12605	-46025
Wind, -5°C	150C1F1	11209	25633	94110	11209	25633	-94110
Permanent loads yg= 1.0	150C1F2	11209	25601	94112	11209	25601	-94112
	150C1F3	11209	25559	94114	11209	25559	-94114
Wind angle: 0°	380C2F1	22419	51266	188221	22419	51266	-188221
	380C2F2	22419	51201	188223	22419	51201	-188223
	380C2F3	22419	51119	188228	22419	51119	-188228
	RTG	0	0	0	13222	25028	-92102
NL4/4	GW / opgw	2429	5579	20622	2429	5579	-20622
Construction/maintenance, +5°C	150C1F1	8103	18929	70087	8103	18929	-70087
Permanent loads yg= 1.0	150C1F2	8103	18917	70088	8103	18917	-70088
	150C1F3	8103	18903	70090	8103	18903	-70090
Wind angle: 0°	380C2F1	16206	37857	140173	16206	37857	-140173
	380C2F2	16206	37835	140176	16206	37835	-140176
	380C2F3	16206	37806	140181	16206	37806	-140181
	RTG	0	0	0	4852	11099	-41168
NL4/1a	GW / opgw	1928	5835	18079	1928	9991	-26190
Wind, 10°C	150C1F1	7101	20026	64364	7104	30812	-83859
Permanent loads yg= 1.0	150C1F2	7101	19687	63915	7103	29403	-81049
	150C1F3	7101	19269	63394	7103	27637	-77583
Wind angle: 45°	380C2F1	14203	40052	128727	14207	61624	-167718
	380C2F2	14203	39375	127830	14206	58806	-162097
	380C2F3	14202	38537	126788	14206	55274	-155165
	RTG	0	0	0	3850	15277	-42756
NL4/1b	GW / opgw	1927	5336	19175	1927	5857	-19641
Wind, -20°C	150C1F1	7097	19784	71762	7097	21141	-72678
Permanent loads yg= 1.0	150C1F2	7097	19737	71750	7097	20965	-72511
	150C1F3	7097	19678	71738	7097	20747	-72319
Wind angle: 45°	380C2F1	14194	39569	143525	14195	42282	-145357
	380C2F2	14194	39475	143501	14195	41930	-145022
	380C2F3	14194	39357	143476	14194	41493	-144639
	RTG	0	0	0	3848	11011	-38244
NL4/3	GW / opgw	6603	13394	46187	6604	16051	-48504
Wind, -5°C	150C1F1	11209	26852	94417	11210	31048	-98485
Permanent loads yg= 1.0	150C1F2	11209	26712	94351	11210	30494	-97782
	150C1F3	11209	26537	94279	11210	29807	-96965
Wind angle: 45°	380C2F1	22419	53704	188833	22420	62096	-196970
	380C2F2	22419	53425	188703	22420	60987	-195564
	380C2F3	22419	53074	188559	22420	59614	-193930
	RTG	0	0	0	13222	29079	-93915
NL4/4	GW / opgw	2429	5727	20634	2429	6206	-20942
Construction/maintenance, +5°C	150C1F1	8103	19339	70099	8103	20637	-70792
Permanent loads yg= 1.0	150C1F2	8103	19293	70091	8103	20470	-70662
	150C1F3	8103	19235	70084	8103	20263	-70513
Wind angle: 45°	380C2F1	16206	38678	140198	16207	41273	-141585
	380C2F2	16206	38586	140183	16206	40941	-141323
	380C2F3	16206	38471	140168	16206	40527	-141027
	RTG	0	0	0	4852	11850	-41375
NL4/1a	GW / opgw	1929	11643	29647	1929	11643	-29647
Wind, 10°C	150C1F1	7105	35283	92941	7105	35283	-92941
Permanent loads yg= 1.0	150C1F2	7104	33478	89252	7104	33478	-89252
	150C1F3	7104	31199	84636	7104	31199	-84636
Wind angle: 90°	380C2F1	14209	70565	185882	14209	70565	-185882
	380C2F2	14208	66956	178504	14208	66956	-178504
	380C2F3	14207	62398	169272	14207	62398	-169272
	RTG	0	0	0	3851	17307	-46852


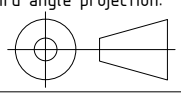
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1927	6082	19940	1927	6082	-19940
	150C1F1	7097	21713	73295	7097	21713	-73295
	150C1F2	7097	21479	73031	7097	21479	-73031
	150C1F3	7097	21190	72727	7097	21190	-72727
	380C2F1	14195	43426	146590	14195	43426	-146590
	380C2F2	14195	42959	146062	14195	42959	-146062
	380C2F3	14195	42379	145453	14195	42379	-145453
	RTG	0	0	0	3848	11262	-38485
	NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	6604	17177	49924	6604	17177
150C1F1		11211	32857	100993	11211	32857	-100993
150C1F2		11210	32117	99932	11210	32117	-99932
150C1F3		11210	31201	98686	11210	31201	-98686
380C2F1		22421	65715	201986	22421	65715	-201986
380C2F2		22421	64234	199863	22421	64234	-199863
380C2F3		22420	62403	197371	22420	62403	-197371
RTG		0	0	0	13223	30355	-95112
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°		GW / opgw	2429	6407	21151	2429	6407
	150C1F1	8103	21174	71279	8103	21174	-71279
	150C1F2	8103	20955	71069	8103	20955	-71069
	150C1F3	8103	20682	70830	8103	20682	-70830
	380C2F1	16207	42348	142557	16207	42348	-142557
	380C2F2	16207	41910	142139	16207	41910	-142139
	380C2F3	16207	41365	141660	16207	41365	-141660
	RTG	0	0	0	4852	12080	-41537
	NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1928	9991	26190	1928	5835
150C1F1		7104	30812	83859	7101	20026	-64364
150C1F2		7103	29403	81049	7101	19687	-63915
150C1F3		7103	27637	77583	7101	19269	-63394
380C2F1		14207	61624	167718	14203	40052	-128727
380C2F2		14206	58806	162097	14203	39375	-127830
380C2F3		14206	55274	155165	14202	38537	-126788
RTG		0	0	0	3850	10507	-34462
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°		GW / opgw	1927	5857	19641	1927	5336
	150C1F1	7097	21141	72678	7097	19784	-71762
	150C1F2	7097	20965	72511	7097	19737	-71750
	150C1F3	7097	20747	72319	7097	19678	-71738
	380C2F1	14195	42282	145357	14194	39569	-143525
	380C2F2	14195	41930	145022	14194	39475	-143501
	380C2F3	14194	41493	144639	14194	39357	-143476
	RTG	0	0	0	3848	10408	-37895
	NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	6604	16051	48504	6603	13394
150C1F1		11210	31048	98485	11209	26852	-94417
150C1F2		11210	30494	97782	11209	26712	-94351
150C1F3		11210	29807	96965	11209	26537	-94279
380C2F1		22420	62096	196970	22419	53704	-188833
380C2F2		22420	60987	195564	22419	53425	-188703
380C2F3		22420	59614	193930	22419	53074	-188559
RTG		0	0	0	13222	25996	-92151
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°		GW / opgw	2429	6206	20942	2429	5727
	150C1F1	8103	20637	70792	8103	19339	-70099
	150C1F2	8103	20470	70662	8103	19293	-70091
	150C1F3	8103	20263	70513	8103	19235	-70084
	380C2F1	16207	41273	141585	16206	38678	-140198
	380C2F2	16206	40941	141323	16206	38586	-140183
	380C2F3	16206	40527	141027	16206	38471	-140168
	RTG	0	0	0	4852	11284	-41161



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4HK400

- Trekparameter 1800m
- 2x380 / 2x150 Hoekmast
- 400m Veldlengte
- 150°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

5.0	03-03-2014	Modified botom diameter and increased traverse length
4.0	03-02-2014	Modified top/botom diameter
3.0	11-03-2013	Small modification
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection: 
Drawn by: BJT 03-03-2014 Checked by: AJP 03-03-2014 Approved by: AW 03-03-2014	Scale: 1:300 Units: m Project no: 000.145 Company: TenneT	Drawing no.: 74102194-035-091V
Description: Wintrack Masttype ZWW4HK400		Revision: 5.0 Format: A3
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		

ZWW4HK400+5

Bijlage CBE

Fundatie berekening

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1,6	m
schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	5,5	m
	Hoogte	1,8	m
	Inhoud	42,8	m ³
	e.g.	1026	kN

Onderplaat	Diameter	12,0	m
	Hoogte	1,2	m
	Inhoud	136	m ³
	e.g.	3257	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		851	kN
Fgeleiders		171	kN
Maximale dwarskracht		1103	kN
Fmax vert (druk)		1192	kN
Fmin vert (trek)		894	kN
Maximale moment		54340	kNm

Moment

F_{diag}		5379	kN
F_{hor}		1103	kN
F_{ver}		5338	kN
M_{hor} (tgv F_{hor})		3309	kNm
M_{tot}		57649	kNm
$F=M/a$		5338	kN

Verticaal reactiekracht

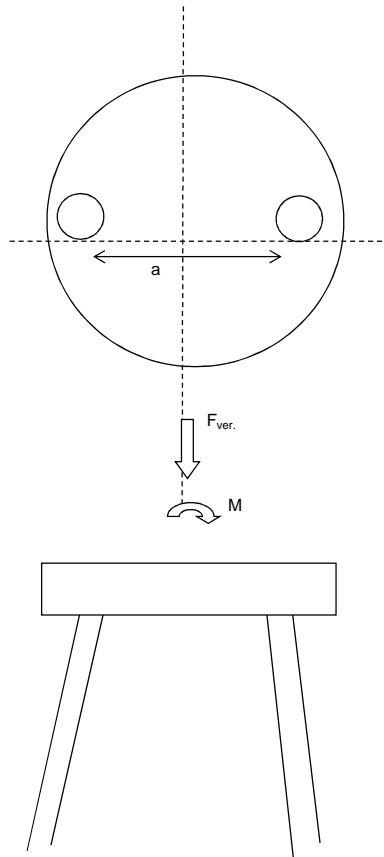
F_{water} (trek)		1785	kN
F_{grond} (druk)		2412	kN
F_{grond} (trek)		2010	kN

F_{dmax} (druk)		4613	kN
F_{tmax} (trek)		2208	kN

F_{dtot} (druk)		9951	kN
F_{ttot} (trek)		3130	kN

Palen druk		9	(-)
Palen trek		10	(-)

Totaal palen		20	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4HK400+5

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CBE

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	$O_{p;gem}$	1,60 m
paalfactor	αt	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11,25 MPa
materiaalfactor	$\gamma_{m,b4}$	1,4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1,5
	$q_{c;z,d}$	5,36 MPa
	$P_{r;z,d}$	37,5 kN/m ²
	$F_{r;trek,d,i}$	60,0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt			
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

$F_{trek,d}$	536,4 kN
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ZWW4HK400+5

DRUKPALEN

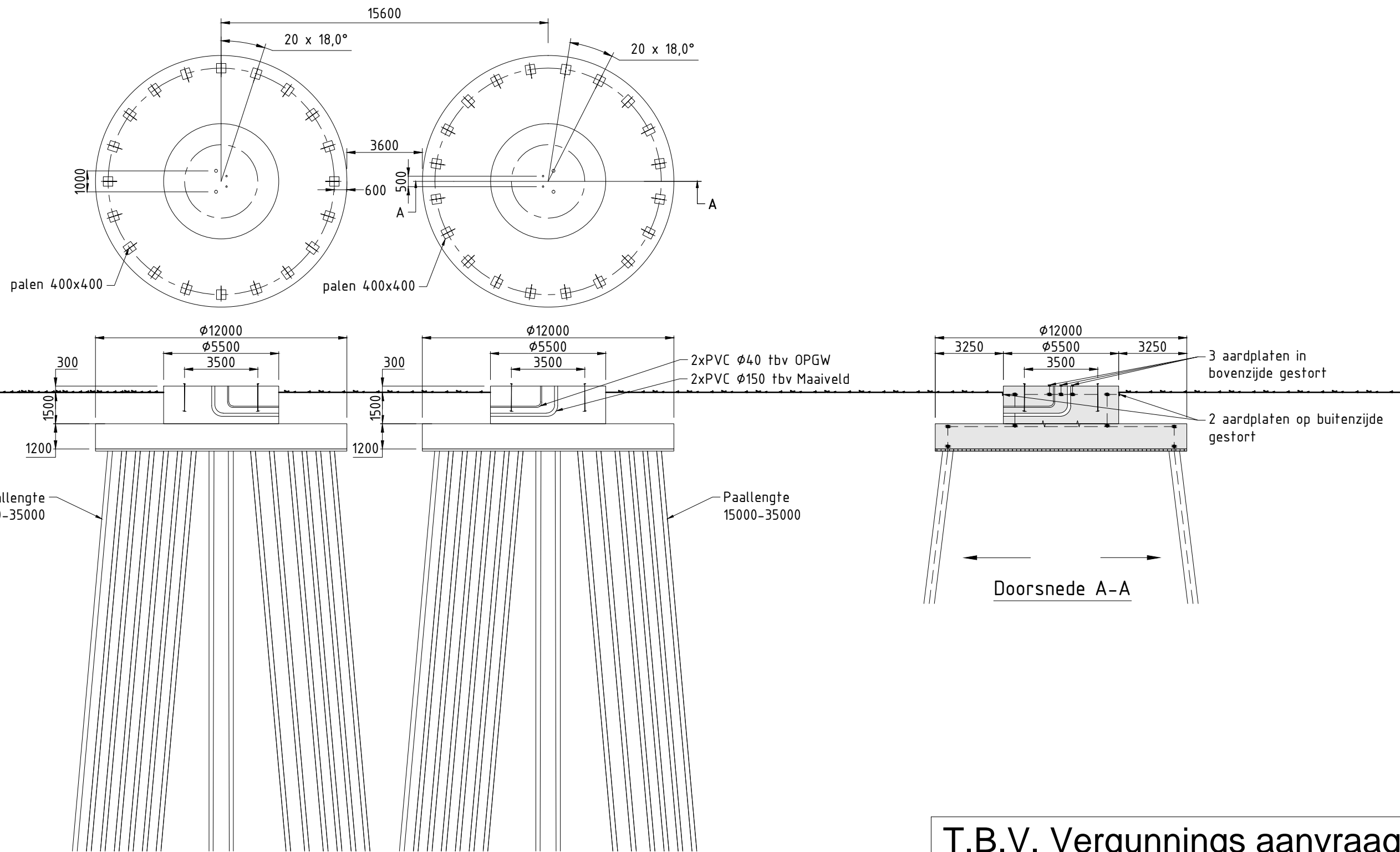
FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CBE

Bepaling opneembare paalbelasting op druk

heipaal	v	
diameter	a	2 mm
		2 mm
Deq		0,001808
maximale puntweerstand		
$P_{r,max;punt;i}$		11,25 MN/m ²
paalklasse factor	α_p	1,00
factor paalvoet	β	1
hoek van inwendige vrijwing van paalvoet	ϕ	40
factor dwarsdoorsnede paalvoet	s	1,00
minimale waarde neergaande deel	$q_{c,II;gem}$	9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11,00 MN/m ²
maximale paalschachtwrijving		
$P_{r,max;schacht;i}$		0,05 MN/m ²
waarin:		
paalfactor	α_s	0,010
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5,00 MN/m ²
maximale draagkracht alleenstaande paal		
$F_{r,max;i}$		0,00 MN
waarin:		
$F_{r,max;punt;i}$		0,00 MN
paalpunt oppervlak	A_{punt}	0,00 m ²
$F_{r,max;schacht;i}$		0,00 MN
gemiddelde paalomtrek	$O_{p;gem}$	0,01 m
lengte schachtwrijving	Δl	15,00 m
Bepaling rekenwaarde van de maximale draagkracht		
$F_{r,paal,max;d}$	MN	0,00 MN
materiaalfactor grond	γ_{mb}	1,20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0,75

$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27,00 m
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T.B.V. Vergunnings aanvraag

Verklaring


- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding $\phi 16\text{mm}$ (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

3.0	10-03-2014	Diverse aanpassingen
2.0	26-07-2013	Diverse aanpassingen
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Scale: 1:200
Drawn by: RBE 07-03-2014		Units: mm
Checked by: AJP 07-03-2014		Project no: 000.145
Approved by: AW 07-03-2014		Company: TenneT
Description: Principe ontwerp fundatie hoekmast ZWW4HK400+5 masten familie		Revision: 3.0
		Format: A3



ZWW4HK400+5

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd	2	
Terrain category		O		
Hoogte		h	68.2	m
Diameter voet		d voet	3.5	m
top		d top	0.8	m
gem		d gem	2.2	m
wanddikte		t	24	mm
Oppervlakte aan voet		A	262084	mm ²
Traagheidsmoment aan voet		W _x	2.26E+08	mm ⁴
Weerstandsmoment aan voet		I _x	3.91E+11	mm ⁴
Mast: Gewicht		2 ^{de} orde F _{rep/over}	10.0 851	% kN

Bijlage BBE

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	67.6	4.1	15.7	-41.3	44.2	2988 kNm
150C1F1	57.6	10.8	33.2	-97.6	103.1	5937 kNm
150C1F2	47.4	10.8	32.3	-96.0	101.2	4799 kNm
150C1F3	37.2	10.8	31.1	-94.1	99.1	3685 kNm
380C2F1	57.6	21.6	66.4	-195.2	206.2	11875 kNm
380C2F2	47.4	21.6	64.5	-191.9	202.5	9598 kNm
380C2F3	37.2	21.7	62.2	-188.1	198.1	7370 kNm
RTG	27.1	8.4	25.5	-72.1	76.5	2073 kNm

Stuwdruk	F _{hor.}	43.2	kN
	M _{d,wind}	1316	kNm
Totaal	M _{d,tot}	49400	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	54340	kNm

Normaalkracht;

Optredende normaalkracht			
N _{d,geleiders}		110	kN
N _{d, e.g. mast}		1021	kN
N _{s,d,totaal}		1192	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA
A _{eff}	153574 mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{yd} /γ _{m1}	8	N/mm ²
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Moment;

Optredende moment in de voet:		
M _{d,tot}	54340	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA
W _{eff}	2.00E+08 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	279	N/mm ²
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Totale spanning:

S _d	279	N/mm ²	< 284 N/mm ² = ACCOORD
S _{d,toegeestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	67.6	4.0	23.5	0.0	23.5	1590 kNm
150C1F1	57.6	15.0	71.3	0.0	71.3	4110 kNm
150C1F2	47.4	15.1	67.9	0.0	67.9	3218 kNm
150C1F3	37.2	15.2	63.6	0.0	63.6	2366 kNm
380C2F1	57.6	30.1	142.7	0.0	142.7	8219 kNm
380C2F2	47.4	30.2	135.8	0.0	135.8	6437 kNm
380C2F3	37.2	30.3	127.2	0.0	127.2	4732 kNm
RTG	27.1	4.1	17.9	-48.1	51.4	1392 kNm

Stuwdruk	F _{hor.}	1161	kN
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Verplaatsing	1.21	m
Percentage van de verplaatsing	5.5%	
Hoek	1.87	graden
Kromming	0.39%	
Fundatie rotatiestijfheid	0.005	rad

3.72	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4HK400+5

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2562	5649	19576	2562	5649	-19576
	150C1F1	9443	20331	71634	9443	20331	-71634
	150C1F2	9444	20234	71588	9444	20234	-71588
	150C1F3	9445	20115	71537	9445	20115	-71537
	380C2F1	18885	40661	143268	18885	40661	-143268
	380C2F2	18888	40469	143175	18888	40469	-143175
	380C2F3	18891	40231	143073	18891	40231	-143073
	RTG	0	0	0	5122	10973	-38929
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	5980	22016	2598	5980	-22016
	150C1F1	9584	22208	82035	9584	22208	-82035
	150C1F2	9584	22192	82037	9584	22192	-82037
	150C1F3	9584	22172	82039	9584	22172	-82039
	380C2F1	19167	44417	164071	19167	44417	-164071
	380C2F2	19168	44384	164073	19168	44384	-164073
	380C2F3	19168	44343	164077	19168	44343	-164077
	RTG	0	0	0	5185	11797	-43623
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	10105	16297	59272	10105	16297	-59272
	150C1F1	16188	31529	115298	16188	31529	-115298
	150C1F2	16188	31482	115299	16188	31482	-115299
	150C1F3	16189	31424	115302	16189	31424	-115302
	380C2F1	32376	63058	230596	32376	63058	-230596
	380C2F2	32377	62965	230598	32377	62965	-230598
	380C2F3	32377	62848	230603	32377	62848	-230603
	RTG	0	0	0	20238	32366	-118720
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3389	6741	24858	3389	6741	-24858
	150C1F1	11106	22456	82959	11106	22456	-82959
	150C1F2	11106	22440	82961	11106	22440	-82961
	150C1F3	11106	22420	82964	11106	22420	-82964
	380C2F1	22211	44912	165918	22211	44912	-165918
	380C2F2	22212	44880	165922	22212	44880	-165922
	380C2F3	22212	44839	165928	22212	44839	-165928
	RTG	0	0	0	6771	13413	-49653
NL1/6 Permanent, +10°C Permanent loads yg= 1.35	GW / opgw	2881	5740	21422	2881	5740	-21422
	150C1F1	10610	21041	78527	10610	21041	-78527
	150C1F2	10610	21041	78527	10610	21041	-78527
	150C1F3	10610	21041	78527	10610	21041	-78527
	380C2F1	21221	42083	157055	21221	42083	-157055
	380C2F2	21221	42083	157055	21221	42083	-157055
	380C2F3	21221	42083	157055	21221	42083	-157055
	RTG	0	0	0	5755	11469	-42804
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2522	7378	21913	2417	13770	-34513
	150C1F1	9344	24767	76602	8999	41711	-108158
	150C1F2	9357	24251	75845	9028	39693	-104134
	150C1F3	9373	23622	74965	9069	37178	-99155
	380C2F1	18688	49533	153203	17997	83422	-216317
	380C2F2	18715	48502	151690	18056	79387	-208269
	380C2F3	18747	47244	149931	18137	74356	-198311
	RTG	0	0	0	4908	21006	-55746
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2596	6218	22084	2576	7051	-22944
	150C1F1	9578	22856	82137	9532	25017	-83874
	150C1F2	9579	22788	82114	9539	24752	-83582
	150C1F3	9580	22702	82088	9547	24426	-83249
	380C2F1	19156	45713	164275	19064	50034	-167748
	380C2F2	19158	45575	164228	19078	49503	-167165
	380C2F3	19160	45404	164177	19094	48853	-166498
	RTG	0	0	0	5164	13108	-44395
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	10094	17492	59498	10012	21481	-62824
	150C1F1	16168	33405	115827	16017	39909	-122408
	150C1F2	16171	33203	115724	16038	39103	-121356
	150C1F3	16174	32953	115610	16064	38116	-120136
	380C2F1	32335	66810	231653	32033	79818	-244817
	380C2F2	32341	66406	231448	32076	78205	-242712
	380C2F3	32348	65906	231221	32128	76232	-240272
	RTG	0	0	0	20147	38802	-121598
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3387	6969	24886	3374	7718	-25429
	150C1F1	11102	23090	83006	11069	25130	-84289
	150C1F2	11102	23023	82991	11074	24883	-84067
	150C1F3	11103	22940	82975	11080	24579	-83815
	380C2F1	22203	46179	166012	22138	50260	-168577
	380C2F2	22205	46046	165981	22148	49765	-168133
	380C2F3	22206	45880	165950	22160	49158	-167630
	RTG	0	0	0	6757	14635	-50088

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2398	16204	39473	2398	16204	-39473
	150C1F1	8918	48444	121681	8918	48444	-121681
	150C1F2	8945	45908	116579	8945	45908	-116579
	150C1F3	8985	42726	110190	8985	42726	-110190
	380C2F1	17835	96888	243363	17835	96888	-243363
	380C2F2	17891	91816	233158	17891	91816	-233158
	380C2F3	17970	85451	220380	17970	85451	-220380
	RTG	0	0	0	4863	24255	-62338
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2565	7414	23476	2565	7414	-23476
	150C1F1	9506	25940	85001	9506	25940	-85001
	150C1F2	9516	25585	84549	9516	25585	-84549
	150C1F3	9528	25153	84029	9528	25153	-84029
	380C2F1	19012	51880	170003	19012	51880	-170003
	380C2F2	19032	51171	169098	19032	51171	-169098
	380C2F3	19057	50305	168057	19057	50305	-168057
	RTG	0	0	0	5153	13535	-44883
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	9972	23157	64844	9972	23157	-64844
	150C1F1	15942	42703	126360	15942	42703	-126360
	150C1F2	15971	41631	124795	15971	41631	-124795
	150C1F3	16006	40320	122961	16006	40320	-122961
	380C2F1	31884	85406	252719	31884	85406	-252719
	380C2F2	31941	83263	249590	31941	83263	-249590
	380C2F3	32012	80639	245923	32012	80639	-245923
	RTG	0	0	0	20103	40824	-123476
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3367	8034	25787	3367	8034	-25787
	150C1F1	11050	25984	85157	11050	25984	-85157
	150C1F2	11057	25656	84807	11057	25656	-84807
	150C1F3	11066	25255	84407	11066	25255	-84407
	380C2F1	22100	51967	170315	22100	51967	-170315
	380C2F2	22115	51313	169614	22115	51313	-169614
	380C2F3	22132	50511	168814	22132	50511	-168814
	RTG	0	0	0	6750	15014	-50401
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2417	13770	34513	2522	7378	-21913
	150C1F1	8999	41711	108158	9344	24767	-76602
	150C1F2	9028	39693	104134	9357	24251	-75845
	150C1F3	9069	37178	99155	9373	23622	-74965
	380C2F1	17997	83422	216317	18688	49533	-153203
	380C2F2	18056	79387	208269	18715	48502	-151690
	380C2F3	18137	74356	198311	18747	47244	-149931
	RTG	0	0	0	5079	13027	-41071
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2576	7051	22944	2596	6218	-22084
	150C1F1	9532	25017	83874	9578	22856	-82137
	150C1F2	9539	24752	83582	9579	22788	-82114
	150C1F3	9547	24426	83249	9580	22702	-82088
	380C2F1	19064	50034	167748	19156	45713	-164275
	380C2F2	19078	49503	167165	19158	45575	-164228
	380C2F3	19094	48853	166498	19160	45404	-164177
	RTG	0	0	0	5183	12103	-43660
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	10012	21481	62824	10094	17492	-59498
	150C1F1	16017	39909	122408	16168	33405	-115827
	150C1F2	16038	39103	121356	16171	33203	-115724
	150C1F3	16064	38116	120136	16174	32953	-115610
	380C2F1	32033	79818	244817	32335	66810	-231653
	380C2F2	32076	78205	242712	32341	66406	-231448
	380C2F3	32128	76232	240272	32348	65906	-231221
	RTG	0	0	0	20228	33905	-118800
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3374	7718	25429	3387	6969	-24886
	150C1F1	11069	25130	84289	11102	23090	-83006
	150C1F2	11074	24883	84067	11102	23023	-82991
	150C1F3	11080	24579	83815	11103	22940	-82975
	380C2F1	22138	50260	168577	22203	46179	-166012
	380C2F2	22148	49765	168133	22205	46046	-165981
	380C2F3	22160	49158	167630	22206	45880	-165950
	RTG	0	0	0	6769	13709	-49653
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1928	4564	15527	1928	4564	-15527
	150C1F1	7113	16380	56889	7113	16380	-56889
	150C1F2	7114	16276	56814	7114	16276	-56814
	150C1F3	7116	16148	56730	7116	16148	-56730
	380C2F1	14225	32759	113779	14225	32759	-113779
	380C2F2	14228	32551	113628	14228	32551	-113628
	380C2F3	14232	32295	113460	14232	32295	-113460
	RTG	0	0	0	3857	8773	-30721

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	4809	17645	1963	4809	-17645
	150C1F1	7248	17997	66319	7248	17997	-66319
	150C1F2	7248	17981	66319	7248	17981	-66319
	150C1F3	7248	17960	66320	7248	17960	-66320
	380C2F1	14496	35995	132639	14496	35995	-132639
	380C2F2	14496	35961	132639	14496	35961	-132639
	380C2F3	14496	35919	132640	14496	35919	-132640
	RTG	0	0	0	3916	9456	-34887
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	9489	15573	56571	9489	15573	-56571
	150C1F1	13887	28105	102519	13887	28105	-102519
	150C1F2	13887	28057	102517	13887	28057	-102517
	150C1F3	13888	27998	102517	13888	27998	-102517
	380C2F1	27774	56209	205037	27774	56209	-205037
	380C2F2	27775	56115	205034	27775	56115	-205034
	380C2F3	27775	55997	205034	27775	55997	-205034
	RTG	0	0	0	19008	30916	-113307
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2760	5712	21016	2760	5712	-21016
	150C1F1	8786	18616	68628	8786	18616	-68628
	150C1F2	8786	18600	68629	8786	18600	-68629
	150C1F3	8786	18579	68631	8786	18579	-68631
	380C2F1	17573	37232	137255	17573	37232	-137255
	380C2F2	17573	37199	137258	17573	37199	-137258
	380C2F3	17573	37158	137261	17573	37158	-137261
	RTG	0	0	0	5514	11352	-41961
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1934	4102	15307	1934	4102	-15307
	150C1F1	7125	15137	56492	7125	15137	-56492
	150C1F2	7125	15137	56492	7125	15137	-56492
	150C1F3	7125	15137	56492	7125	15137	-56492
	380C2F1	14250	30274	112983	14250	30274	-112983
	380C2F2	14250	30274	112983	14250	30274	-112983
	380C2F3	14250	30274	112983	14250	30274	-112983
	RTG	0	0	0	3862	8190	-30564
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1881	6526	18735	1797	13403	-33144
	150C1F1	6991	21387	63991	6686	39991	-101743
	150C1F2	7006	20798	62960	6707	37847	-97247
	150C1F3	7025	20079	61745	6738	35153	-91603
	380C2F1	13982	42774	127983	13372	79981	-203486
	380C2F2	14012	41596	125920	13415	75694	-194495
	380C2F3	14049	40158	123490	13476	70306	-183205
	RTG	0	0	0	3646	19924	-51711
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1959	5062	17767	1934	6004	-19037
	150C1F1	7240	18677	66539	7177	21086	-69203
	150C1F2	7241	18603	66498	7187	20783	-68773
	150C1F3	7242	18512	66452	7197	20414	-68276
	380C2F1	14480	37353	133078	14355	42171	-138407
	380C2F2	14482	37206	132995	14373	41566	-137546
	380C2F3	14485	37024	132903	14395	40828	-136553
	RTG	0	0	0	3887	10888	-36111
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	9477	16779	56842	9390	20854	-60486
	150C1F1	13862	30038	103263	13690	36955	-111389
	150C1F2	13866	29828	103128	13714	36091	-110122
	150C1F3	13870	29567	102977	13742	35035	-108642
	380C2F1	27725	60077	206527	27380	73910	-222778
	380C2F2	27732	59655	206256	27427	72183	-220245
	380C2F3	27741	59135	205954	27485	70071	-217284
	RTG	0	0	0	18910	37447	-116543
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2758	5947	21069	2742	6748	-21813
	150C1F1	8781	19269	68746	8739	21465	-70614
	150C1F2	8782	19199	68720	8745	21194	-70303
	150C1F3	8783	19113	68692	8753	20863	-69947
	380C2F1	17562	38537	137493	17478	42930	-141229
	380C2F2	17564	38398	137440	17491	42388	-140606
	380C2F3	17566	38226	137384	17506	41726	-139893
	RTG	0	0	0	5497	12630	-42609
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1785	15916	38398	1785	15916	-38398
	150C1F1	6630	47061	116525	6630	47061	-116525
	150C1F2	6649	44411	110998	6649	44411	-110998
	150C1F3	6676	41064	103993	6676	41064	-103993
	380C2F1	13261	94122	233050	13261	94122	-233050
	380C2F2	13298	88822	221996	13298	88822	-221996
	380C2F3	13353	82128	207986	13353	82128	-207986
	RTG	0	0	0	3613	23371	-59043

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1921	6423	19776	1921	6423	-19776
	150C1F1	7145	22144	70836	7145	22144	-70836
	150C1F2	7157	21736	70186	7157	21736	-70186
	150C1F3	7173	21240	69430	7173	21240	-69430
	380C2F1	14289	44287	141672	14289	44287	-141672
	380C2F2	14315	43473	140373	14315	43473	-140373
	380C2F3	14345	42481	138861	14345	42481	-138861
	RTG	0	0	0	3873	11375	-36823
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	9349	22572	62660	9349	22572	-62660
	150C1F1	13610	39947	116079	13610	39947	-116079
	150C1F2	13640	38800	114233	13640	38800	-114233
	150C1F3	13678	37395	112051	13678	37395	-112051
	380C2F1	27220	79894	232158	27220	79894	-232158
	380C2F2	27281	77600	228467	27281	77600	-228467
	380C2F3	27356	74790	224103	27356	74790	-224103
	RTG	0	0	0	18863	39515	-118596
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2733	7095	22281	2733	7095	-22281
	150C1F1	8715	22408	71814	8715	22408	-71814
	150C1F2	8725	22045	71334	8725	22045	-71334
	150C1F3	8736	21603	70780	8736	21603	-70780
	380C2F1	17431	44815	143629	17431	44815	-143629
	380C2F2	17449	44091	142667	17449	44091	-142667
	380C2F3	17471	43207	141559	17471	43207	-141559
	RTG	0	0	0	5488	13040	-43032
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1797	13403	33144	1881	6526	-18735
	150C1F1	6686	39991	101743	6991	21387	-63991
	150C1F2	6707	37847	97247	7006	20798	-62960
	150C1F3	6738	35153	91603	7025	20079	-61745
	380C2F1	13372	79981	203486	13982	42774	-127983
	380C2F2	13415	75694	194495	14012	41596	-125920
	380C2F3	13476	70306	183205	14049	40158	-123490
	RTG	0	0	0	3803	11082	-33814
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1934	6004	19037	1959	5062	-17767
	150C1F1	7177	21086	69203	7240	18677	-66539
	150C1F2	7187	20783	68773	7241	18603	-66498
	150C1F3	7197	20414	68276	7242	18512	-66452
	380C2F1	14355	42171	138407	14480	37353	-133078
	380C2F2	14373	41566	137546	14482	37206	-132995
	380C2F3	14395	40828	136553	14485	37024	-132903
	RTG	0	0	0	3913	9775	-34974
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	9390	20854	60486	9477	16779	-56842
	150C1F1	13690	36955	111389	13862	30038	-103263
	150C1F2	13714	36091	110122	13866	29828	-103128
	150C1F3	13742	35035	108642	13870	29567	-102977
	380C2F1	27380	73910	222778	27725	60077	-206527
	380C2F2	27427	72183	220245	27732	59655	-206256
	380C2F3	27485	70071	217284	27741	59135	-205954
	RTG	0	0	0	18997	32466	-113427
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2742	6748	21813	2758	5947	-21069
	150C1F1	8739	21465	70614	8781	19269	-68746
	150C1F2	8745	21194	70303	8782	19199	-68720
	150C1F3	8753	20863	69947	8783	19113	-68692
	380C2F1	17478	42930	141229	17562	38537	-137493
	380C2F2	17491	42388	140606	17564	38398	-137440
	380C2F3	17506	41726	139893	17566	38226	-137384
	RTG	0	0	0	5512	11654	-41984

ZWW4HK400+5

Appendix BE1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2565	5424	-19461
	150C1F1	0	0	0	9449	19729	-71424
	150C1F2	0	0	0	9450	19683	-71416
	150C1F3	0	0	0	9450	19627	-71409
	380C2F1	0	0	0	18898	39458	-142848
	380C2F2	0	0	0	18899	39367	-142833
	380C2F3	0	0	0	18900	39253	-142818
	RTG	0	0	0	5124	10690	-38845
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2598	5964	-22017
	150C1F1	0	0	0	9584	22164	-82039
	150C1F2	0	0	0	9584	22151	-82041
	150C1F3	0	0	0	9584	22135	-82043
	380C2F1	0	0	0	19168	44328	-164079
	380C2F2	0	0	0	19168	44302	-164082
	380C2F3	0	0	0	19168	44270	-164086
	RTG	0	0	0	5185	11776	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4284	8614	-30911
	150C1F1	0	0	0	11014	23452	-85630
	150C1F2	0	0	0	11014	23414	-85628
	150C1F3	0	0	0	11014	23367	-85627
	380C2F1	0	0	0	22027	46905	-171260
	380C2F2	0	0	0	22028	46829	-171256
	380C2F3	0	0	0	22028	46734	-171254
	RTG	0	0	0	8568	16968	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3226	6464	-23882
	150C1F1	0	0	0	10779	21886	-80999
	150C1F2	0	0	0	10779	21873	-81001
	150C1F3	0	0	0	10779	21856	-81004
	380C2F1	0	0	0	21558	43771	-161999
	380C2F2	0	0	0	21558	43745	-162002
	380C2F3	0	0	0	21559	43713	-162008
	RTG	0	0	0	6444	12867	-47695
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2484	9046	-24987
	150C1F1	0	0	0	9236	29053	-83734
	150C1F2	0	0	0	9258	28127	-82098
	150C1F3	0	0	0	9287	26992	-80154
	380C2F1	0	0	0	18471	58107	-167468
	380C2F2	0	0	0	18516	56254	-164195
	380C2F3	0	0	0	18573	53984	-160307
	RTG	0	0	0	5029	15015	-44261
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2583	6775	-22589
	150C1F1	0	0	0	9550	24311	-83138
	150C1F2	0	0	0	9555	24112	-82955
	150C1F3	0	0	0	9560	23868	-82748
	380C2F1	0	0	0	19100	48623	-166276
	380C2F2	0	0	0	19109	48225	-165911
	380C2F3	0	0	0	19120	47736	-165496
	RTG	0	0	0	5171	12781	-44080
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4159	13928	-38120
	150C1F1	0	0	0	10847	30731	-93472
	150C1F2	0	0	0	10866	30014	-92361
	150C1F3	0	0	0	10891	29138	-91061
	380C2F1	0	0	0	21693	61462	-186943
	380C2F2	0	0	0	21733	60028	-184722
	380C2F3	0	0	0	21781	58277	-182123
	RTG	0	0	0	8426	23346	-68582
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3216	7221	-24251
	150C1F1	0	0	0	10754	23958	-81814
	150C1F2	0	0	0	10758	23769	-81671
	150C1F3	0	0	0	10762	23537	-81509
	380C2F1	0	0	0	21509	47915	-163628
	380C2F2	0	0	0	21516	47538	-163341
	380C2F3	0	0	0	21524	47074	-163018
	RTG	0	0	0	6435	13822	-47962
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2461	10262	-27386
	150C1F1	0	0	0	9163	32244	-89614
	150C1F2	0	0	0	9190	31025	-87330
	150C1F3	0	0	0	9224	29525	-84581
	380C2F1	0	0	0	18326	64489	-179229
	380C2F2	0	0	0	18380	62051	-174661
	380C2F3	0	0	0	18449	59049	-169161
	RTG	0	0	0	4994	16508	-46959
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2576	7044	-22935
	150C1F1	0	0	0	9532	25000	-83854
	150C1F2	0	0	0	9539	24736	-83565
	150C1F3	0	0	0	9548	24413	-83236
	380C2F1	0	0	0	19065	49999	-167708
	380C2F2	0	0	0	19079	49471	-167131
	380C2F3	0	0	0	19095	48825	-166471
	RTG	0	0	0	5164	13100	-44387

NL3/3	GW / opgw	0	0	0	4124	15691	-41315
Wind, -5°C	150C1F1	0	0	0	10779	33219	-97578
Permanent loads yg= 1.2	150C1F2	0	0	0	10805	32265	-95963
Wind angle: 90°	150C1F3	0	0	0	10836	31096	-94052
	380C2F1	0	0	0	21558	66438	-195156
	380C2F2	0	0	0	21609	64529	-191926
	380C2F3	0	0	0	21673	62193	-188105
	RTG	0	0	0	8372	25505	-72111
NL3/4	GW / opgw	0	0	0	3211	7463	-24494
Construction/maintenance, +5°C	150C1F1	0	0	0	10741	24607	-82382
Permanent loads yg= 1.2	150C1F2	0	0	0	10746	24358	-82152
Wind angle: 90°	150C1F3	0	0	0	10753	24053	-81891
	380C2F1	0	0	0	21483	49213	-164764
	380C2F2	0	0	0	21493	48717	-164304
	380C2F3	0	0	0	21505	48107	-163782
	RTG	0	0	0	6430	14114	-48169
NL3/1a	GW / opgw	0	0	0	2552	6165	-20085
Wind, 10°C	150C1F1	0	0	0	9419	21673	-72656
Permanent loads yg= 1.2	150C1F2	0	0	0	9423	21456	-72450
Wind angle: -45°	150C1F3	0	0	0	9429	21189	-72217
	380C2F1	0	0	0	18838	43347	-145313
	380C2F2	0	0	0	18847	42911	-144901
	380C2F3	0	0	0	18857	42377	-144433
	RTG	0	0	0	5112	11598	-39360
NL3/1b	GW / opgw	0	0	0	2597	6149	-22051
Wind, -20°C	150C1F1	0	0	0	9580	22671	-82080
Permanent loads yg= 1.2	150C1F2	0	0	0	9581	22618	-82068
Wind angle: -45°	150C1F3	0	0	0	9581	22552	-82054
	380C2F1	0	0	0	19160	45343	-164160
	380C2F2	0	0	0	19162	45236	-164135
	380C2F3	0	0	0	19163	45103	-164109
	RTG	0	0	0	5183	12016	-43637
NL3/3	GW / opgw	0	0	0	4264	9730	-31693
Wind, -5°C	150C1F1	0	0	0	10993	25022	-86311
Permanent loads yg= 1.2	150C1F2	0	0	0	10996	24850	-86190
Wind angle: -45°	150C1F3	0	0	0	10999	24638	-86055
	380C2F1	0	0	0	21985	50044	-172623
	380C2F2	0	0	0	21991	49700	-172381
	380C2F3	0	0	0	21999	49275	-172109
	RTG	0	0	0	8550	18346	-62285
NL3/4	GW / opgw	0	0	0	3225	6644	-23894
Construction/maintenance, +5°C	150C1F1	0	0	0	10777	22385	-81010
Permanent loads yg= 1.2	150C1F2	0	0	0	10777	22333	-81002
Wind angle: -45°	150C1F3	0	0	0	10777	22268	-80994
	380C2F1	0	0	0	21553	44770	-162019
	380C2F2	0	0	0	21554	44666	-162003
	380C2F3	0	0	0	21555	44536	-161987
	RTG	0	0	0	6443	13101	-47687
NL3/1a	GW / opgw	0	0	0	1932	4321	-15342
Wind, 10°C	150C1F1	0	0	0	7121	15738	-56530
Permanent loads yg= 0.9	150C1F2	0	0	0	7122	15690	-56514
Wind angle: 0°	150C1F3	0	0	0	7122	15631	-56498
	380C2F1	0	0	0	14243	31476	-113059
	380C2F2	0	0	0	14244	31380	-113028
	380C2F3	0	0	0	14245	31262	-112995
	RTG	0	0	0	3860	8474	-30573
NL3/1b	GW / opgw	0	0	0	1963	4792	-17644
Wind, -20°C	150C1F1	0	0	0	7248	17952	-66320
Permanent loads yg= 0.9	150C1F2	0	0	0	7248	17939	-66321
Wind angle: 0°	150C1F3	0	0	0	7248	17922	-66322
	380C2F1	0	0	0	14496	35904	-132640
	380C2F2	0	0	0	14496	35878	-132642
	380C2F3	0	0	0	14496	35845	-132644
	RTG	0	0	0	3916	9435	-34888
NL3/3	GW / opgw	0	0	0	3657	7652	-27320
Wind, -5°C	150C1F1	0	0	0	8691	19543	-71041
Permanent loads yg= 0.9	150C1F2	0	0	0	8691	19504	-71035
Wind angle: 0°	150C1F3	0	0	0	8691	19455	-71029
	380C2F1	0	0	0	17381	39086	-142083
	380C2F2	0	0	0	17382	39008	-142070
	380C2F3	0	0	0	17382	38910	-142058
	RTG	0	0	0	7317	15037	-54461
NL3/4	GW / opgw	0	0	0	2596	5418	-19980
Construction/maintenance, +5°C	150C1F1	0	0	0	8458	18007	-66526
Permanent loads yg= 0.9	150C1F2	0	0	0	8458	17994	-66527
Wind angle: 0°	150C1F3	0	0	0	8458	17978	-66529
	380C2F1	0	0	0	16916	36015	-133051
	380C2F2	0	0	0	16916	35988	-133054
	380C2F3	0	0	0	16916	35956	-133058
	RTG	0	0	0	5186	10774	-39884
NL3/1a	GW / opgw	0	0	0	1846	8384	-22519
Wind, 10°C	150C1F1	0	0	0	6880	26243	-73248
Permanent loads yg= 0.9	150C1F2	0	0	0	6901	25202	-71185
Wind angle: 45°	150C1F3	0	0	0	6930	23920	-68692
	380C2F1	0	0	0	13759	52485	-146496
	380C2F2	0	0	0	13803	50404	-142371
	380C2F3	0	0	0	13859	47840	-137385
	RTG	0	0	0	3750	13345	-38030
NL3/1b	GW / opgw	0	0	0	1943	5687	-18529
Wind, -20°C	150C1F1	0	0	0	7201	20284	-68109
Permanent loads yg= 0.9	150C1F2	0	0	0	7208	20060	-67833
Wind angle: 45°	150C1F3	0	0	0	7215	19786	-67515
	380C2F1	0	0	0	14402	40568	-136219
	380C2F2	0	0	0	14415	40120	-135665
	380C2F3	0	0	0	14430	39572	-135030
	RTG	0	0	0	3897	10520	-35639

NL3/3	GW / opgw	0	0	0	3525	13313	-35825
Wind, -5°C	150C1F1	0	0	0	8491	27571	-81682
Permanent loads yg= 0.9	150C1F2	0	0	0	8513	26769	-80254
Wind angle: 45°	150C1F3	0	0	0	8540	25788	-78562
	380C2F1	0	0	0	16983	55141	-163363
	380C2F2	0	0	0	17026	53538	-160508
	380C2F3	0	0	0	17080	51577	-157125
	RTG	0	0	0	7158	21825	-62907
NL3/4	GW / opgw	0	0	0	2583	6220	-20517
Construction/maintenance, +5°C	150C1F1	0	0	0	8426	20203	-67804
Permanent loads yg= 0.9	150C1F2	0	0	0	8430	19998	-67596
Wind angle: 45°	150C1F3	0	0	0	8435	19746	-67360
	380C2F1	0	0	0	16851	40406	-135608
	380C2F2	0	0	0	16860	39995	-135193
	380C2F3	0	0	0	16871	39491	-134720
	RTG	0	0	0	5174	11771	-40307
NL3/1a	GW / opgw	0	0	0	1829	9704	-25304
Wind, 10°C	150C1F1	0	0	0	6815	29786	-80444
Permanent loads yg= 0.9	150C1F2	0	0	0	6838	28440	-77685
Wind angle: 90°	150C1F3	0	0	0	6869	26770	-74304
	380C2F1	0	0	0	13629	59573	-160889
	380C2F2	0	0	0	13675	56880	-155370
	380C2F3	0	0	0	13738	53540	-148608
	RTG	0	0	0	3716	15019	-41405
NL3/1b	GW / opgw	0	0	0	1934	5996	-19024
Wind, -20°C	150C1F1	0	0	0	7178	21066	-69175
Permanent loads yg= 0.9	150C1F2	0	0	0	7187	20765	-68748
Wind angle: 90°	150C1F3	0	0	0	7198	20398	-68256
	380C2F1	0	0	0	14356	42131	-138349
	380C2F2	0	0	0	14374	41530	-137496
	380C2F3	0	0	0	14396	40797	-136512
	RTG	0	0	0	3888	10879	-36099
NL3/3	GW / opgw	0	0	0	3493	15166	-39356
Wind, -5°C	150C1F1	0	0	0	8421	30340	-86837
Permanent loads yg= 0.9	150C1F2	0	0	0	8447	29280	-84830
Wind angle: 90°	150C1F3	0	0	0	8481	27979	-82422
	380C2F1	0	0	0	16843	60679	-173673
	380C2F2	0	0	0	16894	58561	-169661
	380C2F3	0	0	0	16961	55958	-164843
	RTG	0	0	0	7104	24131	-66986
NL3/4	GW / opgw	0	0	0	2577	6485	-20844
Construction/maintenance, +5°C	150C1F1	0	0	0	8409	20916	-68611
Permanent loads yg= 0.9	150C1F2	0	0	0	8416	20643	-68287
Wind angle: 90°	150C1F3	0	0	0	8423	20308	-67914
	380C2F1	0	0	0	16818	41833	-137223
	380C2F2	0	0	0	16831	41285	-136573
	380C2F3	0	0	0	16847	40616	-135828
	RTG	0	0	0	5168	12085	-40596
NL3/1a	GW / opgw	0	0	0	1915	5143	-16272
Wind, 10°C	150C1F1	0	0	0	7081	17865	-58446
Permanent loads yg= 0.9	150C1F2	0	0	0	7087	17621	-58141
Wind angle: -45°	150C1F3	0	0	0	7094	17323	-57790
	380C2F1	0	0	0	14162	35731	-116892
	380C2F2	0	0	0	14174	35242	-116281
	380C2F3	0	0	0	14187	34645	-115581
	RTG	0	0	0	3843	9460	-31382
NL3/1b	GW / opgw	0	0	0	1961	4987	-17714
Wind, -20°C	150C1F1	0	0	0	7243	18480	-66437
Permanent loads yg= 0.9	150C1F2	0	0	0	7244	18423	-66412
Wind angle: -45°	150C1F3	0	0	0	7245	18353	-66386
	380C2F1	0	0	0	14486	36959	-132873
	380C2F2	0	0	0	14487	36846	-132825
	380C2F3	0	0	0	14489	36706	-132772
	RTG	0	0	0	3914	9683	-34932
NL3/3	GW / opgw	0	0	0	3634	8826	-28322
Wind, -5°C	150C1F1	0	0	0	8663	21212	-72093
Permanent loads yg= 0.9	150C1F2	0	0	0	8667	21025	-71917
Wind angle: -45°	150C1F3	0	0	0	8672	20796	-71717
	380C2F1	0	0	0	17326	42423	-144186
	380C2F2	0	0	0	17334	42050	-143834
	380C2F3	0	0	0	17344	41591	-143434
	RTG	0	0	0	7295	16470	-52287
NL3/4	GW / opgw	0	0	0	2595	5603	-20011
Construction/maintenance, +5°C	150C1F1	0	0	0	8455	18520	-66586
Permanent loads yg= 0.9	150C1F2	0	0	0	8455	18466	-66570
Wind angle: -45°	150C1F3	0	0	0	8456	18398	-66554
	380C2F1	0	0	0	16909	37040	-133172
	380C2F2	0	0	0	16910	36932	-133140
	380C2F3	0	0	0	16912	36797	-133107
	RTG	0	0	0	5185	11013	-39893

ZWW4HK400+5

Appendix BE1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	longitudinal [N]	Vertical [N]	Transversal [N]	longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2565	5424	19461	0	0	0
	150C1F1	9449	19729	71424	0	0	0
	150C1F2	9450	19683	71416	0	0	0
	150C1F3	9450	19627	71409	0	0	0
	380C2F1	18898	39458	142848	0	0	0
	380C2F2	18899	39367	142833	0	0	0
	380C2F3	18900	39253	142818	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	5964	22017	0	0	0
	150C1F1	9584	22164	82039	0	0	0
	150C1F2	9584	22151	82041	0	0	0
	150C1F3	9584	22135	82043	0	0	0
	380C2F1	19168	44328	164079	0	0	0
	380C2F2	19168	44302	164082	0	0	0
	380C2F3	19168	44270	164086	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4284	8614	30911	0	0	0
	150C1F1	11014	23452	85630	0	0	0
	150C1F2	11014	23414	85628	0	0	0
	150C1F3	11014	23367	85627	0	0	0
	380C2F1	22027	46905	171260	0	0	0
	380C2F2	22028	46829	171256	0	0	0
	380C2F3	22028	46734	171254	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3226	6464	23882	0	0	0
	150C1F1	10779	21886	80999	0	0	0
	150C1F2	10779	21873	81001	0	0	0
	150C1F3	10779	21856	81004	0	0	0
	380C2F1	21558	43771	161999	0	0	0
	380C2F2	21558	43745	162002	0	0	0
	380C2F3	21559	43713	162008	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2552	6165	20085	0	0	0
	150C1F1	9419	21673	72656	0	0	0
	150C1F2	9423	21456	72450	0	0	0
	150C1F3	9429	21189	72217	0	0	0
	380C2F1	18838	43347	145313	0	0	0
	380C2F2	18847	42911	144901	0	0	0
	380C2F3	18857	42377	144433	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2597	6149	22051	0	0	0
	150C1F1	9580	22671	82080	0	0	0
	150C1F2	9581	22618	82068	0	0	0
	150C1F3	9581	22552	82054	0	0	0
	380C2F1	19160	45343	164160	0	0	0
	380C2F2	19162	45236	164135	0	0	0
	380C2F3	19163	45103	164109	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4264	9730	31693	0	0	0
	150C1F1	10993	25022	86311	0	0	0
	150C1F2	10996	24850	86190	0	0	0
	150C1F3	10999	24638	86055	0	0	0
	380C2F1	21985	50044	172623	0	0	0
	380C2F2	21991	49700	172381	0	0	0
	380C2F3	21999	49275	172109	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3225	6644	23894	0	0	0
	150C1F1	10777	22385	81010	0	0	0
	150C1F2	10777	22333	81002	0	0	0
	150C1F3	10777	22268	80994	0	0	0
	380C2F1	21553	44770	162019	0	0	0
	380C2F2	21554	44666	162003	0	0	0
	380C2F3	21555	44536	161987	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2461	10262	27386	0	0	0
	150C1F1	9163	32244	89614	0	0	0
	150C1F2	9190	31025	87330	0	0	0
	150C1F3	9224	29525	84581	0	0	0
	380C2F1	18326	64489	179229	0	0	0
	380C2F2	18380	62051	174661	0	0	0
	380C2F3	18449	59049	169161	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2576	7044	22935	0	0	0
	150C1F1	9532	25000	83854	0	0	0
	150C1F2	9539	24736	83565	0	0	0
	150C1F3	9548	24413	83236	0	0	0
	380C2F1	19065	49999	167708	0	0	0
	380C2F2	19079	49471	167131	0	0	0
	380C2F3	19095	48825	166471	0	0	0
	RTG	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4124	15691	41315	0	0	0
	150C1F1	10779	33219	97578	0	0	0
	150C1F2	10805	32265	95963	0	0	0
	150C1F3	10836	31096	94052	0	0	0
	380C2F1	21558	66438	195156	0	0	0
	380C2F2	21609	64529	191926	0	0	0
	380C2F3	21673	62193	188105	0	0	0
	RTG	0	0	0	0	0	0
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3211	7463	24494	0	0
150C1F1		10741	24607	82382	0	0	0
150C1F2		10746	24358	82152	0	0	0
150C1F3		10753	24053	81891	0	0	0
380C2F1		21483	49213	164764	0	0	0
380C2F2		21493	48717	164304	0	0	0
380C2F3		21505	48107	163782	0	0	0
RTG		0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2484	9046	24987	0	0
	150C1F1	9236	29053	83734	0	0	0
	150C1F2	9258	28127	82098	0	0	0
	150C1F3	9287	26992	80154	0	0	0
	380C2F1	18471	58107	167468	0	0	0
	380C2F2	18516	56254	164195	0	0	0
	380C2F3	18573	53984	160307	0	0	0
	RTG	0	0	0	0	0	0
	NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2583	6775	22589	0	0
150C1F1		9550	24311	83138	0	0	0
150C1F2		9555	24112	82955	0	0	0
150C1F3		9560	23868	82748	0	0	0
380C2F1		19100	48623	166276	0	0	0
380C2F2		19109	48225	165911	0	0	0
380C2F3		19120	47736	165496	0	0	0
RTG		0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	4159	13928	38120	0	0
	150C1F1	10847	30731	93472	0	0	0
	150C1F2	10866	30014	92361	0	0	0
	150C1F3	10891	29138	91061	0	0	0
	380C2F1	21693	61462	186943	0	0	0
	380C2F2	21733	60028	184722	0	0	0
	380C2F3	21781	58277	182123	0	0	0
	RTG	0	0	0	0	0	0
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3216	7221	24251	0	0
150C1F1		10754	23958	81814	0	0	0
150C1F2		10758	23769	81671	0	0	0
150C1F3		10762	23537	81509	0	0	0
380C2F1		21509	47915	163628	0	0	0
380C2F2		21516	47538	163341	0	0	0
380C2F3		21524	47074	163018	0	0	0
RTG		0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1932	4321	15342	0	0
	150C1F1	7121	15738	56530	0	0	0
	150C1F2	7122	15690	56514	0	0	0
	150C1F3	7122	15631	56498	0	0	0
	380C2F1	14243	31476	113059	0	0	0
	380C2F2	14244	31380	113028	0	0	0
	380C2F3	14245	31262	112995	0	0	0
	RTG	0	0	0	0	0	0
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	4792	17644	0	0
150C1F1		7248	17952	66320	0	0	0
150C1F2		7248	17939	66321	0	0	0
150C1F3		7248	17922	66322	0	0	0
380C2F1		14496	35904	132640	0	0	0
380C2F2		14496	35878	132642	0	0	0
380C2F3		14496	35845	132644	0	0	0
RTG		0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	3657	7652	27320	0	0
	150C1F1	8691	19543	71041	0	0	0
	150C1F2	8691	19504	71035	0	0	0
	150C1F3	8691	19455	71029	0	0	0
	380C2F1	17381	39086	142083	0	0	0
	380C2F2	17382	39008	142070	0	0	0
	380C2F3	17382	38910	142058	0	0	0
	RTG	0	0	0	0	0	0
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2596	5418	19980	0	0
150C1F1		8458	18007	66526	0	0	0
150C1F2		8458	17994	66527	0	0	0
150C1F3		8458	17978	66529	0	0	0
380C2F1		16916	36015	133051	0	0	0
380C2F2		16916	35988	133054	0	0	0
380C2F3		16916	35956	133058	0	0	0
RTG		0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1915	5143	16272	0	0
	150C1F1	7081	17865	58446	0	0	0
	150C1F2	7087	17621	58141	0	0	0
	150C1F3	7094	17323	57790	0	0	0
	380C2F1	14162	35731	116892	0	0	0
	380C2F2	14174	35242	116281	0	0	0
	380C2F3	14187	34645	115581	0	0	0
	RTG	0	0	0	0	0	0
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1961	4987	17714	0	0
150C1F1		7243	18480	66437	0	0	0
150C1F2		7244	18423	66412	0	0	0
150C1F3		7245	18353	66386	0	0	0
380C2F1		14486	36959	132873	0	0	0
380C2F2		14487	36846	132825	0	0	0
380C2F3		14489	36706	132772	0	0	0
RTG		0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3634	8826	28322	0	0	0
	150C1F1	8663	21212	72093	0	0	0
	150C1F2	8667	21025	71917	0	0	0
	150C1F3	8672	20796	71717	0	0	0
	380C2F1	17326	42423	144186	0	0	0
	380C2F2	17334	42050	143834	0	0	0
	380C2F3	17344	41591	143434	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2595	5603	20011	0	0	0
	150C1F1	8455	18520	66586	0	0	0
	150C1F2	8455	18466	66570	0	0	0
	150C1F3	8456	18398	66554	0	0	0
	380C2F1	16909	37040	133172	0	0	0
	380C2F2	16910	36932	133140	0	0	0
	380C2F3	16912	36797	133107	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1829	9704	25304	0	0	0
	150C1F1	6815	29786	80444	0	0	0
	150C1F2	6838	28440	77685	0	0	0
	150C1F3	6869	26770	74304	0	0	0
	380C2F1	13629	59573	160889	0	0	0
	380C2F2	13675	56880	155370	0	0	0
	380C2F3	13738	53540	148608	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1934	5996	19024	0	0	0
	150C1F1	7178	21066	69175	0	0	0
	150C1F2	7187	20765	68748	0	0	0
	150C1F3	7198	20398	68256	0	0	0
	380C2F1	14356	42131	138349	0	0	0
	380C2F2	14374	41530	137496	0	0	0
	380C2F3	14396	40797	136512	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3493	15166	39356	0	0	0
	150C1F1	8421	30340	86837	0	0	0
	150C1F2	8447	29280	84830	0	0	0
	150C1F3	8481	27979	82422	0	0	0
	380C2F1	16843	60679	173673	0	0	0
	380C2F2	16894	58561	169661	0	0	0
	380C2F3	16961	55958	164843	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2577	6485	20844	0	0	0
	150C1F1	8409	20916	68611	0	0	0
	150C1F2	8416	20643	68287	0	0	0
	150C1F3	8423	20308	67914	0	0	0
	380C2F1	16818	41833	137223	0	0	0
	380C2F2	16831	41285	136573	0	0	0
	380C2F3	16847	40616	135828	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1846	8384	22519	0	0	0
	150C1F1	6880	26243	73248	0	0	0
	150C1F2	6901	25202	71185	0	0	0
	150C1F3	6930	23920	68692	0	0	0
	380C2F1	13759	52485	146496	0	0	0
	380C2F2	13803	50404	142371	0	0	0
	380C2F3	13859	47840	137385	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1943	5687	18529	0	0	0
	150C1F1	7201	20284	68109	0	0	0
	150C1F2	7208	20060	67833	0	0	0
	150C1F3	7215	19786	67515	0	0	0
	380C2F1	14402	40568	136219	0	0	0
	380C2F2	14415	40120	135665	0	0	0
	380C2F3	14430	39572	135030	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3525	13313	35825	0	0	0
	150C1F1	8491	27571	81682	0	0	0
	150C1F2	8513	26769	80254	0	0	0
	150C1F3	8540	25788	78562	0	0	0
	380C2F1	16983	55141	163363	0	0	0
	380C2F2	17026	53538	160508	0	0	0
	380C2F3	17080	51577	157125	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2583	6220	20517	0	0	0
	150C1F1	8426	20203	67804	0	0	0
	150C1F2	8430	19998	67596	0	0	0
	150C1F3	8435	19746	67360	0	0	0
	380C2F1	16851	40406	135608	0	0	0
	380C2F2	16860	39995	135193	0	0	0
	380C2F3	16871	39491	134720	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HK400+5

Appendix BE1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	longitudinal [N]	Vertical [N]	Transversal [N]	longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2565	5424	19461	2565	5424	-19461
	150C1F1	9449	19729	71424	9449	19729	-71424
	150C1F2	9450	19683	71416	9450	19683	-71416
	150C1F3	9450	19627	71409	9450	19627	-71409
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	5964	22017	2598	5964	-22017
	150C1F1	9584	22164	82039	9584	22164	-82039
	150C1F2	9584	22151	82041	9584	22151	-82041
	150C1F3	9584	22135	82043	9584	22135	-82043
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4284	8614	30911	4284	8614	-30911
	150C1F1	11014	23452	85630	11014	23452	-85630
	150C1F2	11014	23414	85628	11014	23414	-85628
	150C1F3	11014	23367	85627	11014	23367	-85627
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3226	6464	23882	3226	6464	-23882
	150C1F1	10779	21886	80999	10779	21886	-80999
	150C1F2	10779	21873	81001	10779	21873	-81001
	150C1F3	10779	21856	81004	10779	21856	-81004
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2552	6165	20085	2484	9046	-24987
	150C1F1	9419	21673	72656	9236	29053	-83734
	150C1F2	9423	21456	72450	9258	28127	-82098
	150C1F3	9429	21189	72217	9287	26992	-80154
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2597	6149	22051	2583	6775	-22589
	150C1F1	9580	22671	82080	9550	24311	-83138
	150C1F2	9581	22618	82068	9555	24112	-82955
	150C1F3	9581	22552	82054	9560	23868	-82748
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4264	9730	31693	4159	13928	-38120
	150C1F1	10993	25022	86311	10847	30731	-93472
	150C1F2	10996	24850	86190	10866	30014	-92361
	150C1F3	10999	24638	86055	10891	29138	-91061
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3225	6644	23894	3216	7221	-24251
	150C1F1	10777	22385	81010	10754	23958	-81814
	150C1F2	10777	22333	81002	10758	23769	-81671
	150C1F3	10777	22268	80994	10762	23537	-81509
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2461	10262	27386	2461	10262	-27386
	150C1F1	9163	32244	89614	9163	32244	-89614
	150C1F2	9190	31025	87330	9190	31025	-87330
	150C1F3	9224	29525	84581	9224	29525	-84581
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2576	7044	22935	2576	7044	-22935
	150C1F1	9532	25000	83854	9532	25000	-83854
	150C1F2	9539	24736	83565	9539	24736	-83565
	150C1F3	9548	24413	83236	9548	24413	-83236
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4124	15691	41315	4124	15691	-41315
	150C1F1	10779	33219	97578	10779	33219	-97578
	150C1F2	10805	32265	95963	10805	32265	-95963
	150C1F3	10836	31096	94052	10836	31096	-94052
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3211	7463	24494	3211	7463	-24494
	150C1F1	10741	24607	82382	10741	24607	-82382
	150C1F2	10746	24358	82152	10746	24358	-82152
	150C1F3	10753	24053	81891	10753	24053	-81891
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2484	9046	24987	2552	6165	-20085
	150C1F1	9236	29053	83734	9419	21673	-72656
	150C1F2	9258	28127	82098	9423	21456	-72450
	150C1F3	9287	26992	80154	9429	21189	-72217
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2583	6775	22589	2597	6149	-22051
	150C1F1	9550	24311	83138	9580	22671	-82080
	150C1F2	9555	24112	82955	9581	22618	-82068
	150C1F3	9560	23868	82748	9581	22552	-82054
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4159	13928	38120	4264	9730	-31693
	150C1F1	10847	30731	93472	10993	25022	-86311
	150C1F2	10866	30014	92361	10996	24850	-86190
	150C1F3	10891	29138	91061	10999	24638	-86055
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3216	7221	24251	3225	6644	-23894
	150C1F1	10754	23958	81814	10777	22385	-81010
	150C1F2	10758	23769	81671	10777	22333	-81002
	150C1F3	10762	23537	81509	10777	22268	-80994
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1932	4321	15342	1932	4321	-15342
	150C1F1	7121	15738	56530	7121	15738	-56530
	150C1F2	7122	15690	56514	7122	15690	-56514
	150C1F3	7122	15631	56498	7122	15631	-56498
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	4792	17644	1963	4792	-17644
	150C1F1	7248	17952	66320	7248	17952	-66320
	150C1F2	7248	17939	66321	7248	17939	-66321
	150C1F3	7248	17922	66322	7248	17922	-66322
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3657	7652	27320	3657	7652	-27320
	150C1F1	8691	19543	71041	8691	19543	-71041
	150C1F2	8691	19504	71035	8691	19504	-71035
	150C1F3	8691	19455	71029	8691	19455	-71029
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2596	5418	19980	2596	5418	-19980
	150C1F1	8458	18007	66526	8458	18007	-66526
	150C1F2	8458	17994	66527	8458	17994	-66527
	150C1F3	8458	17978	66529	8458	17978	-66529
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1915	5143	16272	1846	8384	-22519
	150C1F1	7081	17865	58446	6880	26243	-73248
	150C1F2	7087	17621	58141	6901	25202	-71185
	150C1F3	7094	17323	57790	6930	23920	-68692
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1961	4987	17714	1943	5687	-18529
	150C1F1	7243	18480	66437	7201	20284	-68109
	150C1F2	7244	18423	66412	7208	20060	-67833
	150C1F3	7245	18353	66386	7215	19786	-67515
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: 45°	GW / opgw	3634	8826	28322	3525	13313	-35825
	150C1F1	8663	21212	72093	8491	27571	-81682
	150C1F2	8667	21025	71917	8513	26769	-80254
	150C1F3	8672	20796	71717	8540	25788	-78562
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: 45°	GW / opgw	2595	5603	20011	2583	6220	-20517
	150C1F1	8455	18520	66586	8426	20203	-67804
	150C1F2	8455	18466	66570	8430	19998	-67596
	150C1F3	8456	18398	66554	8435	19746	-67360
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	1829	9704	25304	1829	9704	-25304
	150C1F1	6815	29786	80444	6815	29786	-80444
	150C1F2	6838	28440	77685	6838	28440	-77685
	150C1F3	6869	26770	74304	6869	26770	-74304
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	1934	5996	19024	1934	5996	-19024
	150C1F1	7178	21066	69175	7178	21066	-69175
	150C1F2	7187	20765	68748	7187	20765	-68748
	150C1F3	7198	20398	68256	7198	20398	-68256
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	3493	15166	39356	3493	15166	-39356
	150C1F1	8421	30340	86837	8421	30340	-86837
	150C1F2	8447	29280	84830	8447	29280	-84830
	150C1F3	8481	27979	82422	8481	27979	-82422
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	2577	6485	20844	2577	6485	-20844
	150C1F1	8409	20916	68611	8409	20916	-68611
	150C1F2	8416	20643	68287	8416	20643	-68287
	150C1F3	8423	20308	67914	8423	20308	-67914
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	1846	8384	22519	1915	5143	-16272
	150C1F1	6880	26243	73248	7081	17865	-58446
	150C1F2	6901	25202	71185	7087	17621	-58141
	150C1F3	6930	23920	68692	7094	17323	-57790
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	1943	5687	18529	1961	4987	-17714
	150C1F1	7201	20284	68109	7243	18480	-66437
	150C1F2	7208	20060	67833	7244	18423	-66412
	150C1F3	7215	19786	67515	7245	18353	-66386
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	3525	13313	35825	3634	8826	-28322
	150C1F1	8491	27571	81682	8663	21212	-72093
	150C1F2	8513	26769	80254	8667	21025	-71917
	150C1F3	8540	25788	78562	8672	20796	-71717
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	2583	6220	20517	2595	5603	-20011
	150C1F1	8426	20203	67804	8455	18520	-66586
	150C1F2	8430	19998	67596	8455	18466	-66570
	150C1F3	8435	19746	67360	8456	18398	-66554
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HK400+5

Appendix BE1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18898	39458	142848	18898	39458	-142848
	380C2F2	18899	39367	142833	18899	39367	-142833
	380C2F3	18900	39253	142818	18900	39253	-142818
	RTG	0	0	0	5124	10690	-38845
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19168	44328	164079	19168	44328	-164079
	380C2F2	19168	44302	164082	19168	44302	-164082
	380C2F3	19168	44270	164086	19168	44270	-164086
	RTG	0	0	0	5185	11776	-43625
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22027	46905	171260	22027	46905	-171260
	380C2F2	22028	46829	171256	22028	46829	-171256
	380C2F3	22028	46734	171254	22028	46734	-171254
	RTG	0	0	0	8568	16968	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21558	43771	161999	21558	43771	-161999
	380C2F2	21558	43745	162002	21558	43745	-162002
	380C2F3	21559	43713	162008	21559	43713	-162008
	RTG	0	0	0	6444	12867	-47695
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18838	43347	145313	18471	58107	-167468
	380C2F2	18847	42911	144901	18516	56254	-164195
	380C2F3	18857	42377	144433	18573	53984	-160307
	RTG	0	0	0	5029	15015	-44261
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19160	45343	164160	19100	48623	-166276
	380C2F2	19162	45236	164135	19109	48225	-165911
	380C2F3	19163	45103	164109	19120	47736	-165496
	RTG	0	0	0	5171	12781	-44080
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21985	50044	172623	21693	61462	-186943
	380C2F2	21991	49700	172381	21733	60028	-184722
	380C2F3	21999	49275	172109	21781	58277	-182123
	RTG	0	0	0	8426	23346	-68582
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21553	44770	162019	21509	47915	-163628
	380C2F2	21554	44666	162003	21516	47538	-163341
	380C2F3	21555	44536	161987	21524	47074	-163018
	RTG	0	0	0	6435	13822	-47962
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18326	64489	179229	18326	64489	-179229
	380C2F2	18380	62051	174661	18380	62051	-174661
	380C2F3	18449	59049	169161	18449	59049	-169161
	RTG	0	0	0	4994	16508	-46959
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19065	49999	167708	19065	49999	-167708
	380C2F2	19079	49471	167131	19079	49471	-167131
	380C2F3	19095	48825	166471	19095	48825	-166471
	RTG	0	0	0	5164	13100	-44387

ZWW4HK400+5

Appendix BE1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18898	39458	142848	18898	39458	-142848
	380C2F2	18899	39367	142833	18899	39367	-142833
	380C2F3	18900	39253	142818	18900	39253	-142818
	RTG	0	0	0	5124	10690	-38845
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19168	44328	164079	19168	44328	-164079
	380C2F2	19168	44302	164082	19168	44302	-164082
	380C2F3	19168	44270	164086	19168	44270	-164086
	RTG	0	0	0	5185	11776	-43625
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22027	46905	171260	22027	46905	-171260
	380C2F2	22028	46829	171256	22028	46829	-171256
	380C2F3	22028	46734	171254	22028	46734	-171254
	RTG	0	0	0	8568	16968	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21558	43771	161999	21558	43771	-161999
	380C2F2	21558	43745	162002	21558	43745	-162002
	380C2F3	21559	43713	162008	21559	43713	-162008
	RTG	0	0	0	6444	12867	-47695
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18838	43347	145313	18471	58107	-167468
	380C2F2	18847	42911	144901	18516	56254	-164195
	380C2F3	18857	42377	144433	18573	53984	-160307
	RTG	0	0	0	5029	15015	-44261
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19160	45343	164160	19100	48623	-166276
	380C2F2	19162	45236	164135	19109	48225	-165911
	380C2F3	19163	45103	164109	19120	47736	-165496
	RTG	0	0	0	5171	12781	-44080
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21985	50044	172623	21693	61462	-186943
	380C2F2	21991	49700	172381	21733	60028	-184722
	380C2F3	21999	49275	172109	21781	58277	-182123
	RTG	0	0	0	8426	23346	-68582
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21553	44770	162019	21509	47915	-163628
	380C2F2	21554	44666	162003	21516	47538	-163341
	380C2F3	21555	44536	161987	21524	47074	-163018
	RTG	0	0	0	6435	13822	-47962
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18326	64489	179229	18326	64489	-179229
	380C2F2	18380	62051	174661	18380	62051	-174661
	380C2F3	18449	59049	169161	18449	59049	-169161
	RTG	0	0	0	4994	16508	-46959
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19065	49999	167708	19065	49999	-167708
	380C2F2	19079	49471	167131	19079	49471	-167131
	380C2F3	19095	48825	166471	19095	48825	-166471
	RTG	0	0	0	5164	13100	-44387

ZWW4HK400+5

Appendix BE1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2565	5424	19461	0	0	0
	150C1F1	9449	19729	71424	0	0	0
	150C1F2	9450	19683	71416	0	0	0
	150C1F3	9450	19627	71409	0	0	0
	380C2F1	0	0	0	18898	39458	-142848
	380C2F2	0	0	0	18899	39367	-142833
	380C2F3	0	0	0	18900	39253	-142818
	RTG	0	0	0	5124	10690	-38845
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2598	5964	22017	0	0	0
	150C1F1	9584	22164	82039	0	0	0
	150C1F2	9584	22151	82041	0	0	0
	150C1F3	9584	22135	82043	0	0	0
	380C2F1	0	0	0	19168	44328	-164079
	380C2F2	0	0	0	19168	44302	-164082
	380C2F3	0	0	0	19168	44270	-164086
	RTG	0	0	0	5185	11776	-43625
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4284	8614	30911	0	0	0
	150C1F1	11014	23452	85630	0	0	0
	150C1F2	11014	23414	85628	0	0	0
	150C1F3	11014	23367	85627	0	0	0
	380C2F1	0	0	0	22027	46905	-171260
	380C2F2	0	0	0	22028	46829	-171256
	380C2F3	0	0	0	22028	46734	-171254
	RTG	0	0	0	8568	16968	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3226	6464	23882	0	0	0
	150C1F1	10779	21886	80999	0	0	0
	150C1F2	10779	21873	81001	0	0	0
	150C1F3	10779	21856	81004	0	0	0
	380C2F1	0	0	0	21558	43771	-161999
	380C2F2	0	0	0	21558	43745	-162002
	380C2F3	0	0	0	21559	43713	-162008
	RTG	0	0	0	6444	12867	-47695
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2552	6165	20085	0	0	0
	150C1F1	9419	21673	72656	0	0	0
	150C1F2	9423	21456	72450	0	0	0
	150C1F3	9429	21189	72217	0	0	0
	380C2F1	0	0	0	18471	58107	-167468
	380C2F2	0	0	0	18516	58254	-164195
	380C2F3	0	0	0	18573	53984	-160307
	RTG	0	0	0	5029	15015	-44261
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2597	6149	22051	0	0	0
	150C1F1	9580	22671	82080	0	0	0
	150C1F2	9581	22618	82068	0	0	0
	150C1F3	9581	22552	82054	0	0	0
	380C2F1	0	0	0	19100	48623	-166276
	380C2F2	0	0	0	19109	48225	-165911
	380C2F3	0	0	0	19120	47736	-165496
	RTG	0	0	0	5171	12781	-44080
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4264	9730	31693	0	0	0
	150C1F1	10993	25022	86311	0	0	0
	150C1F2	10996	24850	86190	0	0	0
	150C1F3	10999	24638	86055	0	0	0
	380C2F1	0	0	0	21693	61462	-186943
	380C2F2	0	0	0	21733	60028	-184722
	380C2F3	0	0	0	21781	58277	-182123
	RTG	0	0	0	8426	23346	-68582
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3225	6644	23894	0	0	0
	150C1F1	10777	22385	81010	0	0	0
	150C1F2	10777	22333	81002	0	0	0
	150C1F3	10777	22268	80994	0	0	0
	380C2F1	0	0	0	21509	47915	-163628
	380C2F2	0	0	0	21516	47538	-163341
	380C2F3	0	0	0	21524	47074	-163018
	RTG	0	0	0	6435	13822	-47962
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2461	10262	27386	0	0	0
	150C1F1	9163	32244	89614	0	0	0
	150C1F2	9190	31025	87330	0	0	0
	150C1F3	9224	29525	84581	0	0	0
	380C2F1	0	0	0	18326	64489	-179229
	380C2F2	0	0	0	18380	62051	-174661
	380C2F3	0	0	0	18449	59049	-169161
	RTG	0	0	0	4994	16508	-46959
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2576	7044	22935	0	0	0
	150C1F1	9532	25000	83854	0	0	0
	150C1F2	9539	24736	83565	0	0	0
	150C1F3	9548	24413	83236	0	0	0
	380C2F1	0	0	0	19065	49999	-167708
	380C2F2	0	0	0	19079	49471	-167131
	380C2F3	0	0	0	19095	48825	-166471
	RTG	0	0	0	5164	13100	-44387

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4124	15691	41315	0	0	0
	150C1F1	10779	33219	97578	0	0	0
	150C1F2	10805	32265	95963	0	0	0
	150C1F3	10836	31096	94052	0	0	0
	380C2F1	0	0	0	21558	66438	-195156
	380C2F2	0	0	0	21609	64529	-191926
	380C2F3	0	0	0	21673	62193	-188105
	RTG	0	0	0	8372	25505	-72111
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3211	7463	24494	0	0	0
	150C1F1	10741	24607	82382	0	0	0
	150C1F2	10746	24358	82152	0	0	0
	150C1F3	10753	24053	81891	0	0	0
	380C2F1	0	0	0	21483	49213	-164764
	380C2F2	0	0	0	21493	48717	-164304
	380C2F3	0	0	0	21505	48107	-163782
	RTG	0	0	0	6430	14114	-48169
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2484	9046	24987	0	0	0
	150C1F1	9236	29053	83734	0	0	0
	150C1F2	9258	28127	82098	0	0	0
	150C1F3	9287	26992	80154	0	0	0
	380C2F1	0	0	0	18838	43347	-145313
	380C2F2	0	0	0	18847	42911	-144901
	380C2F3	0	0	0	18857	42377	-144433
	RTG	0	0	0	5112	11598	-39360
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2583	6775	22589	0	0	0
	150C1F1	9550	24311	83138	0	0	0
	150C1F2	9555	24112	82955	0	0	0
	150C1F3	9560	23868	82748	0	0	0
	380C2F1	0	0	0	19160	45343	-164160
	380C2F2	0	0	0	19162	45236	-164135
	380C2F3	0	0	0	19163	45103	-164109
	RTG	0	0	0	5183	12016	-43637
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4159	13928	38120	0	0	0
	150C1F1	10847	30731	93472	0	0	0
	150C1F2	10866	30014	92361	0	0	0
	150C1F3	10891	29138	91061	0	0	0
	380C2F1	0	0	0	21985	50044	-172623
	380C2F2	0	0	0	21991	49700	-172381
	380C2F3	0	0	0	21999	49275	-172109
	RTG	0	0	0	8550	18346	-62285
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3216	7221	24251	0	0	0
	150C1F1	10754	23958	81814	0	0	0
	150C1F2	10758	23769	81671	0	0	0
	150C1F3	10762	23537	81509	0	0	0
	380C2F1	0	0	0	21553	44770	-162019
	380C2F2	0	0	0	21554	44666	-162003
	380C2F3	0	0	0	21555	44536	-161987
	RTG	0	0	0	6443	13101	-47687
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1932	4321	15342	0	0	0
	150C1F1	7121	15738	56530	0	0	0
	150C1F2	7122	15690	56514	0	0	0
	150C1F3	7122	15631	56498	0	0	0
	380C2F1	0	0	0	14243	31476	-113059
	380C2F2	0	0	0	14244	31380	-113028
	380C2F3	0	0	0	14245	31262	-112995
	RTG	0	0	0	3860	8474	-30573
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	4792	17644	0	0	0
	150C1F1	7248	17952	66320	0	0	0
	150C1F2	7248	17939	66321	0	0	0
	150C1F3	7248	17922	66322	0	0	0
	380C2F1	0	0	0	14496	35904	-132640
	380C2F2	0	0	0	14496	35878	-132642
	380C2F3	0	0	0	14496	35845	-132644
	RTG	0	0	0	3916	9435	-34888
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3657	7652	27320	0	0	0
	150C1F1	8691	19543	71041	0	0	0
	150C1F2	8691	19504	71035	0	0	0
	150C1F3	8691	19455	71029	0	0	0
	380C2F1	0	0	0	17381	39086	-142083
	380C2F2	0	0	0	17382	39008	-142070
	380C2F3	0	0	0	17382	38910	-142058
	RTG	0	0	0	7317	15037	-54461
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2596	5418	19980	0	0	0
	150C1F1	8458	18007	66526	0	0	0
	150C1F2	8458	17994	66527	0	0	0
	150C1F3	8458	17978	66529	0	0	0
	380C2F1	0	0	0	16916	36015	-133051
	380C2F2	0	0	0	16916	35988	-133054
	380C2F3	0	0	0	16916	35956	-133058
	RTG	0	0	0	5186	10774	-39884
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1915	5143	16272	0	0	0
	150C1F1	7081	17865	58446	0	0	0
	150C1F2	7087	17621	58141	0	0	0
	150C1F3	7094	17323	57790	0	0	0
	380C2F1	0	0	0	13759	52485	-146496
	380C2F2	0	0	0	13803	50404	-142371
	380C2F3	0	0	0	13859	47840	-137385
	RTG	0	0	0	3750	13345	-38030
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1961	4987	17714	0	0	0
	150C1F1	7243	18480	66437	0	0	0
	150C1F2	7244	18423	66412	0	0	0
	150C1F3	7245	18353	66386	0	0	0
	380C2F1	0	0	0	14402	40568	-136219
	380C2F2	0	0	0	14415	40120	-135665
	380C2F3	0	0	0	14430	39572	-135030
	RTG	0	0	0	3897	10520	-35639

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3634	8826	28322	0	0	0
	150C1F1	8663	21212	72093	0	0	0
	150C1F2	8667	21025	71917	0	0	0
	150C1F3	8672	20796	71717	0	0	0
	380C2F1	0	0	0	16983	55141	-163363
	380C2F2	0	0	0	17026	53538	-160508
	380C2F3	0	0	0	17080	51577	-157125
	RTG	0	0	0	7158	21825	-62907
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2595	5603	20011	0	0	0
	150C1F1	8455	18520	66586	0	0	0
	150C1F2	8455	18466	66570	0	0	0
	150C1F3	8456	18398	66554	0	0	0
	380C2F1	0	0	0	16851	40406	-135608
	380C2F2	0	0	0	16860	39995	-135193
	380C2F3	0	0	0	16871	39491	-134720
	RTG	0	0	0	5174	11771	-40307
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1829	9704	25304	0	0	0
	150C1F1	6815	29786	80444	0	0	0
	150C1F2	6838	28440	77685	0	0	0
	150C1F3	6869	26770	74304	0	0	0
	380C2F1	0	0	0	13629	59573	-160889
	380C2F2	0	0	0	13675	56880	-155370
	380C2F3	0	0	0	13738	53540	-148608
	RTG	0	0	0	3716	15019	-41405
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1934	5996	19024	0	0	0
	150C1F1	7178	21066	69175	0	0	0
	150C1F2	7187	20765	68748	0	0	0
	150C1F3	7198	20398	68256	0	0	0
	380C2F1	0	0	0	14356	42131	-138349
	380C2F2	0	0	0	14374	41530	-137496
	380C2F3	0	0	0	14396	40797	-136512
	RTG	0	0	0	3888	10879	-36099
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3493	15166	39356	0	0	0
	150C1F1	8421	30340	86837	0	0	0
	150C1F2	8447	29280	84830	0	0	0
	150C1F3	8481	27979	82422	0	0	0
	380C2F1	0	0	0	16843	60679	-173673
	380C2F2	0	0	0	16894	58561	-169661
	380C2F3	0	0	0	16961	55958	-164843
	RTG	0	0	0	7104	24131	-66986
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2577	6485	20844	0	0	0
	150C1F1	8409	20916	68611	0	0	0
	150C1F2	8416	20643	68287	0	0	0
	150C1F3	8423	20308	67914	0	0	0
	380C2F1	0	0	0	16818	41833	-137223
	380C2F2	0	0	0	16831	41285	-136573
	380C2F3	0	0	0	16847	40616	-135828
	RTG	0	0	0	5168	12085	-40596
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1846	8384	22519	0	0	0
	150C1F1	6880	26243	73248	0	0	0
	150C1F2	6901	25202	71185	0	0	0
	150C1F3	6930	23920	68692	0	0	0
	380C2F1	0	0	0	14162	35731	-116892
	380C2F2	0	0	0	14174	35242	-116281
	380C2F3	0	0	0	14187	34645	-115581
	RTG	0	0	0	3843	9460	-31382
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1943	5887	18529	0	0	0
	150C1F1	7201	20284	68109	0	0	0
	150C1F2	7208	20060	67833	0	0	0
	150C1F3	7215	19786	67515	0	0	0
	380C2F1	0	0	0	14486	36959	-132873
	380C2F2	0	0	0	14487	36846	-132825
	380C2F3	0	0	0	14489	36706	-132772
	RTG	0	0	0	3914	9683	-34932
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3525	13313	35825	0	0	0
	150C1F1	8491	27571	81682	0	0	0
	150C1F2	8513	26769	80254	0	0	0
	150C1F3	8540	25788	78562	0	0	0
	380C2F1	0	0	0	17326	42423	-144186
	380C2F2	0	0	0	17334	42050	-143834
	380C2F3	0	0	0	17344	41591	-143434
	RTG	0	0	0	7295	16470	-55287
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2583	6220	20517	0	0	0
	150C1F1	8426	20203	67804	0	0	0
	150C1F2	8430	19998	67596	0	0	0
	150C1F3	8435	19746	67360	0	0	0
	380C2F1	0	0	0	16909	37040	-133172
	380C2F2	0	0	0	16910	36932	-133140
	380C2F3	0	0	0	16912	36797	-133107
	RTG	0	0	0	5185	11013	-39893

ZWW4HK400+5

Appendix BE1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	2565	5424	-19461
	150C1F1	0	0	0	9449	19729	-71424
	150C1F2	0	0	0	9450	19683	-71416
	150C1F3	0	0	0	9450	19627	-71409
	380C2F1	18898	39458	142848	18898	39458	-142848
	380C2F2	18899	39367	142833	18899	39367	-142833
	380C2F3	18900	39253	142818	18900	39253	-142818
	RTG	5124	10690	38845	5124	10690	-38845
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	2598	5964	-22017
	150C1F1	0	0	0	9584	22164	-82039
	150C1F2	0	0	0	9584	22151	-82041
	150C1F3	0	0	0	9584	22135	-82043
	380C2F1	19168	44328	164079	19168	44328	-164079
	380C2F2	19168	44302	164082	19168	44302	-164082
	380C2F3	19168	44270	164086	19168	44270	-164086
	RTG	5185	11776	43625	5185	11776	-43625
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	4284	8614	-30911
	150C1F1	0	0	0	11014	23452	-85630
	150C1F2	0	0	0	11014	23414	-85628
	150C1F3	0	0	0	11014	23367	-85627
	380C2F1	22027	46905	171260	22027	46905	-171260
	380C2F2	22028	46829	171256	22028	46829	-171256
	380C2F3	22028	46734	171254	22028	46734	-171254
	RTG	8568	16968	61668	8568	16968	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	3226	6464	-23882
	150C1F1	0	0	0	10779	21886	-80999
	150C1F2	0	0	0	10779	21873	-81001
	150C1F3	0	0	0	10779	21856	-81004
	380C2F1	21558	43771	161999	21558	43771	-161999
	380C2F2	21558	43745	162002	21558	43745	-162002
	380C2F3	21559	43713	162008	21559	43713	-162008
	RTG	6444	12867	47695	6444	12867	-47695
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	2484	9046	-24987
	150C1F1	0	0	0	9236	29053	-83734
	150C1F2	0	0	0	9258	28127	-82098
	150C1F3	0	0	0	9287	26992	-80154
	380C2F1	18838	43347	145313	18471	58107	-167468
	380C2F2	18847	42911	144901	18516	56254	-164195
	380C2F3	18857	42377	144433	18573	53984	-160307
	RTG	5112	11598	39360	5029	15015	-44261
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	2583	6775	-22589
	150C1F1	0	0	0	9550	24311	-83138
	150C1F2	0	0	0	9555	24112	-82955
	150C1F3	0	0	0	9560	23868	-82748
	380C2F1	19160	45343	164160	19100	48623	-166276
	380C2F2	19162	45236	164135	19109	48225	-165911
	380C2F3	19163	45103	164109	19120	47736	-165496
	RTG	5183	12016	43637	5171	12781	-44080
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	4159	13928	-38120
	150C1F1	0	0	0	10847	30731	-93472
	150C1F2	0	0	0	10866	30014	-92361
	150C1F3	0	0	0	10891	29138	-91061
	380C2F1	21985	50044	172623	21693	61462	-186943
	380C2F2	21991	49700	172381	21733	60028	-184722
	380C2F3	21999	49275	172109	21781	58277	-182123
	RTG	8550	18346	62285	8426	23346	-68582
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	3216	7221	-24251
	150C1F1	0	0	0	10754	23958	-81814
	150C1F2	0	0	0	10758	23769	-81671
	150C1F3	0	0	0	10762	23537	-81509
	380C2F1	21553	44770	162019	21509	47915	-163628
	380C2F2	21554	44666	162003	21516	47538	-163341
	380C2F3	21555	44536	161987	21524	47074	-163018
	RTG	6443	13101	47687	6435	13822	-47962
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	2461	10262	-27386
	150C1F1	0	0	0	9163	32244	-89614
	150C1F2	0	0	0	9190	31025	-87330
	150C1F3	0	0	0	9224	29525	-84581
	380C2F1	18326	64489	179229	18326	64489	-179229
	380C2F2	18380	62051	174661	18380	62051	-174661
	380C2F3	18449	59049	169161	18449	59049	-169161
	RTG	4994	16508	46959	4994	16508	-46959
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	2576	7044	-22935
	150C1F1	0	0	0	9532	25000	-83854
	150C1F2	0	0	0	9539	24736	-83565
	150C1F3	0	0	0	9548	24413	-83236
	380C2F1	19065	49999	167708	19065	49999	-167708
	380C2F2	19079	49471	167131	19079	49471	-167131
	380C2F3	19095	48825	166471	19095	48825	-166471
	RTG	5164	13100	44387	5164	13100	-44387

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	4124	15691	-41315
	150C1F1	0	0	0	10779	33219	-97578
	150C1F2	0	0	0	10805	32265	-95963
	150C1F3	0	0	0	10836	31096	-94052
	380C2F1	21558	66438	195156	21558	66438	-195156
	380C2F2	21609	64529	191926	21609	64529	-191926
	380C2F3	21673	62193	188105	21673	62193	-188105
	RTG	8372	25505	72111	8372	25505	-72111
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	3211	7463	-24494
	150C1F1	0	0	0	10741	24607	-82382
	150C1F2	0	0	0	10746	24358	-82152
	150C1F3	0	0	0	10753	24053	-81891
	380C2F1	21483	49213	164764	21483	49213	-164764
	380C2F2	21493	48717	164304	21493	48717	-164304
	380C2F3	21505	48107	163782	21505	48107	-163782
	RTG	6430	14114	48169	6430	14114	-48169
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2552	6165	-20085
	150C1F1	0	0	0	9419	21673	-72656
	150C1F2	0	0	0	9423	21456	-72450
	150C1F3	0	0	0	9429	21189	-72217
	380C2F1	18471	58107	167468	18838	43347	-145313
	380C2F2	18516	56254	164195	18847	42911	-144901
	380C2F3	18573	53984	160307	18857	42377	-144433
	RTG	5029	15015	44261	5112	11598	-39360
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2597	6149	-22051
	150C1F1	0	0	0	9580	22671	-82080
	150C1F2	0	0	0	9581	22618	-82068
	150C1F3	0	0	0	9581	22552	-82054
	380C2F1	19100	48623	166276	19160	45343	-164160
	380C2F2	19109	48225	165911	19162	45236	-164135
	380C2F3	19120	47736	165496	19163	45103	-164109
	RTG	5171	12781	44080	5183	12016	-43637
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	4264	9730	-31693
	150C1F1	0	0	0	10993	25022	-86311
	150C1F2	0	0	0	10996	24850	-86190
	150C1F3	0	0	0	10999	24638	-86055
	380C2F1	21693	61462	186943	21985	50044	-172623
	380C2F2	21733	60028	184722	21991	49700	-172381
	380C2F3	21781	58277	182123	21999	49275	-172109
	RTG	8426	23346	68582	8550	18346	-62285
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	3225	6644	-23894
	150C1F1	0	0	0	10777	22385	-81010
	150C1F2	0	0	0	10777	22333	-81002
	150C1F3	0	0	0	10777	22268	-80994
	380C2F1	21509	47915	163628	21553	44770	-162019
	380C2F2	21516	47538	163341	21554	44666	-162003
	380C2F3	21524	47074	163018	21555	44536	-161987
	RTG	6435	13822	47962	6443	13101	-47687
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	1932	4321	-15342
	150C1F1	0	0	0	7121	15738	-56530
	150C1F2	0	0	0	7122	15690	-56514
	150C1F3	0	0	0	7122	15631	-56498
	380C2F1	14243	31476	113059	14243	31476	-113059
	380C2F2	14244	31380	113028	14244	31380	-113028
	380C2F3	14245	31262	112995	14245	31262	-112995
	RTG	3860	8474	30573	3860	8474	-30573
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	1963	4792	-17644
	150C1F1	0	0	0	7248	17952	-66320
	150C1F2	0	0	0	7248	17939	-66321
	150C1F3	0	0	0	7248	17922	-66322
	380C2F1	14496	35904	132640	14496	35904	-132640
	380C2F2	14496	35878	132642	14496	35878	-132642
	380C2F3	14496	35845	132644	14496	35845	-132644
	RTG	3916	9435	34888	3916	9435	-34888
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	3657	7652	-27320
	150C1F1	0	0	0	8691	19543	-71041
	150C1F2	0	0	0	8691	19504	-71035
	150C1F3	0	0	0	8691	19455	-71029
	380C2F1	17381	39086	142083	17381	39086	-142083
	380C2F2	17382	39008	142070	17382	39008	-142070
	380C2F3	17382	38910	142058	17382	38910	-142058
	RTG	7317	15037	54461	7317	15037	-54461
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	2596	5418	-19980
	150C1F1	0	0	0	8458	18007	-66526
	150C1F2	0	0	0	8458	17994	-66527
	150C1F3	0	0	0	8458	17978	-66529
	380C2F1	16916	36015	133051	16916	36015	-133051
	380C2F2	16916	35988	133054	16916	35988	-133054
	380C2F3	16916	35956	133058	16916	35956	-133058
	RTG	5186	10774	39884	5186	10774	-39884
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	1846	8384	-22519
	150C1F1	0	0	0	6880	26243	-73248
	150C1F2	0	0	0	6901	25202	-71185
	150C1F3	0	0	0	6930	23920	-68692
	380C2F1	14162	35731	116892	13759	52485	-146496
	380C2F2	14174	35242	116281	13803	50404	-142371
	380C2F3	14187	34645	115581	13859	47840	-137385
	RTG	3843	9460	31382	3750	13345	-38030
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	1943	5687	-18529
	150C1F1	0	0	0	7201	20284	-68109
	150C1F2	0	0	0	7208	20060	-67833
	150C1F3	0	0	0	7215	19786	-67515
	380C2F1	14486	36959	132873	14402	40568	-136219
	380C2F2	14487	36846	132825	14415	40120	-135665
	380C2F3	14489	36706	132772	14430	39572	-135030
	RTG	3914	9683	34932	3897	10520	-35639

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	3525	13313	-35825
	150C1F1	0	0	0	8491	27571	-81682
	150C1F2	0	0	0	8513	26769	-80254
	150C1F3	0	0	0	8540	25788	-78562
	380C2F1	17326	42423	144186	16983	55141	-163363
	380C2F2	17334	42050	143834	17026	53538	-160508
	380C2F3	17344	41591	143434	17080	51577	-157125
	RTG	7295	16470	55287	7158	21825	-62907
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	2583	6220
150C1F1		0	0	0	8426	20203	-67804
150C1F2		0	0	0	8430	19998	-67596
150C1F3		0	0	0	8435	19746	-67360
380C2F1		16909	37040	133172	16851	40406	-135608
380C2F2		16910	36932	133140	16860	39995	-135193
380C2F3		16912	36797	133107	16871	39491	-134720
RTG		5185	11013	39893	5174	11771	-40307
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	0	0	0	1829	9704
	150C1F1	0	0	0	6815	29786	-80444
	150C1F2	0	0	0	6838	28440	-77685
	150C1F3	0	0	0	6869	26770	-74304
	380C2F1	13629	59573	160889	13629	59573	-160889
	380C2F2	13675	56880	155370	13675	56880	-155370
	380C2F3	13738	53540	148608	13738	53540	-148608
	RTG	3716	15019	41405	3716	15019	-41405
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	1934	5996
150C1F1		0	0	0	7178	21066	-69175
150C1F2		0	0	0	7187	20765	-68748
150C1F3		0	0	0	7198	20398	-68256
380C2F1		14356	42131	138349	14356	42131	-138349
380C2F2		14374	41530	137496	14374	41530	-137496
380C2F3		14396	40797	136512	14396	40797	-136512
RTG		3888	10879	36099	3888	10879	-36099
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	0	0	0	3493	15166
	150C1F1	0	0	0	8421	30340	-86837
	150C1F2	0	0	0	8447	29280	-84830
	150C1F3	0	0	0	8481	27979	-82422
	380C2F1	16843	60679	173673	16843	60679	-173673
	380C2F2	16894	58561	169661	16894	58561	-169661
	380C2F3	16961	55958	164843	16961	55958	-164843
	RTG	7104	24131	66986	7104	24131	-66986
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	2577	6485
150C1F1		0	0	0	8409	20916	-68611
150C1F2		0	0	0	8416	20643	-68287
150C1F3		0	0	0	8423	20308	-67914
380C2F1		16818	41833	137223	16818	41833	-137223
380C2F2		16831	41285	136573	16831	41285	-136573
380C2F3		16847	40616	135828	16847	40616	-135828
RTG		5168	12085	40596	5168	12085	-40596
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	0	0	0	1915	5143
	150C1F1	0	0	0	7081	17865	-58446
	150C1F2	0	0	0	7087	17621	-58141
	150C1F3	0	0	0	7094	17323	-57790
	380C2F1	13759	52485	146496	14162	35731	-116892
	380C2F2	13803	50404	142371	14174	35242	-116281
	380C2F3	13859	47840	137385	14187	34645	-115581
	RTG	3750	13345	38030	3843	9460	-31382
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	1961	4987
150C1F1		0	0	0	7243	18480	-66437
150C1F2		0	0	0	7244	18423	-66412
150C1F3		0	0	0	7245	18353	-66386
380C2F1		14402	40568	136219	14486	36959	-132873
380C2F2		14415	40120	135665	14487	36846	-132825
380C2F3		14430	39572	135030	14489	36706	-132772
RTG		3897	10520	35639	3914	9683	-34932
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	0	0	0	3634	8826
	150C1F1	0	0	0	8663	21212	-72093
	150C1F2	0	0	0	8667	21025	-71917
	150C1F3	0	0	0	8672	20796	-71717
	380C2F1	16983	55141	163363	17326	42423	-144186
	380C2F2	17026	53538	160508	17334	42050	-143834
	380C2F3	17080	51577	157125	17344	41591	-143434
	RTG	7158	21825	62907	7235	16470	-55287
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	2595	5603
150C1F1		0	0	0	8455	18520	-66586
150C1F2		0	0	0	8455	18466	-66570
150C1F3		0	0	0	8456	18398	-66554
380C2F1		16851	40406	135608	16909	37040	-133172
380C2F2		16860	39995	135193	16910	36932	-133140
380C2F3		16871	39491	134720	16912	36797	-133107
RTG		5174	11771	40307	5185	11013	-39893

ZWW4HK400+5

Appendix BE1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2565	5424	19461	2565	5424	-19461
	150C1F1	9449	19729	71424	9449	19729	-71424
	150C1F2	9450	19683	71416	9450	19683	-71416
	150C1F3	9450	19627	71409	9450	19627	-71409
	380C2F1	0	0	0	18898	39458	-142848
	380C2F2	0	0	0	18899	39367	-142833
	380C2F3	0	0	0	18900	39253	-142818
	RTG	0	0	0	5124	10690	-38845
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2598	5964	22017	2598	5964	-22017
	150C1F1	9584	22164	82039	9584	22164	-82039
	150C1F2	9584	22151	82041	9584	22151	-82041
	150C1F3	9584	22135	82043	9584	22135	-82043
	380C2F1	0	0	0	19168	44328	-164079
	380C2F2	0	0	0	19168	44302	-164082
	380C2F3	0	0	0	19168	44270	-164086
	RTG	0	0	0	5185	11776	-43625
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4284	8614	30911	4284	8614	-30911
	150C1F1	11014	23452	85630	11014	23452	-85630
	150C1F2	11014	23414	85628	11014	23414	-85628
	150C1F3	11014	23367	85627	11014	23367	-85627
	380C2F1	0	0	0	22027	46905	-171260
	380C2F2	0	0	0	22028	46829	-171256
	380C2F3	0	0	0	22028	46734	-171254
	RTG	0	0	0	8568	16968	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3226	6464	23882	3226	6464	-23882
	150C1F1	10779	21886	80999	10779	21886	-80999
	150C1F2	10779	21873	81001	10779	21873	-81001
	150C1F3	10779	21856	81004	10779	21856	-81004
	380C2F1	0	0	0	21558	43771	-161999
	380C2F2	0	0	0	21558	43745	-162002
	380C2F3	0	0	0	21559	43713	-162008
	RTG	0	0	0	6444	12867	-47695
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2552	6165	20085	2484	9046	-24987
	150C1F1	9419	21673	72656	9236	29053	-83734
	150C1F2	9423	21456	72450	9258	28127	-82098
	150C1F3	9429	21189	72217	9287	26992	-80154
	380C2F1	0	0	0	18471	58107	-167468
	380C2F2	0	0	0	18516	58254	-164195
	380C2F3	0	0	0	18573	53984	-160307
	RTG	0	0	0	5029	15015	-44261
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2597	6149	22051	2583	6775	-22589
	150C1F1	9580	22671	82080	9550	24311	-83138
	150C1F2	9581	22618	82068	9555	24112	-82955
	150C1F3	9581	22552	82054	9560	23868	-82748
	380C2F1	0	0	0	19100	48623	-166276
	380C2F2	0	0	0	19109	48225	-165911
	380C2F3	0	0	0	19120	47736	-165496
	RTG	0	0	0	5171	12781	-44080
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4264	9730	31693	4159	13928	-38120
	150C1F1	10993	25022	86311	10847	30731	-93472
	150C1F2	10996	24850	86190	10866	30014	-92361
	150C1F3	10999	24638	86055	10891	29138	-91061
	380C2F1	0	0	0	21693	61462	-186943
	380C2F2	0	0	0	21733	60028	-184722
	380C2F3	0	0	0	21781	58277	-182123
	RTG	0	0	0	8426	23346	-68582
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3225	6644	23894	3216	7221	-24251
	150C1F1	10777	22385	81010	10754	23958	-81814
	150C1F2	10777	22333	81002	10758	23769	-81671
	150C1F3	10777	22268	80994	10762	23537	-81509
	380C2F1	0	0	0	21509	47915	-163628
	380C2F2	0	0	0	21516	47538	-163341
	380C2F3	0	0	0	21524	47074	-163018
	RTG	0	0	0	6435	13822	-47962
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2461	10262	27386	2461	10262	-27386
	150C1F1	9163	32244	89614	9163	32244	-89614
	150C1F2	9190	31025	87330	9190	31025	-87330
	150C1F3	9224	29525	84581	9224	29525	-84581
	380C2F1	0	0	0	18326	64489	-179229
	380C2F2	0	0	0	18380	62051	-174661
	380C2F3	0	0	0	18449	59049	-169161
	RTG	0	0	0	4994	16508	-46959
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2576	7044	22935	2576	7044	-22935
	150C1F1	9532	25000	83854	9532	25000	-83854
	150C1F2	9539	24736	83565	9539	24736	-83565
	150C1F3	9548	24413	83236	9548	24413	-83236
	380C2F1	0	0	0	19065	49999	-167708
	380C2F2	0	0	0	19079	49471	-167131
	380C2F3	0	0	0	19095	48825	-166471
	RTG	0	0	0	5164	13100	-44387

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4124	15691	41315	4124	15691	-41315
	150C1F1	10779	33219	97578	10779	33219	-97578
	150C1F2	10805	32265	95963	10805	32265	-95963
	150C1F3	10836	31096	94052	10836	31096	-94052
	380C2F1	0	0	0	21558	66438	-195156
	380C2F2	0	0	0	21609	64529	-191926
	380C2F3	0	0	0	21673	62193	-188105
	RTG	0	0	0	8372	25505	-72111
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3211	7463	24494	3211	7463	-24494
	150C1F1	10741	24607	82382	10741	24607	-82382
	150C1F2	10746	24358	82152	10746	24358	-82152
	150C1F3	10753	24053	81891	10753	24053	-81891
	380C2F1	0	0	0	21483	49213	-164764
	380C2F2	0	0	0	21493	48717	-164304
	380C2F3	0	0	0	21505	48107	-163782
	RTG	0	0	0	6430	14114	-48169
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2484	9046	24987	2552	6165	-20085
	150C1F1	9236	29053	83734	9419	21673	-72656
	150C1F2	9258	28127	82098	9423	21456	-72450
	150C1F3	9287	26992	80154	9429	21189	-72217
	380C2F1	0	0	0	18838	43347	-145313
	380C2F2	0	0	0	18847	42911	-144901
	380C2F3	0	0	0	18857	42377	-144433
	RTG	0	0	0	5112	11598	-39360
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2583	6775	22589	2597	6149	-22051
	150C1F1	9550	24311	83138	9580	22671	-82080
	150C1F2	9555	24112	82955	9581	22618	-82068
	150C1F3	9560	23868	82748	9581	22552	-82054
	380C2F1	0	0	0	19160	45343	-164160
	380C2F2	0	0	0	19162	45236	-164135
	380C2F3	0	0	0	19163	45103	-164109
	RTG	0	0	0	5183	12016	-43637
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4159	13928	38120	4264	9730	-31693
	150C1F1	10847	30731	93472	10993	25022	-86311
	150C1F2	10866	30014	92361	10996	24850	-86190
	150C1F3	10891	29138	91061	10999	24638	-86055
	380C2F1	0	0	0	21985	50044	-172623
	380C2F2	0	0	0	21991	49700	-172381
	380C2F3	0	0	0	21999	49275	-172109
	RTG	0	0	0	8550	18346	-62285
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3216	7221	24251	3225	6644	-23894
	150C1F1	10754	23958	81814	10777	22385	-81010
	150C1F2	10758	23769	81671	10777	22333	-81002
	150C1F3	10762	23537	81509	10777	22268	-80994
	380C2F1	0	0	0	21553	44770	-162019
	380C2F2	0	0	0	21554	44666	-162003
	380C2F3	0	0	0	21555	44536	-161987
	RTG	0	0	0	6443	13101	-47687
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1932	4321	15342	1932	4321	-15342
	150C1F1	7121	15738	56530	7121	15738	-56530
	150C1F2	7122	15690	56514	7122	15690	-56514
	150C1F3	7122	15631	56498	7122	15631	-56498
	380C2F1	0	0	0	14243	31476	-113059
	380C2F2	0	0	0	14244	31380	-113028
	380C2F3	0	0	0	14245	31262	-112995
	RTG	0	0	0	3860	8474	-30573
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	4792	17644	1963	4792	-17644
	150C1F1	7248	17952	66320	7248	17952	-66320
	150C1F2	7248	17939	66321	7248	17939	-66321
	150C1F3	7248	17922	66322	7248	17922	-66322
	380C2F1	0	0	0	14496	35904	-132640
	380C2F2	0	0	0	14496	35878	-132642
	380C2F3	0	0	0	14496	35845	-132644
	RTG	0	0	0	3916	9435	-34888
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3657	7652	27320	3657	7652	-27320
	150C1F1	8691	19543	71041	8691	19543	-71041
	150C1F2	8691	19504	71035	8691	19504	-71035
	150C1F3	8691	19455	71029	8691	19455	-71029
	380C2F1	0	0	0	17381	39086	-142083
	380C2F2	0	0	0	17382	39008	-142070
	380C2F3	0	0	0	17382	38910	-142058
	RTG	0	0	0	7317	15037	-54461
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2596	5418	19980	2596	5418	-19980
	150C1F1	8458	18007	66526	8458	18007	-66526
	150C1F2	8458	17994	66527	8458	17994	-66527
	150C1F3	8458	17978	66529	8458	17978	-66529
	380C2F1	0	0	0	16916	36015	-133051
	380C2F2	0	0	0	16916	35988	-133054
	380C2F3	0	0	0	16916	35956	-133058
	RTG	0	0	0	5186	10774	-39884
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1915	5143	16272	1846	8384	-22519
	150C1F1	7081	17865	58446	6880	26243	-73248
	150C1F2	7087	17621	58141	6901	25202	-71185
	150C1F3	7094	17323	57790	6930	23920	-68692
	380C2F1	0	0	0	13759	52485	-146496
	380C2F2	0	0	0	13803	50404	-142371
	380C2F3	0	0	0	13859	47840	-137385
	RTG	0	0	0	3750	13345	-38030
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1961	4987	17714	1943	5687	-18529
	150C1F1	7243	18480	66437	7201	20284	-68109
	150C1F2	7244	18423	66412	7208	20060	-67833
	150C1F3	7245	18353	66386	7215	19786	-67515
	380C2F1	0	0	0	14402	40568	-136219
	380C2F2	0	0	0	14415	40120	-135665
	380C2F3	0	0	0	14430	39572	-135030
	RTG	0	0	0	3897	10520	-35639

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3634	8826	28322	3525	13313	-35825
	150C1F1	8663	21212	72093	8491	27571	-81682
	150C1F2	8667	21025	71917	8513	26769	-80254
	150C1F3	8672	20796	71717	8540	25788	-78562
	380C2F1	0	0	0	16983	55141	-163363
	380C2F2	0	0	0	17026	53538	-160508
	380C2F3	0	0	0	17080	51577	-157125
	RTG	0	0	0	7158	21825	-62907
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2595	5603	20011	2583	6220	-20517
	150C1F1	8455	18520	66586	8426	20203	-67804
	150C1F2	8455	18466	66570	8430	19998	-67596
	150C1F3	8456	18398	66554	8435	19746	-67360
	380C2F1	0	0	0	16851	40406	-135608
	380C2F2	0	0	0	16860	39995	-135193
	380C2F3	0	0	0	16871	39491	-134720
	RTG	0	0	0	5174	11771	-40307
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1829	9704	25304	1829	9704	-25304
	150C1F1	6815	29786	80444	6815	29786	-80444
	150C1F2	6838	28440	77685	6838	28440	-77685
	150C1F3	6869	26770	74304	6869	26770	-74304
	380C2F1	0	0	0	13629	59573	-160889
	380C2F2	0	0	0	13675	56880	-155370
	380C2F3	0	0	0	13738	53540	-148608
	RTG	0	0	0	3716	15019	-41405
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1934	5996	19024	1934	5996	-19024
	150C1F1	7178	21066	69175	7178	21066	-69175
	150C1F2	7187	20765	68748	7187	20765	-68748
	150C1F3	7198	20398	68256	7198	20398	-68256
	380C2F1	0	0	0	14356	42131	-138349
	380C2F2	0	0	0	14374	41530	-137496
	380C2F3	0	0	0	14396	40797	-136512
	RTG	0	0	0	3888	10879	-36099
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3493	15166	39356	3493	15166	-39356
	150C1F1	8421	30340	86837	8421	30340	-86837
	150C1F2	8447	29280	84830	8447	29280	-84830
	150C1F3	8481	27979	82422	8481	27979	-82422
	380C2F1	0	0	0	16843	60679	-173673
	380C2F2	0	0	0	16894	58561	-169661
	380C2F3	0	0	0	16961	55958	-164843
	RTG	0	0	0	7104	24131	-66986
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2577	6485	20844	2577	6485	-20844
	150C1F1	8409	20916	68611	8409	20916	-68611
	150C1F2	8416	20643	68287	8416	20643	-68287
	150C1F3	8423	20308	67914	8423	20308	-67914
	380C2F1	0	0	0	16818	41833	-137223
	380C2F2	0	0	0	16831	41285	-136573
	380C2F3	0	0	0	16847	40616	-135828
	RTG	0	0	0	5168	12085	-40596
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1846	8384	22519	1915	5143	-16272
	150C1F1	6880	26243	73248	7081	17865	-58446
	150C1F2	6901	25202	71185	7087	17621	-58141
	150C1F3	6930	23920	68692	7094	17323	-57790
	380C2F1	0	0	0	14162	35731	-116892
	380C2F2	0	0	0	14174	35242	-116281
	380C2F3	0	0	0	14187	34645	-115581
	RTG	0	0	0	3843	9460	-31382
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1943	5687	18529	1961	4987	-17714
	150C1F1	7201	20284	68109	7243	18480	-66437
	150C1F2	7208	20060	67833	7244	18423	-66412
	150C1F3	7215	19786	67515	7245	18353	-66386
	380C2F1	0	0	0	14486	36959	-132873
	380C2F2	0	0	0	14487	36846	-132825
	380C2F3	0	0	0	14489	36706	-132772
	RTG	0	0	0	3914	9683	-34932
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3525	13313	35825	3634	8826	-28322
	150C1F1	8491	27571	81682	8663	21212	-72093
	150C1F2	8513	26769	80254	8667	21025	-71917
	150C1F3	8540	25788	78562	8672	20796	-71717
	380C2F1	0	0	0	17326	42423	-144186
	380C2F2	0	0	0	17334	42050	-143834
	380C2F3	0	0	0	17344	41591	-143434
	RTG	0	0	0	7295	16470	-55287
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2583	6220	20517	2595	5603	-20011
	150C1F1	8426	20203	67804	8455	18520	-66586
	150C1F2	8430	19998	67596	8455	18466	-66570
	150C1F3	8435	19746	67360	8456	18398	-66554
	380C2F1	0	0	0	16909	37040	-133172
	380C2F2	0	0	0	16910	36932	-133140
	380C2F3	0	0	0	16912	36797	-133107
	RTG	0	0	0	5185	11013	-39893

ZWW4HK400+5

Appendix BE1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2565	5424	19461	0	0	0
	150C1F1	9449	19729	71424	0	0	0
	150C1F2	9450	19683	71416	0	0	0
	150C1F3	9450	19627	71409	0	0	0
	380C2F1	18898	39458	142848	18898	39458	-142848
	380C2F2	18899	39367	142833	18899	39367	-142833
	380C2F3	18900	39253	142818	18900	39253	-142818
	RTG	0	0	0	5124	10690	-38845
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2598	5964	22017	0	0	0
	150C1F1	9584	22164	82039	0	0	0
	150C1F2	9584	22151	82041	0	0	0
	150C1F3	9584	22135	82043	0	0	0
	380C2F1	19168	44328	164079	19168	44328	-164079
	380C2F2	19168	44302	164082	19168	44302	-164082
	380C2F3	19168	44270	164086	19168	44270	-164086
	RTG	0	0	0	5185	11776	-43625
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4284	8614	30911	0	0	0
	150C1F1	11014	23452	85630	0	0	0
	150C1F2	11014	23414	85628	0	0	0
	150C1F3	11014	23367	85627	0	0	0
	380C2F1	22027	46905	171260	22027	46905	-171260
	380C2F2	22028	46829	171256	22028	46829	-171256
	380C2F3	22028	46734	171254	22028	46734	-171254
	RTG	0	0	0	8568	16968	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3226	6464	23882	0	0	0
	150C1F1	10779	21886	80999	0	0	0
	150C1F2	10779	21873	81001	0	0	0
	150C1F3	10779	21856	81004	0	0	0
	380C2F1	21558	43771	161999	21558	43771	-161999
	380C2F2	21558	43745	162002	21558	43745	-162002
	380C2F3	21559	43713	162008	21559	43713	-162008
	RTG	0	0	0	6444	12867	-47695
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2552	6165	20085	0	0	0
	150C1F1	9419	21673	72656	0	0	0
	150C1F2	9423	21456	72450	0	0	0
	150C1F3	9429	21189	72217	0	0	0
	380C2F1	18838	43347	145313	18471	58107	-167468
	380C2F2	18847	42911	144901	18516	58254	-164195
	380C2F3	18857	42377	144433	18573	53984	-160307
	RTG	0	0	0	5029	15015	-44261
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2597	6149	22051	0	0	0
	150C1F1	9580	22671	82080	0	0	0
	150C1F2	9581	22618	82068	0	0	0
	150C1F3	9581	22552	82054	0	0	0
	380C2F1	19160	45343	164160	19100	48623	-166276
	380C2F2	19162	45236	164135	19109	48225	-165911
	380C2F3	19163	45103	164109	19120	47736	-165496
	RTG	0	0	0	5171	12781	-44080
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4264	9730	31693	0	0	0
	150C1F1	10993	25022	86311	0	0	0
	150C1F2	10996	24850	86190	0	0	0
	150C1F3	10999	24638	86055	0	0	0
	380C2F1	21985	50044	172623	21693	61462	-186943
	380C2F2	21991	49700	172381	21733	60028	-184722
	380C2F3	21999	49275	172109	21781	58277	-182123
	RTG	0	0	0	8426	23346	-68582
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3225	6644	23894	0	0	0
	150C1F1	10777	22385	81010	0	0	0
	150C1F2	10777	22333	81002	0	0	0
	150C1F3	10777	22268	80994	0	0	0
	380C2F1	21553	44770	162019	21509	47915	-163628
	380C2F2	21554	44666	162003	21516	47538	-163341
	380C2F3	21555	44536	161987	21524	47074	-163018
	RTG	0	0	0	6435	13822	-47962
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2461	10262	27386	0	0	0
	150C1F1	9163	32244	89614	0	0	0
	150C1F2	9190	31025	87330	0	0	0
	150C1F3	9224	29525	84581	0	0	0
	380C2F1	18326	64489	179229	18326	64489	-179229
	380C2F2	18380	62051	174661	18380	62051	-174661
	380C2F3	18449	59049	169161	18449	59049	-169161
	RTG	0	0	0	4994	16508	-46959
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2576	7044	22935	0	0	0
	150C1F1	9532	25000	83854	0	0	0
	150C1F2	9539	24736	83565	0	0	0
	150C1F3	9548	24413	83236	0	0	0
	380C2F1	19065	49999	167708	19065	49999	-167708
	380C2F2	19079	49471	167131	19079	49471	-167131
	380C2F3	19095	48825	166471	19095	48825	-166471
	RTG	0	0	0	5164	13100	-44387

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4124	15691	41315	0	0	0
	150C1F1	10779	33219	97578	0	0	0
	150C1F2	10805	32265	95963	0	0	0
	150C1F3	10836	31096	94052	0	0	0
	380C2F1	21558	66438	195156	21558	66438	-195156
	380C2F2	21609	64529	191926	21609	64529	-191926
	380C2F3	21673	62193	188105	21673	62193	-188105
	RTG	0	0	0	8372	25505	-72111
	0	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3211	7463	24494	0	0	0
	150C1F1	10741	24607	82382	0	0	0
	150C1F2	10746	24358	82152	0	0	0
	150C1F3	10753	24053	81891	0	0	0
	380C2F1	21483	49213	164764	21483	49213	-164764
	380C2F2	21493	48717	164304	21493	48717	-164304
	380C2F3	21505	48107	163782	21505	48107	-163782
	RTG	0	0	0	6430	14114	-48169
	0	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2484	9046	24987	0	0	0
	150C1F1	9236	29053	83734	0	0	0
	150C1F2	9258	28127	82098	0	0	0
	150C1F3	9287	26992	80154	0	0	0
	380C2F1	18471	58107	167468	18838	43347	-145313
	380C2F2	18516	56254	164195	18847	42911	-144901
	380C2F3	18573	53984	160307	18857	42377	-144433
	RTG	0	0	0	5112	11598	-39360
	0	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2583	6775	22589	0	0	0
	150C1F1	9550	24311	83138	0	0	0
	150C1F2	9555	24112	82955	0	0	0
	150C1F3	9560	23868	82748	0	0	0
	380C2F1	19100	48623	166276	19160	45343	-164160
	380C2F2	19109	48225	165911	19162	45236	-164135
	380C2F3	19120	47736	165496	19163	45103	-164109
	RTG	0	0	0	5183	12016	-43637
	0	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4159	13928	38120	0	0	0
	150C1F1	10847	30731	93472	0	0	0
	150C1F2	10866	30014	92361	0	0	0
	150C1F3	10891	29138	91061	0	0	0
	380C2F1	21693	61462	186943	21985	50044	-172623
	380C2F2	21733	60028	184722	21991	49700	-172381
	380C2F3	21781	58277	182123	21999	49275	-172109
	RTG	0	0	0	8550	18346	-62285
	0	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3216	7221	24251	0	0	0
	150C1F1	10754	23958	81814	0	0	0
	150C1F2	10758	23769	81671	0	0	0
	150C1F3	10762	23537	81509	0	0	0
	380C2F1	21509	47915	163628	21553	44770	-162019
	380C2F2	21516	47538	163341	21554	44666	-162003
	380C2F3	21524	47074	163018	21555	44536	-161987
	RTG	0	0	0	6443	13101	-47687
	0	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1932	4321	15342	0	0	0
	150C1F1	7121	15738	56530	0	0	0
	150C1F2	7122	15690	56514	0	0	0
	150C1F3	7122	15631	56498	0	0	0
	380C2F1	14243	31476	113059	14243	31476	-113059
	380C2F2	14244	31380	113028	14244	31380	-113028
	380C2F3	14245	31262	112995	14245	31262	-112995
	RTG	0	0	0	3860	8474	-30573
	0	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	4792	17644	0	0	0
	150C1F1	7248	17952	66320	0	0	0
	150C1F2	7248	17939	66321	0	0	0
	150C1F3	7248	17922	66322	0	0	0
	380C2F1	14496	35904	132640	14496	35904	-132640
	380C2F2	14496	35878	132642	14496	35878	-132642
	380C2F3	14496	35845	132644	14496	35845	-132644
	RTG	0	0	0	3916	9435	-34888
	0	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3657	7652	27320	0	0	0
	150C1F1	8691	19543	71041	0	0	0
	150C1F2	8691	19504	71035	0	0	0
	150C1F3	8691	19455	71029	0	0	0
	380C2F1	17381	39086	142083	17381	39086	-142083
	380C2F2	17382	39008	142070	17382	39008	-142070
	380C2F3	17382	38910	142058	17382	38910	-142058
	RTG	0	0	0	7317	15037	-54461
	0	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2596	5418	19980	0	0	0
	150C1F1	8458	18007	66526	0	0	0
	150C1F2	8458	17994	66527	0	0	0
	150C1F3	8458	17978	66529	0	0	0
	380C2F1	16916	36015	133051	16916	36015	-133051
	380C2F2	16916	35988	133054	16916	35988	-133054
	380C2F3	16916	35956	133058	16916	35956	-133058
	RTG	0	0	0	5186	10774	-39884
	0	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1915	5143	16272	0	0	0
	150C1F1	7081	17865	58446	0	0	0
	150C1F2	7087	17621	58141	0	0	0
	150C1F3	7094	17323	57790	0	0	0
	380C2F1	14162	35731	116892	13759	52485	-146496
	380C2F2	14174	35242	116281	13803	50404	-142371
	380C2F3	14187	34645	115581	13859	47840	-137385
	RTG	0	0	0	3750	13345	-38030
	0	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1961	4987	17714	0	0	0
	150C1F1	7243	18480	66437	0	0	0
	150C1F2	7244	18423	66412	0	0	0
	150C1F3	7245	18353	66386	0	0	0
	380C2F1	14486	36959	132873	14402	40568	-136219
	380C2F2	14487	36846	132825	14415	40120	-135665
	380C2F3	14489	36706	132772	14430	39572	-135030
	RTG	0	0	0	3897	10520	-35639
	0	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3634	8826	28322	0	0	0
	150C1F1	8663	21212	72093	0	0	0
	150C1F2	8667	21025	71917	0	0	0
	150C1F3	8672	20796	71717	0	0	0
	380C2F1	17326	42423	144186	16983	55141	-163363
	380C2F2	17334	42050	143834	17026	53538	-160508
	380C2F3	17344	41591	143434	17080	51577	-157125
	RTG	0	0	0	7158	21825	-62907
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2595	5603	20011	0	0	0
	150C1F1	8455	18520	66586	0	0	0
	150C1F2	8455	18466	66570	0	0	0
	150C1F3	8456	18398	66554	0	0	0
	380C2F1	16909	37040	133172	16851	40406	-135608
	380C2F2	16910	36932	133140	16860	39995	-135193
	380C2F3	16912	36797	133107	16871	39491	-134720
	RTG	0	0	0	5174	11771	-40307
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1829	9704	25304	0	0	0
	150C1F1	6815	29786	80444	0	0	0
	150C1F2	6838	28440	77685	0	0	0
	150C1F3	6869	26770	74304	0	0	0
	380C2F1	13629	59573	160889	13629	59573	-160889
	380C2F2	13675	56880	155370	13675	56880	-155370
	380C2F3	13738	53540	148608	13738	53540	-148608
	RTG	0	0	0	3716	15019	-41405
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1934	5996	19024	0	0	0
	150C1F1	7178	21066	69175	0	0	0
	150C1F2	7187	20765	68748	0	0	0
	150C1F3	7198	20398	68256	0	0	0
	380C2F1	14356	42131	138349	14356	42131	-138349
	380C2F2	14374	41530	137496	14374	41530	-137496
	380C2F3	14396	40797	136512	14396	40797	-136512
	RTG	0	0	0	3888	10879	-36099
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3493	15166	39356	0	0	0
	150C1F1	8421	30340	86837	0	0	0
	150C1F2	8447	29280	84830	0	0	0
	150C1F3	8481	27979	82422	0	0	0
	380C2F1	16843	60679	173673	16843	60679	-173673
	380C2F2	16894	58561	169661	16894	58561	-169661
	380C2F3	16961	55958	164843	16961	55958	-164843
	RTG	0	0	0	7104	24131	-66986
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2577	6485	20844	0	0	0
	150C1F1	8409	20916	68611	0	0	0
	150C1F2	8416	20643	68287	0	0	0
	150C1F3	8423	20308	67914	0	0	0
	380C2F1	16818	41833	137223	16818	41833	-137223
	380C2F2	16831	41285	136573	16831	41285	-136573
	380C2F3	16847	40616	135828	16847	40616	-135828
	RTG	0	0	0	5168	12085	-40596
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1846	8384	22519	0	0	0
	150C1F1	6880	26243	73248	0	0	0
	150C1F2	6901	25202	71185	0	0	0
	150C1F3	6930	23920	68692	0	0	0
	380C2F1	13759	52485	146496	14162	35731	-116892
	380C2F2	13803	50404	142371	14174	35242	-116281
	380C2F3	13859	47840	137385	14187	34645	-115581
	RTG	0	0	0	3843	9460	-31382
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1943	5887	18529	0	0	0
	150C1F1	7201	20284	68109	0	0	0
	150C1F2	7208	20060	67833	0	0	0
	150C1F3	7215	19786	67515	0	0	0
	380C2F1	14402	40568	136219	14486	36959	-132873
	380C2F2	14415	40120	135665	14487	36846	-132825
	380C2F3	14430	39572	135030	14489	36706	-132772
	RTG	0	0	0	3914	9683	-34932
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3525	13313	35825	0	0	0
	150C1F1	8491	27571	81682	0	0	0
	150C1F2	8513	26769	80254	0	0	0
	150C1F3	8540	25788	78562	0	0	0
	380C2F1	16983	55141	163363	17326	42423	-144186
	380C2F2	17026	53538	160508	17334	42050	-143834
	380C2F3	17080	51577	157125	17344	41591	-143434
	RTG	0	0	0	7295	16470	-55287
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2583	6220	20517	0	0	0
	150C1F1	8426	20203	67804	0	0	0
	150C1F2	8430	19998	67596	0	0	0
	150C1F3	8435	19746	67360	0	0	0
	380C2F1	16851	40406	135608	16909	37040	-133172
	380C2F2	16860	39995	135193	16910	36932	-133140
	380C2F3	16871	39491	134720	16912	36797	-133107
	RTG	0	0	0	5185	11013	-39893

ZWW4HK400+5

Appendix BE1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2565	5424	19461	2565	5424	-19461
	150C1F1	9449	19729	71424	9449	19729	-71424
	150C1F2	9450	19683	71416	9450	19683	-71416
	150C1F3	9450	19627	71409	9450	19627	-71409
	380C2F1	18898	39458	142848	18898	39458	-142848
	380C2F2	18899	39367	142833	18899	39367	-142833
	380C2F3	18900	39253	142818	18900	39253	-142818
	RTG	0	0	0	5124	10690	-38845
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2598	5964	22017	2598	5964	-22017
	150C1F1	9584	22164	82039	9584	22164	-82039
	150C1F2	9584	22151	82041	9584	22151	-82041
	150C1F3	9584	22135	82043	9584	22135	-82043
	380C2F1	19168	44328	164079	19168	44328	-164079
	380C2F2	19168	44302	164082	19168	44302	-164082
	380C2F3	19168	44270	164086	19168	44270	-164086
	RTG	0	0	0	5185	11776	-43625
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4284	8614	30911	4284	8614	-30911
	150C1F1	11014	23452	85630	11014	23452	-85630
	150C1F2	11014	23414	85628	11014	23414	-85628
	150C1F3	11014	23367	85627	11014	23367	-85627
	380C2F1	22027	46905	171260	22027	46905	-171260
	380C2F2	22028	46829	171256	22028	46829	-171256
	380C2F3	22028	46734	171254	22028	46734	-171254
	RTG	0	0	0	8568	16968	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3226	6464	23882	3226	6464	-23882
	150C1F1	10779	21886	80999	10779	21886	-80999
	150C1F2	10779	21873	81001	10779	21873	-81001
	150C1F3	10779	21856	81004	10779	21856	-81004
	380C2F1	21558	43771	161999	21558	43771	-161999
	380C2F2	21558	43745	162002	21558	43745	-162002
	380C2F3	21559	43713	162008	21559	43713	-162008
	RTG	0	0	0	6444	12867	-47695
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2552	6165	20085	2484	9046	-24987
	150C1F1	9419	21673	72656	9236	29053	-83734
	150C1F2	9423	21456	72450	9258	28127	-82098
	150C1F3	9429	21189	72217	9287	26992	-80154
	380C2F1	18838	43347	145313	18471	58107	-167468
	380C2F2	18847	42911	144901	18516	56254	-164195
	380C2F3	18857	42377	144433	18573	53984	-160307
	RTG	0	0	0	5029	15015	-44261
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2597	6149	22051	2583	6775	-22589
	150C1F1	9580	22671	82080	9550	24311	-83138
	150C1F2	9581	22618	82068	9555	24112	-82955
	150C1F3	9581	22552	82054	9560	23868	-82748
	380C2F1	19160	45343	164160	19100	48623	-166276
	380C2F2	19162	45236	164135	19109	48225	-165911
	380C2F3	19163	45103	164109	19120	47736	-165496
	RTG	0	0	0	5171	12781	-44080
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4264	9730	31693	4159	13928	-38120
	150C1F1	10993	25022	86311	10847	30731	-93472
	150C1F2	10996	24850	86190	10866	30014	-92361
	150C1F3	10999	24638	86055	10891	29138	-91061
	380C2F1	21985	50044	172623	21693	61462	-186943
	380C2F2	21991	49700	172381	21733	60028	-184722
	380C2F3	21999	49275	172109	21781	58277	-182123
	RTG	0	0	0	8426	23346	-68582
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3225	6644	23894	3216	7221	-24251
	150C1F1	10777	22385	81010	10754	23958	-81814
	150C1F2	10777	22333	81002	10758	23769	-81671
	150C1F3	10777	22268	80994	10762	23537	-81509
	380C2F1	21553	44770	162019	21509	47915	-163628
	380C2F2	21554	44666	162003	21516	47538	-163341
	380C2F3	21555	44536	161987	21524	47074	-163018
	RTG	0	0	0	6435	13822	-47962
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2461	10262	27386	2461	10262	-27386
	150C1F1	9163	32244	89614	9163	32244	-89614
	150C1F2	9190	31025	87330	9190	31025	-87330
	150C1F3	9224	29525	84581	9224	29525	-84581
	380C2F1	18326	64489	179229	18326	64489	-179229
	380C2F2	18380	62051	174661	18380	62051	-174661
	380C2F3	18449	59049	169161	18449	59049	-169161
	RTG	0	0	0	4994	16508	-46959
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2576	7044	22935	2576	7044	-22935
	150C1F1	9532	25000	83854	9532	25000	-83854
	150C1F2	9539	24736	83565	9539	24736	-83565
	150C1F3	9548	24413	83236	9548	24413	-83236
	380C2F1	19065	49999	167708	19065	49999	-167708
	380C2F2	19079	49471	167131	19079	49471	-167131
	380C2F3	19095	48825	166471	19095	48825	-166471
	RTG	0	0	0	5164	13100	-44387

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4124	15691	41315	4124	15691	-41315
	150C1F1	10779	33219	97578	10779	33219	-97578
	150C1F2	10805	32265	95963	10805	32265	-95963
	150C1F3	10836	31096	94052	10836	31096	-94052
	380C2F1	21558	66438	195156	21558	66438	-195156
	380C2F2	21609	64529	191926	21609	64529	-191926
	380C2F3	21673	62193	188105	21673	62193	-188105
	RTG	0	0	0	8372	25505	-72111
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3211	7463	24494	3211	7463
150C1F1		10741	24607	82382	10741	24607	-82382
150C1F2		10746	24358	82152	10746	24358	-82152
150C1F3		10753	24053	81891	10753	24053	-81891
380C2F1		21483	49213	164764	21483	49213	-164764
380C2F2		21493	48717	164304	21493	48717	-164304
380C2F3		21505	48107	163782	21505	48107	-163782
RTG		0	0	0	6430	14114	-48169
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2484	9046	24987	2552	6165
	150C1F1	9236	29053	83734	9419	21673	-72656
	150C1F2	9258	28127	82098	9423	21456	-72450
	150C1F3	9287	26992	80154	9429	21189	-72217
	380C2F1	18471	58107	167468	18838	43347	-145313
	380C2F2	18516	56254	164195	18847	42911	-144901
	380C2F3	18573	53984	160307	18857	42377	-144433
	RTG	0	0	0	5112	11598	-39360
	NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2583	6775	22589	2597	6149
150C1F1		9550	24311	83138	9580	22671	-82080
150C1F2		9555	24112	82955	9581	22618	-82068
150C1F3		9560	23868	82748	9581	22552	-82054
380C2F1		19100	48623	166276	19160	45343	-164160
380C2F2		19109	48225	165911	19162	45236	-164135
380C2F3		19120	47736	165496	19163	45103	-164109
RTG		0	0	0	5183	12016	-43637
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	4159	13928	38120	4264	9730
	150C1F1	10847	30731	93472	10993	25022	-86311
	150C1F2	10866	30014	92361	10996	24850	-86190
	150C1F3	10891	29138	91061	10999	24638	-86055
	380C2F1	21693	61462	186943	21985	50044	-172623
	380C2F2	21733	60028	184722	21991	49700	-172381
	380C2F3	21781	58277	182123	21999	49275	-172109
	RTG	0	0	0	8550	18346	-62285
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3216	7221	24251	3225	6644
150C1F1		10754	23958	81814	10777	22385	-81010
150C1F2		10758	23769	81671	10777	22333	-81002
150C1F3		10762	23537	81509	10777	22268	-80994
380C2F1		21509	47915	163628	21553	44770	-162019
380C2F2		21516	47538	163341	21554	44666	-162003
380C2F3		21524	47074	163018	21555	44536	-161987
RTG		0	0	0	6443	13101	-47687
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1932	4321	15342	1932	4321
	150C1F1	7121	15738	56530	7121	15738	-56530
	150C1F2	7122	15690	56514	7122	15690	-56514
	150C1F3	7122	15631	56498	7122	15631	-56498
	380C2F1	14243	31476	113059	14243	31476	-113059
	380C2F2	14244	31380	113028	14244	31380	-113028
	380C2F3	14245	31262	112995	14245	31262	-112995
	RTG	0	0	0	3860	8474	-30573
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	4792	17644	1963	4792
150C1F1		7248	17952	66320	7248	17952	-66320
150C1F2		7248	17939	66321	7248	17939	-66321
150C1F3		7248	17922	66322	7248	17922	-66322
380C2F1		14496	35904	132640	14496	35904	-132640
380C2F2		14496	35878	132642	14496	35878	-132642
380C2F3		14496	35845	132644	14496	35845	-132644
RTG		0	0	0	3916	9435	-34888
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	3657	7652	27320	3657	7652
	150C1F1	8691	19543	71041	8691	19543	-71041
	150C1F2	8691	19504	71035	8691	19504	-71035
	150C1F3	8691	19455	71029	8691	19455	-71029
	380C2F1	17381	39086	142083	17381	39086	-142083
	380C2F2	17382	39008	142070	17382	39008	-142070
	380C2F3	17382	38910	142058	17382	38910	-142058
	RTG	0	0	0	7317	15037	-54461
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2596	5418	19980	2596	5418
150C1F1		8458	18007	66526	8458	18007	-66526
150C1F2		8458	17994	66527	8458	17994	-66527
150C1F3		8458	17978	66529	8458	17978	-66529
380C2F1		16916	36015	133051	16916	36015	-133051
380C2F2		16916	35988	133054	16916	35988	-133054
380C2F3		16916	35956	133058	16916	35956	-133058
RTG		0	0	0	5186	10774	-39884
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1915	5143	16272	1846	8384
	150C1F1	7081	17865	58446	6880	26243	-73248
	150C1F2	7087	17621	58141	6901	25202	-71185
	150C1F3	7094	17323	57790	6930	23920	-68692
	380C2F1	14162	35731	116892	13759	52485	-146496
	380C2F2	14174	35242	116281	13803	50404	-142371
	380C2F3	14187	34645	115581	13859	47840	-137385
	RTG	0	0	0	3750	13345	-38030
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1961	4987	17714	1943	5687
150C1F1		7243	18480	66437	7201	20284	-68109
150C1F2		7244	18423	66412	7208	20060	-67833
150C1F3		7245	18353	66386	7215	19786	-67515
380C2F1		14486	36959	132873	14402	40568	-136219
380C2F2		14487	36846	132825	14415	40120	-135665
380C2F3		14489	36706	132772	14430	39572	-135030
RTG		0	0	0	3897	10520	-35639

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3634	8826	28322	3525	13313	-35825
	150C1F1	8663	21212	72093	8491	27571	-81682
	150C1F2	8667	21025	71917	8513	26769	-80254
	150C1F3	8672	20796	71717	8540	25788	-78562
	380C2F1	17326	42423	144186	16983	55141	-163363
	380C2F2	17334	42050	143834	17026	53538	-160508
	380C2F3	17344	41591	143434	17080	51577	-157125
	RTG	0	0	0	7158	21825	-62907
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2595	5603	20011	2583	6220	-20517
	150C1F1	8455	18520	66586	8426	20203	-67804
	150C1F2	8455	18466	66570	8430	19998	-67596
	150C1F3	8456	18398	66554	8435	19746	-67360
	380C2F1	16909	37040	133172	16851	40406	-135608
	380C2F2	16910	36932	133140	16860	39995	-135193
	380C2F3	16912	36797	133107	16871	39491	-134720
	RTG	0	0	0	5174	11771	-40307
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1829	9704	25304	1829	9704	-25304
	150C1F1	6815	29786	80444	6815	29786	-80444
	150C1F2	6838	28440	77685	6838	28440	-77685
	150C1F3	6869	26770	74304	6869	26770	-74304
	380C2F1	13629	59573	160889	13629	59573	-160889
	380C2F2	13675	56880	155370	13675	56880	-155370
	380C2F3	13738	53540	148608	13738	53540	-148608
	RTG	0	0	0	3716	15019	-41405
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1934	5996	19024	1934	5996	-19024
	150C1F1	7178	21066	69175	7178	21066	-69175
	150C1F2	7187	20765	68748	7187	20765	-68748
	150C1F3	7198	20398	68256	7198	20398	-68256
	380C2F1	14356	42131	138349	14356	42131	-138349
	380C2F2	14374	41530	137496	14374	41530	-137496
	380C2F3	14396	40797	136512	14396	40797	-136512
	RTG	0	0	0	3888	10879	-36099
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3493	15166	39356	3493	15166	-39356
	150C1F1	8421	30340	86837	8421	30340	-86837
	150C1F2	8447	29280	84830	8447	29280	-84830
	150C1F3	8481	27979	82422	8481	27979	-82422
	380C2F1	16843	60679	173673	16843	60679	-173673
	380C2F2	16894	58561	169661	16894	58561	-169661
	380C2F3	16961	55958	164843	16961	55958	-164843
	RTG	0	0	0	7104	24131	-66986
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2577	6485	20844	2577	6485	-20844
	150C1F1	8409	20916	68611	8409	20916	-68611
	150C1F2	8416	20643	68287	8416	20643	-68287
	150C1F3	8423	20308	67914	8423	20308	-67914
	380C2F1	16818	41833	137223	16818	41833	-137223
	380C2F2	16831	41285	136573	16831	41285	-136573
	380C2F3	16847	40616	135828	16847	40616	-135828
	RTG	0	0	0	5168	12085	-40596
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1846	8384	22519	1915	5143	-16272
	150C1F1	6880	26243	73248	7081	17865	-58446
	150C1F2	6901	25202	71185	7087	17621	-58141
	150C1F3	6930	23920	68692	7094	17323	-57790
	380C2F1	13759	52485	146496	14162	35731	-116892
	380C2F2	13803	50404	142371	14174	35242	-116281
	380C2F3	13859	47840	137385	14187	34645	-115581
	RTG	0	0	0	3843	9460	-31382
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1943	5687	18529	1961	4987	-17714
	150C1F1	7201	20284	68109	7243	18480	-66437
	150C1F2	7208	20060	67833	7244	18423	-66412
	150C1F3	7215	19786	67515	7245	18353	-66386
	380C2F1	14402	40568	136219	14486	36959	-132873
	380C2F2	14415	40120	135665	14487	36846	-132825
	380C2F3	14430	39572	135030	14489	36706	-132772
	RTG	0	0	0	3914	9683	-34932
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3525	13313	35825	3634	8826	-28322
	150C1F1	8491	27571	81682	8663	21212	-72093
	150C1F2	8513	26769	80254	8667	21025	-71917
	150C1F3	8540	25788	78562	8672	20796	-71717
	380C2F1	16983	55141	163363	17326	42423	-144186
	380C2F2	17026	53538	160508	17334	42050	-143834
	380C2F3	17080	51577	157125	17344	41591	-143434
	RTG	0	0	0	7235	16470	-55287
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2583	6220	20517	2595	5603	-20011
	150C1F1	8426	20203	67804	8455	18520	-66586
	150C1F2	8430	19998	67596	8455	18466	-66570
	150C1F3	8435	19746	67360	8456	18398	-66554
	380C2F1	16851	40406	135608	16909	37040	-133172
	380C2F2	16860	39995	135193	16910	36932	-133140
	380C2F3	16871	39491	134720	16912	36797	-133107
	RTG	0	0	0	5185	11013	-39893

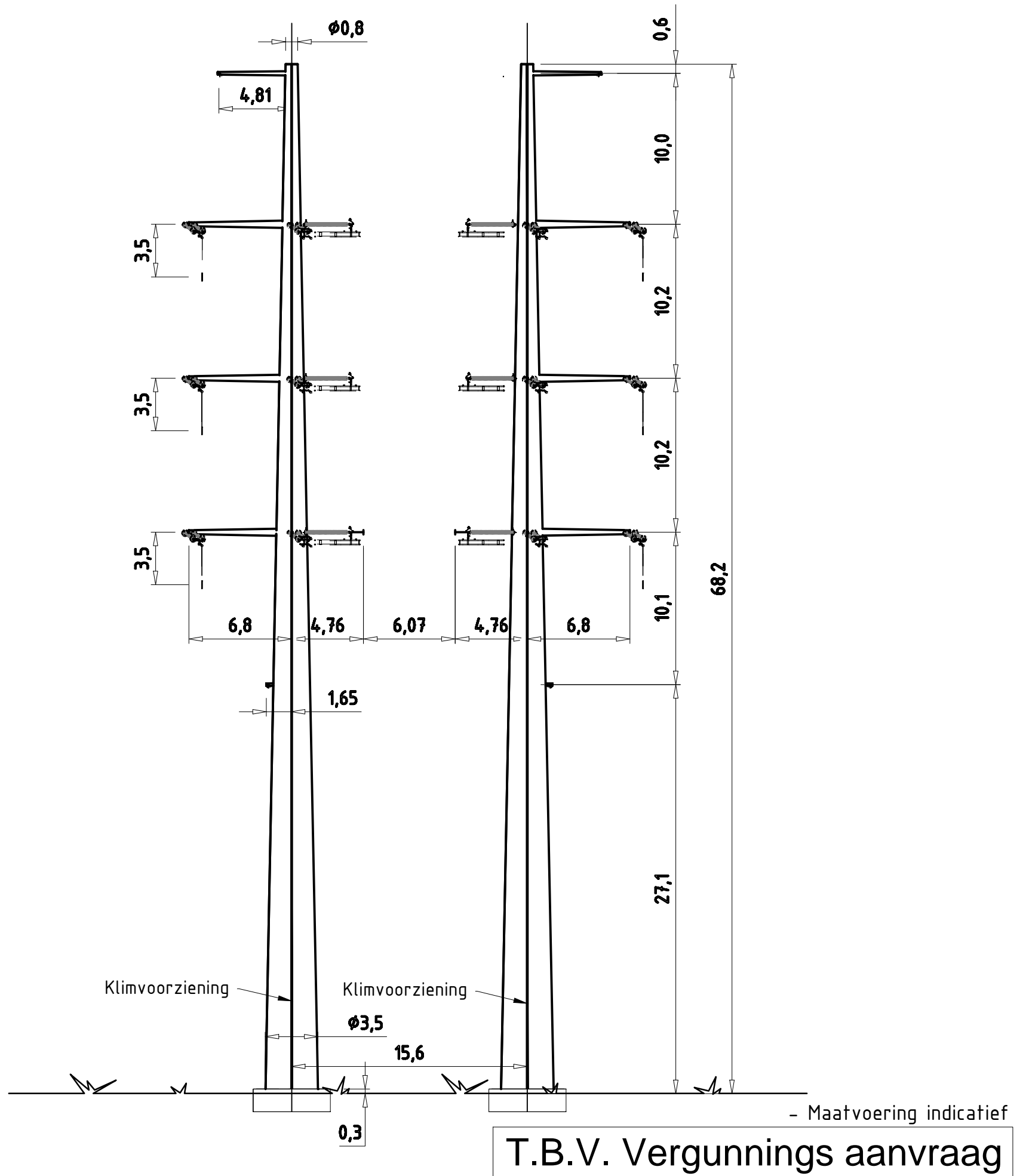
ZWW4HK400+5

Appendix BE2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2143	4766	16781	2143	4766	-16781
Wind, 10°C	150C1F1	7897	17285	61682	7897	17285	-61682
Permanent loads yg= 1.0	150C1F2	7898	17223	61658	7898	17223	-61658
Wind angle: 0°	150C1F3	7899	17146	61632	7899	17146	-61632
	380C2F1	15794	34570	123364	15794	34570	-123364
	380C2F2	15796	34446	123316	15796	34446	-123316
	380C2F3	15797	34291	123264	15797	34291	-123264
	RTG	0	0	0	4282	9316	-33421
NL4/1b	GW / opgw	2175	5184	19144	2175	5184	-19144
Wind, -20°C	150C1F1	8029	19370	71724	8029	19370	-71724
Permanent loads yg= 1.0	150C1F2	8029	19359	71726	8029	19359	-71726
Wind angle: 0°	150C1F3	8029	19345	71727	8029	19345	-71727
	380C2F1	16058	38740	143449	16058	38740	-143449
	380C2F2	16058	38718	143451	16058	38718	-143451
	380C2F3	16058	38691	143455	16058	38691	-143455
	RTG	0	0	0	4340	10224	-37886
NL4/3	GW / opgw	7203	12609	46024	7203	12609	-46024
Wind, -5°C	150C1F1	12433	25640	94110	12433	25640	-94110
Permanent loads yg= 1.0	150C1F2	12433	25609	94111	12433	25609	-94111
Wind angle: 0°	150C1F3	12433	25570	94113	12433	25570	-94113
	380C2F1	24866	51280	188220	24866	51280	-188220
	380C2F2	24866	51218	188222	24866	51218	-188222
	380C2F3	24867	51140	188226	24867	51140	-188226
	RTG	0	0	0	14422	25048	-92098
NL4/4	GW / opgw	2697	5579	20622	2697	5579	-20622
Construction/maintenance, +5°C	150C1F1	9015	18931	70086	9015	18931	-70086
Permanent loads yg= 1.0	150C1F2	9015	18920	70088	9015	18920	-70088
Wind angle: 0°	150C1F3	9015	18907	70090	9015	18907	-70090
	380C2F1	18029	37862	140172	18029	37862	-140172
	380C2F2	18029	37841	140175	18029	37841	-140175
	380C2F3	18029	37814	140179	18029	37814	-140179
	RTG	0	0	0	5388	11103	-41167
NL4/1a	GW / opgw	2118	5858	18116	2036	10082	-26382
Wind, 10°C	150C1F1	7840	20100	64465	7587	31118	-84473
Permanent loads yg= 1.0	150C1F2	7848	19775	64029	7612	29769	-81776
Wind angle: 45°	150C1F3	7857	19378	63526	7646	28101	-78485
	380C2F1	15680	40200	128930	15175	62236	-168946
	380C2F2	15696	39550	128058	15224	59539	-163551
	380C2F3	15715	38756	127052	15291	56201	-156971
	RTG	0	0	0	4137	15757	-43710
NL4/1b	GW / opgw	2174	5339	19177	2162	5869	-19657
Wind, -20°C	150C1F1	8026	19795	71767	7999	21180	-72718
Permanent loads yg= 1.0	150C1F2	8026	19750	71755	8003	21011	-72555
Wind angle: 45°	150C1F3	8027	19694	71742	8008	20804	-72369
	380C2F1	16051	39590	143533	15999	42360	-145436
	380C2F2	16052	39500	143510	16007	42022	-145109
	380C2F3	16053	39389	143485	16016	41608	-144738
	RTG	0	0	0	4328	11070	-38297
NL4/3	GW / opgw	7195	13409	46193	7138	16112	-48576
Wind, -5°C	150C1F1	12420	26882	94431	12323	31169	-98643
Permanent loads yg= 1.0	150C1F2	12422	26748	94367	12338	30637	-97960
Wind angle: 45°	150C1F3	12425	26583	94297	12354	29986	-97172
	380C2F1	24841	53764	188862	24647	62339	-197286
	380C2F2	24845	53497	188735	24675	61274	-195921
	380C2F3	24849	53166	188594	24709	59973	-194344
	RTG	0	0	0	14360	29378	-94175
NL4/4	GW / opgw	2696	5730	20634	2688	6217	-20953
Construction/maintenance, +5°C	150C1F1	9012	19349	70101	8993	20673	-70822
Permanent loads yg= 1.0	150C1F2	9013	19305	70093	8996	20514	-70694
Wind angle: 45°	150C1F3	9013	19251	70086	9000	20318	-70550
	380C2F1	18025	38698	140202	17987	41346	-141644
	380C2F2	18026	38610	140186	17993	41027	-141389
	380C2F3	18026	38501	140171	18000	40635	-141101
	RTG	0	0	0	5380	11905	-41410
NL4/1a	GW / opgw	2018	11758	29888	2018	11758	-29888
Wind, 10°C	150C1F1	7515	35673	93741	7515	35673	-93741
Permanent loads yg= 1.0	150C1F2	7540	33948	90211	7540	33948	-90211
Wind angle: 90°	150C1F3	7575	31799	85846	7575	31799	-85846
	380C2F1	15030	71346	187481	15030	71346	-187481
	380C2F2	15081	67897	180421	15081	67897	-180421
	380C2F3	15151	63598	171692	15151	63598	-171692
	RTG	0	0	0	4099	17927	-48125


NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2156	6098	19963	2156	6098	-19963
	150C1F1	7984	21765	73357	7984	21765	-73357
	150C1F2	7990	21540	73099	7990	21540	-73099
	150C1F3	7997	21266	72805	7997	21266	-72805
	380C2F1	15968	43529	146713	15968	43529	-146713
	380C2F2	15980	43080	146198	15980	43080	-146198
	380C2F3	15994	42532	145610	15994	42532	-145610
	RTG	0	0	0	4322	11340	-38570
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7109	17258	50030	7109	17258	-50030
	150C1F1	12273	33019	101230	12273	33019	-101230
	150C1F2	12292	32309	100202	12292	32309	-100202
	150C1F3	12316	31441	99003	12316	31441	-99003
	380C2F1	24546	66038	202461	24546	66038	-202461
	380C2F2	24585	64617	200403	24585	64617	-200403
	380C2F3	24632	62881	198006	24632	62881	-198006
	RTG	0	0	0	14329	30750	-95519
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2684	6421	21167	2684	6421	-21167
	150C1F1	8982	21222	71326	8982	21222	-71326
	150C1F2	8987	21012	71122	8987	21012	-71122
	150C1F3	8992	20754	70890	8992	20754	-70890
	380C2F1	17964	42444	142652	17964	42444	-142652
	380C2F2	17973	42023	142244	17973	42023	-142244
	380C2F3	17984	41508	141781	17984	41508	-141781
	RTG	0	0	0	5375	12151	-41594
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2036	10082	26382	2118	5858	-18116
	150C1F1	7587	31118	84473	7840	20100	-64465
	150C1F2	7612	29769	81776	7848	19775	-64029
	150C1F3	7646	28101	78485	7857	19378	-63526
	380C2F1	15175	62236	168946	15680	40200	-128930
	380C2F2	15224	59539	163551	15696	39550	-128058
	380C2F3	15291	56201	156971	15715	38756	-127052
	RTG	0	0	0	4257	10620	-34605
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2162	5869	19657	2174	5339	-19177
	150C1F1	7999	21180	72718	8026	19795	-71767
	150C1F2	8003	21011	72555	8026	19750	-71755
	150C1F3	8008	20804	72369	8027	19694	-71742
	380C2F1	15999	42360	145436	16051	39590	-143533
	380C2F2	16007	42022	145109	16052	39500	-143510
	380C2F3	16016	41608	144738	16053	39389	-143485
	RTG	0	0	0	4339	10425	-37899
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7138	16112	48576	7195	13409	-46193
	150C1F1	12323	31169	98643	12420	26882	-94431
	150C1F2	12338	30637	97960	12422	26748	-94367
	150C1F3	12354	29986	97172	12425	26583	-94297
	380C2F1	24647	62339	197286	24841	53764	-188862
	380C2F2	24675	61274	195921	24845	53497	-188735
	380C2F3	24709	59973	194344	24849	53166	-188594
	RTG	0	0	0	14415	26077	-92167
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2688	6217	20953	2696	5730	-20634
	150C1F1	8993	20673	70822	9012	19349	-70101
	150C1F2	8996	20514	70694	9013	19305	-70093
	150C1F3	9000	20318	70550	9013	19251	-70086
	380C2F1	17987	41346	141644	18025	38698	-140202
	380C2F2	17993	41027	141389	18026	38610	-140186
	380C2F3	18000	40635	141101	18026	38501	-140171
	RTG	0	0	0	5387	11299	-41162



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4HK400+5

- Trekparameter 1800m
- 2x380 / 2x150 Hoekmast
- 400m Veldlengte
- 150°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement: Ral 9018 Papyrus white
- Kleurstelling Appendages: Ral 7021 Black grey

3.0	05-03-2014	Modified botom diameter and increased traverse length
2.0	03-02-2014	Modified top/botom diameter
1.0	16-04-2013	First edition
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Scale: 1:300
Drawn by: RBE 05-03-2014		Units: m
Checked by: AJP 05-03-2014		Project no: 000.145
Approved by: AW 05-03-2014		Company: TenneT
Description: Wintrack Masttype ZWW4HK400+5		Drawing no.: 74102194-035-092V
Revision: 3.0		Format: A3
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		

ZWW4HL400

Fundatie berekening

Bijlage CJ

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1,6	m
schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	5,3	m
	Hoogte	1,8	m
	Inhoud	39,7	m ³
	e.g.	953	kN

Onderplaat	Diameter	13,0	m
	Hoogte	1,3	m
	Inhoud	173	m ³
	e.g.	4141	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		874	kN
Fgeleiders		302	kN
Maximale dwarskracht		1327	kN
Fmax vert (druk)		1351	kN
Fmin vert (trek)		1013	kN
Maximale moment		59436	kNm

Moment

F_{diag}		5428	kN
F_{hor}		1327	kN
F_{ver}		5386	kN
M_{hor} (tgv Fhor)		4114	kNm
M_{tot}		63550	kNm
$F=M/a$		5386	kN

Verticaal reactiekracht

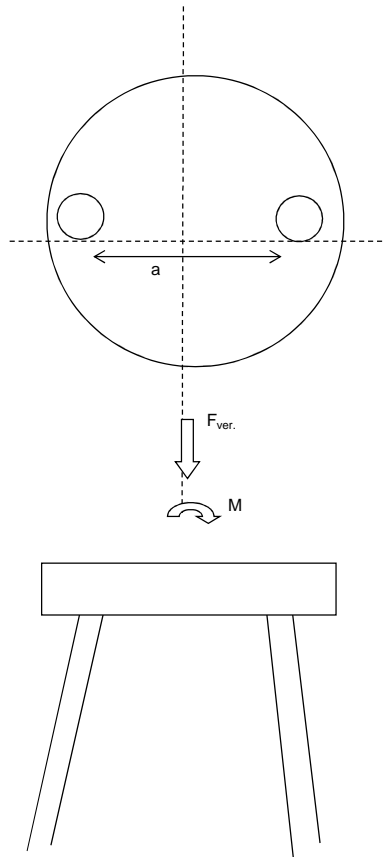
Fwater (trek)		2123	kN
Fgrond (druk)		2988	kN
Fgrond (trek)		2490	kN

Fdmax (druk)		5525	kN
Ftmax (trek)		2646	kN

Fdtot (druk)		10910	kN
Fttot (trek)		2740	kN

Palen druk		10	(-)
Palen trek		9	(-)

Totaal palen		20	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4HL400

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CJ

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	$O_{p;gem}$	1,60 m
paalfactor	αt	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11,25 MPa
materiaalfactor	$\gamma_{m,b4}$	1,4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1,5
	$q_{c;z,d}$	5,36 MPa
	$P_{r;z,d}$	37,5 kN/m ²
	$F_{r;trek,d,i}$	60,0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt			
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

$F_{trek,d}$	536,4 kN
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ZWW4HL400

DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CJ

Bepaling opneembare paalbelasting op druk

heipaal	v	
diameter	a	2 mm
		2 mm
Deq		0,001808
maximale puntweerstand		
$P_{r,max;punt;i}$		11,25 MN/m ²
paalklasse factor	α_p	1,00
factor paalvoet	β	1
hoek van inwendige vrijwing van paalvoet	ϕ	40
factor dwarsdoorsnede paalvoet	s	1,00
minimale waarde neergaande deel	$q_{c,II;gem}$	9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11,00 MN/m ²
maximale paalschachtwrijving		
$P_{r,max;schacht;i}$		0,05 MN/m ²
waarin:		
paalfactor	α_s	0,010
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5,00 MN/m ²
maximale draagkracht alleenstaande paal		
$F_{r,max;i}$		0,00 MN
waarin:		
$F_{r,max;punt;i}$		0,00 MN
paalpunt oppervlak	A_{punt}	0,00 m ²
$F_{r,max;schacht;i}$		0,00 MN
gemiddelde paalomtrek	$O_{p;gem}$	0,01 m
lengte schachtwrijving	Δl	15,00 m
Bepaling rekenwaarde van de maximale draagkracht		
$F_{r,paal;max;d}$	MN	0,00 MN
materiaalfactor grond	γ_{mb}	1,20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0,75
$F_{r,paal;max;d}$	3 kN	mm, paalpuntnivo -27,00 m



ZWW4HL400

Location dependent data to obtain pressures

Wind area					2	
Terrain category		O=onbebouwd, B=bebouwd			O	
Hoogte		h			63.2	m
Diameter voet		d voet			3.3	m
top		d top			0.8	m
gem		d gem			2.1	m
wanddikte		t			28	mm
Oppervlakte aan voet		A			287820	mm ²
Traagheidsmoment aan voet		W _x			2.33E+08	mm ⁴
Weerstandsmoment aan voet		I _x			3.81E+11	mm ⁴
Mast: Gewicht		2 ^{de} orde			10.0	%
		F _{rep,ver}			874	kN

Bijlage BJ

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	62.6	18.7	65.4	0.0	65.4	2689 kNm
150C1F1	52.6	29.4	123.2	0.0	123.2	5331 kNm
150C1F2	42.4	29.4	120.9	0.0	120.9	4223 kNm
150C1F3	32.2	29.4	118.1	0.0	118.1	3140 kNm
380C2F1	52.6	58.8	246.4	0.0	246.4	10662 kNm
380C2F2	42.4	58.8	241.8	0.0	241.8	8447 kNm
380C2F3	32.2	58.8	236.2	0.0	236.2	6281 kNm
RTG	22.1	18.7	59.6	-113.2	128.0	1641 kNm

Stuwdruk		F _{hor.}		37.6	kN
		M _{d,wind}		1063	kNm
Totaal		M _{d,tot}		54033	kNm
Totaal moment incl. 2 ^{de} orde effect		M _{d,tot}		59436	kNm

Normaalkracht;

Optredende normaalkracht

N _{d,geleiders}		302	kN
N _{d, e.g. mast}		1049	kN
N _{s,d,totaal}		1351	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA
ρ _a	0.65
A _{eff}	188192 mm ²

Optredende spanning tgv normaalkracht

N_{sd}/A_{eff} = f_{yd}/y_{m1}

	7	N/mm ²
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Moment;

Optredende moment in de voet:

M_{d,tot}

	59436	kNm
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Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA
ρ _a	0.95
W _{eff}	2.23E+08 mm ³

Optredende spanning tgv moment:

M_d/W_{eff} = f_{yd}/y_{m1}

	267	N/mm ²
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Totale spanning:

σ _d	274	N/mm ²	< 284 N/mm ² = ACCOORD
σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	62.6	13.2	49.5	0.0	49.5	3098 kNm
150C1F1	52.6	22.4	97.0	0.0	97.0	5104 kNm
150C1F2	42.4	22.4	95.5	0.0	95.5	4050 kNm
150C1F3	32.2	22.4	93.7	0.0	93.7	3016 kNm
380C2F1	52.6	44.8	194.1	0.0	194.1	10208 kNm
380C2F2	42.4	44.8	191.0	0.0	191.0	8100 kNm
380C2F3	32.2	44.8	187.3	0.0	187.3	6031 kNm
RTG	22.1	13.2	45.5	-87.8	98.9	2185 kNm

Stuwdruk		F _{hor.}		303	kN
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Verplaatsing		1.20	m
Percentage van de verplaatsing		1.90%	
Hoek		2.01	graden
Kromming		0.42%	
Fundatie rotatiestijfheid		0.005	rad

3.44	EIS TENNET VISUEEL
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4HL400

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2314	10090	19211	2314	10090	-19211
Wind, 10°C	150C1F1	8523	35255	68794	8523	35255	-68794
Permanent loads yg= 1.2	150C1F2	8523	34846	68453	8523	34846	-68453
Wind angle: 0°	150C1F3	8523	34346	68064	8523	34346	-68064
	380C2F1	17046	70509	137588	17046	70509	-137588
	380C2F2	17046	69692	136906	17046	69692	-136906
	380C2F3	17045	68692	136128	17045	68692	-136128
	RTG	0	0	0	4620	18754	-37098
NL1/1b	GW / opgw	2312	9852	20642	2312	9852	-20642
Wind, -20°C	150C1F1	8518	36490	76891	8518	36490	-76891
Permanent loads yg= 1.2	150C1F2	8518	36440	76891	8518	36440	-76891
Wind angle: 0°	150C1F3	8518	36377	76893	8518	36377	-76893
	380C2F1	17036	72979	153782	17036	72979	-153782
	380C2F2	17036	72879	153781	17036	72879	-153781
	380C2F3	17036	72754	153785	17036	72754	-153785
	RTG	0	0	0	4618	19357	-40887
NL1/3	GW / opgw	9331	27037	55487	9331	27037	-55487
Wind, -5°C	150C1F1	14688	52165	108064	14688	52165	-108064
Permanent loads yg= 1.2	150C1F2	14688	52017	108045	14688	52017	-108045
Wind angle: 0°	150C1F3	14688	51831	108029	14688	51831	-108029
	380C2F1	29376	104331	216128	29376	104331	-216128
	380C2F2	29376	104034	216090	29376	104034	-216090
	380C2F3	29376	103663	216058	29376	103663	-216058
	RTG	0	0	0	18688	53313	-111133
NL1/4	GW / opgw	3065	11087	23292	3065	11087	-23292
Construction/maintenance, +5°C	150C1F1	10026	36884	77736	10026	36884	-77736
Permanent loads yg= 1.2	150C1F2	10026	36836	77739	10026	36836	-77739
Wind angle: 0°	150C1F3	10026	36775	77746	10026	36775	-77746
	380C2F1	20053	73768	155471	20053	73768	-155471
	380C2F2	20053	73671	155479	20053	73671	-155479
	380C2F3	20053	73550	155492	20053	73550	-155492
	RTG	0	0	0	6124	21989	-46531
NL1/6	GW / opgw	2603	9373	20100	2603	9373	-20100
Permanent, +10°C	150C1F1	9589	34358	73681	9589	34358	-73681
Permanent loads yg= 1.35	150C1F2	9589	34358	73681	9589	34358	-73681
	150C1F3	9589	34358	73681	9589	34358	-73681
	380C2F1	19177	68716	147362	19177	68716	-147362
	380C2F2	19177	68716	147362	19177	68716	-147362
	380C2F3	19177	68716	147362	19177	68716	-147362
	RTG	0	0	0	5198	18728	-40162
NL1/1a	GW / opgw	2313	9407	18584	2316	21715	-34560
Wind, 10°C	150C1F1	8523	33574	67539	8529	65656	-107111
Permanent loads yg= 1.2	150C1F2	8523	33349	67407	8528	62307	-102578
Wind angle: 45°	150C1F3	8523	33072	67261	8527	58056	-96847
	380C2F1	17045	67147	135078	17057	131313	-214221
	380C2F2	17045	66698	134815	17056	124613	-205156
	380C2F3	17045	66144	134523	17054	116113	-193693
	RTG	0	0	0	4622	32353	-53953
NL1/1b	GW / opgw	2312	9771	20637	2312	11221	-21666
Wind, -20°C	150C1F1	8518	36275	76901	8518	39903	-78843
Permanent loads yg= 1.2	150C1F2	8518	36245	76906	8518	39493	-78492
Wind angle: 45°	150C1F3	8518	36206	76912	8518	38991	-78090
	380C2F1	17036	72551	153803	17037	79806	-157686
	380C2F2	17036	72489	153811	17036	78985	-156983
	380C2F3	17036	72412	153824	17036	77981	-156181
	RTG	0	0	0	4618	20844	-41618
NL1/3	GW / opgw	9331	26639	55494	9334	33373	-59228
Wind, -5°C	150C1F1	14688	51534	108024	14690	62748	-115750
Permanent loads yg= 1.2	150C1F2	14688	51445	108027	14690	61470	-114487
Wind angle: 45°	150C1F3	14688	51332	108036	14690	59901	-113012
	380C2F1	29376	103069	216048	29381	125496	-231499
	380C2F2	29376	102889	216055	29380	122939	-228975
	380C2F3	29376	102664	216072	29379	119802	-226024
	RTG	0	0	0	18691	60372	-113656
NL1/4	GW / opgw	3065	11012	23298	3066	12260	-23891
Construction/maintenance, +5°C	150C1F1	10026	36677	77762	10027	40016	-79081
Permanent loads yg= 1.2	150C1F2	10026	36647	77768	10027	39647	-78819
Wind angle: 45°	150C1F3	10026	36609	77776	10027	39195	-78525
	380C2F1	20053	73354	155524	20053	80032	-158161
	380C2F2	20053	73294	155536	20053	79295	-157639
	380C2F3	20053	73218	155553	20053	78390	-157050
	RTG	0	0	0	6124	23303	-46888

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2315	20632	33076	2315	20632	-33076
	150C1F1	8528	62681	103084	8528	62681	-103084
	150C1F2	8527	59578	98895	8527	59578	-98895
	150C1F3	8527	55652	93623	8527	55652	-93623
	380C2F1	17056	125363	206168	17056	125363	-206168
	380C2F2	17055	119157	197791	17055	119157	-197791
	380C2F3	17053	111305	187246	17053	111305	-187246
	RTG	0	0	0	4622	30976	-52078
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	11072	21512	2312	11072	-21512
	150C1F1	8518	39538	78529	8518	39538	-78529
	150C1F2	8518	39168	78228	8518	39168	-78228
	150C1F3	8518	38715	77886	8518	38715	-77886
	380C2F1	17036	79076	157059	17036	79076	-157059
	380C2F2	17036	78336	156457	17036	78336	-156457
	380C2F3	17036	77431	155772	17036	77431	-155772
	RTG	0	0	0	4618	20687	-41495
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	9334	32708	58664	9334	32708	-58664
	150C1F1	14690	61611	114624	14690	61611	-114624
	150C1F2	14690	60456	113524	14690	60456	-113524
	150C1F3	14689	59040	112243	14689	59040	-112243
	380C2F1	29380	123221	229249	29380	123221	-229249
	380C2F2	29380	120912	227047	29380	120912	-227047
	380C2F3	29379	118079	224486	29379	118079	-224486
	RTG	0	0	0	18690	59646	-113204
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3066	12136	23793	3066	12136	-23793
	150C1F1	10027	39688	78847	10027	39688	-78847
	150C1F2	10027	39355	78626	10027	39355	-78626
	150C1F3	10027	38946	78377	10027	38946	-78377
	380C2F1	20053	79376	157695	20053	79376	-157695
	380C2F2	20053	78710	157251	20053	78710	-157251
	380C2F3	20053	77892	156754	20053	77892	-156754
	RTG	0	0	0	6124	23169	-46816
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2316	21715	34560	2313	9407	-18584
	150C1F1	8529	65656	107111	8523	33574	-67539
	150C1F2	8528	62307	102578	8523	33349	-67407
	150C1F3	8527	58056	96847	8523	33072	-67261
	380C2F1	17057	131313	214221	17045	67147	-135078
	380C2F2	17056	124613	205156	17045	66698	-134815
	380C2F3	17054	116113	193693	17045	66144	-134523
	RTG	0	0	0	4620	18027	-36616
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	11221	21666	2312	9771	-20637
	150C1F1	8518	39903	78843	8518	36275	-76901
	150C1F2	8518	39493	78492	8518	36245	-76906
	150C1F3	8518	38991	78090	8518	36206	-76912
	380C2F1	17037	79806	157686	17036	72551	-153803
	380C2F2	17036	78985	156983	17036	72489	-153811
	380C2F3	17036	77981	156181	17036	72412	-153824
	RTG	0	0	0	4618	19261	-40896
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	9334	33373	59228	9331	26639	-55494
	150C1F1	14690	62748	115750	14688	51534	-108024
	150C1F2	14690	61470	114487	14688	51445	-108027
	150C1F3	14690	59901	113012	14688	51332	-108036
	380C2F1	29381	125496	231499	29376	103069	-216048
	380C2F2	29380	122939	228975	29376	102889	-216055
	380C2F3	29379	119802	226024	29376	102664	-216072
	RTG	0	0	0	18688	52834	-111209
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3066	12260	23891	3065	11012	-23298
	150C1F1	10027	40016	79081	10026	36677	-77762
	150C1F2	10027	39647	78819	10026	36647	-77768
	150C1F3	10027	39195	78525	10026	36609	-77776
	380C2F1	20053	80032	158161	20053	73354	-155524
	380C2F2	20053	79295	157639	20053	73294	-155536
	380C2F3	20053	78390	157050	20053	73218	-155553
	RTG	0	0	0	6124	21897	-46550
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1735	8522	15849	1735	8522	-15849
	150C1F1	6391	29274	55970	6391	29274	-55970
	150C1F2	6391	28789	55465	6391	28789	-55465
	150C1F3	6391	28196	54878	6391	28196	-54878
	380C2F1	12782	58548	111941	12782	58548	-111941
	380C2F2	12782	57577	110929	12782	57577	-110929
	380C2F3	12781	56393	109755	12781	56393	-109755
	RTG	0	0	0	3464	15350	-29801

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	7950	16564	1734	7950	-16564
	150C1F1	6387	29637	62195	6387	29637	-62195
	150C1F2	6387	29582	62186	6387	29582	-62186
	150C1F3	6387	29515	62177	6387	29515	-62177
	380C2F1	12774	59273	124390	12774	59273	-124390
	380C2F2	12774	59165	124372	12774	59165	-124372
	380C2F3	12774	59030	124355	12774	59030	-124355
	RTG	0	0	0	3463	15543	-32710
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	8751	25865	52972	8751	25865	-52972
	150C1F1	12554	46617	96166	12554	46617	-96166
	150C1F2	12554	46461	96131	12554	46461	-96131
	150C1F3	12554	46267	96096	12554	46267	-96096
	380C2F1	25109	93234	192332	25109	93234	-192332
	380C2F2	25109	92922	192261	25109	92922	-192261
	380C2F3	25109	92533	192191	25109	92533	-192191
	RTG	0	0	0	17529	50952	-106070
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2487	9412	19698	2487	9412	-19698
	150C1F1	7894	30627	64319	7894	30627	-64319
	150C1F2	7894	30577	64317	7894	30577	-64317
	150C1F3	7894	30513	64318	7894	30513	-64318
	380C2F1	15788	61255	128638	15788	61255	-128638
	380C2F2	15788	61153	128635	15788	61153	-128635
	380C2F3	15788	61026	128636	15788	61026	-128636
	RTG	0	0	0	4968	18628	-39323
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1735	6697	14362	1735	6697	-14362
	150C1F1	6390	24717	53005	6390	24717	-53005
	150C1F2	6390	24717	53005	6390	24717	-53005
	150C1F3	6390	24717	53005	6390	24717	-53005
	380C2F1	12781	49433	106010	12781	49433	-106010
	380C2F2	12781	49433	106010	12781	49433	-106010
	380C2F3	12781	49433	106010	12781	49433	-106010
	RTG	0	0	0	3464	13373	-28678
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1735	7711	14947	1737	21206	-33470
	150C1F1	6391	27289	54062	6396	63225	-101899
	150C1F2	6391	27027	53851	6395	59668	-96922
	150C1F3	6391	26706	53611	6395	55112	-90535
	380C2F1	12781	54578	108124	12792	126450	-203798
	380C2F2	12781	54054	107702	12791	119336	-193843
	380C2F3	12781	53413	107222	12789	110224	-181071
	RTG	0	0	0	3466	30747	-50511
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	7862	16543	1734	9571	-18127
	150C1F1	6387	29407	62172	6387	33623	-65377
	150C1F2	6387	29374	62172	6387	33131	-64850
	150C1F3	6387	29333	62174	6387	32530	-64237
	380C2F1	12774	58814	124344	12775	67247	-130754
	380C2F2	12774	58749	124344	12775	66262	-129699
	380C2F3	12774	58667	124348	12774	65060	-128474
	RTG	0	0	0	3463	17263	-33938
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	8751	25460	52966	8754	32394	-57130
	150C1F1	12554	45957	96064	12557	58133	-105855
	150C1F2	12554	45864	96060	12556	56734	-104334
	150C1F3	12554	45748	96060	12556	55015	-102537
	380C2F1	25109	91914	192127	25114	116266	-211711
	380C2F2	25109	91728	192121	25113	113468	-208669
	380C2F3	25109	91495	192121	25112	110030	-205074
	RTG	0	0	0	17531	58193	-108986
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2487	9333	19697	2487	10709	-20565
	150C1F1	7894	30411	64325	7894	34123	-66445
	150C1F2	7894	30380	64328	7894	33701	-66069
	150C1F3	7894	30341	64334	7894	33185	-65638
	380C2F1	15788	60822	128649	15789	68247	-132891
	380C2F2	15788	60760	128657	15788	67402	-132138
	380C2F3	15788	60682	128668	15788	66370	-131275
	RTG	0	0	0	4968	20051	-39916
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1736	20081	31895	1736	20081	-31895
	150C1F1	6395	60067	97481	6395	60067	-97481
	150C1F2	6395	56750	92832	6395	56750	-92832
	150C1F3	6394	52510	86888	6394	52510	-86888
	380C2F1	12791	120134	194961	12791	120134	-194961
	380C2F2	12790	113499	185664	12790	113499	-185664
	380C2F3	12789	105021	173776	12789	105021	-173776
	RTG	0	0	0	3466	29262	-48403

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	9391	17909	1734	9391	-17909
	150C1F1	6387	33185	64907	6387	33185	-64907
	150C1F2	6387	32742	64449	6387	32742	-64449
	150C1F3	6387	32202	63919	6387	32202	-63919
	380C2F1	12775	66370	129814	12775	66370	-129814
	380C2F2	12774	65484	128898	12774	65484	-128898
	380C2F3	12774	64404	127839	12774	64404	-127839
	RTG	0	0	0	3463	17075	-33750
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	8753	31706	56517	8753	31706	-56517
	150C1F1	12557	56888	104500	12557	56888	-104500
	150C1F2	12556	55623	103163	12556	55623	-103163
	150C1F3	12556	54071	101590	12556	54071	-101590
	380C2F1	25113	113777	209000	25113	113777	-209000
	380C2F2	25112	111247	206326	25112	111247	-206326
	380C2F3	25112	108142	203180	25112	108142	-203180
	RTG	0	0	0	17531	57444	-108483
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2487	10568	20432	2487	10568	-20432
	150C1F1	7894	33748	66110	7894	33748	-66110
	150C1F2	7894	33367	65786	7894	33367	-65786
	150C1F3	7894	32902	65417	7894	32902	-65417
	380C2F1	15788	67495	132219	15788	67495	-132219
	380C2F2	15788	66735	131572	15788	66735	-131572
	380C2F3	15788	65804	130834	15788	65804	-130834
	RTG	0	0	0	4968	19902	-39812
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1737	21206	33470	1735	7711	-14947
	150C1F1	6396	63225	101899	6391	27289	-54062
	150C1F2	6395	59668	96922	6391	27027	-53851
	150C1F3	6395	55112	90535	6391	26706	-53611
	380C2F1	12792	126450	203798	12781	54578	-108124
	380C2F2	12791	119336	193843	12781	54054	-107702
	380C2F3	12789	110224	181071	12781	53413	-107222
	RTG	0	0	0	3464	14499	-29051
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	9571	18127	1734	7862	-16543
	150C1F1	6387	33623	65377	6387	29407	-62172
	150C1F2	6387	33131	64850	6387	29374	-62172
	150C1F3	6387	32530	64237	6387	29333	-62174
	380C2F1	12775	67247	130754	12774	58814	-124344
	380C2F2	12775	66262	129699	12774	58749	-124344
	380C2F3	12774	65060	128474	12774	58667	-124348
	RTG	0	0	0	3463	15441	-32706
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	8754	32394	57130	8751	25460	-52966
	150C1F1	12557	58133	105855	12554	45957	-96064
	150C1F2	12556	56734	104334	12554	45864	-96060
	150C1F3	12556	55015	102537	12554	45748	-96060
	380C2F1	25114	116266	211711	25109	91914	-192127
	380C2F2	25113	113468	208669	25109	91728	-192121
	380C2F3	25112	110030	205074	25109	91495	-192121
	RTG	0	0	0	17529	50468	-106135
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2487	10709	20565	2487	9333	-19697
	150C1F1	7894	34123	66445	7894	30411	-64325
	150C1F2	7894	33701	66069	7894	30380	-64328
	150C1F3	7894	33185	65638	7894	30341	-64334
	380C2F1	15789	68247	132891	15788	60822	-128649
	380C2F2	15788	67402	132138	15788	60760	-128657
	380C2F3	15788	66370	131275	15788	60682	-128668
	RTG	0	0	0	4968	18533	-39336

ZWW4HL400

Appendix J1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2313	9177	-18418
	150C1F1	0	0	0	8523	32999	-67226
	150C1F2	0	0	0	8523	32835	-67152
	150C1F3	0	0	0	8522	32632	-67072
	380C2F1	0	0	0	17045	65999	-134453
	380C2F2	0	0	0	17045	65670	-134305
	380C2F3	0	0	0	17045	65264	-134145
	RTG	0	0	0	4620	17777	-36500
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2312	9804	-20637
	150C1F1	0	0	0	8518	36364	-76893
	150C1F2	0	0	0	8518	36325	-76896
	150C1F3	0	0	0	8518	36277	-76901
	380C2F1	0	0	0	17036	72727	-153787
	380C2F2	0	0	0	17036	72650	-153792
	380C2F3	0	0	0	17036	72553	-153803
	RTG	0	0	0	4618	19300	-40891
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3883	14529	-29165
	150C1F1	0	0	0	9901	38892	-80361
	150C1F2	0	0	0	9901	38764	-80327
	150C1F3	0	0	0	9901	38605	-80291
	380C2F1	0	0	0	19802	77784	-160723
	380C2F2	0	0	0	19802	77528	-160653
	380C2F3	0	0	0	19802	77210	-160582
	RTG	0	0	0	7767	28176	-57870
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2915	10616	-22378
	150C1F1	0	0	0	9725	35903	-75906
	150C1F2	0	0	0	9725	35866	-75911
	150C1F3	0	0	0	9725	35819	-75919
	380C2F1	0	0	0	19451	71807	-151812
	380C2F2	0	0	0	19451	71732	-151822
	380C2F3	0	0	0	19451	71637	-151837
	RTG	0	0	0	5823	21078	-44703
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2314	14308	-24444
	150C1F1	0	0	0	8525	45813	-80736
	150C1F2	0	0	0	8524	44263	-78789
	150C1F3	0	0	0	8524	42347	-76437
	380C2F1	0	0	0	17049	91626	-161472
	380C2F2	0	0	0	17049	88526	-157578
	380C2F3	0	0	0	17048	84693	-152874
	RTG	0	0	0	4621	23345	-42043
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2312	10807	-21256
	150C1F1	0	0	0	8518	38889	-78013
	150C1F2	0	0	0	8518	38591	-77797
	150C1F3	0	0	0	8518	38225	-77553
	380C2F1	0	0	0	17036	77777	-156027
	380C2F2	0	0	0	17036	77181	-155594
	380C2F3	0	0	0	17036	76450	-155107
	RTG	0	0	0	4618	20406	-41295
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3885	21841	-36979
	150C1F1	0	0	0	9903	48510	-88986
	150C1F2	0	0	0	9903	47334	-87645
	150C1F3	0	0	0	9902	45889	-86059
	380C2F1	0	0	0	19806	97020	-177971
	380C2F2	0	0	0	19805	94667	-175291
	380C2F3	0	0	0	19805	91779	-172118
	RTG	0	0	0	7768	36134	-64856
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2915	11505	-22754
	150C1F1	0	0	0	9726	38271	-76685
	150C1F2	0	0	0	9726	37996	-76520
	150C1F3	0	0	0	9725	37659	-76337
	380C2F1	0	0	0	19451	76541	-153370
	380C2F2	0	0	0	19451	75993	-153041
	380C2F3	0	0	0	19451	75318	-152674
	RTG	0	0	0	5823	22087	-44897
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2314	13771	-23728
	150C1F1	0	0	0	8524	44435	-79003
	150C1F2	0	0	0	8524	43026	-77263
	150C1F3	0	0	0	8524	41289	-75172
	380C2F1	0	0	0	17049	88869	-158005
	380C2F2	0	0	0	17048	86053	-154526
	380C2F3	0	0	0	17048	82578	-150345
	RTG	0	0	0	4621	22737	-41301
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2312	10699	-21159
	150C1F1	0	0	0	8518	38623	-77820
	150C1F2	0	0	0	8518	38354	-77637
	150C1F3	0	0	0	8518	38024	-77431
	380C2F1	0	0	0	17036	77247	-155640
	380C2F2	0	0	0	17036	76709	-155273
	380C2F3	0	0	0	17036	76048	-154861
	RTG	0	0	0	4618	20291	-41221

NL3/3	GW / opgw	0	0	0	3885	21080	-36034
Wind, -5°C	150C1F1	0	0	0	9903	47463	-87791
Permanent loads yg= 1.2	150C1F2	0	0	0	9902	46400	-86612
Wind angle: 90°	150C1F3	0	0	0	9902	45097	-85222
	380C2F1	0	0	0	19805	94927	-175583
	380C2F2	0	0	0	19805	92801	-173223
	380C2F3	0	0	0	19804	90194	-170443
	RTG	0	0	0	7768	35276	-63898
NL3/4	GW / opgw	0	0	0	2915	11412	-22688
Construction/maintenance, +5°C	150C1F1	0	0	0	9726	38027	-76538
Permanent loads yg= 1.2	150C1F2	0	0	0	9726	37779	-76399
Wind angle: 90°	150C1F3	0	0	0	9725	37473	-76246
	380C2F1	0	0	0	19451	76053	-153076
	380C2F2	0	0	0	19451	75557	-152799
	380C2F3	0	0	0	19451	74945	-152493
	RTG	0	0	0	5823	21985	-44852
NL3/1a	GW / opgw	0	0	0	2313	8906	-18274
Wind, 10°C	150C1F1	0	0	0	8522	32312	-66975
Permanent loads yg= 1.2	150C1F2	0	0	0	8522	32218	-66954
Wind angle: -45°	150C1F3	0	0	0	8522	32100	-66934
	380C2F1	0	0	0	17045	64625	-133950
	380C2F2	0	0	0	17045	64435	-133908
	380C2F3	0	0	0	17045	64199	-133867
	RTG	0	0	0	4620	17475	-36413
NL3/1b	GW / opgw	0	0	0	2312	9742	-20639
Wind, -20°C	150C1F1	0	0	0	8518	36198	-76913
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	36174	-76918
Wind angle: -45°	150C1F3	0	0	0	8518	36144	-76925
	380C2F1	0	0	0	17036	72396	-153827
	380C2F2	0	0	0	17036	72348	-153836
	380C2F3	0	0	0	17036	72287	-153850
	RTG	0	0	0	4618	19226	-40903
NL3/3	GW / opgw	0	0	0	3883	14130	-28996
Wind, -5°C	150C1F1	0	0	0	9901	38353	-80255
Permanent loads yg= 1.2	150C1F2	0	0	0	9901	38277	-80249
Wind angle: -45°	150C1F3	0	0	0	9901	38182	-80246
	380C2F1	0	0	0	19802	76705	-160510
	380C2F2	0	0	0	19802	76554	-160499
	380C2F3	0	0	0	19802	76365	-160493
	RTG	0	0	0	7767	27725	-57784
NL3/4	GW / opgw	0	0	0	2915	10557	-22386
Construction/maintenance, +5°C	150C1F1	0	0	0	9725	35742	-75935
Permanent loads yg= 1.2	150C1F2	0	0	0	9725	35718	-75940
Wind angle: -45°	150C1F3	0	0	0	9725	35688	-75948
	380C2F1	0	0	0	19451	71483	-151869
	380C2F2	0	0	0	19451	71436	-151881
	380C2F3	0	0	0	19451	71377	-151896
	RTG	0	0	0	5823	21006	-44720
NL3/1a	GW / opgw	0	0	0	1735	7440	-14693
Wind, 10°C	150C1F1	0	0	0	6391	26623	-53552
Permanent loads yg= 0.9	150C1F2	0	0	0	6391	26434	-53426
Wind angle: 0°	150C1F3	0	0	0	6390	26203	-53285
	380C2F1	0	0	0	12781	53245	-107104
	380C2F2	0	0	0	12781	52868	-106853
	380C2F3	0	0	0	12781	52405	-106571
	RTG	0	0	0	3464	14212	-28857
NL3/1b	GW / opgw	0	0	0	1734	7898	-16549
Wind, -20°C	150C1F1	0	0	0	6387	29501	-62176
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	29460	-62173
Wind angle: 0°	150C1F3	0	0	0	6387	29408	-62172
	380C2F1	0	0	0	12774	59002	-124352
	380C2F2	0	0	0	12774	58919	-124347
	380C2F3	0	0	0	12774	58816	-124344
	RTG	0	0	0	3463	15483	-32705
NL3/3	GW / opgw	0	0	0	3304	13004	-25894
Wind, -5°C	150C1F1	0	0	0	7769	32583	-66833
Permanent loads yg= 0.9	150C1F2	0	0	0	7769	32443	-66770
Wind angle: 0°	150C1F3	0	0	0	7769	32268	-66702
	380C2F1	0	0	0	15538	65167	-133667
	380C2F2	0	0	0	15538	64885	-133541
	380C2F3	0	0	0	15538	64537	-133405
	RTG	0	0	0	6610	25061	-51190
NL3/4	GW / opgw	0	0	0	2336	8913	-18725
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	29581	-62346
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	29541	-62348
Wind angle: 0°	150C1F3	0	0	0	7593	29492	-62351
	380C2F1	0	0	0	15186	59161	-124693
	380C2F2	0	0	0	15186	59082	-124695
	380C2F3	0	0	0	15186	58984	-124702
	RTG	0	0	0	4667	17663	-37380
NL3/1a	GW / opgw	0	0	0	1735	13344	-22377
Wind, 10°C	150C1F1	0	0	0	6393	41605	-71713
Permanent loads yg= 0.9	150C1F2	0	0	0	6392	39839	-69303
Wind angle: 45°	150C1F3	0	0	0	6392	37633	-66331
	380C2F1	0	0	0	12785	63209	-143427
	380C2F2	0	0	0	12785	79677	-138605
	380C2F3	0	0	0	12784	75266	-132662
	RTG	0	0	0	3465	20757	-36495
NL3/1b	GW / opgw	0	0	0	1734	9072	-17537
Wind, -20°C	150C1F1	0	0	0	6387	32408	-64118
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	32054	-63780
Wind angle: 45°	150C1F3	0	0	0	6387	31621	-63392
	380C2F1	0	0	0	12774	64817	-128235
	380C2F2	0	0	0	12774	64107	-127560
	380C2F3	0	0	0	12774	63242	-126784
	RTG	0	0	0	3463	16742	-33438

NL3/3	GW / opgw	0	0	0	3306	20937	-35040
Wind, -5°C	150C1F1	0	0	0	7771	43648	-78562
Permanent loads yg= 0.9	150C1F2	0	0	0	7771	42300	-76853
Wind angle: 45°	150C1F3	0	0	0	7770	40637	-74797
	380C2F1	0	0	0	15542	87296	-157124
	380C2F2	0	0	0	15541	84600	-153707
	380C2F3	0	0	0	15541	81274	-148593
	RTG	0	0	0	6612	33762	-59771
NL3/4	GW / opgw	0	0	0	2336	9895	-19301
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	32206	-63680
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	31893	-63432
Wind angle: 45°	150C1F3	0	0	0	7593	31509	-63151
	380C2F1	0	0	0	15187	64412	-127360
	380C2F2	0	0	0	15187	63786	-126864
	380C2F3	0	0	0	15186	63019	-126301
	RTG	0	0	0	4667	18753	-37748
NL3/1a	GW / opgw	0	0	0	1735	12751	-21541
Wind, 10°C	150C1F1	0	0	0	6392	40035	-69569
Permanent loads yg= 0.9	150C1F2	0	0	0	6392	38418	-67383
Wind angle: 90°	150C1F3	0	0	0	6392	36405	-64701
	380C2F1	0	0	0	12785	80070	-139139
	380C2F2	0	0	0	12784	76836	-134766
	380C2F3	0	0	0	12784	72810	-129403
	RTG	0	0	0	3465	20054	-35547
NL3/1b	GW / opgw	0	0	0	1734	8943	-17393
Wind, -20°C	150C1F1	0	0	0	6387	32093	-63816
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	31774	-63526
Wind angle: 90°	150C1F3	0	0	0	6387	31384	-63193
	380C2F1	0	0	0	12774	64186	-127633
	380C2F2	0	0	0	12774	63547	-127051
	380C2F3	0	0	0	12774	62768	-126386
	RTG	0	0	0	3463	16607	-33320
NL3/3	GW / opgw	0	0	0	3306	20126	-33990
Wind, -5°C	150C1F1	0	0	0	7771	42449	-77041
Permanent loads yg= 0.9	150C1F2	0	0	0	7771	41226	-75518
Wind angle: 90°	150C1F3	0	0	0	7770	39721	-73694
	380C2F1	0	0	0	15541	84898	-154082
	380C2F2	0	0	0	15541	82452	-151036
	380C2F3	0	0	0	15541	79441	-147388
	RTG	0	0	0	6612	32826	-58647
NL3/4	GW / opgw	0	0	0	2336	9790	-19209
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	31927	-63459
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	31645	-63247
Wind angle: 90°	150C1F3	0	0	0	7593	31299	-63008
	380C2F1	0	0	0	15187	63855	-126917
	380C2F2	0	0	0	15186	63290	-126494
	380C2F3	0	0	0	15186	62598	-126016
	RTG	0	0	0	4667	18640	-37679
NL3/1a	GW / opgw	0	0	0	1735	7127	-14457
Wind, 10°C	150C1F1	0	0	0	6390	25843	-53102
Permanent loads yg= 0.9	150C1F2	0	0	0	6390	25737	-53057
Wind angle: -45°	150C1F3	0	0	0	6390	25607	-53010
	380C2F1	0	0	0	12781	51686	-106203
	380C2F2	0	0	0	12781	51475	-106115
	380C2F3	0	0	0	12781	51213	-106020
	RTG	0	0	0	3464	13874	-28690
NL3/1b	GW / opgw	0	0	0	1734	7831	-16541
Wind, -20°C	150C1F1	0	0	0	6387	29325	-62175
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	29300	-62177
Wind angle: -45°	150C1F3	0	0	0	6387	29268	-62181
	380C2F1	0	0	0	12774	58650	-124349
	380C2F2	0	0	0	12774	58600	-124354
	380C2F3	0	0	0	12774	58537	-124361
	RTG	0	0	0	3463	15405	-32709
NL3/3	GW / opgw	0	0	0	3304	12574	-25660
Wind, -5°C	150C1F1	0	0	0	7769	31994	-66620
Permanent loads yg= 0.9	150C1F2	0	0	0	7769	31913	-66602
Wind angle: -45°	150C1F3	0	0	0	7769	31812	-66585
	380C2F1	0	0	0	15538	63989	-133240
	380C2F2	0	0	0	15538	63826	-133204
	380C2F3	0	0	0	15538	63624	-133170
	RTG	0	0	0	6610	24584	-51049
NL3/4	GW / opgw	0	0	0	2336	8851	-18727
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	29412	-62361
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	29388	-62365
Wind angle: -45°	150C1F3	0	0	0	7593	29357	-62371
	380C2F1	0	0	0	15186	58824	-124722
	380C2F2	0	0	0	15186	58776	-124730
	380C2F3	0	0	0	15186	58714	-124742
	RTG	0	0	0	4667	17589	-37393

ZWW4HL400

Appendix J1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	9177	18418	0	0	0
	150C1F1	8523	32999	67226	0	0	0
	150C1F2	8523	32835	67152	0	0	0
	150C1F3	8522	32632	67072	0	0	0
	380C2F1	17045	65999	134453	0	0	0
	380C2F2	17045	65670	134305	0	0	0
	380C2F3	17045	65264	134145	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	9804	20637	0	0	0
	150C1F1	8518	36364	76893	0	0	0
	150C1F2	8518	36325	76896	0	0	0
	150C1F3	8518	36277	76901	0	0	0
	380C2F1	17036	72727	153787	0	0	0
	380C2F2	17036	72650	153792	0	0	0
	380C2F3	17036	72553	153803	0	0	0
RTG	0	0	0	0	0	0	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	14529	29165	0	0	0
	150C1F1	9901	38892	80361	0	0	0
	150C1F2	9901	38764	80327	0	0	0
	150C1F3	9901	38605	80291	0	0	0
	380C2F1	19802	77784	160723	0	0	0
	380C2F2	19802	77528	160653	0	0	0
	380C2F3	19802	77210	160582	0	0	0
RTG	0	0	0	0	0	0	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	10616	22378	0	0	0
	150C1F1	9725	35903	75906	0	0	0
	150C1F2	9725	35866	75911	0	0	0
	150C1F3	9725	35819	75919	0	0	0
	380C2F1	19451	71807	151812	0	0	0
	380C2F2	19451	71732	151822	0	0	0
	380C2F3	19451	71637	151837	0	0	0
RTG	0	0	0	0	0	0	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	8906	18274	0	0	0
	150C1F1	8522	32312	66975	0	0	0
	150C1F2	8522	32218	66954	0	0	0
	150C1F3	8522	32100	66934	0	0	0
	380C2F1	17045	64625	133950	0	0	0
	380C2F2	17045	64435	133908	0	0	0
	380C2F3	17045	64199	133867	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	9742	20639	0	0	0
	150C1F1	8518	36198	76913	0	0	0
	150C1F2	8518	36174	76918	0	0	0
	150C1F3	8518	36144	76925	0	0	0
	380C2F1	17036	72396	153827	0	0	0
	380C2F2	17036	72348	153836	0	0	0
	380C2F3	17036	72287	153850	0	0	0
RTG	0	0	0	0	0	0	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	14130	28996	0	0	0
	150C1F1	9901	38353	80255	0	0	0
	150C1F2	9901	38277	80249	0	0	0
	150C1F3	9901	38182	80246	0	0	0
	380C2F1	19802	76705	160510	0	0	0
	380C2F2	19802	76554	160499	0	0	0
	380C2F3	19802	76365	160493	0	0	0
RTG	0	0	0	0	0	0	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	10557	22386	0	0	0
	150C1F1	9725	35742	75935	0	0	0
	150C1F2	9725	35718	75940	0	0	0
	150C1F3	9725	35688	75948	0	0	0
	380C2F1	19451	71483	151869	0	0	0
	380C2F2	19451	71436	151881	0	0	0
	380C2F3	19451	71377	151896	0	0	0
RTG	0	0	0	0	0	0	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	13771	23728	0	0	0
	150C1F1	8524	44435	79003	0	0	0
	150C1F2	8524	43026	77263	0	0	0
	150C1F3	8524	41289	75172	0	0	0
	380C2F1	17049	88869	158005	0	0	0
	380C2F2	17048	86053	154526	0	0	0
	380C2F3	17048	82578	150345	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	10699	21159	0	0	0
	150C1F1	8518	38623	77820	0	0	0
	150C1F2	8518	38354	77637	0	0	0
	150C1F3	8518	38024	77431	0	0	0
	380C2F1	17036	77247	155640	0	0	0
	380C2F2	17036	76709	155273	0	0	0
	380C2F3	17036	76048	154861	0	0	0
RTG	0	0	0	0	0	0	

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	21080	36034	0	0	0
	150C1F1	9903	47463	87791	0	0	0
	150C1F2	9902	46400	86612	0	0	0
	150C1F3	9902	45097	85222	0	0	0
	380C2F1	19805	94927	175583	0	0	0
	380C2F2	19805	92801	173223	0	0	0
	380C2F3	19804	90194	170443	0	0	0
	RTG	0	0	0	0	0	0
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	11412	22688	0	0
150C1F1		9726	38027	76538	0	0	0
150C1F2		9726	37779	76399	0	0	0
150C1F3		9725	37473	76246	0	0	0
380C2F1		19451	76053	153076	0	0	0
380C2F2		19451	75557	152799	0	0	0
380C2F3		19451	74945	152493	0	0	0
RTG		0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2314	14308	24444	0	0
	150C1F1	8525	45813	80736	0	0	0
	150C1F2	8524	44263	78789	0	0	0
	150C1F3	8524	42347	76437	0	0	0
	380C2F1	17049	91626	161472	0	0	0
	380C2F2	17049	88526	157578	0	0	0
	380C2F3	17048	84693	152874	0	0	0
	RTG	0	0	0	0	0	0
	NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	10807	21256	0	0
150C1F1		8518	38889	78013	0	0	0
150C1F2		8518	38591	77797	0	0	0
150C1F3		8518	38225	77553	0	0	0
380C2F1		17036	77777	156027	0	0	0
380C2F2		17036	77181	155594	0	0	0
380C2F3		17036	76450	155107	0	0	0
RTG		0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	3885	21841	36979	0	0
	150C1F1	9903	48510	88986	0	0	0
	150C1F2	9903	47334	87645	0	0	0
	150C1F3	9902	45889	86059	0	0	0
	380C2F1	19806	97020	177971	0	0	0
	380C2F2	19805	94667	175291	0	0	0
	380C2F3	19805	91779	172118	0	0	0
	RTG	0	0	0	0	0	0
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2915	11505	22754	0	0
150C1F1		9726	38271	76685	0	0	0
150C1F2		9726	37996	76520	0	0	0
150C1F3		9725	37659	76337	0	0	0
380C2F1		19451	76541	153370	0	0	0
380C2F2		19451	75993	153041	0	0	0
380C2F3		19451	75318	152674	0	0	0
RTG		0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1735	7440	14693	0	0
	150C1F1	6391	26623	53552	0	0	0
	150C1F2	6391	26434	53426	0	0	0
	150C1F3	6390	26203	53285	0	0	0
	380C2F1	12781	53245	107104	0	0	0
	380C2F2	12781	52868	106853	0	0	0
	380C2F3	12781	52405	106571	0	0	0
	RTG	0	0	0	0	0	0
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	7898	16549	0	0
150C1F1		6387	29501	62176	0	0	0
150C1F2		6387	29460	62173	0	0	0
150C1F3		6387	29408	62172	0	0	0
380C2F1		12774	59002	124352	0	0	0
380C2F2		12774	58919	124347	0	0	0
380C2F3		12774	58816	124344	0	0	0
RTG		0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	3304	13004	25894	0	0
	150C1F1	7769	32583	66833	0	0	0
	150C1F2	7769	32443	66770	0	0	0
	150C1F3	7769	32268	66702	0	0	0
	380C2F1	15538	65167	133667	0	0	0
	380C2F2	15538	64885	133541	0	0	0
	380C2F3	15538	64537	133405	0	0	0
	RTG	0	0	0	0	0	0
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2336	8913	18725	0	0
150C1F1		7593	29581	62346	0	0	0
150C1F2		7593	29541	62348	0	0	0
150C1F3		7593	29492	62351	0	0	0
380C2F1		15186	59161	124693	0	0	0
380C2F2		15186	59082	124695	0	0	0
380C2F3		15186	58984	124702	0	0	0
RTG		0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1735	7127	14457	0	0
	150C1F1	6390	25843	53102	0	0	0
	150C1F2	6390	25737	53057	0	0	0
	150C1F3	6390	25607	53010	0	0	0
	380C2F1	12781	51686	106203	0	0	0
	380C2F2	12781	51475	106115	0	0	0
	380C2F3	12781	51213	106020	0	0	0
	RTG	0	0	0	0	0	0
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	7831	16541	0	0
150C1F1		6387	29325	62175	0	0	0
150C1F2		6387	29300	62177	0	0	0
150C1F3		6387	29268	62181	0	0	0
380C2F1		12774	58650	124349	0	0	0
380C2F2		12774	58600	124354	0	0	0
380C2F3		12774	58537	124361	0	0	0
RTG		0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: 45°	GW / opgw	3304	12574	25660	0	0	0
	150C1F1	7769	31994	66620	0	0	0
	150C1F2	7769	31913	66602	0	0	0
	150C1F3	7769	31812	66585	0	0	0
	380C2F1	15538	63989	133240	0	0	0
	380C2F2	15538	63826	133204	0	0	0
	380C2F3	15538	63624	133170	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: 45°	GW / opgw	2336	8851	18727	0	0	0
	150C1F1	7593	29412	62361	0	0	0
	150C1F2	7593	29388	62365	0	0	0
	150C1F3	7593	29357	62371	0	0	0
	380C2F1	15186	58824	124722	0	0	0
	380C2F2	15186	58776	124730	0	0	0
	380C2F3	15186	58714	124742	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	1735	12751	21541	0	0	0
	150C1F1	6392	40035	69569	0	0	0
	150C1F2	6392	38418	67383	0	0	0
	150C1F3	6392	36405	64701	0	0	0
	380C2F1	12785	80070	139139	0	0	0
	380C2F2	12784	76836	134766	0	0	0
	380C2F3	12784	72810	129403	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	1734	8943	17393	0	0	0
	150C1F1	6387	32093	63816	0	0	0
	150C1F2	6387	31774	63526	0	0	0
	150C1F3	6387	31384	63193	0	0	0
	380C2F1	12774	64186	127633	0	0	0
	380C2F2	12774	63547	127051	0	0	0
	380C2F3	12774	62768	126386	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	3306	20126	33990	0	0	0
	150C1F1	7771	42449	77041	0	0	0
	150C1F2	7771	41226	75518	0	0	0
	150C1F3	7770	39721	73694	0	0	0
	380C2F1	15541	84898	154082	0	0	0
	380C2F2	15541	82452	151036	0	0	0
	380C2F3	15541	79441	147388	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	2336	9790	19209	0	0	0
	150C1F1	7593	31927	63459	0	0	0
	150C1F2	7593	31645	63247	0	0	0
	150C1F3	7593	31299	63008	0	0	0
	380C2F1	15187	63855	126917	0	0	0
	380C2F2	15186	63290	126494	0	0	0
	380C2F3	15186	62598	126016	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	1735	13344	22377	0	0	0
	150C1F1	6393	41605	71713	0	0	0
	150C1F2	6392	39839	69303	0	0	0
	150C1F3	6392	37633	66331	0	0	0
	380C2F1	12785	83209	143427	0	0	0
	380C2F2	12785	79677	138605	0	0	0
	380C2F3	12784	75266	132662	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	1734	9072	17537	0	0	0
	150C1F1	6387	32408	64118	0	0	0
	150C1F2	6387	32054	63780	0	0	0
	150C1F3	6387	31621	63392	0	0	0
	380C2F1	12774	64817	128235	0	0	0
	380C2F2	12774	64107	127560	0	0	0
	380C2F3	12774	63242	126784	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	3306	20937	35040	0	0	0
	150C1F1	7771	43648	78562	0	0	0
	150C1F2	7771	42300	76853	0	0	0
	150C1F3	7770	40637	74797	0	0	0
	380C2F1	15542	87296	157124	0	0	0
	380C2F2	15541	84600	153707	0	0	0
	380C2F3	15541	81274	149593	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	2336	9895	19301	0	0	0
	150C1F1	7593	32206	63680	0	0	0
	150C1F2	7593	31893	63432	0	0	0
	150C1F3	7593	31509	63151	0	0	0
	380C2F1	15187	64412	127360	0	0	0
	380C2F2	15187	63786	126864	0	0	0
	380C2F3	15186	63019	126301	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HL400

Appendix J1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	9177	18418	2313	9177	-18418
	150C1F1	8523	32999	67226	8523	32999	-67226
	150C1F2	8523	32835	67152	8523	32835	-67152
	150C1F3	8522	32632	67072	8522	32632	-67072
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	9804	20637	2312	9804	-20637
	150C1F1	8518	36364	76893	8518	36364	-76893
	150C1F2	8518	36325	76896	8518	36325	-76896
	150C1F3	8518	36277	76901	8518	36277	-76901
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	14529	29165	3883	14529	-29165
	150C1F1	9901	38892	80361	9901	38892	-80361
	150C1F2	9901	38764	80327	9901	38764	-80327
	150C1F3	9901	38605	80291	9901	38605	-80291
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	10616	22378	2915	10616	-22378
	150C1F1	9725	35903	75906	9725	35903	-75906
	150C1F2	9725	35866	75911	9725	35866	-75911
	150C1F3	9725	35819	75919	9725	35819	-75919
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	8906	18274	2314	14308	-24444
	150C1F1	8522	32312	66975	8525	45813	-80736
	150C1F2	8522	32218	66954	8524	44263	-78789
	150C1F3	8522	32100	66934	8524	42347	-76437
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	9742	20639	2312	10807	-21256
	150C1F1	8518	36198	76913	8518	38889	-78013
	150C1F2	8518	36174	76918	8518	38591	-77797
	150C1F3	8518	36144	76925	8518	38225	-77553
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	14130	28996	3885	21841	-36979
	150C1F1	9901	38353	80255	9903	48510	-88986
	150C1F2	9901	38277	80249	9903	47334	-87645
	150C1F3	9901	38182	80246	9902	45889	-86059
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	10557	22386	2915	11505	-22754
	150C1F1	9725	35742	75935	9726	38271	-76685
	150C1F2	9725	35718	75940	9726	37996	-76520
	150C1F3	9725	35688	75948	9725	37659	-76337
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	13771	23728	2314	13771	-23728
	150C1F1	8524	44435	79003	8524	44435	-79003
	150C1F2	8524	43026	77263	8524	43026	-77263
	150C1F3	8524	41289	75172	8524	41289	-75172
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	10699	21159	2312	10699	-21159
	150C1F1	8518	38623	77820	8518	38623	-77820
	150C1F2	8518	38354	77637	8518	38354	-77637
	150C1F3	8518	38024	77431	8518	38024	-77431
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	3885 21080 36034 9903 47463 87791 9902 46400 86612 9902 45097 85222 0 0 0 0 0 0 0 0 0 0 0 0	3885 21080 -36034 9903 47463 -87791 9902 46400 -86612 9902 45097 -85222 0 0 0 0 0 0 0 0 0 0 0 0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2915 11412 22688 9726 38027 76538 9726 37779 76399 9725 37473 76246 0 0 0 0 0 0 0 0 0 0 0 0	2915 11412 -22688 9726 38027 -76538 9726 37779 -76399 9725 37473 -76246 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2314 14308 24444 8525 45813 80736 8524 44263 78789 8524 42347 76437 0 0 0 0 0 0 0 0 0 0 0 0	2313 8906 -18274 8522 32312 -66975 8522 32218 -66954 8522 32100 -66934 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2312 10807 21256 8518 38889 78013 8518 38591 77797 8518 38225 77553 0 0 0 0 0 0 0 0 0 0 0 0	2312 9742 -20639 8518 36198 -76913 8518 36174 -76918 8518 36144 -76925 0 0 0 0 0 0 0 0 0 0 0 0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	3885 21841 36979 9903 48510 88986 9903 47334 87645 9902 45889 86059 0 0 0 0 0 0 0 0 0 0 0 0	3883 14130 -28996 9901 38353 -80255 9901 38277 -80249 9901 38182 -80246 0 0 0 0 0 0 0 0 0 0 0 0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2915 11505 22754 9726 38271 76685 9726 37996 76520 9725 37659 76337 0 0 0 0 0 0 0 0 0 0 0 0	2915 10557 -22386 9725 35742 -75935 9725 35718 -75940 9725 35688 -75948 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1735 7440 14693 6391 26623 53552 6391 26434 53426 6390 26203 53285 0 0 0 0 0 0 0 0 0 0 0 0	1735 7440 -14693 6391 26623 -53552 6391 26434 -53426 6390 26203 -53285 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1734 7898 16549 6387 29501 62176 6387 29460 62173 6387 29408 62172 0 0 0 0 0 0 0 0 0 0 0 0	1734 7898 -16549 6387 29501 -62176 6387 29460 -62173 6387 29408 -62172 0 0 0 0 0 0 0 0 0 0 0 0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	3304 13004 25894 7769 32583 66833 7769 32443 66770 7769 32268 66702 0 0 0 0 0 0 0 0 0 0 0 0	3304 13004 -25894 7769 32583 -66833 7769 32443 -66770 7769 32268 -66702 0 0 0 0 0 0 0 0 0 0 0 0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	2336 8913 18725 7593 29581 62346 7593 29541 62348 7593 29492 62351 0 0 0 0 0 0 0 0 0 0 0 0	2336 8913 -18725 7593 29581 -62346 7593 29541 -62348 7593 29492 -62351 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1735 7127 14457 6390 25843 53102 6390 25737 53057 6390 25607 53010 0 0 0 0 0 0 0 0 0 0 0 0	1735 13344 -22377 6393 41605 -71713 6392 39839 -69303 6392 37633 -66331 0 0 0 0 0 0 0 0 0 0 0 0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 150C1F1 150C1F2 150C1F3 380C2F1 380C2F2 380C2F3 RTG	1734 7831 16541 6387 29325 62175 6387 29300 62177 6387 29268 62181 0 0 0 0 0 0 0 0 0 0 0 0	1734 9072 -17537 6387 32408 -64118 6387 32054 -63780 6387 31621 -63392 0 0 0 0 0 0 0 0 0 0 0 0

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3304	12574	25660	3306	20937	-35040
	150C1F1	7769	31994	66620	7771	43648	-78562
	150C1F2	7769	31913	66602	7771	42300	-76853
	150C1F3	7769	31812	66585	7770	40637	-74797
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2336	8851	18727	2336	9895	-19301
	150C1F1	7593	29412	62361	7593	32206	-63680
	150C1F2	7593	29388	62365	7593	31893	-63432
	150C1F3	7593	29357	62371	7593	31509	-63151
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1735	12751	21541	1735	12751	-21541
	150C1F1	6392	40035	69569	6392	40035	-69569
	150C1F2	6392	38418	67383	6392	38418	-67383
	150C1F3	6392	36405	64701	6392	36405	-64701
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	8943	17393	1734	8943	-17393
	150C1F1	6387	32093	63816	6387	32093	-63816
	150C1F2	6387	31774	63526	6387	31774	-63526
	150C1F3	6387	31384	63193	6387	31384	-63193
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3306	20126	33990	3306	20126	-33990
	150C1F1	7771	42449	77041	7771	42449	-77041
	150C1F2	7771	41226	75518	7771	41226	-75518
	150C1F3	7770	39721	73694	7770	39721	-73694
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2336	9790	19209	2336	9790	-19209
	150C1F1	7593	31927	63459	7593	31927	-63459
	150C1F2	7593	31645	63247	7593	31645	-63247
	150C1F3	7593	31299	63008	7593	31299	-63008
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1735	13344	22377	1735	7127	-14457
	150C1F1	6393	41605	71713	6390	25843	-53102
	150C1F2	6392	39839	69303	6390	25737	-53057
	150C1F3	6392	37633	66331	6390	25607	-53010
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	9072	17537	1734	7831	-16541
	150C1F1	6387	32408	64118	6387	29325	-62175
	150C1F2	6387	32054	63780	6387	29300	-62177
	150C1F3	6387	31621	63392	6387	29268	-62181
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3306	20937	35040	3304	12574	-25660
	150C1F1	7771	43648	78562	7769	31994	-66620
	150C1F2	7771	42300	76853	7769	31913	-66602
	150C1F3	7770	40637	74797	7769	31812	-66585
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2336	9895	19301	2336	8851	-18727
	150C1F1	7593	32206	63680	7593	29412	-62361
	150C1F2	7593	31893	63432	7593	29388	-62365
	150C1F3	7593	31509	63151	7593	29357	-62371
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HL400

Appendix J1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17045	65999	134453	17045	65999	-134453
	380C2F2	17045	65670	134305	17045	65670	-134305
	380C2F3	17045	65264	134145	17045	65264	-134145
RTG	0	0	0	4620	17777	-36500	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	72727	153787	17036	72727	-153787
	380C2F2	17036	72650	153792	17036	72650	-153792
	380C2F3	17036	72553	153803	17036	72553	-153803
RTG	0	0	0	4618	19300	-40891	
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19802	77784	160723	19802	77784	-160723
	380C2F2	19802	77528	160653	19802	77528	-160653
	380C2F3	19802	77210	160582	19802	77210	-160582
RTG	0	0	0	7767	28176	-57870	
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19451	71807	151812	19451	71807	-151812
	380C2F2	19451	71732	151822	19451	71732	-151822
	380C2F3	19451	71637	151837	19451	71637	-151837
RTG	0	0	0	5823	21078	-44703	
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17045	64625	133950	17049	91626	-161472
	380C2F2	17045	64435	133908	17049	88526	-157578
	380C2F3	17045	64199	133867	17048	84693	-152874
RTG	0	0	0	4621	23345	-42043	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	72396	153827	17036	77777	-156027
	380C2F2	17036	72348	153836	17036	77181	-155594
	380C2F3	17036	72287	153850	17036	76450	-155107
RTG	0	0	0	4618	20406	-41295	
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19802	76705	160510	19806	97020	-177971
	380C2F2	19802	76554	160499	19805	94667	-175291
	380C2F3	19802	76365	160493	19805	91779	-172118
RTG	0	0	0	7768	36134	-64856	
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19451	71483	151869	19451	76541	-153370
	380C2F2	19451	71436	151881	19451	75993	-153041
	380C2F3	19451	71377	151896	19451	75318	-152674
RTG	0	0	0	5823	22087	-44897	
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17049	88869	158005	17049	88869	-158005
	380C2F2	17048	86053	154526	17048	86053	-154526
	380C2F3	17048	82578	150345	17048	82578	-150345
RTG	0	0	0	4621	22737	-41301	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	77247	155640	17036	77247	-155640
	380C2F2	17036	76709	155273	17036	76709	-155273
	380C2F3	17036	76048	154861	17036	76048	-154861
RTG	0	0	0	4618	20291	-41221	

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19805	94927	175583	19805	94927	-175583	
	380C2F2	19805	92801	173223	19805	92801	-173223	
	380C2F3	19804	90194	170443	19804	90194	-170443	
	RTG	0	0	0	7768	35276	-63898	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19451	76053	153076	19451	76053	-153076	
	380C2F2	19451	75557	152799	19451	75557	-152799	
	380C2F3	19451	74945	152493	19451	74945	-152493	
	RTG	0	0	0	5823	21985	-44852	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17049	91626	161472	17045	64625	-133950	
	380C2F2	17049	88526	157578	17045	64435	-133908	
	380C2F3	17048	84693	152874	17045	64199	-133867	
	RTG	0	0	0	4620	17475	-36413	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17036	77777	156027	17036	72396	-153827	
	380C2F2	17036	77181	155594	17036	72348	-153836	
	380C2F3	17036	76450	155107	17036	72287	-153850	
	RTG	0	0	0	4618	19226	-40903	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19806	97020	177971	19802	76705	-160510	
	380C2F2	19805	94667	175291	19802	76554	-160499	
	380C2F3	19805	91779	172118	19802	76365	-160493	
	RTG	0	0	0	7767	27725	-57784	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19451	76541	153370	19451	71483	-151869	
	380C2F2	19451	75993	153041	19451	71436	-151881	
	380C2F3	19451	75318	152674	19451	71377	-151896	
	RTG	0	0	0	5823	21006	-44720	
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	12781	53245	107104	12781	53245	-107104	
	380C2F2	12781	52868	106853	12781	52868	-106853	
	380C2F3	12781	52405	106571	12781	52405	-106571	
	RTG	0	0	0	3464	14212	-28857	
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	59002	124352	12774	59002	-124352	
	380C2F2	12774	58919	124347	12774	58919	-124347	
	380C2F3	12774	58816	124344	12774	58816	-124344	
	RTG	0	0	0	3463	15483	-32705	
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	15538	65167	133667	15538	65167	-133667	
	380C2F2	15538	64885	133541	15538	64885	-133541	
	380C2F3	15538	64537	133405	15538	64537	-133405	
	RTG	0	0	0	6610	25061	-51190	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	59161	124693	15186	59161	-124693	
	380C2F2	15186	59082	124695	15186	59082	-124695	
	380C2F3	15186	58984	124702	15186	58984	-124702	
	RTG	0	0	0	4667	17663	-37380	
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	12781	51686	106203	12785	83209	-143427	
	380C2F2	12781	51475	106115	12785	79677	-138605	
	380C2F3	12781	51213	106020	12784	75266	-132662	
	RTG	0	0	0	3465	20757	-36495	
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	58650	124349	12774	64817	-128235	
	380C2F2	12774	58600	124354	12774	64107	-127560	
	380C2F3	12774	58537	124361	12774	63242	-126784	
	RTG	0	0	0	3463	16742	-33438	

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15538	63989	133240	15542	87296	-157124
	380C2F2	15538	63826	133204	15541	84600	-153707
	380C2F3	15538	63624	133170	15541	81274	-149593
	RTG	0	0	0	6612	33762	-59771
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15186	58824	124722	15187	64412	-127360
	380C2F2	15186	58776	124730	15187	63786	-126864
	380C2F3	15186	58714	124742	15186	63019	-126301
	RTG	0	0	0	4667	18753	-37748
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	12785	80070	139139	12785	80070	-139139
	380C2F2	12784	76836	134766	12784	76836	-134766
	380C2F3	12784	72810	129403	12784	72810	-129403
	RTG	0	0	0	3465	20054	-35547
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	12774	64186	127633	12774	64186	-127633
	380C2F2	12774	63547	127051	12774	63547	-127051
	380C2F3	12774	62768	126386	12774	62768	-126386
	RTG	0	0	0	3463	16607	-33320
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15541	84898	154082	15541	84898	-154082
	380C2F2	15541	82452	151036	15541	82452	-151036
	380C2F3	15541	79441	147388	15541	79441	-147388
	RTG	0	0	0	6612	32826	-58647
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15187	63855	126917	15187	63855	-126917
	380C2F2	15186	63290	126494	15186	63290	-126494
	380C2F3	15186	62598	126016	15186	62598	-126016
	RTG	0	0	0	4667	18640	-37679
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	12785	83209	143427	12781	51686	-106203
	380C2F2	12785	79677	138605	12781	51475	-106115
	380C2F3	12784	75266	132662	12781	51213	-106020
	RTG	0	0	0	3464	13874	-28690
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	12774	64817	128235	12774	58650	-124349
	380C2F2	12774	64107	127560	12774	58600	-124354
	380C2F3	12774	63242	126784	12774	58537	-124361
	RTG	0	0	0	3463	15405	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15542	87296	157124	15538	63989	-133240
	380C2F2	15541	84600	153707	15538	63826	-133204
	380C2F3	15541	81274	149593	15538	63624	-133170
	RTG	0	0	0	6610	24584	-51049
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15187	64412	127360	15186	58824	-124722
	380C2F2	15187	63786	126864	15186	58776	-124730
	380C2F3	15186	63019	126301	15186	58714	-124742
	RTG	0	0	0	4667	17589	-37393

ZWW4HL400

Appendix J1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17045	65999	134453	17045	65999	-134453
	380C2F2	17045	65670	134305	17045	65670	-134305
	380C2F3	17045	65264	134145	17045	65264	-134145
RTG	0	0	0	4620	17777	-36500	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	72727	153787	17036	72727	-153787
	380C2F2	17036	72650	153792	17036	72650	-153792
	380C2F3	17036	72553	153803	17036	72553	-153803
RTG	0	0	0	4618	19300	-40891	
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19802	77784	160723	19802	77784	-160723
	380C2F2	19802	77528	160653	19802	77528	-160653
	380C2F3	19802	77210	160582	19802	77210	-160582
RTG	0	0	0	7767	28176	-57870	
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19451	71807	151812	19451	71807	-151812
	380C2F2	19451	71732	151822	19451	71732	-151822
	380C2F3	19451	71637	151837	19451	71637	-151837
RTG	0	0	0	5823	21078	-44703	
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17045	64625	133950	17049	91626	-161472
	380C2F2	17045	64435	133908	17049	88526	-157578
	380C2F3	17045	64199	133867	17048	84693	-152874
RTG	0	0	0	4621	23345	-42043	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	72396	153827	17036	77777	-156027
	380C2F2	17036	72348	153836	17036	77181	-155594
	380C2F3	17036	72287	153850	17036	76450	-155107
RTG	0	0	0	4618	20406	-41295	
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19802	76705	160510	19806	97020	-177971
	380C2F2	19802	76554	160499	19805	94667	-175291
	380C2F3	19802	76365	160493	19805	91779	-172118
RTG	0	0	0	7768	36134	-64856	
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19451	71483	151869	19451	76541	-153370
	380C2F2	19451	71436	151881	19451	75993	-153041
	380C2F3	19451	71377	151896	19451	75318	-152674
RTG	0	0	0	5823	22087	-44897	
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17049	88869	158005	17049	88869	-158005
	380C2F2	17048	86053	154526	17048	86053	-154526
	380C2F3	17048	82578	150345	17048	82578	-150345
RTG	0	0	0	4621	22737	-41301	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	77247	155640	17036	77247	-155640
	380C2F2	17036	76709	155273	17036	76709	-155273
	380C2F3	17036	76048	154861	17036	76048	-154861
RTG	0	0	0	4618	20291	-41221	

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19805	94927	175583	19805	94927	-175583	
	380C2F2	19805	92801	173223	19805	92801	-173223	
	380C2F3	19804	90194	170443	19804	90194	-170443	
	RTG	0	0	0	7768	35276	-63898	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19451	76053	153076	19451	76053	-153076	
	380C2F2	19451	75557	152799	19451	75557	-152799	
	380C2F3	19451	74945	152493	19451	74945	-152493	
	RTG	0	0	0	5823	21985	-44852	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17049	91626	161472	17045	64625	-133950	
	380C2F2	17049	88526	157578	17045	64435	-133908	
	380C2F3	17048	84693	152874	17045	64199	-133867	
	RTG	0	0	0	4620	17475	-36413	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17036	77777	156027	17036	72396	-153827	
	380C2F2	17036	77181	155594	17036	72348	-153836	
	380C2F3	17036	76450	155107	17036	72287	-153850	
	RTG	0	0	0	4618	19226	-40903	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19806	97020	177971	19802	76705	-160510	
	380C2F2	19805	94667	175291	19802	76554	-160499	
	380C2F3	19805	91779	172118	19802	76365	-160493	
	RTG	0	0	0	7767	27725	-57784	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19451	76541	153370	19451	71483	-151869	
	380C2F2	19451	75993	153041	19451	71436	-151881	
	380C2F3	19451	75318	152674	19451	71377	-151896	
	RTG	0	0	0	5823	21006	-44720	
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	12781	53245	107104	12781	53245	-107104	
	380C2F2	12781	52868	106853	12781	52868	-106853	
	380C2F3	12781	52405	106571	12781	52405	-106571	
	RTG	0	0	0	3464	14212	-28857	
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	59002	124352	12774	59002	-124352	
	380C2F2	12774	58919	124347	12774	58919	-124347	
	380C2F3	12774	58816	124344	12774	58816	-124344	
	RTG	0	0	0	3463	15483	-32705	
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	15538	65167	133667	15538	65167	-133667	
	380C2F2	15538	64885	133541	15538	64885	-133541	
	380C2F3	15538	64537	133405	15538	64537	-133405	
	RTG	0	0	0	6610	25061	-51190	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	59161	124693	15186	59161	-124693	
	380C2F2	15186	59082	124695	15186	59082	-124695	
	380C2F3	15186	58984	124702	15186	58984	-124702	
	RTG	0	0	0	4667	17663	-37380	
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	12781	51686	106203	12785	83209	-143427	
	380C2F2	12781	51475	106115	12785	79677	-138605	
	380C2F3	12781	51213	106020	12784	75266	-132662	
	RTG	0	0	0	3465	20757	-36495	
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	58650	124349	12774	64817	-128235	
	380C2F2	12774	58600	124354	12774	64107	-127560	
	380C2F3	12774	58537	124361	12774	63242	-126784	
	RTG	0	0	0	3463	16742	-33438	

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15538	63989	133240	15542	87296	-157124
	380C2F2	15538	63826	133204	15541	84600	-153707
	380C2F3	15538	63624	133170	15541	81274	-149593
	RTG	0	0	0	6612	33762	-59771
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15186	58824	124722	15187	64412	-127360
	380C2F2	15186	58776	124730	15187	63786	-126864
	380C2F3	15186	58714	124742	15186	63019	-126301
	RTG	0	0	0	4667	18753	-37748
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	12785	80070	139139	12785	80070	-139139
	380C2F2	12784	76836	134766	12784	76836	-134766
	380C2F3	12784	72810	129403	12784	72810	-129403
	RTG	0	0	0	3465	20054	-35547
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	12774	64186	127633	12774	64186	-127633
	380C2F2	12774	63547	127051	12774	63547	-127051
	380C2F3	12774	62768	126386	12774	62768	-126386
	RTG	0	0	0	3463	16607	-33320
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15541	84898	154082	15541	84898	-154082
	380C2F2	15541	82452	151036	15541	82452	-151036
	380C2F3	15541	79441	147388	15541	79441	-147388
	RTG	0	0	0	6612	32826	-58647
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15187	63855	126917	15187	63855	-126917
	380C2F2	15186	63290	126494	15186	63290	-126494
	380C2F3	15186	62598	126016	15186	62598	-126016
	RTG	0	0	0	4667	18640	-37679
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	12785	83209	143427	12781	51686	-106203
	380C2F2	12785	79677	138605	12781	51475	-106115
	380C2F3	12784	75266	132662	12781	51213	-106020
	RTG	0	0	0	3464	13874	-28690
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	12774	64817	128235	12774	58650	-124349
	380C2F2	12774	64107	127560	12774	58600	-124354
	380C2F3	12774	63242	126784	12774	58537	-124361
	RTG	0	0	0	3463	15405	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15542	87296	157124	15538	63989	-133240
	380C2F2	15541	84600	153707	15538	63826	-133204
	380C2F3	15541	81274	149593	15538	63624	-133170
	RTG	0	0	0	6610	24584	-51049
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	15187	64412	127360	15186	58824	-124722
	380C2F2	15187	63786	126864	15186	58776	-124730
	380C2F3	15186	63019	126301	15186	58714	-124742
	RTG	0	0	0	4667	17589	-37393

ZWW4HL400

Appendix J1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2313	9177	18418	0	0	0
	150C1F1	8523	32999	67226	0	0	0
	150C1F2	8523	32835	67152	0	0	0
	150C1F3	8522	32632	67072	0	0	0
	380C2F1	0	0	0	17045	65999	-134453
	380C2F2	0	0	0	17045	65670	-134305
	380C2F3	0	0	0	17045	65264	-134145
RTG	0	0	0	4620	17777	-36500	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2312	9804	20637	0	0	0
	150C1F1	8518	36364	76893	0	0	0
	150C1F2	8518	36325	76896	0	0	0
	150C1F3	8518	36277	76901	0	0	0
	380C2F1	0	0	0	17036	72727	-153787
	380C2F2	0	0	0	17036	72650	-153792
	380C2F3	0	0	0	17036	72553	-153803
RTG	0	0	0	4618	19300	-40891	
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3883	14529	29165	0	0	0
	150C1F1	9901	38892	80361	0	0	0
	150C1F2	9901	38764	80327	0	0	0
	150C1F3	9901	38605	80291	0	0	0
	380C2F1	0	0	0	19802	77784	-160723
	380C2F2	0	0	0	19802	77528	-160653
	380C2F3	0	0	0	19802	77210	-160582
RTG	0	0	0	7767	28176	-57870	
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2915	10616	22378	0	0	0
	150C1F1	9725	35903	75906	0	0	0
	150C1F2	9725	35866	75911	0	0	0
	150C1F3	9725	35819	75919	0	0	0
	380C2F1	0	0	0	19451	71807	-151812
	380C2F2	0	0	0	19451	71732	-151822
	380C2F3	0	0	0	19451	71637	-151837
RTG	0	0	0	5823	21078	-44703	
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2313	8906	18274	0	0	0
	150C1F1	8522	32312	66975	0	0	0
	150C1F2	8522	32218	66954	0	0	0
	150C1F3	8522	32100	66934	0	0	0
	380C2F1	0	0	0	17049	91626	-161472
	380C2F2	0	0	0	17049	88526	-157578
	380C2F3	0	0	0	17048	84693	-152874
RTG	0	0	0	4621	23345	-42043	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2312	9742	20639	0	0	0
	150C1F1	8518	36198	76913	0	0	0
	150C1F2	8518	36174	76918	0	0	0
	150C1F3	8518	36144	76925	0	0	0
	380C2F1	0	0	0	17036	77777	-156027
	380C2F2	0	0	0	17036	77181	-155594
	380C2F3	0	0	0	17036	76450	-155107
RTG	0	0	0	4618	20406	-41295	
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3883	14130	28996	0	0	0
	150C1F1	9901	38353	80255	0	0	0
	150C1F2	9901	38277	80249	0	0	0
	150C1F3	9901	38182	80246	0	0	0
	380C2F1	0	0	0	19806	97020	-177971
	380C2F2	0	0	0	19805	94667	-175291
	380C2F3	0	0	0	19805	91779	-172118
RTG	0	0	0	7768	36134	-64856	
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2915	10557	22386	0	0	0
	150C1F1	9725	35742	75935	0	0	0
	150C1F2	9725	35718	75940	0	0	0
	150C1F3	9725	35688	75948	0	0	0
	380C2F1	0	0	0	19451	76541	-153370
	380C2F2	0	0	0	19451	75993	-153041
	380C2F3	0	0	0	19451	75318	-152674
RTG	0	0	0	5823	22087	-44897	
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2314	13771	23728	0	0	0
	150C1F1	8524	44435	79003	0	0	0
	150C1F2	8524	43026	77263	0	0	0
	150C1F3	8524	41289	75172	0	0	0
	380C2F1	0	0	0	17049	88869	-158005
	380C2F2	0	0	0	17048	86053	-154526
	380C2F3	0	0	0	17048	82578	-150345
RTG	0	0	0	4621	22737	-41301	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2312	10699	21159	0	0	0
	150C1F1	8518	38623	77820	0	0	0
	150C1F2	8518	38354	77637	0	0	0
	150C1F3	8518	38024	77431	0	0	0
	380C2F1	0	0	0	17036	77247	-155640
	380C2F2	0	0	0	17036	76709	-155273
	380C2F3	0	0	0	17036	76048	-154861
RTG	0	0	0	4618	20291	-41221	

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	21080	36034	0	0	0
	150C1F1	9903	47463	87791	0	0	0
	150C1F2	9902	46400	86612	0	0	0
	150C1F3	9902	45097	85222	0	0	0
	380C2F1	0	0	0	19805	94927	-175583
	380C2F2	0	0	0	19805	92801	-173223
	380C2F3	0	0	0	19804	90194	-170443
	RTG	0	0	0	7768	35276	-63898
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	11412	22688	0	0
150C1F1		9726	38027	76538	0	0	0
150C1F2		9726	37779	76399	0	0	0
150C1F3		9725	37473	76246	0	0	0
380C2F1		0	0	0	19451	76053	-153076
380C2F2		0	0	0	19451	75557	-152799
380C2F3		0	0	0	19451	74945	-152493
RTG		0	0	0	5823	21985	-44852
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2314	14308	24444	0	0
	150C1F1	8525	45813	80736	0	0	0
	150C1F2	8524	44263	78789	0	0	0
	150C1F3	8524	42347	76437	0	0	0
	380C2F1	0	0	0	17045	64625	-133950
	380C2F2	0	0	0	17045	64435	-133908
	380C2F3	0	0	0	17045	64199	-133867
	RTG	0	0	0	4620	17475	-36413
	NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	10807	21256	0	0
150C1F1		8518	38889	78013	0	0	0
150C1F2		8518	38591	77797	0	0	0
150C1F3		8518	38225	77553	0	0	0
380C2F1		0	0	0	17036	72396	-153827
380C2F2		0	0	0	17036	72348	-153836
380C2F3		0	0	0	17036	72287	-153850
RTG		0	0	0	4618	19226	-40903
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	3885	21841	36979	0	0
	150C1F1	9903	48510	88986	0	0	0
	150C1F2	9903	47334	87645	0	0	0
	150C1F3	9902	45889	86059	0	0	0
	380C2F1	0	0	0	19802	76705	-160510
	380C2F2	0	0	0	19802	76554	-160499
	380C2F3	0	0	0	19802	76365	-160493
	RTG	0	0	0	7767	27725	-57784
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2915	11505	22754	0	0
150C1F1		9726	38271	76685	0	0	0
150C1F2		9726	37996	76520	0	0	0
150C1F3		9725	37659	76337	0	0	0
380C2F1		0	0	0	19451	71483	-151869
380C2F2		0	0	0	19451	71436	-151881
380C2F3		0	0	0	19451	71377	-151896
RTG		0	0	0	5823	21006	-44720
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1735	7440	14693	0	0
	150C1F1	6391	26623	53552	0	0	0
	150C1F2	6391	26434	53426	0	0	0
	150C1F3	6390	26203	53285	0	0	0
	380C2F1	0	0	0	12781	53245	-107104
	380C2F2	0	0	0	12781	52868	-106853
	380C2F3	0	0	0	12781	52405	-106571
	RTG	0	0	0	3464	14212	-28857
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	7898	16549	0	0
150C1F1		6387	29501	62176	0	0	0
150C1F2		6387	29460	62173	0	0	0
150C1F3		6387	29408	62172	0	0	0
380C2F1		0	0	0	12774	59002	-124352
380C2F2		0	0	0	12774	58919	-124347
380C2F3		0	0	0	12774	58816	-124344
RTG		0	0	0	3463	15483	-32705
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	3304	13004	25894	0	0
	150C1F1	7769	32583	66833	0	0	0
	150C1F2	7769	32443	66770	0	0	0
	150C1F3	7769	32268	66702	0	0	0
	380C2F1	0	0	0	15538	65167	-133667
	380C2F2	0	0	0	15538	64985	-133541
	380C2F3	0	0	0	15538	64537	-133405
	RTG	0	0	0	6610	25061	-51190
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2336	8913	18725	0	0
150C1F1		7593	29581	62346	0	0	0
150C1F2		7593	29541	62348	0	0	0
150C1F3		7593	29492	62351	0	0	0
380C2F1		0	0	0	15186	59161	-124693
380C2F2		0	0	0	15186	59082	-124695
380C2F3		0	0	0	15186	58984	-124702
RTG		0	0	0	4667	17663	-37380
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1735	7127	14457	0	0
	150C1F1	6390	25843	53102	0	0	0
	150C1F2	6390	25737	53057	0	0	0
	150C1F3	6390	25607	53010	0	0	0
	380C2F1	0	0	0	12785	83209	-143427
	380C2F2	0	0	0	12785	79677	-138605
	380C2F3	0	0	0	12784	75266	-132662
	RTG	0	0	0	3465	20757	-36495
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	7831	16541	0	0
150C1F1		6387	29325	62175	0	0	0
150C1F2		6387	29300	62177	0	0	0
150C1F3		6387	29268	62181	0	0	0
380C2F1		0	0	0	12774	64817	-128235
380C2F2		0	0	0	12774	64107	-127560
380C2F3		0	0	0	12774	63242	-126784
RTG		0	0	0	3463	16742	-33438

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3304	12574	25660	0	0	0
	150C1F1	7769	31994	66620	0	0	0
	150C1F2	7769	31913	66602	0	0	0
	150C1F3	7769	31812	66585	0	0	0
	380C2F1	0	0	0	15542	87296	-157124
	380C2F2	0	0	0	15541	84600	-153707
	380C2F3	0	0	0	15541	81274	-149593
	RTG	0	0	0	6612	33762	-59771
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2336	8851	18727	0	0	0
	150C1F1	7593	29412	62361	0	0	0
	150C1F2	7593	29388	62365	0	0	0
	150C1F3	7593	29357	62371	0	0	0
	380C2F1	0	0	0	15187	64412	-127360
	380C2F2	0	0	0	15187	63786	-126864
	380C2F3	0	0	0	15186	63019	-126301
	RTG	0	0	0	4667	18753	-37748
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1735	12751	21541	0	0	0
	150C1F1	6392	40035	69569	0	0	0
	150C1F2	6392	38418	67383	0	0	0
	150C1F3	6392	36405	64701	0	0	0
	380C2F1	0	0	0	12785	80070	-139139
	380C2F2	0	0	0	12784	76836	-134766
	380C2F3	0	0	0	12784	72810	-129403
	RTG	0	0	0	3465	20054	-35547
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	8943	17393	0	0	0
	150C1F1	6387	32093	63816	0	0	0
	150C1F2	6387	31774	63526	0	0	0
	150C1F3	6387	31384	63193	0	0	0
	380C2F1	0	0	0	12774	64186	-127633
	380C2F2	0	0	0	12774	63547	-127051
	380C2F3	0	0	0	12774	62768	-126386
	RTG	0	0	0	3463	16607	-33320
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3306	20126	33990	0	0	0
	150C1F1	7771	42449	77041	0	0	0
	150C1F2	7771	41226	75518	0	0	0
	150C1F3	7770	39721	73694	0	0	0
	380C2F1	0	0	0	15541	84898	-154082
	380C2F2	0	0	0	15541	82452	-151036
	380C2F3	0	0	0	15541	79441	-147388
	RTG	0	0	0	6612	32826	-58647
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2336	9790	19209	0	0	0
	150C1F1	7593	31927	63459	0	0	0
	150C1F2	7593	31645	63247	0	0	0
	150C1F3	7593	31299	63008	0	0	0
	380C2F1	0	0	0	15187	63855	-126917
	380C2F2	0	0	0	15186	63290	-126494
	380C2F3	0	0	0	15186	62598	-126016
	RTG	0	0	0	4667	18640	-37679
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1735	13344	22377	0	0	0
	150C1F1	6393	41605	71713	0	0	0
	150C1F2	6392	39839	69303	0	0	0
	150C1F3	6392	37633	66331	0	0	0
	380C2F1	0	0	0	12781	51686	-106203
	380C2F2	0	0	0	12781	51475	-106115
	380C2F3	0	0	0	12781	51213	-106020
	RTG	0	0	0	3464	13874	-28690
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	9072	17537	0	0	0
	150C1F1	6387	32408	64118	0	0	0
	150C1F2	6387	32054	63780	0	0	0
	150C1F3	6387	31621	63392	0	0	0
	380C2F1	0	0	0	12774	58650	-124349
	380C2F2	0	0	0	12774	58600	-124354
	380C2F3	0	0	0	12774	58537	-124361
	RTG	0	0	0	3463	15405	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3306	20937	35040	0	0	0
	150C1F1	7771	43648	78562	0	0	0
	150C1F2	7771	42300	76853	0	0	0
	150C1F3	7770	40637	74797	0	0	0
	380C2F1	0	0	0	15538	63989	-133240
	380C2F2	0	0	0	15538	63826	-133204
	380C2F3	0	0	0	15538	63624	-133170
	RTG	0	0	0	6610	24584	-51049
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2336	9895	19301	0	0	0
	150C1F1	7593	32206	63680	0	0	0
	150C1F2	7593	31893	63432	0	0	0
	150C1F3	7593	31509	63151	0	0	0
	380C2F1	0	0	0	15186	58824	-124722
	380C2F2	0	0	0	15186	58776	-124730
	380C2F3	0	0	0	15186	58714	-124742
	RTG	0	0	0	4667	17589	-37393

ZWW4HL400

Appendix J1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	2313	9177	-18418
	150C1F1	0	0	0	8523	32999	-67226
	150C1F2	0	0	0	8523	32835	-67152
	150C1F3	0	0	0	8522	32632	-67072
	380C2F1	17045	65999	134453	17045	65999	-134453
	380C2F2	17045	65670	134305	17045	65670	-134305
	380C2F3	17045	65264	134145	17045	65264	-134145
	RTG	4620	17777	36500	4620	17777	-36500
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	2312	9804	-20637
	150C1F1	0	0	0	8518	36364	-76893
	150C1F2	0	0	0	8518	36325	-76896
	150C1F3	0	0	0	8518	36277	-76901
	380C2F1	17036	72727	153787	17036	72727	-153787
	380C2F2	17036	72650	153792	17036	72650	-153792
	380C2F3	17036	72553	153803	17036	72553	-153803
	RTG	4618	19300	40891	4618	19300	-40891
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	3883	14529	-29165
	150C1F1	0	0	0	9901	38892	-80361
	150C1F2	0	0	0	9901	38764	-80327
	150C1F3	0	0	0	9901	38605	-80291
	380C2F1	19802	77784	160723	19802	77784	-160723
	380C2F2	19802	77528	160653	19802	77528	-160653
	380C2F3	19802	77210	160582	19802	77210	-160582
	RTG	7767	28176	57870	7767	28176	-57870
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	2915	10616	-22378
	150C1F1	0	0	0	9725	35903	-75906
	150C1F2	0	0	0	9725	35866	-75911
	150C1F3	0	0	0	9725	35819	-75919
	380C2F1	19451	71807	151812	19451	71807	-151812
	380C2F2	19451	71732	151822	19451	71732	-151822
	380C2F3	19451	71637	151837	19451	71637	-151837
	RTG	5823	21078	44703	5823	21078	-44703
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	2314	14308	-24444
	150C1F1	0	0	0	8525	45813	-80736
	150C1F2	0	0	0	8524	44263	-78789
	150C1F3	0	0	0	8524	42347	-76437
	380C2F1	17045	64625	133950	17049	91626	-161472
	380C2F2	17045	64435	133908	17049	88526	-157578
	380C2F3	17045	64199	133867	17048	84693	-152874
	RTG	4620	17475	36413	4621	23345	-42043
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	2312	10807	-21256
	150C1F1	0	0	0	8518	38889	-78013
	150C1F2	0	0	0	8518	38591	-77797
	150C1F3	0	0	0	8518	38225	-77553
	380C2F1	17036	72396	153827	17036	77777	-156027
	380C2F2	17036	72348	153836	17036	77181	-155594
	380C2F3	17036	72287	153850	17036	76450	-155107
	RTG	4618	19226	40903	4618	20406	-41295
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	3885	21841	-36979
	150C1F1	0	0	0	9903	48510	-88986
	150C1F2	0	0	0	9903	47334	-87645
	150C1F3	0	0	0	9902	45889	-86059
	380C2F1	19802	76705	160510	19806	97020	-177971
	380C2F2	19802	76554	160499	19805	94667	-175291
	380C2F3	19802	76365	160493	19805	91779	-172118
	RTG	7767	27725	57784	7768	36134	-64856
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	2915	11505	-22754
	150C1F1	0	0	0	9726	38271	-76685
	150C1F2	0	0	0	9726	37996	-76520
	150C1F3	0	0	0	9725	37659	-76337
	380C2F1	19451	71483	151869	19451	76541	-153370
	380C2F2	19451	71436	151881	19451	75993	-153041
	380C2F3	19451	71377	151896	19451	75318	-152674
	RTG	5823	21006	44720	5823	22087	-44897
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	2314	13771	-23728
	150C1F1	0	0	0	8524	44435	-79003
	150C1F2	0	0	0	8524	43026	-77263
	150C1F3	0	0	0	8524	41289	-75172
	380C2F1	17049	88869	158005	17049	88869	-158005
	380C2F2	17048	86053	154526	17048	86053	-154526
	380C2F3	17048	82578	150345	17048	82578	-150345
	RTG	4621	22737	41301	4621	22737	-41301
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	2312	10699	-21159
	150C1F1	0	0	0	8518	38623	-77820
	150C1F2	0	0	0	8518	38354	-77637
	150C1F3	0	0	0	8518	38024	-77431
	380C2F1	17036	77247	155640	17036	77247	-155640
	380C2F2	17036	76709	155273	17036	76709	-155273
	380C2F3	17036	76048	154861	17036	76048	-154861
	RTG	4618	20291	41221	4618	20291	-41221

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	3885	21080	-36034
	150C1F1	0	0	0	9903	47463	-87791
	150C1F2	0	0	0	9902	46400	-86612
	150C1F3	0	0	0	9902	45097	-85222
	380C2F1	19805	94927	175583	19805	94927	-175583
	380C2F2	19805	92801	173223	19805	92801	-173223
	380C2F3	19804	90194	170443	19804	90194	-170443
	RTG	7768	35276	63898	7768	35276	-63898
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2915	11412	-22688
	150C1F1	0	0	0	9726	38027	-76538
	150C1F2	0	0	0	9726	37779	-76399
	150C1F3	0	0	0	9725	37473	-76246
	380C2F1	19451	76053	153076	19451	76053	-153076
	380C2F2	19451	75557	152799	19451	75557	-152799
	380C2F3	19451	74945	152493	19451	74945	-152493
	RTG	5823	21985	44852	5823	21985	-44852
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2313	8906	-18274
	150C1F1	0	0	0	8522	32312	-66975
	150C1F2	0	0	0	8522	32218	-66954
	150C1F3	0	0	0	8522	32100	-66934
	380C2F1	17049	91626	161472	17045	64625	-133950
	380C2F2	17049	88526	157578	17045	64435	-133908
	380C2F3	17048	84693	152874	17045	64199	-133867
	RTG	4621	23345	42043	4620	17475	-36413
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2312	9742	-20639
	150C1F1	0	0	0	8518	36198	-76913
	150C1F2	0	0	0	8518	36174	-76918
	150C1F3	0	0	0	8518	36144	-76925
	380C2F1	17036	77777	156027	17036	72396	-153827
	380C2F2	17036	77181	155594	17036	72348	-153836
	380C2F3	17036	76450	155107	17036	72287	-153850
	RTG	4618	20406	41295	4618	19226	-40903
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	3883	14130	-28996
	150C1F1	0	0	0	9901	38353	-80255
	150C1F2	0	0	0	9901	38277	-80249
	150C1F3	0	0	0	9901	38182	-80246
	380C2F1	19806	97020	177971	19802	76705	-160510
	380C2F2	19805	94667	175291	19802	76554	-160499
	380C2F3	19805	91779	172118	19802	76365	-160493
	RTG	7768	36134	64856	7767	27725	-57784
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2915	10557	-22386
	150C1F1	0	0	0	9725	35742	-75935
	150C1F2	0	0	0	9725	35718	-75940
	150C1F3	0	0	0	9725	35688	-75948
	380C2F1	19451	76541	153370	19451	71483	-151869
	380C2F2	19451	75993	153041	19451	71436	-151881
	380C2F3	19451	75318	152674	19451	71377	-151896
	RTG	5823	22087	44897	5823	21006	-44720
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	1735	7440	-14693
	150C1F1	0	0	0	6391	26623	-53552
	150C1F2	0	0	0	6391	26434	-53426
	150C1F3	0	0	0	6390	26203	-53285
	380C2F1	12781	53245	107104	12781	53245	-107104
	380C2F2	12781	52868	106853	12781	52868	-106853
	380C2F3	12781	52405	106571	12781	52405	-106571
	RTG	3464	14212	28857	3464	14212	-28857
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	1734	7898	-16549
	150C1F1	0	0	0	6387	29501	-62176
	150C1F2	0	0	0	6387	29460	-62173
	150C1F3	0	0	0	6387	29408	-62172
	380C2F1	12774	59002	124352	12774	59002	-124352
	380C2F2	12774	58919	124347	12774	58919	-124347
	380C2F3	12774	58816	124344	12774	58816	-124344
	RTG	3463	15483	32705	3463	15483	-32705
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	3304	13004	-25894
	150C1F1	0	0	0	7769	32583	-66833
	150C1F2	0	0	0	7769	32443	-66770
	150C1F3	0	0	0	7769	32268	-66702
	380C2F1	15538	65167	133667	15538	65167	-133667
	380C2F2	15538	64885	133541	15538	64885	-133541
	380C2F3	15538	64537	133405	15538	64537	-133405
	RTG	6610	25061	51190	6610	25061	-51190
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	2336	8913	-18725
	150C1F1	0	0	0	7593	29581	-62346
	150C1F2	0	0	0	7593	29541	-62348
	150C1F3	0	0	0	7593	29492	-62351
	380C2F1	15186	59161	124693	15186	59161	-124693
	380C2F2	15186	59082	124695	15186	59082	-124695
	380C2F3	15186	58984	124702	15186	58984	-124702
	RTG	4667	17663	37380	4667	17663	-37380
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	1735	13344	-22377
	150C1F1	0	0	0	6393	41605	-71713
	150C1F2	0	0	0	6392	39839	-69303
	150C1F3	0	0	0	6392	37633	-66331
	380C2F1	12781	51686	106203	12785	83209	-143427
	380C2F2	12781	51475	106115	12785	79677	-138605
	380C2F3	12781	51213	106020	12784	75266	-132662
	RTG	3464	13874	28690	3465	20757	-36495
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	1734	9072	-17537
	150C1F1	0	0	0	6387	32408	-64118
	150C1F2	0	0	0	6387	32054	-63780
	150C1F3	0	0	0	6387	31621	-63392
	380C2F1	12774	58650	124349	12774	64817	-128235
	380C2F2	12774	58600	124354	12774	64107	-127560
	380C2F3	12774	58537	124361	12774	63242	-126784
	RTG	3463	15405	32709	3463	16742	-33438

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	3306	20937	-35040
	150C1F1	0	0	0	7771	43648	-78562
	150C1F2	0	0	0	7771	42300	-76853
	150C1F3	0	0	0	7770	40637	-74797
	380C2F1	15538	63989	133240	15542	87296	-157124
	380C2F2	15538	63826	133204	15541	84600	-153707
	380C2F3	15538	63624	133170	15541	81274	-149593
	RTG	6610	24584	51049	6612	33762	-59771
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	2336	9895
150C1F1		0	0	0	7593	32206	-63680
150C1F2		0	0	0	7593	31893	-63432
150C1F3		0	0	0	7593	31509	-63151
380C2F1		15186	58824	124722	15187	64412	-127360
380C2F2		15186	58776	124730	15187	63786	-126864
380C2F3		15186	58714	124742	15186	63019	-126301
RTG		4667	17589	37393	4667	18753	-37748
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	0	0	0	1735	12751
	150C1F1	0	0	0	6392	40035	-69569
	150C1F2	0	0	0	6392	38418	-67383
	150C1F3	0	0	0	6392	36405	-64701
	380C2F1	12785	80070	139139	12785	80070	-139139
	380C2F2	12784	76836	134766	12784	76836	-134766
	380C2F3	12784	72810	129403	12784	72810	-129403
	RTG	3465	20054	35547	3465	20054	-35547
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	1734	8943
150C1F1		0	0	0	6387	32093	-63816
150C1F2		0	0	0	6387	31774	-63526
150C1F3		0	0	0	6387	31384	-63193
380C2F1		12774	64186	127633	12774	64186	-127633
380C2F2		12774	63547	127051	12774	63547	-127051
380C2F3		12774	62768	126386	12774	62768	-126386
RTG		3463	16607	33320	3463	16607	-33320
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	0	0	0	3306	20126
	150C1F1	0	0	0	7771	42449	-77041
	150C1F2	0	0	0	7771	41226	-75518
	150C1F3	0	0	0	7770	39721	-73694
	380C2F1	15541	84898	154082	15541	84898	-154082
	380C2F2	15541	82452	151036	15541	82452	-151036
	380C2F3	15541	79441	147388	15541	79441	-147388
	RTG	6612	32826	58647	6612	32826	-58647
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	2336	9790
150C1F1		0	0	0	7593	31927	-63459
150C1F2		0	0	0	7593	31645	-63247
150C1F3		0	0	0	7593	31299	-63008
380C2F1		15187	63855	126917	15187	63855	-126917
380C2F2		15186	63290	126494	15186	63290	-126494
380C2F3		15186	62598	126016	15186	62598	-126016
RTG		4667	18640	37679	4667	18640	-37679
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	0	0	0	1735	7127
	150C1F1	0	0	0	6390	25843	-53102
	150C1F2	0	0	0	6390	25737	-53057
	150C1F3	0	0	0	6390	25607	-53010
	380C2F1	12785	83209	143427	12781	51686	-106203
	380C2F2	12785	79677	138605	12781	51475	-106115
	380C2F3	12784	75266	132662	12781	51213	-106020
	RTG	3465	20757	36495	3464	13874	-28690
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	1734	7831
150C1F1		0	0	0	6387	29325	-62175
150C1F2		0	0	0	6387	29300	-62177
150C1F3		0	0	0	6387	29268	-62181
380C2F1		12774	64817	128235	12774	58650	-124349
380C2F2		12774	64107	127560	12774	58600	-124354
380C2F3		12774	63242	126784	12774	58537	-124361
RTG		3463	16742	33438	3463	15405	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	0	0	0	3304	12574
	150C1F1	0	0	0	7769	31994	-66620
	150C1F2	0	0	0	7769	31913	-66602
	150C1F3	0	0	0	7769	31812	-66585
	380C2F1	15542	87296	157124	15538	63989	-133240
	380C2F2	15541	84600	153707	15538	63826	-133204
	380C2F3	15541	81274	149593	15538	63624	-133170
	RTG	6612	33762	59771	6610	24584	-51049
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	2336	8851
150C1F1		0	0	0	7593	29412	-62361
150C1F2		0	0	0	7593	29388	-62365
150C1F3		0	0	0	7593	29357	-62371
380C2F1		15187	64412	127360	15186	58824	-124722
380C2F2		15187	63786	126864	15186	58776	-124730
380C2F3		15186	63019	126301	15186	58714	-124742
RTG		4667	18753	37748	4667	17589	-37393

ZWW4HL400

Appendix J1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	9177	18418	2313	9177	-18418
	150C1F1	8523	32999	67226	8523	32999	-67226
	150C1F2	8523	32835	67152	8523	32835	-67152
	150C1F3	8522	32632	67072	8522	32632	-67072
	380C2F1	0	0	0	17045	65999	-134453
	380C2F2	0	0	0	17045	65670	-134305
	380C2F3	0	0	0	17045	65264	-134145
	RTG	0	0	0	4620	17777	-36500
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	9804	20637	2312	9804	-20637
	150C1F1	8518	36364	76893	8518	36364	-76893
	150C1F2	8518	36325	76896	8518	36325	-76896
	150C1F3	8518	36277	76901	8518	36277	-76901
	380C2F1	0	0	0	17036	72727	-153787
	380C2F2	0	0	0	17036	72650	-153792
	380C2F3	0	0	0	17036	72553	-153803
	RTG	0	0	0	4618	19300	-40891
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	14529	29165	3883	14529	-29165
	150C1F1	9901	38892	80361	9901	38892	-80361
	150C1F2	9901	38764	80327	9901	38764	-80327
	150C1F3	9901	38605	80291	9901	38605	-80291
	380C2F1	0	0	0	19802	77784	-160723
	380C2F2	0	0	0	19802	77528	-160653
	380C2F3	0	0	0	19802	77210	-160582
	RTG	0	0	0	7767	28176	-57870
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	10616	22378	2915	10616	-22378
	150C1F1	9725	35903	75906	9725	35903	-75906
	150C1F2	9725	35866	75911	9725	35866	-75911
	150C1F3	9725	35819	75919	9725	35819	-75919
	380C2F1	0	0	0	19451	71807	-151812
	380C2F2	0	0	0	19451	71732	-151822
	380C2F3	0	0	0	19451	71637	-151837
	RTG	0	0	0	5823	21078	-44703
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	8906	18274	2314	14308	-24444
	150C1F1	8522	32312	66975	8525	45813	-80736
	150C1F2	8522	32218	66954	8524	44263	-78789
	150C1F3	8522	32100	66934	8524	42347	-76437
	380C2F1	0	0	0	17049	91626	-161472
	380C2F2	0	0	0	17049	88526	-157578
	380C2F3	0	0	0	17048	84693	-152874
	RTG	0	0	0	4621	23345	-42043
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	9742	20639	2312	10807	-21256
	150C1F1	8518	36198	76913	8518	38889	-78013
	150C1F2	8518	36174	76918	8518	38591	-77797
	150C1F3	8518	36144	76925	8518	38225	-77553
	380C2F1	0	0	0	17036	77777	-156027
	380C2F2	0	0	0	17036	77181	-155594
	380C2F3	0	0	0	17036	76450	-155107
	RTG	0	0	0	4618	20406	-41295
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	14130	28996	3885	21841	-36979
	150C1F1	9901	38353	80255	9903	48510	-88986
	150C1F2	9901	38277	80249	9903	47334	-87645
	150C1F3	9901	38182	80246	9902	45889	-86059
	380C2F1	0	0	0	19806	97020	-177971
	380C2F2	0	0	0	19805	94667	-175291
	380C2F3	0	0	0	19805	91779	-172118
	RTG	0	0	0	7768	36134	-64856
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	10557	22386	2915	11505	-22754
	150C1F1	9725	35742	75935	9726	38271	-76685
	150C1F2	9725	35718	75940	9726	37996	-76520
	150C1F3	9725	35688	75948	9725	37659	-76337
	380C2F1	0	0	0	19451	76541	-153370
	380C2F2	0	0	0	19451	75993	-153041
	380C2F3	0	0	0	19451	75318	-152674
	RTG	0	0	0	5823	22087	-44897
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	13771	23728	2314	13771	-23728
	150C1F1	8524	44435	79003	8524	44435	-79003
	150C1F2	8524	43026	77263	8524	43026	-77263
	150C1F3	8524	41289	75172	8524	41289	-75172
	380C2F1	0	0	0	17049	88869	-158005
	380C2F2	0	0	0	17048	86053	-154526
	380C2F3	0	0	0	17048	82578	-150345
	RTG	0	0	0	4621	22737	-41301
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	10699	21159	2312	10699	-21159
	150C1F1	8518	38623	77820	8518	38623	-77820
	150C1F2	8518	38354	77637	8518	38354	-77637
	150C1F3	8518	38024	77431	8518	38024	-77431
	380C2F1	0	0	0	17036	77247	-155640
	380C2F2	0	0	0	17036	76709	-155273
	380C2F3	0	0	0	17036	76048	-154861
	RTG	0	0	0	4618	20291	-41221

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	21080	36034	3885	21080	-36034
	150C1F1	9903	47463	87791	9903	47463	-87791
	150C1F2	9902	46400	86612	9902	46400	-86612
	150C1F3	9902	45097	85222	9902	45097	-85222
	380C2F1	0	0	0	19805	94927	-175583
	380C2F2	0	0	0	19805	92801	-173223
	380C2F3	0	0	0	19804	90194	-170443
	RTG	0	0	0	7768	35276	-63898
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	11412	22688	2915	11412
150C1F1		9726	38027	76538	9726	38027	-76538
150C1F2		9726	37779	76399	9726	37779	-76399
150C1F3		9725	37473	76246	9725	37473	-76246
380C2F1		0	0	0	19451	76053	-153076
380C2F2		0	0	0	19451	75557	-152799
380C2F3		0	0	0	19451	74945	-152493
RTG		0	0	0	5823	21985	-44852
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2314	14308	24444	2313	8906
	150C1F1	8525	45813	80736	8522	32312	-66975
	150C1F2	8524	44263	78789	8522	32218	-66954
	150C1F3	8524	42347	76437	8522	32100	-66934
	380C2F1	0	0	0	17045	64625	-133950
	380C2F2	0	0	0	17045	64435	-133908
	380C2F3	0	0	0	17045	64199	-133867
	RTG	0	0	0	4620	17475	-36413
	NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	10807	21256	2312	9742
150C1F1		8518	38889	78013	8518	36198	-76913
150C1F2		8518	38591	77797	8518	36174	-76918
150C1F3		8518	38225	77553	8518	36144	-76925
380C2F1		0	0	0	17036	72396	-153827
380C2F2		0	0	0	17036	72348	-153836
380C2F3		0	0	0	17036	72287	-153850
RTG		0	0	0	4618	19226	-40903
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	3885	21841	36979	3883	14130
	150C1F1	9903	48510	88986	9901	38353	-80255
	150C1F2	9903	47334	87645	9901	38277	-80249
	150C1F3	9902	45889	86059	9901	38182	-80246
	380C2F1	0	0	0	19802	76705	-160510
	380C2F2	0	0	0	19802	76554	-160499
	380C2F3	0	0	0	19802	76365	-160493
	RTG	0	0	0	7767	27725	-57784
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2915	11505	22754	2915	10557
150C1F1		9726	38271	76685	9725	35742	-75935
150C1F2		9726	37996	76520	9725	35718	-75940
150C1F3		9725	37659	76337	9725	35688	-75948
380C2F1		0	0	0	19451	71483	-151869
380C2F2		0	0	0	19451	71436	-151881
380C2F3		0	0	0	19451	71377	-151896
RTG		0	0	0	5823	21006	-44720
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1735	7440	14693	1735	7440
	150C1F1	6391	26623	53552	6391	26623	-53552
	150C1F2	6391	26434	53426	6391	26434	-53426
	150C1F3	6390	26203	53285	6390	26203	-53285
	380C2F1	0	0	0	12781	53245	-107104
	380C2F2	0	0	0	12781	52868	-106853
	380C2F3	0	0	0	12781	52405	-106571
	RTG	0	0	0	3464	14212	-28857
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	7898	16549	1734	7898
150C1F1		6387	29501	62176	6387	29501	-62176
150C1F2		6387	29460	62173	6387	29460	-62173
150C1F3		6387	29408	62172	6387	29408	-62172
380C2F1		0	0	0	12774	59002	-124352
380C2F2		0	0	0	12774	58919	-124347
380C2F3		0	0	0	12774	58816	-124344
RTG		0	0	0	3463	15483	-32705
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	3304	13004	25894	3304	13004
	150C1F1	7769	32583	66833	7769	32583	-66833
	150C1F2	7769	32443	66770	7769	32443	-66770
	150C1F3	7769	32268	66702	7769	32268	-66702
	380C2F1	0	0	0	15538	65167	-133667
	380C2F2	0	0	0	15538	64985	-133541
	380C2F3	0	0	0	15538	64537	-133405
	RTG	0	0	0	6610	25061	-51190
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2336	8913	18725	2336	8913
150C1F1		7593	29581	62346	7593	29581	-62346
150C1F2		7593	29541	62348	7593	29541	-62348
150C1F3		7593	29492	62351	7593	29492	-62351
380C2F1		0	0	0	15186	59161	-124693
380C2F2		0	0	0	15186	59082	-124695
380C2F3		0	0	0	15186	58984	-124702
RTG		0	0	0	4667	17663	-37380
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1735	7127	14457	1735	13344
	150C1F1	6390	25843	53102	6393	41605	-71713
	150C1F2	6390	25737	53057	6392	39839	-69303
	150C1F3	6390	25607	53010	6392	37633	-66331
	380C2F1	0	0	0	12785	83209	-143427
	380C2F2	0	0	0	12785	79677	-138605
	380C2F3	0	0	0	12784	75266	-132662
	RTG	0	0	0	3465	20757	-36495
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	7831	16541	1734	9072
150C1F1		6387	29325	62175	6387	32408	-64118
150C1F2		6387	29300	62177	6387	32054	-63780
150C1F3		6387	29268	62181	6387	31621	-63392
380C2F1		0	0	0	12774	64817	-128235
380C2F2		0	0	0	12774	64107	-127560
380C2F3		0	0	0	12774	63242	-126784
RTG		0	0	0	3463	16742	-33438

NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: 45°	GW / opgw	3304	12574	25660	3306	20937	-35040
	150C1F1	7769	31994	66620	7771	43648	-78562
	150C1F2	7769	31913	66602	7771	42300	-76853
	150C1F3	7769	31812	66585	7770	40637	-74797
	380C2F1	0	0	0	15542	87296	-157124
	380C2F2	0	0	0	15541	84600	-153707
	380C2F3	0	0	0	15541	81274	-149593
	RTG	0	0	0	6612	33762	-59771
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: 45°	GW / opgw	2336	8851	18727	2336	9895	-19301
	150C1F1	7593	29412	62361	7593	32206	-63680
	150C1F2	7593	29388	62365	7593	31893	-63432
	150C1F3	7593	29357	62371	7593	31509	-63151
	380C2F1	0	0	0	15187	64412	-127360
	380C2F2	0	0	0	15187	63786	-126864
	380C2F3	0	0	0	15186	63019	-126301
	RTG	0	0	0	4667	18753	-37748
NL3/1a Wind, 10°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	1735	12751	21541	1735	12751	-21541
	150C1F1	6392	40035	69569	6392	40035	-69569
	150C1F2	6392	38418	67383	6392	38418	-67383
	150C1F3	6392	36405	64701	6392	36405	-64701
	380C2F1	0	0	0	12785	80070	-139139
	380C2F2	0	0	0	12784	76836	-134766
	380C2F3	0	0	0	12784	72810	-129403
	RTG	0	0	0	3465	20054	-35547
NL3/1b Wind, -20°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	1734	8943	17393	1734	8943	-17393
	150C1F1	6387	32093	63816	6387	32093	-63816
	150C1F2	6387	31774	63526	6387	31774	-63526
	150C1F3	6387	31384	63193	6387	31384	-63193
	380C2F1	0	0	0	12774	64186	-127633
	380C2F2	0	0	0	12774	63547	-127051
	380C2F3	0	0	0	12774	62768	-126386
	RTG	0	0	0	3463	16607	-33320
NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	3306	20126	33990	3306	20126	-33990
	150C1F1	7771	42449	77041	7771	42449	-77041
	150C1F2	7771	41226	75518	7771	41226	-75518
	150C1F3	7770	39721	73694	7770	39721	-73694
	380C2F1	0	0	0	15541	84898	-154082
	380C2F2	0	0	0	15541	82452	-151036
	380C2F3	0	0	0	15541	79441	-147388
	RTG	0	0	0	6612	32826	-58647
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: 90°	GW / opgw	2336	9790	19209	2336	9790	-19209
	150C1F1	7593	31927	63459	7593	31927	-63459
	150C1F2	7593	31645	63247	7593	31645	-63247
	150C1F3	7593	31299	63008	7593	31299	-63008
	380C2F1	0	0	0	15187	63855	-126917
	380C2F2	0	0	0	15186	63290	-126494
	380C2F3	0	0	0	15186	62598	-126016
	RTG	0	0	0	4667	18640	-37679
NL3/1a Wind, 10°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	1735	13344	22377	1735	7127	-14457
	150C1F1	6393	41605	71713	6390	25843	-53102
	150C1F2	6392	39839	69303	6390	25737	-53057
	150C1F3	6392	37633	66331	6390	25607	-53010
	380C2F1	0	0	0	12781	51686	-106203
	380C2F2	0	0	0	12781	51475	-106115
	380C2F3	0	0	0	12781	51213	-106020
	RTG	0	0	0	3464	13874	-28690
NL3/1b Wind, -20°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	1734	9072	17537	1734	7831	-16541
	150C1F1	6387	32408	64118	6387	29325	-62175
	150C1F2	6387	32054	63780	6387	29300	-62177
	150C1F3	6387	31621	63392	6387	29268	-62181
	380C2F1	0	0	0	12774	58650	-124349
	380C2F2	0	0	0	12774	58600	-124354
	380C2F3	0	0	0	12774	58537	-124361
	RTG	0	0	0	3463	15405	-32709
NL3/3 Wind, -5°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	3306	20937	35040	3304	12574	-25660
	150C1F1	7771	43648	78562	7769	31994	-66620
	150C1F2	7771	42300	76853	7769	31913	-66602
	150C1F3	7770	40637	74797	7769	31812	-66585
	380C2F1	0	0	0	15538	63989	-133240
	380C2F2	0	0	0	15538	63826	-133204
	380C2F3	0	0	0	15538	63624	-133170
	RTG	0	0	0	6610	24584	-51049
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 0.9 Wind angle: -45°	GW / opgw	2336	9895	19301	2336	8851	-18727
	150C1F1	7593	32206	63680	7593	29412	-62361
	150C1F2	7593	31893	63432	7593	29388	-62365
	150C1F3	7593	31509	63151	7593	29357	-62371
	380C2F1	0	0	0	15186	58824	-124722
	380C2F2	0	0	0	15186	58776	-124730
	380C2F3	0	0	0	15186	58714	-124742
	RTG	0	0	0	4667	17589	-37393

ZWW4HL400

Appendix J1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2313	9177	18418	0	0	0
	150C1F1	8523	32999	67226	0	0	0
	150C1F2	8523	32835	67152	0	0	0
	150C1F3	8522	32632	67072	0	0	0
	380C2F1	17045	65999	134453	17045	65999	-134453
	380C2F2	17045	65670	134305	17045	65670	-134305
	380C2F3	17045	65264	134145	17045	65264	-134145
	RTG	0	0	0	4620	17777	-36500
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2312	9804	20637	0	0	0
	150C1F1	8518	36364	76893	0	0	0
	150C1F2	8518	36325	76896	0	0	0
	150C1F3	8518	36277	76901	0	0	0
	380C2F1	17036	72727	153787	17036	72727	-153787
	380C2F2	17036	72650	153792	17036	72650	-153792
	380C2F3	17036	72553	153803	17036	72553	-153803
	RTG	0	0	0	4618	19300	-40891
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3883	14529	29165	0	0	0
	150C1F1	9901	38892	80361	0	0	0
	150C1F2	9901	38764	80327	0	0	0
	150C1F3	9901	38605	80291	0	0	0
	380C2F1	19802	77784	160723	19802	77784	-160723
	380C2F2	19802	77528	160653	19802	77528	-160653
	380C2F3	19802	77210	160582	19802	77210	-160582
	RTG	0	0	0	7767	28176	-57870
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2915	10616	22378	0	0	0
	150C1F1	9725	35903	75906	0	0	0
	150C1F2	9725	35866	75911	0	0	0
	150C1F3	9725	35819	75919	0	0	0
	380C2F1	19451	71807	151812	19451	71807	-151812
	380C2F2	19451	71732	151822	19451	71732	-151822
	380C2F3	19451	71637	151837	19451	71637	-151837
	RTG	0	0	0	5823	21078	-44703
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2313	8906	18274	0	0	0
	150C1F1	8522	32312	66975	0	0	0
	150C1F2	8522	32218	66954	0	0	0
	150C1F3	8522	32100	66934	0	0	0
	380C2F1	17045	64625	133950	17049	91626	-161472
	380C2F2	17045	64435	133908	17049	88526	-157578
	380C2F3	17045	64199	133867	17048	84693	-152874
	RTG	0	0	0	4621	23345	-42043
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2312	9742	20639	0	0	0
	150C1F1	8518	36198	76913	0	0	0
	150C1F2	8518	36174	76918	0	0	0
	150C1F3	8518	36144	76925	0	0	0
	380C2F1	17036	72396	153827	17036	77777	-156027
	380C2F2	17036	72348	153836	17036	77181	-155594
	380C2F3	17036	72287	153850	17036	76450	-155107
	RTG	0	0	0	4618	20406	-41295
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3883	14130	28996	0	0	0
	150C1F1	9901	38353	80255	0	0	0
	150C1F2	9901	38277	80249	0	0	0
	150C1F3	9901	38182	80246	0	0	0
	380C2F1	19802	76705	160510	19806	97020	-177971
	380C2F2	19802	76554	160499	19805	94667	-175291
	380C2F3	19802	76365	160493	19805	91779	-172118
	RTG	0	0	0	7768	36134	-64856
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2915	10557	22386	0	0	0
	150C1F1	9725	35742	75935	0	0	0
	150C1F2	9725	35718	75940	0	0	0
	150C1F3	9725	35688	75948	0	0	0
	380C2F1	19451	71483	151869	19451	76541	-153370
	380C2F2	19451	71436	151881	19451	75993	-153041
	380C2F3	19451	71377	151896	19451	75318	-152674
	RTG	0	0	0	5823	22087	-44897
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2314	13771	23728	0	0	0
	150C1F1	8524	44435	79003	0	0	0
	150C1F2	8524	43026	77263	0	0	0
	150C1F3	8524	41289	75172	0	0	0
	380C2F1	17049	88869	158005	17049	88869	-158005
	380C2F2	17048	86053	154526	17048	86053	-154526
	380C2F3	17048	82578	150345	17048	82578	-150345
	RTG	0	0	0	4621	22737	-41301
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2312	10699	21159	0	0	0
	150C1F1	8518	38623	77820	0	0	0
	150C1F2	8518	38354	77637	0	0	0
	150C1F3	8518	38024	77431	0	0	0
	380C2F1	17036	77247	155640	17036	77247	-155640
	380C2F2	17036	76709	155273	17036	76709	-155273
	380C2F3	17036	76048	154861	17036	76048	-154861
	RTG	0	0	0	4618	20291	-41221

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	21080	36034	0	0	0
	150C1F1	9903	47463	87791	0	0	0
	150C1F2	9902	46400	86612	0	0	0
	150C1F3	9902	45097	85222	0	0	0
	380C2F1	19805	94927	175583	19805	94927	-175583
	380C2F2	19805	92801	173223	19805	92801	-173223
	380C2F3	19804	90194	170443	19804	90194	-170443
	RTG	0	0	0	7768	35276	-63898
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	11412	22688	0	0
150C1F1	9726	38027	76538	0	0	0	
150C1F2	9726	37779	76399	0	0	0	
150C1F3	9725	37473	76246	0	0	0	
380C2F1	19451	76053	153076	19451	76053	-153076	
380C2F2	19451	75557	152799	19451	75557	-152799	
380C2F3	19451	74945	152493	19451	74945	-152493	
RTG	0	0	0	5823	21985	-44852	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2314	14308	24444	0	0	0
	150C1F1	8525	45813	80736	0	0	0
	150C1F2	8524	44263	78789	0	0	0
	150C1F3	8524	42347	76437	0	0	0
	380C2F1	17049	91626	161472	17045	64625	-133950
	380C2F2	17049	88526	157578	17045	64435	-133908
	380C2F3	17048	84693	152874	17045	64199	-133867
	RTG	0	0	0	4620	17475	-36413
	NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	10807	21256	0	0
150C1F1		8518	38889	78013	0	0	0
150C1F2		8518	38591	77797	0	0	0
150C1F3		8518	38225	77553	0	0	0
380C2F1		17036	77777	156027	17036	72396	-153827
380C2F2		17036	77181	155594	17036	72348	-153836
380C2F3		17036	76450	155107	17036	72287	-153850
RTG		0	0	0	4618	19226	-40903
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	3885	21841	36979	0	0
	150C1F1	9903	48510	88986	0	0	0
	150C1F2	9903	47334	87645	0	0	0
	150C1F3	9902	45889	86059	0	0	0
	380C2F1	19806	97020	177971	19802	76705	-160510
	380C2F2	19805	94667	175291	19802	76554	-160499
	380C2F3	19805	91779	172118	19802	76365	-160493
	RTG	0	0	0	7767	27725	-57784
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2915	11505	22754	0	0
150C1F1		9726	38271	76685	0	0	0
150C1F2		9726	37996	76520	0	0	0
150C1F3		9725	37659	76337	0	0	0
380C2F1		19451	76541	153370	19451	71483	-151869
380C2F2		19451	75993	153041	19451	71436	-151881
380C2F3		19451	75318	152674	19451	71377	-151896
RTG		0	0	0	5823	21006	-44720
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1735	7440	14693	0	0
	150C1F1	6391	26623	53552	0	0	0
	150C1F2	6391	26434	53426	0	0	0
	150C1F3	6390	26203	53285	0	0	0
	380C2F1	12781	53245	107104	12781	53245	-107104
	380C2F2	12781	52868	106853	12781	52868	-106853
	380C2F3	12781	52405	106571	12781	52405	-106571
	RTG	0	0	0	3464	14212	-28857
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	7898	16549	0	0
150C1F1		6387	29501	62176	0	0	0
150C1F2		6387	29460	62173	0	0	0
150C1F3		6387	29408	62172	0	0	0
380C2F1		12774	59002	124352	12774	59002	-124352
380C2F2		12774	58919	124347	12774	58919	-124347
380C2F3		12774	58816	124344	12774	58816	-124344
RTG		0	0	0	3463	15483	-32705
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	3304	13004	25894	0	0
	150C1F1	7769	32583	66833	0	0	0
	150C1F2	7769	32443	66770	0	0	0
	150C1F3	7769	32268	66702	0	0	0
	380C2F1	15538	65167	133667	15538	65167	-133667
	380C2F2	15538	64885	133541	15538	64885	-133541
	380C2F3	15538	64537	133405	15538	64537	-133405
	RTG	0	0	0	6610	25061	-51190
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2336	8913	18725	0	0
150C1F1		7593	29581	62346	0	0	0
150C1F2		7593	29541	62348	0	0	0
150C1F3		7593	29492	62351	0	0	0
380C2F1		15186	59161	124693	15186	59161	-124693
380C2F2		15186	59082	124695	15186	59082	-124695
380C2F3		15186	58984	124702	15186	58984	-124702
RTG		0	0	0	4667	17663	-37380
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1735	7127	14457	0	0
	150C1F1	6390	25843	53102	0	0	0
	150C1F2	6390	25737	53057	0	0	0
	150C1F3	6390	25607	53010	0	0	0
	380C2F1	12781	51686	106203	12785	83209	-143427
	380C2F2	12781	51475	106115	12785	79677	-138605
	380C2F3	12781	51213	106020	12784	75266	-132662
	RTG	0	0	0	3465	20757	-36495
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	7831	16541	0	0
150C1F1		6387	29325	62175	0	0	0
150C1F2		6387	29300	62177	0	0	0
150C1F3		6387	29268	62181	0	0	0
380C2F1		12774	58650	124349	12774	64817	-128235
380C2F2		12774	58600	124354	12774	64107	-127560
380C2F3		12774	58537	124361	12774	63242	-126784
RTG		0	0	0	3463	16742	-33438

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3304	12574	25660	0	0	0
	150C1F1	7769	31994	66620	0	0	0
	150C1F2	7769	31913	66602	0	0	0
	150C1F3	7769	31812	66585	0	0	0
	380C2F1	15538	63989	133240	15542	87296	-157124
	380C2F2	15538	63826	133204	15541	84600	-153707
	380C2F3	15538	63624	133170	15541	81274	-149593
	RTG	0	0	0	6612	33762	-59771
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2336	8851	18727	0	0	0
	150C1F1	7593	29412	62361	0	0	0
	150C1F2	7593	29388	62365	0	0	0
	150C1F3	7593	29357	62371	0	0	0
	380C2F1	15186	58824	124722	15187	64412	-127360
	380C2F2	15186	58776	124730	15187	63786	-126864
	380C2F3	15186	58714	124742	15186	63019	-126301
	RTG	0	0	0	4667	18753	-37748
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1735	12751	21541	0	0	0
	150C1F1	6392	40035	69569	0	0	0
	150C1F2	6392	38418	67383	0	0	0
	150C1F3	6392	36405	64701	0	0	0
	380C2F1	12785	80070	139139	12785	80070	-139139
	380C2F2	12784	76836	134766	12784	76836	-134766
	380C2F3	12784	72810	129403	12784	72810	-129403
	RTG	0	0	0	3465	20054	-35547
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	8943	17393	0	0	0
	150C1F1	6387	32093	63816	0	0	0
	150C1F2	6387	31774	63526	0	0	0
	150C1F3	6387	31384	63193	0	0	0
	380C2F1	12774	64186	127633	12774	64186	-127633
	380C2F2	12774	63547	127051	12774	63547	-127051
	380C2F3	12774	62768	126386	12774	62768	-126386
	RTG	0	0	0	3463	16607	-33320
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3306	20126	33990	0	0	0
	150C1F1	7771	42449	77041	0	0	0
	150C1F2	7771	41226	75518	0	0	0
	150C1F3	7770	39721	73694	0	0	0
	380C2F1	15541	84898	154082	15541	84898	-154082
	380C2F2	15541	82452	151036	15541	82452	-151036
	380C2F3	15541	79441	147388	15541	79441	-147388
	RTG	0	0	0	6612	32826	-58647
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2336	9790	19209	0	0	0
	150C1F1	7593	31927	63459	0	0	0
	150C1F2	7593	31645	63247	0	0	0
	150C1F3	7593	31299	63008	0	0	0
	380C2F1	15187	63855	126917	15187	63855	-126917
	380C2F2	15186	63290	126494	15186	63290	-126494
	380C2F3	15186	62598	126016	15186	62598	-126016
	RTG	0	0	0	4667	18640	-37679
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1735	13344	22377	0	0	0
	150C1F1	6393	41605	71713	0	0	0
	150C1F2	6392	39839	69303	0	0	0
	150C1F3	6392	37633	66331	0	0	0
	380C2F1	12785	83209	143427	12781	51686	-106203
	380C2F2	12785	79677	138605	12781	51475	-106115
	380C2F3	12784	75266	132662	12781	51213	-106020
	RTG	0	0	0	3464	13874	-28690
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	9072	17537	0	0	0
	150C1F1	6387	32408	64118	0	0	0
	150C1F2	6387	32054	63780	0	0	0
	150C1F3	6387	31621	63392	0	0	0
	380C2F1	12774	64817	128235	12774	58650	-124349
	380C2F2	12774	64107	127560	12774	58600	-124354
	380C2F3	12774	63242	126784	12774	58537	-124361
	RTG	0	0	0	3463	15405	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3306	20937	35040	0	0	0
	150C1F1	7771	43648	78562	0	0	0
	150C1F2	7771	42300	76853	0	0	0
	150C1F3	7770	40637	74797	0	0	0
	380C2F1	15542	87296	157124	15538	63989	-133240
	380C2F2	15541	84600	153707	15538	63826	-133204
	380C2F3	15541	81274	149593	15538	63624	-133170
	RTG	0	0	0	6610	24584	-51049
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2336	9895	19301	0	0	0
	150C1F1	7593	32206	63680	0	0	0
	150C1F2	7593	31893	63432	0	0	0
	150C1F3	7593	31509	63151	0	0	0
	380C2F1	15187	64412	127360	15186	58824	-124722
	380C2F2	15187	63786	126864	15186	58776	-124730
	380C2F3	15186	63019	126301	15186	58714	-124742
	RTG	0	0	0	4667	17589	-37393

ZWW4HL400

Appendix J1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2313	9177	18418	2313	9177	-18418
	150C1F1	8523	32999	67226	8523	32999	-67226
	150C1F2	8523	32835	67152	8523	32835	-67152
	150C1F3	8522	32632	67072	8522	32632	-67072
	380C2F1	17045	65999	134453	17045	65999	-134453
	380C2F2	17045	65670	134305	17045	65670	-134305
	380C2F3	17045	65264	134145	17045	65264	-134145
	RTG	0	0	0	4620	17777	-36500
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2312	9804	20637	2312	9804	-20637
	150C1F1	8518	36364	76893	8518	36364	-76893
	150C1F2	8518	36325	76896	8518	36325	-76896
	150C1F3	8518	36277	76901	8518	36277	-76901
	380C2F1	17036	72727	153787	17036	72727	-153787
	380C2F2	17036	72650	153792	17036	72650	-153792
	380C2F3	17036	72553	153803	17036	72553	-153803
	RTG	0	0	0	4618	19300	-40891
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3883	14529	29165	3883	14529	-29165
	150C1F1	9901	38892	80361	9901	38892	-80361
	150C1F2	9901	38764	80327	9901	38764	-80327
	150C1F3	9901	38605	80291	9901	38605	-80291
	380C2F1	19802	77784	160723	19802	77784	-160723
	380C2F2	19802	77528	160653	19802	77528	-160653
	380C2F3	19802	77210	160582	19802	77210	-160582
	RTG	0	0	0	7767	28176	-57870
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2915	10616	22378	2915	10616	-22378
	150C1F1	9725	35903	75906	9725	35903	-75906
	150C1F2	9725	35866	75911	9725	35866	-75911
	150C1F3	9725	35819	75919	9725	35819	-75919
	380C2F1	19451	71807	151812	19451	71807	-151812
	380C2F2	19451	71732	151822	19451	71732	-151822
	380C2F3	19451	71637	151837	19451	71637	-151837
	RTG	0	0	0	5823	21078	-44703
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2313	8906	18274	2314	14308	-24444
	150C1F1	8522	32312	66975	8525	45813	-80736
	150C1F2	8522	32218	66954	8524	44263	-78789
	150C1F3	8522	32100	66934	8524	42347	-76437
	380C2F1	17045	64625	133950	17049	91626	-161472
	380C2F2	17045	64435	133908	17049	88526	-157578
	380C2F3	17045	64199	133867	17048	84693	-152874
	RTG	0	0	0	4621	23345	-42043
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2312	9742	20639	2312	10807	-21256
	150C1F1	8518	36198	76913	8518	38889	-78013
	150C1F2	8518	36174	76918	8518	38591	-77797
	150C1F3	8518	36144	76925	8518	38225	-77553
	380C2F1	17036	72396	153827	17036	77777	-156027
	380C2F2	17036	72348	153836	17036	77181	-155594
	380C2F3	17036	72287	153850	17036	76450	-155107
	RTG	0	0	0	4618	20406	-41295
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3883	14130	28996	3885	21841	-36979
	150C1F1	9901	38353	80255	9903	48510	-89896
	150C1F2	9901	38277	80249	9903	47334	-87645
	150C1F3	9901	38182	80246	9902	45889	-86059
	380C2F1	19802	76705	160510	19806	97020	-177971
	380C2F2	19802	76554	160499	19805	94667	-175291
	380C2F3	19802	76365	160493	19805	91779	-172118
	RTG	0	0	0	7768	36134	-64856
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2915	10557	22386	2915	11505	-22754
	150C1F1	9725	35742	75935	9726	38271	-76685
	150C1F2	9725	35718	75940	9726	37996	-76520
	150C1F3	9725	35688	75948	9725	37659	-76337
	380C2F1	19451	71483	151869	19451	76541	-153370
	380C2F2	19451	71436	151881	19451	75993	-153041
	380C2F3	19451	71377	151896	19451	75318	-152674
	RTG	0	0	0	5823	22087	-44897
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2314	13771	23728	2314	13771	-23728
	150C1F1	8524	44435	79003	8524	44435	-79003
	150C1F2	8524	43026	77263	8524	43026	-77263
	150C1F3	8524	41289	75172	8524	41289	-75172
	380C2F1	17049	88869	158005	17049	88869	-158005
	380C2F2	17048	86053	154526	17048	86053	-154526
	380C2F3	17048	82578	150345	17048	82578	-150345
	RTG	0	0	0	4621	22737	-41301
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2312	10699	21159	2312	10699	-21159
	150C1F1	8518	38623	77820	8518	38623	-77820
	150C1F2	8518	38354	77637	8518	38354	-77637
	150C1F3	8518	38024	77431	8518	38024	-77431
	380C2F1	17036	77247	155640	17036	77247	-155640
	380C2F2	17036	76709	155273	17036	76709	-155273
	380C2F3	17036	76048	154861	17036	76048	-154861
	RTG	0	0	0	4618	20291	-41221

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	21080	36034	3885	21080	-36034
	150C1F1	9903	47463	87791	9903	47463	-87791
	150C1F2	9902	46400	86612	9902	46400	-86612
	150C1F3	9902	45097	85222	9902	45097	-85222
	380C2F1	19805	94927	175583	19805	94927	-175583
	380C2F2	19805	92801	173223	19805	92801	-173223
	380C2F3	19804	90194	170443	19804	90194	-170443
	RTG	0	0	0	7768	35276	-63898
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	11412	22688	2915	11412
150C1F1		9726	38027	76538	9726	38027	-76538
150C1F2		9726	37779	76399	9726	37779	-76399
150C1F3		9725	37473	76246	9725	37473	-76246
380C2F1		19451	76053	153076	19451	76053	-153076
380C2F2		19451	75557	152799	19451	75557	-152799
380C2F3		19451	74945	152493	19451	74945	-152493
RTG		0	0	0	5823	21985	-44852
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2314	14308	24444	2313	8906
	150C1F1	8525	45813	80736	8522	32312	-66975
	150C1F2	8524	44263	78789	8522	32218	-66954
	150C1F3	8524	42347	76437	8522	32100	-66934
	380C2F1	17049	91626	161472	17045	64625	-133950
	380C2F2	17049	88526	157578	17045	64435	-133908
	380C2F3	17048	84693	152874	17045	64199	-133867
	RTG	0	0	0	4620	17475	-36413
	NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	10807	21256	2312	9742
150C1F1		8518	38889	78013	8518	36198	-76913
150C1F2		8518	38591	77797	8518	36174	-76918
150C1F3		8518	38225	77553	8518	36144	-76925
380C2F1		17036	77777	156027	17036	72396	-153827
380C2F2		17036	77181	155594	17036	72348	-153836
380C2F3		17036	76450	155107	17036	72287	-153850
RTG		0	0	0	4618	19226	-40903
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	3885	21841	36979	3883	14130
	150C1F1	9903	48510	88986	9901	38353	-80255
	150C1F2	9903	47334	87645	9901	38277	-80249
	150C1F3	9902	45889	86059	9901	38182	-80246
	380C2F1	19806	97020	177971	19802	76705	-160510
	380C2F2	19805	94667	175291	19802	76554	-160499
	380C2F3	19805	91779	172118	19802	76365	-160493
	RTG	0	0	0	7767	27725	-57784
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2915	11505	22754	2915	10557
150C1F1		9726	38271	76685	9725	35742	-75935
150C1F2		9726	37996	76520	9725	35718	-75940
150C1F3		9725	37659	76337	9725	35688	-75948
380C2F1		19451	76541	153370	19451	71483	-151869
380C2F2		19451	75993	153041	19451	71436	-151881
380C2F3		19451	75318	152674	19451	71377	-151896
RTG		0	0	0	5823	21006	-44720
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1735	7440	14693	1735	7440
	150C1F1	6391	26623	53552	6391	26623	-53552
	150C1F2	6391	26434	53426	6391	26434	-53426
	150C1F3	6390	26203	53285	6390	26203	-53285
	380C2F1	12781	53245	107104	12781	53245	-107104
	380C2F2	12781	52868	106853	12781	52868	-106853
	380C2F3	12781	52405	106571	12781	52405	-106571
	RTG	0	0	0	3464	14212	-28857
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	7898	16549	1734	7898
150C1F1		6387	29501	62176	6387	29501	-62176
150C1F2		6387	29460	62173	6387	29460	-62173
150C1F3		6387	29408	62172	6387	29408	-62172
380C2F1		12774	59002	124352	12774	59002	-124352
380C2F2		12774	58919	124347	12774	58919	-124347
380C2F3		12774	58816	124344	12774	58816	-124344
RTG		0	0	0	3463	15483	-32705
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	3304	13004	25894	3304	13004
	150C1F1	7769	32583	66833	7769	32583	-66833
	150C1F2	7769	32443	66770	7769	32443	-66770
	150C1F3	7769	32268	66702	7769	32268	-66702
	380C2F1	15538	65167	133667	15538	65167	-133667
	380C2F2	15538	64885	133541	15538	64885	-133541
	380C2F3	15538	64537	133405	15538	64537	-133405
	RTG	0	0	0	6610	25061	-51190
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2336	8913	18725	2336	8913
150C1F1		7593	29581	62346	7593	29581	-62346
150C1F2		7593	29541	62348	7593	29541	-62348
150C1F3		7593	29492	62351	7593	29492	-62351
380C2F1		15186	59161	124693	15186	59161	-124693
380C2F2		15186	59082	124695	15186	59082	-124695
380C2F3		15186	58984	124702	15186	58984	-124702
RTG		0	0	0	4667	17663	-37380
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1735	7127	14457	1735	13344
	150C1F1	6390	25843	53102	6393	41605	-71713
	150C1F2	6390	25737	53057	6392	39839	-69303
	150C1F3	6390	25607	53010	6392	37633	-66331
	380C2F1	12781	51686	106203	12785	83209	-143427
	380C2F2	12781	51475	106115	12785	79677	-138605
	380C2F3	12781	51213	106020	12784	75266	-132662
	RTG	0	0	0	3465	20757	-36495
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	7831	16541	1734	9072
150C1F1		6387	29325	62175	6387	32408	-64118
150C1F2		6387	29300	62177	6387	32054	-63780
150C1F3		6387	29268	62181	6387	31621	-63392
380C2F1		12774	58650	124349	12774	64817	-128235
380C2F2		12774	58600	124354	12774	64107	-127560
380C2F3		12774	58537	124361	12774	63242	-126784
RTG		0	0	0	3463	16742	-33438

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3304	12574	25660	3306	20937	-35040
	150C1F1	7769	31994	66620	7771	43648	-78562
	150C1F2	7769	31913	66602	7771	42300	-76853
	150C1F3	7769	31812	66585	7770	40637	-74797
	380C2F1	15538	63989	133240	15542	87296	-157124
	380C2F2	15538	63826	133204	15541	84600	-153707
	380C2F3	15538	63624	133170	15541	81274	-149593
	RTG	0	0	0	6612	33762	-59771
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2336	8851	18727	2336	9895	-19301
	150C1F1	7593	29412	62361	7593	32206	-63680
	150C1F2	7593	29388	62365	7593	31893	-63432
	150C1F3	7593	29357	62371	7593	31509	-63151
	380C2F1	15186	58824	124722	15187	64412	-127360
	380C2F2	15186	58776	124730	15187	63786	-126864
	380C2F3	15186	58714	124742	15186	63019	-126301
	RTG	0	0	0	4667	18753	-37748
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1735	12751	21541	1735	12751	-21541
	150C1F1	6392	40035	69569	6392	40035	-69569
	150C1F2	6392	38418	67383	6392	38418	-67383
	150C1F3	6392	36405	64701	6392	36405	-64701
	380C2F1	12785	80070	139139	12785	80070	-139139
	380C2F2	12784	76836	134766	12784	76836	-134766
	380C2F3	12784	72810	129403	12784	72810	-129403
	RTG	0	0	0	3465	20054	-35547
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	8943	17393	1734	8943	-17393
	150C1F1	6387	32093	63816	6387	32093	-63816
	150C1F2	6387	31774	63526	6387	31774	-63526
	150C1F3	6387	31384	63193	6387	31384	-63193
	380C2F1	12774	64186	127633	12774	64186	-127633
	380C2F2	12774	63547	127051	12774	63547	-127051
	380C2F3	12774	62768	126386	12774	62768	-126386
	RTG	0	0	0	3463	16607	-33320
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3306	20126	33990	3306	20126	-33990
	150C1F1	7771	42449	77041	7771	42449	-77041
	150C1F2	7771	41226	75518	7771	41226	-75518
	150C1F3	7770	39721	73694	7770	39721	-73694
	380C2F1	15541	84898	154082	15541	84898	-154082
	380C2F2	15541	82452	151036	15541	82452	-151036
	380C2F3	15541	79441	147388	15541	79441	-147388
	RTG	0	0	0	6612	32826	-58647
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2336	9790	19209	2336	9790	-19209
	150C1F1	7593	31927	63459	7593	31927	-63459
	150C1F2	7593	31645	63247	7593	31645	-63247
	150C1F3	7593	31299	63008	7593	31299	-63008
	380C2F1	15187	63855	126917	15187	63855	-126917
	380C2F2	15186	63290	126494	15186	63290	-126494
	380C2F3	15186	62598	126016	15186	62598	-126016
	RTG	0	0	0	4667	18640	-37679
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1735	13344	22377	1735	7127	-14457
	150C1F1	6393	41605	71713	6390	25843	-53102
	150C1F2	6392	39839	69303	6390	25737	-53057
	150C1F3	6392	37633	66331	6390	25607	-53010
	380C2F1	12785	83209	143427	12781	51686	-106203
	380C2F2	12785	79677	138605	12781	51475	-106115
	380C2F3	12784	75266	132662	12781	51213	-106020
	RTG	0	0	0	3464	13874	-28690
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	9072	17537	1734	7831	-16541
	150C1F1	6387	32408	64118	6387	29325	-62175
	150C1F2	6387	32054	63780	6387	29300	-62177
	150C1F3	6387	31621	63392	6387	29268	-62181
	380C2F1	12774	64817	128235	12774	58650	-124349
	380C2F2	12774	64107	127560	12774	58600	-124354
	380C2F3	12774	63242	126784	12774	58537	-124361
	RTG	0	0	0	3463	15405	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3306	20937	35040	3304	12574	-25660
	150C1F1	7771	43648	78562	7769	31994	-66620
	150C1F2	7771	42300	76853	7769	31913	-66602
	150C1F3	7770	40637	74797	7769	31812	-66585
	380C2F1	15542	87296	157124	15538	63989	-133240
	380C2F2	15541	84600	153707	15538	63826	-133204
	380C2F3	15541	81274	149593	15538	63624	-133170
	RTG	0	0	0	6610	24584	-51049
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2336	9895	19301	2336	8851	-18727
	150C1F1	7593	32206	63680	7593	29412	-62361
	150C1F2	7593	31893	63432	7593	29388	-62365
	150C1F3	7593	31509	63151	7593	29357	-62371
	380C2F1	15187	64412	127360	15186	58824	-124722
	380C2F2	15187	63786	126864	15186	58776	-124730
	380C2F3	15186	63019	126301	15186	58714	-124742
	RTG	0	0	0	4667	17589	-37393

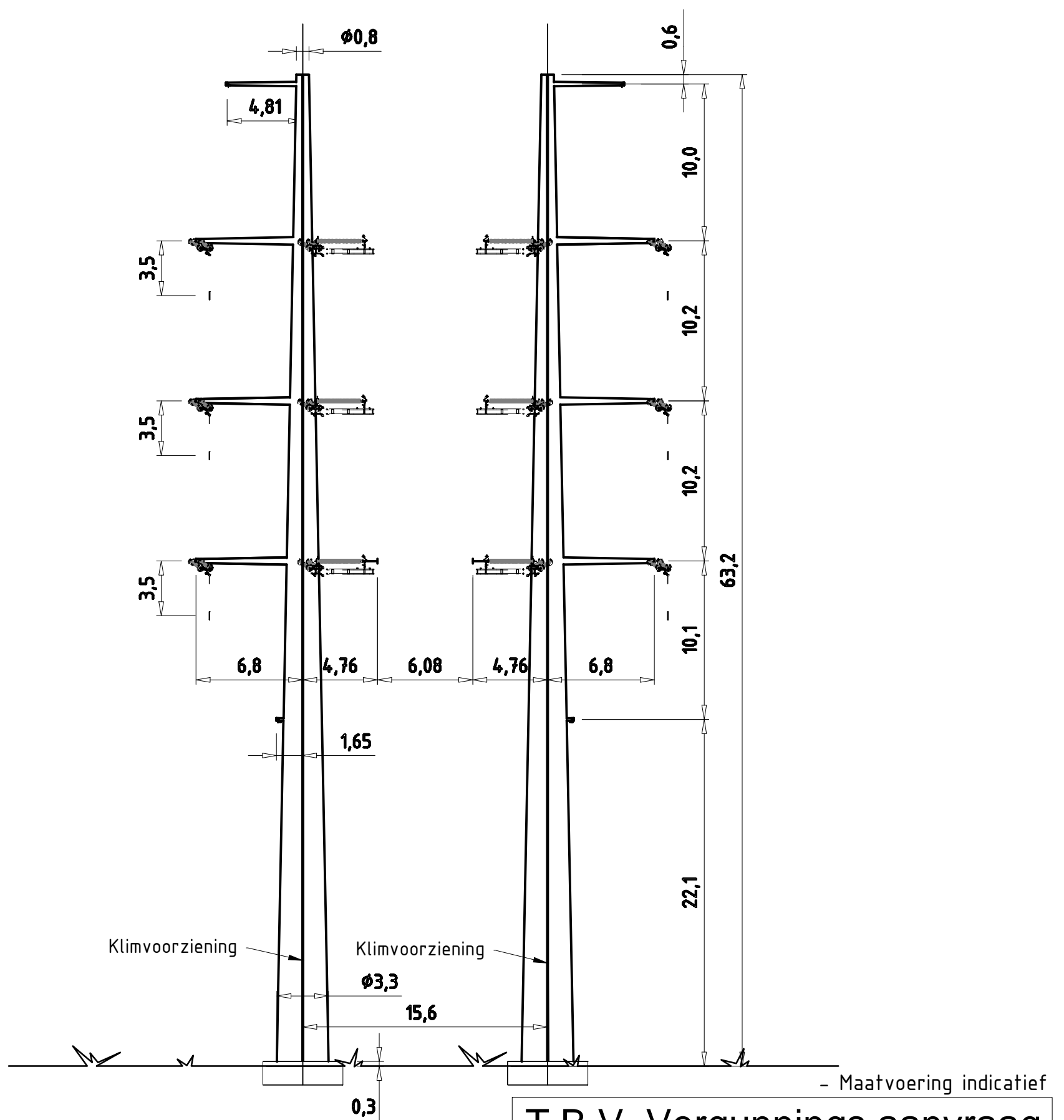
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Appendix J2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	1928	8306	16195	1928	8306	-16195
Wind, 10°C	150C1F1	7101	29479	58680	7101	29479	-58680
Permanent loads yg= 1.0	150C1F2	7101	29226	58493	7101	29226	-58493
Wind angle: 0°	150C1F3	7101	28916	58283	7101	28916	-58283
	380C2F1	14202	58959	117360	14202	58959	-117360
	380C2F2	14202	58452	116987	14202	58452	-116987
	380C2F3	14202	57831	116566	14202	57831	-116566
	RTG	0	0	0	3850	15722	-31636
NL4/1b	GW / opgw	1927	8520	17947	1927	8520	-17947
Wind, -20°C	150C1F1	7097	31774	67232	7097	31774	-67232
Permanent loads yg= 1.0	150C1F2	7097	31741	67233	7097	31741	-67233
Wind angle: 0°	150C1F3	7097	31701	67237	7097	31701	-67237
	380C2F1	14194	63548	134463	14194	63548	-134463
	380C2F2	14194	63483	134467	14194	63483	-134467
	380C2F3	14194	63401	134474	14194	63401	-134474
	RTG	0	0	0	3848	16754	-35514
NL4/3	GW / opgw	6603	20876	43107	6603	20876	-43107
Wind, -5°C	150C1F1	11209	42315	88209	11209	42315	-88209
Permanent loads yg= 1.0	150C1F2	11209	42217	88199	11209	42217	-88199
Wind angle: 0°	150C1F3	11209	42095	88191	11209	42095	-88191
	380C2F1	22419	84630	176418	22419	84630	-176418
	380C2F2	22419	84434	176397	22419	84434	-176397
	380C2F3	22419	84190	176381	22419	84190	-176381
	RTG	0	0	0	13222	41211	-86246
NL4/4	GW / opgw	2429	9162	19325	2429	9162	-19325
Construction/maintenance, +5°C	150C1F1	8103	31052	65684	8103	31052	-65684
Permanent loads yg= 1.0	150C1F2	8103	31021	65688	8103	31021	-65688
Wind angle: 0°	150C1F3	8103	30981	65694	8103	30981	-65694
	380C2F1	16206	62105	131368	16206	62105	-131368
	380C2F2	16206	62042	131376	16206	62042	-131376
	380C2F3	16206	61962	131388	16206	61962	-131388
	RTG	0	0	0	4852	18187	-38586
NL4/1a	GW / opgw	1928	7884	15849	1929	16004	-26320
Wind, 10°C	150C1F1	7101	28434	58005	7104	49235	-83134
Permanent loads yg= 1.0	150C1F2	7101	28294	57937	7104	46962	-80026
Wind angle: 45°	150C1F3	7101	28120	57862	7103	44106	-76156
	380C2F1	14202	56868	116009	14209	98470	-166268
	380C2F2	14202	56587	115873	14208	93925	-160053
	380C2F3	14202	56239	115724	14207	88213	-152312
	RTG	0	0	0	3851	24427	-42102
NL4/1b	GW / opgw	1927	8468	17947	1927	9375	-18505
Wind, -20°C	150C1F1	7097	31634	67246	7097	33921	-68259
Permanent loads yg= 1.0	150C1F2	7097	31614	67250	7097	33666	-68064
Wind angle: 45°	150C1F3	7097	31589	67255	7097	33354	-67844
	380C2F1	14194	63269	134492	14195	67843	-136518
	380C2F2	14194	63229	134500	14195	67333	-136129
	380C2F3	14194	63178	134510	14195	66707	-135689
	RTG	0	0	0	3848	17692	-35886
NL4/3	GW / opgw	6603	20608	43106	6604	25204	-45830
Wind, -5°C	150C1F1	11209	41899	88191	11210	49269	-93121
Permanent loads yg= 1.0	150C1F2	11209	41839	88194	11210	48425	-92296
Wind angle: 45°	150C1F3	11209	41765	88201	11210	47392	-91339
	380C2F1	22419	83797	176382	22421	98539	-186241
	380C2F2	22419	83679	176389	22421	96850	-184592
	380C2F3	22419	83529	176402	22420	94784	-182677
	RTG	0	0	0	13223	45998	-88109
NL4/4	GW / opgw	2429	9113	19331	2429	9916	-19666
Construction/maintenance, +5°C	150C1F1	8103	30917	65707	8103	33057	-66402
Permanent loads yg= 1.0	150C1F2	8103	30897	65711	8103	32823	-66255
Wind angle: 45°	150C1F3	8103	30872	65717	8103	32536	-66089
	380C2F1	16206	61833	131413	16207	66114	-132805
	380C2F2	16206	61794	131422	16207	65647	-132509
	380C2F3	16206	61744	131435	16207	65073	-132179
	RTG	0	0	0	4852	19038	-38772
NL4/1a	GW / opgw	1929	15253	25268	1929	15253	-25268
Wind, 10°C	150C1F1	7104	47216	80372	7104	47216	-80372
Permanent loads yg= 1.0	150C1F2	7104	45125	77532	7104	45125	-77532
Wind angle: 90°	150C1F3	7103	42507	74012	7103	42507	-74012
	380C2F1	14208	94431	160743	14208	94431	-160743
	380C2F2	14207	90251	155063	14207	90251	-155063
	380C2F3	14206	85013	148024	14206	85013	-148024
	RTG	0	0	0	3851	23511	-40855


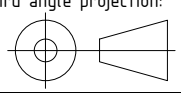
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1927	9282	18418	1927	9282	-18418
	150C1F1	7097	33694	68085	7097	33694	-68085
	150C1F2	7097	33464	67920	7097	33464	-67920
	150C1F3	7097	33182	67733	7097	33182	-67733
	380C2F1	14195	67389	136171	14195	67389	-136171
	380C2F2	14195	66929	135839	14195	66929	-135839
	380C2F3	14195	66364	135466	14195	66364	-135466
	RTG	0	0	0	3848	17594	-35820
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	6604	24745	45420	6604	24745	-45420
	150C1F1	11210	48518	92385	11210	48518	-92385
	150C1F2	11210	47757	91670	11210	47757	-91670
	150C1F3	11210	46826	90842	11210	46826	-90842
	380C2F1	22421	97037	184770	22421	97037	-184770
	380C2F2	22420	95514	183340	22420	95514	-183340
	380C2F3	22420	93651	181685	22420	93651	-181685
	RTG	0	0	0	13223	45502	-87781
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2429	9837	19608	2429	9837	-19608
	150C1F1	8103	32849	66270	8103	32849	-66270
	150C1F2	8103	32638	66146	8103	32638	-66146
	150C1F3	8103	32378	66007	8103	32378	-66007
	380C2F1	16207	65698	132541	16207	65698	-132541
	380C2F2	16207	65276	132291	16207	65276	-132291
	380C2F3	16206	64756	132015	16206	64756	-132015
	RTG	0	0	0	4852	18952	-38731
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1929	16004	26320	1928	7884	-15849
	150C1F1	7104	49235	83134	7101	28434	-58005
	150C1F2	7104	46962	80026	7101	28294	-57937
	150C1F3	7103	44106	76156	7101	28120	-57862
	380C2F1	14209	98470	166268	14202	56868	-116009
	380C2F2	14208	93925	160053	14202	56587	-115873
	380C2F3	14207	88213	152312	14202	56239	-115724
	RTG	0	0	0	3850	15269	-31383
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1927	9375	18505	1927	8468	-17947
	150C1F1	7097	33921	68259	7097	31634	-67246
	150C1F2	7097	33666	68064	7097	31614	-67250
	150C1F3	7097	33354	67844	7097	31589	-67255
	380C2F1	14195	67843	136518	14194	63269	-134492
	380C2F2	14195	67333	136129	14194	63229	-134500
	380C2F3	14195	66707	135689	14194	63178	-134510
	RTG	0	0	0	3848	16692	-35523
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	6604	25204	45830	6603	20608	-43106
	150C1F1	11210	49269	93121	11209	41899	-88191
	150C1F2	11210	48425	92296	11209	41839	-88194
	150C1F3	11210	47392	91339	11209	41765	-88201
	380C2F1	22421	98539	186241	22419	83797	-176382
	380C2F2	22421	96850	184592	22419	83679	-176389
	380C2F3	22420	94784	182677	22419	83529	-176402
	RTG	0	0	0	13222	40890	-86293
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2429	9916	19666	2429	9113	-19331
	150C1F1	8103	33057	66402	8103	30917	-65707
	150C1F2	8103	32823	66255	8103	30897	-65711
	150C1F3	8103	32536	66089	8103	30872	-65717
	380C2F1	16207	66114	132805	16206	61833	-131413
	380C2F2	16207	65647	132509	16206	61794	-131422
	380C2F3	16207	65073	132179	16206	61744	-131435
	RTG	0	0	0	4852	18126	-38600



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4HL400

- Trekparameter 1800m
- 2x380 / 2x150 Hoekmast
- 400m Veldlengte
- 130°-150° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

5.0	05-03-2014	Modified top/botom diameter and increased traverse length
4.0	03-02-2014	Modified top/botom diameter
3.0	11-03-2013	Small modification
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection: 
Drawn by: RBE 05-03-2014 Checked by: AJP 05-03-2014 Approved by: AW 05-03-2014	Scale: 1:300 Units: m Project no: 000.145 Company: TenneT	Drawing no.: 74102194-035-094 V
Description: Wintrack Masttype ZWW4HL400		Revision: 5.0 Format: A3
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		

ZWW4HM400+5

Fundatie berekening

Bijlage CL

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1,6	m
schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	5,5	m
	Hoogte	1,8	m
	Inhoud	42,8	m ³
	e.g.	1026	kN

Onderplaat	Diameter	14,0	m
	Hoogte	1,4	m
	Inhoud	216	m ³
	e.g.	5172	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		1199	kN
Fgeleiders		329	kN
Maximale dwarskracht		1500	kN
Fmax vert (druk)		1768	kN
Fmin vert (trek)		1326	kN
Maximale moment		75789	kNm

Moment

F_{diag}		6345	kN
F_{hor}		1500	kN
F_{ver}		6296	kN
M_{hor} (tgv F_{hor})		4800	kNm
M_{tot}		80589	kNm
$F=M/a$		6296	kN

Verticaal reactiekracht

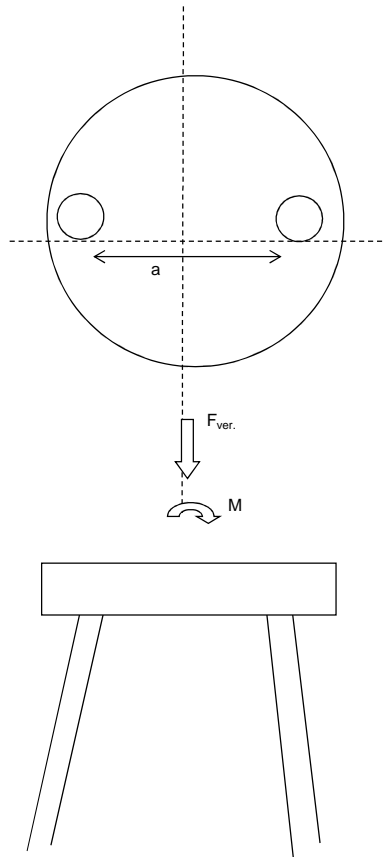
F_{water} (trek)		2583	kN
F_{grond} (druk)		3515	kN
F_{grond} (trek)		2929	kN

F_{dmax} (druk)		6712	kN
F_{tmax} (trek)		3221	kN

F_{dtot} (druk)		13008	kN
F_{ttot} (trek)		3075	kN

Palen druk		12	(-)
Palen trek		10	(-)

Totaal palen		24	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4HM400+5

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CL

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	$O_{p;gem}$	1,60 m
paalfactor	αt	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11,25 MPa
materiaalfactor	$\gamma_{m,b4}$	1,4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1,5
	$q_{c;z,d}$	5,36 MPa
	$P_{r,z,d}$	37,5 kN/m ²
	$F_{r;trek,d,i}$	60,0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

$F_{trek,d}$	536,4 kN
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ZWW4HM400+5

DRUKPALEN

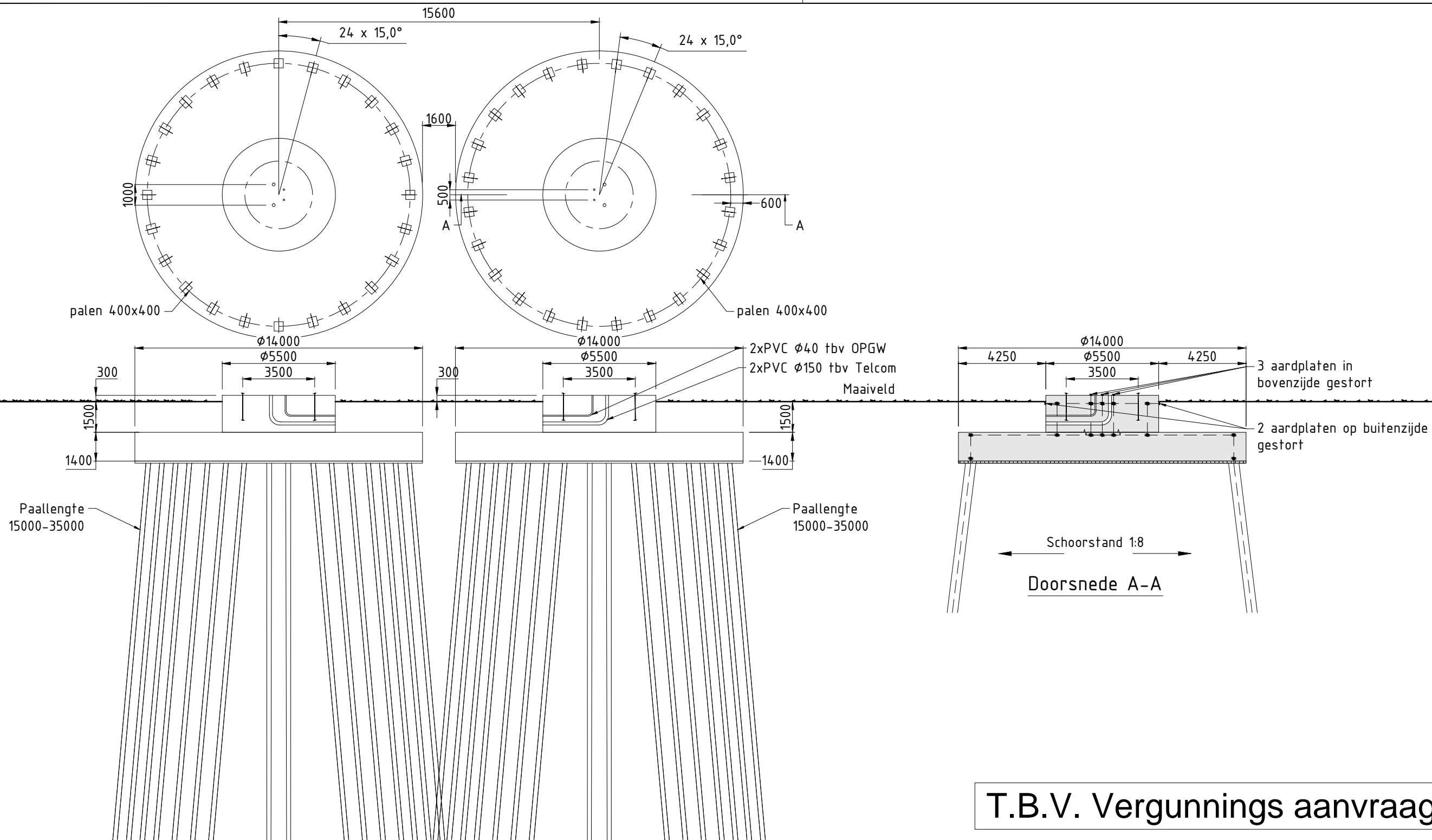
FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CL

Bepaling opneembare paalbelasting op druk

heipaal	v	
diameter	a	2 mm
		2 mm
Deq		0,001808
maximale puntweerstand		
$P_{r,max;punt;i}$		11,25 MN/m ²
paalklasse factor	α_p	1,00
factor paalvoet	β	1
hoek van inwendige vrijwing van paalvoet	ϕ	40
factor dwarsdoorsnede paalvoet	s	1,00
minimale waarde neergaande deel	$q_{c,II;gem}$	9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11,00 MN/m ²
maximale paalschachtwrijving		
$P_{r,max;schacht;i}$		0,05 MN/m ²
waarin:		
paalfactor	α_s	0,010
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5,00 MN/m ²
maximale draagkracht alleenstaande paal		
$F_{r,max;i}$		0,00 MN
waarin:		
$F_{r,max;punt;i}$		0,00 MN
paalpunt oppervlak	A_{punt}	0,00 m ²
$F_{r,max;schacht;i}$		0,00 MN
gemiddelde paalomtrek	$O_{p;gem}$	0,01 m
lengte schachtwrijving	Δl	15,00 m
Bepaling rekenwaarde van de maximale draagkracht		
$F_{r,paal,max;d}$	MN	0,00 MN
materiaalfactor grond	γ_{mb}	1,20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0,75

$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27,00 m
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Verklaring

- Gewapend beton
- Werkvloer


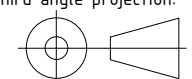
Verklaring aarding

- Ringleiding $\phi 16\text{mm}$ (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

T.B.V. Vergunnings aanvraag

6.0	12-03-2014	Diverse aanpassingen
5.0	26-07-2013	Diverse aanpassingen
4.0	13-06-2013	Fundering tekst toegevoegd
		Projectname: Engineering verbinding ZW380
		Third angle projection: 
		Drawing no.: 74102194-032-096V
Design state: Definitief		Scale: 1:200
Drawn by: RBE 12-03-2014		Units: mm
Checked by: AJP 12-03-2014		Project no: 000.145
Approved by: AW 12-03-2014		Company: TenneT
		Description: Principe ontwerp fundatie hoekmast ZWW4HM400+5 masten familie
		Revision: 6.0
		Format: A3



ZWW4HM400+5

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h		68.2	m
Diameter voet		d voet		3.5	m
top		d top		0.8	m
gem		d gem		2.2	m
wanddikte		t		32	mm
Oppervlakte aan voet		A		348641	mm ²
Traagheidsmoment aan voet		W _x		3.00E+08	mm ⁴
Weerstandsmoment aan voet		I _x		5.18E+11	mm ⁶
Mast: Gewicht		2 ^{de} orde		10.0	%
		F _{rep,ver}		1130	kN

Bijlage BL

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{fl}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	67.6	20.0	74.0	0.0	74.0	3153	kNm
150C1F1	57.6	32.0	140.5	0.0	140.5	6207	kNm
150C1F2	47.4	32.1	138.4	0.0	138.4	5015	kNm
150C1F3	37.2	32.1	135.8	0.0	135.8	3848	kNm
380C2F1	57.6	64.1	280.9	0.0	280.9	12413	kNm
380C2F2	47.4	64.2	276.7	0.0	276.7	10029	kNm
380C2F3	37.2	64.3	271.6	0.0	271.6	7695	kNm
RTG	27.1	20.1	69.0	-107.4	127.6	1963	kNm

68.2

Stuwdruk		F _{hor.}	43.2	kN
		M _{d,wind}	1316	kNm
Totaal		M _{d,tot}	68899	kNm
Totaal moment incl. 2 ^{de} orde effect		M _{d,tot}	75789	kNm

Normaalkracht;

Optredende normaalkracht				
N _{d,geleiders}			329	kN
N _{d, e.g. mast}			1356	kN
N _{s,d,totaal}			1685	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA
β _a	0.68
A _{eff}	237528 mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{yd} /γ _{m1}	7	N/mm ²
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Moment;

Optredende moment in de voet:			
M _{d,tot}		75789	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA
β _a	0.98
W _{eff}	2.94E+08 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	258	N/mm ²
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Totale spanning:

σ _d	265	N/mm ²	< 284 N/mm ² = ACCOORD
σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{fl}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	67.6	14.3	56.3	0.0	56.3	3804	kNm
150C1F1	57.6	24.6	111.3	0.0	111.3	6409	kNm
150C1F2	47.4	24.7	109.9	0.0	109.9	5209	kNm
150C1F3	37.2	24.7	108.2	0.0	108.2	4026	kNm
380C2F1	57.6	49.3	222.6	0.0	222.6	12819	kNm
380C2F2	47.4	49.4	219.8	0.0	219.8	10418	kNm
380C2F3	37.2	49.4	216.5	0.0	216.5	8052	kNm
RTG	27.1	14.4	52.8	-83.4	98.7	2673	kNm

Stuwdruk		F _{hor.}	348	kN
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Verplaatsing			1.37	m
Percentage van de verplaatsing			2.01%	
Hoek			2.18	graden
Kromming			0.47%	
Fundatie rotatiestijfheid			0.005	rad

3.72	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4HM400+5

Appendix L / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2522	12798	19257	2522	12798	-19257
	150C1F1	9344	43749	67582	9344	43749	-67582
	150C1F2	9357	43055	66984	9357	43055	-66984
	150C1F3	9373	42220	66297	9373	42220	-66297
	380C2F1	18688	87497	135163	18688	87497	-135163
	380C2F2	18715	86110	133968	18715	86110	-133968
	380C2F3	18747	84439	132594	18747	84439	-132594
	RTG	0	0	0	5079	23213	-36300
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2596	11722	19722	2596	11722	-19722
	150C1F1	9578	43336	73423	9578	43336	-73423
	150C1F2	9579	43264	73418	9579	43264	-73418
	150C1F3	9580	43175	73415	9580	43175	-73415
	380C2F1	19156	86673	146846	19156	86673	-146846
	380C2F2	19158	86527	146836	19158	86527	-146836
	380C2F3	19160	86349	146831	19160	86349	-146831
	RTG	0	0	0	5183	22990	-39039
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	10094	32295	52944	10094	32295	-52944
	150C1F1	16168	62245	103234	16168	62245	-103234
	150C1F2	16171	62023	103187	16171	62023	-103187
	150C1F3	16174	61752	103142	16174	61752	-103142
	380C2F1	32335	124490	206468	32335	124490	-206468
	380C2F2	32341	124047	206375	32341	124047	-206375
	380C2F3	32348	123504	206285	32348	123504	-206285
	RTG	0	0	0	20228	63498	-105976
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3387	13173	22234	3387	13173	-22234
	150C1F1	11102	43786	74201	11102	43786	-74201
	150C1F2	11102	43718	74204	11102	43718	-74204
	150C1F3	11103	43634	74210	11103	43634	-74210
	380C2F1	22203	87573	148403	22203	87573	-148403
	380C2F2	22205	87436	148408	22205	87436	-148408
	380C2F3	22206	87268	148420	22206	87268	-148420
	RTG	0	0	0	6769	26093	-44413
NL1/6 Permanent, +10°C Permanent loads yg= 1.35	GW / opgw	2881	11089	19206	2881	11089	-19206
	150C1F1	10610	40649	70406	10610	40649	-70406
	150C1F2	10610	40649	70406	10610	40649	-70406
	150C1F3	10610	40649	70406	10610	40649	-70406
	380C2F1	21221	81297	140811	21221	81297	-140811
	380C2F2	21221	81297	140811	21221	81297	-140811
	380C2F3	21221	81297	140811	21221	81297	-140811
	RTG	0	0	0	5755	22157	-38377
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2562	10523	17447	2398	25868	-33934
	150C1F1	9443	38178	63931	8918	78287	-104997
	150C1F2	9444	38073	63911	8945	74516	-100725
	150C1F3	9445	37945	63893	8985	69789	-95377
	380C2F1	18885	76356	127862	17835	156573	-209994
	380C2F2	18888	76146	127823	17891	149033	-201450
	380C2F3	18891	75890	127786	17970	139578	-190754
	RTG	0	0	0	4863	39562	-53936
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2598	11474	19718	2565	13238	-20757
	150C1F1	9584	42684	73492	9506	47056	-75391
	150C1F2	9584	42669	73498	9516	46597	-75046
	150C1F3	9584	42649	73505	9528	46044	-74655
	380C2F1	19167	85368	146984	19012	94112	-150783
	380C2F2	19168	85337	146995	19032	93193	-150092
	380C2F3	19168	85298	147010	19057	92087	-149311
	RTG	0	0	0	5153	24690	-39850
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	10105	31082	53034	9972	39151	-56641
	150C1F1	16188	60296	103209	15942	73952	-111002
	150C1F2	16188	60251	103222	15971	72512	-109768
	150C1F3	16189	60196	103240	16006	70770	-108336
	380C2F1	32376	120592	206418	31884	147904	-222003
	380C2F2	32377	120503	206445	31941	145024	-219536
	380C2F3	32377	120392	206479	32012	141541	-216672
	RTG	0	0	0	20103	71390	-108703
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3389	12945	22266	3367	14434	-22829
	150C1F1	11106	43162	74320	11050	47139	-75531
	150C1F2	11106	43147	74326	11057	46732	-75277
	150C1F3	11106	43128	74334	11066	46241	-74994
	380C2F1	22211	86325	148641	22100	94277	-151061
	380C2F2	22212	86294	148653	22115	93464	-150554
	380C2F3	22212	86257	148669	22132	92482	-149989
	RTG	0	0	0	6750	27547	-44797

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2417	22234	29773	2417	22234	-29773
	150C1F1	8999	68283	93678	8999	68283	-93678
	150C1F2	9028	65293	90313	9028	65293	-90313
	150C1F3	9069	61574	86155	9069	61574	-86155
	380C2F1	17997	136566	187355	17997	136566	-187355
	380C2F2	18056	130586	180625	18056	130586	-180625
	380C2F3	18137	123149	172309	18137	123149	-172309
	RTG	0	0	0	4908	34719	-48410
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2576	12749	20338	2576	12749	-20338
	150C1F1	9532	45873	74541	9532	45873	-74541
	150C1F2	9539	45541	74328	9539	45541	-74328
	150C1F3	9547	45141	74091	9547	45141	-74091
	380C2F1	19064	91746	149082	19064	91746	-149082
	380C2F2	19078	91082	148656	19078	91082	-148656
	380C2F3	19094	90281	148181	19094	90281	-148181
	RTG	0	0	0	5164	24152	-39490
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	10012	37009	55123	10012	37009	-55123
	150C1F1	16017	70231	107908	16017	70231	-107908
	150C1F2	16038	69180	107101	16038	69180	-107101
	150C1F3	16064	67911	106177	16064	67911	-106177
	380C2F1	32033	140461	215816	32033	140461	-215816
	380C2F2	32076	138359	214201	32076	138359	-214201
	380C2F3	32128	135822	212354	32128	135822	-212354
	RTG	0	0	0	20147	68952	-107412
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3374	14036	22565	3374	14036	-22565
	150C1F1	11069	46089	74913	11069	46089	-74913
	150C1F2	11074	45793	74762	11074	45793	-74762
	150C1F3	11080	45435	74597	11080	45435	-74597
	380C2F1	22138	92178	149825	22138	92178	-149825
	380C2F2	22148	91586	149524	22148	91586	-149524
	380C2F3	22160	90869	149195	22160	90869	-149195
	RTG	0	0	0	6757	27100	-44594
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2398	25868	33934	2562	10523	-17447
	150C1F1	8918	78287	104997	9443	38178	-63931
	150C1F2	8945	74516	100725	9444	38073	-63911
	150C1F3	8985	69789	95377	9445	37945	-63893
	380C2F1	17835	156573	209994	18885	76356	-127862
	380C2F2	17891	149033	201450	18888	76146	-127823
	380C2F3	17970	139578	190754	18891	75890	-127786
	RTG	0	0	0	5122	20674	-34763
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2565	13238	20757	2598	11474	-19718
	150C1F1	9506	47056	75391	9584	42684	-73492
	150C1F2	9516	46597	75046	9584	42669	-73498
	150C1F3	9528	46044	74655	9584	42649	-73505
	380C2F1	19012	94112	150783	19167	85368	-146984
	380C2F2	19032	93193	150092	19168	85337	-146995
	380C2F3	19057	92087	149311	19168	85298	-147010
	RTG	0	0	0	5185	22685	-39083
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	9972	39151	56641	10105	31082	-53034
	150C1F1	15942	73952	111002	16188	60296	-103209
	150C1F2	15971	72512	109768	16188	60251	-103222
	150C1F3	16006	70770	108336	16189	60196	-103240
	380C2F1	31884	147904	222003	32376	120592	-206418
	380C2F2	31941	145024	219536	32377	120503	-206445
	380C2F3	32012	141541	216672	32377	120392	-206479
	RTG	0	0	0	20238	61990	-106297
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3367	14434	22829	3389	12945	-22266
	150C1F1	11050	47139	75531	11106	43162	-74320
	150C1F2	11057	46732	75277	11106	43147	-74326
	150C1F3	11066	46241	74994	11106	43128	-74334
	380C2F1	22100	94277	151061	22211	86325	-148641
	380C2F2	22115	93464	150554	22212	86294	-148653
	380C2F3	22132	92482	149989	22212	86257	-148669
	RTG	0	0	0	6771	25807	-44489
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1881	11153	16407	1881	11153	-16407
	150C1F1	6991	37220	56276	6991	37220	-56276
	150C1F2	7006	36384	55432	7006	36384	-55432
	150C1F3	7025	35375	54444	7025	35375	-54444
	380C2F1	13982	74441	112551	13982	74441	-112551
	380C2F2	14012	72769	110864	14012	72769	-110864
	380C2F3	14049	70751	108888	14049	70751	-108888
	RTG	0	0	0	3803	19456	-29793

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1959	9488	15852	1959	9488	-15852
	150C1F1	7240	35262	59438	7240	35262	-59438
	150C1F2	7241	35180	59417	7241	35180	-59417
	150C1F3	7242	35080	59396	7242	35080	-59396
	380C2F1	14480	70524	118876	14480	70524	-118876
	380C2F2	14482	70360	118834	14482	70360	-118834
	380C2F3	14485	70160	118792	14485	70160	-118792
	RTG	0	0	0	3913	18494	-31252
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	9477	30920	50562	9477	30920	-50562
	150C1F1	13862	55741	91970	13862	55741	-91970
	150C1F2	13866	55503	91894	13866	55503	-91894
	150C1F3	13870	55212	91816	13870	55212	-91816
	380C2F1	27725	111483	183940	27725	111483	-183940
	380C2F2	27732	111006	183789	27732	111006	-183789
	380C2F3	27741	110425	183631	27741	110425	-183631
	RTG	0	0	0	18997	60717	-101160
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2758	11197	18812	2758	11197	-18812
	150C1F1	8781	36405	61417	8781	36405	-61417
	150C1F2	8782	36331	61410	8782	36331	-61410
	150C1F3	8783	36240	61404	8783	36240	-61404
	380C2F1	17562	72810	122834	17562	72810	-122834
	380C2F2	17564	72662	122819	17564	72662	-122819
	380C2F3	17566	72480	122809	17566	72480	-122809
	RTG	0	0	0	5512	22123	-37538
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1934	7924	13724	1934	7924	-13724
	150C1F1	7125	29242	50649	7125	29242	-50649
	150C1F2	7125	29242	50649	7125	29242	-50649
	150C1F3	7125	29242	50649	7125	29242	-50649
	380C2F1	14250	58484	101298	14250	58484	-101298
	380C2F2	14250	58484	101298	14250	58484	-101298
	380C2F3	14250	58484	101298	14250	58484	-101298
	RTG	0	0	0	3862	15821	-27403
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1928	8427	13817	1785	25311	-32970
	150C1F1	7113	30545	50712	6630	75616	-100374
	150C1F2	7114	30426	50666	6649	71626	-95721
	150C1F3	7116	30280	50617	6676	66580	-89821
	380C2F1	14225	61091	101423	13261	151233	-200749
	380C2F2	14228	60851	101332	13298	143253	-191443
	380C2F3	14232	60560	101235	13353	133160	-179643
	RTG	0	0	0	3613	37856	-50982
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	9212	15799	1921	11322	-17440
	150C1F1	7248	34549	59401	7145	39723	-62691
	150C1F2	7248	34533	59406	7157	39161	-62169
	150C1F3	7248	34513	59412	7173	38486	-61567
	380C2F1	14496	69097	118803	14289	79446	-125383
	380C2F2	14496	69065	118812	14315	78323	-124338
	380C2F3	14496	69025	118824	14345	76973	-123134
	RTG	0	0	0	3873	20518	-32625
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	9489	29684	50613	9349	38020	-54683
	150C1F1	13887	53681	91751	13610	68629	-101785
	150C1F2	13887	53635	91762	13640	67044	-100299
	150C1F3	13888	53578	91777	13678	65122	-98555
	380C2F1	27774	107361	183503	27220	137259	-203570
	380C2F2	27775	107270	183524	27281	134088	-200598
	380C2F3	27775	107155	183554	27356	130244	-197110
	RTG	0	0	0	18863	68863	-104327
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2760	10957	18822	2733	12620	-19686
	150C1F1	8786	35744	61471	8715	40231	-63568
	150C1F2	8786	35728	61476	8725	39757	-63197
	150C1F3	8786	35709	61483	8736	39186	-62776
	380C2F1	17573	71488	122942	17431	80462	-127135
	380C2F2	17573	71456	122953	17449	79514	-126394
	380C2F3	17573	71418	122967	17471	78373	-125553
	RTG	0	0	0	5488	23733	-38191
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1797	21525	28546	1797	21525	-28546
	150C1F1	6686	64961	87926	6686	64961	-87926
	150C1F2	6707	61727	84138	6707	61727	-84138
	150C1F3	6738	57664	79383	6738	57664	-79383
	380C2F1	13372	129922	175852	13372	129922	-175852
	380C2F2	13415	123453	168277	13415	123453	-168277
	380C2F3	13476	115327	158766	13476	115327	-158766
	RTG	0	0	0	3646	32629	-44792

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1934	10727	16835	1934	10727	-16835
	150C1F1	7177	38278	61388	7177	38278	-61388
	150C1F2	7187	37875	61051	7187	37875	-61051
	150C1F3	7197	37390	60666	7197	37390	-60666
	380C2F1	14355	76557	122776	14355	76557	-122776
	380C2F2	14373	75749	122101	14373	75749	-122101
	380C2F3	14395	74779	121333	14395	74779	-121333
	RTG	0	0	0	3887	19864	-32063
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	9390	35799	53028	9390	35799	-53028
	150C1F1	13690	64525	98029	13690	64525	-98029
	150C1F2	13714	63363	97029	13714	63363	-97029
	150C1F3	13742	61960	95872	13742	61960	-95872
	380C2F1	27380	129051	196058	27380	129051	-196058
	380C2F2	27427	126727	194058	27427	126727	-194058
	380C2F3	27485	123920	191745	27485	123920	-191745
	RTG	0	0	0	18910	66335	-102880
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2742	12164	19323	2742	12164	-19323
	150C1F1	8739	39010	62653	8739	39010	-62653
	150C1F2	8745	38668	62422	8745	38668	-62422
	150C1F3	8753	38255	62164	8753	38255	-62164
	380C2F1	17478	78020	125305	17478	78020	-125305
	380C2F2	17491	77336	124844	17491	77336	-124844
	380C2F3	17506	76511	124327	17506	76511	-124327
	RTG	0	0	0	5497	23228	-37888
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1785	25311	32970	1928	8427	-13817
	150C1F1	6630	75616	100374	7113	30545	-50712
	150C1F2	6649	71626	95721	7114	30426	-50666
	150C1F3	6676	66580	89821	7116	30280	-50617
	380C2F1	13261	151233	200749	14225	61091	-101423
	380C2F2	13298	143253	191443	14228	60851	-101332
	380C2F3	13353	133160	179643	14232	60560	-101235
	RTG	0	0	0	3857	16426	-27404
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1921	11322	17440	1963	9212	-15799
	150C1F1	7145	39723	62691	7248	34549	-59401
	150C1F2	7157	39161	62169	7248	34533	-59406
	150C1F3	7173	38486	61567	7248	34513	-59412
	380C2F1	14289	79446	125383	14496	69097	-118803
	380C2F2	14315	78323	124338	14496	69065	-118812
	380C2F3	14345	76973	123134	14496	69025	-118824
	RTG	0	0	0	3916	18164	-31251
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	9349	38020	54683	9489	29684	-50613
	150C1F1	13610	68629	101785	13887	53681	-91751
	150C1F2	13640	67044	100299	13887	53635	-91762
	150C1F3	13678	65122	98555	13888	53578	-91777
	380C2F1	27220	137259	203570	27774	107361	-183503
	380C2F2	27281	134088	200598	27775	107270	-183524
	380C2F3	27356	130244	197110	27775	107155	-183554
	RTG	0	0	0	19008	59189	-101445
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2733	12620	19686	2760	10957	-18822
	150C1F1	8715	40231	63568	8786	35744	-61471
	150C1F2	8725	39757	63197	8786	35728	-61476
	150C1F3	8736	39186	62776	8786	35709	-61483
	380C2F1	17431	80462	127135	17573	71488	-122942
	380C2F2	17449	79514	126394	17573	71456	-122953
	380C2F3	17471	78373	125553	17573	71418	-122967
	RTG	0	0	0	5514	21825	-37593

ZWW4HM400+5

Appendix L1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL3/1a	GW / opgw	0	0	0	2552	11153	-17805
Wind, 10°C	150C1F1	0	0	0	9419	39740	-64571
Permanent loads yg= 1.2	150C1F2	0	0	0	9423	39476	-64429
Wind angle: 0°	150C1F3	0	0	0	9429	39158	-64272
	380C2F1	0	0	0	18838	79480	-129142
	380C2F2	0	0	0	18847	78952	-128857
	380C2F3	0	0	0	18857	78315	-128544
	RTG	0	0	0	5112	21390	-35017
NL3/1b	GW / opgw	0	0	0	2597	11647	-19708
Wind, -20°C	150C1F1	0	0	0	9580	43143	-73416
Permanent loads yg= 1.2	150C1F2	0	0	0	9581	43088	-73417
Wind angle: 0°	150C1F3	0	0	0	9581	43020	-73422
	380C2F1	0	0	0	19160	86286	-146831
	380C2F2	0	0	0	19162	86176	-146834
	380C2F3	0	0	0	19163	86041	-146843
	RTG	0	0	0	5183	22900	-39040
NL3/3	GW / opgw	0	0	0	4264	17601	-28095
Wind, -5°C	150C1F1	0	0	0	10993	46508	-76894
Permanent loads yg= 1.2	150C1F2	0	0	0	10996	46311	-76822
Wind angle: 0°	150C1F3	0	0	0	10999	46071	-76746
	380C2F1	0	0	0	21985	93017	-153789
	380C2F2	0	0	0	21991	92622	-153644
	380C2F3	0	0	0	21999	92141	-153491
	RTG	0	0	0	8550	33841	-55415
NL3/4	GW / opgw	0	0	0	3225	12601	-21361
Construction/maintenance, +5°C	150C1F1	0	0	0	10777	42589	-72456
Permanent loads yg= 1.2	150C1F2	0	0	0	10777	42537	-72461
Wind angle: 0°	150C1F3	0	0	0	10777	42472	-72471
	380C2F1	0	0	0	21553	85178	-144911
	380C2F2	0	0	0	21554	85073	-144923
	380C2F3	0	0	0	21555	84943	-144941
	RTG	0	0	0	6443	24997	-42671
NL3/1a	GW / opgw	0	0	0	2461	17001	-23796
Wind, 10°C	150C1F1	0	0	0	9163	54340	-78215
Permanent loads yg= 1.2	150C1F2	0	0	0	9190	52571	-76325
Wind angle: 45°	150C1F3	0	0	0	9224	50410	-74057
	380C2F1	0	0	0	18326	108679	-156431
	380C2F2	0	0	0	18380	105142	-152649
	380C2F3	0	0	0	18449	100820	-148114
	RTG	0	0	0	4994	28099	-41087
NL3/1b	GW / opgw	0	0	0	2576	12740	-20330
Wind, -20°C	150C1F1	0	0	0	9532	45851	-74527
Permanent loads yg= 1.2	150C1F2	0	0	0	9539	45521	-74316
Wind angle: 45°	150C1F3	0	0	0	9548	45124	-74081
	380C2F1	0	0	0	19065	91702	-149053
	380C2F2	0	0	0	19079	91042	-148632
	380C2F3	0	0	0	19095	90248	-148162
	RTG	0	0	0	5164	24142	-39484
NL3/3	GW / opgw	0	0	0	4124	25850	-35846
Wind, -5°C	150C1F1	0	0	0	10779	57342	-85655
Permanent loads yg= 1.2	150C1F2	0	0	0	10805	56002	-84343
Wind angle: 45°	150C1F3	0	0	0	10836	54379	-82799
	380C2F1	0	0	0	21558	114684	-171311
	380C2F2	0	0	0	21609	112005	-168685
	380C2F3	0	0	0	21673	108759	-165599
	RTG	0	0	0	8372	43299	-63052
NL3/4	GW / opgw	0	0	0	3211	13548	-21728
Construction/maintenance, +5°C	150C1F1	0	0	0	10741	45090	-73206
Permanent loads yg= 1.2	150C1F2	0	0	0	10746	44791	-73048
Wind angle: 45°	150C1F3	0	0	0	10753	44429	-72875
	380C2F1	0	0	0	21483	90180	-146412
	380C2F2	0	0	0	21493	89582	-146097
	380C2F3	0	0	0	21505	88858	-145750
	RTG	0	0	0	6430	26100	-42874
NL3/1a	GW / opgw	0	0	0	2484	15204	-21794
Wind, 10°C	150C1F1	0	0	0	9236	49735	-73361
Permanent loads yg= 1.2	150C1F2	0	0	0	9258	48417	-72020
Wind angle: 90°	150C1F3	0	0	0	9287	46818	-70436
	380C2F1	0	0	0	18471	99471	-146722
	380C2F2	0	0	0	18516	96834	-144041
	380C2F3	0	0	0	18573	93636	-140873
	RTG	0	0	0	5029	25959	-38867

NL3/1b	GW / opgw	0	0	0	2583	12391	-20066
Wind, -20°C	150C1F1	0	0	0	9550	45001	-74013
Permanent loads yg= 1.2	150C1F2	0	0	0	9555	44761	-73888
Wind angle: 90°	150C1F3	0	0	0	9560	44472	-73751
	380C2F1	0	0	0	19100	90001	-148026
	380C2F2	0	0	0	19109	89522	-147776
	380C2F3	0	0	0	19120	88943	-147502
	RTG	0	0	0	5171	23755	-39270
NL3/3	GW / opgw	0	0	0	4159	23320	-33216
Wind, -5°C	150C1F1	0	0	0	10847	53876	-82333
Permanent loads yg= 1.2	150C1F2	0	0	0	10866	52896	-81446
Wind angle: 90°	150C1F3	0	0	0	10891	51714	-80417
	380C2F1	0	0	0	21693	107752	-164666
	380C2F2	0	0	0	21733	105792	-162891
	380C2F3	0	0	0	21781	103428	-160834
	RTG	0	0	0	8426	40301	-60203
NL3/4	GW / opgw	0	0	0	3216	13252	-21556
Construction/maintenance, +5°C	150C1F1	0	0	0	10754	44316	-72826
Permanent loads yg= 1.2	150C1F2	0	0	0	10758	44097	-72736
Wind angle: 90°	150C1F3	0	0	0	10762	43831	-72640
	380C2F1	0	0	0	21509	88633	-145651
	380C2F2	0	0	0	21516	88194	-145472
	380C2F3	0	0	0	21524	87662	-145280
	RTG	0	0	0	6435	25765	-42750
NL3/1a	GW / opgw	0	0	0	2565	10276	-17394
Wind, 10°C	150C1F1	0	0	0	9449	37542	-63884
Permanent loads yg= 1.2	150C1F2	0	0	0	9450	37497	-63889
Wind angle: -45°	150C1F3	0	0	0	9450	37440	-63896
	380C2F1	0	0	0	18898	75085	-127768
	380C2F2	0	0	0	18899	74993	-127777
	380C2F3	0	0	0	18900	74880	-127792
	RTG	0	0	0	5124	20380	-34754
NL3/1b	GW / opgw	0	0	0	2598	11459	-19723
Wind, -20°C	150C1F1	0	0	0	9584	42642	-73508
Permanent loads yg= 1.2	150C1F2	0	0	0	9584	42630	-73512
Wind angle: -45°	150C1F3	0	0	0	9584	42615	-73519
	380C2F1	0	0	0	19168	85285	-147015
	380C2F2	0	0	0	19168	85260	-147025
	380C2F3	0	0	0	19168	85230	-147037
	RTG	0	0	0	5185	22666	-39091
NL3/3	GW / opgw	0	0	0	4284	16321	-27629
Wind, -5°C	150C1F1	0	0	0	11014	44816	-76643
Permanent loads yg= 1.2	150C1F2	0	0	0	11014	44779	-76650
Wind angle: -45°	150C1F3	0	0	0	11014	44732	-76661
	380C2F1	0	0	0	22027	89632	-153285
	380C2F2	0	0	0	22028	89557	-153301
	380C2F3	0	0	0	22028	89465	-153323
	RTG	0	0	0	8568	32350	-55175
NL3/4	GW / opgw	0	0	0	3226	12425	-21395
Construction/maintenance, +5°C	150C1F1	0	0	0	10779	42104	-72575
Permanent loads yg= 1.2	150C1F2	0	0	0	10779	42092	-72580
Wind angle: -45°	150C1F3	0	0	0	10779	42077	-72587
	380C2F1	0	0	0	21558	84208	-145150
	380C2F2	0	0	0	21558	84184	-145160
	380C2F3	0	0	0	21559	84154	-145174
	RTG	0	0	0	6444	24773	-42740
NL3/1a	GW / opgw	0	0	0	1915	9180	-14387
Wind, 10°C	150C1F1	0	0	0	7081	32383	-51830
Permanent loads yg= 0.9	150C1F2	0	0	0	7087	32068	-51599
Wind angle: 0°	150C1F3	0	0	0	7094	31690	-51338
	380C2F1	0	0	0	14162	64767	-103661
	380C2F2	0	0	0	14174	64137	-103198
	380C2F3	0	0	0	14187	63379	-102675
	RTG	0	0	0	3843	17260	-27865
NL3/1b	GW / opgw	0	0	0	1961	9402	-15819
Wind, -20°C	150C1F1	0	0	0	7243	35045	-59390
Permanent loads yg= 0.9	150C1F2	0	0	0	7244	34984	-59381
Wind angle: 0°	150C1F3	0	0	0	7245	34910	-59374
	380C2F1	0	0	0	14486	70090	-118780
	380C2F2	0	0	0	14487	69968	-118762
	380C2F3	0	0	0	14489	69819	-118747
	RTG	0	0	0	3914	18394	-31236
NL3/3	GW / opgw	0	0	0	3634	15856	-25073
Wind, -5°C	150C1F1	0	0	0	8663	39148	-64147
Permanent loads yg= 0.9	150C1F2	0	0	0	8667	38922	-64025
Wind angle: 0°	150C1F3	0	0	0	8672	38649	-63891
	380C2F1	0	0	0	17326	78296	-128293
	380C2F2	0	0	0	17334	77844	-128050
	380C2F3	0	0	0	17344	77298	-127782
	RTG	0	0	0	7295	30218	-49140

NL3/4	GW / opgw	0	0	0	2595	10591	-17879
Construction/maintenance, +5°C	150C1F1	0	0	0	8455	35123	-59524
Permanent loads yg= 0.9	150C1F2	0	0	0	8455	35066	-59523
Wind angle: 0°	150C1F3	0	0	0	8456	34997	-59524
	380C2F1	0	0	0	16909	70245	-119047
	380C2F2	0	0	0	16910	70133	-119045
	380C2F3	0	0	0	16912	69994	-119048
	RTG	0	0	0	5185	20962	-35683
NL3/1a	GW / opgw	0	0	0	1829	15923	-21930
Wind, 10°C	150C1F1	0	0	0	6815	49592	-69994
Permanent loads yg= 0.9	150C1F2	0	0	0	6838	47577	-67677
Wind angle: 45°	150C1F3	0	0	0	6869	45089	-64843
	380C2F1	0	0	0	13629	99184	-139988
	380C2F2	0	0	0	13675	95154	-135355
	380C2F3	0	0	0	13738	90178	-129687
	RTG	0	0	0	3716	25224	-36107
NL3/1b	GW / opgw	0	0	0	1934	10716	-16824
Wind, -20°C	150C1F1	0	0	0	7178	38252	-61365
Permanent loads yg= 0.9	150C1F2	0	0	0	7187	37851	-61031
Wind angle: 45°	150C1F3	0	0	0	7198	37369	-60651
	380C2F1	0	0	0	14356	76503	-122731
	380C2F2	0	0	0	14374	75701	-122063
	380C2F3	0	0	0	14396	74739	-121302
	RTG	0	0	0	3888	19852	-32053
NL3/3	GW / opgw	0	0	0	3493	24835	-34090
Wind, -5°C	150C1F1	0	0	0	8421	51781	-76025
Permanent loads yg= 0.9	150C1F2	0	0	0	8447	50238	-74361
Wind angle: 45°	150C1F3	0	0	0	8481	48358	-72372
	380C2F1	0	0	0	16843	103562	-152051
	380C2F2	0	0	0	16894	100477	-148723
	380C2F3	0	0	0	16961	96716	-144744
	RTG	0	0	0	7104	40646	-58458
NL3/4	GW / opgw	0	0	0	2577	11658	-18456
Construction/maintenance, +5°C	150C1F1	0	0	0	8409	37961	-60860
Permanent loads yg= 0.9	150C1F2	0	0	0	8416	37613	-60617
Wind angle: 45°	150C1F3	0	0	0	8423	37193	-60344
	380C2F1	0	0	0	16818	75923	-121720
	380C2F2	0	0	0	16831	75226	-121234
	380C2F3	0	0	0	16847	74387	-120688
	RTG	0	0	0	5168	22180	-36085
NL3/1a	GW / opgw	0	0	0	1846	13927	-19581
Wind, 10°C	150C1F1	0	0	0	6880	44306	-63960
Permanent loads yg= 0.9	150C1F2	0	0	0	6901	42767	-62237
Wind angle: 90°	150C1F3	0	0	0	6930	40884	-60161
	380C2F1	0	0	0	13759	88613	-127920
	380C2F2	0	0	0	13803	85535	-124474
	380C2F3	0	0	0	13859	81768	-120321
	RTG	0	0	0	3750	22733	-33281
NL3/1b	GW / opgw	0	0	0	1943	10289	-16426
Wind, -20°C	150C1F1	0	0	0	7201	37221	-60539
Permanent loads yg= 0.9	150C1F2	0	0	0	7208	36933	-60329
Wind angle: 90°	150C1F3	0	0	0	7215	36586	-60094
	380C2F1	0	0	0	14402	74442	-121078
	380C2F2	0	0	0	14415	73865	-120659
	380C2F3	0	0	0	14430	73172	-120187
	RTG	0	0	0	3897	19385	-31702
NL3/3	GW / opgw	0	0	0	3525	22131	-31158
Wind, -5°C	150C1F1	0	0	0	8491	47772	-71763
Permanent loads yg= 0.9	150C1F2	0	0	0	8513	46628	-70591
Wind angle: 90°	150C1F3	0	0	0	8540	45243	-69211
	380C2F1	0	0	0	16983	95544	-143525
	380C2F2	0	0	0	17026	93256	-141182
	380C2F3	0	0	0	17080	90486	-138422
	RTG	0	0	0	7158	37363	-55115
NL3/4	GW / opgw	0	0	0	2583	11319	-18208
Construction/maintenance, +5°C	150C1F1	0	0	0	8426	37064	-60264
Permanent loads yg= 0.9	150C1F2	0	0	0	8430	36811	-60117
Wind angle: 90°	150C1F3	0	0	0	8435	36507	-59954
	380C2F1	0	0	0	16851	74127	-120529
	380C2F2	0	0	0	16860	73623	-120235
	380C2F3	0	0	0	16871	73014	-119909
	RTG	0	0	0	5174	21802	-35887

NL3/1a	GW / opgw	0	0	0	1932	8144	-13701
Wind, 10°C	150C1F1	0	0	0	7121	29832	-50530
Permanent loads yg= 0.9	150C1F2	0	0	0	7122	29782	-50528
Wind angle: -45°	150C1F3	0	0	0	7122	29721	-50527
	380C2F1	0	0	0	14243	59665	-101060
	380C2F2	0	0	0	14244	59565	-101055
	380C2F3	0	0	0	14245	59442	-101054
	RTG	0	0	0	3860	16098	-27338
NL3/1b	GW / opgw	0	0	0	1963	9195	-15802
Wind, -20°C	150C1F1	0	0	0	7248	34505	-59414
Permanent loads yg= 0.9	150C1F2	0	0	0	7248	34493	-59418
Wind angle: -45°	150C1F3	0	0	0	7248	34477	-59424
	380C2F1	0	0	0	14496	69011	-118828
	380C2F2	0	0	0	14496	68985	-118836
	380C2F3	0	0	0	14496	68954	-118847
	RTG	0	0	0	3916	18143	-31257
NL3/3	GW / opgw	0	0	0	3657	14462	-24409
Wind, -5°C	150C1F1	0	0	0	8691	37264	-63563
Permanent loads yg= 0.9	150C1F2	0	0	0	8691	37225	-63567
Wind angle: -45°	150C1F3	0	0	0	8691	37176	-63573
	380C2F1	0	0	0	17381	74528	-127125
	380C2F2	0	0	0	17382	74449	-127133
	380C2F3	0	0	0	17382	74352	-127147
	RTG	0	0	0	7317	28620	-48714
NL3/4	GW / opgw	0	0	0	2596	10405	-17897
Construction/maintenance, +5°C	150C1F1	0	0	0	8458	34612	-59598
Permanent loads yg= 0.9	150C1F2	0	0	0	8458	34600	-59603
Wind angle: -45°	150C1F3	0	0	0	8458	34584	-59609
	380C2F1	0	0	0	16916	69224	-119196
	380C2F2	0	0	0	16916	69199	-119206
	380C2F3	0	0	0	16916	69168	-119218
	RTG	0	0	0	5186	20729	-35737

ZWW4HM400+5

Appendix L1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2552	11153	17805	0	0	0
	150C1F1	9419	39740	64571	0	0	0
	150C1F2	9423	39476	64429	0	0	0
	150C1F3	9429	39158	64272	0	0	0
	380C2F1	18838	79480	129142	0	0	0
	380C2F2	18847	78952	128857	0	0	0
	380C2F3	18857	78315	128544	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2597	11647	19708	0	0	0
	150C1F1	9580	43143	73416	0	0	0
	150C1F2	9581	43088	73417	0	0	0
	150C1F3	9581	43020	73422	0	0	0
	380C2F1	19160	86286	146831	0	0	0
	380C2F2	19162	86176	146834	0	0	0
	380C2F3	19163	86041	146843	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4264	17601	28095	0	0	0
	150C1F1	10993	46508	76894	0	0	0
	150C1F2	10996	46311	76822	0	0	0
	150C1F3	10999	46071	76746	0	0	0
	380C2F1	21985	93017	153789	0	0	0
	380C2F2	21991	92622	153644	0	0	0
	380C2F3	21999	92141	153491	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3225	12601	21361	0	0	0
	150C1F1	10777	42589	72456	0	0	0
	150C1F2	10777	42537	72461	0	0	0
	150C1F3	10777	42472	72471	0	0	0
	380C2F1	21553	85178	144911	0	0	0
	380C2F2	21554	85073	144923	0	0	0
	380C2F3	21555	84943	144941	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2565	10276	17394	0	0	0
	150C1F1	9449	37542	63884	0	0	0
	150C1F2	9450	37497	63889	0	0	0
	150C1F3	9450	37440	63896	0	0	0
	380C2F1	18898	75085	127768	0	0	0
	380C2F2	18899	74993	127777	0	0	0
	380C2F3	18900	74880	127792	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2598	11459	19723	0	0	0
	150C1F1	9584	42642	73508	0	0	0
	150C1F2	9584	42630	73512	0	0	0
	150C1F3	9584	42615	73519	0	0	0
	380C2F1	19168	85285	147015	0	0	0
	380C2F2	19168	85260	147025	0	0	0
	380C2F3	19168	85230	147037	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4284	16321	27629	0	0	0
	150C1F1	11014	44816	76643	0	0	0
	150C1F2	11014	44779	76650	0	0	0
	150C1F3	11014	44732	76661	0	0	0
	380C2F1	22027	89632	153285	0	0	0
	380C2F2	22028	89557	153301	0	0	0
	380C2F3	22028	89465	153323	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3226	12425	21395	0	0	0
	150C1F1	10779	42104	72575	0	0	0
	150C1F2	10779	42092	72580	0	0	0
	150C1F3	10779	42077	72587	0	0	0
	380C2F1	21558	84208	145150	0	0	0
	380C2F2	21558	84184	145160	0	0	0
	380C2F3	21559	84154	145174	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2484	15204	21794	0	0	0
	150C1F1	9236	49735	73361	0	0	0
	150C1F2	9258	48417	72020	0	0	0
	150C1F3	9287	46818	70436	0	0	0
	380C2F1	18471	99471	146722	0	0	0
	380C2F2	18516	96834	144041	0	0	0
	380C2F3	18573	93636	140873	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b	GW / opgw	2583	12391	20066	0	0	0
Wind, -20°C	150C1F1	9550	45001	74013	0	0	0
Permanent loads yg= 1.2	150C1F2	9555	44761	73888	0	0	0
Wind angle: 90°	150C1F3	9560	44472	73751	0	0	0
	380C2F1	19100	90001	148026	0	0	0
	380C2F2	19109	89522	147776	0	0	0
	380C2F3	19120	88943	147502	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4159	23320	33216	0	0	0
Wind, -5°C	150C1F1	10847	53876	82333	0	0	0
Permanent loads yg= 1.2	150C1F2	10866	52896	81446	0	0	0
Wind angle: 90°	150C1F3	10891	51714	80417	0	0	0
	380C2F1	21693	107752	164666	0	0	0
	380C2F2	21733	105792	162891	0	0	0
	380C2F3	21781	103428	160834	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3216	13252	21556	0	0	0
Construction/maintenance, +5°C	150C1F1	10754	44316	72826	0	0	0
Permanent loads yg= 1.2	150C1F2	10758	44097	72736	0	0	0
Wind angle: 90°	150C1F3	10762	43831	72640	0	0	0
	380C2F1	21509	88633	145651	0	0	0
	380C2F2	21516	88194	145472	0	0	0
	380C2F3	21524	87662	145280	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2461	17001	23796	0	0	0
Wind, 10°C	150C1F1	9163	54340	78215	0	0	0
Permanent loads yg= 1.2	150C1F2	9190	52571	76325	0	0	0
Wind angle: -45°	150C1F3	9224	50410	74057	0	0	0
	380C2F1	18326	108679	156431	0	0	0
	380C2F2	18380	105142	152649	0	0	0
	380C2F3	18449	100820	148114	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2576	12740	20330	0	0	0
Wind, -20°C	150C1F1	9532	45851	74527	0	0	0
Permanent loads yg= 1.2	150C1F2	9539	45521	74316	0	0	0
Wind angle: -45°	150C1F3	9548	45124	74081	0	0	0
	380C2F1	19065	91702	149053	0	0	0
	380C2F2	19079	91042	148632	0	0	0
	380C2F3	19095	90248	148162	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4124	25850	35846	0	0	0
Wind, -5°C	150C1F1	10779	57342	85655	0	0	0
Permanent loads yg= 1.2	150C1F2	10805	56002	84343	0	0	0
Wind angle: -45°	150C1F3	10836	54379	82799	0	0	0
	380C2F1	21558	114684	171311	0	0	0
	380C2F2	21609	112005	168685	0	0	0
	380C2F3	21673	108759	165599	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3211	13548	21728	0	0	0
Construction/maintenance, +5°C	150C1F1	10741	45090	73206	0	0	0
Permanent loads yg= 1.2	150C1F2	10746	44791	73048	0	0	0
Wind angle: -45°	150C1F3	10753	44429	72875	0	0	0
	380C2F1	21483	90180	146412	0	0	0
	380C2F2	21493	89582	146097	0	0	0
	380C2F3	21505	88858	145750	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1915	9180	14387	0	0	0
Wind, 10°C	150C1F1	7081	32383	51830	0	0	0
Permanent loads yg= 0.9	150C1F2	7087	32068	51599	0	0	0
Wind angle: 0°	150C1F3	7094	31690	51338	0	0	0
	380C2F1	14162	64767	103661	0	0	0
	380C2F2	14174	64137	103198	0	0	0
	380C2F3	14187	63379	102675	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1961	9402	15819	0	0	0
Wind, -20°C	150C1F1	7243	35045	59390	0	0	0
Permanent loads yg= 0.9	150C1F2	7244	34984	59381	0	0	0
Wind angle: 0°	150C1F3	7245	34910	59374	0	0	0
	380C2F1	14486	70090	118780	0	0	0
	380C2F2	14487	69968	118762	0	0	0
	380C2F3	14489	69819	118747	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3634	15856	25073	0	0	0
Wind, -5°C	150C1F1	8663	39148	64147	0	0	0
Permanent loads yg= 0.9	150C1F2	8667	38922	64025	0	0	0
Wind angle: 0°	150C1F3	8672	38649	63891	0	0	0
	380C2F1	17326	78296	128293	0	0	0
	380C2F2	17334	77844	128050	0	0	0
	380C2F3	17344	77298	127782	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2595	10591	17879	0	0	0
Construction/maintenance, +5°C	150C1F1	8455	35123	59524	0	0	0
Permanent loads yg= 0.9	150C1F2	8455	35066	59523	0	0	0
Wind angle: 0°	150C1F3	8456	34997	59524	0	0	0
	380C2F1	16909	70245	119047	0	0	0
	380C2F2	16910	70133	119045	0	0	0
	380C2F3	16912	69994	119048	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1932	8144	13701	0	0	0
Wind, 10°C	150C1F1	7121	29832	50530	0	0	0
Permanent loads yg= 0.9	150C1F2	7122	29782	50528	0	0	0
Wind angle: 45°	150C1F3	7122	29721	50527	0	0	0
	380C2F1	14243	59665	101060	0	0	0
	380C2F2	14244	59565	101055	0	0	0
	380C2F3	14245	59442	101054	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1963	9195	15802	0	0	0
Wind, -20°C	150C1F1	7248	34505	59414	0	0	0
Permanent loads yg= 0.9	150C1F2	7248	34493	59418	0	0	0
Wind angle: 45°	150C1F3	7248	34477	59424	0	0	0
	380C2F1	14496	69011	118828	0	0	0
	380C2F2	14496	68985	118836	0	0	0
	380C2F3	14496	68954	118847	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3657	14462	24409	0	0	0
Wind, -5°C	150C1F1	8691	37264	63563	0	0	0
Permanent loads yg= 0.9	150C1F2	8691	37225	63567	0	0	0
Wind angle: 45°	150C1F3	8691	37176	63573	0	0	0
	380C2F1	17381	74528	127125	0	0	0
	380C2F2	17382	74449	127133	0	0	0
	380C2F3	17382	74352	127147	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2596	10405	17897	0	0	0
Construction/maintenance, +5°C	150C1F1	8458	34612	59598	0	0	0
Permanent loads yg= 0.9	150C1F2	8458	34600	59603	0	0	0
Wind angle: 45°	150C1F3	8458	34584	59609	0	0	0
	380C2F1	16916	69224	119196	0	0	0
	380C2F2	16916	69199	119206	0	0	0
	380C2F3	16916	69168	119218	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1846	13927	19581	0	0	0
Wind, 10°C	150C1F1	6880	44306	63960	0	0	0
Permanent loads yg= 0.9	150C1F2	6901	42767	62237	0	0	0
Wind angle: 90°	150C1F3	6930	40884	60161	0	0	0
	380C2F1	13759	88613	127920	0	0	0
	380C2F2	13803	85535	124474	0	0	0
	380C2F3	13859	81768	120321	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1943	10289	16426	0	0	0
Wind, -20°C	150C1F1	7201	37221	60539	0	0	0
Permanent loads yg= 0.9	150C1F2	7208	36933	60329	0	0	0
Wind angle: 90°	150C1F3	7215	36586	60094	0	0	0
	380C2F1	14402	74442	121078	0	0	0
	380C2F2	14415	73865	120659	0	0	0
	380C2F3	14430	73172	120187	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3525	22131	31158	0	0	0
Wind, -5°C	150C1F1	8491	47772	71763	0	0	0
Permanent loads yg= 0.9	150C1F2	8513	46628	70591	0	0	0
Wind angle: 90°	150C1F3	8540	45243	69211	0	0	0
	380C2F1	16983	95544	143525	0	0	0
	380C2F2	17026	93256	141182	0	0	0
	380C2F3	17080	90486	138422	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2583	11319	18208	0	0	0
Construction/maintenance, +5°C	150C1F1	8426	37064	60264	0	0	0
Permanent loads yg= 0.9	150C1F2	8430	36811	60117	0	0	0
Wind angle: 90°	150C1F3	8435	36507	59954	0	0	0
	380C2F1	16851	74127	120529	0	0	0
	380C2F2	16860	73623	120235	0	0	0
	380C2F3	16871	73014	119909	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	1829	15923	21930	0	0	0
Wind, 10°C	150C1F1	6815	49592	69994	0	0	0
Permanent loads yg= 0.9	150C1F2	6838	47577	67677	0	0	0
Wind angle: -45°	150C1F3	6869	45089	64843	0	0	0
	380C2F1	13629	99184	139988	0	0	0
	380C2F2	13675	95154	135355	0	0	0
	380C2F3	13738	90178	129687	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1934	10716	16824	0	0	0
Wind, -20°C	150C1F1	7178	38252	61365	0	0	0
Permanent loads yg= 0.9	150C1F2	7187	37851	61031	0	0	0
Wind angle: -45°	150C1F3	7198	37369	60651	0	0	0
	380C2F1	14356	76503	122731	0	0	0
	380C2F2	14374	75701	122063	0	0	0
	380C2F3	14396	74739	121302	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3493	24835	34090	0	0	0
Wind, -5°C	150C1F1	8421	51781	76025	0	0	0
Permanent loads yg= 0.9	150C1F2	8447	50238	74361	0	0	0
Wind angle: -45°	150C1F3	8481	48358	72372	0	0	0
	380C2F1	16843	103562	152051	0	0	0
	380C2F2	16894	100477	148723	0	0	0
	380C2F3	16961	96716	144744	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2577	11658	18456	0	0	0
Construction/maintenance, +5°C	150C1F1	8409	37961	60860	0	0	0
Permanent loads yg= 0.9	150C1F2	8416	37613	60617	0	0	0
Wind angle: -45°	150C1F3	8423	37193	60344	0	0	0
	380C2F1	16818	75923	121720	0	0	0
	380C2F2	16831	75226	121234	0	0	0
	380C2F3	16847	74387	120688	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HM400+5

Appendix L1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / opgw	2552	11153	17805	2552	11153	-17805
Wind, 10°C	150C1F1	9419	39740	64571	9419	39740	-64571
Permanent loads yg= 1.2	150C1F2	9423	39476	64429	9423	39476	-64429
Wind angle: 0°	150C1F3	9429	39158	64272	9429	39158	-64272
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2597	11647	19708	2597	11647	-19708
Wind, -20°C	150C1F1	9580	43143	73416	9580	43143	-73416
Permanent loads yg= 1.2	150C1F2	9581	43088	73417	9581	43088	-73417
Wind angle: 0°	150C1F3	9581	43020	73422	9581	43020	-73422
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4264	17601	28095	4264	17601	-28095
Wind, -5°C	150C1F1	10993	46508	76894	10993	46508	-76894
Permanent loads yg= 1.2	150C1F2	10996	46311	76822	10996	46311	-76822
Wind angle: 0°	150C1F3	10999	46071	76746	10999	46071	-76746
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3225	12601	21361	3225	12601	-21361
Construction/maintenance, +5°C	150C1F1	10777	42589	72456	10777	42589	-72456
Permanent loads yg= 1.2	150C1F2	10777	42537	72461	10777	42537	-72461
Wind angle: 0°	150C1F3	10777	42472	72471	10777	42472	-72471
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2565	10276	17394	2461	17001	-23796
Wind, 10°C	150C1F1	9449	37542	63884	9163	54340	-78215
Permanent loads yg= 1.2	150C1F2	9450	37497	63889	9190	52571	-76325
Wind angle: 45°	150C1F3	9450	37440	63896	9224	50410	-74057
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2598	11459	19723	2576	12740	-20330
Wind, -20°C	150C1F1	9584	42642	73508	9532	45851	-74527
Permanent loads yg= 1.2	150C1F2	9584	42630	73512	9539	45521	-74316
Wind angle: 45°	150C1F3	9584	42615	73519	9548	45124	-74081
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4284	16321	27629	4124	25850	-35846
Wind, -5°C	150C1F1	11014	44816	76643	10779	57342	-85655
Permanent loads yg= 1.2	150C1F2	11014	44779	76650	10805	56002	-84343
Wind angle: 45°	150C1F3	11014	44732	76661	10836	54379	-82799
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3226	12425	21395	3211	13548	-21728
Construction/maintenance, +5°C	150C1F1	10779	42104	72575	10741	45090	-73206
Permanent loads yg= 1.2	150C1F2	10779	42092	72580	10746	44791	-73048
Wind angle: 45°	150C1F3	10779	42077	72587	10753	44429	-72875
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2484	15204	21794	2484	15204	-21794
Wind, 10°C	150C1F1	9236	49735	73361	9236	49735	-73361
Permanent loads yg= 1.2	150C1F2	9258	48417	72020	9258	48417	-72020
Wind angle: 90°	150C1F3	9287	46818	70436	9287	46818	-70436
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b	GW / opgw	2583	12391	20066	2583	12391	-20066
Wind, -20°C	150C1F1	9550	45001	74013	9550	45001	-74013
Permanent loads yg= 1.2	150C1F2	9555	44761	73888	9555	44761	-73888
Wind angle: 90°	150C1F3	9560	44472	73751	9560	44472	-73751
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4159	23320	33216	4159	23320	-33216
Wind, -5°C	150C1F1	10847	53876	82333	10847	53876	-82333
Permanent loads yg= 1.2	150C1F2	10866	52896	81446	10866	52896	-81446
Wind angle: 90°	150C1F3	10891	51714	80417	10891	51714	-80417
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3216	13252	21556	3216	13252	-21556
Construction/maintenance, +5°C	150C1F1	10754	44316	72826	10754	44316	-72826
Permanent loads yg= 1.2	150C1F2	10758	44097	72736	10758	44097	-72736
Wind angle: 90°	150C1F3	10762	43831	72640	10762	43831	-72640
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2461	17001	23796	2565	10276	-17394
Wind, 10°C	150C1F1	9163	54340	78215	9449	37542	-63884
Permanent loads yg= 1.2	150C1F2	9190	52571	76325	9450	37497	-63889
Wind angle: -45°	150C1F3	9224	50410	74057	9450	37440	-63896
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2576	12740	20330	2598	11459	-19723
Wind, -20°C	150C1F1	9532	45851	74527	9584	42642	-73508
Permanent loads yg= 1.2	150C1F2	9539	45521	74316	9584	42630	-73512
Wind angle: -45°	150C1F3	9548	45124	74081	9584	42615	-73519
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4124	25850	35846	4284	16321	-27629
Wind, -5°C	150C1F1	10779	57342	85655	11014	44816	-76643
Permanent loads yg= 1.2	150C1F2	10805	56002	84343	11014	44779	-76650
Wind angle: -45°	150C1F3	10836	54379	82799	11014	44732	-76661
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3211	13548	21728	3226	12425	-21395
Construction/maintenance, +5°C	150C1F1	10741	45090	73206	10779	42104	-72575
Permanent loads yg= 1.2	150C1F2	10746	44791	73048	10779	42092	-72580
Wind angle: -45°	150C1F3	10753	44429	72875	10779	42077	-72587
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1915	9180	14387	1915	9180	-14387
Wind, 10°C	150C1F1	7081	32383	51830	7081	32383	-51830
Permanent loads yg= 0.9	150C1F2	7087	32068	51599	7087	32068	-51599
Wind angle: 0°	150C1F3	7094	31690	51338	7094	31690	-51338
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1961	9402	15819	1961	9402	-15819
Wind, -20°C	150C1F1	7243	35045	59390	7243	35045	-59390
Permanent loads yg= 0.9	150C1F2	7244	34984	59381	7244	34984	-59381
Wind angle: 0°	150C1F3	7245	34910	59374	7245	34910	-59374
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3634	15856	25073	3634	15856	-25073
Wind, -5°C	150C1F1	8663	39148	64147	8663	39148	-64147
Permanent loads yg= 0.9	150C1F2	8667	38922	64025	8667	38922	-64025
Wind angle: 0°	150C1F3	8672	38649	63891	8672	38649	-63891
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2595	10591	17879	2595	10591	-17879
Construction/maintenance, +5°C	150C1F1	8455	35123	59524	8455	35123	-59524
Permanent loads yg= 0.9	150C1F2	8455	35066	59523	8455	35066	-59523
Wind angle: 0°	150C1F3	8456	34997	59524	8456	34997	-59524
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1932	8144	13701	1829	15923	-21930
Wind, 10°C	150C1F1	7121	29832	50530	6815	49592	-69994
Permanent loads yg= 0.9	150C1F2	7122	29782	50528	6838	47577	-67677
Wind angle: 45°	150C1F3	7122	29721	50527	6869	45089	-64843
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1963	9195	15802	1934	10716	-16824
Wind, -20°C	150C1F1	7248	34505	59414	7178	38252	-61365
Permanent loads yg= 0.9	150C1F2	7248	34493	59418	7187	37851	-61031
Wind angle: 45°	150C1F3	7248	34477	59424	7198	37369	-60651
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3657	14462	24409	3493	24835	-34090
Wind, -5°C	150C1F1	8691	37264	63563	8421	51781	-76025
Permanent loads yg= 0.9	150C1F2	8691	37225	63567	8447	50238	-74361
Wind angle: 45°	150C1F3	8691	37176	63573	8481	48358	-72372
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2596	10405	17897	2577	11658	-18456
Construction/maintenance, +5°C	150C1F1	8458	34612	59598	8409	37961	-60860
Permanent loads yg= 0.9	150C1F2	8458	34600	59603	8416	37613	-60617
Wind angle: 45°	150C1F3	8458	34584	59609	8423	37193	-60344
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1846	13927	19581	1846	13927	-19581
Wind, 10°C	150C1F1	6880	44306	63960	6880	44306	-63960
Permanent loads yg= 0.9	150C1F2	6901	42767	62237	6901	42767	-62237
Wind angle: 90°	150C1F3	6930	40884	60161	6930	40884	-60161
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1943	10289	16426	1943	10289	-16426
Wind, -20°C	150C1F1	7201	37221	60539	7201	37221	-60539
Permanent loads yg= 0.9	150C1F2	7208	36933	60329	7208	36933	-60329
Wind angle: 90°	150C1F3	7215	36586	60094	7215	36586	-60094
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3525	22131	31158	3525	22131	-31158
Wind, -5°C	150C1F1	8491	47772	71763	8491	47772	-71763
Permanent loads yg= 0.9	150C1F2	8513	46628	70591	8513	46628	-70591
Wind angle: 90°	150C1F3	8540	45243	69211	8540	45243	-69211
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2583	11319	18208	2583	11319	-18208
Construction/maintenance, +5°C	150C1F1	8426	37064	60264	8426	37064	-60264
Permanent loads yg= 0.9	150C1F2	8430	36811	60117	8430	36811	-60117
Wind angle: 90°	150C1F3	8435	36507	59954	8435	36507	-59954
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	1829	15923	21930	1932	8144	-13701
Wind, 10°C	150C1F1	6815	49592	69994	7121	29832	-50530
Permanent loads yg= 0.9	150C1F2	6838	47577	67677	7122	29782	-50528
Wind angle: -45°	150C1F3	6869	45089	64843	7122	29721	-50527
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1934	10716	16824	1963	9195	-15802
Wind, -20°C	150C1F1	7178	38252	61365	7248	34505	-59414
Permanent loads yg= 0.9	150C1F2	7187	37851	61031	7248	34493	-59418
Wind angle: -45°	150C1F3	7198	37369	60651	7248	34477	-59424
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3493	24835	34090	3657	14462	-24409
Wind, -5°C	150C1F1	8421	51781	76025	8691	37264	-63563
Permanent loads yg= 0.9	150C1F2	8447	50238	74361	8691	37225	-63567
Wind angle: -45°	150C1F3	8481	48358	72372	8691	37176	-63573
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2577	11658	18456	2596	10405	-17897
Construction/maintenance, +5°C	150C1F1	8409	37961	60860	8458	34612	-59598
Permanent loads yg= 0.9	150C1F2	8416	37613	60617	8458	34600	-59603
Wind angle: -45°	150C1F3	8423	37193	60344	8458	34584	-59609
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HM400+5

Appendix L1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18838	79480	129142	18838	79480	-129142
	380C2F2	18847	78952	128857	18847	78952	-128857
	380C2F3	18857	78315	128544	18857	78315	-128544
	RTG	0	0	0	5112	21390	-35017
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19160	86286	146831	19160	86286	-146831
	380C2F2	19162	86176	146834	19162	86176	-146834
	380C2F3	19163	86041	146843	19163	86041	-146843
	RTG	0	0	0	5183	22900	-39040
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21985	93017	153789	21985	93017	-153789
	380C2F2	21991	92622	153644	21991	92622	-153644
	380C2F3	21999	92141	153491	21999	92141	-153491
	RTG	0	0	0	8550	33841	-55415
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21553	85178	144911	21553	85178	-144911
	380C2F2	21554	85073	144923	21554	85073	-144923
	380C2F3	21555	84943	144941	21555	84943	-144941
	RTG	0	0	0	6443	24997	-42671
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18898	75085	127768	18326	108679	-156431
	380C2F2	18899	74993	127777	18380	105142	-152649
	380C2F3	18900	74880	127792	18449	100820	-148114
	RTG	0	0	0	4994	28099	-41087
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19168	85285	147015	19065	91702	-149053
	380C2F2	19168	85260	147025	19079	91042	-148632
	380C2F3	19168	85230	147037	19095	90248	-148162
	RTG	0	0	0	5164	24142	-39484
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22027	89632	153285	21558	114684	-171311
	380C2F2	22028	89557	153301	21609	112005	-168685
	380C2F3	22028	89465	153323	21673	108759	-165599
	RTG	0	0	0	8372	43299	-63052
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21558	84208	145150	21483	90180	-146412
	380C2F2	21558	84184	145160	21493	89582	-146097
	380C2F3	21559	84154	145174	21505	88858	-145750
	RTG	0	0	0	6430	26100	-42874
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18471	99471	146722	18471	99471	-146722
	380C2F2	18516	96834	144041	18516	96834	-144041
	380C2F3	18573	93636	140873	18573	93636	-140873
	RTG	0	0	0	5029	25959	-38867

NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19100	90001	148026	19100	90001	-148026	
	380C2F2	19109	89522	147776	19109	89522	-147776	
	380C2F3	19120	88943	147502	19120	88943	-147502	
	RTG	0	0	0	5171	23755	-39270	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	21693	107752	164666	21693	107752	-164666	
	380C2F2	21733	105792	162891	21733	105792	-162891	
	380C2F3	21781	103428	160834	21781	103428	-160834	
	RTG	0	0	0	8426	40301	-60203	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	21509	88633	145651	21509	88633	-145651	
	380C2F2	21516	88194	145472	21516	88194	-145472	
	380C2F3	21524	87662	145280	21524	87662	-145280	
	RTG	0	0	0	6435	25765	-42750	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	18326	108679	156431	18898	75085	-127768	
	380C2F2	18380	105142	152649	18899	74993	-127777	
	380C2F3	18449	100820	148114	18900	74880	-127792	
	RTG	0	0	0	5124	20380	-34754	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19065	91702	149053	19168	85285	-147015	
	380C2F2	19079	91042	148632	19168	85260	-147025	
	380C2F3	19095	90248	148162	19168	85230	-147037	
	RTG	0	0	0	5185	22666	-39091	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	21558	114684	171311	22027	89632	-153285	
	380C2F2	21609	112005	168685	22028	89557	-153301	
	380C2F3	21673	108759	165599	22028	89465	-153323	
	RTG	0	0	0	8568	32350	-55175	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	21483	90180	146412	21558	84208	-145150	
	380C2F2	21493	89582	146097	21558	84184	-145160	
	380C2F3	21505	88858	145750	21559	84154	-145174	
	RTG	0	0	0	6444	24773	-42740	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14162	64767	103661	14162	64767	-103661	
	380C2F2	14174	64137	103198	14174	64137	-103198	
	380C2F3	14187	63379	102675	14187	63379	-102675	
	RTG	0	0	0	3843	17260	-27865	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14486	70090	118780	14486	70090	-118780	
	380C2F2	14487	69968	118762	14487	69968	-118762	
	380C2F3	14489	69819	118747	14489	69819	-118747	
	RTG	0	0	0	3914	18394	-31236	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17326	78296	128293	17326	78296	-128293	
	380C2F2	17334	77844	128050	17334	77844	-128050	
	380C2F3	17344	77298	127782	17344	77298	-127782	
	RTG	0	0	0	7295	30218	-49140	

NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16909	70245	119047	16909	70245	-119047	
	380C2F2	16910	70133	119045	16910	70133	-119045	
	380C2F3	16912	69994	119048	16912	69994	-119048	
	RTG	0	0	0	5185	20962	-35683	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14243	59665	101060	13629	99184	-139988	
	380C2F2	14244	59565	101055	13675	95154	-135355	
	380C2F3	14245	59442	101054	13738	90178	-129687	
	RTG	0	0	0	3716	25224	-36107	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14496	69011	118828	14356	76503	-122731	
	380C2F2	14496	68985	118836	14374	75701	-122063	
	380C2F3	14496	68954	118847	14396	74739	-121302	
	RTG	0	0	0	3888	19852	-32053	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17381	74528	127125	16843	103562	-152051	
	380C2F2	17382	74449	127133	16894	100477	-148723	
	380C2F3	17382	74352	127147	16961	96716	-144744	
	RTG	0	0	0	7104	40646	-58458	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16916	69224	119196	16818	75923	-121720	
	380C2F2	16916	69199	119206	16831	75226	-121234	
	380C2F3	16916	69168	119218	16847	74387	-120688	
	RTG	0	0	0	5168	22180	-36085	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	13759	88613	127920	13759	88613	-127920	
	380C2F2	13803	85535	124474	13803	85535	-124474	
	380C2F3	13859	81768	120321	13859	81768	-120321	
	RTG	0	0	0	3750	22733	-33281	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14402	74442	121078	14402	74442	-121078	
	380C2F2	14415	73865	120659	14415	73865	-120659	
	380C2F3	14430	73172	120187	14430	73172	-120187	
	RTG	0	0	0	3897	19385	-31702	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16983	95544	143525	16983	95544	-143525	
	380C2F2	17026	93256	141182	17026	93256	-141182	
	380C2F3	17080	90486	138422	17080	90486	-138422	
	RTG	0	0	0	7158	37363	-55115	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16851	74127	120529	16851	74127	-120529	
	380C2F2	16860	73623	120235	16860	73623	-120235	
	380C2F3	16871	73014	119909	16871	73014	-119909	
	RTG	0	0	0	5174	21802	-35887	

NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	13629	99184	139988	14243	59665	-101060
	380C2F2	13675	95154	135355	14244	59565	-101055
	380C2F3	13738	90178	129687	14245	59442	-101054
	RTG	0	0	0	3860	16098	-27338
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	14356	76503	122731	14496	69011	-118828
	380C2F2	14374	75701	122063	14496	68985	-118836
	380C2F3	14396	74739	121302	14496	68954	-118847
	RTG	0	0	0	3916	18143	-31257
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	16843	103562	152051	17381	74528	-127125
	380C2F2	16894	100477	148723	17382	74449	-127133
	380C2F3	16961	96716	144744	17382	74352	-127147
	RTG	0	0	0	7317	28620	-48714
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	16818	75923	121720	16916	69224	-119196
	380C2F2	16831	75226	121234	16916	69199	-119206
	380C2F3	16847	74387	120688	16916	69168	-119218
	RTG	0	0	0	5186	20729	-35737

ZWW4HM400+5

Appendix L1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18838	79480	129142	18838	79480	-129142
	380C2F2	18847	78952	128857	18847	78952	-128857
	380C2F3	18857	78315	128544	18857	78315	-128544
	RTG	0	0	0	5112	21390	-35017
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19160	86286	146831	19160	86286	-146831
	380C2F2	19162	86176	146834	19162	86176	-146834
	380C2F3	19163	86041	146843	19163	86041	-146843
	RTG	0	0	0	5183	22900	-39040
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21985	93017	153789	21985	93017	-153789
	380C2F2	21991	92622	153644	21991	92622	-153644
	380C2F3	21999	92141	153491	21999	92141	-153491
	RTG	0	0	0	8550	33841	-55415
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21553	85178	144911	21553	85178	-144911
	380C2F2	21554	85073	144923	21554	85073	-144923
	380C2F3	21555	84943	144941	21555	84943	-144941
	RTG	0	0	0	6443	24997	-42671
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18898	75085	127768	18326	108679	-156431
	380C2F2	18899	74993	127777	18380	105142	-152649
	380C2F3	18900	74880	127792	18449	100820	-148114
	RTG	0	0	0	4994	28099	-41087
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19168	85285	147015	19065	91702	-149053
	380C2F2	19168	85260	147025	19079	91042	-148632
	380C2F3	19168	85230	147037	19095	90248	-148162
	RTG	0	0	0	5164	24142	-39484
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22027	89632	153285	21558	114684	-171311
	380C2F2	22028	89557	153301	21609	112005	-168685
	380C2F3	22028	89465	153323	21673	108759	-165599
	RTG	0	0	0	8372	43299	-63052
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21558	84208	145150	21483	90180	-146412
	380C2F2	21558	84184	145160	21493	89582	-146097
	380C2F3	21559	84154	145174	21505	88858	-145750
	RTG	0	0	0	6430	26100	-42874
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18471	99471	146722	18471	99471	-146722
	380C2F2	18516	96834	144041	18516	96834	-144041
	380C2F3	18573	93636	140873	18573	93636	-140873
	RTG	0	0	0	5029	25959	-38867

NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19100	90001	148026	19100	90001	-148026	
	380C2F2	19109	89522	147776	19109	89522	-147776	
	380C2F3	19120	88943	147502	19120	88943	-147502	
	RTG	0	0	0	5171	23755	-39270	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	21693	107752	164666	21693	107752	-164666	
	380C2F2	21733	105792	162891	21733	105792	-162891	
	380C2F3	21781	103428	160834	21781	103428	-160834	
	RTG	0	0	0	8426	40301	-60203	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	21509	88633	145651	21509	88633	-145651	
	380C2F2	21516	88194	145472	21516	88194	-145472	
	380C2F3	21524	87662	145280	21524	87662	-145280	
	RTG	0	0	0	6435	25765	-42750	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	18326	108679	156431	18898	75085	-127768	
	380C2F2	18380	105142	152649	18899	74993	-127777	
	380C2F3	18449	100820	148114	18900	74880	-127792	
	RTG	0	0	0	5124	20380	-34754	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19065	91702	149053	19168	85285	-147015	
	380C2F2	19079	91042	148632	19168	85260	-147025	
	380C2F3	19095	90248	148162	19168	85230	-147037	
	RTG	0	0	0	5185	22666	-39091	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	21558	114684	171311	22027	89632	-153285	
	380C2F2	21609	112005	168685	22028	89557	-153301	
	380C2F3	21673	108759	165599	22028	89465	-153323	
	RTG	0	0	0	8568	32350	-55175	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	21483	90180	146412	21558	84208	-145150	
	380C2F2	21493	89582	146097	21558	84184	-145160	
	380C2F3	21505	88858	145750	21559	84154	-145174	
	RTG	0	0	0	6444	24773	-42740	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14162	64767	103661	14162	64767	-103661	
	380C2F2	14174	64137	103198	14174	64137	-103198	
	380C2F3	14187	63379	102675	14187	63379	-102675	
	RTG	0	0	0	3843	17260	-27865	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14486	70090	118780	14486	70090	-118780	
	380C2F2	14487	69968	118762	14487	69968	-118762	
	380C2F3	14489	69819	118747	14489	69819	-118747	
	RTG	0	0	0	3914	18394	-31236	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17326	78296	128293	17326	78296	-128293	
	380C2F2	17334	77844	128050	17334	77844	-128050	
	380C2F3	17344	77298	127782	17344	77298	-127782	
	RTG	0	0	0	7295	30218	-49140	

NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16909	70245	119047	16909	70245	-119047	
	380C2F2	16910	70133	119045	16910	70133	-119045	
	380C2F3	16912	69994	119048	16912	69994	-119048	
	RTG	0	0	0	5185	20962	-35683	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14243	59665	101060	13629	99184	-139988	
	380C2F2	14244	59565	101055	13675	95154	-135355	
	380C2F3	14245	59442	101054	13738	90178	-129687	
	RTG	0	0	0	3716	25224	-36107	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14496	69011	118828	14356	76503	-122731	
	380C2F2	14496	68985	118836	14374	75701	-122063	
	380C2F3	14496	68954	118847	14396	74739	-121302	
	RTG	0	0	0	3888	19852	-32053	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17381	74528	127125	16843	103562	-152051	
	380C2F2	17382	74449	127133	16894	100477	-148723	
	380C2F3	17382	74352	127147	16961	96716	-144744	
	RTG	0	0	0	7104	40646	-58458	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16916	69224	119196	16818	75923	-121720	
	380C2F2	16916	69199	119206	16831	75226	-121234	
	380C2F3	16916	69168	119218	16847	74387	-120688	
	RTG	0	0	0	5168	22180	-36085	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	13759	88613	127920	13759	88613	-127920	
	380C2F2	13803	85535	124474	13803	85535	-124474	
	380C2F3	13859	81768	120321	13859	81768	-120321	
	RTG	0	0	0	3750	22733	-33281	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14402	74442	121078	14402	74442	-121078	
	380C2F2	14415	73865	120659	14415	73865	-120659	
	380C2F3	14430	73172	120187	14430	73172	-120187	
	RTG	0	0	0	3897	19385	-31702	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16983	95544	143525	16983	95544	-143525	
	380C2F2	17026	93256	141182	17026	93256	-141182	
	380C2F3	17080	90486	138422	17080	90486	-138422	
	RTG	0	0	0	7158	37363	-55115	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16851	74127	120529	16851	74127	-120529	
	380C2F2	16860	73623	120235	16860	73623	-120235	
	380C2F3	16871	73014	119909	16871	73014	-119909	
	RTG	0	0	0	5174	21802	-35887	

NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	13629	99184	139988	14243	59665	-101060
	380C2F2	13675	95154	135355	14244	59565	-101055
	380C2F3	13738	90178	129687	14245	59442	-101054
	RTG	0	0	0	3860	16098	-27338
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	14356	76503	122731	14496	69011	-118828
	380C2F2	14374	75701	122063	14496	68985	-118836
	380C2F3	14396	74739	121302	14496	68954	-118847
	RTG	0	0	0	3916	18143	-31257
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	16843	103562	152051	17381	74528	-127125
	380C2F2	16894	100477	148723	17382	74449	-127133
	380C2F3	16961	96716	144744	17382	74352	-127147
	RTG	0	0	0	7317	28620	-48714
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	16818	75923	121720	16916	69224	-119196
	380C2F2	16831	75226	121234	16916	69199	-119206
	380C2F3	16847	74387	120688	16916	69168	-119218
	RTG	0	0	0	5186	20729	-35737

ZWW4HM400+5

Appendix L1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL3/1a	GW / opgw	2552	11153	17805	0	0	0
Wind, 10°C	150C1F1	9419	39740	64571	0	0	0
Permanent loads yg= 1.2	150C1F2	9423	39476	64429	0	0	0
Wind angle: 0°	150C1F3	9429	39158	64272	0	0	0
	380C2F1	0	0	0	18838	79480	-129142
	380C2F2	0	0	0	18847	78952	-128857
	380C2F3	0	0	0	18857	78315	-128544
	RTG	0	0	0	5112	21390	-35017
NL3/1b	GW / opgw	2597	11647	19708	0	0	0
Wind, -20°C	150C1F1	9580	43143	73416	0	0	0
Permanent loads yg= 1.2	150C1F2	9581	43088	73417	0	0	0
Wind angle: 0°	150C1F3	9581	43020	73422	0	0	0
	380C2F1	0	0	0	19160	86286	-146831
	380C2F2	0	0	0	19162	86176	-146834
	380C2F3	0	0	0	19163	86041	-146843
	RTG	0	0	0	5183	22900	-39040
NL3/3	GW / opgw	4264	17601	28095	0	0	0
Wind, -5°C	150C1F1	10993	46508	76894	0	0	0
Permanent loads yg= 1.2	150C1F2	10996	46311	76822	0	0	0
Wind angle: 0°	150C1F3	10999	46071	76746	0	0	0
	380C2F1	0	0	0	21985	93017	-153789
	380C2F2	0	0	0	21991	92622	-153644
	380C2F3	0	0	0	21999	92141	-153491
	RTG	0	0	0	8550	33841	-55415
NL3/4	GW / opgw	3225	12601	21361	0	0	0
Construction/maintenance, +5°C	150C1F1	10777	42589	72456	0	0	0
Permanent loads yg= 1.2	150C1F2	10777	42537	72461	0	0	0
Wind angle: 0°	150C1F3	10777	42472	72471	0	0	0
	380C2F1	0	0	0	21553	85178	-144911
	380C2F2	0	0	0	21554	85073	-144923
	380C2F3	0	0	0	21555	84943	-144941
	RTG	0	0	0	6443	24997	-42671
NL3/1a	GW / opgw	2565	10276	17394	0	0	0
Wind, 10°C	150C1F1	9449	37542	63884	0	0	0
Permanent loads yg= 1.2	150C1F2	9450	37497	63889	0	0	0
Wind angle: 45°	150C1F3	9450	37440	63896	0	0	0
	380C2F1	0	0	0	18326	108679	-156431
	380C2F2	0	0	0	18380	105142	-152649
	380C2F3	0	0	0	18449	100820	-148114
	RTG	0	0	0	4994	28099	-41087
NL3/1b	GW / opgw	2598	11459	19723	0	0	0
Wind, -20°C	150C1F1	9584	42642	73508	0	0	0
Permanent loads yg= 1.2	150C1F2	9584	42630	73512	0	0	0
Wind angle: 45°	150C1F3	9584	42615	73519	0	0	0
	380C2F1	0	0	0	19065	91702	-149053
	380C2F2	0	0	0	19079	91042	-148632
	380C2F3	0	0	0	19095	90248	-148162
	RTG	0	0	0	5164	24142	-39484
NL3/3	GW / opgw	4284	16321	27629	0	0	0
Wind, -5°C	150C1F1	11014	44816	76643	0	0	0
Permanent loads yg= 1.2	150C1F2	11014	44779	76650	0	0	0
Wind angle: 45°	150C1F3	11014	44732	76661	0	0	0
	380C2F1	0	0	0	21558	114684	-171311
	380C2F2	0	0	0	21609	112005	-168685
	380C2F3	0	0	0	21673	108759	-165599
	RTG	0	0	0	8372	43299	-63052
NL3/4	GW / opgw	3226	12425	21395	0	0	0
Construction/maintenance, +5°C	150C1F1	10779	42104	72575	0	0	0
Permanent loads yg= 1.2	150C1F2	10779	42092	72580	0	0	0
Wind angle: 45°	150C1F3	10779	42077	72587	0	0	0
	380C2F1	0	0	0	21483	90180	-146412
	380C2F2	0	0	0	21493	89582	-146097
	380C2F3	0	0	0	21505	88858	-145750
	RTG	0	0	0	6430	26100	-42874
NL3/1a	GW / opgw	2484	15204	21794	0	0	0
Wind, 10°C	150C1F1	9236	49735	73361	0	0	0
Permanent loads yg= 1.2	150C1F2	9258	48417	72020	0	0	0
Wind angle: 90°	150C1F3	9287	46818	70436	0	0	0
	380C2F1	0	0	0	18471	99471	-146722
	380C2F2	0	0	0	18516	96834	-144041
	380C2F3	0	0	0	18573	93636	-140873
	RTG	0	0	0	5029	25959	-38867

NL3/1b	GW / opgw	2583	12391	20066	0	0	0
Wind, -20°C	150C1F1	9550	45001	74013	0	0	0
Permanent loads yg= 1.2	150C1F2	9555	44761	73888	0	0	0
Wind angle: 90°	150C1F3	9560	44472	73751	0	0	0
	380C2F1	0	0	0	19100	90001	-148026
	380C2F2	0	0	0	19109	89522	-147776
	380C2F3	0	0	0	19120	88943	-147502
	RTG	0	0	0	5171	23755	-39270
NL3/3	GW / opgw	4159	23320	33216	0	0	0
Wind, -5°C	150C1F1	10847	53876	82333	0	0	0
Permanent loads yg= 1.2	150C1F2	10866	52896	81446	0	0	0
Wind angle: 90°	150C1F3	10891	51714	80417	0	0	0
	380C2F1	0	0	0	21693	107752	-164666
	380C2F2	0	0	0	21733	105792	-162891
	380C2F3	0	0	0	21781	103428	-160834
	RTG	0	0	0	8426	40301	-60203
NL3/4	GW / opgw	3216	13252	21556	0	0	0
Construction/maintenance, +5°C	150C1F1	10754	44316	72826	0	0	0
Permanent loads yg= 1.2	150C1F2	10758	44097	72736	0	0	0
Wind angle: 90°	150C1F3	10762	43831	72640	0	0	0
	380C2F1	0	0	0	21509	88633	-145651
	380C2F2	0	0	0	21516	88194	-145472
	380C2F3	0	0	0	21524	87662	-145280
	RTG	0	0	0	6435	25765	-42750
NL3/1a	GW / opgw	2461	17001	23796	0	0	0
Wind, 10°C	150C1F1	9163	54340	78215	0	0	0
Permanent loads yg= 1.2	150C1F2	9190	52571	76325	0	0	0
Wind angle: -45°	150C1F3	9224	50410	74057	0	0	0
	380C2F1	0	0	0	18898	75085	-127768
	380C2F2	0	0	0	18899	74993	-127777
	380C2F3	0	0	0	18900	74880	-127792
	RTG	0	0	0	5124	20380	-34754
NL3/1b	GW / opgw	2576	12740	20330	0	0	0
Wind, -20°C	150C1F1	9532	45851	74527	0	0	0
Permanent loads yg= 1.2	150C1F2	9539	45621	74316	0	0	0
Wind angle: -45°	150C1F3	9548	45124	74081	0	0	0
	380C2F1	0	0	0	19168	85285	-147015
	380C2F2	0	0	0	19168	85260	-147025
	380C2F3	0	0	0	19168	85230	-147037
	RTG	0	0	0	5185	22666	-39091
NL3/3	GW / opgw	4124	25850	35846	0	0	0
Wind, -5°C	150C1F1	10779	57342	85655	0	0	0
Permanent loads yg= 1.2	150C1F2	10805	56002	84343	0	0	0
Wind angle: -45°	150C1F3	10836	54379	82799	0	0	0
	380C2F1	0	0	0	22027	89632	-153285
	380C2F2	0	0	0	22028	89557	-153301
	380C2F3	0	0	0	22028	89465	-153323
	RTG	0	0	0	8568	32350	-55175
NL3/4	GW / opgw	3211	13548	21728	0	0	0
Construction/maintenance, +5°C	150C1F1	10741	45090	73206	0	0	0
Permanent loads yg= 1.2	150C1F2	10746	44791	73048	0	0	0
Wind angle: -45°	150C1F3	10753	44429	72875	0	0	0
	380C2F1	0	0	0	21558	84208	-145150
	380C2F2	0	0	0	21558	84184	-145160
	380C2F3	0	0	0	21559	84154	-145174
	RTG	0	0	0	6444	24773	-42740
NL3/1a	GW / opgw	1915	9180	14387	0	0	0
Wind, 10°C	150C1F1	7081	32383	51830	0	0	0
Permanent loads yg= 0.9	150C1F2	7087	32068	51599	0	0	0
Wind angle: 0°	150C1F3	7094	31690	51338	0	0	0
	380C2F1	0	0	0	14162	64767	-103661
	380C2F2	0	0	0	14174	64137	-103198
	380C2F3	0	0	0	14187	63379	-102675
	RTG	0	0	0	3843	17260	-27865
NL3/1b	GW / opgw	1961	9402	15819	0	0	0
Wind, -20°C	150C1F1	7243	35045	59390	0	0	0
Permanent loads yg= 0.9	150C1F2	7244	34984	59381	0	0	0
Wind angle: 0°	150C1F3	7245	34910	59374	0	0	0
	380C2F1	0	0	0	14486	70090	-118780
	380C2F2	0	0	0	14487	69968	-118762
	380C2F3	0	0	0	14489	69819	-118747
	RTG	0	0	0	3914	18394	-31236
NL3/3	GW / opgw	3634	15856	25073	0	0	0
Wind, -5°C	150C1F1	8663	39148	64147	0	0	0
Permanent loads yg= 0.9	150C1F2	8667	38922	64025	0	0	0
Wind angle: 0°	150C1F3	8672	38649	63891	0	0	0
	380C2F1	0	0	0	17326	78296	-128293
	380C2F2	0	0	0	17334	77844	-128050
	380C2F3	0	0	0	17344	77298	-127782
	RTG	0	0	0	7295	30218	-49140

NL3/4	GW / opgw	2595	10591	17879	0	0	0
Construction/maintenance, +5°C	150C1F1	8455	35123	59524	0	0	0
Permanent loads yg= 0.9	150C1F2	8455	35066	59523	0	0	0
Wind angle: 0°	150C1F3	8456	34997	59524	0	0	0
	380C2F1	0	0	0	16909	70245	-119047
	380C2F2	0	0	0	16910	70133	-119045
	380C2F3	0	0	0	16912	69994	-119048
	RTG	0	0	0	5185	20962	-35683
NL3/1a	GW / opgw	1932	8144	13701	0	0	0
Wind, 10°C	150C1F1	7121	29832	50530	0	0	0
Permanent loads yg= 0.9	150C1F2	7122	29782	50528	0	0	0
Wind angle: 45°	150C1F3	7122	29721	50527	0	0	0
	380C2F1	0	0	0	13629	99184	-139988
	380C2F2	0	0	0	13675	95154	-135355
	380C2F3	0	0	0	13738	90178	-129687
	RTG	0	0	0	3716	25224	-36107
NL3/1b	GW / opgw	1963	9195	15802	0	0	0
Wind, -20°C	150C1F1	7248	34505	59414	0	0	0
Permanent loads yg= 0.9	150C1F2	7248	34493	59418	0	0	0
Wind angle: 45°	150C1F3	7248	34477	59424	0	0	0
	380C2F1	0	0	0	14356	76503	-122731
	380C2F2	0	0	0	14374	75701	-122063
	380C2F3	0	0	0	14396	74739	-121302
	RTG	0	0	0	3888	19852	-32053
NL3/3	GW / opgw	3657	14462	24409	0	0	0
Wind, -5°C	150C1F1	8691	37264	63563	0	0	0
Permanent loads yg= 0.9	150C1F2	8691	37225	63567	0	0	0
Wind angle: 45°	150C1F3	8691	37176	63573	0	0	0
	380C2F1	0	0	0	16843	103562	-152051
	380C2F2	0	0	0	16894	100477	-148723
	380C2F3	0	0	0	16961	96716	-144744
	RTG	0	0	0	7104	40646	-58458
NL3/4	GW / opgw	2596	10405	17897	0	0	0
Construction/maintenance, +5°C	150C1F1	8458	34612	59598	0	0	0
Permanent loads yg= 0.9	150C1F2	8458	34600	59603	0	0	0
Wind angle: 45°	150C1F3	8458	34584	59609	0	0	0
	380C2F1	0	0	0	16818	75923	-121720
	380C2F2	0	0	0	16831	75226	-121234
	380C2F3	0	0	0	16847	74387	-120688
	RTG	0	0	0	5168	22180	-36085
NL3/1a	GW / opgw	1846	13927	19581	0	0	0
Wind, 10°C	150C1F1	6880	44306	63960	0	0	0
Permanent loads yg= 0.9	150C1F2	6901	42767	62237	0	0	0
Wind angle: 90°	150C1F3	6930	40884	60161	0	0	0
	380C2F1	0	0	0	13759	88613	-127920
	380C2F2	0	0	0	13803	85535	-124474
	380C2F3	0	0	0	13859	81768	-120321
	RTG	0	0	0	3750	22733	-33281
NL3/1b	GW / opgw	1943	10289	16426	0	0	0
Wind, -20°C	150C1F1	7201	37221	60539	0	0	0
Permanent loads yg= 0.9	150C1F2	7208	36933	60329	0	0	0
Wind angle: 90°	150C1F3	7215	36586	60094	0	0	0
	380C2F1	0	0	0	14402	74442	-121078
	380C2F2	0	0	0	14415	73865	-120659
	380C2F3	0	0	0	14430	73172	-120187
	RTG	0	0	0	3897	19385	-31702
NL3/3	GW / opgw	3525	22131	31158	0	0	0
Wind, -5°C	150C1F1	8491	47772	71763	0	0	0
Permanent loads yg= 0.9	150C1F2	8513	46628	70591	0	0	0
Wind angle: 90°	150C1F3	8540	45243	69211	0	0	0
	380C2F1	0	0	0	16983	95544	-143525
	380C2F2	0	0	0	17026	93256	-141182
	380C2F3	0	0	0	17080	90486	-138422
	RTG	0	0	0	7158	37363	-55115
NL3/4	GW / opgw	2583	11319	18208	0	0	0
Construction/maintenance, +5°C	150C1F1	8426	37064	60264	0	0	0
Permanent loads yg= 0.9	150C1F2	8430	36811	60117	0	0	0
Wind angle: 90°	150C1F3	8435	36507	59954	0	0	0
	380C2F1	0	0	0	16851	74127	-120529
	380C2F2	0	0	0	16860	73623	-120235
	380C2F3	0	0	0	16871	73014	-119909
	RTG	0	0	0	5174	21802	-35887

NL3/1a	GW / opgw	1829	15923	21930	0	0	0
Wind, 10°C	150C1F1	6815	49592	69994	0	0	0
Permanent loads yg= 0.9	150C1F2	6838	47577	67677	0	0	0
Wind angle: -45°	150C1F3	6869	45089	64843	0	0	0
	380C2F1	0	0	0	14243	59665	-101060
	380C2F2	0	0	0	14244	59565	-101055
	380C2F3	0	0	0	14245	59442	-101054
	RTG	0	0	0	3860	16098	-27338
NL3/1b	GW / opgw	1934	10716	16824	0	0	0
Wind, -20°C	150C1F1	7178	38252	61365	0	0	0
Permanent loads yg= 0.9	150C1F2	7187	37851	61031	0	0	0
Wind angle: -45°	150C1F3	7198	37369	60651	0	0	0
	380C2F1	0	0	0	14496	69011	-118828
	380C2F2	0	0	0	14496	68985	-118836
	380C2F3	0	0	0	14496	68954	-118847
	RTG	0	0	0	3916	18143	-31257
NL3/3	GW / opgw	3493	24835	34090	0	0	0
Wind, -5°C	150C1F1	8421	51781	76025	0	0	0
Permanent loads yg= 0.9	150C1F2	8447	50238	74361	0	0	0
Wind angle: -45°	150C1F3	8481	48358	72372	0	0	0
	380C2F1	0	0	0	17381	74528	-127125
	380C2F2	0	0	0	17382	74449	-127133
	380C2F3	0	0	0	17382	74352	-127147
	RTG	0	0	0	7317	28620	-48714
NL3/4	GW / opgw	2577	11658	18456	0	0	0
Construction/maintenance, +5°C	150C1F1	8409	37961	60860	0	0	0
Permanent loads yg= 0.9	150C1F2	8416	37613	60617	0	0	0
Wind angle: -45°	150C1F3	8423	37193	60344	0	0	0
	380C2F1	0	0	0	16916	69224	-119196
	380C2F2	0	0	0	16916	69199	-119206
	380C2F3	0	0	0	16916	69168	-119218
	RTG	0	0	0	5186	20729	-35737

ZWW4HM400+5

Appendix L1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
Att. Point							
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2552	11153	-17805
	150C1F1	0	0	0	9419	39740	-64571
	150C1F2	0	0	0	9423	39476	-64429
	150C1F3	0	0	0	9429	39158	-64272
	380C2F1	18838	79480	129142	18838	79480	-129142
	380C2F2	18847	78952	128857	18847	78952	-128857
	380C2F3	18857	78315	128544	18857	78315	-128544
	RTG	5112	21390	35017	5112	21390	-35017
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2597	11647	-19708
	150C1F1	0	0	0	9580	43143	-73416
	150C1F2	0	0	0	9581	43088	-73417
	150C1F3	0	0	0	9581	43020	-73422
	380C2F1	19160	86286	146831	19160	86286	-146831
	380C2F2	19162	86176	146834	19162	86176	-146834
	380C2F3	19163	86041	146843	19163	86041	-146843
	RTG	5183	22900	39040	5183	22900	-39040
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4264	17601	-28095
	150C1F1	0	0	0	10993	46508	-76894
	150C1F2	0	0	0	10996	46311	-76822
	150C1F3	0	0	0	10999	46071	-76746
	380C2F1	21985	93017	153789	21985	93017	-153789
	380C2F2	21991	92622	153644	21991	92622	-153644
	380C2F3	21999	92141	153491	21999	92141	-153491
	RTG	8550	33841	55415	8550	33841	-55415
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3225	12601	-21361
	150C1F1	0	0	0	10777	42589	-72456
	150C1F2	0	0	0	10777	42537	-72461
	150C1F3	0	0	0	10777	42472	-72471
	380C2F1	21553	85178	144911	21553	85178	-144911
	380C2F2	21554	85073	144923	21554	85073	-144923
	380C2F3	21555	84943	144941	21555	84943	-144941
	RTG	6443	24997	42671	6443	24997	-42671
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2461	17001	-23796
	150C1F1	0	0	0	9163	54340	-78215
	150C1F2	0	0	0	9190	52571	-76325
	150C1F3	0	0	0	9224	50410	-74057
	380C2F1	18898	75085	127768	18326	108679	-156431
	380C2F2	18899	74993	127777	18380	105142	-152649
	380C2F3	18900	74880	127792	18449	100820	-148114
	RTG	5124	20380	34754	4994	28099	-41087
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2576	12740	-20330
	150C1F1	0	0	0	9532	45851	-74527
	150C1F2	0	0	0	9539	45521	-74316
	150C1F3	0	0	0	9548	45124	-74081
	380C2F1	19168	85285	147015	19065	91702	-149053
	380C2F2	19168	85260	147025	19079	91042	-148632
	380C2F3	19168	85230	147037	19095	90248	-148162
	RTG	5185	22666	39091	5164	24142	-39484
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4124	25850	-35846
	150C1F1	0	0	0	10779	57342	-85655
	150C1F2	0	0	0	10805	56002	-84343
	150C1F3	0	0	0	10836	54379	-82799
	380C2F1	22027	89632	153285	21558	114684	-171311
	380C2F2	22028	89557	153301	21609	112005	-168685
	380C2F3	22028	89465	153323	21673	108759	-165599
	RTG	8568	32350	55175	8372	43299	-63052
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3211	13548	-21728
	150C1F1	0	0	0	10741	45090	-73206
	150C1F2	0	0	0	10746	44791	-73048
	150C1F3	0	0	0	10753	44429	-72875
	380C2F1	21558	84208	145150	21483	90180	-146412
	380C2F2	21558	84184	145160	21493	89582	-146097
	380C2F3	21559	84154	145174	21505	88858	-145750
	RTG	6444	24773	42740	6430	26100	-42874
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2484	15204	-21794
	150C1F1	0	0	0	9236	49735	-73361
	150C1F2	0	0	0	9258	48417	-72020
	150C1F3	0	0	0	9287	46818	-70436
	380C2F1	18471	99471	146722	18471	99471	-146722
	380C2F2	18516	96834	144041	18516	96834	-144041
	380C2F3	18573	93636	140873	18573	93636	-140873
	RTG	5029	25959	38867	5029	25959	-38867

NL3/1b	GW / opgw	0	0	0	2583	12391	-20066
Wind, -20°C	150C1F1	0	0	0	9550	45001	-74013
Permanent loads yg= 1.2	150C1F2	0	0	0	9555	44761	-73888
Wind angle: 90°	150C1F3	0	0	0	9560	44472	-73751
	380C2F1	19100	90001	148026	19100	90001	-148026
	380C2F2	19109	89522	147776	19109	89522	-147776
	380C2F3	19120	88943	147502	19120	88943	-147502
	RTG	5171	23755	39270	5171	23755	-39270
NL3/3	GW / opgw	0	0	0	4159	23320	-33216
Wind, -5°C	150C1F1	0	0	0	10847	53876	-82333
Permanent loads yg= 1.2	150C1F2	0	0	0	10866	52896	-81446
Wind angle: 90°	150C1F3	0	0	0	10891	51714	-80417
	380C2F1	21693	107752	164666	21693	107752	-164666
	380C2F2	21733	105792	162891	21733	105792	-162891
	380C2F3	21781	103428	160834	21781	103428	-160834
	RTG	8426	40301	60203	8426	40301	-60203
NL3/4	GW / opgw	0	0	0	3216	13252	-21556
Construction/maintenance, +5°C	150C1F1	0	0	0	10754	44316	-72826
Permanent loads yg= 1.2	150C1F2	0	0	0	10758	44097	-72736
Wind angle: 90°	150C1F3	0	0	0	10762	43831	-72640
	380C2F1	21509	88633	145651	21509	88633	-145651
	380C2F2	21516	88194	145472	21516	88194	-145472
	380C2F3	21524	87662	145280	21524	87662	-145280
	RTG	6435	25765	42750	6435	25765	-42750
NL3/1a	GW / opgw	0	0	0	2565	10276	-17394
Wind, 10°C	150C1F1	0	0	0	9449	37542	-63884
Permanent loads yg= 1.2	150C1F2	0	0	0	9450	37497	-63889
Wind angle: -45°	150C1F3	0	0	0	9450	37440	-63896
	380C2F1	18326	108679	156431	18898	75085	-127768
	380C2F2	18380	105142	152649	18899	74993	-127777
	380C2F3	18449	100820	148114	18900	74880	-127792
	RTG	4994	28099	41087	5124	20380	-34754
NL3/1b	GW / opgw	0	0	0	2598	11459	-19723
Wind, -20°C	150C1F1	0	0	0	9584	42642	-73508
Permanent loads yg= 1.2	150C1F2	0	0	0	9584	42630	-73512
Wind angle: -45°	150C1F3	0	0	0	9584	42615	-73519
	380C2F1	19065	91702	149053	19168	85285	-147015
	380C2F2	19079	91042	148632	19168	85260	-147025
	380C2F3	19095	90248	148162	19168	85230	-147037
	RTG	5164	24142	39484	5185	22666	-39091
NL3/3	GW / opgw	0	0	0	4284	16321	-27629
Wind, -5°C	150C1F1	0	0	0	11014	44816	-76643
Permanent loads yg= 1.2	150C1F2	0	0	0	11014	44779	-76650
Wind angle: -45°	150C1F3	0	0	0	11014	44732	-76661
	380C2F1	21558	114684	171311	22027	89632	-153285
	380C2F2	21609	112005	168685	22028	89557	-153301
	380C2F3	21673	108759	165599	22028	89465	-153323
	RTG	8372	43299	63052	8568	32350	-55175
NL3/4	GW / opgw	0	0	0	3226	12425	-21395
Construction/maintenance, +5°C	150C1F1	0	0	0	10779	42104	-72575
Permanent loads yg= 1.2	150C1F2	0	0	0	10779	42092	-72580
Wind angle: -45°	150C1F3	0	0	0	10779	42077	-72587
	380C2F1	21483	90180	146412	21558	84208	-145150
	380C2F2	21493	89582	146097	21558	84184	-145160
	380C2F3	21505	88858	145750	21559	84154	-145174
	RTG	6430	26100	42874	6444	24773	-42740
NL3/1a	GW / opgw	0	0	0	1915	9180	-14387
Wind, 10°C	150C1F1	0	0	0	7081	32383	-51830
Permanent loads yg= 0.9	150C1F2	0	0	0	7087	32068	-51599
Wind angle: 0°	150C1F3	0	0	0	7094	31690	-51338
	380C2F1	14162	64767	103661	14162	64767	-103661
	380C2F2	14174	64137	103198	14174	64137	-103198
	380C2F3	14187	63379	102675	14187	63379	-102675
	RTG	3843	17260	27865	3843	17260	-27865
NL3/1b	GW / opgw	0	0	0	1961	9402	-15819
Wind, -20°C	150C1F1	0	0	0	7243	35045	-59390
Permanent loads yg= 0.9	150C1F2	0	0	0	7244	34984	-59381
Wind angle: 0°	150C1F3	0	0	0	7245	34910	-59374
	380C2F1	14486	70090	118780	14486	70090	-118780
	380C2F2	14487	69968	118762	14487	69968	-118762
	380C2F3	14489	69819	118747	14489	69819	-118747
	RTG	3914	18394	31236	3914	18394	-31236
NL3/3	GW / opgw	0	0	0	3634	15856	-25073
Wind, -5°C	150C1F1	0	0	0	8663	39148	-64147
Permanent loads yg= 0.9	150C1F2	0	0	0	8667	38922	-64025
Wind angle: 0°	150C1F3	0	0	0	8672	38649	-63891
	380C2F1	17326	78296	128293	17326	78296	-128293
	380C2F2	17334	77844	128050	17334	77844	-128050
	380C2F3	17344	77298	127782	17344	77298	-127782
	RTG	7295	30218	49140	7295	30218	-49140

NL3/4	GW / opgw	0	0	0	2595	10591	-17879
Construction/maintenance, +5°C	150C1F1	0	0	0	8455	35123	-59524
Permanent loads yg= 0.9	150C1F2	0	0	0	8455	35066	-59523
Wind angle: 0°	150C1F3	0	0	0	8456	34997	-59524
	380C2F1	16909	70245	119047	16909	70245	-119047
	380C2F2	16910	70133	119045	16910	70133	-119045
	380C2F3	16912	69994	119048	16912	69994	-119048
	RTG	5185	20962	35683	5185	20962	-35683
NL3/1a	GW / opgw	0	0	0	1829	15923	-21930
Wind, 10°C	150C1F1	0	0	0	6815	49592	-69994
Permanent loads yg= 0.9	150C1F2	0	0	0	6838	47577	-67677
Wind angle: 45°	150C1F3	0	0	0	6869	45089	-64843
	380C2F1	14243	59665	101060	13629	99184	-139988
	380C2F2	14244	59565	101055	13675	95154	-135355
	380C2F3	14245	59442	101054	13738	90178	-129687
	RTG	3860	16098	27338	3716	25224	-36107
NL3/1b	GW / opgw	0	0	0	1934	10716	-16824
Wind, -20°C	150C1F1	0	0	0	7178	38252	-61365
Permanent loads yg= 0.9	150C1F2	0	0	0	7187	37851	-61031
Wind angle: 45°	150C1F3	0	0	0	7198	37369	-60651
	380C2F1	14496	69011	118828	14356	76503	-122731
	380C2F2	14496	68985	118836	14374	75701	-122063
	380C2F3	14496	68954	118847	14396	74739	-121302
	RTG	3916	18143	31257	3888	19852	-32053
NL3/3	GW / opgw	0	0	0	3493	24835	-34090
Wind, -5°C	150C1F1	0	0	0	8421	51781	-76025
Permanent loads yg= 0.9	150C1F2	0	0	0	8447	50238	-74361
Wind angle: 45°	150C1F3	0	0	0	8481	48358	-72372
	380C2F1	17381	74528	127125	16843	103562	-152051
	380C2F2	17382	74449	127133	16894	100477	-148723
	380C2F3	17382	74352	127147	16961	96716	-144744
	RTG	7317	28620	48714	7104	40646	-58458
NL3/4	GW / opgw	0	0	0	2577	11658	-18456
Construction/maintenance, +5°C	150C1F1	0	0	0	8409	37961	-60860
Permanent loads yg= 0.9	150C1F2	0	0	0	8416	37613	-60617
Wind angle: 45°	150C1F3	0	0	0	8423	37193	-60344
	380C2F1	16916	69224	119196	16818	75923	-121720
	380C2F2	16916	69199	119206	16831	75226	-121234
	380C2F3	16916	69168	119218	16847	74387	-120688
	RTG	5186	20729	35737	5168	22180	-36085
NL3/1a	GW / opgw	0	0	0	1846	13927	-19581
Wind, 10°C	150C1F1	0	0	0	6880	44306	-63960
Permanent loads yg= 0.9	150C1F2	0	0	0	6901	42767	-62237
Wind angle: 90°	150C1F3	0	0	0	6930	40884	-60161
	380C2F1	13759	88613	127920	13759	88613	-127920
	380C2F2	13803	85535	124474	13803	85535	-124474
	380C2F3	13859	81768	120321	13859	81768	-120321
	RTG	3750	22733	33281	3750	22733	-33281
NL3/1b	GW / opgw	0	0	0	1943	10289	-16426
Wind, -20°C	150C1F1	0	0	0	7201	37221	-60539
Permanent loads yg= 0.9	150C1F2	0	0	0	7208	36933	-60329
Wind angle: 90°	150C1F3	0	0	0	7215	36586	-60094
	380C2F1	14402	74442	121078	14402	74442	-121078
	380C2F2	14415	73865	120659	14415	73865	-120659
	380C2F3	14430	73172	120187	14430	73172	-120187
	RTG	3897	19385	31702	3897	19385	-31702
NL3/3	GW / opgw	0	0	0	3525	22131	-31158
Wind, -5°C	150C1F1	0	0	0	8491	47772	-71763
Permanent loads yg= 0.9	150C1F2	0	0	0	8513	46628	-70591
Wind angle: 90°	150C1F3	0	0	0	8540	45243	-69211
	380C2F1	16983	95544	143525	16983	95544	-143525
	380C2F2	17026	93256	141182	17026	93256	-141182
	380C2F3	17080	90486	138422	17080	90486	-138422
	RTG	7158	37363	55115	7158	37363	-55115
NL3/4	GW / opgw	0	0	0	2583	11319	-18208
Construction/maintenance, +5°C	150C1F1	0	0	0	8426	37064	-60264
Permanent loads yg= 0.9	150C1F2	0	0	0	8430	36811	-60117
Wind angle: 90°	150C1F3	0	0	0	8435	36507	-59954
	380C2F1	16851	74127	120529	16851	74127	-120529
	380C2F2	16860	73623	120235	16860	73623	-120235
	380C2F3	16871	73014	119909	16871	73014	-119909
	RTG	5174	21802	35887	5174	21802	-35887

NL3/1a	GW / opgw	0	0	0	1932	8144	-13701
Wind, 10°C	150C1F1	0	0	0	7121	29832	-50530
Permanent loads yg= 0.9	150C1F2	0	0	0	7122	29782	-50528
Wind angle: -45°	150C1F3	0	0	0	7122	29721	-50527
	380C2F1	13629	99184	139988	14243	59665	-101060
	380C2F2	13675	95154	135355	14244	59565	-101055
	380C2F3	13738	90178	129687	14245	59442	-101054
	RTG	3716	25224	36107	3860	16098	-27338
NL3/1b	GW / opgw	0	0	0	1963	9195	-15802
Wind, -20°C	150C1F1	0	0	0	7248	34505	-59414
Permanent loads yg= 0.9	150C1F2	0	0	0	7248	34493	-59418
Wind angle: -45°	150C1F3	0	0	0	7248	34477	-59424
	380C2F1	14356	76503	122731	14496	69011	-118828
	380C2F2	14374	75701	122063	14496	68985	-118836
	380C2F3	14396	74739	121302	14496	68954	-118847
	RTG	3888	19852	32053	3916	18143	-31257
NL3/3	GW / opgw	0	0	0	3657	14462	-24409
Wind, -5°C	150C1F1	0	0	0	8691	37264	-63563
Permanent loads yg= 0.9	150C1F2	0	0	0	8691	37225	-63567
Wind angle: -45°	150C1F3	0	0	0	8691	37176	-63573
	380C2F1	16843	103562	152051	17381	74528	-127125
	380C2F2	16894	100477	148723	17382	74449	-127133
	380C2F3	16961	96716	144744	17382	74352	-127147
	RTG	7104	40646	58458	7317	28620	-48714
NL3/4	GW / opgw	0	0	0	2596	10405	-17897
Construction/maintenance, +5°C	150C1F1	0	0	0	8458	34612	-59598
Permanent loads yg= 0.9	150C1F2	0	0	0	8458	34600	-59603
Wind angle: -45°	150C1F3	0	0	0	8458	34584	-59609
	380C2F1	16818	75923	121720	16916	69224	-119196
	380C2F2	16831	75226	121234	16916	69199	-119206
	380C2F3	16847	74387	120688	16916	69168	-119218
	RTG	5168	22180	36085	5186	20729	-35737

ZWW4HM400+5

Appendix L1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / opgw	2552	11153	17805	2552	11153	-17805
Wind, 10°C	150C1F1	9419	39740	64571	9419	39740	-64571
Permanent loads yg= 1.2	150C1F2	9423	39476	64429	9423	39476	-64429
Wind angle: 0°	150C1F3	9429	39158	64272	9429	39158	-64272
	380C2F1	0	0	0	18838	79480	-129142
	380C2F2	0	0	0	18847	78952	-128857
	380C2F3	0	0	0	18857	78315	-128544
	RTG	0	0	0	5112	21390	-35017
NL3/1b	GW / opgw	2597	11647	19708	2597	11647	-19708
Wind, -20°C	150C1F1	9580	43143	73416	9580	43143	-73416
Permanent loads yg= 1.2	150C1F2	9581	43088	73417	9581	43088	-73417
Wind angle: 0°	150C1F3	9581	43020	73422	9581	43020	-73422
	380C2F1	0	0	0	19160	86286	-146831
	380C2F2	0	0	0	19162	86176	-146834
	380C2F3	0	0	0	19163	86041	-146843
	RTG	0	0	0	5183	22900	-39040
NL3/3	GW / opgw	4264	17601	28095	4264	17601	-28095
Wind, -5°C	150C1F1	10993	46508	76894	10993	46508	-76894
Permanent loads yg= 1.2	150C1F2	10996	46311	76822	10996	46311	-76822
Wind angle: 0°	150C1F3	10999	46071	76746	10999	46071	-76746
	380C2F1	0	0	0	21985	93017	-153789
	380C2F2	0	0	0	21991	92622	-153644
	380C2F3	0	0	0	21999	92141	-153491
	RTG	0	0	0	8550	33841	-55415
NL3/4	GW / opgw	3225	12601	21361	3225	12601	-21361
Construction/maintenance, +5°C	150C1F1	10777	42589	72456	10777	42589	-72456
Permanent loads yg= 1.2	150C1F2	10777	42537	72461	10777	42537	-72461
Wind angle: 0°	150C1F3	10777	42472	72471	10777	42472	-72471
	380C2F1	0	0	0	21553	85178	-144911
	380C2F2	0	0	0	21554	85073	-144923
	380C2F3	0	0	0	21555	84943	-144941
	RTG	0	0	0	6443	24997	-42671
NL3/1a	GW / opgw	2565	10276	17394	2461	17001	-23796
Wind, 10°C	150C1F1	9449	37542	63884	9163	54340	-78215
Permanent loads yg= 1.2	150C1F2	9450	37497	63889	9190	52571	-76325
Wind angle: 45°	150C1F3	9450	37440	63896	9224	50410	-74057
	380C2F1	0	0	0	18326	108679	-156431
	380C2F2	0	0	0	18380	105142	-152649
	380C2F3	0	0	0	18449	100820	-148114
	RTG	0	0	0	4994	28099	-41087
NL3/1b	GW / opgw	2598	11459	19723	2576	12740	-20330
Wind, -20°C	150C1F1	9584	42642	73508	9532	45851	-74527
Permanent loads yg= 1.2	150C1F2	9584	42630	73512	9539	45521	-74316
Wind angle: 45°	150C1F3	9584	42615	73519	9548	45124	-74081
	380C2F1	0	0	0	19065	91702	-149053
	380C2F2	0	0	0	19079	91042	-148632
	380C2F3	0	0	0	19095	90248	-148162
	RTG	0	0	0	5164	24142	-39484
NL3/3	GW / opgw	4284	16321	27629	4124	25850	-35846
Wind, -5°C	150C1F1	11014	44816	76643	10779	57342	-85655
Permanent loads yg= 1.2	150C1F2	11014	44779	76650	10805	56002	-84343
Wind angle: 45°	150C1F3	11014	44732	76661	10836	54379	-82799
	380C2F1	0	0	0	21558	114684	-171311
	380C2F2	0	0	0	21609	112005	-168685
	380C2F3	0	0	0	21673	108759	-165599
	RTG	0	0	0	8372	43299	-63052
NL3/4	GW / opgw	3226	12425	21395	3211	13548	-21728
Construction/maintenance, +5°C	150C1F1	10779	42104	72575	10741	45090	-73206
Permanent loads yg= 1.2	150C1F2	10779	42092	72580	10746	44791	-73048
Wind angle: 45°	150C1F3	10779	42077	72587	10753	44429	-72875
	380C2F1	0	0	0	21483	90180	-146412
	380C2F2	0	0	0	21493	89582	-146097
	380C2F3	0	0	0	21505	88858	-145750
	RTG	0	0	0	6430	26100	-42874
NL3/1a	GW / opgw	2484	15204	21794	2484	15204	-21794
Wind, 10°C	150C1F1	9236	49735	73361	9236	49735	-73361
Permanent loads yg= 1.2	150C1F2	9258	48417	72020	9258	48417	-72020
Wind angle: 90°	150C1F3	9287	46818	70436	9287	46818	-70436
	380C2F1	0	0	0	18471	99471	-146722
	380C2F2	0	0	0	18516	96834	-144041
	380C2F3	0	0	0	18573	93636	-140873
	RTG	0	0	0	5029	25959	-38867

NL3/1b	GW / opgw	2583	12391	20066	2583	12391	-20066
Wind, -20°C	150C1F1	9550	45001	74013	9550	45001	-74013
Permanent loads yg= 1.2	150C1F2	9555	44761	73888	9555	44761	-73888
Wind angle: 90°	150C1F3	9560	44472	73751	9560	44472	-73751
	380C2F1	0	0	0	19100	90001	-148026
	380C2F2	0	0	0	19109	89522	-147776
	380C2F3	0	0	0	19120	88943	-147502
	RTG	0	0	0	5171	23755	-39270
NL3/3	GW / opgw	4159	23320	33216	4159	23320	-33216
Wind, -5°C	150C1F1	10847	53876	82333	10847	53876	-82333
Permanent loads yg= 1.2	150C1F2	10866	52896	81446	10866	52896	-81446
Wind angle: 90°	150C1F3	10891	51714	80417	10891	51714	-80417
	380C2F1	0	0	0	21693	107752	-164666
	380C2F2	0	0	0	21733	105792	-162891
	380C2F3	0	0	0	21781	103428	-160834
	RTG	0	0	0	8426	40301	-60203
NL3/4	GW / opgw	3216	13252	21556	3216	13252	-21556
Construction/maintenance, +5°C	150C1F1	10754	44316	72826	10754	44316	-72826
Permanent loads yg= 1.2	150C1F2	10758	44097	72736	10758	44097	-72736
Wind angle: 90°	150C1F3	10762	43831	72640	10762	43831	-72640
	380C2F1	0	0	0	21509	88633	-145651
	380C2F2	0	0	0	21516	88194	-145472
	380C2F3	0	0	0	21524	87662	-145280
	RTG	0	0	0	6435	25765	-42750
NL3/1a	GW / opgw	2461	17001	23796	2565	10276	-17394
Wind, 10°C	150C1F1	9163	54340	78215	9449	37542	-63884
Permanent loads yg= 1.2	150C1F2	9190	52571	76325	9450	37497	-63889
Wind angle: -45°	150C1F3	9224	50410	74057	9450	37440	-63896
	380C2F1	0	0	0	18898	75085	-127768
	380C2F2	0	0	0	18899	74993	-127777
	380C2F3	0	0	0	18900	74880	-127792
	RTG	0	0	0	5124	20380	-34754
NL3/1b	GW / opgw	2576	12740	20330	2598	11459	-19723
Wind, -20°C	150C1F1	9532	45851	74527	9584	42642	-73508
Permanent loads yg= 1.2	150C1F2	9539	45621	74316	9584	42630	-73512
Wind angle: -45°	150C1F3	9548	45124	74081	9584	42615	-73519
	380C2F1	0	0	0	19168	85285	-147015
	380C2F2	0	0	0	19168	85260	-147025
	380C2F3	0	0	0	19168	85230	-147037
	RTG	0	0	0	5185	22666	-39091
NL3/3	GW / opgw	4124	25850	35846	4284	16321	-27629
Wind, -5°C	150C1F1	10779	57342	85655	11014	44816	-76643
Permanent loads yg= 1.2	150C1F2	10805	56002	84343	11014	44779	-76650
Wind angle: -45°	150C1F3	10836	54379	82799	11014	44732	-76661
	380C2F1	0	0	0	22027	89632	-153285
	380C2F2	0	0	0	22028	89557	-153301
	380C2F3	0	0	0	22028	89465	-153323
	RTG	0	0	0	8568	32350	-55175
NL3/4	GW / opgw	3211	13548	21728	3226	12425	-21395
Construction/maintenance, +5°C	150C1F1	10741	45090	73206	10779	42104	-72575
Permanent loads yg= 1.2	150C1F2	10746	44791	73048	10779	42092	-72580
Wind angle: -45°	150C1F3	10753	44429	72875	10779	42077	-72587
	380C2F1	0	0	0	21558	84208	-145150
	380C2F2	0	0	0	21558	84184	-145160
	380C2F3	0	0	0	21559	84154	-145174
	RTG	0	0	0	6444	24773	-42740
NL3/1a	GW / opgw	1915	9180	14387	1915	9180	-14387
Wind, 10°C	150C1F1	7081	32383	51830	7081	32383	-51830
Permanent loads yg= 0.9	150C1F2	7087	32068	51599	7087	32068	-51599
Wind angle: 0°	150C1F3	7094	31690	51338	7094	31690	-51338
	380C2F1	0	0	0	14162	64767	-103661
	380C2F2	0	0	0	14174	64137	-103198
	380C2F3	0	0	0	14187	63379	-102675
	RTG	0	0	0	3843	17260	-27865
NL3/1b	GW / opgw	1961	9402	15819	1961	9402	-15819
Wind, -20°C	150C1F1	7243	35045	59390	7243	35045	-59390
Permanent loads yg= 0.9	150C1F2	7244	34984	59381	7244	34984	-59381
Wind angle: 0°	150C1F3	7245	34910	59374	7245	34910	-59374
	380C2F1	0	0	0	14486	70090	-118780
	380C2F2	0	0	0	14487	69968	-118762
	380C2F3	0	0	0	14489	69819	-118747
	RTG	0	0	0	3914	18394	-31236
NL3/3	GW / opgw	3634	15856	25073	3634	15856	-25073
Wind, -5°C	150C1F1	8663	39148	64147	8663	39148	-64147
Permanent loads yg= 0.9	150C1F2	8667	38922	64025	8667	38922	-64025
Wind angle: 0°	150C1F3	8672	38649	63891	8672	38649	-63891
	380C2F1	0	0	0	17326	78296	-128293
	380C2F2	0	0	0	17334	77844	-128050
	380C2F3	0	0	0	17344	77298	-127782
	RTG	0	0	0	7295	30218	-49140

NL3/4	GW / opgw	2595	10591	17879	2595	10591	-17879
Construction/maintenance, +5°C	150C1F1	8455	35123	59524	8455	35123	-59524
Permanent loads yg= 0.9	150C1F2	8455	35066	59523	8455	35066	-59523
Wind angle: 0°	150C1F3	8456	34997	59524	8456	34997	-59524
	380C2F1	0	0	0	16909	70245	-119047
	380C2F2	0	0	0	16910	70133	-119045
	380C2F3	0	0	0	16912	69994	-119048
	RTG	0	0	0	5185	20962	-35683
NL3/1a	GW / opgw	1932	8144	13701	1829	15923	-21930
Wind, 10°C	150C1F1	7121	29832	50530	6815	49592	-69994
Permanent loads yg= 0.9	150C1F2	7122	29782	50528	6838	47577	-67677
Wind angle: 45°	150C1F3	7122	29721	50527	6869	45089	-64843
	380C2F1	0	0	0	13629	99184	-139988
	380C2F2	0	0	0	13675	95154	-135355
	380C2F3	0	0	0	13738	90178	-129687
	RTG	0	0	0	3716	25224	-36107
NL3/1b	GW / opgw	1963	9195	15802	1934	10716	-16824
Wind, -20°C	150C1F1	7248	34505	59414	7178	38252	-61365
Permanent loads yg= 0.9	150C1F2	7248	34493	59418	7187	37851	-61031
Wind angle: 45°	150C1F3	7248	34477	59424	7198	37369	-60651
	380C2F1	0	0	0	14356	76503	-122731
	380C2F2	0	0	0	14374	75701	-122063
	380C2F3	0	0	0	14396	74739	-121302
	RTG	0	0	0	3888	19852	-32053
NL3/3	GW / opgw	3657	14462	24409	3493	24835	-34090
Wind, -5°C	150C1F1	8691	37264	63563	8421	51781	-76025
Permanent loads yg= 0.9	150C1F2	8691	37225	63567	8447	50238	-74361
Wind angle: 45°	150C1F3	8691	37176	63573	8481	48358	-72372
	380C2F1	0	0	0	16843	103562	-152051
	380C2F2	0	0	0	16894	100477	-148723
	380C2F3	0	0	0	16961	96716	-144744
	RTG	0	0	0	7104	40646	-58458
NL3/4	GW / opgw	2596	10405	17897	2577	11658	-18456
Construction/maintenance, +5°C	150C1F1	8458	34612	59598	8409	37961	-60860
Permanent loads yg= 0.9	150C1F2	8458	34600	59603	8416	37613	-60617
Wind angle: 45°	150C1F3	8458	34584	59609	8423	37193	-60344
	380C2F1	0	0	0	16818	75923	-121720
	380C2F2	0	0	0	16831	75226	-121234
	380C2F3	0	0	0	16847	74387	-120688
	RTG	0	0	0	5168	22180	-36085
NL3/1a	GW / opgw	1846	13927	19581	1846	13927	-19581
Wind, 10°C	150C1F1	6880	44306	63960	6880	44306	-63960
Permanent loads yg= 0.9	150C1F2	6901	42767	62237	6901	42767	-62237
Wind angle: 90°	150C1F3	6930	40884	60161	6930	40884	-60161
	380C2F1	0	0	0	13759	88613	-127920
	380C2F2	0	0	0	13803	85535	-124474
	380C2F3	0	0	0	13859	81768	-120321
	RTG	0	0	0	3750	22733	-33281
NL3/1b	GW / opgw	1943	10289	16426	1943	10289	-16426
Wind, -20°C	150C1F1	7201	37221	60539	7201	37221	-60539
Permanent loads yg= 0.9	150C1F2	7208	36933	60329	7208	36933	-60329
Wind angle: 90°	150C1F3	7215	36586	60094	7215	36586	-60094
	380C2F1	0	0	0	14402	74442	-121078
	380C2F2	0	0	0	14415	73865	-120659
	380C2F3	0	0	0	14430	73172	-120187
	RTG	0	0	0	3897	19385	-31702
NL3/3	GW / opgw	3525	22131	31158	3525	22131	-31158
Wind, -5°C	150C1F1	8491	47772	71763	8491	47772	-71763
Permanent loads yg= 0.9	150C1F2	8513	46628	70591	8513	46628	-70591
Wind angle: 90°	150C1F3	8540	45243	69211	8540	45243	-69211
	380C2F1	0	0	0	16983	95544	-143525
	380C2F2	0	0	0	17026	93256	-141182
	380C2F3	0	0	0	17080	90486	-138422
	RTG	0	0	0	7158	37363	-55115
NL3/4	GW / opgw	2583	11319	18208	2583	11319	-18208
Construction/maintenance, +5°C	150C1F1	8426	37064	60264	8426	37064	-60264
Permanent loads yg= 0.9	150C1F2	8430	36811	60117	8430	36811	-60117
Wind angle: 90°	150C1F3	8435	36507	59954	8435	36507	-59954
	380C2F1	0	0	0	16851	74127	-120529
	380C2F2	0	0	0	16860	73623	-120235
	380C2F3	0	0	0	16871	73014	-119909
	RTG	0	0	0	5174	21802	-35887

NL3/1a	GW / opgw	1829	15923	21930	1932	8144	-13701
Wind, 10°C	150C1F1	6815	49592	69994	7121	29832	-50530
Permanent loads yg= 0.9	150C1F2	6838	47577	67677	7122	29782	-50528
Wind angle: -45°	150C1F3	6869	45089	64843	7122	29721	-50527
	380C2F1	0	0	0	14243	59665	-101060
	380C2F2	0	0	0	14244	59565	-101055
	380C2F3	0	0	0	14245	59442	-101054
	RTG	0	0	0	3860	16098	-27338
NL3/1b	GW / opgw	1934	10716	16824	1963	9195	-15802
Wind, -20°C	150C1F1	7178	38252	61365	7248	34505	-59414
Permanent loads yg= 0.9	150C1F2	7187	37851	61031	7248	34493	-59418
Wind angle: -45°	150C1F3	7198	37369	60651	7248	34477	-59424
	380C2F1	0	0	0	14496	69011	-118828
	380C2F2	0	0	0	14496	68985	-118836
	380C2F3	0	0	0	14496	68954	-118847
	RTG	0	0	0	3916	18143	-31257
NL3/3	GW / opgw	3493	24835	34090	3657	14462	-24409
Wind, -5°C	150C1F1	8421	51781	76025	8691	37264	-63563
Permanent loads yg= 0.9	150C1F2	8447	50238	74361	8691	37225	-63567
Wind angle: -45°	150C1F3	8481	48358	72372	8691	37176	-63573
	380C2F1	0	0	0	17381	74528	-127125
	380C2F2	0	0	0	17382	74449	-127133
	380C2F3	0	0	0	17382	74352	-127147
	RTG	0	0	0	7317	28620	-48714
NL3/4	GW / opgw	2577	11658	18456	2596	10405	-17897
Construction/maintenance, +5°C	150C1F1	8409	37961	60860	8458	34612	-59598
Permanent loads yg= 0.9	150C1F2	8416	37613	60617	8458	34600	-59603
Wind angle: -45°	150C1F3	8423	37193	60344	8458	34584	-59609
	380C2F1	0	0	0	16916	69224	-119196
	380C2F2	0	0	0	16916	69199	-119206
	380C2F3	0	0	0	16916	69168	-119218
	RTG	0	0	0	5186	20729	-35737

ZWW4HM400+5

Appendix L1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2552	11153	17805	0	0	0
	150C1F1	9419	39740	64571	0	0	0
	150C1F2	9423	39476	64429	0	0	0
	150C1F3	9429	39158	64272	0	0	0
	380C2F1	18838	79480	129142	18838	79480	-129142
	380C2F2	18847	78952	128857	18847	78952	-128857
	380C2F3	18857	78315	128544	18857	78315	-128544
	RTG	0	0	0	5112	21390	-35017
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2597	11647	19708	0	0	0
	150C1F1	9580	43143	73416	0	0	0
	150C1F2	9581	43088	73417	0	0	0
	150C1F3	9581	43020	73422	0	0	0
	380C2F1	19160	86286	146831	19160	86286	-146831
	380C2F2	19162	86176	146834	19162	86176	-146834
	380C2F3	19163	86041	146843	19163	86041	-146843
	RTG	0	0	0	5183	22900	-39040
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4264	17601	28095	0	0	0
	150C1F1	10993	46508	76894	0	0	0
	150C1F2	10996	46311	76822	0	0	0
	150C1F3	10999	46071	76746	0	0	0
	380C2F1	21985	93017	153789	21985	93017	-153789
	380C2F2	21991	92622	153644	21991	92622	-153644
	380C2F3	21999	92141	153491	21999	92141	-153491
	RTG	0	0	0	8550	33841	-55415
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3225	12601	21361	0	0	0
	150C1F1	10777	42589	72456	0	0	0
	150C1F2	10777	42537	72461	0	0	0
	150C1F3	10777	42472	72471	0	0	0
	380C2F1	21553	85178	144911	21553	85178	-144911
	380C2F2	21554	85073	144923	21554	85073	-144923
	380C2F3	21555	84943	144941	21555	84943	-144941
	RTG	0	0	0	6443	24997	-42671
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2565	10276	17394	0	0	0
	150C1F1	9449	37542	63884	0	0	0
	150C1F2	9450	37497	63889	0	0	0
	150C1F3	9450	37440	63896	0	0	0
	380C2F1	18898	75085	127768	18326	108679	-156431
	380C2F2	18899	74993	127777	18380	105142	-152649
	380C2F3	18900	74880	127792	18449	100820	-148114
	RTG	0	0	0	4994	28099	-41087
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2598	11459	19723	0	0	0
	150C1F1	9584	42642	73508	0	0	0
	150C1F2	9584	42630	73512	0	0	0
	150C1F3	9584	42615	73519	0	0	0
	380C2F1	19168	85285	147015	19065	91702	-149053
	380C2F2	19168	85260	147025	19079	91042	-148632
	380C2F3	19168	85230	147037	19095	90248	-148162
	RTG	0	0	0	5164	24142	-39484
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4284	16321	27629	0	0	0
	150C1F1	11014	44816	76643	0	0	0
	150C1F2	11014	44779	76650	0	0	0
	150C1F3	11014	44732	76661	0	0	0
	380C2F1	22027	89632	153285	21558	114684	-171311
	380C2F2	22028	89557	153301	21609	112005	-168685
	380C2F3	22028	89465	153323	21673	108759	-165599
	RTG	0	0	0	8372	43299	-63052
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3226	12425	21395	0	0	0
	150C1F1	10779	42104	72575	0	0	0
	150C1F2	10779	42092	72580	0	0	0
	150C1F3	10779	42077	72587	0	0	0
	380C2F1	21558	84208	145150	21483	90180	-146412
	380C2F2	21558	84184	145160	21493	89582	-146097
	380C2F3	21559	84154	145174	21505	88858	-145750
	RTG	0	0	0	6430	26100	-42874
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2484	15204	21794	0	0	0
	150C1F1	9236	49735	73361	0	0	0
	150C1F2	9258	48417	72020	0	0	0
	150C1F3	9287	46818	70436	0	0	0
	380C2F1	18471	99471	146722	18471	99471	-146722
	380C2F2	18516	96834	144041	18516	96834	-144041
	380C2F3	18573	93636	140873	18573	93636	-140873
	RTG	0	0	0	5029	25959	-38867

NL3/1b	GW / opgw	2583	12391	20066	0	0	0
Wind, -20°C	150C1F1	9550	45001	74013	0	0	0
Permanent loads yg= 1.2	150C1F2	9555	44761	73888	0	0	0
Wind angle: 90°	150C1F3	9560	44472	73751	0	0	0
	380C2F1	19100	90001	148026	19100	90001	-148026
	380C2F2	19109	89522	147776	19109	89522	-147776
	380C2F3	19120	88943	147502	19120	88943	-147502
	RTG	0	0	0	5171	23755	-39270
NL3/3	GW / opgw	4159	23320	33216	0	0	0
Wind, -5°C	150C1F1	10847	53876	82333	0	0	0
Permanent loads yg= 1.2	150C1F2	10866	52896	81446	0	0	0
Wind angle: 90°	150C1F3	10891	51714	80417	0	0	0
	380C2F1	21693	107752	164666	21693	107752	-164666
	380C2F2	21733	105792	162891	21733	105792	-162891
	380C2F3	21781	103428	160834	21781	103428	-160834
	RTG	0	0	0	8426	40301	-60203
NL3/4	GW / opgw	3216	13252	21556	0	0	0
Construction/maintenance, +5°C	150C1F1	10754	44316	72826	0	0	0
Permanent loads yg= 1.2	150C1F2	10758	44097	72736	0	0	0
Wind angle: 90°	150C1F3	10762	43831	72640	0	0	0
	380C2F1	21509	88633	145651	21509	88633	-145651
	380C2F2	21516	88194	145472	21516	88194	-145472
	380C2F3	21524	87662	145280	21524	87662	-145280
	RTG	0	0	0	6435	25765	-42750
NL3/1a	GW / opgw	2461	17001	23796	0	0	0
Wind, 10°C	150C1F1	9163	54340	78215	0	0	0
Permanent loads yg= 1.2	150C1F2	9190	52571	76325	0	0	0
Wind angle: -45°	150C1F3	9224	50410	74057	0	0	0
	380C2F1	18326	108679	156431	18898	75085	-127768
	380C2F2	18380	105142	152649	18899	74993	-127777
	380C2F3	18449	100820	148114	18900	74880	-127792
	RTG	0	0	0	5124	20380	-34754
NL3/1b	GW / opgw	2576	12740	20330	0	0	0
Wind, -20°C	150C1F1	9532	45851	74527	0	0	0
Permanent loads yg= 1.2	150C1F2	9539	45521	74316	0	0	0
Wind angle: -45°	150C1F3	9548	45124	74081	0	0	0
	380C2F1	19065	91702	149053	19168	85285	-147015
	380C2F2	19079	91042	148632	19168	85260	-147025
	380C2F3	19095	90248	148162	19168	85230	-147037
	RTG	0	0	0	5185	22666	-39091
NL3/3	GW / opgw	4124	25850	35846	0	0	0
Wind, -5°C	150C1F1	10779	57342	85655	0	0	0
Permanent loads yg= 1.2	150C1F2	10805	56002	84343	0	0	0
Wind angle: -45°	150C1F3	10836	54379	82799	0	0	0
	380C2F1	21558	114684	171311	22027	89632	-153285
	380C2F2	21609	112005	168685	22028	89557	-153301
	380C2F3	21673	108759	165599	22028	89465	-153323
	RTG	0	0	0	8568	32350	-55175
NL3/4	GW / opgw	3211	13548	21728	0	0	0
Construction/maintenance, +5°C	150C1F1	10741	45090	73206	0	0	0
Permanent loads yg= 1.2	150C1F2	10746	44791	73048	0	0	0
Wind angle: -45°	150C1F3	10753	44429	72875	0	0	0
	380C2F1	21483	90180	146412	21558	84208	-145150
	380C2F2	21493	89582	146097	21558	84184	-145160
	380C2F3	21505	88858	145750	21559	84154	-145174
	RTG	0	0	0	6444	24773	-42740
NL3/1a	GW / opgw	1915	9180	14387	0	0	0
Wind, 10°C	150C1F1	7081	32383	51830	0	0	0
Permanent loads yg= 0.9	150C1F2	7087	32068	51599	0	0	0
Wind angle: 0°	150C1F3	7094	31690	51338	0	0	0
	380C2F1	14162	64767	103661	14162	64767	-103661
	380C2F2	14174	64137	103198	14174	64137	-103198
	380C2F3	14187	63379	102675	14187	63379	-102675
	RTG	0	0	0	3843	17260	-27865
NL3/1b	GW / opgw	1961	9402	15819	0	0	0
Wind, -20°C	150C1F1	7243	35045	59390	0	0	0
Permanent loads yg= 0.9	150C1F2	7244	34984	59381	0	0	0
Wind angle: 0°	150C1F3	7245	34910	59374	0	0	0
	380C2F1	14486	70090	118780	14486	70090	-118780
	380C2F2	14487	69968	118762	14487	69968	-118762
	380C2F3	14489	69819	118747	14489	69819	-118747
	RTG	0	0	0	3914	18394	-31236
NL3/3	GW / opgw	3634	15856	25073	0	0	0
Wind, -5°C	150C1F1	8663	39148	64147	0	0	0
Permanent loads yg= 0.9	150C1F2	8667	38922	64025	0	0	0
Wind angle: 0°	150C1F3	8672	38649	63891	0	0	0
	380C2F1	17326	78296	128293	17326	78296	-128293
	380C2F2	17334	77844	128050	17334	77844	-128050
	380C2F3	17344	77298	127782	17344	77298	-127782
	RTG	0	0	0	7295	30218	-49140

NL3/4	GW / opgw	2595	10591	17879	0	0	0
Construction/maintenance, +5°C	150C1F1	8455	35123	59524	0	0	0
Permanent loads yg= 0.9	150C1F2	8455	35066	59523	0	0	0
Wind angle: 0°	150C1F3	8456	34997	59524	0	0	0
	380C2F1	16909	70245	119047	16909	70245	-119047
	380C2F2	16910	70133	119045	16910	70133	-119045
	380C2F3	16912	69994	119048	16912	69994	-119048
	RTG	0	0	0	5185	20962	-35683
NL3/1a	GW / opgw	1932	8144	13701	0	0	0
Wind, 10°C	150C1F1	7121	29832	50530	0	0	0
Permanent loads yg= 0.9	150C1F2	7122	29782	50528	0	0	0
Wind angle: 45°	150C1F3	7122	29721	50527	0	0	0
	380C2F1	14243	59665	101060	13629	99184	-139988
	380C2F2	14244	59565	101055	13675	95154	-135355
	380C2F3	14245	59442	101054	13738	90178	-129687
	RTG	0	0	0	3716	25224	-36107
NL3/1b	GW / opgw	1963	9195	15802	0	0	0
Wind, -20°C	150C1F1	7248	34505	59414	0	0	0
Permanent loads yg= 0.9	150C1F2	7248	34493	59418	0	0	0
Wind angle: 45°	150C1F3	7248	34477	59424	0	0	0
	380C2F1	14496	69011	118828	14356	76503	-122731
	380C2F2	14496	68985	118836	14374	75701	-122063
	380C2F3	14496	68954	118847	14396	74739	-121302
	RTG	0	0	0	3888	19852	-32053
NL3/3	GW / opgw	3657	14462	24409	0	0	0
Wind, -5°C	150C1F1	8691	37264	63563	0	0	0
Permanent loads yg= 0.9	150C1F2	8691	37225	63567	0	0	0
Wind angle: 45°	150C1F3	8691	37176	63573	0	0	0
	380C2F1	17381	74528	127125	16843	103562	-152051
	380C2F2	17382	74449	127133	16894	100477	-148723
	380C2F3	17382	74352	127147	16961	96716	-144744
	RTG	0	0	0	7104	40646	-58458
NL3/4	GW / opgw	2596	10405	17897	0	0	0
Construction/maintenance, +5°C	150C1F1	8458	34612	59598	0	0	0
Permanent loads yg= 0.9	150C1F2	8458	34600	59603	0	0	0
Wind angle: 45°	150C1F3	8458	34584	59609	0	0	0
	380C2F1	16916	69224	119196	16818	75923	-121720
	380C2F2	16916	69199	119206	16831	75226	-121234
	380C2F3	16916	69168	119218	16847	74387	-120688
	RTG	0	0	0	5168	22180	-36085
NL3/1a	GW / opgw	1846	13927	19581	0	0	0
Wind, 10°C	150C1F1	6880	44306	63960	0	0	0
Permanent loads yg= 0.9	150C1F2	6901	42767	62237	0	0	0
Wind angle: 90°	150C1F3	6930	40884	60161	0	0	0
	380C2F1	13759	88613	127920	13759	88613	-127920
	380C2F2	13803	85535	124474	13803	85535	-124474
	380C2F3	13859	81768	120321	13859	81768	-120321
	RTG	0	0	0	3750	22733	-33281
NL3/1b	GW / opgw	1943	10289	16426	0	0	0
Wind, -20°C	150C1F1	7201	37221	60539	0	0	0
Permanent loads yg= 0.9	150C1F2	7208	36933	60329	0	0	0
Wind angle: 90°	150C1F3	7215	36586	60094	0	0	0
	380C2F1	14402	74442	121078	14402	74442	-121078
	380C2F2	14415	73865	120659	14415	73865	-120659
	380C2F3	14430	73172	120187	14430	73172	-120187
	RTG	0	0	0	3897	19385	-31702
NL3/3	GW / opgw	3525	22131	31158	0	0	0
Wind, -5°C	150C1F1	8491	47772	71763	0	0	0
Permanent loads yg= 0.9	150C1F2	8513	46628	70591	0	0	0
Wind angle: 90°	150C1F3	8540	45243	69211	0	0	0
	380C2F1	16983	95544	143525	16983	95544	-143525
	380C2F2	17026	93256	141182	17026	93256	-141182
	380C2F3	17080	90486	138422	17080	90486	-138422
	RTG	0	0	0	7158	37363	-55115
NL3/4	GW / opgw	2583	11319	18208	0	0	0
Construction/maintenance, +5°C	150C1F1	8426	37064	60264	0	0	0
Permanent loads yg= 0.9	150C1F2	8430	36811	60117	0	0	0
Wind angle: 90°	150C1F3	8435	36507	59954	0	0	0
	380C2F1	16851	74127	120529	16851	74127	-120529
	380C2F2	16860	73623	120235	16860	73623	-120235
	380C2F3	16871	73014	119909	16871	73014	-119909
	RTG	0	0	0	5174	21802	-35887

NL3/1a	GW / opgw	1829	15923	21930	0	0	0
Wind, 10°C	150C1F1	6815	49592	69994	0	0	0
Permanent loads yg= 0.9	150C1F2	6838	47577	67677	0	0	0
Wind angle: -45°	150C1F3	6869	45089	64843	0	0	0
	380C2F1	13629	99184	139988	14243	59665	-101060
	380C2F2	13675	95154	135355	14244	59565	-101055
	380C2F3	13738	90178	129687	14245	59442	-101054
	RTG	0	0	0	3860	16098	-27338
NL3/1b	GW / opgw	1934	10716	16824	0	0	0
Wind, -20°C	150C1F1	7178	38252	61365	0	0	0
Permanent loads yg= 0.9	150C1F2	7187	37851	61031	0	0	0
Wind angle: -45°	150C1F3	7198	37369	60651	0	0	0
	380C2F1	14356	76503	122731	14496	69011	-118828
	380C2F2	14374	75701	122063	14496	68985	-118836
	380C2F3	14396	74739	121302	14496	68954	-118847
	RTG	0	0	0	3916	18143	-31257
NL3/3	GW / opgw	3493	24835	34090	0	0	0
Wind, -5°C	150C1F1	8421	51781	76025	0	0	0
Permanent loads yg= 0.9	150C1F2	8447	50238	74361	0	0	0
Wind angle: -45°	150C1F3	8481	48358	72372	0	0	0
	380C2F1	16843	103562	152051	17381	74528	-127125
	380C2F2	16894	100477	148723	17382	74449	-127133
	380C2F3	16961	96716	144744	17382	74352	-127147
	RTG	0	0	0	7317	28620	-48714
NL3/4	GW / opgw	2577	11658	18456	0	0	0
Construction/maintenance, +5°C	150C1F1	8409	37961	60860	0	0	0
Permanent loads yg= 0.9	150C1F2	8416	37613	60617	0	0	0
Wind angle: -45°	150C1F3	8423	37193	60344	0	0	0
	380C2F1	16818	75923	121720	16916	69224	-119196
	380C2F2	16831	75226	121234	16916	69199	-119206
	380C2F3	16847	74387	120688	16916	69168	-119218
	RTG	0	0	0	5186	20729	-35737

ZWW4HM400+5

Appendix L1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2552	11153	17805	2552	11153	-17805
	150C1F1	9419	39740	64571	9419	39740	-64571
	150C1F2	9423	39476	64429	9423	39476	-64429
	150C1F3	9429	39158	64272	9429	39158	-64272
	380C2F1	18838	79480	129142	18838	79480	-129142
	380C2F2	18847	78952	128857	18847	78952	-128857
	380C2F3	18857	78315	128544	18857	78315	-128544
	RTG	0	0	0	5112	21390	-35017
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2597	11647	19708	2597	11647	-19708
	150C1F1	9580	43143	73416	9580	43143	-73416
	150C1F2	9581	43088	73417	9581	43088	-73417
	150C1F3	9581	43020	73422	9581	43020	-73422
	380C2F1	19160	86286	146831	19160	86286	-146831
	380C2F2	19162	86176	146834	19162	86176	-146834
	380C2F3	19163	86041	146843	19163	86041	-146843
	RTG	0	0	0	5183	22900	-39040
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4264	17601	28095	4264	17601	-28095
	150C1F1	10993	46508	76894	10993	46508	-76894
	150C1F2	10996	46311	76822	10996	46311	-76822
	150C1F3	10999	46071	76746	10999	46071	-76746
	380C2F1	21985	93017	153789	21985	93017	-153789
	380C2F2	21991	92622	153644	21991	92622	-153644
	380C2F3	21999	92141	153491	21999	92141	-153491
	RTG	0	0	0	8550	33841	-55415
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3225	12601	21361	3225	12601	-21361
	150C1F1	10777	42589	72456	10777	42589	-72456
	150C1F2	10777	42537	72461	10777	42537	-72461
	150C1F3	10777	42472	72471	10777	42472	-72471
	380C2F1	21553	85178	144911	21553	85178	-144911
	380C2F2	21554	85073	144923	21554	85073	-144923
	380C2F3	21555	84943	144941	21555	84943	-144941
	RTG	0	0	0	6443	24997	-42671
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2565	10276	17394	2461	17001	-23796
	150C1F1	9449	37542	63884	9163	54340	-78215
	150C1F2	9450	37497	63889	9190	52571	-76325
	150C1F3	9450	37440	63896	9224	50410	-74057
	380C2F1	18898	75085	127768	18326	108679	-156431
	380C2F2	18899	74993	127777	18380	105142	-152649
	380C2F3	18900	74880	127792	18449	100820	-148114
	RTG	0	0	0	4994	28099	-41087
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2598	11459	19723	2576	12740	-20330
	150C1F1	9584	42642	73508	9532	45851	-74527
	150C1F2	9584	42630	73512	9539	45521	-74316
	150C1F3	9584	42615	73519	9548	45124	-74081
	380C2F1	19168	85285	147015	19065	91702	-149053
	380C2F2	19168	85260	147025	19079	91042	-148632
	380C2F3	19168	85230	147037	19095	90248	-148162
	RTG	0	0	0	5164	24142	-39484
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4284	16321	27629	4124	25850	-35846
	150C1F1	11014	44816	76643	10779	57342	-85655
	150C1F2	11014	44779	76650	10805	56002	-84343
	150C1F3	11014	44732	76661	10836	54379	-82799
	380C2F1	22027	89632	153285	21558	114684	-171311
	380C2F2	22028	89557	153301	21609	112005	-168685
	380C2F3	22028	89465	153323	21673	108759	-165599
	RTG	0	0	0	8372	43299	-63052
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3226	12425	21395	3211	13548	-21728
	150C1F1	10779	42104	72575	10741	45090	-73206
	150C1F2	10779	42092	72580	10746	44791	-73048
	150C1F3	10779	42077	72587	10753	44429	-72875
	380C2F1	21558	84208	145150	21483	90180	-146412
	380C2F2	21558	84184	145160	21493	89582	-146097
	380C2F3	21559	84154	145174	21505	88858	-145750
	RTG	0	0	0	6430	26100	-42874
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2484	15204	21794	2484	15204	-21794
	150C1F1	9236	49735	73361	9236	49735	-73361
	150C1F2	9258	48417	72020	9258	48417	-72020
	150C1F3	9287	46818	70436	9287	46818	-70436
	380C2F1	18471	99471	146722	18471	99471	-146722
	380C2F2	18516	96834	144041	18516	96834	-144041
	380C2F3	18573	93636	140873	18573	93636	-140873
	RTG	0	0	0	5029	25959	-38867

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2583	12391	20066	2583	12391	-20066
	150C1F1	9550	45001	74013	9550	45001	-74013
	150C1F2	9555	44761	73888	9555	44761	-73888
	150C1F3	9560	44472	73751	9560	44472	-73751
	380C2F1	19100	90001	148026	19100	90001	-148026
	380C2F2	19109	89522	147776	19109	89522	-147776
	380C2F3	19120	88943	147502	19120	88943	-147502
	RTG	0	0	0	5171	23755	-39270
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4159	23320	33216	4159	23320	-33216
	150C1F1	10847	53876	82333	10847	53876	-82333
	150C1F2	10866	52896	81446	10866	52896	-81446
	150C1F3	10891	51714	80417	10891	51714	-80417
	380C2F1	21693	107752	164666	21693	107752	-164666
	380C2F2	21733	105792	162891	21733	105792	-162891
	380C2F3	21781	103428	160834	21781	103428	-160834
	RTG	0	0	0	8426	40301	-60203
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3216	13252	21556	3216	13252	-21556
	150C1F1	10754	44316	72826	10754	44316	-72826
	150C1F2	10758	44097	72736	10758	44097	-72736
	150C1F3	10762	43831	72640	10762	43831	-72640
	380C2F1	21509	88633	145651	21509	88633	-145651
	380C2F2	21516	88194	145472	21516	88194	-145472
	380C2F3	21524	87662	145280	21524	87662	-145280
	RTG	0	0	0	6435	25765	-42750
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2461	17001	23796	2565	10276	-17394
	150C1F1	9163	54340	78215	9449	37542	-63884
	150C1F2	9190	52571	76325	9450	37497	-63889
	150C1F3	9224	50410	74057	9450	37440	-63896
	380C2F1	18326	108679	156431	18898	75085	-127768
	380C2F2	18380	105142	152649	18899	74993	-127777
	380C2F3	18449	100820	148114	18900	74880	-127792
	RTG	0	0	0	5124	20380	-34754
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2576	12740	20330	2598	11459	-19723
	150C1F1	9532	45851	74527	9584	42642	-73508
	150C1F2	9539	45621	74316	9584	42630	-73512
	150C1F3	9548	45124	74081	9584	42615	-73519
	380C2F1	19065	91702	149053	19168	85285	-147015
	380C2F2	19079	91042	148632	19168	85260	-147025
	380C2F3	19095	90248	148162	19168	85230	-147037
	RTG	0	0	0	5185	22666	-39091
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4124	25850	35846	4284	16321	-27629
	150C1F1	10779	57342	85655	11014	44816	-76643
	150C1F2	10805	56002	84343	11014	44779	-76650
	150C1F3	10836	54379	82799	11014	44732	-76661
	380C2F1	21558	114684	171311	22027	89632	-153285
	380C2F2	21609	112005	168685	22028	89557	-153301
	380C2F3	21673	108759	165599	22028	89465	-153323
	RTG	0	0	0	8568	32350	-55175
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3211	13548	21728	3226	12425	-21395
	150C1F1	10741	45090	73206	10779	42104	-72575
	150C1F2	10746	44791	73048	10779	42092	-72580
	150C1F3	10753	44429	72875	10779	42077	-72587
	380C2F1	21483	90180	146412	21558	84208	-145150
	380C2F2	21493	89582	146097	21558	84184	-145160
	380C2F3	21505	88858	145750	21559	84154	-145174
	RTG	0	0	0	6444	24773	-42740
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1915	9180	14387	1915	9180	-14387
	150C1F1	7081	32383	51830	7081	32383	-51830
	150C1F2	7087	32068	51599	7087	32068	-51599
	150C1F3	7094	31690	51338	7094	31690	-51338
	380C2F1	14162	64767	103661	14162	64767	-103661
	380C2F2	14174	64137	103198	14174	64137	-103198
	380C2F3	14187	63379	102675	14187	63379	-102675
	RTG	0	0	0	3843	17260	-27865
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1961	9402	15819	1961	9402	-15819
	150C1F1	7243	35045	59390	7243	35045	-59390
	150C1F2	7244	34984	59381	7244	34984	-59381
	150C1F3	7245	34910	59374	7245	34910	-59374
	380C2F1	14486	70090	118780	14486	70090	-118780
	380C2F2	14487	69968	118762	14487	69968	-118762
	380C2F3	14489	69819	118747	14489	69819	-118747
	RTG	0	0	0	3914	18394	-31236
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3634	15856	25073	3634	15856	-25073
	150C1F1	8663	39148	64147	8663	39148	-64147
	150C1F2	8667	38922	64025	8667	38922	-64025
	150C1F3	8672	38649	63891	8672	38649	-63891
	380C2F1	17326	78296	128293	17326	78296	-128293
	380C2F2	17334	77844	128050	17334	77844	-128050
	380C2F3	17344	77298	127782	17344	77298	-127782
	RTG	0	0	0	7295	30218	-49140

NL3/4	GW / opgw	2595	10591	17879	2595	10591	-17879
Construction/maintenance, +5°C	150C1F1	8455	35123	59524	8455	35123	-59524
Permanent loads yg= 0.9	150C1F2	8455	35066	59523	8455	35066	-59523
Wind angle: 0°	150C1F3	8456	34997	59524	8456	34997	-59524
	380C2F1	16909	70245	119047	16909	70245	-119047
	380C2F2	16910	70133	119045	16910	70133	-119045
	380C2F3	16912	69994	119048	16912	69994	-119048
	RTG	0	0	0	5185	20962	-35683
NL3/1a	GW / opgw	1932	8144	13701	1829	15923	-21930
Wind, 10°C	150C1F1	7121	29832	50530	6815	49592	-69994
Permanent loads yg= 0.9	150C1F2	7122	29782	50528	6838	47577	-67677
Wind angle: 45°	150C1F3	7122	29721	50527	6869	45089	-64843
	380C2F1	14243	59665	101060	13629	99184	-139988
	380C2F2	14244	59565	101055	13675	95154	-135355
	380C2F3	14245	59442	101054	13738	90178	-129687
	RTG	0	0	0	3716	25224	-36107
NL3/1b	GW / opgw	1963	9195	15802	1934	10716	-16824
Wind, -20°C	150C1F1	7248	34505	59414	7178	38252	-61365
Permanent loads yg= 0.9	150C1F2	7248	34493	59418	7187	37851	-61031
Wind angle: 45°	150C1F3	7248	34477	59424	7198	37369	-60651
	380C2F1	14496	69011	118828	14356	76503	-122731
	380C2F2	14496	68985	118836	14374	75701	-122063
	380C2F3	14496	68954	118847	14396	74739	-121302
	RTG	0	0	0	3888	19852	-32053
NL3/3	GW / opgw	3657	14462	24409	3493	24835	-34090
Wind, -5°C	150C1F1	8691	37264	63563	8421	51781	-76025
Permanent loads yg= 0.9	150C1F2	8691	37225	63567	8447	50238	-74361
Wind angle: 45°	150C1F3	8691	37176	63573	8481	48358	-72372
	380C2F1	17381	74528	127125	16843	103562	-152051
	380C2F2	17382	74449	127133	16894	100477	-148723
	380C2F3	17382	74352	127147	16961	96716	-144744
	RTG	0	0	0	7104	40646	-58458
NL3/4	GW / opgw	2596	10405	17897	2577	11658	-18456
Construction/maintenance, +5°C	150C1F1	8458	34612	59598	8409	37961	-60860
Permanent loads yg= 0.9	150C1F2	8458	34600	59603	8416	37613	-60617
Wind angle: 45°	150C1F3	8458	34584	59609	8423	37193	-60344
	380C2F1	16916	69224	119196	16818	75923	-121720
	380C2F2	16916	69199	119206	16831	75226	-121234
	380C2F3	16916	69168	119218	16847	74387	-120688
	RTG	0	0	0	5168	22180	-36085
NL3/1a	GW / opgw	1846	13927	19581	1846	13927	-19581
Wind, 10°C	150C1F1	6880	44306	63960	6880	44306	-63960
Permanent loads yg= 0.9	150C1F2	6901	42767	62237	6901	42767	-62237
Wind angle: 90°	150C1F3	6930	40884	60161	6930	40884	-60161
	380C2F1	13759	88613	127920	13759	88613	-127920
	380C2F2	13803	85535	124474	13803	85535	-124474
	380C2F3	13859	81768	120321	13859	81768	-120321
	RTG	0	0	0	3750	22733	-33281
NL3/1b	GW / opgw	1943	10289	16426	1943	10289	-16426
Wind, -20°C	150C1F1	7201	37221	60539	7201	37221	-60539
Permanent loads yg= 0.9	150C1F2	7208	36933	60329	7208	36933	-60329
Wind angle: 90°	150C1F3	7215	36586	60094	7215	36586	-60094
	380C2F1	14402	74442	121078	14402	74442	-121078
	380C2F2	14415	73865	120659	14415	73865	-120659
	380C2F3	14430	73172	120187	14430	73172	-120187
	RTG	0	0	0	3897	19385	-31702
NL3/3	GW / opgw	3525	22131	31158	3525	22131	-31158
Wind, -5°C	150C1F1	8491	47772	71763	8491	47772	-71763
Permanent loads yg= 0.9	150C1F2	8513	46628	70591	8513	46628	-70591
Wind angle: 90°	150C1F3	8540	45243	69211	8540	45243	-69211
	380C2F1	16983	95544	143525	16983	95544	-143525
	380C2F2	17026	93256	141182	17026	93256	-141182
	380C2F3	17080	90486	138422	17080	90486	-138422
	RTG	0	0	0	7158	37363	-55115
NL3/4	GW / opgw	2583	11319	18208	2583	11319	-18208
Construction/maintenance, +5°C	150C1F1	8426	37064	60264	8426	37064	-60264
Permanent loads yg= 0.9	150C1F2	8430	36811	60117	8430	36811	-60117
Wind angle: 90°	150C1F3	8435	36507	59954	8435	36507	-59954
	380C2F1	16851	74127	120529	16851	74127	-120529
	380C2F2	16860	73623	120235	16860	73623	-120235
	380C2F3	16871	73014	119909	16871	73014	-119909
	RTG	0	0	0	5174	21802	-35887

NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1829	15923	21930	1932	8144	-13701
	150C1F1	6815	49592	69994	7121	29832	-50530
	150C1F2	6838	47577	67677	7122	29782	-50528
	150C1F3	6869	45089	64843	7122	29721	-50527
	380C2F1	13629	99184	139988	14243	59665	-101060
	380C2F2	13675	95154	135355	14244	59565	-101055
	380C2F3	13738	90178	129687	14245	59442	-101054
	RTG	0	0	0	3860	16098	-27338
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1934	10716	16824	1963	9195	-15802
	150C1F1	7178	38252	61365	7248	34505	-59414
	150C1F2	7187	37851	61031	7248	34493	-59418
	150C1F3	7198	37369	60651	7248	34477	-59424
	380C2F1	14356	76503	122731	14496	69011	-118828
	380C2F2	14374	75701	122063	14496	68985	-118836
	380C2F3	14396	74739	121302	14496	68954	-118847
	RTG	0	0	0	3916	18143	-31257
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3493	24835	34090	3657	14462	-24409
	150C1F1	8421	51781	76025	8691	37264	-63563
	150C1F2	8447	50238	74361	8691	37225	-63567
	150C1F3	8481	48358	72372	8691	37176	-63573
	380C2F1	16843	103562	152051	17381	74528	-127125
	380C2F2	16894	100477	148723	17382	74449	-127133
	380C2F3	16961	96716	144744	17382	74352	-127147
	RTG	0	0	0	7317	28620	-48714
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2577	11658	18456	2596	10405	-17897
	150C1F1	8409	37961	60860	8458	34612	-59598
	150C1F2	8416	37613	60617	8458	34600	-59603
	150C1F3	8423	37193	60344	8458	34584	-59609
	380C2F1	16818	75923	121720	16916	69224	-119196
	380C2F2	16831	75226	121234	16916	69199	-119206
	380C2F3	16847	74387	120688	16916	69168	-119218
	RTG	0	0	0	5186	20729	-35737

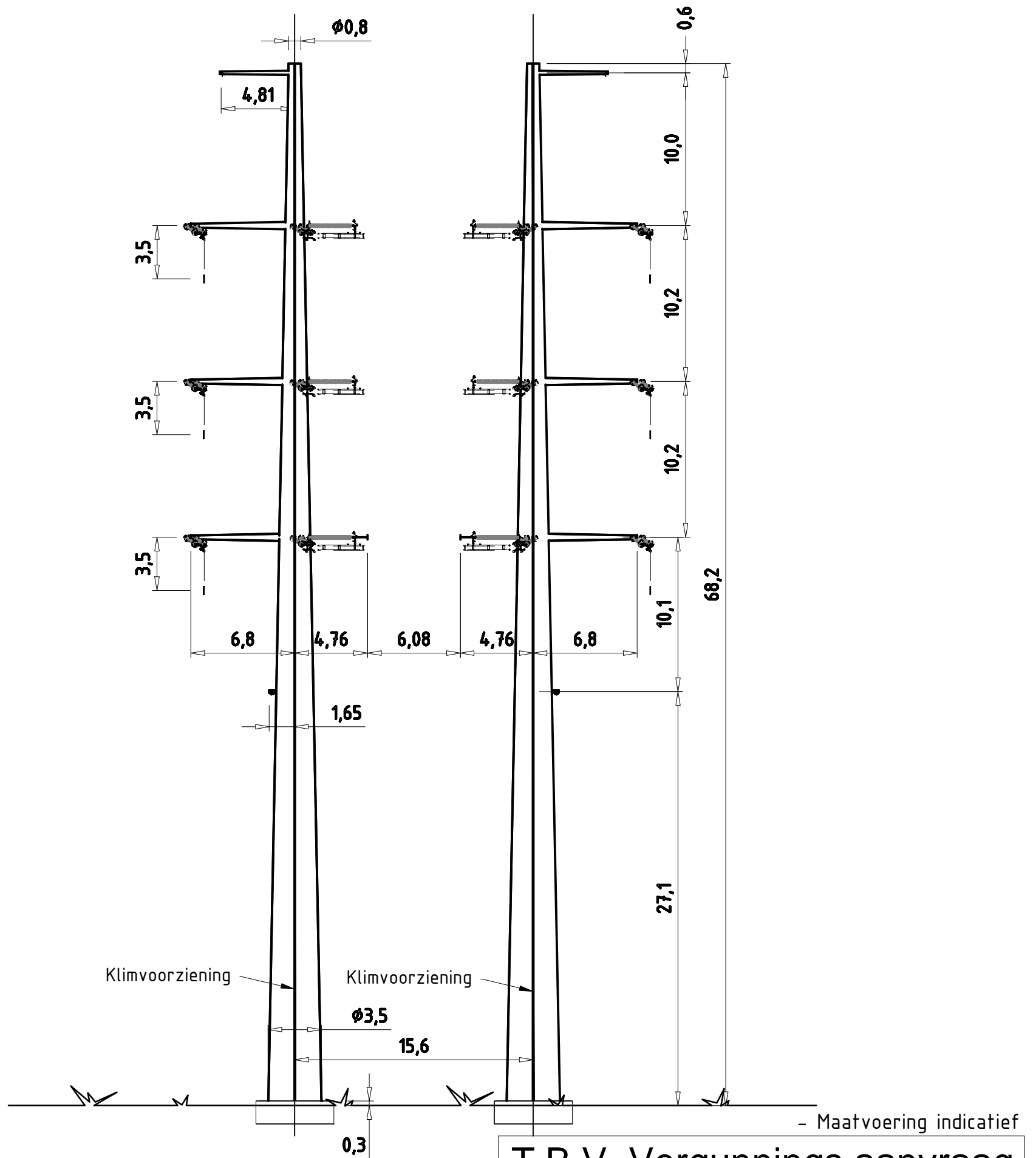
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Appendix L2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2118	10348	15983	2118	10348	-15983
Wind, 10°C	150C1F1	7840	36100	57066	7840	36100	-57066
Permanent loads yg= 1.0	150C1F2	7848	35673	56729	7848	35673	-56729
Wind angle: 0°	150C1F3	7857	35160	56346	7857	35160	-56346
	380C2F1	15680	72200	114132	15680	72200	-114132
	380C2F2	15696	71346	113458	15696	71346	-113458
	380C2F3	15715	70319	112692	15715	70319	-112692
	RTG	0	0	0	4257	19215	-30677
NL4/1b	GW / opgw	2174	10121	17142	2174	10121	-17142
Wind, -20°C	150C1F1	8026	37695	64198	8026	37695	-64198
Permanent loads yg= 1.0	150C1F2	8026	37649	64198	8026	37649	-64198
Wind angle: 0°	150C1F3	8027	37591	64201	8027	37591	-64201
	380C2F1	16051	75390	128396	16051	75390	-128396
	380C2F2	16052	75297	128396	16052	75297	-128396
	380C2F3	16053	75183	128401	16053	75183	-128401
	RTG	0	0	0	4339	19878	-33910
NL4/3	GW / opgw	7195	24908	41148	7195	24908	-41148
Wind, -5°C	150C1F1	12420	50407	84256	12420	50407	-84256
Permanent loads yg= 1.0	150C1F2	12422	50261	84229	12422	50261	-84229
Wind angle: 0°	150C1F3	12425	50083	84204	12425	50083	-84204
	380C2F1	24841	100813	168512	24841	100813	-168512
	380C2F2	24845	100522	168458	24845	100522	-168458
	380C2F3	24849	100166	168407	24849	100166	-168407
	RTG	0	0	0	14415	49043	-82277
NL4/4	GW / opgw	2696	10875	18448	2696	10875	-18448
Construction/maintenance, +5°C	150C1F1	9012	36833	62704	9012	36833	-62704
Permanent loads yg= 1.0	150C1F2	9013	36789	62708	9013	36789	-62708
Wind angle: 0°	150C1F3	9013	36734	62715	9013	36734	-62715
	380C2F1	18025	73666	125409	18025	73666	-125409
	380C2F2	18026	73577	125417	18026	73577	-125417
	380C2F3	18026	73468	125430	18026	73468	-125430
	RTG	0	0	0	5387	21568	-36835
NL4/1a	GW / opgw	2143	8947	14976	2018	19093	-25827
Wind, 10°C	150C1F1	7897	32660	55106	7515	58719	-81314
Permanent loads yg= 1.0	150C1F2	7898	32594	55099	7540	56140	-78350
Wind angle: 45°	150C1F3	7899	32513	55094	7575	52934	-74691
	380C2F1	15794	65321	110213	15030	117438	-162628
	380C2F2	15796	65188	110199	15081	112279	-156701
	380C2F3	15797	65026	110189	15151	105869	-149381
	RTG	0	0	0	4099	29772	-41845
NL4/1b	GW / opgw	2175	9962	17151	2156	11057	-17705
Wind, -20°C	150C1F1	8029	37274	64267	7984	40009	-65224
Permanent loads yg= 1.0	150C1F2	8029	37263	64271	7990	39726	-65033
Wind angle: 45°	150C1F3	8029	37251	64276	7997	39385	-64820
	380C2F1	16058	74547	128534	15968	80018	-130448
	380C2F2	16058	74527	128542	15980	79451	-130067
	380C2F3	16058	74501	128553	15994	78769	-129640
	RTG	0	0	0	4322	20936	-34320
NL4/3	GW / opgw	7203	24091	41193	7109	29619	-43859
Wind, -5°C	150C1F1	12433	49124	84267	12273	58094	-89235
Permanent loads yg= 1.0	150C1F2	12433	49094	84276	12292	57142	-88425
Wind angle: 45°	150C1F3	12433	49057	84288	12316	55993	-87492
	380C2F1	24866	98247	168534	24546	116189	-178470
	380C2F2	24866	98188	168552	24585	114284	-176850
	380C2F3	24867	98114	168576	24632	111986	-174984
	RTG	0	0	0	14329	54424	-84306
NL4/4	GW / opgw	2697	10727	18475	2684	11681	-18784
Construction/maintenance, +5°C	150C1F1	9015	36426	62798	8982	38959	-63403
Permanent loads yg= 1.0	150C1F2	9015	36416	62803	8987	38703	-63260
Wind angle: 45°	150C1F3	9015	36403	62808	8992	38394	-63103
	380C2F1	18029	72851	125597	17964	77918	-126806
	380C2F2	18029	72831	125605	17973	77407	-126521
	380C2F3	18029	72806	125616	17984	76789	-126207
	RTG	0	0	0	5375	22502	-37031
NL4/1a	GW / opgw	2036	16567	22873	2036	16567	-22873
Wind, 10°C	150C1F1	7587	51921	73541	7587	51921	-73541
Permanent loads yg= 1.0	150C1F2	7612	49920	71284	7612	49920	-71284
Wind angle: 90°	150C1F3	7646	47457	68538	7646	47457	-68538
	380C2F1	15175	103841	147081	15175	103841	-147081
	380C2F2	15224	99840	142569	15224	99840	-142569
	380C2F3	15291	94913	137076	15291	94913	-137076
	RTG	0	0	0	4137	26533	-38143


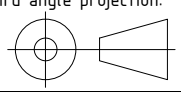
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2162	10757	17468	2162	10757	-17468
	150C1F1	7999	39279	64758	7999	39279	-64758
	150C1F2	8003	39074	64644	8003	39074	-64644
	150C1F3	8008	38826	64519	8008	38826	-64519
	380C2F1	15999	78558	129517	15999	78558	-129517
	380C2F2	16007	78147	129288	16007	78147	-129288
	380C2F3	16016	77652	129037	16016	77652	-129037
	RTG	0	0	0	4328	20605	-34127
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7138	28135	42750	7138	28135	-42750
	150C1F1	12323	55638	87215	12323	55638	-87215
	150C1F2	12338	54947	86693	12338	54947	-86693
	150C1F3	12354	54115	86100	12354	54115	-86100
	380C2F1	24647	111276	174429	24647	111276	-174429
	380C2F2	24675	109894	173386	24675	109894	-173386
	380C2F3	24709	108229	172200	24709	108229	-172200
	RTG	0	0	0	14360	52751	-83363
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2688	11428	18630	2688	11428	-18630
	150C1F1	8993	38299	63058	8993	38299	-63058
	150C1F2	8996	38112	62976	8996	38112	-62976
	150C1F3	9000	37885	62888	9000	37885	-62888
	380C2F1	17987	76597	126117	17987	76597	-126117
	380C2F2	17993	76223	125953	17993	76223	-125953
	380C2F3	18000	75770	125776	18000	75770	-125776
	RTG	0	0	0	5380	22217	-36918
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2018	19093	25827	2143	8947	-14976
	150C1F1	7515	58719	81314	7897	32660	-55106
	150C1F2	7540	56140	78350	7898	32594	-55099
	150C1F3	7575	52934	74691	7899	32513	-55094
	380C2F1	15030	117438	162628	15794	65321	-110213
	380C2F2	15081	112279	156701	15796	65188	-110199
	380C2F3	15151	105869	149381	15797	65026	-110189
	RTG	0	0	0	4282	17649	-29871
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2156	11057	17705	2175	9962	-17151
	150C1F1	7984	40009	65224	8029	37274	-64267
	150C1F2	7990	39726	65033	8029	37263	-64271
	150C1F3	7997	39385	64820	8029	37251	-64276
	380C2F1	15968	80018	130448	16058	74547	-128534
	380C2F2	15980	79451	130067	16058	74527	-128542
	380C2F3	15994	78769	129640	16058	74501	-128553
	RTG	0	0	0	4340	19681	-33949
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7109	29619	43859	7203	24091	-41193
	150C1F1	12273	58094	89235	12433	49124	-84267
	150C1F2	12292	57142	88425	12433	49094	-84276
	150C1F3	12316	55993	87492	12433	49057	-84288
	380C2F1	24546	116189	178470	24866	98247	-168534
	380C2F2	24585	114284	176850	24866	98188	-168552
	380C2F3	24632	111986	174984	24867	98114	-168576
	RTG	0	0	0	14422	48031	-82477
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2684	11681	18784	2697	10727	-18475
	150C1F1	8982	38959	63403	9015	36426	-62798
	150C1F2	8987	38703	63260	9015	36416	-62803
	150C1F3	8992	38394	63103	9015	36403	-62808
	380C2F1	17964	77918	126806	18029	72851	-125597
	380C2F2	17973	77407	126521	18029	72831	-125605
	380C2F3	17984	76789	126207	18029	72806	-125616
	RTG	0	0	0	5388	21379	-36890



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4HM400+5

- Trekparameter 1800m
- 2x380 / 2x150 Hoekmast
- 400m Veldlengte
- 120°-130° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

5.0	05-03-2014	Increased space between poles and increased traverse length	
4.0	21-02-2014	Modified top/botom diameter 0.8/3.5	
3.0	03-02-2014	Modified top/botom diameter	
		Projectname: Engineering verbinding ZW380	
Design state: Definitief		Third angle projection: 	
Drawn by: RBE 05-03-2014		Drawing no.: 74102194-035-096V	
Checked by: AJP 05-03-2014		Description: Wintrack Masttype ZWW4HM400+5	
Approved by: AW 05-03-2014		Project no: 000.145	
		Company: TenneT	
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com			
			Revision: 5.0 Format: A3

ZWW4HL400+5

Bijlage CCC

Fundatie berekening

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m
schoorstand		8	:1
α		7.125	graden

Opstort	Diameter	5.5	m
	Hoogte	1.8	m
	Inhoud	42.8	m ³
	e.g.	1026	kN

Onderplaat	Diameter	14.0	m
	Hoogte	1.4	m
	Inhoud	216	m ³
	e.g.	5172	kN

Hart paal tov rand fund.		0.6	m
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Optreden krachten

e.g. mast		991	kN
Fgeleiders		328	kN
Maximale dwarskracht		1341	kN
Fmax vert (druk)		1517	kN
Fmin vert (trek)		1138	kN
Maximale moment		67341	kNm

Moment

F_{diag}		5640	kN
F_{hor}		1341	kN
F_{ver}		5596	kN
M_{hor} (tgv F_{hor})		4290	kNm
M_{tot}		71631	kNm
$F=M/a$		5596	kN

Verticaal reactiekracht

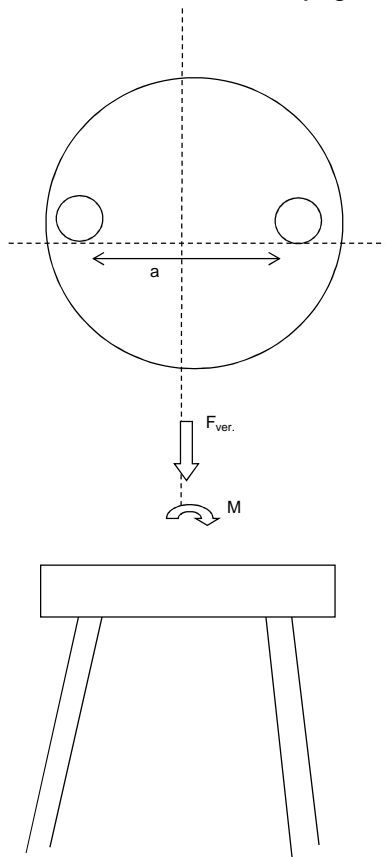
F_{water} (trek)		2583	kN
F_{grond} (druk)		3515	kN
F_{grond} (trek)		2929	kN

F_{dmax} (druk)		6587	kN
F_{tmax} (trek)		3127	kN

F_{dtot} (druk)		12183	kN
F_{ttot} (trek)		2469	kN

Palen druk		11	(-)
Palen trek		8	(-)

Totaal palen		22	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4HL400+5

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CCC

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0.40 m
	b	0.40 m
omtrek paal	$O_{p;gem}$	1.60 m
paalfactor	αt	0.007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0.75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11.25 MPa
materiaalfactor	$\gamma_{m,b4}$	1.4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1.5
	$q_{c;z,d}$	5.36 MPa
	$P_{r;z,d}$	37.5 kN/m ²
	$F_{r;trek,d,i}$	60.0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt			
	0	-1	0	0.007	0.00	0.00	0
	-1	-2	0	0.007	0.00	0.00	0
	-2	-3	0	0.007	0.00	0.00	0
	-3	-4	0	0.007	0.00	0.00	0
	-4	-5	0	0.007	0.00	0.00	0
	-5	-6	0	0.007	0.00	0.00	0
	-6	-7	0	0.007	0.00	0.00	0
	-7	-8	0	0.007	0.00	0.00	0
	-8	-9	1	0.007	2.50	4.00	4
	-9	-10	3	0.007	7.50	12.00	16
	-10	-11	2	0.007	5.00	8.00	24
	-11	-12	0	0.007	0.00	0.00	24
	-12	-13	3	0.007	7.50	12.00	36
	-13	-14	2	0.007	5.00	8.00	44
	-14	-15	4	0.007	10.00	16.00	60
	-15	-16	10	0.007	25.00	40.00	100
	-16	-17	9	0.007	22.50	36.00	136
	-17	-18	8	0.007	20.00	32.00	168
	-18	-19	12	0.007	30.00	48.00	216
	-19	-20	12	0.007	30.00	48.00	264
	-20	-21	10	0.007	25.00	40.00	304
	-21	-22	11	0.007	27.50	44.00	348
	-22	-23	11	0.007	27.50	44.00	392
	-23	-24	12	0.007	30.00	48.00	440
	-24	-25	12	0.007	30.00	48.00	488
	-25	-26	12	0.007	30.00	48.00	536
	-26	-27	15	0.007	37.50	60.00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27.00 m
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Paalgroep factor 10%

$F_{trek,d}$	536.4 kN
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ZWW4HL400+5

DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CCC

Bepaling opneembare paalbelasting op druk

heipaal	v	
diameter	a	2 mm
		2 mm
Deq		0.001808

maximale puntweerstand

$P_{r,max;punt;i}$		11.25 MN/m ²
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paalklasse factor	α_p	1.00
factor paalvoet	β	1
hoek van inwendige vrijwing van paalvoet	ϕ	40
factor dwarsdoorsnede paalvoet	s	1.00
minimale waarde neergaande deel	$q_{c,II;gem}$	9.00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14.00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11.00 MN/m ²

maximale paalschachtwrijving

$P_{r,max;schacht;i}$		0.05 MN/m ²
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waarin:		
paalfactor	α_s	0.010
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5.00 MN/m ²

maximale draagkracht alleenstaande paal

$F_{r,max;i}$		0.00 MN
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waarin:		
$F_{r,max;punt;i}$		0.00 MN

paalpunt oppervlak	A_{punt}	0.00 m ²
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$F_{r,max;schacht;i}$		0.00 MN
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gemiddelde paalomtrek	$O_{p;gem}$	0.01 m
lengte schachtwrijving	Δl	15.00 m

Bepaling rekenwaarde van de maximale draagkracht

$F_{r,paal,max;d}$	MN	0.00 MN
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materiaalfactor grond	γ_{mb}	1.20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0.75

$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27.00 m
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ZWW4HL400+5

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h		68.2	m
Diameter voet		d voet		3.5	m
top		d top		0.8	m
gem		d gem		2.2	m
wanddikte		t		28	mm
Oppervlakte aan voet		A		305413	mm ²
Traagheidsmoment aan voet		W _x		2.63E+08	mm ⁴
Weerstandsmoment aan voet		I _x		4.55E+11	mm ⁶
Mast: Gewicht		2 ^{de} orde		10.0	%
		F _{rep,ver}		991	kN

Bijlage BCC

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	67.6	20.0	65.7	0.0	65.7	2919 kNm
150C1F1	57.6	32.0	123.7	0.0	123.7	5860 kNm
150C1F2	47.4	32.0	121.5	0.0	121.5	4743 kNm
150C1F3	37.2	32.1	118.8	0.0	118.8	3648 kNm
380C2F1	57.6	64.0	247.5	0.0	247.5	11720 kNm
380C2F2	47.4	64.0	243.0	0.0	243.0	9485 kNm
380C2F3	37.2	64.2	237.6	0.0	237.6	7296 kNm
RTG	27.1	20.1	60.2	-113.6	128.5	2042 kNm

Stuwdruk	F _{hor.}	43.2	kN
	M _{d,wind}	1316	kNm
Totaal	M _{d,tot}	61219	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	67341	kNm

Normaalkracht;

Optredende normaalkracht			
N _{d,geleiders}		328	kN
N _{d, e.g. mast}		1189	kN
N _{s,d,totaal}		1517	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA
β _a	0.63
A _{eff}	193520 mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{yd} /γ _{m1}	8	N/mm ²
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Moment;

Optredende moment in de voet:		
M _{d,tot}	67341	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA
β _a	0.93
W _{eff}	2.46E+08 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	274	N/mm ²
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Totale spanning:

σ _d	282	N/mm ²	< 284 N/mm ² = ACCOORD
σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	67.6	14.3	49.7	0.0	49.7	3357 kNm
150C1F1	57.6	24.6	97.4	0.0	97.4	5609 kNm
150C1F2	47.4	24.6	95.9	0.0	95.9	4546 kNm
150C1F3	37.2	24.7	94.1	0.0	94.1	3502 kNm
380C2F1	57.6	49.2	194.7	0.0	194.7	11217 kNm
380C2F2	47.4	49.3	191.8	0.0	191.8	9092 kNm
380C2F3	37.2	49.4	188.3	0.0	188.3	7004 kNm
RTG	27.1	14.3	45.9	-88.0	99.3	2690 kNm

Stuwdruk	F _{hor.}	348	kN
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Verplaatsing		1.37	m
Percentage van de verplaatsing		2.01%	
Hoek		2.18	graden
Kromming		0.47%	
Fundatie rotatiestijfheid		0.005	rad

3.72	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4HL400+5

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2541	10119	19241	2541	10119	-19241
Wind, 10°C	150C1F1	9392	35344	68871	9392	35344	-68871
Permanent loads yg= 1.2	150C1F2	9400	34951	68539	9400	34951	-68539
Wind angle: 0°	150C1F3	9409	34476	68161	9409	34476	-68161
	380C2F1	18785	70689	137742	18785	70689	-137742
	380C2F2	18800	69902	137077	18800	69902	-137077
	380C2F3	18819	68952	136323	18819	68952	-136323
	RTG	0	0	0	5100	18889	-37205
NL1/1b	GW / opgw	2597	9855	20643	2597	9855	-20643
Wind, -20°C	150C1F1	9581	36501	76892	9581	36501	-76892
Permanent loads yg= 1.2	150C1F2	9581	36453	76892	9581	36453	-76892
Wind angle: 0°	150C1F3	9582	36394	76893	9582	36394	-76893
	380C2F1	19162	73002	153785	19162	73002	-153785
	380C2F2	19163	72906	153783	19163	72906	-153783
	380C2F3	19164	72788	153786	19164	72788	-153786
	RTG	0	0	0	5184	19374	-40887
NL1/3	GW / opgw	10099	27053	55486	10099	27053	-55486
Wind, -5°C	150C1F1	16178	52197	108068	16178	52197	-108068
Permanent loads yg= 1.2	150C1F2	16180	52055	108048	16180	52055	-108048
Wind angle: 0°	150C1F3	16182	51880	108031	16182	51880	-108031
	380C2F1	32357	104394	216136	32357	104394	-216136
	380C2F2	32360	104110	216097	32360	104110	-216097
	380C2F3	32363	103759	216062	32363	103759	-216062
	RTG	0	0	0	20233	53396	-111122
NL1/4	GW / opgw	3388	11090	23292	3388	11090	-23292
Construction/maintenance, +5°C	150C1F1	11104	36894	77734	11104	36894	-77734
Permanent loads yg= 1.2	150C1F2	11104	36848	77738	11104	36848	-77738
Wind angle: 0°	150C1F3	11104	36791	77744	11104	36791	-77744
	380C2F1	22208	73788	155469	22208	73788	-155469
	380C2F2	22208	73696	155476	22208	73696	-155476
	380C2F3	22209	73582	155488	22209	73582	-155488
	RTG	0	0	0	6770	22005	-46529
NL1/6	GW / opgw	2881	9372	20099	2881	9372	-20099
Permanent, +10°C	150C1F1	10610	34358	73681	10610	34358	-73681
Permanent loads yg= 1.35	150C1F2	10610	34358	73681	10610	34358	-73681
	150C1F3	10610	34358	73681	10610	34358	-73681
	380C2F1	21221	68716	147361	21221	68716	-147361
	380C2F2	21221	68716	147361	21221	68716	-147361
	380C2F3	21221	68716	147361	21221	68716	-147361
	RTG	0	0	0	5755	18728	-40162
NL1/1a	GW / opgw	2554	9423	18597	2402	21926	-34848
Wind, 10°C	150C1F1	9425	33623	67569	8938	66378	-108088
Permanent loads yg= 1.2	150C1F2	9429	33407	67440	8966	63181	-103759
Wind angle: 45°	150C1F3	9433	33144	67297	9006	59178	-98355
	380C2F1	18850	67246	135138	17875	132756	-216176
	380C2F2	18857	66814	134880	17932	126361	-207518
	380C2F3	18866	66288	134595	18012	118356	-196711
	RTG	0	0	0	4874	33516	-55542
NL1/1b	GW / opgw	2598	9773	20637	2568	11251	-21697
Wind, -20°C	150C1F1	9583	36283	76902	9513	39994	-78923
Permanent loads yg= 1.2	150C1F2	9583	36253	76906	9523	39599	-78581
Wind angle: 45°	150C1F3	9583	36217	76911	9534	39122	-78192
	380C2F1	19166	72565	153803	19027	79988	-157847
	380C2F2	19166	72506	153811	19046	79198	-157162
	380C2F3	19166	72433	153822	19068	78243	-156385
	RTG	0	0	0	5156	20980	-41729
NL1/3	GW / opgw	10103	26649	55492	9983	33504	-59341
Wind, -5°C	150C1F1	16185	51553	108022	15963	63028	-116032
Permanent loads yg= 1.2	150C1F2	16185	51468	108025	15990	61799	-114807
Wind angle: 45°	150C1F3	16186	51361	108032	16022	60309	-113386
	380C2F1	32370	103106	216044	31926	126056	-232063
	380C2F2	32371	102935	216050	31979	123598	-229615
	380C2F3	32373	102722	216064	32044	120617	-226772
	RTG	0	0	0	20116	60994	-114063
NL1/4	GW / opgw	3389	11014	23298	3369	12284	-23911
Construction/maintenance, +5°C	150C1F1	11105	36683	77760	11055	40097	-79140
Permanent loads yg= 1.2	150C1F2	11105	36655	77766	11062	39742	-78885
Wind angle: 45°	150C1F3	11105	36619	77774	11070	39313	-78598
	380C2F1	22210	73366	155521	22111	80193	-158279
	380C2F2	22210	73309	155532	22124	79484	-157769
	380C2F3	22211	73238	155547	22140	78625	-157197
	RTG	0	0	0	6752	23418	-46954

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2409	20829	33346	2409	20829	-33346
	150C1F1	8964	63351	103989	8964	63351	-103989
	150C1F2	8993	60387	99985	8993	60387	-99985
	150C1F3	9034	56687	95008	9034	56687	-95008
	380C2F1	17928	126702	207978	17928	126702	-207978
	380C2F2	17986	120775	199971	17986	120775	-199971
	380C2F3	18067	113375	190016	18067	113375	-190016
	RTG	0	0	0	4889	32050	-53540
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2572	11099	21540	2572	11099
150C1F1		9522	39620	78599	9522	39620	-78599
150C1F2		9531	39264	78305	9531	39264	-78305
150C1F3		9540	38834	77973	9540	38834	-77973
380C2F1		19045	79239	157198	19045	79239	-157198
380C2F2		19061	78528	156610	19061	78528	-156610
380C2F3		19080	77667	155946	19080	77667	-155946
RTG		0	0	0	5160	20810	-41591
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°		GW / opgw	9997	32826	58762	9997	32826
	150C1F1	15988	61864	114870	15988	61864	-114870
	150C1F2	16012	60753	113802	16012	60753	-113802
	150C1F3	16042	59408	112567	16042	59408	-112567
	380C2F1	31976	123727	229741	31976	123727	-229741
	380C2F2	32025	121507	227604	32025	121507	-227604
	380C2F3	32084	118815	225133	32084	118815	-225133
	RTG	0	0	0	20131	60210	-113550
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3372	12158	23810	3372	12158
150C1F1		11062	39761	78898	11062	39761	-78898
150C1F2		11068	39441	78681	11068	39441	-78681
150C1F3		11075	39052	78439	11075	39052	-78439
380C2F1		22124	79522	157795	22124	79522	-157795
380C2F2		22136	78882	157362	22136	78882	-157362
380C2F3		22150	78105	156877	22150	78105	-156877
RTG		0	0	0	6754	23273	-46871
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2402	21926	34848	2554	9423
	150C1F1	8938	66378	108088	9425	33623	-67569
	150C1F2	8966	63181	103759	9429	33407	-67440
	150C1F3	9006	59178	98355	9433	33144	-67297
	380C2F1	17875	132756	216176	18850	67246	-135138
	380C2F2	17932	126361	207518	18857	66814	-134880
	380C2F3	18012	118356	196711	18866	66288	-134595
	RTG	0	0	0	5114	18101	-36656
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2568	11251	21697	2598	9773
150C1F1		9513	39994	78923	9583	36283	-76902
150C1F2		9523	39599	78581	9583	36253	-76906
150C1F3		9534	39122	78192	9583	36217	-76911
380C2F1		19027	79988	157847	19166	72565	-153803
380C2F2		19046	79198	157162	19166	72506	-153811
380C2F3		19068	78243	156385	19166	72433	-153822
RTG		0	0	0	5184	19271	-40895
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	9983	33504	59341	10103	26649
	150C1F1	15963	63028	116032	16185	51553	-108022
	150C1F2	15990	61799	114807	16185	51468	-108025
	150C1F3	16022	60309	113386	16186	51361	-108032
	380C2F1	31926	126056	232063	32370	103106	-216044
	380C2F2	31979	123598	229615	32371	102935	-216050
	380C2F3	32044	120617	226772	32373	102722	-216064
	RTG	0	0	0	20237	52885	-111195
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3369	12284	23911	3389	11014
150C1F1		11055	40097	79140	11105	36683	-77760
150C1F2		11062	39742	78885	11105	36655	-77766
150C1F3		11070	39313	78598	11105	36619	-77774
380C2F1		22111	80193	158279	22210	73366	-155521
380C2F2		22124	79484	157769	22210	73309	-155532
380C2F3		22140	78625	157197	22211	73238	-155547
RTG		0	0	0	6770	21907	-46547
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1901	8557	15891	1901	8557
	150C1F1	7048	29381	56084	7048	29381	-56084
	150C1F2	7057	28914	55593	7057	28914	-55593
	150C1F3	7069	28350	55027	7069	28350	-55027
	380C2F1	14095	58762	112169	14095	58762	-112169
	380C2F2	14114	57828	111186	14114	57828	-111186
	380C2F3	14138	56701	110053	14138	56701	-110053
	RTG	0	0	0	3829	15511	-29962

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1961	7954	16566	1961	7954	-16566
	150C1F1	7244	29649	62199	7244	29649	-62199
	150C1F2	7245	29597	62190	7245	29597	-62190
	150C1F3	7245	29533	62181	7245	29533	-62181
	380C2F1	14488	59298	124398	14488	59298	-124398
	380C2F2	14489	59194	124379	14489	59194	-124379
	380C2F3	14491	59067	124362	14491	59067	-124362
	RTG	0	0	0	3914	15562	-32713
	NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	9483	25880	52972	9483	25880
150C1F1		13875	46651	96174	13875	46651	-96174
150C1F2		13877	46501	96139	13877	46501	-96139
150C1F3		13879	46317	96103	13879	46317	-96103
380C2F1		27750	93301	192348	27750	93301	-192348
380C2F2		27754	93002	192277	27754	93002	-192277
380C2F3		27759	92635	192206	27759	92635	-192206
RTG		0	0	0	19003	51036	-106061
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	2759	9415	19698	2759	9415
	150C1F1	8784	30638	64319	8784	30638	-64319
	150C1F2	8784	30590	64318	8784	30590	-64318
	150C1F3	8785	30530	64317	8785	30530	-64318
	380C2F1	17568	61277	128639	17568	61277	-128639
	380C2F2	17568	61180	128635	17568	61180	-128635
	380C2F3	17569	61060	128635	17569	61060	-128635
	RTG	0	0	0	5513	18644	-39322
	NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1934	6697	14362	1934	6697
150C1F1		7125	24717	53005	7125	24717	-53005
150C1F2		7125	24717	53005	7125	24717	-53005
150C1F3		7125	24717	53005	7125	24717	-53005
380C2F1		14250	49433	106010	14250	49433	-106010
380C2F2		14250	49433	106010	14250	49433	-106010
380C2F3		14250	49433	106010	14250	49433	-106010
RTG		0	0	0	3862	13373	-28678
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1918	7730	14965	1788	21424
	150C1F1	7089	27346	54110	6644	63988	-102965
	150C1F2	7094	27094	53904	6663	60599	-98225
	150C1F3	7099	26790	53671	6691	56320	-92228
	380C2F1	14178	54693	108220	13287	127976	-205930
	380C2F2	14187	54189	107808	13326	121197	-196449
	380C2F3	14199	53580	107343	13383	112640	-184457
	RTG	0	0	0	3621	31994	-52280
	NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1962	7865	16544	1925	9607
150C1F1		7247	29415	62173	7154	33732	-65497
150C1F2		7247	29383	62173	7166	33258	-64985
150C1F3		7247	29345	62175	7180	32687	-64394
380C2F1		14493	58829	124347	14308	67465	-130995
380C2F2		14494	58767	124347	14331	66517	-129970
380C2F3		14494	58690	124350	14360	65374	-128788
RTG		0	0	0	3877	17426	-34107
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	9487	25470	52964	9360	32529
	150C1F1	13883	45977	96064	13632	58439	-106194
	150C1F2	13884	45888	96060	13661	57095	-104722
	150C1F3	13885	45778	96059	13696	55462	-102995
	380C2F1	27766	91954	192128	27264	116878	-212388
	380C2F2	27768	91776	192120	27321	114190	-209444
	380C2F3	27770	91556	192119	27392	110925	-205991
	RTG	0	0	0	18877	58836	-109438
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2760	9335	19697	2736	10736
150C1F1		8785	30418	64324	8722	34216	-66531
150C1F2		8786	30388	64327	8731	33810	-66164
150C1F3		8786	30351	64332	8741	33319	-65746
380C2F1		17571	60835	128648	17444	68433	-133061
380C2F2		17571	60776	128655	17461	67620	-132328
380C2F3		17572	60702	128665	17481	66638	-131493
RTG		0	0	0	5491	20180	-40010
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	1792	20285	32182	1792	20285
	150C1F1	6662	60780	98478	6662	60780	-98478
	150C1F2	6682	57617	94048	6682	57617	-94048
	150C1F3	6712	53633	88461	6712	53633	-88461
	380C2F1	13324	121559	196956	13324	121559	-196956
	380C2F2	13364	115234	188095	13364	115234	-188095
	380C2F3	13423	107266	176922	13423	107266	-176922
	RTG	0	0	0	3632	30422	-50049

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1929	9423	17948	1929	9423	-17948
	150C1F1	7165	33283	65012	7165	33283	-65012
	150C1F2	7176	32857	64567	7176	32857	-64567
	150C1F3	7188	32343	64055	7188	32343	-64055
	380C2F1	14330	66567	130023	14330	66567	-130023
	380C2F2	14351	65714	129133	14351	65714	-129133
	380C2F3	14376	64686	128110	14376	64686	-128110
	RTG	0	0	0	3882	17221	-33896
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	9374	31829	56624	9374	31829	-56624
	150C1F1	13659	57166	104798	13659	57166	-104798
	150C1F2	13685	55950	103503	13685	55950	-103503
	150C1F3	13718	54475	101991	13718	54475	-101991
	380C2F1	27318	114331	209596	27318	114331	-209596
	380C2F2	27371	111899	207006	27371	111899	-207006
	380C2F3	27436	108950	203981	27436	108950	-203981
	RTG	0	0	0	18893	58026	-108869
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2739	10593	20455	2739	10593	-20455
	150C1F1	8730	33831	66183	8730	33831	-66183
	150C1F2	8738	33465	65868	8738	33465	-65868
	150C1F3	8746	33023	65510	8746	33023	-65510
	380C2F1	17460	67663	132366	17460	67663	-132366
	380C2F2	17475	66931	131736	17475	66931	-131736
	380C2F3	17493	66046	131020	17493	66046	-131020
	RTG	0	0	0	5494	20018	-39892
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1788	21424	33774	1918	7730	-14965
	150C1F1	6644	63988	102965	7089	27346	-54110
	150C1F2	6663	60599	98225	7094	27094	-53904
	150C1F3	6691	56320	92228	7099	26790	-53671
	380C2F1	13287	127976	205930	14178	54693	-108220
	380C2F2	13326	121197	196449	14187	54189	-107808
	380C2F3	13383	112640	184457	14199	53580	-107343
	RTG	0	0	0	3847	14586	-29117
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1925	9607	18171	1962	7865	-16544
	150C1F1	7154	33732	65497	7247	29415	-62173
	150C1F2	7166	33258	64985	7247	29383	-62173
	150C1F3	7180	32687	64394	7247	29345	-62175
	380C2F1	14308	67465	130995	14493	58829	-124347
	380C2F2	14331	66517	129970	14494	58767	-124347
	380C2F3	14360	65374	128788	14494	58690	-124350
	RTG	0	0	0	3915	15453	-32706
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	9360	32529	57252	9487	25470	-52964
	150C1F1	13632	58439	106194	13883	45977	-96064
	150C1F2	13661	57095	104722	13884	45888	-96060
	150C1F3	13696	55462	102995	13885	45778	-96059
	380C2F1	27264	116878	212388	27766	91954	-192128
	380C2F2	27321	114190	209444	27768	91776	-192120
	380C2F3	27392	110925	205991	27770	91556	-192119
	RTG	0	0	0	19006	50519	-106122
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2736	10736	20592	2760	9335	-19697
	150C1F1	8722	34216	66531	8785	30418	-64324
	150C1F2	8731	33810	66164	8786	30388	-64327
	150C1F3	8741	33319	65746	8786	30351	-64332
	380C2F1	17444	68433	133061	17571	60835	-128648
	380C2F2	17461	67620	132328	17571	60776	-128655
	380C2F3	17481	66638	131493	17572	60702	-128665
	RTG	0	0	0	5514	18543	-39334

ZWW4HL400+5

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2559	9188	-18426
	150C1F1	0	0	0	9435	33035	-67243
	150C1F2	0	0	0	9437	32877	-67170
	150C1F3	0	0	0	9440	32685	-67092
	380C2F1	0	0	0	18869	66070	-134486
	380C2F2	0	0	0	18874	65755	-134341
	380C2F3	0	0	0	18879	65370	-134183
	RTG	0	0	0	5118	17831	-36523
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2598	9807	-20638
	150C1F1	0	0	0	9582	36373	-76894
	150C1F2	0	0	0	9582	36336	-76896
	150C1F3	0	0	0	9583	36290	-76901
	380C2F1	0	0	0	19164	72745	-153788
	380C2F2	0	0	0	19165	72671	-153793
	380C2F3	0	0	0	19166	72580	-153802
	RTG	0	0	0	5184	19313	-40890
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4274	14546	-29174
	150C1F1	0	0	0	11004	38920	-80370
	150C1F2	0	0	0	11005	38797	-80335
	150C1F3	0	0	0	11007	38647	-80299
	380C2F1	0	0	0	22007	77840	-160739
	380C2F2	0	0	0	22010	77594	-160670
	380C2F3	0	0	0	22014	77294	-160599
	RTG	0	0	0	8559	28257	-57893
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3225	10619	-22378
	150C1F1	0	0	0	10778	35911	-75904
	150C1F2	0	0	0	10778	35876	-75909
	150C1F3	0	0	0	10778	35831	-75916
	380C2F1	0	0	0	21556	71823	-151809
	380C2F2	0	0	0	21556	71751	-151818
	380C2F3	0	0	0	21557	71662	-151832
	RTG	0	0	0	6444	21090	-44700
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2467	14414	-24585
	150C1F1	0	0	0	9182	46152	-81165
	150C1F2	0	0	0	9208	44664	-79289
	150C1F3	0	0	0	9241	42847	-77043
	380C2F1	0	0	0	18365	92303	-162331
	380C2F2	0	0	0	18416	89329	-158578
	380C2F3	0	0	0	18483	85694	-154087
	RTG	0	0	0	5003	23867	-42693
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2578	10828	-21276
	150C1F1	0	0	0	9538	38955	-78064
	150C1F2	0	0	0	9544	38668	-77852
	150C1F3	0	0	0	9551	38321	-77615
	380C2F1	0	0	0	19075	77909	-156127
	380C2F2	0	0	0	19088	77336	-155705
	380C2F3	0	0	0	19102	76641	-155231
	RTG	0	0	0	5166	20505	-41363
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4133	21991	-37166
	150C1F1	0	0	0	10798	48768	-89284
	150C1F2	0	0	0	10822	47637	-87988
	150C1F3	0	0	0	10852	46265	-86465
	380C2F1	0	0	0	21595	97536	-178569
	380C2F2	0	0	0	21643	95275	-175975
	380C2F3	0	0	0	21703	92531	-172929
	RTG	0	0	0	8386	36871	-65696
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3212	11524	-22767
	150C1F1	0	0	0	10745	38331	-76722
	150C1F2	0	0	0	10750	38067	-76561
	150C1F3	0	0	0	10755	37747	-76382
	380C2F1	0	0	0	21490	76661	-153445
	380C2F2	0	0	0	21500	76134	-153122
	380C2F3	0	0	0	21511	75494	-152765
	RTG	0	0	0	6431	22174	-44939
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2475	13868	-23856
	150C1F1	0	0	0	9207	44743	-79387
	150C1F2	0	0	0	9231	43391	-77709
	150C1F3	0	0	0	9262	41742	-75710
	380C2F1	0	0	0	18413	89485	-158774
	380C2F2	0	0	0	18462	86781	-155418
	380C2F3	0	0	0	18525	83484	-151421
	RTG	0	0	0	5015	23210	-41878
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2581	10718	-21176
	150C1F1	0	0	0	9543	38683	-77863
	150C1F2	0	0	0	9549	38424	-77684
	150C1F3	0	0	0	9555	38110	-77483
	380C2F1	0	0	0	19087	77366	-155726
	380C2F2	0	0	0	19098	76849	-155368
	380C2F3	0	0	0	19111	76221	-154966
	RTG	0	0	0	5169	20381	-41279

NL3/3	GW / opgw	0	0	0	4145	21217	-36203
Wind, -5°C	150C1F1	0	0	0	10820	47697	-88055
Permanent loads yg= 1.2	150C1F2	0	0	0	10843	46675	-86913
Wind angle: 90°	150C1F3	0	0	0	10870	45436	-85576
	380C2F1	0	0	0	21641	95394	-176110
	380C2F2	0	0	0	21685	93349	-173825
	380C2F3	0	0	0	21740	90872	-171153
	RTG	0	0	0	8405	35944	-64641
NL3/4	GW / opgw	0	0	0	3214	11429	-22700
Construction/maintenance, +5°C	150C1F1	0	0	0	10750	38081	-76569
Permanent loads yg= 1.2	150C1F2	0	0	0	10754	37843	-76434
Wind angle: 90°	150C1F3	0	0	0	10758	37552	-76284
	380C2F1	0	0	0	21499	76162	-153139
	380C2F2	0	0	0	21507	75685	-152867
	380C2F3	0	0	0	21517	75105	-152568
	RTG	0	0	0	6433	22064	-44887
NL3/1a	GW / opgw	0	0	0	2563	8913	-18276
Wind, 10°C	150C1F1	0	0	0	9444	32333	-66980
Permanent loads yg= 1.2	150C1F2	0	0	0	9445	32242	-66959
Wind angle: -45°	150C1F3	0	0	0	9447	32130	-66938
	380C2F1	0	0	0	18888	64666	-133960
	380C2F2	0	0	0	18891	64484	-133918
	380C2F3	0	0	0	18893	64261	-133876
	RTG	0	0	0	5122	17507	-36419
NL3/1b	GW / opgw	0	0	0	2598	9744	-20639
Wind, -20°C	150C1F1	0	0	0	9583	36204	-76914
Permanent loads yg= 1.2	150C1F2	0	0	0	9583	36181	-76918
Wind angle: -45°	150C1F3	0	0	0	9584	36152	-76924
	380C2F1	0	0	0	19167	72407	-153827
	380C2F2	0	0	0	19167	72361	-153836
	380C2F3	0	0	0	19167	72304	-153848
	RTG	0	0	0	5185	19234	-40901
NL3/3	GW / opgw	0	0	0	4280	14139	-28998
Wind, -5°C	150C1F1	0	0	0	11010	38369	-80256
Permanent loads yg= 1.2	150C1F2	0	0	0	11011	38297	-80251
Wind angle: -45°	150C1F3	0	0	0	11012	38207	-80247
	380C2F1	0	0	0	22020	76738	-160513
	380C2F2	0	0	0	22022	76593	-160501
	380C2F3	0	0	0	22023	76415	-160493
	RTG	0	0	0	8565	27773	-57788
NL3/4	GW / opgw	0	0	0	3226	10559	-22386
Construction/maintenance, +5°C	150C1F1	0	0	0	10779	35747	-75933
Permanent loads yg= 1.2	150C1F2	0	0	0	10779	35724	-75938
Wind angle: -45°	150C1F3	0	0	0	10779	35696	-75946
	380C2F1	0	0	0	21558	71493	-151866
	380C2F2	0	0	0	21558	71448	-151877
	380C2F3	0	0	0	21558	71392	-151891
	RTG	0	0	0	6444	21014	-44718
NL3/1a	GW / opgw	0	0	0	1923	7453	-14705
Wind, 10°C	150C1F1	0	0	0	7102	26664	-53581
Permanent loads yg= 0.9	150C1F2	0	0	0	7105	26483	-53458
Wind angle: 0°	150C1F3	0	0	0	7108	26263	-53321
	380C2F1	0	0	0	14203	53328	-107162
	380C2F2	0	0	0	14210	52966	-106916
	380C2F3	0	0	0	14217	52526	-106641
	RTG	0	0	0	3852	14275	-28895
NL3/1b	GW / opgw	0	0	0	1962	7901	-16550
Wind, -20°C	150C1F1	0	0	0	7246	29511	-62178
Permanent loads yg= 0.9	150C1F2	0	0	0	7246	29471	-62175
Wind angle: 0°	150C1F3	0	0	0	7246	29422	-62174
	380C2F1	0	0	0	14491	59021	-124357
	380C2F2	0	0	0	14492	58942	-124351
	380C2F3	0	0	0	14493	58845	-124347
	RTG	0	0	0	3915	15497	-32707
NL3/3	GW / opgw	0	0	0	3645	13022	-25906
Wind, -5°C	150C1F1	0	0	0	8677	32614	-66849
Permanent loads yg= 0.9	150C1F2	0	0	0	8679	32479	-66787
Wind angle: 0°	150C1F3	0	0	0	8682	32314	-66719
	380C2F1	0	0	0	17354	65229	-133697
	380C2F2	0	0	0	17359	64958	-133573
	380C2F3	0	0	0	17364	64628	-133439
	RTG	0	0	0	7306	25148	-51226
NL3/4	GW / opgw	0	0	0	2595	8915	-18725
Construction/maintenance, +5°C	150C1F1	0	0	0	8456	29589	-62346
Permanent loads yg= 0.9	150C1F2	0	0	0	8457	29551	-62347
Wind angle: 0°	150C1F3	0	0	0	8457	29505	-62350
	380C2F1	0	0	0	16913	59178	-124692
	380C2F2	0	0	0	16913	59103	-124695
	380C2F3	0	0	0	16914	59010	-124700
	RTG	0	0	0	5186	17676	-37378
NL3/1a	GW / opgw	0	0	0	1833	13460	-22541
Wind, 10°C	150C1F1	0	0	0	6831	41988	-72240
Permanent loads yg= 0.9	150C1F2	0	0	0	6854	40297	-69926
Wind angle: 45°	150C1F3	0	0	0	6885	38211	-67105
	380C2F1	0	0	0	13662	83977	-144480
	380C2F2	0	0	0	13708	80595	-139853
	380C2F3	0	0	0	13770	76422	-134210
	RTG	0	0	0	3725	21358	-37313
NL3/1b	GW / opgw	0	0	0	1936	9098	-17567
Wind, -20°C	150C1F1	0	0	0	7185	32487	-64196
Permanent loads yg= 0.9	150C1F2	0	0	0	7193	32146	-63867
Wind angle: 45°	150C1F3	0	0	0	7203	31734	-63491
	380C2F1	0	0	0	14369	64975	-128391
	380C2F2	0	0	0	14386	64292	-127734
	380C2F3	0	0	0	14406	63468	-126983
	RTG	0	0	0	3890	16660	-33545

NL3/3	GW / opgw	0	0	0	3501	21096	-35247
Wind, -5°C	150C1F1	0	0	0	8440	43943	-78940
Permanent loads yg= 0.9	150C1F2	0	0	0	8465	42649	-77292
Wind angle: 45°	150C1F3	0	0	0	8497	41071	-75327
	380C2F1	0	0	0	16880	87886	-157879
	380C2F2	0	0	0	16930	85298	-154585
	380C2F3	0	0	0	16994	82141	-150654
	RTG	0	0	0	7118	34563	-60749
NL3/4	GW / opgw	0	0	0	2579	9916	-19319
Construction/maintenance, +5°C	150C1F1	0	0	0	8414	32275	-63737
Permanent loads yg= 0.9	150C1F2	0	0	0	8420	31974	-63495
Wind angle: 45°	150C1F3	0	0	0	8427	31609	-63221
	380C2F1	0	0	0	16828	64549	-127473
	380C2F2	0	0	0	16840	63947	-126989
	380C2F3	0	0	0	16854	63219	-126443
	RTG	0	0	0	5170	18849	-37811
NL3/1a	GW / opgw	0	0	0	1839	12858	-21692
Wind, 10°C	150C1F1	0	0	0	6853	40387	-70048
Permanent loads yg= 0.9	150C1F2	0	0	0	6875	38838	-67948
Wind angle: 90°	150C1F3	0	0	0	6905	36932	-65398
	380C2F1	0	0	0	13706	80773	-140097
	380C2F2	0	0	0	13751	77675	-135895
	380C2F3	0	0	0	13811	73864	-130796
	RTG	0	0	0	3736	20602	-36285
NL3/1b	GW / opgw	0	0	0	1940	8966	-17419
Wind, -20°C	150C1F1	0	0	0	7193	32164	-63884
Permanent loads yg= 0.9	150C1F2	0	0	0	7200	31857	-63601
Wind angle: 90°	150C1F3	0	0	0	7209	31486	-63278
	380C2F1	0	0	0	14385	64327	-127767
	380C2F2	0	0	0	14400	63713	-127201
	380C2F3	0	0	0	14417	62972	-126557
	RTG	0	0	0	3894	16713	-33412
NL3/3	GW / opgw	0	0	0	3512	20273	-34179
Wind, -5°C	150C1F1	0	0	0	8464	42717	-77378
Permanent loads yg= 0.9	150C1F2	0	0	0	8487	41543	-75909
Wind angle: 90°	150C1F3	0	0	0	8517	40113	-74163
	380C2F1	0	0	0	16927	85434	-154757
	380C2F2	0	0	0	16974	83085	-151818
	380C2F3	0	0	0	17034	80226	-148327
	RTG	0	0	0	7137	33555	-59520
NL3/4	GW / opgw	0	0	0	2581	9809	-19225
Construction/maintenance, +5°C	150C1F1	0	0	0	8420	31989	-63507
Permanent loads yg= 0.9	150C1F2	0	0	0	8425	31718	-63300
Wind angle: 90°	150C1F3	0	0	0	8431	31389	-63068
	380C2F1	0	0	0	16839	63979	-127014
	380C2F2	0	0	0	16850	63436	-126601
	380C2F3	0	0	0	16862	62778	-126136
	RTG	0	0	0	5172	18728	-37732
NL3/1a	GW / opgw	0	0	0	1929	7134	-14462
Wind, 10°C	150C1F1	0	0	0	7115	25866	-53112
Permanent loads yg= 0.9	150C1F2	0	0	0	7116	25765	-53069
Wind angle: -45°	150C1F3	0	0	0	7118	25641	-53022
	380C2F1	0	0	0	14229	51732	-106224
	380C2F2	0	0	0	14232	51529	-106137
	380C2F3	0	0	0	14235	51282	-106044
	RTG	0	0	0	3857	13909	-28704
NL3/1b	GW / opgw	0	0	0	1963	7833	-16541
Wind, -20°C	150C1F1	0	0	0	7247	29331	-62176
Permanent loads yg= 0.9	150C1F2	0	0	0	7247	29307	-62178
Wind angle: -45°	150C1F3	0	0	0	7248	29277	-62181
	380C2F1	0	0	0	14494	58662	-124352
	380C2F2	0	0	0	14495	58614	-124355
	380C2F3	0	0	0	14495	58555	-124362
	RTG	0	0	0	3916	15414	-32709
NL3/3	GW / opgw	0	0	0	3653	12584	-25664
Wind, -5°C	150C1F1	0	0	0	8686	32012	-66625
Permanent loads yg= 0.9	150C1F2	0	0	0	8687	31934	-66607
Wind angle: -45°	150C1F3	0	0	0	8688	31839	-66589
	380C2F1	0	0	0	17372	64025	-133249
	380C2F2	0	0	0	17374	63869	-133214
	380C2F3	0	0	0	17376	63677	-133179
	RTG	0	0	0	7313	24635	-51058
NL3/4	GW / opgw	0	0	0	2596	8853	-18727
Construction/maintenance, +5°C	150C1F1	0	0	0	8458	29417	-62360
Permanent loads yg= 0.9	150C1F2	0	0	0	8458	29394	-62364
Wind angle: -45°	150C1F3	0	0	0	8458	29365	-62369
	380C2F1	0	0	0	16915	58835	-124720
	380C2F2	0	0	0	16915	58788	-124728
	380C2F3	0	0	0	16916	58730	-124738
	RTG	0	0	0	5186	17597	-37391

ZWW4HL400+5

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2559	9188	18426	0	0	0
	150C1F1	9435	33035	67243	0	0	0
	150C1F2	9437	32877	67170	0	0	0
	150C1F3	9440	32685	67092	0	0	0
	380C2F1	18869	66070	134486	0	0	0
	380C2F2	18874	65755	134341	0	0	0
	380C2F3	18879	65370	134183	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2598	9807	20638	0	0	0
	150C1F1	9582	36373	76894	0	0	0
	150C1F2	9582	36336	76896	0	0	0
	150C1F3	9583	36290	76901	0	0	0
	380C2F1	19164	72745	153788	0	0	0
	380C2F2	19165	72671	153793	0	0	0
	380C2F3	19166	72580	153802	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4274	14546	29174	0	0	0
	150C1F1	11004	38920	80370	0	0	0
	150C1F2	11005	38797	80335	0	0	0
	150C1F3	11007	38647	80299	0	0	0
	380C2F1	22007	77840	160739	0	0	0
	380C2F2	22010	77594	160670	0	0	0
	380C2F3	22014	77294	160599	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3225	10619	22378	0	0	0
	150C1F1	10778	35911	75904	0	0	0
	150C1F2	10778	35876	75909	0	0	0
	150C1F3	10778	35831	75916	0	0	0
	380C2F1	21556	71823	151809	0	0	0
	380C2F2	21556	71751	151818	0	0	0
	380C2F3	21557	71662	151832	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2563	8913	18276	0	0	0
	150C1F1	9444	32333	66980	0	0	0
	150C1F2	9445	32242	66959	0	0	0
	150C1F3	9447	32130	66938	0	0	0
	380C2F1	18888	64666	133960	0	0	0
	380C2F2	18891	64484	133918	0	0	0
	380C2F3	18893	64261	133876	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2598	9744	20639	0	0	0
	150C1F1	9583	36204	76914	0	0	0
	150C1F2	9583	36181	76918	0	0	0
	150C1F3	9584	36152	76924	0	0	0
	380C2F1	19167	72407	153827	0	0	0
	380C2F2	19167	72361	153836	0	0	0
	380C2F3	19167	72304	153848	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4280	14139	28998	0	0	0
	150C1F1	11010	38369	80256	0	0	0
	150C1F2	11011	38297	80251	0	0	0
	150C1F3	11012	38207	80247	0	0	0
	380C2F1	22020	76738	160513	0	0	0
	380C2F2	22022	76593	160501	0	0	0
	380C2F3	22023	76415	160493	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3226	10559	22386	0	0	0
	150C1F1	10779	35747	75933	0	0	0
	150C1F2	10779	35724	75938	0	0	0
	150C1F3	10779	35696	75946	0	0	0
	380C2F1	21558	71493	151866	0	0	0
	380C2F2	21558	71448	151877	0	0	0
	380C2F3	21558	71392	151891	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2475	13868	23856	0	0	0
	150C1F1	9207	44743	79387	0	0	0
	150C1F2	9231	43391	77709	0	0	0
	150C1F3	9262	41742	75710	0	0	0
	380C2F1	18413	89485	158774	0	0	0
	380C2F2	18462	86781	155418	0	0	0
	380C2F3	18525	83484	151421	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2581	10718	21176	0	0	0
	150C1F1	9543	38683	77863	0	0	0
	150C1F2	9549	38424	77684	0	0	0
	150C1F3	9555	38110	77483	0	0	0
	380C2F1	19087	77366	155726	0	0	0
	380C2F2	19098	76849	155368	0	0	0
	380C2F3	19111	76221	154966	0	0	0
	RTG	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4145	21217	36203	0	0	0
	150C1F1	10820	47697	88055	0	0	0
	150C1F2	10843	46675	86913	0	0	0
	150C1F3	10870	45436	85576	0	0	0
	380C2F1	21641	95394	176110	0	0	0
	380C2F2	21685	93349	173825	0	0	0
	380C2F3	21740	90872	171153	0	0	0
	RTG	0	0	0	0	0	0
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3214	11429	22700	0	0
150C1F1		10750	38081	76569	0	0	0
150C1F2		10754	37843	76434	0	0	0
150C1F3		10758	37552	76284	0	0	0
380C2F1		21499	76162	153139	0	0	0
380C2F2		21507	75685	152867	0	0	0
380C2F3		21517	75105	152568	0	0	0
RTG		0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2467	14414	24585	0	0
	150C1F1	9182	46152	81165	0	0	0
	150C1F2	9208	44664	79289	0	0	0
	150C1F3	9241	42847	77043	0	0	0
	380C2F1	18365	92303	162331	0	0	0
	380C2F2	18416	89329	158578	0	0	0
	380C2F3	18483	85694	154087	0	0	0
	RTG	0	0	0	0	0	0
	NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2578	10828	21276	0	0
150C1F1		9538	38955	78064	0	0	0
150C1F2		9544	38668	77852	0	0	0
150C1F3		9551	38321	77615	0	0	0
380C2F1		19075	77909	156127	0	0	0
380C2F2		19088	77336	155705	0	0	0
380C2F3		19102	76641	155231	0	0	0
RTG		0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	4133	21991	37166	0	0
	150C1F1	10798	48768	89284	0	0	0
	150C1F2	10822	47637	87988	0	0	0
	150C1F3	10852	46265	86465	0	0	0
	380C2F1	21595	97536	178569	0	0	0
	380C2F2	21643	95275	175975	0	0	0
	380C2F3	21703	92531	172929	0	0	0
	RTG	0	0	0	0	0	0
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3212	11524	22767	0	0
150C1F1		10745	38331	76722	0	0	0
150C1F2		10750	38067	76561	0	0	0
150C1F3		10755	37747	76382	0	0	0
380C2F1		21490	76661	153445	0	0	0
380C2F2		21500	76134	153122	0	0	0
380C2F3		21511	75494	152765	0	0	0
RTG		0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1923	7453	14705	0	0
	150C1F1	7102	26664	53581	0	0	0
	150C1F2	7105	26483	53458	0	0	0
	150C1F3	7108	26263	53321	0	0	0
	380C2F1	14203	53328	107162	0	0	0
	380C2F2	14210	52966	106916	0	0	0
	380C2F3	14217	52526	106641	0	0	0
	RTG	0	0	0	0	0	0
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1962	7901	16550	0	0
150C1F1		7246	29511	62178	0	0	0
150C1F2		7246	29471	62175	0	0	0
150C1F3		7246	29422	62174	0	0	0
380C2F1		14491	59021	124357	0	0	0
380C2F2		14492	58942	124351	0	0	0
380C2F3		14493	58845	124347	0	0	0
RTG		0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	3645	13022	25906	0	0
	150C1F1	8677	32614	66849	0	0	0
	150C1F2	8679	32479	66787	0	0	0
	150C1F3	8682	32314	66719	0	0	0
	380C2F1	17354	65229	133697	0	0	0
	380C2F2	17359	64958	133573	0	0	0
	380C2F3	17364	64628	133439	0	0	0
	RTG	0	0	0	0	0	0
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2595	8915	18725	0	0
150C1F1		8456	29589	62346	0	0	0
150C1F2		8457	29551	62347	0	0	0
150C1F3		8457	29505	62350	0	0	0
380C2F1		16913	59178	124692	0	0	0
380C2F2		16913	59103	124695	0	0	0
380C2F3		16914	59010	124700	0	0	0
RTG		0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1929	7134	14462	0	0
	150C1F1	7115	25866	53112	0	0	0
	150C1F2	7116	25765	53069	0	0	0
	150C1F3	7118	25641	53022	0	0	0
	380C2F1	14229	51732	106224	0	0	0
	380C2F2	14232	51529	106137	0	0	0
	380C2F3	14235	51282	106044	0	0	0
	RTG	0	0	0	0	0	0
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7833	16541	0	0
150C1F1		7247	29331	62176	0	0	0
150C1F2		7247	29307	62178	0	0	0
150C1F3		7248	29277	62181	0	0	0
380C2F1		14494	58662	124352	0	0	0
380C2F2		14495	58614	124355	0	0	0
380C2F3		14495	58555	124362	0	0	0
RTG		0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3653	12584	25664	0	0	0
	150C1F1	8686	32012	66625	0	0	0
	150C1F2	8687	31934	66607	0	0	0
	150C1F3	8688	31839	66589	0	0	0
	380C2F1	17372	64025	133249	0	0	0
	380C2F2	17374	63869	133214	0	0	0
	380C2F3	17376	63677	133179	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2596	8853	18727	0	0	0
	150C1F1	8458	29417	62360	0	0	0
	150C1F2	8458	29394	62364	0	0	0
	150C1F3	8458	29365	62369	0	0	0
	380C2F1	16915	58835	124720	0	0	0
	380C2F2	16915	58788	124728	0	0	0
	380C2F3	16916	58730	124738	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1839	12858	21692	0	0	0
	150C1F1	6853	40387	70048	0	0	0
	150C1F2	6875	38838	67948	0	0	0
	150C1F3	6905	36932	65398	0	0	0
	380C2F1	13706	80773	140097	0	0	0
	380C2F2	13751	77675	135895	0	0	0
	380C2F3	13811	73864	130796	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1940	8966	17419	0	0	0
	150C1F1	7193	32164	63884	0	0	0
	150C1F2	7200	31857	63601	0	0	0
	150C1F3	7209	31486	63278	0	0	0
	380C2F1	14385	64327	127767	0	0	0
	380C2F2	14400	63713	127201	0	0	0
	380C2F3	14417	62972	126557	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3512	20273	34179	0	0	0
	150C1F1	8464	42717	77378	0	0	0
	150C1F2	8487	41543	75909	0	0	0
	150C1F3	8517	40113	74163	0	0	0
	380C2F1	16927	85434	154757	0	0	0
	380C2F2	16974	83085	151818	0	0	0
	380C2F3	17034	80226	148327	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2581	9809	19225	0	0	0
	150C1F1	8420	31989	63507	0	0	0
	150C1F2	8425	31718	63300	0	0	0
	150C1F3	8431	31389	63068	0	0	0
	380C2F1	16839	63979	127014	0	0	0
	380C2F2	16850	63436	126601	0	0	0
	380C2F3	16862	62778	126136	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1833	13460	22541	0	0	0
	150C1F1	6831	41988	72240	0	0	0
	150C1F2	6854	40297	69926	0	0	0
	150C1F3	6885	38211	67105	0	0	0
	380C2F1	13662	83977	144480	0	0	0
	380C2F2	13708	80595	139853	0	0	0
	380C2F3	13770	76422	134210	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1936	9098	17567	0	0	0
	150C1F1	7185	32487	64196	0	0	0
	150C1F2	7193	32146	63867	0	0	0
	150C1F3	7203	31734	63491	0	0	0
	380C2F1	14369	64975	128391	0	0	0
	380C2F2	14386	64292	127734	0	0	0
	380C2F3	14406	63468	126983	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3501	21096	35247	0	0	0
	150C1F1	8440	43943	78940	0	0	0
	150C1F2	8465	42649	77292	0	0	0
	150C1F3	8497	41071	75327	0	0	0
	380C2F1	16880	87886	157879	0	0	0
	380C2F2	16930	85298	154585	0	0	0
	380C2F3	16994	82141	150654	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2579	9916	19319	0	0	0
	150C1F1	8414	32275	63737	0	0	0
	150C1F2	8420	31974	63495	0	0	0
	150C1F3	8427	31609	63221	0	0	0
	380C2F1	16828	64549	127473	0	0	0
	380C2F2	16840	63947	126989	0	0	0
	380C2F3	16854	63219	126443	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HL400+5

Appendix CC1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2559	9188	18426	2559	9188	-18426
	150C1F1	9435	33035	67243	9435	33035	-67243
	150C1F2	9437	32877	67170	9437	32877	-67170
	150C1F3	9440	32685	67092	9440	32685	-67092
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2598	9807	20638	2598	9807	-20638
	150C1F1	9582	36373	76894	9582	36373	-76894
	150C1F2	9582	36336	76896	9582	36336	-76896
	150C1F3	9583	36290	76901	9583	36290	-76901
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4274	14546	29174	4274	14546	-29174
	150C1F1	11004	38920	80370	11004	38920	-80370
	150C1F2	11005	38797	80335	11005	38797	-80335
	150C1F3	11007	38647	80299	11007	38647	-80299
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3225	10619	22378	3225	10619	-22378
	150C1F1	10778	35911	75904	10778	35911	-75904
	150C1F2	10778	35876	75909	10778	35876	-75909
	150C1F3	10778	35831	75916	10778	35831	-75916
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2563	8913	18276	2467	14414	-24585
	150C1F1	9444	32333	66980	9182	46152	-81165
	150C1F2	9445	32242	66959	9208	44664	-79289
	150C1F3	9447	32130	66938	9241	42847	-77043
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2598	9744	20639	2578	10828	-21276
	150C1F1	9583	36204	76914	9538	38955	-78064
	150C1F2	9583	36181	76918	9544	38668	-77852
	150C1F3	9584	36152	76924	9551	38321	-77615
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4280	14139	28998	4133	21991	-37166
	150C1F1	11010	38369	80256	10798	48768	-89284
	150C1F2	11011	38297	80251	10822	47637	-87988
	150C1F3	11012	38207	80247	10852	46265	-86465
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3226	10559	22386	3212	11524	-22767
	150C1F1	10779	35747	75933	10745	38331	-76722
	150C1F2	10779	35724	75938	10750	38067	-76561
	150C1F3	10779	35696	75946	10755	37747	-76382
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2475	13868	23856	2475	13868	-23856
	150C1F1	9207	44743	79387	9207	44743	-79387
	150C1F2	9231	43391	77709	9231	43391	-77709
	150C1F3	9262	41742	75710	9262	41742	-75710
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2581	10718	21176	2581	10718	-21176
	150C1F1	9543	38683	77863	9543	38683	-77863
	150C1F2	9549	38424	77684	9549	38424	-77684
	150C1F3	9555	38110	77483	9555	38110	-77483
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
RTG	0	0	0	0	0	0	

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4145	21217	36203	4145	21217	-36203
	150C1F1	10820	47697	88055	10820	47697	-88055
	150C1F2	10843	46675	86913	10843	46675	-86913
	150C1F3	10870	45436	85576	10870	45436	-85576
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3214	11429	22700	3214	11429	-22700
	150C1F1	10750	38081	76569	10750	38081	-76569
	150C1F2	10754	37843	76434	10754	37843	-76434
	150C1F3	10758	37552	76284	10758	37552	-76284
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2467	14414	24585	2563	8913	-18276
	150C1F1	9182	46152	81165	9444	32333	-66980
	150C1F2	9208	44664	79289	9445	32242	-66959
	150C1F3	9241	42847	77043	9447	32130	-66938
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2578	10828	21276	2598	9744	-20639
	150C1F1	9538	38955	78064	9583	36204	-76914
	150C1F2	9544	38668	77852	9583	36181	-76918
	150C1F3	9551	38321	77615	9584	36152	-76924
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4133	21991	37166	4280	14139	-28998
	150C1F1	10798	48768	89284	11010	38369	-80256
	150C1F2	10822	47637	87988	11011	38297	-80251
	150C1F3	10852	46265	86465	11012	38207	-80247
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3212	11524	22767	3226	10559	-22386
	150C1F1	10745	38331	76722	10779	35747	-75933
	150C1F2	10750	38067	76561	10779	35724	-75938
	150C1F3	10755	37747	76382	10779	35696	-75946
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1923	7453	14705	1923	7453	-14705
	150C1F1	7102	26664	53581	7102	26664	-53581
	150C1F2	7105	26483	53458	7105	26483	-53458
	150C1F3	7108	26263	53321	7108	26263	-53321
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1962	7901	16550	1962	7901	-16550
	150C1F1	7246	29511	62178	7246	29511	-62178
	150C1F2	7246	29471	62175	7246	29471	-62175
	150C1F3	7246	29422	62174	7246	29422	-62174
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3645	13022	25906	3645	13022	-25906
	150C1F1	8677	32614	66849	8677	32614	-66849
	150C1F2	8679	32479	66787	8679	32479	-66787
	150C1F3	8682	32314	66719	8682	32314	-66719
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2595	8915	18725	2595	8915	-18725
	150C1F1	8456	29589	62346	8456	29589	-62346
	150C1F2	8457	29551	62347	8457	29551	-62347
	150C1F3	8457	29505	62350	8457	29505	-62350
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1929	7134	14462	1833	13460	-22541
	150C1F1	7115	25866	53112	6831	41988	-72240
	150C1F2	7116	25765	53069	6854	40297	-69926
	150C1F3	7118	25641	53022	6885	38211	-67105
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7833	16541	1936	9098	-17567
	150C1F1	7247	29331	62176	7185	32487	-64196
	150C1F2	7247	29307	62178	7193	32146	-63867
	150C1F3	7248	29277	62181	7203	31734	-63491
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3653	12584	25664	3501	21096	-35247
	150C1F1	8686	32012	66625	8440	43943	-78940
	150C1F2	8687	31934	66607	8465	42649	-77292
	150C1F3	8688	31839	66589	8497	41071	-75327
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2596	8853	18727	2579	9916	-19319
	150C1F1	8458	29417	62360	8414	32275	-63737
	150C1F2	8458	29394	62364	8420	31974	-63495
	150C1F3	8458	29365	62369	8427	31609	-63221
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1839	12858	21692	1839	12858	-21692
	150C1F1	6853	40387	70048	6853	40387	-70048
	150C1F2	6875	38838	67948	6875	38838	-67948
	150C1F3	6905	36932	65398	6905	36932	-65398
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1940	8966	17419	1940	8966	-17419
	150C1F1	7193	32164	63884	7193	32164	-63884
	150C1F2	7200	31857	63601	7200	31857	-63601
	150C1F3	7209	31486	63278	7209	31486	-63278
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3512	20273	34179	3512	20273	-34179
	150C1F1	8464	42717	77378	8464	42717	-77378
	150C1F2	8487	41543	75909	8487	41543	-75909
	150C1F3	8517	40113	74163	8517	40113	-74163
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2581	9809	19225	2581	9809	-19225
	150C1F1	8420	31989	63507	8420	31989	-63507
	150C1F2	8425	31718	63300	8425	31718	-63300
	150C1F3	8431	31389	63068	8431	31389	-63068
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1833	13460	22541	1929	7134	-14462
	150C1F1	6831	41988	72240	7115	25866	-53112
	150C1F2	6854	40297	69926	7116	25765	-53069
	150C1F3	6885	38211	67105	7118	25641	-53022
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1936	9098	17567	1963	7833	-16541
	150C1F1	7185	32487	64196	7247	29331	-62176
	150C1F2	7193	32146	63867	7247	29307	-62178
	150C1F3	7203	31734	63491	7248	29277	-62181
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3501	21096	35247	3653	12584	-25664
	150C1F1	8440	43943	78940	8686	32012	-66625
	150C1F2	8465	42649	77292	8687	31934	-66607
	150C1F3	8497	41071	75327	8688	31839	-66589
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2579	9916	19319	2596	8853	-18727
	150C1F1	8414	32275	63737	8458	29417	-62360
	150C1F2	8420	31974	63495	8458	29394	-62364
	150C1F3	8427	31609	63221	8458	29365	-62369
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HL400+5

Appendix CC1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18869	66070	134486	18869	66070	-134486
	380C2F2	18874	65755	134341	18874	65755	-134341
	380C2F3	18879	65370	134183	18879	65370	-134183
	RTG	0	0	0	5118	17831	-36523
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19164	72745	153788	19164	72745	-153788
	380C2F2	19165	72671	153793	19165	72671	-153793
	380C2F3	19166	72580	153802	19166	72580	-153802
	RTG	0	0	0	5184	19313	-40890
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22007	77840	160739	22007	77840	-160739
	380C2F2	22010	77594	160670	22010	77594	-160670
	380C2F3	22014	77294	160599	22014	77294	-160599
	RTG	0	0	0	8559	28257	-57893
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21556	71823	151809	21556	71823	-151809
	380C2F2	21556	71751	151818	21556	71751	-151818
	380C2F3	21557	71662	151832	21557	71662	-151832
	RTG	0	0	0	6444	21090	-44700
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18888	64666	133960	18365	92303	-162331
	380C2F2	18891	64484	133918	18416	89329	-158578
	380C2F3	18893	64261	133876	18483	85694	-154087
	RTG	0	0	0	5003	23867	-42693
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19167	72407	153827	19075	77909	-156127
	380C2F2	19167	72361	153836	19088	77336	-155705
	380C2F3	19167	72304	153848	19102	76641	-155231
	RTG	0	0	0	5166	20505	-41363
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22020	76738	160513	21595	97536	-178569
	380C2F2	22022	76593	160501	21643	95275	-175975
	380C2F3	22023	76415	160493	21703	92531	-172929
	RTG	0	0	0	8386	36871	-65696
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21558	71493	151866	21490	76661	-153445
	380C2F2	21558	71448	151877	21500	76134	-153122
	380C2F3	21558	71392	151891	21511	75494	-152765
	RTG	0	0	0	6431	22174	-44939
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18413	89485	158774	18413	89485	-158774
	380C2F2	18462	86781	155418	18462	86781	-155418
	380C2F3	18525	83484	151421	18525	83484	-151421
	RTG	0	0	0	5015	23210	-41878
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19087	77366	155726	19087	77366	-155726
	380C2F2	19098	76849	155368	19098	76849	-155368
	380C2F3	19111	76221	154966	19111	76221	-154966
	RTG	0	0	0	5169	20381	-41279

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17372	64025	133249	16880	87886	-157879
	380C2F2	17374	63869	133214	16930	85298	-154585
	380C2F3	17376	63677	133179	16994	82141	-150654
	RTG	0	0	0	7118	34563	-60749
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16915	58835	124720	16828	64549	-127473
	380C2F2	16915	58788	124728	16840	63947	-126989
	380C2F3	16916	58730	124738	16854	63219	-126443
	RTG	0	0	0	5170	18849	-37811
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	13706	80773	140097	13706	80773	-140097
	380C2F2	13751	77675	135895	13751	77675	-135895
	380C2F3	13811	73864	130796	13811	73864	-130796
	RTG	0	0	0	3736	20602	-36285
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	14385	64327	127767	14385	64327	-127767
	380C2F2	14400	63713	127201	14400	63713	-127201
	380C2F3	14417	62972	126557	14417	62972	-126557
	RTG	0	0	0	3894	16713	-33412
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16927	85434	154757	16927	85434	-154757
	380C2F2	16974	83085	151818	16974	83085	-151818
	380C2F3	17034	80226	148327	17034	80226	-148327
	RTG	0	0	0	7137	33555	-59520
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16839	63979	127014	16839	63979	-127014
	380C2F2	16850	63436	126601	16850	63436	-126601
	380C2F3	16862	62778	126136	16862	62778	-126136
	RTG	0	0	0	5172	18728	-37732
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	13662	83977	144480	14229	51732	-106224
	380C2F2	13708	80595	139853	14232	51529	-106137
	380C2F3	13770	76422	134210	14235	51282	-106044
	RTG	0	0	0	3857	13909	-28704
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	14369	64975	128391	14494	58662	-124352
	380C2F2	14386	64292	127734	14495	58614	-124355
	380C2F3	14406	63468	126983	14495	58555	-124362
	RTG	0	0	0	3916	15414	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16880	87886	157879	17372	64025	-133249
	380C2F2	16930	85298	154585	17374	63869	-133214
	380C2F3	16994	82141	150654	17376	63677	-133179
	RTG	0	0	0	7313	24635	-51058
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16828	64549	127473	16915	58835	-124720
	380C2F2	16840	63947	126989	16915	58788	-124728
	380C2F3	16854	63219	126443	16916	58730	-124738
	RTG	0	0	0	5186	17597	-37391

ZWW4HL400+5

Appendix CC1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18869	66070	134486	18869	66070	-134486
	380C2F2	18874	65755	134341	18874	65755	-134341
	380C2F3	18879	65370	134183	18879	65370	-134183
	RTG	0	0	0	5118	17831	-36523
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19164	72745	153788	19164	72745	-153788
	380C2F2	19165	72671	153793	19165	72671	-153793
	380C2F3	19166	72580	153802	19166	72580	-153802
	RTG	0	0	0	5184	19313	-40890
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22007	77840	160739	22007	77840	-160739
	380C2F2	22010	77594	160670	22010	77594	-160670
	380C2F3	22014	77294	160599	22014	77294	-160599
	RTG	0	0	0	8559	28257	-57893
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21556	71823	151809	21556	71823	-151809
	380C2F2	21556	71751	151818	21556	71751	-151818
	380C2F3	21557	71662	151832	21557	71662	-151832
	RTG	0	0	0	6444	21090	-44700
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18888	64666	133960	18365	92303	-162331
	380C2F2	18891	64484	133918	18416	89329	-158578
	380C2F3	18893	64261	133876	18483	85694	-154087
	RTG	0	0	0	5003	23867	-42693
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19167	72407	153827	19075	77909	-156127
	380C2F2	19167	72361	153836	19088	77336	-155705
	380C2F3	19167	72304	153848	19102	76641	-155231
	RTG	0	0	0	5166	20505	-41363
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22020	76738	160513	21595	97536	-178569
	380C2F2	22022	76593	160501	21643	95275	-175975
	380C2F3	22023	76415	160493	21703	92531	-172929
	RTG	0	0	0	8386	36871	-65696
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21558	71493	151866	21490	76661	-153445
	380C2F2	21558	71448	151877	21500	76134	-153122
	380C2F3	21558	71392	151891	21511	75494	-152765
	RTG	0	0	0	6431	22174	-44939
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18413	89485	158774	18413	89485	-158774
	380C2F2	18462	86781	155418	18462	86781	-155418
	380C2F3	18525	83484	151421	18525	83484	-151421
	RTG	0	0	0	5015	23210	-41878
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19087	77366	155726	19087	77366	-155726
	380C2F2	19098	76849	155368	19098	76849	-155368
	380C2F3	19111	76221	154966	19111	76221	-154966
	RTG	0	0	0	5169	20381	-41279

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17372	64025	133249	16880	87886	-157879
	380C2F2	17374	63869	133214	16930	85298	-154585
	380C2F3	17376	63677	133179	16994	82141	-150654
	RTG	0	0	0	7118	34563	-60749
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16915	58835	124720	16828	64549	-127473
	380C2F2	16915	58788	124728	16840	63947	-126989
	380C2F3	16916	58730	124738	16854	63219	-126443
	RTG	0	0	0	5170	18849	-37811
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	13706	80773	140097	13706	80773	-140097
	380C2F2	13751	77675	135895	13751	77675	-135895
	380C2F3	13811	73864	130796	13811	73864	-130796
	RTG	0	0	0	3736	20602	-36285
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	14385	64327	127767	14385	64327	-127767
	380C2F2	14400	63713	127201	14400	63713	-127201
	380C2F3	14417	62972	126557	14417	62972	-126557
	RTG	0	0	0	3894	16713	-33412
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16927	85434	154757	16927	85434	-154757
	380C2F2	16974	83085	151818	16974	83085	-151818
	380C2F3	17034	80226	148327	17034	80226	-148327
	RTG	0	0	0	7137	33555	-59520
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16839	63979	127014	16839	63979	-127014
	380C2F2	16850	63436	126601	16850	63436	-126601
	380C2F3	16862	62778	126136	16862	62778	-126136
	RTG	0	0	0	5172	18728	-37732
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	13662	83977	144480	14229	51732	-106224
	380C2F2	13708	80595	139853	14232	51529	-106137
	380C2F3	13770	76422	134210	14235	51282	-106044
	RTG	0	0	0	3857	13909	-28704
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	14369	64975	128391	14494	58662	-124352
	380C2F2	14386	64292	127734	14495	58614	-124355
	380C2F3	14406	63468	126983	14495	58555	-124362
	RTG	0	0	0	3916	15414	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16880	87886	157879	17372	64025	-133249
	380C2F2	16930	85298	154585	17374	63869	-133214
	380C2F3	16994	82141	150654	17376	63677	-133179
	RTG	0	0	0	7313	24635	-51058
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	16828	64549	127473	16915	58835	-124720
	380C2F2	16840	63947	126989	16915	58788	-124728
	380C2F3	16854	63219	126443	16916	58730	-124738
	RTG	0	0	0	5186	17597	-37391

ZWW4HL400+5

Appendix CC1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2559	9188	18426	0	0	0
	150C1F1	9435	33035	67243	0	0	0
	150C1F2	9437	32877	67170	0	0	0
	150C1F3	9440	32685	67092	0	0	0
	380C2F1	0	0	0	18869	66070	-134486
	380C2F2	0	0	0	18874	65755	-134341
	380C2F3	0	0	0	18879	65370	-134183
	RTG	0	0	0	5118	17831	-36523
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2598	9807	20638	0	0	0
	150C1F1	9582	36373	76894	0	0	0
	150C1F2	9582	36336	76896	0	0	0
	150C1F3	9583	36290	76901	0	0	0
	380C2F1	0	0	0	19164	72745	-153788
	380C2F2	0	0	0	19165	72671	-153793
	380C2F3	0	0	0	19166	72580	-153802
	RTG	0	0	0	5184	19313	-40890
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4274	14546	29174	0	0	0
	150C1F1	11004	38920	80370	0	0	0
	150C1F2	11005	38797	80335	0	0	0
	150C1F3	11007	38647	80299	0	0	0
	380C2F1	0	0	0	22007	77840	-160739
	380C2F2	0	0	0	22010	77594	-160670
	380C2F3	0	0	0	22014	77294	-160599
	RTG	0	0	0	8559	28257	-57893
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3225	10619	22378	0	0	0
	150C1F1	10778	35911	75904	0	0	0
	150C1F2	10778	35876	75909	0	0	0
	150C1F3	10778	35831	75916	0	0	0
	380C2F1	0	0	0	21556	71823	-151809
	380C2F2	0	0	0	21556	71751	-151818
	380C2F3	0	0	0	21557	71662	-151832
	RTG	0	0	0	6444	21090	-44700
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2563	8913	18276	0	0	0
	150C1F1	9444	32333	66980	0	0	0
	150C1F2	9445	32242	66959	0	0	0
	150C1F3	9447	32130	66938	0	0	0
	380C2F1	0	0	0	18365	92303	-162331
	380C2F2	0	0	0	18416	89329	-158578
	380C2F3	0	0	0	18483	85694	-154087
	RTG	0	0	0	5003	23867	-42693
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2598	9744	20639	0	0	0
	150C1F1	9583	36204	76914	0	0	0
	150C1F2	9583	36181	76918	0	0	0
	150C1F3	9584	36152	76924	0	0	0
	380C2F1	0	0	0	19075	77909	-156127
	380C2F2	0	0	0	19088	77336	-155705
	380C2F3	0	0	0	19102	76641	-155231
	RTG	0	0	0	5166	20505	-41363
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4280	14139	28998	0	0	0
	150C1F1	11010	38369	80256	0	0	0
	150C1F2	11011	38297	80251	0	0	0
	150C1F3	11012	38207	80247	0	0	0
	380C2F1	0	0	0	21595	97536	-178569
	380C2F2	0	0	0	21643	95275	-175975
	380C2F3	0	0	0	21703	92531	-172929
	RTG	0	0	0	8386	36871	-65696
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3226	10559	22386	0	0	0
	150C1F1	10779	35747	75933	0	0	0
	150C1F2	10779	35724	75938	0	0	0
	150C1F3	10779	35696	75946	0	0	0
	380C2F1	0	0	0	21490	76661	-153445
	380C2F2	0	0	0	21500	76134	-153122
	380C2F3	0	0	0	21511	75494	-152765
	RTG	0	0	0	6431	22174	-44939
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2475	13868	23856	0	0	0
	150C1F1	9207	44743	79387	0	0	0
	150C1F2	9231	43391	77709	0	0	0
	150C1F3	9262	41742	75710	0	0	0
	380C2F1	0	0	0	18413	89485	-158774
	380C2F2	0	0	0	18462	86781	-155418
	380C2F3	0	0	0	18525	83484	-151421
	RTG	0	0	0	5015	23210	-41878
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2581	10718	21176	0	0	0
	150C1F1	9543	38683	77863	0	0	0
	150C1F2	9549	38424	77684	0	0	0
	150C1F3	9555	38110	77483	0	0	0
	380C2F1	0	0	0	19087	77366	-155726
	380C2F2	0	0	0	19098	76849	-155368
	380C2F3	0	0	0	19111	76221	-154966
	RTG	0	0	0	5169	20381	-41279

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4145	21217	36203	0	0	0
	150C1F1	10820	47697	88055	0	0	0
	150C1F2	10843	46675	86913	0	0	0
	150C1F3	10870	45436	85576	0	0	0
	380C2F1	0	0	0	21641	95394	-176110
	380C2F2	0	0	0	21685	93349	-173825
	380C2F3	0	0	0	21740	90872	-171153
	RTG	0	0	0	8405	35944	-64641
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3214	11429	22700	0	0	0
	150C1F1	10750	38081	76569	0	0	0
	150C1F2	10754	37843	76434	0	0	0
	150C1F3	10758	37552	76284	0	0	0
	380C2F1	0	0	0	21499	76162	-153139
	380C2F2	0	0	0	21507	75685	-152867
	380C2F3	0	0	0	21517	75105	-152568
	RTG	0	0	0	6433	22064	-44887
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2467	14414	24585	0	0	0
	150C1F1	9182	46152	81165	0	0	0
	150C1F2	9208	44664	79289	0	0	0
	150C1F3	9241	42847	77043	0	0	0
	380C2F1	0	0	0	18888	64666	-133960
	380C2F2	0	0	0	18891	64484	-133918
	380C2F3	0	0	0	18893	64261	-133876
	RTG	0	0	0	5122	17507	-36419
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2578	10828	21276	0	0	0
	150C1F1	9538	38955	78064	0	0	0
	150C1F2	9544	38668	77852	0	0	0
	150C1F3	9551	38321	77615	0	0	0
	380C2F1	0	0	0	19167	72407	-153827
	380C2F2	0	0	0	19167	72361	-153836
	380C2F3	0	0	0	19167	72304	-153848
	RTG	0	0	0	5185	19234	-40901
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4133	21991	37166	0	0	0
	150C1F1	10798	48768	89284	0	0	0
	150C1F2	10822	47637	87988	0	0	0
	150C1F3	10852	46265	86465	0	0	0
	380C2F1	0	0	0	22020	76738	-160513
	380C2F2	0	0	0	22022	76593	-160501
	380C2F3	0	0	0	22023	76415	-160493
	RTG	0	0	0	8565	27773	-57788
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3212	11524	22767	0	0	0
	150C1F1	10745	38331	76722	0	0	0
	150C1F2	10750	38067	76561	0	0	0
	150C1F3	10755	37747	76382	0	0	0
	380C2F1	0	0	0	21558	71493	-151866
	380C2F2	0	0	0	21558	71448	-151877
	380C2F3	0	0	0	21558	71392	-151891
	RTG	0	0	0	6444	21014	-44718
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1923	7453	14705	0	0	0
	150C1F1	7102	26664	53581	0	0	0
	150C1F2	7105	26483	53458	0	0	0
	150C1F3	7108	26263	53321	0	0	0
	380C2F1	0	0	0	14203	53328	-107162
	380C2F2	0	0	0	14210	52966	-106916
	380C2F3	0	0	0	14217	52526	-106641
	RTG	0	0	0	3852	14275	-28895
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1962	7901	16550	0	0	0
	150C1F1	7246	29511	62178	0	0	0
	150C1F2	7246	29471	62175	0	0	0
	150C1F3	7246	29422	62174	0	0	0
	380C2F1	0	0	0	14491	59021	-124357
	380C2F2	0	0	0	14492	58942	-124351
	380C2F3	0	0	0	14493	58845	-124347
	RTG	0	0	0	3915	15497	-32707
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3645	13022	25906	0	0	0
	150C1F1	8677	32614	66849	0	0	0
	150C1F2	8679	32479	66787	0	0	0
	150C1F3	8682	32314	66719	0	0	0
	380C2F1	0	0	0	17354	65229	-133697
	380C2F2	0	0	0	17359	64958	-133573
	380C2F3	0	0	0	17364	64628	-133439
	RTG	0	0	0	7306	25148	-51226
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2595	8915	18725	0	0	0
	150C1F1	8456	29589	62346	0	0	0
	150C1F2	8457	29551	62347	0	0	0
	150C1F3	8457	29505	62350	0	0	0
	380C2F1	0	0	0	16913	59178	-124692
	380C2F2	0	0	0	16913	59103	-124695
	380C2F3	0	0	0	16914	59010	-124700
	RTG	0	0	0	5186	17676	-37378
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1929	7134	14462	0	0	0
	150C1F1	7115	25866	53112	0	0	0
	150C1F2	7116	25765	53069	0	0	0
	150C1F3	7118	25641	53022	0	0	0
	380C2F1	0	0	0	13662	83977	-144480
	380C2F2	0	0	0	13708	80595	-139853
	380C2F3	0	0	0	13770	76422	-134210
	RTG	0	0	0	3725	21358	-37313
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7833	16541	0	0	0
	150C1F1	7247	29331	62176	0	0	0
	150C1F2	7247	29307	62178	0	0	0
	150C1F3	7248	29277	62181	0	0	0
	380C2F1	0	0	0	14369	64975	-128391
	380C2F2	0	0	0	14386	64292	-127734
	380C2F3	0	0	0	14406	63468	-126983
	RTG	0	0	0	3890	16860	-33545

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3653	12584	25664	0	0	0
	150C1F1	8686	32012	66625	0	0	0
	150C1F2	8687	31934	66607	0	0	0
	150C1F3	8688	31839	66589	0	0	0
	380C2F1	0	0	0	16880	87886	-157879
	380C2F2	0	0	0	16930	85298	-154585
	380C2F3	0	0	0	16994	82141	-150654
	RTG	0	0	0	7118	34563	-60749
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2596	8853	18727	0	0
150C1F1		8458	29417	62360	0	0	0
150C1F2		8458	29394	62364	0	0	0
150C1F3		8458	29365	62369	0	0	0
380C2F1		0	0	0	16828	64549	-127473
380C2F2		0	0	0	16840	63947	-126989
380C2F3		0	0	0	16854	63219	-126443
RTG		0	0	0	5170	18849	-37811
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	1839	12858	21692	0	0
	150C1F1	6853	40387	70048	0	0	0
	150C1F2	6875	38838	67948	0	0	0
	150C1F3	6905	36932	65398	0	0	0
	380C2F1	0	0	0	13706	80773	-140097
	380C2F2	0	0	0	13751	77675	-135895
	380C2F3	0	0	0	13811	73864	-130796
	RTG	0	0	0	3736	20602	-36285
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1940	8966	17419	0	0
150C1F1		7193	32164	63884	0	0	0
150C1F2		7200	31857	63601	0	0	0
150C1F3		7209	31486	63278	0	0	0
380C2F1		0	0	0	14385	64327	-127767
380C2F2		0	0	0	14400	63713	-127201
380C2F3		0	0	0	14417	62972	-126557
RTG		0	0	0	3894	16713	-33412
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	3512	20273	34179	0	0
	150C1F1	8464	42717	77378	0	0	0
	150C1F2	8487	41543	75909	0	0	0
	150C1F3	8517	40113	74163	0	0	0
	380C2F1	0	0	0	16927	85434	-154757
	380C2F2	0	0	0	16974	83085	-151818
	380C2F3	0	0	0	17034	80226	-148327
	RTG	0	0	0	7137	33555	-59520
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2581	9809	19225	0	0
150C1F1		8420	31989	63507	0	0	0
150C1F2		8425	31718	63300	0	0	0
150C1F3		8431	31389	63068	0	0	0
380C2F1		0	0	0	16839	63979	-127014
380C2F2		0	0	0	16850	63436	-126601
380C2F3		0	0	0	16862	62778	-126136
RTG		0	0	0	5172	18728	-37732
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	1833	13460	22541	0	0
	150C1F1	6831	41988	72240	0	0	0
	150C1F2	6854	40297	69926	0	0	0
	150C1F3	6885	38211	67105	0	0	0
	380C2F1	0	0	0	14229	51732	-106224
	380C2F2	0	0	0	14232	51529	-106137
	380C2F3	0	0	0	14235	51282	-106044
	RTG	0	0	0	3857	13909	-28704
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1936	9098	17567	0	0
150C1F1		7185	32487	64196	0	0	0
150C1F2		7193	32146	63867	0	0	0
150C1F3		7203	31734	63491	0	0	0
380C2F1		0	0	0	14494	58662	-124352
380C2F2		0	0	0	14495	58614	-124355
380C2F3		0	0	0	14495	58555	-124362
RTG		0	0	0	3916	15414	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	3501	21096	35247	0	0
	150C1F1	8440	43943	78940	0	0	0
	150C1F2	8465	42649	77292	0	0	0
	150C1F3	8497	41071	75327	0	0	0
	380C2F1	0	0	0	17372	64025	-133249
	380C2F2	0	0	0	17374	63869	-133214
	380C2F3	0	0	0	17376	63677	-133179
	RTG	0	0	0	7313	24635	-51058
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2579	9916	19319	0	0
150C1F1		8414	32275	63737	0	0	0
150C1F2		8420	31974	63495	0	0	0
150C1F3		8427	31609	63221	0	0	0
380C2F1		0	0	0	16915	58835	-124720
380C2F2		0	0	0	16915	58788	-124728
380C2F3		0	0	0	16916	58730	-124738
RTG		0	0	0	5186	17597	-37391

ZWW4HL400+5

Appendix CC1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2559	9188	-18426
	150C1F1	0	0	0	9435	33035	-67243
	150C1F2	0	0	0	9437	32877	-67170
	150C1F3	0	0	0	9440	32685	-67092
	380C2F1	18869	66070	134486	18869	66070	-134486
	380C2F2	18874	65755	134341	18874	65755	-134341
	380C2F3	18879	65370	134183	18879	65370	-134183
	RTG	5118	17831	36523	5118	17831	-36523
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2598	9807	-20638
	150C1F1	0	0	0	9582	36373	-76894
	150C1F2	0	0	0	9582	36336	-76896
	150C1F3	0	0	0	9583	36290	-76901
	380C2F1	19164	72745	153788	19164	72745	-153788
	380C2F2	19165	72671	153793	19165	72671	-153793
	380C2F3	19166	72580	153802	19166	72580	-153802
	RTG	5184	19313	40890	5184	19313	-40890
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4274	14546	-29174
	150C1F1	0	0	0	11004	38920	-80370
	150C1F2	0	0	0	11005	38797	-80335
	150C1F3	0	0	0	11007	38647	-80299
	380C2F1	22007	77840	160739	22007	77840	-160739
	380C2F2	22010	77594	160670	22010	77594	-160670
	380C2F3	22014	77294	160599	22014	77294	-160599
	RTG	8559	28257	57893	8559	28257	-57893
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3225	10619	-22378
	150C1F1	0	0	0	10778	35911	-75904
	150C1F2	0	0	0	10778	35876	-75909
	150C1F3	0	0	0	10778	35831	-75916
	380C2F1	21556	71823	151809	21556	71823	-151809
	380C2F2	21556	71751	151818	21556	71751	-151818
	380C2F3	21557	71662	151832	21557	71662	-151832
	RTG	6444	21090	44700	6444	21090	-44700
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2467	14414	-24585
	150C1F1	0	0	0	9182	46152	-81165
	150C1F2	0	0	0	9208	44664	-79289
	150C1F3	0	0	0	9241	42847	-77043
	380C2F1	18888	64666	133960	18365	92303	-162331
	380C2F2	18891	64484	133918	18416	89329	-158578
	380C2F3	18893	64261	133876	18483	85694	-154087
	RTG	5122	17507	36419	5003	23867	-42693
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2578	10828	-21276
	150C1F1	0	0	0	9538	38955	-78064
	150C1F2	0	0	0	9544	38668	-77852
	150C1F3	0	0	0	9551	38321	-77615
	380C2F1	19167	72407	153827	19075	77909	-156127
	380C2F2	19167	72361	153836	19088	77336	-155705
	380C2F3	19167	72304	153848	19102	76641	-155231
	RTG	5185	19234	40901	5166	20505	-41363
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4133	21991	-37166
	150C1F1	0	0	0	10798	48768	-89284
	150C1F2	0	0	0	10822	47637	-87988
	150C1F3	0	0	0	10852	46265	-86465
	380C2F1	22020	76738	160513	21595	97536	-178569
	380C2F2	22022	76593	160501	21643	95275	-175975
	380C2F3	22023	76415	160493	21703	92531	-172929
	RTG	8565	27773	57788	8386	36871	-65696
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3212	11524	-22767
	150C1F1	0	0	0	10745	38331	-76722
	150C1F2	0	0	0	10750	38067	-76561
	150C1F3	0	0	0	10755	37747	-76382
	380C2F1	21558	71493	151866	21490	76661	-153445
	380C2F2	21558	71448	151877	21500	76134	-153122
	380C2F3	21558	71392	151891	21511	75494	-152765
	RTG	6444	21014	44718	6431	22174	-44939
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2475	13868	-23856
	150C1F1	0	0	0	9207	44743	-79387
	150C1F2	0	0	0	9231	43391	-77709
	150C1F3	0	0	0	9262	41742	-75710
	380C2F1	18413	89485	158774	18413	89485	-158774
	380C2F2	18462	86781	155418	18462	86781	-155418
	380C2F3	18525	83484	151421	18525	83484	-151421
	RTG	5015	23210	41878	5015	23210	-41878
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2581	10718	-21176
	150C1F1	0	0	0	9543	38683	-77863
	150C1F2	0	0	0	9549	38424	-77684
	150C1F3	0	0	0	9555	38110	-77483
	380C2F1	19087	77366	155726	19087	77366	-155726
	380C2F2	19098	76849	155368	19098	76849	-155368
	380C2F3	19111	76221	154966	19111	76221	-154966
	RTG	5169	20381	41279	5169	20381	-41279

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	4145	21217	-36203
	150C1F1	0	0	0	10820	47697	-88055
	150C1F2	0	0	0	10843	46675	-86913
	150C1F3	0	0	0	10870	45436	-85576
	380C2F1	21641	95394	176110	21641	95394	-176110
	380C2F2	21685	93349	173825	21685	93349	-173825
	380C2F3	21740	90872	171153	21740	90872	-171153
	RTG	8405	35944	64641	8405	35944	-64641
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	3214	11429
150C1F1		0	0	0	10750	38081	-76569
150C1F2		0	0	0	10754	37843	-76434
150C1F3		0	0	0	10758	37552	-76284
380C2F1		21499	76162	153139	21499	76162	-153139
380C2F2		21507	75685	152867	21507	75685	-152867
380C2F3		21517	75105	152568	21517	75105	-152568
RTG		6433	22064	44887	6433	22064	-44887
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	0	0	0	2563	8913
	150C1F1	0	0	0	9444	32333	-66980
	150C1F2	0	0	0	9445	32242	-66959
	150C1F3	0	0	0	9447	32130	-66938
	380C2F1	18365	92303	162331	18888	64666	-133960
	380C2F2	18416	89329	158578	18891	64484	-133918
	380C2F3	18483	85694	154087	18893	64261	-133876
	RTG	5003	23867	42693	5122	17507	-36419
	NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2598	9744
150C1F1		0	0	0	9583	36204	-76914
150C1F2		0	0	0	9583	36181	-76918
150C1F3		0	0	0	9584	36152	-76924
380C2F1		19075	77909	156127	19167	72407	-153827
380C2F2		19088	77336	155705	19167	72361	-153836
380C2F3		19102	76641	155231	19167	72304	-153848
RTG		5166	20505	41363	5185	19234	-40901
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	0	0	0	4280	14139
	150C1F1	0	0	0	11010	38369	-80256
	150C1F2	0	0	0	11011	38297	-80251
	150C1F3	0	0	0	11012	38207	-80247
	380C2F1	21595	97536	178569	22020	76738	-160513
	380C2F2	21643	95275	175975	22022	76593	-160501
	380C2F3	21703	92531	172929	22023	76415	-160493
	RTG	8386	36871	65696	8565	27773	-57788
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	3226	10559
150C1F1		0	0	0	10779	35747	-75933
150C1F2		0	0	0	10779	35724	-75938
150C1F3		0	0	0	10779	35696	-75946
380C2F1		21490	76661	153445	21558	71493	-151866
380C2F2		21500	76134	153122	21558	71448	-151877
380C2F3		21511	75494	152765	21558	71392	-151891
RTG		6431	22174	44939	6444	21014	-44718
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	0	0	0	1923	7453
	150C1F1	0	0	0	7102	26664	-53581
	150C1F2	0	0	0	7105	26483	-53458
	150C1F3	0	0	0	7108	26263	-53321
	380C2F1	14203	53328	107162	14203	53328	-107162
	380C2F2	14210	52966	106916	14210	52966	-106916
	380C2F3	14217	52526	106641	14217	52526	-106641
	RTG	3852	14275	28895	3852	14275	-28895
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	1962	7901
150C1F1		0	0	0	7246	29511	-62178
150C1F2		0	0	0	7246	29471	-62175
150C1F3		0	0	0	7246	29422	-62174
380C2F1		14491	59021	124357	14491	59021	-124357
380C2F2		14492	58942	124351	14492	58942	-124351
380C2F3		14493	58845	124347	14493	58845	-124347
RTG		3915	15497	32707	3915	15497	-32707
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	0	0	0	3645	13022
	150C1F1	0	0	0	8677	32614	-66849
	150C1F2	0	0	0	8679	32479	-66787
	150C1F3	0	0	0	8682	32314	-66719
	380C2F1	17354	65229	133697	17354	65229	-133697
	380C2F2	17359	64958	133573	17359	64958	-133573
	380C2F3	17364	64628	133439	17364	64628	-133439
	RTG	7306	25148	51226	7306	25148	-51226
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	2595	8915
150C1F1		0	0	0	8456	29589	-62346
150C1F2		0	0	0	8457	29551	-62347
150C1F3		0	0	0	8457	29505	-62350
380C2F1		16913	59178	124692	16913	59178	-124692
380C2F2		16913	59103	124695	16913	59103	-124695
380C2F3		16914	59010	124700	16914	59010	-124700
RTG		5186	17676	37378	5186	17676	-37378
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	0	0	0	1833	13460
	150C1F1	0	0	0	6831	41988	-72240
	150C1F2	0	0	0	6854	40297	-69926
	150C1F3	0	0	0	6885	38211	-67105
	380C2F1	14229	51732	106224	13662	83977	-144480
	380C2F2	14232	51529	106137	13708	80595	-139853
	380C2F3	14235	51282	106044	13770	76422	-134210
	RTG	3857	13909	28704	3725	21358	-37313
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	1936	9098
150C1F1		0	0	0	7185	32487	-64196
150C1F2		0	0	0	7193	32146	-63867
150C1F3		0	0	0	7203	31734	-63491
380C2F1		14494	58662	124352	14369	64975	-128391
380C2F2		14495	58614	124355	14386	64292	-127734
380C2F3		14495	58555	124362	14406	63468	-126983
RTG		3916	15414	32709	3890	16860	-33545

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	3501	21096	-35247
	150C1F1	0	0	0	8440	43943	-78940
	150C1F2	0	0	0	8465	42649	-77292
	150C1F3	0	0	0	8497	41071	-75327
	380C2F1	17372	64025	133249	16880	87886	-157879
	380C2F2	17374	63869	133214	16930	85298	-154585
	380C2F3	17376	63677	133179	16994	82141	-150654
	RTG	7313	24635	51058	7118	34563	-60749
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	0	0	0	2579	9916
150C1F1		0	0	0	8414	32275	-63737
150C1F2		0	0	0	8420	31974	-63495
150C1F3		0	0	0	8427	31609	-63221
380C2F1		16915	58835	124720	16828	64549	-127473
380C2F2		16915	58788	124728	16840	63947	-126989
380C2F3		16916	58730	124738	16854	63219	-126443
RTG		5186	17597	37391	5170	18849	-37811
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	0	0	0	1839	12858
	150C1F1	0	0	0	6853	40387	-70048
	150C1F2	0	0	0	6875	38838	-67948
	150C1F3	0	0	0	6905	36932	-65398
	380C2F1	13706	80773	140097	13706	80773	-140097
	380C2F2	13751	77675	135895	13751	77675	-135895
	380C2F3	13811	73864	130796	13811	73864	-130796
	RTG	3736	20602	36285	3736	20602	-36285
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	1940	8966
150C1F1		0	0	0	7193	32164	-63884
150C1F2		0	0	0	7200	31857	-63601
150C1F3		0	0	0	7209	31486	-63278
380C2F1		14385	64327	127767	14385	64327	-127767
380C2F2		14400	63713	127201	14400	63713	-127201
380C2F3		14417	62972	126557	14417	62972	-126557
RTG		3894	16713	33412	3894	16713	-33412
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	0	0	0	3512	20273
	150C1F1	0	0	0	8464	42717	-77378
	150C1F2	0	0	0	8487	41543	-75909
	150C1F3	0	0	0	8517	40113	-74163
	380C2F1	16927	85434	154757	16927	85434	-154757
	380C2F2	16974	83085	151818	16974	83085	-151818
	380C2F3	17034	80226	148327	17034	80226	-148327
	RTG	7137	33555	59520	7137	33555	-59520
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	0	0	0	2581	9809
150C1F1		0	0	0	8420	31989	-63507
150C1F2		0	0	0	8425	31718	-63300
150C1F3		0	0	0	8431	31389	-63068
380C2F1		16839	63979	127014	16839	63979	-127014
380C2F2		16850	63436	126601	16850	63436	-126601
380C2F3		16862	62778	126136	16862	62778	-126136
RTG		5172	18728	37732	5172	18728	-37732
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	0	0	0	1929	7134
	150C1F1	0	0	0	7115	25866	-53112
	150C1F2	0	0	0	7116	25765	-53069
	150C1F3	0	0	0	7118	25641	-53022
	380C2F1	13662	83977	144480	14229	51732	-106224
	380C2F2	13708	80595	139853	14232	51529	-106137
	380C2F3	13770	76422	134210	14235	51282	-106044
	RTG	3725	21358	37313	3857	13909	-28704
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	1963	7833
150C1F1		0	0	0	7247	29331	-62176
150C1F2		0	0	0	7247	29307	-62178
150C1F3		0	0	0	7248	29277	-62181
380C2F1		14369	64975	128391	14494	58662	-124352
380C2F2		14386	64292	127734	14495	58614	-124355
380C2F3		14406	63468	126983	14495	58555	-124362
RTG		3890	16860	33545	3916	15414	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	0	0	0	3653	12584
	150C1F1	0	0	0	8686	32012	-66625
	150C1F2	0	0	0	8687	31934	-66607
	150C1F3	0	0	0	8688	31839	-66589
	380C2F1	16880	87886	157879	17372	64025	-133249
	380C2F2	16930	85298	154585	17374	63869	-133214
	380C2F3	16994	82141	150654	17376	63677	-133179
	RTG	7118	34563	60749	7313	24635	-51058
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	0	0	0	2596	8853
150C1F1		0	0	0	8458	29417	-62360
150C1F2		0	0	0	8458	29394	-62364
150C1F3		0	0	0	8458	29365	-62369
380C2F1		16828	64549	127473	16915	58835	-124720
380C2F2		16840	63947	126989	16915	58788	-124728
380C2F3		16854	63219	126443	16916	58730	-124738
RTG		5170	18849	37811	5186	17597	-37391

ZWW4HL400+5

Appendix CC1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2559	9188	18426	2559	9188	-18426
	150C1F1	9435	33035	67243	9435	33035	-67243
	150C1F2	9437	32877	67170	9437	32877	-67170
	150C1F3	9440	32685	67092	9440	32685	-67092
	380C2F1	0	0	0	18869	66070	-134486
	380C2F2	0	0	0	18874	65755	-134341
	380C2F3	0	0	0	18879	65370	-134183
	RTG	0	0	0	5118	17831	-36523
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2598	9807	20638	2598	9807	-20638
	150C1F1	9582	36373	76894	9582	36373	-76894
	150C1F2	9582	36336	76896	9582	36336	-76896
	150C1F3	9583	36290	76901	9583	36290	-76901
	380C2F1	0	0	0	19164	72745	-153788
	380C2F2	0	0	0	19165	72671	-153793
	380C2F3	0	0	0	19166	72580	-153802
	RTG	0	0	0	5184	19313	-40890
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4274	14546	29174	4274	14546	-29174
	150C1F1	11004	38920	80370	11004	38920	-80370
	150C1F2	11005	38797	80335	11005	38797	-80335
	150C1F3	11007	38647	80299	11007	38647	-80299
	380C2F1	0	0	0	22007	77840	-160739
	380C2F2	0	0	0	22010	77594	-160670
	380C2F3	0	0	0	22014	77294	-160599
	RTG	0	0	0	8559	28257	-57893
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3225	10619	22378	3225	10619	-22378
	150C1F1	10778	35911	75904	10778	35911	-75904
	150C1F2	10778	35876	75909	10778	35876	-75909
	150C1F3	10778	35831	75916	10778	35831	-75916
	380C2F1	0	0	0	21556	71823	-151809
	380C2F2	0	0	0	21556	71751	-151818
	380C2F3	0	0	0	21557	71662	-151832
	RTG	0	0	0	6444	21090	-44700
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2563	8913	18276	2467	14414	-24585
	150C1F1	9444	32333	66980	9182	46152	-81165
	150C1F2	9445	32242	66959	9208	44664	-79289
	150C1F3	9447	32130	66938	9241	42847	-77043
	380C2F1	0	0	0	18365	92303	-162331
	380C2F2	0	0	0	18416	89329	-158578
	380C2F3	0	0	0	18483	85694	-154087
	RTG	0	0	0	5003	23867	-42693
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2598	9744	20639	2578	10828	-21276
	150C1F1	9583	36204	76914	9538	38955	-78064
	150C1F2	9583	36181	76918	9544	38668	-77852
	150C1F3	9584	36152	76924	9551	38321	-77615
	380C2F1	0	0	0	19075	77909	-156127
	380C2F2	0	0	0	19088	77336	-155705
	380C2F3	0	0	0	19102	76641	-155231
	RTG	0	0	0	5166	20505	-41363
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4280	14139	28998	4133	21991	-37166
	150C1F1	11010	38369	80256	10798	48768	-89284
	150C1F2	11011	38297	80251	10822	47637	-87988
	150C1F3	11012	38207	80247	10852	46265	-86465
	380C2F1	0	0	0	21595	97536	-178569
	380C2F2	0	0	0	21643	95275	-175975
	380C2F3	0	0	0	21703	92531	-172929
	RTG	0	0	0	8386	36871	-65696
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3226	10559	22386	3212	11524	-22767
	150C1F1	10779	35747	75933	10745	38331	-76722
	150C1F2	10779	35724	75938	10750	38067	-76561
	150C1F3	10779	35696	75946	10755	37747	-76382
	380C2F1	0	0	0	21490	76661	-153445
	380C2F2	0	0	0	21500	76134	-153122
	380C2F3	0	0	0	21511	75494	-152765
	RTG	0	0	0	6431	22174	-44939
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2475	13868	23856	2475	13868	-23856
	150C1F1	9207	44743	79387	9207	44743	-79387
	150C1F2	9231	43391	77709	9231	43391	-77709
	150C1F3	9262	41742	75710	9262	41742	-75710
	380C2F1	0	0	0	18413	89485	-158774
	380C2F2	0	0	0	18462	86781	-155418
	380C2F3	0	0	0	18525	83484	-151421
	RTG	0	0	0	5015	23210	-41878
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2581	10718	21176	2581	10718	-21176
	150C1F1	9543	38683	77863	9543	38683	-77863
	150C1F2	9549	38424	77684	9549	38424	-77684
	150C1F3	9555	38110	77483	9555	38110	-77483
	380C2F1	0	0	0	19087	77366	-155726
	380C2F2	0	0	0	19098	76849	-155368
	380C2F3	0	0	0	19111	76221	-154966
	RTG	0	0	0	5169	20381	-41279

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4145	21217	36203	4145	21217	-36203
	150C1F1	10820	47697	88055	10820	47697	-88055
	150C1F2	10843	46675	86913	10843	46675	-86913
	150C1F3	10870	45436	85576	10870	45436	-85576
	380C2F1	0	0	0	21641	95394	-176110
	380C2F2	0	0	0	21685	93349	-173825
	380C2F3	0	0	0	21740	90872	-171153
	RTG	0	0	0	8405	35944	-64641
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3214	11429	22700	3214	11429	-22700
	150C1F1	10750	38081	76569	10750	38081	-76569
	150C1F2	10754	37843	76434	10754	37843	-76434
	150C1F3	10758	37552	76284	10758	37552	-76284
	380C2F1	0	0	0	21499	76162	-153139
	380C2F2	0	0	0	21507	75685	-152867
	380C2F3	0	0	0	21517	75105	-152568
	RTG	0	0	0	6433	22064	-44887
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2467	14414	24585	2563	8913	-18276
	150C1F1	9182	46152	81165	9444	32333	-66980
	150C1F2	9208	44664	79289	9445	32242	-66959
	150C1F3	9241	42847	77043	9447	32130	-66938
	380C2F1	0	0	0	18888	64666	-133960
	380C2F2	0	0	0	18891	64484	-133918
	380C2F3	0	0	0	18893	64261	-133876
	RTG	0	0	0	5122	17507	-36419
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2578	10828	21276	2598	9744	-20639
	150C1F1	9538	38955	78064	9583	36204	-76914
	150C1F2	9544	38668	77852	9583	36181	-76918
	150C1F3	9551	38321	77615	9584	36152	-76924
	380C2F1	0	0	0	19167	72407	-153827
	380C2F2	0	0	0	19167	72361	-153836
	380C2F3	0	0	0	19167	72304	-153848
	RTG	0	0	0	5185	19234	-40901
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4133	21991	37166	4280	14139	-28998
	150C1F1	10798	48768	89284	11010	38369	-80256
	150C1F2	10822	47637	87988	11011	38297	-80251
	150C1F3	10852	46265	86465	11012	38207	-80247
	380C2F1	0	0	0	22020	76738	-160513
	380C2F2	0	0	0	22022	76593	-160501
	380C2F3	0	0	0	22023	76415	-160493
	RTG	0	0	0	8565	27773	-57788
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3212	11524	22767	3226	10559	-22386
	150C1F1	10745	38331	76722	10779	35747	-75933
	150C1F2	10750	38067	76561	10779	35724	-75938
	150C1F3	10755	37747	76382	10779	35696	-75946
	380C2F1	0	0	0	21558	71493	-151866
	380C2F2	0	0	0	21558	71448	-151877
	380C2F3	0	0	0	21558	71392	-151891
	RTG	0	0	0	6444	21014	-44718
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1923	7453	14705	1923	7453	-14705
	150C1F1	7102	26664	53581	7102	26664	-53581
	150C1F2	7105	26483	53458	7105	26483	-53458
	150C1F3	7108	26263	53321	7108	26263	-53321
	380C2F1	0	0	0	14203	53328	-107162
	380C2F2	0	0	0	14210	52966	-106916
	380C2F3	0	0	0	14217	52526	-106641
	RTG	0	0	0	3852	14275	-28895
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1962	7901	16550	1962	7901	-16550
	150C1F1	7246	29511	62178	7246	29511	-62178
	150C1F2	7246	29471	62175	7246	29471	-62175
	150C1F3	7246	29422	62174	7246	29422	-62174
	380C2F1	0	0	0	14491	59021	-124357
	380C2F2	0	0	0	14492	58942	-124351
	380C2F3	0	0	0	14493	58845	-124347
	RTG	0	0	0	3915	15497	-32707
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3645	13022	25906	3645	13022	-25906
	150C1F1	8677	32614	66849	8677	32614	-66849
	150C1F2	8679	32479	66787	8679	32479	-66787
	150C1F3	8682	32314	66719	8682	32314	-66719
	380C2F1	0	0	0	17354	65229	-133697
	380C2F2	0	0	0	17359	64958	-133573
	380C2F3	0	0	0	17364	64628	-133439
	RTG	0	0	0	7306	25148	-51226
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2595	8915	18725	2595	8915	-18725
	150C1F1	8456	29589	62346	8456	29589	-62346
	150C1F2	8457	29551	62347	8457	29551	-62347
	150C1F3	8457	29505	62350	8457	29505	-62350
	380C2F1	0	0	0	16913	59178	-124692
	380C2F2	0	0	0	16913	59103	-124695
	380C2F3	0	0	0	16914	59010	-124700
	RTG	0	0	0	5186	17676	-37378
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1929	7134	14462	1833	13460	-22541
	150C1F1	7115	25866	53112	6831	41988	-72240
	150C1F2	7116	25765	53069	6854	40297	-69926
	150C1F3	7118	25641	53022	6885	38211	-67105
	380C2F1	0	0	0	13662	83977	-144480
	380C2F2	0	0	0	13708	80595	-139853
	380C2F3	0	0	0	13770	76422	-134210
	RTG	0	0	0	3725	21358	-37313
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7833	16541	1936	9098	-17567
	150C1F1	7247	29331	62176	7185	32487	-64196
	150C1F2	7247	29307	62178	7193	32146	-63867
	150C1F3	7248	29277	62181	7203	31734	-63491
	380C2F1	0	0	0	14369	64975	-128391
	380C2F2	0	0	0	14386	64292	-127734
	380C2F3	0	0	0	14406	63468	-126983
	RTG	0	0	0	3890	16860	-33545

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3653	12584	25664	3501	21096	-35247
	150C1F1	8686	32012	66625	8440	43943	-78940
	150C1F2	8687	31934	66607	8465	42649	-77292
	150C1F3	8688	31839	66589	8497	41071	-75327
	380C2F1	0	0	0	16880	87886	-157879
	380C2F2	0	0	0	16930	85298	-154585
	380C2F3	0	0	0	16994	82141	-150654
	RTG	0	0	0	7118	34563	-60749
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2596	8853	18727	2579	9916	-19319
	150C1F1	8458	29417	62360	8414	32275	-63737
	150C1F2	8458	29394	62364	8420	31974	-63495
	150C1F3	8458	29365	62369	8427	31609	-63221
	380C2F1	0	0	0	16828	64549	-127473
	380C2F2	0	0	0	16840	63947	-126989
	380C2F3	0	0	0	16854	63219	-126443
	RTG	0	0	0	5170	18849	-37811
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1839	12858	21692	1839	12858	-21692
	150C1F1	6853	40387	70048	6853	40387	-70048
	150C1F2	6875	38838	67948	6875	38838	-67948
	150C1F3	6905	36932	65398	6905	36932	-65398
	380C2F1	0	0	0	13706	80773	-140097
	380C2F2	0	0	0	13751	77675	-135895
	380C2F3	0	0	0	13811	73864	-130796
	RTG	0	0	0	3736	20602	-36285
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1940	8966	17419	1940	8966	-17419
	150C1F1	7193	32164	63884	7193	32164	-63884
	150C1F2	7200	31857	63601	7200	31857	-63601
	150C1F3	7209	31486	63278	7209	31486	-63278
	380C2F1	0	0	0	14385	64327	-127767
	380C2F2	0	0	0	14400	63713	-127201
	380C2F3	0	0	0	14417	62972	-126557
	RTG	0	0	0	3894	16713	-33412
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3512	20273	34179	3512	20273	-34179
	150C1F1	8464	42717	77378	8464	42717	-77378
	150C1F2	8487	41543	75909	8487	41543	-75909
	150C1F3	8517	40113	74163	8517	40113	-74163
	380C2F1	0	0	0	16927	85434	-154757
	380C2F2	0	0	0	16974	83085	-151818
	380C2F3	0	0	0	17034	80226	-148327
	RTG	0	0	0	7137	33555	-59520
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2581	9809	19225	2581	9809	-19225
	150C1F1	8420	31989	63507	8420	31989	-63507
	150C1F2	8425	31718	63300	8425	31718	-63300
	150C1F3	8431	31389	63068	8431	31389	-63068
	380C2F1	0	0	0	16839	63979	-127014
	380C2F2	0	0	0	16850	63436	-126601
	380C2F3	0	0	0	16862	62778	-126136
	RTG	0	0	0	5172	18728	-37732
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1833	13460	22541	1929	7134	-14462
	150C1F1	6831	41988	72240	7115	25866	-53112
	150C1F2	6854	40297	69926	7116	25765	-53069
	150C1F3	6885	38211	67105	7118	25641	-53022
	380C2F1	0	0	0	14229	51732	-106224
	380C2F2	0	0	0	14232	51529	-106137
	380C2F3	0	0	0	14235	51282	-106044
	RTG	0	0	0	3857	13909	-28704
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1936	9098	17567	1963	7833	-16541
	150C1F1	7185	32487	64196	7247	29331	-62176
	150C1F2	7193	32146	63867	7247	29307	-62178
	150C1F3	7203	31734	63491	7248	29277	-62181
	380C2F1	0	0	0	14494	58662	-124352
	380C2F2	0	0	0	14495	58614	-124355
	380C2F3	0	0	0	14495	58555	-124362
	RTG	0	0	0	3916	15414	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3501	21096	35247	3653	12584	-25664
	150C1F1	8440	43943	78940	8686	32012	-66625
	150C1F2	8465	42649	77292	8687	31934	-66607
	150C1F3	8497	41071	75327	8688	31839	-66589
	380C2F1	0	0	0	17372	64025	-133249
	380C2F2	0	0	0	17374	63869	-133214
	380C2F3	0	0	0	17376	63677	-133179
	RTG	0	0	0	7313	24635	-51058
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2579	9916	19319	2596	8853	-18727
	150C1F1	8414	32275	63737	8458	29417	-62360
	150C1F2	8420	31974	63495	8458	29394	-62364
	150C1F3	8427	31609	63221	8458	29365	-62369
	380C2F1	0	0	0	16915	58835	-124720
	380C2F2	0	0	0	16915	58788	-124728
	380C2F3	0	0	0	16916	58730	-124738
	RTG	0	0	0	5186	17597	-37391

ZWW4HL400+5

Appendix CC1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2559	9188	18426	0	0	0
	150C1F1	9435	33035	67243	0	0	0
	150C1F2	9437	32877	67170	0	0	0
	150C1F3	9440	32685	67092	0	0	0
	380C2F1	18869	66070	134486	18869	66070	-134486
	380C2F2	18874	65755	134341	18874	65755	-134341
	380C2F3	18879	65370	134183	18879	65370	-134183
	RTG	0	0	0	5118	17831	-36523
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2598	9807	20638	0	0	0
	150C1F1	9582	36373	76894	0	0	0
	150C1F2	9582	36336	76896	0	0	0
	150C1F3	9583	36290	76901	0	0	0
	380C2F1	19164	72745	153788	19164	72745	-153788
	380C2F2	19165	72671	153793	19165	72671	-153793
	380C2F3	19166	72580	153802	19166	72580	-153802
	RTG	0	0	0	5184	19313	-40890
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4274	14546	29174	0	0	0
	150C1F1	11004	38920	80370	0	0	0
	150C1F2	11005	38797	80335	0	0	0
	150C1F3	11007	38647	80299	0	0	0
	380C2F1	22007	77840	160739	22007	77840	-160739
	380C2F2	22010	77594	160670	22010	77594	-160670
	380C2F3	22014	77294	160599	22014	77294	-160599
	RTG	0	0	0	8559	28257	-57893
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3225	10619	22378	0	0	0
	150C1F1	10778	35911	75904	0	0	0
	150C1F2	10778	35876	75909	0	0	0
	150C1F3	10778	35831	75916	0	0	0
	380C2F1	21556	71823	151809	21556	71823	-151809
	380C2F2	21556	71751	151818	21556	71751	-151818
	380C2F3	21557	71662	151832	21557	71662	-151832
	RTG	0	0	0	6444	21090	-44700
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2563	8913	18276	0	0	0
	150C1F1	9444	32333	66980	0	0	0
	150C1F2	9445	32242	66959	0	0	0
	150C1F3	9447	32130	66938	0	0	0
	380C2F1	18888	64666	133960	18365	92303	-162331
	380C2F2	18891	64484	133918	18416	89329	-158578
	380C2F3	18893	64261	133876	18483	85694	-154087
	RTG	0	0	0	5003	23867	-42693
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2598	9744	20639	0	0	0
	150C1F1	9583	36204	76914	0	0	0
	150C1F2	9583	36181	76918	0	0	0
	150C1F3	9584	36152	76924	0	0	0
	380C2F1	19167	72407	153827	19075	77909	-156127
	380C2F2	19167	72361	153836	19088	77336	-155705
	380C2F3	19167	72304	153848	19102	76641	-155231
	RTG	0	0	0	5166	20505	-41363
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4280	14139	28998	0	0	0
	150C1F1	11010	38369	80256	0	0	0
	150C1F2	11011	38297	80251	0	0	0
	150C1F3	11012	38207	80247	0	0	0
	380C2F1	22020	76738	160513	21595	97536	-178569
	380C2F2	22022	76593	160501	21643	95275	-175975
	380C2F3	22023	76415	160493	21703	92531	-172929
	RTG	0	0	0	8386	36871	-65696
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3226	10559	22386	0	0	0
	150C1F1	10779	35747	75933	0	0	0
	150C1F2	10779	35724	75938	0	0	0
	150C1F3	10779	35696	75946	0	0	0
	380C2F1	21558	71493	151866	21490	76661	-153445
	380C2F2	21558	71448	151877	21500	76134	-153122
	380C2F3	21558	71392	151891	21511	75494	-152765
	RTG	0	0	0	6431	22174	-44939
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2475	13868	23856	0	0	0
	150C1F1	9207	44743	79387	0	0	0
	150C1F2	9231	43391	77709	0	0	0
	150C1F3	9262	41742	75710	0	0	0
	380C2F1	18413	89485	158774	18413	89485	-158774
	380C2F2	18462	86781	155418	18462	86781	-155418
	380C2F3	18525	83484	151421	18525	83484	-151421
	RTG	0	0	0	5015	23210	-41878
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2581	10718	21176	0	0	0
	150C1F1	9543	38683	77863	0	0	0
	150C1F2	9549	38424	77684	0	0	0
	150C1F3	9555	38110	77483	0	0	0
	380C2F1	19087	77366	155726	19087	77366	-155726
	380C2F2	19098	76849	155368	19098	76849	-155368
	380C2F3	19111	76221	154966	19111	76221	-154966
	RTG	0	0	0	5169	20381	-41279

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4145	21217	36203	0	0	0
	150C1F1	10820	47697	88055	0	0	0
	150C1F2	10843	46675	86913	0	0	0
	150C1F3	10870	45436	85576	0	0	0
	380C2F1	21641	95394	176110	21641	95394	-176110
	380C2F2	21685	93349	173825	21685	93349	-173825
	380C2F3	21740	90872	171153	21740	90872	-171153
	RTG	0	0	0	8405	35944	-64641
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3214	11429	22700	0	0
150C1F1	10750	38081	76569	0	0	0	
150C1F2	10754	37843	76434	0	0	0	
150C1F3	10758	37552	76284	0	0	0	
380C2F1	21499	76162	153139	21499	76162	-153139	
380C2F2	21507	75685	152867	21507	75685	-152867	
380C2F3	21517	75105	152568	21517	75105	-152568	
RTG	0	0	0	6433	22064	-44887	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2467	14414	24585	0	0	0
	150C1F1	9182	46152	81165	0	0	0
	150C1F2	9208	44664	79289	0	0	0
	150C1F3	9241	42847	77043	0	0	0
	380C2F1	18365	92303	162331	18888	64666	-133960
	380C2F2	18416	89329	158578	18891	64484	-133918
	380C2F3	18483	85694	154087	18893	64261	-133876
	RTG	0	0	0	5122	17507	-36419
	NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2578	10828	21276	0	0
150C1F1		9538	38955	78064	0	0	0
150C1F2		9544	38668	77852	0	0	0
150C1F3		9551	38321	77615	0	0	0
380C2F1		19075	77909	156127	19167	72407	-153827
380C2F2		19088	77336	155705	19167	72361	-153836
380C2F3		19102	76641	155231	19167	72304	-153848
RTG		0	0	0	5185	19234	-40901
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	4133	21991	37166	0	0
	150C1F1	10798	48768	89284	0	0	0
	150C1F2	10822	47637	87988	0	0	0
	150C1F3	10852	46265	86465	0	0	0
	380C2F1	21595	97536	178569	22020	76738	-160513
	380C2F2	21643	95275	175975	22022	76593	-160501
	380C2F3	21703	92531	172929	22023	76415	-160493
	RTG	0	0	0	8565	27773	-57788
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3212	11524	22767	0	0
150C1F1		10745	38331	76722	0	0	0
150C1F2		10750	38067	76561	0	0	0
150C1F3		10755	37747	76382	0	0	0
380C2F1		21490	76661	153445	21558	71493	-151866
380C2F2		21500	76134	153122	21558	71448	-151877
380C2F3		21511	75494	152765	21558	71392	-151891
RTG		0	0	0	6444	21014	-44718
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1923	7453	14705	0	0
	150C1F1	7102	26664	53581	0	0	0
	150C1F2	7105	26483	53458	0	0	0
	150C1F3	7108	26263	53321	0	0	0
	380C2F1	14203	53328	107162	14203	53328	-107162
	380C2F2	14210	52966	106916	14210	52966	-106916
	380C2F3	14217	52526	106641	14217	52526	-106641
	RTG	0	0	0	3852	14275	-28895
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1962	7901	16550	0	0
150C1F1		7246	29511	62178	0	0	0
150C1F2		7246	29471	62175	0	0	0
150C1F3		7246	29422	62174	0	0	0
380C2F1		14491	59021	124357	14491	59021	-124357
380C2F2		14492	58942	124351	14492	58942	-124351
380C2F3		14493	58845	124347	14493	58845	-124347
RTG		0	0	0	3915	15497	-32707
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	3645	13022	25906	0	0
	150C1F1	8677	32614	66849	0	0	0
	150C1F2	8679	32479	66787	0	0	0
	150C1F3	8682	32314	66719	0	0	0
	380C2F1	17354	65229	133697	17354	65229	-133697
	380C2F2	17359	64958	133573	17359	64958	-133573
	380C2F3	17364	64628	133439	17364	64628	-133439
	RTG	0	0	0	7306	25148	-51226
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2595	8915	18725	0	0
150C1F1		8456	29589	62346	0	0	0
150C1F2		8457	29551	62347	0	0	0
150C1F3		8457	29505	62350	0	0	0
380C2F1		16913	59178	124692	16913	59178	-124692
380C2F2		16913	59103	124695	16913	59103	-124695
380C2F3		16914	59010	124700	16914	59010	-124700
RTG		0	0	0	5186	17676	-37378
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1929	7134	14462	0	0
	150C1F1	7115	25866	53112	0	0	0
	150C1F2	7116	25765	53069	0	0	0
	150C1F3	7118	25641	53022	0	0	0
	380C2F1	14229	51732	106224	13662	83977	-144480
	380C2F2	14232	51529	106137	13708	80595	-139853
	380C2F3	14235	51282	106044	13770	76422	-134210
	RTG	0	0	0	3725	21358	-37313
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7833	16541	0	0
150C1F1		7247	29331	62176	0	0	0
150C1F2		7247	29307	62178	0	0	0
150C1F3		7248	29277	62181	0	0	0
380C2F1		14494	58662	124352	14369	64975	-128391
380C2F2		14495	58614	124355	14386	64292	-127734
380C2F3		14495	58555	124362	14406	63468	-126983
RTG		0	0	0	3890	16860	-33545

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3653	12584	25664	0	0	0
	150C1F1	8686	32012	66625	0	0	0
	150C1F2	8687	31934	66607	0	0	0
	150C1F3	8688	31839	66589	0	0	0
	380C2F1	17372	64025	133249	16880	87886	-157879
	380C2F2	17374	63869	133214	16930	85298	-154585
	380C2F3	17376	63677	133179	16994	82141	-150654
	RTG	0	0	0	7118	34563	-60749
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2596	8853	18727	0	0	0
	150C1F1	8458	29417	62360	0	0	0
	150C1F2	8458	29394	62364	0	0	0
	150C1F3	8458	29365	62369	0	0	0
	380C2F1	16915	58835	124720	16828	64549	-127473
	380C2F2	16915	58788	124728	16840	63947	-126989
	380C2F3	16916	58730	124738	16854	63219	-126443
	RTG	0	0	0	5170	18849	-37811
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1839	12858	21692	0	0	0
	150C1F1	6853	40387	70048	0	0	0
	150C1F2	6875	38838	67948	0	0	0
	150C1F3	6905	36932	65398	0	0	0
	380C2F1	13706	80773	140097	13706	80773	-140097
	380C2F2	13751	77675	135895	13751	77675	-135895
	380C2F3	13811	73864	130796	13811	73864	-130796
	RTG	0	0	0	3736	20602	-36285
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1940	8966	17419	0	0	0
	150C1F1	7193	32164	63884	0	0	0
	150C1F2	7200	31857	63601	0	0	0
	150C1F3	7209	31486	63278	0	0	0
	380C2F1	14385	64327	127767	14385	64327	-127767
	380C2F2	14400	63713	127201	14400	63713	-127201
	380C2F3	14417	62972	126557	14417	62972	-126557
	RTG	0	0	0	3894	16713	-33412
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3512	20273	34179	0	0	0
	150C1F1	8464	42717	77378	0	0	0
	150C1F2	8487	41543	75909	0	0	0
	150C1F3	8517	40113	74163	0	0	0
	380C2F1	16927	85434	154757	16927	85434	-154757
	380C2F2	16974	83085	151818	16974	83085	-151818
	380C2F3	17034	80226	148327	17034	80226	-148327
	RTG	0	0	0	7137	33555	-59520
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2581	9809	19225	0	0	0
	150C1F1	8420	31989	63507	0	0	0
	150C1F2	8425	31718	63300	0	0	0
	150C1F3	8431	31389	63068	0	0	0
	380C2F1	16839	63979	127014	16839	63979	-127014
	380C2F2	16850	63436	126601	16850	63436	-126601
	380C2F3	16862	62778	126136	16862	62778	-126136
	RTG	0	0	0	5172	18728	-37732
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1833	13460	22541	0	0	0
	150C1F1	6831	41988	72240	0	0	0
	150C1F2	6854	40297	69926	0	0	0
	150C1F3	6885	38211	67105	0	0	0
	380C2F1	13662	83977	144480	14229	51732	-106224
	380C2F2	13708	80595	139853	14232	51529	-106137
	380C2F3	13770	76422	134210	14235	51282	-106044
	RTG	0	0	0	3857	13909	-28704
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1936	9098	17567	0	0	0
	150C1F1	7185	32487	64196	0	0	0
	150C1F2	7193	32146	63867	0	0	0
	150C1F3	7203	31734	63491	0	0	0
	380C2F1	14369	64975	128391	14494	58662	-124352
	380C2F2	14386	64292	127734	14495	58614	-124355
	380C2F3	14406	63468	126983	14495	58555	-124362
	RTG	0	0	0	3916	15414	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3501	21096	35247	0	0	0
	150C1F1	8440	43943	78940	0	0	0
	150C1F2	8465	42649	77292	0	0	0
	150C1F3	8497	41071	75327	0	0	0
	380C2F1	16880	87886	157879	17372	64025	-133249
	380C2F2	16930	85298	154585	17374	63869	-133214
	380C2F3	16994	82141	150654	17376	63677	-133179
	RTG	0	0	0	7313	24635	-51058
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2579	9916	19319	0	0	0
	150C1F1	8414	32275	63737	0	0	0
	150C1F2	8420	31974	63495	0	0	0
	150C1F3	8427	31609	63221	0	0	0
	380C2F1	16828	64549	127473	16915	58835	-124720
	380C2F2	16840	63947	126989	16915	58788	-124728
	380C2F3	16854	63219	126443	16916	58730	-124738
	RTG	0	0	0	5186	17597	-37391

ZWW4HL400+5

Appendix CC1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2559	9188	18426	2559	9188	-18426
	150C1F1	9435	33035	67243	9435	33035	-67243
	150C1F2	9437	32877	67170	9437	32877	-67170
	150C1F3	9440	32685	67092	9440	32685	-67092
	380C2F1	18869	66070	134486	18869	66070	-134486
	380C2F2	18874	65755	134341	18874	65755	-134341
	380C2F3	18879	65370	134183	18879	65370	-134183
	RTG	0	0	0	5118	17831	-36523
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	2598	9807	20638	2598	9807	-20638
	150C1F1	9582	36373	76894	9582	36373	-76894
	150C1F2	9582	36336	76896	9582	36336	-76896
	150C1F3	9583	36290	76901	9583	36290	-76901
	380C2F1	19164	72745	153788	19164	72745	-153788
	380C2F2	19165	72671	153793	19165	72671	-153793
	380C2F3	19166	72580	153802	19166	72580	-153802
	RTG	0	0	0	5184	19313	-40890
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	4274	14546	29174	4274	14546	-29174
	150C1F1	11004	38920	80370	11004	38920	-80370
	150C1F2	11005	38797	80335	11005	38797	-80335
	150C1F3	11007	38647	80299	11007	38647	-80299
	380C2F1	22007	77840	160739	22007	77840	-160739
	380C2F2	22010	77594	160670	22010	77594	-160670
	380C2F3	22014	77294	160599	22014	77294	-160599
	RTG	0	0	0	8559	28257	-57893
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 0°	GW / opgw	3225	10619	22378	3225	10619	-22378
	150C1F1	10778	35911	75904	10778	35911	-75904
	150C1F2	10778	35876	75909	10778	35876	-75909
	150C1F3	10778	35831	75916	10778	35831	-75916
	380C2F1	21556	71823	151809	21556	71823	-151809
	380C2F2	21556	71751	151818	21556	71751	-151818
	380C2F3	21557	71662	151832	21557	71662	-151832
	RTG	0	0	0	6444	21090	-44700
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2563	8913	18276	2467	14414	-24585
	150C1F1	9444	32333	66980	9182	46152	-81165
	150C1F2	9445	32242	66959	9208	44664	-79289
	150C1F3	9447	32130	66938	9241	42847	-77043
	380C2F1	18888	64666	133960	18365	92303	-162331
	380C2F2	18891	64484	133918	18416	89329	-158578
	380C2F3	18893	64261	133876	18483	85694	-154087
	RTG	0	0	0	5003	23867	-42693
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	2598	9744	20639	2578	10828	-21276
	150C1F1	9583	36204	76914	9538	38955	-78064
	150C1F2	9583	36181	76918	9544	38668	-77852
	150C1F3	9584	36152	76924	9551	38321	-77615
	380C2F1	19167	72407	153827	19075	77909	-156127
	380C2F2	19167	72361	153836	19088	77336	-155705
	380C2F3	19167	72304	153848	19102	76641	-155231
	RTG	0	0	0	5166	20505	-41363
NL3/3 Wind, -5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	4280	14139	28998	4133	21991	-37166
	150C1F1	11010	38369	80256	10798	48768	-89284
	150C1F2	11011	38297	80251	10822	47637	-87988
	150C1F3	11012	38207	80247	10852	46265	-86465
	380C2F1	22020	76738	160513	21595	97536	-178569
	380C2F2	22022	76593	160501	21643	95275	-175975
	380C2F3	22023	76415	160493	21703	92531	-172929
	RTG	0	0	0	8386	36871	-65696
NL3/4 Construction/maintenance, +5°C Permanent loads y _g = 1.2 Wind angle: 45°	GW / opgw	3226	10559	22386	3212	11524	-22767
	150C1F1	10779	35747	75933	10745	38331	-76722
	150C1F2	10779	35724	75938	10750	38067	-76561
	150C1F3	10779	35696	75946	10755	37747	-76382
	380C2F1	21558	71493	151866	21490	76661	-153445
	380C2F2	21558	71448	151877	21500	76134	-153122
	380C2F3	21558	71392	151891	21511	75494	-152765
	RTG	0	0	0	6431	22174	-44939
NL3/1a Wind, 10°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2475	13868	23856	2475	13868	-23856
	150C1F1	9207	44743	79387	9207	44743	-79387
	150C1F2	9231	43391	77709	9231	43391	-77709
	150C1F3	9262	41742	75710	9262	41742	-75710
	380C2F1	18413	89485	158774	18413	89485	-158774
	380C2F2	18462	86781	155418	18462	86781	-155418
	380C2F3	18525	83484	151421	18525	83484	-151421
	RTG	0	0	0	5015	23210	-41878
NL3/1b Wind, -20°C Permanent loads y _g = 1.2 Wind angle: 90°	GW / opgw	2581	10718	21176	2581	10718	-21176
	150C1F1	9543	38683	77863	9543	38683	-77863
	150C1F2	9549	38424	77684	9549	38424	-77684
	150C1F3	9555	38110	77483	9555	38110	-77483
	380C2F1	19087	77366	155726	19087	77366	-155726
	380C2F2	19098	76849	155368	19098	76849	-155368
	380C2F3	19111	76221	154966	19111	76221	-154966
	RTG	0	0	0	5169	20381	-41279

NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4145	21217	36203	4145	21217	-36203
	150C1F1	10820	47697	88055	10820	47697	-88055
	150C1F2	10843	46675	86913	10843	46675	-86913
	150C1F3	10870	45436	85576	10870	45436	-85576
	380C2F1	21641	95394	176110	21641	95394	-176110
	380C2F2	21685	93349	173825	21685	93349	-173825
	380C2F3	21740	90872	171153	21740	90872	-171153
	RTG	0	0	0	8405	35944	-64641
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3214	11429	22700	3214	11429	-22700
	150C1F1	10750	38081	76569	10750	38081	-76569
	150C1F2	10754	37843	76434	10754	37843	-76434
	150C1F3	10758	37552	76284	10758	37552	-76284
	380C2F1	21499	76162	153139	21499	76162	-153139
	380C2F2	21507	75685	152867	21507	75685	-152867
	380C2F3	21517	75105	152568	21517	75105	-152568
	RTG	0	0	0	6433	22064	-44887
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2467	14414	24585	2563	8913	-18276
	150C1F1	9182	46152	81165	9444	32333	-66980
	150C1F2	9208	44664	79289	9445	32242	-66959
	150C1F3	9241	42847	77043	9447	32130	-66938
	380C2F1	18365	92303	162331	18888	64666	-133960
	380C2F2	18416	89329	158578	18891	64484	-133918
	380C2F3	18483	85694	154087	18893	64261	-133876
	RTG	0	0	0	5122	17507	-36419
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2578	10828	21276	2598	9744	-20639
	150C1F1	9538	38955	78064	9583	36204	-76914
	150C1F2	9544	38668	77852	9583	36181	-76918
	150C1F3	9551	38321	77615	9584	36152	-76924
	380C2F1	19075	77909	156127	19167	72407	-153827
	380C2F2	19088	77336	155705	19167	72361	-153836
	380C2F3	19102	76641	155231	19167	72304	-153848
	RTG	0	0	0	5185	19234	-40901
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4133	21991	37166	4280	14139	-28998
	150C1F1	10798	48768	89284	11010	38369	-80256
	150C1F2	10822	47637	87988	11011	38297	-80251
	150C1F3	10852	46265	86465	11012	38207	-80247
	380C2F1	21595	97536	178569	22020	76738	-160513
	380C2F2	21643	95275	175975	22022	76593	-160501
	380C2F3	21703	92531	172929	22023	76415	-160493
	RTG	0	0	0	8565	27773	-57788
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3212	11524	22767	3226	10559	-22386
	150C1F1	10745	38331	76722	10779	35747	-75933
	150C1F2	10750	38067	76561	10779	35724	-75938
	150C1F3	10755	37747	76382	10779	35696	-75946
	380C2F1	21490	76661	153445	21558	71493	-151866
	380C2F2	21500	76134	153122	21558	71448	-151877
	380C2F3	21511	75494	152765	21558	71392	-151891
	RTG	0	0	0	6444	21014	-44718
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1923	7453	14705	1923	7453	-14705
	150C1F1	7102	26664	53581	7102	26664	-53581
	150C1F2	7105	26483	53458	7105	26483	-53458
	150C1F3	7108	26263	53321	7108	26263	-53321
	380C2F1	14203	53328	107162	14203	53328	-107162
	380C2F2	14210	52966	106916	14210	52966	-106916
	380C2F3	14217	52526	106641	14217	52526	-106641
	RTG	0	0	0	3852	14275	-28895
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1962	7901	16550	1962	7901	-16550
	150C1F1	7246	29511	62178	7246	29511	-62178
	150C1F2	7246	29471	62175	7246	29471	-62175
	150C1F3	7246	29422	62174	7246	29422	-62174
	380C2F1	14491	59021	124357	14491	59021	-124357
	380C2F2	14492	58942	124351	14492	58942	-124351
	380C2F3	14493	58845	124347	14493	58845	-124347
	RTG	0	0	0	3915	15497	-32707
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3645	13022	25906	3645	13022	-25906
	150C1F1	8677	32614	66849	8677	32614	-66849
	150C1F2	8679	32479	66787	8679	32479	-66787
	150C1F3	8682	32314	66719	8682	32314	-66719
	380C2F1	17354	65229	133697	17354	65229	-133697
	380C2F2	17359	64958	133573	17359	64958	-133573
	380C2F3	17364	64628	133439	17364	64628	-133439
	RTG	0	0	0	7306	25148	-51226
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2595	8915	18725	2595	8915	-18725
	150C1F1	8456	29589	62346	8456	29589	-62346
	150C1F2	8457	29551	62347	8457	29551	-62347
	150C1F3	8457	29505	62350	8457	29505	-62350
	380C2F1	16913	59178	124692	16913	59178	-124692
	380C2F2	16913	59103	124695	16913	59103	-124695
	380C2F3	16914	59010	124700	16914	59010	-124700
	RTG	0	0	0	5186	17676	-37378
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1929	7134	14462	1833	13460	-22541
	150C1F1	7115	25866	53112	6831	41988	-72240
	150C1F2	7116	25765	53069	6854	40297	-69926
	150C1F3	7118	25641	53022	6885	38211	-67105
	380C2F1	14229	51732	106224	13662	83977	-144480
	380C2F2	14232	51529	106137	13708	80595	-139853
	380C2F3	14235	51282	106044	13770	76422	-134210
	RTG	0	0	0	3725	21358	-37313
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1963	7833	16541	1936	9098	-17567
	150C1F1	7247	29331	62176	7185	32487	-64196
	150C1F2	7247	29307	62178	7193	32146	-63867
	150C1F3	7248	29277	62181	7203	31734	-63491
	380C2F1	14494	58662	124352	14369	64975	-128391
	380C2F2	14495	58614	124355	14386	64292	-127734
	380C2F3	14495	58555	124362	14406	63468	-126983
	RTG	0	0	0	3890	16860	-33545

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3653	12584	25664	3501	21096	-35247
	150C1F1	8686	32012	66625	8440	43943	-78940
	150C1F2	8687	31934	66607	8465	42649	-77292
	150C1F3	8688	31839	66589	8497	41071	-75327
	380C2F1	17372	64025	133249	16880	87886	-157879
	380C2F2	17374	63869	133214	16930	85298	-154585
	380C2F3	17376	63677	133179	16994	82141	-150654
	RTG	0	0	0	7118	34563	-60749
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2596	8853	18727	2579	9916
150C1F1		8458	29417	62360	8414	32275	-63737
150C1F2		8458	29394	62364	8420	31974	-63495
150C1F3		8458	29365	62369	8427	31609	-63221
380C2F1		16915	58835	124720	16828	64549	-127473
380C2F2		16915	58788	124728	16840	63947	-126989
380C2F3		16916	58730	124738	16854	63219	-126443
RTG		0	0	0	5170	18849	-37811
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	1839	12858	21692	1839	12858
	150C1F1	6853	40387	70048	6853	40387	-70048
	150C1F2	6875	38838	67948	6875	38838	-67948
	150C1F3	6905	36932	65398	6905	36932	-65398
	380C2F1	13706	80773	140097	13706	80773	-140097
	380C2F2	13751	77675	135895	13751	77675	-135895
	380C2F3	13811	73864	130796	13811	73864	-130796
	RTG	0	0	0	3736	20602	-36285
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1940	8966	17419	1940	8966
150C1F1		7193	32164	63884	7193	32164	-63884
150C1F2		7200	31857	63601	7200	31857	-63601
150C1F3		7209	31486	63278	7209	31486	-63278
380C2F1		14385	64327	127767	14385	64327	-127767
380C2F2		14400	63713	127201	14400	63713	-127201
380C2F3		14417	62972	126557	14417	62972	-126557
RTG		0	0	0	3894	16713	-33412
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	3512	20273	34179	3512	20273
	150C1F1	8464	42717	77378	8464	42717	-77378
	150C1F2	8487	41543	75909	8487	41543	-75909
	150C1F3	8517	40113	74163	8517	40113	-74163
	380C2F1	16927	85434	154757	16927	85434	-154757
	380C2F2	16974	83085	151818	16974	83085	-151818
	380C2F3	17034	80226	148327	17034	80226	-148327
	RTG	0	0	0	7137	33555	-59520
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2581	9809	19225	2581	9809
150C1F1		8420	31989	63507	8420	31989	-63507
150C1F2		8425	31718	63300	8425	31718	-63300
150C1F3		8431	31389	63068	8431	31389	-63068
380C2F1		16839	63979	127014	16839	63979	-127014
380C2F2		16850	63436	126601	16850	63436	-126601
380C2F3		16862	62778	126136	16862	62778	-126136
RTG		0	0	0	5172	18728	-37732
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	1833	13460	22541	1929	7134
	150C1F1	6831	41988	72240	7115	25866	-53112
	150C1F2	6854	40297	69926	7116	25765	-53069
	150C1F3	6885	38211	67105	7118	25641	-53022
	380C2F1	13662	83977	144480	14229	51732	-106224
	380C2F2	13708	80595	139853	14232	51529	-106137
	380C2F3	13770	76422	134210	14235	51282	-106044
	RTG	0	0	0	3857	13909	-28704
	NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1936	9098	17567	1963	7833
150C1F1		7185	32487	64196	7247	29331	-62176
150C1F2		7193	32146	63867	7247	29307	-62178
150C1F3		7203	31734	63491	7248	29277	-62181
380C2F1		14369	64975	128391	14494	58662	-124352
380C2F2		14386	64292	127734	14495	58614	-124355
380C2F3		14406	63468	126983	14495	58555	-124362
RTG		0	0	0	3916	15414	-32709
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	3501	21096	35247	3653	12584
	150C1F1	8440	43943	78940	8686	32012	-66625
	150C1F2	8465	42649	77292	8687	31934	-66607
	150C1F3	8497	41071	75327	8688	31839	-66589
	380C2F1	16880	87886	157879	17372	64025	-133249
	380C2F2	16930	85298	154585	17374	63869	-133214
	380C2F3	16994	82141	150654	17376	63677	-133179
	RTG	0	0	0	7313	24635	-51058
	NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2579	9916	19319	2596	8853
150C1F1		8414	32275	63737	8458	29417	-62360
150C1F2		8420	31974	63495	8458	29394	-62364
150C1F3		8427	31609	63221	8458	29365	-62369
380C2F1		16828	64549	127473	16915	58835	-124720
380C2F2		16840	63947	126989	16915	58788	-124728
380C2F3		16854	63219	126443	16916	58730	-124738
RTG		0	0	0	5186	17597	-37391

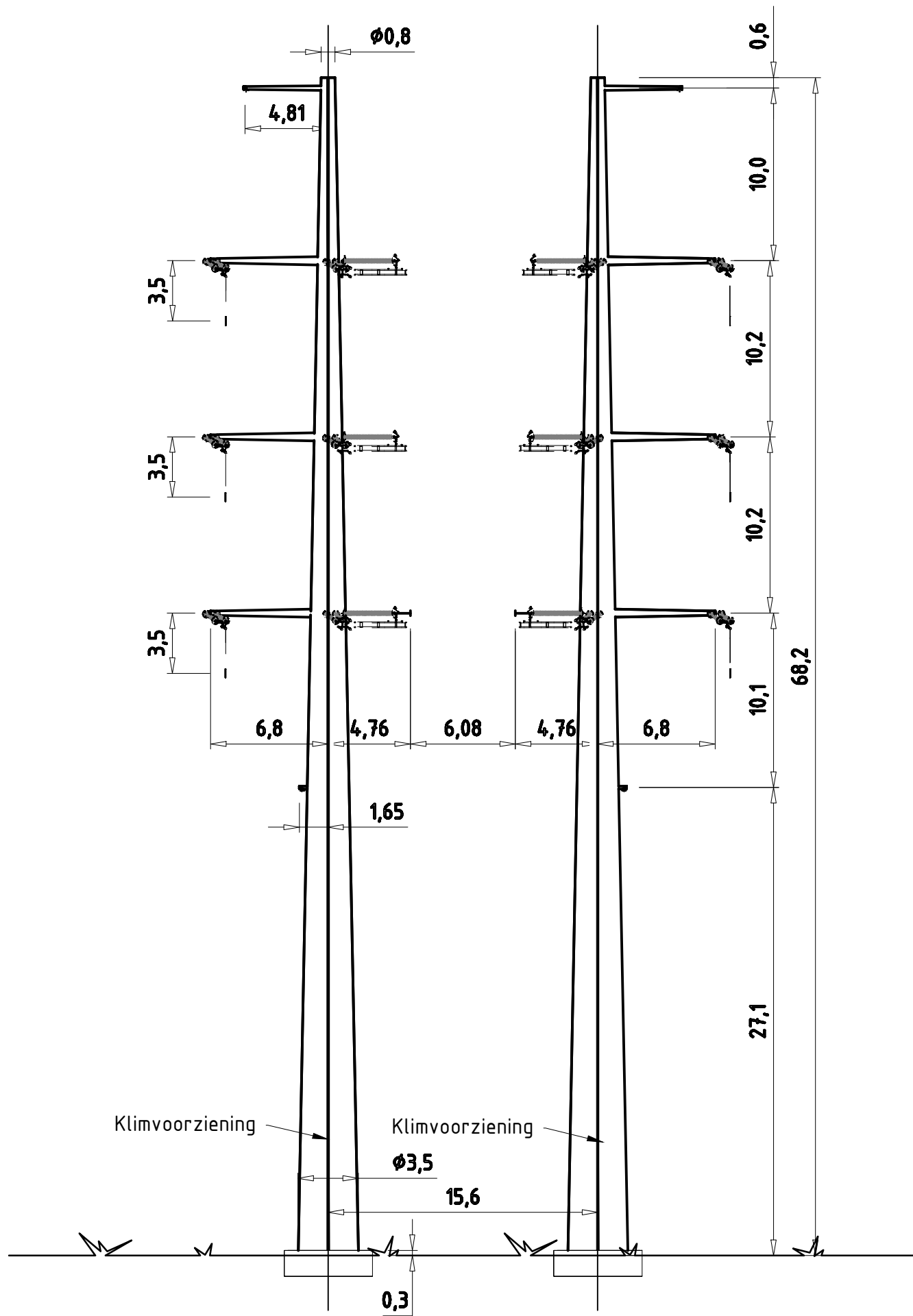
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Appendix CC2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2130	8324	16212	2130	8324	-16212
Wind, 10°C	150C1F1	7869	29535	58722	7869	29535	-58722
Permanent loads yg= 1.0	150C1F2	7873	29291	58540	7873	29291	-58540
Wind angle: 0°	150C1F3	7878	28996	58336	7878	28996	-58336
	380C2F1	15737	59070	117445	15737	59070	-117445
	380C2F2	15746	58583	117080	15746	58583	-117080
	380C2F3	15757	57993	116671	15757	57993	-116671
	RTG	0	0	0	4270	15806	-31694
NL4/1b	GW / opgw	2175	8522	17948	2175	8522	-17948
Wind, -20°C	150C1F1	8027	31781	67233	8027	31781	-67233
Permanent loads yg= 1.0	150C1F2	8028	31750	67234	8028	31750	-67234
Wind angle: 0°	150C1F3	8028	31712	67237	8028	31712	-67237
	380C2F1	16055	63563	134466	16055	63563	-134466
	380C2F2	16055	63501	134469	16055	63501	-134469
	380C2F3	16056	63424	134475	16056	63424	-134475
	RTG	0	0	0	4339	16765	-35514
NL4/3	GW / opgw	7199	20887	43107	7199	20887	-43107
Wind, -5°C	150C1F1	12427	42336	88211	12427	42336	-88211
Permanent loads yg= 1.0	150C1F2	12428	42242	88201	12428	42242	-88201
Wind angle: 0°	150C1F3	12429	42127	88192	12429	42127	-88192
	380C2F1	24854	84672	176423	24854	84672	-176423
	380C2F2	24856	84485	176401	24856	84485	-176401
	380C2F3	24858	84254	176384	24858	84254	-176384
	RTG	0	0	0	14419	41266	-86240
NL4/4	GW / opgw	2697	9164	19325	2697	9164	-19325
Construction/maintenance, +5°C	150C1F1	9014	31059	65683	9014	31059	-65683
Permanent loads yg= 1.0	150C1F2	9014	31029	65687	9014	31029	-65687
Wind angle: 0°	150C1F3	9014	30992	65692	9014	30992	-65692
	380C2F1	18027	62118	131367	18027	62118	-131367
	380C2F2	18028	62058	131374	18028	62058	-131374
	380C2F3	18028	61983	131385	18028	61983	-131385
	RTG	0	0	0	5387	18197	-38584
NL4/1a	GW / opgw	2138	7894	15856	2022	16151	-26526
Wind, 10°C	150C1F1	7887	28465	58020	7533	49727	-83809
Permanent loads yg= 1.0	150C1F2	7889	28330	57953	7559	47554	-80833
Wind angle: 45°	150C1F3	7892	28165	57880	7593	44857	-77168
	380C2F1	15774	56930	116041	15066	99454	-167618
	380C2F2	15779	56660	115907	15117	95108	-161666
	380C2F3	15783	56330	115761	15187	89714	-154337
	RTG	0	0	0	4109	25207	-43171
NL4/1b	GW / opgw	2175	8469	17947	2158	9393	-18523
Wind, -20°C	150C1F1	8028	31639	67247	7988	33978	-68305
Permanent loads yg= 1.0	150C1F2	8028	31620	67250	7994	33733	-68115
Wind angle: 45°	150C1F3	8029	31596	67255	8000	33436	-67901
	380C2F1	16057	63279	134494	15977	67956	-136610
	380C2F2	16057	63241	134500	15988	67466	-136230
	380C2F3	16057	63193	134510	16001	66871	-135802
	RTG	0	0	0	4324	17777	-35948
NL4/3	GW / opgw	7201	20615	43105	7117	25295	-45912
Wind, -5°C	150C1F1	12431	41911	88190	12287	49455	-93306
Permanent loads yg= 1.0	150C1F2	12431	41855	88193	12305	48643	-92505
Wind angle: 45°	150C1F3	12432	41784	88199	12327	47660	-91581
	380C2F1	24862	83822	176380	24574	98909	-186612
	380C2F2	24863	83709	176386	24611	97286	-185010
	380C2F3	24864	83568	176398	24654	95321	-183162
	RTG	0	0	0	14337	46424	-88404
NL4/4	GW / opgw	2697	9114	19331	2685	9932	-19678
Construction/maintenance, +5°C	150C1F1	9014	30921	65706	8985	33108	-66436
Permanent loads yg= 1.0	150C1F2	9014	30902	65710	8989	32884	-66292
Wind angle: 45°	150C1F3	9014	30879	65716	8994	32611	-66131
	380C2F1	18029	61842	131411	17971	66216	-132873
	380C2F2	18029	61804	131420	17979	65767	-132583
	380C2F3	18029	61757	131431	17988	65222	-132261
	RTG	0	0	0	5377	19112	-38809
NL4/1a	GW / opgw	2028	15390	25459	2028	15390	-25459
Wind, 10°C	150C1F1	7557	47669	80990	7557	47669	-80990
Permanent loads yg= 1.0	150C1F2	7583	45669	78267	7583	45669	-78267
Wind angle: 90°	150C1F3	7617	43194	74930	7617	43194	-74930
	380C2F1	15114	95338	161980	15114	95338	-161980
	380C2F2	15165	91338	156535	15165	91338	-156535
	380C2F3	15234	86388	149861	15234	86388	-149861
	RTG	0	0	0	4122	24225	-41826

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2160	9299	18434	2160	9299	-18434
	150C1F1	7994	33746	68124	7994	33746	-68124
	150C1F2	7998	33524	67963	7998	33524	-67963
	150C1F3	8004	33256	67781	8004	33256	-67781
	380C2F1	15987	67491	136249	15987	67491	-136249
	380C2F2	15997	67049	135925	15997	67049	-135925
	380C2F3	16008	66512	135562	16008	66512	-135562
	RTG	0	0	0	4326	17671	-35872
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7127	24827	45492	7127	24827	-45492
	150C1F1	12304	48685	92546	12304	48685	-92546
	150C1F2	12321	47953	91851	12321	47953	-91851
	150C1F3	12340	47068	91052	12340	47068	-91052
	380C2F1	24609	97371	185092	24609	97371	-185092
	380C2F2	24641	95907	183702	24641	95907	-183702
	380C2F3	24680	94135	182103	24680	94135	-182103
	RTG	0	0	0	14348	45887	-88033
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2687	9851	19618	2687	9851	-19618
	150C1F1	8989	32895	66299	8989	32895	-66299
	150C1F2	8993	32693	66177	8993	32693	-66177
	150C1F3	8997	32446	66042	8997	32446	-66042
	380C2F1	17978	65791	132598	17978	65791	-132598
	380C2F2	17986	65385	132354	17986	65385	-132354
	380C2F3	17994	64892	132083	17994	64892	-132083
	RTG	0	0	0	5378	19019	-38762
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2022	16151	26526	2138	7894	-15856
	150C1F1	7533	49727	83809	7887	28465	-58020
	150C1F2	7559	47554	80833	7889	28330	-57953
	150C1F3	7593	44857	77168	7892	28165	-57880
	380C2F1	15066	99454	167618	15774	56930	-116041
	380C2F2	15117	95108	161666	15779	56660	-115907
	380C2F3	15187	89714	154337	15783	56330	-115761
	RTG	0	0	0	4278	15316	-31404
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2158	9393	18523	2175	8469	-17947
	150C1F1	7988	33978	68305	8028	31639	-67247
	150C1F2	7994	33733	68115	8028	31620	-67250
	150C1F3	8000	33436	67901	8029	31596	-67255
	380C2F1	15977	67956	136610	16057	63279	-134494
	380C2F2	15988	67466	136230	16057	63241	-134500
	380C2F3	16001	66871	135802	16057	63193	-134510
	RTG	0	0	0	4340	16699	-35522
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7117	25295	45912	7201	20615	-43105
	150C1F1	12287	49455	93306	12431	41911	-88190
	150C1F2	12305	48643	92505	12431	41855	-88193
	150C1F3	12327	47660	91581	12432	41784	-88199
	380C2F1	24574	98909	186612	24862	83822	-176380
	380C2F2	24611	97286	185010	24863	83709	-176386
	380C2F3	24654	95321	183162	24864	83568	-176398
	RTG	0	0	0	14421	40924	-86284
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2685	9932	19678	2697	9114	-19331
	150C1F1	8985	33108	66436	9014	30921	-65706
	150C1F2	8989	32884	66292	9014	30902	-65710
	150C1F3	8994	32611	66131	9014	30879	-65716
	380C2F1	17971	66216	132873	18029	61842	-131411
	380C2F2	17979	65767	132583	18029	61804	-131420
	380C2F3	17988	65222	132261	18029	61757	-131431
	RTG	0	0	0	5387	18133	-38598


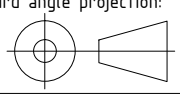


- Maatvoering indicatief

T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4HL400+5

- Trekparameter 1800m
- 2x380 / 2x150 Hoekmast
- 400m Veldlengte
- 130°-150° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

1.0	06-03-2014	First edition	Projectname: Engineering verbinding ZW380	
				Drawing no.: 74102194-035-099V
Design state: Definitief		Scale: 1:300		Description: Wintrack Masttype ZWW4HL400+5
Drawn by: RBE	06-03-2014	Units: m		
Checked by: AJP	06-03-2014	Project no: 000.145		
Approved by: AW	06-03-2014	Company: TenneT		
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com				
				Revision: 1.0
				Format: A4

ZWW4HK400+5S

Bijlage CBZ

Fundatie berekening

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1,6	m
schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	5,5	m
	Hoogte	1,8	m
	Inhoud	42,8	m ³
	e.g.	1026	kN

Onderplaat	Diameter	13,0	m
	Hoogte	1,3	m
	Inhoud	173	m ³
	e.g.	4141	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		1060	kN
Fgeleiders		178	kN
Maximale dwarskracht		1114	kN
Fmax vert (druk)		1451	kN
Fmin vert (trek)		1088	kN
Maximale moment		57338	kNm

Moment

F_{diag}		5192	kN
F_{hor}		1114	kN
F_{ver}		5152	kN
M_{hor} (tgv Fhor)		3452	kNm
M_{tot}		60790	kNm
$F=M/a$		5152	kN

Verticaal reactiekracht

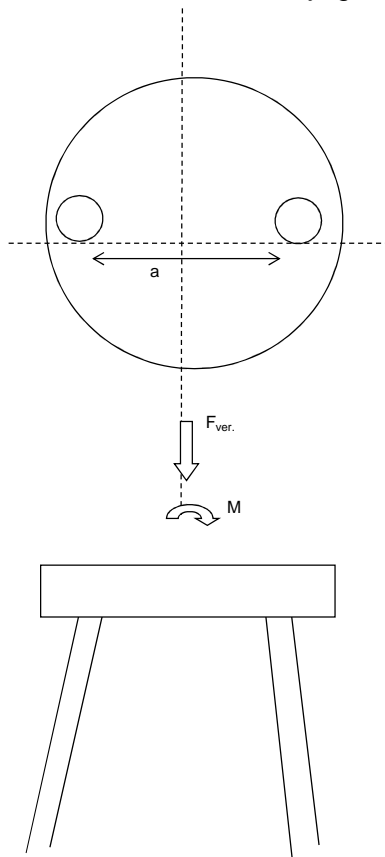
Fwater (trek)		2153	kN
Fgrond (druk)		2942	kN
Fgrond (trek)		2452	kN

Fdmax (druk)		5591	kN
Ftmax (trek)		2681	kN

Fdtot (druk)		10743	kN
Fttot (trek)		2471	kN

Palen druk		10	(-)
Palen trek		8	(-)

Totaal palen		20	(-)	Per fundering
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ZWW4HK400+5S

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CBZ

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	$O_{p;gem}$	1,60 m
paalfactor	αt	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11,25 MPa
materiaalfactor	$\gamma_{m,b4}$	1,4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1,5
	$q_{c;z,d}$	5,36 MPa
	$P_{r;z,d}$	37,5 kN/m ²
	$F_{r;trek,d,i}$	60,0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

$F_{trek,d}$	536,4 kN
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ZWW4HK400+5S

DRUKPALEN

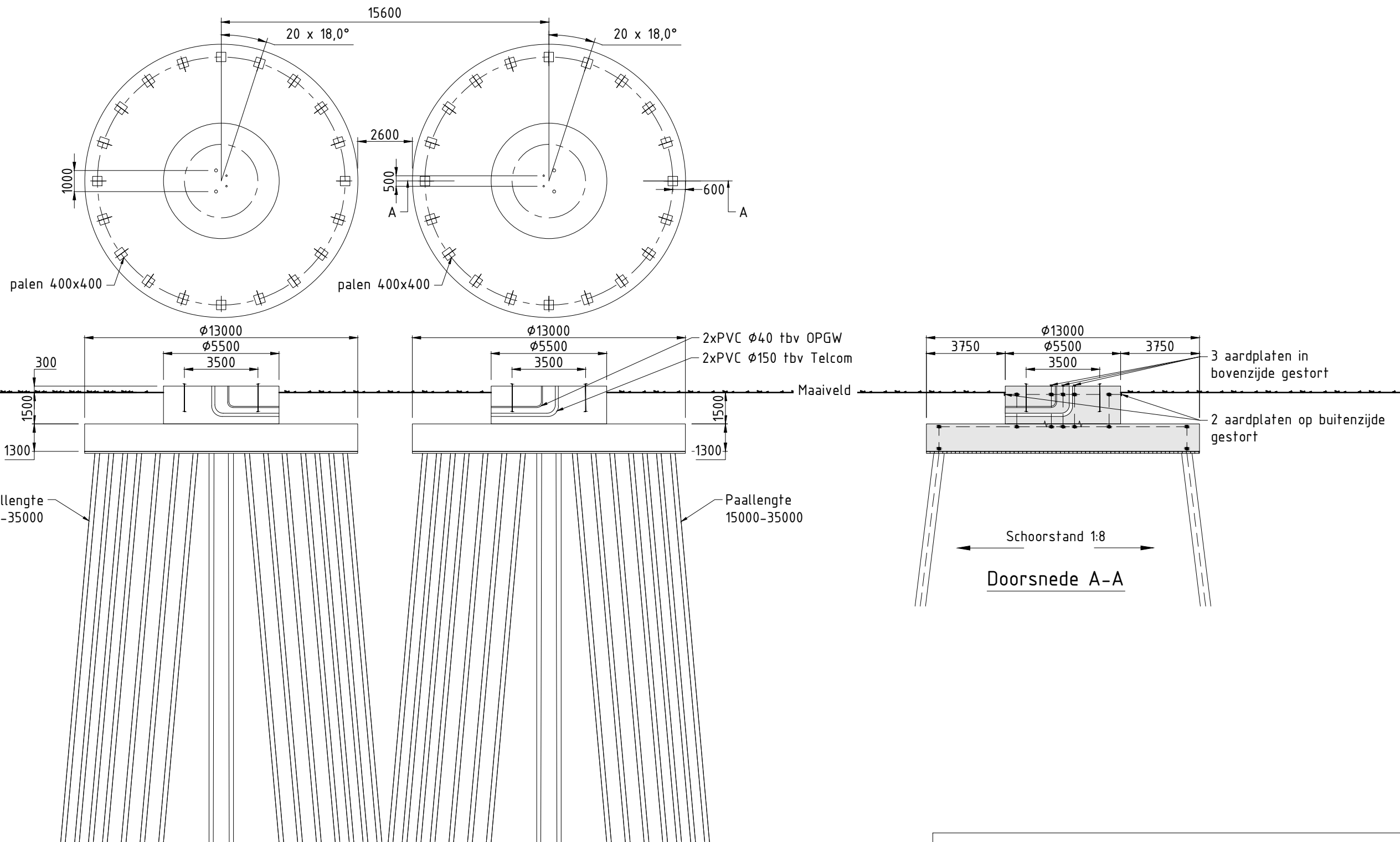
FUNDERINGSCONSTRUCTIE
Toelaatbare paalbelastingen

Bijlage CBZ

Bepaling opneembare paalbelasting op druk

heipaal	v	
diameter	a	2 mm
		2 mm
Deq		0,001808
maximale puntweerstand		
$P_{r,max;punt;i}$		11,25 MN/m ²
paalklasse factor	α_p	1,00
factor paalvoet	β	1
hoek van inwendige vrijwing van paalvoet	ϕ	40
factor dwarsdoorsnede paalvoet	s	1,00
minimale waarde neergaande deel	$q_{c,II;gem}$	9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11,00 MN/m ²
maximale paalschachtwrijving		
$P_{r,max;schacht;i}$		0,05 MN/m ²
waarin:		
paalfactor	α_s	0,010
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5,00 MN/m ²
maximale draagkracht alleenstaande paal		
$F_{r,max;i}$		0,00 MN
waarin:		
$F_{r,max;punt;i}$		0,00 MN
paalpunt oppervlak	A_{punt}	0,00 m ²
$F_{r,max;schacht;i}$		0,00 MN
gemiddelde paalomtrek	$O_{p;gem}$	0,01 m
lengte schachtwrijving	Δl	15,00 m
Bepaling rekenwaarde van de maximale draagkracht		
$F_{r,paal,max;d}$	MN	0,00 MN
materiaalfactor grond	γ_{mb}	1,20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0,75

$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27,00 m
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T.B.V. Vergunnings aanvraag

Verklaring


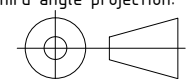
- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding $\phi 16\text{mm}$ (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

1.0	17-03-2014	Eerste uitgave		
		Projectname: Engineering verbinding ZW380		
		Third angle projection: 	Drawing no.: 74102194-032-100V	
Design state: Definitief		Scale: 1:200	Description: Principe ontwerp fundatie hoekmast ZWW4HK400+5S masten familie	
Drawn by: RBE 17-03-2014		Units: mm		
Checked by: AJP 17-03-2014		Project no: 000.145		
Approved by: AW 17-03-2014		Company: TenneT	Revision: 1.0	
			Format: A3	
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com				



ZWW4HK400S+5

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte			h	68.2	m
Diameter voet			d voet	3.5	m
top			d top	0.8	m
gem			d gem	2.2	m
wanddikte			t	26	mm
Oppervlakte aan voet			A	283761	mm ²
Traagheidsmoment aan voet			W _x	2.45E+08	mm ⁴
Weerstandsmoment aan voet			I _x	4.23E+11	mm ⁶
Mast: Gewicht			2 ^{de} orde F _{rep,ver}	10.0	%
				921	kN

Bijlage BBZ

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	67.6	4.2	5.6	-43.4	43.8	2960 kNm
GW / opgw	67.6	6.3	10.8	-39.9	41.3	2795 kNm
150C1F1	57.6	17.7	22.8	-97.2	99.8	5750 kNm
150C1F2	47.4	15.8	22.2	-96.1	98.6	4674 kNm
150C1F3	37.2	13.8	21.6	-94.8	97.2	3617 kNm
380C2F1	57.6	21.2	19.6	-206.5	207.5	11950 kNm
380C2F2	47.4	21.3	18.4	-202.8	203.6	9651 kNm
380C2F3	37.2	21.4	17.1	-198.3	199.0	7404 kNm
RTG	27.1	7.5	8.4	-76.4	76.9	2084 kNm
Stuwdruk				F _{hor.}	43.2	kN
				M _{d,wind}	1316	kNm
Totaal				M _{d,tot}	52125	kNm
Totaal moment incl. 2 ^{de} orde effect				M _{d,tot}	57338	kNm

Normaalkracht;

Optredende normaalkracht						
N _{d,geluiders}					122	kN
N _{d, e.g. mast}					1105	kN
N _{s,d,totaal}					1282	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
β_a	0.61	
A _{eff}	173038	mm ²

Optredende spanning tgv normaalkracht

N _{d,d} /A _{eff} = f _{yd} /γ _{m1}	7	N/mm ²
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Moment;

Optredende moment in de voet:		
M _{d,tot}	57338	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
β_a	0.91	
W _{eff}	2.23E+08	mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	265	N/mm ²
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Totale spanning:

σ_d	265	N/mm ²	< 284 N/mm ² = ACCOORD
$\sigma_{d,toegestaan}$	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	67.6	4.0	9.4	1.3	9.4	638 kNm
GW / opgw	67.6	4.8	11.9	4.9	12.9	873 kNm
150C1F1	57.6	18.1	35.3	13.8	37.9	2180 kNm
150C1F2	47.4	17.3	33.5	12.2	35.6	1689 kNm
150C1F3	37.2	16.5	31.3	9.9	32.9	1223 kNm
380C2F1	57.6	29.3	54.2	5.3	54.4	3136 kNm
380C2F2	47.4	29.5	50.6	4.9	50.8	2410 kNm
380C2F3	37.2	29.7	46.1	4.3	46.3	1723 kNm
RTG	27.1	3.7	6.5	-52.8	53.2	1442 kNm
RTG	27.1	0.0	0.0	0.0	0.0	0 kNm
Stuwdruk				F _{hor.}	1161	kN

Verplaatsing	0.72	m
Percentage van de verplaatsing	1.05%	
Hoek	1.03	graden
Kromming	0.18%	
Fundatie rotatiestijfheid	0.005	rad

3.72	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4HK400+5S

Appendix BZ / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2566	620	20128	2843	615	-19986
	GW / opgw	2566	0	20138	4858	3619	-19728
	150C1F1	9452	0	73963	16586	13157	-72393
	150C1F2	9452	0	73963	14489	13132	-72389
	150C1F3	9452	0	73963	12397	13102	-72385
	380C2F1	18903	4548	147856	19006	4511	-146740
	380C2F2	18903	4546	147856	19006	4509	-146740
	380C2F3	18903	4543	147856	19006	4506	-146740
RTG	0	0	0	4623	1227	-39929	
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	697	22793	2965	713	-25307
	GW / opgw	2598	0	22804	5301	4060	-22866
	150C1F1	9584	0	84967	18165	15125	-85335
	150C1F2	9584	0	84967	15695	15120	-85335
	150C1F3	9584	0	84967	13230	15115	-85336
	380C2F1	19168	5196	169855	19659	5322	-174010
	380C2F2	19168	5195	169855	19659	5322	-174010
	380C2F3	19168	5195	169855	19659	5321	-174010
RTG	0	0	0	4689	1410	-46091	
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	10106	1882	61400	10651	1797	-58659
	GW / opgw	10106	0	61429	16679	10415	-58247
	150C1F1	16190	0	119452	27527	20643	-115831
	150C1F2	16190	0	119452	24160	20630	-115832
	150C1F3	16190	0	119452	20803	20614	-115833
	380C2F1	32379	7313	238792	32308	7177	-234391
	380C2F2	32379	7312	238792	32308	7176	-234391
	380C2F3	32379	7310	238792	32308	7174	-234391
RTG	0	0	0	18215	3595	-117449	
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2571	628	20520	3816	791	-25872
	GW / opgw	2571	0	20530	6441	4534	-25557
	150C1F1	9471	0	75562	19645	15052	-84921
	150C1F2	9471	0	75562	17179	15048	-84922
	150C1F3	9471	0	75562	14720	15042	-84923
	380C2F1	18942	4621	151054	22633	5263	-172073
	380C2F2	18942	4621	151054	22633	5262	-172073
	380C2F3	18942	4620	151054	22633	5262	-172073
RTG	0	0	0	6257	1580	-51669	
NL1/6 Permanent, +10°C Permanent loads yg= 1.35	GW / opgw	2881	677	22167	3177	669	-21913
	GW / opgw	2881	0	22177	5398	3815	-21636
	150C1F1	10610	0	81297	18412	13977	-79265
	150C1F2	10610	0	81297	16110	13977	-79265
	150C1F3	10610	0	81297	13814	13977	-79265
	380C2F1	21221	4965	162519	21274	4905	-160540
	380C2F2	21221	4965	162519	21274	4905	-160540
	380C2F3	21221	4965	162519	21274	4905	-160540
RTG	0	0	0	5189	1338	-43788	
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2464	3621	28626	2498	3659	-29376
	GW / opgw	2458	2924	29597	3467	8464	-30269
	150C1F1	9151	8234	96147	13115	25821	-96972
	150C1F2	9178	7630	93511	12020	24852	-94544
	150C1F3	9213	6869	90320	10845	23723	-91754
	380C2F1	18346	21193	187336	17731	21599	-191732
	380C2F2	18398	19912	182551	17842	20254	-186346
	380C2F3	18466	18307	176785	17989	18576	-179830
RTG	0	0	0	4483	5464	-50852	
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2589	1259	23257	2928	1280	-23842
	GW / opgw	2588	584	23347	5133	4759	-23445
	150C1F1	9560	1645	86116	17835	16887	-86455
	150C1F2	9563	1525	85955	15472	16853	-86307
	150C1F3	9567	1373	85770	13099	16697	-86145
	380C2F1	19125	8340	171788	19546	8531	-176281
	380C2F2	19131	8105	171511	19562	8286	-175951
	380C2F3	19138	7810	171192	19580	7979	-175572
RTG	0	0	0	4678	2206	-46630	
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	10065	4758	63297	10504	4696	-60812
	GW / opgw	10060	3006	63670	16009	13878	-60479
	150C1F1	16105	4600	123689	26448	26064	-120185
	150C1F2	16116	4262	123105	23429	25665	-119638
	150C1F3	16130	3838	122428	20368	25204	-119037
	380C2F1	32229	16158	246022	31938	16212	-242845
	380C2F2	32249	15493	245007	31987	15517	-241644
	380C2F3	32273	14660	243832	32046	14648	-240257
RTG	0	0	0	18170	7662	-119602	
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2563	1190	20966	3794	1353	-26219
	GW / opgw	2562	585	21053	6341	5193	-25904
	150C1F1	9450	1646	76672	19425	16860	-85730
	150C1F2	9453	1525	76516	17031	16733	-85618
	150C1F3	9456	1373	76337	14633	16584	-85497
	380C2F1	18905	7765	152918	22558	8458	-173825
	380C2F2	18910	7530	152650	22569	8215	-173567
	380C2F3	18916	7235	152343	22581	7910	-173273
RTG	0	0	0	6251	2371	-52014	

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2392	7200	44187	2317	6487	-42013
	GW / opgw	2392	5852	44413	3070	11081	-37206
	150C1F1	8892	16478	135901	11747	32938	-115284
	150C1F2	8918	15267	129913	10973	31493	-111529
	150C1F3	8957	13745	122386	10126	29797	-107136
	380C2F1	17784	41205	270517	16801	37619	-260549
	380C2F2	17838	38422	258632	16907	35052	-249341
	380C2F3	17914	34922	243683	17060	31834	-235290
	RTG	0	0	0	4369	9455	-68367
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2561	1926	24809	2849	1807
GW / opgw		2561	1169	24860	4974	5152	-24100
150C1F1		9495	3291	89407	17503	18002	-87806
150C1F2		9506	3050	88803	15246	17791	-87495
150C1F3		9520	2746	88100	12964	17547	-87154
380C2F1		18990	12033	178513	19288	11483	-181951
380C2F2		19013	11514	177323	19336	11005	-180838
380C2F3		19040	10864	175939	19394	10409	-179549
RTG		0	0	0	4652	2938	-47985
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°		GW / opgw	9956	8132	69422	10221	7358
	GW / opgw	9956	6014	69652	15418	15753	-62996
	150C1F1	15912	9201	135068	25482	29084	-125003
	150C1F2	15943	8525	133054	22759	28456	-123917
	150C1F3	15981	7676	130668	19961	27729	-122711
	380C2F1	31824	28624	269396	31219	24581	-262498
	380C2F2	31886	25152	265417	31343	23226	-258770
	380C2F3	31963	23310	260707	31497	21535	-254378
	RTG	0	0	0	18073	11365	-124947
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2539	1855	22463	3743	1868
GW / opgw		2539	1169	22512	6239	5546	-26331
150C1F1		9395	3293	79854	19198	17819	-86764
150C1F2		9405	3051	79270	16877	17621	-86524
150C1F3		9416	2747	78590	14542	17391	-86262
380C2F1		18790	11453	159418	22382	11374	-178293
380C2F2		18810	10934	158267	22416	10903	-177408
380C2F3		18833	10286	156928	22456	10315	-176388
RTG		0	0	0	6235	3089	-52912
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2452	4032	30372	2537	3292
	GW / opgw	2458	2924	29597	4242	5584	-22978
	150C1F1	9151	8234	96147	15280	18259	-79308
	150C1F2	9178	7630	93511	13593	17852	-78500
	150C1F3	9213	6869	90320	11858	17381	-77599
	380C2F1	18258	23476	196171	17904	19536	-183525
	380C2F2	18314	22019	190489	18009	18353	-178985
	380C2F3	18387	20194	183593	18144	16878	-173534
	RTG	0	0	0	4503	4951	-48815
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2586	1335	23384	2936	1213
GW / opgw		2588	584	23347	5259	4359	-22985
150C1F1		9560	1645	86116	18084	15938	-85542
150C1F2		9563	1525	85955	15640	15879	-85510
150C1F3		9567	1373	85770	13198	15811	-85475
380C2F1		19114	8759	172330	19570	8154	-175784
380C2F2		19121	8491	171977	19582	7938	-175525
380C2F3		19130	8157	171571	19597	7667	-175228
RTG		0	0	0	4680	2113	-46512
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	10054	5141	63815	10534	4356
	GW / opgw	10060	3006	63670	16505	11923	-58683
	150C1F1	16105	4600	123689	27249	22971	-116728
	150C1F2	16116	4262	123105	23973	22800	-116601
	150C1F3	16130	3838	122428	20693	22602	-116464
	380C2F1	32191	17342	247994	32013	15145	-241035
	380C2F2	32216	16587	246712	32053	14533	-240083
	380C2F3	32245	15640	245225	32100	13769	-238987
	RTG	0	0	0	18179	7186	-119130
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2561	1265	21089	3799	1287
GW / opgw		2562	585	21053	6417	4824	-25617
150C1F1		9450	1646	76672	19591	15852	-85052
150C1F2		9453	1525	76516	17143	15795	-85029
150C1F3		9456	1373	76337	14699	15728	-85005
380C2F1		18896	8183	153441	22574	8084	-173438
380C2F2		18902	7916	153100	22582	7869	-173237
380C2F3		18909	7582	152708	22592	7601	-173006
RTG		0	0	0	6252	2279	-51937

NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1934	489	15840	2166	491	-15906
	GW / opgw	1934	0	15847	3760	2906	-15685
	150C1F1	7125	0	58484	12855	10591	-57844
	150C1F2	7125	0	58484	11185	10565	-57836
	150C1F3	7125	0	58484	9519	10535	-57827
	380C2F1	14250	3603	116914	14431	3616	-117446
	380C2F2	14250	3601	116914	14431	3614	-117446
	380C2F3	14250	3598	116914	14431	3611	-117446
	RTG	0	0	0	3486	977	-31760
	NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	559	18265	2282	583
GW / opgw		1963	0	18274	4180	3312	-18625
150C1F1		7248	0	68687	14379	12463	-70238
150C1F2		7248	0	68687	12348	12458	-70238
150C1F3		7248	0	68687	10321	12453	-70239
380C2F1		14497	4201	137311	15065	4400	-143821
380C2F2		14497	4201	137311	15065	4399	-143821
380C2F3		14497	4200	137311	15065	4399	-143821
RTG		0	0	0	3549	1150	-37581
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	9490	1796	58602	10028	1718
	GW / opgw	9490	0	58629	15786	9961	-55670
	150C1F1	13889	0	106204	24079	18479	-103557
	150C1F2	13889	0	106204	21072	18465	-103558
	150C1F3	13889	0	106204	18073	18450	-103559
	380C2F1	27778	6504	212308	27844	6426	-209810
	380C2F2	27778	6503	212308	27844	6425	-209810
	380C2F3	27778	6501	212308	27844	6423	-209810
	RTG	0	0	0	17108	3438	-112284
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1938	496	16188	3152	678
GW / opgw		1938	0	16196	5395	3882	-21859
150C1F1		7142	0	59930	16011	12614	-71096
150C1F2		7142	0	59930	13948	12610	-71096
150C1F3		7142	0	59930	11891	12604	-71097
380C2F1		14284	3666	119804	18095	4415	-144330
380C2F2		14284	3666	119804	18095	4415	-144330
380C2F3		14284	3665	119804	18095	4414	-144330
RTG		0	0	0	5129	1353	-44238
NL1/6 Permanent, +10°C Permanent loads yg= 0.9		GW / opgw	1934	484	15840	2166	486
	GW / opgw	1934	0	15847	3770	2761	-15660
	150C1F1	7125	0	58484	12875	10193	-57809
	150C1F2	7125	0	58484	11198	10193	-57809
	150C1F3	7125	0	58484	9526	10193	-57809
	380C2F1	14250	3572	116914	14431	3588	-117446
	380C2F2	14250	3572	116914	14431	3588	-117446
	380C2F3	14250	3572	116914	14431	3588	-117446
	RTG	0	0	0	3486	970	-31760
	NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1831	3554	26420	1824	3601
GW / opgw		1826	2924	27504	2419	8164	-28571
150C1F1		6804	8233	86881	9265	24452	-89216
150C1F2		6827	7629	83750	8588	23413	-86388
150C1F3		6859	6868	79899	7851	22194	-83091
380C2F1		13646	20600	167993	13075	21088	-175074
380C2F2		13692	19289	162239	13169	19714	-168714
380C2F3		13754	17645	155190	13298	17995	-160888
RTG		0	0	0	3335	5311	-45878
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1950	1127	18938	2230	1158
	GW / opgw	1949	584	19053	3950	4063	-19500
	150C1F1	7215	1645	70350	13911	14436	-71990
	150C1F2	7219	1524	70119	12032	14289	-71769
	150C1F3	7225	1373	69852	10134	14119	-71527
	380C2F1	14437	7373	140154	14902	7641	-147163
	380C2F2	14445	7134	139752	14924	7391	-146684
	380C2F3	14485	6834	139289	14950	7079	-146133
	RTG	0	0	0	3533	1954	-38374
	NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	9446	4677	60665	9871	4623
GW / opgw		9440	3006	61058	15069	13463	-58130
150C1F1		13789	4599	111353	22808	24093	-109013
150C1F2		13802	4261	110650	20207	23674	-108347
150C1F3		13817	3837	109832	17557	23188	-107611
380C2F1		27600	15397	221162	27405	15517	-220154
380C2F2		27623	14726	219933	27462	14814	-218703
380C2F3		27651	13884	218505	27530	13937	-217022
RTG		0	0	0	17060	7509	-114633

NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1927	1063	16827	3125	1243	-22616
	GW / opgw	1926	584	16937	5269	4564	-22338
	150C1F1	7114	1646	61518	15723	14490	-72288
	150C1F2	7118	1525	61297	13755	14354	-72132
	150C1F3	7123	1373	61042	11777	14197	-71961
	380C2F1	14235	6835	122514	17997	7630	-146734
	380C2F2	14242	6597	122131	18010	7383	-146385
	380C2F3	14250	6298	121688	18026	7076	-145985
	RTG	0	0	0	5120	2147	-44693
	NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1781	7168	43164	1702	6457
GW / opgw		1781	5852	43391	2151	10877	-36052
150C1F1		6613	16476	130968	8252	31961	-109749
150C1F2		6631	15266	124562	7794	30452	-105629
150C1F3		6657	13744	116427	7287	28672	-100758
380C2F1		13227	40901	260646	12393	37335	-251344
380C2F2		13262	38093	247925	12464	34744	-239333
380C2F3		13314	34556	231770	12568	31491	-224108
RTG		0	0	0	3249	9368	-65523
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	1916	1812	21067	2133	1699
	GW / opgw	1916	1168	21117	3751	4504	-20425
	150C1F1	7131	3290	74963	13467	15559	-73957
	150C1F2	7145	3049	74132	11727	15324	-73510
	150C1F3	7162	2745	73156	9950	15053	-73016
	380C2F1	14262	11149	149633	14560	10663	-155172
	380C2F2	14290	10616	147990	14622	10172	-153628
	380C2F3	14324	9950	146060	14696	9561	-151823
	RTG	0	0	0	3499	2703	-40297
	NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	9333	8064	67225	9576	7295
GW / opgw		9333	6013	67455	14453	15373	-60845
150C1F1		13578	9199	124730	21739	27281	-114784
150C1F2		13611	8524	122402	19459	26617	-113497
150C1F3		13652	7675	119625	17096	25849	-112058
380C2F1		27158	25989	248721	26618	23992	-243323
380C2F2		27222	24499	244116	26749	22619	-239000
380C2F3		27304	22633	238624	26913	20907	-233868
RTG		0	0	0	16957	11226	-120402
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	1898	1745	18861	3064	1765
	GW / opgw	1898	1169	18910	5146	4941	-22896
	150C1F1	7045	3292	65933	15436	15517	-73711
	150C1F2	7056	3050	65137	13560	15303	-73384
	150C1F3	7071	2746	64201	11661	15056	-73025
	380C2F1	14090	10601	131583	17775	10591	-152702
	380C2F2	14113	10070	130008	17817	10112	-151533
	380C2F3	14142	9406	128160	17866	9514	-150178
	RTG	0	0	0	5101	2873	-45854
	NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1821	3971	28388	1853	3228
GW / opgw		1826	2924	27504	3054	5073	-20081
150C1F1		6804	8233	86881	11257	16188	-67566
150C1F2		6827	7629	83750	10075	15734	-66491
150C1F3		6859	6868	79899	8840	15208	-65280
380C2F1		13572	22932	178427	13223	18978	-165345
380C2F2		13618	21444	171744	13316	17767	-159861
380C2F3		13682	19578	163498	13442	16254	-153162
RTG		0	0	0	3353	4786	-43427
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	1947	1204	19119	2241	1089
	GW / opgw	1949	584	19053	4120	3625	-18820
	150C1F1	7215	1645	70350	14261	13303	-70602
	150C1F2	7219	1524	70119	12269	13241	-70551
	150C1F3	7225	1373	69852	10275	13169	-70496
	380C2F1	14421	7799	140937	14936	7257	-146442
	380C2F2	14431	7527	140427	14953	7037	-146064
	380C2F3	14443	7186	139839	14974	6762	-145630
	RTG	0	0	0	3537	1859	-38202
	NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	9435	5061	61225	9902	4281
GW / opgw		9440	3006	61058	15598	11479	-56165
150C1F1		13789	4599	111353	23743	20857	-104743
150C1F2		13802	4261	110650	20846	20681	-104582
150C1F3		13817	3837	109832	17940	20475	-104407
380C2F1		27556	16594	223541	27492	14439	-217965
380C2F2		27585	15830	221995	27539	13821	-216810
380C2F3		27618	14874	220197	27594	13049	-215475
RTG		0	0	0	17070	7033	-114119
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	1924	1140	17000	3131	1176
	GW / opgw	1926	584	16937	5364	4177	-21952
	150C1F1	7114	1646	61518	15940	13431	-71320
	150C1F2	7118	1525	61297	13901	13372	-71286
	150C1F3	7123	1373	61042	11864	13303	-71250
	380C2F1	14222	7260	123261	18017	7252	-146209
	380C2F2	14230	6989	122775	18028	7035	-145935
	380C2F3	14240	6649	122213	18041	6764	-145621
	RTG	0	0	0	5122	2054	-44592

ZWW4HK400+5S

Appendix BZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / opgw	0	0	0	2843	613	-19986
Wind, 10°C	GW / opgw	0	0	0	4864	3549	-19714
Permanent loads yg= 1.2	150C1F1	0	0	0	16596	12965	-72374
Wind angle: 0°	150C1F2	0	0	0	14495	12953	-72374
	150C1F3	0	0	0	12401	12938	-72374
	380C2F1	0	0	0	19006	4498	-146741
	380C2F2	0	0	0	19006	4497	-146741
	380C2F3	0	0	0	19006	4495	-146741
	RTG	0	0	0	4623	1224	-39929
NL3/1b	GW / opgw	0	0	0	2965	713	-23307
Wind, -20°C	GW / opgw	0	0	0	5302	4054	-22867
Permanent loads yg= 1.2	150C1F1	0	0	0	18166	15110	-85336
Wind angle: 0°	150C1F2	0	0	0	15695	15106	-85337
	150C1F3	0	0	0	13230	15101	-85337
	380C2F1	0	0	0	19659	5321	-174010
	380C2F2	0	0	0	19659	5321	-174010
	380C2F3	0	0	0	19659	5320	-174010
	RTG	0	0	0	4689	1409	-46091
NL3/3	GW / opgw	0	0	0	4694	965	-31456
Wind, -5°C	GW / opgw	0	0	0	7885	5595	-31079
Permanent loads yg= 1.2	150C1F1	0	0	0	19671	15567	-87294
Wind angle: 0°	150C1F2	0	0	0	17139	15557	-87294
	150C1F3	0	0	0	14614	15544	-87295
	380C2F1	0	0	0	22244	5427	-177217
	380C2F2	0	0	0	22244	5426	-177217
	380C2F3	0	0	0	22244	5425	-177217
	RTG	0	0	0	7723	1923	-62760
NL3/4	GW / opgw	0	0	0	3626	759	-24829
Construction/maintenance, +5°C	GW / opgw	0	0	0	6144	4346	-24518
Permanent loads yg= 1.2	150C1F1	0	0	0	19086	14668	-82831
Wind angle: 0°	150C1F2	0	0	0	16681	14664	-82832
	150C1F3	0	0	0	14283	14660	-82832
	380C2F1	0	0	0	21928	5134	-167877
	380C2F2	0	0	0	21928	5133	-167877
	380C2F3	0	0	0	21928	5133	-167877
	RTG	0	0	0	5933	1516	-49578
NL3/1a	GW / opgw	0	0	0	2686	2144	-23178
Wind, 10°C	GW / opgw	0	0	0	4188	5741	-23344
Permanent loads yg= 1.2	150C1F1	0	0	0	15149	18664	-80135
Wind angle: 45°	150C1F2	0	0	0	13501	18225	-79240
	150C1F3	0	0	0	11801	17718	-78240
	380C2F1	0	0	0	18499	13104	-161043
	380C2F2	0	0	0	18561	12431	-159101
	380C2F3	0	0	0	18636	11593	-156831
	RTG	0	0	0	4570	3357	-43327
NL3/1b	GW / opgw	0	0	0	2941	1164	-23650
Wind, -20°C	GW / opgw	0	0	0	5191	4595	-23225
Permanent loads yg= 1.2	150C1F1	0	0	0	17951	16561	-86013
Wind angle: 45°	150C1F2	0	0	0	15551	16458	-85920
	150C1F3	0	0	0	13145	16338	-85819
	380C2F1	0	0	0	19586	7877	-175455
	380C2F2	0	0	0	19596	7682	-175243
	380C2F3	0	0	0	19608	7438	-175000
	RTG	0	0	0	4682	2044	-46434
NL3/3	GW / opgw	0	0	0	4460	3355	-35597
Wind, -5°C	GW / opgw	0	0	0	6868	8872	-35751
Permanent loads yg= 1.2	150C1F1	0	0	0	18580	20140	-92127
Wind angle: 45°	150C1F2	0	0	0	16396	19796	-91541
	150C1F3	0	0	0	14170	19397	-90893
	380C2F1	0	0	0	21866	12723	-186296
	380C2F2	0	0	0	21915	12157	-185025
	380C2F3	0	0	0	21974	11452	-183552
	RTG	0	0	0	7645	5252	-67113
NL3/4	GW / opgw	0	0	0	3611	1208	-25066
Construction/maintenance, +5°C	GW / opgw	0	0	0	6075	4863	-24746
Permanent loads yg= 1.2	150C1F1	0	0	0	18938	16090	-83337
Wind angle: 45°	150C1F2	0	0	0	16582	15990	-83264
	150C1F3	0	0	0	14224	15875	-83185
	380C2F1	0	0	0	21878	7682	-169039
	380C2F2	0	0	0	21885	7489	-168867
	380C2F3	0	0	0	21893	7246	-168670
	RTG	0	0	0	5929	2147	-49813

NL3/1a	GW / opgw	0	0	0	2505	3593	-29084
Wind, 10°C	GW / opgw	0	0	0	3798	7025	-26515
Permanent loads yg= 1.2	150C1F1	0	0	0	14118	22001	-87602
Wind angle: 90°	150C1F2	0	0	0	12763	21308	-85976
	150C1F3	0	0	0	11333	20504	-84134
	380C2F1	0	0	0	17761	21226	-190225
	380C2F2	0	0	0	17872	19911	-184991
	380C2F3	0	0	0	18017	18269	-178667
	RTG	0	0	0	4486	5371	-50477
NL3/1b	GW / opgw	0	0	0	2886	1580	-24501
Wind, -20°C	GW / opgw	0	0	0	5082	4892	-23650
Permanent loads yg= 1.2	150C1F1	0	0	0	17729	17333	-86873
Wind angle: 90°	150C1F2	0	0	0	15400	17173	-86673
	150C1F3	0	0	0	13056	16988	-86455
	380C2F1	0	0	0	19412	10212	-179148
	380C2F2	0	0	0	19445	9835	-178417
	380C2F3	0	0	0	19484	9364	-177573
	RTG	0	0	0	4664	2623	-47313
NL3/3	GW / opgw	0	0	0	4177	5599	-43420
Wind, -5°C	GW / opgw	0	0	0	6258	10752	-39927
Permanent loads yg= 1.2	150C1F1	0	0	0	17666	22769	-97192
Wind angle: 90°	150C1F2	0	0	0	15757	22221	-96064
	150C1F3	0	0	0	13776	21587	-94802
	380C2F1	0	0	0	21192	19553	-206537
	380C2F2	0	0	0	21303	18445	-202766
	380C2F3	0	0	0	21444	17064	-198287
	RTG	0	0	0	7519	8367	-76437
NL3/4	GW / opgw	0	0	0	3575	1616	-25674
Construction/maintenance, +5°C	GW / opgw	0	0	0	6003	5138	-25039
Permanent loads yg= 1.2	150C1F1	0	0	0	18783	16831	-84019
Wind angle: 90°	150C1F2	0	0	0	16477	16678	-83860
	150C1F3	0	0	0	14163	16500	-83686
	380C2F1	0	0	0	21757	9998	-172054
	380C2F2	0	0	0	21781	9625	-171454
	380C2F3	0	0	0	21808	9158	-170763
	RTG	0	0	0	5917	2719	-50432
NL3/1a	GW / opgw	0	0	0	2713	1959	-22546
Wind, 10°C	GW / opgw	0	0	0	4652	4435	-20632
Permanent loads yg= 1.2	150C1F1	0	0	0	16185	15308	-74210
Wind angle: -45°	150C1F2	0	0	0	14219	15129	-73975
	150C1F3	0	0	0	12237	14921	-73718
	380C2F1	0	0	0	18593	12072	-158108
	380C2F2	0	0	0	18645	11482	-156542
	380C2F3	0	0	0	18707	10746	-154719
	RTG	0	0	0	4580	3101	-42623
NL3/1b	GW / opgw	0	0	0	2946	1111	-23575
Wind, -20°C	GW / opgw	0	0	0	5274	4289	-22935
Permanent loads yg= 1.2	150C1F1	0	0	0	18113	15750	-85448
Wind angle: -45°	150C1F2	0	0	0	15660	15705	-85429
	150C1F3	0	0	0	13209	15651	-85408
	380C2F1	0	0	0	19601	7578	-175136
	380C2F2	0	0	0	19610	7406	-174970
	380C2F3	0	0	0	19619	7191	-174780
	RTG	0	0	0	4683	1970	-46358
NL3/3	GW / opgw	0	0	0	4500	3069	-34770
Wind, -5°C	GW / opgw	0	0	0	7573	6942	-32234
Permanent loads yg= 1.2	150C1F1	0	0	0	19382	17490	-88360
Wind angle: -45°	150C1F2	0	0	0	16945	17347	-88217
	150C1F3	0	0	0	14499	17180	-88062
	380C2F1	0	0	0	21941	11855	-184378
	380C2F2	0	0	0	21981	11358	-183366
	380C2F3	0	0	0	22029	10738	-182196
	RTG	0	0	0	7660	4856	-66205
NL3/4	GW / opgw	0	0	0	3614	1155	-25014
Construction/maintenance, +5°C	GW / opgw	0	0	0	6127	4575	-24554
Permanent loads yg= 1.2	150C1F1	0	0	0	19050	15302	-82901
Wind angle: -45°	150C1F2	0	0	0	16657	15257	-82887
	150C1F3	0	0	0	14269	15204	-82872
	380C2F1	0	0	0	21889	7385	-168780
	380C2F2	0	0	0	21895	7214	-168646
	380C2F3	0	0	0	21901	7000	-168493
	RTG	0	0	0	5929	2074	-49760

NL3/1a	GW / opgw	0	0	0	2166	489	-15906
Wind, 10°C	GW / opgw	0	0	0	3767	2834	-15661
Permanent loads yg= 0.9	150C1F1	0	0	0	12869	10396	-57802
Wind angle: 0°	150C1F2	0	0	0	11195	10383	-57801
	150C1F3	0	0	0	9524	10368	-57800
	380C2F1	0	0	0	14431	3603	-117446
	380C2F2	0	0	0	14431	3602	-117446
	380C2F3	0	0	0	14431	3600	-117446
	RTG	0	0	0	3486	974	-31760
NL3/1b	GW / opgw	0	0	0	2282	583	-19057
Wind, -20°C	GW / opgw	0	0	0	4180	3307	-18626
Permanent loads yg= 0.9	150C1F1	0	0	0	14379	12448	-70239
Wind angle: 0°	150C1F2	0	0	0	12348	12444	-70239
	150C1F3	0	0	0	10322	12439	-70240
	380C2F1	0	0	0	15065	4399	-143821
	380C2F2	0	0	0	15065	4398	-143821
	380C2F3	0	0	0	15065	4398	-143821
	RTG	0	0	0	3549	1149	-37581
NL3/3	GW / opgw	0	0	0	4039	859	-27971
Wind, -5°C	GW / opgw	0	0	0	6869	4983	-27605
Permanent loads yg= 0.9	150C1F1	0	0	0	16000	13076	-73167
Wind angle: 0°	150C1F2	0	0	0	13881	13065	-73167
	150C1F3	0	0	0	11766	13053	-73167
	380C2F1	0	0	0	17693	4561	-148888
	380C2F2	0	0	0	17693	4560	-148888
	380C2F3	0	0	0	17693	4559	-148888
	RTG	0	0	0	6599	1710	-55784
NL3/4	GW / opgw	0	0	0	2960	644	-21049
Construction/maintenance, +5°C	GW / opgw	0	0	0	5088	3682	-20752
Permanent loads yg= 0.9	150C1F1	0	0	0	15433	12202	-68845
Wind angle: 0°	150C1F2	0	0	0	13436	12198	-68845
	150C1F3	0	0	0	11444	12194	-68846
	380C2F1	0	0	0	17382	4276	-139808
	380C2F2	0	0	0	17382	4276	-139808
	380C2F3	0	0	0	17382	4275	-139808
	RTG	0	0	0	4803	1285	-42009
NL3/1a	GW / opgw	0	0	0	1984	2052	-20193
Wind, 10°C	GW / opgw	0	0	0	3003	5246	-20538
Permanent loads yg= 0.9	150C1F1	0	0	0	11117	16639	-68655
Wind angle: 45°	150C1F2	0	0	0	9975	16150	-67475
	150C1F3	0	0	0	8776	15584	-66143
	380C2F1	0	0	0	13804	12374	-137222
	380C2F2	0	0	0	13872	11683	-134653
	380C2F3	0	0	0	13958	10821	-131610
	RTG	0	0	0	3420	3147	-36476
NL3/1b	GW / opgw	0	0	0	2248	1039	-19559
Wind, -20°C	GW / opgw	0	0	0	4027	3882	-19180
Permanent loads yg= 0.9	150C1F1	0	0	0	14072	13971	-71328
Wind angle: 45°	150C1F2	0	0	0	12141	13860	-71187
	150C1F3	0	0	0	10199	13731	-71032
	380C2F1	0	0	0	14958	6975	-145963
	380C2F2	0	0	0	14973	6777	-145653
	380C2F3	0	0	0	14990	6530	-145297
	RTG	0	0	0	3539	1789	-38088
NL3/3	GW / opgw	0	0	0	3776	3273	-32919
Wind, -5°C	GW / opgw	0	0	0	5748	8423	-33209
Permanent loads yg= 0.9	150C1F1	0	0	0	14633	17971	-79828
Wind angle: 45°	150C1F2	0	0	0	12943	17593	-79054
	150C1F3	0	0	0	11201	17156	-78191
	380C2F1	0	0	0	17212	11953	-161137
	380C2F2	0	0	0	17271	11375	-159464
	380C2F3	0	0	0	17343	10655	-157511
	RTG	0	0	0	6509	5067	-61073
NL3/4	GW / opgw	0	0	0	2941	1094	-21367
Construction/maintenance, +5°C	GW / opgw	0	0	0	5000	4217	-21079
Permanent loads yg= 0.9	150C1F1	0	0	0	15237	13671	-69622
Wind angle: 45°	150C1F2	0	0	0	13304	13566	-69517
	150C1F3	0	0	0	11367	13444	-69403
	380C2F1	0	0	0	17316	6838	-141430
	380C2F2	0	0	0	17325	6642	-141193
	380C2F3	0	0	0	17336	6398	-140921
	RTG	0	0	0	4797	1919	-42325

NL3/1a	GW / opgw	0	0	0	1829	3534	-27164
Wind, 10°C	GW / opgw	0	0	0	2667	6639	-24331
Permanent loads yg= 0.9	150C1F1	0	0	0	10113	20322	-78083
Wind angle: 90°	150C1F2	0	0	0	9235	19563	-76083
	150C1F3	0	0	0	8292	18678	-73783
	380C2F1	0	0	0	13100	20707	-173304
	380C2F2	0	0	0	13195	19362	-167100
	380C2F3	0	0	0	13323	17681	-159474
	RTG	0	0	0	3338	5216	-45431
NL3/1b	GW / opgw	0	0	0	2177	1465	-20758
Wind, -20°C	GW / opgw	0	0	0	3884	4212	-19794
Permanent loads yg= 0.9	150C1F1	0	0	0	13767	14817	-72606
Wind angle: 90°	150C1F2	0	0	0	11933	14641	-72313
	150C1F3	0	0	0	10075	14437	-71990
	380C2F1	0	0	0	14720	9359	-151259
	380C2F2	0	0	0	14765	8973	-150223
	380C2F3	0	0	0	14817	8491	-149021
	RTG	0	0	0	3515	2379	-39354
NL3/3	GW / opgw	0	0	0	3508	5544	-41628
Wind, -5°C	GW / opgw	0	0	0	5167	10395	-37903
Permanent loads yg= 0.9	150C1F1	0	0	0	13628	20852	-86324
Wind angle: 90°	150C1F2	0	0	0	12225	20252	-84904
	150C1F3	0	0	0	10749	19558	-83298
	380C2F1	0	0	0	16484	18941	-186555
	380C2F2	0	0	0	16595	17808	-181964
	380C2F3	0	0	0	16740	16395	-176434
	RTG	0	0	0	6379	8225	-71813
NL3/4	GW / opgw	0	0	0	2897	1509	-22161
Construction/maintenance, +5°C	GW / opgw	0	0	0	4911	4509	-21471
Permanent loads yg= 0.9	150C1F1	0	0	0	15036	14462	-70584
Wind angle: 90°	150C1F2	0	0	0	13168	14298	-70361
	150C1F3	0	0	0	11286	14108	-70118
	380C2F1	0	0	0	17160	9187	-145534
	380C2F2	0	0	0	17189	8807	-144724
	380C2F3	0	0	0	17224	8333	-143788
	RTG	0	0	0	4783	2496	-43142
NL3/1a	GW / opgw	0	0	0	2010	1862	-19389
Wind, 10°C	GW / opgw	0	0	0	3494	3794	-16997
Permanent loads yg= 0.9	150C1F1	0	0	0	12320	12901	-60563
Wind angle: -45°	150C1F2	0	0	0	10822	12704	-60224
	150C1F3	0	0	0	9303	12476	-59851
	380C2F1	0	0	0	13909	11314	-133327
	380C2F2	0	0	0	13969	10707	-131221
	380C2F3	0	0	0	14043	9951	-128741
	RTG	0	0	0	3432	2884	-35533
NL3/1b	GW / opgw	0	0	0	2255	985	-19451
Wind, -20°C	GW / opgw	0	0	0	4142	3550	-18743
Permanent loads yg= 0.9	150C1F1	0	0	0	14303	13106	-70452
Wind angle: -45°	150C1F2	0	0	0	12297	13058	-70420
	150C1F3	0	0	0	10292	13002	-70387
	380C2F1	0	0	0	14981	6672	-145496
	380C2F2	0	0	0	14993	6497	-145253
	380C2F3	0	0	0	15006	6280	-144973
	RTG	0	0	0	3541	1713	-37977
NL3/3	GW / opgw	0	0	0	3819	2983	-31958
Wind, -5°C	GW / opgw	0	0	0	6501	6382	-29057
Permanent loads yg= 0.9	150C1F1	0	0	0	15618	15087	-74731
Wind angle: -45°	150C1F2	0	0	0	13623	14933	-74530
	150C1F3	0	0	0	11614	14755	-74311
	380C2F1	0	0	0	17302	11067	-158609
	380C2F2	0	0	0	17352	10559	-157264
	380C2F3	0	0	0	17411	9927	-155700
	RTG	0	0	0	6526	4666	-59989
NL3/4	GW / opgw	0	0	0	2945	1041	-21297
Construction/maintenance, +5°C	GW / opgw	0	0	0	5067	3915	-20813
Permanent loads yg= 0.9	150C1F1	0	0	0	15385	12847	-68981
Wind angle: -45°	150C1F2	0	0	0	13404	12801	-68959
	150C1F3	0	0	0	11426	12747	-68935
	380C2F1	0	0	0	17330	6538	-141073
	380C2F2	0	0	0	17337	6365	-140887
	380C2F3	0	0	0	17346	6149	-140675
	RTG	0	0	0	4798	1844	-42255

ZWW4HK400+5S

Appendix BZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2566	618	20128	0	0	0
	GW / opgw	2566	0	20138	0	0	0
	150C1F1	9452	0	73963	0	0	0
	150C1F2	9452	0	73963	0	0	0
	150C1F3	9452	0	73963	0	0	0
	380C2F1	18903	4533	147856	0	0	0
	380C2F2	18903	4532	147856	0	0	0
	380C2F3	18903	4531	147856	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	697	22793	0	0	0
	GW / opgw	2598	0	22804	0	0	0
	150C1F1	9584	0	84967	0	0	0
	150C1F2	9584	0	84967	0	0	0
	150C1F3	9584	0	84967	0	0	0
	380C2F1	19168	5194	169855	0	0	0
	380C2F2	19168	5194	169855	0	0	0
	380C2F3	19168	5194	169855	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4285	982	31989	0	0	0
	GW / opgw	4285	0	32004	0	0	0
	150C1F1	11015	0	88699	0	0	0
	150C1F2	11015	0	88699	0	0	0
	150C1F3	11015	0	88699	0	0	0
	380C2F1	22030	5431	177315	0	0	0
	380C2F2	22030	5430	177315	0	0	0
	380C2F3	22030	5429	177315	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2571	628	20520	0	0	0
	GW / opgw	2571	0	20530	0	0	0
	150C1F1	9471	0	75562	0	0	0
	150C1F2	9471	0	75562	0	0	0
	150C1F3	9471	0	75562	0	0	0
	380C2F1	18942	4620	151054	0	0	0
	380C2F2	18942	4620	151054	0	0	0
	380C2F3	18942	4619	151054	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2523	2128	22921	0	0	0
	GW / opgw	2518	1520	23317	0	0	0
	150C1F1	9336	4281	80953	0	0	0
	150C1F2	9350	3967	80023	0	0	0
	150C1F3	9367	3571	78932	0	0	0
	380C2F1	18695	12932	160031	0	0	0
	380C2F2	18721	12292	158386	0	0	0
	380C2F3	18752	11490	156462	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2592	1145	23089	0	0	0
	GW / opgw	2591	467	23154	0	0	0
	150C1F1	9568	1316	85706	0	0	0
	150C1F2	9571	1220	85602	0	0	0
	150C1F3	9573	1098	85483	0	0	0
	380C2F1	19141	7700	171082	0	0	0
	380C2F2	19144	7513	170905	0	0	0
	380C2F3	19149	7279	170701	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4220	3346	35663	0	0	0
	GW / opgw	4213	2402	36203	0	0	0
	150C1F1	10931	3678	93188	0	0	0
	150C1F2	10941	3408	92576	0	0	0
	150C1F3	10954	3069	91863	0	0	0
	380C2F1	21879	12564	185054	0	0	0
	380C2F2	21899	12024	183981	0	0	0
	380C2F3	21922	11348	182735	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2566	1075	20804	0	0	0
	GW / opgw	2565	468	20867	0	0	0
	150C1F1	9458	1317	76275	0	0	0
	150C1F2	9459	1220	76175	0	0	0
	150C1F3	9462	1099	76060	0	0	0
	380C2F1	18918	7125	152236	0	0	0
	380C2F2	18921	6939	152065	0	0	0
	380C2F3	18925	6704	151868	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	2454	3958	30054	0	0	0
Wind, 10°C	GW / opgw	2454	3041	30175	0	0	0
Permanent loads yg= 1.2	150C1F1	9136	8564	97617	0	0	0
Wind angle: 90°	150C1F2	9164	7935	94833	0	0	0
	150C1F3	9200	7144	91456	0	0	0
	380C2F1	18273	23063	194548	0	0	0
	380C2F2	18328	21638	189028	0	0	0
	380C2F3	18401	19853	182335	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2573	1671	24112	0	0	0
Wind, -20°C	GW / opgw	2573	935	24154	0	0	0
Permanent loads yg= 1.2	150C1F1	9525	2633	87855	0	0	0
Wind angle: 90°	150C1F2	9533	2440	87457	0	0	0
	150C1F3	9542	2197	86995	0	0	0
	380C2F1	19050	10624	175457	0	0	0
	380C2F2	19065	10214	174675	0	0	0
	380C2F3	19084	9700	173768	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4112	6185	45222	0	0	0
Wind, -5°C	GW / opgw	4111	4806	45409	0	0	0
Permanent loads yg= 1.2	150C1F1	10752	7357	104819	0	0	0
Wind angle: 90°	150C1F2	10780	6817	102798	0	0	0
	150C1F3	10814	6138	100385	0	0	0
	380C2F1	21505	21095	209039	0	0	0
	380C2F2	21560	19893	205037	0	0	0
	380C2F3	21629	18389	200262	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2549	1601	21790	0	0	0
Construction/maintenance, +5°C	GW / opgw	2549	935	21831	0	0	0
Permanent loads yg= 1.2	150C1F1	9420	2634	78353	0	0	0
Wind angle: 90°	150C1F2	9427	2441	77968	0	0	0
	150C1F3	9435	2198	77522	0	0	0
	380C2F1	18841	10046	156462	0	0	0
	380C2F2	18854	9636	155706	0	0	0
	380C2F3	18870	9123	154830	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2514	2335	23611	0	0	0
Wind, 10°C	GW / opgw	2518	1520	23317	0	0	0
Permanent loads yg= 1.2	150C1F1	9336	4281	80953	0	0	0
Wind angle: -45°	150C1F2	9350	3967	80023	0	0	0
	150C1F3	9367	3571	78932	0	0	0
	380C2F1	18647	14074	163180	0	0	0
	380C2F2	18678	13345	161139	0	0	0
	380C2F3	18715	12433	158741	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2591	1204	23172	0	0	0
Wind, -20°C	GW / opgw	2591	467	23154	0	0	0
Permanent loads yg= 1.2	150C1F1	9568	1316	85706	0	0	0
Wind angle: -45°	150C1F2	9571	1220	85602	0	0	0
	150C1F3	9573	1098	85483	0	0	0
	380C2F1	19133	8032	171430	0	0	0
	380C2F2	19138	7820	171204	0	0	0
	380C2F3	19144	7554	170943	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4206	3667	36579	0	0	0
Wind, -5°C	GW / opgw	4213	2402	36203	0	0	0
Permanent loads yg= 1.2	150C1F1	10931	3678	93188	0	0	0
Wind angle: -45°	150C1F2	10941	3408	92576	0	0	0
	150C1F3	10954	3069	91863	0	0	0
	380C2F1	21842	13526	187128	0	0	0
	380C2F2	21866	12912	185781	0	0	0
	380C2F3	21895	12143	184211	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2564	1134	20884	0	0	0
Construction/maintenance, +5°C	GW / opgw	2565	468	20867	0	0	0
Permanent loads yg= 1.2	150C1F1	9458	1317	76275	0	0	0
Wind angle: -45°	150C1F2	9459	1220	76175	0	0	0
	150C1F3	9462	1099	76060	0	0	0
	380C2F1	18912	7457	152572	0	0	0
	380C2F2	18916	7246	152353	0	0	0
	380C2F3	18921	6980	152102	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	1934	487	15840	0	0	0
Wind, 10°C	GW / opgw	1934	0	15847	0	0	0
Permanent loads yg= 0.9	150C1F1	7125	0	58484	0	0	0
Wind angle: 0°	150C1F2	7125	0	58484	0	0	0
	150C1F3	7125	0	58484	0	0	0
	380C2F1	14250	3588	116914	0	0	0
	380C2F2	14250	3587	116914	0	0	0
	380C2F3	14250	3585	116914	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1963	559	18265	0	0	0
Wind, -20°C	GW / opgw	1963	0	18274	0	0	0
Permanent loads yg= 0.9	150C1F1	7248	0	68687	0	0	0
Wind angle: 0°	150C1F2	7248	0	68687	0	0	0
	150C1F3	7248	0	68687	0	0	0
	380C2F1	14497	4200	137311	0	0	0
	380C2F2	14497	4200	137311	0	0	0
	380C2F3	14497	4199	137311	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3659	868	28254	0	0	0
Wind, -5°C	GW / opgw	3659	0	28267	0	0	0
Permanent loads yg= 0.9	150C1F1	8693	0	73565	0	0	0
Wind angle: 0°	150C1F2	8693	0	73565	0	0	0
	150C1F3	8693	0	73565	0	0	0
	380C2F1	17385	4507	147061	0	0	0
	380C2F2	17385	4506	147061	0	0	0
	380C2F3	17385	4505	147061	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	1938	495	16188	0	0	0
Construction/maintenance, +5°C	GW / opgw	1938	0	16196	0	0	0
Permanent loads yg= 0.9	150C1F1	7142	0	59930	0	0	0
Wind angle: 0°	150C1F2	7142	0	59930	0	0	0
	150C1F3	7142	0	59930	0	0	0
	380C2F1	14284	3665	119804	0	0	0
	380C2F2	14284	3665	119804	0	0	0
	380C2F3	14284	3664	119804	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1882	2027	19605	0	0	0
Wind, 10°C	GW / opgw	1878	1520	20089	0	0	0
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	0	0	0
Wind angle: 45°	150C1F2	6997	3966	66845	0	0	0
	150C1F3	7017	3571	65387	0	0	0
	380C2F1	13990	12129	133786	0	0	0
	380C2F2	14019	11471	131589	0	0	0
	380C2F3	14055	10650	128992	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1955	1010	18698	0	0	0
Wind, -20°C	GW / opgw	1953	467	18778	0	0	0
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	0	0	0
Wind angle: 45°	150C1F2	7229	1219	69610	0	0	0
	150C1F3	7233	1098	69437	0	0	0
	380C2F1	14458	6723	139128	0	0	0
	380C2F2	14463	6534	138869	0	0	0
	380C2F3	14470	6297	138570	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3585	3254	32658	0	0	0
Wind, -5°C	GW / opgw	3578	2401	33268	0	0	0
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	0	0	0
Wind angle: 45°	150C1F2	8599	3408	78765	0	0	0
	150C1F3	8615	3068	77825	0	0	0
	380C2F1	17194	11721	157508	0	0	0
	380C2F2	17218	11171	156090	0	0	0
	380C2F3	17247	10483	154433	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	1931	946	16599	0	0	0
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	0	0	0
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	0	0	0
Wind angle: 45°	150C1F2	7127	1220	60810	0	0	0
	150C1F3	7129	1098	60645	0	0	0
	380C2F1	14252	6187	121535	0	0	0
	380C2F2	14257	5998	121288	0	0	0
	380C2F3	14262	5761	121003	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	1823	3896	28032	0	0	0
Wind, 10°C	GW / opgw	1823	3041	28154	0	0	0
Permanent loads yg= 0.9	150C1F1	6792	8563	88608	0	0	0
Wind angle: 90°	150C1F2	6815	7934	85325	0	0	0
	150C1F3	6847	7143	81278	0	0	0
	380C2F1	13585	22511	176528	0	0	0
	380C2F2	13631	21055	170010	0	0	0
	380C2F3	13694	19229	161977	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1930	1549	20129	0	0	0
Wind, -20°C	GW / opgw	1930	935	20171	0	0	0
Permanent loads yg= 0.9	150C1F1	7168	2632	72813	0	0	0
Wind angle: 90°	150C1F2	7178	2439	72255	0	0	0
	150C1F3	7190	2196	71604	0	0	0
	380C2F1	14337	9704	145384	0	0	0
	380C2F2	14357	9284	144281	0	0	0
	380C2F3	14381	8759	142996	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3482	6126	43312	0	0	0
Wind, -5°C	GW / opgw	3482	4805	43500	0	0	0
Permanent loads yg= 0.9	150C1F1	8395	7356	94114	0	0	0
Wind angle: 90°	150C1F2	8422	6816	91666	0	0	0
	150C1F3	8457	6137	88705	0	0	0
	380C2F1	16791	20438	187628	0	0	0
	380C2F2	16845	19211	182773	0	0	0
	380C2F3	16915	17673	176904	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	1910	1484	17964	0	0	0
Construction/maintenance, +5°C	GW / opgw	1910	935	18004	0	0	0
Permanent loads yg= 0.9	150C1F1	7076	2633	63873	0	0	0
Wind angle: 90°	150C1F2	7084	2440	63339	0	0	0
	150C1F3	7094	2197	62716	0	0	0
	380C2F1	14152	9160	127513	0	0	0
	380C2F2	14169	8742	126458	0	0	0
	380C2F3	14189	8218	125229	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1873	2239	20475	0	0	0
Wind, 10°C	GW / opgw	1878	1520	20089	0	0	0
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	0	0	0
Wind angle: -45°	150C1F2	6997	3966	66845	0	0	0
	150C1F3	7017	3571	65387	0	0	0
	380C2F1	13937	13301	137937	0	0	0
	380C2F2	13971	12552	135254	0	0	0
	380C2F3	14013	11616	132064	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	1071	18816	0	0	0
Wind, -20°C	GW / opgw	1953	467	18778	0	0	0
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	0	0	0
Wind angle: -45°	150C1F2	7229	1219	69610	0	0	0
	150C1F3	7233	1098	69437	0	0	0
	380C2F1	14448	7060	139635	0	0	0
	380C2F2	14454	6845	139305	0	0	0
	380C2F3	14462	6576	138924	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3571	3579	33718	0	0	0
Wind, -5°C	GW / opgw	3578	2401	33268	0	0	0
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	0	0	0
Wind angle: -45°	150C1F2	8599	3408	78765	0	0	0
	150C1F3	8615	3068	77825	0	0	0
	380C2F1	17150	12703	160228	0	0	0
	380C2F2	17178	12076	158464	0	0	0
	380C2F3	17213	11292	156395	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	1929	1007	16712	0	0	0
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	0	0	0
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	0	0	0
Wind angle: -45°	150C1F2	7127	1220	60810	0	0	0
	150C1F3	7129	1098	60645	0	0	0
	380C2F1	14244	6523	122018	0	0	0
	380C2F2	14249	6309	121704	0	0	0
	380C2F3	14256	6040	121341	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HK400+5S

Appendix BZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2566	618	20128	2843	613	-19986
	GW / opgw	2566	0	20138	4864	3549	-19714
	150C1F1	9452	0	73963	16596	12965	-72374
	150C1F2	9452	0	73963	14495	12953	-72374
	150C1F3	9452	0	73963	12401	12938	-72374
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	697	22793	2965	713	-23307
	GW / opgw	2598	0	22804	5302	4054	-22867
	150C1F1	9584	0	84967	18166	15110	-85336
	150C1F2	9584	0	84967	15695	15106	-85337
	150C1F3	9584	0	84967	13230	15101	-85337
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4285	982	31989	4694	965	-31456
	GW / opgw	4285	0	32004	7885	5595	-31079
	150C1F1	11015	0	88699	19671	15567	-87294
	150C1F2	11015	0	88699	17139	15557	-87294
	150C1F3	11015	0	88699	14614	15544	-87295
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2571	628	20520	3626	759	-24829
	GW / opgw	2571	0	20530	6144	4346	-24518
	150C1F1	9471	0	75562	19086	14668	-82831
	150C1F2	9471	0	75562	16681	14664	-82832
	150C1F3	9471	0	75562	14283	14660	-82832
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2523	2128	22921	2686	2144	-23178
	GW / opgw	2518	1520	23317	4188	5741	-23344
	150C1F1	9336	4281	80953	15149	18664	-80135
	150C1F2	9350	3967	80023	13501	18225	-79240
	150C1F3	9367	3571	78932	11801	17718	-78240
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2592	1145	23089	2941	1164	-23650
	GW / opgw	2591	467	23154	5191	4595	-23225
	150C1F1	9568	1316	85706	17951	16561	-86013
	150C1F2	9571	1220	85602	15551	16458	-85920
	150C1F3	9573	1098	85483	13145	16338	-85819
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4220	3346	35663	4460	3355	-35597
	GW / opgw	4213	2402	36203	6868	8872	-35751
	150C1F1	10931	3678	93188	18580	20140	-92127
	150C1F2	10941	3408	92576	16396	19796	-91541
	150C1F3	10954	3069	91863	14170	19397	-90893
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2566	1075	20804	3611	1208	-25066
	GW / opgw	2565	468	20867	6075	4863	-24746
	150C1F1	9458	1317	76275	18938	16090	-83337
	150C1F2	9459	1220	76175	16582	15990	-83264
	150C1F3	9462	1099	76060	14224	15875	-83185
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	2454	3958	30054	2505	3593	-29084
Wind, 10°C	GW / opgw	2454	3041	30175	3798	7025	-26515
Permanent loads yg= 1.2	150C1F1	9136	8564	97617	14118	22001	-87602
Wind angle: 90°	150C1F2	9164	7935	94833	12763	21308	-85976
	150C1F3	9200	7144	91456	11333	20504	-84134
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2573	1671	24112	2886	1580	-24501
Wind, -20°C	GW / opgw	2573	935	24154	5082	4892	-23650
Permanent loads yg= 1.2	150C1F1	9525	2633	87855	17729	17333	-86873
Wind angle: 90°	150C1F2	9533	2440	87457	15400	17173	-86673
	150C1F3	9542	2197	86995	13056	16988	-86455
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4112	6185	45222	4177	5599	-43420
Wind, -5°C	GW / opgw	4111	4806	45409	6258	10752	-39927
Permanent loads yg= 1.2	150C1F1	10752	7357	104819	17666	22769	-97192
Wind angle: 90°	150C1F2	10780	6817	102798	15757	22221	-96064
	150C1F3	10814	6138	100385	13776	21587	-94802
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2549	1601	21790	3575	1616	-25674
Construction/maintenance, +5°C	GW / opgw	2549	935	21831	6003	5138	-25039
Permanent loads yg= 1.2	150C1F1	9420	2634	78353	18783	16831	-84019
Wind angle: 90°	150C1F2	9427	2441	77968	16477	16678	-83860
	150C1F3	9435	2198	77522	14163	16500	-83686
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2514	2335	23611	2713	1959	-22546
Wind, 10°C	GW / opgw	2518	1520	23317	4652	4435	-20632
Permanent loads yg= 1.2	150C1F1	9336	4281	80953	16185	15308	-74210
Wind angle: -45°	150C1F2	9350	3967	80023	14219	15129	-73975
	150C1F3	9367	3571	78932	12237	14921	-73718
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2591	1204	23172	2946	1111	-23575
Wind, -20°C	GW / opgw	2591	467	23154	5274	4289	-22935
Permanent loads yg= 1.2	150C1F1	9568	1316	85706	18113	15750	-85448
Wind angle: -45°	150C1F2	9571	1220	85602	15660	15705	-85429
	150C1F3	9573	1098	85483	13209	15651	-85408
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4206	3667	36579	4500	3069	-34770
Wind, -5°C	GW / opgw	4213	2402	36203	7573	6942	-32234
Permanent loads yg= 1.2	150C1F1	10931	3678	93188	19382	17490	-88360
Wind angle: -45°	150C1F2	10941	3408	92576	16945	17347	-88217
	150C1F3	10954	3069	91863	14499	17180	-88062
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2564	1134	20884	3614	1155	-25014
Construction/maintenance, +5°C	GW / opgw	2565	468	20867	6127	4575	-24554
Permanent loads yg= 1.2	150C1F1	9458	1317	76275	19050	15302	-82901
Wind angle: -45°	150C1F2	9459	1220	76175	16657	15257	-82887
	150C1F3	9462	1099	76060	14269	15204	-82872
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	1934	487	15840	2166	489	-15906
Wind, 10°C	GW / opgw	1934	0	15847	3767	2834	-15661
Permanent loads yg= 0.9	150C1F1	7125	0	58484	12869	10396	-57802
Wind angle: 0°	150C1F2	7125	0	58484	11195	10383	-57801
	150C1F3	7125	0	58484	9524	10368	-57800
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1963	559	18265	2282	583	-19057
Wind, -20°C	GW / opgw	1963	0	18274	4180	3307	-18626
Permanent loads yg= 0.9	150C1F1	7248	0	68687	14379	12448	-70239
Wind angle: 0°	150C1F2	7248	0	68687	12348	12444	-70239
	150C1F3	7248	0	68687	10322	12439	-70240
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3659	868	28254	4039	859	-27971
Wind, -5°C	GW / opgw	3659	0	28267	6869	4983	-27605
Permanent loads yg= 0.9	150C1F1	8693	0	73565	16000	13076	-73167
Wind angle: 0°	150C1F2	8693	0	73565	13881	13065	-73167
	150C1F3	8693	0	73565	11766	13053	-73167
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	1938	495	16188	2960	644	-21049
Construction/maintenance, +5°C	GW / opgw	1938	0	16196	5088	3682	-20752
Permanent loads yg= 0.9	150C1F1	7142	0	59930	15433	12202	-68845
Wind angle: 0°	150C1F2	7142	0	59930	13436	12198	-68845
	150C1F3	7142	0	59930	11444	12194	-68846
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1882	2027	19605	1984	2052	-20193
Wind, 10°C	GW / opgw	1878	1520	20089	3003	5246	-20538
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	11117	16639	-68655
Wind angle: 45°	150C1F2	6997	3966	66845	9975	16150	-67475
	150C1F3	7017	3571	65387	8776	15584	-66143
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1955	1010	18698	2248	1039	-19559
Wind, -20°C	GW / opgw	1953	467	18778	4027	3882	-19180
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	14072	13971	-71328
Wind angle: 45°	150C1F2	7229	1219	69610	12141	13860	-71187
	150C1F3	7233	1098	69437	10199	13731	-71032
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3585	3254	32658	3776	3273	-32919
Wind, -5°C	GW / opgw	3578	2401	33268	5748	8423	-33209
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	14633	17971	-79828
Wind angle: 45°	150C1F2	8599	3408	78765	12943	17593	-79054
	150C1F3	8615	3068	77825	11201	17156	-78191
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	1931	946	16599	2941	1094	-21367
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	5000	4217	-21079
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	15237	13671	-69622
Wind angle: 45°	150C1F2	7127	1220	60810	13304	13566	-69517
	150C1F3	7129	1098	60645	11367	13444	-69403
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	1823	3896	28032	1829	3534	-27164
Wind, 10°C	GW / opgw	1823	3041	28154	2667	6639	-24331
Permanent loads yg= 0.9	150C1F1	6792	8563	88608	10113	20322	-78083
Wind angle: 90°	150C1F2	6815	7934	85325	9235	19563	-76083
	150C1F3	6847	7143	81278	8292	18678	-73783
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1930	1549	20129	2177	1465	-20758
Wind, -20°C	GW / opgw	1930	935	20171	3884	4212	-19794
Permanent loads yg= 0.9	150C1F1	7168	2632	72813	13767	14817	-72606
Wind angle: 90°	150C1F2	7178	2439	72255	11933	14641	-72313
	150C1F3	7190	2196	71604	10075	14437	-71990
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3482	6126	43312	3508	5544	-41628
Wind, -5°C	GW / opgw	3482	4805	43500	5167	10395	-37903
Permanent loads yg= 0.9	150C1F1	8395	7356	94114	13628	20852	-86324
Wind angle: 90°	150C1F2	8422	6816	91666	12225	20252	-84904
	150C1F3	8457	6137	88705	10749	19558	-83298
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	1910	1484	17964	2897	1509	-22161
Construction/maintenance, +5°C	GW / opgw	1910	935	18004	4911	4509	-21471
Permanent loads yg= 0.9	150C1F1	7076	2633	63873	15036	14462	-70584
Wind angle: 90°	150C1F2	7084	2440	63339	13168	14298	-70361
	150C1F3	7094	2197	62716	11286	14108	-70118
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1873	2239	20475	2010	1862	-19389
Wind, 10°C	GW / opgw	1878	1520	20089	3494	3794	-16997
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	12320	12901	-60563
Wind angle: -45°	150C1F2	6997	3966	66845	10822	12704	-60224
	150C1F3	7017	3571	65387	9303	12476	-59851
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	1071	18816	2255	985	-19451
Wind, -20°C	GW / opgw	1953	467	18778	4142	3550	-18743
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	14303	13106	-70452
Wind angle: -45°	150C1F2	7229	1219	69610	12297	13058	-70420
	150C1F3	7233	1098	69437	10292	13002	-70387
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3571	3579	33718	3819	2983	-31958
Wind, -5°C	GW / opgw	3578	2401	33268	6501	6382	-29057
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	15618	15087	-74731
Wind angle: -45°	150C1F2	8599	3408	78765	13623	14933	-74530
	150C1F3	8615	3068	77825	11614	14755	-74311
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	1929	1007	16712	2945	1041	-21297
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	5067	3915	-20813
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	15385	12847	-68981
Wind angle: -45°	150C1F2	7127	1220	60810	13404	12801	-68959
	150C1F3	7129	1098	60645	11426	12747	-68935
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HK400+5S

Appendix BZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18903	4533	147856	19006	4498	-146741
	380C2F2	18903	4532	147856	19006	4497	-146741
	380C2F3	18903	4531	147856	19006	4495	-146741
RTG	0	0	0	4623	1224	-39929	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19168	5194	169855	19659	5321	-174010
	380C2F2	19168	5194	169855	19659	5321	-174010
	380C2F3	19168	5194	169855	19659	5320	-174010
RTG	0	0	0	4689	1409	-46091	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22030	5431	177315	22244	5427	-177217
	380C2F2	22030	5430	177315	22244	5426	-177217
	380C2F3	22030	5429	177315	22244	5425	-177217
RTG	0	0	0	7723	1923	-62760	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18942	4620	151054	21928	5134	-167877
	380C2F2	18942	4620	151054	21928	5133	-167877
	380C2F3	18942	4619	151054	21928	5133	-167877
RTG	0	0	0	5933	1516	-49578	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18695	12932	160031	18499	13104	-161043
	380C2F2	18721	12292	158386	18561	12431	-159101
	380C2F3	18752	11490	156462	18636	11593	-156831
RTG	0	0	0	4570	3357	-43327	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19141	7700	171082	19586	7877	-175455
	380C2F2	19144	7513	170905	19596	7682	-175243
	380C2F3	19149	7279	170701	19608	7438	-175000
RTG	0	0	0	4682	2044	-46434	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21879	12564	185054	21866	12723	-186296
	380C2F2	21899	12024	183981	21915	12157	-185025
	380C2F3	21922	11348	182735	21974	11452	-183552
RTG	0	0	0	7645	5252	-67113	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18918	7125	152236	21878	7682	-169039
	380C2F2	18921	6939	152065	21885	7489	-168867
	380C2F3	18925	6704	151868	21893	7246	-168670
RTG	0	0	0	5929	2147	-49813	

NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	0
Wind angle: 90°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	18273	23063	194548	17761	21226	-190225	
	380C2F2	18328	21638	189028	17872	19911	-184991	
	380C2F3	18401	19853	182335	18017	18269	-178667	
	RTG	0	0	0	4486	5371	-50477	
	NL3/1b	GW / opgw	0	0	0	0	0	0
	Wind, -20°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: 90°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19050	10624	175457	19412	10212	-179148	
	380C2F2	19065	10214	174675	19445	9835	-178417	
	380C2F3	19084	9700	173768	19484	9364	-177573	
	RTG	0	0	0	4664	2623	-47313	
	NL3/3	GW / opgw	0	0	0	0	0	0
	Wind, -5°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: 90°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	21505	21095	209039	21192	19553	-206537	
	380C2F2	21560	19893	205037	21303	18445	-202766	
	380C2F3	21629	18389	200262	21444	17064	-198287	
	RTG	0	0	0	7519	8367	-76437	
	NL3/4	GW / opgw	0	0	0	0	0	0
	Construction/maintenance, +5°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: 90°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	18841	10046	156462	21757	9998	-172054	
	380C2F2	18854	9636	155706	21781	9625	-171454	
	380C2F3	18870	9123	154830	21808	9158	-170763	
	RTG	0	0	0	5917	2719	-50432	
	NL3/1a	GW / opgw	0	0	0	0	0	0
	Wind, 10°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: -45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	18647	14074	163180	18593	12072	-158108	
	380C2F2	18678	13345	161139	18645	11482	-156542	
	380C2F3	18715	12433	158741	18707	10746	-154719	
	RTG	0	0	0	4580	3101	-42623	
	NL3/1b	GW / opgw	0	0	0	0	0	0
	Wind, -20°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: -45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19133	8032	171430	19601	7578	-175136	
	380C2F2	19138	7820	171204	19610	7406	-174970	
	380C2F3	19144	7554	170943	19619	7191	-174780	
	RTG	0	0	0	4683	1970	-46358	
	NL3/3	GW / opgw	0	0	0	0	0	0
	Wind, -5°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: -45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	21842	13526	187128	21941	11855	-184378	
	380C2F2	21866	12912	185781	21981	11358	-183366	
	380C2F3	21895	12143	184211	22029	10738	-182196	
	RTG	0	0	0	7660	4856	-66205	
	NL3/4	GW / opgw	0	0	0	0	0	0
	Construction/maintenance, +5°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: -45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	18912	7457	152572	21889	7385	-168780	
	380C2F2	18916	7246	152353	21895	7214	-168646	
	380C2F3	18921	6980	152102	21901	7000	-168493	
	RTG	0	0	0	5929	2074	-49760	

NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 0°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	14250	3588	116914	14431	3603	-117446	
	380C2F2	14250	3587	116914	14431	3602	-117446	
	380C2F3	14250	3585	116914	14431	3600	-117446	
	RTG	0	0	0	3486	974	-31760	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 0°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	14497	4200	137311	15065	4399	-143821	
	380C2F2	14497	4200	137311	15065	4398	-143821	
	380C2F3	14497	4199	137311	15065	4398	-143821	
	RTG	0	0	0	3549	1149	-37581	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 0°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17385	4507	147061	17693	4561	-148888	
	380C2F2	17385	4506	147061	17693	4560	-148888	
	380C2F3	17385	4505	147061	17693	4559	-148888	
	RTG	0	0	0	6599	1710	-55784	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 0°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	14284	3665	119804	17382	4276	-139808	
	380C2F2	14284	3665	119804	17382	4276	-139808	
	380C2F3	14284	3664	119804	17382	4275	-139808	
	RTG	0	0	0	4803	1285	-42009	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	13990	12129	133786	13804	12374	-137222	
	380C2F2	14019	11471	131589	13872	11683	-134653	
	380C2F3	14055	10650	128992	13958	10821	-131610	
	RTG	0	0	0	3420	3147	-36476	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	14458	6723	139128	14958	6975	-145963	
	380C2F2	14463	6534	138869	14973	6777	-145653	
	380C2F3	14470	6297	138570	14990	6530	-145297	
	RTG	0	0	0	3539	1789	-38088	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17194	11721	157508	17212	11953	-161137	
	380C2F2	17218	11171	156090	17271	11375	-159464	
	380C2F3	17247	10483	154433	17343	10655	-157511	
	RTG	0	0	0	6509	5067	-61073	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	14252	6187	121535	17316	6838	-141430	
	380C2F2	14257	5998	121288	17325	6642	-141193	
	380C2F3	14262	5761	121003	17336	6398	-140921	
	RTG	0	0	0	4797	1919	-42325	

ZWW4HK400+5S

Appendix BZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18903	4533	147856	19006	4498	-146741
	380C2F2	18903	4532	147856	19006	4497	-146741
	380C2F3	18903	4531	147856	19006	4495	-146741
RTG	0	0	0	4623	1224	-39929	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19168	5194	169855	19659	5321	-174010
	380C2F2	19168	5194	169855	19659	5321	-174010
	380C2F3	19168	5194	169855	19659	5320	-174010
RTG	0	0	0	4689	1409	-46091	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22030	5431	177315	22244	5427	-177217
	380C2F2	22030	5430	177315	22244	5426	-177217
	380C2F3	22030	5429	177315	22244	5425	-177217
RTG	0	0	0	7723	1923	-62760	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18942	4620	151054	21928	5134	-167877
	380C2F2	18942	4620	151054	21928	5133	-167877
	380C2F3	18942	4619	151054	21928	5133	-167877
RTG	0	0	0	5933	1516	-49578	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18695	12932	160031	18499	13104	-161043
	380C2F2	18721	12292	158386	18561	12431	-159101
	380C2F3	18752	11490	156462	18636	11593	-156831
RTG	0	0	0	4570	3357	-43327	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19141	7700	171082	19586	7877	-175455
	380C2F2	19144	7513	170905	19596	7682	-175243
	380C2F3	19149	7279	170701	19608	7438	-175000
RTG	0	0	0	4682	2044	-46434	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21879	12564	185054	21866	12723	-186296
	380C2F2	21899	12024	183981	21915	12157	-185025
	380C2F3	21922	11348	182735	21974	11452	-183552
RTG	0	0	0	7645	5252	-67113	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	18918	7125	152236	21878	7682	-169039
	380C2F2	18921	6939	152065	21885	7489	-168867
	380C2F3	18925	6704	151868	21893	7246	-168670
RTG	0	0	0	5929	2147	-49813	

NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	0
Wind angle: 90°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	18273	23063	194548	17761	21226	-190225	
	380C2F2	18328	21638	189028	17872	19911	-184991	
	380C2F3	18401	19853	182335	18017	18269	-178667	
	RTG	0	0	0	4486	5371	-50477	
	NL3/1b	GW / opgw	0	0	0	0	0	0
	Wind, -20°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: 90°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19050	10624	175457	19412	10212	-179148	
	380C2F2	19065	10214	174675	19445	9835	-178417	
	380C2F3	19084	9700	173768	19484	9364	-177573	
	RTG	0	0	0	4664	2623	-47313	
	NL3/3	GW / opgw	0	0	0	0	0	0
	Wind, -5°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: 90°	150C1F2	0	0	0	0	0	0	0
	150C1F3	10814	6138	100385	13776	21587	-94802	
	380C2F1	21505	21095	209039	21192	19553	-206537	
	380C2F2	21560	19893	205037	21303	18445	-202766	
	380C2F3	21629	18389	200262	21444	17064	-198287	
	RTG	0	0	0	7519	8367	-76437	
	NL3/4	GW / opgw	0	0	0	0	0	0
	Construction/maintenance, +5°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: 90°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	18841	10046	156462	21757	9998	-172054	
	380C2F2	18854	9636	155706	21781	9625	-171454	
	380C2F3	18870	9123	154830	21808	9158	-170763	
	RTG	0	0	0	5917	2719	-50432	
	NL3/1a	GW / opgw	0	0	0	0	0	0
	Wind, 10°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: -45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	18647	14074	163180	18593	12072	-158108	
	380C2F2	18678	13345	161139	18645	11482	-156542	
	380C2F3	18715	12433	158741	18707	10746	-154719	
	RTG	0	0	0	4580	3101	-42623	
	NL3/1b	GW / opgw	0	0	0	0	0	0
	Wind, -20°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: -45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	19133	8032	171430	19601	7578	-175136	
	380C2F2	19138	7820	171204	19610	7406	-174970	
	380C2F3	19144	7554	170943	19619	7191	-174780	
	RTG	0	0	0	4683	1970	-46358	
	NL3/3	GW / opgw	0	0	0	0	0	0
	Wind, -5°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: -45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	21842	13526	187128	21941	11855	-184378	
	380C2F2	21866	12912	185781	21981	11358	-183366	
	380C2F3	21895	12143	184211	22029	10738	-182196	
	RTG	0	0	0	7660	4856	-66205	
	NL3/4	GW / opgw	0	0	0	0	0	0
	Construction/maintenance, +5°C	GW / opgw	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F1	0	0	0	0	0	0	
Wind angle: -45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	18912	7457	152572	21889	7385	-168780	
	380C2F2	18916	7246	152353	21895	7214	-168646	
	380C2F3	18921	6980	152102	21901	7000	-168493	
	RTG	0	0	0	5929	2074	-49760	

NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 0°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	14250	3588	116914	14431	3603	-117446	
	380C2F2	14250	3587	116914	14431	3602	-117446	
	380C2F3	14250	3585	116914	14431	3600	-117446	
	RTG	0	0	0	3486	974	-31760	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 0°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	14497	4200	137311	15065	4399	-143821	
	380C2F2	14497	4200	137311	15065	4398	-143821	
	380C2F3	14497	4199	137311	15065	4398	-143821	
	RTG	0	0	0	3549	1149	-37581	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 0°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17385	4507	147061	17693	4561	-148888	
	380C2F2	17385	4506	147061	17693	4560	-148888	
	380C2F3	17385	4505	147061	17693	4559	-148888	
	RTG	0	0	0	6599	1710	-55784	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 0°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	14284	3665	119804	17382	4276	-139808	
	380C2F2	14284	3665	119804	17382	4276	-139808	
	380C2F3	14284	3664	119804	17382	4275	-139808	
	RTG	0	0	0	4803	1285	-42009	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	13990	12129	133786	13804	12374	-137222	
	380C2F2	14019	11471	131589	13872	11683	-134653	
	380C2F3	14055	10650	128992	13958	10821	-131610	
	RTG	0	0	0	3420	3147	-36476	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	14458	6723	139128	14958	6975	-145963	
	380C2F2	14463	6534	138869	14973	6777	-145653	
	380C2F3	14470	6297	138570	14990	6530	-145297	
	RTG	0	0	0	3539	1789	-38088	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	17194	11721	157508	17212	11953	-161137	
	380C2F2	17218	11171	156090	17271	11375	-159464	
	380C2F3	17247	10483	154433	17343	10655	-157511	
	RTG	0	0	0	6509	5067	-61073	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	GW / opgw	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F1	0	0	0	0	0	0	0
Wind angle: 45°	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	14252	6187	121535	17316	6838	-141430	
	380C2F2	14257	5998	121288	17325	6642	-141193	
	380C2F3	14262	5761	121003	17336	6398	-140921	
	RTG	0	0	0	4797	1919	-42325	

ZWW4HK400+5S

Appendix BZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2566	618	20128	0	0	0
	GW / opgw	2566	0	20138	0	0	0
	150C1F1	9452	0	73963	0	0	0
	150C1F2	9452	0	73963	0	0	0
	150C1F3	9452	0	73963	0	0	0
	380C2F1	0	0	0	19006	4498	-146741
	380C2F2	0	0	0	19006	4497	-146741
	380C2F3	0	0	0	19006	4495	-146741
RTG	0	0	0	4623	1224	-39929	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	697	22793	0	0	0
	GW / opgw	2598	0	22804	0	0	0
	150C1F1	9584	0	84967	0	0	0
	150C1F2	9584	0	84967	0	0	0
	150C1F3	9584	0	84967	0	0	0
	380C2F1	0	0	0	19659	5321	-174010
	380C2F2	0	0	0	19659	5321	-174010
	380C2F3	0	0	0	19659	5320	-174010
RTG	0	0	0	4689	1409	-46091	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4285	982	31989	0	0	0
	GW / opgw	4285	0	32004	0	0	0
	150C1F1	11015	0	88699	0	0	0
	150C1F2	11015	0	88699	0	0	0
	150C1F3	11015	0	88699	0	0	0
	380C2F1	0	0	0	22244	5427	-177217
	380C2F2	0	0	0	22244	5426	-177217
	380C2F3	0	0	0	22244	5425	-177217
RTG	0	0	0	7723	1923	-62760	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2571	628	20520	0	0	0
	GW / opgw	2571	0	20530	0	0	0
	150C1F1	9471	0	75562	0	0	0
	150C1F2	9471	0	75562	0	0	0
	150C1F3	9471	0	75562	0	0	0
	380C2F1	0	0	0	21928	5134	-167877
	380C2F2	0	0	0	21928	5133	-167877
	380C2F3	0	0	0	21928	5133	-167877
RTG	0	0	0	5933	1516	-49578	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2523	2128	22921	0	0	0
	GW / opgw	2518	1520	23317	0	0	0
	150C1F1	9336	4281	80953	0	0	0
	150C1F2	9350	3967	80023	0	0	0
	150C1F3	9367	3571	78932	0	0	0
	380C2F1	0	0	0	18499	13104	-161043
	380C2F2	0	0	0	18561	12431	-159101
	380C2F3	0	0	0	18636	11593	-156831
RTG	0	0	0	4570	3357	-43327	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2592	1145	23089	0	0	0
	GW / opgw	2591	467	23154	0	0	0
	150C1F1	9568	1316	85706	0	0	0
	150C1F2	9571	1220	85602	0	0	0
	150C1F3	9573	1098	85483	0	0	0
	380C2F1	0	0	0	19586	7877	-175455
	380C2F2	0	0	0	19596	7682	-175243
	380C2F3	0	0	0	19608	7438	-175000
RTG	0	0	0	4682	2044	-46434	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4220	3346	35663	0	0	0
	GW / opgw	4213	2402	36203	0	0	0
	150C1F1	10931	3678	93188	0	0	0
	150C1F2	10941	3408	92576	0	0	0
	150C1F3	10954	3069	91863	0	0	0
	380C2F1	0	0	0	21866	12723	-186296
	380C2F2	0	0	0	21915	12157	-185025
	380C2F3	0	0	0	21974	11452	-183552
RTG	0	0	0	7645	5252	-67113	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2566	1075	20804	0	0	0
	GW / opgw	2565	468	20867	0	0	0
	150C1F1	9458	1317	76275	0	0	0
	150C1F2	9459	1220	76175	0	0	0
	150C1F3	9462	1099	76060	0	0	0
	380C2F1	0	0	0	21878	7682	-169039
	380C2F2	0	0	0	21885	7489	-168867
	380C2F3	0	0	0	21893	7246	-168670
RTG	0	0	0	5929	2147	-49813	

NL3/1a	GW / opgw	2454	3958	30054	0	0	0
Wind, 10°C	GW / opgw	2454	3041	30175	0	0	0
Permanent loads yg= 1.2	150C1F1	9136	8564	97617	0	0	0
Wind angle: 90°	150C1F2	9164	7935	94833	0	0	0
	150C1F3	9200	7144	91456	0	0	0
	380C2F1	0	0	0	17761	21226	-190225
	380C2F2	0	0	0	17872	19911	-184991
	380C2F3	0	0	0	18017	18269	-178667
	RTG	0	0	0	4486	5371	-50477
NL3/1b	GW / opgw	2573	1671	24112	0	0	0
Wind, -20°C	GW / opgw	2573	935	24154	0	0	0
Permanent loads yg= 1.2	150C1F1	9525	2633	87855	0	0	0
Wind angle: 90°	150C1F2	9533	2440	87457	0	0	0
	150C1F3	9542	2197	86995	0	0	0
	380C2F1	0	0	0	19412	10212	-179148
	380C2F2	0	0	0	19445	9835	-178417
	380C2F3	0	0	0	19484	9364	-177573
	RTG	0	0	0	4664	2623	-47313
NL3/3	GW / opgw	4112	6185	45222	0	0	0
Wind, -5°C	GW / opgw	4111	4806	45409	0	0	0
Permanent loads yg= 1.2	150C1F1	10752	7357	104819	0	0	0
Wind angle: 90°	150C1F2	10780	6817	102798	0	0	0
	150C1F3	10814	6138	100385	0	0	0
	380C2F1	0	0	0	21192	19553	-206537
	380C2F2	0	0	0	21303	18445	-202766
	380C2F3	0	0	0	21444	17064	-198287
	RTG	0	0	0	7519	8367	-76437
NL3/4	GW / opgw	2549	1601	21790	0	0	0
Construction/maintenance, +5°C	GW / opgw	2549	935	21831	0	0	0
Permanent loads yg= 1.2	150C1F1	9420	2634	78353	0	0	0
Wind angle: 90°	150C1F2	9427	2441	77968	0	0	0
	150C1F3	9435	2198	77522	0	0	0
	380C2F1	0	0	0	21757	9998	-172054
	380C2F2	0	0	0	21781	9625	-171454
	380C2F3	0	0	0	21808	9158	-170763
	RTG	0	0	0	5917	2719	-50432
NL3/1a	GW / opgw	2514	2335	23611	0	0	0
Wind, 10°C	GW / opgw	2518	1520	23317	0	0	0
Permanent loads yg= 1.2	150C1F1	9336	4281	80953	0	0	0
Wind angle: -45°	150C1F2	9350	3967	80023	0	0	0
	150C1F3	9367	3571	78932	0	0	0
	380C2F1	0	0	0	18593	12072	-158108
	380C2F2	0	0	0	18645	11482	-156542
	380C2F3	0	0	0	18707	10746	-154719
	RTG	0	0	0	4580	3101	-42623
NL3/1b	GW / opgw	2591	1204	23172	0	0	0
Wind, -20°C	GW / opgw	2591	467	23154	0	0	0
Permanent loads yg= 1.2	150C1F1	9568	1316	85706	0	0	0
Wind angle: -45°	150C1F2	9571	1220	85602	0	0	0
	150C1F3	9573	1098	85483	0	0	0
	380C2F1	0	0	0	19601	7578	-175136
	380C2F2	0	0	0	19610	7406	-174970
	380C2F3	0	0	0	19619	7191	-174780
	RTG	0	0	0	4683	1970	-46358
NL3/3	GW / opgw	4206	3667	36579	0	0	0
Wind, -5°C	GW / opgw	4213	2402	36203	0	0	0
Permanent loads yg= 1.2	150C1F1	10931	3678	93188	0	0	0
Wind angle: -45°	150C1F2	10941	3408	92576	0	0	0
	150C1F3	10954	3069	91863	0	0	0
	380C2F1	0	0	0	21941	11855	-184378
	380C2F2	0	0	0	21981	11358	-183366
	380C2F3	0	0	0	22029	10738	-182196
	RTG	0	0	0	7660	4856	-66205
NL3/4	GW / opgw	2564	1134	20884	0	0	0
Construction/maintenance, +5°C	GW / opgw	2565	468	20867	0	0	0
Permanent loads yg= 1.2	150C1F1	9458	1317	76275	0	0	0
Wind angle: -45°	150C1F2	9459	1220	76175	0	0	0
	150C1F3	9462	1099	76060	0	0	0
	380C2F1	0	0	0	21889	7385	-168780
	380C2F2	0	0	0	21895	7214	-168646
	380C2F3	0	0	0	21901	7000	-168493
	RTG	0	0	0	5929	2074	-49760

NL3/1a	GW / opgw	1934	487	15840	0	0	0
Wind, 10°C	GW / opgw	1934	0	15847	0	0	0
Permanent loads yg= 0.9	150C1F1	7125	0	58484	0	0	0
Wind angle: 0°	150C1F2	7125	0	58484	0	0	0
	150C1F3	7125	0	58484	0	0	0
	380C2F1	0	0	0	14431	3603	-117446
	380C2F2	0	0	0	14431	3602	-117446
	380C2F3	0	0	0	14431	3600	-117446
	RTG	0	0	0	3486	974	-31760
NL3/1b	GW / opgw	1963	559	18265	0	0	0
Wind, -20°C	GW / opgw	1963	0	18274	0	0	0
Permanent loads yg= 0.9	150C1F1	7248	0	68687	0	0	0
Wind angle: 0°	150C1F2	7248	0	68687	0	0	0
	150C1F3	7248	0	68687	0	0	0
	380C2F1	0	0	0	15065	4399	-143821
	380C2F2	0	0	0	15065	4398	-143821
	380C2F3	0	0	0	15065	4398	-143821
	RTG	0	0	0	3549	1149	-37581
NL3/3	GW / opgw	3659	868	28254	0	0	0
Wind, -5°C	GW / opgw	3659	0	28267	0	0	0
Permanent loads yg= 0.9	150C1F1	8693	0	73565	0	0	0
Wind angle: 0°	150C1F2	8693	0	73565	0	0	0
	150C1F3	8693	0	73565	0	0	0
	380C2F1	0	0	0	17693	4561	-148888
	380C2F2	0	0	0	17693	4560	-148888
	380C2F3	0	0	0	17693	4559	-148888
	RTG	0	0	0	6599	1710	-55784
NL3/4	GW / opgw	1938	495	16188	0	0	0
Construction/maintenance, +5°C	GW / opgw	1938	0	16196	0	0	0
Permanent loads yg= 0.9	150C1F1	7142	0	59930	0	0	0
Wind angle: 0°	150C1F2	7142	0	59930	0	0	0
	150C1F3	7142	0	59930	0	0	0
	380C2F1	0	0	0	17382	4276	-139808
	380C2F2	0	0	0	17382	4276	-139808
	380C2F3	0	0	0	17382	4275	-139808
	RTG	0	0	0	4803	1285	-42009
NL3/1a	GW / opgw	1882	2027	19605	0	0	0
Wind, 10°C	GW / opgw	1878	1520	20089	0	0	0
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	0	0	0
Wind angle: 45°	150C1F2	6997	3966	66845	0	0	0
	150C1F3	7017	3571	65387	0	0	0
	380C2F1	0	0	0	13804	12374	-137222
	380C2F2	0	0	0	13872	11683	-134653
	380C2F3	0	0	0	13958	10821	-131610
	RTG	0	0	0	3420	3147	-36476
NL3/1b	GW / opgw	1955	1010	18698	0	0	0
Wind, -20°C	GW / opgw	1953	467	18778	0	0	0
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	0	0	0
Wind angle: 45°	150C1F2	7229	1219	69610	0	0	0
	150C1F3	7233	1098	69437	0	0	0
	380C2F1	0	0	0	14958	6975	-145963
	380C2F2	0	0	0	14973	6777	-145653
	380C2F3	0	0	0	14990	6530	-145297
	RTG	0	0	0	3539	1789	-38088
NL3/3	GW / opgw	3585	3254	32658	0	0	0
Wind, -5°C	GW / opgw	3578	2401	33268	0	0	0
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	0	0	0
Wind angle: 45°	150C1F2	8599	3408	78765	0	0	0
	150C1F3	8615	3068	77825	0	0	0
	380C2F1	0	0	0	17212	11953	-161137
	380C2F2	0	0	0	17271	11375	-159464
	380C2F3	0	0	0	17343	10655	-157511
	RTG	0	0	0	6509	5067	-61073
NL3/4	GW / opgw	1931	946	16599	0	0	0
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	0	0	0
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	0	0	0
Wind angle: 45°	150C1F2	7127	1220	60810	0	0	0
	150C1F3	7129	1098	60645	0	0	0
	380C2F1	0	0	0	17316	6838	-141430
	380C2F2	0	0	0	17325	6642	-141193
	380C2F3	0	0	0	17336	6398	-140921
	RTG	0	0	0	4797	1919	-42325

NL3/1a	GW / opgw	1823	3896	28032	0	0	0
Wind, 10°C	GW / opgw	1823	3041	28154	0	0	0
Permanent loads yg= 0.9	150C1F1	6792	8563	88608	0	0	0
Wind angle: 90°	150C1F2	6815	7934	85325	0	0	0
	150C1F3	6847	7143	81278	0	0	0
	380C2F1	0	0	0	13100	20707	-173304
	380C2F2	0	0	0	13195	19362	-167100
	380C2F3	0	0	0	13323	17681	-159474
	RTG	0	0	0	3338	5216	-45431
NL3/1b	GW / opgw	1930	1549	20129	0	0	0
Wind, -20°C	GW / opgw	1930	935	20171	0	0	0
Permanent loads yg= 0.9	150C1F1	7168	2632	72813	0	0	0
Wind angle: 90°	150C1F2	7178	2439	72255	0	0	0
	150C1F3	7190	2196	71604	0	0	0
	380C2F1	0	0	0	14720	9359	-151259
	380C2F2	0	0	0	14765	8973	-150223
	380C2F3	0	0	0	14817	8491	-149021
	RTG	0	0	0	3515	2379	-39354
NL3/3	GW / opgw	3482	6126	43312	0	0	0
Wind, -5°C	GW / opgw	3482	4805	43500	0	0	0
Permanent loads yg= 0.9	150C1F1	8395	7356	94114	0	0	0
Wind angle: 90°	150C1F2	8422	6816	91666	0	0	0
	150C1F3	8457	6137	88705	0	0	0
	380C2F1	0	0	0	16484	18941	-186555
	380C2F2	0	0	0	16595	17808	-181964
	380C2F3	0	0	0	16740	16395	-176434
	RTG	0	0	0	6379	8225	-71813
NL3/4	GW / opgw	1910	1484	17964	0	0	0
Construction/maintenance, +5°C	GW / opgw	1910	935	18004	0	0	0
Permanent loads yg= 0.9	150C1F1	7076	2633	63873	0	0	0
Wind angle: 90°	150C1F2	7084	2440	63339	0	0	0
	150C1F3	7094	2197	62716	0	0	0
	380C2F1	0	0	0	17160	9187	-145534
	380C2F2	0	0	0	17189	8807	-144724
	380C2F3	0	0	0	17224	8333	-143788
	RTG	0	0	0	4783	2496	-43142
NL3/1a	GW / opgw	1873	2239	20475	0	0	0
Wind, 10°C	GW / opgw	1878	1520	20089	0	0	0
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	0	0	0
Wind angle: -45°	150C1F2	6997	3966	66845	0	0	0
	150C1F3	7017	3571	65387	0	0	0
	380C2F1	0	0	0	13909	11314	-133327
	380C2F2	0	0	0	13969	10707	-131221
	380C2F3	0	0	0	14043	9951	-128741
	RTG	0	0	0	3432	2884	-35533
NL3/1b	GW / opgw	1952	1071	18816	0	0	0
Wind, -20°C	GW / opgw	1953	467	18778	0	0	0
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	0	0	0
Wind angle: -45°	150C1F2	7229	1219	69610	0	0	0
	150C1F3	7233	1098	69437	0	0	0
	380C2F1	0	0	0	14981	6672	-145496
	380C2F2	0	0	0	14993	6497	-145253
	380C2F3	0	0	0	15006	6280	-144973
	RTG	0	0	0	3541	1713	-37977
NL3/3	GW / opgw	3571	3579	33718	0	0	0
Wind, -5°C	GW / opgw	3578	2401	33268	0	0	0
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	0	0	0
Wind angle: -45°	150C1F2	8599	3408	78765	0	0	0
	150C1F3	8615	3068	77825	0	0	0
	380C2F1	0	0	0	17302	11067	-158609
	380C2F2	0	0	0	17352	10559	-157264
	380C2F3	0	0	0	17411	9927	-155700
	RTG	0	0	0	6526	4666	-59989
NL3/4	GW / opgw	1929	1007	16712	0	0	0
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	0	0	0
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	0	0	0
Wind angle: -45°	150C1F2	7127	1220	60810	0	0	0
	150C1F3	7129	1098	60645	0	0	0
	380C2F1	0	0	0	17330	6538	-141073
	380C2F2	0	0	0	17337	6365	-140887
	380C2F3	0	0	0	17346	6149	-140675
	RTG	0	0	0	4798	1844	-42255

ZWW4HK400+5S

Appendix BZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2843	613	-19986
	GW / opgw	0	0	0	4864	3549	-19714
	150C1F1	0	0	0	16596	12965	-72374
	150C1F2	0	0	0	14495	12953	-72374
	150C1F3	0	0	0	12401	12938	-72374
	380C2F1	18903	4533	147856	19006	4498	-146741
	380C2F2	18903	4532	147856	19006	4497	-146741
	380C2F3	18903	4531	147856	19006	4495	-146741
RTG	5125	1232	40212	4623	1224	-39929	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2965	713	-23307
	GW / opgw	0	0	0	5302	4054	-22867
	150C1F1	0	0	0	18166	15110	-85336
	150C1F2	0	0	0	15695	15106	-85337
	150C1F3	0	0	0	13230	15101	-85337
	380C2F1	19168	5194	169855	19659	5321	-174010
	380C2F2	19168	5194	169855	19659	5321	-174010
	380C2F3	19168	5194	169855	19659	5320	-174010
RTG	5185	1381	45159	4689	1409	-46091	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4694	965	-31456
	GW / opgw	0	0	0	7885	5595	-31079
	150C1F1	0	0	0	19671	15567	-87294
	150C1F2	0	0	0	17139	15557	-87294
	150C1F3	0	0	0	14614	15544	-87295
	380C2F1	22030	5431	177315	22244	5427	-177217
	380C2F2	22030	5430	177315	22244	5426	-177217
	380C2F3	22030	5429	177315	22244	5425	-177217
RTG	8570	1957	63853	7723	1923	-62760	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3626	759	-24829
	GW / opgw	0	0	0	6144	4346	-24518
	150C1F1	0	0	0	19086	14668	-82831
	150C1F2	0	0	0	16681	14664	-82832
	150C1F3	0	0	0	14283	14660	-82832
	380C2F1	18942	4620	151054	21928	5134	-167877
	380C2F2	18942	4620	151054	21928	5133	-167877
	380C2F3	18942	4619	151054	21928	5133	-167877
RTG	5134	1252	40945	5933	1516	-49578	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2686	2144	-23178
	GW / opgw	0	0	0	4188	5741	-23344
	150C1F1	0	0	0	15149	18664	-80135
	150C1F2	0	0	0	13501	18225	-79240
	150C1F3	0	0	0	11801	17718	-78240
	380C2F1	18695	12932	160031	18499	13104	-161043
	380C2F2	18721	12292	158386	18561	12431	-159101
	380C2F3	18752	11490	156462	18636	11593	-156831
RTG	5081	3231	42874	4570	3357	-43327	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2941	1164	-23650
	GW / opgw	0	0	0	5191	4595	-23225
	150C1F1	0	0	0	17951	16561	-86013
	150C1F2	0	0	0	15551	16458	-85920
	150C1F3	0	0	0	13145	16338	-85819
	380C2F1	19141	7700	171082	19586	7877	-175455
	380C2F2	19144	7513	170905	19596	7682	-175243
	380C2F3	19149	7279	170701	19608	7438	-175000
RTG	5179	1979	45424	4682	2044	-46434	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4460	3355	-35597
	GW / opgw	0	0	0	6868	8872	-35751
	150C1F1	0	0	0	18580	20140	-92127
	150C1F2	0	0	0	16396	19796	-91541
	150C1F3	0	0	0	14170	19397	-90893
	380C2F1	21879	12564	185054	21866	12723	-186296
	380C2F2	21899	12024	183981	21915	12157	-185025
	380C2F3	21922	11348	182735	21974	11452	-183552
RTG	8503	5083	67312	7645	5252	-67113	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3611	1208	-25066
	GW / opgw	0	0	0	6075	4863	-24746
	150C1F1	0	0	0	18938	16090	-83337
	150C1F2	0	0	0	16582	15990	-83264
	150C1F3	0	0	0	14224	15875	-83185
	380C2F1	18918	7125	152236	21878	7682	-169039
	380C2F2	18921	6939	152065	21885	7489	-168867
	380C2F3	18925	6704	151868	21893	7246	-168670
RTG	5129	1850	41199	5929	2147	-49813	

NL3/1a	GW / opgw	0	0	0	2505	3593	-29084
Wind, 10°C	GW / opgw	0	0	0	3798	7025	-26515
Permanent loads yg= 1.2	150C1F1	0	0	0	14118	22001	-87602
Wind angle: 90°	150C1F2	0	0	0	12763	21308	-85976
	150C1F3	0	0	0	11333	20504	-84134
	380C2F1	18273	23063	194548	17761	21226	-190225
	380C2F2	18328	21638	189028	17872	19911	-184991
	380C2F3	18401	19853	182335	18017	18269	-178667
	RTG	4980	5640	50763	4486	5371	-50477
NL3/1b	GW / opgw	0	0	0	2886	1580	-24501
Wind, -20°C	GW / opgw	0	0	0	5082	4892	-23650
Permanent loads yg= 1.2	150C1F1	0	0	0	17729	17333	-86873
Wind angle: 90°	150C1F2	0	0	0	15400	17173	-86673
	150C1F3	0	0	0	13056	16988	-86455
	380C2F1	19050	10624	175457	19412	10212	-179148
	380C2F2	19065	10214	174675	19445	9835	-178417
	380C2F3	19084	9700	173768	19484	9364	-177573
	RTG	5161	2674	46377	4664	2623	-47313
NL3/3	GW / opgw	0	0	0	4177	5599	-43420
Wind, -5°C	GW / opgw	0	0	0	6258	10752	-39927
Permanent loads yg= 1.2	150C1F1	0	0	0	17666	22769	-97192
Wind angle: 90°	150C1F2	0	0	0	15757	22221	-96064
	150C1F3	0	0	0	13776	21587	-94802
	380C2F1	21505	21095	209039	21192	19553	-206537
	380C2F2	21560	19893	205037	21303	18445	-202766
	380C2F3	21629	18389	200262	21444	17064	-198287
	RTG	8351	8816	77725	7519	8367	-76437
NL3/4	GW / opgw	0	0	0	3575	1616	-25674
Construction/maintenance, +5°C	GW / opgw	0	0	0	6003	5138	-25039
Permanent loads yg= 1.2	150C1F1	0	0	0	18783	16831	-84019
Wind angle: 90°	150C1F2	0	0	0	16477	16678	-83860
	150C1F3	0	0	0	14163	16500	-83686
	380C2F1	18841	10046	156462	21757	9998	-172054
	380C2F2	18854	9636	155706	21781	9625	-171454
	380C2F3	18870	9123	154830	21808	9158	-170763
	RTG	5113	2545	42117	5917	2719	-50432
NL3/1a	GW / opgw	0	0	0	2713	1959	-22546
Wind, 10°C	GW / opgw	0	0	0	4652	4435	-20632
Permanent loads yg= 1.2	150C1F1	0	0	0	16185	15308	-74210
Wind angle: -45°	150C1F2	0	0	0	14219	15129	-73975
	150C1F3	0	0	0	12237	14921	-73718
	380C2F1	18647	14074	163180	18593	12072	-158108
	380C2F2	18678	13345	161139	18645	11482	-156542
	380C2F3	18715	12433	158741	18707	10746	-154719
	RTG	5070	3502	43575	4580	3101	-42623
NL3/1b	GW / opgw	0	0	0	2946	1111	-23575
Wind, -20°C	GW / opgw	0	0	0	5274	4289	-22935
Permanent loads yg= 1.2	150C1F1	0	0	0	18113	15750	-85448
Wind angle: -45°	150C1F2	0	0	0	15660	15705	-85429
	150C1F3	0	0	0	13209	15651	-85408
	380C2F1	19133	8032	171430	19601	7578	-175136
	380C2F2	19138	7820	171204	19610	7406	-174970
	380C2F3	19144	7554	170943	19619	7191	-174780
	RTG	5178	2058	45499	4683	1970	-46358
NL3/3	GW / opgw	0	0	0	4500	3069	-34770
Wind, -5°C	GW / opgw	0	0	0	7573	6942	-32234
Permanent loads yg= 1.2	150C1F1	0	0	0	19382	17490	-88360
Wind angle: -45°	150C1F2	0	0	0	16945	17347	-88217
	150C1F3	0	0	0	14499	17180	-88062
	380C2F1	21842	13526	187128	21941	11855	-184378
	380C2F2	21866	12912	185781	21981	11358	-183366
	380C2F3	21895	12143	184211	22029	10738	-182196
	RTG	8488	5504	68230	7660	4856	-66205
NL3/4	GW / opgw	0	0	0	3614	1155	-25014
Construction/maintenance, +5°C	GW / opgw	0	0	0	6127	4575	-24554
Permanent loads yg= 1.2	150C1F1	0	0	0	19050	15302	-82901
Wind angle: -45°	150C1F2	0	0	0	16657	15257	-82887
	150C1F3	0	0	0	14269	15204	-82872
	380C2F1	18912	7457	152572	21889	7385	-168780
	380C2F2	18916	7246	152353	21895	7214	-168646
	380C2F3	18921	6980	152102	21901	7000	-168493
	RTG	5128	1929	41271	5929	2074	-49760

NL3/1a	GW / opgw	0	0	0	2166	489	-15906
Wind, 10°C	GW / opgw	0	0	0	3767	2834	-15661
Permanent loads yg= 0.9	150C1F1	0	0	0	12869	10396	-57802
Wind angle: 0°	150C1F2	0	0	0	11195	10383	-57801
	150C1F3	0	0	0	9524	10368	-57800
	380C2F1	14250	3588	116914	14431	3603	-117446
	380C2F2	14250	3587	116914	14431	3602	-117446
	380C2F3	14250	3585	116914	14431	3600	-117446
	RTG	3862	970	31628	3486	974	-31760
NL3/1b	GW / opgw	0	0	0	2282	583	-19057
Wind, -20°C	GW / opgw	0	0	0	4180	3307	-18626
Permanent loads yg= 0.9	150C1F1	0	0	0	14379	12448	-70239
Wind angle: 0°	150C1F2	0	0	0	12348	12444	-70239
	150C1F3	0	0	0	10322	12439	-70240
	380C2F1	14497	4200	137311	15065	4399	-143821
	380C2F2	14497	4200	137311	15065	4398	-143821
	380C2F3	14497	4199	137311	15065	4398	-143821
	RTG	3916	1105	36116	3549	1149	-37581
NL3/3	GW / opgw	0	0	0	4039	859	-27971
Wind, -5°C	GW / opgw	0	0	0	6869	4983	-27605
Permanent loads yg= 0.9	150C1F1	0	0	0	16000	13076	-73167
Wind angle: 0°	150C1F2	0	0	0	13881	13065	-73167
	150C1F3	0	0	0	11766	13053	-73167
	380C2F1	17385	4507	147061	17693	4561	-148888
	380C2F2	17385	4506	147061	17693	4560	-148888
	380C2F3	17385	4505	147061	17693	4559	-148888
	RTG	7319	1729	56379	6599	1710	-55784
NL3/4	GW / opgw	0	0	0	2960	644	-21049
Construction/maintenance, +5°C	GW / opgw	0	0	0	5088	3682	-20752
Permanent loads yg= 0.9	150C1F1	0	0	0	15433	12202	-68845
Wind angle: 0°	150C1F2	0	0	0	13436	12198	-68845
	150C1F3	0	0	0	11444	12194	-68846
	380C2F1	14284	3665	119804	17382	4276	-139808
	380C2F2	14284	3665	119804	17382	4276	-139808
	380C2F3	14284	3664	119804	17382	4275	-139808
	RTG	3870	987	32279	4803	1285	-42009
NL3/1a	GW / opgw	0	0	0	1984	2052	-20193
Wind, 10°C	GW / opgw	0	0	0	3003	5246	-20538
Permanent loads yg= 0.9	150C1F1	0	0	0	11117	16639	-68655
Wind angle: 45°	150C1F2	0	0	0	9975	16150	-67475
	150C1F3	0	0	0	8776	15584	-66143
	380C2F1	13990	12129	133786	13804	12374	-137222
	380C2F2	14019	11471	131589	13872	11683	-134653
	380C2F3	14055	10650	128992	13958	10821	-131610
	RTG	3805	3000	35334	3420	3147	-36476
NL3/1b	GW / opgw	0	0	0	2248	1039	-19559
Wind, -20°C	GW / opgw	0	0	0	4027	3882	-19180
Permanent loads yg= 0.9	150C1F1	0	0	0	14072	13971	-71328
Wind angle: 45°	150C1F2	0	0	0	12141	13860	-71187
	150C1F3	0	0	0	10199	13731	-71032
	380C2F1	14458	6723	139128	14958	6975	-145963
	380C2F2	14463	6534	138869	14973	6777	-145653
	380C2F3	14470	6297	138570	14990	6530	-145297
	RTG	3908	1706	36506	3539	1789	-38088
NL3/3	GW / opgw	0	0	0	3776	3273	-32919
Wind, -5°C	GW / opgw	0	0	0	5748	8423	-33209
Permanent loads yg= 0.9	150C1F1	0	0	0	14633	17971	-79828
Wind angle: 45°	150C1F2	0	0	0	12943	17593	-79054
	150C1F3	0	0	0	11201	17156	-78191
	380C2F1	17194	11721	157508	17212	11953	-161137
	380C2F2	17218	11171	156090	17271	11375	-159464
	380C2F3	17247	10483	154433	17343	10655	-157511
	RTG	7242	4877	60594	6509	5067	-61073
NL3/4	GW / opgw	0	0	0	2941	1094	-21367
Construction/maintenance, +5°C	GW / opgw	0	0	0	5000	4217	-21079
Permanent loads yg= 0.9	150C1F1	0	0	0	15237	13671	-69622
Wind angle: 45°	150C1F2	0	0	0	13304	13566	-69517
	150C1F3	0	0	0	11367	13444	-69403
	380C2F1	14252	6187	121535	17316	6838	-141430
	380C2F2	14257	5998	121288	17325	6642	-141193
	380C2F3	14262	5761	121003	17336	6398	-140921
	RTG	3863	1588	32650	4797	1919	-42325

NL3/1a	GW / opgw	0	0	0	1829	3534	-27164
Wind, 10°C	GW / opgw	0	0	0	2667	6639	-24331
Permanent loads yg= 0.9	150C1F1	0	0	0	10113	20322	-78083
Wind angle: 90°	150C1F2	0	0	0	9235	19563	-76083
	150C1F3	0	0	0	8292	18678	-73783
	380C2F1	13585	22511	176528	13100	20707	-173304
	380C2F2	13631	21055	170010	13195	19362	-167100
	380C2F3	13694	19229	161977	13323	17681	-159474
	RTG	3704	5472	45277	3338	5216	-45431
NL3/1b	GW / opgw	0	0	0	2177	1465	-20758
Wind, -20°C	GW / opgw	0	0	0	3884	4212	-19794
Permanent loads yg= 0.9	150C1F1	0	0	0	13767	14817	-72606
Wind angle: 90°	150C1F2	0	0	0	11933	14641	-72313
	150C1F3	0	0	0	10075	14437	-71990
	380C2F1	14337	9704	145384	14720	9359	-151259
	380C2F2	14357	9284	144281	14765	8973	-150223
	380C2F3	14381	8759	142996	14817	8491	-149021
	RTG	3883	2414	37870	3515	2379	-39354
NL3/3	GW / opgw	0	0	0	3508	5544	-41628
Wind, -5°C	GW / opgw	0	0	0	5167	10395	-37903
Permanent loads yg= 0.9	150C1F1	0	0	0	13628	20852	-86324
Wind angle: 90°	150C1F2	0	0	0	12225	20252	-84904
	150C1F3	0	0	0	10749	19558	-83298
	380C2F1	16791	20438	187628	16484	18941	-186555
	380C2F2	16845	19211	182773	16595	17808	-181964
	380C2F3	16915	17673	176904	16740	16395	-176434
	RTG	7083	8660	72639	6379	8225	-71813
NL3/4	GW / opgw	0	0	0	2897	1509	-22161
Construction/maintenance, +5°C	GW / opgw	0	0	0	4911	4509	-21471
Permanent loads yg= 0.9	150C1F1	0	0	0	15036	14462	-70584
Wind angle: 90°	150C1F2	0	0	0	13168	14298	-70361
	150C1F3	0	0	0	11286	14108	-70118
	380C2F1	14152	9160	127513	17160	9187	-145534
	380C2F2	14169	8742	126458	17189	8807	-144724
	380C2F3	14189	8218	125229	17224	8333	-143788
	RTG	3842	2295	33950	4783	2496	-43142
NL3/1a	GW / opgw	0	0	0	2010	1862	-19389
Wind, 10°C	GW / opgw	0	0	0	3494	3794	-16997
Permanent loads yg= 0.9	150C1F1	0	0	0	12320	12901	-60563
Wind angle: -45°	150C1F2	0	0	0	10822	12704	-60224
	150C1F3	0	0	0	9303	12476	-59851
	380C2F1	13937	13301	137937	13909	11314	-133327
	380C2F2	13971	12552	135254	13969	10707	-131221
	380C2F3	14013	11616	132064	14043	9951	-128741
	RTG	3793	3279	36270	3432	2884	-35533
NL3/1b	GW / opgw	0	0	0	2255	985	-19451
Wind, -20°C	GW / opgw	0	0	0	4142	3550	-18743
Permanent loads yg= 0.9	150C1F1	0	0	0	14303	13106	-70452
Wind angle: -45°	150C1F2	0	0	0	12297	13058	-70420
	150C1F3	0	0	0	10292	13002	-70387
	380C2F1	14448	7060	139635	14981	6672	-145496
	380C2F2	14454	6845	139305	14993	6497	-145253
	380C2F3	14462	6576	138924	15006	6280	-144973
	RTG	3906	1786	36616	3541	1713	-37977
NL3/3	GW / opgw	0	0	0	3819	2983	-31958
Wind, -5°C	GW / opgw	0	0	0	6501	6382	-29057
Permanent loads yg= 0.9	150C1F1	0	0	0	15618	15087	-74731
Wind angle: -45°	150C1F2	0	0	0	13623	14933	-74530
	150C1F3	0	0	0	11614	14755	-74311
	380C2F1	17150	12703	160228	17302	11067	-158609
	380C2F2	17178	12076	158464	17352	10559	-157264
	380C2F3	17213	11292	156395	17411	9927	-155700
	RTG	7224	5304	61688	6526	4666	-59989
NL3/4	GW / opgw	0	0	0	2945	1041	-21297
Construction/maintenance, +5°C	GW / opgw	0	0	0	5067	3915	-20813
Permanent loads yg= 0.9	150C1F1	0	0	0	15385	12847	-68981
Wind angle: -45°	150C1F2	0	0	0	13404	12801	-68959
	150C1F3	0	0	0	11426	12747	-68935
	380C2F1	14244	6523	122018	17330	6538	-141073
	380C2F2	14249	6309	121704	17337	6365	-140887
	380C2F3	14256	6040	121341	17346	6149	-140675
	RTG	3861	1669	32755	4798	1844	-42255

ZWW4HK400+5S

Appendix BZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2566	618	20128	2843	613	-19986
	GW / opgw	2566	0	20138	4864	3549	-19714
	150C1F1	9452	0	73963	16596	12965	-72374
	150C1F2	9452	0	73963	14495	12953	-72374
	150C1F3	9452	0	73963	12401	12938	-72374
	380C2F1	0	0	0	19006	4498	-146741
	380C2F2	0	0	0	19006	4497	-146741
	380C2F3	0	0	0	19006	4495	-146741
RTG	0	0	0	4623	1224	-39929	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	697	22793	2965	713	-23307
	GW / opgw	2598	0	22804	5302	4054	-22867
	150C1F1	9584	0	84967	18166	15110	-85336
	150C1F2	9584	0	84967	15695	15106	-85337
	150C1F3	9584	0	84967	13230	15101	-85337
	380C2F1	0	0	0	19659	5321	-174010
	380C2F2	0	0	0	19659	5321	-174010
	380C2F3	0	0	0	19659	5320	-174010
RTG	0	0	0	4689	1409	-46091	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4285	982	31989	4694	965	-31456
	GW / opgw	4285	0	32004	7885	5595	-31079
	150C1F1	11015	0	88699	19671	15567	-87294
	150C1F2	11015	0	88699	17139	15557	-87294
	150C1F3	11015	0	88699	14614	15544	-87295
	380C2F1	0	0	0	22244	5427	-177217
	380C2F2	0	0	0	22244	5426	-177217
	380C2F3	0	0	0	22244	5425	-177217
RTG	0	0	0	7723	1923	-62760	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2571	628	20520	3626	759	-24829
	GW / opgw	2571	0	20530	6144	4346	-24518
	150C1F1	9471	0	75562	19086	14668	-82831
	150C1F2	9471	0	75562	16681	14664	-82832
	150C1F3	9471	0	75562	14283	14660	-82832
	380C2F1	0	0	0	21928	5134	-167877
	380C2F2	0	0	0	21928	5133	-167877
	380C2F3	0	0	0	21928	5133	-167877
RTG	0	0	0	5933	1516	-49578	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2523	2128	22921	2686	2144	-23178
	GW / opgw	2518	1520	23317	4188	5741	-23344
	150C1F1	9336	4281	80953	15149	18664	-80135
	150C1F2	9350	3967	80023	13501	18225	-79240
	150C1F3	9367	3571	78932	11801	17718	-78240
	380C2F1	0	0	0	18499	13104	-161043
	380C2F2	0	0	0	18561	12431	-159101
	380C2F3	0	0	0	18636	11593	-156831
RTG	0	0	0	4570	3357	-43327	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2592	1145	23089	2941	1164	-23650
	GW / opgw	2591	467	23154	5191	4595	-23225
	150C1F1	9568	1316	85706	17951	16561	-86013
	150C1F2	9571	1220	85602	15551	16458	-85920
	150C1F3	9573	1098	85483	13145	16338	-85819
	380C2F1	0	0	0	19586	7877	-175455
	380C2F2	0	0	0	19596	7682	-175243
	380C2F3	0	0	0	19608	7438	-175000
RTG	0	0	0	4682	2044	-46434	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4220	3346	35663	4460	3355	-35597
	GW / opgw	4213	2402	36203	6868	8872	-35751
	150C1F1	10931	3678	93188	18580	20140	-92127
	150C1F2	10941	3408	92576	16396	19796	-91541
	150C1F3	10954	3069	91863	14170	19397	-90893
	380C2F1	0	0	0	21866	12723	-186296
	380C2F2	0	0	0	21915	12157	-185025
	380C2F3	0	0	0	21974	11452	-183552
RTG	0	0	0	7645	5252	-67113	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2566	1075	20804	3611	1208	-25066
	GW / opgw	2565	468	20867	6075	4863	-24746
	150C1F1	9458	1317	76275	18938	16090	-83337
	150C1F2	9459	1220	76175	16582	15990	-83264
	150C1F3	9462	1099	76060	14224	15875	-83185
	380C2F1	0	0	0	21878	7682	-169039
	380C2F2	0	0	0	21885	7489	-168867
	380C2F3	0	0	0	21893	7246	-168670
RTG	0	0	0	5929	2147	-49813	

NL3/1a	GW / opgw	2454	3958	30054	2505	3593	-29084
Wind, 10°C	GW / opgw	2454	3041	30175	3798	7025	-26515
Permanent loads yg= 1.2	150C1F1	9136	8564	97617	14118	22001	-87602
Wind angle: 90°	150C1F2	9164	7935	94833	12763	21308	-85976
	150C1F3	9200	7144	91456	11333	20504	-84134
	380C2F1	0	0	0	17761	21226	-190225
	380C2F2	0	0	0	17872	19911	-184991
	380C2F3	0	0	0	18017	18269	-178667
	RTG	0	0	0	4486	5371	-50477
NL3/1b	GW / opgw	2573	1671	24112	2886	1580	-24501
Wind, -20°C	GW / opgw	2573	935	24154	5082	4892	-23650
Permanent loads yg= 1.2	150C1F1	9525	2633	87855	17729	17333	-86873
Wind angle: 90°	150C1F2	9533	2440	87457	15400	17173	-86673
	150C1F3	9542	2197	86995	13056	16988	-86455
	380C2F1	0	0	0	19412	10212	-179148
	380C2F2	0	0	0	19445	9835	-178417
	380C2F3	0	0	0	19484	9364	-177573
	RTG	0	0	0	4664	2623	-47313
NL3/3	GW / opgw	4112	6185	45222	4177	5599	-43420
Wind, -5°C	GW / opgw	4111	4806	45409	6258	10752	-39927
Permanent loads yg= 1.2	150C1F1	10752	7357	104819	17666	22769	-97192
Wind angle: 90°	150C1F2	10780	6817	102798	15757	22221	-96064
	150C1F3	10814	6138	100385	13776	21587	-94802
	380C2F1	0	0	0	21192	19553	-206537
	380C2F2	0	0	0	21303	18445	-202766
	380C2F3	0	0	0	21444	17064	-198287
	RTG	0	0	0	7519	8367	-76437
NL3/4	GW / opgw	2549	1601	21790	3575	1616	-25674
Construction/maintenance, +5°C	GW / opgw	2549	935	21831	6003	5138	-25039
Permanent loads yg= 1.2	150C1F1	9420	2634	78353	18783	16831	-84019
Wind angle: 90°	150C1F2	9427	2441	77968	16477	16678	-83860
	150C1F3	9435	2198	77522	14163	16500	-83686
	380C2F1	0	0	0	21757	9998	-172054
	380C2F2	0	0	0	21781	9625	-171454
	380C2F3	0	0	0	21808	9158	-170763
	RTG	0	0	0	5917	2719	-50432
NL3/1a	GW / opgw	2514	2335	23611	2713	1959	-22546
Wind, 10°C	GW / opgw	2518	1520	23317	4652	4435	-20632
Permanent loads yg= 1.2	150C1F1	9336	4281	80953	16185	15308	-74210
Wind angle: -45°	150C1F2	9350	3967	80023	14219	15129	-73975
	150C1F3	9367	3571	78932	12237	14921	-73718
	380C2F1	0	0	0	18593	12072	-158108
	380C2F2	0	0	0	18645	11482	-156542
	380C2F3	0	0	0	18707	10746	-154719
	RTG	0	0	0	4580	3101	-42623
NL3/1b	GW / opgw	2591	1204	23172	2946	1111	-23575
Wind, -20°C	GW / opgw	2591	467	23154	5274	4289	-22935
Permanent loads yg= 1.2	150C1F1	9568	1316	85706	18113	15750	-85448
Wind angle: -45°	150C1F2	9571	1220	85602	15660	15705	-85429
	150C1F3	9573	1098	85483	13209	15651	-85408
	380C2F1	0	0	0	19601	7578	-175136
	380C2F2	0	0	0	19610	7406	-174970
	380C2F3	0	0	0	19619	7191	-174780
	RTG	0	0	0	4683	1970	-46358
NL3/3	GW / opgw	4206	3667	36579	4500	3069	-34770
Wind, -5°C	GW / opgw	4213	2402	36203	7573	6942	-32234
Permanent loads yg= 1.2	150C1F1	10931	3678	93188	19382	17490	-88360
Wind angle: -45°	150C1F2	10941	3408	92576	16945	17347	-88217
	150C1F3	10954	3069	91863	14499	17180	-88062
	380C2F1	0	0	0	21941	11855	-184378
	380C2F2	0	0	0	21981	11358	-183366
	380C2F3	0	0	0	22029	10738	-182196
	RTG	0	0	0	7660	4856	-66205
NL3/4	GW / opgw	2564	1134	20884	3614	1155	-25014
Construction/maintenance, +5°C	GW / opgw	2565	468	20867	6127	4575	-24554
Permanent loads yg= 1.2	150C1F1	9458	1317	76275	19050	15302	-82901
Wind angle: -45°	150C1F2	9459	1220	76175	16657	15257	-82887
	150C1F3	9462	1099	76060	14269	15204	-82872
	380C2F1	0	0	0	21889	7385	-168780
	380C2F2	0	0	0	21895	7214	-168646
	380C2F3	0	0	0	21901	7000	-168493
	RTG	0	0	0	5929	2074	-49760

NL3/1a	GW / opgw	1934	487	15840	2166	489	-15906
Wind, 10°C	GW / opgw	1934	0	15847	3767	2834	-15661
Permanent loads yg= 0.9	150C1F1	7125	0	58484	12869	10396	-57802
Wind angle: 0°	150C1F2	7125	0	58484	11195	10383	-57801
	150C1F3	7125	0	58484	9524	10368	-57800
	380C2F1	0	0	0	14431	3603	-117446
	380C2F2	0	0	0	14431	3602	-117446
	380C2F3	0	0	0	14431	3600	-117446
	RTG	0	0	0	3486	974	-31760
NL3/1b	GW / opgw	1963	559	18265	2282	583	-19057
Wind, -20°C	GW / opgw	1963	0	18274	4180	3307	-18626
Permanent loads yg= 0.9	150C1F1	7248	0	68687	14379	12448	-70239
Wind angle: 0°	150C1F2	7248	0	68687	12348	12444	-70239
	150C1F3	7248	0	68687	10322	12439	-70240
	380C2F1	0	0	0	15065	4399	-143821
	380C2F2	0	0	0	15065	4398	-143821
	380C2F3	0	0	0	15065	4398	-143821
	RTG	0	0	0	3549	1149	-37581
NL3/3	GW / opgw	3659	868	28254	4039	859	-27971
Wind, -5°C	GW / opgw	3659	0	28267	6869	4983	-27605
Permanent loads yg= 0.9	150C1F1	8693	0	73565	16000	13076	-73167
Wind angle: 0°	150C1F2	8693	0	73565	13881	13065	-73167
	150C1F3	8693	0	73565	11766	13053	-73167
	380C2F1	0	0	0	17693	4561	-148888
	380C2F2	0	0	0	17693	4560	-148888
	380C2F3	0	0	0	17693	4559	-148888
	RTG	0	0	0	6599	1710	-55784
NL3/4	GW / opgw	1938	495	16188	2960	644	-21049
Construction/maintenance, +5°C	GW / opgw	1938	0	16196	5088	3682	-20752
Permanent loads yg= 0.9	150C1F1	7142	0	59930	15433	12202	-68845
Wind angle: 0°	150C1F2	7142	0	59930	13436	12198	-68845
	150C1F3	7142	0	59930	11444	12194	-68846
	380C2F1	0	0	0	17382	4276	-139808
	380C2F2	0	0	0	17382	4276	-139808
	380C2F3	0	0	0	17382	4275	-139808
	RTG	0	0	0	4803	1285	-42009
NL3/1a	GW / opgw	1882	2027	19605	1984	2052	-20193
Wind, 10°C	GW / opgw	1878	1520	20089	3003	5246	-20538
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	11117	16639	-68655
Wind angle: 45°	150C1F2	6997	3966	66845	9975	16150	-67475
	150C1F3	7017	3571	65387	8776	15584	-66143
	380C2F1	0	0	0	13804	12374	-137222
	380C2F2	0	0	0	13872	11683	-134653
	380C2F3	0	0	0	13958	10821	-131610
	RTG	0	0	0	3420	3147	-36476
NL3/1b	GW / opgw	1955	1010	18698	2248	1039	-19559
Wind, -20°C	GW / opgw	1953	467	18778	4027	3882	-19180
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	14072	13971	-71328
Wind angle: 45°	150C1F2	7229	1219	69610	12141	13860	-71187
	150C1F3	7233	1098	69437	10199	13731	-71032
	380C2F1	0	0	0	14958	6975	-145963
	380C2F2	0	0	0	14973	6777	-145653
	380C2F3	0	0	0	14990	6530	-145297
	RTG	0	0	0	3539	1789	-38088
NL3/3	GW / opgw	3585	3254	32658	3776	3273	-32919
Wind, -5°C	GW / opgw	3578	2401	33268	5748	8423	-33209
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	14633	17971	-79828
Wind angle: 45°	150C1F2	8599	3408	78765	12943	17593	-79054
	150C1F3	8615	3068	77825	11201	17156	-78191
	380C2F1	0	0	0	17212	11953	-161137
	380C2F2	0	0	0	17271	11375	-159464
	380C2F3	0	0	0	17343	10655	-157511
	RTG	0	0	0	6509	5067	-61073
NL3/4	GW / opgw	1931	946	16599	2941	1094	-21367
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	5000	4217	-21079
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	15237	13671	-69622
Wind angle: 45°	150C1F2	7127	1220	60810	13304	13566	-69517
	150C1F3	7129	1098	60645	11367	13444	-69403
	380C2F1	0	0	0	17316	6838	-141430
	380C2F2	0	0	0	17325	6642	-141193
	380C2F3	0	0	0	17336	6398	-140921
	RTG	0	0	0	4797	1919	-42325

NL3/1a	GW / opgw	1823	3896	28032	1829	3534	-27164
Wind, 10°C	GW / opgw	1823	3041	28154	2667	6639	-24331
Permanent loads yg= 0.9	150C1F1	6792	8563	88608	10113	20322	-78083
Wind angle: 90°	150C1F2	6815	7934	85325	9235	19563	-76083
	150C1F3	6847	7143	81278	8292	18678	-73783
	380C2F1	0	0	0	13100	20707	-173304
	380C2F2	0	0	0	13195	19362	-167100
	380C2F3	0	0	0	13323	17681	-159474
	RTG	0	0	0	3338	5216	-45431
NL3/1b	GW / opgw	1930	1549	20129	2177	1465	-20758
Wind, -20°C	GW / opgw	1930	935	20171	3884	4212	-19794
Permanent loads yg= 0.9	150C1F1	7168	2632	72813	13767	14817	-72606
Wind angle: 90°	150C1F2	7178	2439	72255	11933	14641	-72313
	150C1F3	7190	2196	71604	10075	14437	-71990
	380C2F1	0	0	0	14720	9359	-151259
	380C2F2	0	0	0	14765	8973	-150223
	380C2F3	0	0	0	14817	8491	-149021
	RTG	0	0	0	3515	2379	-39354
NL3/3	GW / opgw	3482	6126	43312	3508	5544	-41628
Wind, -5°C	GW / opgw	3482	4805	43500	5167	10395	-37903
Permanent loads yg= 0.9	150C1F1	8395	7356	94114	13628	20852	-86324
Wind angle: 90°	150C1F2	8422	6816	91666	12225	20252	-84904
	150C1F3	8457	6137	88705	10749	19558	-83298
	380C2F1	0	0	0	16484	18941	-186555
	380C2F2	0	0	0	16595	17808	-181964
	380C2F3	0	0	0	16740	16395	-176434
	RTG	0	0	0	6379	8225	-71813
NL3/4	GW / opgw	1910	1484	17964	2897	1509	-22161
Construction/maintenance, +5°C	GW / opgw	1910	935	18004	4911	4509	-21471
Permanent loads yg= 0.9	150C1F1	7076	2633	63873	15036	14462	-70584
Wind angle: 90°	150C1F2	7084	2440	63339	13168	14298	-70361
	150C1F3	7094	2197	62716	11286	14108	-70118
	380C2F1	0	0	0	17160	9187	-145534
	380C2F2	0	0	0	17189	8807	-144724
	380C2F3	0	0	0	17224	8333	-143788
	RTG	0	0	0	4783	2496	-43142
NL3/1a	GW / opgw	1873	2239	20475	2010	1862	-19389
Wind, 10°C	GW / opgw	1878	1520	20089	3494	3794	-16997
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	12320	12901	-60563
Wind angle: -45°	150C1F2	6997	3966	66845	10822	12704	-60224
	150C1F3	7017	3571	65387	9303	12476	-59851
	380C2F1	0	0	0	13909	11314	-133327
	380C2F2	0	0	0	13969	10707	-131221
	380C2F3	0	0	0	14043	9951	-128741
	RTG	0	0	0	3432	2884	-35533
NL3/1b	GW / opgw	1952	1071	18816	2255	985	-19451
Wind, -20°C	GW / opgw	1953	467	18778	4142	3550	-18743
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	14303	13106	-70452
Wind angle: -45°	150C1F2	7229	1219	69610	12297	13058	-70420
	150C1F3	7233	1098	69437	10292	13002	-70387
	380C2F1	0	0	0	14981	6672	-145496
	380C2F2	0	0	0	14993	6497	-145253
	380C2F3	0	0	0	15006	6280	-144973
	RTG	0	0	0	3541	1713	-37977
NL3/3	GW / opgw	3571	3579	33718	3819	2983	-31958
Wind, -5°C	GW / opgw	3578	2401	33268	6501	6382	-29057
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	15618	15087	-74731
Wind angle: -45°	150C1F2	8599	3408	78765	13623	14933	-74530
	150C1F3	8615	3068	77825	11614	14755	-74311
	380C2F1	0	0	0	17302	11067	-158609
	380C2F2	0	0	0	17352	10559	-157264
	380C2F3	0	0	0	17411	9927	-155700
	RTG	0	0	0	6526	4666	-59989
NL3/4	GW / opgw	1929	1007	16712	2945	1041	-21297
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	5067	3915	-20813
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	15385	12847	-68981
Wind angle: -45°	150C1F2	7127	1220	60810	13404	12801	-68959
	150C1F3	7129	1098	60645	11426	12747	-68935
	380C2F1	0	0	0	17330	6538	-141073
	380C2F2	0	0	0	17337	6365	-140887
	380C2F3	0	0	0	17346	6149	-140675
	RTG	0	0	0	4798	1844	-42255

ZWW4HK400+5S

Appendix BZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2566	618	20128	0	0	0
	GW / opgw	2566	0	20138	0	0	0
	150C1F1	9452	0	73963	0	0	0
	150C1F2	9452	0	73963	0	0	0
	150C1F3	9452	0	73963	0	0	0
	380C2F1	18903	4533	147856	19006	4498	-146741
	380C2F2	18903	4532	147856	19006	4497	-146741
	380C2F3	18903	4531	147856	19006	4495	-146741
RTG	0	0	0	4623	1224	-39929	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	697	22793	0	0	0
	GW / opgw	2598	0	22804	0	0	0
	150C1F1	9584	0	84967	0	0	0
	150C1F2	9584	0	84967	0	0	0
	150C1F3	9584	0	84967	0	0	0
	380C2F1	19168	5194	169855	19659	5321	-174010
	380C2F2	19168	5194	169855	19659	5321	-174010
	380C2F3	19168	5194	169855	19659	5320	-174010
RTG	0	0	0	4689	1409	-46091	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4285	982	31989	0	0	0
	GW / opgw	4285	0	32004	0	0	0
	150C1F1	11015	0	88699	0	0	0
	150C1F2	11015	0	88699	0	0	0
	150C1F3	11015	0	88699	0	0	0
	380C2F1	22030	5431	177315	22244	5427	-177217
	380C2F2	22030	5430	177315	22244	5426	-177217
	380C2F3	22030	5429	177315	22244	5425	-177217
RTG	0	0	0	7723	1923	-62760	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2571	628	20520	0	0	0
	GW / opgw	2571	0	20530	0	0	0
	150C1F1	9471	0	75562	0	0	0
	150C1F2	9471	0	75562	0	0	0
	150C1F3	9471	0	75562	0	0	0
	380C2F1	18942	4620	151054	21928	5134	-167877
	380C2F2	18942	4620	151054	21928	5133	-167877
	380C2F3	18942	4619	151054	21928	5133	-167877
RTG	0	0	0	5933	1516	-49578	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2523	2128	22921	0	0	0
	GW / opgw	2518	1520	23317	0	0	0
	150C1F1	9336	4281	80953	0	0	0
	150C1F2	9350	3967	80023	0	0	0
	150C1F3	9367	3571	78932	0	0	0
	380C2F1	18695	12932	160031	18499	13104	-161043
	380C2F2	18721	12292	158386	18561	12431	-159101
	380C2F3	18752	11490	156462	18636	11593	-156831
RTG	0	0	0	4570	3357	-43327	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2592	1145	23089	0	0	0
	GW / opgw	2591	467	23154	0	0	0
	150C1F1	9568	1316	85706	0	0	0
	150C1F2	9571	1220	85602	0	0	0
	150C1F3	9573	1098	85483	0	0	0
	380C2F1	19141	7700	171082	19586	7877	-175455
	380C2F2	19144	7513	170905	19596	7682	-175243
	380C2F3	19149	7279	170701	19608	7438	-175000
RTG	0	0	0	4682	2044	-46434	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4220	3346	35663	0	0	0
	GW / opgw	4213	2402	36203	0	0	0
	150C1F1	10931	3678	93188	0	0	0
	150C1F2	10941	3408	92576	0	0	0
	150C1F3	10954	3069	91863	0	0	0
	380C2F1	21879	12564	185054	21866	12723	-186296
	380C2F2	21899	12024	183981	21915	12157	-185025
	380C2F3	21922	11348	182735	21974	11452	-183552
RTG	0	0	0	7645	5252	-67113	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2566	1075	20804	0	0	0
	GW / opgw	2565	468	20867	0	0	0
	150C1F1	9458	1317	76275	0	0	0
	150C1F2	9459	1220	76175	0	0	0
	150C1F3	9462	1099	76060	0	0	0
	380C2F1	18918	7125	152236	21878	7682	-169039
	380C2F2	18921	6939	152065	21885	7489	-168867
	380C2F3	18925	6704	151868	21893	7246	-168670
RTG	0	0	0	5929	2147	-49813	

NL3/1a	GW / opgw	2454	3958	30054	0	0	0
Wind, 10°C	GW / opgw	2454	3041	30175	0	0	0
Permanent loads yg= 1.2	150C1F1	9136	8564	97617	0	0	0
Wind angle: 90°	150C1F2	9164	7935	94833	0	0	0
	150C1F3	9200	7144	91456	0	0	0
	380C2F1	18273	23063	194548	17761	21226	-190225
	380C2F2	18328	21638	189028	17872	19911	-184991
	380C2F3	18401	19853	182335	18017	18269	-178667
	RTG	0	0	0	4486	5371	-50477
NL3/1b	GW / opgw	2573	1671	24112	0	0	0
Wind, -20°C	GW / opgw	2573	935	24154	0	0	0
Permanent loads yg= 1.2	150C1F1	9525	2633	87855	0	0	0
Wind angle: 90°	150C1F2	9533	2440	87457	0	0	0
	150C1F3	9542	2197	86995	0	0	0
	380C2F1	19050	10624	175457	19412	10212	-179148
	380C2F2	19065	10214	174675	19445	9835	-178417
	380C2F3	19084	9700	173768	19484	9364	-177573
	RTG	0	0	0	4664	2623	-47313
NL3/3	GW / opgw	4112	6185	45222	0	0	0
Wind, -5°C	GW / opgw	4111	4806	45409	0	0	0
Permanent loads yg= 1.2	150C1F1	10752	7357	104819	0	0	0
Wind angle: 90°	150C1F2	10780	6817	102798	0	0	0
	150C1F3	10814	6138	100385	0	0	0
	380C2F1	21505	21095	209039	21192	19553	-206537
	380C2F2	21560	19893	205037	21303	18445	-202766
	380C2F3	21629	18389	200262	21444	17064	-198287
	RTG	0	0	0	7519	8367	-76437
NL3/4	GW / opgw	2549	1601	21790	0	0	0
Construction/maintenance, +5°C	GW / opgw	2549	935	21831	0	0	0
Permanent loads yg= 1.2	150C1F1	9420	2634	78353	0	0	0
Wind angle: 90°	150C1F2	9427	2441	77968	0	0	0
	150C1F3	9435	2198	77522	0	0	0
	380C2F1	18841	10046	156462	21757	9998	-172054
	380C2F2	18854	9636	155706	21781	9625	-171454
	380C2F3	18870	9123	154830	21808	9158	-170763
	RTG	0	0	0	5917	2719	-50432
NL3/1a	GW / opgw	2514	2335	23611	0	0	0
Wind, 10°C	GW / opgw	2518	1520	23317	0	0	0
Permanent loads yg= 1.2	150C1F1	9336	4281	80953	0	0	0
Wind angle: -45°	150C1F2	9350	3967	80023	0	0	0
	150C1F3	9367	3571	78932	0	0	0
	380C2F1	18647	14074	163180	18593	12072	-158108
	380C2F2	18678	13345	161139	18645	11482	-156542
	380C2F3	18715	12433	158741	18707	10746	-154719
	RTG	0	0	0	4580	3101	-42623
NL3/1b	GW / opgw	2591	1204	23172	0	0	0
Wind, -20°C	GW / opgw	2591	467	23154	0	0	0
Permanent loads yg= 1.2	150C1F1	9568	1316	85706	0	0	0
Wind angle: -45°	150C1F2	9571	1220	85602	0	0	0
	150C1F3	9573	1098	85483	0	0	0
	380C2F1	19133	8032	171430	19601	7578	-175136
	380C2F2	19138	7820	171204	19610	7406	-174970
	380C2F3	19144	7554	170943	19619	7191	-174780
	RTG	0	0	0	4683	1970	-46358
NL3/3	GW / opgw	4206	3667	36579	0	0	0
Wind, -5°C	GW / opgw	4213	2402	36203	0	0	0
Permanent loads yg= 1.2	150C1F1	10931	3678	93188	0	0	0
Wind angle: -45°	150C1F2	10941	3408	92576	0	0	0
	150C1F3	10954	3069	91863	0	0	0
	380C2F1	21842	13526	187128	21941	11855	-184378
	380C2F2	21866	12912	185781	21981	11358	-183366
	380C2F3	21895	12143	184211	22029	10738	-182196
	RTG	0	0	0	7660	4856	-66205
NL3/4	GW / opgw	2564	1134	20884	0	0	0
Construction/maintenance, +5°C	GW / opgw	2565	468	20867	0	0	0
Permanent loads yg= 1.2	150C1F1	9458	1317	76275	0	0	0
Wind angle: -45°	150C1F2	9459	1220	76175	0	0	0
	150C1F3	9462	1099	76060	0	0	0
	380C2F1	18912	7457	152572	21889	7385	-168780
	380C2F2	18916	7246	152353	21895	7214	-168646
	380C2F3	18921	6980	152102	21901	7000	-168493
	RTG	0	0	0	5929	2074	-49760

NL3/1a	GW / opgw	1934	487	15840	0	0	0
Wind, 10°C	GW / opgw	1934	0	15847	0	0	0
Permanent loads yg= 0.9	150C1F1	7125	0	58484	0	0	0
Wind angle: 0°	150C1F2	7125	0	58484	0	0	0
	150C1F3	7125	0	58484	0	0	0
	380C2F1	14250	3588	116914	14431	3603	-117446
	380C2F2	14250	3587	116914	14431	3602	-117446
	380C2F3	14250	3585	116914	14431	3600	-117446
	RTG	0	0	0	3486	974	-31760
NL3/1b	GW / opgw	1963	559	18265	0	0	0
Wind, -20°C	GW / opgw	1963	0	18274	0	0	0
Permanent loads yg= 0.9	150C1F1	7248	0	68687	0	0	0
Wind angle: 0°	150C1F2	7248	0	68687	0	0	0
	150C1F3	7248	0	68687	0	0	0
	380C2F1	14497	4200	137311	15065	4399	-143821
	380C2F2	14497	4200	137311	15065	4398	-143821
	380C2F3	14497	4199	137311	15065	4398	-143821
	RTG	0	0	0	3549	1149	-37581
NL3/3	GW / opgw	3659	868	28254	0	0	0
Wind, -5°C	GW / opgw	3659	0	28267	0	0	0
Permanent loads yg= 0.9	150C1F1	8693	0	73565	0	0	0
Wind angle: 0°	150C1F2	8693	0	73565	0	0	0
	150C1F3	8693	0	73565	0	0	0
	380C2F1	17385	4507	147061	17693	4561	-148888
	380C2F2	17385	4506	147061	17693	4560	-148888
	380C2F3	17385	4505	147061	17693	4559	-148888
	RTG	0	0	0	6599	1710	-55784
NL3/4	GW / opgw	1938	495	16188	0	0	0
Construction/maintenance, +5°C	GW / opgw	1938	0	16196	0	0	0
Permanent loads yg= 0.9	150C1F1	7142	0	59930	0	0	0
Wind angle: 0°	150C1F2	7142	0	59930	0	0	0
	150C1F3	7142	0	59930	0	0	0
	380C2F1	14284	3665	119804	17382	4276	-139808
	380C2F2	14284	3665	119804	17382	4276	-139808
	380C2F3	14284	3664	119804	17382	4275	-139808
	RTG	0	0	0	4803	1285	-42009
NL3/1a	GW / opgw	1882	2027	19605	0	0	0
Wind, 10°C	GW / opgw	1878	1520	20089	0	0	0
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	0	0	0
Wind angle: 45°	150C1F2	6997	3966	66845	0	0	0
	150C1F3	7017	3571	65387	0	0	0
	380C2F1	13990	12129	133786	13804	12374	-137222
	380C2F2	14019	11471	131589	13872	11683	-134653
	380C2F3	14055	10650	128992	13958	10821	-131610
	RTG	0	0	0	3420	3147	-36476
NL3/1b	GW / opgw	1955	1010	18698	0	0	0
Wind, -20°C	GW / opgw	1953	467	18778	0	0	0
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	0	0	0
Wind angle: 45°	150C1F2	7229	1219	69610	0	0	0
	150C1F3	7233	1098	69437	0	0	0
	380C2F1	14458	6723	139128	14958	6975	-145963
	380C2F2	14463	6534	138869	14973	6777	-145653
	380C2F3	14470	6297	138570	14990	6530	-145297
	RTG	0	0	0	3539	1789	-38088
NL3/3	GW / opgw	3585	3254	32658	0	0	0
Wind, -5°C	GW / opgw	3578	2401	33268	0	0	0
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	0	0	0
Wind angle: 45°	150C1F2	8599	3408	78765	0	0	0
	150C1F3	8615	3068	77825	0	0	0
	380C2F1	17194	11721	157508	17212	11953	-161137
	380C2F2	17218	11171	156090	17271	11375	-159464
	380C2F3	17247	10483	154433	17343	10655	-157511
	RTG	0	0	0	6509	5067	-61073
NL3/4	GW / opgw	1931	946	16599	0	0	0
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	0	0	0
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	0	0	0
Wind angle: 45°	150C1F2	7127	1220	60810	0	0	0
	150C1F3	7129	1098	60645	0	0	0
	380C2F1	14252	6187	121535	17316	6838	-141430
	380C2F2	14257	5998	121288	17325	6642	-141193
	380C2F3	14262	5761	121003	17336	6398	-140921
	RTG	0	0	0	4797	1919	-42325

NL3/1a	GW / opgw	1823	3896	28032	0	0	0
Wind, 10°C	GW / opgw	1823	3041	28154	0	0	0
Permanent loads yg= 0.9	150C1F1	6792	8563	88608	0	0	0
Wind angle: 90°	150C1F2	6815	7934	85325	0	0	0
	150C1F3	6847	7143	81278	0	0	0
	380C2F1	13585	22511	176528	13100	20707	-173304
	380C2F2	13631	21055	170010	13195	19362	-167100
	380C2F3	13694	19229	161977	13323	17681	-159474
	RTG	0	0	0	3338	5216	-45431
NL3/1b	GW / opgw	1930	1549	20129	0	0	0
Wind, -20°C	GW / opgw	1930	935	20171	0	0	0
Permanent loads yg= 0.9	150C1F1	7168	2632	72813	0	0	0
Wind angle: 90°	150C1F2	7178	2439	72255	0	0	0
	150C1F3	7190	2196	71604	0	0	0
	380C2F1	14337	9704	145384	14720	9359	-151259
	380C2F2	14357	9284	144281	14765	8973	-150223
	380C2F3	14381	8759	142996	14817	8491	-149021
	RTG	0	0	0	3515	2379	-39354
NL3/3	GW / opgw	3482	6126	43312	0	0	0
Wind, -5°C	GW / opgw	3482	4805	43500	0	0	0
Permanent loads yg= 0.9	150C1F1	8395	7356	94114	0	0	0
Wind angle: 90°	150C1F2	8422	6816	91666	0	0	0
	150C1F3	8457	6137	88705	0	0	0
	380C2F1	16791	20438	187628	16484	18941	-186555
	380C2F2	16845	19211	182773	16595	17808	-181964
	380C2F3	16915	17673	176904	16740	16395	-176434
	RTG	0	0	0	6379	8225	-71813
NL3/4	GW / opgw	1910	1484	17964	0	0	0
Construction/maintenance, +5°C	GW / opgw	1910	935	18004	0	0	0
Permanent loads yg= 0.9	150C1F1	7076	2633	63873	0	0	0
Wind angle: 90°	150C1F2	7084	2440	63339	0	0	0
	150C1F3	7094	2197	62716	0	0	0
	380C2F1	14152	9160	127513	17160	9187	-145534
	380C2F2	14169	8742	126458	17189	8807	-144724
	380C2F3	14189	8218	125229	17224	8333	-143788
	RTG	0	0	0	4783	2496	-43142
NL3/1a	GW / opgw	1873	2239	20475	0	0	0
Wind, 10°C	GW / opgw	1878	1520	20089	0	0	0
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	0	0	0
Wind angle: -45°	150C1F2	6997	3966	66845	0	0	0
	150C1F3	7017	3571	65387	0	0	0
	380C2F1	13937	13301	137937	13909	11314	-133327
	380C2F2	13971	12552	135254	13969	10707	-131221
	380C2F3	14013	11616	132064	14043	9951	-128741
	RTG	0	0	0	3432	2884	-35533
NL3/1b	GW / opgw	1952	1071	18816	0	0	0
Wind, -20°C	GW / opgw	1953	467	18778	0	0	0
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	0	0	0
Wind angle: -45°	150C1F2	7229	1219	69610	0	0	0
	150C1F3	7233	1098	69437	0	0	0
	380C2F1	14448	7060	139635	14981	6672	-145496
	380C2F2	14454	6845	139305	14993	6497	-145253
	380C2F3	14462	6576	138924	15006	6280	-144973
	RTG	0	0	0	3541	1713	-37977
NL3/3	GW / opgw	3571	3579	33718	0	0	0
Wind, -5°C	GW / opgw	3578	2401	33268	0	0	0
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	0	0	0
Wind angle: -45°	150C1F2	8599	3408	78765	0	0	0
	150C1F3	8615	3068	77825	0	0	0
	380C2F1	17150	12703	160228	17302	11067	-158609
	380C2F2	17178	12076	158464	17352	10559	-157264
	380C2F3	17213	11292	156395	17411	9927	-155700
	RTG	0	0	0	6526	4666	-59989
NL3/4	GW / opgw	1929	1007	16712	0	0	0
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	0	0	0
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	0	0	0
Wind angle: -45°	150C1F2	7127	1220	60810	0	0	0
	150C1F3	7129	1098	60645	0	0	0
	380C2F1	14244	6523	122018	17330	6538	-141073
	380C2F2	14249	6309	121704	17337	6365	-140887
	380C2F3	14256	6040	121341	17346	6149	-140675
	RTG	0	0	0	4798	1844	-42255

ZWW4HK400+5S

Appendix BZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2566	618	20128	2843	613	-19986
	GW / opgw	2566	0	20138	4864	3549	-19714
	150C1F1	9452	0	73963	16596	12965	-72374
	150C1F2	9452	0	73963	14495	12953	-72374
	150C1F3	9452	0	73963	12401	12938	-72374
	380C2F1	18903	4533	147856	19006	4498	-146741
	380C2F2	18903	4532	147856	19006	4497	-146741
	380C2F3	18903	4532	147856	0	0	0
	RTG	5125	1232	40212	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	697	22793	2965	713	-23307
	GW / opgw	2598	0	22804	5302	4054	-22867
	150C1F1	9584	0	84967	18166	15110	-85336
	150C1F2	9584	0	84967	15695	15106	-85337
	150C1F3	9584	0	84967	13230	15101	-85337
	380C2F1	19168	5194	169855	19659	5321	-174010
	380C2F2	19168	5194	169855	19659	5321	-174010
	380C2F3	19168	5194	169855	0	0	0
	RTG	5185	1381	45159	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4285	982	31989	4694	965	-31456
	GW / opgw	4285	0	32004	7885	5595	-31079
	150C1F1	11015	0	88699	19671	15567	-87294
	150C1F2	11015	0	88699	17139	15557	-87294
	150C1F3	11015	0	88699	14614	15544	-87295
	380C2F1	22030	5431	177315	22244	5427	-177217
	380C2F2	22030	5430	177315	22244	5426	-177217
	380C2F3	22030	5430	177315	0	0	0
	RTG	8570	1957	63853	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2571	628	20520	3626	759	-24829
	GW / opgw	2571	0	20530	6144	4346	-24518
	150C1F1	9471	0	75562	19086	14668	-82831
	150C1F2	9471	0	75562	16681	14664	-82832
	150C1F3	9471	0	75562	14283	14660	-82832
	380C2F1	18942	4620	151054	21928	5134	-167877
	380C2F2	18942	4620	151054	21928	5133	-167877
	380C2F3	18942	4620	151054	0	0	0
	RTG	5134	1252	40945	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2523	2128	22921	2686	2144	-23178
	GW / opgw	2518	1520	23317	4188	5741	-23344
	150C1F1	9336	4281	80953	15149	18664	-80135
	150C1F2	9350	3967	80023	13501	18225	-79240
	150C1F3	9367	3571	78932	11801	17718	-78240
	380C2F1	18695	12932	160031	18499	13104	-161043
	380C2F2	18721	12292	158386	18561	12431	-159101
	380C2F3	18721	12292	158386	0	0	0
	RTG	5081	3231	42874	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2592	1145	23089	2941	1164	-23650
	GW / opgw	2591	467	23154	5191	4595	-23225
	150C1F1	9568	1316	85706	17951	16561	-86013
	150C1F2	9571	1220	85602	15551	16458	-85920
	150C1F3	9573	1098	85483	13145	16338	-85819
	380C2F1	19141	7700	171082	19586	7877	-175455
	380C2F2	19144	7513	170905	19596	7682	-175243
	380C2F3	19144	7513	170905	0	0	0
	RTG	5179	1979	45424	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4220	3346	35663	4460	3355	-35597
	GW / opgw	4213	2402	36203	6868	8872	-35751
	150C1F1	10931	3678	93188	18580	20140	-92127
	150C1F2	10941	3408	92576	16396	19796	-91541
	150C1F3	10954	3069	91863	14170	19397	-90893
	380C2F1	21879	12564	185054	21866	12723	-186296
	380C2F2	21899	12024	183981	21915	12157	-185025
	380C2F3	21899	12024	183981	0	0	0
	RTG	8503	5083	67312	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2566	1075	20804	3611	1208	-25066
	GW / opgw	2565	468	20867	6075	4863	-24746
	150C1F1	9458	1317	76275	18938	16090	-83337
	150C1F2	9459	1220	76175	16582	15990	-83264
	150C1F3	9462	1099	76060	14224	15875	-83185
	380C2F1	18918	7125	152236	21878	7682	-169039
	380C2F2	18921	6939	152065	21885	7489	-168867
	380C2F3	18921	6939	152065	0	0	0
	RTG	5129	1850	41199	0	0	0

NL3/1a	GW / opgw	2454	3958	30054	2505	3593	-29084
Wind, 10°C	GW / opgw	2454	3041	30175	3798	7025	-26515
Permanent loads yg= 1.2	150C1F1	9136	8564	97617	14118	22001	-87602
Wind angle: 90°	150C1F2	9164	7935	94833	12763	21308	-85976
	150C1F3	9200	7144	91456	11333	20504	-84134
	380C2F1	18273	23063	194548	17761	21226	-190225
	380C2F2	18328	21638	189028	17872	19911	-184991
	380C2F3	18328	21638	189028	0	0	0
	RTG	4980	5640	50763	0	0	0
NL3/1b	GW / opgw	2573	1671	24112	2886	1580	-24501
Wind, -20°C	GW / opgw	2573	935	24154	5082	4892	-23650
Permanent loads yg= 1.2	150C1F1	9525	2633	87855	17729	17333	-86873
Wind angle: 90°	150C1F2	9533	2440	87457	15400	17173	-86673
	150C1F3	9542	2197	86995	13056	16988	-86455
	380C2F1	19050	10624	175457	19412	10212	-179148
	380C2F2	19065	10214	174675	19445	9835	-178417
	380C2F3	19065	10214	174675	0	0	0
	RTG	5161	2674	46377	0	0	0
NL3/3	GW / opgw	4112	6185	45222	4177	5599	-43420
Wind, -5°C	GW / opgw	4111	4806	45409	6258	10752	-39927
Permanent loads yg= 1.2	150C1F1	10752	7357	104819	17666	22769	-97192
Wind angle: 90°	150C1F2	10780	6817	102798	15757	22221	-96064
	150C1F3	10814	6138	100385	13776	21587	-94802
	380C2F1	21505	21095	209039	21192	19553	-206537
	380C2F2	21560	19893	205037	21303	18445	-202766
	380C2F3	21560	19893	205037	0	0	0
	RTG	8351	8816	77725	0	0	0
NL3/4	GW / opgw	2549	1601	21790	3575	1616	-25674
Construction/maintenance, +5°C	GW / opgw	2549	935	21831	6003	5138	-25039
Permanent loads yg= 1.2	150C1F1	9420	2634	78353	18783	16831	-84019
Wind angle: 90°	150C1F2	9427	2441	77968	16477	16678	-83860
	150C1F3	9435	2198	77522	14163	16500	-83686
	380C2F1	18841	10046	156462	21757	9998	-172054
	380C2F2	18854	9636	155706	21781	9625	-171454
	380C2F3	18854	9636	155706	0	0	0
	RTG	5113	2545	42117	0	0	0
NL3/1a	GW / opgw	2514	2335	23611	2713	1959	-22546
Wind, 10°C	GW / opgw	2518	1520	23317	4652	4435	-20632
Permanent loads yg= 1.2	150C1F1	9336	4281	80953	16185	15308	-74210
Wind angle: -45°	150C1F2	9350	3967	80023	14219	15129	-73975
	150C1F3	9367	3571	78932	12237	14921	-73718
	380C2F1	18647	14074	163180	18593	12072	-158108
	380C2F2	18678	13345	161139	18645	11482	-156542
	380C2F3	18678	13345	161139	0	0	0
	RTG	5070	3502	43575	0	0	0
NL3/1b	GW / opgw	2591	1204	23172	2946	1111	-23575
Wind, -20°C	GW / opgw	2591	467	23154	5274	4289	-22935
Permanent loads yg= 1.2	150C1F1	9568	1316	85706	18113	15750	-85448
Wind angle: -45°	150C1F2	9571	1220	85602	15660	15705	-85429
	150C1F3	9573	1098	85483	13209	15651	-85408
	380C2F1	19133	8032	171430	19601	7578	-175136
	380C2F2	19138	7820	171204	19610	7406	-174970
	380C2F3	v	0	0	0	0	0
	RTG	5178	2058	45499	0	0	0
NL3/3	GW / opgw	4206	3667	36579	4500	3069	-34770
Wind, -5°C	GW / opgw	4213	2402	36203	7573	6942	-32234
Permanent loads yg= 1.2	150C1F1	10931	3678	93188	19382	17490	-88360
Wind angle: -45°	150C1F2	10941	3408	92576	16945	17347	-88217
	150C1F3	10954	3069	91863	14499	17180	-88062
	380C2F1	21842	13526	187128	21941	11855	-184378
	380C2F2	21866	12912	185781	21981	11358	-183366
	380C2F3	21866	12912	185781	0	0	0
	RTG	8488	5504	68230	0	0	0
NL3/4	GW / opgw	2564	1134	20884	3614	1155	-25014
Construction/maintenance, +5°C	GW / opgw	2565	468	20867	6127	4575	-24554
Permanent loads yg= 1.2	150C1F1	9458	1317	76275	19050	15302	-82901
Wind angle: -45°	150C1F2	9459	1220	76175	16657	15257	-82887
	150C1F3	9462	1099	76060	14269	15204	-82872
	380C2F1	18912	7457	152572	21889	7385	-168780
	380C2F2	18916	7246	152353	21895	7214	-168646
	380C2F3	18916	7246	152353	0	0	0
	RTG	5128	1929	41271	0	0	0

NL3/1a	GW / opgw	1934	487	15840	2166	489	-15906
Wind, 10°C	GW / opgw	1934	0	15847	3767	2834	-15661
Permanent loads yg= 0.9	150C1F1	7125	0	58484	12869	10396	-57802
Wind angle: 0°	150C1F2	7125	0	58484	11195	10383	-57801
	150C1F3	7125	0	58484	9524	10368	-57800
	380C2F1	14250	3588	116914	14431	3603	-117446
	380C2F2	14250	3587	116914	14431	3602	-117446
	380C2F3	14250	3587	116914	0	0	0
	RTG	3862	970	31628	0	0	0
NL3/1b	GW / opgw	1963	559	18265	2282	583	-19057
Wind, -20°C	GW / opgw	1963	0	18274	4180	3307	-18626
Permanent loads yg= 0.9	150C1F1	7248	0	68687	14379	12448	-70239
Wind angle: 0°	150C1F2	7248	0	68687	12348	12444	-70239
	150C1F3	7248	0	68687	10322	12439	-70240
	380C2F1	14497	4200	137311	15065	4399	-143821
	380C2F2	14497	4200	137311	15065	4398	-143821
	380C2F3	14497	4200	137311	0	0	0
	RTG	3916	1105	36116	0	0	0
NL3/3	GW / opgw	3659	868	28254	4039	859	-27971
Wind, -5°C	GW / opgw	3659	0	28267	6869	4983	-27605
Permanent loads yg= 0.9	150C1F1	8693	0	73565	16000	13076	-73167
Wind angle: 0°	150C1F2	8693	0	73565	13881	13065	-73167
	150C1F3	8693	0	73565	11766	13053	-73167
	380C2F1	17385	4507	147061	17693	4561	-148888
	380C2F2	17385	4506	147061	17693	4560	-148888
	380C2F3	17385	4506	147061	0	0	0
	RTG	7319	1729	56379	0	0	0
NL3/4	GW / opgw	1938	495	16188	2960	644	-21049
Construction/maintenance, +5°C	GW / opgw	1938	0	16196	5088	3682	-20752
Permanent loads yg= 0.9	150C1F1	7142	0	59930	15433	12202	-68845
Wind angle: 0°	150C1F2	7142	0	59930	13436	12198	-68845
	150C1F3	7142	0	59930	11444	12194	-68846
	380C2F1	14284	3665	119804	17382	4276	-139808
	380C2F2	14284	3665	119804	17382	4276	-139808
	380C2F3	14284	3665	119804	0	0	0
	RTG	3870	987	32279	0	0	0
NL3/1a	GW / opgw	1882	2027	19605	1984	2052	-20193
Wind, 10°C	GW / opgw	1878	1520	20089	3003	5246	-20538
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	11117	16639	-68655
Wind angle: 45°	150C1F2	6997	3966	66845	9975	16150	-67475
	150C1F3	7017	3571	65387	8776	15584	-66143
	380C2F1	13990	12129	133786	13804	12374	-137222
	380C2F2	14019	11471	131589	13872	11683	-134653
	380C2F3	14019	11471	131589	0	0	0
	RTG	3805	3000	35334	0	0	0
NL3/1b	GW / opgw	1955	1010	18698	2248	1039	-19559
Wind, -20°C	GW / opgw	1953	467	18778	4027	3882	-19180
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	14072	13971	-71328
Wind angle: 45°	150C1F2	7229	1219	69610	12141	13860	-71187
	150C1F3	7233	1098	69437	10199	13731	-71032
	380C2F1	14458	6723	139128	14958	6975	-145963
	380C2F2	14463	6534	138869	14973	6777	-145653
	380C2F3	14463	6534	138869	0	0	0
	RTG	3908	1706	36506	0	0	0
NL3/3	GW / opgw	3585	3254	32658	3776	3273	-32919
Wind, -5°C	GW / opgw	3578	2401	33268	5748	8423	-33209
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	14633	17971	-79828
Wind angle: 45°	150C1F2	8599	3408	78765	12943	17593	-79054
	150C1F3	8615	3068	77825	11201	17156	-78191
	380C2F1	17194	11721	157508	17212	11953	-161137
	380C2F2	17218	11171	156090	17271	11375	-159464
	380C2F3	17218	11171	156090	0	0	0
	RTG	7242	4877	60594	0	0	0
NL3/4	GW / opgw	1931	946	16599	2941	1094	-21367
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	5000	4217	-21079
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	15237	13671	-69622
Wind angle: 45°	150C1F2	7127	1220	60810	13304	13566	-69517
	150C1F3	7129	1098	60645	11367	13444	-69403
	380C2F1	14252	6187	121535	17316	6838	-141430
	380C2F2	14257	5998	121288	17325	6642	-141193
	380C2F3	14257	5998	121288	0	0	0
	RTG	3863	1588	32650	0	0	0

NL3/1a	GW / opgw	1823	3896	28032	1829	3534	-27164
Wind, 10°C	GW / opgw	1823	3041	28154	2667	6639	-24331
Permanent loads yg= 0.9	150C1F1	6792	8563	88608	10113	20322	-78083
Wind angle: 90°	150C1F2	6815	7934	85325	9235	19563	-76083
	150C1F3	6847	7143	81278	8292	18678	-73783
	380C2F1	13585	22511	176528	13100	20707	-173304
	380C2F2	13631	21055	170010	13195	19362	-167100
	380C2F3	13631	21055	170010	0	0	0
	RTG	3704	5472	45277	0	0	0
NL3/1b	GW / opgw	1930	1549	20129	2177	1465	-20758
Wind, -20°C	GW / opgw	1930	935	20171	3884	4212	-19794
Permanent loads yg= 0.9	150C1F1	7168	2632	72813	13767	14817	-72606
Wind angle: 90°	150C1F2	7178	2439	72255	11933	14641	-72313
	150C1F3	7190	2196	71604	10075	14437	-71990
	380C2F1	14337	9704	145384	14720	9359	-151259
	380C2F2	14357	9284	144281	14765	8973	-150223
	380C2F3	14357	9284	144281	0	0	0
	RTG	3883	2414	37870	0	0	0
NL3/3	GW / opgw	3482	6126	43312	3508	5544	-41628
Wind, -5°C	GW / opgw	3482	4805	43500	5167	10395	-37903
Permanent loads yg= 0.9	150C1F1	8395	7356	94114	13628	20852	-86324
Wind angle: 90°	150C1F2	8422	6816	91666	12225	20252	-84904
	150C1F3	8457	6137	88705	10749	19558	-83298
	380C2F1	16791	20438	187628	16484	18941	-186555
	380C2F2	16845	19211	182773	16595	17808	-181964
	380C2F3	16845	19211	182773	0	0	0
	RTG	7083	8660	72639	0	0	0
NL3/4	GW / opgw	1910	1484	17964	2897	1509	-22161
Construction/maintenance, +5°C	GW / opgw	1910	935	18004	4911	4509	-21471
Permanent loads yg= 0.9	150C1F1	7076	2633	63873	15036	14462	-70584
Wind angle: 90°	150C1F2	7084	2440	63339	13168	14298	-70361
	150C1F3	7094	2197	62716	11286	14108	-70118
	380C2F1	14152	9160	127513	17160	9187	-145534
	380C2F2	14169	8742	126458	17189	8807	-144724
	380C2F3	14169	8742	126458	0	0	0
	RTG	3842	2295	33950	0	0	0
NL3/1a	GW / opgw	1873	2239	20475	2010	1862	-19389
Wind, 10°C	GW / opgw	1878	1520	20089	3494	3794	-16997
Permanent loads yg= 0.9	150C1F1	6982	4280	68074	12320	12901	-60563
Wind angle: -45°	150C1F2	6997	3966	66845	10822	12704	-60224
	150C1F3	7017	3571	65387	9303	12476	-59851
	380C2F1	13937	13301	137937	13909	11314	-133327
	380C2F2	13971	12552	135254	13969	10707	-131221
	380C2F3	13971	12552	135254	0	0	0
	RTG	3793	3279	36270	0	0	0
NL3/1b	GW / opgw	1952	1071	18816	2255	985	-19451
Wind, -20°C	GW / opgw	1953	467	18778	4142	3550	-18743
Permanent loads yg= 0.9	150C1F1	7226	1316	69760	14303	13106	-70452
Wind angle: -45°	150C1F2	7229	1219	69610	12297	13058	-70420
	150C1F3	7233	1098	69437	10292	13002	-70387
	380C2F1	14448	7060	139635	14981	6672	-145496
	380C2F2	14454	6845	139305	14993	6497	-145253
	380C2F3	14454	6845	139305	0	0	0
	RTG	3906	1786	36616	0	0	0
NL3/3	GW / opgw	3571	3579	33718	3819	2983	-31958
Wind, -5°C	GW / opgw	3578	2401	33268	6501	6382	-29057
Permanent loads yg= 0.9	150C1F1	8586	3677	79568	15618	15087	-74731
Wind angle: -45°	150C1F2	8599	3408	78765	13623	14933	-74530
	150C1F3	8615	3068	77825	11614	14755	-74311
	380C2F1	17150	12703	160228	17302	11067	-158609
	380C2F2	17178	12076	158464	17352	10559	-157264
	380C2F3	17178	12076	158464	0	0	0
	RTG	7224	5304	61688	0	0	0
NL3/4	GW / opgw	1929	1007	16712	2945	1041	-21297
Construction/maintenance, +5°C	GW / opgw	1930	468	16676	5067	3915	-20813
Permanent loads yg= 0.9	150C1F1	7124	1317	60953	15385	12847	-68981
Wind angle: -45°	150C1F2	7127	1220	60810	13404	12801	-68959
	150C1F3	7129	1098	60645	11426	12747	-68935
	380C2F1	14244	6523	122018	17330	6538	-141073
	380C2F2	14249	6309	121704	17337	6365	-140887
	380C2F3	14249	6309	121704	0	0	0
	RTG	3861	1669	32755	0	0	0

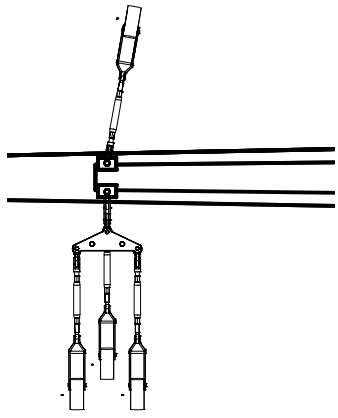
ZWW4HK400+5S

Appendix BZ2 / NL4

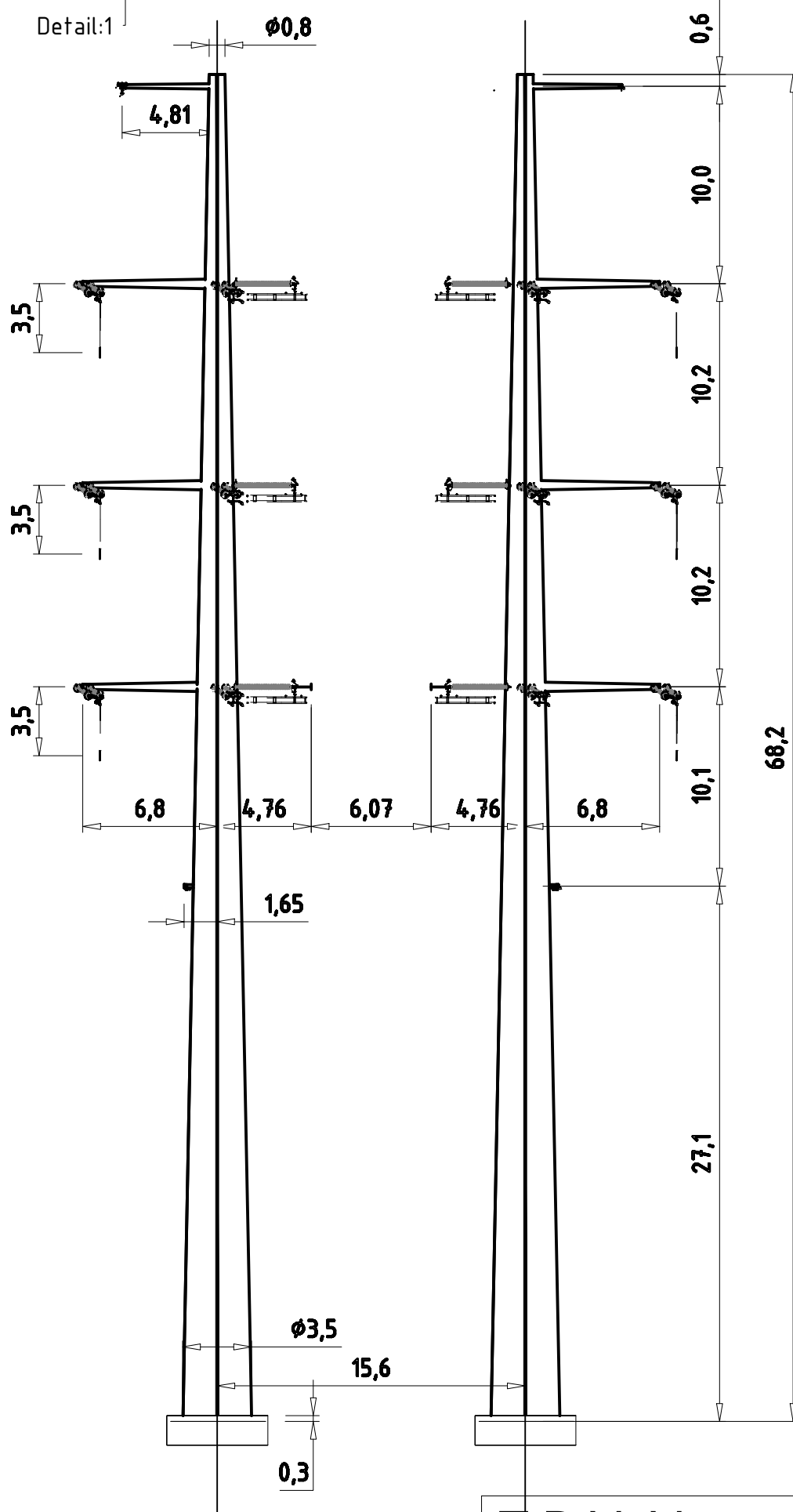
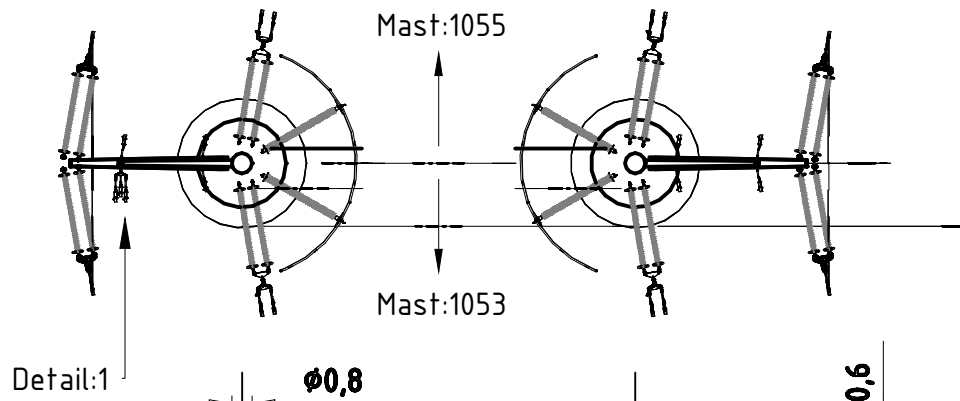
Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2145	532	17304	2393	532	-17304
Wind, 10°C	GW / opgw	2145	0	17312	4136	3100	-17052
Permanent loads yg= 1.0	150C1F1	7902	0	63778	14125	11335	-62803
Wind angle: 0°	150C1F2	7902	0	63778	12306	11319	-62801
	150C1F3	7902	0	63778	10491	11299	-62800
	380C2F1	15804	3916	127495	15963	3914	-127495
	380C2F2	15804	3914	127495	15963	3912	-127495
	380C2F3	15804	3912	127495	15963	3911	-127495
	RTG	0	0	0	3866	1060	-34558
NL4/1b	GW / opgw	2175	606	19819	2512	628	-20519
Wind, -20°C	GW / opgw	2175	0	19828	4560	3560	-20085
Permanent loads yg= 1.0	150C1F1	8029	0	74282	15661	13354	-75436
Wind angle: 0°	150C1F2	8029	0	74282	13479	13350	-75436
	150C1F3	8029	0	74282	11301	13347	-75437
	380C2F1	16058	4541	148495	16604	4715	-154211
	380C2F2	16058	4541	148495	16604	4715	-154211
	380C2F3	16058	4540	148495	16604	4715	-154211
	RTG	0	0	0	3930	1239	-40509
NL4/3	GW / opgw	7203	1460	47668	7703	1408	-45991
Wind, -5°C	GW / opgw	7203	0	47690	12408	8135	-45593
Permanent loads yg= 1.0	150C1F1	12434	0	97490	21865	16980	-95473
Wind angle: 0°	150C1F2	12434	0	97490	19093	16971	-95473
	150C1F3	12434	0	97490	16330	16961	-95474
	380C2F1	24868	5966	194889	25013	5925	-193604
	380C2F2	24868	5965	194889	25013	5925	-193604
	380C2F3	24868	5964	194889	25013	5924	-193604
	RTG	0	0	0	12984	2815	-91994
NL4/4	GW / opgw	2149	541	17669	3055	661	-21601
Construction/maintenance, +5°C	GW / opgw	2149	0	17677	5240	3775	-21302
Permanent loads yg= 1.0	150C1F1	7920	0	65280	16283	12774	-72149
Wind angle: 0°	150C1F2	7920	0	65280	14189	12771	-72150
	150C1F3	7920	0	65280	12102	12767	-72150
	380C2F1	15840	3991	130500	18430	4478	-146440
	380C2F2	15840	3991	130500	18430	4478	-146440
	380C2F3	15840	3991	130500	18430	4477	-146440
	RTG	0	0	0	4963	1318	-43112
NL4/1a	GW / opgw	2077	2518	22494	2157	2547	-23146
Wind, 10°C	GW / opgw	2072	1949	23133	3161	6257	-23670
Permanent loads yg= 1.0	150C1F1	7709	5488	77109	11816	19529	-77789
Wind angle: 45°	150C1F2	7729	5085	75444	10685	18891	-76215
	150C1F3	7754	4578	73455	9488	18151	-74425
	380C2F1	15451	14925	151053	15128	15221	-154821
	380C2F2	15489	14077	148059	15212	14329	-151370
	380C2F3	15535	13016	144495	15320	13218	-147251
	RTG	0	0	0	3776	3862	-41117
NL4/1b	GW / opgw	2170	979	20080	2490	1004	-20823
Wind, -20°C	GW / opgw	2169	389	20137	4464	4014	-20406
Permanent loads yg= 1.0	150C1F1	8015	1097	74934	15472	14571	-76047
Wind angle: 45°	150C1F2	8017	1016	74843	13352	14484	-75964
	150C1F3	8019	915	74737	11227	14383	-75873
	380C2F1	16034	6631	149582	16539	6847	-155495
	380C2F2	16037	6475	149425	16548	6685	-155307
	380C2F3	16041	6279	149245	16559	6481	-155092
	RTG	0	0	0	3924	1768	-40812
NL4/3	GW / opgw	7175	3378	49005	7600	3343	-47514
Wind, -5°C	GW / opgw	7171	2003	49267	11940	10462	-47190
Permanent loads yg= 1.0	150C1F1	12381	3065	100192	21175	20571	-98248
Wind angle: 45°	150C1F2	12388	2840	99818	18627	20307	-97895
	150C1F3	12397	2557	99384	16053	20002	-97508
	380C2F1	24774	11854	199489	24776	11940	-199019
	380C2F2	24787	11412	198838	24809	11478	-198244
	380C2F3	24802	10857	198087	24846	10900	-197351
	RTG	0	0	0	12953	5527	-93516
NL4/4	GW / opgw	2145	913	17918	3042	1034	-21811
Construction/maintenance, +5°C	GW / opgw	2144	390	17972	5180	4209	-21507
Permanent loads yg= 1.0	150C1F1	7909	1097	65906	16155	13965	-72606
Wind angle: 45°	150C1F2	7910	1017	65818	14103	13881	-72541
	150C1F3	7912	915	65717	12051	13784	-72471
	380C2F1	15820	6080	131540	18386	6603	-147469
	380C2F2	15823	5925	131390	18392	6442	-147317
	380C2F3	15826	5729	131217	18400	6239	-147143
	RTG	0	0	0	4959	1845	-43319

NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2012	4914	33255	1989	4444	-31981
	GW / opgw	2012	3900	33409	2796	8037	-28498
	150C1F1	7491	10980	103841	10659	24288	-90088
	150C1F2	7516	10174	99668	9819	23313	-87514
	150C1F3	7550	9160	94482	8911	22174	-84534
	380C2F1	14982	28268	206809	14328	25920	-201513
	380C2F2	15032	26404	198524	14429	24198	-193658
	380C2F3	15101	24062	188230	14569	22043	-183924
	RTG	0	0	0	3681	6523	-52824
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2153	1420	20982	2442	1352	-21577
	GW / opgw	2153	779	21018	4368	4267	-20784
	150C1F1	7977	2194	76832	15276	15224	-76814
	150C1F2	7984	2033	76481	13219	15088	-76636
	150C1F3	7992	1830	76073	11148	14931	-76442
	380C2F1	15955	9074	153450	16385	8799	-158769
	380C2F2	15969	8731	152759	16414	8484	-158121
	380C2F3	15985	8301	151957	16449	8090	-157373
	RTG	0	0	0	3909	2252	-41592
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7098	5635	53369	7397	5123	-51097
	GW / opgw	7098	4006	53526	11519	11734	-48994
	150C1F1	12252	6131	107625	20530	22571	-101389
	150C1F2	12274	5681	106292	18183	22154	-100676
	150C1F3	12300	5115	104723	15785	21672	-99887
	380C2F1	24505	18818	214740	24289	17511	-211917
	380C2F2	24548	17838	212108	24376	16608	-209441
	380C2F3	24600	16612	209011	24482	15483	-206540
	RTG	0	0	0	12885	8002	-97311
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2131	1353	18780	3011	1376	-22347
	GW / opgw	2131	779	18815	5119	4440	-21766
	150C1F1	7877	2195	67727	16020	14589	-73213
	150C1F2	7883	2034	67390	14013	14460	-73071
	150C1F3	7889	1831	66999	11998	14311	-72917
	380C2F1	15754	8519	135249	18281	8538	-150133
	380C2F2	15766	8177	134585	18302	8225	-149603
	380C2F3	15779	7749	133817	18325	7836	-148992
	RTG	0	0	0	4950	2322	-43865
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2067	2791	23644	2188	2303	-22087
	GW / opgw	2072	1949	23133	3759	4362	-18946
	150C1F1	7709	5488	77109	13353	14621	-66757
	150C1F2	7729	5085	75444	11780	14360	-66280
	150C1F3	7754	4578	73455	10177	14059	-65752
	380C2F1	15386	16438	156660	15258	13853	-149579
	380C2F2	15427	15472	153043	15334	13070	-146721
	380C2F3	15480	14264	148708	15429	12095	-143332
	RTG	0	0	0	3791	3523	-39837
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2169	1029	20153	2495	960	-20757
	GW / opgw	2169	389	20137	4537	3757	-20147
	150C1F1	8015	1097	74934	15615	13889	-75540
	150C1F2	8017	1016	74843	13448	13851	-75523
	150C1F3	8019	915	74737	11283	13806	-75505
	380C2F1	16027	6908	149890	16553	6598	-155212
	380C2F2	16032	6731	149690	16560	6454	-155065
	380C2F3	16037	6509	149459	16568	6275	-154897
	RTG	0	0	0	3925	1706	-40745
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7168	3634	49371	7621	3115	-47187
	GW / opgw	7171	2003	49267	12287	9145	-45909
	150C1F1	12381	3065	100192	21690	18525	-96034
	150C1F2	12388	2840	99818	18976	18412	-95954
	150C1F3	12397	2557	99384	16261	18281	-95867
	380C2F1	24750	12642	200754	24825	11230	-197851
	380C2F2	24765	12139	199931	24851	10823	-197239
	380C2F3	24784	11509	198978	24881	10315	-196535
	RTG	0	0	0	12960	5210	-93182
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2144	963	17987	3045	991	-21765
	GW / opgw	2144	390	17972	5226	3966	-21336
	150C1F1	7909	1097	65906	16252	13304	-72216
	150C1F2	7910	1017	65818	14168	13266	-72203
	150C1F3	7912	915	65717	12089	13222	-72190
	380C2F1	15815	6358	131835	18396	6355	-147240
	380C2F2	15818	6181	131643	18400	6212	-147122
	380C2F3	15822	5959	131422	18406	6034	-146986
	RTG	0	0	0	4960	1783	-43273



Detail: 1
Schaal: 1:50


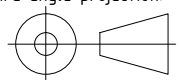


- Maatvoering indicatief

T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4HK400S+5

- Uitgangspunten locatie specifiek
- Voor uitgangspunten zie:
Doc. 13-3149 mastenontwerp dossier
- 2x380 / 2x150 Hoekmast
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

2.0	28-03-2014	tower type changed to ZWW4HK400S+5
1.0	17-03-2014	First edition
		Projectname: Engineering verbinding ZW380
Design state: Concept		Third angle projection: 
Drawn by: SGR 17-03-2014		Drawing no.: 74102194-035-100V
Checked by: AJP 17-03-2014		Description: Wintrack Masttype ZWW4HK400S+5 Mastnummer:1054
Approved by: AW 17-03-2014		
Scale: 1:300		Revision: 2.0
Units: m		Format: A3
Project no: 000.145		
Company: TenneT		
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		

ZWW4S450

Fundatie berekening

Bijlage CS

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p, gem}$	1,6	m

schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	4,0	m
	Hoogte	1,8	m
	Inhoud	22,6	m ³
	e.g.	543	kN

Onderplaat	Diameter	10,0	m
	Hoogte	1,0	m
	Inhoud	79	m ³
	e.g.	1885	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		565	kN
Fgeleiders		188	kN
Maximale dwarskracht		581	kN
Fmax vert (druk)		867	kN
Fmin vert (trek)		650	kN
Maximale moment		28001	kNm

Moment

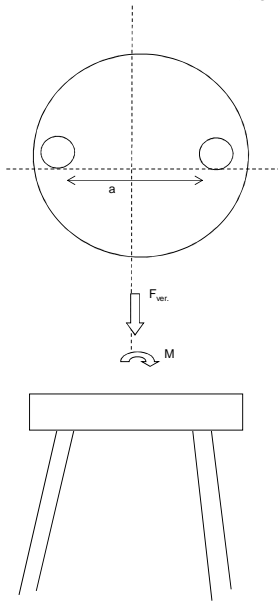
F_{slag}		3393	kN
F_{hor}		581	kN
F_{ver}		3367	kN
M_{hor} (tgv F_{hor})		1628	kNm
M_{tot}		29628	kNm
$F=M/a$		3367	kN

Verticaal reactiekracht

F_{water} (trek)		1012	kN
F_{grond} (druk)		1781	kN
F_{grond} (trek)		1484	kN
F_{dmax} (druk)		2959	kN
F_{tmax} (trek)		1479	kN
F_{dtot} (druk)		6326	kN
F_{ttot} (trek)		1888	kN

Palen druk	6	(-)
Palen trek	6	(-)

Totaal palen	12	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4S450

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r,trek;d} = \int_0^L O_{p;gem} \times p_{r;d} \times dz$$

Bijlage CS

Bepaling opneembare paalbelasting op druk

heipaal

Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	O _{p;gem}	1,60 m

paalfactor	α t	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75

conusweerstand over wrijvingstraject q_{c,z,max} 15 MPa

q_{c,z,rep} 11,25 MPa

materiaalfactor γ_{m,b4} 1,4

factor, wisselende belastingen γ_{m,var,qc} 1,5

q_{c,z,d} 5,36 MPa

p_{r,z,d} 37,5 kN/m²

F_{r,trek;d,i} 60,0 kN/m¹

F_{trek,d} 596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		q _{c,z}		P _{r,max,z} (schacht)	F _{r,trek;d,i}	F _{trek,d}
	m	m	MPa	α t			
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

F _{trek,d}	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

F _{trek,d}	536,4 kN
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ZWW4S450

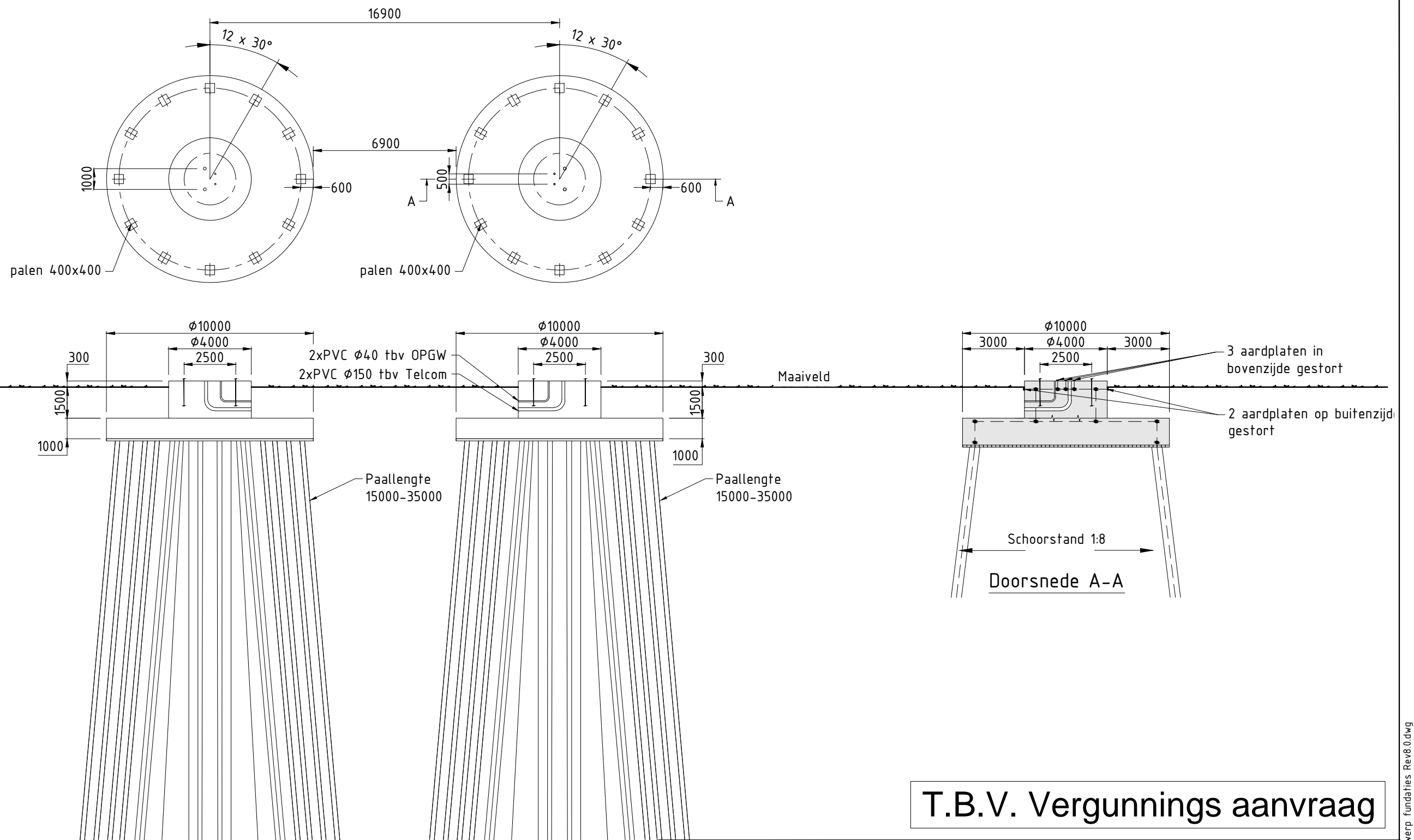
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CS

Bepaling opneembare paalbelasting op druk

heipaal	diameter	v a	2 mm 2 mm
	Deq		0,001808
maximale puntweerstand			
$P_{r,max,punt}$			11,25 MN/m ²
paalklasse factor	α_p		1,00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1,00
minimale waarde neergaande deel	$q_{c,lgem}$		9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,lgem}$		14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,lgem}$		11,00 MN/m ²
maximale paalschachtwrijving			
$P_{r,max,schacht}$			0,05 MN/m ²
waarin:			
paalfactor	α_s		0,010
conusweerstand over wrijvingstraject	$q_{c,z,a}$		5,00 MN/m ²
maximale draagkracht alleenstaande paal			
$F_{r,max}$			0,00 MN
waarin:			
$F_{r,max,punt}$			0,00 MN
paalpunt oppervlak	A_{punt}		0,00 m ²
$F_{r,max,schacht}$			0,00 MN
gemiddelde paalomtrek	$O_{p,lgem}$		0,01 m
lengte schachtwrijving	Δl		15,00 m
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max,d}$		MN	0,00 MN
materiaalfactor grond			
waarde afhankelijk van aantal palen en aantal sonderingen	γ_{mb} $\xi_{1,N}$		1,20 0,75
$F_{r,paal,max,d}$	3 kN	mm, paalpunt-nivo	-27,00 m



T.B.V. Vergunnings aanvraag

Verklaring


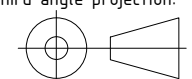
- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding Ø16mm (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

8.0	21-03-2014	Paal paal afstand aangepast
7.0	10-03-2014	Diverse aanpassingen
6.0	13-02-2014	Diverse aanpassingen
		Projectname: Engineering verbinding ZW380
		Third angle projection: 
		Drawing no.: 74102194-032-101V
Design state: Definitief		Scale: 1:200
Drawn by: RBE 21-03-2014		Units: mm
Checked by: AJP 21-03-2014		Project no: 000.145
Approved by: AW 21-03-2014		Company: TenneT
		Description: Principe ontwerp fundatie hoekmast ZWW4S450 masten familie
		Revision: 8.0
		Format: A3



ZWW4S450

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h		71.2	m
Diameter voet		d voet		2.5	m
top		d top		0.5	m
gem		d gem		1.5	m
wanddikte		t		22	mm
Oppervlakte aan voet		A		171267	mm ²
Traagheidsmoment aan voet		W _x		1.05E+08	mm ⁴
Weerstandsmoment aan voet		I _x		1.30E+11	mm ⁶
Mast: Gewicht		2 ^{de} orde		10.0	%
		F _{rep,ver}		565	kN

Bijlage BS

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	70.5	5.2	17.2	0.0	17.2	1211	kNm
150C1F1	59.3	19.2	49.1	0.0	49.1	2913	kNm
150C1F2	47.9	19.2	45.6	0.0	45.6	2184	kNm
150C1F3	36.5	19.2	41.1	0.0	41.1	1500	kNm
380C2F1	59.3	38.4	98.2	0.0	98.2	5826	kNm
380C2F2	47.9	38.4	91.2	0.0	91.2	4367	kNm
380C2F3	36.5	38.4	82.2	0.0	82.2	3001	kNm
RTG	25.2	10.4	22.9	0.0	22.9	577	kNm

Stuwdruk		F _{hor.}	31.9	kN
		M _{d,wind}	998	kNm
Totaal		M _{d,tot}	25455	kNm
Totaal moment incl. 2 ^{de} orde effect		M _{d,tot}	28001	kNm

Normaalkracht;

Optredende normaalkracht							
N _{d,geleiders}						188	kN
N _{d, e.g. mast}						678	kN
N _{s,d,totaal}						867	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
β _a	0.67	
A _{eff}	114235	mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{y,d} /γ _{m1}	8	N/mm ²
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Moment;

Optredende moment in de voet:							
M _{d,tot}						28001	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
β _a	0.97	
W _{eff}	1.02E+08	mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{y,d} /γ _{m1}	275	N/mm ²
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Totale spanning:

σ _d	283	N/mm ²	< 284 N/mm ² = ACCOORD
σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	70.5	4.3	11.8	0.0	11.8	829	kNm
150C1F1	59.3	16.0	33.8	0.0	33.8	2006	kNm
150C1F2	47.9	16.0	31.5	0.0	31.5	1507	kNm
150C1F3	36.5	16.0	28.5	0.0	28.5	1039	kNm
380C2F1	59.3	32.0	67.7	0.0	67.7	4013	kNm
380C2F2	47.9	32.0	62.9	0.0	62.9	3014	kNm
380C2F3	36.5	32.0	56.9	0.0	56.9	2078	kNm
RTG	25.2	8.7	15.8	0.0	15.8	399	kNm

Stuwdruk		F _{hor.}	850	kN
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Verplaatsing			1.81	m
Percentage van de verplaatsing			2.54%	
Hoek			2.84	graden
Kromming			0.63%	
Fundatie rotatiestijfheid			0.005	rad

3.88	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4S450

Appendix S / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	896	20228	2604	896	-20228
	150C1F1	9593	3280	74325	9593	3280	-74325
	150C1F2	9593	3278	74325	9593	3278	-74325
	150C1F3	9593	3274	74325	9593	3274	-74325
	380C2F1	19186	6561	148650	19186	6561	-148650
	380C2F2	19186	6555	148650	19186	6555	-148650
	380C2F3	19186	6548	148650	19186	6548	-148650
	RTG	5200	1780	40409	5200	1780	-40409
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	980	22397	2603	980	-22397
	150C1F1	9588	3645	83312	9588	3645	-83312
	150C1F2	9588	3644	83312	9588	3644	-83312
	150C1F3	9588	3643	83312	9588	3643	-83312
	380C2F1	19175	7289	166624	19175	7289	-166624
	380C2F2	19175	7288	166624	19175	7288	-166624
	380C2F3	19175	7287	166624	19175	7287	-166624
	RTG	5198	1943	44440	5198	1943	-44440
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	10505	2797	63760	10505	2797	-63760
	150C1F1	16533	5309	121139	16533	5309	-121139
	150C1F2	16533	5307	121139	16533	5307	-121139
	150C1F3	16533	5305	121139	16533	5305	-121139
	380C2F1	33067	10617	242278	33067	10617	-242278
	380C2F2	33067	10614	242278	33067	10614	-242278
	380C2F3	33067	10610	242278	33067	10610	-242278
	RTG	21038	5592	127696	21038	5592	-127696
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3356	1112	25421	3356	1112	-25421
	150C1F1	11098	3733	85329	11098	3733	-85329
	150C1F2	11098	3732	85329	11098	3732	-85329
	150C1F3	11098	3731	85329	11098	3731	-85329
	380C2F1	22195	7465	170658	22195	7465	-170658
	380C2F2	22195	7464	170658	22195	7464	-170658
	380C2F3	22195	7463	170658	22195	7463	-170658
	RTG	6705	2220	50770	6705	2220	-50770
NL1/6 Permanent, +10°C Permanent loads yg= 1.35	GW / opgw	2930	976	22355	2930	976	-22355
	150C1F1	10793	3580	82000	10793	3580	-82000
	150C1F2	10793	3580	82000	10793	3580	-82000
	150C1F3	10793	3580	82000	10793	3580	-82000
	380C2F1	21587	7160	164000	21587	7160	-164000
	380C2F2	21587	7160	164000	21587	7160	-164000
	380C2F3	21587	7160	164000	21587	7160	-164000
	RTG	5851	1950	44665	5851	1950	-44665
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2605	4269	28732	2605	4959	-31359
	150C1F1	9596	12559	93910	9597	14463	-100520
	150C1F2	9595	11774	91314	9596	13518	-97191
	150C1F3	9595	10785	88181	9596	12325	-93130
	380C2F1	19192	25117	187821	19193	28927	-201040
	380C2F2	19191	23547	182627	19192	27036	-194381
	380C2F3	19190	21569	176363	19191	24651	-186260
	RTG	5201	5980	48486	5202	6844	-51355
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	1600	22848	2603	1723	-23038
	150C1F1	9588	5368	84245	9588	5709	-84646
	150C1F2	9588	5228	84099	9588	5540	-84439
	150C1F3	9588	5050	83931	9588	5327	-84200
	380C2F1	19176	10737	168490	19176	11418	-169292
	380C2F2	19175	10456	168197	19176	11080	-168878
	380C2F3	19175	10101	167861	19176	10654	-168401
	RTG	5198	2728	44802	5198	2883	-44960
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	10506	5965	65646	10506	6591	-66434
	150C1F1	16534	10169	124691	16535	11136	-126169
	150C1F2	16534	9770	124146	16534	10656	-125408
	150C1F3	16534	9267	123517	16534	10051	-124525
	380C2F1	33068	20339	249381	33069	22272	-252337
	380C2F2	33068	19541	248293	33069	21312	-250815
	380C2F3	33068	18534	247035	33068	20102	-249050
	RTG	21039	9602	129204	21039	10387	-129862
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3357	1726	25730	3357	1847	-25864
	150C1F1	11098	5449	86062	11098	5786	-86381
	150C1F2	11098	5309	85945	11098	5619	-86216
	150C1F3	11098	5133	85812	11098	5407	-86026
	380C2F1	22196	10898	172123	22196	11572	-172763
	380C2F2	22195	10619	171891	22196	11237	-172432
	380C2F3	22195	10267	171624	22195	10815	-172052
	RTG	6706	3000	51014	6706	3152	-51124

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2607	8586	45574	2607	8586	-45574
	150C1F1	9602	24562	138636	9602	24562	-138636
	150C1F2	9601	22794	131836	9601	22794	-131836
	150C1F3	9600	20553	123234	9600	20553	-123234
	380C2F1	19204	49124	277273	19204	49124	-277273
	380C2F2	19202	45588	263672	19202	45588	-263672
	380C2F3	19200	41105	246468	19200	41105	-246468
	RTG	5204	11453	68736	5204	11453	-68736
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2603	2387	24492	2603	2387
150C1F1		9588	7530	87796	9588	7530	-87796
150C1F2		9588	7207	87127	9588	7207	-87127
150C1F3		9588	6801	86348	9588	6801	-86348
380C2F1		19177	15059	175592	19177	15059	-175592
380C2F2		19176	14414	174253	19176	14414	-174253
380C2F3		19176	13601	172695	19176	13601	-172695
RTG		5198	3706	46213	5198	3706	-46213
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°		GW / opgw	10509	9935	72287	10509	9935
	150C1F1	16537	16325	137190	16537	16325	-137190
	150C1F2	16537	15405	134923	16537	15405	-134923
	150C1F3	16536	14247	132238	16536	14247	-132238
	380C2F1	33074	32649	274379	33074	32649	-274379
	380C2F2	33073	30810	269847	33073	30810	-269847
	380C2F3	33072	28493	264476	33072	28493	-264476
	RTG	21042	14558	135029	21042	14558	-135029
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3357	2493	26912	3357	2493
150C1F1		11098	7581	88923	11098	7581	-88923
150C1F2		11098	7264	88379	11098	7264	-88379
150C1F3		11098	6864	87748	11098	6864	-87748
380C2F1		22196	15162	177846	22196	15162	-177846
380C2F2		22196	14527	176758	22196	14527	-176758
380C2F3		22196	13727	175497	22196	13727	-175497
RTG		6706	3960	52007	6706	3960	-52007
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2605	4959	31359	2605	4269
	150C1F1	9597	14463	100520	9596	12559	-93910
	150C1F2	9596	13518	97191	9595	11774	-91314
	150C1F3	9596	12325	93130	9595	10785	-88181
	380C2F1	19193	28927	201040	19192	25117	-187821
	380C2F2	19192	27036	194381	19191	23547	-182627
	380C2F3	19191	24651	186260	19190	21569	-176363
	RTG	5202	6844	51355	5201	5980	-48486
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2603	1723	23038	2603	1600
150C1F1		9588	5709	84646	9588	5368	-84245
150C1F2		9588	5540	84439	9588	5228	-84099
150C1F3		9588	5327	84200	9588	5050	-83931
380C2F1		19176	11418	169292	19176	10737	-168490
380C2F2		19176	11080	168878	19175	10456	-168197
380C2F3		19176	10654	168401	19175	10101	-167861
RTG		5198	2883	44960	5198	2728	-44802
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	10506	6591	66434	10506	5965
	150C1F1	16535	11136	126169	16534	10169	-124691
	150C1F2	16534	10656	125408	16534	9770	-124146
	150C1F3	16534	10051	124525	16534	9267	-123517
	380C2F1	33069	22272	252337	33068	20339	-249381
	380C2F2	33069	21312	250815	33068	19541	-248293
	380C2F3	33068	20102	249050	33068	18534	-247035
	RTG	21039	10387	129862	21039	9602	-129204
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3357	1847	25864	3357	1726
150C1F1		11098	5786	86381	11098	5449	-86062
150C1F2		11098	5619	86216	11098	5309	-85945
150C1F3		11098	5407	86026	11098	5133	-85812
380C2F1		22196	11572	172763	22196	10898	-172123
380C2F2		22196	11237	172432	22195	10619	-171891
380C2F3		22195	10815	172052	22195	10267	-171624
RTG		6706	3152	51124	6706	3000	-51014
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1953	702	15782	1953	702
	150C1F1	7193	2578	58228	7193	2578	-58228
	150C1F2	7193	2575	58228	7193	2575	-58228
	150C1F3	7193	2571	58228	7193	2571	-58228
	380C2F1	14386	5155	116457	14386	5155	-116457
	380C2F2	14386	5149	116457	14386	5149	-116457
	380C2F3	14386	5142	116457	14386	5142	-116457
	RTG	3899	1392	31514	3899	1392	-31514

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1952	775	17692	1952	775	-17692
	150C1F1	7189	2901	66272	7189	2901	-66272
	150C1F2	7189	2900	66272	7189	2900	-66272
	150C1F3	7189	2899	66272	7189	2899	-66272
	380C2F1	14378	5801	132544	14378	5801	-132544
	380C2F2	14378	5800	132544	14378	5800	-132544
	380C2F3	14378	5799	132544	14378	5799	-132544
	RTG	3898	1534	35052	3898	1534	-35052
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	9851	2666	60762	9851	2666	-60762
	150C1F1	14131	4696	107107	14131	4696	-107107
	150C1F2	14131	4695	107107	14131	4695	-107107
	150C1F3	14131	4693	107108	14131	4693	-107108
	380C2F1	28263	9392	214215	28263	9392	-214215
	380C2F2	28263	9389	214215	28263	9389	-214215
	380C2F3	28263	9385	214215	28263	9385	-214215
	RTG	19733	5330	121693	19733	5330	-121693
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2705	929	21225	2705	929	-21225
	150C1F1	8697	3051	69725	8697	3051	-69725
	150C1F2	8697	3051	69726	8697	3051	-69726
	150C1F3	8697	3050	69726	8697	3050	-69726
	380C2F1	17395	6103	139451	17395	6103	-139451
	380C2F2	17395	6102	139451	17395	6102	-139451
	380C2F3	17395	6100	139451	17395	6100	-139451
	RTG	5404	1853	42376	5404	1853	-42376
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1953	689	15782	1953	689	-15782
	150C1F1	7193	2542	58229	7193	2542	-58229
	150C1F2	7193	2542	58229	7193	2542	-58229
	150C1F3	7193	2542	58229	7193	2542	-58229
	380C2F1	14386	5085	116458	14386	5085	-116458
	380C2F2	14386	5085	116458	14386	5085	-116458
	380C2F3	14386	5085	116458	14386	5085	-116458
	RTG	3899	1376	31514	3899	1376	-31514
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1954	4165	26361	1954	4870	-29315
	150C1F1	7196	12105	83545	7197	14061	-91332
	150C1F2	7195	11296	80414	7196	13091	-87439
	150C1F3	7195	10277	76571	7196	11865	-82609
	380C2F1	14392	24210	167090	14393	28122	-182664
	380C2F2	14391	22593	160828	14392	26182	-174879
	380C2F3	14390	20553	153142	14391	23730	-165218
	RTG	3900	5702	42130	3901	6592	-45606
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1952	1403	18343	1952	1530	-18611
	150C1F1	7189	4643	67644	7189	4991	-68220
	150C1F2	7189	4500	67432	7189	4818	-67923
	150C1F3	7189	4319	67189	7189	4601	-67579
	380C2F1	14378	9287	135288	14378	9982	-136440
	380C2F2	14378	9000	134865	14378	9637	-135846
	380C2F3	14378	8638	134378	14378	9201	-135159
	RTG	3898	2326	35585	3898	2483	-35811
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	9852	5841	62817	9853	6470	-63669
	150C1F1	14132	9591	111461	14133	10571	-113242
	150C1F2	14132	9187	110802	14133	10084	-112326
	150C1F3	14132	8678	110038	14132	9471	-111261
	380C2F1	28265	19182	222922	28266	21142	-226483
	380C2F2	28265	18374	221604	28265	20168	-224653
	380C2F3	28264	17355	220076	28265	18942	-222521
	RTG	19734	9345	123344	19734	10133	-124060
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2705	1547	21636	2705	1670	-21810
	150C1F1	8697	4780	70741	8698	5121	-71176
	150C1F2	8697	4638	70583	8697	4952	-70951
	150C1F3	8697	4460	70400	8697	4738	-70693
	380C2F1	17395	9559	141483	17395	10243	-142351
	380C2F2	17395	9277	141165	17395	9904	-141903
	380C2F3	17395	8920	140801	17395	9475	-141386
	RTG	5404	2637	42706	5404	2791	-42850
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1955	8538	44486	1955	8538	-44486
	150C1F1	7201	24331	133376	7201	24331	-133376
	150C1F2	7200	22542	126099	7200	22542	-126099
	150C1F3	7199	20270	116788	7199	20270	-116788
	380C2F1	14402	48661	266751	14402	48661	-266751
	380C2F2	14400	45084	252197	14400	45084	-252197
	380C2F3	14398	40540	233576	14398	40540	-233576
	RTG	3903	11300	65229	3903	11300	-65229

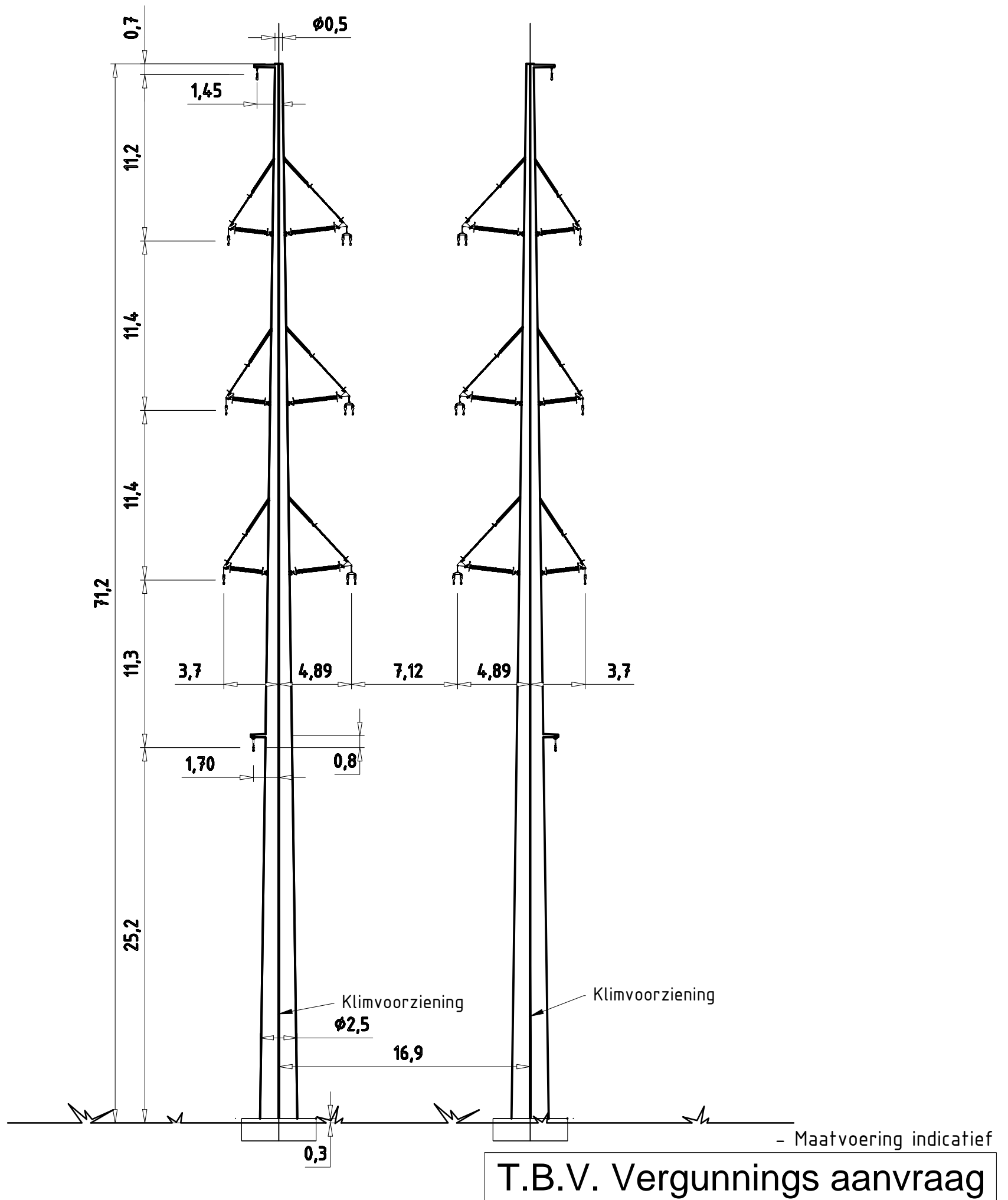
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1952	2216	20584	1952	2216	-20584
	150C1F1	7190	6866	72622	7190	6866	-72622
	150C1F2	7190	6533	71703	7190	6533	-71703
	150C1F3	7189	6113	70622	7189	6113	-70622
	380C2F1	14379	13733	145245	14379	13733	-145245
	380C2F2	14379	13066	143405	14379	13066	-143405
	380C2F3	14379	12227	141244	14379	12227	-141244
	RTG	3898	3329	37573	3898	3329	-37573
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	9855	9831	69930	9855	9831	-69930
	150C1F1	14135	15843	126185	14135	15843	-126185
	150C1F2	14135	14908	123565	14135	14908	-123565
	150C1F3	14134	13730	120434	14134	13730	-120434
	380C2F1	28271	31685	252371	28271	31685	-252371
	380C2F2	28270	29815	247129	28270	29815	-247129
	380C2F3	28268	27460	240868	28268	27460	-240868
	RTG	19737	14322	129644	19737	14322	-129644
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2705	2329	23151	2705	2329	-23151
	150C1F1	8698	6953	74563	8698	6953	-74563
	150C1F2	8698	6629	73847	8698	6629	-73847
	150C1F3	8698	6220	73010	8698	6220	-73010
	380C2F1	17396	13907	149127	17396	13907	-149127
	380C2F2	17396	13257	147693	17396	13257	-147693
	380C2F3	17396	12439	146020	17396	12439	-146020
	RTG	5404	3610	44000	5404	3610	-44000
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1954	4870	29315	1954	4165	-26361
	150C1F1	7197	14061	91332	7196	12105	-83545
	150C1F2	7196	13091	87439	7195	11296	-80414
	150C1F3	7196	11865	82609	7195	10277	-76571
	380C2F1	14393	28122	182664	14392	24210	-167090
	380C2F2	14392	26182	174879	14391	22593	-160828
	380C2F3	14391	23730	165218	14390	20553	-153142
	RTG	3901	6592	45606	3900	5702	-42130
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1952	1530	18611	1952	1403	-18343
	150C1F1	7189	4991	68220	7189	4643	-67644
	150C1F2	7189	4818	67923	7189	4500	-67432
	150C1F3	7189	4601	67579	7189	4319	-67189
	380C2F1	14378	9982	136440	14378	9287	-135288
	380C2F2	14378	9637	135846	14378	9000	-134865
	380C2F3	14378	9201	135159	14378	8638	-134378
	RTG	3898	2483	35811	3898	2326	-35585
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	9853	6470	63669	9852	5841	-62817
	150C1F1	14133	10571	113242	14132	9591	-111461
	150C1F2	14133	10084	112326	14132	9187	-110802
	150C1F3	14132	9471	111261	14132	8678	-110038
	380C2F1	28266	21142	226483	28265	19182	-222922
	380C2F2	28265	20168	224653	28265	18374	-221604
	380C2F3	28265	18942	222521	28264	17355	-220076
	RTG	19734	10133	124060	19734	9345	-123344
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2705	1670	21810	2705	1547	-21636
	150C1F1	8698	5121	71176	8697	4780	-70741
	150C1F2	8697	4952	70951	8697	4638	-70583
	150C1F3	8697	4738	70693	8697	4460	-70400
	380C2F1	17395	10243	142351	17395	9559	-141483
	380C2F2	17395	9904	141903	17395	9277	-141165
	380C2F3	17395	9475	141386	17395	8920	-140801
	RTG	5404	2791	42850	5404	2637	-42706

ZWW4S450

Loadcases for tower strength (serviceability limit state)


Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2170	764	17295	2170	764	-17295
Wind, 10°C	150C1F1	7993	2805	63716	7993	2805	-63716
Permanent loads yg= 1.0	150C1F2	7993	2804	63716	7993	2804	-63716
Wind angle: 0°	150C1F3	7993	2801	63716	7993	2801	-63716
	380C2F1	15986	5611	127432	15986	5611	-127432
	380C2F2	15986	5607	127432	15986	5607	-127432
	380C2F3	15986	5602	127432	15986	5602	-127432
	RTG	4333	1519	34541	4333	1519	-34541
NL4/1b	GW / opgw	2169	844	19300	2169	844	-19300
Wind, -20°C	150C1F1	7988	3153	72109	7988	3153	-72109
Permanent loads yg= 1.0	150C1F2	7988	3153	72109	7988	3153	-72109
Wind angle: 0°	150C1F3	7988	3152	72109	7988	3152	-72109
	380C2F1	15977	6306	144218	15977	6306	-144218
	380C2F2	15977	6305	144218	15977	6305	-144218
	380C2F3	15977	6304	144218	15977	6304	-144218
	RTG	4331	1673	38260	4331	1673	-38260
NL4/3	GW / opgw	7433	2151	49070	7433	2151	-49070
Wind, -5°C	150C1F1	12617	4288	97907	12617	4288	-97907
Permanent loads yg= 1.0	150C1F2	12617	4287	97907	12617	4287	-97907
Wind angle: 0°	150C1F3	12617	4285	97907	12617	4285	-97907
	380C2F1	25235	8576	195813	25235	8576	-195813
	380C2F2	25235	8574	195813	25235	8574	-195813
	380C2F3	25235	8571	195813	25235	8571	-195813
	RTG	14883	4298	98194	14883	4298	-98194
NL4/4	GW / opgw	2671	919	21002	2671	919	-21002
Construction/maintenance, +5°C	150C1F1	8996	3136	71719	8996	3136	-71719
Permanent loads yg= 1.0	150C1F2	8996	3136	71719	8996	3136	-71719
Wind angle: 0°	150C1F3	8996	3135	71719	8996	3135	-71719
	380C2F1	17991	6272	143437	17991	6272	-143437
	380C2F2	17991	6271	143437	17991	6271	-143437
	380C2F3	17991	6270	143438	17991	6270	-143438
	RTG	5336	1833	41924	5336	1833	-41924
NL4/1a	GW / opgw	2170	2988	22435	2170	3447	-24152
Wind, 10°C	150C1F1	7994	8924	75285	7995	10183	-79448
Permanent loads yg= 1.0	150C1F2	7994	8407	73680	7995	9558	-77337
Wind angle: 45°	150C1F3	7994	7755	71769	7994	8771	-74800
	380C2F1	15989	17849	150569	15990	20366	-158895
	380C2F2	15988	16813	147359	15989	19116	-154675
	380C2F3	15988	15511	143537	15989	17541	-149601
	RTG	4334	4288	39227	4334	4856	-40984
NL4/1b	GW / opgw	2169	1255	19552	2169	1336	-19659
Wind, -20°C	150C1F1	7988	4298	72628	7989	4523	-72853
Permanent loads yg= 1.0	150C1F2	7988	4205	72545	7988	4411	-72737
Wind angle: 45°	150C1F3	7988	4087	72451	7988	4270	-72602
	380C2F1	15977	8595	145255	15977	9045	-145707
	380C2F2	15977	8409	145091	15977	8822	-145473
	380C2F3	15977	8174	144902	15977	8540	-145205
	RTG	4331	2194	38460	4331	2296	-38548
NL4/3	GW / opgw	7433	4265	50395	7433	4683	-50950
Wind, -5°C	150C1F1	12618	7522	100149	12618	8164	-101091
Permanent loads yg= 1.0	150C1F2	12618	7257	99803	12618	7845	-100605
Wind angle: 45°	150C1F3	12618	6922	99404	12618	7443	-100043
	380C2F1	25236	15043	200297	25236	16328	-202182
	380C2F2	25236	14513	199606	25236	15690	-201211
	380C2F3	25235	13844	198808	25236	14886	-200087
	RTG	14884	6972	99252	14884	7496	-99715
NL4/4	GW / opgw	2671	1327	21183	2671	1407	-21262
Construction/maintenance, +5°C	150C1F1	8996	4277	72137	8996	4500	-72322
Permanent loads yg= 1.0	150C1F2	8996	4184	72070	8996	4389	-72226
Wind angle: 45°	150C1F3	8996	4068	71993	8996	4249	-72117
	380C2F1	17991	8554	144274	17991	9000	-144644
	380C2F2	17991	8369	144140	17991	8779	-144453
	380C2F3	17991	8135	143987	17991	8499	-144233
	RTG	5336	2352	42066	5336	2453	-42131
NL4/1a	GW / opgw	2171	5879	33985	2171	5879	-33985
Wind, 10°C	150C1F1	7998	16918	105001	7998	16918	-105001
Permanent loads yg= 1.0	150C1F2	7997	15732	100296	7997	15732	-100296
Wind angle: 90°	150C1F3	7997	14233	94421	7997	14233	-94421
	380C2F1	15995	33835	210002	15995	33835	-210002
	380C2F2	15994	31465	200593	15994	31465	-200593
	380C2F3	15993	28466	188843	15993	28466	-188843
	RTG	4335	7917	52307	4335	7917	-52307

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2169	1773	20499	2169	1773	-20499
	150C1F1	7989	5723	74654	7989	5723	-74654
	150C1F2	7989	5511	74268	7989	5511	-74268
	150C1F3	7989	5243	73821	7989	5243	-73821
	380C2F1	15977	11447	149307	15977	11447	-149307
	380C2F2	15977	11022	148535	15977	11022	-148535
	380C2F3	15977	10486	147641	15977	10486	-147641
	RTG	4331	2840	39256	4331	2840	-39256
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7435	6922	55110	7435	6922	-55110
	150C1F1	12619	11613	108250	12619	11613	-108250
	150C1F2	12619	11001	106761	12619	11001	-106761
	150C1F3	12619	10231	105007	12619	10231	-105007
	380C2F1	25239	23227	216500	25239	23227	-216500
	380C2F2	25238	22003	213521	25238	22003	-213521
	380C2F3	25237	20462	210013	25237	20462	-210013
	RTG	14885	10283	103355	14885	10283	-103355
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2671	1834	21891	2671	1834	-21891
	150C1F1	8996	5688	73807	8996	5688	-73807
	150C1F2	8996	5478	73487	8996	5478	-73487
	150C1F3	8996	5214	73117	8996	5214	-73117
	380C2F1	17992	11375	147613	17992	11375	-147613
	380C2F2	17992	10956	146974	17992	10956	-146974
	380C2F3	17992	10427	146235	17992	10427	-146235
	RTG	5336	2988	42654	5336	2988	-42654
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2170	3447	24152	2170	2988	-22435
	150C1F1	7995	10183	79448	7994	8924	-75285
	150C1F2	7995	9558	77337	7994	8407	-73680
	150C1F3	7994	8771	74800	7994	7755	-71769
	380C2F1	15990	20366	158895	15989	17849	-150569
	380C2F2	15989	19116	154675	15988	16813	-147359
	380C2F3	15989	17541	149601	15988	15511	-143537
	RTG	4334	4856	40984	4334	4288	-39227
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2169	1336	19659	2169	1255	-19552
	150C1F1	7989	4523	72853	7988	4298	-72628
	150C1F2	7988	4411	72737	7988	4205	-72545
	150C1F3	7988	4270	72602	7988	4087	-72451
	380C2F1	15977	9045	145707	15977	8595	-145255
	380C2F2	15977	8822	145473	15977	8409	-145091
	380C2F3	15977	8540	145205	15977	8174	-144902
	RTG	4331	2296	38548	4331	2194	-38460
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7433	4683	50950	7433	4265	-50395
	150C1F1	12618	8164	101091	12618	7522	-100149
	150C1F2	12618	7845	100605	12618	7257	-99803
	150C1F3	12618	7443	100043	12618	6922	-99404
	380C2F1	25236	16328	202182	25236	15043	-200297
	380C2F2	25236	15690	201211	25236	14513	-199606
	380C2F3	25236	14886	200087	25235	13844	-198808
	RTG	14884	7496	99715	14884	6972	-99252
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2671	1407	21262	2671	1327	-21183
	150C1F1	8996	4500	72322	8996	4277	-72137
	150C1F2	8996	4389	72226	8996	4184	-72070
	150C1F3	8996	4249	72117	8996	4068	-71993
	380C2F1	17991	9000	144644	17991	8554	-144274
	380C2F2	17991	8779	144453	17991	8369	-144140
	380C2F3	17991	8499	144233	17991	8135	-143987
	RTG	5336	2453	42131	5336	2352	-42066



Wintrack
Masttype: ZWW4S450

- Trekparameter 1800m
- 2x380 / 2x150 Steunmast
- 450m Veldlengte
- 175°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

4.0	03-03-2014	Increased space between poles	
3.0	11-02-2014	Modified top/botom diameter and added new braced-V	
2.0	11-03-2013	Small modification	
		Projectname: Engineering verbinding ZW380	
Design state: Definitief		Scale: 1:300	Description: Wintrack Masttype ZWW4S450 Revision: 4.0 Format: A3
Drawn by: RBE	03-03-2014	Units: m	
Checked by: AJP	03-03-2014	Project no: 000.145	
Approved by: AW	03-03-2014	Company: TenneT	
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com			

ZWW4S450+5

Fundatie berekening

Bijlage CT

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m
schoorstand		8	:1
α		7.125	graden

Opstort

Diameter	4.1	m
Hoogte	1.8	m
Inhoud	23.8	m ³
e.g.	570	kN

Onderplaat

Diameter	10.0	m
Hoogte	1.0	m
Inhoud	79	m ³
e.g.	1885	kN

Hart paal tov rand fund.

0.6 m

Optreden krachten

e.g. mast	682	kN
Fgeleiders	195	kN
Maximale dwarskracht	600	kN
Fmax vert (druk)	1013	kN
Fmin vert (trek)	760	kN
Maximale moment	31657	kNm

Moment

F_{diag}	3818	kN
F_{hor}	600	kN
F_{ver}	3788	kN
M_{hor} (tgv F_{hor})	1680	kNm
M_{tot}	33337	kNm
$F=M/a$	3788	kN

Verticaal reactiekracht

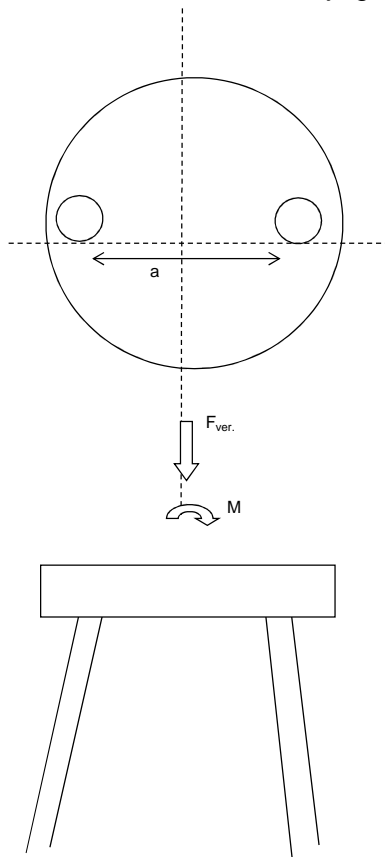
F_{water} (trek)	1023	kN
F_{grond} (druk)	1764	kN
F_{grond} (trek)	1470	kN

F_{dmax} (druk)	3038	kN
F_{tmax} (trek)	1532	kN

F_{dtot} (druk)	6826	kN
F_{ttot} (trek)	2256	kN

Palen druk	7	(-)
Palen trek	7	(-)

Totaal palen 14 (-) Per fundering



reductie door opwaarste kracht water



ZWW4S450+5

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CT

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0.40 m
	b	0.40 m
omtrek paal	$O_{p;gem}$	1.60 m
paalfactor	αt	0.007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0.75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11.25 MPa
materiaalfactor	$\gamma_{m,b4}$	1.4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1.5
	$q_{c;z,d}$	5.36 MPa
	$P_{r;z,d}$	37.5 kN/m ²
	$F_{r;trek,d,i}$	60.0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0.007	0.00	0.00	0
	-1	-2	0	0.007	0.00	0.00	0
	-2	-3	0	0.007	0.00	0.00	0
	-3	-4	0	0.007	0.00	0.00	0
	-4	-5	0	0.007	0.00	0.00	0
	-5	-6	0	0.007	0.00	0.00	0
	-6	-7	0	0.007	0.00	0.00	0
	-7	-8	0	0.007	0.00	0.00	0
	-8	-9	1	0.007	2.50	4.00	4
	-9	-10	3	0.007	7.50	12.00	16
	-10	-11	2	0.007	5.00	8.00	24
	-11	-12	0	0.007	0.00	0.00	24
	-12	-13	3	0.007	7.50	12.00	36
	-13	-14	2	0.007	5.00	8.00	44
	-14	-15	4	0.007	10.00	16.00	60
	-15	-16	10	0.007	25.00	40.00	100
	-16	-17	9	0.007	22.50	36.00	136
	-17	-18	8	0.007	20.00	32.00	168
	-18	-19	12	0.007	30.00	48.00	216
	-19	-20	12	0.007	30.00	48.00	264
	-20	-21	10	0.007	25.00	40.00	304
	-21	-22	11	0.007	27.50	44.00	348
	-22	-23	11	0.007	27.50	44.00	392
	-23	-24	12	0.007	30.00	48.00	440
	-24	-25	12	0.007	30.00	48.00	488
	-25	-26	12	0.007	30.00	48.00	536
	-26	-27	15	0.007	37.50	60.00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27.00 m
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Paalgroep factor 10%

$F_{trek,d}$	536.4 kN
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ZWW4S450+5

DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CT

Bepaling opneembare paalbelasting op druk

heipaal	v	
diameter	a	2 mm
		2 mm
Deq		0.001808

maximale puntweerstand

$P_{r,max;punt;i}$		11.25 MN/m ²
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paalklasse factor	α_p	1.00
factor paalvoet	β	1
hoek van inwendige vrijwing van paalvoet	ϕ	40
factor dwarsdoorsnede paalvoet	s	1.00
minimale waarde neergaande deel	$q_{c,II;gem}$	9.00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14.00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11.00 MN/m ²

maximale paalschachtwrijving

$P_{r,max;schacht;i}$		0.05 MN/m ²
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waarin:		
paalfactor	α_s	0.010
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5.00 MN/m ²

maximale draagkracht alleenstaande paal

$F_{r,max;i}$		0.00 MN
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waarin:		
$F_{r,max;punt;i}$		0.00 MN

paalpunt oppervlak	A_{punt}	0.00 m ²
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$F_{r,max;schacht;i}$		0.00 MN
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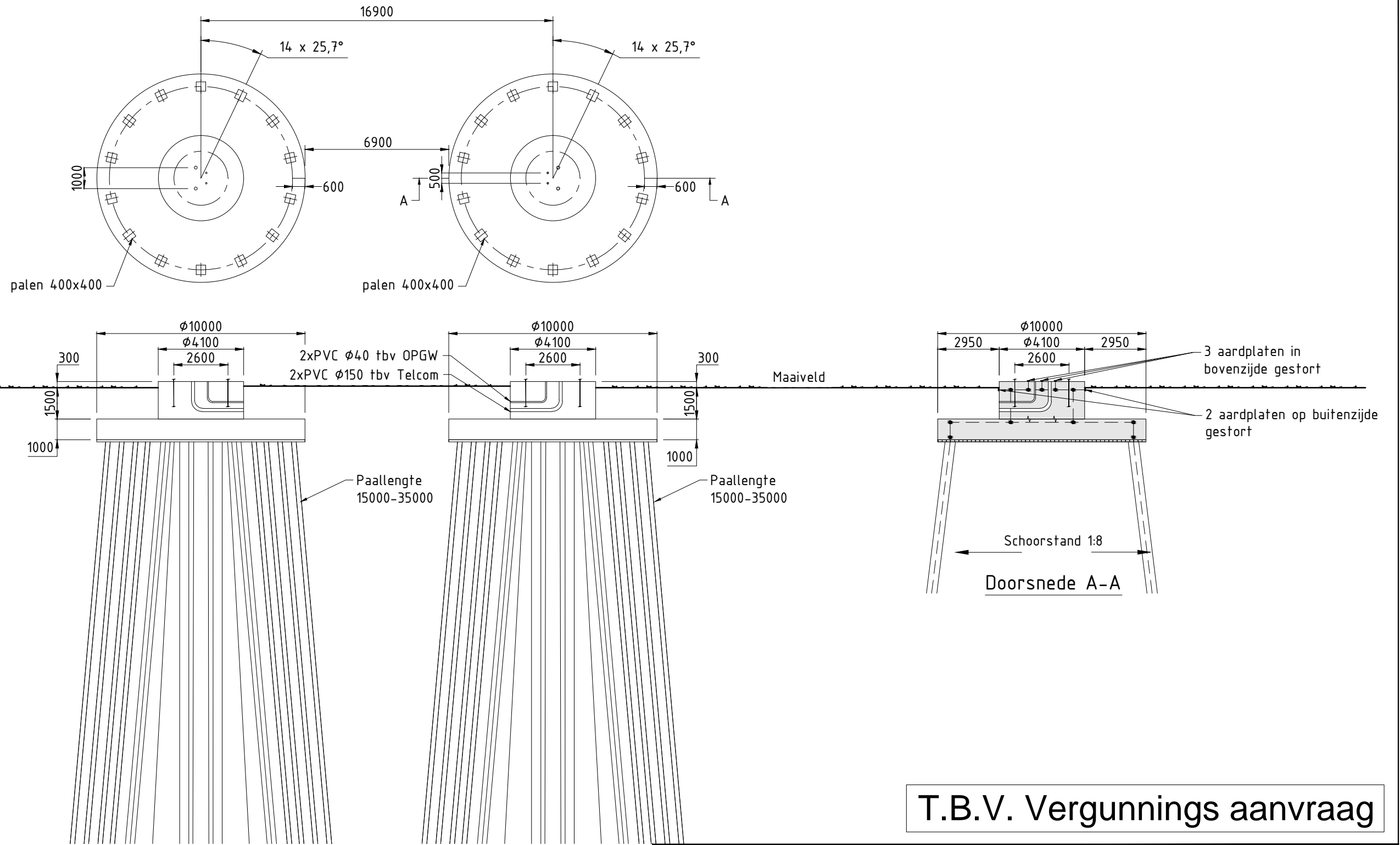
gemiddelde paalomtrek	$O_{p;gem}$	0.01 m
lengte schachtwrijving	Δl	15.00 m

Bepaling rekenwaarde van de maximale draagkracht

$F_{r,paal,max;d}$	MN	0.00 MN
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materiaalfactor grond	γ_{mb}	1.20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0.75

$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27.00 m
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T.B.V. Vergunnings aanvraag

Verklaring


- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding $\phi 16\text{mm}$ (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

8.0	21-03-2014	Paal paal afstand aangepast
7.0	17-03-2014	Diverse aanpassingen
6.0	13-02-2014	Diverse aanpassingen
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Scale: 1:200
Drawn by: RBE 21-03-2014		Units: mm
Checked by: AJP 21-03-2014		Project no: 000.145
Approved by: AW 21-03-2014		Company: TenneT
Drawing no.: 74102194-032-102V		Description: Principe ontwerp fundatie hoekmast ZWW4S450+5 masten familie
		Revision: 8.0
		Format: A3



ZWW4S450+5

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h		76.2	m
Diameter voet		d voet		2.6	m
top		d top		0.5	m
gem		d gem		1.6	m
wanddikte		t		24	mm
Oppervlakte aan voet		A		194226	mm ²
Traagheidsmoment aan voet		W _x		1.24E+08	mm ⁴
Weerstandsmoment aan voet		I _x		1.59E+11	mm ⁶
Mast: Gewicht		2 ^{de} orde		10.0	%
		F _{rep,ver}		682	kN

Bijlage BT

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{fl}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	75.5	5.4	17.3	0.0	17.3	1308	kNm
150C1F1	64.3	19.9	49.7	0.0	49.7	3194	kNm
150C1F2	52.9	19.9	46.4	0.0	46.4	2453	kNm
150C1F3	41.5	20.0	42.2	0.0	42.2	1749	kNm
380C2F1	64.3	39.7	99.4	0.0	99.4	6389	kNm
380C2F2	52.9	39.8	92.7	0.0	92.7	4905	kNm
380C2F3	41.5	39.9	84.3	0.0	84.3	3499	kNm
RTG	30.2	10.2	17.4	2.2	17.5	529	kNm

Stuwdruk	F _{hor.}	35.9	kN
	M _{d,wind}	1200	kNm
Totaal	M _{d,tot}	28779	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	31657	kNm

Normaalkracht;

Optredende normaalkracht					
N _{d,geluiders}				195	kN
N _{d, e.g. mast}				816	kN
N _{s,d,totaal}				1013	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	β _a	0.68
	A _{eff}	133037 mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{yd} /γ _{m1}	8	N/mm ²
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Moment;

Optredende moment in de voet:				
M _{d,tot}				31657 kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	β _a	0.98
	W _{eff}	1.22E+08 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	259	N/mm ²
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Totale spanning:

	σ _d	267	N/mm ²	< 284 N/mm ² = ACCOORD
	σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{fl}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	75.5	4.5	11.9	0.0	11.9	896	kNm
150C1F1	64.3	16.7	34.2	0.0	34.2	2200	kNm
150C1F2	52.9	16.7	32.0	0.0	32.0	1693	kNm
150C1F3	41.5	16.8	29.2	0.0	29.2	1211	kNm
380C2F1	64.3	33.4	68.4	0.0	68.4	4401	kNm
380C2F2	52.9	33.5	64.0	0.0	64.0	3385	kNm
380C2F3	41.5	33.6	58.4	0.0	58.4	2422	kNm
RTG	30.2	8.5	11.6	1.5	11.7	353	kNm

Stuwdruk	F _{hor.}	956	kN
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Verplaatsing		1.97	m
Percentage van de verplaatsing		2.59%	
Hoek		2.95	graden
Kromming		0.67%	
Fundatie rotatiestijfheid		0.005	rad

4.15	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4S450+5

Appendix T / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2830	895	20204	2830	895	-20204
Wind, 10°C	150C1F1	10424	3277	74229	10424	3277	-74229
Permanent loads yg= 1.2	150C1F2	10424	3274	74229	10424	3274	-74229
Wind angle: 0°	150C1F3	10424	3271	74229	10424	3271	-74229
	380C2F1	20848	6553	148458	20848	6553	-148458
	380C2F2	20848	6548	148458	20848	6548	-148458
	380C2F3	20848	6541	148459	20848	6541	-148459
	RTG	4749	0	40400	5200	0	-40400
NL1/1b	GW / opgw	2854	984	22481	2854	984	-22481
Wind, -20°C	150C1F1	10522	3660	83655	10522	3660	-83655
Permanent loads yg= 1.2	150C1F2	10522	3659	83655	10522	3659	-83655
Wind angle: 0°	150C1F3	10522	3658	83656	10522	3658	-83656
	380C2F1	21045	7319	167311	21045	7319	-167311
	380C2F2	21045	7318	167311	21045	7318	-167311
	380C2F3	21045	7317	167311	21045	7317	-167311
	RTG	4700	0	44634	5198	0	-44634
NL1/3	GW / opgw	11215	2773	63210	11215	2773	-63210
Wind, -5°C	150C1F1	17886	5291	120734	17886	5291	-120734
Permanent loads yg= 1.2	150C1F2	17886	5290	120734	17886	5290	-120734
Wind angle: 0°	150C1F3	17886	5288	120734	17886	5288	-120734
	380C2F1	35772	10583	241468	35772	10583	-241468
	380C2F2	35772	10580	241468	35772	10580	-241468
	380C2F3	35772	10576	241468	35772	10576	-241468
	RTG	19620	0	126712	21040	0	-126712
NL1/4	GW / opgw	3640	1110	25364	3640	1110	-25364
Construction/maintenance, +5°C	150C1F1	12051	3727	85194	12051	3727	-85194
Permanent loads yg= 1.2	150C1F2	12051	3726	85194	12051	3726	-85194
Wind angle: 0°	150C1F3	12051	3726	85194	12051	3726	-85194
	380C2F1	24102	7454	170387	24102	7454	-170387
	380C2F2	24102	7453	170387	24102	7453	-170387
	380C2F3	24102	7451	170387	24102	7451	-170387
	RTG	6139	0	50704	6706	0	-50704
NL1/6	GW / opgw	3179	974	22311	3179	974	-22311
Permanent, +10°C	150C1F1	11709	3573	81827	11709	3573	-81827
Permanent loads yg= 1.35	150C1F2	11709	3573	81827	11709	3573	-81827
	150C1F3	11709	3573	81827	11709	3573	-81827
	380C2F1	23419	7145	163654	23419	7145	-163654
	380C2F2	23419	7145	163654	23419	7145	-163654
	380C2F3	23419	7145	163654	23419	7145	-163654
	RTG	5353	0	44620	5851	0	-44620
NL1/1a	GW / opgw	2742	4304	28767	2726	5001	-31397
Wind, 10°C	150C1F1	10184	12686	94072	10129	14616	-100732
Permanent loads yg= 1.2	150C1F2	10207	11948	91639	10154	13728	-97620
Wind angle: 45°	150C1F3	10237	11017	88686	10187	12606	-93803
	380C2F1	20369	25372	188144	20258	29232	-201464
	380C2F2	20414	23897	183278	20307	27456	-195240
	380C2F3	20474	22035	177371	20374	25212	-187607
	RTG	4874	4457	50884	5202	4228	-49979
NL1/1b	GW / opgw	2846	1610	22937	2843	1735	-23129
Wind, -20°C	150C1F1	10505	5408	84605	10498	5753	-85013
Permanent loads yg= 1.2	150C1F2	10507	5276	84467	10501	5595	-84817
Wind angle: 45°	150C1F3	10510	5109	84306	10505	5394	-84589
	380C2F1	21010	10816	169210	20995	11507	-170026
	380C2F2	21015	10552	168933	21002	11189	-169634
	380C2F3	21020	10218	168612	21010	10788	-169179
	RTG	4709	891	45157	5198	845	-45105
NL1/3	GW / opgw	11180	5976	65105	11166	6609	-65897
Wind, -5°C	150C1F1	17822	10221	124336	17797	11202	-125833
Permanent loads yg= 1.2	150C1F2	17830	9846	123823	17809	10750	-125117
Wind angle: 45°	150C1F3	17840	9372	123225	17823	10180	-124278
	380C2F1	35643	20442	248672	35594	22404	-251666
	380C2F2	35661	19692	247646	35618	21501	-250233
	380C2F3	35681	18744	246450	35645	20360	-248557
	RTG	19662	4570	128910	21041	4335	-128693
NL1/4	GW / opgw	3635	1730	25677	3633	1853	-25812
Construction/maintenance, +5°C	150C1F1	12038	5468	85939	12033	5809	-86265
Permanent loads yg= 1.2	150C1F2	12040	5337	85829	12035	5652	-86108
Wind angle: 45°	150C1F3	12042	5171	85702	12038	5453	-85927
	380C2F1	24076	10935	171879	24066	11619	-172529
	380C2F2	24080	10673	171659	24071	11304	-172217
	380C2F3	24084	10341	171404	24077	10907	-171854
	RTG	6145	891	51071	6706	846	-51034

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2676	8660	45575	2676	8660	-45575
	150C1F1	9928	24840	138945	9928	24840	-138945
	150C1F2	9952	23181	132641	9952	23181	-132641
	150C1F3	9986	21076	124646	9986	21076	-124646
	380C2F1	19857	49679	277891	19857	49679	-277891
	380C2F2	19904	46362	265282	19904	46362	-265282
	380C2F3	19972	42152	249293	19972	42152	-249293
	RTG	5003	8919	71059	5204	8461	-68882
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2821	2406	24599	2821	2406
150C1F1		10445	7600	88212	10445	7600	-88212
150C1F2		10455	7297	87581	10455	7297	-87581
150C1F3		10467	6914	86840	10467	6914	-86840
380C2F1		20891	15201	176425	20891	15201	-176425
380C2F2		20910	14594	175162	20910	14594	-175162
380C2F3		20934	13828	173680	20934	13828	-173680
RTG		4732	1782	46670	5198	1690	-46473
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°		GW / opgw	11079	9988	71765	11079	9988
	150C1F1	17637	16462	136972	17637	16462	-136972
	150C1F2	17665	15598	134847	17665	15598	-134847
	150C1F3	17700	14507	132311	17700	14507	-132311
	380C2F1	35274	32925	273944	35274	32925	-273944
	380C2F2	35330	31196	269694	35330	31196	-269694
	380C2F3	35400	29015	264622	35400	29015	-264622
	RTG	19770	9141	135135	21044	8671	-134334
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3617	2506	26871	3617	2506
150C1F1		11993	7630	88847	11993	7630	-88847
150C1F2		12000	7332	88334	12000	7332	-88334
150C1F3		12010	6955	87733	12010	6955	-87733
380C2F1		23985	15261	177695	23985	15261	-177695
380C2F2		24001	14664	176668	24001	14664	-176668
380C2F3		24019	13910	175467	24019	13910	-175467
RTG		6162	1783	52148	6706	1691	-52007
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2726	5001	31397	2742	4304
	150C1F1	10129	14616	100732	10184	12686	-94072
	150C1F2	10154	13728	97620	10207	11948	-91639
	150C1F3	10187	12606	93803	10237	11017	-88686
	380C2F1	20258	29232	201464	20369	25372	-188144
	380C2F2	20307	27456	195240	20414	23897	-183278
	380C2F3	20374	25212	187607	20474	22035	-177371
	RTG	4874	4457	50884	5202	4228	-49979
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2843	1735	23129	2846	1610
150C1F1		10498	5753	85013	10505	5408	-84605
150C1F2		10501	5595	84817	10507	5276	-84467
150C1F3		10505	5394	84589	10510	5109	-84306
380C2F1		20995	11507	170026	21010	10816	-169210
380C2F2		21002	11189	169634	21015	10552	-168933
380C2F3		21010	10788	169179	21020	10218	-168612
RTG		4709	891	45157	5198	845	-45105
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	11166	6609	65897	11180	5976
	150C1F1	17797	11202	125833	17822	10221	-124336
	150C1F2	17809	10750	125117	17830	9846	-123823
	150C1F3	17823	10180	124278	17840	9372	-123225
	380C2F1	35594	22404	251666	35643	20442	-248672
	380C2F2	35618	21501	250233	35661	19692	-247646
	380C2F3	35645	20360	248557	35681	18744	-246450
	RTG	19662	4570	128910	21041	4335	-128693
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3633	1853	25812	3635	1730
150C1F1		12033	5809	86265	12038	5468	-85939
150C1F2		12035	5652	86108	12040	5337	-85829
150C1F3		12038	5453	85927	12042	5171	-85702
380C2F1		24066	11619	172529	24076	10935	-171879
380C2F2		24071	11304	172217	24080	10673	-171659
380C2F3		24077	10907	171854	24084	10341	-171404
RTG		6145	891	51071	6706	846	-51034
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	2129	702	15793	2129	702
	150C1F1	7845	2580	58272	7845	2580	-58272
	150C1F2	7845	2577	58272	7845	2577	-58272
	150C1F3	7845	2574	58272	7845	2574	-58272
	380C2F1	15690	5160	116544	15690	5160	-116544
	380C2F2	15690	5155	116544	15690	5155	-116544
	380C2F3	15690	5148	116544	15690	5148	-116544
	RTG	3547	0	31566	3899	0	-31566

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2151	780	17812	2151	780	-17812
	150C1F1	7935	2923	66776	7935	2923	-66776
	150C1F2	7935	2922	66776	7935	2922	-66776
	150C1F3	7935	2921	66776	7935	2921	-66776
	380C2F1	15869	5845	133551	15869	5845	-133551
	380C2F2	15869	5844	133551	15869	5844	-133551
	380C2F3	15869	5843	133551	15869	5843	-133551
	RTG	3504	0	35310	3897	0	-35310
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	10529	2644	60258	10529	2644	-60258
	150C1F1	15328	4687	106883	15328	4687	-106883
	150C1F2	15328	4685	106883	15328	4685	-106883
	150C1F3	15328	4683	106883	15328	4683	-106883
	380C2F1	30656	9373	213766	30656	9373	-213766
	380C2F2	30656	9370	213766	30656	9370	-213766
	380C2F3	30656	9366	213766	30656	9366	-213766
	RTG	18382	0	120798	19734	0	-120798
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2942	929	21210	2942	929	-21210
	150C1F1	9478	3052	69744	9478	3052	-69744
	150C1F2	9478	3052	69744	9478	3052	-69744
	150C1F3	9478	3051	69744	9478	3051	-69744
	380C2F1	18955	6104	139488	18955	6104	-139488
	380C2F2	18955	6103	139488	18955	6103	-139488
	380C2F3	18955	6102	139488	18955	6102	-139488
	RTG	4931	0	42384	5404	0	-42384
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	2129	690	15793	2129	690	-15793
	150C1F1	7845	2544	58273	7845	2544	-58273
	150C1F2	7845	2544	58273	7845	2544	-58273
	150C1F3	7845	2544	58273	7845	2544	-58273
	380C2F1	15690	5088	116545	15690	5088	-116545
	380C2F2	15690	5088	116545	15690	5088	-116545
	380C2F3	15690	5088	116545	15690	5088	-116545
	RTG	3547	0	31566	3899	0	-31566
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2040	4202	26443	2028	4913	-29398
	150C1F1	7586	12241	83914	7540	14223	-91748
	150C1F2	7606	11482	80987	7560	13312	-88117
	150C1F3	7634	10522	77375	7588	12159	-83593
	380C2F1	15172	24483	167828	15079	28445	-183495
	380C2F2	15213	22964	161973	15120	26623	-176234
	380C2F3	15267	21044	154749	15177	24317	-167186
	RTG	3682	4457	45078	3901	4228	-43988
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2140	1415	18474	2136	1544	-18745
	150C1F1	7910	4690	68175	7901	5043	-68762
	150C1F2	7914	4556	67974	7905	4881	-68480
	150C1F3	7918	4385	67742	7911	4676	-68152
	380C2F1	15821	9381	136349	15802	10087	-137524
	380C2F2	15828	9111	135949	15811	9762	-136961
	380C2F3	15835	8770	135483	15822	9351	-136305
	RTG	3515	891	36057	3898	845	-35984
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	10490	5854	62324	10476	6490	-63180
	150C1F1	15253	9651	111301	15225	10645	-113105
	150C1F2	15263	9271	110680	15238	10187	-112243
	150C1F3	15274	8792	109953	15254	9610	-111231
	380C2F1	30505	19302	222602	30449	21290	-226210
	380C2F2	30525	18542	221359	30476	20374	-224486
	380C2F3	30549	17583	219907	30507	19219	-222462
	RTG	18426	4569	123182	19735	4334	-122948
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2936	1553	21626	2933	1678	-21802
	150C1F1	9461	4805	70780	9454	5152	-71222
	150C1F2	9463	4672	70629	9457	4992	-71010
	150C1F3	9466	4505	70455	9461	4791	-70763
	380C2F1	18921	9611	141559	18907	10304	-142444
	380C2F2	18926	9345	141259	18914	9985	-142019
	380C2F3	18931	9009	140910	18922	9582	-141525
	RTG	4938	891	42864	5404	845	-42816
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1995	8614	44516	1995	8614	-44516
	150C1F1	7396	24615	133836	7396	24615	-133836
	150C1F2	7411	22938	127100	7411	22938	-127100
	150C1F3	7434	20805	118471	7434	20805	-118471
	380C2F1	14791	49230	267671	14791	49230	-267671
	380C2F2	14822	45875	254200	14822	45875	-254200
	380C2F3	14868	41609	236941	14868	41609	-236941
	RTG	3781	8918	67776	3903	8460	-65422

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2111	2237	20740	2111	2237	-20740
	150C1F1	7835	6946	73239	7835	6946	-73239
	150C1F2	7847	6632	72371	7847	6632	-72371
	150C1F3	7861	6237	71343	7861	6237	-71343
	380C2F1	15669	13892	146478	15669	13892	-146478
	380C2F2	15693	13264	144742	15693	13264	-144742
	380C2F3	15723	12474	142686	15723	12474	-142686
	RTG	3546	1781	38169	3898	1690	-37898
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	10385	9887	69457	10385	9887	-69457
	150C1F1	15052	15990	126182	15052	15990	-126182
	150C1F2	15081	15111	123728	15081	15111	-123728
	150C1F3	15118	14002	120775	15118	14002	-120775
	380C2F1	30104	31979	252364	30104	31979	-252364
	380C2F2	30162	30222	247455	30162	30222	-247455
	380C2F3	30235	28004	241550	30235	28004	-241550
	RTG	18541	9140	129891	19738	8670	-129031
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2914	2343	23157	2914	2343	-23157
	150C1F1	9404	7011	74668	9404	7011	-74668
	150C1F2	9413	6705	73991	9413	6705	-73991
	150C1F3	9425	6320	73194	9425	6320	-73194
	380C2F1	18808	14021	149336	18808	14021	-149336
	380C2F2	18827	13410	147982	18827	13410	-147982
	380C2F3	18849	12639	146389	18849	12639	-146389
	RTG	4959	1782	44256	5404	1691	-44074
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2028	4913	29398	2040	4202	-26443
	150C1F1	7540	14223	91748	7586	12241	-83914
	150C1F2	7560	13312	88117	7606	11482	-80987
	150C1F3	7588	12159	83593	7634	10522	-77375
	380C2F1	15079	28445	183495	15172	24483	-167828
	380C2F2	15120	26623	176234	15213	22964	-161973
	380C2F3	15177	24317	167186	15267	21044	-154749
	RTG	3682	4457	45078	3901	4228	-43988
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2136	1544	18745	2140	1415	-18474
	150C1F1	7901	5043	68762	7910	4690	-68175
	150C1F2	7905	4881	68480	7914	4556	-67974
	150C1F3	7911	4676	68152	7918	4385	-67742
	380C2F1	15802	10087	137524	15821	9381	-136349
	380C2F2	15811	9762	136961	15828	9111	-135949
	380C2F3	15822	9351	136305	15835	8770	-135483
	RTG	3515	891	36057	3898	845	-35984
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	10476	6490	63180	10490	5854	-62324
	150C1F1	15225	10645	113105	15253	9651	-111301
	150C1F2	15238	10187	112243	15263	9271	-110680
	150C1F3	15254	9610	111231	15274	8792	-109953
	380C2F1	30449	21290	226210	30505	19302	-222602
	380C2F2	30476	20374	224486	30525	18542	-221359
	380C2F3	30507	19219	222462	30549	17583	-219907
	RTG	18426	4569	123182	19735	4334	-122948
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2933	1678	21802	2936	1553	-21626
	150C1F1	9454	5152	71222	9461	4805	-70780
	150C1F2	9457	4992	71010	9463	4672	-70629
	150C1F3	9461	4791	70763	9466	4505	-70455
	380C2F1	18907	10304	142444	18921	9611	-141559
	380C2F2	18914	9985	142019	18926	9345	-141259
	380C2F3	18922	9582	141525	18931	9009	-140910
	RTG	4938	891	42864	5404	845	-42816

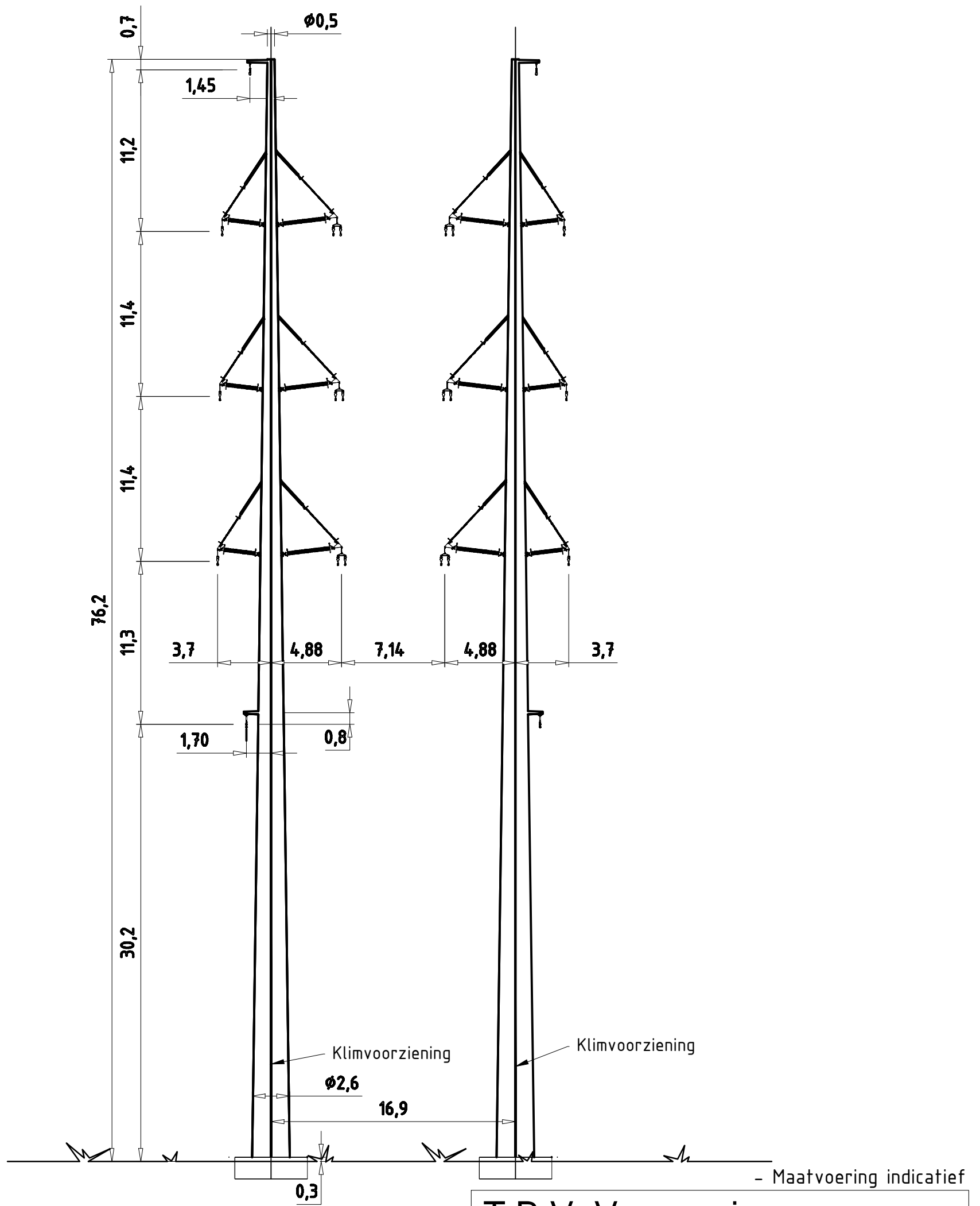
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Appendix T2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2363	764	17295	2363	764	-17295
Wind, 10°C	150C1F1	8706	2806	63716	8706	2806	-63716
Permanent loads yg= 1.0	150C1F2	8706	2804	63716	8706	2804	-63716
Wind angle: 0°	150C1F3	8706	2802	63716	8706	2802	-63716
	380C2F1	17412	5611	127432	17412	5611	-127432
	380C2F2	17412	5608	127432	17412	5608	-127432
	380C2F3	17412	5604	127432	17412	5604	-127432
	RTG	3947	0	34574	4333	0	-34574
NL4/1b	GW / opgw	2385	849	19410	2385	849	-19410
Wind, -20°C	150C1F1	8799	3173	72563	8799	3173	-72563
Permanent loads yg= 1.0	150C1F2	8799	3173	72563	8799	3173	-72563
Wind angle: 0°	150C1F3	8799	3172	72563	8799	3172	-72563
	380C2F1	17598	6346	145125	17598	6346	-145125
	380C2F2	17598	6345	145125	17598	6345	-145125
	380C2F3	17598	6344	145125	17598	6344	-145125
	RTG	3902	0	38499	4331	0	-38499
NL4/3	GW / opgw	7980	2137	48745	7980	2137	-48745
Wind, -5°C	150C1F1	13712	4283	97793	13712	4283	-97793
Permanent loads yg= 1.0	150C1F2	13712	4282	97793	13712	4282	-97793
Wind angle: 0°	150C1F3	13712	4281	97793	13712	4281	-97793
	380C2F1	27424	8566	195587	27424	8566	-195587
	380C2F2	27424	8564	195587	27424	8564	-195587
	380C2F3	27424	8562	195587	27424	8562	-195587
	RTG	13792	0	97633	14884	0	-97633
NL4/4	GW / opgw	2906	918	20988	2906	918	-20988
Construction/maintenance, +5°C	150C1F1	9798	3136	71719	9798	3136	-71719
Permanent loads yg= 1.0	150C1F2	9798	3136	71719	9798	3136	-71719
Wind angle: 0°	150C1F3	9798	3135	71719	9798	3135	-71719
	380C2F1	19596	6272	143438	19596	6272	-143438
	380C2F2	19596	6271	143438	19596	6271	-143438
	380C2F3	19596	6271	143438	19596	6271	-143438
	RTG	4868	0	41936	5336	0	-41936
NL4/1a	GW / opgw	2305	3013	22486	2292	3476	-24211
Wind, 10°C	150C1F1	8555	9013	75470	8514	10289	-79681
Permanent loads yg= 1.0	150C1F2	8572	8526	73960	8533	9701	-77700
Wind angle: 45°	150C1F3	8592	7912	72149	8557	8960	-75303
	380C2F1	17111	18026	150940	17028	20578	-159362
	380C2F2	17143	17052	147920	17066	19402	-155400
	380C2F3	17184	15825	144299	17115	17919	-150605
	RTG	4024	2971	40754	4334	2818	-40196
NL4/1b	GW / opgw	2381	1264	19665	2379	1347	-19774
Wind, -20°C	150C1F1	8789	4334	73091	8785	4562	-73322
Permanent loads yg= 1.0	150C1F2	8791	4246	73013	8787	4457	-73211
Wind angle: 45°	150C1F3	8792	4136	72923	8789	4324	-73083
	380C2F1	17578	8668	146183	17570	9124	-146643
	380C2F2	17581	8493	146027	17574	8914	-146422
	380C2F3	17584	8271	145847	17579	8649	-146165
	RTG	3906	594	38793	4331	563	-38763
NL4/3	GW / opgw	7955	4274	50078	7946	4697	-50637
Wind, -5°C	150C1F1	13672	7563	100071	13657	8215	-101028
Permanent loads yg= 1.0	150C1F2	13677	7314	99745	13664	7915	-100569
Wind angle: 45°	150C1F3	13684	6999	99365	13673	7536	-100035
	380C2F1	27344	15126	200142	27313	16429	-202056
	380C2F2	27355	14627	199489	27328	15829	-201139
	380C2F3	27368	13997	198729	27345	15072	-200069
	RTG	13820	3044	99171	14885	2888	-99019
NL4/4	GW / opgw	2903	1331	21172	2902	1412	-21252
Construction/maintenance, +5°C	150C1F1	9791	4293	72146	9787	4520	-72334
Permanent loads yg= 1.0	150C1F2	9792	4206	72082	9789	4416	-72243
Wind angle: 45°	150C1F3	9793	4096	72009	9791	4284	-72139
	380C2F1	19581	8587	144291	19575	9040	-144668
	380C2F2	19583	8413	144164	19578	8831	-144487
	380C2F3	19586	8193	144018	19581	8568	-144277
	RTG	4871	594	42153	5336	564	-42132
NL4/1a	GW / opgw	2246	5931	34048	2246	5931	-34048
Wind, 10°C	150C1F1	8343	17111	105395	8343	17111	-105395
Permanent loads yg= 1.0	150C1F2	8365	15998	101017	8365	15998	-101017
Wind angle: 90°	150C1F3	8396	14589	95529	8396	14589	-95529
	380C2F1	16686	34221	210790	16686	34221	-210790
	380C2F2	16730	31996	202033	16730	31996	-202033
	380C2F3	16792	29177	191057	16792	29177	-191057
	RTG	4126	5943	53968	4335	5638	-52486

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2366	1788	20624	2366	1788	-20624
	150C1F1	8755	5780	75154	8755	5780	-75154
	150C1F2	8761	5580	74789	8761	5580	-74789
	150C1F3	8768	5328	74363	8768	5328	-74363
	380C2F1	17509	11560	150308	17509	11560	-150308
	380C2F2	17521	11161	149578	17521	11161	-149578
	380C2F3	17535	10656	148725	17535	10656	-148725
	RTG	3920	1188	39654	4331	1127	-39541
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7884	6959	54813	7884	6959	-54813
	150C1F1	13551	11713	108280	13551	11713	-108280
	150C1F2	13570	11137	106880	13570	11137	-106880
	150C1F3	13593	10412	105218	13593	10412	-105218
	380C2F1	27101	23425	216560	27101	23425	-216560
	380C2F2	27139	22275	213760	27139	22275	-213760
	380C2F3	27186	20824	210437	27186	20824	-210437
	RTG	13894	6089	103556	14886	5777	-102989
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2892	1844	21888	2892	1844	-21888
	150C1F1	9764	5724	73846	9764	5724	-73846
	150C1F2	9769	5527	73543	9769	5527	-73543
	150C1F3	9774	5278	73191	9774	5278	-73191
	380C2F1	19528	11449	147692	19528	11449	-147692
	380C2F2	19537	11054	147086	19537	11054	-147086
	380C2F3	19548	10556	146381	19548	10556	-146381
	RTG	4881	1188	42796	5336	1127	-42711
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2292	3476	24211	2305	3013	-22486
	150C1F1	8514	10289	79681	8555	9013	-75470
	150C1F2	8533	9701	77700	8572	8526	-73960
	150C1F3	8557	8960	75303	8592	7912	-72149
	380C2F1	17028	20578	159362	17111	18026	-150940
	380C2F2	17066	19402	155400	17143	17052	-147920
	380C2F3	17115	17919	150605	17184	15825	-144299
	RTG	4024	2971	40754	4334	2818	-40196
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2379	1347	19774	2381	1264	-19665
	150C1F1	8785	4562	73322	8789	4334	-73091
	150C1F2	8787	4457	73211	8791	4246	-73013
	150C1F3	8789	4324	73083	8792	4136	-72923
	380C2F1	17570	9124	146643	17578	8668	-146183
	380C2F2	17574	8914	146422	17581	8493	-146027
	380C2F3	17579	8649	146165	17584	8271	-145847
	RTG	3906	594	38793	4331	563	-38763
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7946	4697	50637	7955	4274	-50078
	150C1F1	13657	8215	101028	13672	7563	-100071
	150C1F2	13664	7915	100569	13677	7314	-99745
	150C1F3	13673	7536	100035	13684	6999	-99365
	380C2F1	27313	16429	202056	27344	15126	-200142
	380C2F2	27328	15829	201139	27355	14627	-199489
	380C2F3	27345	15072	200069	27368	13997	-198729
	RTG	13820	3044	99171	14885	2888	-99019
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2902	1412	21252	2903	1331	-21172
	150C1F1	9787	4520	72334	9791	4293	-72146
	150C1F2	9789	4416	72243	9792	4206	-72082
	150C1F3	9791	4284	72139	9793	4096	-72009
	380C2F1	19575	9040	144668	19581	8587	-144291
	380C2F2	19578	8831	144487	19583	8413	-144164
	380C2F3	19581	8568	144277	19586	8193	-144018
	RTG	4871	594	42153	5336	564	-42132



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4S450+5

- Trekparameter 1800m
- 2x380 / 2x150 Steunmast
- 450m Veldlengte
- 175°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement: Ral 9018 Papyrus white
- Kleurstelling Appendages: Ral 7021 Black grey

4.0	03-03-2014	Increased space between poles	
3.0	11-02-2014	Modified top/botom diameter and added new braced-V	
2.0	11-03-2013	Small modification	
		Projectname: Engineering verbinding ZW380	
Design state: DEFINITIEF		Third angle projection: 	Drawing no.: 74102194-035-102V
Drawn by: BJT 03-03-2014	Scale: 1:300	Description: Wintrack Masttype ZWW4S450+5	
Checked by: AJP 03-03-2014	Units: m		
Approved by: AW 03-03-2014	Project no: 000.145 Company: TenneT		
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		Revision: 4.0	Format: A3

ZWW4HK450

Fundatie berekening

Bijlage CM

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p, gem}$	1,6	m

schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	5,6	m
	Hoogte	1,8	m
	Inhoud	44,3	m ³
	e.g.	1064	kN

Onderplaat	Diameter	13,0	m
	Hoogte	1,3	m
	Inhoud	173	m ³
	e.g.	4141	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		908	kN
Fgeleiders		183	kN
Maximale dwarskracht		1163	kN
Fmax vert (druk)		1273	kN
Fmin vert (trek)		955	kN
Maximale moment		56791	kNm

Moment

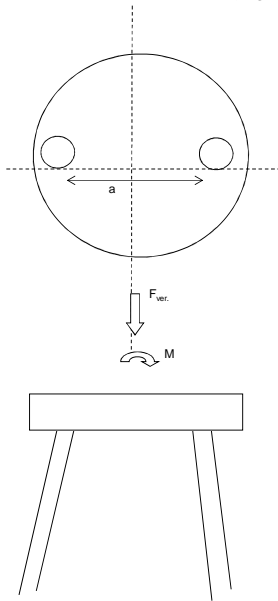
F_{slag}		5158	kN
F_{hor}		1163	kN
F_{ver}		5118	kN
M_{hor} (tgv F_{hor})		3604	kNm
M_{tot}		60395	kNm
$F=M/a$		5118	kN

Verticaal reactiekracht

F_{water} (trek)		2169	kN
F_{grond} (druk)		2919	kN
F_{grond} (trek)		2432	kN
F_{dmax} (druk)		5511	kN
F_{tmax} (trek)		2613	kN
F_{dtot} (druk)		10629	kN
F_{ttot} (trek)		2505	kN

Palen druk	10	(-)
Palen trek	8	(-)

Totaal palen	20	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4HK450

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r,trek;d} = \int_0^L O_{p;gem} \times p_{r;d} \times dz$$

Bijlage CM

Bepaling opneembare paalbelasting op druk

heipaal

Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	O _{p;gem}	1,60 m

paalfactor	α t	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75

conusweerstand over wrijvingstraject q_{c,z,max} 15 MPa

q_{c,z,rep} 11,25 MPa

materiaalfactor γ_{m,b4} 1,4

factor, wisselende belastingen γ_{m,var,qc} 1,5

q_{c,z,d} 5,36 MPa

p_{r,z,d} 37,5 kN/m²

F_{r,trek;d,i} 60,0 kN/m¹

F_{trek,d} 596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		q _{c,z}		P _{r,max,z} (schacht)	F _{r,trek;d,i}	F _{trek,d}
	m	m	MPa	α t			
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

F _{trek,d}	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

F _{trek,d}	536,4 kN
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ZWW4HK450

DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CM

Bepaling opneembare paalbelasting op druk

heipaal	diameter	v a	2 mm 2 mm
	Deq		0,001808
maximale puntweerstand			
$P_{r,max,punt}$			11,25 MN/m ²
paalklasse factor	α_p		1,00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1,00
minimale waarde neergaande deel	$q_{c,lgem}$		9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,lgem}$		14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,lgem}$		11,00 MN/m ²
maximale paalschachtwrijving			
$P_{r,max,schacht}$			0,05 MN/m ²
waarin:			
paalfactor	α_s		0,010
conusweerstand over wrijvingstraject	$q_{c,z,a}$		5,00 MN/m ²
maximale draagkracht alleenstaande paal			
$F_{r,max}$			0,00 MN
waarin:			
$F_{r,max,punt}$			0,00 MN
paalpunt oppervlak	A_{punt}		0,00 m ²
$F_{r,max,schacht}$			0,00 MN
gemiddelde paalomtrek	$O_{p,lgem}$		0,01 m
lengte schachtwrijving	Δl		15,00 m
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max,d}$		MN	0,00 MN
materiaalfactor grond	γ_{mb}		1,20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$		0,75
$F_{r,paal,max,d}$	3 kN	mm, paalpuntnivo	-27,00 m



ZWW4HK450

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h		71.1	m
Diameter voet		d voet		3.6	m
top		d top		0.8	m
gem		d gem		2.2	m
wanddikte		t		24	mm
Oppervlakte aan voet		A		269624	mm ²
Traagheidsmoment aan voet		W _x		2.39E+08	mm ⁴
Weerstandsmoment aan voet		I _x		4.26E+11	mm ⁶
Mast: Gewicht		2 ^{de} orde		10.0	%
		F _{rep,ver}		908	kN

Bijlage BM

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	70.5	5.2	34.6	0.0	34.6	3212	kNm
150C1F1	59.3	19.2	102.7	0.0	102.7	6170	kNm
150C1F2	47.9	19.2	96.7	0.0	96.7	4883	kNm
150C1F3	36.5	19.2	89.2	0.0	89.2	3629	kNm
380C2F1	59.3	38.4	205.4	0.0	205.4	12340	kNm
380C2F2	47.9	38.4	193.5	0.0	193.5	9766	kNm
380C2F3	36.5	38.4	178.4	0.0	178.4	7259	kNm
RTG	25.2	5.2	24.8	-62.2	67.0	1947	kNm

Stuwdruk	F _{hor.}	46.6	kN
	M _{d,wind}	1476	kNm
Totaal	M _{d,tot}	51628	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	56791	kNm

Normaalkracht;

Optredende normaalkracht					
N _{d,geluiders}				183	kN
N _{d, e.g. mast}				1090	kN
N _{s,d,totaal}				1273	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	0.58	
	A _{eff}	155850 mm ²

Optredende spanning tgv normaalkracht

N _{d,d/eff} = f _{yd} /γ _{m1}	8	N/mm ²
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Moment;

Optredende moment in de voet:			
M _{d,tot}		56791	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	0.88	
	W _{eff}	2.10E+08 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	270	N/mm ²
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Totale spanning:

	σ _d	278	N/mm ²	< 284 N/mm ² = ACCOORD
	σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	70.5	4.3	24.9	0.0	24.9	1754	kNm
150C1F1	59.3	16.0	74.9	0.0	74.9	4442	kNm
150C1F2	47.9	16.0	70.9	0.0	70.9	3394	kNm
150C1F3	36.5	16.0	65.8	0.0	65.8	2401	kNm
380C2F1	59.3	32.0	149.8	0.0	149.8	8884	kNm
380C2F2	47.9	32.0	141.7	0.0	141.7	6789	kNm
380C2F3	36.5	32.0	131.6	0.0	131.6	4803	kNm
RTG	25.2	4.3	18.2	-47.7	51.1	1288	kNm

Stuwdruk	F _{hor.}	1251	kN
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Verplaatsing		1.26	m
Percentage van de verplaatsing		1.77%	
Hoek		1.85	graden
Kromming		0.39%	
Fundatie rotatiestijfheid		0.005	rad

3.88	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4HK450

Appendix M / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2604	5731	19681	2604	5731	-19681
Wind, 10°C	150C1F1	9593	20587	72041	9593	20587	-72041
Permanent loads yg= 1.2	150C1F2	9593	20472	71991	9593	20472	-71991
Wind angle: 0°	150C1F3	9593	20328	71936	9593	20328	-71936
	380C2F1	19186	41174	144083	19186	41174	-144083
	380C2F2	19186	40943	143982	19186	40943	-143982
	380C2F3	19186	40655	143871	19186	40655	-143871
	RTG	0	0	0	5200	11069	-39120
NL1/1b	GW / opgw	2603	5890	21642	2603	5890	-21642
Wind, -20°C	150C1F1	9588	21828	80507	9588	21828	-80507
Permanent loads yg= 1.2	150C1F2	9588	21809	80509	9588	21809	-80509
Wind angle: 0°	150C1F3	9588	21783	80512	9588	21783	-80512
	380C2F1	19175	43657	161014	19175	43657	-161014
	380C2F2	19175	43617	161018	19175	43617	-161018
	380C2F3	19175	43567	161024	19175	43567	-161024
	RTG	0	0	0	5198	11624	-42945
NL1/3	GW / opgw	10505	16969	61573	10505	16969	-61573
Wind, -5°C	150C1F1	16533	32074	117024	16533	32074	-117024
Permanent loads yg= 1.2	150C1F2	16533	32017	117026	16533	32017	-117026
Wind angle: 0°	150C1F3	16533	31946	117030	16533	31946	-117030
	380C2F1	33067	64148	234049	33067	64148	-234049
	380C2F2	33067	64035	234053	33067	64035	-234053
	380C2F3	33067	63893	234061	33067	63893	-234061
	RTG	0	0	0	21038	33652	-123349
NL1/4	GW / opgw	3356	6673	24562	3356	6673	-24562
Construction/maintenance, +5°C	150C1F1	11098	22350	82453	11098	22350	-82453
Permanent loads yg= 1.2	150C1F2	11098	22330	82455	11098	22330	-82455
Wind angle: 0°	150C1F3	11098	22305	82459	11098	22305	-82459
	380C2F1	22195	44700	164906	22195	44700	-164906
	380C2F2	22195	44660	164911	22195	44660	-164911
	380C2F3	22195	44611	164918	22195	44611	-164918
	RTG	0	0	0	6705	13264	-49063
NL1/6	GW / opgw	2930	5791	21613	2930	5791	-21613
Permanent, +10°C	150C1F1	10793	21243	79282	10793	21243	-79282
Permanent loads yg= 1.35	150C1F2	10793	21243	79282	10793	21243	-79282
	150C1F3	10793	21243	79282	10793	21243	-79282
	380C2F1	21587	42487	158563	21587	42487	-158563
	380C2F2	21587	42487	158563	21587	42487	-158563
	380C2F3	21587	42487	158563	21587	42487	-158563
	RTG	0	0	0	5851	11571	-43184
NL1/1a	GW / opgw	2604	7637	22131	2606	14633	-35485
Wind, 10°C	150C1F1	9594	25482	77220	9599	43997	-110530
Permanent loads yg= 1.2	150C1F2	9594	24874	76369	9598	41624	-105938
Wind angle: 45°	150C1F3	9594	24126	75379	9597	38645	-100228
	380C2F1	19188	50964	154440	19198	87994	-221060
	380C2F2	19188	49747	152737	19197	83248	-211877
	380C2F3	19187	48252	150759	19195	77290	-200456
	RTG	0	0	0	5203	21464	-55595
NL1/1b	GW / opgw	2603	6158	21709	2603	7082	-22611
Wind, -20°C	150C1F1	9588	22556	80605	9588	24956	-82417
Permanent loads yg= 1.2	150C1F2	9588	22473	80579	9588	24640	-82088
Wind angle: 45°	150C1F3	9588	22369	80552	9588	24250	-81713
	380C2F1	19175	45111	161209	19176	49913	-164833
	380C2F2	19175	44945	161158	19176	49280	-164176
	380C2F3	19175	44738	161103	19176	48501	-163427
	RTG	0	0	0	5198	13011	-43661
NL1/3	GW / opgw	10505	18316	61805	10507	22786	-65381
Wind, -5°C	150C1F1	16534	34178	117564	16536	41401	-124536
Permanent loads yg= 1.2	150C1F2	16534	33935	117449	16535	40441	-123335
Wind angle: 45°	150C1F3	16534	33631	117322	16535	39259	-121941
	380C2F1	33067	68356	235127	33071	82801	-249072
	380C2F2	33067	67869	234897	33071	80882	-246669
	380C2F3	33067	67262	234645	33070	78518	-243882
	RTG	0	0	0	21040	40516	-126082
NL1/4	GW / opgw	3357	6930	24591	3357	7772	-25184
Construction/maintenance, +5°C	150C1F1	11098	23063	82496	11098	25345	-83861
Permanent loads yg= 1.2	150C1F2	11098	22982	82479	11098	25049	-83606
Wind angle: 45°	150C1F3	11098	22881	82462	11098	24682	-83318
	380C2F1	22195	46126	164991	22196	50690	-167722
	380C2F2	22195	45965	164958	22196	50097	-167212
	380C2F3	22195	45762	164924	22196	49363	-166635
	RTG	0	0	0	6706	14571	-49480

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2607	17303	40774	2607	17303	-40774
	150C1F1	9601	51359	124894	9601	51359	-124894
	150C1F2	9600	48372	119054	9600	48372	-119054
	150C1F3	9599	44597	111695	9599	44597	-111695
	380C2F1	19202	102718	249789	19202	102718	-249789
	380C2F2	19201	96744	238108	19201	96744	-238108
	380C2F3	19198	89193	223389	19198	89193	-223389
	RTG	0	0	0	5204	24844	-62221
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2603	7482	23171	2603	7482	-23171
	150C1F1	9588	25975	83602	9588	25975	-83602
	150C1F2	9588	25554	83091	9588	25554	-83091
	150C1F3	9588	25037	82504	9588	25037	-82504
	380C2F1	19176	51950	167205	19176	51950	-167205
	380C2F2	19176	51109	166182	19176	51109	-166182
	380C2F3	19176	50074	165008	19176	50074	-165008
	RTG	0	0	0	5198	13456	-44125
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	10508	24657	67561	10508	24657	-67561
	150C1F1	16537	44488	128742	16537	44488	-128742
	150C1F2	16536	43215	126952	16536	43215	-126952
	150C1F3	16536	41646	124852	16536	41646	-124852
	380C2F1	33074	88976	257483	33074	88976	-257483
	380C2F2	33073	86430	253903	33073	86430	-253903
	380C2F3	33071	83292	249704	33071	83292	-249704
	RTG	0	0	0	21041	42652	-127924
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3357	8127	25575	3357	8127	-25575
	150C1F1	11098	26296	84792	11098	26296	-84792
	150C1F2	11098	25904	84389	11098	25904	-84389
	150C1F3	11098	25421	83929	11098	25421	-83929
	380C2F1	22196	52592	169583	22196	52592	-169583
	380C2F2	22196	51808	168777	22196	51808	-168777
	380C2F3	22196	50841	167858	22196	50841	-167858
	RTG	0	0	0	6706	14974	-49788
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2606	14633	35485	2604	7637	-22131
	150C1F1	9599	43997	110530	9594	25482	-77220
	150C1F2	9598	41624	105938	9594	24874	-76369
	150C1F3	9597	38645	100228	9594	24126	-75379
	380C2F1	19198	87994	221060	19188	50964	-154440
	380C2F2	19197	83248	211877	19188	49747	-152737
	380C2F3	19195	77290	200456	19187	48252	-150759
	RTG	0	0	0	5201	13215	-41151
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2603	7082	22611	2603	6158	-21709
	150C1F1	9588	24956	82417	9588	22556	-80605
	150C1F2	9588	24640	82088	9588	22473	-80579
	150C1F3	9588	24250	81713	9588	22369	-80552
	380C2F1	19176	49913	164833	19175	45111	-161209
	380C2F2	19176	49280	164176	19175	44945	-161158
	380C2F3	19176	48501	163427	19175	44738	-161103
	RTG	0	0	0	5198	11952	-42973
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	10507	22786	65381	10505	18316	-61805
	150C1F1	16536	41401	124536	16534	34178	-117564
	150C1F2	16535	40441	123335	16534	33935	-117449
	150C1F3	16535	39259	121941	16534	33631	-117322
	380C2F1	33071	82801	249072	33067	68356	-235127
	380C2F2	33071	80882	246669	33067	67869	-234897
	380C2F3	33070	78518	243882	33067	67262	-234645
	RTG	0	0	0	21038	35307	-123393
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3357	7772	25184	3357	6930	-24591
	150C1F1	11098	25345	83861	11098	23063	-82496
	150C1F2	11098	25049	83606	11098	22982	-82479
	150C1F3	11098	24682	83318	11098	22881	-82462
	380C2F1	22196	50690	167722	22195	46126	-164991
	380C2F2	22196	50097	167212	22195	45965	-164958
	380C2F3	22196	49363	166635	22195	45762	-164924
	RTG	0	0	0	6705	13583	-49058
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1953	4605	15480	1953	4605	-15480
	150C1F1	7193	16473	56689	7193	16473	-56689
	150C1F2	7193	16349	56607	7193	16349	-56607
	150C1F3	7193	16195	56515	7193	16195	-56515
	380C2F1	14386	32946	113378	14386	32946	-113378
	380C2F2	14386	32699	113214	14386	32699	-113214
	380C2F3	14386	32391	113030	14386	32391	-113030
	RTG	0	0	0	3900	8786	-30602

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1952	4673	17097	1952	4673	-17097
	150C1F1	7189	17416	64042	7189	17416	-64042
	150C1F2	7189	17396	64042	7189	17396	-64042
	150C1F3	7189	17371	64043	7189	17371	-64043
	380C2F1	14378	34833	128083	14378	34833	-128083
	380C2F2	14378	34792	128084	14378	34792	-128084
	380C2F3	14378	34741	128086	14378	34741	-128086
	RTG	0	0	0	3898	9193	-33873
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	9851	16193	58677	9851	16193	-58677
	150C1F1	14132	28443	103476	14132	28443	-103476
	150C1F2	14131	28386	103475	14131	28386	-103475
	150C1F3	14131	28314	103476	14131	28314	-103476
	380C2F1	28263	56887	206952	28263	56887	-206952
	380C2F2	28263	56773	206951	28263	56773	-206951
	380C2F3	28263	56629	206952	28263	56629	-206952
	RTG	0	0	0	19733	32098	-117547
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2705	5587	20508	2705	5587	-20508
	150C1F1	8697	18309	67373	8697	18309	-67373
	150C1F2	8697	18289	67374	8697	18289	-67374
	150C1F3	8697	18264	67377	8697	18264	-67377
	380C2F1	17395	36618	134746	17395	36618	-134746
	380C2F2	17395	36578	134749	17395	36578	-134749
	380C2F3	17395	36528	134754	17395	36528	-134754
	RTG	0	0	0	5404	11090	-40949
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1953	4089	15259	1953	4089	-15259
	150C1F1	7193	15085	56299	7193	15085	-56299
	150C1F2	7193	15085	56299	7193	15085	-56299
	150C1F3	7193	15085	56299	7193	15085	-56299
	380C2F1	14386	30170	112597	14386	30170	-112597
	380C2F2	14386	30170	112597	14386	30170	-112597
	380C2F3	14386	30170	112597	14386	30170	-112597
	RTG	0	0	0	3899	8164	-30469
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1953	6750	18822	1954	14246	-34043
	150C1F1	7194	21953	64052	7199	42181	-103756
	150C1F2	7194	21263	62897	7198	39666	-98634
	150C1F3	7194	20416	61536	7197	36482	-92163
	380C2F1	14388	43905	128103	14397	84361	-207513
	380C2F2	14388	42526	125795	14396	79331	-197269
	380C2F3	14388	40832	123073	14394	72965	-184327
	RTG	0	0	0	3902	20286	-51200
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1952	4955	17220	1952	5991	-18541
	150C1F1	7189	18176	64260	7189	20832	-67026
	150C1F2	7189	18088	64215	7189	20475	-66544
	150C1F3	7189	17978	64165	7189	20036	-65988
	380C2F1	14378	36352	128520	14379	41664	-134053
	380C2F2	14378	36175	128429	14379	40949	-133089
	380C2F3	14378	35956	128329	14378	40073	-131977
	RTG	0	0	0	3898	10693	-35011
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	9851	17553	58958	9854	22115	-62877
	150C1F1	14132	30608	104242	14134	38265	-112838
	150C1F2	14132	30355	104091	14134	37240	-111394
	150C1F3	14132	30040	103922	14133	35979	-109705
	380C2F1	28264	61216	208485	28268	76530	-225675
	380C2F2	28263	60710	208182	28267	74481	-222787
	380C2F3	28263	60080	207844	28266	71958	-219410
	RTG	0	0	0	19735	39055	-120636
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2705	5852	20564	2705	6753	-21379
	150C1F1	8697	19043	67493	8698	21493	-69486
	150C1F2	8697	18959	67464	8698	21169	-69128
	150C1F3	8697	18854	67432	8698	20770	-68719
	380C2F1	17395	38085	134986	17395	42985	-138971
	380C2F2	17395	37917	134927	17395	42337	-138256
	380C2F3	17395	37708	134864	17395	41539	-137438
	RTG	0	0	0	5404	12455	-41581
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1955	16998	39638	1955	16998	-39638
	150C1F1	7200	49895	119434	7200	49895	-119434
	150C1F2	7200	46779	113114	7200	46779	-113114
	150C1F3	7199	42814	105045	7199	42814	-105045
	380C2F1	14401	99789	238869	14401	99789	-238869
	380C2F2	14399	93558	226228	14399	93558	-226228
	380C2F3	14397	85627	210091	14397	85627	-210091
	RTG	0	0	0	3902	23873	-58602

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1952	6448	19313	1952	6448	-19313
	150C1F1	7190	21990	68732	7190	21990	-68732
	150C1F2	7189	21511	68003	7189	21511	-68003
	150C1F3	7189	20923	67153	7189	20923	-67153
	380C2F1	14379	43980	137465	14379	43980	-137465
	380C2F2	14379	43021	136005	14379	43021	-136005
	380C2F3	14379	41847	134307	14379	41847	-134307
	RTG	0	0	0	3898	11195	-35688
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	9855	24029	65223	9855	24029	-65223
	150C1F1	14135	41560	117821	14135	41560	-117821
	150C1F2	14134	40202	115712	14134	40202	-115712
	150C1F3	14134	38527	113216	14134	38527	-113216
	380C2F1	28270	83121	235642	28270	83121	-235642
	380C2F2	28269	80404	231424	28269	80404	-231424
	380C2F3	28268	77053	226431	28268	77053	-226431
	RTG	0	0	0	19736	41238	-122651
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2705	7140	21892	2705	7140	-21892
	150C1F1	8698	22538	70770	8698	22538	-70770
	150C1F2	8698	22106	70218	8698	22106	-70218
	150C1F3	8698	21575	69580	8698	21575	-69580
	380C2F1	17396	45076	141541	17396	45076	-141541
	380C2F2	17396	44212	140435	17396	44212	-140435
	380C2F3	17395	43151	139161	17395	43151	-139161
	RTG	0	0	0	5404	12888	-42002
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1954	14246	34043	1953	6750	-18822
	150C1F1	7199	42181	103756	7194	21953	-64052
	150C1F2	7198	39666	98634	7194	21263	-62897
	150C1F3	7197	36482	92163	7194	20416	-61536
	380C2F1	14397	84361	207513	14388	43905	-128103
	380C2F2	14396	79331	197269	14388	42526	-125795
	380C2F3	14394	72965	184327	14388	40832	-123073
	RTG	0	0	0	3900	11173	-33533
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1952	5991	18541	1952	4955	-17220
	150C1F1	7189	20832	67026	7189	18176	-64260
	150C1F2	7189	20475	66544	7189	18088	-64215
	150C1F3	7189	20036	65988	7189	17978	-64165
	380C2F1	14379	41664	134053	14378	36352	-128520
	380C2F2	14379	40949	133089	14378	36175	-128429
	380C2F3	14378	40073	131977	14378	35956	-128329
	RTG	0	0	0	3898	9533	-33947
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	9854	22115	62877	9851	17553	-58958
	150C1F1	14134	38265	112838	14132	30608	-104242
	150C1F2	14134	37240	111394	14132	30355	-104091
	150C1F3	14133	35979	109705	14132	30040	-103922
	380C2F1	28268	76530	225675	28264	61216	-208485
	380C2F2	28267	74481	222787	28263	60710	-208182
	380C2F3	28266	71958	219410	28263	60080	-207844
	RTG	0	0	0	19733	33763	-117632
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2705	6753	21379	2705	5852	-20564
	150C1F1	8698	21493	69486	8697	19043	-67493
	150C1F2	8698	21169	69128	8697	18959	-67464
	150C1F3	8698	20770	68719	8697	18854	-67432
	380C2F1	17395	42985	138971	17395	38085	-134986
	380C2F2	17395	42337	138256	17395	37917	-134927
	380C2F3	17395	41539	137438	17395	37708	-134864
	RTG	0	0	0	5404	11415	-40968

ZWW4HK450

Appendix M1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / opgw	0	0	0	2604	5480	-19563
Wind, 10°C	150C1F1	0	0	0	9593	19914	-71831
Permanent loads yg= 1.2	150C1F2	0	0	0	9593	19859	-71823
Wind angle: 0°	150C1F3	0	0	0	9593	19790	-71816
	380C2F1	0	0	0	19186	39829	-143662
	380C2F2	0	0	0	19186	39719	-143647
	380C2F3	0	0	0	19186	39581	-143633
	RTG	0	0	0	5200	10767	-39047
NL3/1b	GW / opgw	0	0	0	2603	5872	-21643
Wind, -20°C	150C1F1	0	0	0	9588	21778	-80512
Permanent loads yg= 1.2	150C1F2	0	0	0	9588	21763	-80514
Wind angle: 0°	150C1F3	0	0	0	9588	21743	-80517
	380C2F1	0	0	0	19175	43557	-161025
	380C2F2	0	0	0	19175	43525	-161029
	380C2F3	0	0	0	19175	43486	-161034
	RTG	0	0	0	5198	11602	-42948
NL3/3	GW / opgw	0	0	0	4371	8769	-31323
Wind, -5°C	150C1F1	0	0	0	11145	23525	-85655
Permanent loads yg= 1.2	150C1F2	0	0	0	11145	23479	-85654
Wind angle: 0°	150C1F3	0	0	0	11145	23421	-85653
	380C2F1	0	0	0	22290	47050	-171311
	380C2F2	0	0	0	22290	46958	-171308
	380C2F3	0	0	0	22290	46842	-171307
	RTG	0	0	0	8742	17230	-62511
NL3/4	GW / opgw	0	0	0	3206	6409	-23646
Construction/maintenance, +5°C	150C1F1	0	0	0	10796	21807	-80617
Permanent loads yg= 1.2	150C1F2	0	0	0	10796	21791	-80620
Wind angle: 0°	150C1F3	0	0	0	10796	21771	-80623
	380C2F1	0	0	0	21593	43613	-161235
	380C2F2	0	0	0	21593	43582	-161239
	380C2F3	0	0	0	21593	43542	-161246
	RTG	0	0	0	6404	12748	-47227
NL3/1a	GW / opgw	0	0	0	2605	9462	-25373
Wind, 10°C	150C1F1	0	0	0	9595	30173	-84712
Permanent loads yg= 1.2	150C1F2	0	0	0	9595	29084	-82861
Wind angle: 45°	150C1F3	0	0	0	9594	27741	-80659
	380C2F1	0	0	0	19190	60346	-169423
	380C2F2	0	0	0	19190	58168	-165723
	380C2F3	0	0	0	19189	55482	-161318
	RTG	0	0	0	5201	15268	-44237
NL3/1b	GW / opgw	0	0	0	2603	6777	-22237
Wind, -20°C	150C1F1	0	0	0	9588	24175	-81645
Permanent loads yg= 1.2	150C1F2	0	0	0	9588	23938	-81440
Wind angle: 45°	150C1F3	0	0	0	9588	23644	-81208
	380C2F1	0	0	0	19176	48350	-163290
	380C2F2	0	0	0	19176	47875	-162880
	380C2F3	0	0	0	19176	47288	-162415
	RTG	0	0	0	5198	12669	-43363
NL3/3	GW / opgw	0	0	0	4373	14660	-39007
Wind, -5°C	150C1F1	0	0	0	11146	31579	-93885
Permanent loads yg= 1.2	150C1F2	0	0	0	11146	30731	-92625
Wind angle: 45°	150C1F3	0	0	0	11146	29689	-91151
	380C2F1	0	0	0	22293	63157	-187769
	380C2F2	0	0	0	22293	61462	-185250
	380C2F3	0	0	0	22292	59378	-182301
	RTG	0	0	0	8744	23926	-69220
NL3/4	GW / opgw	0	0	0	3206	7262	-24043
Construction/maintenance, +5°C	150C1F1	0	0	0	10797	24129	-81469
Permanent loads yg= 1.2	150C1F2	0	0	0	10797	23903	-81305
Wind angle: 45°	150C1F3	0	0	0	10797	23622	-81122
	380C2F1	0	0	0	21593	48258	-162938
	380C2F2	0	0	0	21593	47805	-162611
	380C2F3	0	0	0	21593	47244	-162244
	RTG	0	0	0	6404	13771	-47474
NL3/1a	GW / opgw	0	0	0	2605	10793	-27912
Wind, 10°C	150C1F1	0	0	0	9596	33659	-90909
Permanent loads yg= 1.2	150C1F2	0	0	0	9596	32226	-88319
Wind angle: 90°	150C1F3	0	0	0	9595	30451	-85191
	380C2F1	0	0	0	19192	67317	-181817
	380C2F2	0	0	0	19191	64452	-176637
	380C2F3	0	0	0	19190	60902	-170383
	RTG	0	0	0	5201	16808	-46877

NL3/1b	GW / opgw	0	0	0	2603	7075	-22601
Wind, -20°C	150C1F1	0	0	0	9588	24937	-82396
Permanent loads yg= 1.2	150C1F2	0	0	0	9588	24623	-82071
Wind angle: 90°	150C1F3	0	0	0	9588	24236	-81700
	380C2F1	0	0	0	19176	49874	-164792
	380C2F2	0	0	0	19176	49246	-164141
	380C2F3	0	0	0	19176	48471	-163400
	RTG	0	0	0	5198	13003	-43653
NL3/3	GW / opgw	0	0	0	4373	16605	-42427
Wind, -5°C	150C1F1	0	0	0	11147	34309	-98225
Permanent loads yg= 1.2	150C1F2	0	0	0	11147	33183	-96390
Wind angle: 90°	150C1F3	0	0	0	11147	31795	-94214
	380C2F1	0	0	0	22295	68618	-196450
	380C2F2	0	0	0	22294	66366	-192779
	380C2F3	0	0	0	22293	63590	-188429
	RTG	0	0	0	8745	26174	-72712
NL3/4	GW / opgw	0	0	0	3206	7532	-24307
Construction/maintenance, +5°C	150C1F1	0	0	0	10797	24852	-82073
Permanent loads yg= 1.2	150C1F2	0	0	0	10797	24555	-81810
Wind angle: 90°	150C1F3	0	0	0	10797	24187	-81513
	380C2F1	0	0	0	21594	49704	-164145
	380C2F2	0	0	0	21594	49109	-163620
	380C2F3	0	0	0	21593	48373	-163025
	RTG	0	0	0	6404	14081	-47676
NL3/1a	GW / opgw	0	0	0	2604	6303	-20211
Wind, 10°C	150C1F1	0	0	0	9593	22078	-73098
Permanent loads yg= 1.2	150C1F2	0	0	0	9593	21818	-72869
Wind angle: -45°	150C1F3	0	0	0	9593	21498	-72609
	380C2F1	0	0	0	19187	44156	-146196
	380C2F2	0	0	0	19186	43637	-145737
	380C2F3	0	0	0	19186	42996	-145217
	RTG	0	0	0	5200	11727	-39521
NL3/1b	GW / opgw	0	0	0	2603	6081	-21676
Wind, -20°C	150C1F1	0	0	0	9588	22349	-80547
Permanent loads yg= 1.2	150C1F2	0	0	0	9588	22284	-80533
Wind angle: -45°	150C1F3	0	0	0	9588	22203	-80520
	380C2F1	0	0	0	19175	44697	-161094
	380C2F2	0	0	0	19175	44568	-161067
	380C2F3	0	0	0	19175	44407	-161040
	RTG	0	0	0	5198	11859	-42953
NL3/3	GW / opgw	0	0	0	4371	10016	-32147
Wind, -5°C	150C1F1	0	0	0	11145	25279	-86353
Permanent loads yg= 1.2	150C1F2	0	0	0	11145	25073	-86218
Wind angle: -45°	150C1F3	0	0	0	11145	24817	-86067
	380C2F1	0	0	0	22290	50557	-172706
	380C2F2	0	0	0	22290	50145	-172436
	380C2F3	0	0	0	22290	49633	-172134
	RTG	0	0	0	8742	18696	-63083
NL3/4	GW / opgw	0	0	0	3206	6612	-23658
Construction/maintenance, +5°C	150C1F1	0	0	0	10797	22369	-80622
Permanent loads yg= 1.2	150C1F2	0	0	0	10797	22306	-80613
Wind angle: -45°	150C1F3	0	0	0	10797	22227	-80605
	380C2F1	0	0	0	21593	44738	-161243
	380C2F2	0	0	0	21593	44612	-161226
	380C2F3	0	0	0	21593	44453	-161210
	RTG	0	0	0	6404	13001	-47213
NL3/1a	GW / opgw	0	0	0	1953	4335	-15291
Wind, 10°C	150C1F1	0	0	0	7193	15760	-56325
Permanent loads yg= 0.9	150C1F2	0	0	0	7193	15702	-56309
Wind angle: 0°	150C1F3	0	0	0	7193	15631	-56292
	380C2F1	0	0	0	14386	31519	-112651
	380C2F2	0	0	0	14386	31405	-112618
	380C2F3	0	0	0	14386	31261	-112584
	RTG	0	0	0	3899	8469	-30469
NL3/1b	GW / opgw	0	0	0	1952	4654	-17096
Wind, -20°C	150C1F1	0	0	0	7189	17366	-64043
Permanent loads yg= 0.9	150C1F2	0	0	0	7189	17350	-64044
Wind angle: 0°	150C1F3	0	0	0	7189	17329	-64046
	380C2F1	0	0	0	14378	34731	-128087
	380C2F2	0	0	0	14378	34699	-128089
	380C2F3	0	0	0	14378	34659	-128092
	RTG	0	0	0	3898	9170	-33875

NL3/3	GW / opgw	0	0	0	3719	7753	-27532
Wind, -5°C	150C1F1	0	0	0	8745	19427	-70362
Permanent loads yg= 0.9	150C1F2	0	0	0	8745	19380	-70356
Wind angle: 0°	150C1F3	0	0	0	8745	19320	-70350
	380C2F1	0	0	0	17490	38854	-140725
	380C2F2	0	0	0	17490	38759	-140712
	380C2F3	0	0	0	17490	38641	-140701
	RTG	0	0	0	7440	15192	-54906
NL3/4	GW / opgw	0	0	0	2554	5309	-19540
Construction/maintenance, +5°C	150C1F1	0	0	0	8396	17734	-65417
Permanent loads yg= 0.9	150C1F2	0	0	0	8396	17718	-65418
Wind angle: 0°	150C1F3	0	0	0	8396	17698	-65421
	380C2F1	0	0	0	16793	35467	-130833
	380C2F2	0	0	0	16793	35436	-130837
	380C2F3	0	0	0	16793	35396	-130841
	RTG	0	0	0	5103	10547	-39011
NL3/1a	GW / opgw	0	0	0	1953	8771	-22794
Wind, 10°C	150C1F1	0	0	0	7195	27228	-73726
Permanent loads yg= 0.9	150C1F2	0	0	0	7195	26012	-71402
Wind angle: 45°	150C1F3	0	0	0	7195	24505	-68586
	380C2F1	0	0	0	14390	54457	-147451
	380C2F2	0	0	0	14390	52025	-142805
	380C2F3	0	0	0	14389	49010	-137172
	RTG	0	0	0	3900	13493	-37618
NL3/1b	GW / opgw	0	0	0	1952	5645	-18010
Wind, -20°C	150C1F1	0	0	0	7189	19952	-65886
Permanent loads yg= 0.9	150C1F2	0	0	0	7189	19687	-65577
Wind angle: 45°	150C1F3	0	0	0	7189	19360	-65223
	380C2F1	0	0	0	14378	39904	-131772
	380C2F2	0	0	0	14378	39373	-131154
	380C2F3	0	0	0	14378	38721	-130446
	RTG	0	0	0	3898	10312	-34566
NL3/3	GW / opgw	0	0	0	3721	14009	-36576
Wind, -5°C	150C1F1	0	0	0	8747	28254	-81482
Permanent loads yg= 0.9	150C1F2	0	0	0	8746	27312	-79870
Wind angle: 45°	150C1F3	0	0	0	8746	26153	-77956
	380C2F1	0	0	0	17493	56508	-162964
	380C2F2	0	0	0	17493	54624	-159739
	380C2F3	0	0	0	17492	52305	-155912
	RTG	0	0	0	7442	22289	-63115
NL3/4	GW / opgw	0	0	0	2554	6210	-20120
Construction/maintenance, +5°C	150C1F1	0	0	0	8397	20188	-66761
Permanent loads yg= 0.9	150C1F2	0	0	0	8397	19942	-66524
Wind angle: 45°	150C1F3	0	0	0	8396	19638	-66256
	380C2F1	0	0	0	16793	40375	-133522
	380C2F2	0	0	0	16793	39883	-133049
	380C2F3	0	0	0	16793	39276	-132512
	RTG	0	0	0	5103	11611	-39414
NL3/1a	GW / opgw	0	0	0	1954	10208	-25731
Wind, 10°C	150C1F1	0	0	0	7196	31077	-81279
Permanent loads yg= 0.9	150C1F2	0	0	0	7196	29503	-78160
Wind angle: 90°	150C1F3	0	0	0	7195	27538	-74322
	380C2F1	0	0	0	14392	62154	-162559
	380C2F2	0	0	0	14391	59006	-156320
	380C2F3	0	0	0	14390	55075	-148645
	RTG	0	0	0	3901	15214	-40930
NL3/1b	GW / opgw	0	0	0	1952	5983	-18527
Wind, -20°C	150C1F1	0	0	0	7189	20810	-66996
Permanent loads yg= 0.9	150C1F2	0	0	0	7189	20455	-66519
Wind angle: 90°	150C1F3	0	0	0	7189	20020	-65968
	380C2F1	0	0	0	14379	41620	-133992
	380C2F2	0	0	0	14379	40910	-133037
	380C2F3	0	0	0	14378	40039	-131936
	RTG	0	0	0	3898	10684	-34999
NL3/3	GW / opgw	0	0	0	3721	16048	-40351
Wind, -5°C	150C1F1	0	0	0	8747	31276	-86909
Permanent loads yg= 0.9	150C1F2	0	0	0	8747	30032	-84636
Wind angle: 90°	150C1F3	0	0	0	8747	28495	-81901
	380C2F1	0	0	0	17495	62552	-173818
	380C2F2	0	0	0	17494	60065	-169273
	380C2F3	0	0	0	17493	56989	-163802
	RTG	0	0	0	7443	24686	-67163

NL3/4	GW / opgw	0	0	0	2554	6506	-20476
Construction/maintenance, +5°C	150C1F1	0	0	0	8397	20979	-67619
Permanent loads yg= 0.9	150C1F2	0	0	0	8397	20652	-67249
Wind angle: 90°	150C1F3	0	0	0	8397	20250	-66824
	380C2F1	0	0	0	16793	41957	-135239
	380C2F2	0	0	0	16793	41304	-134497
	380C2F3	0	0	0	16793	40501	-133648
	RTG	0	0	0	5103	11944	-39698
NL3/1a	GW / opgw	0	0	0	1953	5242	-16253
Wind, 10°C	150C1F1	0	0	0	7193	18110	-58292
Permanent loads yg= 0.9	150C1F2	0	0	0	7193	17821	-57953
Wind angle: -45°	150C1F3	0	0	0	7193	17467	-57565
	380C2F1	0	0	0	14387	36220	-116583
	380C2F2	0	0	0	14387	35643	-115906
	380C2F3	0	0	0	14387	34933	-115130
	RTG	0	0	0	3900	9503	-31218
NL3/1b	GW / opgw	0	0	0	1952	4872	-17166
Wind, -20°C	150C1F1	0	0	0	7189	17956	-64156
Permanent loads yg= 0.9	150C1F2	0	0	0	7189	17889	-64130
Wind angle: -45°	150C1F3	0	0	0	7189	17804	-64101
	380C2F1	0	0	0	14378	35913	-128311
	380C2F2	0	0	0	14378	35777	-128259
	380C2F3	0	0	0	14378	35608	-128202
	RTG	0	0	0	3898	9436	-33909
NL3/3	GW / opgw	0	0	0	3719	9062	-28588
Wind, -5°C	150C1F1	0	0	0	8745	21283	-71442
Permanent loads yg= 0.9	150C1F2	0	0	0	8745	21060	-71246
Wind angle: -45°	150C1F3	0	0	0	8745	20785	-71024
	380C2F1	0	0	0	17490	42566	-142884
	380C2F2	0	0	0	17490	42121	-142492
	380C2F3	0	0	0	17490	41571	-142048
	RTG	0	0	0	7441	16711	-55679
NL3/4	GW / opgw	0	0	0	2554	5517	-19572
Construction/maintenance, +5°C	150C1F1	0	0	0	8396	18310	-65474
Permanent loads yg= 0.9	150C1F2	0	0	0	8396	18245	-65457
Wind angle: -45°	150C1F3	0	0	0	8396	18163	-65439
	380C2F1	0	0	0	16793	36620	-130948
	380C2F2	0	0	0	16793	36489	-130914
	380C2F3	0	0	0	16793	36325	-130878
	RTG	0	0	0	5103	10804	-39014

ZWW4HK450

Appendix M1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	5480	19563	0	0	0
	150C1F1	9593	19914	71831	0	0	0
	150C1F2	9593	19859	71823	0	0	0
	150C1F3	9593	19790	71816	0	0	0
	380C2F1	19186	39829	143662	0	0	0
	380C2F2	19186	39719	143647	0	0	0
	380C2F3	19186	39581	143633	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	5872	21643	0	0	0
	150C1F1	9588	21778	80512	0	0	0
	150C1F2	9588	21763	80514	0	0	0
	150C1F3	9588	21743	80517	0	0	0
	380C2F1	19175	43557	161025	0	0	0
	380C2F2	19175	43525	161029	0	0	0
	380C2F3	19175	43486	161034	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	8769	31323	0	0	0
	150C1F1	11145	23525	85655	0	0	0
	150C1F2	11145	23479	85654	0	0	0
	150C1F3	11145	23421	85653	0	0	0
	380C2F1	22290	47050	171311	0	0	0
	380C2F2	22290	46958	171308	0	0	0
	380C2F3	22290	46842	171307	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	6409	23646	0	0	0
	150C1F1	10796	21807	80617	0	0	0
	150C1F2	10796	21791	80620	0	0	0
	150C1F3	10796	21771	80623	0	0	0
	380C2F1	21593	43613	161235	0	0	0
	380C2F2	21593	43582	161239	0	0	0
	380C2F3	21593	43542	161246	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	6303	20211	0	0	0
	150C1F1	9593	22078	73098	0	0	0
	150C1F2	9593	21818	72869	0	0	0
	150C1F3	9593	21498	72609	0	0	0
	380C2F1	19187	44156	146196	0	0	0
	380C2F2	19186	43637	145737	0	0	0
	380C2F3	19186	42996	145217	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	6081	21676	0	0	0
	150C1F1	9588	22349	80547	0	0	0
	150C1F2	9588	22284	80533	0	0	0
	150C1F3	9588	22203	80520	0	0	0
	380C2F1	19175	44697	161094	0	0	0
	380C2F2	19175	44568	161067	0	0	0
	380C2F3	19175	44407	161040	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	10016	32147	0	0	0
	150C1F1	11145	25279	86353	0	0	0
	150C1F2	11145	25073	86218	0	0	0
	150C1F3	11145	24817	86067	0	0	0
	380C2F1	22290	50557	172706	0	0	0
	380C2F2	22290	50145	172436	0	0	0
	380C2F3	22290	49633	172134	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	6612	23658	0	0	0
	150C1F1	10797	22369	80622	0	0	0
	150C1F2	10797	22306	80613	0	0	0
	150C1F3	10797	22227	80605	0	0	0
	380C2F1	21593	44738	161243	0	0	0
	380C2F2	21593	44612	161226	0	0	0
	380C2F3	21593	44453	161210	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	10793	27912	0	0	0
	150C1F1	9596	33659	90909	0	0	0
	150C1F2	9596	32226	88319	0	0	0
	150C1F3	9595	30451	85191	0	0	0
	380C2F1	19192	67317	181817	0	0	0
	380C2F2	19191	64452	176637	0	0	0
	380C2F3	19190	60902	170383	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2603	7075	22601	0	0	0
	150C1F1	9588	24937	82396	0	0	0
	150C1F2	9588	24623	82071	0	0	0
	150C1F3	9588	24236	81700	0	0	0
	380C2F1	19176	49874	164792	0	0	0
	380C2F2	19176	49246	164141	0	0	0
	380C2F3	19176	48471	163400	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4373	16605	42427	0	0	0
	150C1F1	11147	34309	98225	0	0	0
	150C1F2	11147	33183	96390	0	0	0
	150C1F3	11147	31795	94214	0	0	0
	380C2F1	22295	68618	196450	0	0	0
	380C2F2	22294	66366	192779	0	0	0
	380C2F3	22293	63590	188429	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3206	7532	24307	0	0	0
	150C1F1	10797	24852	82073	0	0	0
	150C1F2	10797	24555	81810	0	0	0
	150C1F3	10797	24187	81513	0	0	0
	380C2F1	21594	49704	164145	0	0	0
	380C2F2	21594	49109	163620	0	0	0
	380C2F3	21593	48373	163025	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2605	9462	25373	0	0	0
	150C1F1	9595	30173	84712	0	0	0
	150C1F2	9595	29084	82861	0	0	0
	150C1F3	9594	27741	80659	0	0	0
	380C2F1	19190	60346	169423	0	0	0
	380C2F2	19190	58168	165723	0	0	0
	380C2F3	19189	55482	161318	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2603	6777	22237	0	0	0
	150C1F1	9588	24175	81645	0	0	0
	150C1F2	9588	23938	81440	0	0	0
	150C1F3	9588	23644	81208	0	0	0
	380C2F1	19176	48350	163290	0	0	0
	380C2F2	19176	47875	162880	0	0	0
	380C2F3	19176	47288	162415	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4373	14660	39007	0	0	0
	150C1F1	11146	31579	93885	0	0	0
	150C1F2	11146	30731	92625	0	0	0
	150C1F3	11146	29689	91151	0	0	0
	380C2F1	22293	63157	187769	0	0	0
	380C2F2	22293	61462	185250	0	0	0
	380C2F3	22292	59378	182301	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3206	7262	24043	0	0	0
	150C1F1	10797	24129	81469	0	0	0
	150C1F2	10797	23903	81305	0	0	0
	150C1F3	10797	23622	81122	0	0	0
	380C2F1	21593	48258	162938	0	0	0
	380C2F2	21593	47805	162611	0	0	0
	380C2F3	21593	47244	162244	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1953	4335	15291	0	0	0
	150C1F1	7193	15760	56325	0	0	0
	150C1F2	7193	15702	56309	0	0	0
	150C1F3	7193	15631	56292	0	0	0
	380C2F1	14386	31519	112651	0	0	0
	380C2F2	14386	31405	112618	0	0	0
	380C2F3	14386	31261	112584	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1952	4654	17096	0	0	0
	150C1F1	7189	17366	64043	0	0	0
	150C1F2	7189	17350	64044	0	0	0
	150C1F3	7189	17329	64046	0	0	0
	380C2F1	14378	34731	128087	0	0	0
	380C2F2	14378	34699	128089	0	0	0
	380C2F3	14378	34659	128092	0	0	0
	RTG	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3719	7753	27532	0	0	0
	150C1F1	8745	19427	70362	0	0	0
	150C1F2	8745	19380	70356	0	0	0
	150C1F3	8745	19320	70350	0	0	0
	380C2F1	17490	38854	140725	0	0	0
	380C2F2	17490	38759	140712	0	0	0
	380C2F3	17490	38641	140701	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2554	5309	19540	0	0	0
	150C1F1	8396	17734	65417	0	0	0
	150C1F2	8396	17718	65418	0	0	0
	150C1F3	8396	17698	65421	0	0	0
	380C2F1	16793	35467	130833	0	0	0
	380C2F2	16793	35436	130837	0	0	0
	380C2F3	16793	35396	130841	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1953	5242	16253	0	0	0
	150C1F1	7193	18110	58292	0	0	0
	150C1F2	7193	17821	57953	0	0	0
	150C1F3	7193	17467	57565	0	0	0
	380C2F1	14387	36220	116583	0	0	0
	380C2F2	14387	35643	115906	0	0	0
	380C2F3	14387	34933	115130	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1952	4872	17166	0	0	0
	150C1F1	7189	17956	64156	0	0	0
	150C1F2	7189	17889	64130	0	0	0
	150C1F3	7189	17804	64101	0	0	0
	380C2F1	14378	35913	128311	0	0	0
	380C2F2	14378	35777	128259	0	0	0
	380C2F3	14378	35608	128202	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3719	9062	28588	0	0	0
	150C1F1	8745	21283	71442	0	0	0
	150C1F2	8745	21060	71246	0	0	0
	150C1F3	8745	20785	71024	0	0	0
	380C2F1	17490	42566	142884	0	0	0
	380C2F2	17490	42121	142492	0	0	0
	380C2F3	17490	41571	142048	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2554	5517	19572	0	0	0
	150C1F1	8396	18310	65474	0	0	0
	150C1F2	8396	18245	65457	0	0	0
	150C1F3	8396	18163	65439	0	0	0
	380C2F1	16793	36620	130948	0	0	0
	380C2F2	16793	36489	130914	0	0	0
	380C2F3	16793	36325	130878	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1954	10208	25731	0	0	0
	150C1F1	7196	31077	81279	0	0	0
	150C1F2	7196	29503	78160	0	0	0
	150C1F3	7195	27538	74322	0	0	0
	380C2F1	14392	62154	162559	0	0	0
	380C2F2	14391	59006	156320	0	0	0
	380C2F3	14390	55075	148645	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1952	5983	18527	0	0	0
	150C1F1	7189	20810	66996	0	0	0
	150C1F2	7189	20455	66519	0	0	0
	150C1F3	7189	20020	65968	0	0	0
	380C2F1	14379	41620	133992	0	0	0
	380C2F2	14379	40910	133037	0	0	0
	380C2F3	14378	40039	131936	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3721	16048	40351	0	0	0
	150C1F1	8747	31276	86909	0	0	0
	150C1F2	8747	30032	84636	0	0	0
	150C1F3	8747	28495	81901	0	0	0
	380C2F1	17495	62552	173818	0	0	0
	380C2F2	17494	60065	169273	0	0	0
	380C2F3	17493	56989	163802	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2554	6506	20476	0	0	0
Construction/maintenance, +5°C	150C1F1	8397	20979	67619	0	0	0
Permanent loads yg= 0.9	150C1F2	8397	20652	67249	0	0	0
Wind angle: 90°	150C1F3	8397	20250	66824	0	0	0
	380C2F1	16793	41957	135239	0	0	0
	380C2F2	16793	41304	134497	0	0	0
	380C2F3	16793	40501	133648	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1953	8771	22794	0	0	0
Wind, 10°C	150C1F1	7195	27228	73726	0	0	0
Permanent loads yg= 0.9	150C1F2	7195	26012	71402	0	0	0
Wind angle: -45°	150C1F3	7195	24505	68586	0	0	0
	380C2F1	14390	54457	147451	0	0	0
	380C2F2	14390	52025	142805	0	0	0
	380C2F3	14389	49010	137172	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	5645	18010	0	0	0
Wind, -20°C	150C1F1	7189	19952	65886	0	0	0
Permanent loads yg= 0.9	150C1F2	7189	19687	65577	0	0	0
Wind angle: -45°	150C1F3	7189	19360	65223	0	0	0
	380C2F1	14378	39904	131772	0	0	0
	380C2F2	14378	39373	131154	0	0	0
	380C2F3	14378	38721	130446	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3721	14009	36576	0	0	0
Wind, -5°C	150C1F1	8747	28254	81482	0	0	0
Permanent loads yg= 0.9	150C1F2	8746	27312	79870	0	0	0
Wind angle: -45°	150C1F3	8746	26153	77956	0	0	0
	380C2F1	17493	56508	162964	0	0	0
	380C2F2	17493	54624	159739	0	0	0
	380C2F3	17492	52305	155912	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2554	6210	20120	0	0	0
Construction/maintenance, +5°C	150C1F1	8397	20188	66761	0	0	0
Permanent loads yg= 0.9	150C1F2	8397	19942	66524	0	0	0
Wind angle: -45°	150C1F3	8396	19638	66256	0	0	0
	380C2F1	16793	40375	133522	0	0	0
	380C2F2	16793	39883	133049	0	0	0
	380C2F3	16793	39276	132512	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HK450

Appendix M1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	5480	19563	2604	5480	-19563
	150C1F1	9593	19914	71831	9593	19914	-71831
	150C1F2	9593	19859	71823	9593	19859	-71823
	150C1F3	9593	19790	71816	9593	19790	-71816
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	5872	21643	2603	5872	-21643
	150C1F1	9588	21778	80512	9588	21778	-80512
	150C1F2	9588	21763	80514	9588	21763	-80514
	150C1F3	9588	21743	80517	9588	21743	-80517
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	8769	31323	4371	8769	-31323
	150C1F1	11145	23525	85655	11145	23525	-85655
	150C1F2	11145	23479	85654	11145	23479	-85654
	150C1F3	11145	23421	85653	11145	23421	-85653
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	6409	23646	3206	6409	-23646
	150C1F1	10796	21807	80617	10796	21807	-80617
	150C1F2	10796	21791	80620	10796	21791	-80620
	150C1F3	10796	21771	80623	10796	21771	-80623
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	6303	20211	2605	9462	-25373
	150C1F1	9593	22078	73098	9595	30173	-84712
	150C1F2	9593	21818	72869	9595	29084	-82861
	150C1F3	9593	21498	72609	9594	27741	-80659
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	6081	21676	2603	6777	-22237
	150C1F1	9588	22349	80547	9588	24175	-81645
	150C1F2	9588	22284	80533	9588	23938	-81440
	150C1F3	9588	22203	80520	9588	23644	-81208
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	10016	32147	4373	14660	-39007
	150C1F1	11145	25279	86353	11146	31579	-93885
	150C1F2	11145	25073	86218	11146	30731	-92625
	150C1F3	11145	24817	86067	11146	29689	-91151
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	6612	23658	3206	7262	-24043
	150C1F1	10797	22369	80622	10797	24129	-81469
	150C1F2	10797	22306	80613	10797	23903	-81305
	150C1F3	10797	22227	80605	10797	23622	-81122
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	10793	27912	2605	10793	-27912
	150C1F1	9596	33659	90909	9596	33659	-90909
	150C1F2	9596	32226	88319	9596	32226	-88319
	150C1F3	9595	30451	85191	9595	30451	-85191
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b	GW / opgw	2603	7075	22601	2603	7075	-22601
Wind, -20°C	150C1F1	9588	24937	82396	9588	24937	-82396
Permanent loads yg= 1.2	150C1F2	9588	24623	82071	9588	24623	-82071
Wind angle: 90°	150C1F3	9588	24236	81700	9588	24236	-81700
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4373	16605	42427	4373	16605	-42427
Wind, -5°C	150C1F1	11147	34309	98225	11147	34309	-98225
Permanent loads yg= 1.2	150C1F2	11147	33183	96390	11147	33183	-96390
Wind angle: 90°	150C1F3	11147	31795	94214	11147	31795	-94214
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3206	7532	24307	3206	7532	-24307
Construction/maintenance, +5°C	150C1F1	10797	24852	82073	10797	24852	-82073
Permanent loads yg= 1.2	150C1F2	10797	24555	81810	10797	24555	-81810
Wind angle: 90°	150C1F3	10797	24187	81513	10797	24187	-81513
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2605	9462	25373	2604	6303	-20211
Wind, 10°C	150C1F1	9595	30173	84712	9593	22078	-73098
Permanent loads yg= 1.2	150C1F2	9595	29084	82861	9593	21818	-72869
Wind angle: -45°	150C1F3	9594	27741	80659	9593	21498	-72609
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2603	6777	22237	2603	6081	-21676
Wind, -20°C	150C1F1	9588	24175	81645	9588	22349	-80547
Permanent loads yg= 1.2	150C1F2	9588	23938	81440	9588	22284	-80533
Wind angle: -45°	150C1F3	9588	23644	81208	9588	22203	-80520
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4373	14660	39007	4371	10016	-32147
Wind, -5°C	150C1F1	11146	31579	93885	11145	25279	-86353
Permanent loads yg= 1.2	150C1F2	11146	30731	92625	11145	25073	-86218
Wind angle: -45°	150C1F3	11146	29689	91151	11145	24817	-86067
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3206	7262	24043	3206	6612	-23658
Construction/maintenance, +5°C	150C1F1	10797	24129	81469	10797	22369	-80622
Permanent loads yg= 1.2	150C1F2	10797	23903	81305	10797	22306	-80613
Wind angle: -45°	150C1F3	10797	23622	81122	10797	22227	-80605
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1953	4335	15291	1953	4335	-15291
Wind, 10°C	150C1F1	7193	15760	56325	7193	15760	-56325
Permanent loads yg= 0.9	150C1F2	7193	15702	56309	7193	15702	-56309
Wind angle: 0°	150C1F3	7193	15631	56292	7193	15631	-56292
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	4654	17096	1952	4654	-17096
Wind, -20°C	150C1F1	7189	17366	64043	7189	17366	-64043
Permanent loads yg= 0.9	150C1F2	7189	17350	64044	7189	17350	-64044
Wind angle: 0°	150C1F3	7189	17329	64046	7189	17329	-64046
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/3	GW / opgw	3719	7753	27532	3719	7753	-27532
Wind, -5°C	150C1F1	8745	19427	70362	8745	19427	-70362
Permanent loads yg= 0.9	150C1F2	8745	19380	70356	8745	19380	-70356
Wind angle: 0°	150C1F3	8745	19320	70350	8745	19320	-70350
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2554	5309	19540	2554	5309	-19540
Construction/maintenance, +5°C	150C1F1	8396	17734	65417	8396	17734	-65417
Permanent loads yg= 0.9	150C1F2	8396	17718	65418	8396	17718	-65418
Wind angle: 0°	150C1F3	8396	17698	65421	8396	17698	-65421
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1953	5242	16253	1953	8771	-22794
Wind, 10°C	150C1F1	7193	18110	58292	7195	27228	-73726
Permanent loads yg= 0.9	150C1F2	7193	17821	57953	7195	26012	-71402
Wind angle: 45°	150C1F3	7193	17467	57565	7195	24505	-68586
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	4872	17166	1952	5645	-18010
Wind, -20°C	150C1F1	7189	17956	64156	7189	19952	-65886
Permanent loads yg= 0.9	150C1F2	7189	17889	64130	7189	19687	-65577
Wind angle: 45°	150C1F3	7189	17804	64101	7189	19360	-65223
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3719	9062	28588	3721	14009	-36576
Wind, -5°C	150C1F1	8745	21283	71442	8747	28254	-81482
Permanent loads yg= 0.9	150C1F2	8745	21060	71246	8746	27312	-79870
Wind angle: 45°	150C1F3	8745	20785	71024	8746	26153	-77956
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2554	5517	19572	2554	6210	-20120
Construction/maintenance, +5°C	150C1F1	8396	18310	65474	8397	20188	-66761
Permanent loads yg= 0.9	150C1F2	8396	18245	65457	8397	19942	-66524
Wind angle: 45°	150C1F3	8396	18163	65439	8396	19638	-66256
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1954	10208	25731	1954	10208	-25731
Wind, 10°C	150C1F1	7196	31077	81279	7196	31077	-81279
Permanent loads yg= 0.9	150C1F2	7196	29503	78160	7196	29503	-78160
Wind angle: 90°	150C1F3	7195	27538	74322	7195	27538	-74322
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	5983	18527	1952	5983	-18527
Wind, -20°C	150C1F1	7189	20810	66996	7189	20810	-66996
Permanent loads yg= 0.9	150C1F2	7189	20455	66519	7189	20455	-66519
Wind angle: 90°	150C1F3	7189	20020	65968	7189	20020	-65968
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3721	16048	40351	3721	16048	-40351
Wind, -5°C	150C1F1	8747	31276	86909	8747	31276	-86909
Permanent loads yg= 0.9	150C1F2	8747	30032	84636	8747	30032	-84636
Wind angle: 90°	150C1F3	8747	28495	81901	8747	28495	-81901
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2554	6506	20476	2554	6506	-20476
Construction/maintenance, +5°C	150C1F1	8397	20979	67619	8397	20979	-67619
Permanent loads yg= 0.9	150C1F2	8397	20652	67249	8397	20652	-67249
Wind angle: 90°	150C1F3	8397	20250	66824	8397	20250	-66824
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1953	8771	22794	1953	5242	-16253
Wind, 10°C	150C1F1	7195	27228	73726	7193	18110	-58292
Permanent loads yg= 0.9	150C1F2	7195	26012	71402	7193	17821	-57953
Wind angle: -45°	150C1F3	7195	24505	68586	7193	17467	-57565
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	5645	18010	1952	4872	-17166
Wind, -20°C	150C1F1	7189	19952	65886	7189	17956	-64156
Permanent loads yg= 0.9	150C1F2	7189	19687	65577	7189	17889	-64130
Wind angle: -45°	150C1F3	7189	19360	65223	7189	17804	-64101
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3721	14009	36576	3719	9062	-28588
Wind, -5°C	150C1F1	8747	28254	81482	8745	21283	-71442
Permanent loads yg= 0.9	150C1F2	8746	27312	79870	8745	21060	-71246
Wind angle: -45°	150C1F3	8746	26153	77956	8745	20785	-71024
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2554	6210	20120	2554	5517	-19572
Construction/maintenance, +5°C	150C1F1	8397	20188	66761	8396	18310	-65474
Permanent loads yg= 0.9	150C1F2	8397	19942	66524	8396	18245	-65457
Wind angle: -45°	150C1F3	8396	19638	66256	8396	18163	-65439
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HK450

Appendix M1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19186	39829	143662	19186	39829	-143662
	380C2F2	19186	39719	143647	19186	39719	-143647
	380C2F3	19186	39581	143633	19186	39581	-143633
	RTG	0	0	0	5200	10767	-39047
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19175	43557	161025	19175	43557	-161025
	380C2F2	19175	43525	161029	19175	43525	-161029
	380C2F3	19175	43486	161034	19175	43486	-161034
	RTG	0	0	0	5198	11602	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22290	47050	171311	22290	47050	-171311
	380C2F2	22290	46958	171308	22290	46958	-171308
	380C2F3	22290	46842	171307	22290	46842	-171307
	RTG	0	0	0	8742	17230	-62511
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21593	43613	161235	21593	43613	-161235
	380C2F2	21593	43582	161239	21593	43582	-161239
	380C2F3	21593	43542	161246	21593	43542	-161246
	RTG	0	0	0	6404	12748	-47227
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19187	44156	146196	19190	60346	-169423
	380C2F2	19186	43637	145737	19190	58168	-165723
	380C2F3	19186	42996	145217	19189	55482	-161318
	RTG	0	0	0	5201	15268	-44237
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19175	44697	161094	19176	48350	-163290
	380C2F2	19175	44568	161067	19176	47875	-162880
	380C2F3	19175	44407	161040	19176	47288	-162415
	RTG	0	0	0	5198	12669	-43363
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22290	50557	172706	22293	63157	-187769
	380C2F2	22290	50145	172436	22293	61462	-185250
	380C2F3	22290	49633	172134	22292	59378	-182301
	RTG	0	0	0	8744	23926	-69220
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21593	44738	161243	21593	48258	-162938
	380C2F2	21593	44612	161226	21593	47805	-162611
	380C2F3	21593	44453	161210	21593	47244	-162244
	RTG	0	0	0	6404	13771	-47474
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19192	67317	181817	19192	67317	-181817
	380C2F2	19191	64452	176637	19191	64452	-176637
	380C2F3	19190	60902	170383	19190	60902	-170383
	RTG	0	0	0	5201	16808	-46877

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19176	49874	164792	19176	49874	-164792
	380C2F2	19176	49246	164141	19176	49246	-164141
	380C2F3	19176	48471	163400	19176	48471	-163400
	RTG	0	0	0	5198	13003	-43653
	NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		22295	68618	196450	22295	68618	-196450
380C2F2		22294	66366	192779	22294	66366	-192779
380C2F3		22293	63590	188429	22293	63590	-188429
RTG		0	0	0	8745	26174	-72712
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°		GW / opgw	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21594	49704	164145	21594	49704	-164145
	380C2F2	21594	49109	163620	21594	49109	-163620
	380C2F3	21593	48373	163025	21593	48373	-163025
	RTG	0	0	0	6404	14081	-47676
	NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		19190	60346	169423	19187	44156	-146196
380C2F2		19190	58168	165723	19186	43637	-145737
380C2F3		19189	55482	161318	19186	42996	-145217
RTG		0	0	0	5200	11727	-39521
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19176	48350	163290	19175	44697	-161094
	380C2F2	19176	47875	162880	19175	44568	-161067
	380C2F3	19176	47288	162415	19175	44407	-161040
	RTG	0	0	0	5198	11859	-42953
	NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		22293	63157	187769	22290	50557	-172706
380C2F2		22293	61462	185250	22290	50145	-172436
380C2F3		22292	59378	182301	22290	49633	-172134
RTG		0	0	0	8742	18696	-63083
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21593	48258	162938	21593	44738	-161243
	380C2F2	21593	47805	162611	21593	44612	-161226
	380C2F3	21593	47244	162244	21593	44453	-161210
	RTG	0	0	0	6404	13001	-47213
	NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		14386	31519	112651	14386	31519	-112651
380C2F2		14386	31405	112618	14386	31405	-112618
380C2F3		14386	31261	112584	14386	31261	-112584
RTG		0	0	0	3899	8469	-30469
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	14378	34731	128087	14378	34731	-128087
	380C2F2	14378	34699	128089	14378	34699	-128089
	380C2F3	14378	34659	128092	14378	34659	-128092
	RTG	0	0	0	3898	9170	-33875

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17490	38854	140725	17490	38854	-140725	
	380C2F2	17490	38759	140712	17490	38759	-140712	
	380C2F3	17490	38641	140701	17490	38641	-140701	
	RTG	0	0	0	7440	15192	-54906	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16793	35467	130833	16793	35467	-130833	
	380C2F2	16793	35436	130837	16793	35436	-130837	
	380C2F3	16793	35396	130841	16793	35396	-130841	
	RTG	0	0	0	5103	10547	-39011	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14387	36220	116583	14390	54457	-147451	
	380C2F2	14387	35643	115906	14390	52025	-142805	
	380C2F3	14387	34933	115130	14389	49010	-137172	
	RTG	0	0	0	3900	13493	-37618	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14378	35913	128311	14378	39904	-131772	
	380C2F2	14378	35777	128259	14378	39373	-131154	
	380C2F3	14378	35608	128202	14378	38721	-130446	
	RTG	0	0	0	3898	10312	-34566	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17490	42566	142884	17493	56508	-162964	
	380C2F2	17490	42121	142492	17493	54624	-159739	
	380C2F3	17490	41571	142048	17492	52305	-155912	
	RTG	0	0	0	7442	22289	-63115	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16793	36620	130948	16793	40375	-133522	
	380C2F2	16793	36489	130914	16793	39883	-133049	
	380C2F3	16793	36325	130878	16793	39276	-132512	
	RTG	0	0	0	5103	11611	-39414	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14392	62154	162559	14392	62154	-162559	
	380C2F2	14391	59006	156320	14391	59006	-156320	
	380C2F3	14390	55075	148645	14390	55075	-148645	
	RTG	0	0	0	3901	15214	-40930	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14379	41620	133992	14379	41620	-133992	
	380C2F2	14379	40910	133037	14379	40910	-133037	
	380C2F3	14378	40039	131936	14378	40039	-131936	
	RTG	0	0	0	3898	10684	-34999	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17495	62552	173818	17495	62552	-173818	
	380C2F2	17494	60065	169273	17494	60065	-169273	
	380C2F3	17493	56989	163802	17493	56989	-163802	
	RTG	0	0	0	7443	24686	-67163	

NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	16793	41957	135239	16793	41957	-135239
	380C2F2	16793	41304	134497	16793	41304	-134497
	380C2F3	16793	40501	133648	16793	40501	-133648
	RTG	0	0	0	5103	11944	-39698
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	14390	54457	147451	14387	36220	-116583
	380C2F2	14390	52025	142805	14387	35643	-115906
	380C2F3	14389	49010	137172	14387	34933	-115130
	RTG	0	0	0	3900	9503	-31218
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	14378	39904	131772	14378	35913	-128311
	380C2F2	14378	39373	131154	14378	35777	-128259
	380C2F3	14378	38721	130446	14378	35608	-128202
	RTG	0	0	0	3898	9436	-33909
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	17493	56508	162964	17490	42566	-142884
	380C2F2	17493	54624	159739	17490	42121	-142492
	380C2F3	17492	52305	155912	17490	41571	-142048
	RTG	0	0	0	7441	16711	-55679
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	16793	40375	133522	16793	36620	-130948
	380C2F2	16793	39883	133049	16793	36489	-130914
	380C2F3	16793	39276	132512	16793	36325	-130878
	RTG	0	0	0	5103	10804	-39014

ZWW4HK450

Appendix M1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19186	39829	143662	19186	39829	-143662
	380C2F2	19186	39719	143647	19186	39719	-143647
	380C2F3	19186	39581	143633	19186	39581	-143633
	RTG	0	0	0	5200	10767	-39047
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19175	43557	161025	19175	43557	-161025
	380C2F2	19175	43525	161029	19175	43525	-161029
	380C2F3	19175	43486	161034	19175	43486	-161034
	RTG	0	0	0	5198	11602	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22290	47050	171311	22290	47050	-171311
	380C2F2	22290	46958	171308	22290	46958	-171308
	380C2F3	22290	46842	171307	22290	46842	-171307
	RTG	0	0	0	8742	17230	-62511
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21593	43613	161235	21593	43613	-161235
	380C2F2	21593	43582	161239	21593	43582	-161239
	380C2F3	21593	43542	161246	21593	43542	-161246
	RTG	0	0	0	6404	12748	-47227
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19187	44156	146196	19190	60346	-169423
	380C2F2	19186	43637	145737	19190	58168	-165723
	380C2F3	19186	42996	145217	19189	55482	-161318
	RTG	0	0	0	5201	15268	-44237
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19175	44697	161094	19176	48350	-163290
	380C2F2	19175	44568	161067	19176	47875	-162880
	380C2F3	19175	44407	161040	19176	47288	-162415
	RTG	0	0	0	5198	12669	-43363
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	22290	50557	172706	22293	63157	-187769
	380C2F2	22290	50145	172436	22293	61462	-185250
	380C2F3	22290	49633	172134	22292	59378	-182301
	RTG	0	0	0	8744	23926	-69220
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21593	44738	161243	21593	48258	-162938
	380C2F2	21593	44612	161226	21593	47805	-162611
	380C2F3	21593	44453	161210	21593	47244	-162244
	RTG	0	0	0	6404	13771	-47474
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19192	67317	181817	19192	67317	-181817
	380C2F2	19191	64452	176637	19191	64452	-176637
	380C2F3	19190	60902	170383	19190	60902	-170383
	RTG	0	0	0	5201	16808	-46877

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19176	49874	164792	19176	49874	-164792
	380C2F2	19176	49246	164141	19176	49246	-164141
	380C2F3	19176	48471	163400	19176	48471	-163400
	RTG	0	0	0	5198	13003	-43653
	NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		22295	68618	196450	22295	68618	-196450
380C2F2		22294	66366	192779	22294	66366	-192779
380C2F3		22293	63590	188429	22293	63590	-188429
RTG		0	0	0	8745	26174	-72712
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°		GW / opgw	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21594	49704	164145	21594	49704	-164145
	380C2F2	21594	49109	163620	21594	49109	-163620
	380C2F3	21593	48373	163025	21593	48373	-163025
	RTG	0	0	0	6404	14081	-47676
	NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		19190	60346	169423	19187	44156	-146196
380C2F2		19190	58168	165723	19186	43637	-145737
380C2F3		19189	55482	161318	19186	42996	-145217
RTG		0	0	0	5200	11727	-39521
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19176	48350	163290	19175	44697	-161094
	380C2F2	19176	47875	162880	19175	44568	-161067
	380C2F3	19176	47288	162415	19175	44407	-161040
	RTG	0	0	0	5198	11859	-42953
	NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		22293	63157	187769	22290	50557	-172706
380C2F2		22293	61462	185250	22290	50145	-172436
380C2F3		22292	59378	182301	22290	49633	-172134
RTG		0	0	0	8742	18696	-63083
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21593	48258	162938	21593	44738	-161243
	380C2F2	21593	47805	162611	21593	44612	-161226
	380C2F3	21593	47244	162244	21593	44453	-161210
	RTG	0	0	0	6404	13001	-47213
	NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0
150C1F1		0	0	0	0	0	0
150C1F2		0	0	0	0	0	0
150C1F3		0	0	0	0	0	0
380C2F1		14386	31519	112651	14386	31519	-112651
380C2F2		14386	31405	112618	14386	31405	-112618
380C2F3		14386	31261	112584	14386	31261	-112584
RTG		0	0	0	3899	8469	-30469
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	14378	34731	128087	14378	34731	-128087
	380C2F2	14378	34699	128089	14378	34699	-128089
	380C2F3	14378	34659	128092	14378	34659	-128092
	RTG	0	0	0	3898	9170	-33875

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17490	38854	140725	17490	38854	-140725	
	380C2F2	17490	38759	140712	17490	38759	-140712	
	380C2F3	17490	38641	140701	17490	38641	-140701	
	RTG	0	0	0	7440	15192	-54906	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16793	35467	130833	16793	35467	-130833	
	380C2F2	16793	35436	130837	16793	35436	-130837	
	380C2F3	16793	35396	130841	16793	35396	-130841	
	RTG	0	0	0	5103	10547	-39011	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14387	36220	116583	14390	54457	-147451	
	380C2F2	14387	35643	115906	14390	52025	-142805	
	380C2F3	14387	34933	115130	14389	49010	-137172	
	RTG	0	0	0	3900	13493	-37618	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14378	35913	128311	14378	39904	-131772	
	380C2F2	14378	35777	128259	14378	39373	-131154	
	380C2F3	14378	35608	128202	14378	38721	-130446	
	RTG	0	0	0	3898	10312	-34566	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17490	42566	142884	17493	56508	-162964	
	380C2F2	17490	42121	142492	17493	54624	-159739	
	380C2F3	17490	41571	142048	17492	52305	-155912	
	RTG	0	0	0	7442	22289	-63115	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	16793	36620	130948	16793	40375	-133522	
	380C2F2	16793	36489	130914	16793	39883	-133049	
	380C2F3	16793	36325	130878	16793	39276	-132512	
	RTG	0	0	0	5103	11611	-39414	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14392	62154	162559	14392	62154	-162559	
	380C2F2	14391	59006	156320	14391	59006	-156320	
	380C2F3	14390	55075	148645	14390	55075	-148645	
	RTG	0	0	0	3901	15214	-40930	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	14379	41620	133992	14379	41620	-133992	
	380C2F2	14379	40910	133037	14379	40910	-133037	
	380C2F3	14378	40039	131936	14378	40039	-131936	
	RTG	0	0	0	3898	10684	-34999	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17495	62552	173818	17495	62552	-173818	
	380C2F2	17494	60065	169273	17494	60065	-169273	
	380C2F3	17493	56989	163802	17493	56989	-163802	
	RTG	0	0	0	7443	24686	-67163	

NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	16793	41957	135239	16793	41957	-135239
	380C2F2	16793	41304	134497	16793	41304	-134497
	380C2F3	16793	40501	133648	16793	40501	-133648
	RTG	0	0	0	5103	11944	-39698
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	14390	54457	147451	14387	36220	-116583
	380C2F2	14390	52025	142805	14387	35643	-115906
	380C2F3	14389	49010	137172	14387	34933	-115130
	RTG	0	0	0	3900	9503	-31218
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	14378	39904	131772	14378	35913	-128311
	380C2F2	14378	39373	131154	14378	35777	-128259
	380C2F3	14378	38721	130446	14378	35608	-128202
	RTG	0	0	0	3898	9436	-33909
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	17493	56508	162964	17490	42566	-142884
	380C2F2	17493	54624	159739	17490	42121	-142492
	380C2F3	17492	52305	155912	17490	41571	-142048
	RTG	0	0	0	7441	16711	-55679
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	16793	40375	133522	16793	36620	-130948
	380C2F2	16793	39883	133049	16793	36489	-130914
	380C2F3	16793	39276	132512	16793	36325	-130878
	RTG	0	0	0	5103	10804	-39014

ZWW4HK450

Appendix M1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	5480	19563	0	0	0
	150C1F1	9593	19914	71831	0	0	0
	150C1F2	9593	19859	71823	0	0	0
	150C1F3	9593	19790	71816	0	0	0
	380C2F1	0	0	0	19186	39829	-143662
	380C2F2	0	0	0	19186	39719	-143647
	380C2F3	0	0	0	19186	39581	-143633
	RTG	0	0	0	5200	10767	-39047
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	5872	21643	0	0	0
	150C1F1	9588	21778	80512	0	0	0
	150C1F2	9588	21763	80514	0	0	0
	150C1F3	9588	21743	80517	0	0	0
	380C2F1	0	0	0	19175	43557	-161025
	380C2F2	0	0	0	19175	43525	-161029
	380C2F3	0	0	0	19175	43486	-161034
	RTG	0	0	0	5198	11602	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	8769	31323	0	0	0
	150C1F1	11145	23525	85655	0	0	0
	150C1F2	11145	23479	85654	0	0	0
	150C1F3	11145	23421	85653	0	0	0
	380C2F1	0	0	0	22290	47050	-171311
	380C2F2	0	0	0	22290	46958	-171308
	380C2F3	0	0	0	22290	46842	-171307
	RTG	0	0	0	8742	17230	-62511
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	6409	23646	0	0	0
	150C1F1	10796	21807	80617	0	0	0
	150C1F2	10796	21791	80620	0	0	0
	150C1F3	10796	21771	80623	0	0	0
	380C2F1	0	0	0	21593	43613	-161235
	380C2F2	0	0	0	21593	43582	-161239
	380C2F3	0	0	0	21593	43542	-161246
	RTG	0	0	0	6404	12748	-47227
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	6303	20211	0	0	0
	150C1F1	9593	22078	73098	0	0	0
	150C1F2	9593	21818	72869	0	0	0
	150C1F3	9593	21498	72609	0	0	0
	380C2F1	0	0	0	19190	60346	-169423
	380C2F2	0	0	0	19190	58168	-165723
	380C2F3	0	0	0	19189	55482	-161318
	RTG	0	0	0	5201	15268	-44237
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	6081	21676	0	0	0
	150C1F1	9588	22349	80547	0	0	0
	150C1F2	9588	22284	80533	0	0	0
	150C1F3	9588	22203	80520	0	0	0
	380C2F1	0	0	0	19176	48350	-163290
	380C2F2	0	0	0	19176	47875	-162880
	380C2F3	0	0	0	19176	47288	-162415
	RTG	0	0	0	5198	12669	-43363
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	10016	32147	0	0	0
	150C1F1	11145	25279	86353	0	0	0
	150C1F2	11145	25073	86218	0	0	0
	150C1F3	11145	24817	86067	0	0	0
	380C2F1	0	0	0	22293	63157	-187769
	380C2F2	0	0	0	22293	61462	-185250
	380C2F3	0	0	0	22292	59378	-182301
	RTG	0	0	0	8744	23926	-69220
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	6612	23658	0	0	0
	150C1F1	10797	22369	80622	0	0	0
	150C1F2	10797	22306	80613	0	0	0
	150C1F3	10797	22227	80605	0	0	0
	380C2F1	0	0	0	21593	48258	-162938
	380C2F2	0	0	0	21593	47805	-162611
	380C2F3	0	0	0	21593	47244	-162244
	RTG	0	0	0	6404	13771	-47474
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	10793	27912	0	0	0
	150C1F1	9596	33659	90909	0	0	0
	150C1F2	9596	32226	88319	0	0	0
	150C1F3	9595	30451	85191	0	0	0
	380C2F1	0	0	0	19192	67317	-181817
	380C2F2	0	0	0	19191	64452	-176637
	380C2F3	0	0	0	19190	60902	-170383
	RTG	0	0	0	5201	16808	-46877

NL3/1b	GW / opgw	2603	7075	22601	0	0	0
Wind, -20°C	150C1F1	9588	24937	82396	0	0	0
Permanent loads yg= 1.2	150C1F2	9588	24623	82071	0	0	0
Wind angle: 90°	150C1F3	9588	24236	81700	0	0	0
	380C2F1	0	0	0	19176	49874	-164792
	380C2F2	0	0	0	19176	49246	-164141
	380C2F3	0	0	0	19176	48471	-163400
	RTG	0	0	0	5198	13003	-43653
NL3/3	GW / opgw	4373	16605	42427	0	0	0
Wind, -5°C	150C1F1	11147	34309	98225	0	0	0
Permanent loads yg= 1.2	150C1F2	11147	33183	96390	0	0	0
Wind angle: 90°	150C1F3	11147	31795	94214	0	0	0
	380C2F1	0	0	0	22295	68618	-196450
	380C2F2	0	0	0	22294	66366	-192779
	380C2F3	0	0	0	22293	63590	-188429
	RTG	0	0	0	8745	26174	-72712
NL3/4	GW / opgw	3206	7532	24307	0	0	0
Construction/maintenance, +5°C	150C1F1	10797	24852	82073	0	0	0
Permanent loads yg= 1.2	150C1F2	10797	24555	81810	0	0	0
Wind angle: 90°	150C1F3	10797	24187	81513	0	0	0
	380C2F1	0	0	0	21594	49704	-164145
	380C2F2	0	0	0	21594	49109	-163620
	380C2F3	0	0	0	21593	48373	-163025
	RTG	0	0	0	6404	14081	-47676
NL3/1a	GW / opgw	2605	9462	25373	0	0	0
Wind, 10°C	150C1F1	9595	30173	84712	0	0	0
Permanent loads yg= 1.2	150C1F2	9595	29084	82861	0	0	0
Wind angle: -45°	150C1F3	9594	27741	80659	0	0	0
	380C2F1	0	0	0	19187	44156	-146196
	380C2F2	0	0	0	19186	43637	-145737
	380C2F3	0	0	0	19186	42996	-145217
	RTG	0	0	0	5200	11727	-39521
NL3/1b	GW / opgw	2603	6777	22237	0	0	0
Wind, -20°C	150C1F1	9588	24175	81645	0	0	0
Permanent loads yg= 1.2	150C1F2	9588	23938	81440	0	0	0
Wind angle: -45°	150C1F3	9588	23644	81208	0	0	0
	380C2F1	0	0	0	19175	44697	-161094
	380C2F2	0	0	0	19175	44568	-161067
	380C2F3	0	0	0	19175	44407	-161040
	RTG	0	0	0	5198	11859	-42953
NL3/3	GW / opgw	4373	14660	39007	0	0	0
Wind, -5°C	150C1F1	11146	31579	93885	0	0	0
Permanent loads yg= 1.2	150C1F2	11146	30731	92625	0	0	0
Wind angle: -45°	150C1F3	11146	29689	91151	0	0	0
	380C2F1	0	0	0	22290	50557	-172706
	380C2F2	0	0	0	22290	50145	-172436
	380C2F3	0	0	0	22290	49633	-172134
	RTG	0	0	0	8742	18696	-63083
NL3/4	GW / opgw	3206	7262	24043	0	0	0
Construction/maintenance, +5°C	150C1F1	10797	24129	81469	0	0	0
Permanent loads yg= 1.2	150C1F2	10797	23903	81305	0	0	0
Wind angle: -45°	150C1F3	10797	23622	81122	0	0	0
	380C2F1	0	0	0	21593	44738	-161243
	380C2F2	0	0	0	21593	44612	-161226
	380C2F3	0	0	0	21593	44453	-161210
	RTG	0	0	0	6404	13001	-47213
NL3/1a	GW / opgw	1953	4335	15291	0	0	0
Wind, 10°C	150C1F1	7193	15760	56325	0	0	0
Permanent loads yg= 0.9	150C1F2	7193	15702	56309	0	0	0
Wind angle: 0°	150C1F3	7193	15631	56292	0	0	0
	380C2F1	0	0	0	14386	31519	-112651
	380C2F2	0	0	0	14386	31405	-112618
	380C2F3	0	0	0	14386	31261	-112584
	RTG	0	0	0	3899	8469	-30469
NL3/1b	GW / opgw	1952	4654	17096	0	0	0
Wind, -20°C	150C1F1	7189	17366	64043	0	0	0
Permanent loads yg= 0.9	150C1F2	7189	17350	64044	0	0	0
Wind angle: 0°	150C1F3	7189	17329	64046	0	0	0
	380C2F1	0	0	0	14378	34731	-128087
	380C2F2	0	0	0	14378	34699	-128089
	380C2F3	0	0	0	14378	34659	-128092
	RTG	0	0	0	3898	9170	-33875

NL3/3	GW / opgw	3719	7753	27532	0	0	0
Wind, -5°C	150C1F1	8745	19427	70362	0	0	0
Permanent loads yg= 0.9	150C1F2	8745	19380	70356	0	0	0
Wind angle: 0°	150C1F3	8745	19320	70350	0	0	0
	380C2F1	0	0	0	17490	38854	-140725
	380C2F2	0	0	0	17490	38759	-140712
	380C2F3	0	0	0	17490	38641	-140701
	RTG	0	0	0	7440	15192	-54906
NL3/4	GW / opgw	2554	5309	19540	0	0	0
Construction/maintenance, +5°C	150C1F1	8396	17734	65417	0	0	0
Permanent loads yg= 0.9	150C1F2	8396	17718	65418	0	0	0
Wind angle: 0°	150C1F3	8396	17698	65421	0	0	0
	380C2F1	0	0	0	16793	35467	-130833
	380C2F2	0	0	0	16793	35436	-130837
	380C2F3	0	0	0	16793	35396	-130841
	RTG	0	0	0	5103	10547	-39011
NL3/1a	GW / opgw	1953	5242	16253	0	0	0
Wind, 10°C	150C1F1	7193	18110	58292	0	0	0
Permanent loads yg= 0.9	150C1F2	7193	17821	57953	0	0	0
Wind angle: 45°	150C1F3	7193	17467	57565	0	0	0
	380C2F1	0	0	0	14390	54457	-147451
	380C2F2	0	0	0	14390	52025	-142805
	380C2F3	0	0	0	14389	49010	-137172
	RTG	0	0	0	3900	13493	-37618
NL3/1b	GW / opgw	1952	4872	17166	0	0	0
Wind, -20°C	150C1F1	7189	17956	64156	0	0	0
Permanent loads yg= 0.9	150C1F2	7189	17889	64130	0	0	0
Wind angle: 45°	150C1F3	7189	17804	64101	0	0	0
	380C2F1	0	0	0	14378	39904	-131772
	380C2F2	0	0	0	14378	39373	-131154
	380C2F3	0	0	0	14378	38721	-130446
	RTG	0	0	0	3898	10312	-34566
NL3/3	GW / opgw	3719	9062	28588	0	0	0
Wind, -5°C	150C1F1	8745	21283	71442	0	0	0
Permanent loads yg= 0.9	150C1F2	8745	21060	71246	0	0	0
Wind angle: 45°	150C1F3	8745	20785	71024	0	0	0
	380C2F1	0	0	0	17493	56508	-162964
	380C2F2	0	0	0	17493	54624	-159739
	380C2F3	0	0	0	17492	52305	-155912
	RTG	0	0	0	7442	22289	-63115
NL3/4	GW / opgw	2554	5517	19572	0	0	0
Construction/maintenance, +5°C	150C1F1	8396	18310	65474	0	0	0
Permanent loads yg= 0.9	150C1F2	8396	18245	65457	0	0	0
Wind angle: 45°	150C1F3	8396	18163	65439	0	0	0
	380C2F1	0	0	0	16793	40375	-133522
	380C2F2	0	0	0	16793	39883	-133049
	380C2F3	0	0	0	16793	39276	-132512
	RTG	0	0	0	5103	11611	-39414
NL3/1a	GW / opgw	1954	10208	25731	0	0	0
Wind, 10°C	150C1F1	7196	31077	81279	0	0	0
Permanent loads yg= 0.9	150C1F2	7196	29503	78160	0	0	0
Wind angle: 90°	150C1F3	7195	27538	74322	0	0	0
	380C2F1	0	0	0	14392	62154	-162559
	380C2F2	0	0	0	14391	59006	-156320
	380C2F3	0	0	0	14390	55075	-148645
	RTG	0	0	0	3901	15214	-40930
NL3/1b	GW / opgw	1952	5983	18527	0	0	0
Wind, -20°C	150C1F1	7189	20810	66996	0	0	0
Permanent loads yg= 0.9	150C1F2	7189	20455	66519	0	0	0
Wind angle: 90°	150C1F3	7189	20020	65968	0	0	0
	380C2F1	0	0	0	14379	41620	-133992
	380C2F2	0	0	0	14379	40910	-133037
	380C2F3	0	0	0	14378	40039	-131936
	RTG	0	0	0	3898	10684	-34999
NL3/3	GW / opgw	3721	16048	40351	0	0	0
Wind, -5°C	150C1F1	8747	31276	86909	0	0	0
Permanent loads yg= 0.9	150C1F2	8747	30032	84636	0	0	0
Wind angle: 90°	150C1F3	8747	28495	81901	0	0	0
	380C2F1	0	0	0	17495	62552	-173818
	380C2F2	0	0	0	17494	60065	-169273
	380C2F3	0	0	0	17493	56989	-163802
	RTG	0	0	0	7443	24686	-67163

NL3/4	GW / opgw	2554	6506	20476	0	0	0
Construction/maintenance, +5°C	150C1F1	8397	20979	67619	0	0	0
Permanent loads yg= 0.9	150C1F2	8397	20652	67249	0	0	0
Wind angle: 90°	150C1F3	8397	20250	66824	0	0	0
	380C2F1	0	0	0	16793	41957	-135239
	380C2F2	0	0	0	16793	41304	-134497
	380C2F3	0	0	0	16793	40501	-133648
	RTG	0	0	0	5103	11944	-39698
NL3/1a	GW / opgw	1953	8771	22794	0	0	0
Wind, 10°C	150C1F1	7195	27228	73726	0	0	0
Permanent loads yg= 0.9	150C1F2	7195	26012	71402	0	0	0
Wind angle: -45°	150C1F3	7195	24505	68586	0	0	0
	380C2F1	0	0	0	14387	36220	-116583
	380C2F2	0	0	0	14387	35643	-115906
	380C2F3	0	0	0	14387	34933	-115130
	RTG	0	0	0	3900	9503	-31218
NL3/1b	GW / opgw	1952	5645	18010	0	0	0
Wind, -20°C	150C1F1	7189	19952	65886	0	0	0
Permanent loads yg= 0.9	150C1F2	7189	19687	65577	0	0	0
Wind angle: -45°	150C1F3	7189	19360	65223	0	0	0
	380C2F1	0	0	0	14378	35913	-128311
	380C2F2	0	0	0	14378	35777	-128259
	380C2F3	0	0	0	14378	35608	-128202
	RTG	0	0	0	3898	9436	-33909
NL3/3	GW / opgw	3721	14009	36576	0	0	0
Wind, -5°C	150C1F1	8747	28254	81482	0	0	0
Permanent loads yg= 0.9	150C1F2	8746	27312	79870	0	0	0
Wind angle: -45°	150C1F3	8746	26153	77956	0	0	0
	380C2F1	0	0	0	17490	42566	-142884
	380C2F2	0	0	0	17490	42121	-142492
	380C2F3	0	0	0	17490	41571	-142048
	RTG	0	0	0	7441	16711	-55679
NL3/4	GW / opgw	2554	6210	20120	0	0	0
Construction/maintenance, +5°C	150C1F1	8397	20188	66761	0	0	0
Permanent loads yg= 0.9	150C1F2	8397	19942	66524	0	0	0
Wind angle: -45°	150C1F3	8396	19638	66256	0	0	0
	380C2F1	0	0	0	16793	36620	-130948
	380C2F2	0	0	0	16793	36489	-130914
	380C2F3	0	0	0	16793	36325	-130878
	RTG	0	0	0	5103	10804	-39014

ZWW4HK450

Appendix M1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2604	5480	-19563
	150C1F1	0	0	0	9593	19914	-71831
	150C1F2	0	0	0	9593	19859	-71823
	150C1F3	0	0	0	9593	19790	-71816
	380C2F1	19186	39829	143662	19186	39829	-143662
	380C2F2	19186	39719	143647	19186	39719	-143647
	380C2F3	19186	39581	143633	19186	39581	-143633
	RTG	5200	10767	39047	5200	10767	-39047
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2603	5872	-21643
	150C1F1	0	0	0	9588	21778	-80512
	150C1F2	0	0	0	9588	21763	-80514
	150C1F3	0	0	0	9588	21743	-80517
	380C2F1	19175	43557	161025	19175	43557	-161025
	380C2F2	19175	43525	161029	19175	43525	-161029
	380C2F3	19175	43486	161034	19175	43486	-161034
	RTG	5198	11602	42948	5198	11602	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4371	8769	-31323
	150C1F1	0	0	0	11145	23525	-85655
	150C1F2	0	0	0	11145	23479	-85654
	150C1F3	0	0	0	11145	23421	-85653
	380C2F1	22290	47050	171311	22290	47050	-171311
	380C2F2	22290	46958	171308	22290	46958	-171308
	380C2F3	22290	46842	171307	22290	46842	-171307
	RTG	8742	17230	62511	8742	17230	-62511
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3206	6409	-23646
	150C1F1	0	0	0	10796	21807	-80617
	150C1F2	0	0	0	10796	21791	-80620
	150C1F3	0	0	0	10796	21771	-80623
	380C2F1	21593	43613	161235	21593	43613	-161235
	380C2F2	21593	43582	161239	21593	43582	-161239
	380C2F3	21593	43542	161246	21593	43542	-161246
	RTG	6404	12748	47227	6404	12748	-47227
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2605	9462	-25373
	150C1F1	0	0	0	9595	30173	-84712
	150C1F2	0	0	0	9595	29084	-82861
	150C1F3	0	0	0	9594	27741	-80659
	380C2F1	19187	44156	146196	19190	60346	-169423
	380C2F2	19186	43637	145737	19190	58168	-165723
	380C2F3	19186	42996	145217	19189	55482	-161318
	RTG	5200	11727	39521	5201	15268	-44237
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2603	6777	-22237
	150C1F1	0	0	0	9588	24175	-81645
	150C1F2	0	0	0	9588	23938	-81440
	150C1F3	0	0	0	9588	23644	-81208
	380C2F1	19175	44697	161094	19176	48350	-163290
	380C2F2	19175	44568	161067	19176	47875	-162880
	380C2F3	19175	44407	161040	19176	47288	-162415
	RTG	5198	11859	42953	5198	12669	-43363
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4373	14660	-39007
	150C1F1	0	0	0	11146	31579	-93885
	150C1F2	0	0	0	11146	30731	-92625
	150C1F3	0	0	0	11146	29689	-91151
	380C2F1	22290	50557	172706	22293	63157	-187769
	380C2F2	22290	50145	172436	22293	61462	-185250
	380C2F3	22290	49633	172134	22292	59378	-182301
	RTG	8742	18696	63083	8744	23926	-69220
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3206	7262	-24043
	150C1F1	0	0	0	10797	24129	-81469
	150C1F2	0	0	0	10797	23903	-81305
	150C1F3	0	0	0	10797	23622	-81122
	380C2F1	21593	44738	161243	21593	48258	-162938
	380C2F2	21593	44612	161226	21593	47805	-162611
	380C2F3	21593	44453	161210	21593	47244	-162244
	RTG	6404	13001	47213	6404	13771	-47474
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2605	10793	-27912
	150C1F1	0	0	0	9596	33659	-90909
	150C1F2	0	0	0	9596	32226	-88319
	150C1F3	0	0	0	9595	30451	-85191
	380C2F1	19192	67317	181817	19192	67317	-181817
	380C2F2	19191	64452	176637	19191	64452	-176637
	380C2F3	19190	60902	170383	19190	60902	-170383
	RTG	5201	16808	46877	5201	16808	-46877

NL3/1b	GW / opgw	0	0	0	2603	7075	-22601
Wind, -20°C	150C1F1	0	0	0	9588	24937	-82396
Permanent loads yg= 1.2	150C1F2	0	0	0	9588	24623	-82071
Wind angle: 90°	150C1F3	0	0	0	9588	24236	-81700
	380C2F1	19176	49874	164792	19176	49874	-164792
	380C2F2	19176	49246	164141	19176	49246	-164141
	380C2F3	19176	48471	163400	19176	48471	-163400
	RTG	5198	13003	43653	5198	13003	-43653
NL3/3	GW / opgw	0	0	0	4373	16605	-42427
Wind, -5°C	150C1F1	0	0	0	11147	34309	-98225
Permanent loads yg= 1.2	150C1F2	0	0	0	11147	33183	-96390
Wind angle: 90°	150C1F3	0	0	0	11147	31795	-94214
	380C2F1	22295	68618	196450	22295	68618	-196450
	380C2F2	22294	66366	192779	22294	66366	-192779
	380C2F3	22293	63590	188429	22293	63590	-188429
	RTG	8745	26174	72712	8745	26174	-72712
NL3/4	GW / opgw	0	0	0	3206	7532	-24307
Construction/maintenance, +5°C	150C1F1	0	0	0	10797	24852	-82073
Permanent loads yg= 1.2	150C1F2	0	0	0	10797	24555	-81810
Wind angle: 90°	150C1F3	0	0	0	10797	24187	-81513
	380C2F1	21594	49704	164145	21594	49704	-164145
	380C2F2	21594	49109	163620	21594	49109	-163620
	380C2F3	21593	48373	163025	21593	48373	-163025
	RTG	6404	14081	47676	6404	14081	-47676
NL3/1a	GW / opgw	0	0	0	2604	6303	-20211
Wind, 10°C	150C1F1	0	0	0	9593	22078	-73098
Permanent loads yg= 1.2	150C1F2	0	0	0	9593	21818	-72869
Wind angle: -45°	150C1F3	0	0	0	9593	21498	-72609
	380C2F1	19190	60346	169423	19187	44156	-146196
	380C2F2	19190	58168	165723	19186	43637	-145737
	380C2F3	19189	55482	161318	19186	42996	-145217
	RTG	5201	15268	44237	5200	11727	-39521
NL3/1b	GW / opgw	0	0	0	2603	6081	-21676
Wind, -20°C	150C1F1	0	0	0	9588	22349	-80547
Permanent loads yg= 1.2	150C1F2	0	0	0	9588	22284	-80533
Wind angle: -45°	150C1F3	0	0	0	9588	22203	-80520
	380C2F1	19176	48350	163290	19175	44697	-161094
	380C2F2	19176	47875	162880	19175	44568	-161067
	380C2F3	19176	47288	162415	19175	44407	-161040
	RTG	5198	12669	43363	5198	11859	-42953
NL3/3	GW / opgw	0	0	0	4371	10016	-32147
Wind, -5°C	150C1F1	0	0	0	11145	25279	-86353
Permanent loads yg= 1.2	150C1F2	0	0	0	11145	25073	-86218
Wind angle: -45°	150C1F3	0	0	0	11145	24817	-86067
	380C2F1	22293	63157	187769	22290	50557	-172706
	380C2F2	22293	61462	185250	22290	50145	-172436
	380C2F3	22292	59378	182301	22290	49633	-172134
	RTG	8744	23926	69220	8742	18696	-63083
NL3/4	GW / opgw	0	0	0	3206	6612	-23658
Construction/maintenance, +5°C	150C1F1	0	0	0	10797	22369	-80622
Permanent loads yg= 1.2	150C1F2	0	0	0	10797	22306	-80613
Wind angle: -45°	150C1F3	0	0	0	10797	22227	-80605
	380C2F1	21593	48258	162938	21593	44738	-161243
	380C2F2	21593	47805	162611	21593	44612	-161226
	380C2F3	21593	47244	162244	21593	44453	-161210
	RTG	6404	13771	47474	6404	13001	-47213
NL3/1a	GW / opgw	0	0	0	1953	4335	-15291
Wind, 10°C	150C1F1	0	0	0	7193	15760	-56325
Permanent loads yg= 0.9	150C1F2	0	0	0	7193	15702	-56309
Wind angle: 0°	150C1F3	0	0	0	7193	15631	-56292
	380C2F1	14386	31519	112651	14386	31519	-112651
	380C2F2	14386	31405	112618	14386	31405	-112618
	380C2F3	14386	31261	112584	14386	31261	-112584
	RTG	3899	8469	30469	3899	8469	-30469
NL3/1b	GW / opgw	0	0	0	1952	4654	-17096
Wind, -20°C	150C1F1	0	0	0	7189	17366	-64043
Permanent loads yg= 0.9	150C1F2	0	0	0	7189	17350	-64044
Wind angle: 0°	150C1F3	0	0	0	7189	17329	-64046
	380C2F1	14378	34731	128087	14378	34731	-128087
	380C2F2	14378	34699	128089	14378	34699	-128089
	380C2F3	14378	34659	128092	14378	34659	-128092
	RTG	3898	9170	33875	3898	9170	-33875

NL3/3	GW / opgw	0	0	0	3719	7753	-27532
Wind, -5°C	150C1F1	0	0	0	8745	19427	-70362
Permanent loads yg= 0.9	150C1F2	0	0	0	8745	19380	-70356
Wind angle: 0°	150C1F3	0	0	0	8745	19320	-70350
	380C2F1	17490	38854	140725	17490	38854	-140725
	380C2F2	17490	38759	140712	17490	38759	-140712
	380C2F3	17490	38641	140701	17490	38641	-140701
	RTG	7440	15192	54906	7440	15192	-54906
NL3/4	GW / opgw	0	0	0	2554	5309	-19540
Construction/maintenance, +5°C	150C1F1	0	0	0	8396	17734	-65417
Permanent loads yg= 0.9	150C1F2	0	0	0	8396	17718	-65418
Wind angle: 0°	150C1F3	0	0	0	8396	17698	-65421
	380C2F1	16793	35467	130833	16793	35467	-130833
	380C2F2	16793	35436	130837	16793	35436	-130837
	380C2F3	16793	35396	130841	16793	35396	-130841
	RTG	5103	10547	39011	5103	10547	-39011
NL3/1a	GW / opgw	0	0	0	1953	8771	-22794
Wind, 10°C	150C1F1	0	0	0	7195	27228	-73726
Permanent loads yg= 0.9	150C1F2	0	0	0	7195	26012	-71402
Wind angle: 45°	150C1F3	0	0	0	7195	24505	-68586
	380C2F1	14387	36220	116583	14390	54457	-147451
	380C2F2	14387	35643	115906	14390	52025	-142805
	380C2F3	14387	34933	115130	14389	49010	-137172
	RTG	3900	9503	31218	3900	13493	-37618
NL3/1b	GW / opgw	0	0	0	1952	5645	-18010
Wind, -20°C	150C1F1	0	0	0	7189	19952	-65886
Permanent loads yg= 0.9	150C1F2	0	0	0	7189	19687	-65577
Wind angle: 45°	150C1F3	0	0	0	7189	19360	-65223
	380C2F1	14378	35913	128311	14378	39904	-131772
	380C2F2	14378	35777	128259	14378	39373	-131154
	380C2F3	14378	35608	128202	14378	38721	-130446
	RTG	3898	9436	33909	3898	10312	-34566
NL3/3	GW / opgw	0	0	0	3721	14009	-36576
Wind, -5°C	150C1F1	0	0	0	8747	28254	-81482
Permanent loads yg= 0.9	150C1F2	0	0	0	8746	27312	-79870
Wind angle: 45°	150C1F3	0	0	0	8746	26153	-77956
	380C2F1	17490	42566	142884	17493	56508	-162964
	380C2F2	17490	42121	142492	17493	54624	-159739
	380C2F3	17490	41571	142048	17492	52305	-155912
	RTG	7441	16711	55679	7442	22289	-63115
NL3/4	GW / opgw	0	0	0	2554	6210	-20120
Construction/maintenance, +5°C	150C1F1	0	0	0	8397	20188	-66761
Permanent loads yg= 0.9	150C1F2	0	0	0	8397	19942	-66524
Wind angle: 45°	150C1F3	0	0	0	8396	19638	-66256
	380C2F1	16793	36620	130948	16793	40375	-133522
	380C2F2	16793	36489	130914	16793	39883	-133049
	380C2F3	16793	36325	130878	16793	39276	-132512
	RTG	5103	10804	39014	5103	11611	-39414
NL3/1a	GW / opgw	0	0	0	1954	10208	-25731
Wind, 10°C	150C1F1	0	0	0	7196	31077	-81279
Permanent loads yg= 0.9	150C1F2	0	0	0	7196	29503	-78160
Wind angle: 90°	150C1F3	0	0	0	7195	27538	-74322
	380C2F1	14392	62154	162559	14392	62154	-162559
	380C2F2	14391	59006	156320	14391	59006	-156320
	380C2F3	14390	55075	148645	14390	55075	-148645
	RTG	3901	15214	40930	3901	15214	-40930
NL3/1b	GW / opgw	0	0	0	1952	5983	-18527
Wind, -20°C	150C1F1	0	0	0	7189	20810	-66996
Permanent loads yg= 0.9	150C1F2	0	0	0	7189	20455	-66519
Wind angle: 90°	150C1F3	0	0	0	7189	20020	-65968
	380C2F1	14379	41620	133992	14379	41620	-133992
	380C2F2	14379	40910	133037	14379	40910	-133037
	380C2F3	14378	40039	131936	14378	40039	-131936
	RTG	3898	10684	34999	3898	10684	-34999
NL3/3	GW / opgw	0	0	0	3721	16048	-40351
Wind, -5°C	150C1F1	0	0	0	8747	31276	-86909
Permanent loads yg= 0.9	150C1F2	0	0	0	8747	30032	-84636
Wind angle: 90°	150C1F3	0	0	0	8747	28495	-81901
	380C2F1	17495	62552	173818	17495	62552	-173818
	380C2F2	17494	60065	169273	17494	60065	-169273
	380C2F3	17493	56989	163802	17493	56989	-163802
	RTG	7443	24686	67163	7443	24686	-67163

NL3/4	GW / opgw	0	0	0	2554	6506	-20476
Construction/maintenance, +5°C	150C1F1	0	0	0	8397	20979	-67619
Permanent loads yg= 0.9	150C1F2	0	0	0	8397	20652	-67249
Wind angle: 90°	150C1F3	0	0	0	8397	20250	-66824
	380C2F1	16793	41957	135239	16793	41957	-135239
	380C2F2	16793	41304	134497	16793	41304	-134497
	380C2F3	16793	40501	133648	16793	40501	-133648
	RTG	5103	11944	39698	5103	11944	-39698
NL3/1a	GW / opgw	0	0	0	1953	5242	-16253
Wind, 10°C	150C1F1	0	0	0	7193	18110	-58292
Permanent loads yg= 0.9	150C1F2	0	0	0	7193	17821	-57953
Wind angle: -45°	150C1F3	0	0	0	7193	17467	-57565
	380C2F1	14390	54457	147451	14387	36220	-116583
	380C2F2	14390	52025	142805	14387	35643	-115906
	380C2F3	14389	49010	137172	14387	34933	-115130
	RTG	3900	13493	37618	3900	9503	-31218
NL3/1b	GW / opgw	0	0	0	1952	4872	-17166
Wind, -20°C	150C1F1	0	0	0	7189	17956	-64156
Permanent loads yg= 0.9	150C1F2	0	0	0	7189	17889	-64130
Wind angle: -45°	150C1F3	0	0	0	7189	17804	-64101
	380C2F1	14378	39904	131772	14378	35913	-128311
	380C2F2	14378	39373	131154	14378	35777	-128259
	380C2F3	14378	38721	130446	14378	35608	-128202
	RTG	3898	10312	34566	3898	9436	-33909
NL3/3	GW / opgw	0	0	0	3719	9062	-28588
Wind, -5°C	150C1F1	0	0	0	8745	21283	-71442
Permanent loads yg= 0.9	150C1F2	0	0	0	8745	21060	-71246
Wind angle: -45°	150C1F3	0	0	0	8745	20785	-71024
	380C2F1	17493	56508	162964	17490	42566	-142884
	380C2F2	17493	54624	159739	17490	42121	-142492
	380C2F3	17492	52305	155912	17490	41571	-142048
	RTG	7442	22289	63115	7441	16711	-55679
NL3/4	GW / opgw	0	0	0	2554	5517	-19572
Construction/maintenance, +5°C	150C1F1	0	0	0	8396	18310	-65474
Permanent loads yg= 0.9	150C1F2	0	0	0	8396	18245	-65457
Wind angle: -45°	150C1F3	0	0	0	8396	18163	-65439
	380C2F1	16793	40375	133522	16793	36620	-130948
	380C2F2	16793	39883	133049	16793	36489	-130914
	380C2F3	16793	39276	132512	16793	36325	-130878
	RTG	5103	11611	39414	5103	10804	-39014

ZWW4HK450

Appendix M1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	5480	19563	2604	5480	-19563
	150C1F1	9593	19914	71831	9593	19914	-71831
	150C1F2	9593	19859	71823	9593	19859	-71823
	150C1F3	9593	19790	71816	9593	19790	-71816
	380C2F1	0	0	0	19186	39829	-143662
	380C2F2	0	0	0	19186	39719	-143647
	380C2F3	0	0	0	19186	39581	-143633
	RTG	0	0	0	5200	10767	-39047
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	5872	21643	2603	5872	-21643
	150C1F1	9588	21778	80512	9588	21778	-80512
	150C1F2	9588	21763	80514	9588	21763	-80514
	150C1F3	9588	21743	80517	9588	21743	-80517
	380C2F1	0	0	0	19175	43557	-161025
	380C2F2	0	0	0	19175	43525	-161029
	380C2F3	0	0	0	19175	43486	-161034
	RTG	0	0	0	5198	11602	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	8769	31323	4371	8769	-31323
	150C1F1	11145	23525	85655	11145	23525	-85655
	150C1F2	11145	23479	85654	11145	23479	-85654
	150C1F3	11145	23421	85653	11145	23421	-85653
	380C2F1	0	0	0	22290	47050	-171311
	380C2F2	0	0	0	22290	46958	-171308
	380C2F3	0	0	0	22290	46842	-171307
	RTG	0	0	0	8742	17230	-62511
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	6409	23646	3206	6409	-23646
	150C1F1	10796	21807	80617	10796	21807	-80617
	150C1F2	10796	21791	80620	10796	21791	-80620
	150C1F3	10796	21771	80623	10796	21771	-80623
	380C2F1	0	0	0	21593	43613	-161235
	380C2F2	0	0	0	21593	43582	-161239
	380C2F3	0	0	0	21593	43542	-161246
	RTG	0	0	0	6404	12748	-47227
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	6303	20211	2605	9462	-25373
	150C1F1	9593	22078	73098	9595	30173	-84712
	150C1F2	9593	21818	72869	9595	29084	-82861
	150C1F3	9593	21498	72609	9594	27741	-80659
	380C2F1	0	0	0	19190	60346	-169423
	380C2F2	0	0	0	19190	58168	-165723
	380C2F3	0	0	0	19189	55482	-161318
	RTG	0	0	0	5201	15268	-44237
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	6081	21676	2603	6777	-22237
	150C1F1	9588	22349	80547	9588	24175	-81645
	150C1F2	9588	22284	80533	9588	23938	-81440
	150C1F3	9588	22203	80520	9588	23644	-81208
	380C2F1	0	0	0	19176	48350	-163290
	380C2F2	0	0	0	19176	47875	-162880
	380C2F3	0	0	0	19176	47288	-162415
	RTG	0	0	0	5198	12669	-43363
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	10016	32147	4373	14660	-39007
	150C1F1	11145	25279	86353	11146	31579	-93885
	150C1F2	11145	25073	86218	11146	30731	-92625
	150C1F3	11145	24817	86067	11146	29689	-91151
	380C2F1	0	0	0	22293	63157	-187769
	380C2F2	0	0	0	22293	61462	-185250
	380C2F3	0	0	0	22292	59378	-182301
	RTG	0	0	0	8744	23926	-69220
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	6612	23658	3206	7262	-24043
	150C1F1	10797	22369	80622	10797	24129	-81469
	150C1F2	10797	22306	80613	10797	23903	-81305
	150C1F3	10797	22227	80605	10797	23622	-81122
	380C2F1	0	0	0	21593	48258	-162938
	380C2F2	0	0	0	21593	47805	-162611
	380C2F3	0	0	0	21593	47244	-162244
	RTG	0	0	0	6404	13771	-47474
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	10793	27912	2605	10793	-27912
	150C1F1	9596	33659	90909	9596	33659	-90909
	150C1F2	9596	32226	88319	9596	32226	-88319
	150C1F3	9595	30451	85191	9595	30451	-85191
	380C2F1	0	0	0	19192	67317	-181817
	380C2F2	0	0	0	19191	64452	-176637
	380C2F3	0	0	0	19190	60902	-170383
	RTG	0	0	0	5201	16808	-46877

NL3/1b	GW / opgw	2603	7075	22601	2603	7075	-22601
Wind, -20°C	150C1F1	9588	24937	82396	9588	24937	-82396
Permanent loads yg= 1.2	150C1F2	9588	24623	82071	9588	24623	-82071
Wind angle: 90°	150C1F3	9588	24236	81700	9588	24236	-81700
	380C2F1	0	0	0	19176	49874	-164792
	380C2F2	0	0	0	19176	49246	-164141
	380C2F3	0	0	0	19176	48471	-163400
	RTG	0	0	0	5198	13003	-43653
NL3/3	GW / opgw	4373	16605	42427	4373	16605	-42427
Wind, -5°C	150C1F1	11147	34309	98225	11147	34309	-98225
Permanent loads yg= 1.2	150C1F2	11147	33183	96390	11147	33183	-96390
Wind angle: 90°	150C1F3	11147	31795	94214	11147	31795	-94214
	380C2F1	0	0	0	22295	68618	-196450
	380C2F2	0	0	0	22294	66366	-192779
	380C2F3	0	0	0	22293	63590	-188429
	RTG	0	0	0	8745	26174	-72712
NL3/4	GW / opgw	3206	7532	24307	3206	7532	-24307
Construction/maintenance, +5°C	150C1F1	10797	24852	82073	10797	24852	-82073
Permanent loads yg= 1.2	150C1F2	10797	24555	81810	10797	24555	-81810
Wind angle: 90°	150C1F3	10797	24187	81513	10797	24187	-81513
	380C2F1	0	0	0	21594	49704	-164145
	380C2F2	0	0	0	21594	49109	-163620
	380C2F3	0	0	0	21593	48373	-163025
	RTG	0	0	0	6404	14081	-47676
NL3/1a	GW / opgw	2605	9462	25373	2604	6303	-20211
Wind, 10°C	150C1F1	9595	30173	84712	9593	22078	-73098
Permanent loads yg= 1.2	150C1F2	9595	29084	82861	9593	21818	-72869
Wind angle: -45°	150C1F3	9594	27741	80659	9593	21498	-72609
	380C2F1	0	0	0	19187	44156	-146196
	380C2F2	0	0	0	19186	43637	-145737
	380C2F3	0	0	0	19186	42996	-145217
	RTG	0	0	0	5200	11727	-39521
NL3/1b	GW / opgw	2603	6777	22237	2603	6081	-21676
Wind, -20°C	150C1F1	9588	24175	81645	9588	22349	-80547
Permanent loads yg= 1.2	150C1F2	9588	23938	81440	9588	22284	-80533
Wind angle: -45°	150C1F3	9588	23644	81208	9588	22203	-80520
	380C2F1	0	0	0	19175	44697	-161094
	380C2F2	0	0	0	19175	44568	-161067
	380C2F3	0	0	0	19175	44407	-161040
	RTG	0	0	0	5198	11859	-42953
NL3/3	GW / opgw	4373	14660	39007	4371	10016	-32147
Wind, -5°C	150C1F1	11146	31579	93885	11145	25279	-86353
Permanent loads yg= 1.2	150C1F2	11146	30731	92625	11145	25073	-86218
Wind angle: -45°	150C1F3	11146	29689	91151	11145	24817	-86067
	380C2F1	0	0	0	22290	50557	-172706
	380C2F2	0	0	0	22290	50145	-172436
	380C2F3	0	0	0	22290	49633	-172134
	RTG	0	0	0	8742	18696	-63083
NL3/4	GW / opgw	3206	7262	24043	3206	6612	-23658
Construction/maintenance, +5°C	150C1F1	10797	24129	81469	10797	22369	-80622
Permanent loads yg= 1.2	150C1F2	10797	23903	81305	10797	22306	-80613
Wind angle: -45°	150C1F3	10797	23622	81122	10797	22227	-80605
	380C2F1	0	0	0	21593	44738	-161243
	380C2F2	0	0	0	21593	44612	-161226
	380C2F3	0	0	0	21593	44453	-161210
	RTG	0	0	0	6404	13001	-47213
NL3/1a	GW / opgw	1953	4335	15291	1953	4335	-15291
Wind, 10°C	150C1F1	7193	15760	56325	7193	15760	-56325
Permanent loads yg= 0.9	150C1F2	7193	15702	56309	7193	15702	-56309
Wind angle: 0°	150C1F3	7193	15631	56292	7193	15631	-56292
	380C2F1	0	0	0	14386	31519	-112651
	380C2F2	0	0	0	14386	31405	-112618
	380C2F3	0	0	0	14386	31261	-112584
	RTG	0	0	0	3899	8469	-30469
NL3/1b	GW / opgw	1952	4654	17096	1952	4654	-17096
Wind, -20°C	150C1F1	7189	17366	64043	7189	17366	-64043
Permanent loads yg= 0.9	150C1F2	7189	17350	64044	7189	17350	-64044
Wind angle: 0°	150C1F3	7189	17329	64046	7189	17329	-64046
	380C2F1	0	0	0	14378	34731	-128087
	380C2F2	0	0	0	14378	34699	-128089
	380C2F3	0	0	0	14378	34659	-128092
	RTG	0	0	0	3898	9170	-33875

NL3/3	GW / opgw	3719	7753	27532	3719	7753	-27532
Wind, -5°C	150C1F1	8745	19427	70362	8745	19427	-70362
Permanent loads yg= 0.9	150C1F2	8745	19380	70356	8745	19380	-70356
Wind angle: 0°	150C1F3	8745	19320	70350	8745	19320	-70350
	380C2F1	0	0	0	17490	38854	-140725
	380C2F2	0	0	0	17490	38759	-140712
	380C2F3	0	0	0	17490	38641	-140701
	RTG	0	0	0	7440	15192	-54906
NL3/4	GW / opgw	2554	5309	19540	2554	5309	-19540
Construction/maintenance, +5°C	150C1F1	8396	17734	65417	8396	17734	-65417
Permanent loads yg= 0.9	150C1F2	8396	17718	65418	8396	17718	-65418
Wind angle: 0°	150C1F3	8396	17698	65421	8396	17698	-65421
	380C2F1	0	0	0	16793	35467	-130833
	380C2F2	0	0	0	16793	35436	-130837
	380C2F3	0	0	0	16793	35396	-130841
	RTG	0	0	0	5103	10547	-39011
NL3/1a	GW / opgw	1953	5242	16253	1953	8771	-22794
Wind, 10°C	150C1F1	7193	18110	58292	7193	27228	-73726
Permanent loads yg= 0.9	150C1F2	7193	17821	57953	7193	26012	-71402
Wind angle: 45°	150C1F3	7193	17467	57565	7193	24505	-68586
	380C2F1	0	0	0	14390	54457	-147451
	380C2F2	0	0	0	14390	52025	-142805
	380C2F3	0	0	0	14389	49010	-137172
	RTG	0	0	0	3900	13493	-37618
NL3/1b	GW / opgw	1952	4872	17166	1952	5645	-18010
Wind, -20°C	150C1F1	7189	17956	64156	7189	19952	-65886
Permanent loads yg= 0.9	150C1F2	7189	17889	64130	7189	19687	-65577
Wind angle: 45°	150C1F3	7189	17804	64101	7189	19360	-65223
	380C2F1	0	0	0	14378	39904	-131772
	380C2F2	0	0	0	14378	39373	-131154
	380C2F3	0	0	0	14378	38721	-130446
	RTG	0	0	0	3898	10312	-34566
NL3/3	GW / opgw	3719	9062	28588	3721	14009	-36576
Wind, -5°C	150C1F1	8745	21283	71442	8747	28254	-81482
Permanent loads yg= 0.9	150C1F2	8745	21060	71246	8746	27312	-79870
Wind angle: 45°	150C1F3	8745	20785	71024	8746	26153	-77956
	380C2F1	0	0	0	17493	56508	-162964
	380C2F2	0	0	0	17493	54624	-159739
	380C2F3	0	0	0	17492	52305	-155912
	RTG	0	0	0	7442	22289	-63115
NL3/4	GW / opgw	2554	5517	19572	2554	6210	-20120
Construction/maintenance, +5°C	150C1F1	8396	18310	65474	8397	20188	-66761
Permanent loads yg= 0.9	150C1F2	8396	18245	65457	8397	19942	-66524
Wind angle: 45°	150C1F3	8396	18163	65439	8396	19638	-66256
	380C2F1	0	0	0	16793	40375	-133522
	380C2F2	0	0	0	16793	39883	-133049
	380C2F3	0	0	0	16793	39276	-132512
	RTG	0	0	0	5103	11611	-39414
NL3/1a	GW / opgw	1954	10208	25731	1954	10208	-25731
Wind, 10°C	150C1F1	7196	31077	81279	7196	31077	-81279
Permanent loads yg= 0.9	150C1F2	7196	29503	78160	7196	29503	-78160
Wind angle: 90°	150C1F3	7195	27538	74322	7195	27538	-74322
	380C2F1	0	0	0	14392	62154	-162559
	380C2F2	0	0	0	14391	59006	-156320
	380C2F3	0	0	0	14390	55075	-148645
	RTG	0	0	0	3901	15214	-40930
NL3/1b	GW / opgw	1952	5983	18527	1952	5983	-18527
Wind, -20°C	150C1F1	7189	20810	66996	7189	20810	-66996
Permanent loads yg= 0.9	150C1F2	7189	20455	66519	7189	20455	-66519
Wind angle: 90°	150C1F3	7189	20020	65968	7189	20020	-65968
	380C2F1	0	0	0	14379	41620	-133992
	380C2F2	0	0	0	14379	40910	-133037
	380C2F3	0	0	0	14378	40039	-131936
	RTG	0	0	0	3898	10684	-34999
NL3/3	GW / opgw	3721	16048	40351	3721	16048	-40351
Wind, -5°C	150C1F1	8747	31276	86909	8747	31276	-86909
Permanent loads yg= 0.9	150C1F2	8747	30032	84636	8747	30032	-84636
Wind angle: 90°	150C1F3	8747	28495	81901	8747	28495	-81901
	380C2F1	0	0	0	17495	62552	-173818
	380C2F2	0	0	0	17494	60065	-169273
	380C2F3	0	0	0	17493	56989	-163802
	RTG	0	0	0	7443	24686	-67163

NL3/4	GW / opgw	2554	6506	20476	2554	6506	-20476
Construction/maintenance, +5°C	150C1F1	8397	20979	67619	8397	20979	-67619
Permanent loads yg= 0.9	150C1F2	8397	20652	67249	8397	20652	-67249
Wind angle: 90°	150C1F3	8397	20250	66824	8397	20250	-66824
	380C2F1	0	0	0	16793	41957	-135239
	380C2F2	0	0	0	16793	41304	-134497
	380C2F3	0	0	0	16793	40501	-133648
	RTG	0	0	0	5103	11944	-39698
NL3/1a	GW / opgw	1953	8771	22794	1953	5242	-16253
Wind, 10°C	150C1F1	7195	27228	73726	7193	18110	-58292
Permanent loads yg= 0.9	150C1F2	7195	26012	71402	7193	17821	-57953
Wind angle: -45°	150C1F3	7195	24505	68586	7193	17467	-57565
	380C2F1	0	0	0	14387	36220	-116583
	380C2F2	0	0	0	14387	35643	-115906
	380C2F3	0	0	0	14387	34933	-115130
	RTG	0	0	0	3900	9503	-31218
NL3/1b	GW / opgw	1952	5645	18010	1952	4872	-17166
Wind, -20°C	150C1F1	7189	19952	65886	7189	17956	-64156
Permanent loads yg= 0.9	150C1F2	7189	19687	65577	7189	17889	-64130
Wind angle: -45°	150C1F3	7189	19360	65223	7189	17804	-64101
	380C2F1	0	0	0	14378	35913	-128311
	380C2F2	0	0	0	14378	35777	-128259
	380C2F3	0	0	0	14378	35608	-128202
	RTG	0	0	0	3898	9436	-33909
NL3/3	GW / opgw	3721	14009	36576	3719	9062	-28588
Wind, -5°C	150C1F1	8747	28254	81482	8745	21283	-71442
Permanent loads yg= 0.9	150C1F2	8746	27312	79870	8745	21060	-71246
Wind angle: -45°	150C1F3	8746	26153	77956	8745	20785	-71024
	380C2F1	0	0	0	17490	42566	-142884
	380C2F2	0	0	0	17490	42121	-142492
	380C2F3	0	0	0	17490	41571	-142048
	RTG	0	0	0	7441	16711	-55679
NL3/4	GW / opgw	2554	6210	20120	2554	5517	-19572
Construction/maintenance, +5°C	150C1F1	8397	20188	66761	8396	18310	-65474
Permanent loads yg= 0.9	150C1F2	8397	19942	66524	8396	18245	-65457
Wind angle: -45°	150C1F3	8396	19638	66256	8396	18163	-65439
	380C2F1	0	0	0	16793	36620	-130948
	380C2F2	0	0	0	16793	36489	-130914
	380C2F3	0	0	0	16793	36325	-130878
	RTG	0	0	0	5103	10804	-39014

ZWW4HK450

Appendix M1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	5480	19563	0	0	0
	150C1F1	9593	19914	71831	0	0	0
	150C1F2	9593	19859	71823	0	0	0
	150C1F3	9593	19790	71816	0	0	0
	380C2F1	19186	39829	143662	19186	39829	-143662
	380C2F2	19186	39719	143647	19186	39719	-143647
	380C2F3	19186	39581	143633	19186	39581	-143633
	RTG	0	0	0	5200	10767	-39047
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	5872	21643	0	0	0
	150C1F1	9588	21778	80512	0	0	0
	150C1F2	9588	21763	80514	0	0	0
	150C1F3	9588	21743	80517	0	0	0
	380C2F1	19175	43557	161025	19175	43557	-161025
	380C2F2	19175	43525	161029	19175	43525	-161029
	380C2F3	19175	43486	161034	19175	43486	-161034
	RTG	0	0	0	5198	11602	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	8769	31323	0	0	0
	150C1F1	11145	23525	85655	0	0	0
	150C1F2	11145	23479	85654	0	0	0
	150C1F3	11145	23421	85653	0	0	0
	380C2F1	22290	47050	171311	22290	47050	-171311
	380C2F2	22290	46958	171308	22290	46958	-171308
	380C2F3	22290	46842	171307	22290	46842	-171307
	RTG	0	0	0	8742	17230	-62511
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	6409	23646	0	0	0
	150C1F1	10796	21807	80617	0	0	0
	150C1F2	10796	21791	80620	0	0	0
	150C1F3	10796	21771	80623	0	0	0
	380C2F1	21593	43613	161235	21593	43613	-161235
	380C2F2	21593	43582	161239	21593	43582	-161239
	380C2F3	21593	43542	161246	21593	43542	-161246
	RTG	0	0	0	6404	12748	-47227
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	6303	20211	0	0	0
	150C1F1	9593	22078	73098	0	0	0
	150C1F2	9593	21818	72869	0	0	0
	150C1F3	9593	21498	72609	0	0	0
	380C2F1	19187	44156	146196	19190	60346	-169423
	380C2F2	19186	43637	145737	19190	58168	-165723
	380C2F3	19186	42996	145217	19189	55482	-161318
	RTG	0	0	0	5201	15268	-44237
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	6081	21676	0	0	0
	150C1F1	9588	22349	80547	0	0	0
	150C1F2	9588	22284	80533	0	0	0
	150C1F3	9588	22203	80520	0	0	0
	380C2F1	19175	44697	161094	19176	48350	-163290
	380C2F2	19175	44568	161067	19176	47875	-162880
	380C2F3	19175	44407	161040	19176	47288	-162415
	RTG	0	0	0	5198	12669	-43363
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	10016	32147	0	0	0
	150C1F1	11145	25279	86353	0	0	0
	150C1F2	11145	25073	86218	0	0	0
	150C1F3	11145	24817	86067	0	0	0
	380C2F1	22290	50557	172706	22293	63157	-187769
	380C2F2	22290	50145	172436	22293	61462	-185250
	380C2F3	22290	49633	172134	22292	59378	-182301
	RTG	0	0	0	8744	23926	-69220
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	6612	23658	0	0	0
	150C1F1	10797	22369	80622	0	0	0
	150C1F2	10797	22306	80613	0	0	0
	150C1F3	10797	22227	80605	0	0	0
	380C2F1	21593	44738	161243	21593	48258	-162938
	380C2F2	21593	44612	161226	21593	47805	-162611
	380C2F3	21593	44453	161210	21593	47244	-162244
	RTG	0	0	0	6404	13771	-47474
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	10793	27912	0	0	0
	150C1F1	9596	33659	90909	0	0	0
	150C1F2	9596	32226	88319	0	0	0
	150C1F3	9595	30451	85191	0	0	0
	380C2F1	19192	67317	181817	19192	67317	-181817
	380C2F2	19191	64452	176637	19191	64452	-176637
	380C2F3	19190	60902	170383	19190	60902	-170383
	RTG	0	0	0	5201	16808	-46877

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2603	7075	22601	0	0	0
	150C1F1	9588	24937	82396	0	0	0
	150C1F2	9588	24623	82071	0	0	0
	150C1F3	9588	24236	81700	0	0	0
	380C2F1	19176	49874	164792	19176	49874	-164792
	380C2F2	19176	49246	164141	19176	49246	-164141
	380C2F3	19176	48471	163400	19176	48471	-163400
	RTG	0	0	0	5198	13003	-43653
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4373	16605	42427	0	0	0
	150C1F1	11147	34309	98225	0	0	0
	150C1F2	11147	33183	96390	0	0	0
	150C1F3	11147	31795	94214	0	0	0
	380C2F1	22295	68618	196450	22295	68618	-196450
	380C2F2	22294	66366	192779	22294	66366	-192779
	380C2F3	22293	63590	188429	22293	63590	-188429
	RTG	0	0	0	8745	26174	-72712
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3206	7532	24307	0	0	0
	150C1F1	10797	24852	82073	0	0	0
	150C1F2	10797	24555	81810	0	0	0
	150C1F3	10797	24187	81513	0	0	0
	380C2F1	21594	49704	164145	21594	49704	-164145
	380C2F2	21594	49109	163620	21594	49109	-163620
	380C2F3	21593	48373	163025	21593	48373	-163025
	RTG	0	0	0	6404	14081	-47676
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2605	9462	25373	0	0	0
	150C1F1	9595	30173	84712	0	0	0
	150C1F2	9595	29084	82861	0	0	0
	150C1F3	9594	27741	80659	0	0	0
	380C2F1	19190	60346	169423	19187	44156	-146196
	380C2F2	19190	58168	165723	19186	43637	-145737
	380C2F3	19189	55482	161318	19186	42996	-145217
	RTG	0	0	0	5200	11727	-39521
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2603	6777	22237	0	0	0
	150C1F1	9588	24175	81645	0	0	0
	150C1F2	9588	23938	81440	0	0	0
	150C1F3	9588	23644	81208	0	0	0
	380C2F1	19176	48350	163290	19175	44697	-161094
	380C2F2	19176	47875	162880	19175	44568	-161067
	380C2F3	19176	47288	162415	19175	44407	-161040
	RTG	0	0	0	5198	11859	-42953
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4373	14660	39007	0	0	0
	150C1F1	11146	31579	93885	0	0	0
	150C1F2	11146	30731	92625	0	0	0
	150C1F3	11146	29689	91151	0	0	0
	380C2F1	22293	63157	187769	22290	50557	-172706
	380C2F2	22293	61462	185250	22290	50145	-172436
	380C2F3	22292	59378	182301	22290	49633	-172134
	RTG	0	0	0	8742	18696	-63083
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3206	7262	24043	0	0	0
	150C1F1	10797	24129	81469	0	0	0
	150C1F2	10797	23903	81305	0	0	0
	150C1F3	10797	23622	81122	0	0	0
	380C2F1	21593	48258	162938	21593	44738	-161243
	380C2F2	21593	47805	162611	21593	44612	-161226
	380C2F3	21593	47244	162244	21593	44453	-161210
	RTG	0	0	0	6404	13001	-47213
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1953	4335	15291	0	0	0
	150C1F1	7193	15760	56325	0	0	0
	150C1F2	7193	15702	56309	0	0	0
	150C1F3	7193	15631	56292	0	0	0
	380C2F1	14386	31519	112651	14386	31519	-112651
	380C2F2	14386	31405	112618	14386	31405	-112618
	380C2F3	14386	31261	112584	14386	31261	-112584
	RTG	0	0	0	3899	8469	-30469
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1952	4654	17096	0	0	0
	150C1F1	7189	17366	64043	0	0	0
	150C1F2	7189	17350	64044	0	0	0
	150C1F3	7189	17329	64046	0	0	0
	380C2F1	14378	34731	128087	14378	34731	-128087
	380C2F2	14378	34699	128089	14378	34699	-128089
	380C2F3	14378	34659	128092	14378	34659	-128092
	RTG	0	0	0	3898	9170	-33875

NL3/3	GW / opgw	3719	7753	27532	0	0	0
Wind, -5°C	150C1F1	8745	19427	70362	0	0	0
Permanent loads yg= 0.9	150C1F2	8745	19380	70356	0	0	0
Wind angle: 0°	150C1F3	8745	19320	70350	0	0	0
	380C2F1	17490	38854	140725	17490	38854	-140725
	380C2F2	17490	38759	140712	17490	38759	-140712
	380C2F3	17490	38641	140701	17490	38641	-140701
	RTG	0	0	0	7440	15192	-54906
NL3/4	GW / opgw	2554	5309	19540	0	0	0
Construction/maintenance, +5°C	150C1F1	8396	17734	65417	0	0	0
Permanent loads yg= 0.9	150C1F2	8396	17718	65418	0	0	0
Wind angle: 0°	150C1F3	8396	17698	65421	0	0	0
	380C2F1	16793	35467	130833	16793	35467	-130833
	380C2F2	16793	35436	130837	16793	35436	-130837
	380C2F3	16793	35396	130841	16793	35396	-130841
	RTG	0	0	0	5103	10547	-39011
NL3/1a	GW / opgw	1953	5242	16253	0	0	0
Wind, 10°C	150C1F1	7193	18110	58292	0	0	0
Permanent loads yg= 0.9	150C1F2	7193	17821	57953	0	0	0
Wind angle: 45°	150C1F3	7193	17467	57565	0	0	0
	380C2F1	14387	36220	116583	14390	54457	-147451
	380C2F2	14387	35643	115906	14390	52025	-142805
	380C2F3	14387	34933	115130	14389	49010	-137172
	RTG	0	0	0	3900	13493	-37618
NL3/1b	GW / opgw	1952	4872	17166	0	0	0
Wind, -20°C	150C1F1	7189	17956	64156	0	0	0
Permanent loads yg= 0.9	150C1F2	7189	17889	64130	0	0	0
Wind angle: 45°	150C1F3	7189	17804	64101	0	0	0
	380C2F1	14378	35913	128311	14378	39904	-131772
	380C2F2	14378	35777	128259	14378	39373	-131154
	380C2F3	14378	35608	128202	14378	38721	-130446
	RTG	0	0	0	3898	10312	-34566
NL3/3	GW / opgw	3719	9062	28588	0	0	0
Wind, -5°C	150C1F1	8745	21283	71442	0	0	0
Permanent loads yg= 0.9	150C1F2	8745	21060	71246	0	0	0
Wind angle: 45°	150C1F3	8745	20785	71024	0	0	0
	380C2F1	17490	42566	142884	17493	56508	-162964
	380C2F2	17490	42121	142492	17493	54624	-159739
	380C2F3	17490	41571	142048	17492	52305	-155912
	RTG	0	0	0	7442	22289	-63115
NL3/4	GW / opgw	2554	5517	19572	0	0	0
Construction/maintenance, +5°C	150C1F1	8396	18310	65474	0	0	0
Permanent loads yg= 0.9	150C1F2	8396	18245	65457	0	0	0
Wind angle: 45°	150C1F3	8396	18163	65439	0	0	0
	380C2F1	16793	36620	130948	16793	40375	-133522
	380C2F2	16793	36489	130914	16793	39883	-133049
	380C2F3	16793	36325	130878	16793	39276	-132512
	RTG	0	0	0	5103	11611	-39414
NL3/1a	GW / opgw	1954	10208	25731	0	0	0
Wind, 10°C	150C1F1	7196	31077	81279	0	0	0
Permanent loads yg= 0.9	150C1F2	7196	29503	78160	0	0	0
Wind angle: 90°	150C1F3	7195	27538	74322	0	0	0
	380C2F1	14392	62154	162559	14392	62154	-162559
	380C2F2	14391	59006	156320	14391	59006	-156320
	380C2F3	14390	55075	148645	14390	55075	-148645
	RTG	0	0	0	3901	15214	-40930
NL3/1b	GW / opgw	1952	5983	18527	0	0	0
Wind, -20°C	150C1F1	7189	20810	66996	0	0	0
Permanent loads yg= 0.9	150C1F2	7189	20455	66519	0	0	0
Wind angle: 90°	150C1F3	7189	20020	65968	0	0	0
	380C2F1	14379	41620	133992	14379	41620	-133992
	380C2F2	14379	40910	133037	14379	40910	-133037
	380C2F3	14378	40039	131936	14378	40039	-131936
	RTG	0	0	0	3898	10684	-34999
NL3/3	GW / opgw	3721	16048	40351	0	0	0
Wind, -5°C	150C1F1	8747	31276	86909	0	0	0
Permanent loads yg= 0.9	150C1F2	8747	30032	84636	0	0	0
Wind angle: 90°	150C1F3	8747	28495	81901	0	0	0
	380C2F1	17495	62552	173818	17495	62552	-173818
	380C2F2	17494	60065	169273	17494	60065	-169273
	380C2F3	17493	56989	163802	17493	56989	-163802
	RTG	0	0	0	7443	24686	-67163

NL3/4	GW / opgw	2554	6506	20476	0	0	0
Construction/maintenance, +5°C	150C1F1	8397	20979	67619	0	0	0
Permanent loads yg= 0.9	150C1F2	8397	20652	67249	0	0	0
Wind angle: 90°	150C1F3	8397	20250	66824	0	0	0
	380C2F1	16793	41957	135239	16793	41957	-135239
	380C2F2	16793	41304	134497	16793	41304	-134497
	380C2F3	16793	40501	133648	16793	40501	-133648
	RTG	0	0	0	5103	11944	-39698
NL3/1a	GW / opgw	1953	8771	22794	0	0	0
Wind, 10°C	150C1F1	7195	27228	73726	0	0	0
Permanent loads yg= 0.9	150C1F2	7195	26012	71402	0	0	0
Wind angle: -45°	150C1F3	7195	24505	68586	0	0	0
	380C2F1	14390	54457	147451	14387	36220	-116583
	380C2F2	14390	52025	142805	14387	35643	-115906
	380C2F3	14389	49010	137172	14387	34933	-115130
	RTG	0	0	0	3900	9503	-31218
NL3/1b	GW / opgw	1952	5645	18010	0	0	0
Wind, -20°C	150C1F1	7189	19952	65886	0	0	0
Permanent loads yg= 0.9	150C1F2	7189	19687	65577	0	0	0
Wind angle: -45°	150C1F3	7189	19360	65223	0	0	0
	380C2F1	14378	39904	131772	14378	35913	-128311
	380C2F2	14378	39373	131154	14378	35777	-128259
	380C2F3	14378	38721	130446	14378	35608	-128202
	RTG	0	0	0	3898	9436	-33909
NL3/3	GW / opgw	3721	14009	36576	0	0	0
Wind, -5°C	150C1F1	8747	28254	81482	0	0	0
Permanent loads yg= 0.9	150C1F2	8746	27312	79870	0	0	0
Wind angle: -45°	150C1F3	8746	26153	77956	0	0	0
	380C2F1	17493	56508	162964	17490	42566	-142884
	380C2F2	17493	54624	159739	17490	42121	-142492
	380C2F3	17492	52305	155912	17490	41571	-142048
	RTG	0	0	0	7441	16711	-55679
NL3/4	GW / opgw	2554	6210	20120	0	0	0
Construction/maintenance, +5°C	150C1F1	8397	20188	66761	0	0	0
Permanent loads yg= 0.9	150C1F2	8397	19942	66524	0	0	0
Wind angle: -45°	150C1F3	8396	19638	66256	0	0	0
	380C2F1	16793	40375	133522	16793	36620	-130948
	380C2F2	16793	39883	133049	16793	36489	-130914
	380C2F3	16793	39276	132512	16793	36325	-130878
	RTG	0	0	0	5103	10804	-39014

ZWW4HK450

Appendix M1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	5480	19563	2604	5480	-19563
	150C1F1	9593	19914	71831	9593	19914	-71831
	150C1F2	9593	19859	71823	9593	19859	-71823
	150C1F3	9593	19790	71816	9593	19790	-71816
	380C2F1	19186	39829	143662	19186	39829	-143662
	380C2F2	19186	39719	143647	19186	39719	-143647
	380C2F3	19186	39581	143633	19186	39581	-143633
	RTG	0	0	0	5200	10767	-39047
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	5872	21643	2603	5872	-21643
	150C1F1	9588	21778	80512	9588	21778	-80512
	150C1F2	9588	21763	80514	9588	21763	-80514
	150C1F3	9588	21743	80517	9588	21743	-80517
	380C2F1	19175	43557	161025	19175	43557	-161025
	380C2F2	19175	43525	161029	19175	43525	-161029
	380C2F3	19175	43486	161034	19175	43486	-161034
	RTG	0	0	0	5198	11602	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	8769	31323	4371	8769	-31323
	150C1F1	11145	23525	85655	11145	23525	-85655
	150C1F2	11145	23479	85654	11145	23479	-85654
	150C1F3	11145	23421	85653	11145	23421	-85653
	380C2F1	22290	47050	171311	22290	47050	-171311
	380C2F2	22290	46958	171308	22290	46958	-171308
	380C2F3	22290	46842	171307	22290	46842	-171307
	RTG	0	0	0	8742	17230	-62511
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	6409	23646	3206	6409	-23646
	150C1F1	10796	21807	80617	10796	21807	-80617
	150C1F2	10796	21791	80620	10796	21791	-80620
	150C1F3	10796	21771	80623	10796	21771	-80623
	380C2F1	21593	43613	161235	21593	43613	-161235
	380C2F2	21593	43582	161239	21593	43582	-161239
	380C2F3	21593	43542	161246	21593	43542	-161246
	RTG	0	0	0	6404	12748	-47227
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	6303	20211	2605	9462	-25373
	150C1F1	9593	22078	73098	9595	30173	-84712
	150C1F2	9593	21818	72869	9595	29084	-82861
	150C1F3	9593	21498	72609	9594	27741	-80659
	380C2F1	19187	44156	146196	19190	60346	-169423
	380C2F2	19186	43637	145737	19190	58168	-165723
	380C2F3	19186	42996	145217	19189	55482	-161318
	RTG	0	0	0	5201	15268	-44237
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	6081	21676	2603	6777	-22237
	150C1F1	9588	22349	80547	9588	24175	-81645
	150C1F2	9588	22284	80533	9588	23938	-81440
	150C1F3	9588	22203	80520	9588	23644	-81208
	380C2F1	19175	44697	161094	19176	48350	-163290
	380C2F2	19175	44568	161067	19176	47875	-162880
	380C2F3	19175	44407	161040	19176	47288	-162415
	RTG	0	0	0	5198	12669	-43363
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	10016	32147	4373	14660	-39007
	150C1F1	11145	25279	86353	11146	31579	-93885
	150C1F2	11145	25073	86218	11146	30731	-92625
	150C1F3	11145	24817	86067	11146	29689	-91151
	380C2F1	22290	50557	172706	22293	63157	-187769
	380C2F2	22290	50145	172436	22293	61462	-185250
	380C2F3	22290	49633	172134	22292	59378	-182301
	RTG	0	0	0	8744	23926	-69220
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	6612	23658	3206	7262	-24043
	150C1F1	10797	22369	80622	10797	24129	-81469
	150C1F2	10797	22306	80613	10797	23903	-81305
	150C1F3	10797	22227	80605	10797	23622	-81122
	380C2F1	21593	44738	161243	21593	48258	-162938
	380C2F2	21593	44612	161226	21593	47805	-162611
	380C2F3	21593	44453	161210	21593	47244	-162244
	RTG	0	0	0	6404	13771	-47474
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	10793	27912	2605	10793	-27912
	150C1F1	9596	33659	90909	9596	33659	-90909
	150C1F2	9596	32226	88319	9596	32226	-88319
	150C1F3	9595	30451	85191	9595	30451	-85191
	380C2F1	19192	67317	181817	19192	67317	-181817
	380C2F2	19191	64452	176637	19191	64452	-176637
	380C2F3	19190	60902	170383	19190	60902	-170383
	RTG	0	0	0	5201	16808	-46877

NL3/1b	GW / opgw	2603	7075	22601	2603	7075	-22601
Wind, -20°C	150C1F1	9588	24937	82396	9588	24937	-82396
Permanent loads yg= 1.2	150C1F2	9588	24623	82071	9588	24623	-82071
Wind angle: 90°	150C1F3	9588	24236	81700	9588	24236	-81700
	380C2F1	19176	49874	164792	19176	49874	-164792
	380C2F2	19176	49246	164141	19176	49246	-164141
	380C2F3	19176	48471	163400	19176	48471	-163400
	RTG	0	0	0	5198	13003	-43653
NL3/3	GW / opgw	4373	16605	42427	4373	16605	-42427
Wind, -5°C	150C1F1	11147	34309	98225	11147	34309	-98225
Permanent loads yg= 1.2	150C1F2	11147	33183	96390	11147	33183	-96390
Wind angle: 90°	150C1F3	11147	31795	94214	11147	31795	-94214
	380C2F1	22295	68618	196450	22295	68618	-196450
	380C2F2	22294	66366	192779	22294	66366	-192779
	380C2F3	22293	63590	188429	22293	63590	-188429
	RTG	0	0	0	8745	26174	-72712
NL3/4	GW / opgw	3206	7532	24307	3206	7532	-24307
Construction/maintenance, +5°C	150C1F1	10797	24852	82073	10797	24852	-82073
Permanent loads yg= 1.2	150C1F2	10797	24555	81810	10797	24555	-81810
Wind angle: 90°	150C1F3	10797	24187	81513	10797	24187	-81513
	380C2F1	21594	49704	164145	21594	49704	-164145
	380C2F2	21594	49109	163620	21594	49109	-163620
	380C2F3	21593	48373	163025	21593	48373	-163025
	RTG	0	0	0	6404	14081	-47676
NL3/1a	GW / opgw	2605	9462	25373	2604	6303	-20211
Wind, -20°C	150C1F1	9595	30173	84712	9593	22078	-73098
Permanent loads yg= 1.2	150C1F2	9595	29084	82861	9593	21818	-72869
Wind angle: -45°	150C1F3	9594	27741	80659	9593	21498	-72609
	380C2F1	19190	60346	169423	19187	44156	-146196
	380C2F2	19190	58168	165723	19186	43637	-145737
	380C2F3	19189	55482	161318	19186	42996	-145217
	RTG	0	0	0	5200	11727	-39521
NL3/1b	GW / opgw	2603	6777	22237	2603	6081	-21676
Wind, -20°C	150C1F1	9588	24175	81645	9588	22349	-80547
Permanent loads yg= 1.2	150C1F2	9588	23938	81440	9588	22284	-80533
Wind angle: -45°	150C1F3	9588	23644	81208	9588	22203	-80520
	380C2F1	19176	48350	163290	19175	44697	-161094
	380C2F2	19176	47875	162880	19175	44568	-161067
	380C2F3	19176	47288	162415	19175	44407	-161040
	RTG	0	0	0	5198	11859	-42953
NL3/3	GW / opgw	4373	14660	39007	4371	10016	-32147
Wind, -5°C	150C1F1	11146	31579	93885	11145	25279	-86353
Permanent loads yg= 1.2	150C1F2	11146	30731	92625	11145	25073	-86218
Wind angle: -45°	150C1F3	11146	29689	91151	11145	24817	-86067
	380C2F1	22293	63157	187769	22290	50557	-172706
	380C2F2	22293	61462	185250	22290	50145	-172436
	380C2F3	22292	59378	182301	22290	49633	-172134
	RTG	0	0	0	8742	18696	-63083
NL3/4	GW / opgw	3206	7262	24043	3206	6612	-23658
Construction/maintenance, +5°C	150C1F1	10797	24129	81469	10797	22369	-80622
Permanent loads yg= 1.2	150C1F2	10797	23903	81305	10797	22306	-80613
Wind angle: -45°	150C1F3	10797	23622	81122	10797	22227	-80605
	380C2F1	21593	48258	162938	21593	44738	-161243
	380C2F2	21593	47805	162611	21593	44612	-161226
	380C2F3	21593	47244	162244	21593	44453	-161210
	RTG	0	0	0	6404	13001	-47213
NL3/1a	GW / opgw	1953	4335	15291	1953	4335	-15291
Wind, 10°C	150C1F1	7193	15760	56325	7193	15760	-56325
Permanent loads yg= 0.9	150C1F2	7193	15702	56309	7193	15702	-56309
Wind angle: 0°	150C1F3	7193	15631	56292	7193	15631	-56292
	380C2F1	14386	31519	112651	14386	31519	-112651
	380C2F2	14386	31405	112618	14386	31405	-112618
	380C2F3	14386	31261	112584	14386	31261	-112584
	RTG	0	0	0	3899	8469	-30469
NL3/1b	GW / opgw	1952	4654	17096	1952	4654	-17096
Wind, -20°C	150C1F1	7189	17366	64043	7189	17366	-64043
Permanent loads yg= 0.9	150C1F2	7189	17350	64044	7189	17350	-64044
Wind angle: 0°	150C1F3	7189	17329	64046	7189	17329	-64046
	380C2F1	14378	34731	128087	14378	34731	-128087
	380C2F2	14378	34699	128089	14378	34699	-128089
	380C2F3	14378	34659	128092	14378	34659	-128092
	RTG	0	0	0	3898	9170	-33875

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3719	7753	27532	3719	7753	-27532
	150C1F1	8745	19427	70362	8745	19427	-70362
	150C1F2	8745	19380	70356	8745	19380	-70356
	150C1F3	8745	19320	70350	8745	19320	-70350
	380C2F1	17490	38854	140725	17490	38854	-140725
	380C2F2	17490	38759	140712	17490	38759	-140712
	380C2F3	17490	38641	140701	17490	38641	-140701
	RTG	0	0	0	7440	15192	-54906
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2554	5309	19540	2554	5309	-19540
	150C1F1	8396	17734	65417	8396	17734	-65417
	150C1F2	8396	17718	65418	8396	17718	-65418
	150C1F3	8396	17698	65421	8396	17698	-65421
	380C2F1	16793	35467	130833	16793	35467	-130833
	380C2F2	16793	35436	130837	16793	35436	-130837
	380C2F3	16793	35396	130841	16793	35396	-130841
	RTG	0	0	0	5103	10547	-39011
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1953	5242	16253	1953	8771	-22794
	150C1F1	7193	18110	58292	7193	27228	-73726
	150C1F2	7193	17821	57953	7193	26012	-71402
	150C1F3	7193	17467	57565	7193	24505	-68586
	380C2F1	14387	36220	116583	14390	54457	-147451
	380C2F2	14387	35643	115906	14390	52025	-142805
	380C2F3	14387	34933	115130	14389	49010	-137172
	RTG	0	0	0	3900	13493	-37618
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1952	4872	17166	1952	5645	-18010
	150C1F1	7189	17956	64156	7189	19952	-65886
	150C1F2	7189	17889	64130	7189	19687	-65577
	150C1F3	7189	17804	64101	7189	19360	-65223
	380C2F1	14378	35913	128311	14378	39904	-131772
	380C2F2	14378	35777	128259	14378	39373	-131154
	380C2F3	14378	35608	128202	14378	38721	-130446
	RTG	0	0	0	3898	10312	-34566
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3719	9062	28588	3721	14009	-36576
	150C1F1	8745	21283	71442	8747	28254	-81482
	150C1F2	8745	21060	71246	8746	27312	-79870
	150C1F3	8745	20785	71024	8746	26153	-77956
	380C2F1	17490	42566	142884	17493	56508	-162964
	380C2F2	17490	42121	142492	17493	54624	-159739
	380C2F3	17490	41571	142048	17492	52305	-155912
	RTG	0	0	0	7442	22289	-63115
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2554	5517	19572	2554	6210	-20120
	150C1F1	8396	18310	65474	8397	20188	-66761
	150C1F2	8396	18245	65457	8397	19942	-66524
	150C1F3	8396	18163	65439	8396	19638	-66256
	380C2F1	16793	36620	130948	16793	40375	-133522
	380C2F2	16793	36489	130914	16793	39883	-133049
	380C2F3	16793	36325	130878	16793	39276	-132512
	RTG	0	0	0	5103	11611	-39414
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1954	10208	25731	1954	10208	-25731
	150C1F1	7196	31077	81279	7196	31077	-81279
	150C1F2	7196	29503	78160	7196	29503	-78160
	150C1F3	7195	27538	74322	7195	27538	-74322
	380C2F1	14392	62154	162559	14392	62154	-162559
	380C2F2	14391	59006	156320	14391	59006	-156320
	380C2F3	14390	55075	148645	14390	55075	-148645
	RTG	0	0	0	3901	15214	-40930
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1952	5983	18527	1952	5983	-18527
	150C1F1	7189	20810	66996	7189	20810	-66996
	150C1F2	7189	20455	66519	7189	20455	-66519
	150C1F3	7189	20020	65968	7189	20020	-65968
	380C2F1	14379	41620	133992	14379	41620	-133992
	380C2F2	14379	40910	133037	14379	40910	-133037
	380C2F3	14378	40039	131936	14378	40039	-131936
	RTG	0	0	0	3898	10684	-34999
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3721	16048	40351	3721	16048	-40351
	150C1F1	8747	31276	86909	8747	31276	-86909
	150C1F2	8747	30032	84636	8747	30032	-84636
	150C1F3	8747	28495	81901	8747	28495	-81901
	380C2F1	17495	62552	173818	17495	62552	-173818
	380C2F2	17494	60065	169273	17494	60065	-169273
	380C2F3	17493	56989	163802	17493	56989	-163802
	RTG	0	0	0	7443	24686	-67163

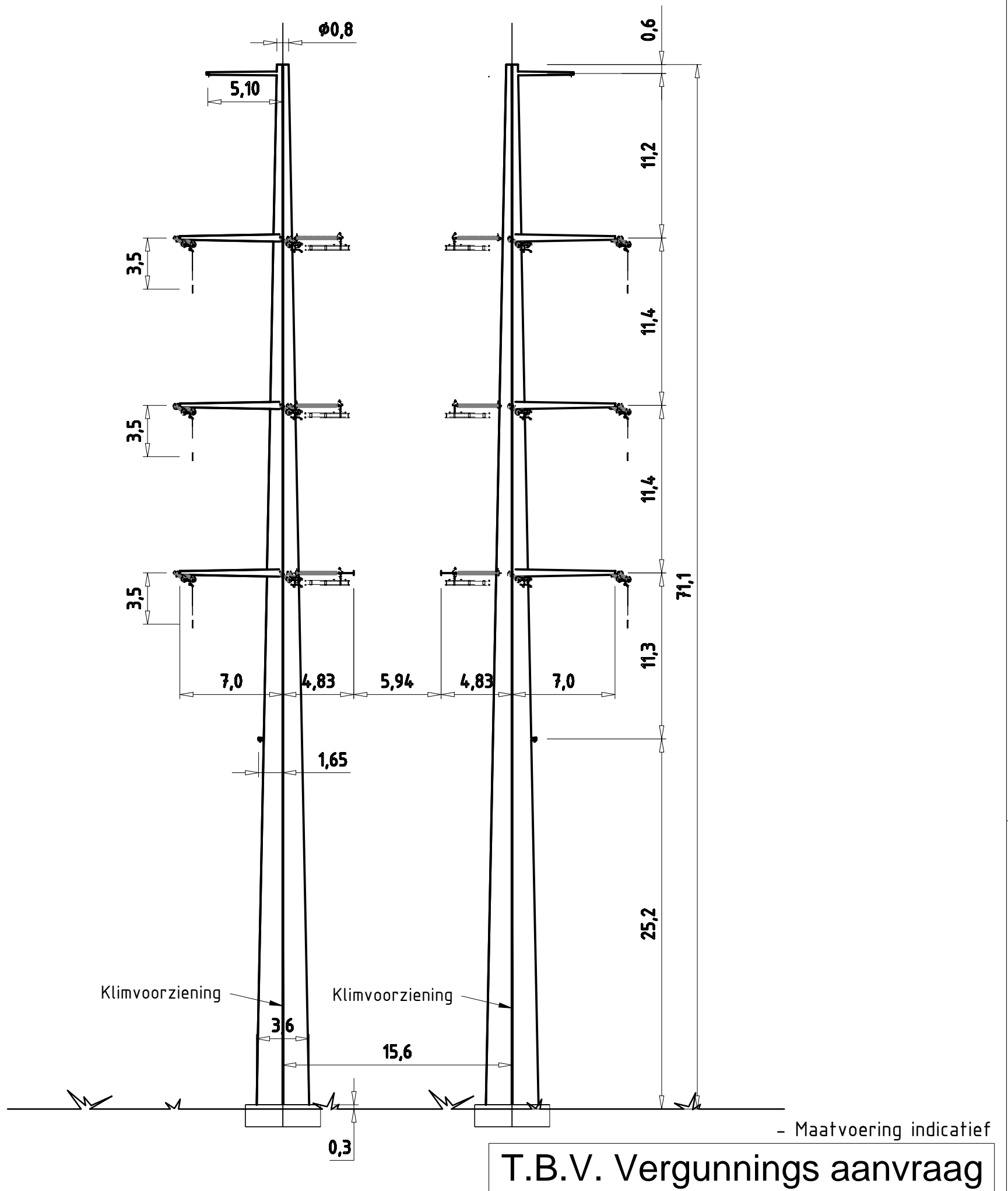
NL3/4	GW / opgw	2554	6506	20476	2554	6506	-20476
Construction/maintenance, +5°C	150C1F1	8397	20979	67619	8397	20979	-67619
Permanent loads yg= 0.9	150C1F2	8397	20652	67249	8397	20652	-67249
Wind angle: 90°	150C1F3	8397	20250	66824	8397	20250	-66824
	380C2F1	16793	41957	135239	16793	41957	-135239
	380C2F2	16793	41304	134497	16793	41304	-134497
	380C2F3	16793	40501	133648	16793	40501	-133648
	RTG	0	0	0	5103	11944	-39698
NL3/1a	GW / opgw	1953	8771	22794	1953	5242	-16253
Wind, 10°C	150C1F1	7195	27228	73726	7193	18110	-58292
Permanent loads yg= 0.9	150C1F2	7195	26012	71402	7193	17821	-57953
Wind angle: -45°	150C1F3	7195	24505	68586	7193	17467	-57565
	380C2F1	14390	54457	147451	14387	36220	-116583
	380C2F2	14390	52025	142805	14387	35643	-115906
	380C2F3	14389	49010	137172	14387	34933	-115130
	RTG	0	0	0	3900	9503	-31218
NL3/1b	GW / opgw	1952	5645	18010	1952	4872	-17166
Wind, -20°C	150C1F1	7189	19952	65886	7189	17956	-64156
Permanent loads yg= 0.9	150C1F2	7189	19687	65577	7189	17889	-64130
Wind angle: -45°	150C1F3	7189	19360	65223	7189	17804	-64101
	380C2F1	14378	39904	131772	14378	35913	-128311
	380C2F2	14378	39373	131154	14378	35777	-128259
	380C2F3	14378	38721	130446	14378	35608	-128202
	RTG	0	0	0	3898	9436	-33909
NL3/3	GW / opgw	3721	14009	36576	3719	9062	-28588
Wind, -5°C	150C1F1	8747	28254	81482	8745	21283	-71442
Permanent loads yg= 0.9	150C1F2	8746	27312	79870	8745	21060	-71246
Wind angle: -45°	150C1F3	8746	26153	77956	8745	20785	-71024
	380C2F1	17493	56508	162964	17490	42566	-142884
	380C2F2	17493	54624	159739	17490	42121	-142492
	380C2F3	17492	52305	155912	17490	41571	-142048
	RTG	0	0	0	7441	16711	-55679
NL3/4	GW / opgw	2554	6210	20120	2554	5517	-19572
Construction/maintenance, +5°C	150C1F1	8397	20188	66761	8396	18310	-65474
Permanent loads yg= 0.9	150C1F2	8397	19942	66524	8396	18245	-65457
Wind angle: -45°	150C1F3	8396	19638	66256	8396	18163	-65439
	380C2F1	16793	40375	133522	16793	36620	-130948
	380C2F2	16793	39883	133049	16793	36489	-130914
	380C2F3	16793	39276	132512	16793	36325	-130878
	RTG	0	0	0	5103	10804	-39014

ZWW4HK450

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2170	4801	16779	2170	4801	-16779
Wind, 10°C	150C1F1	7993	17380	61670	7993	17380	-61670
Permanent loads yg= 1.0	150C1F2	7993	17305	61644	7993	17305	-61644
Wind angle: 0°	150C1F3	7993	17212	61617	7993	17212	-61617
	380C2F1	15986	34760	123340	15986	34760	-123340
	380C2F2	15986	34611	123289	15986	34611	-123289
	380C2F3	15986	34424	123234	15986	34424	-123234
	RTG	0	0	0	4333	9343	-33408
NL4/1b	GW / opgw	2169	5058	18651	2169	5058	-18651
Wind, -20°C	150C1F1	7988	18844	69688	7988	18844	-69688
Permanent loads yg= 1.0	150C1F2	7988	18831	69689	7988	18831	-69689
Wind angle: 0°	150C1F3	7988	18814	69691	7988	18814	-69691
	380C2F1	15977	37688	139375	15977	37688	-139375
	380C2F2	15977	37661	139378	15977	37661	-139378
	380C2F3	15977	37628	139383	15977	37628	-139383
	RTG	0	0	0	4331	9986	-36977
NL4/3	GW / opgw	7433	13013	47395	7433	13013	-47395
Wind, -5°C	150C1F1	12617	25824	94592	12617	25824	-94592
Permanent loads yg= 1.0	150C1F2	12617	25786	94594	12617	25786	-94594
Wind angle: 0°	150C1F3	12617	25739	94597	12617	25739	-94597
	380C2F1	25235	51648	189184	25235	51648	-189184
	380C2F2	25235	51573	189188	25235	51573	-189188
	380C2F3	25235	51478	189194	25235	51478	-189194
	RTG	0	0	0	14883	25819	-94863
NL4/4	GW / opgw	2671	5499	20294	2671	5499	-20294
Construction/maintenance, +5°C	150C1F1	8996	18742	69308	8996	18742	-69308
Permanent loads yg= 1.0	150C1F2	8996	18729	69310	8996	18729	-69310
Wind angle: 0°	150C1F3	8996	18713	69313	8996	18713	-69313
	380C2F1	17991	37484	138616	17991	37484	-138616
	380C2F2	17991	37458	138620	17991	37458	-138620
	380C2F3	17991	37425	138625	17991	37425	-138625
	RTG	0	0	0	5336	10935	-40518
NL4/1a	GW / opgw	2170	6006	18166	2171	10613	-26864
Wind, 10°C	150C1F1	7993	20488	64544	7996	32495	-85509
Permanent loads yg= 1.0	150C1F2	7993	20104	64057	7996	30916	-82455
Wind angle: 45°	150C1F3	7993	19632	63497	7995	28948	-78715
	380C2F1	15987	40976	129088	15992	64991	-171017
	380C2F2	15987	40208	128115	15991	61832	-164909
	380C2F3	15987	39265	126995	15990	57896	-157430
	RTG	0	0	0	4334	15994	-43356
NL4/1b	GW / opgw	2169	5233	18682	2169	5821	-19179
Wind, -20°C	150C1F1	7988	19321	69724	7989	20860	-70706
Permanent loads yg= 1.0	150C1F2	7988	19267	69712	7989	20660	-70523
Wind angle: 45°	150C1F3	7988	19199	69699	7989	20411	-70317
	380C2F1	15977	38642	139448	15977	41721	-141411
	380C2F2	15977	38534	139423	15977	41319	-141047
	380C2F3	15977	38398	139398	15977	40823	-140634
	RTG	0	0	0	4331	10882	-37349
NL4/3	GW / opgw	7433	13915	47568	7434	16939	-50120
Wind, -5°C	150C1F1	12618	27216	94915	12619	31971	-99342
Permanent loads yg= 1.0	150C1F2	12618	27056	94844	12618	31339	-98569
Wind angle: 45°	150C1F3	12617	26855	94767	12618	30560	-97676
	380C2F1	25235	54432	189829	25237	63942	-198685
	380C2F2	25235	54111	189688	25237	62677	-197137
	380C2F3	25235	53711	189533	25236	61121	-195351
	RTG	0	0	0	14885	30430	-96830
NL4/4	GW / opgw	2671	5669	20307	2671	6215	-20648
Construction/maintenance, +5°C	150C1F1	8996	19212	69318	8996	20692	-70072
Permanent loads yg= 1.0	150C1F2	8996	19159	69309	8996	20501	-69928
Wind angle: 45°	150C1F3	8996	19093	69302	8996	20264	-69765
	380C2F1	17991	38424	138635	17991	41384	-140145
	380C2F2	17991	38319	138619	17991	41002	-139856
	380C2F3	17991	38186	138603	17991	40529	-139531
	RTG	0	0	0	5336	11792	-40743
NL4/1a	GW / opgw	2171	12443	30579	2171	12443	-30579
Wind, 10°C	150C1F1	7997	37455	95284	7997	37455	-95284
Permanent loads yg= 1.0	150C1F2	7997	35433	91273	7997	35433	-91273
Wind angle: 90°	150C1F3	7996	32896	86289	7996	32896	-86289
	380C2F1	15995	74910	190569	15995	74910	-190569
	380C2F2	15994	70866	182546	15994	70866	-182546
	380C2F3	15992	65792	172578	15992	65792	-172578
	RTG	0	0	0	4335	18235	-47731


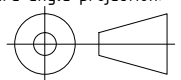
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2169	6074	19499	2169	6074	-19499
	150C1F1	7989	21506	71371	7989	21506	-71371
	150C1F2	7989	21240	71083	7989	21240	-71083
	150C1F3	7989	20912	70754	7989	20912	-70754
	380C2F1	15977	43012	142743	15977	43012	-142743
	380C2F2	15977	42479	142166	15977	42479	-142166
	380C2F3	15977	41823	141508	15977	41823	-141508
	RTG	0	0	0	4331	11164	-37605
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7435	18214	51684	7435	18214	-51684
	150C1F1	12619	34010	102078	12619	34010	-102078
	150C1F2	12619	33168	100909	12619	33168	-100909
	150C1F3	12619	32133	99547	12619	32133	-99547
	380C2F1	25238	68021	204156	25238	68021	-204156
	380C2F2	25238	66337	201818	25238	66337	-201818
	380C2F3	25237	64265	199093	25237	64265	-199093
	RTG	0	0	0	14885	31876	-98142
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2671	6444	20880	2671	6444	-20880
	150C1F1	8996	21302	70605	8996	21302	-70605
	150C1F2	8996	21051	70374	8996	21051	-70374
	150C1F3	8996	20740	70111	8996	20740	-70111
	380C2F1	17992	42604	141210	17992	42604	-141210
	380C2F2	17992	42102	140747	17992	42102	-140747
	380C2F3	17991	41481	140222	17991	41481	-140222
	RTG	0	0	0	5336	12054	-40921
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2171	10613	26864	2170	6006	-18166
	150C1F1	7996	32495	85509	7993	20488	-64544
	150C1F2	7996	30916	82455	7993	20104	-64057
	150C1F3	7995	28948	78715	7993	19632	-63497
	380C2F1	15992	64991	171017	15987	40976	-129088
	380C2F2	15991	61832	164909	15987	40208	-128115
	380C2F3	15990	57896	157430	15987	39265	-126995
	RTG	0	0	0	4333	10707	-34516
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2169	5821	19179	2169	5233	-18682
	150C1F1	7989	20860	70706	7988	19321	-69724
	150C1F2	7989	20660	70523	7988	19267	-69712
	150C1F3	7989	20411	70317	7988	19199	-69699
	380C2F1	15977	41721	141411	15977	38642	-139448
	380C2F2	15977	41319	141047	15977	38534	-139423
	380C2F3	15977	40823	140634	15977	38398	-139398
	RTG	0	0	0	4331	10201	-36984
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7434	16939	50120	7433	13915	-47568
	150C1F1	12619	31971	99342	12618	27216	-94915
	150C1F2	12618	31339	98569	12618	27056	-94844
	150C1F3	12618	30560	97676	12617	26855	-94767
	380C2F1	25237	63942	198685	25235	54432	-189829
	380C2F2	25237	62677	197137	25235	54111	-189688
	380C2F3	25236	61121	195351	25235	53711	-189533
	RTG	0	0	0	14884	26925	-94908
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2671	6215	20648	2671	5669	-20307
	150C1F1	8996	20692	70072	8996	19212	-69318
	150C1F2	8996	20501	69928	8996	19159	-69309
	150C1F3	8996	20264	69765	8996	19093	-69302
	380C2F1	17991	41384	140145	17991	38424	-138635
	380C2F2	17991	41002	139856	17991	38319	-138619
	380C2F3	17991	40529	139531	17991	38186	-138603
	RTG	0	0	0	5336	11146	-40509



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4HK450

- Trekparameter 1800m
- 2x380 / 2x150 Hoekmast
- 450m Veldlengte
- 150°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement: Ral 9018 Papyrus white
- Kleurstelling Appendages: Ral 7021 Black grey

5.0	03-03-2014	Modified botom diameter and increased traverse length
4.0	03-02-2014	Modified top/botom diameter
3.0	13-06-2013	Small modification
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection: 
Drawn by: BJT 03-03-2014		Drawing no.: 74102194-035-111V
Checked by: AJP 03-03-2014		Description: Wintrack Masttype ZWW4HK450
Approved by: AW 03-03-2014		
Scale: 1:300		Revision: 5.0
Units: m		Format: A3
Project no: 000.145		
Company: TenneT		
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		

ZWW4HL450

Fundatie berekening

Bijlage CCN

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m
schoorstand		8	:1
α		7.125	graden

Opstort	Diameter	5.6	m
	Hoogte	1.8	m
	Inhoud	44.3	m ³
	e.g.	1064	kN

Onderplaat	Diameter	13.0	m
	Hoogte	1.3	m
	Inhoud	173	m ³
	e.g.	4141	kN

Hart paal tov rand fund.		0.6	m
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Optreden krachten

e.g. mast		1057	kN
Fgeleiders		340	kN
Maximale dwarskracht		1385	kN
Fmax vert (druk)		1609	kN
Fmin vert (trek)		1206	kN
Maximale moment		69716	kNm

Moment

F_{diag}		6321	kN
F_{hor}		1385	kN
F_{ver}		6272	kN
Mhor (tgv Fhor)		4293	kNm
Mtot		74009	kNm
$F=M/a$		6272	kN

Verticaal reactiekracht

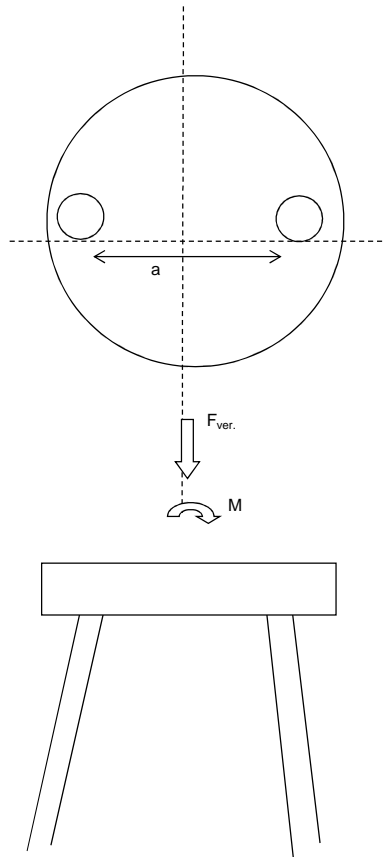
Fwater (trek)		2169	kN
Fgrond (druk)		2919	kN
Fgrond (trek)		2432	kN

Fdmax (druk)		5679	kN
Ftmax (trek)		2739	kN

Fdtot (druk)		11951	kN
Fttot (trek)		3533	kN

Palen druk		11	(-)
Palen trek		11	(-)

Totaal palen		22	(-)	Per fundering
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ZWW4HL450

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CCN

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0.40 m
	b	0.40 m
omtrek paal	$O_{p;gem}$	1.60 m
paalfactor	αt	0.007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0.75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11.25 MPa
materiaalfactor	$\gamma_{m,b4}$	1.4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1.5
	$q_{c;z,d}$	5.36 MPa
	$P_{rz,d}$	37.5 kN/m ²
	$F_{r;trek,d,i}$	60.0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0.007	0.00	0.00	0
	-1	-2	0	0.007	0.00	0.00	0
	-2	-3	0	0.007	0.00	0.00	0
	-3	-4	0	0.007	0.00	0.00	0
	-4	-5	0	0.007	0.00	0.00	0
	-5	-6	0	0.007	0.00	0.00	0
	-6	-7	0	0.007	0.00	0.00	0
	-7	-8	0	0.007	0.00	0.00	0
	-8	-9	1	0.007	2.50	4.00	4
	-9	-10	3	0.007	7.50	12.00	16
	-10	-11	2	0.007	5.00	8.00	24
	-11	-12	0	0.007	0.00	0.00	24
	-12	-13	3	0.007	7.50	12.00	36
	-13	-14	2	0.007	5.00	8.00	44
	-14	-15	4	0.007	10.00	16.00	60
	-15	-16	10	0.007	25.00	40.00	100
	-16	-17	9	0.007	22.50	36.00	136
	-17	-18	8	0.007	20.00	32.00	168
	-18	-19	12	0.007	30.00	48.00	216
	-19	-20	12	0.007	30.00	48.00	264
	-20	-21	10	0.007	25.00	40.00	304
	-21	-22	11	0.007	27.50	44.00	348
	-22	-23	11	0.007	27.50	44.00	392
	-23	-24	12	0.007	30.00	48.00	440
	-24	-25	12	0.007	30.00	48.00	488
	-25	-26	12	0.007	30.00	48.00	536
	-26	-27	15	0.007	37.50	60.00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27.00 m
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Paalgroep factor 10%

$F_{trek,d}$	536.4 kN
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ZWW4HL450

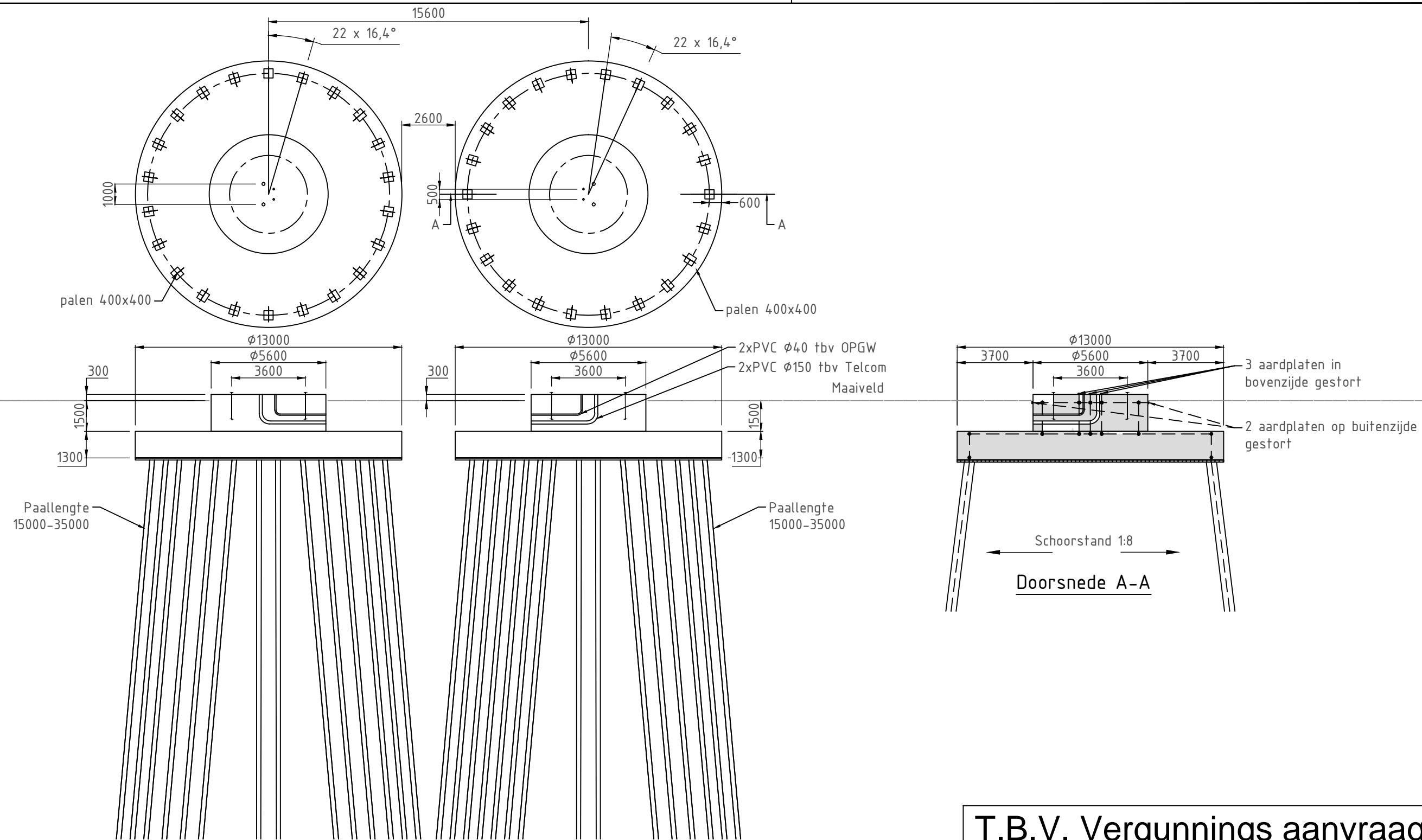
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CCN

Bepaling opneembare paalbelasting op druk

heipaal			
	diameter	v a	2 mm 2 mm
	Deq		0.001808
maximale puntweerstand			
$P_{r,max;punt;i}$			11.25 MN/m ²
paalklasse factor	α_p		1.00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1.00
minimale waarde neergaande deel	$q_{c,II;gem}$		9.00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$		14.00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$		11.00 MN/m ²
maximale paalschachtwrijving			
$P_{r,max;schacht;i}$			0.05 MN/m ²
waarin:			
paalfactor	α_s		0.010
conusweerstand over wrijvingstraject	$q_{c,z;a}$		5.00 MN/m ²
maximale draagkracht alleenstaande paal			
$F_{r,max;i}$			0.00 MN
waarin:			
$F_{r,max;punt;i}$			0.00 MN
paalpunt oppervlak	A_{punt}		0.00 m ²
$F_{r,max;schacht;i}$			0.00 MN
gemiddelde paalomtrek	$O_{p;gem}$		0.01 m
lengte schachtwrijving	Δl		15.00 m
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max;d}$		MN	0.00 MN
materiaalfactor grond	γ_{mb}		1.20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$		0.75
<hr/>			
$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27.00 m
<hr/>			



T.B.V. Vergunnings aanvraag

Verklaring


- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding Ø16mm (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

2.0	17-13-2015	Aantal palen gewijzigd
1.0	10-03-2014	Eerste uitgave
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Scale: 1:200
Drawn by: SGR 17-03-2015		Units: mm
Checked by: AJP 17-03-2015		Project no: 000.145
Approved by: AW 17-03-2015		Company: TenneT
Drawing no.: 74102194-032-112V		Description: Principe ontwerp fundatie hoekmast ZWW4HL450 masten familie
		Revision: 2.0
		Format: A3



ZWW4HL450

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category		O		O	
Hoogte		h	71.1	m	
Diameter voet		d voet	3.6	m	
top		d top	0.8	m	
gem		d gem	2.2	m	
wanddikte		t	28	mm	
Oppervlakte aan voet		A	314210	mm ²	
Traagheidsmoment aan voet		W _x	2.78E+08	mm ⁴	
Weerstandsmoment aan voet		I _x	4.95E+11	mm ⁶	
Mast: Gewicht		2 ^{de} orde F _{rep/ver}	10.0	%	
			1057	kN	

Bijlage BCN

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	70.5	21.0	69.3	0.0	69.3	3135	kNm
380C1F1	59.3	33.1	127.7	0.0	127.7	6085	kNm
380C1F2	47.9	33.1	125.0	0.0	125.0	4823	kNm
380C1F3	36.5	33.1	121.8	0.0	121.8	3592	kNm
380C2F1	59.3	66.1	255.3	0.0	255.3	12170	kNm
380C2F2	47.9	66.1	250.1	0.0	250.1	9646	kNm
380C2F3	36.5	66.1	243.7	0.0	243.7	7183	kNm
RTG	25.2	21.0	62.7	-117.6	133.3	1918	kNm

Stuwdruk	F _{hor.}	46.6	kN
	M _{d,wind}	1476	kNm
Totaal	M _{d,tot}	63378	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	69716	kNm

Normaalkracht;

Optredende normaalkracht					
N _{d,geleiders}				340	kN
N _{d, e.g. mast}				1269	kN
N _{s,d,totaal}				1609	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	β _a	0.62
	A _{eff}	196182
		mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{yd} /γ _{m1}	8	N/mm ²
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Moment;

Optredende moment in de voet:					
M _{d,tot}				69716	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
	β _a	0.92
	W _{eff}	2.57E+08
		mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	271	N/mm ²
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Totale spanning:

σ _d	279	N/mm ²	< 284 N/mm ² = ACCOORD
σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	70.5	14.9	51.9	0.0	51.9	3661	kNm
380C1F1	59.3	25.2	99.4	0.0	99.4	5892	kNm
380C1F2	47.9	25.2	97.6	0.0	97.6	4677	kNm
380C1F3	36.5	25.2	95.5	0.0	95.5	3487	kNm
380C2F1	59.3	50.5	198.7	0.0	198.7	11784	kNm
380C2F2	47.9	50.5	195.3	0.0	195.3	9353	kNm
380C2F3	36.5	50.5	191.1	0.0	191.1	6974	kNm
RTG	25.2	14.9	47.4	-90.4	102.1	2573	kNm

Stuwdruk	F _{hor.}	375	kN
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Verplaatsing		1.39	m
Percentage van de verplaatsing		1.95%	
Hoek		2.11	graden
Kromming		0.45%	
Fundatie rotatiestijfheid		0.005	rad

3.88	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4HL450

Appendix ZWW4HL450 / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	10329	19363	2604	10329	-19363
	380C1F1	9594	35948	69269	9594	35948	-69269
	380C1F2	9593	35487	68900	9593	35487	-68900
	380C1F3	9593	34925	68483	9593	34925	-68483
	380C2F1	19187	71897	138538	19187	71897	-138538
	380C2F2	19187	70974	137800	19187	70974	-137800
	380C2F3	19187	69850	136967	19187	69850	-136967
	RTG	0	0	0	5201	19063	-37308
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	9719	20286	2603	9719	-20286
	380C1F1	9588	35907	75440	9588	35907	-75440
	380C1F2	9588	35850	75441	9588	35850	-75441
	380C1F3	9588	35778	75444	9588	35778	-75444
	380C2F1	19175	71815	150880	19175	71815	-150880
	380C2F2	19175	71700	150882	19175	71700	-150882
	380C2F3	19175	71556	150889	19175	71556	-150889
	RTG	0	0	0	5198	19098	-40242
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	10505	28204	57617	10505	28204	-57617
	380C1F1	16533	53167	109647	16533	53167	-109647
	380C1F2	16533	52997	109628	16533	52997	-109628
	380C1F3	16533	52785	109613	16533	52785	-109613
	380C2F1	33067	106335	219294	33067	106335	-219294
	380C2F2	33067	105994	219256	33067	105994	-219256
	380C2F3	33067	105569	219227	33067	105569	-219227
	RTG	0	0	0	21038	55532	-115424
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3356	10989	23008	3356	10989	-23008
	380C1F1	11098	36748	77241	11098	36748	-77241
	380C1F2	11098	36692	77246	11098	36692	-77246
	380C1F3	11098	36623	77255	11098	36623	-77255
	380C2F1	22195	73496	154483	22195	73496	-154483
	380C2F2	22195	73385	154493	22195	73385	-154493
	380C2F3	22195	73245	154510	22195	73245	-154510
	RTG	0	0	0	6705	21768	-45968
NL1/6 Permanent, +10°C Permanent loads yg= 1.35	GW / opgw	2930	9456	20279	2930	9456	-20279
	380C1F1	10793	34688	74388	10793	34688	-74388
	380C1F2	10793	34688	74388	10793	34688	-74388
	380C1F3	10793	34688	74388	10793	34688	-74388
	380C2F1	21587	69376	148776	21587	69376	-148776
	380C2F2	21587	69376	148776	21587	69376	-148776
	380C2F3	21587	69376	148776	21587	69376	-148776
	RTG	0	0	0	5851	18894	-40519
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	9568	18694	2607	23154	-35861
	380C1F1	9593	34065	67929	9601	69596	-110545
	380C1F2	9593	33810	67788	9600	65859	-105608
	380C1F3	9593	33497	67634	9599	61150	-99408
	380C2F1	19186	68130	135858	19201	139191	-221089
	380C2F2	19186	67619	135576	19199	131719	-211215
	380C2F3	19186	66994	135268	19197	122299	-198817
	RTG	0	0	0	5203	34036	-55316
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	9628	20282	2603	11253	-21378
	380C1F1	9588	35663	75456	9588	39756	-77527
	380C1F2	9588	35628	75461	9588	39292	-77144
	380C1F3	9588	35583	75469	9588	38726	-76710
	380C2F1	19175	71327	150912	19176	79513	-155054
	380C2F2	19175	71256	150923	19176	78583	-154288
	380C2F3	19175	71167	150938	19176	77452	-153420
	RTG	0	0	0	5198	20767	-41004
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	10505	27749	57630	10508	35391	-61721
	380C1F1	16533	52448	109618	16536	65106	-118008
	380C1F2	16533	52345	109618	16536	63657	-116616
	380C1F3	16533	52216	109630	16535	61889	-115001
	380C2F1	33067	104896	219225	33073	130213	-236016
	380C2F2	33067	104689	219236	33072	127314	-233232
	380C2F3	33067	104431	219259	33071	123777	-230001
	RTG	0	0	0	21041	63538	-118141
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3356	10903	23016	3357	12327	-23679
	380C1F1	11098	36511	77274	11098	40311	-78712
	380C1F2	11098	36476	77281	11098	39889	-78421
	380C1F3	11098	36433	77291	11098	39374	-78096
	380C2F1	22195	73022	154547	22196	80622	-157423
	380C2F2	22195	72953	154561	22196	79778	-156842
	380C2F3	22195	72866	154581	22196	78748	-156192
	RTG	0	0	0	6706	23266	-46360

NL1/1a	GW / opgw	2606	21959	34263	2606	21959	-34263
Wind, 10°C	380C1F1	9600	66310	106202	9600	66310	-106202
Permanent loads yg= 1.2	380C1F2	9599	62849	101641	9599	62849	-101641
Wind angle: 90°	380C1F3	9598	58499	95940	9598	58499	-95940
	380C2F1	19200	132620	212405	19200	132620	-212405
	380C2F2	19198	125698	203282	19198	125698	-203282
	380C2F3	19196	116998	191880	19196	116998	-191880
	RTG	0	0	0	5203	32525	-53309
NL1/1b	GW / opgw	2603	11087	21213	2603	11087	-21213
Wind, -20°C	380C1F1	9588	39347	77188	9588	39347	-77188
Permanent loads yg= 1.2	380C1F2	9588	38928	76860	9588	38928	-76860
Wind angle: 90°	380C1F3	9588	38417	76491	9588	38417	-76491
	380C2F1	19176	78694	154377	19176	78694	-154377
	380C2F2	19176	77855	153721	19176	77855	-153721
	380C2F3	19176	76835	152981	19176	76835	-152981
	RTG	0	0	0	5198	20592	-40874
NL1/3	GW / opgw	10508	34640	61099	10508	34640	-61099
Wind, -5°C	380C1F1	16536	63830	116779	16536	63830	-116779
Permanent loads yg= 1.2	380C1F2	16536	62519	115565	16536	62519	-115565
Wind angle: 90°	380C1F3	16535	60921	114164	16535	60921	-114164
	380C2F1	33072	127659	233558	33072	127659	-233558
	380C2F2	33071	125039	231130	33071	125039	-231130
	380C2F3	33070	121843	228327	33070	121843	-228327
	RTG	0	0	0	21041	62718	-117647
NL1/4	GW / opgw	3357	12186	23568	3357	12186	-23568
Construction/maintenance, +5°C	380C1F1	11098	39939	78455	11098	39939	-78455
Permanent loads yg= 1.2	380C1F2	11098	39558	78208	11098	39558	-78208
Wind angle: 90°	380C1F3	11098	39092	77933	11098	39092	-77933
	380C2F1	22196	79878	156909	22196	79878	-156909
	380C2F2	22196	79116	156416	22196	79116	-156416
	380C2F3	22196	78184	155867	22196	78184	-155867
	RTG	0	0	0	6706	23114	-46280
NL1/1a	GW / opgw	2607	23154	35861	2604	9568	-18894
Wind, 10°C	380C1F1	9601	69596	110545	9593	34065	-67929
Permanent loads yg= 1.2	380C1F2	9600	65859	105608	9593	33810	-67788
Wind angle: -45°	380C1F3	9599	61150	99408	9593	33497	-67634
	380C2F1	19201	139191	221089	19186	68130	-135858
	380C2F2	19199	131719	211215	19186	67619	-135576
	380C2F3	19197	122299	198817	19186	66994	-135268
	RTG	0	0	0	5200	18252	-36900
NL1/1b	GW / opgw	2603	11253	21378	2603	9628	-20282
Wind, -20°C	380C1F1	9588	39756	77527	9588	35663	-75456
Permanent loads yg= 1.2	380C1F2	9588	39292	77144	9588	35628	-75461
Wind angle: -45°	380C1F3	9588	38726	76710	9588	35583	-75469
	380C2F1	19176	79513	155054	19175	71327	-150912
	380C2F2	19176	78583	154288	19175	71256	-150923
	380C2F3	19176	77452	153420	19175	71167	-150938
	RTG	0	0	0	5198	18989	-40255
NL1/3	GW / opgw	10508	35391	61721	10505	27749	-57630
Wind, -5°C	380C1F1	16536	65106	118008	16533	52448	-109613
Permanent loads yg= 1.2	380C1F2	16536	63657	116616	16533	52345	-109618
Wind angle: -45°	380C1F3	16535	61889	115001	16533	52216	-109630
	380C2F1	33073	130213	236016	33067	104896	-219225
	380C2F2	33072	127314	233232	33067	104689	-219236
	380C2F3	33071	123777	230001	33067	104431	-219259
	RTG	0	0	0	21038	54985	-115516
NL1/4	GW / opgw	3357	12327	23679	3356	10903	-23016
Construction/maintenance, +5°C	380C1F1	11098	40311	78712	11098	36511	-77274
Permanent loads yg= 1.2	380C1F2	11098	39889	78421	11098	36476	-77281
Wind angle: -45°	380C1F3	11098	39374	78096	11098	36433	-77291
	380C2F1	22196	80622	157423	22195	73022	-154547
	380C2F2	22196	79778	156842	22195	72953	-154561
	380C2F3	22196	78748	156192	22195	72866	-154581
	RTG	0	0	0	6705	21664	-45990
NL1/1a	GW / opgw	1953	8705	15881	1953	8705	-15881
Wind, 10°C	380C1F1	7194	29730	55935	7194	29730	-55935
Permanent loads yg= 0.9	380C1F2	7194	29187	55392	7194	29187	-55392
Wind angle: 0°	380C1F3	7193	28528	54767	7193	28528	-54767
	380C2F1	14387	59460	111871	14387	59460	-111871
	380C2F2	14387	58374	110784	14387	58374	-110784
	380C2F3	14387	57056	109533	14387	57056	-109533
	RTG	0	0	0	3900	15536	-29745

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1952	7742	16046	1952	7742	-16046
	380C1F1	7189	28728	60045	7189	28728	-60045
	380C1F2	7189	28666	60036	7189	28666	-60036
	380C1F3	7189	28589	60028	7189	28589	-60028
	380C2F1	14378	57457	120090	14378	57457	-120090
	380C2F2	14378	57333	120072	14378	57333	-120072
	380C2F3	14378	57179	120057	14378	57179	-120057
	RTG	0	0	0	3898	15139	-31751
	NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	9851	26947	54922	9851	26947
380C1F1		14132	47287	97037	14132	47287	-97037
380C1F2		14132	47108	97000	14132	47108	-97000
380C1F3		14132	46886	96965	14132	46886	-96965
380C2F1		28263	94574	194074	28263	94574	-194074
380C2F2		28263	94216	194000	28263	94216	-194000
380C2F3		28263	93772	193929	28263	93772	-193929
RTG		0	0	0	19733	53002	-109999
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	2705	9221	19217	2705	9221
	380C1F1	8697	30166	63127	8697	30166	-63127
	380C1F2	8697	30107	63126	8697	30107	-63126
	380C1F3	8697	30035	63127	8697	30035	-63127
	380C2F1	17395	60332	126253	17395	60332	-126253
	380C2F2	17395	60215	126251	17395	60215	-126251
	380C2F3	17395	60069	126254	17395	60069	-126254
	RTG	0	0	0	5404	18223	-38365
	NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1953	6676	14317	1953	6676
380C1F1		7193	24632	52824	7193	24632	-52824
380C1F2		7193	24632	52824	7193	24632	-52824
380C1F3		7193	24632	52824	7193	24632	-52824
380C2F1		14386	49264	105648	14386	49264	-105648
380C2F2		14386	49264	105648	14386	49264	-105648
380C2F3		14386	49264	105648	14386	49264	-105648
RTG		0	0	0	3899	13331	-28589
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	1953	7810	14924	1955	22625
	380C1F1	7193	27526	53908	7200	67067	-105124
	380C1F2	7193	27232	53683	7199	63114	-99723
	380C1F3	7193	26873	53429	7198	58086	-92842
	380C2F1	14387	50563	107816	14400	134133	-210248
	380C2F2	14387	54463	107365	14398	126227	-199445
	380C2F3	14387	53746	106859	14397	116172	-185685
	RTG	0	0	0	3902	32369	-51741
	NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1952	7643	16026	1952	9539
380C1F1		7189	28468	60025	7190	33185	-63435
380C1F2		7189	28430	60026	7189	32632	-62864
380C1F3		7189	28384	60029	7189	31962	-62206
380C2F1		14378	56935	120050	14379	66369	-126871
380C2F2		14378	56860	120052	14379	65264	-125729
380C2F3		14378	56767	120058	14379	63924	-124412
RTG		0	0	0	3898	17049	-33031
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°		GW / opgw	9851	26485	54921	9855	34347
	380C1F1	14132	46536	96935	14135	60233	-107560
	380C1F2	14132	46429	96933	14134	58652	-105887
	380C1F3	14132	46296	96935	14134	56722	-103924
	380C2F1	28263	93072	193870	28269	120465	-215119
	380C2F2	28263	92858	193865	28268	117305	-211774
	380C2F3	28263	92592	193870	28267	113444	-207849
	RTG	0	0	0	19736	61208	-113147
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2705	9131	19216	2705	10700
380C1F1		8697	29918	63136	8698	34131	-65460
380C1F2		8697	29883	63140	8698	33649	-65041
380C1F3		8697	29838	63147	8698	33064	-64565
380C2F1		17395	59837	126272	17396	68262	-130921
380C2F2		17395	59765	126281	17395	67299	-130083
380C2F3		17395	59676	126295	17395	66128	-129130
RTG		0	0	0	5404	19845	-39024
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	1955	21387	33035	1955	21387
	380C1F1	7199	63592	100377	7199	63592	-100377
	380C1F2	7199	59907	95334	7199	59907	-95334
	380C1F3	7198	55231	88935	7198	55231	-88935
	380C2F1	14398	127184	200753	14398	127184	-200753
	380C2F2	14397	119814	190669	14397	119814	-190669
	380C2F3	14396	110461	177870	14396	110461	-177870
	RTG	0	0	0	3902	30745	-49493

NL1/1b	GW / opgw	1952	9341	17470	1952	9341	-17470
Wind, -20°C	380C1F1	7189	32698	62931	7189	32698	-62931
Permanent loads yg= 0.9	380C1F2	7189	32201	62436	7189	32201	-62436
Wind angle: 90°	380C1F3	7189	31598	61867	7189	31598	-61867
	380C2F1	14379	65395	125862	14379	65395	-125862
	380C2F2	14379	64401	124871	14379	64401	-124871
	380C2F3	14379	63195	123734	14379	63195	-123734
	RTG	0	0	0	3898	16842	-32833
NL1/3	GW / opgw	9854	33571	58809	9854	33571	-58809
Wind, -5°C	380C1F1	14134	58841	106083	14134	58841	-106083
Permanent loads yg= 0.9	380C1F2	14134	57411	104613	14134	57411	-104613
Wind angle: 90°	380C1F3	14133	55666	102896	14133	55666	-102896
	380C2F1	28269	117681	212167	28269	117681	-212167
	380C2F2	28268	114822	209226	28268	114822	-209226
	380C2F3	28267	111332	205793	28267	111332	-205793
	RTG	0	0	0	19736	60362	-112598
NL1/4	GW / opgw	2705	10541	20041	2705	10541	-20041
Construction/maintenance, +5°C	380C1F1	8698	33707	65090	8698	33707	-65090
Permanent loads yg= 0.9	380C1F2	8698	33272	64730	8698	33272	-64730
Wind angle: 90°	380C1F3	8698	32745	64323	8698	32745	-64323
	380C2F1	17396	67413	130180	17396	67413	-130180
	380C2F2	17395	66545	129461	17395	66545	-129461
	380C2F3	17395	65489	128646	17395	65489	-128646
	RTG	0	0	0	5404	19676	-38908
NL1/1a	GW / opgw	1955	22625	34727	1953	7810	-14924
Wind, 10°C	380C1F1	7200	67067	105124	7193	27526	-53908
Permanent loads yg= 0.9	380C1F2	7199	63114	99723	7193	27232	-53683
Wind angle: -45°	380C1F3	7198	58086	92842	7193	26873	-53429
	380C2F1	14400	134133	210248	14387	55053	-107816
	380C2F2	14398	126227	199445	14387	54463	-107365
	380C2F3	14397	116172	185685	14387	53746	-106859
	RTG	0	0	0	3900	14595	-28959
NL1/1b	GW / opgw	1952	9539	17702	1952	7643	-16026
Wind, -20°C	380C1F1	7190	33185	63435	7189	28468	-60025
Permanent loads yg= 0.9	380C1F2	7189	32632	62864	7189	28430	-60026
Wind angle: -45°	380C1F3	7189	31962	62206	7189	28384	-60029
	380C2F1	14379	66369	126871	14378	56935	-120050
	380C2F2	14379	65264	125729	14378	56860	-120052
	380C2F3	14379	63924	124412	14378	56767	-120058
	RTG	0	0	0	3898	15023	-31749
NL1/3	GW / opgw	9855	34347	59483	9851	26485	-54921
Wind, -5°C	380C1F1	14135	60233	107560	14132	46536	-96935
Permanent loads yg= 0.9	380C1F2	14134	58652	105887	14132	46429	-96933
Wind angle: -45°	380C1F3	14134	56722	103924	14132	46296	-96935
	380C2F1	28269	120465	215119	28263	93072	-193870
	380C2F2	28268	117305	211774	28263	92858	-193865
	380C2F3	28267	113444	207849	28263	92592	-193870
	RTG	0	0	0	19733	52449	-110079
NL1/4	GW / opgw	2705	10700	20190	2705	9131	-19216
Construction/maintenance, +5°C	380C1F1	8698	34131	65460	8697	29918	-63136
Permanent loads yg= 0.9	380C1F2	8698	33649	65041	8697	29883	-63140
Wind angle: -45°	380C1F3	8698	33064	64565	8697	29838	-63147
	380C2F1	17396	68262	130921	17395	59837	-126272
	380C2F2	17395	67299	130083	17395	59765	-126281
	380C2F3	17395	66128	129130	17395	59676	-126295
	RTG	0	0	0	5404	18115	-38381

ZWW4HL450

Appendix ZWW4HL450 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2604	9311	-18517
	380C1F1	0	0	0	9593	33418	-67599
	380C1F2	0	0	0	9593	33231	-67520
	380C1F3	0	0	0	9593	33001	-67437
	380C2F1	0	0	0	19186	66837	-135197
	380C2F2	0	0	0	19186	66463	-135041
	380C2F3	0	0	0	19186	66003	-134874
RTG	0	0	0	5200	17971	-36681	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2603	9665	-20282
	380C1F1	0	0	0	9588	35764	-75445
	380C1F2	0	0	0	9588	35720	-75449
	380C1F3	0	0	0	9588	35664	-75456
	380C2F1	0	0	0	19175	71528	-150891
	380C2F2	0	0	0	19175	71439	-150899
	380C2F3	0	0	0	19175	71328	-150912
RTG	0	0	0	5198	19034	-40248	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4371	14849	-29555
	380C1F1	0	0	0	11145	39104	-80365
	380C1F2	0	0	0	11145	38958	-80328
	380C1F3	0	0	0	11145	38777	-80292
	380C2F1	0	0	0	22290	78209	-160729
	380C2F2	0	0	0	22290	77916	-160657
	380C2F3	0	0	0	22290	77554	-160585
RTG	0	0	0	8742	28711	-58644	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3206	10537	-22151
	380C1F1	0	0	0	10797	35804	-75530
	380C1F2	0	0	0	10797	35761	-75537
	380C1F3	0	0	0	10796	35706	-75546
	380C2F1	0	0	0	21593	71608	-151061
	380C2F2	0	0	0	21593	71521	-151073
	380C2F3	0	0	0	21593	71413	-151092
RTG	0	0	0	6404	20903	-44254	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2605	14990	-24978
	380C1F1	0	0	0	9596	47673	-82119
	380C1F2	0	0	0	9595	45940	-80001
	380C1F3	0	0	0	9595	43811	-77461
	380C2F1	0	0	0	19192	95346	-164238
	380C2F2	0	0	0	19191	91880	-160002
	380C2F3	0	0	0	19190	87622	-154922
RTG	0	0	0	5201	24138	-42576	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2603	10791	-20938
	380C1F1	0	0	0	9588	38618	-76632
	380C1F2	0	0	0	9588	38279	-76397
	380C1F3	0	0	0	9588	37866	-76134
	380C2F1	0	0	0	19176	77236	-153263
	380C2F2	0	0	0	19176	76559	-152793
	380C2F3	0	0	0	19176	75733	-152269
RTG	0	0	0	5198	20279	-40663	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4373	23024	-38048
	380C1F1	0	0	0	11147	49876	-89677
	380C1F2	0	0	0	11147	48552	-88211
	380C1F3	0	0	0	11146	46937	-86488
	380C2F1	0	0	0	22294	99752	-179353
	380C2F2	0	0	0	22294	97105	-176421
	380C2F3	0	0	0	22293	93874	-172976
RTG	0	0	0	8745	37611	-66184	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3206	11551	-22566
	380C1F1	0	0	0	10797	38497	-76368
	380C1F2	0	0	0	10797	38183	-76186
	380C1F3	0	0	0	10797	37799	-75986
	380C2F1	0	0	0	21594	76993	-152736
	380C2F2	0	0	0	21593	76365	-152373
	380C2F3	0	0	0	21593	75598	-151972
RTG	0	0	0	6404	22051	-44461	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2605	14398	-24209
	380C1F1	0	0	0	9595	46147	-80252
	380C1F2	0	0	0	9595	44572	-78360
	380C1F3	0	0	0	9595	42641	-76103
	380C2F1	0	0	0	19191	92294	-160503
	380C2F2	0	0	0	19190	89144	-156719
	380C2F3	0	0	0	19189	85281	-152205
RTG	0	0	0	5201	23469	-41783	

NL3/1b	GW / opgw	0	0	0	2603	10671	-20833
Wind, -20°C	380C1F1	0	0	0	9588	38320	-76424
Permanent loads yg= 1.2	380C1F2	0	0	0	9588	38014	-76225
Wind angle: 90°	380C1F3	0	0	0	9588	37640	-76003
	380C2F1	0	0	0	19176	76639	-152848
	380C2F2	0	0	0	19176	76027	-152449
	380C2F3	0	0	0	19176	75281	-152007
	RTG	0	0	0	5198	20150	-40585
NL3/3	GW / opgw	0	0	0	4373	22176	-37021
Wind, -5°C	380C1F1	0	0	0	11147	48710	-88383
Permanent loads yg= 1.2	380C1F2	0	0	0	11147	47513	-87093
Wind angle: 90°	380C1F3	0	0	0	11146	46054	-85584
	380C2F1	0	0	0	22294	97420	-176766
	380C2F2	0	0	0	22293	95026	-174186
	380C2F3	0	0	0	22292	92109	-171168
	RTG	0	0	0	8744	36656	-65146
NL3/4	GW / opgw	0	0	0	3206	11445	-22493
Construction/maintenance, +5°C	380C1F1	0	0	0	10797	38220	-76207
Permanent loads yg= 1.2	380C1F2	0	0	0	10797	37936	-76055
Wind angle: 90°	380C1F3	0	0	0	10797	37588	-75888
	380C2F1	0	0	0	21594	76440	-152414
	380C2F2	0	0	0	21593	75872	-152109
	380C2F3	0	0	0	21593	75175	-151775
	RTG	0	0	0	6404	21936	-44412
NL3/1a	GW / opgw	0	0	0	2604	9007	-18365
Wind, 10°C	380C1F1	0	0	0	9593	32643	-67338
Permanent loads yg= 1.2	380C1F2	0	0	0	9593	32534	-67317
Wind angle: -45°	380C1F3	0	0	0	9593	32400	-67297
	380C2F1	0	0	0	19186	65285	-134676
	380C2F2	0	0	0	19186	65068	-134634
	380C2F3	0	0	0	19186	64800	-134594
	RTG	0	0	0	5200	17631	-36594
NL3/1b	GW / opgw	0	0	0	2603	9595	-20284
Wind, -20°C	380C1F1	0	0	0	9588	35575	-75471
Permanent loads yg= 1.2	380C1F2	0	0	0	9588	35547	-75477
Wind angle: -45°	380C1F3	0	0	0	9588	35512	-75485
	380C2F1	0	0	0	19175	71149	-150942
	380C2F2	0	0	0	19175	71094	-150953
	380C2F3	0	0	0	19175	71025	-150969
	RTG	0	0	0	5198	18949	-40263
NL3/3	GW / opgw	0	0	0	4371	14397	-29375
Wind, -5°C	380C1F1	0	0	0	11145	38492	-80258
Permanent loads yg= 1.2	380C1F2	0	0	0	11145	38405	-80253
Wind angle: -45°	380C1F3	0	0	0	11145	38297	-80252
	380C2F1	0	0	0	22290	76984	-160516
	380C2F2	0	0	0	22290	76811	-160506
	380C2F3	0	0	0	22290	76594	-160504
	RTG	0	0	0	8742	28200	-58558
NL3/4	GW / opgw	0	0	0	3206	10470	-22161
Construction/maintenance, +5°C	380C1F1	0	0	0	10796	35619	-75565
Permanent loads yg= 1.2	380C1F2	0	0	0	10796	35592	-75572
Wind angle: -45°	380C1F3	0	0	0	10796	35557	-75581
	380C2F1	0	0	0	21593	71237	-151130
	380C2F2	0	0	0	21593	71183	-151143
	380C2F3	0	0	0	21593	71115	-151161
	RTG	0	0	0	6404	20820	-44274
NL3/1a	GW / opgw	0	0	0	1953	7510	-14656
Wind, 10°C	380C1F1	0	0	0	7193	26783	-53370
Permanent loads yg= 0.9	380C1F2	0	0	0	7193	26570	-53236
Wind angle: 0°	380C1F3	0	0	0	7193	26310	-53089
	380C2F1	0	0	0	14387	53566	-106740
	380C2F2	0	0	0	14386	53141	-106473
	380C2F3	0	0	0	14386	52621	-106177
	RTG	0	0	0	3900	14276	-28757
NL3/1b	GW / opgw	0	0	0	1952	7684	-16032
Wind, -20°C	380C1F1	0	0	0	7189	28574	-60027
Permanent loads yg= 0.9	380C1F2	0	0	0	7189	28527	-60025
Wind angle: 0°	380C1F3	0	0	0	7189	28468	-60025
	380C2F1	0	0	0	14378	57149	-120055
	380C2F2	0	0	0	14378	57054	-120051
	380C2F3	0	0	0	14378	56936	-120050
	RTG	0	0	0	3898	15071	-31748

NL3/3	GW / opgw	0	0	0	3719	13241	-26105
Wind, -5°C	380C1F1	0	0	0	8745	32493	-66188
Permanent loads yg= 0.9	380C1F2	0	0	0	8745	32333	-66121
Wind angle: 0°	380C1F3	0	0	0	8745	32136	-66050
	380C2F1	0	0	0	17490	64986	-132375
	380C2F2	0	0	0	17490	64666	-132242
	380C2F3	0	0	0	17490	64272	-132101
	RTG	0	0	0	7441	25426	-51599
NL3/4	GW / opgw	0	0	0	2554	8745	-18308
Construction/maintenance, +5°C	380C1F1	0	0	0	8396	29164	-61291
Permanent loads yg= 0.9	380C1F2	0	0	0	8396	29119	-61294
Wind angle: 0°	380C1F3	0	0	0	8396	29062	-61298
	380C2F1	0	0	0	16793	58328	-122583
	380C2F2	0	0	0	16793	58238	-122587
	380C2F3	0	0	0	16793	58124	-122596
	RTG	0	0	0	5103	17311	-36553
NL3/1a	GW / opgw	0	0	0	1954	13991	-22837
Wind, 10°C	380C1F1	0	0	0	7196	43304	-72752
Permanent loads yg= 0.9	380C1F2	0	0	0	7195	41344	-70148
Wind angle: 45°	380C1F3	0	0	0	7195	38913	-66961
	380C2F1	0	0	0	14392	86607	-145504
	380C2F2	0	0	0	14391	82689	-140296
	380C2F3	0	0	0	14390	77827	-133922
	RTG	0	0	0	3900	21457	-36828
NL3/1b	GW / opgw	0	0	0	1952	8989	-17075
Wind, -20°C	380C1F1	0	0	0	7189	31834	-62085
Permanent loads yg= 0.9	380C1F2	0	0	0	7189	31435	-61720
Wind angle: 45°	380C1F3	0	0	0	7189	30951	-61305
	380C2F1	0	0	0	14379	63668	-124170
	380C2F2	0	0	0	14379	62870	-123440
	380C2F3	0	0	0	14378	61901	-122609
	RTG	0	0	0	3898	16474	-32504
NL3/3	GW / opgw	0	0	0	3721	22075	-36015
Wind, -5°C	380C1F1	0	0	0	8747	44795	-78783
Permanent loads yg= 0.9	380C1F2	0	0	0	8747	43289	-76926
Wind angle: 45°	380C1F3	0	0	0	8747	41442	-74706
	380C2F1	0	0	0	17494	89590	-157566
	380C2F2	0	0	0	17494	86578	-153852
	380C2F3	0	0	0	17493	82884	-149412
	RTG	0	0	0	7443	35116	-60836
NL3/4	GW / opgw	0	0	0	2554	9863	-18946
Construction/maintenance, +5°C	380C1F1	0	0	0	8397	32140	-62738
Permanent loads yg= 0.9	380C1F2	0	0	0	8397	31783	-62464
Wind angle: 45°	380C1F3	0	0	0	8397	31349	-62156
	380C2F1	0	0	0	16793	64280	-125476
	380C2F2	0	0	0	16793	63566	-124928
	380C2F3	0	0	0	16793	62698	-124311
	RTG	0	0	0	5103	18550	-36954
NL3/1a	GW / opgw	0	0	0	1953	13342	-21945
Wind, 10°C	380C1F1	0	0	0	7195	41579	-70459
Permanent loads yg= 0.9	380C1F2	0	0	0	7195	39785	-68097
Wind angle: 90°	380C1F3	0	0	0	7195	37566	-65223
	380C2F1	0	0	0	14391	83159	-140917
	380C2F2	0	0	0	14390	79571	-136195
	380C2F3	0	0	0	14390	75132	-130445
	RTG	0	0	0	3900	20689	-35823
NL3/1b	GW / opgw	0	0	0	1952	8846	-16921
Wind, -20°C	380C1F1	0	0	0	7189	31482	-61763
Permanent loads yg= 0.9	380C1F2	0	0	0	7189	31123	-61449
Wind angle: 90°	380C1F3	0	0	0	7189	30687	-61093
	380C2F1	0	0	0	14379	62965	-123525
	380C2F2	0	0	0	14378	62246	-122898
	380C2F3	0	0	0	14378	61374	-122186
	RTG	0	0	0	3898	16324	-32380
NL3/3	GW / opgw	0	0	0	3721	21176	-34877
Wind, -5°C	380C1F1	0	0	0	8747	43469	-77146
Permanent loads yg= 0.9	380C1F2	0	0	0	8747	42102	-75490
Wind angle: 90°	380C1F3	0	0	0	8746	40429	-73522
	380C2F1	0	0	0	17494	86937	-154291
	380C2F2	0	0	0	17493	84203	-150981
	380C2F3	0	0	0	17493	80858	-147044
	RTG	0	0	0	7442	34079	-59623

NL3/4	GW / opgw	0	0	0	2554	9743	-18844
Construction/maintenance, +5°C	380C1F1	0	0	0	8397	31826	-62496
Permanent loads yg= 0.9	380C1F2	0	0	0	8397	31504	-62262
Wind angle: 90°	380C1F3	0	0	0	8397	31111	-62000
	380C2F1	0	0	0	16793	63651	-124991
	380C2F2	0	0	0	16793	63008	-124524
	380C2F3	0	0	0	16793	62223	-124001
	RTG	0	0	0	5103	18422	-36878
NL3/1a	GW / opgw	0	0	0	1953	7161	-14408
Wind, 10°C	380C1F1	0	0	0	7193	25909	-52899
Permanent loads yg= 0.9	380C1F2	0	0	0	7193	25789	-52854
Wind angle: -45°	380C1F3	0	0	0	7193	25642	-52805
	380C2F1	0	0	0	14386	51819	-105799
	380C2F2	0	0	0	14386	51579	-105707
	380C2F3	0	0	0	14386	51284	-105610
	RTG	0	0	0	3900	13898	-28588
NL3/1b	GW / opgw	0	0	0	1952	7608	-16024
Wind, -20°C	380C1F1	0	0	0	7189	28374	-60030
Permanent loads yg= 0.9	380C1F2	0	0	0	7189	28346	-60033
Wind angle: -45°	380C1F3	0	0	0	7189	28309	-60038
	380C2F1	0	0	0	14378	56749	-120060
	380C2F2	0	0	0	14378	56691	-120066
	380C2F3	0	0	0	14378	56619	-120076
	RTG	0	0	0	3898	14981	-31754
NL3/3	GW / opgw	0	0	0	3719	12755	-25855
Wind, -5°C	380C1F1	0	0	0	8745	31828	-65967
Permanent loads yg= 0.9	380C1F2	0	0	0	8745	31735	-65949
Wind angle: -45°	380C1F3	0	0	0	8745	31620	-65933
	380C2F1	0	0	0	17490	63656	-131934
	380C2F2	0	0	0	17490	63470	-131899
	380C2F3	0	0	0	17490	63240	-131865
	RTG	0	0	0	7441	24887	-51454
NL3/4	GW / opgw	0	0	0	2554	8675	-18311
Construction/maintenance, +5°C	380C1F1	0	0	0	8396	28972	-61310
Permanent loads yg= 0.9	380C1F2	0	0	0	8396	28944	-61315
Wind angle: -45°	380C1F3	0	0	0	8396	28908	-61322
	380C2F1	0	0	0	16793	57943	-122620
	380C2F2	0	0	0	16793	57887	-122630
	380C2F3	0	0	0	16793	57817	-122644
	RTG	0	0	0	5103	17227	-36568

ZWW4HL450

Appendix ZWW4HL450 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	9311	18517	0	0	0
	380C1F1	9593	33418	67599	0	0	0
	380C1F2	9593	33231	67520	0	0	0
	380C1F3	9593	33001	67437	0	0	0
	380C2F1	19186	66837	135197	0	0	0
	380C2F2	19186	66463	135041	0	0	0
	380C2F3	19186	66003	134874	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	9665	20282	0	0	0
	380C1F1	9588	35764	75445	0	0	0
	380C1F2	9588	35720	75449	0	0	0
	380C1F3	9588	35664	75456	0	0	0
	380C2F1	19175	71528	150891	0	0	0
	380C2F2	19175	71439	150899	0	0	0
	380C2F3	19175	71328	150912	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	14849	29555	0	0	0
	380C1F1	11145	39104	80365	0	0	0
	380C1F2	11145	38958	80328	0	0	0
	380C1F3	11145	38777	80292	0	0	0
	380C2F1	22290	78209	160729	0	0	0
	380C2F2	22290	77916	160657	0	0	0
	380C2F3	22290	77554	160585	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	10537	22151	0	0	0
	380C1F1	10797	35804	75530	0	0	0
	380C1F2	10797	35761	75537	0	0	0
	380C1F3	10796	35706	75546	0	0	0
	380C2F1	21593	71608	151061	0	0	0
	380C2F2	21593	71521	151073	0	0	0
	380C2F3	21593	71413	151092	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	9007	18365	0	0	0
	380C1F1	9593	32643	67338	0	0	0
	380C1F2	9593	32534	67317	0	0	0
	380C1F3	9593	32400	67297	0	0	0
	380C2F1	19186	65285	134676	0	0	0
	380C2F2	19186	65068	134634	0	0	0
	380C2F3	19186	64800	134594	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	9595	20284	0	0	0
	380C1F1	9588	35575	75471	0	0	0
	380C1F2	9588	35547	75477	0	0	0
	380C1F3	9588	35512	75485	0	0	0
	380C2F1	19175	71149	150942	0	0	0
	380C2F2	19175	71094	150953	0	0	0
	380C2F3	19175	71025	150969	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	14397	29375	0	0	0
	380C1F1	11145	38492	80258	0	0	0
	380C1F2	11145	38405	80253	0	0	0
	380C1F3	11145	38297	80252	0	0	0
	380C2F1	22290	76984	160516	0	0	0
	380C2F2	22290	76811	160506	0	0	0
	380C2F3	22290	76594	160504	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	10470	22161	0	0	0
	380C1F1	10796	35619	75565	0	0	0
	380C1F2	10796	35592	75572	0	0	0
	380C1F3	10796	35557	75581	0	0	0
	380C2F1	21593	71237	151130	0	0	0
	380C2F2	21593	71183	151143	0	0	0
	380C2F3	21593	71115	151161	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	14398	24209	0	0	0
	380C1F1	9595	46147	80252	0	0	0
	380C1F2	9595	44572	78360	0	0	0
	380C1F3	9595	42641	76103	0	0	0
	380C2F1	19191	92294	160503	0	0	0
	380C2F2	19190	89144	156719	0	0	0
	380C2F3	19189	85281	152205	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b	GW / opgw	2603	10671	20833	0	0	0
Wind, -20°C	380C1F1	9588	38320	76424	0	0	0
Permanent loads yg= 1.2	380C1F2	9588	38014	76225	0	0	0
Wind angle: 90°	380C1F3	9588	37640	76003	0	0	0
	380C2F1	19176	76639	152848	0	0	0
	380C2F2	19176	76027	152449	0	0	0
	380C2F3	19176	75281	152007	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4373	22176	37021	0	0	0
Wind, -5°C	380C1F1	11147	48710	88383	0	0	0
Permanent loads yg= 1.2	380C1F2	11147	47513	87093	0	0	0
Wind angle: 90°	380C1F3	11146	46054	85584	0	0	0
	380C2F1	22294	97420	176766	0	0	0
	380C2F2	22293	95026	174186	0	0	0
	380C2F3	22292	92109	171168	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3206	11445	22493	0	0	0
Construction/maintenance, +5°C	380C1F1	10797	38220	76207	0	0	0
Permanent loads yg= 1.2	380C1F2	10797	37936	76055	0	0	0
Wind angle: 90°	380C1F3	10797	37588	75888	0	0	0
	380C2F1	21594	76440	152414	0	0	0
	380C2F2	21593	75872	152109	0	0	0
	380C2F3	21593	75175	151775	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2605	14990	24978	0	0	0
Wind, 10°C	380C1F1	9596	47673	82119	0	0	0
Permanent loads yg= 1.2	380C1F2	9595	45940	80001	0	0	0
Wind angle: -45°	380C1F3	9595	43811	77461	0	0	0
	380C2F1	19192	95346	164238	0	0	0
	380C2F2	19191	91880	160002	0	0	0
	380C2F3	19190	87622	154922	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2603	10791	20938	0	0	0
Wind, -20°C	380C1F1	9588	38618	76632	0	0	0
Permanent loads yg= 1.2	380C1F2	9588	38279	76397	0	0	0
Wind angle: -45°	380C1F3	9588	37866	76134	0	0	0
	380C2F1	19176	77236	153263	0	0	0
	380C2F2	19176	76559	152793	0	0	0
	380C2F3	19176	75733	152269	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4373	23024	38048	0	0	0
Wind, -5°C	380C1F1	11147	49876	89677	0	0	0
Permanent loads yg= 1.2	380C1F2	11147	48552	88211	0	0	0
Wind angle: -45°	380C1F3	11146	46937	86488	0	0	0
	380C2F1	22294	99752	179353	0	0	0
	380C2F2	22294	97105	176421	0	0	0
	380C2F3	22293	93874	172976	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3206	11551	22566	0	0	0
Construction/maintenance, +5°C	380C1F1	10797	38497	76368	0	0	0
Permanent loads yg= 1.2	380C1F2	10797	38183	76186	0	0	0
Wind angle: -45°	380C1F3	10797	37799	75986	0	0	0
	380C2F1	21594	76993	152736	0	0	0
	380C2F2	21593	76365	152373	0	0	0
	380C2F3	21593	75598	151972	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1953	7510	14656	0	0	0
Wind, 10°C	380C1F1	7193	26783	53370	0	0	0
Permanent loads yg= 0.9	380C1F2	7193	26570	53236	0	0	0
Wind angle: 0°	380C1F3	7193	26310	53089	0	0	0
	380C2F1	14387	53566	106740	0	0	0
	380C2F2	14386	53141	106473	0	0	0
	380C2F3	14386	52621	106177	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	7684	16032	0	0	0
Wind, -20°C	380C1F1	7189	28574	60027	0	0	0
Permanent loads yg= 0.9	380C1F2	7189	28527	60025	0	0	0
Wind angle: 0°	380C1F3	7189	28468	60025	0	0	0
	380C2F1	14378	57149	120055	0	0	0
	380C2F2	14378	57054	120051	0	0	0
	380C2F3	14378	56936	120050	0	0	0
	RTG	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3719	13241	26105	0	0	0
	380C1F1	8745	32493	66188	0	0	0
	380C1F2	8745	32333	66121	0	0	0
	380C1F3	8745	32136	66050	0	0	0
	380C2F1	17490	64986	132375	0	0	0
	380C2F2	17490	64666	132242	0	0	0
	380C2F3	17490	64272	132101	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2554	8745	18308	0	0	0
	380C1F1	8396	29164	61291	0	0	0
	380C1F2	8396	29119	61294	0	0	0
	380C1F3	8396	29062	61298	0	0	0
	380C2F1	16793	58328	122583	0	0	0
	380C2F2	16793	58238	122587	0	0	0
	380C2F3	16793	58124	122596	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1953	7161	14408	0	0	0
	380C1F1	7193	25909	52899	0	0	0
	380C1F2	7193	25789	52854	0	0	0
	380C1F3	7193	25642	52805	0	0	0
	380C2F1	14386	51819	105799	0	0	0
	380C2F2	14386	51579	105707	0	0	0
	380C2F3	14386	51284	105610	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1952	7608	16024	0	0	0
	380C1F1	7189	28374	60030	0	0	0
	380C1F2	7189	28346	60033	0	0	0
	380C1F3	7189	28309	60038	0	0	0
	380C2F1	14378	56749	120060	0	0	0
	380C2F2	14378	56691	120066	0	0	0
	380C2F3	14378	56619	120076	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3719	12755	25855	0	0	0
	380C1F1	8745	31828	65967	0	0	0
	380C1F2	8745	31735	65949	0	0	0
	380C1F3	8745	31620	65933	0	0	0
	380C2F1	17490	63656	131934	0	0	0
	380C2F2	17490	63470	131899	0	0	0
	380C2F3	17490	63240	131865	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2554	8675	18311	0	0	0
	380C1F1	8396	28972	61310	0	0	0
	380C1F2	8396	28944	61315	0	0	0
	380C1F3	8396	28908	61322	0	0	0
	380C2F1	16793	57943	122620	0	0	0
	380C2F2	16793	57887	122630	0	0	0
	380C2F3	16793	57817	122644	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1953	13342	21945	0	0	0
	380C1F1	7195	41579	70459	0	0	0
	380C1F2	7195	39785	68097	0	0	0
	380C1F3	7195	37566	65223	0	0	0
	380C2F1	14391	83159	140917	0	0	0
	380C2F2	14390	79571	136195	0	0	0
	380C2F3	14390	75132	130445	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1952	8846	16921	0	0	0
	380C1F1	7189	31482	61763	0	0	0
	380C1F2	7189	31123	61449	0	0	0
	380C1F3	7189	30687	61093	0	0	0
	380C2F1	14379	62965	123525	0	0	0
	380C2F2	14378	62246	122898	0	0	0
	380C2F3	14378	61374	122186	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3721	21176	34877	0	0	0
	380C1F1	8747	43469	77146	0	0	0
	380C1F2	8747	42102	75490	0	0	0
	380C1F3	8746	40429	73522	0	0	0
	380C2F1	17494	86937	154291	0	0	0
	380C2F2	17493	84203	150981	0	0	0
	380C2F3	17493	80858	147044	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2554	9743	18844	0	0	0
Construction/maintenance, +5°C	380C1F1	8397	31826	62496	0	0	0
Permanent loads yg= 0.9	380C1F2	8397	31504	62262	0	0	0
Wind angle: 90°	380C1F3	8397	31111	62000	0	0	0
	380C2F1	16793	63651	124991	0	0	0
	380C2F2	16793	63008	124524	0	0	0
	380C2F3	16793	62223	124001	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1954	13991	22837	0	0	0
Wind, 10°C	380C1F1	7196	43304	72752	0	0	0
Permanent loads yg= 0.9	380C1F2	7195	41344	70148	0	0	0
Wind angle: -45°	380C1F3	7195	38913	66961	0	0	0
	380C2F1	14392	86607	145504	0	0	0
	380C2F2	14391	82689	140296	0	0	0
	380C2F3	14390	77827	133922	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	8989	17075	0	0	0
Wind, -20°C	380C1F1	7189	31834	62085	0	0	0
Permanent loads yg= 0.9	380C1F2	7189	31435	61720	0	0	0
Wind angle: -45°	380C1F3	7189	30951	61305	0	0	0
	380C2F1	14379	63668	124170	0	0	0
	380C2F2	14379	62870	123440	0	0	0
	380C2F3	14378	61901	122609	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3721	22075	36015	0	0	0
Wind, -5°C	380C1F1	8747	44795	78783	0	0	0
Permanent loads yg= 0.9	380C1F2	8747	43289	76926	0	0	0
Wind angle: -45°	380C1F3	8747	41442	74706	0	0	0
	380C2F1	17494	89590	157566	0	0	0
	380C2F2	17494	86578	153852	0	0	0
	380C2F3	17493	82884	149412	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2554	9863	18946	0	0	0
Construction/maintenance, +5°C	380C1F1	8397	32140	62738	0	0	0
Permanent loads yg= 0.9	380C1F2	8397	31783	62464	0	0	0
Wind angle: -45°	380C1F3	8397	31349	62156	0	0	0
	380C2F1	16793	64280	125476	0	0	0
	380C2F2	16793	63566	124928	0	0	0
	380C2F3	16793	62698	124311	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HL450

Appendix ZWW4HL450 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	9311	18517	2604	9311	-18517
	380C1F1	9593	33418	67599	9593	33418	-67599
	380C1F2	9593	33231	67520	9593	33231	-67520
	380C1F3	9593	33001	67437	9593	33001	-67437
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	9665	20282	2603	9665	-20282
	380C1F1	9588	35764	75445	9588	35764	-75445
	380C1F2	9588	35720	75449	9588	35720	-75449
	380C1F3	9588	35664	75456	9588	35664	-75456
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	14849	29555	4371	14849	-29555
	380C1F1	11145	39104	80365	11145	39104	-80365
	380C1F2	11145	38958	80328	11145	38958	-80328
	380C1F3	11145	38777	80292	11145	38777	-80292
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	10537	22151	3206	10537	-22151
	380C1F1	10797	35804	75530	10797	35804	-75530
	380C1F2	10797	35761	75537	10797	35761	-75537
	380C1F3	10796	35706	75546	10796	35706	-75546
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	9007	18365	2605	14990	-24978
	380C1F1	9593	32643	67338	9596	47673	-82119
	380C1F2	9593	32534	67317	9595	45940	-80001
	380C1F3	9593	32400	67297	9595	43811	-77461
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	9595	20284	2603	10791	-20938
	380C1F1	9588	35575	75471	9588	38618	-76632
	380C1F2	9588	35547	75477	9588	38279	-76397
	380C1F3	9588	35512	75485	9588	37866	-76134
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	14397	29375	4373	23024	-38048
	380C1F1	11145	38492	80258	11147	49876	-89677
	380C1F2	11145	38405	80253	11147	48552	-88211
	380C1F3	11145	38297	80252	11146	46937	-86488
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	10470	22161	3206	11551	-22566
	380C1F1	10796	35619	75565	10797	38497	-76368
	380C1F2	10796	35592	75572	10797	38183	-76186
	380C1F3	10796	35557	75581	10797	37799	-75986
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	14398	24209	2605	14398	-24209
	380C1F1	9595	46147	80252	9595	46147	-80252
	380C1F2	9595	44572	78360	9595	44572	-78360
	380C1F3	9595	42641	76103	9595	42641	-76103
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b	GW / opgw	2603	10671	20833	2603	10671	-20833
Wind, -20°C	380C1F1	9588	38320	76424	9588	38320	-76424
Permanent loads yg= 1.2	380C1F2	9588	38014	76225	9588	38014	-76225
Wind angle: 90°	380C1F3	9588	37640	76003	9588	37640	-76003
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4373	22176	37021	4373	22176	-37021
Wind, -5°C	380C1F1	11147	48710	88383	11147	48710	-88383
Permanent loads yg= 1.2	380C1F2	11147	47513	87093	11147	47513	-87093
Wind angle: 90°	380C1F3	11146	46054	85584	11146	46054	-85584
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3206	11445	22493	3206	11445	-22493
Construction/maintenance, +5°C	380C1F1	10797	38220	76207	10797	38220	-76207
Permanent loads yg= 1.2	380C1F2	10797	37936	76055	10797	37936	-76055
Wind angle: 90°	380C1F3	10797	37588	75888	10797	37588	-75888
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2605	14990	24978	2604	9007	-18365
Wind, 10°C	380C1F1	9596	47673	82119	9593	32643	-67338
Permanent loads yg= 1.2	380C1F2	9595	45940	80001	9593	32534	-67317
Wind angle: -45°	380C1F3	9595	43811	77461	9593	32400	-67297
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2603	10791	20938	2603	9595	-20284
Wind, -20°C	380C1F1	9588	38618	76632	9588	35575	-75471
Permanent loads yg= 1.2	380C1F2	9588	38279	76397	9588	35547	-75477
Wind angle: -45°	380C1F3	9588	37866	76134	9588	35512	-75485
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4373	23024	38048	4371	14397	-29375
Wind, -5°C	380C1F1	11147	49876	89677	11145	38492	-80258
Permanent loads yg= 1.2	380C1F2	11147	48552	88211	11145	38405	-80253
Wind angle: -45°	380C1F3	11146	46937	86488	11145	38297	-80252
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3206	11551	22566	3206	10470	-22161
Construction/maintenance, +5°C	380C1F1	10797	38497	76368	10796	35619	-75565
Permanent loads yg= 1.2	380C1F2	10797	38183	76186	10796	35592	-75572
Wind angle: -45°	380C1F3	10797	37799	75986	10796	35557	-75581
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1953	7510	14656	1953	7510	-14656
Wind, 10°C	380C1F1	7193	26783	53370	7193	26783	-53370
Permanent loads yg= 0.9	380C1F2	7193	26570	53236	7193	26570	-53236
Wind angle: 0°	380C1F3	7193	26310	53089	7193	26310	-53089
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	7684	16032	1952	7684	-16032
Wind, -20°C	380C1F1	7189	28574	60027	7189	28574	-60027
Permanent loads yg= 0.9	380C1F2	7189	28527	60025	7189	28527	-60025
Wind angle: 0°	380C1F3	7189	28468	60025	7189	28468	-60025
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/3	GW / opgw	3719	13241	26105	3719	13241	-26105
Wind, -5°C	380C1F1	8745	32493	66188	8745	32493	-66188
Permanent loads yg= 0.9	380C1F2	8745	32333	66121	8745	32333	-66121
Wind angle: 0°	380C1F3	8745	32136	66050	8745	32136	-66050
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2554	8745	18308	2554	8745	-18308
Construction/maintenance, +5°C	380C1F1	8396	29164	61291	8396	29164	-61291
Permanent loads yg= 0.9	380C1F2	8396	29119	61294	8396	29119	-61294
Wind angle: 0°	380C1F3	8396	29062	61298	8396	29062	-61298
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1953	7161	14408	1954	13991	-22837
Wind, 10°C	380C1F1	7193	25909	52899	7196	43304	-72752
Permanent loads yg= 0.9	380C1F2	7193	25789	52854	7195	41344	-70148
Wind angle: 45°	380C1F3	7193	25642	52805	7195	38913	-66961
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	7608	16024	1952	8989	-17075
Wind, -20°C	380C1F1	7189	28374	60030	7189	31834	-62085
Permanent loads yg= 0.9	380C1F2	7189	28346	60033	7189	31435	-61720
Wind angle: 45°	380C1F3	7189	28309	60038	7189	30951	-61305
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3719	12755	25855	3721	22075	-36015
Wind, -5°C	380C1F1	8745	31828	65967	8747	44795	-78783
Permanent loads yg= 0.9	380C1F2	8745	31735	65949	8747	43289	-76926
Wind angle: 45°	380C1F3	8745	31620	65933	8747	41442	-74706
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2554	8675	18311	2554	9863	-18946
Construction/maintenance, +5°C	380C1F1	8396	28972	61310	8397	32140	-62738
Permanent loads yg= 0.9	380C1F2	8396	28944	61315	8397	31783	-62464
Wind angle: 45°	380C1F3	8396	28908	61322	8397	31349	-62156
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1953	13342	21945	1953	13342	-21945
Wind, 10°C	380C1F1	7195	41579	70459	7195	41579	-70459
Permanent loads yg= 0.9	380C1F2	7195	39785	68097	7195	39785	-68097
Wind angle: 90°	380C1F3	7195	37566	65223	7195	37566	-65223
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	8846	16921	1952	8846	-16921
Wind, -20°C	380C1F1	7189	31482	61763	7189	31482	-61763
Permanent loads yg= 0.9	380C1F2	7189	31123	61449	7189	31123	-61449
Wind angle: 90°	380C1F3	7189	30687	61093	7189	30687	-61093
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3721	21176	34877	3721	21176	-34877
Wind, -5°C	380C1F1	8747	43469	77146	8747	43469	-77146
Permanent loads yg= 0.9	380C1F2	8747	42102	75490	8747	42102	-75490
Wind angle: 90°	380C1F3	8746	40429	73522	8746	40429	-73522
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2554	9743	18844	2554	9743	-18844
Construction/maintenance, +5°C	380C1F1	8397	31826	62496	8397	31826	-62496
Permanent loads yg= 0.9	380C1F2	8397	31504	62262	8397	31504	-62262
Wind angle: 90°	380C1F3	8397	31111	62000	8397	31111	-62000
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1954	13991	22837	1953	7161	-14408
Wind, 10°C	380C1F1	7196	43304	72752	7193	25909	-52899
Permanent loads yg= 0.9	380C1F2	7195	41344	70148	7193	25789	-52854
Wind angle: -45°	380C1F3	7195	38913	66961	7193	25642	-52805
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1952	8989	17075	1952	7608	-16024
Wind, -20°C	380C1F1	7189	31834	62085	7189	28374	-60030
Permanent loads yg= 0.9	380C1F2	7189	31435	61720	7189	28346	-60033
Wind angle: -45°	380C1F3	7189	30951	61305	7189	28309	-60038
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3721	22075	36015	3719	12755	-25855
Wind, -5°C	380C1F1	8747	44795	78783	8745	31828	-65967
Permanent loads yg= 0.9	380C1F2	8747	43289	76926	8745	31735	-65949
Wind angle: -45°	380C1F3	8747	41442	74706	8745	31620	-65933
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2554	9863	18946	2554	8675	-18311
Construction/maintenance, +5°C	380C1F1	8397	32140	62738	8396	28972	-61310
Permanent loads yg= 0.9	380C1F2	8397	31783	62464	8396	28944	-61315
Wind angle: -45°	380C1F3	8397	31349	62156	8396	28908	-61322
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HL450

Appendix ZWW4HL450 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19186	66837	135197	19186	66837	-135197
	380C2F2	19186	66463	135041	19186	66463	-135041
	380C2F3	19186	66003	134874	19186	66003	-134874
	RTG	0	0	0	5200	17971	-36681
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19175	71528	150891	19175	71528	-150891
	380C2F2	19175	71439	150899	19175	71439	-150899
	380C2F3	19175	71328	150912	19175	71328	-150912
	RTG	0	0	0	5198	19034	-40248
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	22290	78209	160729	22290	78209	-160729
	380C2F2	22290	77916	160657	22290	77916	-160657
	380C2F3	22290	77554	160585	22290	77554	-160585
	RTG	0	0	0	8742	28711	-58644
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	21593	71608	151061	21593	71608	-151061
	380C2F2	21593	71521	151073	21593	71521	-151073
	380C2F3	21593	71413	151092	21593	71413	-151092
	RTG	0	0	0	6404	20903	-44254
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19186	65285	134676	19192	95346	-164238
	380C2F2	19186	65068	134634	19191	91880	-160002
	380C2F3	19186	64800	134594	19190	87622	-154922
	RTG	0	0	0	5201	24138	-42576
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19175	71149	150942	19176	77236	-153263
	380C2F2	19175	71094	150953	19176	76559	-152793
	380C2F3	19175	71025	150969	19176	75733	-152269
	RTG	0	0	0	5198	20279	-40663
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	22290	76984	160516	22294	99752	-179353
	380C2F2	22290	76811	160506	22294	97105	-176421
	380C2F3	22290	76594	160504	22293	93874	-172976
	RTG	0	0	0	8745	37611	-66184
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	21593	71237	151130	21594	76993	-152736
	380C2F2	21593	71183	151143	21593	76365	-152373
	380C2F3	21593	71115	151161	21593	75598	-151972
	RTG	0	0	0	6404	22051	-44461
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19191	92294	160503	19191	92294	-160503
	380C2F2	19190	89144	156719	19190	89144	-156719
	380C2F3	19189	85281	152205	19189	85281	-152205
	RTG	0	0	0	5201	23469	-41783

NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	19176	76639	152848	19176	76639	-152848	
	380C2F2	19176	76027	152449	19176	76027	-152449	
	380C2F3	19176	75281	152007	19176	75281	-152007	
	RTG	0	0	0	5198	20150	-40585	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	22294	97420	176766	22294	97420	-176766	
	380C2F2	22293	95026	174186	22293	95026	-174186	
	380C2F3	22292	92109	171168	22292	92109	-171168	
	RTG	0	0	0	8744	36656	-65146	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21594	76440	152414	21594	76440	-152414	
	380C2F2	21593	75872	152109	21593	75872	-152109	
	380C2F3	21593	75175	151775	21593	75175	-151775	
	RTG	0	0	0	6404	21936	-44412	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	19192	95346	164238	19186	65285	-134676	
	380C2F2	19191	91880	160002	19186	65068	-134634	
	380C2F3	19190	87622	154922	19186	64800	-134594	
	RTG	0	0	0	5200	17631	-36594	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	19176	77236	153263	19175	71149	-150942	
	380C2F2	19176	76559	152793	19175	71094	-150953	
	380C2F3	19176	75733	152269	19175	71025	-150969	
	RTG	0	0	0	5198	18949	-40263	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	22294	99752	179353	22290	76984	-160516	
	380C2F2	22294	97105	176421	22290	76811	-160506	
	380C2F3	22293	93874	172976	22290	76594	-160504	
	RTG	0	0	0	8742	28200	-58558	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21594	76993	152736	21593	71237	-151130	
	380C2F2	21593	76365	152373	21593	71183	-151143	
	380C2F3	21593	75598	151972	21593	71115	-151161	
	RTG	0	0	0	6404	20820	-44274	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14387	53566	106740	14387	53566	-106740	
	380C2F2	14386	53141	106473	14386	53141	-106473	
	380C2F3	14386	52621	106177	14386	52621	-106177	
	RTG	0	0	0	3900	14276	-28757	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14378	57149	120055	14378	57149	-120055	
	380C2F2	14378	57054	120051	14378	57054	-120051	
	380C2F3	14378	56936	120050	14378	56936	-120050	
	RTG	0	0	0	3898	15071	-31748	

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	17490	64986	132375	17490	64986	-132375	
	380C2F2	17490	64666	132242	17490	64666	-132242	
	380C2F3	17490	64272	132101	17490	64272	-132101	
	RTG	0	0	0	7441	25426	-51599	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	16793	58328	122583	16793	58328	-122583	
	380C2F2	16793	58238	122587	16793	58238	-122587	
	380C2F3	16793	58124	122596	16793	58124	-122596	
	RTG	0	0	0	5103	17311	-36553	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14386	51819	105799	14392	86607	-145504	
	380C2F2	14386	51579	105707	14391	82689	-140296	
	380C2F3	14386	51284	105610	14390	77827	-133922	
	RTG	0	0	0	3900	21457	-36828	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14378	56749	120060	14379	63668	-124170	
	380C2F2	14378	56691	120066	14379	62870	-123440	
	380C2F3	14378	56619	120076	14378	61901	-122609	
	RTG	0	0	0	3898	16474	-32504	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	17490	63656	131934	17494	89590	-157566	
	380C2F2	17490	63470	131899	17494	86578	-153852	
	380C2F3	17490	63240	131865	17493	82884	-149412	
	RTG	0	0	0	7443	35116	-60836	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	16793	57943	122620	16793	64280	-125476	
	380C2F2	16793	57887	122630	16793	63566	-124928	
	380C2F3	16793	57817	122644	16793	62698	-124311	
	RTG	0	0	0	5103	18550	-36954	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14391	83159	140917	14391	83159	-140917	
	380C2F2	14390	79571	136195	14390	79571	-136195	
	380C2F3	14390	75132	130445	14390	75132	-130445	
	RTG	0	0	0	3900	20689	-35823	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14379	62965	123525	14379	62965	-123525	
	380C2F2	14378	62246	122898	14378	62246	-122898	
	380C2F3	14378	61374	122186	14378	61374	-122186	
	RTG	0	0	0	3898	16324	-32380	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	17494	86937	154291	17494	86937	-154291	
	380C2F2	17493	84203	150981	17493	84203	-150981	
	380C2F3	17493	80858	147044	17493	80858	-147044	
	RTG	0	0	0	7442	34079	-59623	

NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	16793	63651	124991	16793	63651	-124991
	380C2F2	16793	63008	124524	16793	63008	-124524
	380C2F3	16793	62223	124001	16793	62223	-124001
	RTG	0	0	0	5103	18422	-36878
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	14392	86607	145504	14386	51819	-105799
	380C2F2	14391	82689	140296	14386	51579	-105707
	380C2F3	14390	77827	133922	14386	51284	-105610
	RTG	0	0	0	3900	13898	-28588
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	14379	63668	124170	14378	56749	-120060
	380C2F2	14379	62870	123440	14378	56691	-120066
	380C2F3	14378	61901	122609	14378	56619	-120076
	RTG	0	0	0	3898	14981	-31754
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	17494	89590	157566	17490	63656	-131934
	380C2F2	17494	86578	153852	17490	63470	-131899
	380C2F3	17493	82884	149412	17490	63240	-131865
	RTG	0	0	0	7441	24887	-51454
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	16793	64280	125476	16793	57943	-122620
	380C2F2	16793	63566	124928	16793	57887	-122630
	380C2F3	16793	62698	124311	16793	57817	-122644
	RTG	0	0	0	5103	17227	-36568

ZWW4HL450

Appendix ZWW4HL450 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19186	66837	135197	19186	66837	-135197
	380C2F2	19186	66463	135041	19186	66463	-135041
	380C2F3	19186	66003	134874	19186	66003	-134874
	RTG	0	0	0	5200	17971	-36681
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19175	71528	150891	19175	71528	-150891
	380C2F2	19175	71439	150899	19175	71439	-150899
	380C2F3	19175	71328	150912	19175	71328	-150912
	RTG	0	0	0	5198	19034	-40248
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	22290	78209	160729	22290	78209	-160729
	380C2F2	22290	77916	160657	22290	77916	-160657
	380C2F3	22290	77554	160585	22290	77554	-160585
	RTG	0	0	0	8742	28711	-58644
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	21593	71608	151061	21593	71608	-151061
	380C2F2	21593	71521	151073	21593	71521	-151073
	380C2F3	21593	71413	151092	21593	71413	-151092
	RTG	0	0	0	6404	20903	-44254
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19186	65285	134676	19192	95346	-164238
	380C2F2	19186	65068	134634	19191	91880	-160002
	380C2F3	19186	64800	134594	19190	87622	-154922
	RTG	0	0	0	5201	24138	-42576
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19175	71149	150942	19176	77236	-153263
	380C2F2	19175	71094	150953	19176	76559	-152793
	380C2F3	19175	71025	150969	19176	75733	-152269
	RTG	0	0	0	5198	20279	-40663
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	22290	76984	160516	22294	99752	-179353
	380C2F2	22290	76811	160506	22294	97105	-176421
	380C2F3	22290	76594	160504	22293	93874	-172976
	RTG	0	0	0	8745	37611	-66184
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	21593	71237	151130	21594	76993	-152736
	380C2F2	21593	71183	151143	21593	76365	-152373
	380C2F3	21593	71115	151161	21593	75598	-151972
	RTG	0	0	0	6404	22051	-44461
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19191	92294	160503	19191	92294	-160503
	380C2F2	19190	89144	156719	19190	89144	-156719
	380C2F3	19189	85281	152205	19189	85281	-152205
	RTG	0	0	0	5201	23469	-41783

NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	19176	76639	152848	19176	76639	-152848	
	380C2F2	19176	76027	152449	19176	76027	-152449	
	380C2F3	19176	75281	152007	19176	75281	-152007	
	RTG	0	0	0	5198	20150	-40585	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	22294	97420	176766	22294	97420	-176766	
	380C2F2	22293	95026	174186	22293	95026	-174186	
	380C2F3	22292	92109	171168	22292	92109	-171168	
	RTG	0	0	0	8744	36656	-65146	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21594	76440	152414	21594	76440	-152414	
	380C2F2	21593	75872	152109	21593	75872	-152109	
	380C2F3	21593	75175	151775	21593	75175	-151775	
	RTG	0	0	0	6404	21936	-44412	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	19192	95346	164238	19186	65285	-134676	
	380C2F2	19191	91880	160002	19186	65068	-134634	
	380C2F3	19190	87622	154922	19186	64800	-134594	
	RTG	0	0	0	5200	17631	-36594	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	19176	77236	153263	19175	71149	-150942	
	380C2F2	19176	76559	152793	19175	71094	-150953	
	380C2F3	19176	75733	152269	19175	71025	-150969	
	RTG	0	0	0	5198	18949	-40263	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	22294	99752	179353	22290	76984	-160516	
	380C2F2	22294	97105	176421	22290	76811	-160506	
	380C2F3	22293	93874	172976	22290	76594	-160504	
	RTG	0	0	0	8742	28200	-58558	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21594	76993	152736	21593	71237	-151130	
	380C2F2	21593	76365	152373	21593	71183	-151143	
	380C2F3	21593	75598	151972	21593	71115	-151161	
	RTG	0	0	0	6404	20820	-44274	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14387	53566	106740	14387	53566	-106740	
	380C2F2	14386	53141	106473	14386	53141	-106473	
	380C2F3	14386	52621	106177	14386	52621	-106177	
	RTG	0	0	0	3900	14276	-28757	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14378	57149	120055	14378	57149	-120055	
	380C2F2	14378	57054	120051	14378	57054	-120051	
	380C2F3	14378	56936	120050	14378	56936	-120050	
	RTG	0	0	0	3898	15071	-31748	

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	17490	64986	132375	17490	64986	-132375	
	380C2F2	17490	64666	132242	17490	64666	-132242	
	380C2F3	17490	64272	132101	17490	64272	-132101	
	RTG	0	0	0	7441	25426	-51599	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	16793	58328	122583	16793	58328	-122583	
	380C2F2	16793	58238	122587	16793	58238	-122587	
	380C2F3	16793	58124	122596	16793	58124	-122596	
	RTG	0	0	0	5103	17311	-36553	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14386	51819	105799	14392	86607	-145504	
	380C2F2	14386	51579	105707	14391	82689	-140296	
	380C2F3	14386	51284	105610	14390	77827	-133922	
	RTG	0	0	0	3900	21457	-36828	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14378	56749	120060	14379	63668	-124170	
	380C2F2	14378	56691	120066	14379	62870	-123440	
	380C2F3	14378	56619	120076	14378	61901	-122609	
	RTG	0	0	0	3898	16474	-32504	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	17490	63656	131934	17494	89590	-157566	
	380C2F2	17490	63470	131899	17494	86578	-153852	
	380C2F3	17490	63240	131865	17493	82884	-149412	
	RTG	0	0	0	7443	35116	-60836	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	16793	57943	122620	16793	64280	-125476	
	380C2F2	16793	57887	122630	16793	63566	-124928	
	380C2F3	16793	57817	122644	16793	62698	-124311	
	RTG	0	0	0	5103	18550	-36954	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14391	83159	140917	14391	83159	-140917	
	380C2F2	14390	79571	136195	14390	79571	-136195	
	380C2F3	14390	75132	130445	14390	75132	-130445	
	RTG	0	0	0	3900	20689	-35823	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14379	62965	123525	14379	62965	-123525	
	380C2F2	14378	62246	122898	14378	62246	-122898	
	380C2F3	14378	61374	122186	14378	61374	-122186	
	RTG	0	0	0	3898	16324	-32380	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	17494	86937	154291	17494	86937	-154291	
	380C2F2	17493	84203	150981	17493	84203	-150981	
	380C2F3	17493	80858	147044	17493	80858	-147044	
	RTG	0	0	0	7442	34079	-59623	

NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	16793	63651	124991	16793	63651	-124991
	380C2F2	16793	63008	124524	16793	63008	-124524
	380C2F3	16793	62223	124001	16793	62223	-124001
	RTG	0	0	0	5103	18422	-36878
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	14392	86607	145504	14386	51819	-105799
	380C2F2	14391	82689	140296	14386	51579	-105707
	380C2F3	14390	77827	133922	14386	51284	-105610
	RTG	0	0	0	3900	13898	-28588
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	14379	63668	124170	14378	56749	-120060
	380C2F2	14379	62870	123440	14378	56691	-120066
	380C2F3	14378	61901	122609	14378	56619	-120076
	RTG	0	0	0	3898	14981	-31754
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	17494	89590	157566	17490	63656	-131934
	380C2F2	17494	86578	153852	17490	63470	-131899
	380C2F3	17493	82884	149412	17490	63240	-131865
	RTG	0	0	0	7441	24887	-51454
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	16793	64280	125476	16793	57943	-122620
	380C2F2	16793	63566	124928	16793	57887	-122630
	380C2F3	16793	62698	124311	16793	57817	-122644
	RTG	0	0	0	5103	17227	-36568

ZWW4HL450

Appendix ZWW4HL450 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	9311	18517	0	0	0
	380C1F1	9593	33418	67599	0	0	0
	380C1F2	9593	33231	67520	0	0	0
	380C1F3	9593	33001	67437	0	0	0
	380C2F1	0	0	0	19186	66837	-135197
	380C2F2	0	0	0	19186	66463	-135041
	380C2F3	0	0	0	19186	66003	-134874
	RTG	0	0	0	5200	17971	-36681
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	9665	20282	0	0	0
	380C1F1	9588	35764	75445	0	0	0
	380C1F2	9588	35720	75449	0	0	0
	380C1F3	9588	35664	75456	0	0	0
	380C2F1	0	0	0	19175	71528	-150891
	380C2F2	0	0	0	19175	71439	-150899
	380C2F3	0	0	0	19175	71328	-150912
	RTG	0	0	0	5198	19034	-40248
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	14849	29555	0	0	0
	380C1F1	11145	39104	80365	0	0	0
	380C1F2	11145	38958	80328	0	0	0
	380C1F3	11145	38777	80292	0	0	0
	380C2F1	0	0	0	22290	78209	-160729
	380C2F2	0	0	0	22290	77916	-160657
	380C2F3	0	0	0	22290	77554	-160585
	RTG	0	0	0	8742	28711	-58644
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	10537	22151	0	0	0
	380C1F1	10797	35804	75530	0	0	0
	380C1F2	10797	35761	75537	0	0	0
	380C1F3	10796	35706	75546	0	0	0
	380C2F1	0	0	0	21593	71608	-151061
	380C2F2	0	0	0	21593	71521	-151073
	380C2F3	0	0	0	21593	71413	-151092
	RTG	0	0	0	6404	20903	-44254
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	9007	18365	0	0	0
	380C1F1	9593	32643	67338	0	0	0
	380C1F2	9593	32534	67317	0	0	0
	380C1F3	9593	32400	67297	0	0	0
	380C2F1	0	0	0	19192	95346	-164238
	380C2F2	0	0	0	19191	91880	-160002
	380C2F3	0	0	0	19190	87622	-154922
	RTG	0	0	0	5201	24138	-42576
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	9595	20284	0	0	0
	380C1F1	9588	35575	75471	0	0	0
	380C1F2	9588	35547	75477	0	0	0
	380C1F3	9588	35512	75485	0	0	0
	380C2F1	0	0	0	19176	77236	-153263
	380C2F2	0	0	0	19176	76559	-152793
	380C2F3	0	0	0	19176	75733	-152269
	RTG	0	0	0	5198	20279	-40663
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	14397	29375	0	0	0
	380C1F1	11145	38492	80258	0	0	0
	380C1F2	11145	38405	80253	0	0	0
	380C1F3	11145	38297	80252	0	0	0
	380C2F1	0	0	0	22294	99752	-179353
	380C2F2	0	0	0	22294	97105	-176421
	380C2F3	0	0	0	22293	93874	-172976
	RTG	0	0	0	8745	37611	-66184
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	10470	22161	0	0	0
	380C1F1	10796	35619	75565	0	0	0
	380C1F2	10796	35592	75572	0	0	0
	380C1F3	10796	35557	75581	0	0	0
	380C2F1	0	0	0	21594	76993	-152736
	380C2F2	0	0	0	21593	76365	-152373
	380C2F3	0	0	0	21593	75598	-151972
	RTG	0	0	0	6404	22051	-44461
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	14398	24209	0	0	0
	380C1F1	9595	46147	80252	0	0	0
	380C1F2	9595	44572	78360	0	0	0
	380C1F3	9595	42641	76103	0	0	0
	380C2F1	0	0	0	19191	92294	-160503
	380C2F2	0	0	0	19190	89144	-156719
	380C2F3	0	0	0	19189	85281	-152205
	RTG	0	0	0	5201	23469	-41783

NL3/1b	GW / opgw	2603	10671	20833	0	0	0
Wind, -20°C	380C1F1	9588	38320	76424	0	0	0
Permanent loads yg= 1.2	380C1F2	9588	38014	76225	0	0	0
Wind angle: 90°	380C1F3	9588	37640	76003	0	0	0
	380C2F1	0	0	0	19176	76639	-152848
	380C2F2	0	0	0	19176	76027	-152449
	380C2F3	0	0	0	19176	75281	-152007
	RTG	0	0	0	5198	20150	-40585
NL3/3	GW / opgw	4373	22176	37021	0	0	0
Wind, -5°C	380C1F1	11147	48710	88383	0	0	0
Permanent loads yg= 1.2	380C1F2	11147	47513	87093	0	0	0
Wind angle: 90°	380C1F3	11146	46054	85584	0	0	0
	380C2F1	0	0	0	22294	97420	-176766
	380C2F2	0	0	0	22293	95026	-174186
	380C2F3	0	0	0	22292	92109	-171168
	RTG	0	0	0	8744	36656	-65146
NL3/4	GW / opgw	3206	11445	22493	0	0	0
Construction/maintenance, +5°C	380C1F1	10797	38220	76207	0	0	0
Permanent loads yg= 1.2	380C1F2	10797	37936	76055	0	0	0
Wind angle: 90°	380C1F3	10797	37588	75888	0	0	0
	380C2F1	0	0	0	21594	76440	-152414
	380C2F2	0	0	0	21593	75872	-152109
	380C2F3	0	0	0	21593	75175	-151775
	RTG	0	0	0	6404	21936	-44412
NL3/1a	GW / opgw	2605	14990	24978	0	0	0
Wind, 10°C	380C1F1	9596	47673	82119	0	0	0
Permanent loads yg= 1.2	380C1F2	9595	45940	80001	0	0	0
Wind angle: -45°	380C1F3	9595	43811	77461	0	0	0
	380C2F1	0	0	0	19186	65285	-134676
	380C2F2	0	0	0	19186	65068	-134634
	380C2F3	0	0	0	19186	64800	-134594
	RTG	0	0	0	5200	17631	-36594
NL3/1b	GW / opgw	2603	10791	20938	0	0	0
Wind, -20°C	380C1F1	9588	38618	76632	0	0	0
Permanent loads yg= 1.2	380C1F2	9588	38279	76397	0	0	0
Wind angle: -45°	380C1F3	9588	37866	76134	0	0	0
	380C2F1	0	0	0	19175	71149	-150942
	380C2F2	0	0	0	19175	71094	-150953
	380C2F3	0	0	0	19175	71025	-150969
	RTG	0	0	0	5198	18949	-40263
NL3/3	GW / opgw	4373	23024	38048	0	0	0
Wind, -5°C	380C1F1	11147	49876	89677	0	0	0
Permanent loads yg= 1.2	380C1F2	11147	48552	88211	0	0	0
Wind angle: -45°	380C1F3	11146	46937	86488	0	0	0
	380C2F1	0	0	0	22290	76984	-160516
	380C2F2	0	0	0	22290	76811	-160506
	380C2F3	0	0	0	22290	76594	-160504
	RTG	0	0	0	8742	28200	-58558
NL3/4	GW / opgw	3206	11551	22566	0	0	0
Construction/maintenance, +5°C	380C1F1	10797	38497	76368	0	0	0
Permanent loads yg= 1.2	380C1F2	10797	38183	76186	0	0	0
Wind angle: -45°	380C1F3	10797	37799	75986	0	0	0
	380C2F1	0	0	0	21593	71237	-151130
	380C2F2	0	0	0	21593	71183	-151143
	380C2F3	0	0	0	21593	71115	-151161
	RTG	0	0	0	6404	20820	-44274
NL3/1a	GW / opgw	1953	7510	14656	0	0	0
Wind, 10°C	380C1F1	7193	26783	53370	0	0	0
Permanent loads yg= 0.9	380C1F2	7193	26570	53236	0	0	0
Wind angle: 0°	380C1F3	7193	26310	53089	0	0	0
	380C2F1	0	0	0	14387	53566	-106740
	380C2F2	0	0	0	14386	53141	-106473
	380C2F3	0	0	0	14386	52621	-106177
	RTG	0	0	0	3900	14276	-28757
NL3/1b	GW / opgw	1952	7684	16032	0	0	0
Wind, -20°C	380C1F1	7189	28574	60027	0	0	0
Permanent loads yg= 0.9	380C1F2	7189	28527	60025	0	0	0
Wind angle: 0°	380C1F3	7189	28468	60025	0	0	0
	380C2F1	0	0	0	14378	57149	-120055
	380C2F2	0	0	0	14378	57054	-120051
	380C2F3	0	0	0	14378	56936	-120050
	RTG	0	0	0	3898	15071	-31748

NL3/3	GW / opgw	3719	13241	26105	0	0	0
Wind, -5°C	380C1F1	8745	32493	66188	0	0	0
Permanent loads yg= 0.9	380C1F2	8745	32333	66121	0	0	0
Wind angle: 0°	380C1F3	8745	32136	66050	0	0	0
	380C2F1	0	0	0	17490	64986	-132375
	380C2F2	0	0	0	17490	64666	-132242
	380C2F3	0	0	0	17490	64272	-132101
	RTG	0	0	0	7441	25426	-51599
NL3/4	GW / opgw	2554	8745	18308	0	0	0
Construction/maintenance, +5°C	380C1F1	8396	29164	61291	0	0	0
Permanent loads yg= 0.9	380C1F2	8396	29119	61294	0	0	0
Wind angle: 0°	380C1F3	8396	29062	61298	0	0	0
	380C2F1	0	0	0	16793	58328	-122583
	380C2F2	0	0	0	16793	58238	-122587
	380C2F3	0	0	0	16793	58124	-122596
	RTG	0	0	0	5103	17311	-36553
NL3/1a	GW / opgw	1953	7161	14408	0	0	0
Wind, 10°C	380C1F1	7193	25909	52899	0	0	0
Permanent loads yg= 0.9	380C1F2	7193	25789	52854	0	0	0
Wind angle: 45°	380C1F3	7193	25642	52805	0	0	0
	380C2F1	0	0	0	14392	86607	-145504
	380C2F2	0	0	0	14391	82689	-140296
	380C2F3	0	0	0	14390	77827	-133922
	RTG	0	0	0	3900	21457	-36828
NL3/1b	GW / opgw	1952	7608	16024	0	0	0
Wind, -20°C	380C1F1	7189	28374	60030	0	0	0
Permanent loads yg= 0.9	380C1F2	7189	28346	60033	0	0	0
Wind angle: 45°	380C1F3	7189	28309	60038	0	0	0
	380C2F1	0	0	0	14379	63668	-124170
	380C2F2	0	0	0	14379	62870	-123440
	380C2F3	0	0	0	14378	61901	-122609
	RTG	0	0	0	3898	16474	-32504
NL3/3	GW / opgw	3719	12755	25855	0	0	0
Wind, -5°C	380C1F1	8745	31828	65967	0	0	0
Permanent loads yg= 0.9	380C1F2	8745	31735	65949	0	0	0
Wind angle: 45°	380C1F3	8745	31620	65933	0	0	0
	380C2F1	0	0	0	17494	89590	-157566
	380C2F2	0	0	0	17494	86578	-153852
	380C2F3	0	0	0	17493	82884	-149412
	RTG	0	0	0	7443	35116	-60836
NL3/4	GW / opgw	2554	8675	18311	0	0	0
Construction/maintenance, +5°C	380C1F1	8396	28972	61310	0	0	0
Permanent loads yg= 0.9	380C1F2	8396	28944	61315	0	0	0
Wind angle: 45°	380C1F3	8396	28908	61322	0	0	0
	380C2F1	0	0	0	16793	64280	-125476
	380C2F2	0	0	0	16793	63566	-124928
	380C2F3	0	0	0	16793	62698	-124311
	RTG	0	0	0	5103	18550	-36954
NL3/1a	GW / opgw	1953	13342	21945	0	0	0
Wind, 10°C	380C1F1	7195	41579	70459	0	0	0
Permanent loads yg= 0.9	380C1F2	7195	39785	68097	0	0	0
Wind angle: 90°	380C1F3	7195	37566	65223	0	0	0
	380C2F1	0	0	0	14391	83159	-140917
	380C2F2	0	0	0	14390	79571	-136195
	380C2F3	0	0	0	14390	75132	-130445
	RTG	0	0	0	3900	20689	-35823
NL3/1b	GW / opgw	1952	8846	16921	0	0	0
Wind, -20°C	380C1F1	7189	31482	61763	0	0	0
Permanent loads yg= 0.9	380C1F2	7189	31123	61449	0	0	0
Wind angle: 90°	380C1F3	7189	30687	61093	0	0	0
	380C2F1	0	0	0	14379	62965	-123525
	380C2F2	0	0	0	14378	62246	-122898
	380C2F3	0	0	0	14378	61374	-122186
	RTG	0	0	0	3898	16324	-32380
NL3/3	GW / opgw	3721	21176	34877	0	0	0
Wind, -5°C	380C1F1	8747	43469	77146	0	0	0
Permanent loads yg= 0.9	380C1F2	8747	42102	75490	0	0	0
Wind angle: 90°	380C1F3	8746	40429	73522	0	0	0
	380C2F1	0	0	0	17494	86937	-154291
	380C2F2	0	0	0	17493	84203	-150981
	380C2F3	0	0	0	17493	80858	-147044
	RTG	0	0	0	7442	34079	-59623

NL3/4	GW / opgw	2554	9743	18844	0	0	0
Construction/maintenance, +5°C	380C1F1	8397	31826	62496	0	0	0
Permanent loads yg= 0.9	380C1F2	8397	31504	62262	0	0	0
Wind angle: 90°	380C1F3	8397	31111	62000	0	0	0
	380C2F1	0	0	0	16793	63651	-124991
	380C2F2	0	0	0	16793	63008	-124524
	380C2F3	0	0	0	16793	62223	-124001
	RTG	0	0	0	5103	18422	-36878
NL3/1a	GW / opgw	1954	13991	22837	0	0	0
Wind, 10°C	380C1F1	7196	43304	72752	0	0	0
Permanent loads yg= 0.9	380C1F2	7195	41344	70148	0	0	0
Wind angle: -45°	380C1F3	7195	38913	66961	0	0	0
	380C2F1	0	0	0	14386	51819	-105799
	380C2F2	0	0	0	14386	51579	-105707
	380C2F3	0	0	0	14386	51284	-105610
	RTG	0	0	0	3900	13898	-28588
NL3/1b	GW / opgw	1952	8989	17075	0	0	0
Wind, -20°C	380C1F1	7189	31834	62085	0	0	0
Permanent loads yg= 0.9	380C1F2	7189	31435	61720	0	0	0
Wind angle: -45°	380C1F3	7189	30951	61305	0	0	0
	380C2F1	0	0	0	14378	56749	-120060
	380C2F2	0	0	0	14378	56691	-120066
	380C2F3	0	0	0	14378	56619	-120076
	RTG	0	0	0	3898	14981	-31754
NL3/3	GW / opgw	3721	22075	36015	0	0	0
Wind, -5°C	380C1F1	8747	44795	78783	0	0	0
Permanent loads yg= 0.9	380C1F2	8747	43289	76926	0	0	0
Wind angle: -45°	380C1F3	8747	41442	74706	0	0	0
	380C2F1	0	0	0	17490	63656	-131934
	380C2F2	0	0	0	17490	63470	-131899
	380C2F3	0	0	0	17490	63240	-131865
	RTG	0	0	0	7441	24887	-51454
NL3/4	GW / opgw	2554	9863	18946	0	0	0
Construction/maintenance, +5°C	380C1F1	8397	32140	62738	0	0	0
Permanent loads yg= 0.9	380C1F2	8397	31783	62464	0	0	0
Wind angle: -45°	380C1F3	8397	31349	62156	0	0	0
	380C2F1	0	0	0	16793	57943	-122620
	380C2F2	0	0	0	16793	57887	-122630
	380C2F3	0	0	0	16793	57817	-122644
	RTG	0	0	0	5103	17227	-36568

ZWW4HL450

Appendix ZWW4HL450 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2604	9311	-18517
	380C1F1	0	0	0	9593	33418	-67599
	380C1F2	0	0	0	9593	33231	-67520
	380C1F3	0	0	0	9593	33001	-67437
	380C2F1	19186	66837	135197	19186	66837	-135197
	380C2F2	19186	66463	135041	19186	66463	-135041
	380C2F3	19186	66003	134874	19186	66003	-134874
	RTG	5200	17971	36681	5200	17971	-36681
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2603	9665	-20282
	380C1F1	0	0	0	9588	35764	-75445
	380C1F2	0	0	0	9588	35720	-75449
	380C1F3	0	0	0	9588	35664	-75456
	380C2F1	19175	71528	150891	19175	71528	-150891
	380C2F2	19175	71439	150899	19175	71439	-150899
	380C2F3	19175	71328	150912	19175	71328	-150912
	RTG	5198	19034	40248	5198	19034	-40248
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4371	14849	-29555
	380C1F1	0	0	0	11145	39104	-80365
	380C1F2	0	0	0	11145	38958	-80328
	380C1F3	0	0	0	11145	38777	-80292
	380C2F1	22290	78209	160729	22290	78209	-160729
	380C2F2	22290	77916	160657	22290	77916	-160657
	380C2F3	22290	77554	160585	22290	77554	-160585
	RTG	8742	28711	58644	8742	28711	-58644
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3206	10537	-22151
	380C1F1	0	0	0	10797	35804	-75530
	380C1F2	0	0	0	10797	35761	-75537
	380C1F3	0	0	0	10796	35706	-75546
	380C2F1	21593	71608	151061	21593	71608	-151061
	380C2F2	21593	71521	151073	21593	71521	-151073
	380C2F3	21593	71413	151092	21593	71413	-151092
	RTG	6404	20903	44254	6404	20903	-44254
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2605	14990	-24978
	380C1F1	0	0	0	9596	47673	-82119
	380C1F2	0	0	0	9595	45940	-80001
	380C1F3	0	0	0	9595	43811	-77461
	380C2F1	19186	65285	134676	19192	95346	-164238
	380C2F2	19186	65068	134634	19191	91880	-160002
	380C2F3	19186	64800	134594	19190	87622	-154922
	RTG	5200	17631	36594	5201	24138	-42576
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2603	10791	-20938
	380C1F1	0	0	0	9588	38618	-76632
	380C1F2	0	0	0	9588	38279	-76397
	380C1F3	0	0	0	9588	37866	-76134
	380C2F1	19175	71149	150942	19176	77236	-153263
	380C2F2	19175	71094	150953	19176	76559	-152793
	380C2F3	19175	71025	150969	19176	75733	-152269
	RTG	5198	18949	40263	5198	20279	-40663
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4373	23024	-38048
	380C1F1	0	0	0	11147	49876	-89677
	380C1F2	0	0	0	11147	48552	-88211
	380C1F3	0	0	0	11146	46937	-86488
	380C2F1	22290	76984	160516	22294	99752	-179353
	380C2F2	22290	76811	160506	22294	97105	-176421
	380C2F3	22290	76594	160504	22293	93874	-172976
	RTG	8742	28200	58558	8745	37611	-66184
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3206	11551	-22566
	380C1F1	0	0	0	10797	38497	-76368
	380C1F2	0	0	0	10797	38183	-76186
	380C1F3	0	0	0	10797	37799	-75986
	380C2F1	21593	71237	151130	21594	76993	-152736
	380C2F2	21593	71183	151143	21593	76365	-152373
	380C2F3	21593	71115	151161	21593	75598	-151972
	RTG	6404	20820	44274	6404	22051	-44461
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2605	14398	-24209
	380C1F1	0	0	0	9595	46147	-80252
	380C1F2	0	0	0	9595	44572	-78360
	380C1F3	0	0	0	9595	42641	-76103
	380C2F1	19191	92294	160503	19191	92294	-160503
	380C2F2	19190	89144	156719	19190	89144	-156719
	380C2F3	19189	85281	152205	19189	85281	-152205
	RTG	5201	23469	41783	5201	23469	-41783

NL3/1b	GW / opgw	0	0	0	2603	10671	-20833
Wind, -20°C	380C1F1	0	0	0	9588	38320	-76424
Permanent loads yg= 1.2	380C1F2	0	0	0	9588	38014	-76225
Wind angle: 90°	380C1F3	0	0	0	9588	37640	-76003
	380C2F1	19176	76639	152848	19176	76639	-152848
	380C2F2	19176	76027	152449	19176	76027	-152449
	380C2F3	19176	75281	152007	19176	75281	-152007
	RTG	5198	20150	40585	5198	20150	-40585
NL3/3	GW / opgw	0	0	0	4373	22176	-37021
Wind, -5°C	380C1F1	0	0	0	11147	48710	-88383
Permanent loads yg= 1.2	380C1F2	0	0	0	11147	47513	-87093
Wind angle: 90°	380C1F3	0	0	0	11146	46054	-85584
	380C2F1	22294	97420	176766	22294	97420	-176766
	380C2F2	22293	95026	174186	22293	95026	-174186
	380C2F3	22292	92109	171168	22292	92109	-171168
	RTG	8744	36656	65146	8744	36656	-65146
NL3/4	GW / opgw	0	0	0	3206	11445	-22493
Construction/maintenance, +5°C	380C1F1	0	0	0	10797	38220	-76207
Permanent loads yg= 1.2	380C1F2	0	0	0	10797	37936	-76055
Wind angle: 90°	380C1F3	0	0	0	10797	37588	-75888
	380C2F1	21594	76440	152414	21594	76440	-152414
	380C2F2	21593	75872	152109	21593	75872	-152109
	380C2F3	21593	75175	151775	21593	75175	-151775
	RTG	6404	21936	44412	6404	21936	-44412
NL3/1a	GW / opgw	0	0	0	2604	9007	-18365
Wind, 10°C	380C1F1	0	0	0	9593	32643	-67338
Permanent loads yg= 1.2	380C1F2	0	0	0	9593	32534	-67317
Wind angle: -45°	380C1F3	0	0	0	9593	32400	-67297
	380C2F1	19192	95346	164238	19186	65285	-134676
	380C2F2	19191	91880	160002	19186	65068	-134634
	380C2F3	19190	87622	154922	19186	64800	-134594
	RTG	5201	24138	42576	5200	17631	-36594
NL3/1b	GW / opgw	0	0	0	2603	9595	-20284
Wind, -20°C	380C1F1	0	0	0	9588	35575	-75471
Permanent loads yg= 1.2	380C1F2	0	0	0	9588	35547	-75477
Wind angle: -45°	380C1F3	0	0	0	9588	35512	-75485
	380C2F1	19176	77236	153263	19175	71149	-150942
	380C2F2	19176	76559	152793	19175	71094	-150953
	380C2F3	19176	75733	152269	19175	71025	-150969
	RTG	5198	20279	40663	5198	18949	-40263
NL3/3	GW / opgw	0	0	0	4371	14397	-29375
Wind, -5°C	380C1F1	0	0	0	11145	38492	-80258
Permanent loads yg= 1.2	380C1F2	0	0	0	11145	38405	-80253
Wind angle: -45°	380C1F3	0	0	0	11145	38297	-80252
	380C2F1	22294	99752	179353	22290	76984	-160516
	380C2F2	22294	97105	176421	22290	76811	-160506
	380C2F3	22293	93874	172976	22290	76594	-160504
	RTG	8745	37611	66184	8742	28200	-58558
NL3/4	GW / opgw	0	0	0	3206	10470	-22161
Construction/maintenance, +5°C	380C1F1	0	0	0	10796	35619	-75565
Permanent loads yg= 1.2	380C1F2	0	0	0	10796	35592	-75572
Wind angle: -45°	380C1F3	0	0	0	10796	35557	-75581
	380C2F1	21594	76993	152736	21593	71237	-151130
	380C2F2	21593	76365	152373	21593	71183	-151143
	380C2F3	21593	75598	151972	21593	71115	-151161
	RTG	6404	22051	44461	6404	20820	-44274
NL3/1a	GW / opgw	0	0	0	1953	7510	-14656
Wind, 10°C	380C1F1	0	0	0	7193	26783	-53370
Permanent loads yg= 0.9	380C1F2	0	0	0	7193	26570	-53236
Wind angle: 0°	380C1F3	0	0	0	7193	26310	-53089
	380C2F1	14387	53566	106740	14387	53566	-106740
	380C2F2	14386	53141	106473	14386	53141	-106473
	380C2F3	14386	52621	106177	14386	52621	-106177
	RTG	3900	14276	28757	3900	14276	-28757
NL3/1b	GW / opgw	0	0	0	1952	7684	-16032
Wind, -20°C	380C1F1	0	0	0	7189	28574	-60027
Permanent loads yg= 0.9	380C1F2	0	0	0	7189	28527	-60025
Wind angle: 0°	380C1F3	0	0	0	7189	28468	-60025
	380C2F1	14378	57149	120055	14378	57149	-120055
	380C2F2	14378	57054	120051	14378	57054	-120051
	380C2F3	14378	56936	120050	14378	56936	-120050
	RTG	3898	15071	31748	3898	15071	-31748

NL3/3	GW / opgw	0	0	0	3719	13241	-26105
Wind, -5°C	380C1F1	0	0	0	8745	32493	-66188
Permanent loads yg= 0.9	380C1F2	0	0	0	8745	32333	-66121
Wind angle: 0°	380C1F3	0	0	0	8745	32136	-66050
	380C2F1	17490	64986	132375	17490	64986	-132375
	380C2F2	17490	64666	132242	17490	64666	-132242
	380C2F3	17490	64272	132101	17490	64272	-132101
	RTG	7441	25426	51599	7441	25426	-51599
NL3/4	GW / opgw	0	0	0	2554	8745	-18308
Construction/maintenance, +5°C	380C1F1	0	0	0	8396	29164	-61291
Permanent loads yg= 0.9	380C1F2	0	0	0	8396	29119	-61294
Wind angle: 0°	380C1F3	0	0	0	8396	29062	-61298
	380C2F1	16793	58328	122583	16793	58328	-122583
	380C2F2	16793	58238	122587	16793	58238	-122587
	380C2F3	16793	58124	122596	16793	58124	-122596
	RTG	5103	17311	36553	5103	17311	-36553
NL3/1a	GW / opgw	0	0	0	1954	13991	-22837
Wind, 10°C	380C1F1	0	0	0	7196	43304	-72752
Permanent loads yg= 0.9	380C1F2	0	0	0	7195	41344	-70148
Wind angle: 45°	380C1F3	0	0	0	7195	38913	-66961
	380C2F1	14386	51819	105799	14392	86607	-145504
	380C2F2	14386	51579	105707	14391	82689	-140296
	380C2F3	14386	51284	105610	14390	77827	-133922
	RTG	3900	13898	28588	3900	21457	-36828
NL3/1b	GW / opgw	0	0	0	1952	8989	-17075
Wind, -20°C	380C1F1	0	0	0	7189	31834	-62085
Permanent loads yg= 0.9	380C1F2	0	0	0	7189	31435	-61720
Wind angle: 45°	380C1F3	0	0	0	7189	30951	-61305
	380C2F1	14378	56749	120060	14379	63668	-124170
	380C2F2	14378	56691	120066	14379	62870	-123440
	380C2F3	14378	56619	120076	14378	61901	-122609
	RTG	3898	14981	31754	3898	16474	-32504
NL3/3	GW / opgw	0	0	0	3721	22075	-36015
Wind, -5°C	380C1F1	0	0	0	8747	44795	-78783
Permanent loads yg= 0.9	380C1F2	0	0	0	8747	43289	-76926
Wind angle: 45°	380C1F3	0	0	0	8747	41442	-74706
	380C2F1	17490	63656	131934	17494	89590	-157566
	380C2F2	17490	63470	131899	17494	86578	-153852
	380C2F3	17490	63240	131865	17493	82884	-149412
	RTG	7441	24887	51454	7443	35116	-60836
NL3/4	GW / opgw	0	0	0	2554	9863	-18946
Construction/maintenance, +5°C	380C1F1	0	0	0	8397	32140	-62738
Permanent loads yg= 0.9	380C1F2	0	0	0	8397	31783	-62464
Wind angle: 45°	380C1F3	0	0	0	8397	31349	-62156
	380C2F1	16793	57943	122620	16793	64280	-125476
	380C2F2	16793	57887	122630	16793	63566	-124928
	380C2F3	16793	57817	122644	16793	62698	-124311
	RTG	5103	17227	36568	5103	18550	-36954
NL3/1a	GW / opgw	0	0	0	1953	13342	-21945
Wind, 10°C	380C1F1	0	0	0	7195	41579	-70459
Permanent loads yg= 0.9	380C1F2	0	0	0	7195	39785	-68097
Wind angle: 90°	380C1F3	0	0	0	7195	37566	-65223
	380C2F1	14391	83159	140917	14391	83159	-140917
	380C2F2	14390	79571	136195	14390	79571	-136195
	380C2F3	14390	75132	130445	14390	75132	-130445
	RTG	3900	20689	35823	3900	20689	-35823
NL3/1b	GW / opgw	0	0	0	1952	8846	-16921
Wind, -20°C	380C1F1	0	0	0	7189	31482	-61763
Permanent loads yg= 0.9	380C1F2	0	0	0	7189	31123	-61449
Wind angle: 90°	380C1F3	0	0	0	7189	30687	-61093
	380C2F1	14379	62965	123525	14379	62965	-123525
	380C2F2	14378	62246	122898	14378	62246	-122898
	380C2F3	14378	61374	122186	14378	61374	-122186
	RTG	3898	16324	32380	3898	16324	-32380
NL3/3	GW / opgw	0	0	0	3721	21176	-34877
Wind, -5°C	380C1F1	0	0	0	8747	43469	-77146
Permanent loads yg= 0.9	380C1F2	0	0	0	8747	42102	-75490
Wind angle: 90°	380C1F3	0	0	0	8746	40429	-73522
	380C2F1	17494	86937	154291	17494	86937	-154291
	380C2F2	17493	84203	150981	17493	84203	-150981
	380C2F3	17493	80858	147044	17493	80858	-147044
	RTG	7442	34079	59623	7442	34079	-59623

NL3/4	GW / opgw	0	0	0	2554	9743	-18844
Construction/maintenance, +5°C	380C1F1	0	0	0	8397	31826	-62496
Permanent loads yg= 0.9	380C1F2	0	0	0	8397	31504	-62262
Wind angle: 90°	380C1F3	0	0	0	8397	31111	-62000
	380C2F1	16793	63651	124991	16793	63651	-124991
	380C2F2	16793	63008	124524	16793	63008	-124524
	380C2F3	16793	62223	124001	16793	62223	-124001
	RTG	5103	18422	36878	5103	18422	-36878
NL3/1a	GW / opgw	0	0	0	1953	7161	-14408
Wind, 10°C	380C1F1	0	0	0	7193	25909	-52899
Permanent loads yg= 0.9	380C1F2	0	0	0	7193	25789	-52854
Wind angle: -45°	380C1F3	0	0	0	7193	25642	-52805
	380C2F1	14392	86607	145504	14386	51819	-105799
	380C2F2	14391	82689	140296	14386	51579	-105707
	380C2F3	14390	77827	133922	14386	51284	-105610
	RTG	3900	21457	36828	3900	13898	-28588
NL3/1b	GW / opgw	0	0	0	1952	7608	-16024
Wind, -20°C	380C1F1	0	0	0	7189	28374	-60030
Permanent loads yg= 0.9	380C1F2	0	0	0	7189	28346	-60033
Wind angle: -45°	380C1F3	0	0	0	7189	28309	-60038
	380C2F1	14379	63668	124170	14378	56749	-120060
	380C2F2	14379	62870	123440	14378	56691	-120066
	380C2F3	14378	61901	122609	14378	56619	-120076
	RTG	3898	16474	32504	3898	14981	-31754
NL3/3	GW / opgw	0	0	0	3719	12755	-25855
Wind, -5°C	380C1F1	0	0	0	8745	31828	-65967
Permanent loads yg= 0.9	380C1F2	0	0	0	8745	31735	-65949
Wind angle: -45°	380C1F3	0	0	0	8745	31620	-65933
	380C2F1	17494	89590	157566	17490	63656	-131934
	380C2F2	17494	86578	153852	17490	63470	-131899
	380C2F3	17493	82884	149412	17490	63240	-131865
	RTG	7443	35116	60836	7441	24887	-51454
NL3/4	GW / opgw	0	0	0	2554	8675	-18311
Construction/maintenance, +5°C	380C1F1	0	0	0	8396	28972	-61310
Permanent loads yg= 0.9	380C1F2	0	0	0	8396	28944	-61315
Wind angle: -45°	380C1F3	0	0	0	8396	28908	-61322
	380C2F1	16793	64280	125476	16793	57943	-122620
	380C2F2	16793	63566	124928	16793	57887	-122630
	380C2F3	16793	62698	124311	16793	57817	-122644
	RTG	5103	18550	36954	5103	17227	-36568

ZWW4HL450

Appendix ZWW4HL450 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	9311	18517	2604	9311	-18517
	380C1F1	9593	33418	67599	9593	33418	-67599
	380C1F2	9593	33231	67520	9593	33231	-67520
	380C1F3	9593	33001	67437	9593	33001	-67437
	380C2F1	0	0	0	19186	66837	-135197
	380C2F2	0	0	0	19186	66463	-135041
	380C2F3	0	0	0	19186	66003	-134874
	RTG	0	0	0	5200	17971	-36681
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	9665	20282	2603	9665	-20282
	380C1F1	9588	35764	75445	9588	35764	-75445
	380C1F2	9588	35720	75449	9588	35720	-75449
	380C1F3	9588	35664	75456	9588	35664	-75456
	380C2F1	0	0	0	19175	71528	-150891
	380C2F2	0	0	0	19175	71439	-150899
	380C2F3	0	0	0	19175	71328	-150912
	RTG	0	0	0	5198	19034	-40248
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	14849	29555	4371	14849	-29555
	380C1F1	11145	39104	80365	11145	39104	-80365
	380C1F2	11145	38958	80328	11145	38958	-80328
	380C1F3	11145	38777	80292	11145	38777	-80292
	380C2F1	0	0	0	22290	78209	-160729
	380C2F2	0	0	0	22290	77916	-160657
	380C2F3	0	0	0	22290	77554	-160585
	RTG	0	0	0	8742	28711	-58644
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	10537	22151	3206	10537	-22151
	380C1F1	10797	35804	75530	10797	35804	-75530
	380C1F2	10797	35761	75537	10797	35761	-75537
	380C1F3	10796	35706	75546	10796	35706	-75546
	380C2F1	0	0	0	21593	71608	-151061
	380C2F2	0	0	0	21593	71521	-151073
	380C2F3	0	0	0	21593	71413	-151092
	RTG	0	0	0	6404	20903	-44254
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	9007	18365	2605	14990	-24978
	380C1F1	9593	32643	67338	9596	47673	-82119
	380C1F2	9593	32534	67317	9595	45940	-80001
	380C1F3	9593	32400	67297	9595	43811	-77461
	380C2F1	0	0	0	19192	95346	-164238
	380C2F2	0	0	0	19191	91880	-160002
	380C2F3	0	0	0	19190	87622	-154922
	RTG	0	0	0	5201	24138	-42576
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	9595	20284	2603	10791	-20938
	380C1F1	9588	35575	75471	9588	38618	-76632
	380C1F2	9588	35547	75477	9588	38279	-76397
	380C1F3	9588	35512	75485	9588	37866	-76134
	380C2F1	0	0	0	19176	77236	-153263
	380C2F2	0	0	0	19176	76559	-152793
	380C2F3	0	0	0	19176	75733	-152269
	RTG	0	0	0	5198	20279	-40663
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	14397	29375	4373	23024	-38048
	380C1F1	11145	38492	80258	11147	49876	-89677
	380C1F2	11145	38405	80253	11147	48552	-88211
	380C1F3	11145	38297	80252	11146	46937	-86488
	380C2F1	0	0	0	22294	99752	-179353
	380C2F2	0	0	0	22294	97105	-176421
	380C2F3	0	0	0	22293	93874	-172976
	RTG	0	0	0	8745	37611	-66184
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	10470	22161	3206	11551	-22566
	380C1F1	10796	35619	75565	10797	38497	-76368
	380C1F2	10796	35592	75572	10797	38183	-76186
	380C1F3	10796	35557	75581	10797	37799	-75986
	380C2F1	0	0	0	21594	76993	-152736
	380C2F2	0	0	0	21593	76365	-152373
	380C2F3	0	0	0	21593	75598	-151972
	RTG	0	0	0	6404	22051	-44461
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	14398	24209	2605	14398	-24209
	380C1F1	9595	46147	80252	9595	46147	-80252
	380C1F2	9595	44572	78360	9595	44572	-78360
	380C1F3	9595	42641	76103	9595	42641	-76103
	380C2F1	0	0	0	19191	92294	-160503
	380C2F2	0	0	0	19190	89144	-156719
	380C2F3	0	0	0	19189	85281	-152205
	RTG	0	0	0	5201	23469	-41783

NL3/1b	GW / opgw	2603	10671	20833	2603	10671	-20833
Wind, -20°C	380C1F1	9588	38320	76424	9588	38320	-76424
Permanent loads yg= 1.2	380C1F2	9588	38014	76225	9588	38014	-76225
Wind angle: 90°	380C1F3	9588	37640	76003	9588	37640	-76003
	380C2F1	0	0	0	19176	76639	-152848
	380C2F2	0	0	0	19176	76027	-152449
	380C2F3	0	0	0	19176	75281	-152007
	RTG	0	0	0	5198	20150	-40585
NL3/3	GW / opgw	4373	22176	37021	4373	22176	-37021
Wind, -5°C	380C1F1	11147	48710	88383	11147	48710	-88383
Permanent loads yg= 1.2	380C1F2	11147	47513	87093	11147	47513	-87093
Wind angle: 90°	380C1F3	11146	46054	85584	11146	46054	-85584
	380C2F1	0	0	0	22294	97420	-176766
	380C2F2	0	0	0	22293	95026	-174186
	380C2F3	0	0	0	22292	92109	-171168
	RTG	0	0	0	8744	36656	-65146
NL3/4	GW / opgw	3206	11445	22493	3206	11445	-22493
Construction/maintenance, +5°C	380C1F1	10797	38220	76207	10797	38220	-76207
Permanent loads yg= 1.2	380C1F2	10797	37936	76055	10797	37936	-76055
Wind angle: 90°	380C1F3	10797	37588	75888	10797	37588	-75888
	380C2F1	0	0	0	21594	76440	-152414
	380C2F2	0	0	0	21593	75872	-152109
	380C2F3	0	0	0	21593	75175	-151775
	RTG	0	0	0	6404	21936	-44412
NL3/1a	GW / opgw	2605	14990	24978	2604	9007	-18365
Wind, 10°C	380C1F1	9596	47673	82119	9593	32643	-67338
Permanent loads yg= 1.2	380C1F2	9595	45940	80001	9593	32534	-67317
Wind angle: -45°	380C1F3	9595	43811	77461	9593	32400	-67297
	380C2F1	0	0	0	19186	65285	-134676
	380C2F2	0	0	0	19186	65068	-134634
	380C2F3	0	0	0	19186	64800	-134594
	RTG	0	0	0	5200	17631	-36594
NL3/1b	GW / opgw	2603	10791	20938	2603	9595	-20284
Wind, -20°C	380C1F1	9588	38618	76632	9588	35575	-75471
Permanent loads yg= 1.2	380C1F2	9588	38279	76397	9588	35547	-75477
Wind angle: -45°	380C1F3	9588	37866	76134	9588	35512	-75485
	380C2F1	0	0	0	19175	71149	-150942
	380C2F2	0	0	0	19175	71094	-150953
	380C2F3	0	0	0	19175	71025	-150969
	RTG	0	0	0	5198	18949	-40263
NL3/3	GW / opgw	4373	23024	38048	4371	14397	-29375
Wind, -5°C	380C1F1	11147	49876	89677	11145	38492	-80258
Permanent loads yg= 1.2	380C1F2	11147	48552	88211	11145	38405	-80253
Wind angle: -45°	380C1F3	11146	46937	86488	11145	38297	-80252
	380C2F1	0	0	0	22290	76984	-160516
	380C2F2	0	0	0	22290	76811	-160506
	380C2F3	0	0	0	22290	76594	-160504
	RTG	0	0	0	8742	28200	-58558
NL3/4	GW / opgw	3206	11551	22566	3206	10470	-22161
Construction/maintenance, +5°C	380C1F1	10797	38497	76368	10796	35619	-75565
Permanent loads yg= 1.2	380C1F2	10797	38183	76186	10796	35592	-75572
Wind angle: -45°	380C1F3	10797	37799	75986	10796	35557	-75581
	380C2F1	0	0	0	21593	71237	-151130
	380C2F2	0	0	0	21593	71183	-151143
	380C2F3	0	0	0	21593	71115	-151161
	RTG	0	0	0	6404	20820	-44274
NL3/1a	GW / opgw	1953	7510	14656	1953	7510	-14656
Wind, 10°C	380C1F1	7193	26783	53370	7193	26783	-53370
Permanent loads yg= 0.9	380C1F2	7193	26570	53236	7193	26570	-53236
Wind angle: 0°	380C1F3	7193	26310	53089	7193	26310	-53089
	380C2F1	0	0	0	14387	53566	-106740
	380C2F2	0	0	0	14386	53141	-106473
	380C2F3	0	0	0	14386	52621	-106177
	RTG	0	0	0	3900	14276	-28757
NL3/1b	GW / opgw	1952	7684	16032	1952	7684	-16032
Wind, -20°C	380C1F1	7189	28574	60027	7189	28574	-60027
Permanent loads yg= 0.9	380C1F2	7189	28527	60025	7189	28527	-60025
Wind angle: 0°	380C1F3	7189	28468	60025	7189	28468	-60025
	380C2F1	0	0	0	14378	57149	-120055
	380C2F2	0	0	0	14378	57054	-120051
	380C2F3	0	0	0	14378	56936	-120050
	RTG	0	0	0	3898	15071	-31748

NL3/3	GW / opgw	3719	13241	26105	3719	13241	-26105
Wind, -5°C	380C1F1	8745	32493	66188	8745	32493	-66188
Permanent loads yg= 0.9	380C1F2	8745	32333	66121	8745	32333	-66121
Wind angle: 0°	380C1F3	8745	32136	66050	8745	32136	-66050
	380C2F1	0	0	0	17490	64986	-132375
	380C2F2	0	0	0	17490	64666	-132242
	380C2F3	0	0	0	17490	64272	-132101
	RTG	0	0	0	7441	25426	-51599
NL3/4	GW / opgw	2554	8745	18308	2554	8745	-18308
Construction/maintenance, +5°C	380C1F1	8396	29164	61291	8396	29164	-61291
Permanent loads yg= 0.9	380C1F2	8396	29119	61294	8396	29119	-61294
Wind angle: 0°	380C1F3	8396	29062	61298	8396	29062	-61298
	380C2F1	0	0	0	16793	58328	-122583
	380C2F2	0	0	0	16793	58238	-122587
	380C2F3	0	0	0	16793	58124	-122596
	RTG	0	0	0	5103	17311	-36553
NL3/1a	GW / opgw	1953	7161	14408	1954	13991	-22837
Wind, 10°C	380C1F1	7193	25909	52899	7196	43304	-72752
Permanent loads yg= 0.9	380C1F2	7193	25789	52854	7195	41344	-70148
Wind angle: 45°	380C1F3	7193	25642	52805	7195	38913	-66961
	380C2F1	0	0	0	14392	86607	-145504
	380C2F2	0	0	0	14391	82689	-140296
	380C2F3	0	0	0	14390	77827	-133922
	RTG	0	0	0	3900	21457	-36828
NL3/1b	GW / opgw	1952	7608	16024	1952	8989	-17075
Wind, -20°C	380C1F1	7189	28374	60030	7189	31834	-62085
Permanent loads yg= 0.9	380C1F2	7189	28346	60033	7189	31435	-61720
Wind angle: 45°	380C1F3	7189	28309	60038	7189	30951	-61305
	380C2F1	0	0	0	14379	63668	-124170
	380C2F2	0	0	0	14379	62870	-123440
	380C2F3	0	0	0	14378	61901	-122609
	RTG	0	0	0	3898	16474	-32504
NL3/3	GW / opgw	3719	12755	25855	3721	22075	-36015
Wind, -5°C	380C1F1	8745	31828	65967	8747	44795	-78783
Permanent loads yg= 0.9	380C1F2	8745	31735	65949	8747	43289	-76926
Wind angle: 45°	380C1F3	8745	31620	65933	8747	41442	-74706
	380C2F1	0	0	0	17494	89590	-157566
	380C2F2	0	0	0	17494	86578	-153852
	380C2F3	0	0	0	17493	82884	-149412
	RTG	0	0	0	7443	35116	-60836
NL3/4	GW / opgw	2554	8675	18311	2554	9863	-18946
Construction/maintenance, +5°C	380C1F1	8396	28972	61310	8397	32140	-62738
Permanent loads yg= 0.9	380C1F2	8396	28944	61315	8397	31783	-62464
Wind angle: 45°	380C1F3	8396	28908	61322	8397	31349	-62156
	380C2F1	0	0	0	16793	64280	-125476
	380C2F2	0	0	0	16793	63566	-124928
	380C2F3	0	0	0	16793	62698	-124311
	RTG	0	0	0	5103	18550	-36954
NL3/1a	GW / opgw	1953	13342	21945	1953	13342	-21945
Wind, 10°C	380C1F1	7195	41579	70459	7195	41579	-70459
Permanent loads yg= 0.9	380C1F2	7195	39785	68097	7195	39785	-68097
Wind angle: 90°	380C1F3	7195	37566	65223	7195	37566	-65223
	380C2F1	0	0	0	14391	83159	-140917
	380C2F2	0	0	0	14390	79571	-136195
	380C2F3	0	0	0	14390	75132	-130445
	RTG	0	0	0	3900	20689	-35823
NL3/1b	GW / opgw	1952	8846	16921	1952	8846	-16921
Wind, -20°C	380C1F1	7189	31482	61763	7189	31482	-61763
Permanent loads yg= 0.9	380C1F2	7189	31123	61449	7189	31123	-61449
Wind angle: 90°	380C1F3	7189	30687	61093	7189	30687	-61093
	380C2F1	0	0	0	14379	62965	-123525
	380C2F2	0	0	0	14378	62246	-122898
	380C2F3	0	0	0	14378	61374	-122186
	RTG	0	0	0	3898	16324	-32380
NL3/3	GW / opgw	3721	21176	34877	3721	21176	-34877
Wind, -5°C	380C1F1	8747	43469	77146	8747	43469	-77146
Permanent loads yg= 0.9	380C1F2	8747	42102	75490	8747	42102	-75490
Wind angle: 90°	380C1F3	8746	40429	73522	8746	40429	-73522
	380C2F1	0	0	0	17494	86937	-154291
	380C2F2	0	0	0	17493	84203	-150981
	380C2F3	0	0	0	17493	80858	-147044
	RTG	0	0	0	7442	34079	-59623

NL3/4	GW / opgw	2554	9743	18844	2554	9743	-18844
Construction/maintenance, +5°C	380C1F1	8397	31826	62496	8397	31826	-62496
Permanent loads yg= 0.9	380C1F2	8397	31504	62262	8397	31504	-62262
Wind angle: 90°	380C1F3	8397	31111	62000	8397	31111	-62000
	380C2F1	0	0	0	16793	63651	-124991
	380C2F2	0	0	0	16793	63008	-124524
	380C2F3	0	0	0	16793	62223	-124001
	RTG	0	0	0	5103	18422	-36878
NL3/1a	GW / opgw	1954	13991	22837	1953	7161	-14408
Wind, 10°C	380C1F1	7196	43304	72752	7193	25909	-52899
Permanent loads yg= 0.9	380C1F2	7195	41344	70148	7193	25789	-52854
Wind angle: -45°	380C1F3	7195	38913	66961	7193	25642	-52805
	380C2F1	0	0	0	14386	51819	-105799
	380C2F2	0	0	0	14386	51579	-105707
	380C2F3	0	0	0	14386	51284	-105610
	RTG	0	0	0	3900	13898	-28588
NL3/1b	GW / opgw	1952	8989	17075	1952	7608	-16024
Wind, -20°C	380C1F1	7189	31834	62085	7189	28374	-60030
Permanent loads yg= 0.9	380C1F2	7189	31435	61720	7189	28346	-60033
Wind angle: -45°	380C1F3	7189	30951	61305	7189	28309	-60038
	380C2F1	0	0	0	14378	56749	-120060
	380C2F2	0	0	0	14378	56691	-120066
	380C2F3	0	0	0	14378	56619	-120076
	RTG	0	0	0	3898	14981	-31754
NL3/3	GW / opgw	3721	22075	36015	3719	12755	-25855
Wind, -5°C	380C1F1	8747	44795	78783	8745	31828	-65967
Permanent loads yg= 0.9	380C1F2	8747	43289	76926	8745	31735	-65949
Wind angle: -45°	380C1F3	8747	41442	74706	8745	31620	-65933
	380C2F1	0	0	0	17490	63656	-131934
	380C2F2	0	0	0	17490	63470	-131899
	380C2F3	0	0	0	17490	63240	-131865
	RTG	0	0	0	7441	24887	-51454
NL3/4	GW / opgw	2554	9863	18946	2554	8675	-18311
Construction/maintenance, +5°C	380C1F1	8397	32140	62738	8396	28972	-61310
Permanent loads yg= 0.9	380C1F2	8397	31783	62464	8396	28944	-61315
Wind angle: -45°	380C1F3	8397	31349	62156	8396	28908	-61322
	380C2F1	0	0	0	16793	57943	-122620
	380C2F2	0	0	0	16793	57887	-122630
	380C2F3	0	0	0	16793	57817	-122644
	RTG	0	0	0	5103	17227	-36568

ZWW4HL450

Appendix ZWW4HL450 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	9311	18517	0	0	0
	380C1F1	9593	33418	67599	0	0	0
	380C1F2	9593	33231	67520	0	0	0
	380C1F3	9593	33001	67437	0	0	0
	380C2F1	19186	66837	135197	19186	66837	-135197
	380C2F2	19186	66463	135041	19186	66463	-135041
	380C2F3	19186	66003	134874	19186	66003	-134874
	RTG	0	0	0	5200	17971	-36681
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	9665	20282	0	0	0
	380C1F1	9588	35764	75445	0	0	0
	380C1F2	9588	35720	75449	0	0	0
	380C1F3	9588	35664	75456	0	0	0
	380C2F1	19175	71528	150891	19175	71528	-150891
	380C2F2	19175	71439	150899	19175	71439	-150899
	380C2F3	19175	71328	150912	19175	71328	-150912
	RTG	0	0	0	5198	19034	-40248
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	14849	29555	0	0	0
	380C1F1	11145	39104	80365	0	0	0
	380C1F2	11145	38958	80328	0	0	0
	380C1F3	11145	38777	80292	0	0	0
	380C2F1	22290	78209	160729	22290	78209	-160729
	380C2F2	22290	77916	160657	22290	77916	-160657
	380C2F3	22290	77554	160585	22290	77554	-160585
	RTG	0	0	0	8742	28711	-58644
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	10537	22151	0	0	0
	380C1F1	10797	35804	75530	0	0	0
	380C1F2	10797	35761	75537	0	0	0
	380C1F3	10796	35706	75546	0	0	0
	380C2F1	21593	71608	151061	21593	71608	-151061
	380C2F2	21593	71521	151073	21593	71521	-151073
	380C2F3	21593	71413	151092	21593	71413	-151092
	RTG	0	0	0	6404	20903	-44254
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	9007	18365	0	0	0
	380C1F1	9593	32643	67338	0	0	0
	380C1F2	9593	32534	67317	0	0	0
	380C1F3	9593	32400	67297	0	0	0
	380C2F1	19186	65285	134676	19192	95346	-164238
	380C2F2	19186	65068	134634	19191	91880	-160002
	380C2F3	19186	64800	134594	19190	87622	-154922
	RTG	0	0	0	5201	24138	-42576
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	9595	20284	0	0	0
	380C1F1	9588	35575	75471	0	0	0
	380C1F2	9588	35547	75477	0	0	0
	380C1F3	9588	35512	75485	0	0	0
	380C2F1	19175	71149	150942	19176	77236	-153263
	380C2F2	19175	71094	150953	19176	76559	-152793
	380C2F3	19175	71025	150969	19176	75733	-152269
	RTG	0	0	0	5198	20279	-40663
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	14397	29375	0	0	0
	380C1F1	11145	38492	80258	0	0	0
	380C1F2	11145	38405	80253	0	0	0
	380C1F3	11145	38297	80252	0	0	0
	380C2F1	22290	76984	160516	22294	99752	-179353
	380C2F2	22290	76811	160506	22294	97105	-176421
	380C2F3	22290	76594	160504	22293	93874	-172976
	RTG	0	0	0	8745	37611	-66184
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	10470	22161	0	0	0
	380C1F1	10796	35619	75565	0	0	0
	380C1F2	10796	35592	75572	0	0	0
	380C1F3	10796	35557	75581	0	0	0
	380C2F1	21593	71237	151130	21594	76993	-152736
	380C2F2	21593	71183	151143	21593	76365	-152373
	380C2F3	21593	71115	151161	21593	75598	-151972
	RTG	0	0	0	6404	22051	-44461
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	14398	24209	0	0	0
	380C1F1	9595	46147	80252	0	0	0
	380C1F2	9595	44572	78360	0	0	0
	380C1F3	9595	42641	76103	0	0	0
	380C2F1	19191	92294	160503	19191	92294	-160503
	380C2F2	19190	89144	156719	19190	89144	-156719
	380C2F3	19189	85281	152205	19189	85281	-152205
	RTG	0	0	0	5201	23469	-41783

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2603	10671	20833	0	0	0
	380C1F1	9588	38320	76424	0	0	0
	380C1F2	9588	38014	76225	0	0	0
	380C1F3	9588	37640	76003	0	0	0
	380C2F1	19176	76639	152848	19176	76639	-152848
	380C2F2	19176	76027	152449	19176	76027	-152449
	380C2F3	19176	75281	152007	19176	75281	-152007
	RTG	0	0	0	5198	20150	-40585
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4373	22176	37021	0	0	0
	380C1F1	11147	48710	88383	0	0	0
	380C1F2	11147	47513	87093	0	0	0
	380C1F3	11146	46054	85584	0	0	0
	380C2F1	22294	97420	176766	22294	97420	-176766
	380C2F2	22293	95026	174186	22293	95026	-174186
	380C2F3	22292	92109	171168	22292	92109	-171168
	RTG	0	0	0	8744	36656	-65146
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3206	11445	22493	0	0	0
	380C1F1	10797	38220	76207	0	0	0
	380C1F2	10797	37936	76055	0	0	0
	380C1F3	10797	37588	75888	0	0	0
	380C2F1	21594	76440	152414	21594	76440	-152414
	380C2F2	21593	75872	152109	21593	75872	-152109
	380C2F3	21593	75175	151775	21593	75175	-151775
	RTG	0	0	0	6404	21936	-44412
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2605	14990	24978	0	0	0
	380C1F1	9596	47673	82119	0	0	0
	380C1F2	9595	45940	80001	0	0	0
	380C1F3	9595	43811	77461	0	0	0
	380C2F1	19192	95346	164238	19186	65285	-134676
	380C2F2	19191	91880	160002	19186	65068	-134634
	380C2F3	19190	87622	154922	19186	64800	-134594
	RTG	0	0	0	5200	17631	-36594
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2603	10791	20938	0	0	0
	380C1F1	9588	38618	76632	0	0	0
	380C1F2	9588	38279	76397	0	0	0
	380C1F3	9588	37866	76134	0	0	0
	380C2F1	19176	77236	153263	19175	71149	-150942
	380C2F2	19176	76559	152793	19175	71094	-150953
	380C2F3	19176	75733	152269	19175	71025	-150969
	RTG	0	0	0	5198	18949	-40263
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4373	23024	38048	0	0	0
	380C1F1	11147	49876	89677	0	0	0
	380C1F2	11147	48552	88211	0	0	0
	380C1F3	11146	46937	86488	0	0	0
	380C2F1	22294	99752	179353	22290	76984	-160516
	380C2F2	22294	97105	176421	22290	76811	-160506
	380C2F3	22293	93874	172976	22290	76594	-160504
	RTG	0	0	0	8742	28200	-58558
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3206	11551	22566	0	0	0
	380C1F1	10797	38497	76368	0	0	0
	380C1F2	10797	38183	76186	0	0	0
	380C1F3	10797	37799	75886	0	0	0
	380C2F1	21594	76993	152736	21593	71237	-151130
	380C2F2	21593	76365	152373	21593	71183	-151143
	380C2F3	21593	75598	151972	21593	71115	-151161
	RTG	0	0	0	6404	20820	-44274
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1953	7510	14656	0	0	0
	380C1F1	7193	26783	53370	0	0	0
	380C1F2	7193	26570	53236	0	0	0
	380C1F3	7193	26310	53089	0	0	0
	380C2F1	14387	53566	106740	14387	53566	-106740
	380C2F2	14386	53141	106473	14386	53141	-106473
	380C2F3	14386	52621	106177	14386	52621	-106177
	RTG	0	0	0	3900	14276	-28757
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1952	7684	16032	0	0	0
	380C1F1	7189	28574	60027	0	0	0
	380C1F2	7189	28527	60025	0	0	0
	380C1F3	7189	28468	60025	0	0	0
	380C2F1	14378	57149	120055	14378	57149	-120055
	380C2F2	14378	57054	120051	14378	57054	-120051
	380C2F3	14378	56936	120050	14378	56936	-120050
	RTG	0	0	0	3898	15071	-31748

NL3/3	GW / opgw	3719	13241	26105	0	0	0
Wind, -5°C	380C1F1	8745	32493	66188	0	0	0
Permanent loads yg= 0.9	380C1F2	8745	32333	66121	0	0	0
Wind angle: 0°	380C1F3	8745	32136	66050	0	0	0
	380C2F1	17490	64986	132375	17490	64986	-132375
	380C2F2	17490	64666	132242	17490	64666	-132242
	380C2F3	17490	64272	132101	17490	64272	-132101
	RTG	0	0	0	7441	25426	-51599
NL3/4	GW / opgw	2554	8745	18308	0	0	0
Construction/maintenance, +5°C	380C1F1	8396	29164	61291	0	0	0
Permanent loads yg= 0.9	380C1F2	8396	29119	61294	0	0	0
Wind angle: 0°	380C1F3	8396	29062	61298	0	0	0
	380C2F1	16793	58328	122583	16793	58328	-122583
	380C2F2	16793	58238	122587	16793	58238	-122587
	380C2F3	16793	58124	122596	16793	58124	-122596
	RTG	0	0	0	5103	17311	-36553
NL3/1a	GW / opgw	1953	7161	14408	0	0	0
Wind, 10°C	380C1F1	7193	25909	52899	0	0	0
Permanent loads yg= 0.9	380C1F2	7193	25789	52854	0	0	0
Wind angle: 45°	380C1F3	7193	25642	52805	0	0	0
	380C2F1	14386	51819	105799	14392	86607	-145504
	380C2F2	14386	51579	105707	14391	82689	-140296
	380C2F3	14386	51284	105610	14390	77827	-133922
	RTG	0	0	0	3900	21457	-36828
NL3/1b	GW / opgw	1952	7608	16024	0	0	0
Wind, -20°C	380C1F1	7189	28374	60030	0	0	0
Permanent loads yg= 0.9	380C1F2	7189	28346	60033	0	0	0
Wind angle: 45°	380C1F3	7189	28309	60038	0	0	0
	380C2F1	14378	56749	120060	14379	63668	-124170
	380C2F2	14378	56691	120066	14379	62870	-123440
	380C2F3	14378	56619	120076	14378	61901	-122609
	RTG	0	0	0	3898	16474	-32504
NL3/3	GW / opgw	3719	12755	25855	0	0	0
Wind, -5°C	380C1F1	8745	31828	65967	0	0	0
Permanent loads yg= 0.9	380C1F2	8745	31735	65949	0	0	0
Wind angle: 45°	380C1F3	8745	31620	65933	0	0	0
	380C2F1	17490	63656	131934	17494	89590	-157566
	380C2F2	17490	63470	131899	17494	86578	-153852
	380C2F3	17490	63240	131865	17493	82884	-149412
	RTG	0	0	0	7443	35116	-60836
NL3/4	GW / opgw	2554	8675	18311	0	0	0
Construction/maintenance, +5°C	380C1F1	8396	28972	61310	0	0	0
Permanent loads yg= 0.9	380C1F2	8396	28944	61315	0	0	0
Wind angle: 45°	380C1F3	8396	28908	61322	0	0	0
	380C2F1	16793	57943	122620	16793	64280	-125476
	380C2F2	16793	57887	122630	16793	63566	-124928
	380C2F3	16793	57817	122644	16793	62698	-124311
	RTG	0	0	0	5103	18550	-36954
NL3/1a	GW / opgw	1953	13342	21945	0	0	0
Wind, 10°C	380C1F1	7195	41579	70459	0	0	0
Permanent loads yg= 0.9	380C1F2	7195	39785	68097	0	0	0
Wind angle: 90°	380C1F3	7195	37566	65223	0	0	0
	380C2F1	14391	83159	140917	14391	83159	-140917
	380C2F2	14390	79571	136195	14390	79571	-136195
	380C2F3	14390	75132	130445	14390	75132	-130445
	RTG	0	0	0	3900	20689	-35823
NL3/1b	GW / opgw	1952	8846	16921	0	0	0
Wind, -20°C	380C1F1	7189	31482	61763	0	0	0
Permanent loads yg= 0.9	380C1F2	7189	31123	61449	0	0	0
Wind angle: 90°	380C1F3	7189	30687	61093	0	0	0
	380C2F1	14379	62965	123525	14379	62965	-123525
	380C2F2	14378	62246	122898	14378	62246	-122898
	380C2F3	14378	61374	122186	14378	61374	-122186
	RTG	0	0	0	3898	16324	-32380
NL3/3	GW / opgw	3721	21176	34877	0	0	0
Wind, -5°C	380C1F1	8747	43469	77146	0	0	0
Permanent loads yg= 0.9	380C1F2	8747	42102	75490	0	0	0
Wind angle: 90°	380C1F3	8746	40429	73522	0	0	0
	380C2F1	17494	86937	154291	17494	86937	-154291
	380C2F2	17493	84203	150981	17493	84203	-150981
	380C2F3	17493	80858	147044	17493	80858	-147044
	RTG	0	0	0	7442	34079	-59623

NL3/4	GW / opgw	2554	9743	18844	0	0	0
Construction/maintenance, +5°C	380C1F1	8397	31826	62496	0	0	0
Permanent loads yg= 0.9	380C1F2	8397	31504	62262	0	0	0
Wind angle: 90°	380C1F3	8397	31111	62000	0	0	0
	380C2F1	16793	63651	124991	16793	63651	-124991
	380C2F2	16793	63008	124524	16793	63008	-124524
	380C2F3	16793	62223	124001	16793	62223	-124001
	RTG	0	0	0	5103	18422	-36878
NL3/1a	GW / opgw	1954	13991	22837	0	0	0
Wind, 10°C	380C1F1	7196	43304	72752	0	0	0
Permanent loads yg= 0.9	380C1F2	7195	41344	70148	0	0	0
Wind angle: -45°	380C1F3	7195	38913	66961	0	0	0
	380C2F1	14392	86607	145504	14386	51819	-105799
	380C2F2	14391	82689	140296	14386	51579	-105707
	380C2F3	14390	77827	133922	14386	51284	-105610
	RTG	0	0	0	3900	13898	-28588
NL3/1b	GW / opgw	1952	8989	17075	0	0	0
Wind, -20°C	380C1F1	7189	31834	62085	0	0	0
Permanent loads yg= 0.9	380C1F2	7189	31435	61720	0	0	0
Wind angle: -45°	380C1F3	7189	30951	61305	0	0	0
	380C2F1	14379	63668	124170	14378	56749	-120060
	380C2F2	14379	62870	123440	14378	56691	-120066
	380C2F3	14378	61901	122609	14378	56619	-120076
	RTG	0	0	0	3898	14981	-31754
NL3/3	GW / opgw	3721	22075	36015	0	0	0
Wind, -5°C	380C1F1	8747	44795	78783	0	0	0
Permanent loads yg= 0.9	380C1F2	8747	43289	76926	0	0	0
Wind angle: -45°	380C1F3	8747	41442	74706	0	0	0
	380C2F1	17494	89590	157566	17490	63656	-131934
	380C2F2	17494	86578	153852	17490	63470	-131899
	380C2F3	17493	82884	149412	17490	63240	-131865
	RTG	0	0	0	7441	24887	-51454
NL3/4	GW / opgw	2554	9863	18946	0	0	0
Construction/maintenance, +5°C	380C1F1	8397	32140	62738	0	0	0
Permanent loads yg= 0.9	380C1F2	8397	31783	62464	0	0	0
Wind angle: -45°	380C1F3	8397	31349	62156	0	0	0
	380C2F1	16793	64280	125476	16793	57943	-122620
	380C2F2	16793	63566	124928	16793	57887	-122630
	380C2F3	16793	62698	124311	16793	57817	-122644
	RTG	0	0	0	5103	17227	-36568

ZWW4HL450

Appendix ZWW4HL450 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2604	9311	18517	2604	9311	-18517
	380C1F1	9593	33418	67599	9593	33418	-67599
	380C1F2	9593	33231	67520	9593	33231	-67520
	380C1F3	9593	33001	67437	9593	33001	-67437
	380C2F1	19186	66837	135197	19186	66837	-135197
	380C2F2	19186	66463	135041	19186	66463	-135041
	380C2F3	19186	66003	134874	19186	66003	-134874
	RTG	0	0	0	5200	17971	-36681
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2603	9665	20282	2603	9665	-20282
	380C1F1	9588	35764	75445	9588	35764	-75445
	380C1F2	9588	35720	75449	9588	35720	-75449
	380C1F3	9588	35664	75456	9588	35664	-75456
	380C2F1	19175	71528	150891	19175	71528	-150891
	380C2F2	19175	71439	150899	19175	71439	-150899
	380C2F3	19175	71328	150912	19175	71328	-150912
	RTG	0	0	0	5198	19034	-40248
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4371	14849	29555	4371	14849	-29555
	380C1F1	11145	39104	80365	11145	39104	-80365
	380C1F2	11145	38958	80328	11145	38958	-80328
	380C1F3	11145	38777	80292	11145	38777	-80292
	380C2F1	22290	78209	160729	22290	78209	-160729
	380C2F2	22290	77916	160657	22290	77916	-160657
	380C2F3	22290	77554	160585	22290	77554	-160585
	RTG	0	0	0	8742	28711	-58644
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3206	10537	22151	3206	10537	-22151
	380C1F1	10797	35804	75530	10797	35804	-75530
	380C1F2	10797	35761	75537	10797	35761	-75537
	380C1F3	10796	35706	75546	10796	35706	-75546
	380C2F1	21593	71608	151061	21593	71608	-151061
	380C2F2	21593	71521	151073	21593	71521	-151073
	380C2F3	21593	71413	151092	21593	71413	-151092
	RTG	0	0	0	6404	20903	-44254
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2604	9007	18365	2605	14990	-24978
	380C1F1	9593	32643	67338	9596	47673	-82119
	380C1F2	9593	32534	67317	9595	45940	-80001
	380C1F3	9593	32400	67297	9595	43811	-77461
	380C2F1	19186	65285	134676	19192	95346	-164238
	380C2F2	19186	65068	134634	19191	91880	-160002
	380C2F3	19186	64800	134594	19190	87622	-154922
	RTG	0	0	0	5201	24138	-42576
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2603	9595	20284	2603	10791	-20938
	380C1F1	9588	35575	75471	9588	38618	-76632
	380C1F2	9588	35547	75477	9588	38279	-76397
	380C1F3	9588	35512	75485	9588	37866	-76134
	380C2F1	19175	71149	150942	19176	77236	-153263
	380C2F2	19175	71094	150953	19176	76559	-152793
	380C2F3	19175	71025	150969	19176	75733	-152269
	RTG	0	0	0	5198	20279	-40663
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4371	14397	29375	4373	23024	-38048
	380C1F1	11145	38492	80258	11147	49876	-89677
	380C1F2	11145	38405	80253	11147	48552	-88211
	380C1F3	11145	38297	80252	11146	46937	-86488
	380C2F1	22290	76984	160516	22294	99752	-179353
	380C2F2	22290	76811	160506	22294	97105	-176421
	380C2F3	22290	76594	160504	22293	93874	-172976
	RTG	0	0	0	8745	37611	-66184
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3206	10470	22161	3206	11551	-22566
	380C1F1	10796	35619	75565	10797	38497	-76368
	380C1F2	10796	35592	75572	10797	38183	-76186
	380C1F3	10796	35557	75581	10797	37799	-75986
	380C2F1	21593	71237	151130	21594	76993	-152736
	380C2F2	21593	71183	151143	21593	76365	-152373
	380C2F3	21593	71115	151161	21593	75598	-151972
	RTG	0	0	0	6404	22051	-44461
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2605	14398	24209	2605	14398	-24209
	380C1F1	9595	46147	80252	9595	46147	-80252
	380C1F2	9595	44572	78360	9595	44572	-78360
	380C1F3	9595	42641	76103	9595	42641	-76103
	380C2F1	19191	92294	160503	19191	92294	-160503
	380C2F2	19190	89144	156719	19190	89144	-156719
	380C2F3	19189	85281	152205	19189	85281	-152205
	RTG	0	0	0	5201	23469	-41783

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2603	10671	20833	2603	10671	-20833
	380C1F1	9588	38320	76424	9588	38320	-76424
	380C1F2	9588	38014	76225	9588	38014	-76225
	380C1F3	9588	37640	76003	9588	37640	-76003
	380C2F1	19176	76639	152848	19176	76639	-152848
	380C2F2	19176	76027	152449	19176	76027	-152449
	380C2F3	19176	75281	152007	19176	75281	-152007
	RTG	0	0	0	5198	20150	-40585
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4373	22176	37021	4373	22176	-37021
	380C1F1	11147	48710	88383	11147	48710	-88383
	380C1F2	11147	47513	87093	11147	47513	-87093
	380C1F3	11146	46054	85584	11146	46054	-85584
	380C2F1	22294	97420	176766	22294	97420	-176766
	380C2F2	22293	95026	174186	22293	95026	-174186
	380C2F3	22292	92109	171168	22292	92109	-171168
	RTG	0	0	0	8744	36656	-65146
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3206	11445	22493	3206	11445	-22493
	380C1F1	10797	38220	76207	10797	38220	-76207
	380C1F2	10797	37936	76055	10797	37936	-76055
	380C1F3	10797	37588	75888	10797	37588	-75888
	380C2F1	21594	76440	152414	21594	76440	-152414
	380C2F2	21593	75872	152109	21593	75872	-152109
	380C2F3	21593	75175	151775	21593	75175	-151775
	RTG	0	0	0	6404	21936	-44412
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2605	14990	24978	2604	9007	-18365
	380C1F1	9596	47673	82119	9593	32643	-67338
	380C1F2	9595	45940	80001	9593	32534	-67317
	380C1F3	9595	43811	77461	9593	32400	-67297
	380C2F1	19192	95346	164238	19186	65285	-134676
	380C2F2	19191	91880	160002	19186	65068	-134634
	380C2F3	19190	87622	154922	19186	64800	-134594
	RTG	0	0	0	5200	17631	-36594
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2603	10791	20938	2603	9595	-20284
	380C1F1	9588	38618	76632	9588	35575	-75471
	380C1F2	9588	38279	76397	9588	35547	-75477
	380C1F3	9588	37866	76134	9588	35512	-75485
	380C2F1	19176	77236	153263	19175	71149	-150942
	380C2F2	19176	76559	152793	19175	71094	-150953
	380C2F3	19176	75733	152269	19175	71025	-150969
	RTG	0	0	0	5198	18949	-40263
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4373	23024	38048	4371	14397	-29375
	380C1F1	11147	49876	89677	11145	38492	-80258
	380C1F2	11147	48552	88211	11145	38405	-80253
	380C1F3	11146	46937	86488	11145	38297	-80252
	380C2F1	22294	99752	179353	22290	76984	-160516
	380C2F2	22294	97105	176421	22290	76811	-160506
	380C2F3	22293	93874	172976	22290	76594	-160504
	RTG	0	0	0	8742	28200	-58558
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3206	11551	22566	3206	10470	-22161
	380C1F1	10797	38497	76368	10796	35619	-75565
	380C1F2	10797	38183	76186	10796	35592	-75572
	380C1F3	10797	37799	75986	10796	35557	-75581
	380C2F1	21594	76993	152736	21593	71237	-151130
	380C2F2	21593	76365	152373	21593	71183	-151143
	380C2F3	21593	75598	151972	21593	71115	-151161
	RTG	0	0	0	6404	20820	-44274
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1953	7510	14656	1953	7510	-14656
	380C1F1	7193	26783	53370	7193	26783	-53370
	380C1F2	7193	26570	53236	7193	26570	-53236
	380C1F3	7193	26310	53089	7193	26310	-53089
	380C2F1	14387	53566	106740	14387	53566	-106740
	380C2F2	14386	53141	106473	14386	53141	-106473
	380C2F3	14386	52621	106177	14386	52621	-106177
	RTG	0	0	0	3900	14276	-28757
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1952	7684	16032	1952	7684	-16032
	380C1F1	7189	28574	60027	7189	28574	-60027
	380C1F2	7189	28527	60025	7189	28527	-60025
	380C1F3	7189	28468	60025	7189	28468	-60025
	380C2F1	14378	57149	120055	14378	57149	-120055
	380C2F2	14378	57054	120051	14378	57054	-120051
	380C2F3	14378	56936	120050	14378	56936	-120050
	RTG	0	0	0	3898	15071	-31748

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	3719	13241	26105	3719	13241	-26105
	380C1F1	8745	32493	66188	8745	32493	-66188
	380C1F2	8745	32333	66121	8745	32333	-66121
	380C1F3	8745	32136	66050	8745	32136	-66050
	380C2F1	17490	64986	132375	17490	64986	-132375
	380C2F2	17490	64666	132242	17490	64666	-132242
	380C2F3	17490	64272	132101	17490	64272	-132101
	RTG	0	0	0	7441	25426	-51599
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2554	8745	18308	2554	8745	-18308
	380C1F1	8396	29164	61291	8396	29164	-61291
	380C1F2	8396	29119	61294	8396	29119	-61294
	380C1F3	8396	29062	61298	8396	29062	-61298
	380C2F1	16793	58328	122583	16793	58328	-122583
	380C2F2	16793	58238	122587	16793	58238	-122587
	380C2F3	16793	58124	122596	16793	58124	-122596
	RTG	0	0	0	5103	17311	-36553
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1953	7161	14408	1954	13991	-22837
	380C1F1	7193	25909	52899	7196	43304	-72752
	380C1F2	7193	25789	52854	7195	41344	-70148
	380C1F3	7193	25642	52805	7195	38913	-66961
	380C2F1	14386	51819	105799	14392	86607	-145504
	380C2F2	14386	51579	105707	14391	82689	-140296
	380C2F3	14386	51284	105610	14390	77827	-133922
	RTG	0	0	0	3900	21457	-36828
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1952	7608	16024	1952	8989	-17075
	380C1F1	7189	28374	60030	7189	31834	-62085
	380C1F2	7189	28346	60033	7189	31435	-61720
	380C1F3	7189	28309	60038	7189	30951	-61305
	380C2F1	14378	56749	120060	14379	63668	-124170
	380C2F2	14378	56691	120066	14379	62870	-123440
	380C2F3	14378	56619	120076	14378	61901	-122609
	RTG	0	0	0	3898	16474	-32504
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	3719	12755	25855	3721	22075	-36015
	380C1F1	8745	31828	65967	8747	44795	-78783
	380C1F2	8745	31735	65949	8747	43289	-76926
	380C1F3	8745	31620	65933	8747	41442	-74706
	380C2F1	17490	63656	131934	17494	89590	-157566
	380C2F2	17490	63470	131899	17494	86578	-153852
	380C2F3	17490	63240	131865	17493	82884	-149412
	RTG	0	0	0	7443	35116	-60836
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2554	8675	18311	2554	9863	-18946
	380C1F1	8396	28972	61310	8397	32140	-62738
	380C1F2	8396	28944	61315	8397	31783	-62464
	380C1F3	8396	28908	61322	8397	31349	-62156
	380C2F1	16793	57943	122620	16793	64280	-125476
	380C2F2	16793	57887	122630	16793	63566	-124928
	380C2F3	16793	57817	122644	16793	62698	-124311
	RTG	0	0	0	5103	18550	-36954
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1953	13342	21945	1953	13342	-21945
	380C1F1	7195	41579	70459	7195	41579	-70459
	380C1F2	7195	39785	68097	7195	39785	-68097
	380C1F3	7195	37566	65223	7195	37566	-65223
	380C2F1	14391	83159	140917	14391	83159	-140917
	380C2F2	14390	79571	136195	14390	79571	-136195
	380C2F3	14390	75132	130445	14390	75132	-130445
	RTG	0	0	0	3900	20689	-35823
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1952	8846	16921	1952	8846	-16921
	380C1F1	7189	31482	61763	7189	31482	-61763
	380C1F2	7189	31123	61449	7189	31123	-61449
	380C1F3	7189	30687	61093	7189	30687	-61093
	380C2F1	14379	62965	123525	14379	62965	-123525
	380C2F2	14378	62246	122898	14378	62246	-122898
	380C2F3	14378	61374	122186	14378	61374	-122186
	RTG	0	0	0	3898	16324	-32380
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3721	21176	34877	3721	21176	-34877
	380C1F1	8747	43469	77146	8747	43469	-77146
	380C1F2	8747	42102	75490	8747	42102	-75490
	380C1F3	8746	40429	73522	8746	40429	-73522
	380C2F1	17494	86937	154291	17494	86937	-154291
	380C2F2	17493	84203	150981	17493	84203	-150981
	380C2F3	17493	80858	147044	17493	80858	-147044
	RTG	0	0	0	7442	34079	-59623

NL3/4	GW / opgw	2554	9743	18844	2554	9743	-18844
Construction/maintenance, +5°C	380C1F1	8397	31826	62496	8397	31826	-62496
Permanent loads yg= 0.9	380C1F2	8397	31504	62262	8397	31504	-62262
Wind angle: 90°	380C1F3	8397	31111	62000	8397	31111	-62000
	380C2F1	16793	63651	124991	16793	63651	-124991
	380C2F2	16793	63008	124524	16793	63008	-124524
	380C2F3	16793	62223	124001	16793	62223	-124001
	RTG	0	0	0	5103	18422	-36878
NL3/1a	GW / opgw	1954	13991	22837	1953	7161	-14408
Wind, 10°C	380C1F1	7196	43304	72752	7193	25909	-52899
Permanent loads yg= 0.9	380C1F2	7195	41344	70148	7193	25789	-52854
Wind angle: -45°	380C1F3	7195	38913	66961	7193	25642	-52805
	380C2F1	14392	86607	145504	14386	51819	-105799
	380C2F2	14391	82689	140296	14386	51579	-105707
	380C2F3	14390	77827	133922	14386	51284	-105610
	RTG	0	0	0	3900	13898	-28588
NL3/1b	GW / opgw	1952	8989	17075	1952	7608	-16024
Wind, -20°C	380C1F1	7189	31834	62085	7189	28374	-60030
Permanent loads yg= 0.9	380C1F2	7189	31435	61720	7189	28346	-60033
Wind angle: -45°	380C1F3	7189	30951	61305	7189	28309	-60038
	380C2F1	14379	63668	124170	14378	56749	-120060
	380C2F2	14379	62870	123440	14378	56691	-120066
	380C2F3	14378	61901	122609	14378	56619	-120076
	RTG	0	0	0	3898	14981	-31754
NL3/3	GW / opgw	3721	22075	36015	3719	12755	-25855
Wind, -5°C	380C1F1	8747	44795	78783	8745	31828	-65967
Permanent loads yg= 0.9	380C1F2	8747	43289	76926	8745	31735	-65949
Wind angle: -45°	380C1F3	8747	41442	74706	8745	31620	-65933
	380C2F1	17494	89590	157566	17490	63656	-131934
	380C2F2	17494	86578	153852	17490	63470	-131899
	380C2F3	17493	82884	149412	17490	63240	-131865
	RTG	0	0	0	7441	24887	-51454
NL3/4	GW / opgw	2554	9863	18946	2554	8675	-18311
Construction/maintenance, +5°C	380C1F1	8397	32140	62738	8396	28972	-61310
Permanent loads yg= 0.9	380C1F2	8397	31783	62464	8396	28944	-61315
Wind angle: -45°	380C1F3	8397	31349	62156	8396	28908	-61322
	380C2F1	16793	64280	125476	16793	57943	-122620
	380C2F2	16793	63566	124928	16793	57887	-122630
	380C2F3	16793	62698	124311	16793	57817	-122644
	RTG	0	0	0	5103	17227	-36568

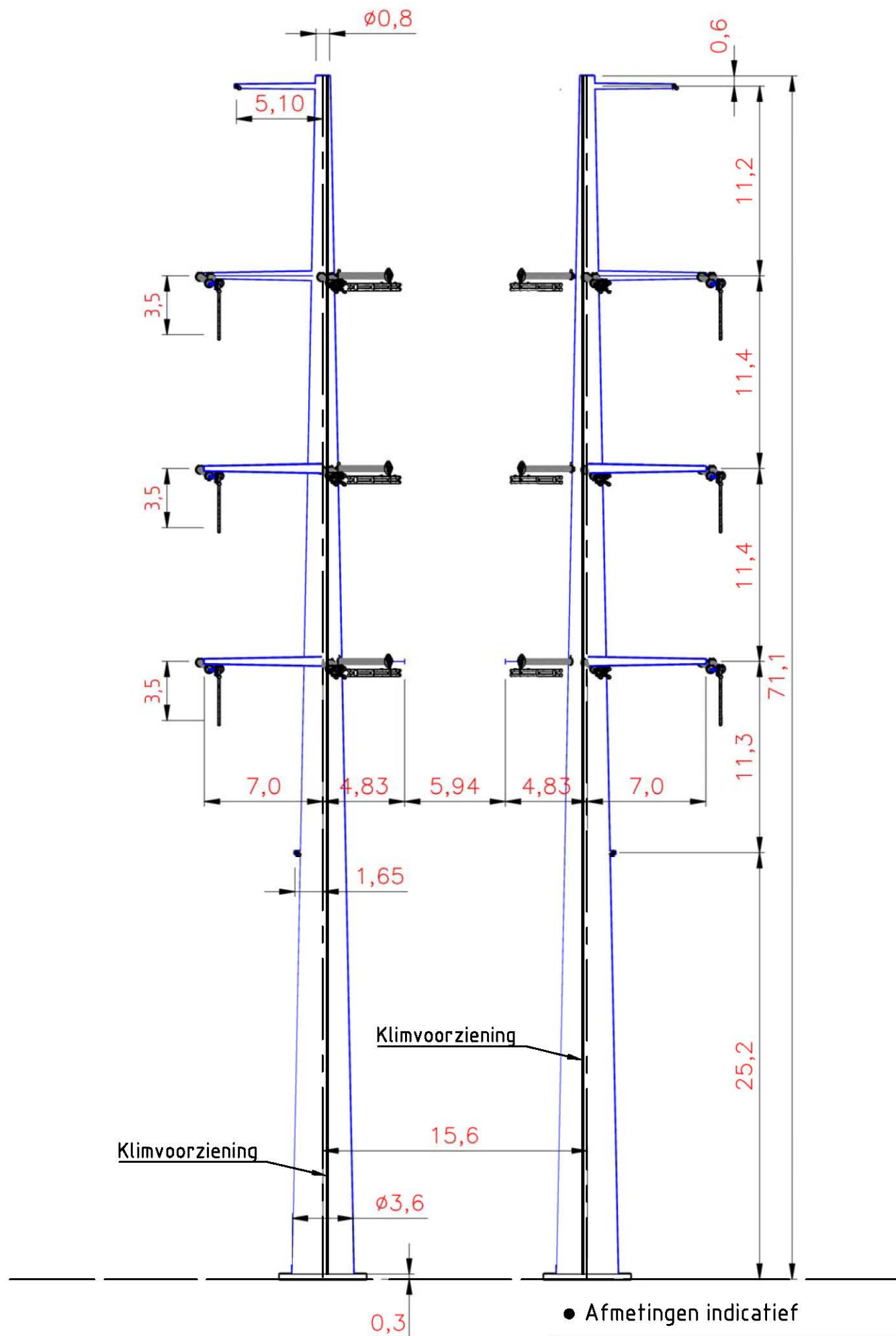
ZWW4HL450

Appendix ZWW4HL450 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2170	8427	16214	2170	8427	-16214
Wind, 10°C	380C1F1	7993	29803	58698	7993	29803	-58698
Permanent loads yg= 1.0	380C1F2	7993	29517	58499	7993	29517	-58499
Wind angle: 0°	380C1F3	7993	29168	58276	7993	29168	-58276
	380C2F1	15986	59606	117397	15986	59606	-117397
	380C2F2	15986	59034	116998	15986	59034	-116998
	380C2F3	15986	58336	116552	15986	58336	-116552
	RTG	0	0	0	4333	15860	-31631
NL4/1b	GW / opgw	2169	8324	17480	2169	8324	-17480
Wind, -20°C	380C1F1	7988	30940	65308	7988	30940	-65308
Permanent loads yg= 1.0	380C1F2	7988	30903	65311	7988	30903	-65311
Wind angle: 0°	380C1F3	7988	30856	65316	7988	30856	-65316
	380C2F1	15977	61880	130617	15977	61880	-130617
	380C2F2	15977	61805	130622	15977	61805	-130622
	380C2F3	15977	61712	130632	15977	61712	-130632
	RTG	0	0	0	4331	16382	-34655
NL4/3	GW / opgw	7433	21583	44374	7433	21583	-44374
Wind, -5°C	380C1F1	12617	42689	88634	12617	42689	-88634
Permanent loads yg= 1.0	380C1F2	12617	42577	88624	12617	42577	-88624
Wind angle: 0°	380C1F3	12617	42437	88618	12617	42437	-88618
	380C2F1	25235	85378	177268	25235	85378	-177268
	380C2F2	25235	85153	177249	25235	85153	-177249
	380C2F3	25235	84874	177236	25235	84874	-177236
	RTG	0	0	0	14884	42550	-88807
NL4/4	GW / opgw	2671	9040	19014	2671	9040	-19014
Construction/maintenance, +5°C	380C1F1	8996	30768	64940	8996	30768	-64940
Permanent loads yg= 1.0	380C1F2	8996	30732	64945	8996	30732	-64945
Wind angle: 0°	380C1F3	8996	30687	64952	8996	30687	-64952
	380C2F1	17991	61537	129881	17991	61537	-129881
	380C2F2	17991	61464	129890	17991	61464	-129890
	380C2F3	17991	61373	129905	17991	61373	-129905
	RTG	0	0	0	5336	17928	-37970
NL4/1a	GW / opgw	2170	7957	15848	2171	16893	-27037
Wind, 10°C	380C1F1	7993	28632	57986	7997	51615	-84897
Permanent loads yg= 1.0	380C1F2	7993	28472	57915	7996	49089	-81529
Wind angle: 45°	380C1F3	7993	28276	57838	7996	45935	-77364
	380C2F1	15986	57264	115972	15994	103230	-169795
	380C2F2	15986	56944	115829	15993	98178	-163058
	380C2F3	15986	56551	115675	15992	91869	-154727
	RTG	0	0	0	4335	25423	-42739
NL4/1b	GW / opgw	2169	8265	17482	2169	9281	-18068
Wind, -20°C	380C1F1	7988	30781	65327	7989	33361	-66390
Permanent loads yg= 1.0	380C1F2	7988	30758	65332	7989	33072	-66179
Wind angle: 45°	380C1F3	7988	30729	65338	7989	32720	-65944
	380C2F1	15977	61562	130655	15977	66722	-132779
	380C2F2	15977	61516	130664	15977	66144	-132359
	380C2F3	15977	61457	130676	15977	65440	-131888
	RTG	0	0	0	4331	17434	-35034
NL4/3	GW / opgw	7433	21277	44378	7434	26483	-47350
Wind, -5°C	380C1F1	12617	42215	88622	12619	50519	-93935
Permanent loads yg= 1.0	380C1F2	12617	42147	88627	12619	49564	-93031
Wind angle: 45°	380C1F3	12617	42061	88636	12618	48402	-91990
	380C2F1	25235	84430	177244	25238	101038	-187870
	380C2F2	25235	84293	177254	25237	99128	-186062
	380C2F3	25235	84122	177273	25237	96804	-183979
	RTG	0	0	0	14885	47970	-90803
NL4/4	GW / opgw	2671	8983	19021	2671	9897	-19387
Construction/maintenance, +5°C	380C1F1	8996	30613	64967	8996	33044	-65707
Permanent loads yg= 1.0	380C1F2	8996	30590	64973	8996	32777	-65545
Wind angle: 45°	380C1F3	8996	30562	64980	8996	32452	-65365
	380C2F1	17991	61226	129935	17992	66087	-131413
	380C2F2	17991	61181	129945	17992	65554	-131089
	380C2F3	17991	61124	129960	17991	64903	-130731
	RTG	0	0	0	5336	18896	-38166

NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2171	16068	25910	2171	16068	-25910
	380C1F1	7997	49392	81933	7997	49392	-81933
	380C1F2	7996	47069	78855	7996	47069	-78855
	380C1F3	7996	44176	75068	7996	44176	-75068
	380C2F1	15993	98785	163865	15993	98785	-163865
	380C2F2	15992	94137	157710	15992	94137	-157710
	380C2F3	15991	88352	150136	15991	88352	-150136
	RTG	0	0	0	4334	24420	-41412
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2169	9178	17975	2169	9178	-17975
	380C1F1	7989	33106	66204	7989	33106	-66204
	380C1F2	7989	32846	66025	7989	32846	-66025
	380C1F3	7989	32528	65826	7989	32528	-65826
	380C2F1	15977	66213	132407	15977	66213	-132407
	380C2F2	15977	65691	132050	15977	65691	-132050
	380C2F3	15977	65056	131652	15977	65056	-131652
	RTG	0	0	0	4331	17325	-34964
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7434	25966	46900	7434	25966	-46900
	380C1F1	12619	49678	93136	12619	49678	-93136
	380C1F2	12619	48816	92353	12619	48816	-92353
	380C1F3	12618	47768	91453	12618	47768	-91453
	380C2F1	25237	99355	186273	25237	99355	-186273
	380C2F2	25237	97632	184705	25237	97632	-184705
	380C2F3	25237	95535	182907	25237	95535	-182907
	RTG	0	0	0	14885	47411	-90447
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2671	9807	19323	2671	9807	-19323
	380C1F1	8996	32809	65563	8996	32809	-65563
	380C1F2	8996	32568	65427	8996	32568	-65427
	380C1F3	8996	32273	65277	8996	32273	-65277
	380C2F1	17992	65618	131126	17992	65618	-131126
	380C2F2	17991	65136	130854	17991	65136	-130854
	380C2F3	17991	64545	130554	17991	64545	-130554
	RTG	0	0	0	5336	18798	-38122
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2171	16893	27037	2170	7957	-15848
	380C1F1	7997	51615	84897	7993	28632	-57986
	380C1F2	7996	49089	81529	7993	28472	-57915
	380C1F3	7996	45935	77364	7993	28276	-57838
	380C2F1	15994	103230	169795	15986	57264	-115972
	380C2F2	15993	98178	163058	15986	56944	-115829
	380C2F3	15992	91869	154727	15986	56551	-115675
	RTG	0	0	0	4333	15355	-31369
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2169	9281	18068	2169	8265	-17482
	380C1F1	7989	33361	66390	7988	30781	-65327
	380C1F2	7989	33072	66179	7988	30758	-65332
	380C1F3	7989	32720	65944	7988	30729	-65338
	380C2F1	15977	66722	132779	15977	61562	-130655
	380C2F2	15977	66144	132359	15977	61516	-130664
	380C2F3	15977	65440	131888	15977	61457	-130676
	RTG	0	0	0	4331	16311	-34666
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7434	26483	47350	7433	21277	-44378
	380C1F1	12619	50519	93935	12617	42215	-88622
	380C1F2	12619	49564	93031	12617	42147	-88627
	380C1F3	12618	48402	91990	12617	42061	-88636
	380C2F1	25238	101038	187870	25235	84430	-177244
	380C2F2	25237	99128	186062	25235	84293	-177254
	380C2F3	25237	96804	183979	25235	84122	-177273
	RTG	0	0	0	14883	42183	-88864
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2671	9897	19387	2671	8983	-19021
	380C1F1	8996	33044	65707	8996	30613	-64967
	380C1F2	8996	32777	65545	8996	30590	-64973
	380C1F3	8996	32452	65365	8996	30562	-64980
	380C2F1	17992	66087	131413	17991	61226	-129935
	380C2F2	17992	65554	131089	17991	61181	-129945
	380C2F3	17991	64903	130731	17991	61124	-129960
	RTG	0	0	0	5336	17859	-37987



• Afmetingen indicatief

T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW4HL450

- Trekparameter 1800m
- 2x380 / 2x150 Hoekmast
- 450m Veldlengte
- 130°-150° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

2.0	16-03-2015	Modified botom diameter
1.0	03-02-2013	First edition
		Projectname: Engineering verbinding ZW380
		Third angle projection:
Design state: CONCEPT		Drawing no.: 74102194-035-112V
Drawn by: SGR 16-03-2015	Scale: 1:300	Description: Wintrack Masttype ZWW4HL450
Checked by: AJP 16-03-2015	Units: m	
Approved by: AW 16-03-2015	Project no: 000.145 Company: TenneT	
		Revision: 2.0
		Format: A3

ZWW4HK450+5

Bijlage CBT

Fundatie berekening

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1,6	m
schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	5,8	m
	Hoogte	1,8	m
	Inhoud	47,6	m ³
	e.g.	1141	kN

Onderplaat	Diameter	14,0	m
	Hoogte	1,4	m
	Inhoud	216	m ³
	e.g.	5172	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		1101	kN
Fgeleiders		190	kN
Maximale dwarskracht		1205	kN
Fmax vert (druk)		1511	kN
Fmin vert (trek)		1134	kN
Maximale moment		64458	kNm

Moment

F_{diag}		5379	kN
F_{hor}		1205	kN
F_{ver}		5337	kN
M_{hor} (tgv F_{hor})		3855	kNm
M_{tot}		68313	kNm
$F=M/a$		5337	kN

Verticaal reactiekracht

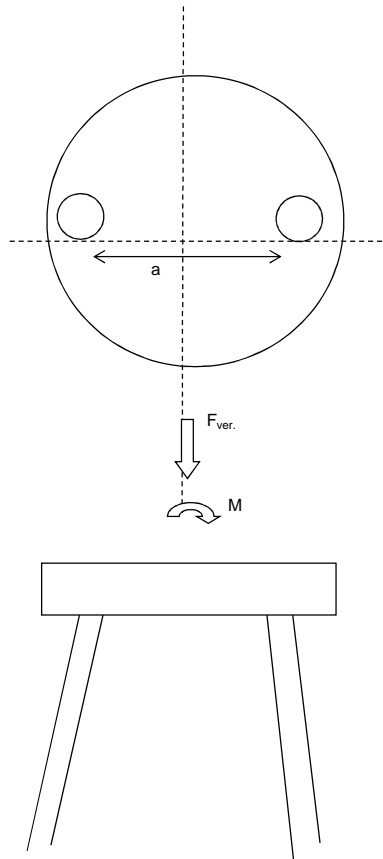
F_{water} (trek)		2631	kN
F_{grond} (druk)		3443	kN
F_{grond} (trek)		2869	kN

F_{dmax} (druk)		6610	kN
F_{tmax} (trek)		3121	kN

F_{dtot} (druk)		11947	kN
F_{ttot} (trek)		2216	kN

Palen druk		11	(-)
Palen trek		7	(-)

Totaal palen		22	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4HK450+5

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CBT

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	$O_{p;gem}$	1,60 m
paalfactor	αt	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11,25 MPa
materiaalfactor	$\gamma_{m,b4}$	1,4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1,5
	$q_{c;z,d}$	5,36 MPa
	$P_{r,z,d}$	37,5 kN/m ²
	$F_{r;trek,d,i}$	60,0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

$F_{trek,d}$	536,4 kN
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ZWW4HK450+5

DRUKPALEN

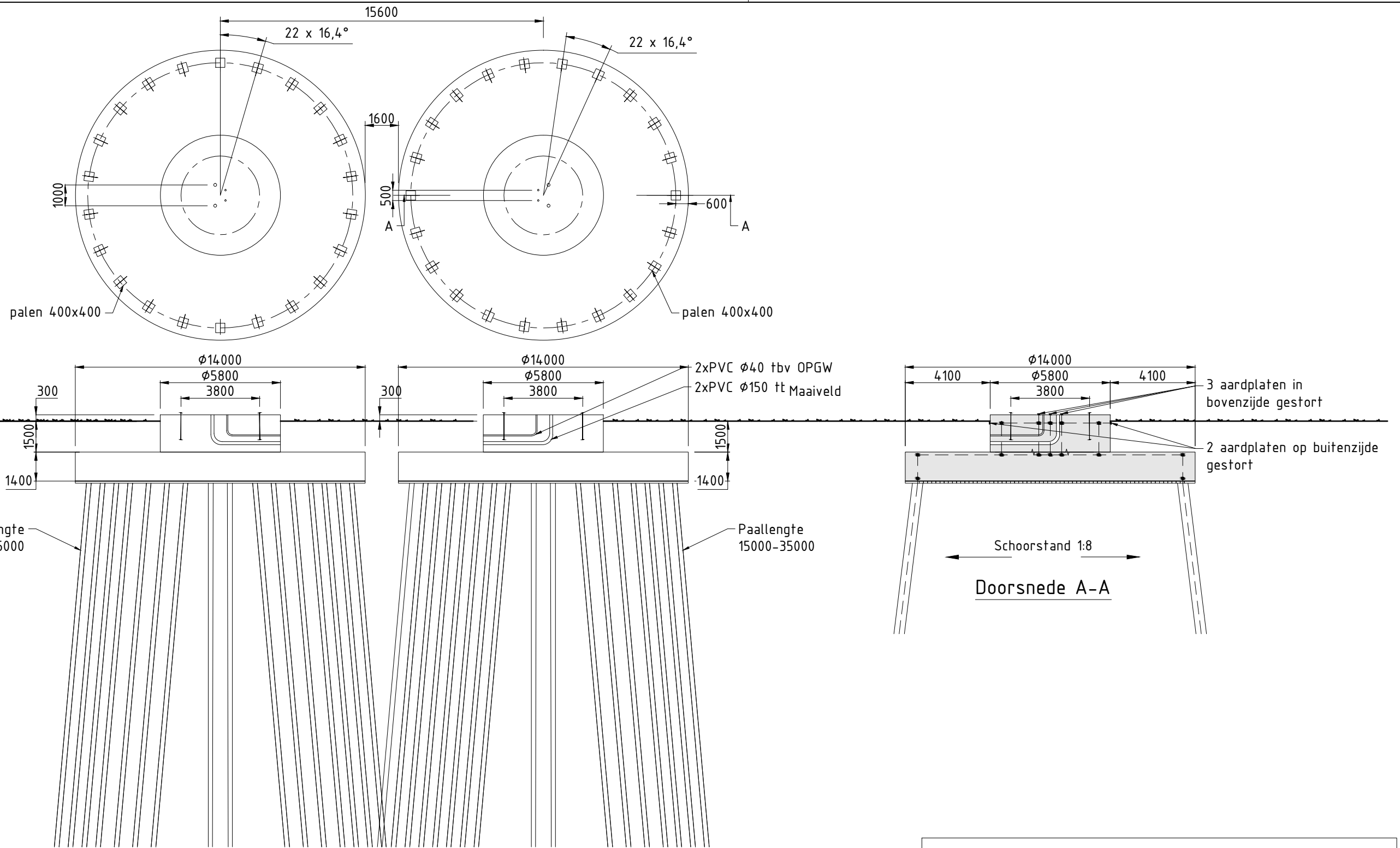
FUNDERINGSCONSTRUCTIE
Toelaatbare paalbelastingen

Bijlage CBT

Bepaling opneembare paalbelasting op druk

heipaal			
	diameter	v a	2 mm 2 mm
	Deq		0,001808
maximale puntweerstand			
$P_{r,max;punt;i}$			11,25 MN/m ²
paalklasse factor	α_p		1,00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1,00
minimale waarde neergaande deel	$q_{c,II;gem}$		9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$		14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$		11,00 MN/m ²
maximale paalschachtwrijving			
$P_{r,max;schacht;i}$			0,05 MN/m ²
waarin:			
paalfactor	α_s		0,010
conusweerstand over wrijvingstraject	$q_{c,z;a}$		5,00 MN/m ²
maximale draagkracht alleenstaande paal			
$F_{r,max;i}$			0,00 MN
waarin:			
$F_{r,max;punt;i}$			0,00 MN
paalpunt oppervlak	A_{punt}		0,00 m ²
$F_{r,max;schacht;i}$			0,00 MN
gemiddelde paalomtrek	$O_{p;gem}$		0,01 m
lengte schachtwrijving	Δl		15,00 m
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max;d}$		MN	0,00 MN
materiaalfactor grond	γ_{mb}		1,20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$		0,75

$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27,00 m
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T.B.V. Vergunnings aanvraag

Verklaring


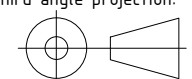
- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding $\phi 16\text{mm}$ (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

1.0	10-03-2014	Eerste uitgave		
		Projectname: Engineering verbinding ZW380		
		Third angle projection: 	Drawing no.: 74102194-032-114 V	
Design state: Definitief		Scale: 1:200	Description: Principe ontwerp fundatie hoekmast ZWW4HK450+5 masten familie	
Drawn by: RBE	10-03-2014	Units: mm		
Checked by: AJP	10-03-2014	Project no: 000.145		
Approved by: AW	10-03-2014	Company: TenneT		
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com				



ZWW4HK450+5

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	O
Terrain category					
Hoogte			h	76.1	m
Diameter voet			d voet	3.8	m
top			d top	0.8	m
gem			d gem	2.3	m
wanddikte			t	24	mm
Oppervlakte aan voet			A	284704	mm ²
Traagheidsmoment aan voet			W _x	2.67E+08	mm ⁴
Weerstandsmoment aan voet			I _x	5.01E+11	mm ⁶
Mast: Gewicht			2 ^{de} orde F _{rep/over}	10.0 1017	% kN

Bijlage BBT

Ultimate limit state	hoogte	F _{ver}	F _{loodrecht}	F _#	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	75.5	5.4	34.9	0.0	34.9	3457 kNm
150C1F1	64.3	19.9	103.8	0.0	103.8	6715 kNm
150C1F2	52.9	20.0	98.2	0.0	98.2	5419 kNm
150C1F3	41.5	20.0	91.1	0.0	91.1	4151 kNm
380C2F1	64.3	39.8	207.6	0.0	207.6	13430 kNm
380C2F2	52.9	39.9	196.3	0.0	196.3	10837 kNm
380C2F3	41.5	40.0	182.1	0.0	182.1	8303 kNm
RTG	30.2	5.4	25.8	-64.1	69.1	2370 kNm

Stuwdruk	F _{hor.}	52.9	kN
	M _{d,wind}	1790	kNm
Totaal	M _{d,tot}	58598	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	64458	kNm

Normaalkracht;

Optredende normaalkracht				
N _{d,geleiders}			190	kN
N _{d, e.g. mast}			1220	kN
N _{s,d,totaal}			1411	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA
A _{eff}	160401 mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{yd} /Y _{m1}	9	N/mm ²
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Moment;

Optredende moment in de voet:			
M _{d,tot}		64458	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA
W _{eff}	0.86
	2.31E+08 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /Y _{m1}	280	N/mm ²
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Totale spanning:

S _d	288	N/mm ²	SPANNING TE GROEC < 284 N/mm ² = ACCOORD => 80% van 355 N/mm ²
S _{d,toegeestaan}	284	N/mm ²	

Special limit state

	hoogte	F _{ver}	F _{loodrecht}	F _#	F _{Samengesteld}	
	m	kN	kN	kN	kN	
GW / opgw	75.5	4.5	25.1	0.0	25.1	1895 kNm
150C1F1	64.3	16.7	75.6	0.0	75.6	4863 kNm
150C1F2	52.9	16.8	71.8	0.0	71.8	3800 kNm
150C1F3	41.5	16.8	67.0	0.0	67.0	2782 kNm
380C2F1	64.3	33.5	151.3	0.0	151.3	9727 kNm
380C2F2	52.9	33.5	143.7	0.0	143.7	7599 kNm
380C2F3	41.5	33.7	134.1	0.0	134.1	5564 kNm
RTG	30.2	4.6	18.9	-49.0	52.5	1585 kNm

Stuwdruk	F _{hor.}	1420	kN
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Verplaatsing		1.42	m
Percentage van de verplaatsing		1.86%	
Hoek		2.00	graden
Kromming		0.43%	
Fundatie rotatiestijfheid		0.005	rad

4.15	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW4HK450+5

Appendix BT / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2827	5737	19685	2827	5737	-19685
	150C1F1	10417	20608	72051	10417	20608	-72051
	150C1F2	10418	20499	72002	10418	20499	-72002
	150C1F3	10419	20363	71948	10419	20363	-71948
	380C2F1	20833	41216	144102	20833	41216	-144102
	380C2F2	20836	40998	144004	20836	40998	-144004
	380C2F3	20838	40726	143896	20838	40726	-143896
	RTG	0	0	0	5649	11104	-39134
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2853	5891	21642	2853	5891	-21642
	150C1F1	10518	21832	80508	10518	21832	-80508
	150C1F2	10519	21813	80509	10519	21813	-80509
	150C1F3	10519	21790	80512	10519	21790	-80512
	380C2F1	21037	43664	161015	21037	43664	-161015
	380C2F2	21037	43627	161019	21037	43627	-161019
	380C2F3	21037	43580	161024	21037	43580	-161024
	RTG	0	0	0	5695	11631	-42945
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	11220	16973	61571	11220	16973	-61571
	150C1F1	17888	32084	117023	17888	32084	-117023
	150C1F2	17889	32031	117025	17889	32031	-117025
	150C1F3	17889	31964	117028	17889	31964	-117028
	380C2F1	35777	64167	234047	35777	64167	-234047
	380C2F2	35777	64061	234050	35777	64061	-234050
	380C2F3	35778	63927	234057	35778	63927	-234057
	RTG	0	0	0	22471	33683	-123342
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3641	6674	24562	3641	6674	-24562
	150C1F1	12052	22353	82452	12052	22353	-82452
	150C1F2	12052	22335	82455	12052	22335	-82455
	150C1F3	12052	22311	82458	12052	22311	-82458
	380C2F1	24105	44707	164904	24105	44707	-164904
	380C2F2	24105	44670	164909	24105	44670	-164909
	380C2F3	24105	44623	164916	24105	44623	-164916
	RTG	0	0	0	7274	13270	-49062
NL1/6 Permanent, +10°C Permanent loads yg= 1.35	GW / opgw	3180	5791	21613	3180	5791	-21613
	150C1F1	11711	21243	79281	11711	21243	-79281
	150C1F2	11711	21243	79281	11711	21243	-79281
	150C1F3	11711	21243	79281	11711	21243	-79281
	380C2F1	23422	42487	158562	23422	42487	-158562
	380C2F2	23422	42487	158562	23422	42487	-158562
	380C2F3	23422	42487	158562	23422	42487	-158562
	RTG	0	0	0	6351	11571	-43184
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2790	7671	22187	2698	14755	-35727
	150C1F1	10328	25593	77378	10022	44423	-111357
	150C1F2	10340	25017	76566	10048	42189	-107028
	150C1F3	10354	24308	75614	10084	39377	-101623
	380C2F1	20656	51185	154757	20044	88847	-222715
	380C2F2	20680	50034	153132	20096	84378	-214056
	380C2F3	20709	48616	151227	20168	78753	-203246
	RTG	0	0	0	5460	22207	-57038
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2851	6163	21712	2833	7100	-22634
	150C1F1	10514	22571	80610	10474	25014	-82479
	150C1F2	10514	22493	80586	10480	24715	-82165
	150C1F3	10515	22395	80559	10487	24346	-81802
	380C2F1	21027	45141	161221	20947	50028	-164958
	380C2F2	21029	44985	161171	20960	49430	-164329
	380C2F3	21030	44789	161117	20974	48691	-163605
	RTG	0	0	0	5676	13107	-43755
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	11209	18338	61813	11134	22869	-65471
	150C1F1	17870	34222	117585	17734	41575	-124759
	150C1F2	17873	33992	117474	17753	40668	-123612
	150C1F3	17876	33705	117351	17776	39547	-122270
	380C2F1	35740	68443	235169	35467	83149	-249518
	380C2F2	35745	67984	234948	35506	81336	-247225
	380C2F3	35752	67411	234701	35553	79094	-244541
	RTG	0	0	0	22387	40979	-126451
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3639	6935	24592	3627	7788	-25200
	150C1F1	12049	23077	82499	12019	25399	-83909
	150C1F2	12049	23001	82482	12023	25119	-83664
	150C1F3	12050	22906	82465	12029	24771	-83385
	380C2F1	24097	46154	164997	24037	50797	-167818
	380C2F2	24098	46003	164965	24046	50237	-167329
	380C2F3	24100	45812	164931	24057	49543	-166770
	RTG	0	0	0	7261	14659	-49541

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2681	17453	41072	2681	17453	-41072
	150C1F1	9951	51894	125940	9951	51894	-125940
	150C1F2	9975	49085	120445	9975	49085	-120445
	150C1F3	10010	45527	113503	10010	45527	-113503
	380C2F1	19902	103788	251880	19902	103788	-251880
	380C2F2	19950	98169	240891	19950	98169	-240891
	380C2F3	20020	91054	227007	20020	91054	-227007
	RTG	0	0	0	5420	25786	-64086
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2824	7506	23206	2824	7506
150C1F1		10451	26052	83699	10451	26052	-83699
150C1F2		10460	25654	83210	10460	25654	-83210
150C1F3		10471	25163	82643	10471	25163	-82643
380C2F1		20903	52103	167398	20903	52103	-167398
380C2F2		20920	51308	166420	20920	51308	-166420
380C2F3		20941	50327	165286	20941	50327	-165286
RTG		0	0	0	5667	13584	-44272
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°		GW / opgw	11097	24765	67695	11097	24765
	150C1F1	17666	44719	129073	17666	44719	-129073
	150C1F2	17692	43516	127367	17692	43516	-127367
	150C1F3	17724	42028	125351	17724	42028	-125351
	380C2F1	35333	89438	258145	35333	89438	-258145
	380C2F2	35384	87032	254735	35384	87032	-254735
	380C2F3	35448	84056	250701	35448	84056	-250701
	RTG	0	0	0	22346	43260	-128501
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3621	8148	25600	3621	8148
150C1F1		12001	26367	84867	12001	26367	-84867
150C1F2		12008	25997	84481	12008	25997	-84481
150C1F3		12016	25539	84037	12016	25539	-84037
380C2F1		24002	52734	169734	24002	52734	-169734
380C2F2		24016	51993	168963	24016	51993	-168963
380C2F3		24032	51077	168073	24032	51077	-168073
RTG		0	0	0	7254	15089	-49887
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2698	14755	35727	2790	7671
	150C1F1	10022	44423	111357	10328	25593	-77378
	150C1F2	10048	42189	107028	10340	25017	-76566
	150C1F3	10084	39377	101623	10354	24308	-75614
	380C2F1	20044	88847	222715	20656	51185	-154757
	380C2F2	20096	84378	214056	20680	50034	-153132
	380C2F3	20168	78753	203246	20709	48616	-151227
	RTG	0	0	0	5611	13399	-41398
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2833	7100	22634	2851	6163
150C1F1		10474	25014	82479	10514	22571	-80610
150C1F2		10480	24715	82165	10514	22493	-80586
150C1F3		10487	24346	81802	10515	22395	-80559
380C2F1		20947	50028	164958	21027	45141	-161221
380C2F2		20960	49430	164329	21029	44985	-161171
380C2F3		20974	48691	163605	21030	44789	-161117
RTG		0	0	0	5693	11978	-42980
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	11134	22869	65471	11209	18338
	150C1F1	17734	41575	124759	17870	34222	-117585
	150C1F2	17753	40668	123612	17873	33992	-117474
	150C1F3	17776	39547	122270	17876	33705	-117351
	380C2F1	35467	83149	249518	35740	68443	-235169
	380C2F2	35506	81336	247225	35745	67984	-234948
	380C2F3	35553	79094	244541	35752	67411	-234701
	RTG	0	0	0	22462	35434	-123415
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3627	7788	25200	3639	6935
150C1F1		12019	25399	83909	12049	23077	-82499
150C1F2		12023	25119	83664	12049	23001	-82482
150C1F3		12029	24771	83385	12050	22906	-82465
380C2F1		24037	50797	167818	24097	46154	-164997
380C2F2		24046	50237	167329	24098	46003	-164965
380C2F3		24057	49543	166770	24100	45812	-164931
RTG		0	0	0	7272	13607	-49061
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	2124	4612	15487	2124	4612
	150C1F1	7833	16496	56705	7833	16496	-56705
	150C1F2	7835	16379	56626	7835	16379	-56626
	150C1F3	7837	16233	56537	7837	16233	-56537
	380C2F1	15667	32991	113410	15667	32991	-113410
	380C2F2	15670	32757	113252	15670	32757	-113252
	380C2F3	15673	32466	113073	15673	32466	-113073
RTG	0	0	0	4247	8824	-30625	

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2149	4674	17097	2149	4674	-17097
	150C1F1	7929	17420	64043	7929	17420	-64043
	150C1F2	7929	17401	64043	7929	17401	-64043
	150C1F3	7929	17377	64044	7929	17377	-64044
	380C2F1	15858	34841	128085	15858	34841	-128085
	380C2F2	15858	34803	128086	15858	34803	-128086
	380C2F3	15858	34754	128088	15858	34754	-128088
	RTG	0	0	0	4289	9200	-33873
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	10532	16198	58676	10532	16198	-58676
	150C1F1	15329	28454	103476	15329	28454	-103476
	150C1F2	15329	28400	103475	15329	28400	-103475
	150C1F3	15329	28332	103475	15329	28332	-103475
	380C2F1	30657	56907	206952	30657	56907	-206952
	380C2F2	30658	56800	206950	30658	56800	-206950
	380C2F3	30658	56664	206951	30658	56664	-206951
	RTG	0	0	0	21099	32129	-117541
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2942	5588	20508	2942	5588	-20508
	150C1F1	9477	18313	67373	9477	18313	-67373
	150C1F2	9477	18294	67374	9477	18294	-67374
	150C1F3	9477	18270	67376	9477	18270	-67376
	380C2F1	18954	36626	134745	18954	36626	-134745
	380C2F2	18954	36588	134748	18954	36588	-134748
	380C2F3	18954	36541	134753	18954	36541	-134753
	RTG	0	0	0	5878	11096	-40949
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	2129	4089	15259	2129	4089	-15259
	150C1F1	7844	15085	56299	7844	15085	-56299
	150C1F2	7844	15085	56299	7844	15085	-56299
	150C1F3	7844	15085	56299	7844	15085	-56299
	380C2F1	15689	30170	112598	15689	30170	-112598
	380C2F2	15689	30170	112598	15689	30170	-112598
	380C2F3	15689	30170	112598	15689	30170	-112598
	RTG	0	0	0	4252	8164	-30469
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2082	6788	18894	2009	14373	-34301
	150C1F1	7726	22078	64265	7459	42631	-104673
	150C1F2	7739	21426	63167	7477	40266	-99856
	150C1F3	7756	20622	61861	7504	37267	-93756
	380C2F1	15451	44156	128531	14918	85262	-209346
	380C2F2	15478	42852	126333	14955	80531	-199712
	380C2F3	15511	41244	123723	15008	74535	-187512
	RTG	0	0	0	4062	21079	-52834
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2146	4960	17224	2124	6012	-18573
	150C1F1	7922	18192	64270	7869	20897	-67118
	150C1F2	7923	18109	64226	7877	20559	-66657
	150C1F3	7924	18005	64177	7886	20143	-66121
	380C2F1	15844	36384	128539	15739	41794	-134235
	380C2F2	15846	36218	128452	15754	41119	-133314
	380C2F3	15848	36010	128354	15773	40287	-132242
	RTG	0	0	0	4265	10801	-35149
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	10521	17575	58966	10441	22199	-62974
	150C1F1	15306	30654	104271	15152	38451	-113105
	150C1F2	15310	30415	104125	15173	37482	-111729
	150C1F3	15314	30117	103961	15199	36286	-110106
	380C2F1	30613	61307	208541	30304	76901	-226210
	380C2F2	30620	60830	208250	30346	74965	-223458
	380C2F3	30627	60234	207922	30398	72572	-220212
	RTG	0	0	0	21009	39528	-121041
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2940	5856	20566	2926	6770	-21400
	150C1F1	9472	19058	67499	9434	21551	-69553
	150C1F2	9473	18979	67470	9440	21245	-69211
	150C1F3	9474	18880	67439	9446	20867	-68815
	380C2F1	18944	38116	134998	18868	43103	-139106
	380C2F2	18946	37957	134941	18879	42490	-138421
	380C2F3	18947	37759	134879	18893	41734	-137631
	RTG	0	0	0	5862	12548	-41666
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1998	17152	39950	1998	17152	-39950
	150C1F1	7410	50451	120560	7410	50451	-120560
	150C1F2	7426	47524	114626	7426	47524	-114626
	150C1F3	7450	43794	107041	7450	43794	-107041
	380C2F1	14820	100902	241120	14820	100902	-241120
	380C2F2	14853	95047	229251	14853	95047	-229251
	380C2F3	14901	87588	214082	14901	87588	-214082
	RTG	0	0	0	4034	24863	-60645

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2114	6475	19361	2114	6475	-19361
	150C1F1	7841	22077	68869	7841	22077	-68869
	150C1F2	7852	21624	68173	7852	21624	-68173
	150C1F3	7865	21066	67356	7865	21066	-67356
	380C2F1	15683	44155	137739	15683	44155	-137739
	380C2F2	15705	43248	136346	15705	43248	-136346
	380C2F3	15731	42133	134712	15731	42133	-134712
	RTG	0	0	0	4253	11340	-35899
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	10403	24141	65366	10403	24141	-65366
	150C1F1	15081	41807	118209	15081	41807	-118209
	150C1F2	15108	40523	116204	15108	40523	-116204
	150C1F3	15142	38935	113812	15142	38935	-113812
	380C2F1	30161	83613	236419	30161	83613	-236419
	380C2F2	30215	81046	232408	30215	81046	-232408
	380C2F3	30283	77870	227623	30283	77870	-227623
	RTG	0	0	0	20965	41860	-123280
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2918	7163	21924	2918	7163	-21924
	150C1F1	9413	22617	70874	9413	22617	-70874
	150C1F2	9421	22208	70346	9421	22208	-70346
	150C1F3	9431	21705	69731	9431	21705	-69731
	380C2F1	18825	45233	141748	18825	45233	-141748
	380C2F2	18842	44417	140691	18842	44417	-140691
	380C2F3	18862	43409	139462	18862	43409	-139462
	RTG	0	0	0	5854	13012	-42136
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2009	14373	34301	2082	6788	-18894
	150C1F1	7459	42631	104673	7726	22078	-64265
	150C1F2	7477	40266	99856	7739	21426	-63167
	150C1F3	7504	37267	93756	7756	20622	-61861
	380C2F1	14918	85262	209346	15451	44156	-128531
	380C2F2	14955	80531	199712	15478	42852	-126333
	380C2F3	15008	74535	187512	15511	41244	-123723
	RTG	0	0	0	4200	11382	-33872
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2124	6012	18573	2146	4960	-17224
	150C1F1	7869	20897	67118	7922	18192	-64270
	150C1F2	7877	20559	66657	7923	18109	-64226
	150C1F3	7886	20143	66121	7924	18005	-64177
	380C2F1	15739	41794	134235	15844	36384	-128539
	380C2F2	15754	41119	133314	15846	36218	-128452
	380C2F3	15773	40287	132242	15848	36010	-128354
	RTG	0	0	0	4286	9560	-33960
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	10441	22199	62974	10521	17575	-58966
	150C1F1	15152	38451	113105	15306	30654	-104271
	150C1F2	15173	37482	111729	15310	30415	-104125
	150C1F3	15199	36286	110106	15314	30117	-103961
	380C2F1	30304	76901	226210	30613	61307	-208541
	380C2F2	30346	74965	223458	30620	60830	-208250
	380C2F3	30398	72572	220212	30627	60234	-207922
	RTG	0	0	0	21088	33891	-117658
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2926	6770	21400	2940	5856	-20566
	150C1F1	9434	21551	69553	9472	19058	-67499
	150C1F2	9440	21245	69211	9473	18979	-67470
	150C1F3	9446	20867	68815	9474	18880	-67439
	380C2F1	18868	43103	139106	18944	38116	-134998
	380C2F2	18879	42490	138421	18946	37957	-134941
	380C2F3	18893	41734	137631	18947	37759	-134879
	RTG	0	0	0	5876	11440	-40973

ZWW4HK450+5

Appendix BT1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2829	5483	-19564
	150C1F1	0	0	0	10423	19924	-71832
	150C1F2	0	0	0	10423	19873	-71825
	150C1F3	0	0	0	10423	19807	-71818
	380C2F1	0	0	0	20845	39849	-143664
	380C2F2	0	0	0	20846	39745	-143649
	380C2F3	0	0	0	20847	39615	-143635
RTG	0	0	0	5652	10784	-39049	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2853	5873	-21643
	150C1F1	0	0	0	10519	21782	-80513
	150C1F2	0	0	0	10519	21767	-80515
	150C1F3	0	0	0	10519	21748	-80517
	380C2F1	0	0	0	21037	43563	-161026
	380C2F2	0	0	0	21037	43533	-161029
	380C2F3	0	0	0	21037	43496	-161034
RTG	0	0	0	5695	11607	-42948	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4732	8773	-31324
	150C1F1	0	0	0	12135	23533	-85656
	150C1F2	0	0	0	12135	23490	-85654
	150C1F3	0	0	0	12136	23435	-85653
	380C2F1	0	0	0	24270	47066	-171312
	380C2F2	0	0	0	24271	46980	-171308
	380C2F3	0	0	0	24271	46871	-171307
RTG	0	0	0	9465	17256	-62512	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3480	6410	-23646
	150C1F1	0	0	0	11730	21809	-80617
	150C1F2	0	0	0	11730	21795	-80619
	150C1F3	0	0	0	11730	21776	-80622
	380C2F1	0	0	0	23460	43619	-161233
	380C2F2	0	0	0	23460	43589	-161238
	380C2F3	0	0	0	23460	43552	-161244
RTG	0	0	0	6951	12753	-47225	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2757	9522	-25485
	150C1F1	0	0	0	10232	30371	-85052
	150C1F2	0	0	0	10252	29342	-83294
	150C1F3	0	0	0	10277	28068	-81186
	380C2F1	0	0	0	20463	60742	-170104
	380C2F2	0	0	0	20503	58683	-166588
	380C2F3	0	0	0	20554	56136	-162373
RTG	0	0	0	5567	15600	-44790	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2840	6791	-22252
	150C1F1	0	0	0	10489	24218	-81685
	150C1F2	0	0	0	10493	23994	-81488
	150C1F3	0	0	0	10498	23716	-81263
	380C2F1	0	0	0	20979	48436	-163369
	380C2F2	0	0	0	20987	47988	-162976
	380C2F3	0	0	0	20996	47432	-162525
RTG	0	0	0	5683	12741	-43421	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4620	14747	-39156
	150C1F1	0	0	0	11987	31733	-94119
	150C1F2	0	0	0	12005	30931	-92918
	150C1F3	0	0	0	12026	29943	-91501
	380C2F1	0	0	0	23974	63465	-188237
	380C2F2	0	0	0	24009	61863	-185836
	380C2F3	0	0	0	24053	59886	-183002
RTG	0	0	0	9338	24412	-69949	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3470	7274	-24054
	150C1F1	0	0	0	11707	24170	-81500
	150C1F2	0	0	0	11710	23956	-81343
	150C1F3	0	0	0	11714	23691	-81165
	380C2F1	0	0	0	23414	48340	-162999
	380C2F2	0	0	0	23421	47913	-162685
	380C2F3	0	0	0	23428	47381	-162329
RTG	0	0	0	6943	13839	-47514	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2737	10870	-28061
	150C1F1	0	0	0	10167	33918	-91382
	150C1F2	0	0	0	10191	32566	-88927
	150C1F3	0	0	0	10222	30885	-85945
	380C2F1	0	0	0	20335	67836	-182764
	380C2F2	0	0	0	20382	65131	-177855
	380C2F3	0	0	0	20443	61769	-171890
RTG	0	0	0	5536	17249	-47663	

NL3/1b	GW / opgw	0	0	0	2834	7092	-22624
Wind, -20°C	150C1F1	0	0	0	10474	24994	-82458
Permanent loads yg= 1.2	150C1F2	0	0	0	10480	24697	-82146
Wind angle: 90°	150C1F3	0	0	0	10487	24330	-81788
	380C2F1	0	0	0	20948	49989	-164916
	380C2F2	0	0	0	20960	49395	-164293
	380C2F3	0	0	0	20974	48660	-163576
	RTG	0	0	0	5677	13098	-43746
NL3/3	GW / opgw	0	0	0	4589	16717	-42628
Wind, -5°C	150C1F1	0	0	0	11927	34514	-98564
Permanent loads yg= 1.2	150C1F2	0	0	0	11950	33449	-96818
Wind angle: 90°	150C1F3	0	0	0	11978	32133	-94734
	380C2F1	0	0	0	23855	69027	-197127
	380C2F2	0	0	0	23900	66899	-193637
	380C2F3	0	0	0	23957	64267	-189469
	RTG	0	0	0	9290	26816	-73757
NL3/4	GW / opgw	0	0	0	3466	7548	-24324
Construction/maintenance, +5°C	150C1F1	0	0	0	11695	24906	-82122
Permanent loads yg= 1.2	150C1F2	0	0	0	11700	24625	-81870
Wind angle: 90°	150C1F3	0	0	0	11706	24276	-81582
	380C2F1	0	0	0	23391	49812	-164244
	380C2F2	0	0	0	23400	49250	-163740
	380C2F3	0	0	0	23411	48553	-163164
	RTG	0	0	0	6938	14170	-47741
NL3/1a	GW / opgw	0	0	0	2817	6317	-20228
Wind, 10°C	150C1F1	0	0	0	10395	22125	-73141
Permanent loads yg= 1.2	150C1F2	0	0	0	10399	21880	-72921
Wind angle: -45°	150C1F3	0	0	0	10404	21576	-72669
	380C2F1	0	0	0	20791	44249	-146283
	380C2F2	0	0	0	20799	43760	-145843
	380C2F3	0	0	0	20808	43152	-145339
	RTG	0	0	0	5640	11806	-39586
NL3/1b	GW / opgw	0	0	0	2851	6084	-21678
Wind, -20°C	150C1F1	0	0	0	10515	22360	-80550
Permanent loads yg= 1.2	150C1F2	0	0	0	10516	22300	-80537
Wind angle: -45°	150C1F3	0	0	0	10516	22223	-80524
	380C2F1	0	0	0	21031	44721	-161101
	380C2F2	0	0	0	21032	44599	-161074
	380C2F3	0	0	0	21033	44447	-161047
	RTG	0	0	0	5693	11879	-42957
NL3/3	GW / opgw	0	0	0	4714	10037	-32168
Wind, -5°C	150C1F1	0	0	0	12117	25316	-86379
Permanent loads yg= 1.2	150C1F2	0	0	0	12119	25121	-86249
Wind angle: -45°	150C1F3	0	0	0	12123	24879	-86102
	380C2F1	0	0	0	24233	50632	-172757
	380C2F2	0	0	0	24239	50243	-172498
	380C2F3	0	0	0	24245	49759	-172205
	RTG	0	0	0	9449	18814	-63165
NL3/4	GW / opgw	0	0	0	3479	6615	-23658
Construction/maintenance, +5°C	150C1F1	0	0	0	11727	22380	-80623
Permanent loads yg= 1.2	150C1F2	0	0	0	11728	22321	-80615
Wind angle: -45°	150C1F3	0	0	0	11728	22246	-80607
	380C2F1	0	0	0	23455	44761	-161246
	380C2F2	0	0	0	23456	44642	-161230
	380C2F3	0	0	0	23457	44492	-161213
	RTG	0	0	0	6950	13020	-47215
NL3/1a	GW / opgw	0	0	0	2128	4338	-15293
Wind, 10°C	150C1F1	0	0	0	7841	15770	-56329
Permanent loads yg= 0.9	150C1F2	0	0	0	7842	15716	-56313
Wind angle: 0°	150C1F3	0	0	0	7842	15648	-56296
	380C2F1	0	0	0	15683	31540	-112657
	380C2F2	0	0	0	15684	31432	-112626
	380C2F3	0	0	0	15685	31296	-112592
	RTG	0	0	0	4251	8487	-30473
NL3/1b	GW / opgw	0	0	0	2149	4655	-17097
Wind, -20°C	150C1F1	0	0	0	7929	17369	-64044
Permanent loads yg= 0.9	150C1F2	0	0	0	7929	17354	-64045
Wind angle: 0°	150C1F3	0	0	0	7929	17335	-64047
	380C2F1	0	0	0	15858	34737	-128089
	380C2F2	0	0	0	15858	34707	-128091
	380C2F3	0	0	0	15858	34669	-128094
	RTG	0	0	0	4289	9176	-33875

NL3/3	GW / opgw	0	0	0	4036	7757	-27533
Wind, -5°C	150C1F1	0	0	0	9557	19436	-70364
Permanent loads yg= 0.9	150C1F2	0	0	0	9557	19391	-70358
Wind angle: 0°	150C1F3	0	0	0	9558	19335	-70352
	380C2F1	0	0	0	19114	38871	-140728
	380C2F2	0	0	0	19115	38782	-140716
	380C2F3	0	0	0	19115	38670	-140704
	RTG	0	0	0	8075	15219	-54909
NL3/4	GW / opgw	0	0	0	2781	5310	-19540
Construction/maintenance, +5°C	150C1F1	0	0	0	9153	17737	-65416
Permanent loads yg= 0.9	150C1F2	0	0	0	9153	17722	-65418
Wind angle: 0°	150C1F3	0	0	0	9153	17703	-65420
	380C2F1	0	0	0	18307	35473	-130833
	380C2F2	0	0	0	18307	35443	-130836
	380C2F3	0	0	0	18307	35405	-130840
	RTG	0	0	0	5555	10552	-39010
NL3/1a	GW / opgw	0	0	0	2052	8836	-22926
Wind, 10°C	150C1F1	0	0	0	7628	27448	-74150
Permanent loads yg= 0.9	150C1F2	0	0	0	7647	26301	-71949
Wind angle: 45°	150C1F3	0	0	0	7672	24873	-69266
	380C2F1	0	0	0	15256	54897	-148299
	380C2F2	0	0	0	15294	52601	-143899
	380C2F3	0	0	0	15344	49746	-138533
	RTG	0	0	0	4153	13867	-38323
NL3/1b	GW / opgw	0	0	0	2132	5660	-18032
Wind, -20°C	150C1F1	0	0	0	7889	20000	-65945
Permanent loads yg= 0.9	150C1F2	0	0	0	7895	19750	-65649
Wind angle: 45°	150C1F3	0	0	0	7901	19440	-65307
	380C2F1	0	0	0	15779	40001	-131890
	380C2F2	0	0	0	15789	39499	-131299
	380C2F3	0	0	0	15802	38880	-130615
	RTG	0	0	0	4273	10392	-34654
NL3/3	GW / opgw	0	0	0	3918	14100	-36743
Wind, -5°C	150C1F1	0	0	0	9383	28425	-81780
Permanent loads yg= 0.9	150C1F2	0	0	0	9402	27535	-80247
Wind angle: 45°	150C1F3	0	0	0	9425	26435	-78414
	380C2F1	0	0	0	18766	56850	-163559
	380C2F2	0	0	0	18803	55070	-160494
	380C2F3	0	0	0	18851	52870	-156828
	RTG	0	0	0	7934	22809	-63968
NL3/4	GW / opgw	0	0	0	2769	6223	-20135
Construction/maintenance, +5°C	150C1F1	0	0	0	9124	20232	-66806
Permanent loads yg= 0.9	150C1F2	0	0	0	9128	20000	-66579
Wind angle: 45°	150C1F3	0	0	0	9133	19712	-66319
	380C2F1	0	0	0	18248	40464	-133611
	380C2F2	0	0	0	18256	40000	-133158
	380C2F3	0	0	0	18265	39425	-132638
	RTG	0	0	0	5544	11683	-39471
NL3/1a	GW / opgw	0	0	0	2036	10290	-25900
Wind, 10°C	150C1F1	0	0	0	7571	31361	-81845
Permanent loads yg= 0.9	150C1F2	0	0	0	7591	29877	-78898
Wind angle: 90°	150C1F3	0	0	0	7619	28019	-75256
	380C2F1	0	0	0	15142	62722	-163689
	380C2F2	0	0	0	15182	59754	-157796
	380C2F3	0	0	0	15238	56038	-150511
	RTG	0	0	0	4124	15702	-41894
NL3/1b	GW / opgw	0	0	0	2124	6003	-18559
Wind, -20°C	150C1F1	0	0	0	7870	20875	-67087
Permanent loads yg= 0.9	150C1F2	0	0	0	7877	20539	-66630
Wind angle: 90°	150C1F3	0	0	0	7887	20126	-66099
	380C2F1	0	0	0	15740	41750	-134173
	380C2F2	0	0	0	15755	41078	-133261
	380C2F3	0	0	0	15773	40252	-132198
	RTG	0	0	0	4265	10791	-35136
NL3/3	GW / opgw	0	0	0	3890	16165	-40570
Wind, -5°C	150C1F1	0	0	0	9322	31501	-87326
Permanent loads yg= 0.9	150C1F2	0	0	0	9344	30327	-85170
Wind angle: 90°	150C1F3	0	0	0	9374	28870	-82560
	380C2F1	0	0	0	18644	63002	-174651
	380C2F2	0	0	0	18689	60654	-170341
	380C2F3	0	0	0	18747	57740	-165120
	RTG	0	0	0	7885	25369	-68357

NL3/4	GW / opgw	0	0	0	2763	6523	-20498
Construction/maintenance, +5°C	150C1F1	0	0	0	9109	21038	-67689
Permanent loads yg= 0.9	150C1F2	0	0	0	9115	20729	-67334
Wind angle: 90°	150C1F3	0	0	0	9122	20348	-66924
	380C2F1	0	0	0	18218	42076	-135378
	380C2F2	0	0	0	18230	41459	-134669
	380C2F3	0	0	0	18244	40697	-133848
	RTG	0	0	0	5538	12039	-39789
NL3/1a	GW / opgw	0	0	0	2112	5258	-16276
Wind, 10°C	150C1F1	0	0	0	7805	18162	-58355
Permanent loads yg= 0.9	150C1F2	0	0	0	7811	17890	-58031
Wind angle: -45°	150C1F3	0	0	0	7817	17553	-57657
	380C2F1	0	0	0	15611	36325	-116711
	380C2F2	0	0	0	15621	35779	-116063
	380C2F3	0	0	0	15633	35106	-115313
	RTG	0	0	0	4236	9590	-31315
NL3/1b	GW / opgw	0	0	0	2147	4876	-17168
Wind, -20°C	150C1F1	0	0	0	7925	17969	-64162
Permanent loads yg= 0.9	150C1F2	0	0	0	7925	17905	-64137
Wind angle: -45°	150C1F3	0	0	0	7926	17825	-64109
	380C2F1	0	0	0	15849	35938	-128324
	380C2F2	0	0	0	15851	35810	-128273
	380C2F3	0	0	0	15852	35650	-128217
	RTG	0	0	0	4287	9457	-33917
NL3/3	GW / opgw	0	0	0	4015	9085	-28615
Wind, -5°C	150C1F1	0	0	0	9533	21323	-71479
Permanent loads yg= 0.9	150C1F2	0	0	0	9537	21113	-71291
Wind angle: -45°	150C1F3	0	0	0	9541	20853	-71076
	380C2F1	0	0	0	19066	42646	-142958
	380C2F2	0	0	0	19073	42226	-142583
	380C2F3	0	0	0	19081	41705	-142153
	RTG	0	0	0	8055	16836	-55784
NL3/4	GW / opgw	0	0	0	2779	5521	-19573
Construction/maintenance, +5°C	150C1F1	0	0	0	9150	18322	-65478
Permanent loads yg= 0.9	150C1F2	0	0	0	9151	18260	-65461
Wind angle: -45°	150C1F3	0	0	0	9151	18183	-65443
	380C2F1	0	0	0	18300	36644	-130955
	380C2F2	0	0	0	18301	36520	-130922
	380C2F3	0	0	0	18302	36366	-130886
	RTG	0	0	0	5553	10824	-39018

ZWW4HK450+5

Loadcases for tower strength (Special limit state)

Appendix BT1 / NL3

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2829	5483	19564	0	0	0
	150C1F1	10423	19924	71832	0	0	0
	150C1F2	10423	19873	71825	0	0	0
	150C1F3	10423	19807	71818	0	0	0
	380C2F1	20845	39849	143664	0	0	0
	380C2F2	20846	39745	143649	0	0	0
	380C2F3	20847	39615	143635	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2853	5873	21643	0	0	0
	150C1F1	10519	21782	80513	0	0	0
	150C1F2	10519	21767	80515	0	0	0
	150C1F3	10519	21748	80517	0	0	0
	380C2F1	21037	43563	161026	0	0	0
	380C2F2	21037	43533	161029	0	0	0
	380C2F3	21037	43496	161034	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4732	8773	31324	0	0	0
	150C1F1	12135	23533	85656	0	0	0
	150C1F2	12135	23490	85654	0	0	0
	150C1F3	12136	23435	85653	0	0	0
	380C2F1	24270	47066	171312	0	0	0
	380C2F2	24271	46980	171308	0	0	0
	380C2F3	24271	46871	171307	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3480	6410	23646	0	0	0
	150C1F1	11730	21809	80617	0	0	0
	150C1F2	11730	21795	80619	0	0	0
	150C1F3	11730	21776	80622	0	0	0
	380C2F1	23460	43619	161233	0	0	0
	380C2F2	23460	43589	161238	0	0	0
	380C2F3	23460	43552	161244	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2817	6317	20228	0	0	0
	150C1F1	10395	22125	73141	0	0	0
	150C1F2	10399	21880	72921	0	0	0
	150C1F3	10404	21576	72669	0	0	0
	380C2F1	20791	44249	146283	0	0	0
	380C2F2	20799	43760	145843	0	0	0
	380C2F3	20808	43152	145339	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2851	6084	21678	0	0	0
	150C1F1	10515	22360	80550	0	0	0
	150C1F2	10516	22300	80537	0	0	0
	150C1F3	10516	22223	80524	0	0	0
	380C2F1	21031	44721	161101	0	0	0
	380C2F2	21032	44599	161074	0	0	0
	380C2F3	21033	44447	161047	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4714	10037	32168	0	0	0
	150C1F1	12117	25316	86379	0	0	0
	150C1F2	12119	25121	86249	0	0	0
	150C1F3	12123	24879	86102	0	0	0
	380C2F1	24233	50632	172757	0	0	0
	380C2F2	24239	50243	172498	0	0	0
	380C2F3	24245	49759	172205	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3479	6615	23658	0	0	0
	150C1F1	11727	22380	80623	0	0	0
	150C1F2	11728	22321	80615	0	0	0
	150C1F3	11728	22246	80607	0	0	0
	380C2F1	23455	44761	161246	0	0	0
	380C2F2	23456	44642	161230	0	0	0
	380C2F3	23457	44492	161213	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2737	10870	28061	0	0	0
	150C1F1	10167	33918	91382	0	0	0
	150C1F2	10191	32566	88927	0	0	0
	150C1F3	10222	30885	85945	0	0	0
	380C2F1	20335	67836	182764	0	0	0
	380C2F2	20382	65131	177855	0	0	0
	380C2F3	20443	61769	171890	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b	GW / opgw	2834	7092	22624	0	0	0
Wind, -20°C	150C1F1	10474	24994	82458	0	0	0
Permanent loads yg= 1.2	150C1F2	10480	24697	82146	0	0	0
Wind angle: 90°	150C1F3	10487	24330	81788	0	0	0
	380C2F1	20948	49989	164916	0	0	0
	380C2F2	20960	49395	164293	0	0	0
	380C2F3	20974	48660	163576	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4589	16717	42628	0	0	0
Wind, -5°C	150C1F1	11927	34514	98564	0	0	0
Permanent loads yg= 1.2	150C1F2	11950	33449	96818	0	0	0
Wind angle: 90°	150C1F3	11978	32133	94734	0	0	0
	380C2F1	23855	69027	197127	0	0	0
	380C2F2	23900	66899	193637	0	0	0
	380C2F3	23957	64267	189469	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3466	7548	24324	0	0	0
Construction/maintenance, +5°C	150C1F1	11695	24906	82122	0	0	0
Permanent loads yg= 1.2	150C1F2	11700	24625	81870	0	0	0
Wind angle: 90°	150C1F3	11706	24276	81582	0	0	0
	380C2F1	23391	49812	164244	0	0	0
	380C2F2	23400	49250	163740	0	0	0
	380C2F3	23411	48553	163164	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2757	9522	25485	0	0	0
Wind, 10°C	150C1F1	10232	30371	85052	0	0	0
Permanent loads yg= 1.2	150C1F2	10252	29342	83294	0	0	0
Wind angle: -45°	150C1F3	10277	28068	81186	0	0	0
	380C2F1	20463	60742	170104	0	0	0
	380C2F2	20503	58683	166588	0	0	0
	380C2F3	20554	56136	162373	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2840	6791	22252	0	0	0
Wind, -20°C	150C1F1	10489	24218	81685	0	0	0
Permanent loads yg= 1.2	150C1F2	10493	23994	81488	0	0	0
Wind angle: -45°	150C1F3	10498	23716	81263	0	0	0
	380C2F1	20979	48436	163369	0	0	0
	380C2F2	20987	47988	162976	0	0	0
	380C2F3	20996	47432	162525	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4620	14747	39156	0	0	0
Wind, -5°C	150C1F1	11987	31733	94119	0	0	0
Permanent loads yg= 1.2	150C1F2	12005	30931	92918	0	0	0
Wind angle: -45°	150C1F3	12026	29943	91501	0	0	0
	380C2F1	23974	63465	188237	0	0	0
	380C2F2	24009	61863	185836	0	0	0
	380C2F3	24053	59886	183002	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3470	7274	24054	0	0	0
Construction/maintenance, +5°C	150C1F1	11707	24170	81500	0	0	0
Permanent loads yg= 1.2	150C1F2	11710	23956	81343	0	0	0
Wind angle: -45°	150C1F3	11714	23691	81165	0	0	0
	380C2F1	23414	48340	162999	0	0	0
	380C2F2	23421	47913	162685	0	0	0
	380C2F3	23428	47381	162329	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2128	4338	15293	0	0	0
Wind, 10°C	150C1F1	7841	15770	56329	0	0	0
Permanent loads yg= 0.9	150C1F2	7842	15716	56313	0	0	0
Wind angle: 0°	150C1F3	7842	15648	56296	0	0	0
	380C2F1	15683	31540	112657	0	0	0
	380C2F2	15684	31432	112626	0	0	0
	380C2F3	15685	31296	112592	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2149	4655	17097	0	0	0
Wind, -20°C	150C1F1	7929	17369	64044	0	0	0
Permanent loads yg= 0.9	150C1F2	7929	17354	64045	0	0	0
Wind angle: 0°	150C1F3	7929	17335	64047	0	0	0
	380C2F1	15858	34737	128089	0	0	0
	380C2F2	15858	34707	128091	0	0	0
	380C2F3	15858	34669	128094	0	0	0
	RTG	0	0	0	0	0	0

NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	4036	7757	27533	0	0	0
	150C1F1	9557	19436	70364	0	0	0
	150C1F2	9557	19391	70358	0	0	0
	150C1F3	9558	19335	70352	0	0	0
	380C2F1	19114	38871	140728	0	0	0
	380C2F2	19115	38782	140716	0	0	0
	380C2F3	19115	38670	140704	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2781	5310	19540	0	0	0
	150C1F1	9153	17737	65416	0	0	0
	150C1F2	9153	17722	65418	0	0	0
	150C1F3	9153	17703	65420	0	0	0
	380C2F1	18307	35473	130833	0	0	0
	380C2F2	18307	35443	130836	0	0	0
	380C2F3	18307	35405	130840	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2112	5258	16276	0	0	0
	150C1F1	7805	18162	58355	0	0	0
	150C1F2	7811	17890	58031	0	0	0
	150C1F3	7817	17553	57657	0	0	0
	380C2F1	15611	36325	116711	0	0	0
	380C2F2	15621	35779	116063	0	0	0
	380C2F3	15633	35106	115313	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2147	4876	17168	0	0	0
	150C1F1	7925	17969	64162	0	0	0
	150C1F2	7925	17905	64137	0	0	0
	150C1F3	7926	17825	64109	0	0	0
	380C2F1	15849	35938	128324	0	0	0
	380C2F2	15851	35810	128273	0	0	0
	380C2F3	15852	35650	128217	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	4015	9085	28615	0	0	0
	150C1F1	9533	21323	71479	0	0	0
	150C1F2	9537	21113	71291	0	0	0
	150C1F3	9541	20853	71076	0	0	0
	380C2F1	19066	42646	142958	0	0	0
	380C2F2	19073	42226	142583	0	0	0
	380C2F3	19081	41705	142153	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2779	5521	19573	0	0	0
	150C1F1	9150	18322	65478	0	0	0
	150C1F2	9151	18260	65461	0	0	0
	150C1F3	9151	18183	65443	0	0	0
	380C2F1	18300	36644	130955	0	0	0
	380C2F2	18301	36520	130922	0	0	0
	380C2F3	18302	36366	130886	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2036	10290	25900	0	0	0
	150C1F1	7571	31361	81845	0	0	0
	150C1F2	7591	29877	78898	0	0	0
	150C1F3	7619	28019	75256	0	0	0
	380C2F1	15142	62722	163689	0	0	0
	380C2F2	15182	59754	157796	0	0	0
	380C2F3	15238	56038	150511	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2124	6003	18559	0	0	0
	150C1F1	7870	20875	67087	0	0	0
	150C1F2	7877	20539	66630	0	0	0
	150C1F3	7887	20126	66099	0	0	0
	380C2F1	15740	41750	134173	0	0	0
	380C2F2	15755	41078	133261	0	0	0
	380C2F3	15773	40252	132198	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	3890	16165	40570	0	0	0
	150C1F1	9322	31501	87326	0	0	0
	150C1F2	9344	30327	85170	0	0	0
	150C1F3	9374	28870	82560	0	0	0
	380C2F1	18644	63002	174651	0	0	0
	380C2F2	18689	60654	170341	0	0	0
	380C2F3	18747	57740	165120	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2763	6523	20498	0	0	0
Construction/maintenance, +5°C	150C1F1	9109	21038	67689	0	0	0
Permanent loads yg= 0.9	150C1F2	9115	20729	67334	0	0	0
Wind angle: 90°	150C1F3	9122	20348	66924	0	0	0
	380C2F1	18218	42076	135378	0	0	0
	380C2F2	18230	41459	134669	0	0	0
	380C2F3	18244	40697	133848	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2052	8836	22926	0	0	0
Wind, 10°C	150C1F1	7628	27448	74150	0	0	0
Permanent loads yg= 0.9	150C1F2	7647	26301	71949	0	0	0
Wind angle: -45°	150C1F3	7672	24873	69266	0	0	0
	380C2F1	15256	54897	148299	0	0	0
	380C2F2	15294	52601	143899	0	0	0
	380C2F3	15344	49746	138533	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2132	5660	18032	0	0	0
Wind, -20°C	150C1F1	7889	20000	65945	0	0	0
Permanent loads yg= 0.9	150C1F2	7895	19750	65649	0	0	0
Wind angle: -45°	150C1F3	7901	19440	65307	0	0	0
	380C2F1	15779	40001	131890	0	0	0
	380C2F2	15789	39499	131299	0	0	0
	380C2F3	15802	38880	130615	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3918	14100	36743	0	0	0
Wind, -5°C	150C1F1	9383	28425	81780	0	0	0
Permanent loads yg= 0.9	150C1F2	9402	27535	80247	0	0	0
Wind angle: -45°	150C1F3	9425	26435	78414	0	0	0
	380C2F1	18766	56850	163559	0	0	0
	380C2F2	18803	55070	160494	0	0	0
	380C2F3	18851	52870	156828	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2769	6223	20135	0	0	0
Construction/maintenance, +5°C	150C1F1	9124	20232	66806	0	0	0
Permanent loads yg= 0.9	150C1F2	9128	20000	66579	0	0	0
Wind angle: -45°	150C1F3	9133	19712	66319	0	0	0
	380C2F1	18248	40464	133611	0	0	0
	380C2F2	18256	40000	133158	0	0	0
	380C2F3	18265	39425	132638	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HK450+5

Loadcases for tower strength (Special limit state)

Appendix BT1 / NL3

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2829	5483	19564	2829	5483	-19564
	150C1F1	10423	19924	71832	10423	19924	-71832
	150C1F2	10423	19873	71825	10423	19873	-71825
	150C1F3	10423	19807	71818	10423	19807	-71818
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2853	5873	21643	2853	5873	-21643
	150C1F1	10519	21782	80513	10519	21782	-80513
	150C1F2	10519	21767	80515	10519	21767	-80515
	150C1F3	10519	21748	80517	10519	21748	-80517
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4732	8773	31324	4732	8773	-31324
	150C1F1	12135	23533	85656	12135	23533	-85656
	150C1F2	12135	23490	85654	12135	23490	-85654
	150C1F3	12136	23435	85653	12136	23435	-85653
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3480	6410	23646	3480	6410	-23646
	150C1F1	11730	21809	80617	11730	21809	-80617
	150C1F2	11730	21795	80619	11730	21795	-80619
	150C1F3	11730	21776	80622	11730	21776	-80622
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2817	6317	20228	2757	9522	-25485
	150C1F1	10395	22125	73141	10232	30371	-85052
	150C1F2	10399	21880	72921	10252	29342	-83294
	150C1F3	10404	21576	72669	10277	28068	-81186
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2851	6084	21678	2840	6791	-22252
	150C1F1	10515	22360	80550	10489	24218	-81685
	150C1F2	10516	22300	80537	10493	23994	-81488
	150C1F3	10516	22223	80524	10498	23716	-81263
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4714	10037	32168	4620	14747	-39156
	150C1F1	12117	25316	86379	11987	31733	-94119
	150C1F2	12119	25121	86249	12005	30931	-92918
	150C1F3	12123	24879	86102	12026	29943	-91501
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3479	6615	23658	3470	7274	-24054
	150C1F1	11727	22380	80623	11707	24170	-81500
	150C1F2	11728	22321	80615	11710	23956	-81343
	150C1F3	11728	22246	80607	11714	23691	-81165
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2737	10870	28061	2737	10870	-28061
	150C1F1	10167	33918	91382	10167	33918	-91382
	150C1F2	10191	32566	88927	10191	32566	-88927
	150C1F3	10222	30885	85945	10222	30885	-85945
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b	GW / opgw	2834	7092	22624	2834	7092	-22624
Wind, -20°C	150C1F1	10474	24994	82458	10474	24994	-82458
Permanent loads yg= 1.2	150C1F2	10480	24697	82146	10480	24697	-82146
Wind angle: 90°	150C1F3	10487	24330	81788	10487	24330	-81788
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4589	16717	42628	4589	16717	-42628
Wind, -5°C	150C1F1	11927	34514	98564	11927	34514	-98564
Permanent loads yg= 1.2	150C1F2	11950	33449	96818	11950	33449	-96818
Wind angle: 90°	150C1F3	11978	32133	94734	11978	32133	-94734
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3466	7548	24324	3466	7548	-24324
Construction/maintenance, +5°C	150C1F1	11695	24906	82122	11695	24906	-82122
Permanent loads yg= 1.2	150C1F2	11700	24625	81870	11700	24625	-81870
Wind angle: 90°	150C1F3	11706	24276	81582	11706	24276	-81582
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2757	9522	25485	2817	6317	-20228
Wind, 10°C	150C1F1	10232	30371	85052	10395	22125	-73141
Permanent loads yg= 1.2	150C1F2	10252	29342	83294	10399	21880	-72921
Wind angle: -45°	150C1F3	10277	28068	81186	10404	21576	-72669
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2840	6791	22252	2851	6084	-21678
Wind, -20°C	150C1F1	10489	24218	81685	10515	22360	-80550
Permanent loads yg= 1.2	150C1F2	10493	23994	81488	10516	22300	-80537
Wind angle: -45°	150C1F3	10498	23716	81263	10516	22223	-80524
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4620	14747	39156	4714	10037	-32168
Wind, -5°C	150C1F1	11987	31733	94119	12117	25316	-86379
Permanent loads yg= 1.2	150C1F2	12005	30931	92918	12119	25121	-86249
Wind angle: -45°	150C1F3	12026	29943	91501	12123	24879	-86102
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3470	7274	24054	3479	6615	-23658
Construction/maintenance, +5°C	150C1F1	11707	24170	81500	11727	22380	-80623
Permanent loads yg= 1.2	150C1F2	11710	23956	81343	11728	22321	-80615
Wind angle: -45°	150C1F3	11714	23691	81165	11728	22246	-80607
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2128	4338	15293	2128	4338	-15293
Wind, 10°C	150C1F1	7841	15770	56329	7841	15770	-56329
Permanent loads yg= 0.9	150C1F2	7842	15716	56313	7842	15716	-56313
Wind angle: 0°	150C1F3	7842	15648	56296	7842	15648	-56296
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2149	4655	17097	2149	4655	-17097
Wind, -20°C	150C1F1	7929	17369	64044	7929	17369	-64044
Permanent loads yg= 0.9	150C1F2	7929	17354	64045	7929	17354	-64045
Wind angle: 0°	150C1F3	7929	17335	64047	7929	17335	-64047
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/3	GW / opgw	4036	7757	27533	4036	7757	-27533
Wind, -5°C	150C1F1	9557	19436	70364	9557	19436	-70364
Permanent loads yg= 0.9	150C1F2	9557	19391	70358	9557	19391	-70358
Wind angle: 0°	150C1F3	9558	19335	70352	9558	19335	-70352
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2781	5310	19540	2781	5310	-19540
Construction/maintenance, +5°C	150C1F1	9153	17737	65416	9153	17737	-65416
Permanent loads yg= 0.9	150C1F2	9153	17722	65418	9153	17722	-65418
Wind angle: 0°	150C1F3	9153	17703	65420	9153	17703	-65420
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2112	5258	16276	2052	8836	-22926
Wind, 10°C	150C1F1	7805	18162	58355	7628	27448	-74150
Permanent loads yg= 0.9	150C1F2	7811	17890	58031	7647	26301	-71949
Wind angle: 45°	150C1F3	7817	17553	57657	7672	24873	-69266
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2147	4876	17168	2132	5660	-18032
Wind, -20°C	150C1F1	7925	17969	64162	7889	20000	-65945
Permanent loads yg= 0.9	150C1F2	7925	17905	64137	7895	19750	-65649
Wind angle: 45°	150C1F3	7926	17825	64109	7901	19440	-65307
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4015	9085	28615	3918	14100	-36743
Wind, -5°C	150C1F1	9533	21323	71479	9383	28425	-81780
Permanent loads yg= 0.9	150C1F2	9537	21113	71291	9402	27535	-80247
Wind angle: 45°	150C1F3	9541	20853	71076	9425	26435	-78414
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2779	5521	19573	2769	6223	-20135
Construction/maintenance, +5°C	150C1F1	9150	18322	65478	9124	20232	-66806
Permanent loads yg= 0.9	150C1F2	9151	18260	65461	9128	20000	-66579
Wind angle: 45°	150C1F3	9151	18183	65443	9133	19712	-66319
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2036	10290	25900	2036	10290	-25900
Wind, 10°C	150C1F1	7571	31361	81845	7571	31361	-81845
Permanent loads yg= 0.9	150C1F2	7591	29877	78898	7591	29877	-78898
Wind angle: 90°	150C1F3	7619	28019	75256	7619	28019	-75256
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2124	6003	18559	2124	6003	-18559
Wind, -20°C	150C1F1	7870	20875	67087	7870	20875	-67087
Permanent loads yg= 0.9	150C1F2	7877	20539	66630	7877	20539	-66630
Wind angle: 90°	150C1F3	7887	20126	66099	7887	20126	-66099
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3890	16165	40570	3890	16165	-40570
Wind, -5°C	150C1F1	9322	31501	87326	9322	31501	-87326
Permanent loads yg= 0.9	150C1F2	9344	30327	85170	9344	30327	-85170
Wind angle: 90°	150C1F3	9374	28870	82560	9374	28870	-82560
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2763	6523	20498	2763	6523	-20498
Construction/maintenance, +5°C	150C1F1	9109	21038	67689	9109	21038	-67689
Permanent loads yg= 0.9	150C1F2	9115	20729	67334	9115	20729	-67334
Wind angle: 90°	150C1F3	9122	20348	66924	9122	20348	-66924
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2052	8836	22926	2112	5258	-16276
Wind, 10°C	150C1F1	7628	27448	74150	7805	18162	-58355
Permanent loads yg= 0.9	150C1F2	7647	26301	71949	7811	17890	-58031
Wind angle: -45°	150C1F3	7672	24873	69266	7817	17553	-57657
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2132	5660	18032	2147	4876	-17168
Wind, -20°C	150C1F1	7889	20000	65945	7925	17969	-64162
Permanent loads yg= 0.9	150C1F2	7895	19750	65649	7925	17905	-64137
Wind angle: -45°	150C1F3	7901	19440	65307	7926	17825	-64109
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3918	14100	36743	4015	9085	-28615
Wind, -5°C	150C1F1	9383	28425	81780	9533	21323	-71479
Permanent loads yg= 0.9	150C1F2	9402	27535	80247	9537	21113	-71291
Wind angle: -45°	150C1F3	9425	26435	78414	9541	20853	-71076
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2769	6223	20135	2779	5521	-19573
Construction/maintenance, +5°C	150C1F1	9124	20232	66806	9150	18322	-65478
Permanent loads yg= 0.9	150C1F2	9128	20000	66579	9151	18260	-65461
Wind angle: -45°	150C1F3	9133	19712	66319	9151	18183	-65443
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

ZWW4HK450+5

Appendix BT1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	20845	39849	143664	20845	39849	-143664
	380C2F2	20846	39745	143649	20846	39745	-143649
	380C2F3	20847	39615	143635	20847	39615	-143635
	RTG	0	0	0	5652	10784	-39049
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21037	43563	161026	21037	43563	-161026
	380C2F2	21037	43533	161029	21037	43533	-161029
	380C2F3	21037	43496	161034	21037	43496	-161034
	RTG	0	0	0	5695	11607	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	24270	47066	171312	24270	47066	-171312
	380C2F2	24271	46980	171308	24271	46980	-171308
	380C2F3	24271	46871	171307	24271	46871	-171307
	RTG	0	0	0	9465	17256	-62512
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	23460	43619	161233	23460	43619	-161233
	380C2F2	23460	43589	161238	23460	43589	-161238
	380C2F3	23460	43552	161244	23460	43552	-161244
	RTG	0	0	0	6951	12753	-47225
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	20791	44249	146283	20463	60742	-170104
	380C2F2	20799	43760	145843	20503	58683	-166588
	380C2F3	20808	43152	145339	20554	56136	-162373
	RTG	0	0	0	5567	15600	-44790
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21031	44721	161101	20979	48436	-163369
	380C2F2	21032	44599	161074	20987	47988	-162976
	380C2F3	21033	44447	161047	20996	47432	-162525
	RTG	0	0	0	5683	12741	-43421
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	24233	50632	172757	23974	63465	-188237
	380C2F2	24239	50243	172498	24009	61863	-185836
	380C2F3	24245	49759	172205	24053	59886	-183002
	RTG	0	0	0	9338	24412	-69949
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	23455	44761	161246	23414	48340	-162999
	380C2F2	23456	44642	161230	23421	47913	-162685
	380C2F3	23457	44492	161213	23428	47381	-162329
	RTG	0	0	0	6943	13839	-47514
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	20335	67836	182764	20335	67836	-182764
	380C2F2	20382	65131	177855	20382	65131	-177855
	380C2F3	20443	61769	171890	20443	61769	-171890
	RTG	0	0	0	5536	17249	-47663

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	20948	49989	164916	20948	49989	-164916	
	380C2F2	20960	49395	164293	20960	49395	-164293	
	380C2F3	20974	48660	163576	20974	48660	-163576	
	RTG	0	0	0	5677	13098	-43746	
	NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
150C1F1		0	0	0	0	0	0	0
150C1F2		0	0	0	0	0	0	0
150C1F3		0	0	0	0	0	0	0
380C2F1		23855	69027	197127	23855	69027	-197127	
380C2F2		23900	66899	193637	23900	66899	-193637	
380C2F3		23957	64267	189469	23957	64267	-189469	
RTG		0	0	0	9290	26816	-73757	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°		GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	23391	49812	164244	23391	49812	-164244	
	380C2F2	23400	49250	163740	23400	49250	-163740	
	380C2F3	23411	48553	163164	23411	48553	-163164	
	RTG	0	0	0	6938	14170	-47741	
	NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
150C1F1		0	0	0	0	0	0	0
150C1F2		0	0	0	0	0	0	0
150C1F3		0	0	0	0	0	0	0
380C2F1		20463	60742	170104	20791	44249	-146283	
380C2F2		20503	58683	166588	20799	43760	-145843	
380C2F3		20554	56136	162373	20808	43152	-145339	
RTG		0	0	0	5640	11806	-39586	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	20979	48436	163369	21031	44721	-161101	
	380C2F2	20987	47988	162976	21032	44599	-161074	
	380C2F3	20996	47432	162525	21033	44447	-161047	
	RTG	0	0	0	5693	11879	-42957	
	NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
150C1F1		0	0	0	0	0	0	0
150C1F2		0	0	0	0	0	0	0
150C1F3		0	0	0	0	0	0	0
380C2F1		23974	63465	188237	24233	50632	-172757	
380C2F2		24009	61863	185836	24239	50243	-172498	
380C2F3		24053	59886	183002	24245	49759	-172205	
RTG		0	0	0	9449	18814	-63165	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	23414	48340	162999	23455	44761	-161246	
	380C2F2	23421	47913	162685	23456	44642	-161230	
	380C2F3	23428	47381	162329	23457	44492	-161213	
	RTG	0	0	0	6950	13020	-47215	
	NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
150C1F1		0	0	0	0	0	0	0
150C1F2		0	0	0	0	0	0	0
150C1F3		0	0	0	0	0	0	0
380C2F1		15683	31540	112657	15683	31540	-112657	
380C2F2		15684	31432	112626	15684	31432	-112626	
380C2F3		15685	31296	112592	15685	31296	-112592	
RTG		0	0	0	4251	8487	-30473	
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	15858	34737	128089	15858	34737	-128089	
	380C2F2	15858	34707	128091	15858	34707	-128091	
	380C2F3	15858	34669	128094	15858	34669	-128094	
	RTG	0	0	0	4289	9176	-33875	

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19114	38871	140728	19114	38871	-140728	
	380C2F2	19115	38782	140716	19115	38782	-140716	
	380C2F3	19115	38670	140704	19115	38670	-140704	
	RTG	0	0	0	8075	15219	-54909	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	18307	35473	130833	18307	35473	-130833	
	380C2F2	18307	35443	130836	18307	35443	-130836	
	380C2F3	18307	35405	130840	18307	35405	-130840	
	RTG	0	0	0	5555	10552	-39010	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15611	36325	116711	15256	54897	-148299	
	380C2F2	15621	35779	116063	15294	52601	-143899	
	380C2F3	15633	35106	115313	15344	49746	-138533	
	RTG	0	0	0	4153	13867	-38323	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15849	35938	128324	15779	40001	-131890	
	380C2F2	15851	35810	128273	15789	39499	-131299	
	380C2F3	15852	35650	128217	15802	38880	-130615	
	RTG	0	0	0	4273	10392	-34654	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19066	42646	142958	18766	56850	-163559	
	380C2F2	19073	42226	142583	18803	55070	-160494	
	380C2F3	19081	41705	142153	18851	52870	-156828	
	RTG	0	0	0	7934	22809	-63968	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	18300	36644	130955	18248	40464	-133611	
	380C2F2	18301	36520	130922	18256	40000	-133158	
	380C2F3	18302	36366	130886	18265	39425	-132638	
	RTG	0	0	0	5544	11683	-39471	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15142	62722	163689	15142	62722	-163689	
	380C2F2	15182	59754	157796	15182	59754	-157796	
	380C2F3	15238	56038	150511	15238	56038	-150511	
	RTG	0	0	0	4124	15702	-41894	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15740	41750	134173	15740	41750	-134173	
	380C2F2	15755	41078	133261	15755	41078	-133261	
	380C2F3	15773	40252	132198	15773	40252	-132198	
	RTG	0	0	0	4265	10791	-35136	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	18644	63002	174651	18644	63002	-174651	
	380C2F2	18689	60654	170341	18689	60654	-170341	
	380C2F3	18747	57740	165120	18747	57740	-165120	
	RTG	0	0	0	7885	25369	-68357	

NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	18218	42076	135378	18218	42076	-135378
	380C2F2	18230	41459	134669	18230	41459	-134669
	380C2F3	18244	40697	133848	18244	40697	-133848
	RTG	0	0	0	5538	12039	-39789
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	15256	54897	148299	15611	36325	-116711
	380C2F2	15294	52601	143899	15621	35779	-116063
	380C2F3	15344	49746	138533	15633	35106	-115313
	RTG	0	0	0	4236	9590	-31315
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	15779	40001	131890	15849	35938	-128324
	380C2F2	15789	39499	131299	15851	35810	-128273
	380C2F3	15802	38880	130615	15852	35650	-128217
	RTG	0	0	0	4287	9457	-33917
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	18766	56850	163559	19066	42646	-142958
	380C2F2	18803	55070	160494	19073	42226	-142583
	380C2F3	18851	52870	156828	19081	41705	-142153
	RTG	0	0	0	8055	16836	-55784
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	18248	40464	133611	18300	36644	-130955
	380C2F2	18256	40000	133158	18301	36520	-130922
	380C2F3	18265	39425	132638	18302	36366	-130886
	RTG	0	0	0	5553	10824	-39018

ZWW4HK450+5

Appendix BT1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	20845	39849	143664	20845	39849	-143664
	380C2F2	20846	39745	143649	20846	39745	-143649
	380C2F3	20847	39615	143635	20847	39615	-143635
	RTG	0	0	0	5652	10784	-39049
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21037	43563	161026	21037	43563	-161026
	380C2F2	21037	43533	161029	21037	43533	-161029
	380C2F3	21037	43496	161034	21037	43496	-161034
	RTG	0	0	0	5695	11607	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	24270	47066	171312	24270	47066	-171312
	380C2F2	24271	46980	171308	24271	46980	-171308
	380C2F3	24271	46871	171307	24271	46871	-171307
	RTG	0	0	0	9465	17256	-62512
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	23460	43619	161233	23460	43619	-161233
	380C2F2	23460	43589	161238	23460	43589	-161238
	380C2F3	23460	43552	161244	23460	43552	-161244
	RTG	0	0	0	6951	12753	-47225
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	20791	44249	146283	20463	60742	-170104
	380C2F2	20799	43760	145843	20503	58683	-166588
	380C2F3	20808	43152	145339	20554	56136	-162373
	RTG	0	0	0	5567	15600	-44790
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	21031	44721	161101	20979	48436	-163369
	380C2F2	21032	44599	161074	20987	47988	-162976
	380C2F3	21033	44447	161047	20996	47432	-162525
	RTG	0	0	0	5683	12741	-43421
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	24233	50632	172757	23974	63465	-188237
	380C2F2	24239	50243	172498	24009	61863	-185836
	380C2F3	24245	49759	172205	24053	59886	-183002
	RTG	0	0	0	9338	24412	-69949
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	23455	44761	161246	23414	48340	-162999
	380C2F2	23456	44642	161230	23421	47913	-162685
	380C2F3	23457	44492	161213	23428	47381	-162329
	RTG	0	0	0	6943	13839	-47514
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	20335	67836	182764	20335	67836	-182764
	380C2F2	20382	65131	177855	20382	65131	-177855
	380C2F3	20443	61769	171890	20443	61769	-171890
	RTG	0	0	0	5536	17249	-47663

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	20948	49989	164916	20948	49989	-164916	
	380C2F2	20960	49395	164293	20960	49395	-164293	
	380C2F3	20974	48660	163576	20974	48660	-163576	
	RTG	0	0	0	5677	13098	-43746	
	NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
150C1F1		0	0	0	0	0	0	0
150C1F2		0	0	0	0	0	0	0
150C1F3		0	0	0	0	0	0	0
380C2F1		23855	69027	197127	23855	69027	-197127	
380C2F2		23900	66899	193637	23900	66899	-193637	
380C2F3		23957	64267	189469	23957	64267	-189469	
RTG		0	0	0	9290	26816	-73757	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°		GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	23391	49812	164244	23391	49812	-164244	
	380C2F2	23400	49250	163740	23400	49250	-163740	
	380C2F3	23411	48553	163164	23411	48553	-163164	
	RTG	0	0	0	6938	14170	-47741	
	NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
150C1F1		0	0	0	0	0	0	0
150C1F2		0	0	0	0	0	0	0
150C1F3		0	0	0	0	0	0	0
380C2F1		20463	60742	170104	20791	44249	-146283	
380C2F2		20503	58683	166588	20799	43760	-145843	
380C2F3		20554	56136	162373	20808	43152	-145339	
RTG		0	0	0	5640	11806	-39586	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	20979	48436	163369	21031	44721	-161101	
	380C2F2	20987	47988	162976	21032	44599	-161074	
	380C2F3	20996	47432	162525	21033	44447	-161047	
	RTG	0	0	0	5693	11879	-42957	
	NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
150C1F1		0	0	0	0	0	0	0
150C1F2		0	0	0	0	0	0	0
150C1F3		0	0	0	0	0	0	0
380C2F1		23974	63465	188237	24233	50632	-172757	
380C2F2		24009	61863	185836	24239	50243	-172498	
380C2F3		24053	59886	183002	24245	49759	-172205	
RTG		0	0	0	9449	18814	-63165	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	23414	48340	162999	23455	44761	-161246	
	380C2F2	23421	47913	162685	23456	44642	-161230	
	380C2F3	23428	47381	162329	23457	44492	-161213	
	RTG	0	0	0	6950	13020	-47215	
	NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
150C1F1		0	0	0	0	0	0	0
150C1F2		0	0	0	0	0	0	0
150C1F3		0	0	0	0	0	0	0
380C2F1		15683	31540	112657	15683	31540	-112657	
380C2F2		15684	31432	112626	15684	31432	-112626	
380C2F3		15685	31296	112592	15685	31296	-112592	
RTG		0	0	0	4251	8487	-30473	
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0	0
	380C2F1	15858	34737	128089	15858	34737	-128089	
	380C2F2	15858	34707	128091	15858	34707	-128091	
	380C2F3	15858	34669	128094	15858	34669	-128094	
	RTG	0	0	0	4289	9176	-33875	

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19114	38871	140728	19114	38871	-140728	
	380C2F2	19115	38782	140716	19115	38782	-140716	
	380C2F3	19115	38670	140704	19115	38670	-140704	
	RTG	0	0	0	8075	15219	-54909	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	18307	35473	130833	18307	35473	-130833	
	380C2F2	18307	35443	130836	18307	35443	-130836	
	380C2F3	18307	35405	130840	18307	35405	-130840	
	RTG	0	0	0	5555	10552	-39010	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15611	36325	116711	15256	54897	-148299	
	380C2F2	15621	35779	116063	15294	52601	-143899	
	380C2F3	15633	35106	115313	15344	49746	-138533	
	RTG	0	0	0	4153	13867	-38323	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15849	35938	128324	15779	40001	-131890	
	380C2F2	15851	35810	128273	15789	39499	-131299	
	380C2F3	15852	35650	128217	15802	38880	-130615	
	RTG	0	0	0	4273	10392	-34654	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19066	42646	142958	18766	56850	-163559	
	380C2F2	19073	42226	142583	18803	55070	-160494	
	380C2F3	19081	41705	142153	18851	52870	-156828	
	RTG	0	0	0	7934	22809	-63968	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	18300	36644	130955	18248	40464	-133611	
	380C2F2	18301	36520	130922	18256	40000	-133158	
	380C2F3	18302	36366	130886	18265	39425	-132638	
	RTG	0	0	0	5544	11683	-39471	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15142	62722	163689	15142	62722	-163689	
	380C2F2	15182	59754	157796	15182	59754	-157796	
	380C2F3	15238	56038	150511	15238	56038	-150511	
	RTG	0	0	0	4124	15702	-41894	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15740	41750	134173	15740	41750	-134173	
	380C2F2	15755	41078	133261	15755	41078	-133261	
	380C2F3	15773	40252	132198	15773	40252	-132198	
	RTG	0	0	0	4265	10791	-35136	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	18644	63002	174651	18644	63002	-174651	
	380C2F2	18689	60654	170341	18689	60654	-170341	
	380C2F3	18747	57740	165120	18747	57740	-165120	
	RTG	0	0	0	7885	25369	-68357	

NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	18218	42076	135378	18218	42076	-135378
	380C2F2	18230	41459	134669	18230	41459	-134669
	380C2F3	18244	40697	133848	18244	40697	-133848
	RTG	0	0	0	5538	12039	-39789
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	15256	54897	148299	15611	36325	-116711
	380C2F2	15294	52601	143899	15621	35779	-116063
	380C2F3	15344	49746	138533	15633	35106	-115313
	RTG	0	0	0	4236	9590	-31315
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	15779	40001	131890	15849	35938	-128324
	380C2F2	15789	39499	131299	15851	35810	-128273
	380C2F3	15802	38880	130615	15852	35650	-128217
	RTG	0	0	0	4287	9457	-33917
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	18766	56850	163559	19066	42646	-142958
	380C2F2	18803	55070	160494	19073	42226	-142583
	380C2F3	18851	52870	156828	19081	41705	-142153
	RTG	0	0	0	8055	16836	-55784
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	18248	40464	133611	18300	36644	-130955
	380C2F2	18256	40000	133158	18301	36520	-130922
	380C2F3	18265	39425	132638	18302	36366	-130886
	RTG	0	0	0	5553	10824	-39018

ZWW4HK450+5

Appendix BT1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2829	5483	19564	0	0	0
	150C1F1	10423	19924	71832	0	0	0
	150C1F2	10423	19873	71825	0	0	0
	150C1F3	10423	19807	71818	0	0	0
	380C2F1	0	0	0	20845	39849	-143664
	380C2F2	0	0	0	20846	39745	-143649
	380C2F3	0	0	0	20847	39615	-143635
	RTG	0	0	0	5652	10784	-39049
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2853	5873	21643	0	0	0
	150C1F1	10519	21782	80513	0	0	0
	150C1F2	10519	21767	80515	0	0	0
	150C1F3	10519	21748	80517	0	0	0
	380C2F1	0	0	0	21037	43563	-161026
	380C2F2	0	0	0	21037	43533	-161029
	380C2F3	0	0	0	21037	43496	-161034
	RTG	0	0	0	5695	11607	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4732	8773	31324	0	0	0
	150C1F1	12135	23533	85656	0	0	0
	150C1F2	12135	23490	85654	0	0	0
	150C1F3	12136	23435	85653	0	0	0
	380C2F1	0	0	0	24270	47066	-171312
	380C2F2	0	0	0	24271	46980	-171308
	380C2F3	0	0	0	24271	46871	-171307
	RTG	0	0	0	9465	17256	-62512
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3480	6410	23646	0	0	0
	150C1F1	11730	21809	80617	0	0	0
	150C1F2	11730	21795	80619	0	0	0
	150C1F3	11730	21776	80622	0	0	0
	380C2F1	0	0	0	23460	43619	-161233
	380C2F2	0	0	0	23460	43589	-161238
	380C2F3	0	0	0	23460	43552	-161244
	RTG	0	0	0	6951	12753	-47225
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2817	6317	20228	0	0	0
	150C1F1	10395	22125	73141	0	0	0
	150C1F2	10399	21880	72921	0	0	0
	150C1F3	10404	21576	72669	0	0	0
	380C2F1	0	0	0	20463	60742	-170104
	380C2F2	0	0	0	20503	58683	-166588
	380C2F3	0	0	0	20554	56136	-162373
	RTG	0	0	0	5567	15600	-44790
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2851	6084	21678	0	0	0
	150C1F1	10515	22360	80550	0	0	0
	150C1F2	10516	22300	80537	0	0	0
	150C1F3	10516	22223	80524	0	0	0
	380C2F1	0	0	0	20979	48436	-163369
	380C2F2	0	0	0	20987	47988	-162976
	380C2F3	0	0	0	20996	47432	-162525
	RTG	0	0	0	5683	12741	-43421
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4714	10037	32168	0	0	0
	150C1F1	12117	25316	86379	0	0	0
	150C1F2	12119	25121	86249	0	0	0
	150C1F3	12123	24879	86102	0	0	0
	380C2F1	0	0	0	23974	63465	-188237
	380C2F2	0	0	0	24009	61863	-185836
	380C2F3	0	0	0	24053	59886	-183002
	RTG	0	0	0	9338	24412	-69949
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3479	6615	23658	0	0	0
	150C1F1	11727	22380	80623	0	0	0
	150C1F2	11728	22321	80615	0	0	0
	150C1F3	11728	22246	80607	0	0	0
	380C2F1	0	0	0	23414	48340	-162999
	380C2F2	0	0	0	23421	47913	-162685
	380C2F3	0	0	0	23428	47381	-162329
	RTG	0	0	0	6943	13839	-47514
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2737	10870	28061	0	0	0
	150C1F1	10167	33918	91382	0	0	0
	150C1F2	10191	32566	88927	0	0	0
	150C1F3	10222	30885	85945	0	0	0
	380C2F1	0	0	0	20335	67836	-182764
	380C2F2	0	0	0	20382	65131	-177855
	380C2F3	0	0	0	20443	61769	-171890
	RTG	0	0	0	5536	17249	-47663

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2834	7092	22624	0	0	0
	150C1F1	10474	24994	82458	0	0	0
	150C1F2	10480	24697	82146	0	0	0
	150C1F3	10487	24330	81788	0	0	0
	380C2F1	0	0	0	20948	49989	-164916
	380C2F2	0	0	0	20960	49395	-164293
	380C2F3	0	0	0	20974	48660	-163576
	RTG	0	0	0	5677	13098	-43746
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4589	16717	42628	0	0	0
	150C1F1	11927	34514	98564	0	0	0
	150C1F2	11950	33449	96818	0	0	0
	150C1F3	11978	32133	94734	0	0	0
	380C2F1	0	0	0	23855	69027	-197127
	380C2F2	0	0	0	23900	66899	-193637
	380C2F3	0	0	0	23957	64267	-189469
	RTG	0	0	0	9290	26816	-73757
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3466	7548	24324	0	0	0
	150C1F1	11695	24906	82122	0	0	0
	150C1F2	11700	24625	81870	0	0	0
	150C1F3	11706	24276	81582	0	0	0
	380C2F1	0	0	0	23391	49812	-164244
	380C2F2	0	0	0	23400	49250	-163740
	380C2F3	0	0	0	23411	48553	-163164
	RTG	0	0	0	6938	14170	-47741
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2757	9522	25485	0	0	0
	150C1F1	10232	30371	85052	0	0	0
	150C1F2	10252	29342	83294	0	0	0
	150C1F3	10277	28068	81186	0	0	0
	380C2F1	0	0	0	20791	44249	-146283
	380C2F2	0	0	0	20799	43760	-145843
	380C2F3	0	0	0	20808	43152	-145339
	RTG	0	0	0	5640	11806	-39586
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2840	6791	22252	0	0	0
	150C1F1	10489	24218	81685	0	0	0
	150C1F2	10493	23994	81488	0	0	0
	150C1F3	10498	23716	81263	0	0	0
	380C2F1	0	0	0	21031	44721	-161101
	380C2F2	0	0	0	21032	44599	-161074
	380C2F3	0	0	0	21033	44447	-161047
	RTG	0	0	0	5693	11879	-42957
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4620	14747	39156	0	0	0
	150C1F1	11987	31733	94119	0	0	0
	150C1F2	12005	30931	92918	0	0	0
	150C1F3	12026	29943	91501	0	0	0
	380C2F1	0	0	0	24233	50632	-172757
	380C2F2	0	0	0	24239	50243	-172498
	380C2F3	0	0	0	24245	49759	-172205
	RTG	0	0	0	9449	18814	-63165
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3470	7274	24054	0	0	0
	150C1F1	11707	24170	81500	0	0	0
	150C1F2	11710	23956	81343	0	0	0
	150C1F3	11714	23691	81165	0	0	0
	380C2F1	0	0	0	23455	44761	-161246
	380C2F2	0	0	0	23456	44642	-161230
	380C2F3	0	0	0	23457	44492	-161213
	RTG	0	0	0	6950	13020	-47215
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2128	4338	15293	0	0	0
	150C1F1	7841	15770	56329	0	0	0
	150C1F2	7842	15716	56313	0	0	0
	150C1F3	7842	15648	56296	0	0	0
	380C2F1	0	0	0	15683	31540	-112657
	380C2F2	0	0	0	15684	31432	-112626
	380C2F3	0	0	0	15685	31296	-112592
	RTG	0	0	0	4251	8487	-30473
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2149	4655	17097	0	0	0
	150C1F1	7929	17369	64044	0	0	0
	150C1F2	7929	17354	64045	0	0	0
	150C1F3	7929	17335	64047	0	0	0
	380C2F1	0	0	0	15858	34737	-128089
	380C2F2	0	0	0	15858	34707	-128091
	380C2F3	0	0	0	15858	34669	-128094
	RTG	0	0	0	4289	9176	-33875

NL3/3	GW / opgw	4036	7757	27533	0	0	0
Wind, -5°C	150C1F1	9557	19436	70364	0	0	0
Permanent loads yg= 0.9	150C1F2	9557	19391	70358	0	0	0
Wind angle: 0°	150C1F3	9558	19335	70352	0	0	0
	380C2F1	0	0	0	19114	38871	-140728
	380C2F2	0	0	0	19115	38782	-140716
	380C2F3	0	0	0	19115	38670	-140704
	RTG	0	0	0	8075	15219	-54909
NL3/4	GW / opgw	2781	5310	19540	0	0	0
Construction/maintenance, +5°C	150C1F1	9153	17737	65416	0	0	0
Permanent loads yg= 0.9	150C1F2	9153	17722	65418	0	0	0
Wind angle: 0°	150C1F3	9153	17703	65420	0	0	0
	380C2F1	0	0	0	18307	35473	-130833
	380C2F2	0	0	0	18307	35443	-130836
	380C2F3	0	0	0	18307	35405	-130840
	RTG	0	0	0	5555	10552	-39010
NL3/1a	GW / opgw	2112	5258	16276	0	0	0
Wind, 10°C	150C1F1	7805	18162	58355	0	0	0
Permanent loads yg= 0.9	150C1F2	7811	17890	58031	0	0	0
Wind angle: 45°	150C1F3	7817	17553	57657	0	0	0
	380C2F1	0	0	0	15256	54897	-148299
	380C2F2	0	0	0	15294	52601	-143899
	380C2F3	0	0	0	15344	49746	-138533
	RTG	0	0	0	4153	13867	-38323
NL3/1b	GW / opgw	2147	4876	17168	0	0	0
Wind, -20°C	150C1F1	7925	17969	64162	0	0	0
Permanent loads yg= 0.9	150C1F2	7925	17905	64137	0	0	0
Wind angle: 45°	150C1F3	7926	17825	64109	0	0	0
	380C2F1	0	0	0	15779	40001	-131890
	380C2F2	0	0	0	15789	39499	-131299
	380C2F3	0	0	0	15802	38880	-130615
	RTG	0	0	0	4273	10392	-34654
NL3/3	GW / opgw	4015	9085	28615	0	0	0
Wind, -5°C	150C1F1	9533	21323	71479	0	0	0
Permanent loads yg= 0.9	150C1F2	9537	21113	71291	0	0	0
Wind angle: 45°	150C1F3	9541	20853	71076	0	0	0
	380C2F1	0	0	0	18766	56850	-163559
	380C2F2	0	0	0	18803	55070	-160494
	380C2F3	0	0	0	18851	52870	-156828
	RTG	0	0	0	7934	22809	-63968
NL3/4	GW / opgw	2779	5521	19573	0	0	0
Construction/maintenance, +5°C	150C1F1	9150	18322	65478	0	0	0
Permanent loads yg= 0.9	150C1F2	9151	18260	65461	0	0	0
Wind angle: 45°	150C1F3	9151	18183	65443	0	0	0
	380C2F1	0	0	0	18248	40464	-133611
	380C2F2	0	0	0	18256	40000	-133158
	380C2F3	0	0	0	18265	39425	-132638
	RTG	0	0	0	5544	11683	-39471
NL3/1a	GW / opgw	2036	10290	25900	0	0	0
Wind, 10°C	150C1F1	7571	31361	81845	0	0	0
Permanent loads yg= 0.9	150C1F2	7591	29877	78898	0	0	0
Wind angle: 90°	150C1F3	7619	28019	75256	0	0	0
	380C2F1	0	0	0	15142	62722	-163689
	380C2F2	0	0	0	15182	59754	-157796
	380C2F3	0	0	0	15238	56038	-150511
	RTG	0	0	0	4124	15702	-41894
NL3/1b	GW / opgw	2124	6003	18559	0	0	0
Wind, -20°C	150C1F1	7870	20875	67087	0	0	0
Permanent loads yg= 0.9	150C1F2	7877	20539	66630	0	0	0
Wind angle: 90°	150C1F3	7887	20126	66099	0	0	0
	380C2F1	0	0	0	15740	41750	-134173
	380C2F2	0	0	0	15755	41078	-133261
	380C2F3	0	0	0	15773	40252	-132198
	RTG	0	0	0	4265	10791	-35136
NL3/3	GW / opgw	3890	16165	40570	0	0	0
Wind, -5°C	150C1F1	9322	31501	87326	0	0	0
Permanent loads yg= 0.9	150C1F2	9344	30327	85170	0	0	0
Wind angle: 90°	150C1F3	9374	28870	82560	0	0	0
	380C2F1	0	0	0	18644	63002	-174651
	380C2F2	0	0	0	18689	60654	-170341
	380C2F3	0	0	0	18747	57740	-165120
	RTG	0	0	0	7885	25369	-68357

NL3/4	GW / opgw	2763	6523	20498	0	0	0
Construction/maintenance, +5°C	150C1F1	9109	21038	67689	0	0	0
Permanent loads yg= 0.9	150C1F2	9115	20729	67334	0	0	0
Wind angle: 90°	150C1F3	9122	20348	66924	0	0	0
	380C2F1	0	0	0	18218	42076	-135378
	380C2F2	0	0	0	18230	41459	-134669
	380C2F3	0	0	0	18244	40697	-133848
	RTG	0	0	0	5538	12039	-39789
NL3/1a	GW / opgw	2052	8836	22926	0	0	0
Wind, 10°C	150C1F1	7628	27448	74150	0	0	0
Permanent loads yg= 0.9	150C1F2	7647	26301	71949	0	0	0
Wind angle: -45°	150C1F3	7672	24873	69266	0	0	0
	380C2F1	0	0	0	15611	36325	-116711
	380C2F2	0	0	0	15621	35779	-116063
	380C2F3	0	0	0	15633	35106	-115313
	RTG	0	0	0	4236	9590	-31315
NL3/1b	GW / opgw	2132	5660	18032	0	0	0
Wind, -20°C	150C1F1	7889	20000	65945	0	0	0
Permanent loads yg= 0.9	150C1F2	7895	19750	65649	0	0	0
Wind angle: -45°	150C1F3	7901	19440	65307	0	0	0
	380C2F1	0	0	0	15849	35938	-128324
	380C2F2	0	0	0	15851	35810	-128273
	380C2F3	0	0	0	15852	35650	-128217
	RTG	0	0	0	4287	9457	-33917
NL3/3	GW / opgw	3918	14100	36743	0	0	0
Wind, -5°C	150C1F1	9383	28425	81780	0	0	0
Permanent loads yg= 0.9	150C1F2	9402	27535	80247	0	0	0
Wind angle: -45°	150C1F3	9425	26435	78414	0	0	0
	380C2F1	0	0	0	19066	42646	-142958
	380C2F2	0	0	0	19073	42226	-142583
	380C2F3	0	0	0	19081	41705	-142153
	RTG	0	0	0	8055	16836	-55784
NL3/4	GW / opgw	2769	6223	20135	0	0	0
Construction/maintenance, +5°C	150C1F1	9124	20232	66806	0	0	0
Permanent loads yg= 0.9	150C1F2	9128	20000	66579	0	0	0
Wind angle: -45°	150C1F3	9133	19712	66319	0	0	0
	380C2F1	0	0	0	18300	36644	-130955
	380C2F2	0	0	0	18301	36520	-130922
	380C2F3	0	0	0	18302	36366	-130886
	RTG	0	0	0	5553	10824	-39018

ZWW4HK450+5

Appendix BT1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2829	5483	-19564
	150C1F1	0	0	0	10423	19924	-71832
	150C1F2	0	0	0	10423	19873	-71825
	150C1F3	0	0	0	10423	19807	-71818
	380C2F1	20845	39849	143664	20845	39849	-143664
	380C2F2	20846	39745	143649	20846	39745	-143649
	380C2F3	20847	39615	143635	20847	39615	-143635
	RTG	5652	10784	39049	5652	10784	-39049
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2853	5873	-21643
	150C1F1	0	0	0	10519	21782	-80513
	150C1F2	0	0	0	10519	21767	-80515
	150C1F3	0	0	0	10519	21748	-80517
	380C2F1	21037	43563	161026	21037	43563	-161026
	380C2F2	21037	43533	161029	21037	43533	-161029
	380C2F3	21037	43496	161034	21037	43496	-161034
	RTG	5695	11607	42948	5695	11607	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4732	8773	-31324
	150C1F1	0	0	0	12135	23533	-85656
	150C1F2	0	0	0	12135	23490	-85654
	150C1F3	0	0	0	12136	23435	-85653
	380C2F1	24270	47066	171312	24270	47066	-171312
	380C2F2	24271	46980	171308	24271	46980	-171308
	380C2F3	24271	46871	171307	24271	46871	-171307
	RTG	9465	17256	62512	9465	17256	-62512
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3480	6410	-23646
	150C1F1	0	0	0	11730	21809	-80617
	150C1F2	0	0	0	11730	21795	-80619
	150C1F3	0	0	0	11730	21776	-80622
	380C2F1	23460	43619	161233	23460	43619	-161233
	380C2F2	23460	43589	161238	23460	43589	-161238
	380C2F3	23460	43552	161244	23460	43552	-161244
	RTG	6951	12753	47225	6951	12753	-47225
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2757	9522	-25485
	150C1F1	0	0	0	10232	30371	-85052
	150C1F2	0	0	0	10252	29342	-83294
	150C1F3	0	0	0	10277	28068	-81186
	380C2F1	20791	44249	146283	20463	60742	-170104
	380C2F2	20799	43760	145843	20503	58683	-166588
	380C2F3	20808	43152	145339	20554	56136	-162373
	RTG	5640	11806	39586	5567	15600	-44790
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2840	6791	-22252
	150C1F1	0	0	0	10489	24218	-81685
	150C1F2	0	0	0	10493	23994	-81488
	150C1F3	0	0	0	10498	23716	-81263
	380C2F1	21031	44721	161101	20979	48436	-163369
	380C2F2	21032	44599	161074	20987	47988	-162976
	380C2F3	21033	44447	161047	20996	47432	-162525
	RTG	5693	11879	42957	5683	12741	-43421
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4620	14747	-39156
	150C1F1	0	0	0	11987	31733	-94119
	150C1F2	0	0	0	12005	30931	-92918
	150C1F3	0	0	0	12026	29943	-91501
	380C2F1	24233	50632	172757	23974	63465	-188237
	380C2F2	24239	50243	172498	24009	61863	-185836
	380C2F3	24245	49759	172205	24053	59886	-183002
	RTG	9449	18814	63165	9338	24412	-69949
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3470	7274	-24054
	150C1F1	0	0	0	11707	24170	-81500
	150C1F2	0	0	0	11710	23956	-81343
	150C1F3	0	0	0	11714	23691	-81165
	380C2F1	23455	44761	161246	23414	48340	-162999
	380C2F2	23456	44642	161230	23421	47913	-162685
	380C2F3	23457	44492	161213	23428	47381	-162329
	RTG	6950	13020	47215	6943	13839	-47514
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2737	10870	-28061
	150C1F1	0	0	0	10167	33918	-91382
	150C1F2	0	0	0	10191	32566	-88927
	150C1F3	0	0	0	10222	30885	-85945
	380C2F1	20335	67836	182764	20335	67836	-182764
	380C2F2	20382	65131	177855	20382	65131	-177855
	380C2F3	20443	61769	171890	20443	61769	-171890
	RTG	5536	17249	47663	5536	17249	-47663

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2834	7092	-22624
	150C1F1	0	0	0	10474	24994	-82458
	150C1F2	0	0	0	10480	24697	-82146
	150C1F3	0	0	0	10487	24330	-81788
	380C2F1	20948	49989	164916	20948	49989	-164916
	380C2F2	20960	49395	164293	20960	49395	-164293
	380C2F3	20974	48660	163576	20974	48660	-163576
	RTG	5677	13098	43746	5677	13098	-43746
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	4589	16717	-42628
	150C1F1	0	0	0	11927	34514	-98564
	150C1F2	0	0	0	11950	33449	-96818
	150C1F3	0	0	0	11978	32133	-94734
	380C2F1	23855	69027	197127	23855	69027	-197127
	380C2F2	23900	66899	193637	23900	66899	-193637
	380C2F3	23957	64267	189469	23957	64267	-189469
	RTG	9290	26816	73757	9290	26816	-73757
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	3466	7548	-24324
	150C1F1	0	0	0	11695	24906	-82122
	150C1F2	0	0	0	11700	24625	-81870
	150C1F3	0	0	0	11706	24276	-81582
	380C2F1	23391	49812	164244	23391	49812	-164244
	380C2F2	23400	49250	163740	23400	49250	-163740
	380C2F3	23411	48553	163164	23411	48553	-163164
	RTG	6938	14170	47741	6938	14170	-47741
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2817	6317	-20228
	150C1F1	0	0	0	10395	22125	-73141
	150C1F2	0	0	0	10399	21880	-72921
	150C1F3	0	0	0	10404	21576	-72669
	380C2F1	20463	60742	170104	20791	44249	-146283
	380C2F2	20503	58683	166588	20799	43760	-145843
	380C2F3	20554	56136	162373	20808	43152	-145339
	RTG	5567	15600	44790	5640	11806	-39586
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	2851	6084	-21678
	150C1F1	0	0	0	10515	22360	-80550
	150C1F2	0	0	0	10516	22300	-80537
	150C1F3	0	0	0	10516	22223	-80524
	380C2F1	20979	48436	163369	21031	44721	-161101
	380C2F2	20987	47988	162976	21032	44599	-161074
	380C2F3	20996	47432	162525	21033	44447	-161047
	RTG	5683	12741	43421	5693	11879	-42957
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	4714	10037	-32168
	150C1F1	0	0	0	12117	25316	-86379
	150C1F2	0	0	0	12119	25121	-86249
	150C1F3	0	0	0	12123	24879	-86102
	380C2F1	23974	63465	188237	24233	50632	-172757
	380C2F2	24009	61863	185836	24239	50243	-172498
	380C2F3	24053	59886	183002	24245	49759	-172205
	RTG	9338	24412	69949	9449	18814	-63165
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	3479	6615	-23658
	150C1F1	0	0	0	11727	22380	-80623
	150C1F2	0	0	0	11728	22321	-80615
	150C1F3	0	0	0	11728	22246	-80607
	380C2F1	23414	48340	162999	23455	44761	-161246
	380C2F2	23421	47913	162685	23456	44642	-161230
	380C2F3	23428	47381	162329	23457	44492	-161213
	RTG	6943	13839	47514	6950	13020	-47215
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	2128	4338	-15293
	150C1F1	0	0	0	7841	15770	-56329
	150C1F2	0	0	0	7842	15716	-56313
	150C1F3	0	0	0	7842	15648	-56296
	380C2F1	15683	31540	112657	15683	31540	-112657
	380C2F2	15684	31432	112626	15684	31432	-112626
	380C2F3	15685	31296	112592	15685	31296	-112592
	RTG	4251	8487	30473	4251	8487	-30473
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	2149	4655	-17097
	150C1F1	0	0	0	7929	17369	-64044
	150C1F2	0	0	0	7929	17354	-64045
	150C1F3	0	0	0	7929	17335	-64047
	380C2F1	15858	34737	128089	15858	34737	-128089
	380C2F2	15858	34707	128091	15858	34707	-128091
	380C2F3	15858	34669	128094	15858	34669	-128094
	RTG	4289	9176	33875	4289	9176	-33875

NL3/3	GW / opgw	0	0	0	4036	7757	-27533
Wind, -5°C	150C1F1	0	0	0	9557	19436	-70364
Permanent loads yg= 0.9	150C1F2	0	0	0	9557	19391	-70358
Wind angle: 0°	150C1F3	0	0	0	9558	19335	-70352
	380C2F1	19114	38871	140728	19114	38871	-140728
	380C2F2	19115	38782	140716	19115	38782	-140716
	380C2F3	19115	38670	140704	19115	38670	-140704
	RTG	8075	15219	54909	8075	15219	-54909
NL3/4	GW / opgw	0	0	0	2781	5310	-19540
Construction/maintenance, +5°C	150C1F1	0	0	0	9153	17737	-65416
Permanent loads yg= 0.9	150C1F2	0	0	0	9153	17722	-65418
Wind angle: 0°	150C1F3	0	0	0	9153	17703	-65420
	380C2F1	18307	35473	130833	18307	35473	-130833
	380C2F2	18307	35443	130836	18307	35443	-130836
	380C2F3	18307	35405	130840	18307	35405	-130840
	RTG	5555	10552	39010	5555	10552	-39010
NL3/1a	GW / opgw	0	0	0	2052	8836	-22926
Wind, 10°C	150C1F1	0	0	0	7628	27448	-74150
Permanent loads yg= 0.9	150C1F2	0	0	0	7647	26301	-71949
Wind angle: 45°	150C1F3	0	0	0	7672	24873	-69266
	380C2F1	15611	36325	116711	15256	54897	-148299
	380C2F2	15621	35779	116063	15294	52601	-143899
	380C2F3	15633	35106	115313	15344	49746	-138533
	RTG	4236	9590	31315	4153	13867	-38323
NL3/1b	GW / opgw	0	0	0	2132	5660	-18032
Wind, -20°C	150C1F1	0	0	0	7889	20000	-65945
Permanent loads yg= 0.9	150C1F2	0	0	0	7895	19750	-65649
Wind angle: 45°	150C1F3	0	0	0	7901	19440	-65307
	380C2F1	15849	35938	128324	15779	40001	-131890
	380C2F2	15851	35810	128273	15789	39499	-131299
	380C2F3	15852	35650	128217	15802	38880	-130615
	RTG	4287	9457	33917	4273	10392	-34654
NL3/3	GW / opgw	0	0	0	3918	14100	-36743
Wind, -5°C	150C1F1	0	0	0	9383	28425	-81780
Permanent loads yg= 0.9	150C1F2	0	0	0	9402	27535	-80247
Wind angle: 45°	150C1F3	0	0	0	9425	26435	-78414
	380C2F1	19066	42646	142958	18766	56850	-163559
	380C2F2	19073	42226	142583	18803	55070	-160494
	380C2F3	19081	41705	142153	18851	52870	-156828
	RTG	8055	16836	55784	7934	22809	-63968
NL3/4	GW / opgw	0	0	0	2769	6223	-20135
Construction/maintenance, +5°C	150C1F1	0	0	0	9124	20232	-66806
Permanent loads yg= 0.9	150C1F2	0	0	0	9128	20000	-66579
Wind angle: 45°	150C1F3	0	0	0	9133	19712	-66319
	380C2F1	18300	36644	130955	18248	40464	-133611
	380C2F2	18301	36520	130922	18256	40000	-133158
	380C2F3	18302	36366	130886	18265	39425	-132638
	RTG	5553	10824	39018	5544	11683	-39471
NL3/1a	GW / opgw	0	0	0	2036	10290	-25900
Wind, 10°C	150C1F1	0	0	0	7571	31361	-81845
Permanent loads yg= 0.9	150C1F2	0	0	0	7591	29877	-78898
Wind angle: 90°	150C1F3	0	0	0	7619	28019	-75256
	380C2F1	15142	62722	163689	15142	62722	-163689
	380C2F2	15182	59754	157796	15182	59754	-157796
	380C2F3	15238	56038	150511	15238	56038	-150511
	RTG	4124	15702	41894	4124	15702	-41894
NL3/1b	GW / opgw	0	0	0	2124	6003	-18559
Wind, -20°C	150C1F1	0	0	0	7870	20875	-67087
Permanent loads yg= 0.9	150C1F2	0	0	0	7877	20539	-66630
Wind angle: 90°	150C1F3	0	0	0	7887	20126	-66099
	380C2F1	15740	41750	134173	15740	41750	-134173
	380C2F2	15755	41078	133261	15755	41078	-133261
	380C2F3	15773	40252	132198	15773	40252	-132198
	RTG	4265	10791	35136	4265	10791	-35136
NL3/3	GW / opgw	0	0	0	3890	16165	-40570
Wind, -5°C	150C1F1	0	0	0	9322	31501	-87326
Permanent loads yg= 0.9	150C1F2	0	0	0	9344	30327	-85170
Wind angle: 90°	150C1F3	0	0	0	9374	28870	-82560
	380C2F1	18644	63002	174651	18644	63002	-174651
	380C2F2	18689	60654	170341	18689	60654	-170341
	380C2F3	18747	57740	165120	18747	57740	-165120
	RTG	7885	25369	68357	7885	25369	-68357

NL3/4	GW / opgw	0	0	0	2763	6523	-20498
Construction/maintenance, +5°C	150C1F1	0	0	0	9109	21038	-67689
Permanent loads yg= 0.9	150C1F2	0	0	0	9115	20729	-67334
Wind angle: 90°	150C1F3	0	0	0	9122	20348	-66924
	380C2F1	18218	42076	135378	18218	42076	-135378
	380C2F2	18230	41459	134669	18230	41459	-134669
	380C2F3	18244	40697	133848	18244	40697	-133848
	RTG	5538	12039	39789	5538	12039	-39789
NL3/1a	GW / opgw	0	0	0	2112	5258	-16276
Wind, 10°C	150C1F1	0	0	0	7805	18162	-58355
Permanent loads yg= 0.9	150C1F2	0	0	0	7811	17890	-58031
Wind angle: -45°	150C1F3	0	0	0	7817	17553	-57657
	380C2F1	15256	54897	148299	15611	36325	-116711
	380C2F2	15294	52601	143899	15621	35779	-116063
	380C2F3	15344	49746	138533	15633	35106	-115313
	RTG	4153	13867	38323	4236	9590	-31315
NL3/1b	GW / opgw	0	0	0	2147	4876	-17168
Wind, -20°C	150C1F1	0	0	0	7925	17969	-64162
Permanent loads yg= 0.9	150C1F2	0	0	0	7925	17905	-64137
Wind angle: -45°	150C1F3	0	0	0	7926	17825	-64109
	380C2F1	15779	40001	131890	15849	35938	-128324
	380C2F2	15789	39499	131299	15851	35810	-128273
	380C2F3	15802	38880	130615	15852	35650	-128217
	RTG	4273	10392	34654	4287	9457	-33917
NL3/3	GW / opgw	0	0	0	4015	9085	-28615
Wind, -5°C	150C1F1	0	0	0	9533	21323	-71479
Permanent loads yg= 0.9	150C1F2	0	0	0	9537	21113	-71291
Wind angle: -45°	150C1F3	0	0	0	9541	20853	-71076
	380C2F1	18766	56850	163559	19066	42646	-142958
	380C2F2	18803	55070	160494	19073	42226	-142583
	380C2F3	18851	52870	156828	19081	41705	-142153
	RTG	7934	22809	63968	8055	16836	-55784
NL3/4	GW / opgw	0	0	0	2779	5521	-19573
Construction/maintenance, +5°C	150C1F1	0	0	0	9150	18322	-65478
Permanent loads yg= 0.9	150C1F2	0	0	0	9151	18260	-65461
Wind angle: -45°	150C1F3	0	0	0	9151	18183	-65443
	380C2F1	18248	40464	133611	18300	36644	-130955
	380C2F2	18256	40000	133158	18301	36520	-130922
	380C2F3	18265	39425	132638	18302	36366	-130886
	RTG	5544	11683	39471	5553	10824	-39018

ZWW4HK450+5

Appendix BT1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2829	5483	19564	2829	5483	-19564
	150C1F1	10423	19924	71832	10423	19924	-71832
	150C1F2	10423	19873	71825	10423	19873	-71825
	150C1F3	10423	19807	71818	10423	19807	-71818
	380C2F1	0	0	0	20845	39849	-143664
	380C2F2	0	0	0	20846	39745	-143649
	380C2F3	0	0	0	20847	39615	-143635
	RTG	0	0	0	5652	10784	-39049
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2853	5873	21643	2853	5873	-21643
	150C1F1	10519	21782	80513	10519	21782	-80513
	150C1F2	10519	21767	80515	10519	21767	-80515
	150C1F3	10519	21748	80517	10519	21748	-80517
	380C2F1	0	0	0	21037	43563	-161026
	380C2F2	0	0	0	21037	43533	-161029
	380C2F3	0	0	0	21037	43496	-161034
	RTG	0	0	0	5695	11607	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4732	8773	31324	4732	8773	-31324
	150C1F1	12135	23533	85656	12135	23533	-85656
	150C1F2	12135	23490	85654	12135	23490	-85654
	150C1F3	12136	23435	85653	12136	23435	-85653
	380C2F1	0	0	0	24270	47066	-171312
	380C2F2	0	0	0	24271	46980	-171308
	380C2F3	0	0	0	24271	46871	-171307
	RTG	0	0	0	9465	17256	-62512
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3480	6410	23646	3480	6410	-23646
	150C1F1	11730	21809	80617	11730	21809	-80617
	150C1F2	11730	21795	80619	11730	21795	-80619
	150C1F3	11730	21776	80622	11730	21776	-80622
	380C2F1	0	0	0	23460	43619	-161233
	380C2F2	0	0	0	23460	43589	-161238
	380C2F3	0	0	0	23460	43552	-161244
	RTG	0	0	0	6951	12753	-47225
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2817	6317	20228	2757	9522	-25485
	150C1F1	10395	22125	73141	10232	30371	-85052
	150C1F2	10399	21880	72921	10252	29342	-83294
	150C1F3	10404	21576	72669	10277	28068	-81186
	380C2F1	0	0	0	20463	60742	-170104
	380C2F2	0	0	0	20503	58683	-166588
	380C2F3	0	0	0	20554	56136	-162373
	RTG	0	0	0	5567	15600	-44790
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2851	6084	21678	2840	6791	-22252
	150C1F1	10515	22360	80550	10489	24218	-81685
	150C1F2	10516	22300	80537	10493	23994	-81488
	150C1F3	10516	22223	80524	10498	23716	-81263
	380C2F1	0	0	0	20979	48436	-163369
	380C2F2	0	0	0	20987	47988	-162976
	380C2F3	0	0	0	20996	47432	-162525
	RTG	0	0	0	5683	12741	-43421
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4714	10037	32168	4620	14747	-39156
	150C1F1	12117	25316	86379	11987	31733	-94119
	150C1F2	12119	25121	86249	12005	30931	-92918
	150C1F3	12123	24879	86102	12026	29943	-91501
	380C2F1	0	0	0	23974	63465	-188237
	380C2F2	0	0	0	24009	61863	-185836
	380C2F3	0	0	0	24053	59886	-183002
	RTG	0	0	0	9338	24412	-69949
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3479	6615	23658	3470	7274	-24054
	150C1F1	11727	22380	80623	11707	24170	-81500
	150C1F2	11728	22321	80615	11710	23956	-81343
	150C1F3	11728	22246	80607	11714	23691	-81165
	380C2F1	0	0	0	23414	48340	-162999
	380C2F2	0	0	0	23421	47913	-162685
	380C2F3	0	0	0	23428	47381	-162329
	RTG	0	0	0	6943	13839	-47514
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2737	10870	28061	2737	10870	-28061
	150C1F1	10167	33918	91382	10167	33918	-91382
	150C1F2	10191	32566	88927	10191	32566	-88927
	150C1F3	10222	30885	85945	10222	30885	-85945
	380C2F1	0	0	0	20335	67836	-182764
	380C2F2	0	0	0	20382	65131	-177855
	380C2F3	0	0	0	20443	61769	-171890
	RTG	0	0	0	5536	17249	-47663

NL3/1b	GW / opgw	2834	7092	22624	2834	7092	-22624
Wind, -20°C	150C1F1	10474	24994	82458	10474	24994	-82458
Permanent loads yg= 1.2	150C1F2	10480	24697	82146	10480	24697	-82146
Wind angle: 90°	150C1F3	10487	24330	81788	10487	24330	-81788
	380C2F1	0	0	0	20948	49989	-164916
	380C2F2	0	0	0	20960	49395	-164293
	380C2F3	0	0	0	20974	48660	-163576
	RTG	0	0	0	5677	13098	-43746
NL3/3	GW / opgw	4589	16717	42628	4589	16717	-42628
Wind, -5°C	150C1F1	11927	34514	98564	11927	34514	-98564
Permanent loads yg= 1.2	150C1F2	11950	33449	96818	11950	33449	-96818
Wind angle: 90°	150C1F3	11978	32133	94734	11978	32133	-94734
	380C2F1	0	0	0	23855	69027	-197127
	380C2F2	0	0	0	23900	66899	-193637
	380C2F3	0	0	0	23957	64267	-189469
	RTG	0	0	0	9290	26816	-73757
NL3/4	GW / opgw	3466	7548	24324	3466	7548	-24324
Construction/maintenance, +5°C	150C1F1	11695	24906	82122	11695	24906	-82122
Permanent loads yg= 1.2	150C1F2	11700	24625	81870	11700	24625	-81870
Wind angle: 90°	150C1F3	11706	24276	81582	11706	24276	-81582
	380C2F1	0	0	0	23391	49812	-164244
	380C2F2	0	0	0	23400	49250	-163740
	380C2F3	0	0	0	23411	48553	-163164
	RTG	0	0	0	6938	14170	-47741
NL3/1a	GW / opgw	2757	9522	25485	2817	6317	-20228
Wind, 10°C	150C1F1	10232	30371	85052	10395	22125	-73141
Permanent loads yg= 1.2	150C1F2	10252	29342	83294	10399	21880	-72921
Wind angle: -45°	150C1F3	10277	28068	81186	10404	21576	-72669
	380C2F1	0	0	0	20791	44249	-146283
	380C2F2	0	0	0	20799	43760	-145843
	380C2F3	0	0	0	20808	43152	-145339
	RTG	0	0	0	5640	11806	-39586
NL3/1b	GW / opgw	2840	6791	22252	2851	6084	-21678
Wind, -20°C	150C1F1	10489	24218	81685	10515	22360	-80550
Permanent loads yg= 1.2	150C1F2	10493	23994	81488	10516	22300	-80537
Wind angle: -45°	150C1F3	10498	23716	81263	10516	22223	-80524
	380C2F1	0	0	0	21031	44721	-161101
	380C2F2	0	0	0	21032	44599	-161074
	380C2F3	0	0	0	21033	44447	-161047
	RTG	0	0	0	5693	11879	-42957
NL3/3	GW / opgw	4620	14747	39156	4714	10037	-32168
Wind, -5°C	150C1F1	11987	31733	94119	12117	25316	-86379
Permanent loads yg= 1.2	150C1F2	12005	30931	92918	12119	25121	-86249
Wind angle: -45°	150C1F3	12026	29943	91501	12123	24879	-86102
	380C2F1	0	0	0	24233	50632	-172757
	380C2F2	0	0	0	24239	50243	-172498
	380C2F3	0	0	0	24245	49759	-172205
	RTG	0	0	0	9449	18814	-63165
NL3/4	GW / opgw	3470	7274	24054	3479	6615	-23658
Construction/maintenance, +5°C	150C1F1	11707	24170	81500	11727	22380	-80623
Permanent loads yg= 1.2	150C1F2	11710	23956	81343	11728	22321	-80615
Wind angle: -45°	150C1F3	11714	23691	81165	11728	22246	-80607
	380C2F1	0	0	0	23455	44761	-161246
	380C2F2	0	0	0	23456	44642	-161230
	380C2F3	0	0	0	23457	44492	-161213
	RTG	0	0	0	6950	13020	-47215
NL3/1a	GW / opgw	2128	4338	15293	2128	4338	-15293
Wind, 10°C	150C1F1	7841	15770	56329	7841	15770	-56329
Permanent loads yg= 0.9	150C1F2	7842	15716	56313	7842	15716	-56313
Wind angle: 0°	150C1F3	7842	15648	56296	7842	15648	-56296
	380C2F1	0	0	0	15683	31540	-112657
	380C2F2	0	0	0	15684	31432	-112626
	380C2F3	0	0	0	15685	31296	-112592
	RTG	0	0	0	4251	8487	-30473
NL3/1b	GW / opgw	2149	4655	17097	2149	4655	-17097
Wind, -20°C	150C1F1	7929	17369	64044	7929	17369	-64044
Permanent loads yg= 0.9	150C1F2	7929	17354	64045	7929	17354	-64045
Wind angle: 0°	150C1F3	7929	17335	64047	7929	17335	-64047
	380C2F1	0	0	0	15858	34737	-128089
	380C2F2	0	0	0	15858	34707	-128091
	380C2F3	0	0	0	15858	34669	-128094
	RTG	0	0	0	4289	9176	-33875

NL3/3	GW / opgw	4036	7757	27533	4036	7757	-27533
Wind, -5°C	150C1F1	9557	19436	70364	9557	19436	-70364
Permanent loads yg= 0.9	150C1F2	9557	19391	70358	9557	19391	-70358
Wind angle: 0°	150C1F3	9558	19335	70352	9558	19335	-70352
	380C2F1	0	0	0	19114	38871	-140728
	380C2F2	0	0	0	19115	38782	-140716
	380C2F3	0	0	0	19115	38670	-140704
	RTG	0	0	0	8075	15219	-54909
NL3/4	GW / opgw	2781	5310	19540	2781	5310	-19540
Construction/maintenance, +5°C	150C1F1	9153	17737	65416	9153	17737	-65416
Permanent loads yg= 0.9	150C1F2	9153	17722	65418	9153	17722	-65418
Wind angle: 0°	150C1F3	9153	17703	65420	9153	17703	-65420
	380C2F1	0	0	0	18307	35473	-130833
	380C2F2	0	0	0	18307	35443	-130836
	380C2F3	0	0	0	18307	35405	-130840
	RTG	0	0	0	5555	10552	-39010
NL3/1a	GW / opgw	2112	5258	16276	2052	8836	-22926
Wind, 10°C	150C1F1	7805	18162	58355	7628	27448	-74150
Permanent loads yg= 0.9	150C1F2	7811	17890	58031	7647	26301	-71949
Wind angle: 45°	150C1F3	7817	17553	57657	7672	24873	-69266
	380C2F1	0	0	0	15256	54897	-148299
	380C2F2	0	0	0	15294	52601	-143899
	380C2F3	0	0	0	15344	49746	-138533
	RTG	0	0	0	4153	13867	-38323
NL3/1b	GW / opgw	2147	4876	17168	2132	5660	-18032
Wind, -20°C	150C1F1	7925	17969	64162	7889	20000	-65945
Permanent loads yg= 0.9	150C1F2	7925	17905	64137	7895	19750	-65649
Wind angle: 45°	150C1F3	7926	17825	64109	7901	19440	-65307
	380C2F1	0	0	0	15779	40001	-131890
	380C2F2	0	0	0	15789	39499	-131299
	380C2F3	0	0	0	15802	38880	-130615
	RTG	0	0	0	4273	10392	-34654
NL3/3	GW / opgw	4015	9085	28615	3918	14100	-36743
Wind, -5°C	150C1F1	9533	21323	71479	9383	28425	-81780
Permanent loads yg= 0.9	150C1F2	9537	21113	71291	9402	27535	-80247
Wind angle: 45°	150C1F3	9541	20853	71076	9425	26435	-78414
	380C2F1	0	0	0	18766	56850	-163559
	380C2F2	0	0	0	18803	55070	-160494
	380C2F3	0	0	0	18851	52870	-156828
	RTG	0	0	0	7934	22809	-63968
NL3/4	GW / opgw	2779	5521	19573	2769	6223	-20135
Construction/maintenance, +5°C	150C1F1	9150	18322	65478	9124	20232	-66806
Permanent loads yg= 0.9	150C1F2	9151	18260	65461	9128	20000	-66579
Wind angle: 45°	150C1F3	9151	18183	65443	9133	19712	-66319
	380C2F1	0	0	0	18248	40464	-133611
	380C2F2	0	0	0	18256	40000	-133158
	380C2F3	0	0	0	18265	39425	-132638
	RTG	0	0	0	5544	11683	-39471
NL3/1a	GW / opgw	2036	10290	25900	2036	10290	-25900
Wind, 10°C	150C1F1	7571	31361	81845	7571	31361	-81845
Permanent loads yg= 0.9	150C1F2	7591	29877	78898	7591	29877	-78898
Wind angle: 90°	150C1F3	7619	28019	75256	7619	28019	-75256
	380C2F1	0	0	0	15142	62722	-163689
	380C2F2	0	0	0	15182	59754	-157796
	380C2F3	0	0	0	15238	56038	-150511
	RTG	0	0	0	4124	15702	-41894
NL3/1b	GW / opgw	2124	6003	18559	2124	6003	-18559
Wind, -20°C	150C1F1	7870	20875	67087	7870	20875	-67087
Permanent loads yg= 0.9	150C1F2	7877	20539	66630	7877	20539	-66630
Wind angle: 90°	150C1F3	7887	20126	66099	7887	20126	-66099
	380C2F1	0	0	0	15740	41750	-134173
	380C2F2	0	0	0	15755	41078	-133261
	380C2F3	0	0	0	15773	40252	-132198
	RTG	0	0	0	4265	10791	-35136
NL3/3	GW / opgw	3890	16165	40570	3890	16165	-40570
Wind, -5°C	150C1F1	9322	31501	87326	9322	31501	-87326
Permanent loads yg= 0.9	150C1F2	9344	30327	85170	9344	30327	-85170
Wind angle: 90°	150C1F3	9374	28870	82560	9374	28870	-82560
	380C2F1	0	0	0	18644	63002	-174651
	380C2F2	0	0	0	18689	60654	-170341
	380C2F3	0	0	0	18747	57740	-165120
	RTG	0	0	0	7885	25369	-68357

NL3/4	GW / opgw	2763	6523	20498	2763	6523	-20498
Construction/maintenance, +5°C	150C1F1	9109	21038	67689	9109	21038	-67689
Permanent loads yg= 0.9	150C1F2	9115	20729	67334	9115	20729	-67334
Wind angle: 90°	150C1F3	9122	20348	66924	9122	20348	-66924
	380C2F1	0	0	0	18218	42076	-135378
	380C2F2	0	0	0	18230	41459	-134669
	380C2F3	0	0	0	18244	40697	-133848
	RTG	0	0	0	5538	12039	-39789
NL3/1a	GW / opgw	2052	8836	22926	2112	5258	-16276
Wind, 10°C	150C1F1	7628	27448	74150	7805	18162	-58355
Permanent loads yg= 0.9	150C1F2	7647	26301	71949	7811	17890	-58031
Wind angle: -45°	150C1F3	7672	24873	69266	7817	17553	-57657
	380C2F1	0	0	0	15611	36325	-116711
	380C2F2	0	0	0	15621	35779	-116063
	380C2F3	0	0	0	15633	35106	-115313
	RTG	0	0	0	4236	9590	-31315
NL3/1b	GW / opgw	2132	5660	18032	2147	4876	-17168
Wind, -20°C	150C1F1	7889	20000	65945	7925	17969	-64162
Permanent loads yg= 0.9	150C1F2	7895	19750	65649	7925	17905	-64137
Wind angle: -45°	150C1F3	7901	19440	65307	7926	17825	-64109
	380C2F1	0	0	0	15849	35938	-128324
	380C2F2	0	0	0	15851	35810	-128273
	380C2F3	0	0	0	15852	35650	-128217
	RTG	0	0	0	4287	9457	-33917
NL3/3	GW / opgw	3918	14100	36743	4015	9085	-28615
Wind, -5°C	150C1F1	9383	28425	81780	9533	21323	-71479
Permanent loads yg= 0.9	150C1F2	9402	27535	80247	9537	21113	-71291
Wind angle: -45°	150C1F3	9425	26435	78414	9541	20853	-71076
	380C2F1	0	0	0	19066	42646	-142958
	380C2F2	0	0	0	19073	42226	-142583
	380C2F3	0	0	0	19081	41705	-142153
	RTG	0	0	0	8055	16836	-55784
NL3/4	GW / opgw	2769	6223	20135	2779	5521	-19573
Construction/maintenance, +5°C	150C1F1	9124	20232	66806	9150	18322	-65478
Permanent loads yg= 0.9	150C1F2	9128	20000	66579	9151	18260	-65461
Wind angle: -45°	150C1F3	9133	19712	66319	9151	18183	-65443
	380C2F1	0	0	0	18300	36644	-130955
	380C2F2	0	0	0	18301	36520	-130922
	380C2F3	0	0	0	18302	36366	-130886
	RTG	0	0	0	5553	10824	-39018

ZWW4HK450+5

Appendix BT1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2829	5483	19564	0	0	0
	150C1F1	10423	19924	71832	0	0	0
	150C1F2	10423	19873	71825	0	0	0
	150C1F3	10423	19807	71818	0	0	0
	380C2F1	20845	39849	143664	20845	39849	-143664
	380C2F2	20846	39745	143649	20846	39745	-143649
	380C2F3	20847	39615	143635	20847	39615	-143635
	RTG	0	0	0	5652	10784	-39049
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2853	5873	21643	0	0	0
	150C1F1	10519	21782	80513	0	0	0
	150C1F2	10519	21767	80515	0	0	0
	150C1F3	10519	21748	80517	0	0	0
	380C2F1	21037	43563	161026	21037	43563	-161026
	380C2F2	21037	43533	161029	21037	43533	-161029
	380C2F3	21037	43496	161034	21037	43496	-161034
	RTG	0	0	0	5695	11607	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4732	8773	31324	0	0	0
	150C1F1	12135	23533	85656	0	0	0
	150C1F2	12135	23490	85654	0	0	0
	150C1F3	12136	23435	85653	0	0	0
	380C2F1	24270	47066	171312	24270	47066	-171312
	380C2F2	24271	46980	171308	24271	46980	-171308
	380C2F3	24271	46871	171307	24271	46871	-171307
	RTG	0	0	0	9465	17256	-62512
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3480	6410	23646	0	0	0
	150C1F1	11730	21809	80617	0	0	0
	150C1F2	11730	21795	80619	0	0	0
	150C1F3	11730	21776	80622	0	0	0
	380C2F1	23460	43619	161233	23460	43619	-161233
	380C2F2	23460	43589	161238	23460	43589	-161238
	380C2F3	23460	43552	161244	23460	43552	-161244
	RTG	0	0	0	6951	12753	-47225
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2817	6317	20228	0	0	0
	150C1F1	10395	22125	73141	0	0	0
	150C1F2	10399	21880	72921	0	0	0
	150C1F3	10404	21576	72669	0	0	0
	380C2F1	20791	44249	146283	20463	60742	-170104
	380C2F2	20799	43760	145843	20503	58683	-166588
	380C2F3	20808	43152	145339	20554	56136	-162373
	RTG	0	0	0	5567	15600	-44790
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2851	6084	21678	0	0	0
	150C1F1	10515	22360	80550	0	0	0
	150C1F2	10516	22300	80537	0	0	0
	150C1F3	10516	22223	80524	0	0	0
	380C2F1	21031	44721	161101	20979	48436	-163369
	380C2F2	21032	44599	161074	20987	47988	-162976
	380C2F3	21033	44447	161047	20996	47432	-162525
	RTG	0	0	0	5683	12741	-43421
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4714	10037	32168	0	0	0
	150C1F1	12117	25316	86379	0	0	0
	150C1F2	12119	25121	86249	0	0	0
	150C1F3	12123	24879	86102	0	0	0
	380C2F1	24233	50632	172757	23974	63465	-188237
	380C2F2	24239	50243	172498	24009	61863	-185836
	380C2F3	24245	49759	172205	24053	59886	-183002
	RTG	0	0	0	9338	24412	-69949
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3479	6615	23658	0	0	0
	150C1F1	11727	22380	80623	0	0	0
	150C1F2	11728	22321	80615	0	0	0
	150C1F3	11728	22246	80607	0	0	0
	380C2F1	23455	44761	161246	23414	48340	-162999
	380C2F2	23456	44642	161230	23421	47913	-162685
	380C2F3	23457	44492	161213	23428	47381	-162329
	RTG	0	0	0	6943	13839	-47514
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2737	10870	28061	0	0	0
	150C1F1	10167	33918	91382	0	0	0
	150C1F2	10191	32566	88927	0	0	0
	150C1F3	10222	30885	85945	0	0	0
	380C2F1	20335	67836	182764	20335	67836	-182764
	380C2F2	20382	65131	177855	20382	65131	-177855
	380C2F3	20443	61769	171890	20443	61769	-171890
	RTG	0	0	0	5536	17249	-47663

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2834	7092	22624	0	0	0
	150C1F1	10474	24994	82458	0	0	0
	150C1F2	10480	24697	82146	0	0	0
	150C1F3	10487	24330	81788	0	0	0
	380C2F1	20948	49989	164916	20948	49989	-164916
	380C2F2	20960	49395	164293	20960	49395	-164293
	380C2F3	20974	48660	163576	20974	48660	-163576
	RTG	0	0	0	5677	13098	-43746
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4589	16717	42628	0	0	0
	150C1F1	11927	34514	98564	0	0	0
	150C1F2	11950	33449	96818	0	0	0
	150C1F3	11978	32133	94734	0	0	0
	380C2F1	23855	69027	197127	23855	69027	-197127
	380C2F2	23900	66899	193637	23900	66899	-193637
	380C2F3	23957	64267	189469	23957	64267	-189469
	RTG	0	0	0	9290	26816	-73757
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3466	7548	24324	0	0	0
	150C1F1	11695	24906	82122	0	0	0
	150C1F2	11700	24625	81870	0	0	0
	150C1F3	11706	24276	81582	0	0	0
	380C2F1	23391	49812	164244	23391	49812	-164244
	380C2F2	23400	49250	163740	23400	49250	-163740
	380C2F3	23411	48553	163164	23411	48553	-163164
	RTG	0	0	0	6938	14170	-47741
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2757	9522	25485	0	0	0
	150C1F1	10232	30371	85052	0	0	0
	150C1F2	10252	29342	83294	0	0	0
	150C1F3	10277	28068	81186	0	0	0
	380C2F1	20463	60742	170104	20791	44249	-146283
	380C2F2	20503	58683	166588	20799	43760	-145843
	380C2F3	20554	56136	162373	20808	43152	-145339
	RTG	0	0	0	5640	11806	-39586
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2840	6791	22252	0	0	0
	150C1F1	10489	24218	81685	0	0	0
	150C1F2	10493	23994	81488	0	0	0
	150C1F3	10498	23716	81263	0	0	0
	380C2F1	20979	48436	163369	21031	44721	-161101
	380C2F2	20987	47988	162976	21032	44599	-161074
	380C2F3	20996	47432	162525	21033	44447	-161047
	RTG	0	0	0	5693	11879	-42957
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4620	14747	39156	0	0	0
	150C1F1	11987	31733	94119	0	0	0
	150C1F2	12005	30931	92918	0	0	0
	150C1F3	12026	29943	91501	0	0	0
	380C2F1	23974	63465	188237	24233	50632	-172757
	380C2F2	24009	61863	185836	24239	50243	-172498
	380C2F3	24053	59886	183002	24245	49759	-172205
	RTG	0	0	0	9449	18814	-63165
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3470	7274	24054	0	0	0
	150C1F1	11707	24170	81500	0	0	0
	150C1F2	11710	23956	81343	0	0	0
	150C1F3	11714	23691	81165	0	0	0
	380C2F1	23414	48340	162999	23455	44761	-161246
	380C2F2	23421	47913	162685	23456	44642	-161230
	380C2F3	23428	47381	162329	23457	44492	-161213
	RTG	0	0	0	6950	13020	-47215
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2128	4338	15293	0	0	0
	150C1F1	7841	15770	56329	0	0	0
	150C1F2	7842	15716	56313	0	0	0
	150C1F3	7842	15648	56296	0	0	0
	380C2F1	15683	31540	112657	15683	31540	-112657
	380C2F2	15684	31432	112626	15684	31432	-112626
	380C2F3	15685	31296	112592	15685	31296	-112592
	RTG	0	0	0	4251	8487	-30473
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2149	4655	17097	0	0	0
	150C1F1	7929	17369	64044	0	0	0
	150C1F2	7929	17354	64045	0	0	0
	150C1F3	7929	17335	64047	0	0	0
	380C2F1	15858	34737	128089	15858	34737	-128089
	380C2F2	15858	34707	128091	15858	34707	-128091
	380C2F3	15858	34669	128094	15858	34669	-128094
	RTG	0	0	0	4289	9176	-33875

NL3/3	GW / opgw	4036	7757	27533	0	0	0
Wind, -5°C	150C1F1	9557	19436	70364	0	0	0
Permanent loads yg= 0.9	150C1F2	9557	19391	70358	0	0	0
Wind angle: 0°	150C1F3	9558	19335	70352	0	0	0
	380C2F1	19114	38871	140728	19114	38871	-140728
	380C2F2	19115	38782	140716	19115	38782	-140716
	380C2F3	19115	38670	140704	19115	38670	-140704
	RTG	0	0	0	8075	15219	-54909
NL3/4	GW / opgw	2781	5310	19540	0	0	0
Construction/maintenance, +5°C	150C1F1	9153	17737	65416	0	0	0
Permanent loads yg= 0.9	150C1F2	9153	17722	65418	0	0	0
Wind angle: 0°	150C1F3	9153	17703	65420	0	0	0
	380C2F1	18307	35473	130833	18307	35473	-130833
	380C2F2	18307	35443	130836	18307	35443	-130836
	380C2F3	18307	35405	130840	18307	35405	-130840
	RTG	0	0	0	5555	10552	-39010
NL3/1a	GW / opgw	2112	5258	16276	0	0	0
Wind, 10°C	150C1F1	7805	18162	58355	0	0	0
Permanent loads yg= 0.9	150C1F2	7811	17890	58031	0	0	0
Wind angle: 45°	150C1F3	7817	17553	57657	0	0	0
	380C2F1	15611	36325	116711	15256	54897	-148299
	380C2F2	15621	35779	116063	15294	52601	-143899
	380C2F3	15633	35106	115313	15344	49746	-138533
	RTG	0	0	0	4153	13867	-38323
NL3/1b	GW / opgw	2147	4876	17168	0	0	0
Wind, -20°C	150C1F1	7925	17969	64162	0	0	0
Permanent loads yg= 0.9	150C1F2	7925	17905	64137	0	0	0
Wind angle: 45°	150C1F3	7926	17825	64109	0	0	0
	380C2F1	15849	35938	128324	15779	40001	-131890
	380C2F2	15851	35810	128273	15789	39499	-131299
	380C2F3	15852	35650	128217	15802	38880	-130615
	RTG	0	0	0	4273	10392	-34654
NL3/3	GW / opgw	4015	9085	28615	0	0	0
Wind, -5°C	150C1F1	9533	21323	71479	0	0	0
Permanent loads yg= 0.9	150C1F2	9537	21113	71291	0	0	0
Wind angle: 45°	150C1F3	9541	20853	71076	0	0	0
	380C2F1	19066	42646	142958	18766	56850	-163559
	380C2F2	19073	42226	142583	18803	55070	-160494
	380C2F3	19081	41705	142153	18851	52870	-156828
	RTG	0	0	0	7934	22809	-63968
NL3/4	GW / opgw	2779	5521	19573	0	0	0
Construction/maintenance, +5°C	150C1F1	9150	18322	65478	0	0	0
Permanent loads yg= 0.9	150C1F2	9151	18260	65461	0	0	0
Wind angle: 45°	150C1F3	9151	18183	65443	0	0	0
	380C2F1	18300	36644	130955	18248	40464	-133611
	380C2F2	18301	36520	130922	18256	40000	-133158
	380C2F3	18302	36366	130886	18265	39425	-132638
	RTG	0	0	0	5544	11683	-39471
NL3/1a	GW / opgw	2036	10290	25900	0	0	0
Wind, 10°C	150C1F1	7571	31361	81845	0	0	0
Permanent loads yg= 0.9	150C1F2	7591	29877	78898	0	0	0
Wind angle: 90°	150C1F3	7619	28019	75256	0	0	0
	380C2F1	15142	62722	163689	15142	62722	-163689
	380C2F2	15182	59754	157796	15182	59754	-157796
	380C2F3	15238	56038	150511	15238	56038	-150511
	RTG	0	0	0	4124	15702	-41894
NL3/1b	GW / opgw	2124	6003	18559	0	0	0
Wind, -20°C	150C1F1	7870	20875	67087	0	0	0
Permanent loads yg= 0.9	150C1F2	7877	20539	66630	0	0	0
Wind angle: 90°	150C1F3	7887	20126	66099	0	0	0
	380C2F1	15740	41750	134173	15740	41750	-134173
	380C2F2	15755	41078	133261	15755	41078	-133261
	380C2F3	15773	40252	132198	15773	40252	-132198
	RTG	0	0	0	4265	10791	-35136
NL3/3	GW / opgw	3890	16165	40570	0	0	0
Wind, -5°C	150C1F1	9322	31501	87326	0	0	0
Permanent loads yg= 0.9	150C1F2	9344	30327	85170	0	0	0
Wind angle: 90°	150C1F3	9374	28870	82560	0	0	0
	380C2F1	18644	63002	174651	18644	63002	-174651
	380C2F2	18689	60654	170341	18689	60654	-170341
	380C2F3	18747	57740	165120	18747	57740	-165120
	RTG	0	0	0	7885	25369	-68357

NL3/4	GW / opgw	2763	6523	20498	0	0	0
Construction/maintenance, +5°C	150C1F1	9109	21038	67689	0	0	0
Permanent loads yg= 0.9	150C1F2	9115	20729	67334	0	0	0
Wind angle: 90°	150C1F3	9122	20348	66924	0	0	0
	380C2F1	18218	42076	135378	18218	42076	-135378
	380C2F2	18230	41459	134669	18230	41459	-134669
	380C2F3	18244	40697	133848	18244	40697	-133848
	RTG	0	0	0	5538	12039	-39789
NL3/1a	GW / opgw	2052	8836	22926	0	0	0
Wind, 10°C	150C1F1	7628	27448	74150	0	0	0
Permanent loads yg= 0.9	150C1F2	7647	26301	71949	0	0	0
Wind angle: -45°	150C1F3	7672	24873	69266	0	0	0
	380C2F1	15256	54897	148299	15611	36325	-116711
	380C2F2	15294	52601	143899	15621	35779	-116063
	380C2F3	15344	49746	138533	15633	35106	-115313
	RTG	0	0	0	4236	9590	-31315
NL3/1b	GW / opgw	2132	5660	18032	0	0	0
Wind, -20°C	150C1F1	7889	20000	65945	0	0	0
Permanent loads yg= 0.9	150C1F2	7895	19750	65649	0	0	0
Wind angle: -45°	150C1F3	7901	19440	65307	0	0	0
	380C2F1	15779	40001	131890	15849	35938	-128324
	380C2F2	15789	39499	131299	15851	35810	-128273
	380C2F3	15802	38880	130615	15852	35650	-128217
	RTG	0	0	0	4287	9457	-33917
NL3/3	GW / opgw	3918	14100	36743	0	0	0
Wind, -5°C	150C1F1	9383	28425	81780	0	0	0
Permanent loads yg= 0.9	150C1F2	9402	27535	80247	0	0	0
Wind angle: -45°	150C1F3	9425	26435	78414	0	0	0
	380C2F1	18766	56850	163559	19066	42646	-142958
	380C2F2	18803	55070	160494	19073	42226	-142583
	380C2F3	18851	52870	156828	19081	41705	-142153
	RTG	0	0	0	8055	16836	-55784
NL3/4	GW / opgw	2769	6223	20135	0	0	0
Construction/maintenance, +5°C	150C1F1	9124	20232	66806	0	0	0
Permanent loads yg= 0.9	150C1F2	9128	20000	66579	0	0	0
Wind angle: -45°	150C1F3	9133	19712	66319	0	0	0
	380C2F1	18248	40464	133611	18300	36644	-130955
	380C2F2	18256	40000	133158	18301	36520	-130922
	380C2F3	18265	39425	132638	18302	36366	-130886
	RTG	0	0	0	5553	10824	-39018

ZWW4HK450+5

Loadcases for tower strength (Special limit state)

Appendix BT1 / NL3

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2829	5483	19564	2829	5483	-19564
	150C1F1	10423	19924	71832	10423	19924	-71832
	150C1F2	10423	19873	71825	10423	19873	-71825
	150C1F3	10423	19807	71818	10423	19807	-71818
	380C2F1	20845	39849	143664	20845	39849	-143664
	380C2F2	20846	39745	143649	20846	39745	-143649
	380C2F3	20847	39615	143635	20847	39615	-143635
	RTG	0	0	0	5652	10784	-39049
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2853	5873	21643	2853	5873	-21643
	150C1F1	10519	21782	80513	10519	21782	-80513
	150C1F2	10519	21767	80515	10519	21767	-80515
	150C1F3	10519	21748	80517	10519	21748	-80517
	380C2F1	21037	43563	161026	21037	43563	-161026
	380C2F2	21037	43533	161029	21037	43533	-161029
	380C2F3	21037	43496	161034	21037	43496	-161034
	RTG	0	0	0	5695	11607	-42948
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4732	8773	31324	4732	8773	-31324
	150C1F1	12135	23533	85656	12135	23533	-85656
	150C1F2	12135	23490	85654	12135	23490	-85654
	150C1F3	12136	23435	85653	12136	23435	-85653
	380C2F1	24270	47066	171312	24270	47066	-171312
	380C2F2	24271	46980	171308	24271	46980	-171308
	380C2F3	24271	46871	171307	24271	46871	-171307
	RTG	0	0	0	9465	17256	-62512
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3480	6410	23646	3480	6410	-23646
	150C1F1	11730	21809	80617	11730	21809	-80617
	150C1F2	11730	21795	80619	11730	21795	-80619
	150C1F3	11730	21776	80622	11730	21776	-80622
	380C2F1	23460	43619	161233	23460	43619	-161233
	380C2F2	23460	43589	161238	23460	43589	-161238
	380C2F3	23460	43552	161244	23460	43552	-161244
	RTG	0	0	0	6951	12753	-47225
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2817	6317	20228	2757	9522	-25485
	150C1F1	10395	22125	73141	10232	30371	-85052
	150C1F2	10399	21880	72921	10252	29342	-83294
	150C1F3	10404	21576	72669	10277	28068	-81186
	380C2F1	20791	44249	146283	20463	60742	-170104
	380C2F2	20799	43760	145843	20503	58683	-166588
	380C2F3	20808	43152	145339	20554	56136	-162373
	RTG	0	0	0	5567	15600	-44790
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2851	6084	21678	2840	6791	-22252
	150C1F1	10515	22360	80550	10489	24218	-81685
	150C1F2	10516	22300	80537	10493	23994	-81488
	150C1F3	10516	22223	80524	10498	23716	-81263
	380C2F1	21031	44721	161101	20979	48436	-163369
	380C2F2	21032	44599	161074	20987	47988	-162976
	380C2F3	21033	44447	161047	20996	47432	-162525
	RTG	0	0	0	5683	12741	-43421
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4714	10037	32168	4620	14747	-39156
	150C1F1	12117	25316	86379	11987	31733	-94119
	150C1F2	12119	25121	86249	12005	30931	-92918
	150C1F3	12123	24879	86102	12026	29943	-91501
	380C2F1	24233	50632	172757	23974	63465	-188237
	380C2F2	24239	50243	172498	24009	61863	-185836
	380C2F3	24245	49759	172205	24053	59886	-183002
	RTG	0	0	0	9338	24412	-69949
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3479	6615	23658	3470	7274	-24054
	150C1F1	11727	22380	80623	11707	24170	-81500
	150C1F2	11728	22321	80615	11710	23956	-81343
	150C1F3	11728	22246	80607	11714	23691	-81165
	380C2F1	23455	44761	161246	23414	48340	-162999
	380C2F2	23456	44642	161230	23421	47913	-162685
	380C2F3	23457	44492	161213	23428	47381	-162329
	RTG	0	0	0	6943	13839	-47514
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2737	10870	28061	2737	10870	-28061
	150C1F1	10167	33918	91382	10167	33918	-91382
	150C1F2	10191	32566	88927	10191	32566	-88927
	150C1F3	10222	30885	85945	10222	30885	-85945
	380C2F1	20335	67836	182764	20335	67836	-182764
	380C2F2	20382	65131	177855	20382	65131	-177855
	380C2F3	20443	61769	171890	20443	61769	-171890
	RTG	0	0	0	5536	17249	-47663

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2834	7092	22624	2834	7092	-22624
	150C1F1	10474	24994	82458	10474	24994	-82458
	150C1F2	10480	24697	82146	10480	24697	-82146
	150C1F3	10487	24330	81788	10487	24330	-81788
	380C2F1	20948	49989	164916	20948	49989	-164916
	380C2F2	20960	49395	164293	20960	49395	-164293
	380C2F3	20974	48660	163576	20974	48660	-163576
	RTG	0	0	0	5677	13098	-43746
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4589	16717	42628	4589	16717	-42628
	150C1F1	11927	34514	98564	11927	34514	-98564
	150C1F2	11950	33449	96818	11950	33449	-96818
	150C1F3	11978	32133	94734	11978	32133	-94734
	380C2F1	23855	69027	197127	23855	69027	-197127
	380C2F2	23900	66899	193637	23900	66899	-193637
	380C2F3	23957	64267	189469	23957	64267	-189469
	RTG	0	0	0	9290	26816	-73757
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3466	7548	24324	3466	7548	-24324
	150C1F1	11695	24906	82122	11695	24906	-82122
	150C1F2	11700	24625	81870	11700	24625	-81870
	150C1F3	11706	24276	81582	11706	24276	-81582
	380C2F1	23391	49812	164244	23391	49812	-164244
	380C2F2	23400	49250	163740	23400	49250	-163740
	380C2F3	23411	48553	163164	23411	48553	-163164
	RTG	0	0	0	6938	14170	-47741
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2757	9522	25485	2817	6317	-20228
	150C1F1	10232	30371	85052	10395	22125	-73141
	150C1F2	10252	29342	83294	10399	21880	-72921
	150C1F3	10277	28068	81186	10404	21576	-72669
	380C2F1	20463	60742	170104	20791	44249	-146283
	380C2F2	20503	58683	166588	20799	43760	-145843
	380C2F3	20554	56136	162373	20808	43152	-145339
	RTG	0	0	0	5640	11806	-39586
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2840	6791	22252	2851	6084	-21678
	150C1F1	10489	24218	81685	10515	22360	-80550
	150C1F2	10493	23994	81488	10516	22300	-80537
	150C1F3	10498	23716	81263	10516	22223	-80524
	380C2F1	20979	48436	163369	21031	44721	-161101
	380C2F2	20987	47988	162976	21032	44599	-161074
	380C2F3	20996	47432	162525	21033	44447	-161047
	RTG	0	0	0	5693	11879	-42957
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4620	14747	39156	4714	10037	-32168
	150C1F1	11987	31733	94119	12117	25316	-86379
	150C1F2	12005	30931	92918	12119	25121	-86249
	150C1F3	12026	29943	91501	12123	24879	-86102
	380C2F1	23974	63465	188237	24233	50632	-172757
	380C2F2	24009	61863	185836	24239	50243	-172498
	380C2F3	24053	59886	183002	24245	49759	-172205
	RTG	0	0	0	9449	18814	-63165
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3470	7274	24054	3479	6615	-23658
	150C1F1	11707	24170	81500	11727	22380	-80623
	150C1F2	11710	23956	81343	11728	22321	-80615
	150C1F3	11714	23691	81165	11728	22246	-80607
	380C2F1	23414	48340	162999	23455	44761	-161246
	380C2F2	23421	47913	162685	23456	44642	-161230
	380C2F3	23428	47381	162329	23457	44492	-161213
	RTG	0	0	0	6950	13020	-47215
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2128	4338	15293	2128	4338	-15293
	150C1F1	7841	15770	56329	7841	15770	-56329
	150C1F2	7842	15716	56313	7842	15716	-56313
	150C1F3	7842	15648	56296	7842	15648	-56296
	380C2F1	15683	31540	112657	15683	31540	-112657
	380C2F2	15684	31432	112626	15684	31432	-112626
	380C2F3	15685	31296	112592	15685	31296	-112592
	RTG	0	0	0	4251	8487	-30473
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2149	4655	17097	2149	4655	-17097
	150C1F1	7929	17369	64044	7929	17369	-64044
	150C1F2	7929	17354	64045	7929	17354	-64045
	150C1F3	7929	17335	64047	7929	17335	-64047
	380C2F1	15858	34737	128089	15858	34737	-128089
	380C2F2	15858	34707	128091	15858	34707	-128091
	380C2F3	15858	34669	128094	15858	34669	-128094
	RTG	0	0	0	4289	9176	-33875

NL3/3	GW / opgw	4036	7757	27533	4036	7757	-27533
Wind, -5°C	150C1F1	9557	19436	70364	9557	19436	-70364
Permanent loads yg= 0.9	150C1F2	9557	19391	70358	9557	19391	-70358
Wind angle: 0°	150C1F3	9558	19335	70352	9558	19335	-70352
	380C2F1	19114	38871	140728	19114	38871	-140728
	380C2F2	19115	38782	140716	19115	38782	-140716
	380C2F3	19115	38670	140704	19115	38670	-140704
	RTG	0	0	0	8075	15219	-54909
NL3/4	GW / opgw	2781	5310	19540	2781	5310	-19540
Construction/maintenance, +5°C	150C1F1	9153	17737	65416	9153	17737	-65416
Permanent loads yg= 0.9	150C1F2	9153	17722	65418	9153	17722	-65418
Wind angle: 0°	150C1F3	9153	17703	65420	9153	17703	-65420
	380C2F1	18307	35473	130833	18307	35473	-130833
	380C2F2	18307	35443	130836	18307	35443	-130836
	380C2F3	18307	35405	130840	18307	35405	-130840
	RTG	0	0	0	5555	10552	-39010
NL3/1a	GW / opgw	2112	5258	16276	2052	8836	-22926
Wind, 10°C	150C1F1	7805	18162	58355	7628	27448	-74150
Permanent loads yg= 0.9	150C1F2	7811	17890	58031	7647	26301	-71949
Wind angle: 45°	150C1F3	7817	17553	57657	7672	24873	-69266
	380C2F1	15611	36325	116711	15256	54897	-148299
	380C2F2	15621	35779	116063	15294	52601	-143899
	380C2F3	15633	35106	115313	15344	49746	-138533
	RTG	0	0	0	4153	13867	-38323
NL3/1b	GW / opgw	2147	4876	17168	2132	5660	-18032
Wind, -20°C	150C1F1	7925	17969	64162	7889	20000	-65945
Permanent loads yg= 0.9	150C1F2	7925	17905	64137	7895	19750	-65649
Wind angle: 45°	150C1F3	7926	17825	64109	7901	19440	-65307
	380C2F1	15849	35938	128324	15779	40001	-131890
	380C2F2	15851	35810	128273	15789	39499	-131299
	380C2F3	15852	35650	128217	15802	38880	-130615
	RTG	0	0	0	4273	10392	-34654
NL3/3	GW / opgw	4015	9085	28615	3918	14100	-36743
Wind, -5°C	150C1F1	9533	21323	71479	9383	28425	-81780
Permanent loads yg= 0.9	150C1F2	9537	21113	71291	9402	27535	-80247
Wind angle: 45°	150C1F3	9541	20853	71076	9425	26435	-78414
	380C2F1	19066	42646	142958	18766	56850	-163559
	380C2F2	19073	42226	142583	18803	55070	-160494
	380C2F3	19081	41705	142153	18851	52870	-156828
	RTG	0	0	0	7934	22809	-63968
NL3/4	GW / opgw	2779	5521	19573	2769	6223	-20135
Construction/maintenance, +5°C	150C1F1	9150	18322	65478	9124	20232	-66806
Permanent loads yg= 0.9	150C1F2	9151	18260	65461	9128	20000	-66579
Wind angle: 45°	150C1F3	9151	18183	65443	9133	19712	-66319
	380C2F1	18300	36644	130955	18248	40464	-133611
	380C2F2	18301	36520	130922	18256	40000	-133158
	380C2F3	18302	36366	130886	18265	39425	-132638
	RTG	0	0	0	5544	11683	-39471
NL3/1a	GW / opgw	2036	10290	25900	2036	10290	-25900
Wind, 10°C	150C1F1	7571	31361	81845	7571	31361	-81845
Permanent loads yg= 0.9	150C1F2	7591	29877	78898	7591	29877	-78898
Wind angle: 90°	150C1F3	7619	28019	75256	7619	28019	-75256
	380C2F1	15142	62722	163689	15142	62722	-163689
	380C2F2	15182	59754	157796	15182	59754	-157796
	380C2F3	15238	56038	150511	15238	56038	-150511
	RTG	0	0	0	4124	15702	-41894
NL3/1b	GW / opgw	2124	6003	18559	2124	6003	-18559
Wind, -20°C	150C1F1	7870	20875	67087	7870	20875	-67087
Permanent loads yg= 0.9	150C1F2	7877	20539	66630	7877	20539	-66630
Wind angle: 90°	150C1F3	7887	20126	66099	7887	20126	-66099
	380C2F1	15740	41750	134173	15740	41750	-134173
	380C2F2	15755	41078	133261	15755	41078	-133261
	380C2F3	15773	40252	132198	15773	40252	-132198
	RTG	0	0	0	4265	10791	-35136
NL3/3	GW / opgw	3890	16165	40570	3890	16165	-40570
Wind, -5°C	150C1F1	9322	31501	87326	9322	31501	-87326
Permanent loads yg= 0.9	150C1F2	9344	30327	85170	9344	30327	-85170
Wind angle: 90°	150C1F3	9374	28870	82560	9374	28870	-82560
	380C2F1	18644	63002	174651	18644	63002	-174651
	380C2F2	18689	60654	170341	18689	60654	-170341
	380C2F3	18747	57740	165120	18747	57740	-165120
	RTG	0	0	0	7885	25369	-68357

NL3/4	GW / opgw	2763	6523	20498	2763	6523	-20498
Construction/maintenance, +5°C	150C1F1	9109	21038	67689	9109	21038	-67689
Permanent loads yg= 0.9	150C1F2	9115	20729	67334	9115	20729	-67334
Wind angle: 90°	150C1F3	9122	20348	66924	9122	20348	-66924
	380C2F1	18218	42076	135378	18218	42076	-135378
	380C2F2	18230	41459	134669	18230	41459	-134669
	380C2F3	18244	40697	133848	18244	40697	-133848
	RTG	0	0	0	5538	12039	-39789
NL3/1a	GW / opgw	2052	8836	22926	2112	5258	-16276
Wind, 10°C	150C1F1	7628	27448	74150	7805	18162	-58355
Permanent loads yg= 0.9	150C1F2	7647	26301	71949	7811	17890	-58031
Wind angle: -45°	150C1F3	7672	24873	69266	7817	17553	-57657
	380C2F1	15256	54897	148299	15611	36325	-116711
	380C2F2	15294	52601	143899	15621	35779	-116063
	380C2F3	15344	49746	138533	15633	35106	-115313
	RTG	0	0	0	4236	9590	-31315
NL3/1b	GW / opgw	2132	5660	18032	2147	4876	-17168
Wind, -20°C	150C1F1	7889	20000	65945	7925	17969	-64162
Permanent loads yg= 0.9	150C1F2	7895	19750	65649	7925	17905	-64137
Wind angle: -45°	150C1F3	7901	19440	65307	7926	17825	-64109
	380C2F1	15779	40001	131890	15849	35938	-128324
	380C2F2	15789	39499	131299	15851	35810	-128273
	380C2F3	15802	38880	130615	15852	35650	-128217
	RTG	0	0	0	4287	9457	-33917
NL3/3	GW / opgw	3918	14100	36743	4015	9085	-28615
Wind, -5°C	150C1F1	9383	28425	81780	9533	21323	-71479
Permanent loads yg= 0.9	150C1F2	9402	27535	80247	9537	21113	-71291
Wind angle: -45°	150C1F3	9425	26435	78414	9541	20853	-71076
	380C2F1	18766	56850	163559	19066	42646	-142958
	380C2F2	18803	55070	160494	19073	42226	-142583
	380C2F3	18851	52870	156828	19081	41705	-142153
	RTG	0	0	0	8055	16836	-55784
NL3/4	GW / opgw	2769	6223	20135	2779	5521	-19573
Construction/maintenance, +5°C	150C1F1	9124	20232	66806	9150	18322	-65478
Permanent loads yg= 0.9	150C1F2	9128	20000	66579	9151	18260	-65461
Wind angle: -45°	150C1F3	9133	19712	66319	9151	18183	-65443
	380C2F1	18248	40464	133611	18300	36644	-130955
	380C2F2	18256	40000	133158	18301	36520	-130922
	380C2F3	18265	39425	132638	18302	36366	-130886
	RTG	0	0	0	5553	10824	-39018

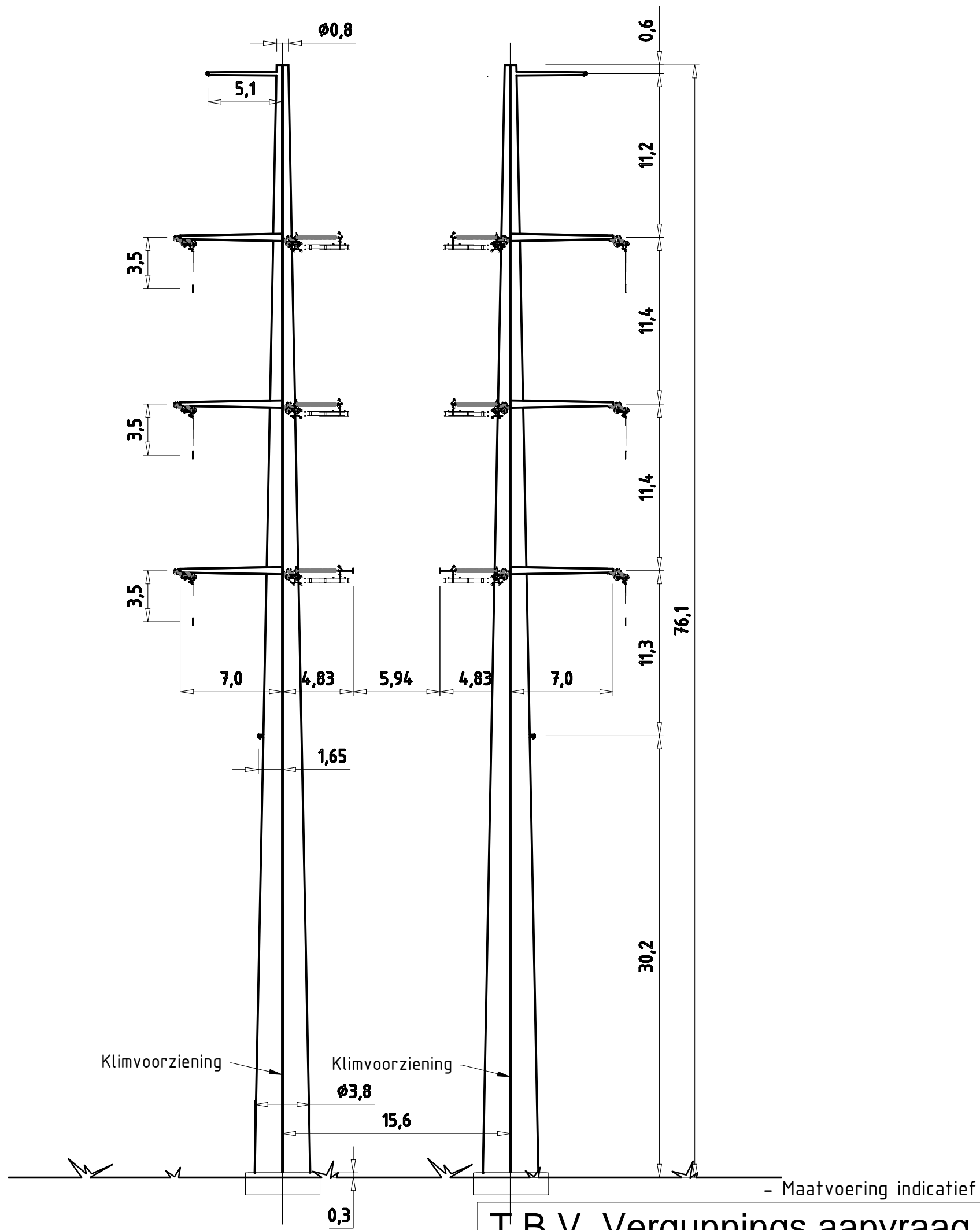
ZWW4HK450+5

Appendix BT2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2361	4805	16781	2361	4805	-16781
Wind, 10°C	150C1F1	8701	17393	61675	8701	17393	-61675
Permanent loads yg= 1.0	150C1F2	8702	17323	61650	8702	17323	-61650
Wind angle: 0°	150C1F3	8703	17235	61623	8703	17235	-61623
	380C2F1	17403	34787	123350	17403	34787	-123350
	380C2F2	17404	34646	123300	17404	34646	-123300
	380C2F3	17405	34469	123246	17405	34469	-123246
	RTG	0	0	0	4718	9366	-33415
NL4/1b	GW / opgw	2384	5059	18651	2384	5059	-18651
Wind, -20°C	150C1F1	8794	18846	69688	8794	18846	-69688
Permanent loads yg= 1.0	150C1F2	8794	18834	69690	8794	18834	-69690
Wind angle: 0°	150C1F3	8794	18818	69692	8794	18818	-69692
	380C2F1	17588	37693	139377	17588	37693	-139377
	380C2F2	17588	37668	139379	17588	37668	-139379
	380C2F3	17588	37637	139384	17588	37637	-139384
	RTG	0	0	0	4758	9990	-36977
NL4/3	GW / opgw	7982	13016	47394	7982	13016	-47394
Wind, -5°C	150C1F1	13712	25831	94592	13712	25831	-94592
Permanent loads yg= 1.0	150C1F2	13712	25795	94593	13712	25795	-94593
Wind angle: 0°	150C1F3	13712	25751	94596	13712	25751	-94596
	380C2F1	27424	51661	189183	27424	51661	-189183
	380C2F2	27425	51591	189186	27425	51591	-189186
	380C2F3	27425	51501	189192	27425	51501	-189192
	RTG	0	0	0	15984	25840	-94859
NL4/4	GW / opgw	2906	5500	20294	2906	5500	-20294
Construction/maintenance, +5°C	150C1F1	9798	18745	69308	9798	18745	-69308
Permanent loads yg= 1.0	150C1F2	9798	18732	69310	9798	18732	-69310
Wind angle: 0°	150C1F3	9798	18717	69312	9798	18717	-69312
	380C2F1	19595	37489	138616	19595	37489	-138616
	380C2F2	19596	37464	138619	19596	37464	-138619
	380C2F3	19596	37433	138624	19596	37433	-138624
	RTG	0	0	0	5805	10939	-40518
NL4/1a	GW / opgw	2339	6027	18199	2267	10696	-27031
Wind, 10°C	150C1F1	8650	20558	64635	8427	32780	-86063
Permanent loads yg= 1.0	150C1F2	8657	20195	64170	8449	31291	-83176
Wind angle: 45°	150C1F3	8666	19747	63630	8479	29430	-79622
	380C2F1	17300	41115	129270	16854	65560	-172126
	380C2F2	17315	40389	128340	16898	62582	-166352
	380C2F3	17332	39494	127259	16957	58860	-159245
	RTG	0	0	0	4590	16483	-44296
NL4/1b	GW / opgw	2383	5236	18684	2373	5832	-19192
Wind, -20°C	150C1F1	8791	19331	69728	8769	20897	-70741
Permanent loads yg= 1.0	150C1F2	8792	19280	69715	8772	20707	-70566
Wind angle: 45°	150C1F3	8792	19216	69703	8776	20472	-70366
	380C2F1	17582	38662	139455	17538	41794	-141482
	380C2F2	17583	38560	139431	17544	41415	-141132
	380C2F3	17584	38432	139405	17553	40944	-140732
	RTG	0	0	0	4748	10944	-37400
NL4/3	GW / opgw	7975	13930	47573	7923	16995	-50184
Wind, -5°C	150C1F1	13701	27245	94928	13614	32086	-99487
Permanent loads yg= 1.0	150C1F2	13702	27094	94860	13627	31488	-98747
Wind angle: 45°	150C1F3	13704	26904	94784	13642	30750	-97886
	380C2F1	27401	54490	189856	27228	64172	-198974
	380C2F2	27405	54187	189719	27253	62976	-197495
	380C2F3	27409	53809	189568	27284	61500	-195773
	RTG	0	0	0	15927	30743	-97093
NL4/4	GW / opgw	2905	5671	20307	2898	6225	-20657
Construction/maintenance, +5°C	150C1F1	9796	19222	69319	9778	20726	-70100
Permanent loads yg= 1.0	150C1F2	9796	19172	69311	9781	20546	-69961
Wind angle: 45°	150C1F3	9796	19109	69303	9784	20322	-69803
	380C2F1	19591	38443	138638	19557	41453	-140199
	380C2F2	19592	38344	138622	19562	41092	-139922
	380C2F3	19593	38219	138607	19569	40645	-139607
	RTG	0	0	0	5798	11849	-40778
NL4/1a	GW / opgw	2251	12547	30791	2251	12547	-30791
Wind, 10°C	150C1F1	8364	37819	96008	8364	37819	-96008
Permanent loads yg= 1.0	150C1F2	8386	35914	92225	8386	35914	-92225
Wind angle: 90°	150C1F3	8417	33519	87506	8417	33519	-87506
	380C2F1	16727	75637	192016	16727	75637	-192016
	380C2F2	16772	71828	184450	16772	71828	-184450
	380C2F3	16834	67038	175013	16834	67038	-175013
	RTG	0	0	0	4556	18867	-48987

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2368	6089	19520	2368	6089	-19520
	150C1F1	8756	21555	71427	8756	21555	-71427
	150C1F2	8761	21303	71151	8761	21303	-71151
	150C1F3	8767	20992	70833	8767	20992	-70833
	380C2F1	17512	43109	142853	17512	43109	-142853
	380C2F2	17522	42606	142301	17522	42606	-142301
	380C2F3	17534	41984	141665	17534	41984	-141665
	RTG	0	0	0	4743	11245	-37687
	NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7897	18289	51780	7897	18289
150C1F1		13569	34163	102296	13569	34163	-102296
150C1F2		13587	33367	101180	13587	33367	-101180
150C1F3		13608	32385	99870	13608	32385	-99870
380C2F1		27138	68327	204591	27138	68327	-204591
380C2F2		27173	66735	202361	27173	66735	-202361
380C2F3		27216	64770	199739	27216	64770	-199739
RTG		0	0	0	15898	32289	-98554
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°		GW / opgw	2894	6457	20894	2894	6457
	150C1F1	9768	21348	70649	9768	21348	-70649
	150C1F2	9772	21110	70427	9772	21110	-70427
	150C1F3	9777	20816	70172	9777	20816	-70172
	380C2F1	19537	42695	141297	19537	42695	-141297
	380C2F2	19545	42221	140854	19545	42221	-140854
	380C2F3	19554	41632	140345	19554	41632	-140345
	RTG	0	0	0	5794	12128	-40978
	NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2267	10696	27031	2339	6027
150C1F1		8427	32780	86063	8650	20558	-64635
150C1F2		8449	31291	83176	8657	20195	-64170
150C1F3		8479	29430	79622	8666	19747	-63630
380C2F1		16854	65560	172126	17300	41115	-129270
380C2F2		16898	62582	166352	17315	40389	-128340
380C2F3		16957	58860	159245	17332	39494	-127259
RTG		0	0	0	4696	10823	-34655
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°		GW / opgw	2373	5832	19192	2383	5236
	150C1F1	8769	20897	70741	8791	19331	-69728
	150C1F2	8772	20707	70566	8792	19280	-69715
	150C1F3	8776	20472	70366	8792	19216	-69703
	380C2F1	17538	41794	141482	17582	38662	-139455
	380C2F2	17544	41415	141132	17583	38560	-139431
	380C2F3	17553	40944	140732	17584	38432	-139405
	RTG	0	0	0	4757	10218	-36987
	NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7923	16995	50184	7975	13930
150C1F1		13614	32086	99487	13701	27245	-94928
150C1F2		13627	31488	98747	13702	27094	-94860
150C1F3		13642	30750	97886	13704	26904	-94784
380C2F1		27228	64172	198974	27401	54490	-189856
380C2F2		27253	62976	197495	27405	54187	-189719
380C2F3		27284	61500	195773	27409	53809	-189568
RTG		0	0	0	15978	27010	-94924
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°		GW / opgw	2898	6225	20657	2905	5671
	150C1F1	9778	20726	70100	9796	19222	-69319
	150C1F2	9781	20546	69961	9796	19172	-69311
	150C1F3	9784	20322	69803	9796	19109	-69303
	380C2F1	19557	41453	140199	19591	38443	-138638
	380C2F2	19562	41092	139922	19592	38344	-138622
	380C2F3	19569	40645	139607	19593	38219	-138607
	RTG	0	0	0	5804	11162	-40511



Wintrack
Masttype: ZWW4HK450+5

- Trekparameter 1800m
- 2x380 / 2x150 Hoekmast
- 450m Veldlengte
- 150°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement: Ral 9018 Papyrus white
- Kleurstelling Appendages: Ral 7021 Black grey

3.0	25-06-2014	Small modification
2.0	03-03-2014	Modified botom diameter and increased traverse length
1.0	03-02-2014	First edition
		Projectname: Engineering verbinding ZW380
Design state: DEFINITIEF		Scale: 1:300
Drawn by: BJT 25-06-2014		Units: m
Checked by: AJP 25-06-2014		Project no: 000.145
Approved by: AW 25-06-2014		Company: TenneT
Description: Wintrack Masttype ZWW4HK450+5		Drawing no.: 74102194-035-114 V
Revision: 3.0		Format: A3

ZWW6S400

Bijlage CA

Fundatie berekening

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1,6	m
schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	4,0	m
	Hoogte	1,8	m
	Inhoud	22,6	m ³
	e.g.	543	kN

Onderplaat	Diameter	10,0	m
	Hoogte	1,0	m
	Inhoud	79	m ³
	e.g.	1885	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		523	kN
Fgeleiders		219	kN
Maximale dwarskracht		627	kN
Fmax vert (druk)		846	kN
Fmin vert (trek)		635	kN
Maximale moment		25411	kNm

Moment

F_{diag}		3111	kN
F_{hor}		627	kN
F_{ver}		3087	kN
M_{hor} (tgv F_{hor})		1755	kNm
M_{tot}		27166	kNm
$F=M/a$		3087	kN

Verticaal reactiekracht

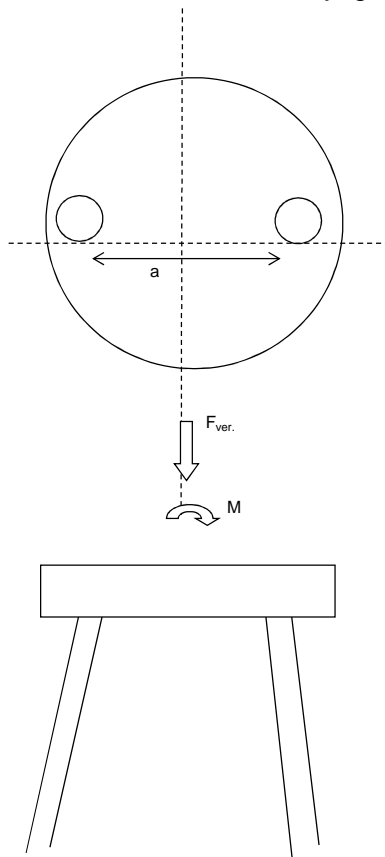
F_{water} (trek)		1012	kN
F_{grond} (druk)		1781	kN
F_{grond} (trek)		1484	kN

F_{dmax} (druk)		2948	kN
F_{tmax} (trek)		1471	kN

F_{dtot} (druk)		6036	kN
F_{ttot} (trek)		1616	kN

Palen druk		6	(-)
Palen trek		6	(-)

Totaal palen		12	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW6S400

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CA

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	$O_{p,gem}$	1,60 m
paalfactor	αt	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11,25 MPa
materiaalfactor	$\gamma_{m,b4}$	1,4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1,5
	$q_{c;z,d}$	5,36 MPa
	$P_{r,z,d}$	37,5 kN/m ²
	$F_{r;trek,d,i}$	60,0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,max,schacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

$F_{trek,d}$	536,4 kN
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ZWW6S400

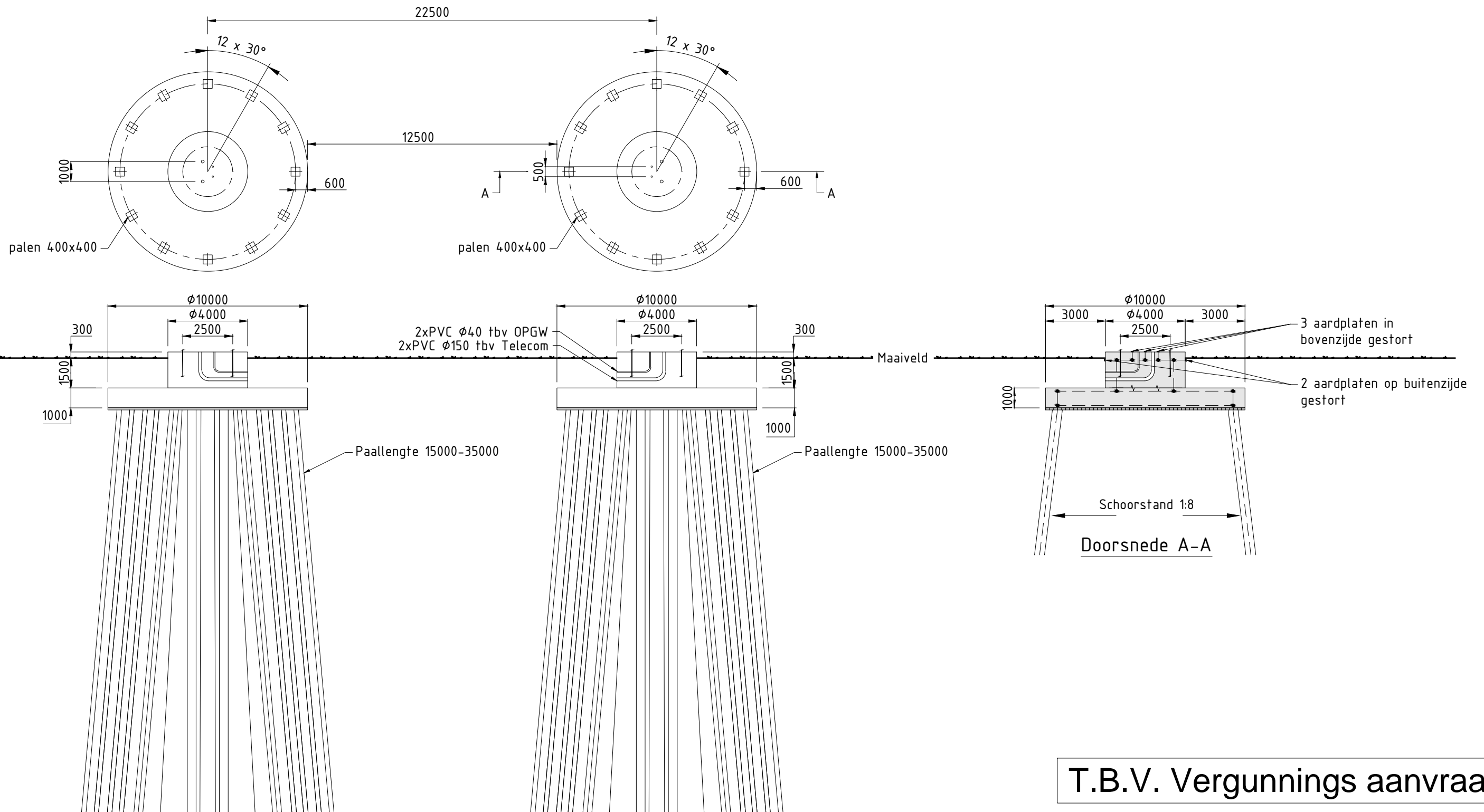
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CA

Bepaling opneembare paalbelasting op druk

heipaal			
	diameter	v a	2 mm 2 mm
	Deq		0,001808
maximale puntweerstand			
$P_{r,max;punt;i}$			11,25 MN/m ²
paalklasse factor	α_p		1,00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1,00
minimale waarde neergaande deel	$q_{c,II;gem}$		9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$		14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$		11,00 MN/m ²
maximale paalschachtwrijving			
$P_{r,max;schacht;i}$			0,05 MN/m ²
waarin:			
paalfactor	α_s		0,010
conusweerstand over wrijvingstraject	$q_{c,z;a}$		5,00 MN/m ²
maximale draagkracht alleenstaande paal			
$F_{r,max;i}$			0,00 MN
waarin:			
$F_{r,max;punt;i}$			0,00 MN
paalpunt oppervlak	A_{punt}		0,00 m ²
$F_{r,max;schacht;i}$			0,00 MN
gemiddelde paalomtrek	$O_{p;gem}$		0,01 m
lengte schachtwrijving	Δl		15,00 m
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max;d}$		MN	0,00 MN
materiaalfactor grond	γ_{mb}		1,20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$		0,75
$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27,00 m



T.B.V. Vergunnings aanvraag

Verklaring


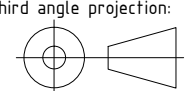
- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding $\phi 16\text{mm}$ (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

Maten in mm
 Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
 Maatvoering in het 360 graden stelsel
 Vellingkanten niet getekend
 Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
 Mastvoetanker afmeting exclusief mastvoetflens breedte
 Afmetingen indicatief

9.0	20-03-2014	Diverse aanpassingen
8.0	29-01-2014	Diverse aanpassingen
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection: 
Drawn by: RBE 20-03-2014		Drawing no.: 74102194-032-141V
Checked by: AJP 20-03-2014		Description: Principe ontwerp fundatie steunmast ZWW6S400 masten familie
Approved by: AW 20-03-2014		
Scale: 1:200		Revision: 9.0
Units: mm		Format: A3
Project no: 000.145		
Company: TenneT		
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		

ZWW6S400

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2313	889	20118	2313	889	-20118
Wind, 10°C	380C1F1	17045	6512	147783	17045	6512	-147783
Permanent loads yg= 1.2	380C1F2	17045	6507	147784	17045	6507	-147784
	380C1F3	17045	6500	147784	17045	6500	-147784
Wind angle: 0°	380C2F1	17045	6512	147783	17045	6512	-147783
	380C2F2	17045	6507	147784	17045	6507	-147784
	380C2F3	17045	6500	147784	17045	6500	-147784
	RTG	4620	1769	40192	4620	1769	-40192
NL1/1b	GW / opgw	2312	997	22782	2312	997	-22782
Wind, -20°C	380C1F1	17036	7424	169770	17036	7424	-169770
Permanent loads yg= 1.2	380C1F2	17036	7423	169770	17036	7423	-169770
	380C1F3	17036	7422	169770	17036	7422	-169770
Wind angle: 0°	380C2F1	17036	7424	169770	17036	7424	-169770
	380C2F2	17036	7423	169770	17036	7423	-169770
	380C2F3	17036	7422	169770	17036	7422	-169770
	RTG	4618	1974	45137	4618	1974	-45137
NL1/3	GW / opgw	9331	2691	61372	9331	2691	-61372
Wind, -5°C	380C1F1	29376	10454	238678	29376	10454	-238678
Permanent loads yg= 1.2	380C1F2	29376	10451	238678	29376	10451	-238678
	380C1F3	29376	10448	238678	29376	10448	-238678
Wind angle: 0°	380C2F1	29376	10454	238678	29376	10454	-238678
	380C2F2	29376	10451	238678	29376	10451	-238678
	380C2F3	29376	10448	238678	29376	10448	-238678
	RTG	18688	5381	122900	18688	5381	-122900
NL1/4	GW / opgw	3065	1125	25725	3065	1125	-25725
Construction/maintenance, +5°C	380C1F1	20053	7508	171694	20053	7508	-171694
Permanent loads yg= 1.2	380C1F2	20053	7507	171694	20053	7507	-171694
	380C1F3	20053	7506	171694	20053	7506	-171694
Wind angle: 0°	380C2F1	20053	7508	171694	20053	7508	-171694
	380C2F2	20053	7507	171694	20053	7507	-171694
	380C2F3	20053	7506	171694	20053	7506	-171694
	RTG	6124	2246	51377	6124	2246	-51377
NL1/6	GW / opgw	2603	967	22156	2603	967	-22156
Permanent, +10°C	380C1F1	19177	7092	162441	19177	7092	-162441
Permanent loads yg= 1.35	380C1F2	19177	7092	162441	19177	7092	-162441
	380C1F3	19177	7092	162441	19177	7092	-162441
	380C2F1	19177	7092	162441	19177	7092	-162441
	380C2F2	19177	7092	162441	19177	7092	-162441
	380C2F3	19177	7092	162441	19177	7092	-162441
	RTG	5198	1933	44272	5198	1933	-44272
NL1/1a	GW / opgw	2314	3785	27744	2314	4380	-30117
Wind, 10°C	380C1F1	17049	22333	182395	17051	25593	-194176
Permanent loads yg= 1.2	380C1F2	17049	20846	177289	17050	23800	-187606
	380C1F3	17048	18955	171123	17049	21518	-179573
Wind angle: 45°	380C2F1	17049	22333	182395	17051	25593	-194176
	380C2F2	17049	20846	177289	17050	23800	-187606
	380C2F3	17048	18955	171123	17049	21518	-179573
	RTG	4621	5560	48054	4621	6343	-50827
NL1/1b	GW / opgw	2312	1526	23181	2312	1632	-23350
Wind, -20°C	380C1F1	17036	10355	171395	17036	10934	-172094
Permanent loads yg= 1.2	380C1F2	17036	10090	171114	17036	10616	-171695
	380C1F3	17036	9752	170792	17036	10210	-171238
Wind angle: 45°	380C2F1	17036	10355	171395	17036	10934	-172094
	380C2F2	17036	10090	171114	17036	10616	-171695
	380C2F3	17036	9752	170792	17036	10210	-171238
	RTG	4618	2678	45493	4618	2817	-45647
NL1/3	GW / opgw	9332	5396	63000	9332	5931	-63682
Wind, -5°C	380C1F1	29377	18716	244810	29378	20361	-247367
Permanent loads yg= 1.2	380C1F2	29377	17964	243772	29377	19456	-245914
	380C1F3	29377	17007	242575	29377	18304	-244231
Wind angle: 45°	380C2F1	29377	18716	244810	29378	20361	-247367
	380C2F2	29377	17964	243772	29377	19456	-245914
	380C2F3	29377	17007	242575	29377	18304	-244231
	RTG	18689	8978	124339	18689	9683	-124965
NL1/4	GW / opgw	3066	1649	25988	3066	1752	-26102
Construction/maintenance, +5°C	380C1F1	20053	10424	172943	20053	10997	-173489
Permanent loads yg= 1.2	380C1F2	20053	10162	172724	20053	10682	-173178
	380C1F3	20053	9827	172474	20053	10281	-172821
Wind angle: 45°	380C2F1	20053	10424	172943	20053	10997	-173489
	380C2F2	20053	10162	172724	20053	10682	-173178
	380C2F3	20053	9827	172474	20053	10281	-172821
	RTG	6124	2946	51608	6124	3082	-51711

NL1/1a	GW / opgw	2316	7508	42994	2316	7508	-42994
Wind, 10°C	380C1F1	17059	42905	262549	17059	42905	-262549
Permanent loads yg= 1.2	380C1F2	17057	39544	248995	17057	39544	-248995
Wind angle: 90°	380C1F3	17055	35241	231710	17055	35241	-231710
	380C2F1	17059	42905	262549	17059	42905	-262549
	380C2F2	17057	39544	248995	17057	39544	-248995
	380C2F3	17055	35241	231710	17055	35241	-231710
	RTG	4623	10521	67493	4623	10521	-67493
NL1/1b	GW / opgw	2312	2200	24642	2312	2200	-24642
Wind, -20°C	380C1F1	17037	14034	177589	17037	14034	-177589
Permanent loads yg= 1.2	380C1F2	17037	13425	176299	17037	13425	-176299
Wind angle: 90°	380C1F3	17036	12651	174799	17036	12651	-174799
	380C2F1	17037	14034	177589	17037	14034	-177589
	380C2F2	17037	13425	176299	17037	13425	-176299
	380C2F3	17036	12651	174799	17036	12651	-174799
	RTG	4618	3560	46869	4618	3560	-46869
NL1/3	GW / opgw	9335	8789	68773	9335	8789	-68773
Wind, -5°C	380C1F1	29382	29194	266528	29382	29194	-266528
Permanent loads yg= 1.2	380C1F2	29381	27458	262161	29381	27458	-262161
Wind angle: 90°	380C1F3	29380	25252	256991	29380	25252	-256991
	380C2F1	29382	29194	266528	29382	29194	-266528
	380C2F2	29381	27458	262161	29381	27458	-262161
	380C2F3	29380	25252	256991	29380	25252	-256991
	RTG	18691	13432	129870	18691	13432	-129870
NL1/4	GW / opgw	3066	2304	26998	3066	2304	-26998
Construction/maintenance, +5°C	380C1F1	20053	14048	177838	20053	14048	-177838
Permanent loads yg= 1.2	380C1F2	20053	13450	176809	20053	13450	-176809
Wind angle: 90°	380C1F3	20053	12690	175619	20053	12690	-175619
	380C2F1	20053	14048	177838	20053	14048	-177838
	380C2F2	20053	13450	176809	20053	13450	-176809
	380C2F3	20053	12690	175619	20053	12690	-175619
	RTG	6124	3808	52539	6124	3808	-52539
NL1/1a	GW / opgw	2314	4380	30117	2314	3785	-27744
Wind, 10°C	380C1F1	17051	25593	194176	17049	22333	-182395
Permanent loads yg= 1.2	380C1F2	17050	23800	187606	17049	20846	-177289
Wind angle: -45°	380C1F3	17049	21518	179573	17048	18955	-171123
	380C2F1	17051	25593	194176	17049	22333	-182395
	380C2F2	17050	23800	187606	17049	20846	-177289
	380C2F3	17049	21518	179573	17048	18955	-171123
	RTG	4621	6343	50827	4621	5560	-48054
NL1/1b	GW / opgw	2312	1632	23350	2312	1526	-23181
Wind, -20°C	380C1F1	17036	10934	172094	17036	10355	-171395
Permanent loads yg= 1.2	380C1F2	17036	10616	171695	17036	10090	-171114
Wind angle: -45°	380C1F3	17036	10210	171238	17036	9752	-170792
	380C2F1	17036	10934	172094	17036	10355	-171395
	380C2F2	17036	10616	171695	17036	10090	-171114
	380C2F3	17036	10210	171238	17036	9752	-170792
	RTG	4618	2817	45647	4618	2678	-45493
NL1/3	GW / opgw	9332	5931	63682	9332	5396	-63000
Wind, -5°C	380C1F1	29378	20361	247367	29377	18716	-244810
Permanent loads yg= 1.2	380C1F2	29377	19456	245914	29377	17964	-243772
Wind angle: -45°	380C1F3	29377	18304	244231	29377	17007	-242575
	380C2F1	29378	20361	247367	29377	18716	-244810
	380C2F2	29377	19456	245914	29377	17964	-243772
	380C2F3	29377	18304	244231	29377	17007	-242575
	RTG	18689	9683	124965	18689	8978	-124339
NL1/4	GW / opgw	3066	1752	26102	3066	1649	-25988
Construction/maintenance, +5°C	380C1F1	20053	10997	173489	20053	10424	-172943
Permanent loads yg= 1.2	380C1F2	20053	10682	173178	20053	10162	-172724
Wind angle: -45°	380C1F3	20053	10281	172821	20053	9827	-172474
	380C2F1	20053	10997	173489	20053	10424	-172943
	380C2F2	20053	10682	173178	20053	10162	-172724
	380C2F3	20053	10281	172821	20053	9827	-172474
	RTG	6124	3082	51711	6124	2946	-51608
NL1//1a	GW / opgw	1735	702	15832	1735	702	-15832
Wind, 10°C	380C1F1	12781	5162	116856	12781	5162	-116856
Permanent loads yg= 0.9	380C1F2	12781	5157	116856	12781	5157	-116856
Wind angle: 0°	380C1F3	12781	5150	116856	12781	5150	-116856
	380C2F1	12781	5162	116856	12781	5162	-116856
	380C2F2	12781	5157	116856	12781	5157	-116856
	380C2F3	12781	5150	116856	12781	5150	-116856
	RTG	3464	1395	31612	3464	1395	-31612

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	799	18256	1734	799	-18256
	380C1F1	12774	6004	137240	12774	6004	-137240
	380C1F2	12774	6003	137240	12774	6003	-137240
	380C1F3	12774	6002	137240	12774	6002	-137240
	380C2F1	12774	6004	137240	12774	6004	-137240
	380C2F2	12774	6003	137240	12774	6003	-137240
	380C2F3	12774	6002	137240	12774	6002	-137240
	RTG	3463	1579	36098	3463	1579	-36098
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	8751	2568	58574	8751	2568	-58574
	380C1F1	25109	9299	212206	25109	9299	-212206
	380C1F2	25109	9296	212206	25109	9296	-212206
	380C1F3	25109	9292	212206	25109	9292	-212206
	380C2F1	25109	9299	212206	25109	9299	-212206
	380C2F2	25109	9296	212206	25109	9296	-212206
	380C2F3	25109	9292	212206	25109	9292	-212206
	RTG	17529	5136	117298	17529	5136	-117298
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2487	952	21749	2487	952	-21749
	380C1F1	15788	6213	142035	15788	6213	-142035
	380C1F2	15788	6212	142035	15788	6212	-142035
	380C1F3	15788	6211	142035	15788	6211	-142035
	380C2F1	15788	6213	142035	15788	6213	-142035
	380C2F2	15788	6212	142035	15788	6212	-142035
	380C2F3	15788	6211	142035	15788	6211	-142035
	RTG	4968	1899	43420	4968	1899	-43420
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1735	691	15832	1735	691	-15832
	380C1F1	12781	5102	116857	12781	5102	-116857
	380C1F2	12781	5102	116857	12781	5102	-116857
	380C1F3	12781	5102	116857	12781	5102	-116857
	380C2F1	12781	5102	116857	12781	5102	-116857
	380C2F2	12781	5102	116857	12781	5102	-116857
	380C2F3	12781	5102	116857	12781	5102	-116857
	RTG	3464	1380	31612	3464	1380	-31612
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1735	3683	25418	1736	4292	-28109
	380C1F1	12785	21446	162117	12786	24804	-176154
	380C1F2	12784	19909	155882	12786	22958	-168381
	380C1F3	12784	17953	148200	12785	20604	-158684
	380C2F1	12785	21446	162117	12786	24804	-176154
	380C2F2	12784	19909	155882	12786	22958	-168381
	380C2F3	12784	17953	148200	12785	20604	-158684
	RTG	3465	5296	42003	3465	6104	-45371
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	1337	18840	1734	1445	-19080
	380C1F1	12774	8968	139653	12774	9561	-140668
	380C1F2	12774	8698	139243	12774	9235	-140090
	380C1F3	12774	8354	138771	12774	8820	-139424
	380C2F1	12774	8968	139653	12774	9561	-140668
	380C2F2	12774	8698	139243	12774	9235	-140090
	380C2F3	12774	8354	138771	12774	8820	-139424
	RTG	3463	2291	36625	3463	2433	-36848
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	8752	5280	60351	8752	5817	-61089
	380C1F1	25110	17621	219752	25111	19288	-222846
	380C1F2	25110	16859	218490	25110	18371	-221090
	380C1F3	25109	15890	217029	25110	17204	-219049
	380C2F1	25110	17621	219752	25111	19288	-222846
	380C2F2	25110	16859	218490	25110	18371	-221090
	380C2F3	25109	15890	217029	25110	17204	-219049
	RTG	17530	8739	118875	17530	9446	-119556
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2487	1479	22098	2487	1584	-22246
	380C1F1	15788	9150	143771	15788	9731	-144515
	380C1F2	15788	8884	143472	15788	9412	-144091
	380C1F3	15788	8545	143129	15788	9004	-143604
	380C2F1	15788	9150	143771	15788	9731	-144515
	380C2F2	15788	8884	143472	15788	9412	-144091
	380C2F3	15788	8545	143129	15788	9004	-143604
	RTG	4968	2602	43729	4968	2740	-43865
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1737	7461	41924	1737	7461	-41924
	380C1F1	12793	42449	252173	12793	42449	-252173
	380C1F2	12792	39043	237574	12792	39043	-237574
	380C1F3	12790	34670	218694	12790	34670	-218694
	380C2F1	12793	42449	252173	12793	42449	-252173
	380C2F2	12792	39043	237574	12792	39043	-237574
	380C2F3	12790	34670	218694	12790	34670	-218694
	RTG	3467	10377	64207	3467	10377	-64207

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	2035	20854	1734	2035	-20854
	380C1F1	12775	12760	148437	12775	12760	-148437
	380C1F2	12775	12129	146641	12775	12129	-146641
	380C1F3	12775	11329	144534	12775	11329	-144534
	380C2F1	12775	12760	148437	12775	12760	-148437
	380C2F2	12775	12129	146641	12775	12129	-146641
	380C2F3	12775	11329	144534	12775	11329	-144534
	RTG	3463	3197	38581	3463	3197	-38581
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	8754	8691	66544	8754	8691	-66544
	380C1F1	25115	28272	245470	25115	28272	-245470
	380C1F2	25114	26505	240390	25114	26505	-240390
	380C1F3	25113	24260	234322	25113	24260	-234322
	380C2F1	25115	28272	245470	25115	28272	-245470
	380C2F2	25114	26505	240390	25114	26505	-240390
	380C2F3	25113	24260	234322	25113	24260	-234322
	RTG	17532	13212	124859	17532	13212	-124859
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2487	2146	23394	2487	2146	-23394
	380C1F1	15789	12846	150335	15789	12846	-150335
	380C1F2	15789	12234	148972	15789	12234	-148972
	380C1F3	15788	11456	147385	15788	11456	-147385
	380C2F1	15789	12846	150335	15789	12846	-150335
	380C2F2	15789	12234	148972	15789	12234	-148972
	380C2F3	15788	11456	147385	15788	11456	-147385
	RTG	4968	3476	44942	4968	3476	-44942
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1736	4292	28109	1735	3683	-25418
	380C1F1	12786	24804	176154	12785	21446	-162117
	380C1F2	12786	22958	168381	12784	19909	-155882
	380C1F3	12785	20604	158684	12784	17953	-148200
	380C2F1	12786	24804	176154	12785	21446	-162117
	380C2F2	12786	22958	168381	12784	19909	-155882
	380C2F3	12785	20604	158684	12784	17953	-148200
	RTG	3465	6104	45371	3465	5296	-42003
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	1445	19080	1734	1337	-18840
	380C1F1	12774	9561	140668	12774	8968	-139653
	380C1F2	12774	9235	140090	12774	8698	-139243
	380C1F3	12774	8820	139424	12774	8354	-138771
	380C2F1	12774	9561	140668	12774	8968	-139653
	380C2F2	12774	9235	140090	12774	8698	-139243
	380C2F3	12774	8820	139424	12774	8354	-138771
	RTG	3463	2433	36848	3463	2291	-36625
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	8752	5817	61089	8752	5280	-60351
	380C1F1	25111	19288	222846	25110	17621	-219752
	380C1F2	25110	18371	221090	25110	16859	-218490
	380C1F3	25110	17204	219049	25109	15890	-217029
	380C2F1	25111	19288	222846	25110	17621	-219752
	380C2F2	25110	18371	221090	25110	16859	-218490
	380C2F3	25110	17204	219049	25109	15890	-217029
	RTG	17530	9446	119556	17530	8739	-118875
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2487	1584	22246	2487	1479	-22098
	380C1F1	15788	9731	144515	15788	9150	-143771
	380C1F2	15788	9412	144091	15788	8884	-143472
	380C1F3	15788	9004	143604	15788	8545	-143129
	380C2F1	15788	9731	144515	15788	9150	-143771
	380C2F2	15788	9412	144091	15788	8884	-143472
	380C2F3	15788	9004	143604	15788	8545	-143129
	RTG	4968	2740	43865	4968	2602	-43729

ZWW6S400

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1928	762	17296	1928	762	-17296
	380C1F1	14202	5604	127432	14202	5604	-127432
	380C1F2	14202	5600	127432	14202	5600	-127432
	380C1F3	14202	5596	127433	14202	5596	-127433
	380C2F1	14202	5604	127432	14202	5604	-127432
	380C2F2	14202	5600	127432	14202	5600	-127432
	380C2F3	14202	5596	127433	14202	5596	-127433
	RTG	3850	1518	34541	3850	1518	-34541
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1927	866	19809	1927	866	-19809
	380C1F1	14194	6488	148419	14194	6488	-148419
	380C1F2	14194	6487	148419	14194	6487	-148419
	380C1F3	14194	6487	148419	14194	6487	-148419
	380C2F1	14194	6488	148419	14194	6488	-148419
	380C2F2	14194	6487	148419	14194	6487	-148419
	380C2F3	14194	6487	148419	14194	6487	-148419
	RTG	3848	1713	39198	3848	1713	-39198
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	6603	2088	47646	6603	2088	-47646
	380C1F1	22419	8527	194794	22419	8527	-194794
	380C1F2	22419	8525	194794	22419	8525	-194794
	380C1F3	22419	8523	194794	22419	8523	-194794
	380C2F1	22419	8527	194794	22419	8527	-194794
	380C2F2	22419	8525	194794	22419	8525	-194794
	380C2F3	22419	8523	194794	22419	8523	-194794
	RTG	13222	4172	95327	13222	4172	-95327
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	2429	933	21339	2429	933	-21339
	380C1F1	16206	6340	145038	16206	6340	-145038
	380C1F2	16206	6340	145038	16206	6340	-145038
	380C1F3	16206	6339	145038	16206	6339	-145038
	380C2F1	16206	6340	145038	16206	6340	-145038
	380C2F2	16206	6340	145038	16206	6340	-145038
	380C2F3	16206	6339	145038	16206	6339	-145038
	RTG	4852	1862	42594	4852	1862	-42594
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1928	2672	21919	1928	3067	-23472
	380C1F1	14204	16036	147936	14205	18190	-155363
	380C1F2	14204	15056	144779	14204	17004	-151198
	380C1F3	14203	13811	141019	14204	15499	-146186
	380C2F1	14204	16036	147936	14205	18190	-155363
	380C2F2	14204	15056	144779	14204	17004	-151198
	380C2F3	14203	13811	141019	14204	15499	-146186
	RTG	3850	4016	39138	3850	4532	-40851
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1927	1217	20033	1927	1287	-20129
	380C1F1	14194	8434	149328	14194	8817	-149724
	380C1F2	14194	8259	149170	14194	8606	-149498
	380C1F3	14194	8035	148988	14194	8338	-149240
	380C2F1	14194	8434	149328	14194	8817	-149724
	380C2F2	14194	8259	149170	14194	8606	-149498
	380C2F3	14194	8035	148988	14194	8338	-149240
	RTG	3848	2181	39396	3848	2273	-39483
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	6603	3893	48795	6603	4251	-49277
	380C1F1	22419	14025	198689	22419	15118	-200327
	380C1F2	22419	13525	198025	22419	14517	-199395
	380C1F3	22419	12888	197262	22419	13751	-198318
	380C2F1	22419	14025	198689	22419	15118	-200327
	380C2F2	22419	13525	198025	22419	14517	-199395
	380C2F3	22419	12888	197262	22419	13751	-198318
	RTG	13222	6571	96343	13222	7042	-96784
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	2429	1281	21495	2429	1350	-21563
	380C1F1	16206	8279	145760	16206	8659	-146078
	380C1F2	16206	8105	145632	16206	8450	-145897
	380C1F3	16206	7883	145487	16206	8184	-145689
	380C2F1	16206	8279	145760	16206	8659	-146078
	380C2F2	16206	8105	145632	16206	8450	-145897
	380C2F3	16206	7883	145487	16206	8184	-145689
	RTG	4852	2327	42730	4852	2418	-42791
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1929	5167	32403	1929	5167	-32403
	380C1F1	14210	29738	201249	14210	29738	-201249
	380C1F2	14209	27484	191865	14209	27484	-191865
	380C1F3	14207	24605	180074	14207	24605	-180074
	380C2F1	14210	29738	201249	14210	29738	-201249
	380C2F2	14209	27484	191865	14209	27484	-191865
	380C2F3	14207	24605	180074	14207	24605	-180074
	RTG	3851	7310	51807	3851	7310	-51807

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1927	1661	20879	1927	1661	-20879
	380C1F1	14195	10861	152880	14195	10861	-152880
	380C1F2	14195	10460	152132	14195	10460	-152132
	380C1F3	14195	9950	151269	14195	9950	-151269
	380C2F1	14195	10861	152880	14195	10861	-152880
	380C2F2	14195	10460	152132	14195	10460	-152132
	380C2F3	14195	9950	151269	14195	9950	-151269
	RTG	3848	2763	40179	3848	2763	-40179
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	6604	6165	52906	6604	6165	-52906
	380C1F1	22421	20992	212822	22421	20992	-212822
	380C1F2	22421	19837	209944	22421	19837	-209944
	380C1F3	22420	18370	206559	22420	18370	-206559
	380C2F1	22421	20992	212822	22421	20992	-212822
	380C2F2	22421	19837	209944	22421	19837	-209944
	380C2F3	22420	18370	206559	22420	18370	-206559
	RTG	13223	9548	100254	13223	9548	-100254
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2429	1715	22106	2429	1715	-22106
	380C1F1	16207	10678	148642	16207	10678	-148642
	380C1F2	16207	10283	148032	16207	10283	-148032
	380C1F3	16207	9780	147329	16207	9780	-147329
	380C2F1	16207	10678	148642	16207	10678	-148642
	380C2F2	16207	10283	148032	16207	10283	-148032
	380C2F3	16207	9780	147329	16207	9780	-147329
	RTG	4852	2899	43288	4852	2899	-43288
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1928	3067	23472	1928	2672	-21919
	380C1F1	14205	18190	155363	14204	16036	-147936
	380C1F2	14204	17004	151198	14204	15056	-144779
	380C1F3	14204	15499	146186	14203	13811	-141019
	380C2F1	14205	18190	155363	14204	16036	-147936
	380C2F2	14204	17004	151198	14204	15056	-144779
	380C2F3	14204	15499	146186	14203	13811	-141019
	RTG	3850	4532	40851	3850	4016	-39138
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1927	1287	20129	1927	1217	-20033
	380C1F1	14194	8817	149724	14194	8434	-149328
	380C1F2	14194	8606	149498	14194	8259	-149170
	380C1F3	14194	8338	149240	14194	8035	-148988
	380C2F1	14194	8817	149724	14194	8434	-149328
	380C2F2	14194	8606	149498	14194	8259	-149170
	380C2F3	14194	8338	149240	14194	8035	-148988
	RTG	3848	2273	39483	3848	2181	-39396
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	6603	4251	49277	6603	3893	-48795
	380C1F1	22419	15118	200327	22419	14025	-198689
	380C1F2	22419	14517	199395	22419	13525	-198025
	380C1F3	22419	13751	198318	22419	12888	-197262
	380C2F1	22419	15118	200327	22419	14025	-198689
	380C2F2	22419	14517	199395	22419	13525	-198025
	380C2F3	22419	13751	198318	22419	12888	-197262
	RTG	13222	7042	96784	13222	6571	-96343
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2429	1350	21563	2429	1281	-21495
	380C1F1	16206	8659	146078	16206	8279	-145760
	380C1F2	16206	8450	145897	16206	8105	-145632
	380C1F3	16206	8184	145689	16206	7883	-145487
	380C2F1	16206	8659	146078	16206	8279	-145760
	380C2F2	16206	8450	145897	16206	8105	-145632
	380C2F3	16206	8184	145689	16206	7883	-145487
	RTG	4852	2418	42791	4852	2327	-42730



ZWW6S400

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte			h	59.9	m
Diameter voet			d voet	2.5	m
top			d top	0.8	m
gem			d gem	1.7	m
wanddikte			t	22	mm
Oppervlakte aan voet			A	171267	mm ²
Traagheidsmoment aan voet			W _x	1.05E+08	mm ⁴
Weerstandsmoment aan voet			I _x	1.30E+11	mm ⁶
Mast: Gewicht			2 ^{de} orde F _{rep,ver}	10.0 523	% kN

Bijlage BA

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	59.2	4.6	15.0	0.0	15.0	889	kNm
380C1F1	49.2	34.1	85.8	0.0	85.8	4222	kNm
380C1F2	39.0	34.1	79.1	0.0	79.1	3084	kNm
380C1F3	28.8	34.1	70.5	0.0	70.5	2030	kNm
380C2F1	49.2	34.1	85.8	0.0	85.8	4222	kNm
380C2F2	39.0	34.1	79.1	0.0	79.1	3084	kNm
380C2F3	28.8	34.1	70.5	0.0	70.5	2030	kNm
RTG	23.2	9.2	21.0	0.0	21.0	488	kNm

Stuwdruk				F _{hor.}	28.7	kN
				M _{d,wind}	795	kNm
Totaal				M _{d,tot}	23101	kNm
Totaal moment incl. 2 ^{de} orde effect				M _{d,tot}	25411	kNm

Normaalkracht;

Optredende normaalkracht							
N _{d,geleiders}					219	kN	
N _{d, e.g. mast}					627	kN	
N _{s,d,totaal}					846	kN	

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
β _a	0.67	
A _{eff}	114235	mm ²

Optredende spanning tgv normaalkracht

N _{d,d/eff} = f _{yd} /γ _{m1}	7	N/mm ²
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Moment;

Optredende moment in de voet:						
M _{d,tot}					25411	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
β _a	0.97	
W _{eff}	1.02E+08	mm ³

Optredende spanning tgv moment:

M _{d,W_{eff}} = f _{yd} /γ _{m1}	250	N/mm ²
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Totale spanning:

σ _d	257	N/mm ²	< 284 N/mm ² = ACCOORD
σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

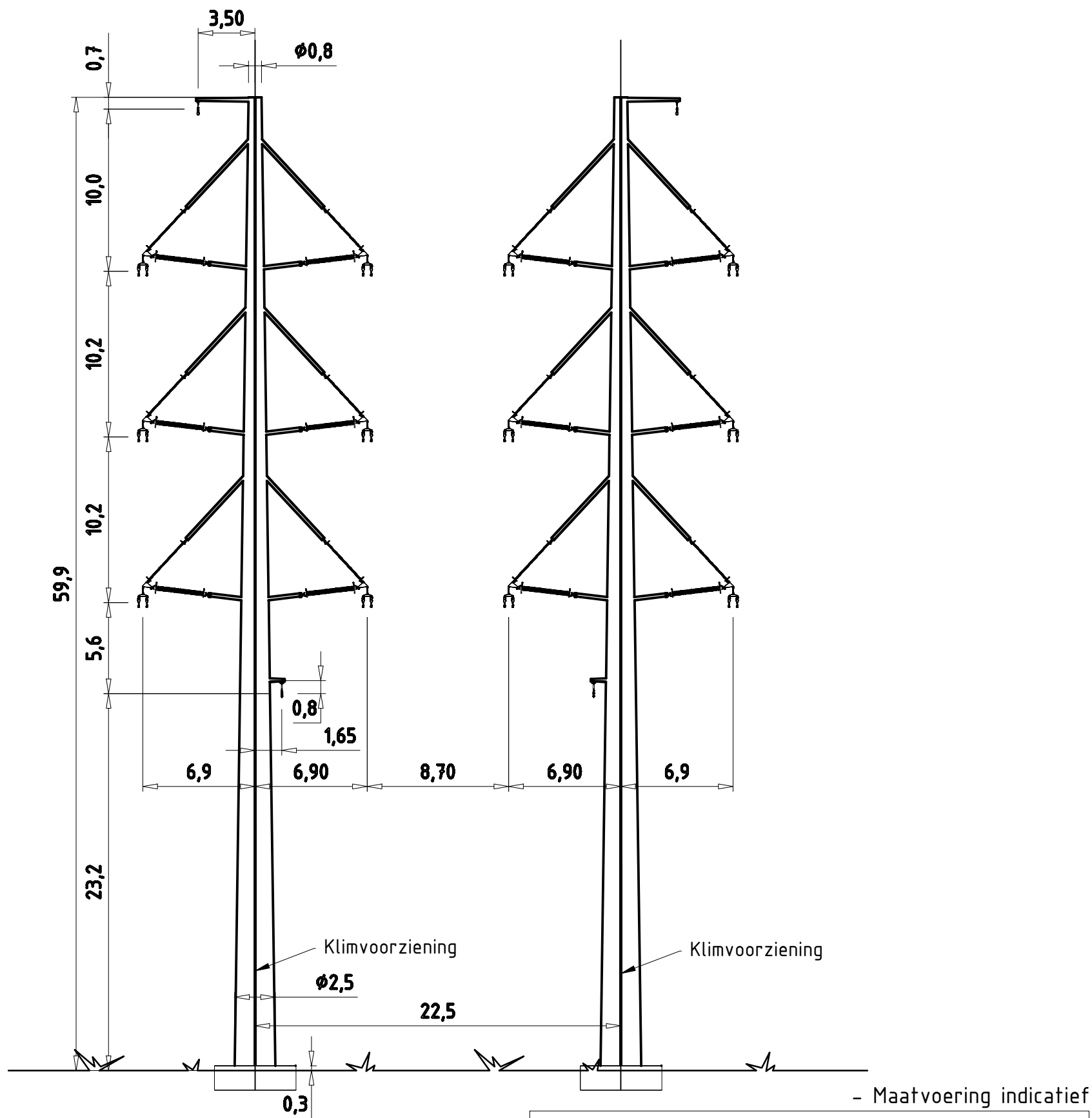
Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	59.2	3.9	10.3	0.0	10.3	612	kNm
380C1F1	49.2	28.4	59.5	0.0	59.5	2926	kNm
380C1F2	39.0	28.4	55.0	0.0	55.0	2144	kNm
380C1F3	28.8	28.4	49.2	0.0	49.2	1417	kNm
380C2F1	49.2	28.4	59.5	0.0	59.5	2926	kNm
380C2F2	39.0	28.4	55.0	0.0	55.0	2144	kNm
380C2F3	28.8	28.4	49.2	0.0	49.2	1417	kNm
RTG	23.2	7.7	14.6	0.0	14.6	339	kNm

Stuwdruk				F _{hor.}	788	kN
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Verplaatsing					1.07	m
Percentage van de verplaatsing					1.79%	
Hoek					1.77	graden
Kromming					0.36%	
Fundatie rotatiestijfheid					0.005	rad


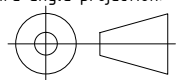
3.26	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW6S400

- Trekparameter 1800m
- 4x380 Steunmast
- 400m Veldlengte
- 175°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

4.0	04-03-2014	Small modification
3.0	13-01-2014	New 380kV braced-V and modified top/botom diameter
2.0	15-03-2013	Small modification
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection: 
Drawn by: SGR 04-03-2014	Scale: 1:300	Drawing no.: 74102194-035-141
Checked by: AJP 04-03-2014	Units: m	Description: Wintrack Masttype ZWW6S400
Approved by: AW 04-03-2014	Project no: 000.145	
Company: .		Revision: 4.0
		Format: A3
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		

ZWW6S400+5

Bijlage CB

Fundatie berekening

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m
schoorstand		8	:1
α		7.125	graden

Opstort	Diameter	4.1	m
	Hoogte	1.8	m
	Inhoud	23.8	m ³
	e.g.	570	kN

Onderplaat	Diameter	10.0	m
	Hoogte	1.0	m
	Inhoud	79	m ³
	e.g.	1885	kN

Hart paal tov rand fund.		0.6	m
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Optreden krachten

e.g. mast		584	kN
Fgeleiders		229	kN
Maximale dwarskracht		656	kN
Fmax vert (druk)		930	kN
Fmin vert (trek)		698	kN
Maximale moment		29564	kNm

Moment

F_{diag}		3596	kN
F_{hor}		656	kN
F_{ver}		3568	kN
M_{hor} (tgv F_{hor})		1836	kNm
M_{tot}		31400	kNm
$F=M/a$		3568	kN

Verticaal reactiekracht

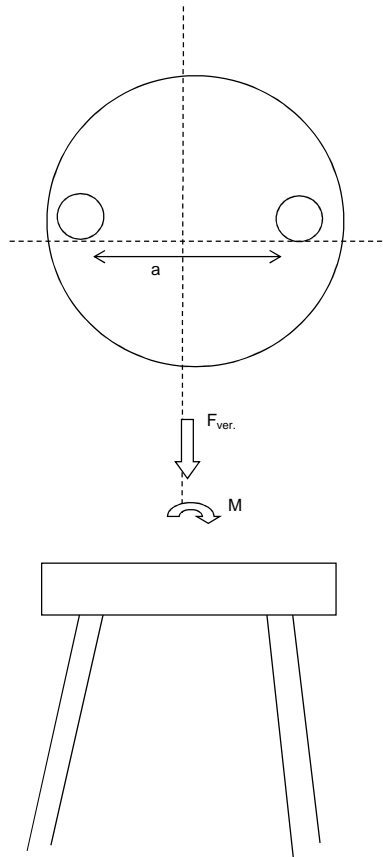
F_{water} (trek)		1023	kN
F_{grond} (druk)		1764	kN
F_{grond} (trek)		1470	kN

F_{dmax} (druk)		2997	kN
F_{tmax} (trek)		1501	kN

F_{dtot} (druk)		6565	kN
F_{ttot} (trek)		2067	kN

Palen druk		6	(-)
Palen trek		7	(-)

Totaal palen		14	(-)	Per fundering
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ZWW6S400+5

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CB

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0.40 m
	b	0.40 m
omtrek paal	$O_{p;gem}$	1.60 m
paalfactor	αt	0.007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0.75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11.25 MPa
materiaalfactor	$\gamma_{m,b4}$	1.4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1.5
	$q_{c;z,d}$	5.36 MPa
	$P_{r;z,d}$	37.5 kN/m ²
	$F_{r;trek,d,i}$	60.0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0.007	0.00	0.00	0
	-1	-2	0	0.007	0.00	0.00	0
	-2	-3	0	0.007	0.00	0.00	0
	-3	-4	0	0.007	0.00	0.00	0
	-4	-5	0	0.007	0.00	0.00	0
	-5	-6	0	0.007	0.00	0.00	0
	-6	-7	0	0.007	0.00	0.00	0
	-7	-8	0	0.007	0.00	0.00	0
	-8	-9	1	0.007	2.50	4.00	4
	-9	-10	3	0.007	7.50	12.00	16
	-10	-11	2	0.007	5.00	8.00	24
	-11	-12	0	0.007	0.00	0.00	24
	-12	-13	3	0.007	7.50	12.00	36
	-13	-14	2	0.007	5.00	8.00	44
	-14	-15	4	0.007	10.00	16.00	60
	-15	-16	10	0.007	25.00	40.00	100
	-16	-17	9	0.007	22.50	36.00	136
	-17	-18	8	0.007	20.00	32.00	168
	-18	-19	12	0.007	30.00	48.00	216
	-19	-20	12	0.007	30.00	48.00	264
	-20	-21	10	0.007	25.00	40.00	304
	-21	-22	11	0.007	27.50	44.00	348
	-22	-23	11	0.007	27.50	44.00	392
	-23	-24	12	0.007	30.00	48.00	440
	-24	-25	12	0.007	30.00	48.00	488
	-25	-26	12	0.007	30.00	48.00	536
	-26	-27	15	0.007	37.50	60.00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27.00 m
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Paalgroep factor 10%

$F_{trek,d}$	536.4 kN
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ZWW6S400+5

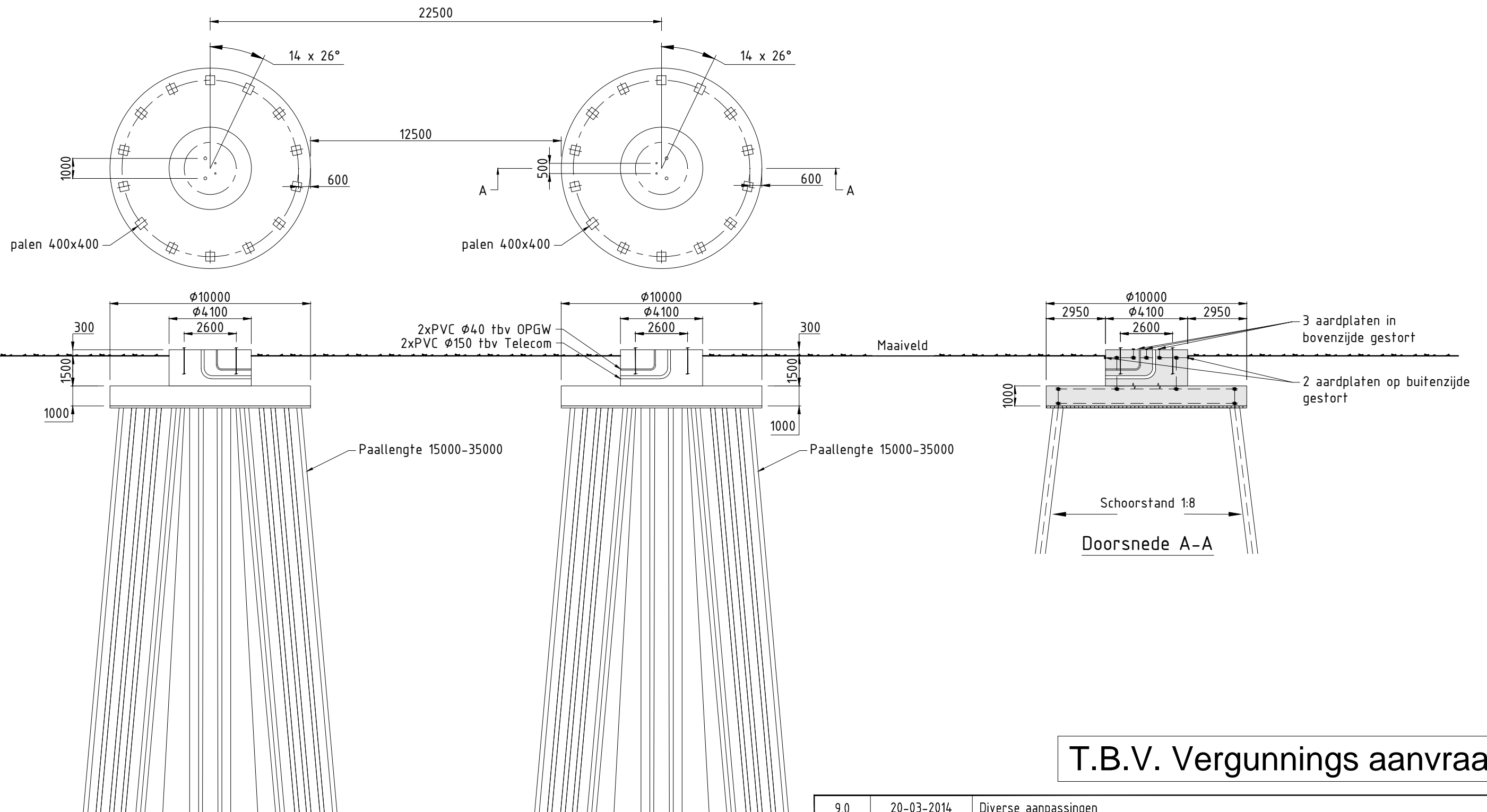
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CB

Bepaling opneembare paalbelasting op druk

heipaal	v	
diameter	a	2 mm
		2 mm
Deq		0.001808
maximale puntweerstand		
$P_{r,max;punt;i}$		11.25 MN/m ²
paalklasse factor	α_p	1.00
factor paalvoet	β	1
hoek van inwendige vrijwing van paalvoet	ϕ	40
factor dwarsdoorsnede paalvoet	s	1.00
minimale waarde neergaande deel	$q_{c,II;gem}$	9.00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14.00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11.00 MN/m ²
maximale paalschachtwrijving		
$P_{r,max;schacht;i}$		0.05 MN/m ²
waarin:		
paalfactor	α_s	0.010
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5.00 MN/m ²
maximale draagkracht alleenstaande paal		
$F_{r,max;i}$		0.00 MN
waarin:		
$F_{r,max;punt;i}$		0.00 MN
paalpunt oppervlak	A_{punt}	0.00 m ²
$F_{r,max;schacht;i}$		0.00 MN
gemiddelde paalomtrek	$O_{p;gem}$	0.01 m
lengte schachtwrijving	Δl	15.00 m
Bepaling rekenwaarde van de maximale draagkracht		
$F_{r,paal;max;d}$	MN	0.00 MN
materiaalfactor grond	γ_{mb}	1.20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0.75
$F_{r,paal;max;d}$	3 kN	mm, paalpuntnivo -27.00 m



T.B.V. Vergunnings aanvraag

Verklaring

- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding Ø16mm (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

Maten in mm
 Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
 Maatvoering in het 360 graden stelsel
 Vellingkanten niet getekend
 Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
 Mastvoetanker afmeting exclusief mastvoetflens breedte
 Afmetingen indicatief

9.0	20-03-2014	Diverse aanpassingen
8.0	21-02-2014	Afmetingen gewijzigd
7.0	29-01-2014	Diverse aanpassingen
Design state: Definitief		Projectname: Engineering verbinding ZW380
Drawn by: RBE 20-03-2014		Third angle projection:
Checked by: AJP 20-03-2014		Drawing no.: 74102194-032-142V
Approved by: AW 20-03-2014		Description: Principe ontwerp fundatie steunmast ZWW6S400+5 masten familie
Scale: 1:200		Revision: 9.0
Units: mm		Format: A3
Project no: 000.145		
Company: TenneT		
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		

ZWW6S400+5

Appendix B / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2566	889	20118	2566	889	-20118
Wind, 10°C	380C1F1	18903	6513	147781	18903	6513	-147781
Permanent loads yg= 1.2	380C1F2	18903	6508	147781	18903	6508	-147781
Wind angle: 0°	380C1F3	18903	6502	147781	18903	6502	-147781
	380C2F1	18903	6513	147781	18903	6513	-147781
	380C2F2	18903	6508	147781	18903	6508	-147781
	380C2F3	18903	6502	147781	18903	6502	-147781
	RTG	5125	1770	40191	5125	1770	-40191
NL1/1b	GW / opgw	2598	997	22783	2598	997	-22783
Wind, -20°C	380C1F1	19168	7425	169779	19168	7425	-169779
Permanent loads yg= 1.2	380C1F2	19168	7424	169779	19168	7424	-169779
Wind angle: 0°	380C1F3	19168	7423	169779	19168	7423	-169779
	380C2F1	19168	7425	169779	19168	7425	-169779
	380C2F2	19168	7424	169779	19168	7424	-169779
	380C2F3	19168	7423	169779	19168	7423	-169779
	RTG	5185	1974	45139	5185	1974	-45139
NL1/3	GW / opgw	10106	2690	61366	10106	2690	-61366
Wind, -5°C	380C1F1	32379	10455	238668	32379	10455	-238668
Permanent loads yg= 1.2	380C1F2	32379	10452	238668	32379	10452	-238668
Wind angle: 0°	380C1F3	32379	10448	238668	32379	10448	-238668
	380C2F1	32379	10455	238668	32379	10455	-238668
	380C2F2	32379	10452	238668	32379	10452	-238668
	380C2F3	32379	10448	238668	32379	10448	-238668
	RTG	20239	5381	122887	20239	5381	-122887
NL1/4	GW / opgw	3389	1125	25724	3389	1125	-25724
Construction/maintenance, +5°C	380C1F1	22212	7508	171690	22212	7508	-171690
Permanent loads yg= 1.2	380C1F2	22212	7507	171690	22212	7507	-171690
Wind angle: 0°	380C1F3	22212	7506	171690	22212	7506	-171690
	380C2F1	22212	7508	171690	22212	7508	-171690
	380C2F2	22212	7507	171690	22212	7507	-171690
	380C2F3	22212	7506	171690	22212	7506	-171690
	RTG	6771	2246	51376	6771	2246	-51376
NL1/6	GW / opgw	2881	967	22156	2881	967	-22156
Permanent, +10°C	380C1F1	21221	7092	162437	21221	7092	-162437
Permanent loads yg= 1.35	380C1F2	21221	7092	162437	21221	7092	-162437
	380C1F3	21221	7092	162437	21221	7092	-162437
	380C2F1	21221	7092	162437	21221	7092	-162437
	380C2F2	21221	7092	162437	21221	7092	-162437
	380C2F3	21221	7092	162437	21221	7092	-162437
	RTG	5755	1933	44271	5755	1933	-44271
NL1/1a	GW / opgw	2470	3828	27911	2452	4432	-30325
Wind, 10°C	380C1F1	18384	22648	183495	18260	25973	-195583
Permanent loads yg= 1.2	380C1F2	18440	21242	178626	18322	24278	-189333
Wind angle: 45°	380C1F3	18513	19472	172765	18404	22142	-181724
	380C2F1	18384	22648	183495	18260	25973	-195583
	380C2F2	18440	21242	178626	18322	24278	-189333
	380C2F3	18513	19472	172765	18404	22142	-181724
	RTG	5001	5786	48831	4969	6615	-51834
NL1/1b	GW / opgw	2590	1534	23194	2586	1641	-23366
Wind, -20°C	380C1F1	19130	10411	171466	19114	11002	-172191
Permanent loads yg= 1.2	380C1F2	19136	10161	171195	19123	10701	-171807
Wind angle: 45°	380C1F3	19143	9845	170885	19132	10321	-171366
	380C2F1	19130	10411	171466	19114	11002	-172191
	380C2F2	19136	10161	171195	19123	10701	-171807
	380C2F3	19143	9845	170885	19132	10321	-171366
	RTG	5177	2718	45537	5173	2865	-45708
NL1/3	GW / opgw	10069	5435	63040	10054	5977	-63740
Wind, -5°C	380C1F1	32244	18875	245030	32192	20552	-247678
Permanent loads yg= 1.2	380C1F2	32264	18165	244030	32219	19697	-246280
Wind angle: 45°	380C1F3	32288	17269	242878	32251	18619	-244662
	380C2F1	32244	18875	245030	32192	20552	-247678
	380C2F2	32264	18165	244030	32219	19697	-246280
	380C2F3	32288	17269	242878	32251	18619	-244662
	RTG	20202	9181	124497	20187	9927	-125193
NL1/4	GW / opgw	3384	1657	25995	3381	1761	-26112
Construction/maintenance, +5°C	380C1F1	22185	10480	172988	22174	11063	-173555
Permanent loads yg= 1.2	380C1F2	22189	10232	172777	22180	10766	-173254
Wind angle: 45°	380C1F3	22194	9919	172536	22186	10391	-172910
	380C2F1	22185	10480	172988	22174	11063	-173555
	380C2F2	22189	10232	172777	22180	10766	-173254
	380C2F3	22194	9919	172536	22186	10391	-172910
	RTG	6765	2985	51634	6763	3130	-51749

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2394	7604	43379	2394	7604	-43379
	380C1F1	17804	43614	265393	17804	43614	-265393
	380C1F2	17864	40442	252602	17864	40442	-252602
	380C1F3	17953	36421	236425	17953	36421	-236425
	380C2F1	17804	43614	265393	17804	43614	-265393
	380C2F2	17864	40442	252602	17864	40442	-252602
	380C2F3	17953	36421	236425	17953	36421	-236425
	RTG	4845	11034	69614	4845	11034	-69614
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2563	2218	24692	2563	2218	-24692
	380C1F1	18999	14163	177883	18999	14163	-177883
	380C1F2	19023	13588	176642	19023	13588	-176642
	380C1F3	19052	12863	175201	19052	12863	-175201
	380C2F1	18999	14163	177883	18999	14163	-177883
	380C2F2	19023	13588	176642	19023	13588	-176642
	380C2F3	19052	12863	175201	19052	12863	-175201
	RTG	5147	3652	47064	5147	3652	-47064
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	9962	8878	68955	9962	8878	-68955
	380C1F1	31848	29561	267470	31848	29561	-267470
	380C1F2	31915	27921	263288	31915	27921	-263288
	380C1F3	31997	25855	258348	31997	25855	-258348
	380C2F1	31848	29561	267470	31848	29561	-267470
	380C2F2	31915	27921	263288	31915	27921	-263288
	380C2F3	31997	25855	258348	31997	25855	-258348
	RTG	20079	13895	130623	20079	13895	-130623
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3365	2321	27031	3365	2321	-27031
	380C1F1	22090	14175	178061	22090	14175	-178061
	380C1F2	22108	13610	177071	22108	13610	-177071
	380C1F3	22129	12898	175927	22129	12898	-175927
	380C2F1	22090	14175	178061	22090	14175	-178061
	380C2F2	22108	13610	177071	22108	13610	-177071
	380C2F3	22129	12898	175927	22129	12898	-175927
	RTG	6746	3898	52670	6746	3898	-52670
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2452	4432	30325	2470	3828	-27911
	380C1F1	18260	25973	195583	18384	22648	-183495
	380C1F2	18322	24278	189333	18440	21242	-178626
	380C1F3	18404	22142	181724	18513	19472	-172765
	380C2F1	18260	25973	195583	18384	22648	-183495
	380C2F2	18322	24278	189333	18440	21242	-178626
	380C2F3	18404	22142	181724	18513	19472	-172765
	RTG	4969	6615	51834	5001	5786	-48831
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2586	1641	23366	2590	1534	-23194
	380C1F1	19114	11002	172191	19130	10411	-171466
	380C1F2	19123	10701	171807	19136	10161	-171195
	380C1F3	19132	10321	171366	19143	9845	-170885
	380C2F1	19114	11002	172191	19130	10411	-171466
	380C2F2	19123	10701	171807	19136	10161	-171195
	380C2F3	19132	10321	171366	19143	9845	-170885
	RTG	5173	2865	45708	5177	2718	-45537
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	10054	5977	63740	10069	5435	-63040
	380C1F1	32192	20552	247678	32244	18875	-245030
	380C1F2	32219	19697	246280	32264	18165	-244030
	380C1F3	32251	18619	244662	32288	17269	-242878
	380C2F1	32192	20552	247678	32244	18875	-245030
	380C2F2	32219	19697	246280	32264	18165	-244030
	380C2F3	32251	18619	244662	32288	17269	-242878
	RTG	20187	9927	125193	20202	9181	-124497
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3381	1761	26112	3384	1657	-25995
	380C1F1	22174	11063	173555	22185	10480	-172988
	380C1F2	22180	10766	173254	22189	10232	-172777
	380C1F3	22186	10391	172910	22194	9919	-172536
	380C2F1	22174	11063	173555	22185	10480	-172988
	380C2F2	22180	10766	173254	22189	10232	-172777
	380C2F3	22186	10391	172910	22194	9919	-172536
	RTG	6763	3130	51749	6765	2985	-51634
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1934	702	15832	1934	702	-15832
	380C1F1	14250	5163	116857	14250	5163	-116857
	380C1F2	14250	5158	116857	14250	5158	-116857
	380C1F3	14250	5152	116857	14250	5152	-116857
	380C2F1	14250	5163	116857	14250	5163	-116857
	380C2F2	14250	5158	116857	14250	5158	-116857
	380C2F3	14250	5152	116857	14250	5152	-116857
	RTG	3862	1395	31612	3862	1395	-31612

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	799	18258	1963	799	-18258
	380C1F1	14497	6005	137254	14497	6005	-137254
	380C1F2	14497	6004	137254	14497	6004	-137254
	380C1F3	14497	6003	137254	14497	6003	-137254
	380C2F1	14497	6005	137254	14497	6005	-137254
	380C2F2	14497	6004	137254	14497	6004	-137254
	380C2F3	14497	6003	137254	14497	6003	-137254
	RTG	3916	1579	36101	3916	1579	-36101
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	9490	2568	58569	9490	2568	-58569
	380C1F1	27778	9299	212200	27778	9299	-212200
	380C1F2	27778	9296	212200	27778	9296	-212200
	380C1F3	27778	9293	212201	27778	9293	-212201
	380C2F1	27778	9299	212200	27778	9299	-212200
	380C2F2	27778	9296	212200	27778	9296	-212200
	380C2F3	27778	9293	212201	27778	9293	-212201
	RTG	19009	5136	117287	19009	5136	-117287
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2760	952	21749	2760	952	-21749
	380C1F1	17573	6214	142035	17573	6214	-142035
	380C1F2	17573	6213	142035	17573	6213	-142035
	380C1F3	17573	6211	142035	17573	6211	-142035
	380C2F1	17573	6214	142035	17573	6214	-142035
	380C2F2	17573	6213	142035	17573	6213	-142035
	380C2F3	17573	6211	142035	17573	6211	-142035
	RTG	5514	1899	43419	5514	1899	-43419
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1934	691	15832	1934	691	-15832
	380C1F1	14250	5102	116859	14250	5102	-116859
	380C1F2	14250	5102	116859	14250	5102	-116859
	380C1F3	14250	5102	116859	14250	5102	-116859
	380C2F1	14250	5102	116859	14250	5102	-116859
	380C2F2	14250	5102	116859	14250	5102	-116859
	380C2F3	14250	5102	116859	14250	5102	-116859
	RTG	3862	1380	31613	3862	1380	-31613
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1835	3727	25612	1821	4345	-28342
	380C1F1	13680	21771	163452	13574	25194	-177807
	380C1F2	13730	20319	157528	13626	23451	-170441
	380C1F3	13799	18488	150267	13698	21249	-161307
	380C2F1	13680	21771	163452	13574	25194	-177807
	380C2F2	13730	20319	157528	13626	23451	-170441
	380C2F3	13799	18488	150267	13698	21249	-161307
	RTG	3722	5529	42959	3694	6385	-46571
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1951	1345	18857	1947	1455	-19104
	380C1F1	14443	9026	139758	14422	9631	-140809
	380C1F2	14451	8771	139363	14433	9323	-140253
	380C1F3	14461	8448	138908	14446	8934	-139612
	380C2F1	14443	9026	139758	14422	9631	-140809
	380C2F2	14451	8771	139363	14433	9323	-140253
	380C2F3	14461	8448	138908	14446	8934	-139612
	RTG	3904	2332	36689	3900	2482	-36937
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	9450	5319	60394	9435	5864	-61152
	380C1F1	27617	17782	220026	27557	19483	-223228
	380C1F2	27641	17062	218811	27589	18615	-221539
	380C1F3	27668	16155	217406	27626	17523	-219579
	380C2F1	27617	17782	220026	27557	19483	-223228
	380C2F2	27641	17062	218811	27589	18615	-221539
	380C2F3	27668	16155	217406	27626	17523	-219579
	RTG	18968	8943	119049	18952	9691	-119806
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2753	1487	22108	2750	1593	-22260
	380C1F1	17538	9206	143838	17524	9799	-144609
	380C1F2	17543	8955	143549	17531	9497	-144200
	380C1F3	17550	8638	143218	17540	9116	-143731
	380C2F1	17538	9206	143838	17524	9799	-144609
	380C2F2	17543	8955	143549	17531	9497	-144200
	380C2F3	17550	8638	143218	17540	9116	-143731
	RTG	5507	2641	43766	5505	2788	-43916
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1782	7557	42327	1782	7557	-42327
	380C1F1	13240	43167	255220	13240	43167	-255220
	380C1F2	13280	39954	241478	13280	39954	-241478
	380C1F3	13341	35871	223881	13341	35871	-223881
	380C2F1	13240	43167	255220	13240	43167	-255220
	380C2F2	13280	39954	241478	13280	39954	-241478
	380C2F3	13341	35871	223881	13341	35871	-223881
	RTG	3601	10897	66503	3601	10897	-66503

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1918	2053	20921	1918	2053	-20921
	380C1F1	14273	12894	148844	14273	12894	-148844
	380C1F2	14303	12298	147121	14303	12298	-147121
	380C1F3	14339	11548	145102	14339	11548	-145102
	380C2F1	14273	12894	148844	14273	12894	-148844
	380C2F2	14303	12298	147121	14303	12298	-147121
	380C2F3	14339	11548	145102	14339	11548	-145102
	RTG	3866	3293	38853	3866	3293	-38853
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	9339	8780	66737	9339	8780	-66737
	380C1F1	27182	28646	246568	27182	28646	-246568
	380C1F2	27253	26976	241711	27253	26976	-241711
	380C1F3	27341	24874	235926	27341	24874	-235926
	380C2F1	27182	28646	246568	27182	28646	-246568
	380C2F2	27253	26976	241711	27253	26976	-241711
	380C2F3	27341	24874	235926	27341	24874	-235926
	RTG	18839	13678	125670	18839	13678	-125670
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2731	2164	23437	2731	2164	-23437
	380C1F1	17419	12976	150636	17419	12976	-150636
	380C1F2	17441	12397	149325	17441	12397	-149325
	380C1F3	17467	11669	147802	17467	11669	-147802
	380C2F1	17419	12976	150636	17419	12976	-150636
	380C2F2	17441	12397	149325	17441	12397	-149325
	380C2F3	17467	11669	147802	17467	11669	-147802
	RTG	5483	3567	45113	5483	3567	-45113
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1821	4345	28342	1835	3727	-25612
	380C1F1	13574	25194	177807	13680	21771	-163452
	380C1F2	13626	23451	170441	13730	20319	-157528
	380C1F3	13698	21249	161307	13799	18488	-150267
	380C2F1	13574	25194	177807	13680	21771	-163452
	380C2F2	13626	23451	170441	13730	20319	-157528
	380C2F3	13698	21249	161307	13799	18488	-150267
	RTG	3694	6385	46571	3722	5529	-42959
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1947	1455	19104	1951	1345	-18857
	380C1F1	14422	9631	140809	14443	9026	-139758
	380C1F2	14433	9323	140253	14451	8771	-139363
	380C1F3	14446	8934	139612	14461	8448	-138908
	380C2F1	14422	9631	140809	14443	9026	-139758
	380C2F2	14433	9323	140253	14451	8771	-139363
	380C2F3	14446	8934	139612	14461	8448	-138908
	RTG	3900	2482	36937	3904	2332	-36689
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	9435	5864	61152	9450	5319	-60394
	380C1F1	27557	19483	223228	27617	17782	-220026
	380C1F2	27589	18615	221539	27641	17062	-218811
	380C1F3	27626	17523	219579	27668	16155	-217406
	380C2F1	27557	19483	223228	27617	17782	-220026
	380C2F2	27589	18615	221539	27641	17062	-218811
	380C2F3	27626	17523	219579	27668	16155	-217406
	RTG	18952	9691	119806	18968	8943	-119049
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2750	1593	22260	2753	1487	-22108
	380C1F1	17524	9799	144609	17538	9206	-143838
	380C1F2	17531	9497	144200	17543	8955	-143549
	380C1F3	17540	9116	143731	17550	8638	-143218
	380C2F1	17524	9799	144609	17538	9206	-143838
	380C2F2	17531	9497	144200	17543	8955	-143549
	380C2F3	17540	9116	143731	17550	8638	-143218
	RTG	5505	2788	43916	5507	2641	-43766

ZWW6S400+5

Appendix B2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2145	762	17295	2145	762	-17295
Wind, 10°C	380C1F1	15804	5604	127432	15804	5604	-127432
Permanent loads yg= 1.0	380C1F2	15804	5601	127432	15804	5601	-127432
Wind angle: 0°	380C1F3	15804	5597	127433	15804	5597	-127433
	380C2F1	15804	5604	127432	15804	5604	-127432
	380C2F2	15804	5601	127432	15804	5601	-127432
	380C2F3	15804	5597	127433	15804	5597	-127433
	RTG	4284	1518	34541	4284	1518	-34541
NL4/1b	GW / opgw	2175	866	19810	2175	866	-19810
Wind, -20°C	380C1F1	16058	6489	148431	16058	6489	-148431
Permanent loads yg= 1.0	380C1F2	16058	6488	148431	16058	6488	-148431
Wind angle: 0°	380C1F3	16058	6487	148431	16058	6487	-148431
	380C2F1	16058	6489	148431	16058	6489	-148431
	380C2F2	16058	6488	148431	16058	6488	-148431
	380C2F3	16058	6487	148431	16058	6487	-148431
	RTG	4340	1714	39201	4340	1714	-39201
NL4/3	GW / opgw	7203	2088	47642	7203	2088	-47642
Wind, -5°C	380C1F1	24868	8527	194791	24868	8527	-194791
Permanent loads yg= 1.0	380C1F2	24868	8526	194791	24868	8526	-194791
Wind angle: 0°	380C1F3	24868	8523	194791	24868	8523	-194791
	380C2F1	24868	8527	194791	24868	8527	-194791
	380C2F2	24868	8526	194791	24868	8526	-194791
	380C2F3	24868	8523	194791	24868	8523	-194791
	RTG	14423	4172	95319	14423	4172	-95319
NL4/4	GW / opgw	2697	933	21339	2697	933	-21339
Construction/maintenance, +5°C	380C1F1	18030	6341	145038	18030	6341	-145038
Permanent loads yg= 1.0	380C1F2	18030	6340	145038	18030	6340	-145038
Wind angle: 0°	380C1F3	18030	6339	145038	18030	6339	-145038
	380C2F1	18030	6341	145038	18030	6341	-145038
	380C2F2	18030	6340	145038	18030	6340	-145038
	380C2F3	18030	6339	145038	18030	6339	-145038
	RTG	5388	1862	42593	5388	1862	-42593
NL4/1a	GW / opgw	2081	2701	22027	2067	3102	-23611
Wind, 10°C	380C1F1	15479	16245	148624	15387	18442	-156265
Permanent loads yg= 1.0	380C1F2	15518	15317	145603	15434	17321	-152289
Wind angle: 45°	380C1F3	15567	14152	142016	15493	15911	-147521
	380C2F1	15479	16245	148624	15387	18442	-156265
	380C2F2	15518	15317	145603	15434	17321	-152289
	380C2F3	15567	14152	142016	15493	15911	-147521
	RTG	4207	4165	39614	4184	4712	-41483
NL4/1b	GW / opgw	2171	1223	20041	2169	1293	-20139
Wind, -20°C	380C1F1	16037	8472	149376	16028	8862	-149786
Permanent loads yg= 1.0	380C1F2	16040	8306	149223	16032	8663	-149569
Wind angle: 45°	380C1F3	16044	8097	149048	16038	8412	-149319
	380C2F1	16037	8472	149376	16028	8862	-149786
	380C2F2	16040	8306	149223	16032	8663	-149569
	380C2F3	16044	8097	149048	16038	8412	-149319
	RTG	4335	2208	39422	4333	2305	-39519
NL4/3	GW / opgw	7178	3919	48823	7168	4282	-49318
Wind, -5°C	380C1F1	24783	14131	198833	24750	15245	-200531
Permanent loads yg= 1.0	380C1F2	24796	13658	198194	24768	14677	-199633
Wind angle: 45°	380C1F3	24811	13063	197459	24788	13961	-198597
	380C2F1	24783	14131	198833	24750	15245	-200531
	380C2F2	24796	13658	198194	24768	14677	-199633
	380C2F3	24811	13063	197459	24788	13961	-198597
	RTG	14397	6707	96455	14387	7205	-96946
NL4/4	GW / opgw	2694	1286	21499	2693	1356	-21570
Construction/maintenance, +5°C	380C1F1	18014	8316	145788	18008	8703	-146119
Permanent loads yg= 1.0	380C1F2	18017	8152	145665	18011	8506	-145943
Wind angle: 45°	380C1F3	18019	7944	145524	18015	8257	-145743
	380C2F1	18014	8316	145788	18008	8703	-146119
	380C2F2	18017	8152	145665	18011	8506	-145943
	380C2F3	18019	7944	145524	18015	8257	-145743
	RTG	5384	2353	42746	5383	2449	-42814
NL4/1a	GW / opgw	2014	5231	32679	2014	5231	-32679
Wind, 10°C	380C1F1	15001	30215	203235	15001	30215	-203235
Permanent loads yg= 1.0	380C1F2	15057	28086	194354	15057	28086	-194354
Wind angle: 90°	380C1F3	15136	25394	183272	15136	25394	-183272
	380C2F1	15001	30215	203235	15001	30215	-203235
	380C2F2	15057	28086	194354	15057	28086	-194354
	380C2F3	15136	25394	183272	15136	25394	-183272
	RTG	4083	7653	53262	4083	7653	-53262

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2154	1673	20909	2154	1673	-20909
	380C1F1	15960	10946	153057	15960	10946	-153057
	380C1F2	15975	10567	152338	15975	10567	-152338
	380C1F3	15992	10090	151507	15992	10090	-151507
	380C2F1	15960	10946	153057	15960	10946	-153057
	380C2F2	15975	10567	152338	15975	10567	-152338
	380C2F3	15992	10090	151507	15992	10090	-151507
	RTG	4319	2824	40293	4319	2824	-40293
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7102	6224	53037	7102	6224	-53037
	380C1F1	24521	21237	213449	24521	21237	-213449
	380C1F2	24567	20145	210689	24567	20145	-210689
	380C1F3	24623	18771	207448	24623	18771	-207448
	380C2F1	24521	21237	213449	24521	21237	-213449
	380C2F2	24567	20145	210689	24567	20145	-210689
	380C2F3	24623	18771	207448	24623	18771	-207448
	RTG	14312	9858	100790	14312	9858	-100790
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2683	1727	22127	2683	1727	-22127
	380C1F1	17959	10762	148777	17959	10762	-148777
	380C1F2	17969	10388	148189	17969	10388	-148189
	380C1F3	17982	9918	147513	17982	9918	-147513
	380C2F1	17959	10762	148777	17959	10762	-148777
	380C2F2	17969	10388	148189	17969	10388	-148189
	380C2F3	17982	9918	147513	17982	9918	-147513
	RTG	5373	2959	43368	5373	2959	-43368
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2067	3102	23611	2081	2701	-22027
	380C1F1	15387	18442	156265	15479	16245	-148624
	380C1F2	15434	17321	152289	15518	15317	-145603
	380C1F3	15493	15911	147521	15567	14152	-142016
	380C2F1	15387	18442	156265	15479	16245	-148624
	380C2F2	15434	17321	152289	15518	15317	-145603
	380C2F3	15493	15911	147521	15567	14152	-142016
	RTG	4184	4712	41483	4207	4165	-39614
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2169	1293	20139	2171	1223	-20041
	380C1F1	16028	8862	149786	16037	8472	-149376
	380C1F2	16032	8663	149569	16040	8306	-149223
	380C1F3	16038	8412	149319	16044	8097	-149048
	380C2F1	16028	8862	149786	16037	8472	-149376
	380C2F2	16032	8663	149569	16040	8306	-149223
	380C2F3	16038	8412	149319	16044	8097	-149048
	RTG	4333	2305	39519	4335	2208	-39422
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7168	4282	49318	7178	3919	-48823
	380C1F1	24750	15245	200531	24783	14131	-198833
	380C1F2	24768	14677	199633	24796	13658	-198194
	380C1F3	24788	13961	198597	24811	13063	-197459
	380C2F1	24750	15245	200531	24783	14131	-198833
	380C2F2	24768	14677	199633	24796	13658	-198194
	380C2F3	24788	13961	198597	24811	13063	-197459
	RTG	14387	7205	96946	14397	6707	-96455
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2693	1356	21570	2694	1286	-21499
	380C1F1	18008	8703	146119	18014	8316	-145788
	380C1F2	18011	8506	145943	18017	8152	-145665
	380C1F3	18015	8257	145743	18019	7944	-145524
	380C2F1	18008	8703	146119	18014	8316	-145788
	380C2F2	18011	8506	145943	18017	8152	-145665
	380C2F3	18015	8257	145743	18019	7944	-145524
	RTG	5383	2449	42814	5384	2353	-42746



ZWW6S400+5

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h	64.2	m	
Diameter voet		d voet	2.6	m	
top		d top	0.8	m	
gem		d gem	1.7	m	
wanddikte		t	22	mm	
Oppervlakte aan voet		A	178179	mm ²	
Traagheidsmoment aan voet		W _x	1.14E+08	mm ⁴	
Weerstandsmoment aan voet		I _x	1.46E+11	mm ⁶	
Mast: Gewicht		2 ^{de} orde F _{rep,ver}	10.0	%	
			584	kN	

Bijlage BB

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	64.2	4.8	15.2	0.0	15.2	976	kNm
380C1F1	54.2	35.6	87.2	0.0	87.2	4728	kNm
380C1F2	44.0	35.7	80.9	0.0	80.9	3559	kNm
380C1F3	33.8	35.9	72.8	0.0	72.8	2462	kNm
380C2F1	54.2	35.6	87.2	0.0	87.2	4728	kNm
380C2F2	44.0	35.7	80.9	0.0	80.9	3559	kNm
380C2F3	33.8	35.9	72.8	0.0	72.8	2462	kNm
RTG	28.2	9.7	22.1	0.0	22.1	622	kNm

Stuwdruk	F _{hor.}	32.6	kN
	M _{d,wind}	980	kNm
Totaal	M _{d,tot}	26877	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	29564	kNm

Normaalkracht;

Optredende normaalkracht			
N _{d,geleiders}		229	kN
N _{d, e.g. mast}		701	kN
N _{s,d,totaal}		930	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA
β _a	0.65
A _{eff}	116330 mm ²

Optredende spanning tgv normaalkracht

$$N_{sd}/A_{eff} = f_{yd}/\gamma_{m1}$$

8 N/mm²

Moment;

Optredende moment in de voet:			
M _{d,tot}		29564	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA
β _a	0.95
W _{eff}	1.09E+08 mm ³

Optredende spanning tgv moment:

$$M_d/W_{eff} = f_{yd}/\gamma_{m1}$$

272 N/mm²

Totale spanning:

σ _d	280	N/mm ²	< 284 N/mm ² = ACCOORD
σ _{d,toegestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

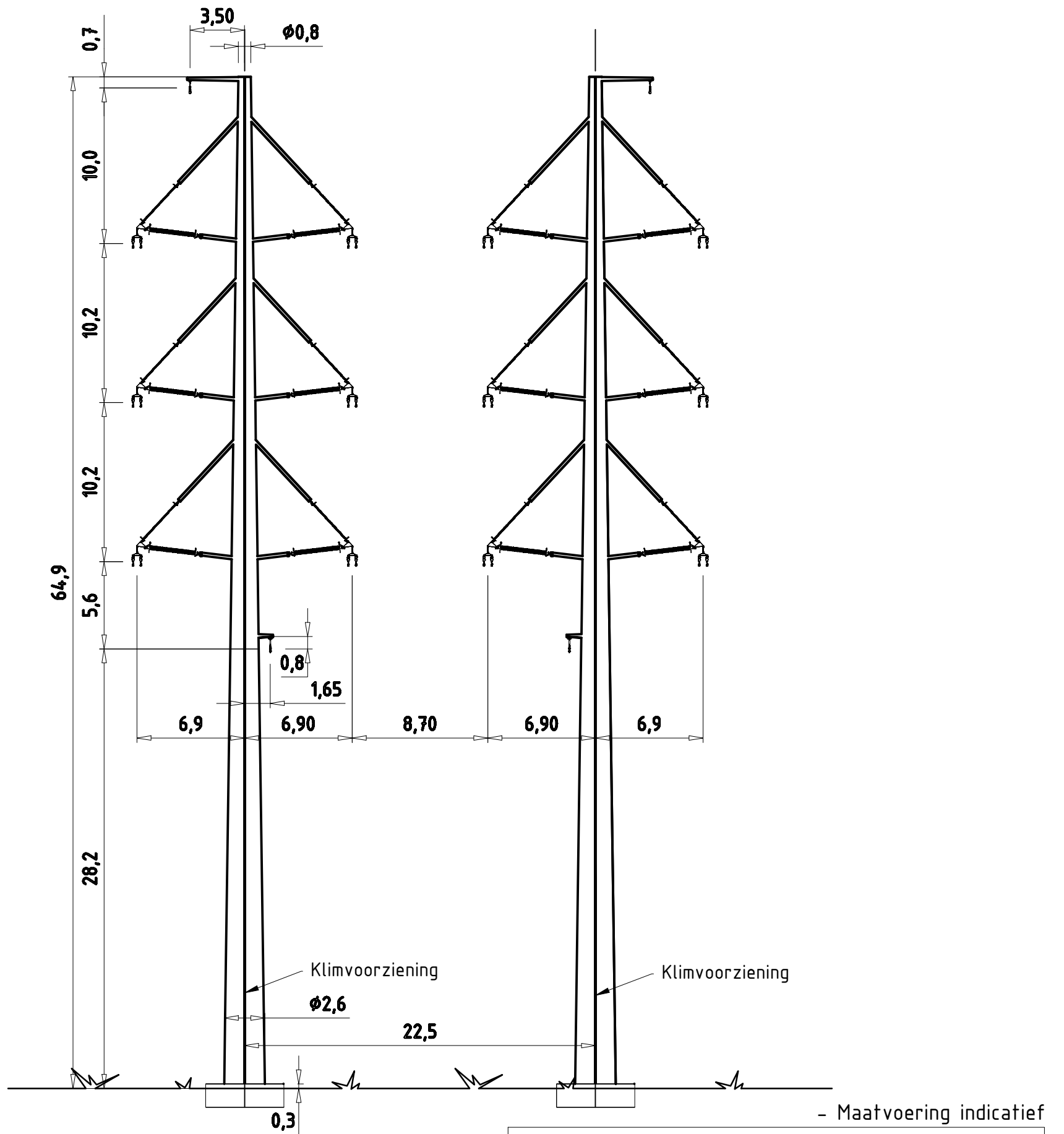
Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	64.2	4.0	10.5	0.0	10.5	672	kNm
380C1F1	54.2	30.0	60.4	0.0	60.4	3275	kNm
380C1F2	44.0	30.1	56.2	0.0	56.2	2472	kNm
380C1F3	33.8	30.3	50.8	0.0	50.8	1717	kNm
380C2F1	54.2	30.0	60.4	0.0	60.4	3275	kNm
380C2F2	44.0	30.1	56.2	0.0	56.2	2472	kNm
380C2F3	33.8	30.3	50.8	0.0	50.8	1717	kNm
RTG	28.2	8.2	15.3	0.0	15.3	432	kNm

Stuwdruk	F _{hor.}	898	kN
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Verplaatsing		1.31	m
Percentage van de verplaatsing		2.04%	
Hoek		2.03	graden
Kromming		0.43%	
Fundatie rotatiestijfheid		0.005	rad


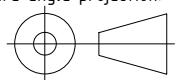
3.53	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWW6S400+5

- Trekparameter 1800m
- 4x380 Steunmast
- 400m Veldlengte
- 175°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

5.0	10-03-2014	Modified top traverse length
4.0	06-03-2014	Increased traverse length
3.0	13-01-2014	New 380kV braced-V and modified top/bottom diameter
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection: 
Drawn by: RBE 10-03-2014	Scale: 1:300	Drawing no.: 74102194-035-142V
Checked by: AJP 10-03-2014	Units: m	
Approved by: AW 10-03-2014	Project no: 000.145 Company: TenneT	
Description: Wintrack Masttype ZWW6S400+5		Revision: 5.0
		Format: A3

ZWW6HK400+5

Fundatie berekening

CBN

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1,6	m
schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	5,4	m
	Hoogte	1,8	m
	Inhoud	41,2	m ³
	e.g.	989	kN

Onderplaat	Diameter	14,0	m
	Hoogte	1,4	m
	Inhoud	216	m ³
	e.g.	5172	kN

Hart paal tov rand fund. 0,6 m

Optreden krachten

e.g. mast	920	kN
Fgeleiders	225	kN
Maximale dwarskracht	1366	kN
Fmax vert (druk)	1329	kN
Fmin vert (trek)	997	kN
Maximale moment	64695	kNm

Moment

F_{diag}	5438	kN
F_{hor}	1366	kN
F_{ver}	5396	kN
M_{hor} (tgv Fhor)	4372	kNm
M_{tot}	69067	kNm
$F=M/a$	5396	kN

Verticaal reactiekracht

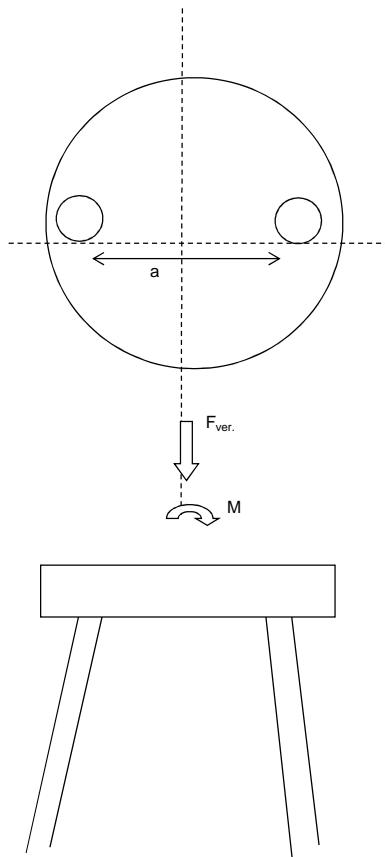
Fwater (trek)	2567	kN
Fgrond (druk)	3538	kN
Fgrond (trek)	2948	kN

Fdmax (druk)	6484	kN
Ftmax (trek)	3057	kN

Fdtot (druk)	11880	kN
Fttot (trek)	2339	kN

Palen druk	11	(-)
Palen trek	8	(-)

Totaal palen 22 (-) Per fundering



reductie door opwaarste kracht water



ZWW6HK400+5

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

CBN

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	$O_{p,gem}$	1,60 m
paalfactor	αt	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11,25 MPa
materiaalfactor	$\gamma_{m,b4}$	1,4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1,5
	$q_{c;z,d}$	5,36 MPa
	$P_{r,z,d}$	37,5 kN/m ²
	$F_{r;trek,d,i}$	60,0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

$F_{trek,d}$	536,4 kN
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ZWW6HK400+5

DRUKPALEN

FUNDERINGSCONSTRUCTIE
Toelaatbare paalbelastingen

CBN

Bepaling opneembare paalbelasting op druk

heipaal	v	
diameter	a	2 mm
		2 mm
Deq		0,001808

maximale puntweerstand

$P_{r,max;punt;i}$		11,25 MN/m ²
paalklasse factor	α_p	1,00
factor paalvoet	β	1
hoek van inwendige vrijwing van paalvoet	ϕ	40
factor dwarsdoorsnede paalvoet	s	1,00
minimale waarde neergaande deel	$q_{c,II;gem}$	9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11,00 MN/m ²

maximale paalschachtwrijving

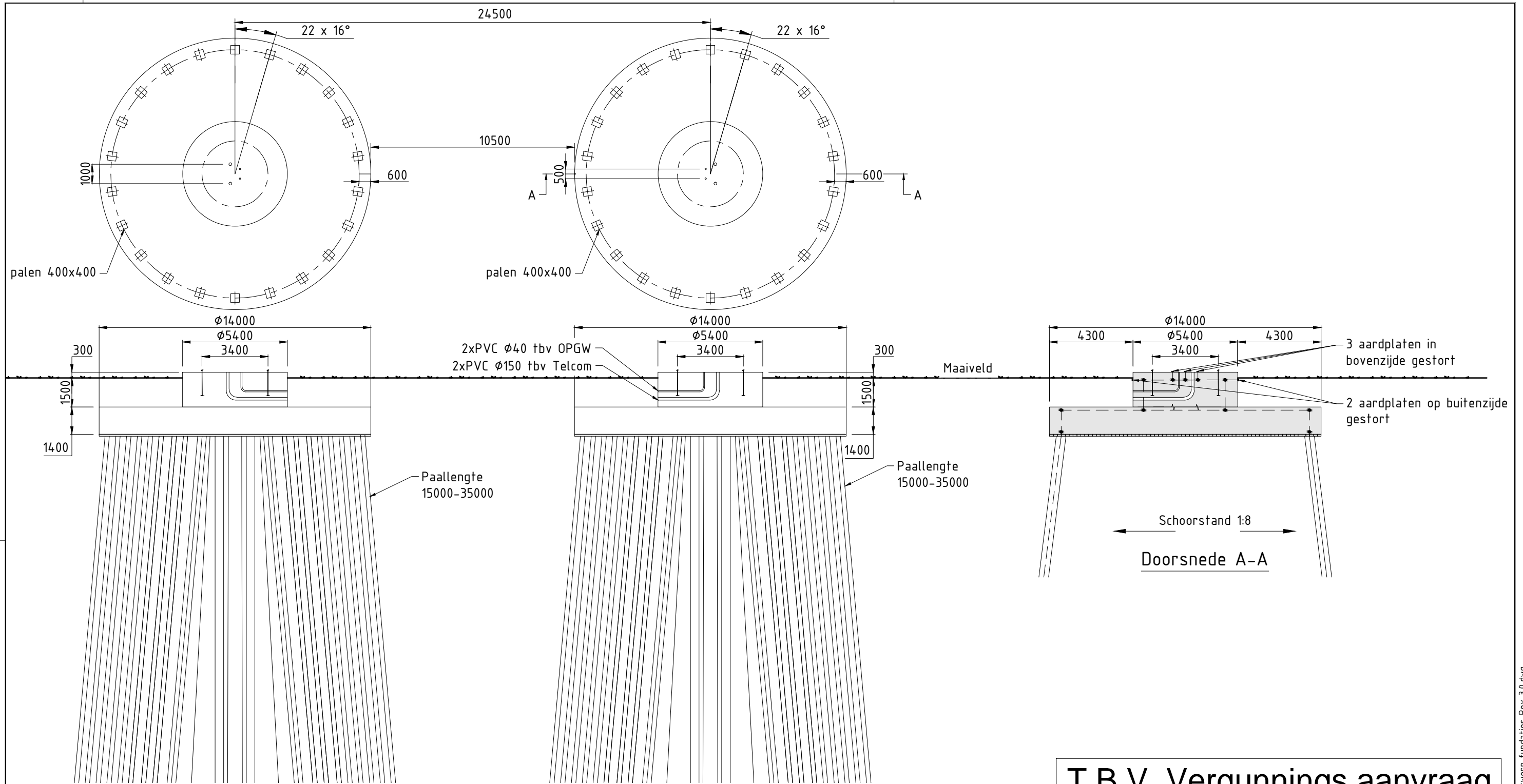
$P_{r,max;schacht;i}$		0,05 MN/m ²
waarin:		
paalfactor	α_s	0,010
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5,00 MN/m ²

maximale draagkracht alleenstaande paal

$F_{r,max;i}$		0,00 MN
waarin:		
$F_{r,max;punt;i}$		0,00 MN
paalpunt oppervlak	A_{punt}	0,00 m ²
$F_{r,max;schacht;i}$		0,00 MN
gemiddelde paalomtrek	$O_{p;gem}$	0,01 m
lengte schachtwrijving	Δl	15,00 m
Bepaling rekenwaarde van de maximale draagkracht		
$F_{r,paal,max;d}$	MN	0,00 MN

materiaalfactor grond	γ_{mb}	1,20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0,75

$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27,00 m
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T.B.V. Vergunnings aanvraag

Verklaring


- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding $\phi 16\text{mm}$ (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

Maten in mm
 Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
 Maatvoering in het 360 graden stelsel
 Vellingkanten niet getekend
 Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
 Mastvoetanker afmeting exclusief mastvoetflens breedte
 Afmetingen indicatief

3.0	20-03-2014	Diverse aanpassingen
2.0	29-01-2014	Diverse aanpassingen
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Scale: 1:200
Drawn by: RBE 20-03-2014		Units: mm
Checked by: AJP 20-03-2014		Project no: 000.145
Approved by: AW 20-03-2014		Company: TenneT
Description: Principe ontwerp fundatie hoekmast ZW6HK4.00+5 masten familie		Revision: 3.0
		Format: A3
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		



ZWW6HK400+5

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	O
Terrain category					
Hoogte			h	64.3	m
Diameter voet			d voet	3.4	m
top			d top	0.8	m
gem			d gem	2.1	m
wanddikte			t	28	mm
Oppervlakte aan voet			A	296617	mm ²
Traagheidsmoment aan voet			W _x	2.48E+08	mm ⁴
Weerstandsmoment aan voet			I _x	4.17E+11	mm ⁶
Mast: Gewicht			2 ^{de} orde F _{rep,over}	10.0 920	% kN

Bijlage BBN

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	64.3	4.1	15.5	-41.0	43.9	2820	kNm
380C1F1	54.3	21.6	65.8	-194.1	205.0	11132	kNm
380C1F2	44.1	21.6	63.8	-190.8	201.2	8871	kNm
380C1F3	33.9	21.7	61.3	-186.7	196.5	6662	kNm
380C2F1	54.3	21.6	65.8	-194.1	205.0	11132	kNm
380C2F2	44.1	21.6	63.8	-190.8	201.2	8871	kNm
380C2F3	33.9	21.7	61.3	-186.7	196.5	6662	kNm
RTG	28.3	8.4	25.8	-72.6	77.0	2180	kNm

Stuwdruk				F _{hor.}	39.7	kN
				M _{d,wind}	1152	kNm
Totaal				M _{d,tot}	58814	kNm
Totaal moment incl. 2 ^{de} orde effect				M _{d,tot}	64695	kNm

Normaalkracht;

Opretende normaalkracht							
N _{d,geleiders}					142	kN	
N _{d, e.g. mast}					1104	kN	
N _{s,d,totaal}					1329	kN	

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA
A _{eff}	0.64
	190857 mm ²

Opretende spanning tgv normaalkracht

N _d /A _{eff} = f _{yd} /γ _{m1}	7	N/mm ²
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Moment;

Opretende moment in de voet:						
M _{d,tot}					64695	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA
W _{eff}	0.94
	2.34E+08 mm ³

Opretende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	283	N/mm ²
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Totale spanning:

S _d	283	N/mm ²	< 284 N/mm ² = ACCOORD
S _{d,toegeestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	64.3	4.0	23.2	0.0	23.2	1492	kNm
380C1F1	54.3	30.1	140.6	0.0	140.6	7633	kNm
380C1F2	44.1	30.2	133.2	0.0	133.2	5876	kNm
380C1F3	33.9	30.4	123.9	0.0	123.9	4201	kNm
380C2F1	54.3	30.1	140.6	0.0	140.6	7633	kNm
380C2F2	44.1	30.2	133.2	0.0	133.2	5876	kNm
380C2F3	33.9	30.4	123.9	0.0	123.9	4201	kNm
RTG	28.3	4.1	18.2	-48.7	52.0	1472	kNm

Stuwdruk				F _{hor.}	1067	kN
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Verplaatsing					1.16	m
Percentage van de verplaatsing					1.80%	
Hoek					1.85	graden
Kromming					0.39%	
Fundatie rotatietijfheid					0.005	rad

3.54	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341

ZWW6HK400+5

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2562	5640	19570	2562	5640	-19570
Wind, 10°C	380C1F1	18886	40602	143238	18886	40602	-143238
Permanent loads yg= 1.2	380C1F2	18889	40398	143143	18889	40398	-143143
	380C1F3	18892	40140	143038	18892	40140	-143038
Wind angle: 0°	380C2F1	18886	40602	143238	18886	40602	-143238
	380C2F2	18889	40398	143143	18889	40398	-143143
	380C2F3	18892	40140	143038	18892	40140	-143038
	RTG	0	0	0	5122	10988	-38936
NL1/1b	GW / opgw	2598	5978	22016	2598	5978	-22016
Wind, -20°C	380C1F1	19168	44407	164071	19168	44407	-164071
Permanent loads yg= 1.2	380C1F2	19168	44372	164074	19168	44372	-164074
	380C1F3	19168	44327	164079	19168	44327	-164079
Wind angle: 0°	380C2F1	19168	44407	164071	19168	44407	-164071
	380C2F2	19168	44372	164074	19168	44372	-164074
	380C2F3	19168	44327	164079	19168	44327	-164079
	RTG	0	0	0	5185	11800	-43622
NL1/3	GW / opgw	10105	16290	59273	10105	16290	-59273
Wind, -5°C	380C1F1	32376	63029	230597	32376	63029	-230597
Permanent loads yg= 1.2	380C1F2	32377	62930	230600	32377	62930	-230600
	380C1F3	32377	62804	230606	32377	62804	-230606
Wind angle: 0°	380C2F1	32376	63029	230597	32376	63029	-230597
	380C2F2	32377	62930	230600	32377	62930	-230600
	380C2F3	32377	62804	230606	32377	62804	-230606
	RTG	0	0	0	20238	32380	-118718
NL1/4	GW / opgw	3389	6740	24858	3389	6740	-24858
Construction/maintenance, +5°C	380C1F1	22211	44902	165920	22211	44902	-165920
Permanent loads yg= 1.2	380C1F2	22212	44868	165924	22212	44868	-165924
	380C1F3	22212	44823	165930	22212	44823	-165930
Wind angle: 0°	380C2F1	22211	44902	165920	22211	44902	-165920
	380C2F2	22212	44868	165924	22212	44868	-165924
	380C2F3	22212	44823	165930	22212	44823	-165930
	RTG	0	0	0	6771	13415	-49652
NL1/6	GW / opgw	2881	5740	21422	2881	5740	-21422
Permanent, +10°C	380C1F1	21221	42083	157055	21221	42083	-157055
Permanent loads yg= 1.35	380C1F2	21221	42083	157055	21221	42083	-157055
	380C1F3	21221	42083	157055	21221	42083	-157055
	380C2F1	21221	42083	157055	21221	42083	-157055
	380C2F2	21221	42083	157055	21221	42083	-157055
	380C2F3	21221	42083	157055	21221	42083	-157055
	RTG	0	0	0	5755	11469	-42804
NL1/1a	GW / opgw	2523	7328	21829	2419	13591	-34147
Wind, 10°C	380C1F1	18696	49214	152729	18015	82182	-213841
Permanent loads yg= 1.2	380C1F2	18724	48126	151154	18079	77897	-205310
	380C1F3	18758	46772	149299	18171	72439	-194548
Wind angle: 45°	380C2F1	18696	49214	152729	18015	82182	-213841
	380C2F2	18724	48126	151154	18079	77897	-205310
	380C2F3	18758	46772	149299	18171	72439	-194548
	RTG	0	0	0	4903	21338	-56415
NL1/1b	GW / opgw	2596	6212	22080	2577	7026	-22909
Wind, -20°C	380C1F1	19157	45670	164260	19068	49870	-167564
Permanent loads yg= 1.2	380C1F2	19158	45524	164212	19083	49309	-166960
	380C1F3	19161	45339	164159	19100	48608	-166263
Wind angle: 45°	380C2F1	19157	45670	164260	19068	49870	-167564
	380C2F2	19158	45524	164212	19083	49309	-166960
	380C2F3	19161	45339	164159	19100	48608	-166263
	RTG	0	0	0	5163	13151	-44440
NL1/3	GW / opgw	10094	17460	59486	10015	21362	-62690
Wind, -5°C	380C1F1	32337	66686	231588	32047	79319	-244157
Permanent loads yg= 1.2	380C1F2	32343	66258	231377	32092	77617	-241968
	380C1F3	32351	65716	231143	32147	75491	-239397
Wind angle: 45°	380C2F1	32337	66686	231588	32047	79319	-244157
	380C2F2	32343	66258	231377	32092	77617	-241968
	380C2F3	32351	65716	231143	32147	75491	-239397
	RTG	0	0	0	20143	39005	-121772
NL1/4	GW / opgw	3387	6963	24884	3375	7695	-25406
Construction/maintenance, +5°C	380C1F1	22204	46138	166002	22141	50107	-168437
Permanent loads yg= 1.2	380C1F2	22205	45997	165971	22151	49585	-167978
	380C1F3	22207	45817	165939	22164	48929	-167452
Wind angle: 45°	380C2F1	22204	46138	166002	22141	50107	-168437
	380C2F2	22205	45997	165971	22151	49585	-167978
	380C2F3	22207	45817	165939	22164	48929	-167452
	RTG	0	0	0	6756	14673	-50117

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2399	15982	39023	2399	15982	-39023
	380C1F1	17852	95333	240234	17852	95333	-240234
	380C1F2	17913	89936	229380	17913	89936	-229380
	380C1F3	18003	83013	215500	18003	83013	-215500
	380C2F1	17852	95333	240234	17852	95333	-240234
	380C2F2	17913	89936	229380	17913	89936	-229380
	380C2F3	18003	83013	215500	18003	83013	-215500
	RTG	0	0	0	4858	24675	-63196
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2566	7380	23423	2566	7380
380C1F1		19018	51661	169718	19018	51661	-169718
380C1F2		19040	50912	168780	19040	50912	-168780
380C1F3		19065	49980	167687	19065	49980	-167687
380C2F1		19018	51661	169718	19018	51661	-169718
380C2F2		19040	50912	168780	19040	50912	-168780
380C2F3		19065	49980	167687	19065	49980	-167687
RTG		0	0	0	5151	13592	-44953
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°		GW / opgw	9976	23000	64645	9976	23000
	380C1F1	31902	84744	251741	31902	84744	-251741
	380C1F2	31962	82481	248476	31962	82481	-248476
	380C1F3	32038	79653	244598	32038	79653	-244598
	380C2F1	31902	84744	251741	31902	84744	-251741
	380C2F2	31962	82481	248476	31962	82481	-248476
	380C2F3	32038	79653	244598	32038	79653	-244598
	RTG	0	0	0	20097	41091	-123747
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3368	8004	25751	3368	8004
380C1F1		22104	51765	170094	22104	51765	-170094
380C1F2		22120	51074	169369	22120	51074	-169369
380C1F3		22139	50209	168531	22139	50209	-168531
380C2F1		22104	51765	170094	22104	51765	-170094
380C2F2		22120	51074	169369	22120	51074	-169369
380C2F3		22139	50209	168531	22139	50209	-168531
RTG		0	0	0	6749	15065	-50446
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	2419	13591	34147	2523	7328
	380C1F1	18015	82182	213841	18696	49214	-152729
	380C1F2	18079	77897	205310	18724	48126	-151154
	380C1F3	18171	72439	194548	18758	46772	-149299
	380C2F1	18015	82182	213841	18696	49214	-152729
	380C2F2	18079	77897	205310	18724	48126	-151154
	380C2F3	18171	72439	194548	18758	46772	-149299
	RTG	0	0	0	5077	13110	-41189
	NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2577	7026	22909	2596	6212
380C1F1		19068	49870	167564	19157	45670	-164260
380C1F2		19083	49309	166960	19158	45524	-164212
380C1F3		19100	48608	166263	19161	45339	-164159
380C2F1		19068	49870	167564	19157	45670	-164260
380C2F2		19083	49309	166960	19158	45524	-164212
380C2F3		19100	48608	166263	19161	45339	-164159
RTG		0	0	0	5182	12114	-43663
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°		GW / opgw	10015	21362	62690	10094	17460
	380C1F1	32047	79319	244157	32337	66686	-231588
	380C1F2	32092	77617	241968	32343	66258	-231377
	380C1F3	32147	75491	239397	32351	65716	-231143
	380C2F1	32047	79319	244157	32337	66686	-231588
	380C2F2	32092	77617	241968	32343	66258	-231377
	380C2F3	32147	75491	239397	32351	65716	-231143
	RTG	0	0	0	20228	33961	-118812
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3375	7695	25406	3387	6963
380C1F1		22141	50107	168437	22204	46138	-166002
380C1F2		22151	49585	167978	22205	45997	-165971
380C1F3		22164	48929	167452	22207	45817	-165939
380C2F1		22141	50107	168437	22204	46138	-166002
380C2F2		22151	49585	167978	22205	45997	-165971
380C2F3		22164	48929	167452	22207	45817	-165939
RTG		0	0	0	6769	13720	-49655
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°		GW / opgw	1928	4554	15518	1928	4554
	380C1F1	14226	32695	113731	14226	32695	-113731
	380C1F2	14230	32475	113576	14230	32475	-113576
	380C1F3	14234	32199	113401	14234	32199	-113401
	380C2F1	14226	32695	113731	14226	32695	-113731
	380C2F2	14230	32475	113576	14230	32475	-113576
	380C2F3	14234	32199	113401	14234	32199	-113401
	RTG	0	0	0	3856	8790	-30733

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	4807	17645	1963	4807	-17645
	380C1F1	14496	35984	132639	14496	35984	-132639
	380C1F2	14496	35949	132639	14496	35949	-132639
	380C1F3	14496	35903	132640	14496	35903	-132640
	380C2F1	14496	35984	132639	14496	35984	-132639
	380C2F2	14496	35949	132639	14496	35949	-132639
	380C2F3	14496	35903	132640	14496	35903	-132640
	RTG	0	0	0	3916	9459	-34887
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	9489	15566	56571	9489	15566	-56571
	380C1F1	27774	56180	205036	27774	56180	-205036
	380C1F2	27775	56080	205034	27775	56080	-205034
	380C1F3	27775	55952	205034	27775	55952	-205034
	380C2F1	27774	56180	205036	27774	56180	-205036
	380C2F2	27775	56080	205034	27775	56080	-205034
	380C2F3	27775	55952	205034	27775	55952	-205034
	RTG	0	0	0	19008	30930	-113305
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2760	5711	21016	2760	5711	-21016
	380C1F1	17573	37222	137256	17573	37222	-137256
	380C1F2	17573	37187	137259	17573	37187	-137259
	380C1F3	17573	37142	137263	17573	37142	-137263
	380C2F1	17573	37222	137256	17573	37222	-137256
	380C2F2	17573	37187	137259	17573	37187	-137259
	380C2F3	17573	37142	137263	17573	37142	-137263
	RTG	0	0	0	5514	11354	-41961
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1934	4102	15307	1934	4102	-15307
	380C1F1	14250	30274	112983	14250	30274	-112983
	380C1F2	14250	30274	112983	14250	30274	-112983
	380C1F3	14250	30274	112983	14250	30274	-112983
	380C2F1	14250	30274	112983	14250	30274	-112983
	380C2F2	14250	30274	112983	14250	30274	-112983
	380C2F3	14250	30274	112983	14250	30274	-112983
	RTG	0	0	0	3862	8190	-30564
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1882	6470	18625	1798	13216	-32751
	380C1F1	13991	42409	127339	13385	78667	-200731
	380C1F2	14023	41166	125184	13432	74103	-191161
	380C1F3	14063	39619	122608	13502	68239	-178883
	380C2F1	13991	42409	127339	13385	78667	-200731
	380C2F2	14023	41166	125184	13432	74103	-191161
	380C2F3	14063	39619	122608	13502	68239	-178883
	RTG	0	0	0	3642	20280	-52467
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1959	5055	17762	1935	5975	-18988
	380C1F1	14480	37308	133052	14361	41984	-138137
	380C1F2	14483	37152	132967	14380	41345	-137243
	380C1F3	14486	36955	132871	14403	40551	-136198
	380C2F1	14480	37308	133052	14361	41984	-138137
	380C2F2	14483	37152	132967	14380	41345	-137243
	380C2F3	14486	36955	132871	14403	40551	-136198
	RTG	0	0	0	3886	10937	-36178
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	9477	16748	56828	9393	20732	-60341
	380C1F1	27727	59947	206441	27395	73376	-221985
	380C1F2	27735	59501	206163	27444	71553	-219345
	380C1F3	27744	58938	205849	27506	69278	-216217
	380C2F1	27727	59947	206441	27395	73376	-221985
	380C2F2	27735	59501	206163	27444	71553	-219345
	380C2F3	27744	58938	205849	27506	69278	-216217
	RTG	0	0	0	18906	37655	-116734
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2758	5941	21066	2743	6724	-21782
	380C1F1	17563	38494	137476	17482	42763	-141033
	380C1F2	17564	38347	137423	17495	42191	-140388
	380C1F3	17566	38160	137364	17511	41476	-139641
	380C2F1	17563	38494	137476	17482	42763	-141033
	380C2F2	17564	38347	137423	17495	42191	-140388
	380C2F3	17566	38160	137364	17511	41476	-139641
	RTG	0	0	0	5496	12671	-42648
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1786	15688	37925	1786	15688	-37925
	380C1F1	13272	92500	229672	13272	92500	-229672
	380C1F2	13313	86851	217875	13313	86851	-217875
	380C1F3	13376	79548	202578	13376	79548	-202578
	380C2F1	13272	92500	229672	13272	92500	-229672
	380C2F2	13313	86851	217875	13313	86851	-217875
	380C2F3	13376	79548	202578	13376	79548	-202578
	RTG	0	0	0	3610	23813	-59981

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1922	6383	19704	1922	6383	-19704
	380C1F1	14297	44035	141265	14297	44035	-141265
	380C1F2	14324	43176	139913	14324	43176	-139913
	380C1F3	14357	42109	138317	14357	42109	-138317
	380C2F1	14297	44035	141265	14297	44035	-141265
	380C2F2	14324	43176	139913	14324	43176	-139913
	380C2F3	14357	42109	138317	14357	42109	-138317
	RTG	0	0	0	3872	11440	-36925
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	9353	22411	62447	9353	22411	-62447
	380C1F1	27239	79186	231007	27239	79186	-231007
	380C1F2	27303	76763	227146	27303	76763	-227146
	380C1F3	27385	73734	222515	27385	73734	-222515
	380C2F1	27239	79186	231007	27239	79186	-231007
	380C2F2	27303	76763	227146	27303	76763	-227146
	380C2F3	27385	73734	222515	27385	73734	-222515
	RTG	0	0	0	18857	39789	-118890
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2734	7062	22234	2734	7062	-22234
	380C1F1	17437	44591	143327	17437	44591	-143327
	380C1F2	17456	43827	142329	17456	43827	-142329
	380C1F3	17479	42875	141164	17479	42875	-141164
	380C2F1	17437	44591	143327	17437	44591	-143327
	380C2F2	17456	43827	142329	17456	43827	-142329
	380C2F3	17479	42875	141164	17479	42875	-141164
	RTG	0	0	0	5487	13094	-43093
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1798	13216	32751	1882	6470	-18625
	380C1F1	13385	78667	200731	13991	42409	-127339
	380C1F2	13432	74103	191161	14023	41166	-125184
	380C1F3	13502	68239	178883	14063	39619	-122608
	380C2F1	13385	78667	200731	13991	42409	-127339
	380C2F2	13432	74103	191161	14023	41166	-125184
	380C2F3	13502	68239	178883	14063	39619	-122608
	RTG	0	0	0	3801	11177	-33976
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1935	5975	18988	1959	5055	-17762
	380C1F1	14361	41984	138137	14480	37308	-133052
	380C1F2	14380	41345	137243	14483	37152	-132967
	380C1F3	14403	40551	136198	14486	36955	-132871
	380C2F1	14361	41984	138137	14480	37308	-133052
	380C2F2	14380	41345	137243	14483	37152	-132967
	380C2F3	14403	40551	136198	14486	36955	-132871
	RTG	0	0	0	3912	9787	-34980
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	9393	20732	60341	9477	16748	-56828
	380C1F1	27395	73376	221985	27727	59947	-206441
	380C1F2	27444	71553	219345	27735	59501	-206163
	380C1F3	27506	69278	216217	27744	58938	-205849
	380C2F1	27395	73376	221985	27727	59947	-206441
	380C2F2	27444	71553	219345	27735	59501	-206163
	380C2F3	27506	69278	216217	27744	58938	-205849
	RTG	0	0	0	18996	32522	-113442
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2743	6724	21782	2758	5941	-21066
	380C1F1	17482	42763	141033	17563	38494	-137476
	380C1F2	17495	42191	140388	17564	38347	-137423
	380C1F3	17511	41476	139641	17566	38160	-137364
	380C2F1	17482	42763	141033	17563	38494	-137476
	380C2F2	17495	42191	140388	17564	38347	-137423
	380C2F3	17511	41476	139641	17566	38160	-137364
	RTG	0	0	0	5512	11665	-41987

ZWW6HK400+5

Appendix BN1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2565	5420	-19459
	380C1F1	0	0	0	18899	39430	-142843
	380C1F2	0	0	0	18899	39333	-142828
	380C1F3	0	0	0	18900	39210	-142814
	380C2F1	0	0	0	18899	39430	-142843
	380C2F2	0	0	0	18899	39333	-142828
	380C2F3	0	0	0	18900	39210	-142814
RTG	0	0	0	5124	10698	-38846	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2598	5963	-22017
	380C1F1	0	0	0	19168	44320	-164080
	380C1F2	0	0	0	19168	44293	-164083
	380C1F3	0	0	0	19168	44257	-164088
	380C2F1	0	0	0	19168	44320	-164080
	380C2F2	0	0	0	19168	44293	-164083
	380C2F3	0	0	0	19168	44257	-164088
RTG	0	0	0	5185	11778	-43625	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4284	8608	-30910
	380C1F1	0	0	0	22027	46881	-171259
	380C1F2	0	0	0	22028	46800	-171255
	380C1F3	0	0	0	22028	46697	-171253
	380C2F1	0	0	0	22027	46881	-171259
	380C2F2	0	0	0	22028	46800	-171255
	380C2F3	0	0	0	22028	46697	-171253
RTG	0	0	0	8568	16979	-61669	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3226	6463	-23882
	380C1F1	0	0	0	21558	43763	-162000
	380C1F2	0	0	0	21559	43736	-162004
	380C1F3	0	0	0	21559	43700	-162010
	380C2F1	0	0	0	21558	43763	-162000
	380C2F2	0	0	0	21559	43736	-162004
	380C2F3	0	0	0	21559	43700	-162010
RTG	0	0	0	6444	12869	-47695	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2485	8958	-24818
	380C1F1	0	0	0	18485	57535	-166449
	380C1F2	0	0	0	18533	55577	-163021
	380C1F3	0	0	0	18595	53132	-158887
	380C2F1	0	0	0	18485	57535	-166449
	380C2F2	0	0	0	18533	55577	-163021
	380C2F3	0	0	0	18595	53132	-158887
RTG	0	0	0	5026	15164	-44523	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2584	6756	-22567
	380C1F1	0	0	0	19103	48500	-166161
	380C1F2	0	0	0	19113	48079	-165783
	380C1F3	0	0	0	19124	47552	-165350
	380C2F1	0	0	0	19103	48500	-166161
	380C2F2	0	0	0	19113	48079	-165783
	380C2F3	0	0	0	19124	47552	-165350
RTG	0	0	0	5170	12813	-44108	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4162	13801	-37896
	380C1F1	0	0	0	21705	61019	-186249
	380C1F2	0	0	0	21747	59505	-183932
	380C1F3	0	0	0	21800	57620	-181184
	380C2F1	0	0	0	21705	61019	-186249
	380C2F2	0	0	0	21747	59505	-183932
	380C2F3	0	0	0	21800	57620	-181184
RTG	0	0	0	8420	23563	-68923	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3216	7204	-24236
	380C1F1	0	0	0	21511	47799	-163538
	380C1F2	0	0	0	21518	47400	-163242
	380C1F3	0	0	0	21527	46899	-162905
	380C2F1	0	0	0	21511	47799	-163538
	380C2F2	0	0	0	21518	47400	-163242
	380C2F3	0	0	0	21527	46899	-162905
RTG	0	0	0	6434	13852	-47981	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2463	10149	-27160
	380C1F1	0	0	0	18342	63737	-177812
	380C1F2	0	0	0	18400	61157	-173008
	380C1F3	0	0	0	18476	57918	-167130
	380C2F1	0	0	0	18342	63737	-177812
	380C2F2	0	0	0	18400	61157	-173008
	380C2F3	0	0	0	18476	57918	-167130
RTG	0	0	0	4990	16706	-47329	

NL3/1b	GW / opgw	0	0	0	2577	7019	-22900
Wind, -20°C	380C1F1	0	0	0	19069	49836	-167527
Permanent loads yg= 1.2	380C1F2	0	0	0	19084	49279	-166929
Wind angle: 90°	380C1F3	0	0	0	19101	48582	-166238
	380C2F1	0	0	0	19069	49836	-167527
	380C2F2	0	0	0	19084	49279	-166929
	380C2F3	0	0	0	19101	48582	-166238
	RTG	0	0	0	5163	13143	-44431
NL3/3	GW / opgw	0	0	0	4127	15527	-41014
Wind, -5°C	380C1F1	0	0	0	21574	65848	-194149
Permanent loads yg= 1.2	380C1F2	0	0	0	21628	63832	-190770
Wind angle: 90°	380C1F3	0	0	0	21697	61315	-186713
	380C2F1	0	0	0	21574	65848	-194149
	380C2F2	0	0	0	21628	63832	-190770
	380C2F3	0	0	0	21697	61315	-186713
	RTG	0	0	0	8365	25791	-72596
NL3/4	GW / opgw	0	0	0	3211	7440	-24470
Construction/maintenance, +5°C	380C1F1	0	0	0	21486	49060	-164619
Permanent loads yg= 1.2	380C1F2	0	0	0	21497	48535	-164143
Wind angle: 90°	380C1F3	0	0	0	21509	47877	-163598
	380C2F1	0	0	0	21486	49060	-164619
	380C2F2	0	0	0	21497	48535	-164143
	380C2F3	0	0	0	21509	47877	-163598
	RTG	0	0	0	6429	14153	-48199
NL3/1a	GW / opgw	0	0	0	2552	6144	-20060
Wind, 10°C	380C1F1	0	0	0	18841	43213	-145183
Permanent loads yg= 1.2	380C1F2	0	0	0	18850	42752	-144757
Wind angle: -45°	380C1F3	0	0	0	18861	42176	-144268
	380C2F1	0	0	0	18841	43213	-145183
	380C2F2	0	0	0	18850	42752	-144757
	380C2F3	0	0	0	18861	42176	-144268
	RTG	0	0	0	5111	11633	-39391
NL3/1b	GW / opgw	0	0	0	2597	6145	-22049
Wind, -20°C	380C1F1	0	0	0	19161	45310	-164152
Permanent loads yg= 1.2	380C1F2	0	0	0	19162	45197	-164127
Wind angle: -45°	380C1F3	0	0	0	19163	45053	-164100
	380C2F1	0	0	0	19161	45310	-164152
	380C2F2	0	0	0	19162	45197	-164127
	380C2F3	0	0	0	19163	45053	-164100
	RTG	0	0	0	5183	12024	-43639
NL3/3	GW / opgw	0	0	0	4264	9699	-31661
Wind, -5°C	380C1F1	0	0	0	21987	49938	-172546
Permanent loads yg= 1.2	380C1F2	0	0	0	21994	49573	-172297
Wind angle: -45°	380C1F3	0	0	0	22001	49115	-172014
	380C2F1	0	0	0	21987	49938	-172546
	380C2F2	0	0	0	21994	49573	-172297
	380C2F3	0	0	0	22001	49115	-172014
	RTG	0	0	0	8549	18398	-62325
NL3/4	GW / opgw	0	0	0	3225	6639	-23893
Construction/maintenance, +5°C	380C1F1	0	0	0	21553	44738	-162014
Permanent loads yg= 1.2	380C1F2	0	0	0	21554	44627	-161998
Wind angle: -45°	380C1F3	0	0	0	21555	44486	-161983
	380C2F1	0	0	0	21553	44738	-162014
	380C2F2	0	0	0	21554	44627	-161998
	380C2F3	0	0	0	21555	44486	-161983
	RTG	0	0	0	6443	13110	-47688
NL3/1a	GW / opgw	0	0	0	1932	4316	-15340
Wind, 10°C	380C1F1	0	0	0	14243	31446	-113049
Permanent loads yg= 0.9	380C1F2	0	0	0	14244	31345	-113018
Wind angle: 0°	380C1F3	0	0	0	14245	31217	-112984
	380C2F1	0	0	0	14243	31446	-113049
	380C2F2	0	0	0	14244	31345	-113018
	380C2F3	0	0	0	14245	31217	-112984
	RTG	0	0	0	3860	8482	-30576
NL3/1b	GW / opgw	0	0	0	1963	4791	-17644
Wind, -20°C	380C1F1	0	0	0	14496	35896	-132641
Permanent loads yg= 0.9	380C1F2	0	0	0	14496	35868	-132642
Wind angle: 0°	380C1F3	0	0	0	14496	35832	-132645
	380C2F1	0	0	0	14496	35896	-132641
	380C2F2	0	0	0	14496	35868	-132642
	380C2F3	0	0	0	14496	35832	-132645
	RTG	0	0	0	3916	9437	-34888

NL3/3	GW / opgw	0	0	0	3657	7645	-27318
Wind, -5°C	380C1F1	0	0	0	17381	39062	-142079
Permanent loads yg= 0.9	380C1F2	0	0	0	17382	38979	-142066
Wind angle: 0°	380C1F3	0	0	0	17383	38873	-142054
	380C2F1	0	0	0	17381	39062	-142079
	380C2F2	0	0	0	17382	38979	-142066
	380C2F3	0	0	0	17383	38873	-142054
	RTG	0	0	0	7317	15048	-54463
NL3/4	GW / opgw	0	0	0	2596	5417	-19980
Construction/maintenance, +5°C	380C1F1	0	0	0	16916	36007	-133052
Permanent loads yg= 0.9	380C1F2	0	0	0	16916	35979	-133055
Wind angle: 0°	380C1F3	0	0	0	16916	35943	-133059
	380C2F1	0	0	0	16916	36007	-133052
	380C2F2	0	0	0	16916	35979	-133055
	380C2F3	0	0	0	16916	35943	-133059
	RTG	0	0	0	5186	10776	-39884
NL3/1a	GW / opgw	0	0	0	1848	8288	-22318
Wind, 10°C	380C1F1	0	0	0	13772	51844	-145218
Permanent loads yg= 0.9	380C1F2	0	0	0	13819	49641	-140875
Wind angle: 45°	380C1F3	0	0	0	13882	46873	-135537
	380C2F1	0	0	0	13772	51844	-145218
	380C2F2	0	0	0	13819	49641	-140875
	380C2F3	0	0	0	13882	46873	-135537
	RTG	0	0	0	3746	13513	-38364
NL3/1b	GW / opgw	0	0	0	1944	5666	-18496
Wind, -20°C	380C1F1	0	0	0	14406	40429	-136045
Permanent loads yg= 0.9	380C1F2	0	0	0	14420	39956	-135471
Wind angle: 45°	380C1F3	0	0	0	14435	39367	-134805
	380C2F1	0	0	0	14406	40429	-136045
	380C2F2	0	0	0	14420	39956	-135471
	380C2F3	0	0	0	14435	39367	-134805
	RTG	0	0	0	3896	10555	-35682
NL3/3	GW / opgw	0	0	0	3528	13178	-35573
Wind, -5°C	380C1F1	0	0	0	16996	54646	-162474
Permanent loads yg= 0.9	380C1F2	0	0	0	17042	52953	-159485
Wind angle: 45°	380C1F3	0	0	0	17101	50841	-155891
	380C2F1	0	0	0	16996	54646	-162474
	380C2F2	0	0	0	17042	52953	-159485
	380C2F3	0	0	0	17101	50841	-155891
	RTG	0	0	0	7153	22057	-63305
NL3/4	GW / opgw	0	0	0	2584	6202	-20495
Construction/maintenance, +5°C	380C1F1	0	0	0	16854	40279	-135477
Permanent loads yg= 0.9	380C1F2	0	0	0	16863	39845	-135048
Wind angle: 45°	380C1F3	0	0	0	16874	39301	-134554
	380C2F1	0	0	0	16854	40279	-135477
	380C2F2	0	0	0	16863	39845	-135048
	380C2F3	0	0	0	16874	39301	-134554
	RTG	0	0	0	5174	11802	-40333
NL3/1a	GW / opgw	0	0	0	1830	9583	-25046
Wind, 10°C	380C1F1	0	0	0	13643	58744	-159186
Permanent loads yg= 0.9	380C1F2	0	0	0	13693	55889	-153353
Wind angle: 90°	380C1F3	0	0	0	13763	52274	-146073
	380C2F1	0	0	0	13643	58744	-159186
	380C2F2	0	0	0	13693	55889	-153353
	380C2F3	0	0	0	13763	52274	-146073
	RTG	0	0	0	3712	15239	-41857
NL3/1b	GW / opgw	0	0	0	1935	5967	-18975
Wind, -20°C	380C1F1	0	0	0	14362	41945	-138081
Permanent loads yg= 0.9	380C1F2	0	0	0	14381	41311	-137196
Wind angle: 90°	380C1F3	0	0	0	14404	40522	-136161
	380C2F1	0	0	0	14362	41945	-138081
	380C2F2	0	0	0	14381	41311	-137196
	380C2F3	0	0	0	14404	40522	-136161
	RTG	0	0	0	3886	10927	-36165
NL3/3	GW / opgw	0	0	0	3496	14995	-39027
Wind, -5°C	380C1F1	0	0	0	16858	60026	-172428
Permanent loads yg= 0.9	380C1F2	0	0	0	16914	57786	-168212
Wind angle: 90°	380C1F3	0	0	0	16987	54978	-163069
	380C2F1	0	0	0	16858	60026	-172428
	380C2F2	0	0	0	16914	57786	-168212
	380C2F3	0	0	0	16987	54978	-163069
	RTG	0	0	0	7097	24435	-67540

NL3/4	GW / opgw	0	0	0	2578	6460	-20811
Construction/maintenance, +5°C	380C1F1	0	0	0	16822	41663	-137018
Permanent loads yg= 0.9	380C1F2	0	0	0	16836	41085	-136345
Wind angle: 90°	380C1F3	0	0	0	16852	40364	-135564
	380C2F1	0	0	0	16822	41663	-137018
	380C2F2	0	0	0	16836	41085	-136345
	380C2F3	0	0	0	16852	40364	-135564
	RTG	0	0	0	5167	12127	-40638
NL3/1a	GW / opgw	0	0	0	1915	5120	-16237
Wind, 10°C	380C1F1	0	0	0	14166	35580	-116700
Permanent loads yg= 0.9	380C1F2	0	0	0	14178	35064	-116067
Wind angle: -45°	380C1F3	0	0	0	14192	34421	-115332
	380C2F1	0	0	0	14166	35580	-116700
	380C2F2	0	0	0	14178	35064	-116067
	380C2F3	0	0	0	14192	34421	-115332
	RTG	0	0	0	3842	9499	-31429
NL3/1b	GW / opgw	0	0	0	1961	4982	-17710
Wind, -20°C	380C1F1	0	0	0	14486	36924	-132858
Permanent loads yg= 0.9	380C1F2	0	0	0	14488	36805	-132808
Wind angle: -45°	380C1F3	0	0	0	14490	36653	-132754
	380C2F1	0	0	0	14486	36924	-132858
	380C2F2	0	0	0	14488	36805	-132808
	380C2F3	0	0	0	14490	36653	-132754
	RTG	0	0	0	3914	9692	-34936
NL3/3	GW / opgw	0	0	0	3634	8793	-28283
Wind, -5°C	380C1F1	0	0	0	17329	42308	-144075
Permanent loads yg= 0.9	380C1F2	0	0	0	17337	41913	-143711
Wind angle: -45°	380C1F3	0	0	0	17347	41418	-143293
	380C2F1	0	0	0	17329	42308	-144075
	380C2F2	0	0	0	17337	41913	-143711
	380C2F3	0	0	0	17347	41418	-143293
	RTG	0	0	0	7294	16525	-55337
NL3/4	GW / opgw	0	0	0	2595	5598	-20009
Construction/maintenance, +5°C	380C1F1	0	0	0	16910	37007	-133162
Permanent loads yg= 0.9	380C1F2	0	0	0	16911	36892	-133130
Wind angle: -45°	380C1F3	0	0	0	16912	36746	-133096
	380C2F1	0	0	0	16910	37007	-133162
	380C2F2	0	0	0	16911	36892	-133130
	380C2F3	0	0	0	16912	36746	-133096
	RTG	0	0	0	5185	11021	-39894

ZWW6HK400+5

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2565	5420	19459	0	0	0
	380C1F1	18899	39430	142843	0	0	0
	380C1F2	18899	39333	142828	0	0	0
	380C1F3	18900	39210	142814	0	0	0
	380C2F1	18899	39430	142843	0	0	0
	380C2F2	18899	39333	142828	0	0	0
	380C2F3	18900	39210	142814	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	5963	22017	0	0	0
	380C1F1	19168	44320	164080	0	0	0
	380C1F2	19168	44293	164083	0	0	0
	380C1F3	19168	44257	164088	0	0	0
	380C2F1	19168	44320	164080	0	0	0
	380C2F2	19168	44293	164083	0	0	0
	380C2F3	19168	44257	164088	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4284	8608	30910	0	0	0
	380C1F1	22027	46881	171259	0	0	0
	380C1F2	22028	46800	171255	0	0	0
	380C1F3	22028	46697	171253	0	0	0
	380C2F1	22027	46881	171259	0	0	0
	380C2F2	22028	46800	171255	0	0	0
	380C2F3	22028	46697	171253	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3226	6463	23882	0	0	0
	380C1F1	21558	43763	162000	0	0	0
	380C1F2	21559	43736	162004	0	0	0
	380C1F3	21559	43700	162010	0	0	0
	380C2F1	21558	43763	162000	0	0	0
	380C2F2	21559	43736	162004	0	0	0
	380C2F3	21559	43700	162010	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2552	6144	20060	0	0	0
	380C1F1	18841	43213	145183	0	0	0
	380C1F2	18850	42752	144757	0	0	0
	380C1F3	18861	42176	144268	0	0	0
	380C2F1	18841	43213	145183	0	0	0
	380C2F2	18850	42752	144757	0	0	0
	380C2F3	18861	42176	144268	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2597	6145	22049	0	0	0
	380C1F1	19161	45310	164152	0	0	0
	380C1F2	19162	45197	164127	0	0	0
	380C1F3	19163	45053	164100	0	0	0
	380C2F1	19161	45310	164152	0	0	0
	380C2F2	19162	45197	164127	0	0	0
	380C2F3	19163	45053	164100	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4264	9699	31661	0	0	0
	380C1F1	21987	49938	172546	0	0	0
	380C1F2	21994	49573	172297	0	0	0
	380C1F3	22001	49115	172014	0	0	0
	380C2F1	21987	49938	172546	0	0	0
	380C2F2	21994	49573	172297	0	0	0
	380C2F3	22001	49115	172014	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3225	6639	23893	0	0	0
	380C1F1	21553	44738	162014	0	0	0
	380C1F2	21554	44627	161998	0	0	0
	380C1F3	21555	44486	161983	0	0	0
	380C2F1	21553	44738	162014	0	0	0
	380C2F2	21554	44627	161998	0	0	0
	380C2F3	21555	44486	161983	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2463	10149	27160	0	0	0
	380C1F1	18342	63737	177812	0	0	0
	380C1F2	18400	61157	173008	0	0	0
	380C1F3	18476	57918	167130	0	0	0
	380C2F1	18342	63737	177812	0	0	0
	380C2F2	18400	61157	173008	0	0	0
	380C2F3	18476	57918	167130	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2577	7019	22900	0	0	0
	380C1F1	19069	49836	167527	0	0	0
	380C1F2	19084	49279	166929	0	0	0
	380C1F3	19101	48582	166238	0	0	0
	380C2F1	19069	49836	167527	0	0	0
	380C2F2	19084	49279	166929	0	0	0
	380C2F3	19101	48582	166238	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4127	15527	41014	0	0	0
	380C1F1	21574	65848	194149	0	0	0
	380C1F2	21628	63832	190770	0	0	0
	380C1F3	21697	61315	186713	0	0	0
	380C2F1	21574	65848	194149	0	0	0
	380C2F2	21628	63832	190770	0	0	0
	380C2F3	21697	61315	186713	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3211	7440	24470	0	0	0
	380C1F1	21486	49060	164619	0	0	0
	380C1F2	21497	48535	164143	0	0	0
	380C1F3	21509	47877	163598	0	0	0
	380C2F1	21486	49060	164619	0	0	0
	380C2F2	21497	48535	164143	0	0	0
	380C2F3	21509	47877	163598	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2485	8958	24818	0	0	0
	380C1F1	18485	57535	166449	0	0	0
	380C1F2	18533	55577	163021	0	0	0
	380C1F3	18595	53132	158887	0	0	0
	380C2F1	18485	57535	166449	0	0	0
	380C2F2	18533	55577	163021	0	0	0
	380C2F3	18595	53132	158887	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2584	6756	22567	0	0	0
	380C1F1	19103	48500	166161	0	0	0
	380C1F2	19113	48079	165783	0	0	0
	380C1F3	19124	47552	163350	0	0	0
	380C2F1	19103	48500	166161	0	0	0
	380C2F2	19113	48079	165783	0	0	0
	380C2F3	19124	47552	163350	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4162	13801	37896	0	0	0
	380C1F1	21705	61019	186249	0	0	0
	380C1F2	21747	59505	183932	0	0	0
	380C1F3	21800	57620	181184	0	0	0
	380C2F1	21705	61019	186249	0	0	0
	380C2F2	21747	59505	183932	0	0	0
	380C2F3	21800	57620	181184	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3216	7204	24236	0	0	0
	380C1F1	21511	47799	163538	0	0	0
	380C1F2	21518	47400	163242	0	0	0
	380C1F3	21527	46899	162905	0	0	0
	380C2F1	21511	47799	163538	0	0	0
	380C2F2	21518	47400	163242	0	0	0
	380C2F3	21527	46899	162905	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1932	4316	15340	0	0	0
	380C1F1	14243	31446	113049	0	0	0
	380C1F2	14244	31345	113018	0	0	0
	380C1F3	14245	31217	112984	0	0	0
	380C2F1	14243	31446	113049	0	0	0
	380C2F2	14244	31345	113018	0	0	0
	380C2F3	14245	31217	112984	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	4791	17644	0	0	0
	380C1F1	14496	35896	132641	0	0	0
	380C1F2	14496	35868	132642	0	0	0
	380C1F3	14496	35832	132645	0	0	0
	380C2F1	14496	35896	132641	0	0	0
	380C2F2	14496	35868	132642	0	0	0
	380C2F3	14496	35832	132645	0	0	0
	RTG	0	0	0	0	0	0

NL3/3	GW / opgw	3657	7645	27318	0	0	0
Wind, -5°C	380C1F1	17381	39062	142079	0	0	0
Permanent loads yg= 0.9	380C1F2	17382	38979	142066	0	0	0
Wind angle: 0°	380C1F3	17383	38873	142054	0	0	0
	380C2F1	17381	39062	142079	0	0	0
	380C2F2	17382	38979	142066	0	0	0
	380C2F3	17383	38873	142054	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2596	5417	19980	0	0	0
Construction/maintenance, +5°C	380C1F1	16916	36007	133052	0	0	0
Permanent loads yg= 0.9	380C1F2	16916	35979	133055	0	0	0
Wind angle: 0°	380C1F3	16916	35943	133059	0	0	0
	380C2F1	16916	36007	133052	0	0	0
	380C2F2	16916	35979	133055	0	0	0
	380C2F3	16916	35943	133059	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1915	5120	16237	0	0	0
Wind, 10°C	380C1F1	14166	35580	116700	0	0	0
Permanent loads yg= 0.9	380C1F2	14178	35064	116067	0	0	0
Wind angle: 45°	380C1F3	14192	34421	115332	0	0	0
	380C2F1	14166	35580	116700	0	0	0
	380C2F2	14178	35064	116067	0	0	0
	380C2F3	14192	34421	115332	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1961	4982	17710	0	0	0
Wind, -20°C	380C1F1	14486	36924	132858	0	0	0
Permanent loads yg= 0.9	380C1F2	14488	36805	132808	0	0	0
Wind angle: 45°	380C1F3	14490	36653	132754	0	0	0
	380C2F1	14486	36924	132858	0	0	0
	380C2F2	14488	36805	132808	0	0	0
	380C2F3	14490	36653	132754	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3634	8793	28283	0	0	0
Wind, -5°C	380C1F1	17329	42308	144075	0	0	0
Permanent loads yg= 0.9	380C1F2	17337	41913	143711	0	0	0
Wind angle: 45°	380C1F3	17347	41418	143293	0	0	0
	380C2F1	17329	42308	144075	0	0	0
	380C2F2	17337	41913	143711	0	0	0
	380C2F3	17347	41418	143293	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2595	5598	20009	0	0	0
Construction/maintenance, +5°C	380C1F1	16910	37007	133162	0	0	0
Permanent loads yg= 0.9	380C1F2	16911	36892	133130	0	0	0
Wind angle: 45°	380C1F3	16912	36746	133096	0	0	0
	380C2F1	16910	37007	133162	0	0	0
	380C2F2	16911	36892	133130	0	0	0
	380C2F3	16912	36746	133096	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1830	9583	25046	0	0	0
Wind, 10°C	380C1F1	13643	58744	159186	0	0	0
Permanent loads yg= 0.9	380C1F2	13693	55889	153353	0	0	0
Wind angle: 90°	380C1F3	13763	52274	146073	0	0	0
	380C2F1	13643	58744	159186	0	0	0
	380C2F2	13693	55889	153353	0	0	0
	380C2F3	13763	52274	146073	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1935	5967	18975	0	0	0
Wind, -20°C	380C1F1	14362	41945	138081	0	0	0
Permanent loads yg= 0.9	380C1F2	14381	41311	137196	0	0	0
Wind angle: 90°	380C1F3	14404	40522	136161	0	0	0
	380C2F1	14362	41945	138081	0	0	0
	380C2F2	14381	41311	137196	0	0	0
	380C2F3	14404	40522	136161	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3496	14995	39027	0	0	0
Wind, -5°C	380C1F1	16858	60026	172428	0	0	0
Permanent loads yg= 0.9	380C1F2	16914	57786	168212	0	0	0
Wind angle: 90°	380C1F3	16987	54978	163069	0	0	0
	380C2F1	16858	60026	172428	0	0	0
	380C2F2	16914	57786	168212	0	0	0
	380C2F3	16987	54978	163069	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2578	6460	20811	0	0	0
Construction/maintenance, +5°C	380C1F1	16822	41663	137018	0	0	0
Permanent loads yg= 0.9	380C1F2	16836	41085	136345	0	0	0
Wind angle: 90°	380C1F3	16852	40364	135564	0	0	0
	380C2F1	16822	41663	137018	0	0	0
	380C2F2	16836	41085	136345	0	0	0
	380C2F3	16852	40364	135564	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1848	8288	22318	0	0	0
Wind, 10°C	380C1F1	13772	51844	145218	0	0	0
Permanent loads yg= 0.9	380C1F2	13819	49641	140875	0	0	0
Wind angle: -45°	380C1F3	13882	46873	135537	0	0	0
	380C2F1	13772	51844	145218	0	0	0
	380C2F2	13819	49641	140875	0	0	0
	380C2F3	13882	46873	135537	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1944	5666	18496	0	0	0
Wind, -20°C	380C1F1	14406	40429	136045	0	0	0
Permanent loads yg= 0.9	380C1F2	14420	39956	135471	0	0	0
Wind angle: -45°	380C1F3	14435	39367	134805	0	0	0
	380C2F1	14406	40429	136045	0	0	0
	380C2F2	14420	39956	135471	0	0	0
	380C2F3	14435	39367	134805	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3528	13178	35573	0	0	0
Wind, -5°C	380C1F1	16996	54646	162474	0	0	0
Permanent loads yg= 0.9	380C1F2	17042	52953	159485	0	0	0
Wind angle: -45°	380C1F3	17101	50841	155891	0	0	0
	380C2F1	16996	54646	162474	0	0	0
	380C2F2	17042	52953	159485	0	0	0
	380C2F3	17101	50841	155891	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2584	6202	20495	0	0	0
Construction/maintenance, +5°C	380C1F1	16854	40279	135477	0	0	0
Permanent loads yg= 0.9	380C1F2	16863	39845	135048	0	0	0
Wind angle: -45°	380C1F3	16874	39301	134554	0	0	0
	380C2F1	16854	40279	135477	0	0	0
	380C2F2	16863	39845	135048	0	0	0
	380C2F3	16874	39301	134554	0	0	0
	RTG	0	0	0	0	0	0

ZWW6HK400+5

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2565	5420	19459	2565	5420	-19459
	380C1F1	18899	39430	142843	18899	39430	-142843
	380C1F2	18899	39333	142828	18899	39333	-142828
	380C1F3	18900	39210	142814	18900	39210	-142814
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	5963	22017	2598	5963	-22017
	380C1F1	19168	44320	164080	19168	44320	-164080
	380C1F2	19168	44293	164083	19168	44293	-164083
	380C1F3	19168	44257	164088	19168	44257	-164088
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4284	8608	30910	4284	8608	-30910
	380C1F1	22027	46881	171259	22027	46881	-171259
	380C1F2	22028	46800	171255	22028	46800	-171255
	380C1F3	22028	46697	171253	22028	46697	-171253
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3226	6463	23882	3226	6463	-23882
	380C1F1	21558	43763	162000	21558	43763	-162000
	380C1F2	21559	43736	162004	21559	43736	-162004
	380C1F3	21559	43700	162010	21559	43700	-162010
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2552	6144	20060	2485	8958	-24818
	380C1F1	18841	43213	145183	18485	57535	-166449
	380C1F2	18850	42752	144757	18533	55577	-163021
	380C1F3	18861	42176	144268	18595	53132	-158887
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2597	6145	22049	2584	6756	-22567
	380C1F1	19161	45310	164152	19103	48500	-166161
	380C1F2	19162	45197	164127	19113	48079	-165783
	380C1F3	19163	45053	164100	19124	47552	-165350
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4264	9699	31661	4162	13801	-37896
	380C1F1	21987	49938	172546	21705	61019	-186249
	380C1F2	21994	49573	172297	21747	59505	-183932
	380C1F3	22001	49115	172014	21800	57620	-181184
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3225	6639	23893	3216	7204	-24236
	380C1F1	21553	44738	162014	21511	47799	-163538
	380C1F2	21554	44627	161998	21518	47400	-163242
	380C1F3	21555	44486	161983	21527	46899	-162905
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2463	10149	27160	2463	10149	-27160
	380C1F1	18342	63737	177812	18342	63737	-177812
	380C1F2	18400	61157	173008	18400	61157	-173008
	380C1F3	18476	57918	167130	18476	57918	-167130
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b	GW / opgw	2577	7019	22900	2577	7019	-22900
Wind, -20°C	380C1F1	19069	49836	167527	19069	49836	-167527
Permanent loads yg= 1.2	380C1F2	19084	49279	166929	19084	49279	-166929
Wind angle: 90°	380C1F3	19101	48582	166238	19101	48582	-166238
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4127	15527	41014	4127	15527	-41014
Wind, -5°C	380C1F1	21574	65848	194149	21574	65848	-194149
Permanent loads yg= 1.2	380C1F2	21628	63832	190770	21628	63832	-190770
Wind angle: 90°	380C1F3	21697	61315	186713	21697	61315	-186713
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3211	7440	24470	3211	7440	-24470
Construction/maintenance, +5°C	380C1F1	21486	49060	164619	21486	49060	-164619
Permanent loads yg= 1.2	380C1F2	21497	48535	164143	21497	48535	-164143
Wind angle: 90°	380C1F3	21509	47877	163598	21509	47877	-163598
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2485	8958	24818	2552	6144	-20060
Wind, 10°C	380C1F1	18485	57535	166449	18841	43213	-145183
Permanent loads yg= 1.2	380C1F2	18533	55577	163021	18850	42752	-144757
Wind angle: -45°	380C1F3	18595	53132	158887	18861	42176	-144268
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2584	6756	22567	2597	6145	-22049
Wind, -20°C	380C1F1	19103	48500	166161	19161	45310	-164152
Permanent loads yg= 1.2	380C1F2	19113	48079	165783	19162	45197	-164127
Wind angle: -45°	380C1F3	19124	47552	165350	19163	45053	-164100
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	4162	13801	37896	4264	9699	-31661
Wind, -5°C	380C1F1	21705	61019	186249	21987	49938	-172546
Permanent loads yg= 1.2	380C1F2	21747	59505	183932	21994	49573	-172297
Wind angle: -45°	380C1F3	21800	57620	181184	22001	49115	-172014
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	3216	7204	24236	3225	6639	-23893
Construction/maintenance, +5°C	380C1F1	21511	47799	163538	21553	44738	-162014
Permanent loads yg= 1.2	380C1F2	21518	47400	163242	21554	44627	-161998
Wind angle: -45°	380C1F3	21527	46899	162905	21555	44486	-161983
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1932	4316	15340	1932	4316	-15340
Wind, 10°C	380C1F1	14243	31446	113049	14243	31446	-113049
Permanent loads yg= 0.9	380C1F2	14244	31345	113018	14244	31345	-113018
Wind angle: 0°	380C1F3	14245	31217	112984	14245	31217	-112984
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1963	4791	17644	1963	4791	-17644
Wind, -20°C	380C1F1	14496	35896	132641	14496	35896	-132641
Permanent loads yg= 0.9	380C1F2	14496	35868	132642	14496	35868	-132642
Wind angle: 0°	380C1F3	14496	35832	132645	14496	35832	-132645
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/3	GW / opgw	3657	7645	27318	3657	7645	-27318
Wind, -5°C	380C1F1	17381	39062	142079	17381	39062	-142079
Permanent loads yg= 0.9	380C1F2	17382	38979	142066	17382	38979	-142066
Wind angle: 0°	380C1F3	17383	38873	142054	17383	38873	-142054
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2596	5417	19980	2596	5417	-19980
Construction/maintenance, +5°C	380C1F1	16916	36007	133052	16916	36007	-133052
Permanent loads yg= 0.9	380C1F2	16916	35979	133055	16916	35979	-133055
Wind angle: 0°	380C1F3	16916	35943	133059	16916	35943	-133059
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1915	5120	16237	1848	8288	-22318
Wind, 10°C	380C1F1	14166	35580	116700	13772	51844	-145218
Permanent loads yg= 0.9	380C1F2	14178	35064	116067	13819	49641	-140875
Wind angle: 45°	380C1F3	14192	34421	115332	13882	46873	-135537
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1961	4982	17710	1944	5666	-18496
Wind, -20°C	380C1F1	14486	36924	132858	14406	40429	-136045
Permanent loads yg= 0.9	380C1F2	14488	36805	132808	14420	39956	-135471
Wind angle: 45°	380C1F3	14490	36653	132754	14435	39367	-134805
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3634	8793	28283	3528	13178	-35573
Wind, -5°C	380C1F1	17329	42308	144075	16996	54646	-162474
Permanent loads yg= 0.9	380C1F2	17337	41913	143711	17042	52953	-159485
Wind angle: 45°	380C1F3	17347	41418	143293	17101	50841	-155891
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2595	5598	20009	2584	6202	-20495
Construction/maintenance, +5°C	380C1F1	16910	37007	133162	16854	40279	-135477
Permanent loads yg= 0.9	380C1F2	16911	36892	133130	16863	39845	-135048
Wind angle: 45°	380C1F3	16912	36746	133096	16874	39301	-134554
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1830	9583	25046	1830	9583	-25046
Wind, 10°C	380C1F1	13643	58744	159186	13643	58744	-159186
Permanent loads yg= 0.9	380C1F2	13693	55889	153353	13693	55889	-153353
Wind angle: 90°	380C1F3	13763	52274	146073	13763	52274	-146073
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1935	5967	18975	1935	5967	-18975
Wind, -20°C	380C1F1	14362	41945	138081	14362	41945	-138081
Permanent loads yg= 0.9	380C1F2	14381	41311	137196	14381	41311	-137196
Wind angle: 90°	380C1F3	14404	40522	136161	14404	40522	-136161
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3496	14995	39027	3496	14995	-39027
Wind, -5°C	380C1F1	16858	60026	172428	16858	60026	-172428
Permanent loads yg= 0.9	380C1F2	16914	57786	168212	16914	57786	-168212
Wind angle: 90°	380C1F3	16987	54978	163069	16987	54978	-163069
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2578	6460	20811	2578	6460	-20811
Construction/maintenance, +5°C	380C1F1	16822	41663	137018	16822	41663	-137018
Permanent loads yg= 0.9	380C1F2	16836	41085	136345	16836	41085	-136345
Wind angle: 90°	380C1F3	16852	40364	135564	16852	40364	-135564
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1848	8288	22318	1915	5120	-16237
Wind, 10°C	380C1F1	13772	51844	145218	14166	35580	-116700
Permanent loads yg= 0.9	380C1F2	13819	49641	140875	14178	35064	-116067
Wind angle: -45°	380C1F3	13882	46873	135537	14192	34421	-115332
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1944	5666	18496	1961	4982	-17710
Wind, -20°C	380C1F1	14406	40429	136045	14486	36924	-132858
Permanent loads yg= 0.9	380C1F2	14420	39956	135471	14488	36805	-132808
Wind angle: -45°	380C1F3	14435	39367	134805	14490	36653	-132754
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3528	13178	35573	3634	8793	-28283
Wind, -5°C	380C1F1	16996	54646	162474	17329	42308	-144075
Permanent loads yg= 0.9	380C1F2	17042	52953	159485	17337	41913	-143711
Wind angle: -45°	380C1F3	17101	50841	155891	17347	41418	-143293
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2584	6202	20495	2595	5598	-20009
Construction/maintenance, +5°C	380C1F1	16854	40279	135477	16910	37007	-133162
Permanent loads yg= 0.9	380C1F2	16863	39845	135048	16911	36892	-133130
Wind angle: -45°	380C1F3	16874	39301	134554	16912	36746	-133096
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

ZWW6HK400+5

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	18899	39430	142843	18899	39430	-142843
	380C2F2	18899	39333	142828	18899	39333	-142828
	380C2F3	18900	39210	142814	18900	39210	-142814
RTG	0	0	0	5124	10698	-38846	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19168	44320	164080	19168	44320	-164080
	380C2F2	19168	44293	164083	19168	44293	-164083
	380C2F3	19168	44257	164088	19168	44257	-164088
RTG	0	0	0	5185	11778	-43625	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	22027	46881	171259	22027	46881	-171259
	380C2F2	22028	46800	171255	22028	46800	-171255
	380C2F3	22028	46697	171253	22028	46697	-171253
RTG	0	0	0	8568	16979	-61669	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	21558	43763	162000	21558	43763	-162000
	380C2F2	21559	43736	162004	21559	43736	-162004
	380C2F3	21559	43700	162010	21559	43700	-162010
RTG	0	0	0	6444	12869	-47695	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	18841	43213	145183	18485	57535	-166449
	380C2F2	18850	42752	144757	18533	55577	-163021
	380C2F3	18861	42176	144268	18595	53132	-158887
RTG	0	0	0	5026	15164	-44523	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19161	45310	164152	19103	48500	-166161
	380C2F2	19162	45197	164127	19113	48079	-165783
	380C2F3	19163	45053	164100	19124	47552	-165350
RTG	0	0	0	5170	12813	-44108	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	21987	49938	172546	21705	61019	-186249
	380C2F2	21994	49573	172297	21747	59505	-183932
	380C2F3	22001	49115	172014	21800	57620	-181184
RTG	0	0	0	8420	23563	-68923	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	21553	44738	162014	21511	47799	-163538
	380C2F2	21554	44627	161998	21518	47400	-163242
	380C2F3	21555	44486	161983	21527	46899	-162905
RTG	0	0	0	6434	13852	-47981	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	18342	63737	177812	18342	63737	-177812
	380C2F2	18400	61157	173008	18400	61157	-173008
	380C2F3	18476	57918	167130	18476	57918	-167130
RTG	0	0	0	4990	16706	-47329	

NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	19069	49836	167527	19069	49836	-167527	
	380C2F2	19084	49279	166929	19084	49279	-166929	
	380C2F3	19101	48582	166238	19101	48582	-166238	
	RTG	0	0	0	5163	13143	-44431	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21574	65848	194149	21574	65848	-194149	
	380C2F2	21628	63832	190770	21628	63832	-190770	
	380C2F3	21697	61315	186713	21697	61315	-186713	
	RTG	0	0	0	8365	25791	-72596	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21486	49060	164619	21486	49060	-164619	
	380C2F2	21497	48535	164143	21497	48535	-164143	
	380C2F3	21509	47877	163598	21509	47877	-163598	
	RTG	0	0	0	6429	14153	-48199	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	18485	57535	166449	18841	43213	-145183	
	380C2F2	18533	55577	163021	18850	42752	-144757	
	380C2F3	18595	53132	158887	18861	42176	-144268	
	RTG	0	0	0	5111	11633	-39391	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	19103	48500	166161	19161	45310	-164152	
	380C2F2	19113	48079	165783	19162	45197	-164127	
	380C2F3	19124	47552	165350	19163	45053	-164100	
	RTG	0	0	0	5183	12024	-43639	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21705	61019	186249	21987	49938	-172546	
	380C2F2	21747	59505	183932	21994	49573	-172297	
	380C2F3	21800	57620	181184	22001	49115	-172014	
	RTG	0	0	0	8549	18398	-62325	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21511	47799	163538	21553	44738	-162014	
	380C2F2	21518	47400	163242	21554	44627	-161998	
	380C2F3	21527	46899	162905	21555	44486	-161983	
	RTG	0	0	0	6443	13110	-47688	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14243	31446	113049	14243	31446	-113049	
	380C2F2	14244	31345	113018	14244	31345	-113018	
	380C2F3	14245	31217	112984	14245	31217	-112984	
	RTG	0	0	0	3860	8482	-30576	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14496	35896	132641	14496	35896	-132641	
	380C2F2	14496	35868	132642	14496	35868	-132642	
	380C2F3	14496	35832	132645	14496	35832	-132645	
	RTG	0	0	0	3916	9437	-34888	

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	17381	39062	142079	17381	39062	-142079	
	380C2F2	17382	38979	142066	17382	38979	-142066	
	380C2F3	17383	38873	142054	17383	38873	-142054	
	RTG	0	0	0	7317	15048	-54463	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	16916	36007	133052	16916	36007	-133052	
	380C2F2	16916	35979	133055	16916	35979	-133055	
	380C2F3	16916	35943	133059	16916	35943	-133059	
	RTG	0	0	0	5186	10776	-39884	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14166	35580	116700	13772	51844	-145218	
	380C2F2	14178	35064	116067	13819	49641	-140875	
	380C2F3	14192	34421	115332	13882	46873	-135537	
	RTG	0	0	0	3746	13513	-38364	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14486	36924	132858	14406	40429	-136045	
	380C2F2	14488	36805	132808	14420	39956	-135471	
	380C2F3	14490	36653	132754	14435	39367	-134805	
	RTG	0	0	0	3896	10555	-35682	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	17329	42308	144075	16996	54646	-162474	
	380C2F2	17337	41913	143711	17042	52953	-159485	
	380C2F3	17347	41418	143293	17101	50841	-155891	
	RTG	0	0	0	7153	22057	-63305	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	16910	37007	133162	16854	40279	-135477	
	380C2F2	16911	36892	133130	16863	39845	-135048	
	380C2F3	16912	36746	133096	16874	39301	-134554	
	RTG	0	0	0	5174	11802	-40333	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	13643	58744	159186	13643	58744	-159186	
	380C2F2	13693	55889	153353	13693	55889	-153353	
	380C2F3	13763	52274	146073	13763	52274	-146073	
	RTG	0	0	0	3712	15239	-41857	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14362	41945	138081	14362	41945	-138081	
	380C2F2	14381	41311	137196	14381	41311	-137196	
	380C2F3	14404	40522	136161	14404	40522	-136161	
	RTG	0	0	0	3886	10927	-36165	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	16858	60026	172428	16858	60026	-172428	
	380C2F2	16914	57786	168212	16914	57786	-168212	
	380C2F3	16987	54978	163069	16987	54978	-163069	
	RTG	0	0	0	7097	24435	-67540	

NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	16822	41663	137018	16822	41663	-137018
	380C2F2	16836	41085	136345	16836	41085	-136345
	380C2F3	16852	40364	135564	16852	40364	-135564
	RTG	0	0	0	5167	12127	-40638
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	13772	51844	145218	14166	35580	-116700
	380C2F2	13819	49641	140875	14178	35064	-116067
	380C2F3	13882	46873	135537	14192	34421	-115332
	RTG	0	0	0	3842	9499	-31429
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	14406	40429	136045	14486	36924	-132858
	380C2F2	14420	39956	135471	14488	36805	-132808
	380C2F3	14435	39367	134805	14490	36653	-132754
	RTG	0	0	0	3914	9692	-34936
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	16996	54646	162474	17329	42308	-144075
	380C2F2	17042	52953	159485	17337	41913	-143711
	380C2F3	17101	50841	155891	17347	41418	-143293
	RTG	0	0	0	7294	16525	-55337
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	16854	40279	135477	16910	37007	-133162
	380C2F2	16863	39845	135048	16911	36892	-133130
	380C2F3	16874	39301	134554	16912	36746	-133096
	RTG	0	0	0	5185	11021	-39894

ZWW6HK400+5

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	18899	39430	142843	18899	39430	-142843
	380C2F2	18899	39333	142828	18899	39333	-142828
	380C2F3	18900	39210	142814	18900	39210	-142814
RTG	0	0	0	5124	10698	-38846	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19168	44320	164080	19168	44320	-164080
	380C2F2	19168	44293	164083	19168	44293	-164083
	380C2F3	19168	44257	164088	19168	44257	-164088
RTG	0	0	0	5185	11778	-43625	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	22027	46881	171259	22027	46881	-171259
	380C2F2	22028	46800	171255	22028	46800	-171255
	380C2F3	22028	46697	171253	22028	46697	-171253
RTG	0	0	0	8568	16979	-61669	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	21558	43763	162000	21558	43763	-162000
	380C2F2	21559	43736	162004	21559	43736	-162004
	380C2F3	21559	43700	162010	21559	43700	-162010
RTG	0	0	0	6444	12869	-47695	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	18841	43213	145183	18485	57535	-166449
	380C2F2	18850	42752	144757	18533	55577	-163021
	380C2F3	18861	42176	144268	18595	53132	-158887
RTG	0	0	0	5026	15164	-44523	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19161	45310	164152	19103	48500	-166161
	380C2F2	19162	45197	164127	19113	48079	-165783
	380C2F3	19163	45053	164100	19124	47552	-165350
RTG	0	0	0	5170	12813	-44108	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	21987	49938	172546	21705	61019	-186249
	380C2F2	21994	49573	172297	21747	59505	-183932
	380C2F3	22001	49115	172014	21800	57620	-181184
RTG	0	0	0	8420	23563	-68923	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	21553	44738	162014	21511	47799	-163538
	380C2F2	21554	44627	161998	21518	47400	-163242
	380C2F3	21555	44486	161983	21527	46899	-162905
RTG	0	0	0	6434	13852	-47981	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	18342	63737	177812	18342	63737	-177812
	380C2F2	18400	61157	173008	18400	61157	-173008
	380C2F3	18476	57918	167130	18476	57918	-167130
RTG	0	0	0	4990	16706	-47329	

NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	19069	49836	167527	19069	49836	-167527	
	380C2F2	19084	49279	166929	19084	49279	-166929	
	380C2F3	19101	48582	166238	19101	48582	-166238	
	RTG	0	0	0	5163	13143	-44431	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21574	65848	194149	21574	65848	-194149	
	380C2F2	21628	63832	190770	21628	63832	-190770	
	380C2F3	21697	61315	186713	21697	61315	-186713	
	RTG	0	0	0	8365	25791	-72596	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21486	49060	164619	21486	49060	-164619	
	380C2F2	21497	48535	164143	21497	48535	-164143	
	380C2F3	21509	47877	163598	21509	47877	-163598	
	RTG	0	0	0	6429	14153	-48199	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	18485	57535	166449	18841	43213	-145183	
	380C2F2	18533	55577	163021	18850	42752	-144757	
	380C2F3	18595	53132	158887	18861	42176	-144268	
	RTG	0	0	0	5111	11633	-39391	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	19103	48500	166161	19161	45310	-164152	
	380C2F2	19113	48079	165783	19162	45197	-164127	
	380C2F3	19124	47552	165350	19163	45053	-164100	
	RTG	0	0	0	5183	12024	-43639	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21705	61019	186249	21987	49938	-172546	
	380C2F2	21747	59505	183932	21994	49573	-172297	
	380C2F3	21800	57620	181184	22001	49115	-172014	
	RTG	0	0	0	8549	18398	-62325	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	21511	47799	163538	21553	44738	-162014	
	380C2F2	21518	47400	163242	21554	44627	-161998	
	380C2F3	21527	46899	162905	21555	44486	-161983	
	RTG	0	0	0	6443	13110	-47688	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14243	31446	113049	14243	31446	-113049	
	380C2F2	14244	31345	113018	14244	31345	-113018	
	380C2F3	14245	31217	112984	14245	31217	-112984	
	RTG	0	0	0	3860	8482	-30576	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14496	35896	132641	14496	35896	-132641	
	380C2F2	14496	35868	132642	14496	35868	-132642	
	380C2F3	14496	35832	132645	14496	35832	-132645	
	RTG	0	0	0	3916	9437	-34888	

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	17381	39062	142079	17381	39062	-142079	
	380C2F2	17382	38979	142066	17382	38979	-142066	
	380C2F3	17383	38873	142054	17383	38873	-142054	
	RTG	0	0	0	7317	15048	-54463	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	16916	36007	133052	16916	36007	-133052	
	380C2F2	16916	35979	133055	16916	35979	-133055	
	380C2F3	16916	35943	133059	16916	35943	-133059	
	RTG	0	0	0	5186	10776	-39884	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14166	35580	116700	13772	51844	-145218	
	380C2F2	14178	35064	116067	13819	49641	-140875	
	380C2F3	14192	34421	115332	13882	46873	-135537	
	RTG	0	0	0	3746	13513	-38364	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14486	36924	132858	14406	40429	-136045	
	380C2F2	14488	36805	132808	14420	39956	-135471	
	380C2F3	14490	36653	132754	14435	39367	-134805	
	RTG	0	0	0	3896	10555	-35682	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	17329	42308	144075	16996	54646	-162474	
	380C2F2	17337	41913	143711	17042	52953	-159485	
	380C2F3	17347	41418	143293	17101	50841	-155891	
	RTG	0	0	0	7153	22057	-63305	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	16910	37007	133162	16854	40279	-135477	
	380C2F2	16911	36892	133130	16863	39845	-135048	
	380C2F3	16912	36746	133096	16874	39301	-134554	
	RTG	0	0	0	5174	11802	-40333	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	13643	58744	159186	13643	58744	-159186	
	380C2F2	13693	55889	153353	13693	55889	-153353	
	380C2F3	13763	52274	146073	13763	52274	-146073	
	RTG	0	0	0	3712	15239	-41857	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	14362	41945	138081	14362	41945	-138081	
	380C2F2	14381	41311	137196	14381	41311	-137196	
	380C2F3	14404	40522	136161	14404	40522	-136161	
	RTG	0	0	0	3886	10927	-36165	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	16858	60026	172428	16858	60026	-172428	
	380C2F2	16914	57786	168212	16914	57786	-168212	
	380C2F3	16987	54978	163069	16987	54978	-163069	
	RTG	0	0	0	7097	24435	-67540	

NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	16822	41663	137018	16822	41663	-137018
	380C2F2	16836	41085	136345	16836	41085	-136345
	380C2F3	16852	40364	135564	16852	40364	-135564
	RTG	0	0	0	5167	12127	-40638
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	13772	51844	145218	14166	35580	-116700
	380C2F2	13819	49641	140875	14178	35064	-116067
	380C2F3	13882	46873	135537	14192	34421	-115332
	RTG	0	0	0	3842	9499	-31429
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	14406	40429	136045	14486	36924	-132858
	380C2F2	14420	39956	135471	14488	36805	-132808
	380C2F3	14435	39367	134805	14490	36653	-132754
	RTG	0	0	0	3914	9692	-34936
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	16996	54646	162474	17329	42308	-144075
	380C2F2	17042	52953	159485	17337	41913	-143711
	380C2F3	17101	50841	155891	17347	41418	-143293
	RTG	0	0	0	7294	16525	-55337
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	16854	40279	135477	16910	37007	-133162
	380C2F2	16863	39845	135048	16911	36892	-133130
	380C2F3	16874	39301	134554	16912	36746	-133096
	RTG	0	0	0	5185	11021	-39894

ZWW6HK400+5

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2565	5420	19459	0	0	0
	380C1F1	18899	39430	142843	0	0	0
	380C1F2	18899	39333	142828	0	0	0
	380C1F3	18900	39210	142814	0	0	0
	380C2F1	0	0	0	18899	39430	-142843
	380C2F2	0	0	0	18899	39333	-142828
	380C2F3	0	0	0	18900	39210	-142814
	RTG	0	0	0	5124	10698	-38846
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	5963	22017	0	0	0
	380C1F1	19168	44320	164080	0	0	0
	380C1F2	19168	44293	164083	0	0	0
	380C1F3	19168	44257	164088	0	0	0
	380C2F1	0	0	0	19168	44320	-164080
	380C2F2	0	0	0	19168	44293	-164083
	380C2F3	0	0	0	19168	44257	-164088
	RTG	0	0	0	5185	11778	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4284	8608	30910	0	0	0
	380C1F1	22027	46881	171259	0	0	0
	380C1F2	22028	46800	171255	0	0	0
	380C1F3	22028	46697	171253	0	0	0
	380C2F1	0	0	0	22027	46881	-171259
	380C2F2	0	0	0	22028	46800	-171255
	380C2F3	0	0	0	22028	46697	-171253
	RTG	0	0	0	8568	16979	-61669
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3226	6463	23882	0	0	0
	380C1F1	21558	43763	162000	0	0	0
	380C1F2	21559	43736	162004	0	0	0
	380C1F3	21559	43700	162010	0	0	0
	380C2F1	0	0	0	21558	43763	-162000
	380C2F2	0	0	0	21559	43736	-162004
	380C2F3	0	0	0	21559	43700	-162010
	RTG	0	0	0	6444	12869	-47695
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2552	6144	20060	0	0	0
	380C1F1	18841	43213	145183	0	0	0
	380C1F2	18850	42752	144757	0	0	0
	380C1F3	18861	42176	144268	0	0	0
	380C2F1	0	0	0	18485	57535	-166449
	380C2F2	0	0	0	18533	55577	-163021
	380C2F3	0	0	0	18595	53132	-158887
	RTG	0	0	0	5026	15164	-44523
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2597	6145	22049	0	0	0
	380C1F1	19161	45310	164152	0	0	0
	380C1F2	19162	45197	164127	0	0	0
	380C1F3	19163	45053	164100	0	0	0
	380C2F1	0	0	0	19103	48500	-166161
	380C2F2	0	0	0	19113	48079	-165783
	380C2F3	0	0	0	19124	47552	-165350
	RTG	0	0	0	5170	12813	-44108
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4264	9699	31661	0	0	0
	380C1F1	21987	49938	172546	0	0	0
	380C1F2	21994	49573	172297	0	0	0
	380C1F3	22001	49115	172014	0	0	0
	380C2F1	0	0	0	21705	61019	-186249
	380C2F2	0	0	0	21747	59505	-183932
	380C2F3	0	0	0	21800	57620	-181184
	RTG	0	0	0	8420	23563	-68923
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3225	6639	23893	0	0	0
	380C1F1	21553	44738	162014	0	0	0
	380C1F2	21554	44627	161998	0	0	0
	380C1F3	21555	44486	161983	0	0	0
	380C2F1	0	0	0	21511	47799	-163538
	380C2F2	0	0	0	21518	47400	-163242
	380C2F3	0	0	0	21527	46899	-162905
	RTG	0	0	0	6434	13852	-47981
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2463	10149	27160	0	0	0
	380C1F1	18342	63737	177812	0	0	0
	380C1F2	18400	61157	173008	0	0	0
	380C1F3	18476	57918	167130	0	0	0
	380C2F1	0	0	0	18342	63737	-177812
	380C2F2	0	0	0	18400	61157	-173008
	380C2F3	0	0	0	18476	57918	-167130
	RTG	0	0	0	4990	16706	-47329

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2577	7019	22900	0	0	0
	380C1F1	19069	49836	167527	0	0	0
	380C1F2	19084	49279	166929	0	0	0
	380C1F3	19101	48582	166238	0	0	0
	380C2F1	0	0	0	19069	49836	-167527
	380C2F2	0	0	0	19084	49279	-166929
	380C2F3	0	0	0	19101	48582	-166238
	RTG	0	0	0	5163	13143	-44431
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4127	15527	41014	0	0	0
	380C1F1	21574	65848	194149	0	0	0
	380C1F2	21628	63832	190770	0	0	0
	380C1F3	21697	61315	186713	0	0	0
	380C2F1	0	0	0	21574	65848	-194149
	380C2F2	0	0	0	21628	63832	-190770
	380C2F3	0	0	0	21697	61315	-186713
	RTG	0	0	0	8365	25791	-72596
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3211	7440	24470	0	0	0
	380C1F1	21486	49060	164619	0	0	0
	380C1F2	21497	48535	164143	0	0	0
	380C1F3	21509	47877	163598	0	0	0
	380C2F1	0	0	0	21486	49060	-164619
	380C2F2	0	0	0	21497	48535	-164143
	380C2F3	0	0	0	21509	47877	-163598
	RTG	0	0	0	6429	14153	-48199
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2485	8958	24818	0	0	0
	380C1F1	18485	57535	166449	0	0	0
	380C1F2	18533	55577	163021	0	0	0
	380C1F3	18595	53132	158887	0	0	0
	380C2F1	0	0	0	18841	43213	-145183
	380C2F2	0	0	0	18850	42752	-144757
	380C2F3	0	0	0	18861	42176	-144268
	RTG	0	0	0	5111	11633	-39391
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2584	6756	22567	0	0	0
	380C1F1	19103	48500	166161	0	0	0
	380C1F2	19113	48079	165783	0	0	0
	380C1F3	19124	47552	165350	0	0	0
	380C2F1	0	0	0	19161	45310	-164152
	380C2F2	0	0	0	19162	45197	-164127
	380C2F3	0	0	0	19163	45053	-164100
	RTG	0	0	0	5183	12024	-43639
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4162	13801	37896	0	0	0
	380C1F1	21705	61019	186249	0	0	0
	380C1F2	21747	59505	183932	0	0	0
	380C1F3	21800	57620	181184	0	0	0
	380C2F1	0	0	0	21987	49938	-172546
	380C2F2	0	0	0	21994	49573	-172297
	380C2F3	0	0	0	22001	49115	-172014
	RTG	0	0	0	8549	18398	-62325
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3216	7204	24236	0	0	0
	380C1F1	21511	47799	163538	0	0	0
	380C1F2	21518	47400	163242	0	0	0
	380C1F3	21527	46899	162905	0	0	0
	380C2F1	0	0	0	21553	44738	-162014
	380C2F2	0	0	0	21554	44627	-161998
	380C2F3	0	0	0	21555	44486	-161983
	RTG	0	0	0	6443	13110	-47688
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1932	4316	15340	0	0	0
	380C1F1	14243	31446	113049	0	0	0
	380C1F2	14244	31345	113018	0	0	0
	380C1F3	14245	31217	112984	0	0	0
	380C2F1	0	0	0	14243	31446	-113049
	380C2F2	0	0	0	14244	31345	-113018
	380C2F3	0	0	0	14245	31217	-112984
	RTG	0	0	0	3860	8482	-30576
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	4791	17644	0	0	0
	380C1F1	14496	35896	132641	0	0	0
	380C1F2	14496	35868	132642	0	0	0
	380C1F3	14496	35832	132645	0	0	0
	380C2F1	0	0	0	14496	35896	-132641
	380C2F2	0	0	0	14496	35868	-132642
	380C2F3	0	0	0	14496	35832	-132645
	RTG	0	0	0	3916	9437	-34888

NL3/3	GW / opgw	3657	7645	27318	0	0	0
Wind, -5°C	380C1F1	17381	39062	142079	0	0	0
Permanent loads yg= 0.9	380C1F2	17382	38979	142066	0	0	0
Wind angle: 0°	380C1F3	17383	38873	142054	0	0	0
	380C2F1	0	0	0	17381	39062	-142079
	380C2F2	0	0	0	17382	38979	-142066
	380C2F3	0	0	0	17383	38873	-142054
	RTG	0	0	0	7317	15048	-54463
NL3/4	GW / opgw	2596	5417	19980	0	0	0
Construction/maintenance, +5°C	380C1F1	16916	36007	133052	0	0	0
Permanent loads yg= 0.9	380C1F2	16916	35979	133055	0	0	0
Wind angle: 0°	380C1F3	16916	35943	133059	0	0	0
	380C2F1	0	0	0	16916	36007	-133052
	380C2F2	0	0	0	16916	35979	-133055
	380C2F3	0	0	0	16916	35943	-133059
	RTG	0	0	0	5186	10776	-39884
NL3/1a	GW / opgw	1915	5120	16237	0	0	0
Wind, 10°C	380C1F1	14166	35580	116700	0	0	0
Permanent loads yg= 0.9	380C1F2	14178	35064	116067	0	0	0
Wind angle: 45°	380C1F3	14192	34421	115332	0	0	0
	380C2F1	0	0	0	13772	51844	-145218
	380C2F2	0	0	0	13819	49641	-140875
	380C2F3	0	0	0	13882	46873	-135537
	RTG	0	0	0	3746	13513	-38364
NL3/1b	GW / opgw	1961	4982	17710	0	0	0
Wind, -20°C	380C1F1	14486	36924	132858	0	0	0
Permanent loads yg= 0.9	380C1F2	14488	36805	132808	0	0	0
Wind angle: 45°	380C1F3	14490	36653	132754	0	0	0
	380C2F1	0	0	0	14406	40429	-136045
	380C2F2	0	0	0	14420	39956	-135471
	380C2F3	0	0	0	14435	39367	-134805
	RTG	0	0	0	3896	10555	-35682
NL3/3	GW / opgw	3634	8793	28283	0	0	0
Wind, -5°C	380C1F1	17329	42308	144075	0	0	0
Permanent loads yg= 0.9	380C1F2	17337	41913	143711	0	0	0
Wind angle: 45°	380C1F3	17347	41418	143293	0	0	0
	380C2F1	0	0	0	16996	54646	-162474
	380C2F2	0	0	0	17042	52953	-159485
	380C2F3	0	0	0	17101	50841	-155891
	RTG	0	0	0	7153	22057	-63305
NL3/4	GW / opgw	2595	5598	20009	0	0	0
Construction/maintenance, +5°C	380C1F1	16910	37007	133162	0	0	0
Permanent loads yg= 0.9	380C1F2	16911	36892	133130	0	0	0
Wind angle: 45°	380C1F3	16912	36746	133096	0	0	0
	380C2F1	0	0	0	16854	40279	-135477
	380C2F2	0	0	0	16863	39845	-135048
	380C2F3	0	0	0	16874	39301	-134554
	RTG	0	0	0	5174	11802	-40333
NL3/1a	GW / opgw	1830	9583	25046	0	0	0
Wind, 10°C	380C1F1	13643	58744	159186	0	0	0
Permanent loads yg= 0.9	380C1F2	13693	55889	153353	0	0	0
Wind angle: 90°	380C1F3	13763	52274	146073	0	0	0
	380C2F1	0	0	0	13643	58744	-159186
	380C2F2	0	0	0	13693	55889	-153353
	380C2F3	0	0	0	13763	52274	-146073
	RTG	0	0	0	3712	15239	-41857
NL3/1b	GW / opgw	1935	5967	18975	0	0	0
Wind, -20°C	380C1F1	14362	41945	138081	0	0	0
Permanent loads yg= 0.9	380C1F2	14381	41311	137196	0	0	0
Wind angle: 90°	380C1F3	14404	40522	136161	0	0	0
	380C2F1	0	0	0	14362	41945	-138081
	380C2F2	0	0	0	14381	41311	-137196
	380C2F3	0	0	0	14404	40522	-136161
	RTG	0	0	0	3886	10927	-36165
NL3/3	GW / opgw	3496	14995	39027	0	0	0
Wind, -5°C	380C1F1	16858	60026	172428	0	0	0
Permanent loads yg= 0.9	380C1F2	16914	57786	168212	0	0	0
Wind angle: 90°	380C1F3	16987	54978	163069	0	0	0
	380C2F1	0	0	0	16858	60026	-172428
	380C2F2	0	0	0	16914	57786	-168212
	380C2F3	0	0	0	16987	54978	-163069
	RTG	0	0	0	7097	24435	-67540

NL3/4	GW / opgw	2578	6460	20811	0	0	0
Construction/maintenance, +5°C	380C1F1	16822	41663	137018	0	0	0
Permanent loads yg= 0.9	380C1F2	16836	41085	136345	0	0	0
Wind angle: 90°	380C1F3	16852	40364	135564	0	0	0
	380C2F1	0	0	0	16822	41663	-137018
	380C2F2	0	0	0	16836	41085	-136345
	380C2F3	0	0	0	16852	40364	-135564
	RTG	0	0	0	5167	12127	-40638
NL3/1a	GW / opgw	1848	8288	22318	0	0	0
Wind, 10°C	380C1F1	13772	51844	145218	0	0	0
Permanent loads yg= 0.9	380C1F2	13819	49641	140875	0	0	0
Wind angle: -45°	380C1F3	13882	46873	135537	0	0	0
	380C2F1	0	0	0	14166	35580	-116700
	380C2F2	0	0	0	14178	35064	-116067
	380C2F3	0	0	0	14192	34421	-115332
	RTG	0	0	0	3842	9499	-31429
NL3/1b	GW / opgw	1944	5666	18496	0	0	0
Wind, -20°C	380C1F1	14406	40429	136045	0	0	0
Permanent loads yg= 0.9	380C1F2	14420	39956	135471	0	0	0
Wind angle: -45°	380C1F3	14435	39367	134805	0	0	0
	380C2F1	0	0	0	14486	36924	-132858
	380C2F2	0	0	0	14488	36805	-132808
	380C2F3	0	0	0	14490	36653	-132754
	RTG	0	0	0	3914	9692	-34936
NL3/3	GW / opgw	3528	13178	35573	0	0	0
Wind, -5°C	380C1F1	16996	54646	162474	0	0	0
Permanent loads yg= 0.9	380C1F2	17042	52953	159485	0	0	0
Wind angle: -45°	380C1F3	17101	50841	155891	0	0	0
	380C2F1	0	0	0	17329	42308	-144075
	380C2F2	0	0	0	17337	41913	-143711
	380C2F3	0	0	0	17347	41418	-143293
	RTG	0	0	0	7294	16525	-55337
NL3/4	GW / opgw	2584	6202	20495	0	0	0
Construction/maintenance, +5°C	380C1F1	16854	40279	135477	0	0	0
Permanent loads yg= 0.9	380C1F2	16863	39845	135048	0	0	0
Wind angle: -45°	380C1F3	16874	39301	134554	0	0	0
	380C2F1	0	0	0	16910	37007	-133162
	380C2F2	0	0	0	16911	36892	-133130
	380C2F3	0	0	0	16912	36746	-133096
	RTG	0	0	0	5185	11021	-39894

ZWW6HK400+5

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2565	5420	-19459
	380C1F1	0	0	0	18899	39430	-142843
	380C1F2	0	0	0	18899	39333	-142828
	380C1F3	0	0	0	18900	39210	-142814
	380C2F1	18899	39430	142843	18899	39430	-142843
	380C2F2	18899	39333	142828	18899	39333	-142828
	380C2F3	18900	39210	142814	18900	39210	-142814
	RTG	5124	10698	38846	5124	10698	-38846
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2598	5963	-22017
	380C1F1	0	0	0	19168	44320	-164080
	380C1F2	0	0	0	19168	44293	-164083
	380C1F3	0	0	0	19168	44257	-164088
	380C2F1	19168	44320	164080	19168	44320	-164080
	380C2F2	19168	44293	164083	19168	44293	-164083
	380C2F3	19168	44257	164088	19168	44257	-164088
	RTG	5185	11778	43625	5185	11778	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	4284	8608	-30910
	380C1F1	0	0	0	22027	46881	-171259
	380C1F2	0	0	0	22028	46800	-171255
	380C1F3	0	0	0	22028	46697	-171253
	380C2F1	22027	46881	171259	22027	46881	-171259
	380C2F2	22028	46800	171255	22028	46800	-171255
	380C2F3	22028	46697	171253	22028	46697	-171253
	RTG	8568	16979	61669	8568	16979	-61669
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3226	6463	-23882
	380C1F1	0	0	0	21558	43763	-162000
	380C1F2	0	0	0	21559	43736	-162004
	380C1F3	0	0	0	21559	43700	-162010
	380C2F1	21558	43763	162000	21558	43763	-162000
	380C2F2	21559	43736	162004	21559	43736	-162004
	380C2F3	21559	43700	162010	21559	43700	-162010
	RTG	6444	12869	47695	6444	12869	-47695
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2485	8958	-24818
	380C1F1	0	0	0	18485	57535	-166449
	380C1F2	0	0	0	18533	55577	-163021
	380C1F3	0	0	0	18595	53132	-158887
	380C2F1	18841	43213	145183	18485	57535	-166449
	380C2F2	18850	42752	144757	18533	55577	-163021
	380C2F3	18861	42176	144268	18595	53132	-158887
	RTG	5111	11633	39391	5026	15164	-44523
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2584	6756	-22567
	380C1F1	0	0	0	19103	48500	-166161
	380C1F2	0	0	0	19113	48079	-165783
	380C1F3	0	0	0	19124	47552	-165350
	380C2F1	19161	45310	164152	19103	48500	-166161
	380C2F2	19162	45197	164127	19113	48079	-165783
	380C2F3	19163	45053	164100	19124	47552	-165350
	RTG	5183	12024	43639	5170	12813	-44108
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	4162	13801	-37896
	380C1F1	0	0	0	21705	61019	-186249
	380C1F2	0	0	0	21747	59505	-183932
	380C1F3	0	0	0	21800	57620	-181184
	380C2F1	21987	49938	172546	21705	61019	-186249
	380C2F2	21994	49573	172297	21747	59505	-183932
	380C2F3	22001	49115	172014	21800	57620	-181184
	RTG	8549	18398	62325	8420	23563	-68923
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3216	7204	-24236
	380C1F1	0	0	0	21511	47799	-163538
	380C1F2	0	0	0	21518	47400	-163242
	380C1F3	0	0	0	21527	46899	-162905
	380C2F1	21553	44738	162014	21511	47799	-163538
	380C2F2	21554	44627	161998	21518	47400	-163242
	380C2F3	21555	44486	161983	21527	46899	-162905
	RTG	6443	13110	47688	6434	13852	-47981
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2463	10149	-27160
	380C1F1	0	0	0	18342	63737	-177812
	380C1F2	0	0	0	18400	61157	-173008
	380C1F3	0	0	0	18476	57918	-167130
	380C2F1	18342	63737	177812	18342	63737	-177812
	380C2F2	18400	61157	173008	18400	61157	-173008
	380C2F3	18476	57918	167130	18476	57918	-167130
	RTG	4990	16706	47329	4990	16706	-47329

NL3/1b	GW / opgw	0	0	0	2577	7019	-22900
Wind, -20°C	380C1F1	0	0	0	19069	49836	-167527
Permanent loads yg= 1.2	380C1F2	0	0	0	19084	49279	-166929
Wind angle: 90°	380C1F3	0	0	0	19101	48582	-166238
	380C2F1	19069	49836	167527	19069	49836	-167527
	380C2F2	19084	49279	166929	19084	49279	-166929
	380C2F3	19101	48582	166238	19101	48582	-166238
	RTG	5163	13143	44431	5163	13143	-44431
NL3/3	GW / opgw	0	0	0	4127	15527	-41014
Wind, -5°C	380C1F1	0	0	0	21574	65848	-194149
Permanent loads yg= 1.2	380C1F2	0	0	0	21628	63832	-190770
Wind angle: 90°	380C1F3	0	0	0	21697	61315	-186713
	380C2F1	21574	65848	194149	21574	65848	-194149
	380C2F2	21628	63832	190770	21628	63832	-190770
	380C2F3	21697	61315	186713	21697	61315	-186713
	RTG	8365	25791	72596	8365	25791	-72596
NL3/4	GW / opgw	0	0	0	3211	7440	-24470
Construction/maintenance, +5°C	380C1F1	0	0	0	21486	49060	-164619
Permanent loads yg= 1.2	380C1F2	0	0	0	21497	48535	-164143
Wind angle: 90°	380C1F3	0	0	0	21509	47877	-163598
	380C2F1	21486	49060	164619	21486	49060	-164619
	380C2F2	21497	48535	164143	21497	48535	-164143
	380C2F3	21509	47877	163598	21509	47877	-163598
	RTG	6429	14153	48199	6429	14153	-48199
NL3/1a	GW / opgw	0	0	0	2552	6144	-20060
Wind, 10°C	380C1F1	0	0	0	18841	43213	-145183
Permanent loads yg= 1.2	380C1F2	0	0	0	18850	42752	-144757
Wind angle: -45°	380C1F3	0	0	0	18861	42176	-144268
	380C2F1	18485	57535	166449	18841	43213	-145183
	380C2F2	18533	55577	163021	18850	42752	-144757
	380C2F3	18595	53132	158887	18861	42176	-144268
	RTG	5026	15164	44523	5111	11633	-39391
NL3/1b	GW / opgw	0	0	0	2597	6145	-22049
Wind, -20°C	380C1F1	0	0	0	19161	45310	-164152
Permanent loads yg= 1.2	380C1F2	0	0	0	19162	45197	-164127
Wind angle: -45°	380C1F3	0	0	0	19163	45053	-164100
	380C2F1	19103	48500	166161	19161	45310	-164152
	380C2F2	19113	48079	165783	19162	45197	-164127
	380C2F3	19124	47552	163550	19163	45053	-164100
	RTG	5170	12813	44108	5183	12024	-43639
NL3/3	GW / opgw	0	0	0	4264	9699	-31661
Wind, -5°C	380C1F1	0	0	0	21987	49938	-172546
Permanent loads yg= 1.2	380C1F2	0	0	0	21994	49573	-172297
Wind angle: -45°	380C1F3	0	0	0	22001	49115	-172014
	380C2F1	21705	61019	186249	21987	49938	-172546
	380C2F2	21747	59505	183932	21994	49573	-172297
	380C2F3	21800	57620	181184	22001	49115	-172014
	RTG	8420	23563	68923	8549	18398	-62325
NL3/4	GW / opgw	0	0	0	3225	6639	-23893
Construction/maintenance, +5°C	380C1F1	0	0	0	21553	44738	-162014
Permanent loads yg= 1.2	380C1F2	0	0	0	21554	44627	-161998
Wind angle: -45°	380C1F3	0	0	0	21555	44486	-161983
	380C2F1	21511	47799	163538	21553	44738	-162014
	380C2F2	21518	47400	163242	21554	44627	-161998
	380C2F3	21527	46899	162905	21555	44486	-161983
	RTG	6434	13852	47981	6443	13110	-47688
NL3/1a	GW / opgw	0	0	0	1932	4316	-15340
Wind, 10°C	380C1F1	0	0	0	14243	31446	-113049
Permanent loads yg= 0.9	380C1F2	0	0	0	14244	31345	-113018
Wind angle: 0°	380C1F3	0	0	0	14245	31217	-112984
	380C2F1	14243	31446	113049	14243	31446	-113049
	380C2F2	14244	31345	113018	14244	31345	-113018
	380C2F3	14245	31217	112984	14245	31217	-112984
	RTG	3860	8482	30576	3860	8482	-30576
NL3/1b	GW / opgw	0	0	0	1963	4791	-17644
Wind, -20°C	380C1F1	0	0	0	14496	35896	-132641
Permanent loads yg= 0.9	380C1F2	0	0	0	14496	35868	-132642
Wind angle: 0°	380C1F3	0	0	0	14496	35832	-132645
	380C2F1	14496	35896	132641	14496	35896	-132641
	380C2F2	14496	35868	132642	14496	35868	-132642
	380C2F3	14496	35832	132645	14496	35832	-132645
	RTG	3916	9437	34888	3916	9437	-34888

NL3/3	GW / opgw	0	0	0	3657	7645	-27318
Wind, -5°C	380C1F1	0	0	0	17381	39062	-142079
Permanent loads yg= 0.9	380C1F2	0	0	0	17382	38979	-142066
Wind angle: 0°	380C1F3	0	0	0	17383	38873	-142054
	380C2F1	17381	39062	142079	17381	39062	-142079
	380C2F2	17382	38979	142066	17382	38979	-142066
	380C2F3	17383	38873	142054	17383	38873	-142054
	RTG	7317	15048	54463	7317	15048	-54463
NL3/4	GW / opgw	0	0	0	2596	5417	-19980
Construction/maintenance, +5°C	380C1F1	0	0	0	16916	36007	-133052
Permanent loads yg= 0.9	380C1F2	0	0	0	16916	35979	-133055
Wind angle: 0°	380C1F3	0	0	0	16916	35943	-133059
	380C2F1	16916	36007	133052	16916	36007	-133052
	380C2F2	16916	35979	133055	16916	35979	-133055
	380C2F3	16916	35943	133059	16916	35943	-133059
	RTG	5186	10776	39884	5186	10776	-39884
NL3/1a	GW / opgw	0	0	0	1848	8288	-22318
Wind, 10°C	380C1F1	0	0	0	13772	51844	-145218
Permanent loads yg= 0.9	380C1F2	0	0	0	13819	49641	-140875
Wind angle: 45°	380C1F3	0	0	0	13882	46873	-135537
	380C2F1	14166	35580	116700	13772	51844	-145218
	380C2F2	14178	35064	116067	13819	49641	-140875
	380C2F3	14192	34421	115332	13882	46873	-135537
	RTG	3842	9499	31429	3746	13513	-38364
NL3/1b	GW / opgw	0	0	0	1944	5666	-18496
Wind, -20°C	380C1F1	0	0	0	14406	40429	-136045
Permanent loads yg= 0.9	380C1F2	0	0	0	14420	39956	-135471
Wind angle: 45°	380C1F3	0	0	0	14435	39367	-134805
	380C2F1	14486	36924	132858	14406	40429	-136045
	380C2F2	14488	36805	132808	14420	39956	-135471
	380C2F3	14490	36653	132754	14435	39367	-134805
	RTG	3914	9692	34936	3896	10555	-35682
NL3/3	GW / opgw	0	0	0	3528	13178	-35573
Wind, -5°C	380C1F1	0	0	0	16996	54646	-162474
Permanent loads yg= 0.9	380C1F2	0	0	0	17042	52953	-159485
Wind angle: 45°	380C1F3	0	0	0	17101	50841	-155891
	380C2F1	17329	42308	144075	16996	54646	-162474
	380C2F2	17337	41913	143711	17042	52953	-159485
	380C2F3	17347	41418	143293	17101	50841	-155891
	RTG	7294	16525	55337	7153	22057	-63305
NL3/4	GW / opgw	0	0	0	2584	6202	-20495
Construction/maintenance, +5°C	380C1F1	0	0	0	16854	40279	-135477
Permanent loads yg= 0.9	380C1F2	0	0	0	16863	39845	-135048
Wind angle: 45°	380C1F3	0	0	0	16874	39301	-134554
	380C2F1	16910	37007	133162	16854	40279	-135477
	380C2F2	16911	36892	133130	16863	39845	-135048
	380C2F3	16912	36746	133096	16874	39301	-134554
	RTG	5185	11021	39894	5174	11802	-40333
NL3/1a	GW / opgw	0	0	0	1830	9583	-25046
Wind, 10°C	380C1F1	0	0	0	13643	58744	-159186
Permanent loads yg= 0.9	380C1F2	0	0	0	13693	55889	-153353
Wind angle: 90°	380C1F3	0	0	0	13763	52274	-146073
	380C2F1	13643	58744	159186	13643	58744	-159186
	380C2F2	13693	55889	153353	13693	55889	-153353
	380C2F3	13763	52274	146073	13763	52274	-146073
	RTG	3712	15239	41857	3712	15239	-41857
NL3/1b	GW / opgw	0	0	0	1935	5967	-18975
Wind, -20°C	380C1F1	0	0	0	14362	41945	-138081
Permanent loads yg= 0.9	380C1F2	0	0	0	14381	41311	-137196
Wind angle: 90°	380C1F3	0	0	0	14404	40522	-136161
	380C2F1	14362	41945	138081	14362	41945	-138081
	380C2F2	14381	41311	137196	14381	41311	-137196
	380C2F3	14404	40522	136161	14404	40522	-136161
	RTG	3886	10927	36165	3886	10927	-36165
NL3/3	GW / opgw	0	0	0	3496	14995	-39027
Wind, -5°C	380C1F1	0	0	0	16858	60026	-172428
Permanent loads yg= 0.9	380C1F2	0	0	0	16914	57786	-168212
Wind angle: 90°	380C1F3	0	0	0	16987	54978	-163069
	380C2F1	16858	60026	172428	16858	60026	-172428
	380C2F2	16914	57786	168212	16914	57786	-168212
	380C2F3	16987	54978	163069	16987	54978	-163069
	RTG	7097	24435	67540	7097	24435	-67540

NL3/4	GW / opgw	0	0	0	2578	6460	-20811
Construction/maintenance, +5°C	380C1F1	0	0	0	16822	41663	-137018
Permanent loads yg= 0.9	380C1F2	0	0	0	16836	41085	-136345
Wind angle: 90°	380C1F3	0	0	0	16852	40364	-135564
	380C2F1	16822	41663	137018	16822	41663	-137018
	380C2F2	16836	41085	136345	16836	41085	-136345
	380C2F3	16852	40364	135564	16852	40364	-135564
	RTG	5167	12127	40638	5167	12127	-40638
NL3/1a	GW / opgw	0	0	0	1915	5120	-16237
Wind, 10°C	380C1F1	0	0	0	14166	35580	-116700
Permanent loads yg= 0.9	380C1F2	0	0	0	14178	35064	-116067
Wind angle: -45°	380C1F3	0	0	0	14192	34421	-115332
	380C2F1	13772	51844	145218	14166	35580	-116700
	380C2F2	13819	49641	140875	14178	35064	-116067
	380C2F3	13882	46873	135537	14192	34421	-115332
	RTG	3746	13513	38364	3842	9499	-31429
NL3/1b	GW / opgw	0	0	0	1961	4982	-17710
Wind, -20°C	380C1F1	0	0	0	14486	36924	-132858
Permanent loads yg= 0.9	380C1F2	0	0	0	14488	36805	-132808
Wind angle: -45°	380C1F3	0	0	0	14490	36653	-132754
	380C2F1	14406	40429	136045	14486	36924	-132858
	380C2F2	14420	39956	135471	14488	36805	-132808
	380C2F3	14435	39367	134805	14490	36653	-132754
	RTG	3896	10555	35682	3914	9692	-34936
NL3/3	GW / opgw	0	0	0	3634	8793	-28283
Wind, -5°C	380C1F1	0	0	0	17329	42308	-144075
Permanent loads yg= 0.9	380C1F2	0	0	0	17337	41913	-143711
Wind angle: -45°	380C1F3	0	0	0	17347	41418	-143293
	380C2F1	16996	54646	162474	17329	42308	-144075
	380C2F2	17042	52953	159485	17337	41913	-143711
	380C2F3	17101	50841	155891	17347	41418	-143293
	RTG	7153	22057	63305	7294	16525	-55337
NL3/4	GW / opgw	0	0	0	2595	5598	-20009
Construction/maintenance, +5°C	380C1F1	0	0	0	16910	37007	-133162
Permanent loads yg= 0.9	380C1F2	0	0	0	16911	36892	-133130
Wind angle: -45°	380C1F3	0	0	0	16912	36746	-133096
	380C2F1	16854	40279	135477	16910	37007	-133162
	380C2F2	16863	39845	135048	16911	36892	-133130
	380C2F3	16874	39301	134554	16912	36746	-133096
	RTG	5174	11802	40333	5185	11021	-39894

ZWW6HK400+5

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2565	5420	19459	2565	5420	-19459
	380C1F1	18899	39430	142843	18899	39430	-142843
	380C1F2	18899	39333	142828	18899	39333	-142828
	380C1F3	18900	39210	142814	18900	39210	-142814
	380C2F1	0	0	0	18899	39430	-142843
	380C2F2	0	0	0	18899	39333	-142828
	380C2F3	0	0	0	18900	39210	-142814
	RTG	0	0	0	5124	10698	-38846
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	5963	22017	2598	5963	-22017
	380C1F1	19168	44320	164080	19168	44320	-164080
	380C1F2	19168	44293	164083	19168	44293	-164083
	380C1F3	19168	44257	164088	19168	44257	-164088
	380C2F1	0	0	0	19168	44320	-164080
	380C2F2	0	0	0	19168	44293	-164083
	380C2F3	0	0	0	19168	44257	-164088
	RTG	0	0	0	5185	11778	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4284	8608	30910	4284	8608	-30910
	380C1F1	22027	46881	171259	22027	46881	-171259
	380C1F2	22028	46800	171255	22028	46800	-171255
	380C1F3	22028	46697	171253	22028	46697	-171253
	380C2F1	0	0	0	22027	46881	-171259
	380C2F2	0	0	0	22028	46800	-171255
	380C2F3	0	0	0	22028	46697	-171253
	RTG	0	0	0	8568	16979	-61669
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3226	6463	23882	3226	6463	-23882
	380C1F1	21558	43763	162000	21558	43763	-162000
	380C1F2	21559	43736	162004	21559	43736	-162004
	380C1F3	21559	43700	162010	21559	43700	-162010
	380C2F1	0	0	0	21558	43763	-162000
	380C2F2	0	0	0	21559	43736	-162004
	380C2F3	0	0	0	21559	43700	-162010
	RTG	0	0	0	6444	12869	-47695
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2552	6144	20060	2485	8958	-24818
	380C1F1	18841	43213	145183	18485	57535	-166449
	380C1F2	18850	42752	144757	18533	55577	-163021
	380C1F3	18861	42176	144268	18595	53132	-158887
	380C2F1	0	0	0	18485	57535	-166449
	380C2F2	0	0	0	18533	55577	-163021
	380C2F3	0	0	0	18595	53132	-158887
	RTG	0	0	0	5026	15164	-44523
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2597	6145	22049	2584	6756	-22567
	380C1F1	19161	45310	164152	19103	48500	-166161
	380C1F2	19162	45197	164127	19113	48079	-165783
	380C1F3	19163	45053	164100	19124	47552	-165350
	380C2F1	0	0	0	19103	48500	-166161
	380C2F2	0	0	0	19113	48079	-165783
	380C2F3	0	0	0	19124	47552	-165350
	RTG	0	0	0	5170	12813	-44108
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4264	9699	31661	4162	13801	-37896
	380C1F1	21987	49938	172546	21705	61019	-186249
	380C1F2	21994	49573	172297	21747	59505	-183932
	380C1F3	22001	49115	172014	21800	57620	-181184
	380C2F1	0	0	0	21705	61019	-186249
	380C2F2	0	0	0	21747	59505	-183932
	380C2F3	0	0	0	21800	57620	-181184
	RTG	0	0	0	8420	23563	-68923
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3225	6639	23893	3216	7204	-24236
	380C1F1	21553	44738	162014	21511	47799	-163538
	380C1F2	21554	44627	161998	21518	47400	-163242
	380C1F3	21555	44486	161983	21527	46899	-162905
	380C2F1	0	0	0	21511	47799	-163538
	380C2F2	0	0	0	21518	47400	-163242
	380C2F3	0	0	0	21527	46899	-162905
	RTG	0	0	0	6434	13852	-47981
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2463	10149	27160	2463	10149	-27160
	380C1F1	18342	63737	177812	18342	63737	-177812
	380C1F2	18400	61157	173008	18400	61157	-173008
	380C1F3	18476	57918	167130	18476	57918	-167130
	380C2F1	0	0	0	18342	63737	-177812
	380C2F2	0	0	0	18400	61157	-173008
	380C2F3	0	0	0	18476	57918	-167130
	RTG	0	0	0	4990	16706	-47329

NL3/1b	GW / opgw	2577	7019	22900	2577	7019	-22900
Wind, -20°C	380C1F1	19069	49836	167527	19069	49836	-167527
Permanent loads yg= 1.2	380C1F2	19084	49279	166929	19084	49279	-166929
Wind angle: 90°	380C1F3	19101	48582	166238	19101	48582	-166238
	380C2F1	0	0	0	19069	49836	-167527
	380C2F2	0	0	0	19084	49279	-166929
	380C2F3	0	0	0	19101	48582	-166238
	RTG	0	0	0	5163	13143	-44431
NL3/3	GW / opgw	4127	15527	41014	4127	15527	-41014
Wind, -5°C	380C1F1	21574	65848	194149	21574	65848	-194149
Permanent loads yg= 1.2	380C1F2	21628	63832	190770	21628	63832	-190770
Wind angle: 90°	380C1F3	21697	61315	186713	21697	61315	-186713
	380C2F1	0	0	0	21574	65848	-194149
	380C2F2	0	0	0	21628	63832	-190770
	380C2F3	0	0	0	21697	61315	-186713
	RTG	0	0	0	8365	25791	-72596
NL3/4	GW / opgw	3211	7440	24470	3211	7440	-24470
Construction/maintenance, +5°C	380C1F1	21486	49060	164619	21486	49060	-164619
Permanent loads yg= 1.2	380C1F2	21497	48535	164143	21497	48535	-164143
Wind angle: 90°	380C1F3	21509	47877	163598	21509	47877	-163598
	380C2F1	0	0	0	21486	49060	-164619
	380C2F2	0	0	0	21497	48535	-164143
	380C2F3	0	0	0	21509	47877	-163598
	RTG	0	0	0	6429	14153	-48199
NL3/1a	GW / opgw	2485	8958	24818	2552	6144	-20060
Wind, 10°C	380C1F1	18485	57535	166449	18841	43213	-145183
Permanent loads yg= 1.2	380C1F2	18533	55577	163021	18850	42752	-144757
Wind angle: -45°	380C1F3	18595	53132	158887	18861	42176	-144268
	380C2F1	0	0	0	18841	43213	-145183
	380C2F2	0	0	0	18850	42752	-144757
	380C2F3	0	0	0	18861	42176	-144268
	RTG	0	0	0	5111	11633	-39391
NL3/1b	GW / opgw	2584	6756	22567	2597	6145	-22049
Wind, -20°C	380C1F1	19103	48500	166161	19161	45310	-164152
Permanent loads yg= 1.2	380C1F2	19113	48079	165783	19162	45197	-164127
Wind angle: -45°	380C1F3	19124	47552	165350	19163	45053	-164100
	380C2F1	0	0	0	19161	45310	-164152
	380C2F2	0	0	0	19162	45197	-164127
	380C2F3	0	0	0	19163	45053	-164100
	RTG	0	0	0	5183	12024	-43639
NL3/3	GW / opgw	4162	13801	37896	4264	9699	-31661
Wind, -5°C	380C1F1	21705	61019	186249	21987	49938	-172546
Permanent loads yg= 1.2	380C1F2	21747	59505	183932	21994	49573	-172297
Wind angle: -45°	380C1F3	21800	57620	181184	22001	49115	-172014
	380C2F1	0	0	0	21987	49938	-172546
	380C2F2	0	0	0	21994	49573	-172297
	380C2F3	0	0	0	22001	49115	-172014
	RTG	0	0	0	8549	18398	-62325
NL3/4	GW / opgw	3216	7204	24236	3225	6639	-23893
Construction/maintenance, +5°C	380C1F1	21511	47799	163538	21553	44738	-162014
Permanent loads yg= 1.2	380C1F2	21518	47400	163242	21554	44627	-161998
Wind angle: -45°	380C1F3	21527	46899	162905	21555	44486	-161983
	380C2F1	0	0	0	21553	44738	-162014
	380C2F2	0	0	0	21554	44627	-161998
	380C2F3	0	0	0	21555	44486	-161983
	RTG	0	0	0	6443	13110	-47688
NL3/1a	GW / opgw	1932	4316	15340	1932	4316	-15340
Wind, 10°C	380C1F1	14243	31446	113049	14243	31446	-113049
Permanent loads yg= 0.9	380C1F2	14244	31345	113018	14244	31345	-113018
Wind angle: 0°	380C1F3	14245	31217	112984	14245	31217	-112984
	380C2F1	0	0	0	14243	31446	-113049
	380C2F2	0	0	0	14244	31345	-113018
	380C2F3	0	0	0	14245	31217	-112984
	RTG	0	0	0	3860	8482	-30576
NL3/1b	GW / opgw	1963	4791	17644	1963	4791	-17644
Wind, -20°C	380C1F1	14496	35896	132641	14496	35896	-132641
Permanent loads yg= 0.9	380C1F2	14496	35868	132642	14496	35868	-132642
Wind angle: 0°	380C1F3	14496	35832	132645	14496	35832	-132645
	380C2F1	0	0	0	14496	35896	-132641
	380C2F2	0	0	0	14496	35868	-132642
	380C2F3	0	0	0	14496	35832	-132645
	RTG	0	0	0	3916	9437	-34888

NL3/3	GW / opgw	3657	7645	27318	3657	7645	-27318
Wind, -5°C	380C1F1	17381	39062	142079	17381	39062	-142079
Permanent loads yg= 0.9	380C1F2	17382	38979	142066	17382	38979	-142066
Wind angle: 0°	380C1F3	17383	38873	142054	17383	38873	-142054
	380C2F1	0	0	0	17381	39062	-142079
	380C2F2	0	0	0	17382	38979	-142066
	380C2F3	0	0	0	17383	38873	-142054
	RTG	0	0	0	7317	15048	-54463
NL3/4	GW / opgw	2596	5417	19980	2596	5417	-19980
Construction/maintenance, +5°C	380C1F1	16916	36007	133052	16916	36007	-133052
Permanent loads yg= 0.9	380C1F2	16916	35979	133055	16916	35979	-133055
Wind angle: 0°	380C1F3	16916	35943	133059	16916	35943	-133059
	380C2F1	0	0	0	16916	36007	-133052
	380C2F2	0	0	0	16916	35979	-133055
	380C2F3	0	0	0	16916	35943	-133059
	RTG	0	0	0	5186	10776	-39884
NL3/1a	GW / opgw	1915	5120	16237	1848	8288	-22318
Wind, 10°C	380C1F1	14166	35580	116700	13772	51844	-145218
Permanent loads yg= 0.9	380C1F2	14178	35064	116067	13819	49641	-140875
Wind angle: 45°	380C1F3	14192	34421	115332	13882	46873	-135537
	380C2F1	0	0	0	13772	51844	-145218
	380C2F2	0	0	0	13819	49641	-140875
	380C2F3	0	0	0	13882	46873	-135537
	RTG	0	0	0	3746	13513	-38364
NL3/1b	GW / opgw	1961	4982	17710	1944	5666	-18496
Wind, -20°C	380C1F1	14486	36924	132858	14406	40429	-136045
Permanent loads yg= 0.9	380C1F2	14488	36805	132808	14420	39956	-135471
Wind angle: 45°	380C1F3	14490	36653	132754	14435	39367	-134805
	380C2F1	0	0	0	14406	40429	-136045
	380C2F2	0	0	0	14420	39956	-135471
	380C2F3	0	0	0	14435	39367	-134805
	RTG	0	0	0	3896	10555	-35682
NL3/3	GW / opgw	3634	8793	28283	3528	13178	-35573
Wind, -5°C	380C1F1	17329	42308	144075	16996	54646	-162474
Permanent loads yg= 0.9	380C1F2	17337	41913	143711	17042	52953	-159485
Wind angle: 45°	380C1F3	17347	41418	143293	17101	50841	-155891
	380C2F1	0	0	0	16996	54646	-162474
	380C2F2	0	0	0	17042	52953	-159485
	380C2F3	0	0	0	17101	50841	-155891
	RTG	0	0	0	7153	22057	-63305
NL3/4	GW / opgw	2595	5598	20009	2584	6202	-20495
Construction/maintenance, +5°C	380C1F1	16910	37007	133162	16854	40279	-135477
Permanent loads yg= 0.9	380C1F2	16911	36892	133130	16863	39845	-135048
Wind angle: 45°	380C1F3	16912	36746	133096	16874	39301	-134554
	380C2F1	0	0	0	16854	40279	-135477
	380C2F2	0	0	0	16863	39845	-135048
	380C2F3	0	0	0	16874	39301	-134554
	RTG	0	0	0	5174	11802	-40333
NL3/1a	GW / opgw	1830	9583	25046	1830	9583	-25046
Wind, 10°C	380C1F1	13643	58744	159186	13643	58744	-159186
Permanent loads yg= 0.9	380C1F2	13693	55889	153353	13693	55889	-153353
Wind angle: 90°	380C1F3	13763	52274	146073	13763	52274	-146073
	380C2F1	0	0	0	13643	58744	-159186
	380C2F2	0	0	0	13693	55889	-153353
	380C2F3	0	0	0	13763	52274	-146073
	RTG	0	0	0	3712	15239	-41857
NL3/1b	GW / opgw	1935	5967	18975	1935	5967	-18975
Wind, -20°C	380C1F1	14362	41945	138081	14362	41945	-138081
Permanent loads yg= 0.9	380C1F2	14381	41311	137196	14381	41311	-137196
Wind angle: 90°	380C1F3	14404	40522	136161	14404	40522	-136161
	380C2F1	0	0	0	14362	41945	-138081
	380C2F2	0	0	0	14381	41311	-137196
	380C2F3	0	0	0	14404	40522	-136161
	RTG	0	0	0	3886	10927	-36165
NL3/3	GW / opgw	3496	14995	39027	3496	14995	-39027
Wind, -5°C	380C1F1	16858	60026	172428	16858	60026	-172428
Permanent loads yg= 0.9	380C1F2	16914	57786	168212	16914	57786	-168212
Wind angle: 90°	380C1F3	16987	54978	163069	16987	54978	-163069
	380C2F1	0	0	0	16858	60026	-172428
	380C2F2	0	0	0	16914	57786	-168212
	380C2F3	0	0	0	16987	54978	-163069
	RTG	0	0	0	7097	24435	-67540

NL3/4	GW / opgw	2578	6460	20811	2578	6460	-20811
Construction/maintenance, +5°C	380C1F1	16822	41663	137018	16822	41663	-137018
Permanent loads yg= 0.9	380C1F2	16836	41085	136345	16836	41085	-136345
Wind angle: 90°	380C1F3	16852	40364	135564	16852	40364	-135564
	380C2F1	0	0	0	16822	41663	-137018
	380C2F2	0	0	0	16836	41085	-136345
	380C2F3	0	0	0	16852	40364	-135564
	RTG	0	0	0	5167	12127	-40638
NL3/1a	GW / opgw	1848	8288	22318	1915	5120	-16237
Wind, 10°C	380C1F1	13772	51844	145218	14166	35580	-116700
Permanent loads yg= 0.9	380C1F2	13819	49641	140875	14178	35064	-116067
Wind angle: -45°	380C1F3	13882	46873	135537	14192	34421	-115332
	380C2F1	0	0	0	14166	35580	-116700
	380C2F2	0	0	0	14178	35064	-116067
	380C2F3	0	0	0	14192	34421	-115332
	RTG	0	0	0	3842	9499	-31429
NL3/1b	GW / opgw	1944	5666	18496	1961	4982	-17710
Wind, -20°C	380C1F1	14406	40429	136045	14486	36924	-132858
Permanent loads yg= 0.9	380C1F2	14420	39956	135471	14488	36805	-132808
Wind angle: -45°	380C1F3	14435	39367	134805	14490	36653	-132754
	380C2F1	0	0	0	14486	36924	-132858
	380C2F2	0	0	0	14488	36805	-132808
	380C2F3	0	0	0	14490	36653	-132754
	RTG	0	0	0	3914	9692	-34936
NL3/3	GW / opgw	3528	13178	35573	3634	8793	-28283
Wind, -5°C	380C1F1	16996	54646	162474	17329	42308	-144075
Permanent loads yg= 0.9	380C1F2	17042	52953	159485	17337	41913	-143711
Wind angle: -45°	380C1F3	17101	50841	155891	17347	41418	-143293
	380C2F1	0	0	0	17329	42308	-144075
	380C2F2	0	0	0	17337	41913	-143711
	380C2F3	0	0	0	17347	41418	-143293
	RTG	0	0	0	7294	16525	-55337
NL3/4	GW / opgw	2584	6202	20495	2595	5598	-20009
Construction/maintenance, +5°C	380C1F1	16854	40279	135477	16910	37007	-133162
Permanent loads yg= 0.9	380C1F2	16863	39845	135048	16911	36892	-133130
Wind angle: -45°	380C1F3	16874	39301	134554	16912	36746	-133096
	380C2F1	0	0	0	16910	37007	-133162
	380C2F2	0	0	0	16911	36892	-133130
	380C2F3	0	0	0	16912	36746	-133096
	RTG	0	0	0	5185	11021	-39894

ZWW6HK400+5

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2565	5420	19459	0	0	0
	380C1F1	18899	39430	142843	0	0	0
	380C1F2	18899	39333	142828	0	0	0
	380C1F3	18900	39210	142814	0	0	0
	380C2F1	18899	39430	142843	18899	39430	-142843
	380C2F2	18899	39333	142828	18899	39333	-142828
	380C2F3	18900	39210	142814	18900	39210	-142814
	RTG	0	0	0	5124	10698	-38846
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	5963	22017	0	0	0
	380C1F1	19168	44320	164080	0	0	0
	380C1F2	19168	44293	164083	0	0	0
	380C1F3	19168	44257	164088	0	0	0
	380C2F1	19168	44320	164080	19168	44320	-164080
	380C2F2	19168	44293	164083	19168	44293	-164083
	380C2F3	19168	44257	164088	19168	44257	-164088
	RTG	0	0	0	5185	11778	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4284	8608	30910	0	0	0
	380C1F1	22027	46881	171259	0	0	0
	380C1F2	22028	46800	171255	0	0	0
	380C1F3	22028	46697	171253	0	0	0
	380C2F1	22027	46881	171259	22027	46881	-171259
	380C2F2	22028	46800	171255	22028	46800	-171255
	380C2F3	22028	46697	171253	22028	46697	-171253
	RTG	0	0	0	8568	16979	-61669
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3226	6463	23882	0	0	0
	380C1F1	21558	43763	162000	0	0	0
	380C1F2	21559	43736	162004	0	0	0
	380C1F3	21559	43700	162010	0	0	0
	380C2F1	21558	43763	162000	21558	43763	-162000
	380C2F2	21559	43736	162004	21559	43736	-162004
	380C2F3	21559	43700	162010	21559	43700	-162010
	RTG	0	0	0	6444	12869	-47695
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2552	6144	20060	0	0	0
	380C1F1	18841	43213	145183	0	0	0
	380C1F2	18850	42752	144757	0	0	0
	380C1F3	18861	42176	144268	0	0	0
	380C2F1	18841	43213	145183	18485	57535	-166449
	380C2F2	18850	42752	144757	18533	55577	-163021
	380C2F3	18861	42176	144268	18595	53132	-158887
	RTG	0	0	0	5026	15164	-44523
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2597	6145	22049	0	0	0
	380C1F1	19161	45310	164152	0	0	0
	380C1F2	19162	45197	164127	0	0	0
	380C1F3	19163	45053	164100	0	0	0
	380C2F1	19161	45310	164152	19103	48500	-166161
	380C2F2	19162	45197	164127	19113	48079	-165783
	380C2F3	19163	45053	164100	19124	47552	-165350
	RTG	0	0	0	5170	12813	-44108
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4264	9699	31661	0	0	0
	380C1F1	21987	49938	172546	0	0	0
	380C1F2	21994	49573	172297	0	0	0
	380C1F3	22001	49115	172014	0	0	0
	380C2F1	21987	49938	172546	21705	61019	-186249
	380C2F2	21994	49573	172297	21747	59505	-183932
	380C2F3	22001	49115	172014	21800	57620	-181184
	RTG	0	0	0	8420	23563	-68923
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3225	6639	23893	0	0	0
	380C1F1	21553	44738	162014	0	0	0
	380C1F2	21554	44627	161998	0	0	0
	380C1F3	21555	44486	161983	0	0	0
	380C2F1	21553	44738	162014	21511	47799	-163538
	380C2F2	21554	44627	161998	21518	47400	-163242
	380C2F3	21555	44486	161983	21527	46899	-162905
	RTG	0	0	0	6434	13852	-47981
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2463	10149	27160	0	0	0
	380C1F1	18342	63737	177812	0	0	0
	380C1F2	18400	61157	173008	0	0	0
	380C1F3	18476	57918	167130	0	0	0
	380C2F1	18342	63737	177812	18342	63737	-177812
	380C2F2	18400	61157	173008	18400	61157	-173008
	380C2F3	18476	57918	167130	18476	57918	-167130
	RTG	0	0	0	4990	16706	-47329

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2577	7019	22900	0	0	0
	380C1F1	19069	49836	167527	0	0	0
	380C1F2	19084	49279	166929	0	0	0
	380C1F3	19101	48582	166238	0	0	0
	380C2F1	19069	49836	167527	19069	49836	-167527
	380C2F2	19084	49279	166929	19084	49279	-166929
	380C2F3	19101	48582	166238	19101	48582	-166238
	RTG	0	0	0	5163	13143	-44431
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	4127	15527	41014	0	0	0
	380C1F1	21574	65848	194149	0	0	0
	380C1F2	21628	63832	190770	0	0	0
	380C1F3	21697	61315	186713	0	0	0
	380C2F1	21574	65848	194149	21574	65848	-194149
	380C2F2	21628	63832	190770	21628	63832	-190770
	380C2F3	21697	61315	186713	21697	61315	-186713
	RTG	0	0	0	8365	25791	-72596
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3211	7440	24470	0	0	0
	380C1F1	21486	49060	164619	0	0	0
	380C1F2	21497	48535	164143	0	0	0
	380C1F3	21509	47877	163598	0	0	0
	380C2F1	21486	49060	164619	21486	49060	-164619
	380C2F2	21497	48535	164143	21497	48535	-164143
	380C2F3	21509	47877	163598	21509	47877	-163598
	RTG	0	0	0	6429	14153	-48199
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2485	8958	24818	0	0	0
	380C1F1	18485	57535	166449	0	0	0
	380C1F2	18533	55577	163021	0	0	0
	380C1F3	18595	53132	158887	0	0	0
	380C2F1	18485	57535	166449	18841	43213	-145183
	380C2F2	18533	55577	163021	18850	42752	-144757
	380C2F3	18595	53132	158887	18861	42176	-144268
	RTG	0	0	0	5111	11633	-39391
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2584	6756	22567	0	0	0
	380C1F1	19103	48500	166161	0	0	0
	380C1F2	19113	48079	165783	0	0	0
	380C1F3	19124	47552	165350	0	0	0
	380C2F1	19103	48500	166161	19161	45310	-164152
	380C2F2	19113	48079	165783	19162	45197	-164127
	380C2F3	19124	47552	165350	19163	45053	-164100
	RTG	0	0	0	5183	12024	-43639
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	4162	13801	37896	0	0	0
	380C1F1	21705	61019	186249	0	0	0
	380C1F2	21747	59505	183932	0	0	0
	380C1F3	21800	57620	181184	0	0	0
	380C2F1	21705	61019	186249	21987	49938	-172546
	380C2F2	21747	59505	183932	21994	49573	-172297
	380C2F3	21800	57620	181184	22001	49115	-172014
	RTG	0	0	0	8549	18398	-62325
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3216	7204	24236	0	0	0
	380C1F1	21511	47799	163538	0	0	0
	380C1F2	21518	47400	163242	0	0	0
	380C1F3	21527	46899	162905	0	0	0
	380C2F1	21511	47799	163538	21553	44738	-162014
	380C2F2	21518	47400	163242	21554	44627	-161998
	380C2F3	21527	46899	162905	21555	44486	-161983
	RTG	0	0	0	6443	13110	-47688
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1932	4316	15340	0	0	0
	380C1F1	14243	31446	113049	0	0	0
	380C1F2	14244	31345	113018	0	0	0
	380C1F3	14245	31217	112984	0	0	0
	380C2F1	14243	31446	113049	14243	31446	-113049
	380C2F2	14244	31345	113018	14244	31345	-113018
	380C2F3	14245	31217	112984	14245	31217	-112984
	RTG	0	0	0	3860	8482	-30576
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1963	4791	17644	0	0	0
	380C1F1	14496	35896	132641	0	0	0
	380C1F2	14496	35868	132642	0	0	0
	380C1F3	14496	35832	132645	0	0	0
	380C2F1	14496	35896	132641	14496	35896	-132641
	380C2F2	14496	35868	132642	14496	35868	-132642
	380C2F3	14496	35832	132645	14496	35832	-132645
	RTG	0	0	0	3916	9437	-34888

NL3/3	GW / opgw	3657	7645	27318	0	0	0
Wind, -5°C	380C1F1	17381	39062	142079	0	0	0
Permanent loads yg= 0.9	380C1F2	17382	38979	142066	0	0	0
Wind angle: 0°	380C1F3	17383	38873	142054	0	0	0
	380C2F1	17381	39062	142079	17381	39062	-142079
	380C2F2	17382	38979	142066	17382	38979	-142066
	380C2F3	17383	38873	142054	17383	38873	-142054
	RTG	0	0	0	7317	15048	-54463
NL3/4	GW / opgw	2596	5417	19980	0	0	0
Construction/maintenance, +5°C	380C1F1	16916	36007	133052	0	0	0
Permanent loads yg= 0.9	380C1F2	16916	35979	133055	0	0	0
Wind angle: 0°	380C1F3	16916	35943	133059	0	0	0
	380C2F1	16916	36007	133052	16916	36007	-133052
	380C2F2	16916	35979	133055	16916	35979	-133055
	380C2F3	16916	35943	133059	16916	35943	-133059
	RTG	0	0	0	5186	10776	-39884
NL3/1a	GW / opgw	1915	5120	16237	0	0	0
Wind, 10°C	380C1F1	14166	35580	116700	0	0	0
Permanent loads yg= 0.9	380C1F2	14178	35064	116067	0	0	0
Wind angle: 45°	380C1F3	14192	34421	115332	0	0	0
	380C2F1	14166	35580	116700	13772	51844	-145218
	380C2F2	14178	35064	116067	13819	49641	-140875
	380C2F3	14192	34421	115332	13882	46873	-135537
	RTG	0	0	0	3746	13513	-38364
NL3/1b	GW / opgw	1961	4982	17710	0	0	0
Wind, -20°C	380C1F1	14486	36924	132858	0	0	0
Permanent loads yg= 0.9	380C1F2	14488	36805	132808	0	0	0
Wind angle: 45°	380C1F3	14490	36653	132754	0	0	0
	380C2F1	14486	36924	132858	14406	40429	-136045
	380C2F2	14488	36805	132808	14420	39956	-135471
	380C2F3	14490	36653	132754	14435	39367	-134805
	RTG	0	0	0	3896	10555	-35682
NL3/3	GW / opgw	3634	8793	28283	0	0	0
Wind, -5°C	380C1F1	17329	42308	144075	0	0	0
Permanent loads yg= 0.9	380C1F2	17337	41913	143711	0	0	0
Wind angle: 45°	380C1F3	17347	41418	143293	0	0	0
	380C2F1	17329	42308	144075	16996	54646	-162474
	380C2F2	17337	41913	143711	17042	52953	-159485
	380C2F3	17347	41418	143293	17101	50841	-155891
	RTG	0	0	0	7153	22057	-63305
NL3/4	GW / opgw	2595	5598	20009	0	0	0
Construction/maintenance, +5°C	380C1F1	16910	37007	133162	0	0	0
Permanent loads yg= 0.9	380C1F2	16911	36892	133130	0	0	0
Wind angle: 45°	380C1F3	16912	36746	133096	0	0	0
	380C2F1	16910	37007	133162	16854	40279	-135477
	380C2F2	16911	36892	133130	16863	39845	-135048
	380C2F3	16912	36746	133096	16874	39301	-134554
	RTG	0	0	0	5174	11802	-40333
NL3/1a	GW / opgw	1830	9583	25046	0	0	0
Wind, 10°C	380C1F1	13643	58744	159186	0	0	0
Permanent loads yg= 0.9	380C1F2	13693	55889	153353	0	0	0
Wind angle: 90°	380C1F3	13763	52274	146073	0	0	0
	380C2F1	13643	58744	159186	13643	58744	-159186
	380C2F2	13693	55889	153353	13693	55889	-153353
	380C2F3	13763	52274	146073	13763	52274	-146073
	RTG	0	0	0	3712	15239	-41857
NL3/1b	GW / opgw	1935	5967	18975	0	0	0
Wind, -20°C	380C1F1	14362	41945	138081	0	0	0
Permanent loads yg= 0.9	380C1F2	14381	41311	137196	0	0	0
Wind angle: 90°	380C1F3	14404	40522	136161	0	0	0
	380C2F1	14362	41945	138081	14362	41945	-138081
	380C2F2	14381	41311	137196	14381	41311	-137196
	380C2F3	14404	40522	136161	14404	40522	-136161
	RTG	0	0	0	3886	10927	-36165
NL3/3	GW / opgw	3496	14995	39027	0	0	0
Wind, -5°C	380C1F1	16858	60026	172428	0	0	0
Permanent loads yg= 0.9	380C1F2	16914	57786	168212	0	0	0
Wind angle: 90°	380C1F3	16987	54978	163069	0	0	0
	380C2F1	16858	60026	172428	16858	60026	-172428
	380C2F2	16914	57786	168212	16914	57786	-168212
	380C2F3	16987	54978	163069	16987	54978	-163069
	RTG	0	0	0	7097	24435	-67540

NL3/4	GW / opgw	2578	6460	20811	0	0	0
Construction/maintenance, +5°C	380C1F1	16822	41663	137018	0	0	0
Permanent loads yg= 0.9	380C1F2	16836	41085	136345	0	0	0
Wind angle: 90°	380C1F3	16852	40364	135564	0	0	0
	380C2F1	16822	41663	137018	16822	41663	-137018
	380C2F2	16836	41085	136345	16836	41085	-136345
	380C2F3	16852	40364	135564	16852	40364	-135564
	RTG	0	0	0	5167	12127	-40638
NL3/1a	GW / opgw	1848	8288	22318	0	0	0
Wind, 10°C	380C1F1	13772	51844	145218	0	0	0
Permanent loads yg= 0.9	380C1F2	13819	49641	140875	0	0	0
Wind angle: -45°	380C1F3	13882	46873	135537	0	0	0
	380C2F1	13772	51844	145218	14166	35580	-116700
	380C2F2	13819	49641	140875	14178	35064	-116067
	380C2F3	13882	46873	135537	14192	34421	-115332
	RTG	0	0	0	3842	9499	-31429
NL3/1b	GW / opgw	1944	5666	18496	0	0	0
Wind, -20°C	380C1F1	14406	40429	136045	0	0	0
Permanent loads yg= 0.9	380C1F2	14420	39956	135471	0	0	0
Wind angle: -45°	380C1F3	14435	39367	134805	0	0	0
	380C2F1	14406	40429	136045	14486	36924	-132858
	380C2F2	14420	39956	135471	14488	36805	-132808
	380C2F3	14435	39367	134805	14490	36653	-132754
	RTG	0	0	0	3914	9692	-34936
NL3/3	GW / opgw	3528	13178	35573	0	0	0
Wind, -5°C	380C1F1	16996	54646	162474	0	0	0
Permanent loads yg= 0.9	380C1F2	17042	52953	159485	0	0	0
Wind angle: -45°	380C1F3	17101	50841	155891	0	0	0
	380C2F1	16996	54646	162474	17329	42308	-144075
	380C2F2	17042	52953	159485	17337	41913	-143711
	380C2F3	17101	50841	155891	17347	41418	-143293
	RTG	0	0	0	7294	16525	-55337
NL3/4	GW / opgw	2584	6202	20495	0	0	0
Construction/maintenance, +5°C	380C1F1	16854	40279	135477	0	0	0
Permanent loads yg= 0.9	380C1F2	16863	39845	135048	0	0	0
Wind angle: -45°	380C1F3	16874	39301	134554	0	0	0
	380C2F1	16854	40279	135477	16910	37007	-133162
	380C2F2	16863	39845	135048	16911	36892	-133130
	380C2F3	16874	39301	134554	16912	36746	-133096
	RTG	0	0	0	5185	11021	-39894

ZWW6HK400+5

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2565	5420	19459	2565	5420	-19459
	380C1F1	18899	39430	142843	18899	39430	-142843
	380C1F2	18899	39333	142828	18899	39333	-142828
	380C1F3	18900	39210	142814	18900	39210	-142814
	380C2F1	18899	39430	142843	18899	39430	-142843
	380C2F2	18899	39333	142828	18899	39333	-142828
	380C2F3	18900	39210	142814	18900	39210	-142814
	RTG	0	0	0	5124	10698	-38846
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2598	5963	22017	2598	5963	-22017
	380C1F1	19168	44320	164080	19168	44320	-164080
	380C1F2	19168	44293	164083	19168	44293	-164083
	380C1F3	19168	44257	164088	19168	44257	-164088
	380C2F1	19168	44320	164080	19168	44320	-164080
	380C2F2	19168	44293	164083	19168	44293	-164083
	380C2F3	19168	44257	164088	19168	44257	-164088
	RTG	0	0	0	5185	11778	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	4284	8608	30910	4284	8608	-30910
	380C1F1	22027	46881	171259	22027	46881	-171259
	380C1F2	22028	46800	171255	22028	46800	-171255
	380C1F3	22028	46697	171253	22028	46697	-171253
	380C2F1	22027	46881	171259	22027	46881	-171259
	380C2F2	22028	46800	171255	22028	46800	-171255
	380C2F3	22028	46697	171253	22028	46697	-171253
	RTG	0	0	0	8568	16979	-61669
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3226	6463	23882	3226	6463	-23882
	380C1F1	21558	43763	162000	21558	43763	-162000
	380C1F2	21559	43736	162004	21559	43736	-162004
	380C1F3	21559	43700	162010	21559	43700	-162010
	380C2F1	21558	43763	162000	21558	43763	-162000
	380C2F2	21559	43736	162004	21559	43736	-162004
	380C2F3	21559	43700	162010	21559	43700	-162010
	RTG	0	0	0	6444	12869	-47695
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2552	6144	20060	2485	8958	-24818
	380C1F1	18841	43213	145183	18485	57535	-166449
	380C1F2	18850	42752	144757	18533	55577	-163021
	380C1F3	18861	42176	144268	18595	53132	-158887
	380C2F1	18841	43213	145183	18485	57535	-166449
	380C2F2	18850	42752	144757	18533	55577	-163021
	380C2F3	18861	42176	144268	18595	53132	-158887
	RTG	0	0	0	5026	15164	-44523
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2597	6145	22049	2584	6756	-22567
	380C1F1	19161	45310	164152	19103	48500	-166161
	380C1F2	19162	45197	164127	19113	48079	-165783
	380C1F3	19163	45053	164100	19124	47552	-165350
	380C2F1	19161	45310	164152	19103	48500	-166161
	380C2F2	19162	45197	164127	19113	48079	-165783
	380C2F3	19163	45053	164100	19124	47552	-165350
	RTG	0	0	0	5170	12813	-44108
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	4264	9699	31661	4162	13801	-37896
	380C1F1	21987	49938	172546	21705	61019	-186249
	380C1F2	21994	49573	172297	21747	59505	-183932
	380C1F3	22001	49115	172014	21800	57620	-181184
	380C2F1	21987	49938	172546	21705	61019	-186249
	380C2F2	21994	49573	172297	21747	59505	-183932
	380C2F3	22001	49115	172014	21800	57620	-181184
	RTG	0	0	0	8420	23563	-68923
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3225	6639	23893	3216	7204	-24236
	380C1F1	21553	44738	162014	21511	47799	-163538
	380C1F2	21554	44627	161998	21518	47400	-163242
	380C1F3	21555	44486	161983	21527	46899	-162905
	380C2F1	21553	44738	162014	21511	47799	-163538
	380C2F2	21554	44627	161998	21518	47400	-163242
	380C2F3	21555	44486	161983	21527	46899	-162905
	RTG	0	0	0	6434	13852	-47981
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2463	10149	27160	2463	10149	-27160
	380C1F1	18342	63737	177812	18342	63737	-177812
	380C1F2	18400	61157	173008	18400	61157	-173008
	380C1F3	18476	57918	167130	18476	57918	-167130
	380C2F1	18342	63737	177812	18342	63737	-177812
	380C2F2	18400	61157	173008	18400	61157	-173008
	380C2F3	18476	57918	167130	18476	57918	-167130
	RTG	0	0	0	4990	16706	-47329

NL3/1b	GW / opgw	2577	7019	22900	2577	7019	-22900
Wind, -20°C	380C1F1	19069	49836	167527	19069	49836	-167527
Permanent loads yg= 1.2	380C1F2	19084	49279	166929	19084	49279	-166929
Wind angle: 90°	380C1F3	19101	48582	166238	19101	48582	-166238
	380C2F1	19069	49836	167527	19069	49836	-167527
	380C2F2	19084	49279	166929	19084	49279	-166929
	380C2F3	19101	48582	166238	19101	48582	-166238
	RTG	0	0	0	5163	13143	-44431
NL3/3	GW / opgw	4127	15527	41014	4127	15527	-41014
Wind, -5°C	380C1F1	21574	65848	194149	21574	65848	-194149
Permanent loads yg= 1.2	380C1F2	21628	63832	190770	21628	63832	-190770
Wind angle: 90°	380C1F3	21697	61315	186713	21697	61315	-186713
	380C2F1	21574	65848	194149	21574	65848	-194149
	380C2F2	21628	63832	190770	21628	63832	-190770
	380C2F3	21697	61315	186713	21697	61315	-186713
	RTG	0	0	0	8365	25791	-72596
NL3/4	GW / opgw	3211	7440	24470	3211	7440	-24470
Construction/maintenance, +5°C	380C1F1	21486	49060	164619	21486	49060	-164619
Permanent loads yg= 1.2	380C1F2	21497	48535	164143	21497	48535	-164143
Wind angle: 90°	380C1F3	21509	47877	163598	21509	47877	-163598
	380C2F1	21486	49060	164619	21486	49060	-164619
	380C2F2	21497	48535	164143	21497	48535	-164143
	380C2F3	21509	47877	163598	21509	47877	-163598
	RTG	0	0	0	6429	14153	-48199
NL3/1a	GW / opgw	2485	8958	24818	2552	6144	-20060
Wind, -20°C	380C1F1	18485	57535	166449	18841	43213	-145183
Permanent loads yg= 1.2	380C1F2	18533	55577	163021	18850	42752	-144757
Wind angle: -45°	380C1F3	18595	53132	158887	18861	42176	-144268
	380C2F1	18485	57535	166449	18841	43213	-145183
	380C2F2	18533	55577	163021	18850	42752	-144757
	380C2F3	18595	53132	158887	18861	42176	-144268
	RTG	0	0	0	5111	11633	-39391
NL3/1b	GW / opgw	2584	6756	22567	2597	6145	-22049
Wind, -20°C	380C1F1	19103	48500	166161	19161	45310	-164152
Permanent loads yg= 1.2	380C1F2	19113	48079	165783	19162	45197	-164127
Wind angle: -45°	380C1F3	19124	47552	163500	19163	45053	-164100
	380C2F1	19103	48500	166161	19161	45310	-164152
	380C2F2	19113	48079	165783	19162	45197	-164127
	380C2F3	19124	47552	163500	19163	45053	-164100
	RTG	0	0	0	5183	12024	-43639
NL3/3	GW / opgw	4162	13801	37896	4264	9699	-31661
Wind, -5°C	380C1F1	21705	61019	186249	21987	49938	-172546
Permanent loads yg= 1.2	380C1F2	21747	59505	183932	21994	49573	-172297
Wind angle: -45°	380C1F3	21800	57620	181184	22001	49115	-172014
	380C2F1	21705	61019	186249	21987	49938	-172546
	380C2F2	21747	59505	183932	21994	49573	-172297
	380C2F3	21800	57620	181184	22001	49115	-172014
	RTG	0	0	0	8549	18398	-62325
NL3/4	GW / opgw	3216	7204	24236	3225	6639	-23893
Construction/maintenance, +5°C	380C1F1	21511	47799	163538	21553	44738	-162014
Permanent loads yg= 1.2	380C1F2	21518	47400	163242	21554	44627	-161998
Wind angle: -45°	380C1F3	21527	46899	162905	21555	44486	-161983
	380C2F1	21511	47799	163538	21553	44738	-162014
	380C2F2	21518	47400	163242	21554	44627	-161998
	380C2F3	21527	46899	162905	21555	44486	-161983
	RTG	0	0	0	6443	13110	-47688
NL3/1a	GW / opgw	1932	4316	15340	1932	4316	-15340
Wind, 10°C	380C1F1	14243	31446	113049	14243	31446	-113049
Permanent loads yg= 0.9	380C1F2	14244	31345	113018	14244	31345	-113018
Wind angle: 0°	380C1F3	14245	31217	112984	14245	31217	-112984
	380C2F1	14243	31446	113049	14243	31446	-113049
	380C2F2	14244	31345	113018	14244	31345	-113018
	380C2F3	14245	31217	112984	14245	31217	-112984
	RTG	0	0	0	3860	8482	-30576
NL3/1b	GW / opgw	1963	4791	17644	1963	4791	-17644
Wind, -20°C	380C1F1	14496	35896	132641	14496	35896	-132641
Permanent loads yg= 0.9	380C1F2	14496	35868	132642	14496	35868	-132642
Wind angle: 0°	380C1F3	14496	35832	132645	14496	35832	-132645
	380C2F1	14496	35896	132641	14496	35896	-132641
	380C2F2	14496	35868	132642	14496	35868	-132642
	380C2F3	14496	35832	132645	14496	35832	-132645
	RTG	0	0	0	3916	9437	-34888

NL3/3	GW / opgw	3657	7645	27318	3657	7645	-27318
Wind, -5°C	380C1F1	17381	39062	142079	17381	39062	-142079
Permanent loads yg= 0.9	380C1F2	17382	38979	142066	17382	38979	-142066
Wind angle: 0°	380C1F3	17383	38873	142054	17383	38873	-142054
	380C2F1	17381	39062	142079	17381	39062	-142079
	380C2F2	17382	38979	142066	17382	38979	-142066
	380C2F3	17383	38873	142054	17383	38873	-142054
	RTG	0	0	0	7317	15048	-54463
NL3/4	GW / opgw	2596	5417	19980	2596	5417	-19980
Construction/maintenance, +5°C	380C1F1	16916	36007	133052	16916	36007	-133052
Permanent loads yg= 0.9	380C1F2	16916	35979	133055	16916	35979	-133055
Wind angle: 0°	380C1F3	16916	35943	133059	16916	35943	-133059
	380C2F1	16916	36007	133052	16916	36007	-133052
	380C2F2	16916	35979	133055	16916	35979	-133055
	380C2F3	16916	35943	133059	16916	35943	-133059
	RTG	0	0	0	5186	10776	-39884
NL3/1a	GW / opgw	1915	5120	16237	1848	8288	-22318
Wind, 10°C	380C1F1	14166	35580	116700	13772	51844	-145218
Permanent loads yg= 0.9	380C1F2	14178	35064	116067	13819	49641	-140875
Wind angle: 45°	380C1F3	14192	34421	115332	13882	46873	-135537
	380C2F1	14166	35580	116700	13772	51844	-145218
	380C2F2	14178	35064	116067	13819	49641	-140875
	380C2F3	14192	34421	115332	13882	46873	-135537
	RTG	0	0	0	3746	13513	-38364
NL3/1b	GW / opgw	1961	4982	17710	1944	5666	-18496
Wind, -20°C	380C1F1	14486	36924	132858	14406	40429	-136045
Permanent loads yg= 0.9	380C1F2	14488	36805	132808	14420	39956	-135471
Wind angle: 45°	380C1F3	14490	36653	132754	14435	39367	-134805
	380C2F1	14486	36924	132858	14406	40429	-136045
	380C2F2	14488	36805	132808	14420	39956	-135471
	380C2F3	14490	36653	132754	14435	39367	-134805
	RTG	0	0	0	3896	10555	-35682
NL3/3	GW / opgw	3634	8793	28283	3528	13178	-35573
Wind, -5°C	380C1F1	17329	42308	144075	16996	54646	-162474
Permanent loads yg= 0.9	380C1F2	17337	41913	143711	17042	52953	-159485
Wind angle: 45°	380C1F3	17347	41418	143293	17101	50841	-155891
	380C2F1	17329	42308	144075	16996	54646	-162474
	380C2F2	17337	41913	143711	17042	52953	-159485
	380C2F3	17347	41418	143293	17101	50841	-155891
	RTG	0	0	0	7153	22057	-63305
NL3/4	GW / opgw	2595	5598	20009	2584	6202	-20495
Construction/maintenance, +5°C	380C1F1	16910	37007	133162	16854	40279	-135477
Permanent loads yg= 0.9	380C1F2	16911	36892	133130	16863	39845	-135048
Wind angle: 45°	380C1F3	16912	36746	133096	16874	39301	-134554
	380C2F1	16910	37007	133162	16854	40279	-135477
	380C2F2	16911	36892	133130	16863	39845	-135048
	380C2F3	16912	36746	133096	16874	39301	-134554
	RTG	0	0	0	5174	11802	-40333
NL3/1a	GW / opgw	1830	9583	25046	1830	9583	-25046
Wind, 10°C	380C1F1	13643	58744	159186	13643	58744	-159186
Permanent loads yg= 0.9	380C1F2	13693	55889	153353	13693	55889	-153353
Wind angle: 90°	380C1F3	13763	52274	146073	13763	52274	-146073
	380C2F1	13643	58744	159186	13643	58744	-159186
	380C2F2	13693	55889	153353	13693	55889	-153353
	380C2F3	13763	52274	146073	13763	52274	-146073
	RTG	0	0	0	3712	15239	-41857
NL3/1b	GW / opgw	1935	5967	18975	1935	5967	-18975
Wind, -20°C	380C1F1	14362	41945	138081	14362	41945	-138081
Permanent loads yg= 0.9	380C1F2	14381	41311	137196	14381	41311	-137196
Wind angle: 90°	380C1F3	14404	40522	136161	14404	40522	-136161
	380C2F1	14362	41945	138081	14362	41945	-138081
	380C2F2	14381	41311	137196	14381	41311	-137196
	380C2F3	14404	40522	136161	14404	40522	-136161
	RTG	0	0	0	3886	10927	-36165
NL3/3	GW / opgw	3496	14995	39027	3496	14995	-39027
Wind, -5°C	380C1F1	16858	60026	172428	16858	60026	-172428
Permanent loads yg= 0.9	380C1F2	16914	57786	168212	16914	57786	-168212
Wind angle: 90°	380C1F3	16987	54978	163069	16987	54978	-163069
	380C2F1	16858	60026	172428	16858	60026	-172428
	380C2F2	16914	57786	168212	16914	57786	-168212
	380C2F3	16987	54978	163069	16987	54978	-163069
	RTG	0	0	0	7097	24435	-67540

NL3/4	GW / opgw	2578	6460	20811	2578	6460	-20811
Construction/maintenance, +5°C	380C1F1	16822	41663	137018	16822	41663	-137018
Permanent loads yg= 0.9	380C1F2	16836	41085	136345	16836	41085	-136345
Wind angle: 90°	380C1F3	16852	40364	135564	16852	40364	-135564
	380C2F1	16822	41663	137018	16822	41663	-137018
	380C2F2	16836	41085	136345	16836	41085	-136345
	380C2F3	16852	40364	135564	16852	40364	-135564
	RTG	0	0	0	5167	12127	-40638
NL3/1a	GW / opgw	1848	8288	22318	1915	5120	-16237
Wind, 10°C	380C1F1	13772	51844	145218	14166	35580	-116700
Permanent loads yg= 0.9	380C1F2	13819	49641	140875	14178	35064	-116067
Wind angle: -45°	380C1F3	13882	46873	135537	14192	34421	-115332
	380C2F1	13772	51844	145218	14166	35580	-116700
	380C2F2	13819	49641	140875	14178	35064	-116067
	380C2F3	13882	46873	135537	14192	34421	-115332
	RTG	0	0	0	3842	9499	-31429
NL3/1b	GW / opgw	1944	5666	18496	1961	4982	-17710
Wind, -20°C	380C1F1	14406	40429	136045	14486	36924	-132858
Permanent loads yg= 0.9	380C1F2	14420	39956	135471	14488	36805	-132808
Wind angle: -45°	380C1F3	14435	39367	134805	14490	36653	-132754
	380C2F1	14406	40429	136045	14486	36924	-132858
	380C2F2	14420	39956	135471	14488	36805	-132808
	380C2F3	14435	39367	134805	14490	36653	-132754
	RTG	0	0	0	3914	9692	-34936
NL3/3	GW / opgw	3528	13178	35573	3634	8793	-28283
Wind, -5°C	380C1F1	16996	54646	162474	17329	42308	-144075
Permanent loads yg= 0.9	380C1F2	17042	52953	159485	17337	41913	-143711
Wind angle: -45°	380C1F3	17101	50841	155891	17347	41418	-143293
	380C2F1	16996	54646	162474	17329	42308	-144075
	380C2F2	17042	52953	159485	17337	41913	-143711
	380C2F3	17101	50841	155891	17347	41418	-143293
	RTG	0	0	0	7294	16525	-55337
NL3/4	GW / opgw	2584	6202	20495	2595	5598	-20009
Construction/maintenance, +5°C	380C1F1	16854	40279	135477	16910	37007	-133162
Permanent loads yg= 0.9	380C1F2	16863	39845	135048	16911	36892	-133130
Wind angle: -45°	380C1F3	16874	39301	134554	16912	36746	-133096
	380C2F1	16854	40279	135477	16910	37007	-133162
	380C2F2	16863	39845	135048	16911	36892	-133130
	380C2F3	16874	39301	134554	16912	36746	-133096
	RTG	0	0	0	5185	11021	-39894

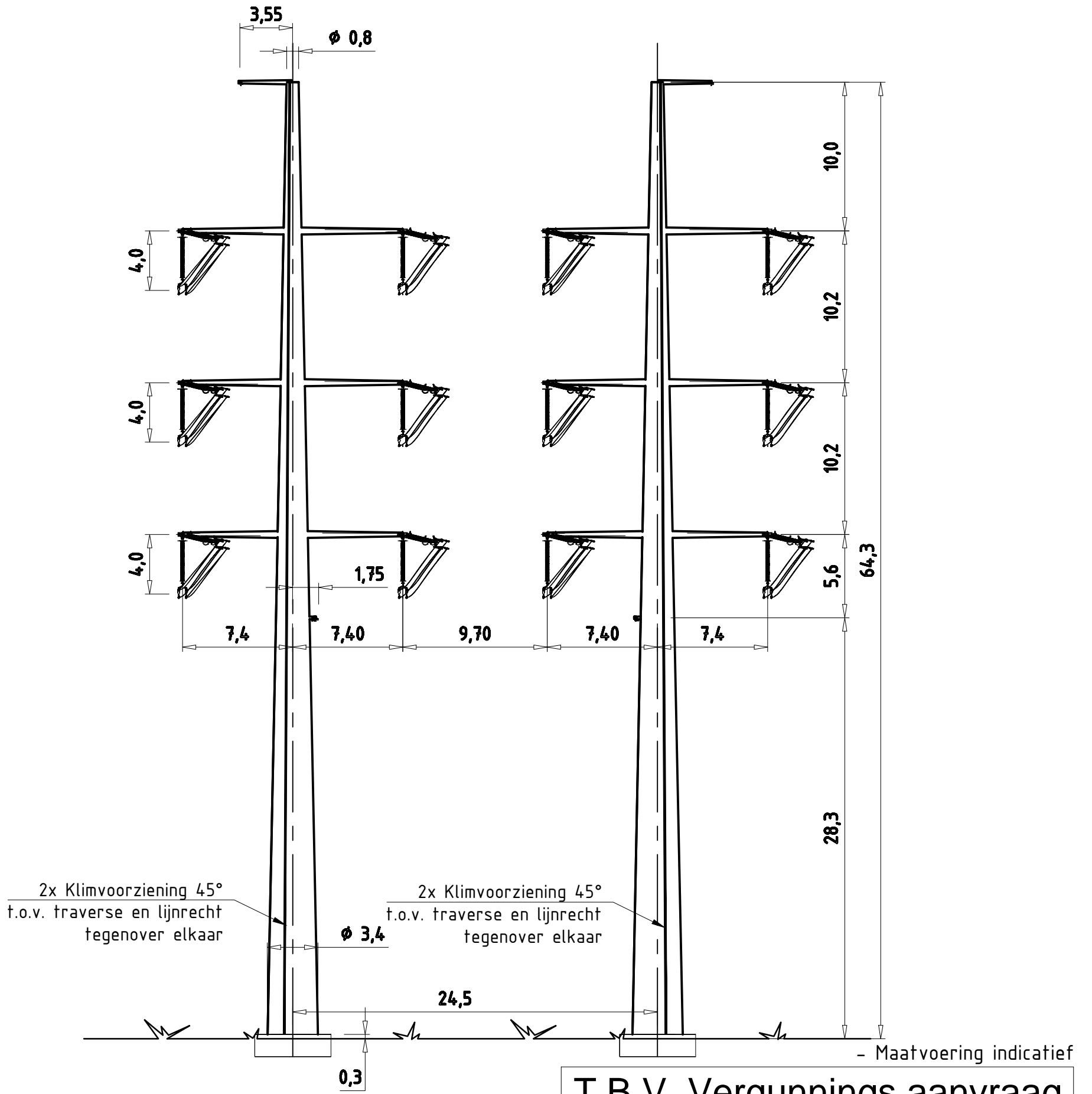
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Appendix BN2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	2143	4760	16778	2143	4760	-16778
Wind, 10°C	380C1F1	15795	34532	123348	15795	34532	-123348
Permanent loads yg= 1.0	380C1F2	15796	34400	123300	15796	34400	-123300
	380C1F3	15798	34233	123247	15798	34233	-123247
Wind angle: 0°	380C2F1	15795	34532	123348	15795	34532	-123348
	380C2F2	15796	34400	123300	15796	34400	-123300
	380C2F3	15798	34233	123247	15798	34233	-123247
	RTG	0	0	0	4282	9326	-33424
NL4/1b	GW / opgw	2175	5183	19144	2175	5183	-19144
Wind, -20°C	380C1F1	16058	38733	143450	16058	38733	-143450
Permanent loads yg= 1.0	380C1F2	16058	38710	143452	16058	38710	-143452
	380C1F3	16058	38681	143456	16058	38681	-143456
Wind angle: 0°	380C2F1	16058	38733	143450	16058	38733	-143450
	380C2F2	16058	38710	143452	16058	38710	-143452
	380C2F3	16058	38681	143456	16058	38681	-143456
	RTG	0	0	0	4340	10225	-37886
NL4/3	GW / opgw	7203	12604	46024	7203	12604	-46024
Wind, -5°C	380C1F1	24866	51261	188220	24866	51261	-188220
Permanent loads yg= 1.0	380C1F2	24867	51195	188223	24867	51195	-188223
	380C1F3	24867	51111	188228	24867	51111	-188228
Wind angle: 0°	380C2F1	24866	51261	188220	24866	51261	-188220
	380C2F2	24867	51195	188223	24867	51195	-188223
	380C2F3	24867	51111	188228	24867	51111	-188228
	RTG	0	0	0	14422	25057	-92096
NL4/4	GW / opgw	2697	5578	20622	2697	5578	-20622
Construction/maintenance, +5°C	380C1F1	18029	37855	140173	18029	37855	-140173
Permanent loads yg= 1.0	380C1F2	18029	37833	140177	18029	37833	-140177
	380C1F3	18030	37803	140181	18030	37803	-140181
Wind angle: 0°	380C2F1	18029	37855	140173	18029	37855	-140173
	380C2F2	18029	37833	140177	18029	37833	-140177
	380C2F3	18030	37803	140181	18030	37803	-140181
	RTG	0	0	0	5388	11105	-41167
NL4/1a	GW / opgw	2119	5827	18066	2038	9960	-26126
Wind, 10°C	380C1F1	15685	39999	128656	15190	61406	-167279
Permanent loads yg= 1.0	380C1F2	15701	39313	127750	15244	58548	-161585
	380C1F3	15722	38458	126694	15318	54937	-154514
Wind angle: 45°	380C2F1	15685	39999	128656	15190	61406	-167279
	380C2F2	15701	39313	127750	15244	58548	-161585
	380C2F3	15722	38458	126694	15318	54937	-154514
	RTG	0	0	0	4133	15977	-44151
NL4/1b	GW / opgw	2174	5335	19175	2163	5853	-19637
Wind, -20°C	380C1F1	16052	39562	143526	16001	42256	-145333
Permanent loads yg= 1.0	380C1F2	16053	39467	143502	16010	41899	-144995
	380C1F3	16054	39346	143476	16020	41452	-144607
Wind angle: 45°	380C2F1	16052	39562	143526	16001	42256	-145333
	380C2F2	16053	39467	143502	16010	41899	-144995
	380C2F3	16054	39346	143476	16020	41452	-144607
	RTG	0	0	0	4328	11097	-38322
NL4/3	GW / opgw	7195	13388	46184	7140	16031	-48479
Wind, -5°C	380C1F1	24842	53682	188822	24656	62010	-196857
Permanent loads yg= 1.0	380C1F2	24846	53399	188691	24685	60886	-195439
	380C1F3	24851	53041	188546	24721	59484	-193782
Wind angle: 45°	380C2F1	24842	53682	188822	24656	62010	-196857
	380C2F2	24846	53399	188691	24685	60886	-195439
	380C2F3	24851	53041	188546	24721	59484	-193782
	RTG	0	0	0	14357	29516	-94300
NL4/4	GW / opgw	2696	5726	20633	2689	6202	-20939
Construction/maintenance, +5°C	380C1F1	18025	38671	140197	17989	41247	-141564
Permanent loads yg= 1.0	380C1F2	18026	38578	140181	17995	40911	-141300
	380C1F3	18027	38460	140166	18002	40487	-141000
Wind angle: 45°	380C2F1	18025	38671	140197	17989	41247	-141564
	380C2F2	18026	38578	140181	17995	40911	-141300
	380C2F3	18027	38460	140166	18002	40487	-141000
	RTG	0	0	0	5379	11929	-41427
NL4/1a	GW / opgw	2019	11605	29567	2019	11605	-29567
Wind, 10°C	380C1F1	15045	70286	185309	15045	70286	-185309
Permanent loads yg= 1.0	380C1F2	15101	66624	177827	15101	66624	-177827
	380C1F3	15179	61962	168395	15179	61962	-168395
Wind angle: 90°	380C2F1	15045	70286	185309	15045	70286	-185309
	380C2F2	15101	66624	177827	15101	66624	-177827
	380C2F3	15179	61962	168395	15179	61962	-168395
	RTG	0	0	0	4094	18211	-48710

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2157	6077	19933	2157	6077	-19933
	380C1F1	15972	43391	146551	15972	43391	-146551
	380C1F2	15984	42917	146018	15984	42917	-146018
	380C1F3	15999	42325	145402	15999	42325	-145402
	380C2F1	15972	43391	146551	15972	43391	-146551
	380C2F2	15984	42917	146018	15984	42917	-146018
	380C2F3	15999	42325	145402	15999	42325	-145402
	RTG	0	0	0	4321	11376	-38609
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	7112	17150	49887	7112	17150	-49887
	380C1F1	24558	65599	201816	24558	65599	-201816
	380C1F2	24599	64099	199673	24599	64099	-199673
	380C1F3	24650	62230	197143	24650	62230	-197143
	380C2F1	24558	65599	201816	24558	65599	-201816
	380C2F2	24599	64099	199673	24599	64099	-199673
	380C2F3	24650	62230	197143	24650	62230	-197143
	RTG	0	0	0	14324	30931	-95713
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2684	6402	21146	2684	6402	-21146
	380C1F1	17967	42314	142523	17967	42314	-142523
	380C1F2	17976	41870	142102	17976	41870	-142102
	380C1F3	17987	41313	141617	17987	41313	-141617
	380C2F1	17967	42314	142523	17967	42314	-142523
	380C2F2	17976	41870	142102	17976	41870	-142102
	380C2F3	17987	41313	141617	17987	41313	-141617
	RTG	0	0	0	5375	12184	-41621
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2038	9960	26126	2119	5827	-18066
	380C1F1	15190	61406	167279	15685	39999	-128656
	380C1F2	15244	58548	161585	15701	39313	-127750
	380C1F3	15318	54937	154514	15722	38458	-126694
	380C2F1	15190	61406	167279	15685	39999	-128656
	380C2F2	15244	58548	161585	15701	39313	-127750
	380C2F3	15318	54937	154514	15722	38458	-126694
	RTG	0	0	0	4256	10672	-34672
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2163	5853	19637	2174	5335	-19175
	380C1F1	16001	42256	145333	16052	39562	-143526
	380C1F2	16010	41899	144995	16053	39467	-143502
	380C1F3	16020	41452	144607	16054	39346	-143476
	380C2F1	16001	42256	145333	16052	39562	-143526
	380C2F2	16010	41899	144995	16053	39467	-143502
	380C2F3	16020	41452	144607	16054	39346	-143476
	RTG	0	0	0	4339	10432	-37901
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	7140	16031	48479	7195	13388	-46184
	380C1F1	24656	62010	196857	24842	53682	-188822
	380C1F2	24685	60886	195439	24846	53399	-188691
	380C1F3	24721	59484	193782	24851	53041	-188546
	380C2F1	24656	62010	196857	24842	53682	-188822
	380C2F2	24685	60886	195439	24846	53399	-188691
	380C2F3	24721	59484	193782	24851	53041	-188546
	RTG	0	0	0	14415	26114	-92176
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2689	6202	20939	2696	5726	-20633
	380C1F1	17989	41247	141564	18025	38671	-140197
	380C1F2	17995	40911	141300	18026	38578	-140181
	380C1F3	18002	40487	141000	18027	38460	-140166
	380C2F1	17989	41247	141564	18025	38671	-140197
	380C2F2	17995	40911	141300	18026	38578	-140181
	380C2F3	18002	40487	141000	18027	38460	-140166
	RTG	0	0	0	5387	11306	-41163



Wintrack
Masttype: ZWW6HK400+5

- Trekparameter 1800m
- 4x380 Hoekmast
- 400m Veldlengte
- 150°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

5.0	05-06-2014	Edit post in bretel
4.0	04-03-2014	Small modification
3.0	29-01-2014	Modification top traverse length
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection:
Drawn by: RBE 05-06-2014		Drawing no.: 74102194-035-154 V
Checked by: AJP 05-06-2014		Description: Wintrack Masttype ZWW6HK400+5
Approved by: AW 05-06-2014		
Scale: 1:300		Revision: 5.0
Units: m		Format: A3
Project no: 000.145		
Company: TenneT		

ZWM6HK400

Bijlage CAZ

Fundatie berekening

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m
schoorstand		8	:1
α		7.125	graden

Opstort	Diameter	5.2	m
	Hoogte	1.8	m
	Inhoud	38.2	m ³
	e.g.	917	kN

Onderplaat	Diameter	13.0	m
	Hoogte	1.3	m
	Inhoud	173	m ³
	e.g.	4141	kN

Hart paal tov rand fund.		0.6	m
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Optreden krachten

e.g. mast		864	kN
Fgeleiders		219	kN
Maximale dwarskracht		1396	kN
Fmax vert (druk)		1256	kN
Fmin vert (trek)		942	kN
Maximale moment		59706	kNm

Moment

F_{diag}		5469	kN
F_{hor}		1396	kN
F_{ver}		5427	kN
Mhor (tgv Fhor)		4329	kNm
Mtot		64034	kNm
$F=M/a$		5427	kN

Verticaal reactiekracht

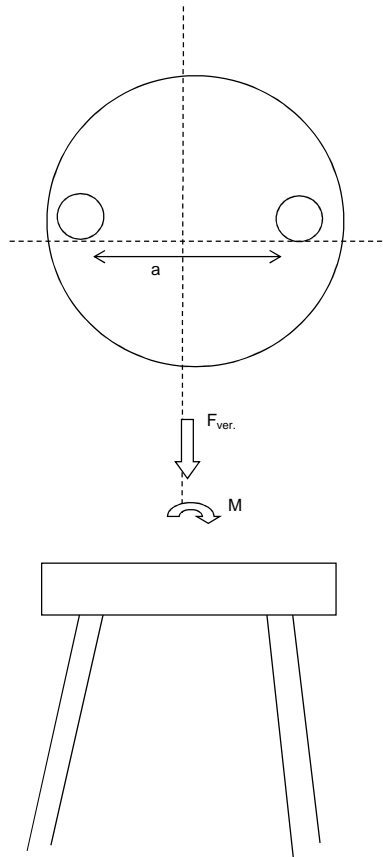
Fwater (trek)		2108	kN
Fgrond (druk)		3010	kN
Fgrond (trek)		2509	kN

Fdmax (druk)		5469	kN
Ftmax (trek)		2612	kN

Fdtot (druk)		10896	kN
Fttot (trek)		2815	kN

Palen druk		10	(-)
Palen trek		9	(-)

Totaal palen		20	(-)	Per fundering
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ZWM6HK400

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CAZ

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0.40 m
	b	0.40 m
omtrek paal	$O_{p;gem}$	1.60 m
paalfactor	αt	0.007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0.75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11.25 MPa
materiaalfactor	$\gamma_{m,b4}$	1.4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1.5
	$q_{c;z,d}$	5.36 MPa
	$P_{rz,d}$	37.5 kN/m ²
	$F_{r;trek,d,i}$	60.0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0.007	0.00	0.00	0
	-1	-2	0	0.007	0.00	0.00	0
	-2	-3	0	0.007	0.00	0.00	0
	-3	-4	0	0.007	0.00	0.00	0
	-4	-5	0	0.007	0.00	0.00	0
	-5	-6	0	0.007	0.00	0.00	0
	-6	-7	0	0.007	0.00	0.00	0
	-7	-8	0	0.007	0.00	0.00	0
	-8	-9	1	0.007	2.50	4.00	4
	-9	-10	3	0.007	7.50	12.00	16
	-10	-11	2	0.007	5.00	8.00	24
	-11	-12	0	0.007	0.00	0.00	24
	-12	-13	3	0.007	7.50	12.00	36
	-13	-14	2	0.007	5.00	8.00	44
	-14	-15	4	0.007	10.00	16.00	60
	-15	-16	10	0.007	25.00	40.00	100
	-16	-17	9	0.007	22.50	36.00	136
	-17	-18	8	0.007	20.00	32.00	168
	-18	-19	12	0.007	30.00	48.00	216
	-19	-20	12	0.007	30.00	48.00	264
	-20	-21	10	0.007	25.00	40.00	304
	-21	-22	11	0.007	27.50	44.00	348
	-22	-23	11	0.007	27.50	44.00	392
	-23	-24	12	0.007	30.00	48.00	440
	-24	-25	12	0.007	30.00	48.00	488
	-25	-26	12	0.007	30.00	48.00	536
	-26	-27	15	0.007	37.50	60.00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27.00 m
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Paalgroep factor 10%

$F_{trek,d}$	536.4 kN
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ZWM6HK400

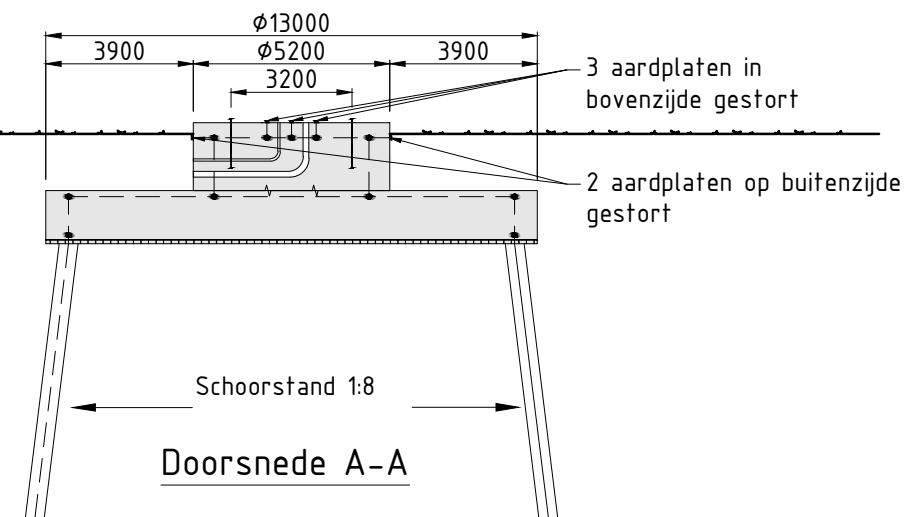
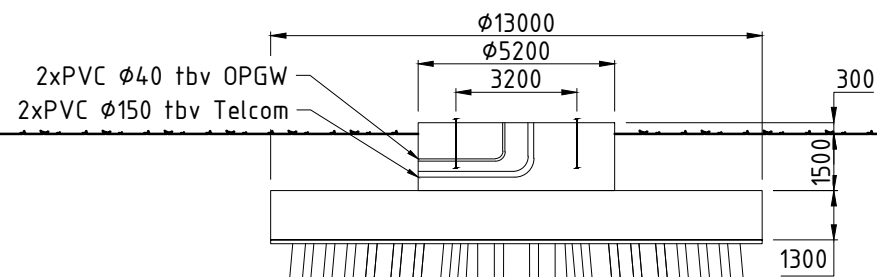
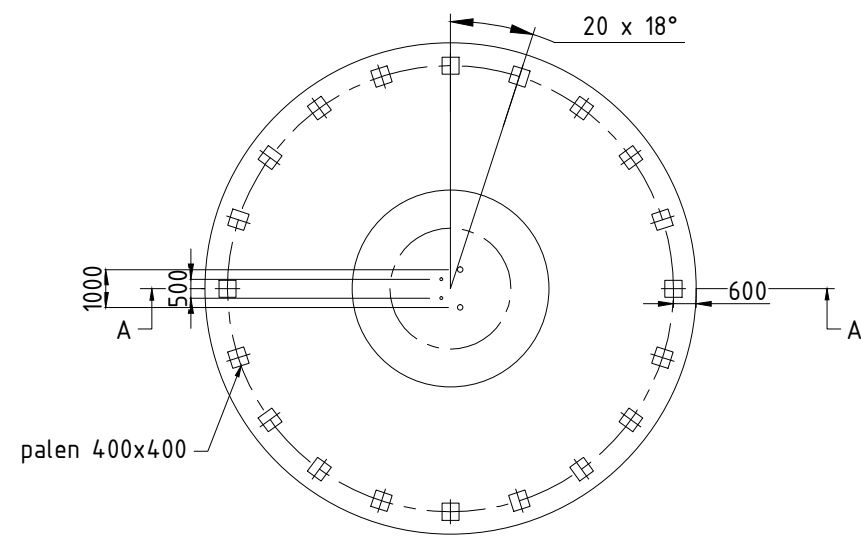
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CAZ

Bepaling opneembare paalbelasting op druk

heipaal	v		
diameter	a	2 mm	
		2 mm	
Deq		0.001808	
maximale puntweerstand			
$P_{r,max;punt;i}$			11.25 MN/m ²
paalklasse factor	α_p	1.00	
factor paalvoet	β	1	
hoek van inwendige vrijwing van paalvoet	ϕ	40	
factor dwarsdoorsnede paalvoet	s	1.00	
minimale waarde neergaande deel	$q_{c,II;gem}$	9.00 MN/m ²	
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14.00 MN/m ²	
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11.00 MN/m ²	
maximale paalschachtwrijving			
$P_{r,max;schacht;i}$			0.05 MN/m ²
waarin:			
paalfactor	α_s	0.010	
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5.00 MN/m ²	
maximale draagkracht alleenstaande paal			
$F_{r,max;i}$			0.00 MN
waarin:			
$F_{r,max;punt;i}$			0.00 MN
paalpunt oppervlak	A_{punt}	0.00 m ²	
$F_{r,max;schacht;i}$			0.00 MN
gemiddelde paalomtrek	$O_{p;gem}$	0.01 m	
lengte schachtwrijving	Δl	15.00 m	
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max;d}$		MN	0.00 MN
materiaalfactor grond	γ_{mb}	1.20	
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0.75	
<hr/>			
$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo	-27.00 m
<hr/>			



T.B.V. Vergunnings aanvraag

Verklaring


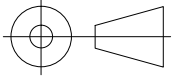
- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding Ø16mm (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

4.0	20-03-2014	Diverse aanpassingen	
3.0	29-01-2014	Diverse aanpassingen	
		Projectname: Engineering verbinding ZW380	
		Third angle projection: 	Drawing no.: 74102194-032-171V
Design state: Definitief		Scale: 1:200	Description: Principe ontwerp fundatie hoekmast ZWM6HK400 masten familie
Drawn by: RBE	20-03-2014	Units: mm	
Checked by: AJP	20-03-2014	Project no: 000.145	
Approved by: AW	20-03-2014	Company: TenneT	
			Revision: 4.0
			Format: A3

ZWM6HK400

Appendix AZ / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2313	5633	19565	2313	5633	-19565
Wind, 10°C	380C1F1	17045	40555	143216	17045	40555	-143216
Permanent loads yg= 1.2	380C1F2	17045	40340	143119	17045	40340	-143119
	380C1F3	17045	40065	143011	17045	40065	-143011
Wind angle: 0°	380C2F1	17045	40555	143216	17045	40555	-143216
	380C2F2	17045	40340	143119	17045	40340	-143119
	380C2F3	17045	40065	143011	17045	40065	-143011
	GW / opgw	2313	5633	19565	2313	5633	-19565
	RTG	0	0	0	4620	10955	-38922
NL1/1b	GW / opgw	2312	5977	22016	2312	5977	-22016
Wind, -20°C	380C1F1	17036	44398	164070	17036	44398	-164070
Permanent loads yg= 1.2	380C1F2	17036	44361	164073	17036	44361	-164073
	380C1F3	17036	44314	164078	17036	44314	-164078
Wind angle: 0°	380C2F1	17036	44398	164070	17036	44398	-164070
	380C2F2	17036	44361	164073	17036	44361	-164073
	380C2F3	17036	44314	164078	17036	44314	-164078
	GW / opgw	2312	5977	22016	2312	5977	-22016
	RTG	0	0	0	4618	11794	-43622
NL1/3	GW / opgw	9331	16284	59274	9331	16284	-59274
Wind, -5°C	380C1F1	29376	63008	230600	29376	63008	-230600
Permanent loads yg= 1.2	380C1F2	29376	62903	230603	29376	62903	-230603
	380C1F3	29376	62767	230611	29376	62767	-230611
Wind angle: 0°	380C2F1	29376	63008	230600	29376	63008	-230600
	380C2F2	29376	62903	230603	29376	62903	-230603
	380C2F3	29376	62767	230611	29376	62767	-230611
	GW / opgw	9331	16284	59274	9331	16284	-59274
	RTG	0	0	0	18688	32352	-118725
NL1/4	GW / opgw	3065	6739	24859	3065	6739	-24859
Construction/maintenance, +5°C	380C1F1	20053	44895	165921	20053	44895	-165921
Permanent loads yg= 1.2	380C1F2	20053	44858	165926	20053	44858	-165926
	380C1F3	20053	44811	165933	20053	44811	-165933
Wind angle: 0°	380C2F1	20053	44895	165921	20053	44895	-165921
	380C2F2	20053	44858	165926	20053	44858	-165926
	380C2F3	20053	44811	165933	20053	44811	-165933
	GW / opgw	3065	6739	24859	3065	6739	-24859
	RTG	0	0	0	6124	13410	-49653
NL1/6	GW / opgw	2603	5740	21422	2603	5740	-21422
Permanent, +10°C	380C1F1	19177	42083	157056	19177	42083	-157056
Permanent loads yg= 1.35	380C1F2	19177	42083	157056	19177	42083	-157056
	380C1F3	19177	42083	157056	19177	42083	-157056
	380C2F1	19177	42083	157056	19177	42083	-157056
	380C2F2	19177	42083	157056	19177	42083	-157056
	380C2F3	19177	42083	157056	19177	42083	-157056
	GW / opgw	2603	5740	21422	2603	5740	-21422
	RTG	0	0	0	5198	11469	-42804
NL1/1a	GW / opgw	2314	7288	21761	2315	13445	-33849
Wind, 10°C	380C1F1	17046	48965	152362	17054	81207	-211895
Permanent loads yg= 1.2	380C1F2	17046	47819	150723	17053	76671	-202882
	380C1F3	17046	46384	148794	17052	70852	-191450
Wind angle: 45°	380C2F1	17046	48965	152362	17054	81207	-211895
	380C2F2	17046	47819	150723	17053	76671	-202882
	380C2F3	17046	46384	148794	17052	70852	-191450
	GW / opgw	2314	7288	21761	2315	13445	-33849
	RTG	0	0	0	4622	20631	-54994
NL1/1b	GW / opgw	2312	6207	22077	2312	7005	-22881
Wind, -20°C	380C1F1	17036	45636	164246	17036	49741	-167420
Permanent loads yg= 1.2	380C1F2	17036	45482	164197	17036	49150	-166794
	380C1F3	17036	45285	164144	17036	48406	-166073
Wind angle: 45°	380C2F1	17036	45636	164246	17036	49741	-167420
	380C2F2	17036	45482	164197	17036	49150	-166794
	380C2F3	17036	45285	164144	17036	48406	-166073
	GW / opgw	2312	6207	22077	2312	7005	-22881
	RTG	0	0	0	4618	13060	-44345
NL1/3	GW / opgw	9332	17436	59478	9333	21266	-62584
Wind, -5°C	380C1F1	29376	66589	231541	29379	78929	-243648
Permanent loads yg= 1.2	380C1F2	29376	66136	231324	29379	77136	-241372
	380C1F3	29376	65559	231084	29378	74881	-238699
Wind angle: 45°	380C2F1	29376	66589	231541	29379	78929	-243648
	380C2F2	29376	66136	231324	29379	77136	-241372
	380C2F3	29376	65559	231084	29378	74881	-238699
	GW / opgw	9332	17436	59478	9333	21266	-62584
	RTG	0	0	0	18690	38574	-121409

NL1/4	GW / opgw	3065	6959	24882	3066	7677	-25388
Construction/maintenance, +5°C	380C1F1	20053	46106	165995	20053	49988	-168330
Permanent loads yg= 1.2	380C1F2	20053	45957	165964	20053	49437	-167855
Wind angle: 45°	380C1F3	20053	45765	165933	20053	48741	-167313
	380C2F1	20053	46106	165995	20053	49988	-168330
	380C2F2	20053	45957	165964	20053	49437	-167855
	380C2F3	20053	45765	165933	20053	48741	-167313
	GW / opgw	3065	6959	24882	3066	7677	-25388
	RTG	0	0	0	6124	14592	-50057
NL1/1a	GW / opgw	2316	15802	38657	2316	15802	-38657
Wind, 10°C	380C1F1	17058	94107	237769	17058	94107	-237769
Permanent loads yg= 1.2	380C1F2	17056	88386	226269	17056	88386	-226269
Wind angle: 90°	380C1F3	17054	80988	211458	17054	80988	-211458
	380C2F1	17058	94107	237769	17058	94107	-237769
	380C2F2	17056	88386	226269	17056	88386	-226269
	380C2F3	17054	80988	211458	17054	80988	-211458
	GW / opgw	2316	15802	38657	2316	15802	-38657
	RTG	0	0	0	4623	23779	-61369
NL1/1b	GW / opgw	2312	7352	23381	2312	7352	-23381
Wind, -20°C	380C1F1	17037	51488	169496	17037	51488	-169496
Permanent loads yg= 1.2	380C1F2	17036	50700	168522	17036	50700	-168522
Wind angle: 90°	380C1F3	17036	49712	167389	17036	49712	-167389
	380C2F1	17037	51488	169496	17037	51488	-169496
	380C2F2	17036	50700	168522	17036	50700	-168522
	380C2F3	17036	49712	167389	17036	49712	-167389
	GW / opgw	2312	7352	23381	2312	7352	-23381
	RTG	0	0	0	4618	13471	-44805
NL1/3	GW / opgw	9334	22874	64487	9334	22874	-64487
Wind, -5°C	380C1F1	29381	84226	250984	29381	84226	-250984
Permanent loads yg= 1.2	380C1F2	29380	81841	247580	29380	81841	-247580
Wind angle: 90°	380C1F3	29379	78842	243535	29379	78842	-243535
	380C2F1	29381	84226	250984	29381	84226	-250984
	380C2F2	29380	81841	247580	29380	81841	-247580
	380C2F3	29379	78842	243535	29379	78842	-243535
	GW / opgw	9334	22874	64487	9334	22874	-64487
	RTG	0	0	0	18691	40524	-123181
NL1/4	GW / opgw	3066	7980	25722	3066	7980	-25722
Construction/maintenance, +5°C	380C1F1	20053	51607	169925	20053	51607	-169925
Permanent loads yg= 1.2	380C1F2	20053	50878	169173	20053	50878	-169173
Wind angle: 90°	380C1F3	20053	49961	168306	20053	49961	-168306
	380C2F1	20053	51607	169925	20053	51607	-169925
	380C2F2	20053	50878	169173	20053	50878	-169173
	380C2F3	20053	49961	168306	20053	49961	-168306
	GW / opgw	3066	7980	25722	3066	7980	-25722
	RTG	0	0	0	6124	14958	-50351
NL1/1a	GW / opgw	2315	13445	33849	2314	7288	-21761
Wind, 10°C	380C1F1	17054	81207	211895	17046	48965	-152362
Permanent loads yg= 1.2	380C1F2	17053	76671	202882	17046	47819	-150723
Wind angle: -45°	380C1F3	17052	70852	191450	17046	46384	-148794
	380C2F1	17054	81207	211895	17046	48965	-152362
	380C2F2	17053	76671	202882	17046	47819	-150723
	380C2F3	17052	70852	191450	17046	46384	-148794
	GW / opgw	2315	13445	33849	2314	7288	-21761
	RTG	0	0	0	4620	12934	-40940
NL1/1b	GW / opgw	2312	7005	22881	2312	6207	-22077
Wind, -20°C	380C1F1	17036	49741	167420	17036	45636	-164246
Permanent loads yg= 1.2	380C1F2	17036	49150	166794	17036	45482	-164197
Wind angle: -45°	380C1F3	17036	48406	166073	17036	45285	-164144
	380C2F1	17036	49741	167420	17036	45636	-164246
	380C2F2	17036	49150	166794	17036	45482	-164197
	380C2F3	17036	48406	166073	17036	45285	-164144
	GW / opgw	2312	7005	22881	2312	6207	-22077
	RTG	0	0	0	4618	12090	-43655
NL1/3	GW / opgw	9333	21266	62584	9332	17436	-59478
Wind, -5°C	380C1F1	29379	78929	243648	29376	66589	-231541
Permanent loads yg= 1.2	380C1F2	29379	77136	241372	29376	66136	-231324
Wind angle: -45°	380C1F3	29378	74881	238699	29376	65559	-231084
	380C2F1	29379	78929	243648	29376	66589	-231541
	380C2F2	29379	77136	241372	29376	66136	-231324
	380C2F3	29378	74881	238699	29376	65559	-231084
	GW / opgw	9333	21266	62584	9332	17436	-59478
	RTG	0	0	0	18688	33844	-118790

NL1/4	GW / opgw	3066	7677	25388	3065	6959	-24882
Construction/maintenance, +5°C	380C1F1	20053	49988	168330	20053	46106	-165995
Permanent loads yg= 1.2	380C1F2	20053	49437	167855	20053	45957	-165964
Wind angle: -45°	380C1F3	20053	48741	167313	20053	45765	-165933
	380C2F1	20053	49988	168330	20053	46106	-165995
	380C2F2	20053	49437	167855	20053	45957	-165964
	380C2F3	20053	48741	167313	20053	45765	-165933
	GW / opgw	3066	7677	25388	3065	6959	-24882
	RTG	0	0	0	6124	13697	-49652
NL1//1a	GW / opgw	1735	4546	15510	1735	4546	-15510
Wind, 10°C	380C1F1	12781	32645	113694	12781	32645	-113694
Permanent loads yg= 0.9	380C1F2	12781	32413	113534	12781	32413	-113534
Wind angle: 0°	380C1F3	12781	32118	113354	12781	32118	-113354
	380C2F1	12781	32645	113694	12781	32645	-113694
	380C2F2	12781	32413	113534	12781	32413	-113534
	380C2F3	12781	32118	113354	12781	32118	-113354
	GW / opgw	1735	4546	15510	1735	4546	-15510
	RTG	0	0	0	3464	8755	-30709
NL1/1b	GW / opgw	1734	4806	17644	1734	4806	-17644
Wind, -20°C	380C1F1	12774	35975	132635	12774	35975	-132635
Permanent loads yg= 0.9	380C1F2	12774	35938	132636	12774	35938	-132636
Wind angle: 0°	380C1F3	12774	35889	132638	12774	35889	-132638
	380C2F1	12774	35975	132635	12774	35975	-132635
	380C2F2	12774	35938	132636	12774	35938	-132636
	380C2F3	12774	35889	132638	12774	35889	-132638
	GW / opgw	1734	4806	17644	1734	4806	-17644
	RTG	0	0	0	3463	9453	-34886
NL1/3	GW / opgw	8751	15560	56573	8751	15560	-56573
Wind, -5°C	380C1F1	25109	56158	205037	25109	56158	-205037
Permanent loads yg= 0.9	380C1F2	25109	56052	205035	25109	56052	-205035
Wind angle: 0°	380C1F3	25109	55915	205037	25109	55915	-205037
	380C2F1	25109	56158	205037	25109	56158	-205037
	380C2F2	25109	56052	205035	25109	56052	-205035
	380C2F3	25109	55915	205037	25109	55915	-205037
	GW / opgw	8751	15560	56573	8751	15560	-56573
	RTG	0	0	0	17529	30901	-113312
NL1/4	GW / opgw	2487	5709	21017	2487	5709	-21017
Construction/maintenance, +5°C	380C1F1	15788	37214	137256	15788	37214	-137256
Permanent loads yg= 0.9	380C1F2	15788	37177	137259	15788	37177	-137259
Wind angle: 0°	380C1F3	15788	37129	137264	15788	37129	-137264
	380C2F1	15788	37214	137256	15788	37214	-137256
	380C2F2	15788	37177	137259	15788	37177	-137259
	380C2F3	15788	37129	137264	15788	37129	-137264
	GW / opgw	2487	5709	21017	2487	5709	-21017
	RTG	0	0	0	4968	11349	-41961
NL1/6	GW / opgw	1735	4102	15307	1735	4102	-15307
Permanent, +10°C	380C1F1	12781	30274	112983	12781	30274	-112983
Permanent loads yg= 0.9	380C1F2	12781	30274	112983	12781	30274	-112983
	380C1F3	12781	30274	112983	12781	30274	-112983
	380C2F1	12781	30274	112983	12781	30274	-112983
	380C2F2	12781	30274	112983	12781	30274	-112983
	380C2F3	12781	30274	112983	12781	30274	-112983
	GW / opgw	1735	4102	15307	1735	4102	-15307
	RTG	0	0	0	3464	8190	-30564
NL1/1a	GW / opgw	1735	6424	18537	1736	13065	-32432
Wind, 10°C	380C1F1	12782	42124	126838	12789	77631	-198558
Permanent loads yg= 0.9	380C1F2	12782	40815	124588	12788	72791	-188411
Wind angle: 45°	380C1F3	12782	39176	121897	12787	66521	-175298
	380C2F1	12782	42124	126838	12789	77631	-198558
	380C2F2	12782	40815	124588	12788	72791	-188411
	380C2F3	12782	39176	121897	12787	66521	-175298
	GW / opgw	1735	6424	18537	1736	13065	-32432
	RTG	0	0	0	3466	19522	-50857
NL1/1b	GW / opgw	1734	5049	17757	1734	5951	-18948
Wind, -20°C	380C1F1	12774	37271	133028	12774	41836	-137924
Permanent loads yg= 0.9	380C1F2	12774	37107	132941	12774	41164	-136996
Wind angle: 45°	380C1F3	12774	36897	132843	12774	40323	-135911
	380C2F1	12774	37271	133028	12774	41836	-137924
	380C2F2	12774	37107	132941	12774	41164	-136996
	380C2F3	12774	36897	132843	12774	40323	-135911
	GW / opgw	1734	5049	17757	1734	5951	-18948
	RTG	0	0	0	3463	10834	-36037

NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	8751	16723	56818	8753	20634	-60227
	380C1F1	25109	59845	206377	25112	72958	-221372
	380C1F2	25109	59374	206090	25112	71037	-218620
	380C1F3	25109	58775	205768	25111	68625	-215361
	380C2F1	25109	59845	206377	25112	72958	-221372
	380C2F2	25109	59374	206090	25112	71037	-218620
	380C2F3	25109	58775	205768	25111	68625	-215361
	GW / opgw	8751	16723	56818	8753	20634	-60227
	RTG	0	0	0	17531	37214	-116336
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2487	5936	21064	2487	6704
380C1F1		15788	38461	137463	15788	42632	-140881
380C1F2		15788	38305	137409	15788	42029	-140213
380C1F3		15788	38105	137349	15788	41271	-139439
380C2F1		15788	38461	137463	15788	42632	-140881
380C2F2		15788	38305	137409	15788	42029	-140213
380C2F3		15788	38105	137349	15788	41271	-139439
GW / opgw		2487	5936	21064	2487	6704	-21758
RTG		0	0	0	4968	12584	-42566
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	1737	15503	37541	1737	15503
	380C1F1	12792	91220	227003	12792	91220	-227003
	380C1F2	12791	85222	214467	12791	85222	-214467
	380C1F3	12789	77398	198070	12789	77398	-198070
	380C2F1	12792	91220	227003	12792	91220	-227003
	380C2F2	12791	85222	214467	12791	85222	-214467
	380C2F3	12789	77398	198070	12789	77398	-198070
	GW / opgw	1737	15503	37541	1737	15503	-37541
	RTG	0	0	0	3467	22870	-57979
	NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	6351	19645	1734	6351
380C1F1		12775	43837	140946	12775	43837	-140946
380C1F2		12775	42933	139538	12775	42933	-139538
380C1F3		12774	41804	137878	12774	41804	-137878
380C2F1		12775	43837	140946	12775	43837	-140946
380C2F2		12775	42933	139538	12775	42933	-139538
380C2F3		12774	41804	137878	12774	41804	-137878
GW / opgw		1734	6351	19645	1734	6351	-19645
RTG		0	0	0	3463	11302	-36710
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°		GW / opgw	8754	22281	62277	8754	22281
	380C1F1	25114	78631	230113	25114	78631	-230113
	380C1F2	25113	76077	226078	25113	76077	-226078
	380C1F3	25112	72865	221235	25112	72865	-221235
	380C2F1	25114	78631	230113	25114	78631	-230113
	380C2F2	25113	76077	226078	25113	76077	-226078
	380C2F3	25112	72865	221235	25112	72865	-221235
	GW / opgw	8754	22281	62277	8754	22281	-62277
	RTG	0	0	0	17532	39208	-118273
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2487	7035	22197	2487	7035
380C1F1		15789	44416	143093	15789	44416	-143093
380C1F2		15788	43611	142056	15788	43611	-142056
380C1F3		15788	42602	140848	15788	42602	-140848
380C2F1		15789	44416	143093	15789	44416	-143093
380C2F2		15788	43611	142056	15788	43611	-142056
380C2F3		15788	42602	140848	15788	42602	-140848
GW / opgw		2487	7035	22197	2487	7035	-22197
RTG		0	0	0	4968	12979	-42965
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°		GW / opgw	1736	13065	32432	1735	6424
	380C1F1	12789	77631	198558	12782	42124	-126838
	380C1F2	12788	72791	188411	12782	40815	-124588
	380C1F3	12787	66521	175298	12782	39176	-121897
	380C2F1	12789	77631	198558	12782	42124	-126838
	380C2F2	12788	72791	188411	12782	40815	-124588
	380C2F3	12787	66521	175298	12782	39176	-121897
	GW / opgw	1736	13065	32432	1735	6424	-18537
	RTG	0	0	0	3465	10976	-33633
	NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	5951	18948	1734	5049
380C1F1		12774	41836	137924	12774	37271	-133028
380C1F2		12774	41164	136996	12774	37107	-132941
380C1F3		12774	40323	135911	12774	36897	-132843
380C2F1		12774	41836	137924	12774	37271	-133028
380C2F2		12774	41164	136996	12774	37107	-132941
380C2F3		12774	40323	135911	12774	36897	-132843
GW / opgw		1734	5951	18948	1734	5049	-17757
RTG		0	0	0	3463	9762	-34967

NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	8753	20634	60227	8751	16723	-56818
	380C1F1	25112	72958	221372	25109	59845	-206377
	380C1F2	25112	71037	218620	25109	59374	-206090
	380C1F3	25111	68625	215361	25109	58775	-205768
	380C2F1	25112	72958	221372	25109	59845	-206377
	380C2F2	25112	71037	218620	25109	59374	-206090
	380C2F3	25111	68625	215361	25109	58775	-205768
	GW / opgw	8753	20634	60227	8751	16723	-56818
	RTG	0	0	0	17529	32403	-113415
	NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2487	6704	21758	2487	5936
380C1F1		15788	42632	140881	15788	38461	-137463
380C1F2		15788	42029	140213	15788	38305	-137409
380C1F3		15788	41271	139439	15788	38105	-137349
380C2F1		15788	42632	140881	15788	38461	-137463
380C2F2		15788	42029	140213	15788	38305	-137409
380C2F3		15788	41271	139439	15788	38105	-137349
GW / opgw		2487	6704	21758	2487	5936	-21064
RTG		0	0	0	4968	11642	-41982

ZWM6HK400

Appendix AZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL3/1a	GW / opgw	0	0	0	2313	5417	-19458
Wind, 10°C	380C1F1	0	0	0	17045	39408	-142840
Permanent loads yg= 1.2	380C1F2	0	0	0	17045	39305	-142825
Wind angle: 0°	380C1F3	0	0	0	17045	39174	-142811
	380C2F1	0	0	0	17045	39408	-142840
	380C2F2	0	0	0	17045	39305	-142825
	380C2F3	0	0	0	17045	39174	-142811
	GW / opgw	0	0	0	2313	5417	-19458
	RTG	0	0	0	4620	10682	-38844
NL3/1b	GW / opgw	0	0	0	2312	5962	-22017
Wind, -20°C	380C1F1	0	0	0	17036	44313	-164078
Permanent loads yg= 1.2	380C1F2	0	0	0	17036	44284	-164082
Wind angle: 0°	380C1F3	0	0	0	17036	44246	-164087
	380C2F1	0	0	0	17036	44313	-164078
	380C2F2	0	0	0	17036	44284	-164082
	380C2F3	0	0	0	17036	44246	-164087
	GW / opgw	0	0	0	2312	5962	-22017
	RTG	0	0	0	4618	11773	-43625
NL3/3	GW / opgw	0	0	0	3883	8603	-30909
Wind, -5°C	380C1F1	0	0	0	19802	46863	-171258
Permanent loads yg= 1.2	380C1F2	0	0	0	19802	46777	-171255
Wind angle: 0°	380C1F3	0	0	0	19802	46667	-171253
	380C2F1	0	0	0	19802	46863	-171258
	380C2F2	0	0	0	19802	46777	-171255
	380C2F3	0	0	0	19802	46667	-171253
	GW / opgw	0	0	0	3883	8603	-30909
	RTG	0	0	0	7767	16955	-61668
NL3/4	GW / opgw	0	0	0	2915	6462	-23882
Construction/maintenance, +5°C	380C1F1	0	0	0	19451	43757	-162002
Permanent loads yg= 1.2	380C1F2	0	0	0	19451	43728	-162006
Wind angle: 0°	380C1F3	0	0	0	19451	43690	-162012
	380C2F1	0	0	0	19451	43757	-162002
	380C2F2	0	0	0	19451	43728	-162006
	380C2F3	0	0	0	19451	43690	-162012
	GW / opgw	0	0	0	2915	6462	-23882
	RTG	0	0	0	5823	12864	-47696
NL3/1a	GW / opgw	0	0	0	2314	8887	-24681
Wind, 10°C	380C1F1	0	0	0	17048	57086	-165656
Permanent loads yg= 1.2	380C1F2	0	0	0	17048	55023	-162069
Wind angle: 45°	380C1F3	0	0	0	17047	52430	-157738
	380C2F1	0	0	0	17048	57086	-165656
	380C2F2	0	0	0	17048	55023	-162069
	380C2F3	0	0	0	17047	52430	-157738
	GW / opgw	0	0	0	2314	8887	-24681
	RTG	0	0	0	4621	14847	-43970
NL3/1b	GW / opgw	0	0	0	2312	6741	-22549
Wind, -20°C	380C1F1	0	0	0	17036	48403	-166070
Permanent loads yg= 1.2	380C1F2	0	0	0	17036	47959	-165679
Wind angle: 45°	380C1F3	0	0	0	17036	47399	-165232
	380C2F1	0	0	0	17036	48403	-166070
	380C2F2	0	0	0	17036	47959	-165679
	380C2F3	0	0	0	17036	47399	-165232
	GW / opgw	0	0	0	2312	6741	-22549
	RTG	0	0	0	4618	12745	-44049
NL3/3	GW / opgw	0	0	0	3884	13699	-37715
Wind, -5°C	380C1F1	0	0	0	19805	60671	-185710
Permanent loads yg= 1.2	380C1F2	0	0	0	19804	59078	-183295
Wind angle: 45°	380C1F3	0	0	0	19804	57080	-180431
	380C2F1	0	0	0	19805	60671	-185710
	380C2F2	0	0	0	19804	59078	-183295
	380C2F3	0	0	0	19804	57080	-180431
	GW / opgw	0	0	0	3884	13699	-37715
	RTG	0	0	0	7768	23103	-68204
NL3/4	GW / opgw	0	0	0	2915	7190	-24224
Construction/maintenance, +5°C	380C1F1	0	0	0	19451	47708	-163468
Permanent loads yg= 1.2	380C1F2	0	0	0	19451	47287	-163163
Wind angle: 45°	380C1F3	0	0	0	19451	46754	-162817
	380C2F1	0	0	0	19451	47708	-163468
	380C2F2	0	0	0	19451	47287	-163163
	380C2F3	0	0	0	19451	46754	-162817
	GW / opgw	0	0	0	2915	7190	-24224
	RTG	0	0	0	5823	13789	-47942

NL3/1a	GW / opgw	0	0	0	2314	10058	-26978
Wind, 10°C	380C1F1	0	0	0	17050	63147	-176706
Permanent loads yg= 1.2	380C1F2	0	0	0	17049	60425	-171664
Wind angle: 90°	380C1F3	0	0	0	17048	56986	-165479
	380C2F1	0	0	0	17050	63147	-176706
	380C2F2	0	0	0	17049	60425	-171664
	380C2F3	0	0	0	17048	56986	-165479
	GW / opgw	0	0	0	2314	10058	-26978
	RTG	0	0	0	4621	16285	-46547
NL3/1b	GW / opgw	0	0	0	2312	6998	-22872
Wind, -20°C	380C1F1	0	0	0	17036	49708	-167384
Permanent loads yg= 1.2	380C1F2	0	0	0	17036	49120	-166764
Wind angle: 90°	380C1F3	0	0	0	17036	48381	-166050
	380C2F1	0	0	0	17036	49708	-167384
	380C2F2	0	0	0	17036	49120	-166764
	380C2F3	0	0	0	17036	48381	-166050
	GW / opgw	0	0	0	2312	6998	-22872
	RTG	0	0	0	4618	13053	-44337
NL3/3	GW / opgw	0	0	0	3885	15395	-40771
Wind, -5°C	380C1F1	0	0	0	19806	65386	-193366
Permanent loads yg= 1.2	380C1F2	0	0	0	19805	63262	-189834
Wind angle: 90°	380C1F3	0	0	0	19805	60594	-185589
	380C2F1	0	0	0	19806	65386	-193366
	380C2F2	0	0	0	19805	63262	-189834
	380C2F3	0	0	0	19805	60594	-185589
	GW / opgw	0	0	0	3885	15395	-40771
	RTG	0	0	0	7769	25184	-71570
NL3/4	GW / opgw	0	0	0	2915	7422	-24450
Construction/maintenance, +5°C	380C1F1	0	0	0	19451	48940	-164507
Permanent loads yg= 1.2	380C1F2	0	0	0	19451	48386	-164016
Wind angle: 90°	380C1F3	0	0	0	19451	47688	-163453
	380C2F1	0	0	0	19451	48940	-164507
	380C2F2	0	0	0	19451	48386	-164016
	380C2F3	0	0	0	19451	47688	-163453
	GW / opgw	0	0	0	2915	7422	-24450
	RTG	0	0	0	5823	14071	-48136
NL3/1a	GW / opgw	0	0	0	2313	6127	-20040
Wind, 10°C	380C1F1	0	0	0	17045	43107	-145083
Permanent loads yg= 1.2	380C1F2	0	0	0	17045	42622	-144643
Wind angle: -45°	380C1F3	0	0	0	17045	42010	-144138
	380C2F1	0	0	0	17045	43107	-145083
	380C2F2	0	0	0	17045	42622	-144643
	380C2F3	0	0	0	17045	42010	-144138
	GW / opgw	0	0	0	2313	6127	-20040
	RTG	0	0	0	4620	11559	-39325
NL3/1b	GW / opgw	0	0	0	2312	6141	-22048
Wind, -20°C	380C1F1	0	0	0	17036	45284	-164144
Permanent loads yg= 1.2	380C1F2	0	0	0	17036	45164	-164118
Wind angle: -45°	380C1F3	0	0	0	17036	45010	-164091
	380C2F1	0	0	0	17036	45284	-164144
	380C2F2	0	0	0	17036	45164	-164118
	380C2F3	0	0	0	17036	45010	-164091
	GW / opgw	0	0	0	2312	6141	-22048
	RTG	0	0	0	4618	12006	-43634
NL3/3	GW / opgw	0	0	0	3883	9674	-31635
Wind, -5°C	380C1F1	0	0	0	19803	49854	-172487
Permanent loads yg= 1.2	380C1F2	0	0	0	19803	49470	-172230
Wind angle: -45°	380C1F3	0	0	0	19803	48982	-171940
	380C2F1	0	0	0	19803	49854	-172487
	380C2F2	0	0	0	19803	49470	-172230
	380C2F3	0	0	0	19803	48982	-171940
	GW / opgw	0	0	0	3883	9674	-31635
	RTG	0	0	0	7767	18287	-62242
NL3/4	GW / opgw	0	0	0	2915	6635	-23893
Construction/maintenance, +5°C	380C1F1	0	0	0	19451	44713	-162011
Permanent loads yg= 1.2	380C1F2	0	0	0	19451	44596	-161995
Wind angle: -45°	380C1F3	0	0	0	19451	44445	-161980
	380C2F1	0	0	0	19451	44713	-162011
	380C2F2	0	0	0	19451	44596	-161995
	380C2F3	0	0	0	19451	44445	-161980
	GW / opgw	0	0	0	2915	6635	-23893
	RTG	0	0	0	5823	13092	-47687

NL3/1a	GW / opgw	0	0	0	1735	4313	-15338
Wind, 10°C	380C1F1	0	0	0	12781	31423	-113041
Permanent loads yg= 0.9	380C1F2	0	0	0	12781	31316	-113009
Wind angle: 0°	380C1F3	0	0	0	12781	31179	-112975
	380C2F1	0	0	0	12781	31423	-113041
	380C2F2	0	0	0	12781	31316	-113009
	380C2F3	0	0	0	12781	31179	-112975
	GW / opgw	0	0	0	1735	4313	-15338
	RTG	0	0	0	3464	8465	-30571
NL3/1b	GW / opgw	0	0	0	1734	4790	-17643
Wind, -20°C	380C1F1	0	0	0	12774	35889	-132638
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	35859	-132640
Wind angle: 0°	380C1F3	0	0	0	12774	35821	-132643
	380C2F1	0	0	0	12774	35889	-132638
	380C2F2	0	0	0	12774	35859	-132640
	380C2F3	0	0	0	12774	35821	-132643
	GW / opgw	0	0	0	1734	4790	-17643
	RTG	0	0	0	3463	9432	-34887
NL3/3	GW / opgw	0	0	0	3304	7640	-27316
Wind, -5°C	380C1F1	0	0	0	15538	39043	-142075
Permanent loads yg= 0.9	380C1F2	0	0	0	15538	38955	-142062
Wind angle: 0°	380C1F3	0	0	0	15538	38842	-142050
	380C2F1	0	0	0	15538	39043	-142075
	380C2F2	0	0	0	15538	38955	-142062
	380C2F3	0	0	0	15538	38842	-142050
	GW / opgw	0	0	0	3304	7640	-27316
	RTG	0	0	0	6610	15024	-54460
NL3/4	GW / opgw	0	0	0	2336	5416	-19980
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	36000	-133052
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	35971	-133056
Wind angle: 0°	380C1F3	0	0	0	15186	35933	-133060
	380C2F1	0	0	0	15186	36000	-133052
	380C2F2	0	0	0	15186	35971	-133056
	380C2F3	0	0	0	15186	35933	-133060
	GW / opgw	0	0	0	2336	5416	-19980
	RTG	0	0	0	4667	10771	-39885
NL3/1a	GW / opgw	0	0	0	1735	8210	-22156
Wind, 10°C	380C1F1	0	0	0	12784	51340	-144218
Permanent loads yg= 0.9	380C1F2	0	0	0	12784	49016	-139656
Wind angle: 45°	380C1F3	0	0	0	12783	46076	-134031
	380C2F1	0	0	0	12784	51340	-144218
	380C2F2	0	0	0	12784	49016	-139656
	380C2F3	0	0	0	12783	46076	-134031
	GW / opgw	0	0	0	1735	8210	-22156
	RTG	0	0	0	3465	13155	-37657
NL3/1b	GW / opgw	0	0	0	1734	5648	-18470
Wind, -20°C	380C1F1	0	0	0	12774	40320	-135907
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	39822	-135311
Wind angle: 45°	380C1F3	0	0	0	12774	39197	-134622
	380C2F1	0	0	0	12774	40320	-135907
	380C2F2	0	0	0	12774	39822	-135311
	380C2F3	0	0	0	12774	39197	-134622
	GW / opgw	0	0	0	1734	5648	-18470
	RTG	0	0	0	3463	10479	-35592
NL3/3	GW / opgw	0	0	0	3305	13070	-35370
Wind, -5°C	380C1F1	0	0	0	15541	54258	-161780
Permanent loads yg= 0.9	380C1F2	0	0	0	15541	52474	-158656
Wind angle: 45°	380C1F3	0	0	0	15540	50235	-154893
	380C2F1	0	0	0	15541	54258	-161780
	380C2F2	0	0	0	15541	52474	-158656
	380C2F3	0	0	0	15540	50235	-154893
	GW / opgw	0	0	0	3305	13070	-35370
	RTG	0	0	0	6612	21564	-62463
NL3/4	GW / opgw	0	0	0	2336	6187	-20478
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	40180	-135376
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	39722	-134931
Wind angle: 45°	380C1F3	0	0	0	15186	39145	-134421
	380C2F1	0	0	0	15186	40180	-135376
	380C2F2	0	0	0	15186	39722	-134931
	380C2F3	0	0	0	15186	39145	-134421
	GW / opgw	0	0	0	2336	6187	-20478
	RTG	0	0	0	4667	11735	-40278

NL3/1a	GW / opgw	0	0	0	1736	9484	-24837
Wind, 10°C	380C1F1	0	0	0	12785	58092	-157850
Permanent loads yg= 0.9	380C1F2	0	0	0	12785	55074	-151702
Wind angle: 90°	380C1F3	0	0	0	12784	51227	-143995
	380C2F1	0	0	0	12785	58092	-157850
	380C2F2	0	0	0	12785	55074	-151702
	380C2F3	0	0	0	12784	51227	-143995
	GW / opgw	0	0	0	1736	9484	-24837
	RTG	0	0	0	3465	14771	-40897
NL3/1b	GW / opgw	0	0	0	1734	5943	-18935
Wind, -20°C	380C1F1	0	0	0	12774	41799	-137871
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	41131	-136951
Wind angle: 90°	380C1F3	0	0	0	12774	40295	-135877
	380C2F1	0	0	0	12774	41799	-137871
	380C2F2	0	0	0	12774	41131	-136951
	380C2F3	0	0	0	12774	40295	-135877
	GW / opgw	0	0	0	1734	5943	-18935
	RTG	0	0	0	3463	10825	-36025
NL3/3	GW / opgw	0	0	0	3306	14856	-38760
Wind, -5°C	380C1F1	0	0	0	15542	59513	-171455
Permanent loads yg= 0.9	380C1F2	0	0	0	15542	57150	-167032
Wind angle: 90°	380C1F3	0	0	0	15541	54171	-161626
	380C2F1	0	0	0	15542	59513	-171455
	380C2F2	0	0	0	15542	57150	-167032
	380C2F3	0	0	0	15541	54171	-161626
	GW / opgw	0	0	0	3306	14856	-38760
	RTG	0	0	0	6612	23789	-66366
NL3/4	GW / opgw	0	0	0	2336	6440	-20785
Construction/maintenance, +5°C	380C1F1	0	0	0	15187	41531	-136860
Permanent loads yg= 0.9	380C1F2	0	0	0	15187	40922	-136162
Wind angle: 90°	380C1F3	0	0	0	15186	40157	-135353
	380C2F1	0	0	0	15187	41531	-136860
	380C2F2	0	0	0	15187	40922	-136162
	380C2F3	0	0	0	15186	40157	-135353
	GW / opgw	0	0	0	2336	6440	-20785
	RTG	0	0	0	4667	12038	-40549
NL3/1a	GW / opgw	0	0	0	1735	5101	-16208
Wind, 10°C	380C1F1	0	0	0	12781	35461	-116551
Permanent loads yg= 0.9	380C1F2	0	0	0	12781	34918	-115894
Wind angle: -45°	380C1F3	0	0	0	12781	34237	-115133
	380C2F1	0	0	0	12781	35461	-116551
	380C2F2	0	0	0	12781	34918	-115894
	380C2F3	0	0	0	12781	34237	-115133
	GW / opgw	0	0	0	1735	5101	-16208
	RTG	0	0	0	3464	9416	-31331
NL3/1b	GW / opgw	0	0	0	1734	4978	-17707
Wind, -20°C	380C1F1	0	0	0	12774	36896	-132843
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	36770	-132792
Wind angle: -45°	380C1F3	0	0	0	12774	36608	-132736
	380C2F1	0	0	0	12774	36896	-132843
	380C2F2	0	0	0	12774	36770	-132792
	380C2F3	0	0	0	12774	36608	-132736
	GW / opgw	0	0	0	1734	4978	-17707
	RTG	0	0	0	3463	9673	-34927
NL3/3	GW / opgw	0	0	0	3304	8767	-28251
Wind, -5°C	380C1F1	0	0	0	15539	42217	-143988
Permanent loads yg= 0.9	380C1F2	0	0	0	15539	41801	-143612
Wind angle: -45°	380C1F3	0	0	0	15539	41276	-143181
	380C2F1	0	0	0	15539	42217	-143988
	380C2F2	0	0	0	15539	41801	-143612
	380C2F3	0	0	0	15539	41276	-143181
	GW / opgw	0	0	0	3304	8767	-28251
	RTG	0	0	0	6610	16408	-55232
NL3/4	GW / opgw	0	0	0	2336	5594	-20007
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	36980	-133154
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	36859	-133121
Wind angle: -45°	380C1F3	0	0	0	15186	36703	-133088
	380C2F1	0	0	0	15186	36980	-133154
	380C2F2	0	0	0	15186	36859	-133121
	380C2F3	0	0	0	15186	36703	-133088
	GW / opgw	0	0	0	2336	5594	-20007
	RTG	0	0	0	4667	11003	-39891

ZWM6HK400

Appendix AZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5417	19458	0	0	0
	380C1F1	17045	39408	142840	0	0	0
	380C1F2	17045	39305	142825	0	0	0
	380C1F3	17045	39174	142811	0	0	0
	380C2F1	17045	39408	142840	0	0	0
	380C2F2	17045	39305	142825	0	0	0
	380C2F3	17045	39174	142811	0	0	0
	GW / opgw	2313	5417	19458	0	0	0
	RTG	4620	10682	38844	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5962	22017	0	0	0
	380C1F1	17036	44313	164078	0	0	0
	380C1F2	17036	44284	164082	0	0	0
	380C1F3	17036	44246	164087	0	0	0
	380C2F1	17036	44313	164078	0	0	0
	380C2F2	17036	44284	164082	0	0	0
	380C2F3	17036	44246	164087	0	0	0
	GW / opgw	2312	5962	22017	0	0	0
	RTG	4618	11773	43625	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8603	30909	0	0	0
	380C1F1	19802	46863	171258	0	0	0
	380C1F2	19802	46777	171255	0	0	0
	380C1F3	19802	46667	171253	0	0	0
	380C2F1	19802	46863	171258	0	0	0
	380C2F2	19802	46777	171255	0	0	0
	380C2F3	19802	46667	171253	0	0	0
	GW / opgw	3883	8603	30909	0	0	0
	RTG	7767	16955	61668	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6462	23882	0	0	0
	380C1F1	19451	43757	162002	0	0	0
	380C1F2	19451	43728	162006	0	0	0
	380C1F3	19451	43690	162012	0	0	0
	380C2F1	19451	43757	162002	0	0	0
	380C2F2	19451	43728	162006	0	0	0
	380C2F3	19451	43690	162012	0	0	0
	GW / opgw	2915	6462	23882	0	0	0
	RTG	5823	12864	47696	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6127	20040	0	0	0
	380C1F1	17045	43107	145083	0	0	0
	380C1F2	17045	42622	144643	0	0	0
	380C1F3	17045	42010	144138	0	0	0
	380C2F1	17045	43107	145083	0	0	0
	380C2F2	17045	42622	144643	0	0	0
	380C2F3	17045	42010	144138	0	0	0
	GW / opgw	2313	6127	20040	0	0	0
	RTG	4620	11559	39325	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6141	22048	0	0	0
	380C1F1	17036	45284	164144	0	0	0
	380C1F2	17036	45164	164118	0	0	0
	380C1F3	17036	45010	164091	0	0	0
	380C2F1	17036	45284	164144	0	0	0
	380C2F2	17036	45164	164118	0	0	0
	380C2F3	17036	45010	164091	0	0	0
	GW / opgw	2312	6141	22048	0	0	0
	RTG	4618	12006	43634	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9674	31635	0	0	0
	380C1F1	19803	49854	172487	0	0	0
	380C1F2	19803	49470	172230	0	0	0
	380C1F3	19803	48982	171940	0	0	0
	380C2F1	19803	49854	172487	0	0	0
	380C2F2	19803	49470	172230	0	0	0
	380C2F3	19803	48982	171940	0	0	0
	GW / opgw	3883	9674	31635	0	0	0
	RTG	7767	18287	62242	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6635	23893	0	0	0
	380C1F1	19451	44713	162011	0	0	0
	380C1F2	19451	44596	161995	0	0	0
	380C1F3	19451	44445	161980	0	0	0
	380C2F1	19451	44713	162011	0	0	0
	380C2F2	19451	44596	161995	0	0	0
	380C2F3	19451	44445	161980	0	0	0
	GW / opgw	2915	6635	23893	0	0	0
	RTG	5823	13092	47687	0	0	0

NL3/1a	GW / opgw	2314	10058	26978	0	0	0
Wind, 10°C	380C1F1	17050	63147	176706	0	0	0
Permanent loads yg= 1.2	380C1F2	17049	60425	171664	0	0	0
Wind angle: 90°	380C1F3	17048	56986	165479	0	0	0
	380C2F1	17050	63147	176706	0	0	0
	380C2F2	17049	60425	171664	0	0	0
	380C2F3	17048	56986	165479	0	0	0
	GW / opgw	2314	10058	26978	0	0	0
	RTG	4621	16285	46547	0	0	0
NL3/1b	GW / opgw	2312	6998	22872	0	0	0
Wind, -20°C	380C1F1	17036	49708	167384	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	49120	166764	0	0	0
Wind angle: 90°	380C1F3	17036	48381	166050	0	0	0
	380C2F1	17036	49708	167384	0	0	0
	380C2F2	17036	49120	166764	0	0	0
	380C2F3	17036	48381	166050	0	0	0
	GW / opgw	2312	6998	22872	0	0	0
	RTG	4618	13053	44337	0	0	0
NL3/3	GW / opgw	3885	15395	40771	0	0	0
Wind, -5°C	380C1F1	19806	65386	193366	0	0	0
Permanent loads yg= 1.2	380C1F2	19805	63262	189834	0	0	0
Wind angle: 90°	380C1F3	19805	60594	185589	0	0	0
	380C2F1	19806	65386	193366	0	0	0
	380C2F2	19805	63262	189834	0	0	0
	380C2F3	19805	60594	185589	0	0	0
	GW / opgw	3885	15395	40771	0	0	0
	RTG	7769	25184	71570	0	0	0
NL3/4	GW / opgw	2915	7422	24450	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	48940	164507	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	48386	164016	0	0	0
Wind angle: 90°	380C1F3	19451	47688	163453	0	0	0
	380C2F1	19451	48940	164507	0	0	0
	380C2F2	19451	48386	164016	0	0	0
	380C2F3	19451	47688	163453	0	0	0
	GW / opgw	2915	7422	24450	0	0	0
	RTG	5823	14071	48136	0	0	0
NL3/1a	GW / opgw	2314	8887	24681	0	0	0
Wind, 10°C	380C1F1	17048	57086	165656	0	0	0
Permanent loads yg= 1.2	380C1F2	17048	55023	162069	0	0	0
Wind angle: -45°	380C1F3	17047	52430	157738	0	0	0
	380C2F1	17048	57086	165656	0	0	0
	380C2F2	17048	55023	162069	0	0	0
	380C2F3	17047	52430	157738	0	0	0
	GW / opgw	2314	8887	24681	0	0	0
	RTG	4621	14847	43970	0	0	0
NL3/1b	GW / opgw	2312	6741	22549	0	0	0
Wind, -20°C	380C1F1	17036	48403	166070	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	47959	165679	0	0	0
Wind angle: -45°	380C1F3	17036	47399	165232	0	0	0
	380C2F1	17036	48403	166070	0	0	0
	380C2F2	17036	47959	165679	0	0	0
	380C2F3	17036	47399	165232	0	0	0
	GW / opgw	2312	6741	22549	0	0	0
	RTG	4618	12745	44049	0	0	0
NL3/3	GW / opgw	3884	13699	37715	0	0	0
Wind, -5°C	380C1F1	19805	60671	185710	0	0	0
Permanent loads yg= 1.2	380C1F2	19804	59078	183295	0	0	0
Wind angle: -45°	380C1F3	19804	57080	180431	0	0	0
	380C2F1	19805	60671	185710	0	0	0
	380C2F2	19804	59078	183295	0	0	0
	380C2F3	19804	57080	180431	0	0	0
	GW / opgw	3884	13699	37715	0	0	0
	RTG	7768	23103	68204	0	0	0
NL3/4	GW / opgw	2915	7190	24224	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	47708	163468	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	47287	163163	0	0	0
Wind angle: -45°	380C1F3	19451	46754	162817	0	0	0
	380C2F1	19451	47708	163468	0	0	0
	380C2F2	19451	47287	163163	0	0	0
	380C2F3	19451	46754	162817	0	0	0
	GW / opgw	2915	7190	24224	0	0	0
	RTG	5823	13789	47942	0	0	0

NL3/1a	GW / opgw	1735	4313	15338	0	0	0
Wind, 10°C	380C1F1	12781	31423	113041	0	0	0
Permanent loads yg= 0.9	380C1F2	12781	31316	113009	0	0	0
Wind angle: 0°	380C1F3	12781	31179	112975	0	0	0
	380C2F1	12781	31423	113041	0	0	0
	380C2F2	12781	31316	113009	0	0	0
	380C2F3	12781	31179	112975	0	0	0
	GW / opgw	1735	4313	15338	0	0	0
	RTG	3464	8465	30571	0	0	0
NL3/1b	GW / opgw	1734	4790	17643	0	0	0
Wind, -20°C	380C1F1	12774	35889	132638	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	35859	132640	0	0	0
Wind angle: 0°	380C1F3	12774	35821	132643	0	0	0
	380C2F1	12774	35889	132638	0	0	0
	380C2F2	12774	35859	132640	0	0	0
	380C2F3	12774	35821	132643	0	0	0
	GW / opgw	1734	4790	17643	0	0	0
	RTG	3463	9432	34887	0	0	0
NL3/3	GW / opgw	3304	7640	27316	0	0	0
Wind, -5°C	380C1F1	15538	39043	142075	0	0	0
Permanent loads yg= 0.9	380C1F2	15538	38955	142062	0	0	0
Wind angle: 0°	380C1F3	15538	38842	142050	0	0	0
	380C2F1	15538	39043	142075	0	0	0
	380C2F2	15538	38955	142062	0	0	0
	380C2F3	15538	38842	142050	0	0	0
	GW / opgw	3304	7640	27316	0	0	0
	RTG	6610	15024	54460	0	0	0
NL3/4	GW / opgw	2336	5416	19980	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	36000	133052	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	35971	133056	0	0	0
Wind angle: 0°	380C1F3	15186	35933	133060	0	0	0
	380C2F1	15186	36000	133052	0	0	0
	380C2F2	15186	35971	133056	0	0	0
	380C2F3	15186	35933	133060	0	0	0
	GW / opgw	2336	5416	19980	0	0	0
	RTG	4667	10771	39885	0	0	0
NL3/1a	GW / opgw	1735	5101	16208	0	0	0
Wind, 10°C	380C1F1	12781	35461	116551	0	0	0
Permanent loads yg= 0.9	380C1F2	12781	34918	115894	0	0	0
Wind angle: 45°	380C1F3	12781	34237	115133	0	0	0
	380C2F1	12781	35461	116551	0	0	0
	380C2F2	12781	34918	115894	0	0	0
	380C2F3	12781	34237	115133	0	0	0
	GW / opgw	1735	5101	16208	0	0	0
	RTG	3464	9416	31331	0	0	0
NL3/1b	GW / opgw	1734	4978	17707	0	0	0
Wind, -20°C	380C1F1	12774	36896	132843	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	36770	132792	0	0	0
Wind angle: 45°	380C1F3	12774	36608	132736	0	0	0
	380C2F1	12774	36896	132843	0	0	0
	380C2F2	12774	36770	132792	0	0	0
	380C2F3	12774	36608	132736	0	0	0
	GW / opgw	1734	4978	17707	0	0	0
	RTG	3463	9673	34927	0	0	0
NL3/3	GW / opgw	3304	8767	28251	0	0	0
Wind, -5°C	380C1F1	15539	42217	143988	0	0	0
Permanent loads yg= 0.9	380C1F2	15539	41801	143612	0	0	0
Wind angle: 45°	380C1F3	15539	41276	143181	0	0	0
	380C2F1	15539	42217	143988	0	0	0
	380C2F2	15539	41801	143612	0	0	0
	380C2F3	15539	41276	143181	0	0	0
	GW / opgw	3304	8767	28251	0	0	0
	RTG	6610	16408	55232	0	0	0
NL3/4	GW / opgw	2336	5594	20007	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	36980	133154	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	36859	133121	0	0	0
Wind angle: 45°	380C1F3	15186	36703	133088	0	0	0
	380C2F1	15186	36980	133154	0	0	0
	380C2F2	15186	36859	133121	0	0	0
	380C2F3	15186	36703	133088	0	0	0
	GW / opgw	2336	5594	20007	0	0	0
	RTG	4667	11003	39891	0	0	0

NL3/1a	GW / opgw	1736	9484	24837	0	0	0
Wind, 10°C	380C1F1	12785	58092	157850	0	0	0
Permanent loads yg= 0.9	380C1F2	12785	55074	151702	0	0	0
Wind angle: 90°	380C1F3	12784	51227	143995	0	0	0
	380C2F1	12785	58092	157850	0	0	0
	380C2F2	12785	55074	151702	0	0	0
	380C2F3	12784	51227	143995	0	0	0
	GW / opgw	1736	9484	24837	0	0	0
	RTG	3465	14771	40897	0	0	0
NL3/1b	GW / opgw	1734	5943	18935	0	0	0
Wind, -20°C	380C1F1	12774	41799	137871	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	41131	136951	0	0	0
Wind angle: 90°	380C1F3	12774	40295	135877	0	0	0
	380C2F1	12774	41799	137871	0	0	0
	380C2F2	12774	41131	136951	0	0	0
	380C2F3	12774	40295	135877	0	0	0
	GW / opgw	1734	5943	18935	0	0	0
	RTG	3463	10825	36025	0	0	0
NL3/3	GW / opgw	3306	14856	38760	0	0	0
Wind, -5°C	380C1F1	15542	59513	171455	0	0	0
Permanent loads yg= 0.9	380C1F2	15542	57150	167032	0	0	0
Wind angle: 90°	380C1F3	15541	54171	161626	0	0	0
	380C2F1	15542	59513	171455	0	0	0
	380C2F2	15542	57150	167032	0	0	0
	380C2F3	15541	54171	161626	0	0	0
	GW / opgw	3306	14856	38760	0	0	0
	RTG	6612	23789	66366	0	0	0
NL3/4	GW / opgw	2336	6440	20785	0	0	0
Construction/maintenance, +5°C	380C1F1	15187	41531	136860	0	0	0
Permanent loads yg= 0.9	380C1F2	15187	40922	136162	0	0	0
Wind angle: 90°	380C1F3	15186	40157	135353	0	0	0
	380C2F1	15187	41531	136860	0	0	0
	380C2F2	15187	40922	136162	0	0	0
	380C2F3	15186	40157	135353	0	0	0
	GW / opgw	2336	6440	20785	0	0	0
	RTG	4667	12038	40549	0	0	0
NL3/1a	GW / opgw	1735	8210	22156	0	0	0
Wind, 10°C	380C1F1	12784	51340	144218	0	0	0
Permanent loads yg= 0.9	380C1F2	12784	49016	139656	0	0	0
Wind angle: -45°	380C1F3	12783	46076	134031	0	0	0
	380C2F1	12784	51340	144218	0	0	0
	380C2F2	12784	49016	139656	0	0	0
	380C2F3	12783	46076	134031	0	0	0
	GW / opgw	1735	8210	22156	0	0	0
	RTG	3465	13155	37657	0	0	0
NL3/1b	GW / opgw	1734	5648	18470	0	0	0
Wind, -20°C	380C1F1	12774	40320	135907	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	39822	135311	0	0	0
Wind angle: -45°	380C1F3	12774	39197	134622	0	0	0
	380C2F1	12774	40320	135907	0	0	0
	380C2F2	12774	39822	135311	0	0	0
	380C2F3	12774	39197	134622	0	0	0
	GW / opgw	1734	5648	18470	0	0	0
	RTG	3463	10479	35592	0	0	0
NL3/3	GW / opgw	3305	13070	35370	0	0	0
Wind, -5°C	380C1F1	15541	54258	161780	0	0	0
Permanent loads yg= 0.9	380C1F2	15541	52474	158656	0	0	0
Wind angle: -45°	380C1F3	15540	50235	154893	0	0	0
	380C2F1	15541	54258	161780	0	0	0
	380C2F2	15541	52474	158656	0	0	0
	380C2F3	15540	50235	154893	0	0	0
	GW / opgw	3305	13070	35370	0	0	0
	RTG	6612	21564	62463	0	0	0
NL3/4	GW / opgw	2336	6187	20478	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	40180	135376	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	39722	134931	0	0	0
Wind angle: -45°	380C1F3	15186	39145	134421	0	0	0
	380C2F1	15186	40180	135376	0	0	0
	380C2F2	15186	39722	134931	0	0	0
	380C2F3	15186	39145	134421	0	0	0
	GW / opgw	2336	6187	20478	0	0	0
	RTG	4667	11735	40278	0	0	0

ZWM6HK400

Appendix AZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5417	19458	0	0	0
	380C1F1	17045	39408	142840	0	0	0
	380C1F2	17045	39305	142825	0	0	0
	380C1F3	17045	39174	142811	0	0	0
	380C2F1	0	0	0	17045	39408	-142840
	380C2F2	0	0	0	17045	39305	-142825
	380C2F3	0	0	0	17045	39174	-142811
	GW / opgw	0	0	0	2313	5417	-19458
	RTG	4620	10682	38844	4620	10682	-38844
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5962	22017	0	0	0
	380C1F1	17036	44313	164078	0	0	0
	380C1F2	17036	44284	164082	0	0	0
	380C1F3	17036	44246	164087	0	0	0
	380C2F1	0	0	0	17036	44313	-164078
	380C2F2	0	0	0	17036	44284	-164082
	380C2F3	0	0	0	17036	44246	-164087
	GW / opgw	0	0	0	2312	5962	-22017
	RTG	4618	11773	43625	4618	11773	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8603	30909	0	0	0
	380C1F1	19802	46863	171258	0	0	0
	380C1F2	19802	46777	171255	0	0	0
	380C1F3	19802	46667	171253	0	0	0
	380C2F1	0	0	0	19802	46863	-171258
	380C2F2	0	0	0	19802	46777	-171255
	380C2F3	0	0	0	19802	46667	-171253
	GW / opgw	0	0	0	3883	8603	-30909
	RTG	7767	16955	61668	7767	16955	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6462	23882	0	0	0
	380C1F1	19451	43757	162002	0	0	0
	380C1F2	19451	43728	162006	0	0	0
	380C1F3	19451	43690	162012	0	0	0
	380C2F1	0	0	0	19451	43757	-162002
	380C2F2	0	0	0	19451	43728	-162006
	380C2F3	0	0	0	19451	43690	-162012
	GW / opgw	0	0	0	2915	6462	-23882
	RTG	5823	12864	47696	5823	12864	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6127	20040	0	0	0
	380C1F1	17045	43107	145083	0	0	0
	380C1F2	17045	42622	144643	0	0	0
	380C1F3	17045	42010	144138	0	0	0
	380C2F1	0	0	0	17048	57086	-165656
	380C2F2	0	0	0	17048	55023	-162069
	380C2F3	0	0	0	17047	52430	-157738
	GW / opgw	0	0	0	2314	8887	-24681
	RTG	4620	11559	39325	4621	14847	-43970
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6141	22048	0	0	0
	380C1F1	17036	45284	164144	0	0	0
	380C1F2	17036	45164	164118	0	0	0
	380C1F3	17036	45010	164091	0	0	0
	380C2F1	0	0	0	17036	48403	-166070
	380C2F2	0	0	0	17036	47959	-165679
	380C2F3	0	0	0	17036	47399	-165232
	GW / opgw	0	0	0	2312	6741	-22549
	RTG	4618	12006	43634	4618	12745	-44049
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9674	31635	0	0	0
	380C1F1	19803	49854	172487	0	0	0
	380C1F2	19803	49470	172230	0	0	0
	380C1F3	19803	48982	171940	0	0	0
	380C2F1	0	0	0	19805	60671	-185710
	380C2F2	0	0	0	19804	59078	-183295
	380C2F3	0	0	0	19804	57080	-180431
	GW / opgw	0	0	0	3884	13699	-37715
	RTG	7767	18287	62242	7768	23103	-68204
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6635	23893	0	0	0
	380C1F1	19451	44713	162011	0	0	0
	380C1F2	19451	44596	161995	0	0	0
	380C1F3	19451	44445	161980	0	0	0
	380C2F1	0	0	0	19451	47708	-163468
	380C2F2	0	0	0	19451	47287	-163163
	380C2F3	0	0	0	19451	46754	-162817
	GW / opgw	0	0	0	2915	7190	-24224
	RTG	5823	13092	47687	5823	13789	-47942

NL3/1a	GW / opgw	2314	10058	26978	0	0	0
Wind, 10°C	380C1F1	17050	63147	176706	0	0	0
Permanent loads yg= 1.2	380C1F2	17049	60425	171664	0	0	0
Wind angle: 90°	380C1F3	17048	56986	165479	0	0	0
	380C2F1	0	0	0	17050	63147	-176706
	380C2F2	0	0	0	17049	60425	-171664
	380C2F3	0	0	0	17048	56986	-165479
	GW / opgw	0	0	0	2314	10058	-26978
	RTG	4621	16285	46547	4621	16285	-46547
NL3/1b	GW / opgw	2312	6998	22872	0	0	0
Wind, -20°C	380C1F1	17036	49708	167384	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	49120	166764	0	0	0
Wind angle: 90°	380C1F3	17036	48381	166050	0	0	0
	380C2F1	0	0	0	17036	49708	-167384
	380C2F2	0	0	0	17036	49120	-166764
	380C2F3	0	0	0	17036	48381	-166050
	GW / opgw	0	0	0	2312	6998	-22872
	RTG	4618	13053	44337	4618	13053	-44337
NL3/3	GW / opgw	3885	15395	40771	0	0	0
Wind, -5°C	380C1F1	19806	65386	193366	0	0	0
Permanent loads yg= 1.2	380C1F2	19805	63262	189834	0	0	0
Wind angle: 90°	380C1F3	19805	60594	185589	0	0	0
	380C2F1	0	0	0	19806	65386	-193366
	380C2F2	0	0	0	19805	63262	-189834
	380C2F3	0	0	0	19805	60594	-185589
	GW / opgw	0	0	0	3885	15395	-40771
	RTG	7769	25184	71570	7769	25184	-71570
NL3/4	GW / opgw	2915	7422	24450	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	48940	164507	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	48386	164016	0	0	0
Wind angle: 90°	380C1F3	19451	47688	163453	0	0	0
	380C2F1	0	0	0	19451	48940	-164507
	380C2F2	0	0	0	19451	48386	-164016
	380C2F3	0	0	0	19451	47688	-163453
	GW / opgw	0	0	0	2915	7422	-24450
	RTG	5823	14071	48136	5823	14071	-48136
NL3/1a	GW / opgw	2314	8887	24681	0	0	0
Wind, 10°C	380C1F1	17048	57086	165656	0	0	0
Permanent loads yg= 1.2	380C1F2	17048	55023	162069	0	0	0
Wind angle: -45°	380C1F3	17047	52430	157738	0	0	0
	380C2F1	0	0	0	17045	43107	-145083
	380C2F2	0	0	0	17045	42622	-144643
	380C2F3	0	0	0	17045	42010	-144138
	GW / opgw	0	0	0	2313	6127	-20040
	RTG	4621	14847	43970	4620	11559	-39325
NL3/1b	GW / opgw	2312	6741	22549	0	0	0
Wind, -20°C	380C1F1	17036	48403	166070	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	47959	165679	0	0	0
Wind angle: -45°	380C1F3	17036	47399	165232	0	0	0
	380C2F1	0	0	0	17036	45284	-164144
	380C2F2	0	0	0	17036	45164	-164118
	380C2F3	0	0	0	17036	45010	-164091
	GW / opgw	0	0	0	2312	6141	-22048
	RTG	4618	12745	44049	4618	12006	-43634
NL3/3	GW / opgw	3884	13699	37715	0	0	0
Wind, -5°C	380C1F1	19805	60671	185710	0	0	0
Permanent loads yg= 1.2	380C1F2	19804	59078	183295	0	0	0
Wind angle: -45°	380C1F3	19804	57080	180431	0	0	0
	380C2F1	0	0	0	19803	49854	-172487
	380C2F2	0	0	0	19803	49470	-172230
	380C2F3	0	0	0	19803	48982	-171940
	GW / opgw	0	0	0	3883	9674	-31635
	RTG	7768	23103	68204	7767	18287	-62242
NL3/4	GW / opgw	2915	7190	24224	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	47708	163468	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	47287	163163	0	0	0
Wind angle: -45°	380C1F3	19451	46754	162817	0	0	0
	380C2F1	0	0	0	19451	44713	-162011
	380C2F2	0	0	0	19451	44596	-161995
	380C2F3	0	0	0	19451	44445	-161980
	GW / opgw	0	0	0	2915	6635	-23893
	RTG	5823	13789	47942	5823	13092	-47687

NL3/1a	GW / opgw	1735	4313	15338	0	0	0
Wind, 10°C	380C1F1	12781	31423	113041	0	0	0
Permanent loads yg= 0.9	380C1F2	12781	31316	113009	0	0	0
Wind angle: 0°	380C1F3	12781	31179	112975	0	0	0
	380C2F1	0	0	0	12781	31423	-113041
	380C2F2	0	0	0	12781	31316	-113009
	380C2F3	0	0	0	12781	31179	-112975
	GW / opgw	0	0	0	1735	4313	-15338
	RTG	3464	8465	30571	3464	8465	-30571
NL3/1b	GW / opgw	1734	4790	17643	0	0	0
Wind, -20°C	380C1F1	12774	35889	132638	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	35859	132640	0	0	0
Wind angle: 0°	380C1F3	12774	35821	132643	0	0	0
	380C2F1	0	0	0	12774	35889	-132638
	380C2F2	0	0	0	12774	35859	-132640
	380C2F3	0	0	0	12774	35821	-132643
	GW / opgw	0	0	0	1734	4790	-17643
	RTG	3463	9432	34887	3463	9432	-34887
NL3/3	GW / opgw	3304	7640	27316	0	0	0
Wind, -5°C	380C1F1	15538	39043	142075	0	0	0
Permanent loads yg= 0.9	380C1F2	15538	38955	142062	0	0	0
Wind angle: 0°	380C1F3	15538	38842	142050	0	0	0
	380C2F1	0	0	0	15538	39043	-142075
	380C2F2	0	0	0	15538	38955	-142062
	380C2F3	0	0	0	15538	38842	-142050
	GW / opgw	0	0	0	3304	7640	-27316
	RTG	6610	15024	54460	6610	15024	-54460
NL3/4	GW / opgw	2336	5416	19980	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	36000	133052	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	35971	133056	0	0	0
Wind angle: 0°	380C1F3	15186	35933	133060	0	0	0
	380C2F1	0	0	0	15186	36000	-133052
	380C2F2	0	0	0	15186	35971	-133056
	380C2F3	0	0	0	15186	35933	-133060
	GW / opgw	0	0	0	2336	5416	-19980
	RTG	4667	10771	39885	4667	10771	-39885
NL3/1a	GW / opgw	1735	5101	16208	0	0	0
Wind, 10°C	380C1F1	12781	35461	116551	0	0	0
Permanent loads yg= 0.9	380C1F2	12781	34918	115894	0	0	0
Wind angle: 45°	380C1F3	12781	34237	115133	0	0	0
	380C2F1	0	0	0	12781	51340	-144218
	380C2F2	0	0	0	12781	49016	-139656
	380C2F3	0	0	0	12783	46076	-134031
	GW / opgw	0	0	0	1735	8210	-22156
	RTG	3464	9416	31331	3465	13155	-37657
NL3/1b	GW / opgw	1734	4978	17707	0	0	0
Wind, -20°C	380C1F1	12774	36896	132843	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	36770	132792	0	0	0
Wind angle: 45°	380C1F3	12774	36608	132736	0	0	0
	380C2F1	0	0	0	12774	40320	-135907
	380C2F2	0	0	0	12774	39822	-135311
	380C2F3	0	0	0	12774	39197	-134622
	GW / opgw	0	0	0	1734	5648	-18470
	RTG	3463	9673	34927	3463	10479	-35592
NL3/3	GW / opgw	3304	8767	28251	0	0	0
Wind, -5°C	380C1F1	15539	42217	143988	0	0	0
Permanent loads yg= 0.9	380C1F2	15539	41801	143612	0	0	0
Wind angle: 45°	380C1F3	15539	41276	143181	0	0	0
	380C2F1	0	0	0	15541	54258	-161780
	380C2F2	0	0	0	15541	52474	-158656
	380C2F3	0	0	0	15540	50235	-154893
	GW / opgw	0	0	0	3305	13070	-35370
	RTG	6610	16408	55232	6612	21564	-62463
NL3/4	GW / opgw	2336	5594	20007	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	36980	133154	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	36859	133121	0	0	0
Wind angle: 45°	380C1F3	15186	36703	133088	0	0	0
	380C2F1	0	0	0	15186	40180	-135376
	380C2F2	0	0	0	15186	39722	-134931
	380C2F3	0	0	0	15186	39145	-134421
	GW / opgw	0	0	0	2336	6187	-20478
	RTG	4667	11003	39891	4667	11735	-40278

NL3/1a	GW / opgw	1736	9484	24837	0	0	0
Wind, 10°C	380C1F1	12785	58092	157850	0	0	0
Permanent loads yg= 0.9	380C1F2	12785	55074	151702	0	0	0
Wind angle: 90°	380C1F3	12784	51227	143995	0	0	0
	380C2F1	0	0	0	12785	58092	-157850
	380C2F2	0	0	0	12785	55074	-151702
	380C2F3	0	0	0	12784	51227	-143995
	GW / opgw	0	0	0	1736	9484	-24837
	RTG	3465	14771	40897	3465	14771	-40897
NL3/1b	GW / opgw	1734	5943	18935	0	0	0
Wind, -20°C	380C1F1	12774	41799	137871	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	41131	136951	0	0	0
Wind angle: 90°	380C1F3	12774	40295	135877	0	0	0
	380C2F1	0	0	0	12774	41799	-137871
	380C2F2	0	0	0	12774	41131	-136951
	380C2F3	0	0	0	12774	40295	-135877
	GW / opgw	0	0	0	1734	5943	-18935
	RTG	3463	10825	36025	3463	10825	-36025
NL3/3	GW / opgw	3306	14856	38760	0	0	0
Wind, -5°C	380C1F1	15542	59513	171455	0	0	0
Permanent loads yg= 0.9	380C1F2	15542	57150	167032	0	0	0
Wind angle: 90°	380C1F3	15541	54171	161626	0	0	0
	380C2F1	0	0	0	15542	59513	-171455
	380C2F2	0	0	0	15542	57150	-167032
	380C2F3	0	0	0	15541	54171	-161626
	GW / opgw	0	0	0	3306	14856	-38760
	RTG	6612	23789	66366	6612	23789	-66366
NL3/4	GW / opgw	2336	6440	20785	0	0	0
Construction/maintenance, +5°C	380C1F1	15187	41531	136860	0	0	0
Permanent loads yg= 0.9	380C1F2	15187	40922	136162	0	0	0
Wind angle: 90°	380C1F3	15186	40157	135353	0	0	0
	380C2F1	0	0	0	15187	41531	-136860
	380C2F2	0	0	0	15187	40922	-136162
	380C2F3	0	0	0	15186	40157	-135353
	GW / opgw	0	0	0	2336	6440	-20785
	RTG	4667	12038	40549	4667	12038	-40549
NL3/1a	GW / opgw	1735	8210	22156	0	0	0
Wind, 10°C	380C1F1	12784	51340	144218	0	0	0
Permanent loads yg= 0.9	380C1F2	12784	49016	139656	0	0	0
Wind angle: -45°	380C1F3	12783	46076	134031	0	0	0
	380C2F1	0	0	0	12781	35461	-116551
	380C2F2	0	0	0	12781	34918	-115894
	380C2F3	0	0	0	12781	34237	-115133
	GW / opgw	0	0	0	1735	5101	-16208
	RTG	3465	13155	37657	3464	9416	-31331
NL3/1b	GW / opgw	1734	5648	18470	0	0	0
Wind, -20°C	380C1F1	12774	40320	135907	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	39822	135311	0	0	0
Wind angle: -45°	380C1F3	12774	39197	134622	0	0	0
	380C2F1	0	0	0	12774	36896	-132843
	380C2F2	0	0	0	12774	36770	-132792
	380C2F3	0	0	0	12774	36608	-132736
	GW / opgw	0	0	0	1734	4978	-17707
	RTG	3463	10479	35592	3463	9673	-34927
NL3/3	GW / opgw	3305	13070	35370	0	0	0
Wind, -5°C	380C1F1	15541	54258	161780	0	0	0
Permanent loads yg= 0.9	380C1F2	15541	52474	158656	0	0	0
Wind angle: -45°	380C1F3	15540	50235	154893	0	0	0
	380C2F1	0	0	0	15539	42217	-143988
	380C2F2	0	0	0	15539	41801	-143612
	380C2F3	0	0	0	15539	41276	-143181
	GW / opgw	0	0	0	3304	8767	-28251
	RTG	6612	21564	62463	6610	16408	-55232
NL3/4	GW / opgw	2336	6187	20478	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	40180	135376	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	39722	134931	0	0	0
Wind angle: -45°	380C1F3	15186	39145	134421	0	0	0
	380C2F1	0	0	0	15186	36980	-133154
	380C2F2	0	0	0	15186	36859	-133121
	380C2F3	0	0	0	15186	36703	-133088
	GW / opgw	0	0	0	2336	5594	-20007
	RTG	4667	11735	40278	4667	11003	-39891

ZWM6HK400

Appendix AZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	17045	39408	142840	17045	39408	-142840
	380C2F2	17045	39305	142825	17045	39305	-142825
	380C2F3	17045	39174	142811	17045	39174	-142811
	GW / opgw	2313	5417	19458	2313	5417	-19458
	RTG	0	0	0	4620	10682	-38844
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	17036	44313	164078	17036	44313	-164078
	380C2F2	17036	44284	164082	17036	44284	-164082
	380C2F3	17036	44246	164087	17036	44246	-164087
	GW / opgw	2312	5962	22017	2312	5962	-22017
	RTG	0	0	0	4618	11773	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19802	46863	171258	19802	46863	-171258
	380C2F2	19802	46777	171255	19802	46777	-171255
	380C2F3	19802	46667	171253	19802	46667	-171253
	GW / opgw	3883	8603	30909	3883	8603	-30909
	RTG	0	0	0	7767	16955	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19451	43757	162002	19451	43757	-162002
	380C2F2	19451	43728	162006	19451	43728	-162006
	380C2F3	19451	43690	162012	19451	43690	-162012
	GW / opgw	2915	6462	23882	2915	6462	-23882
	RTG	0	0	0	5823	12864	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	17045	43107	145083	17048	57086	-165656
	380C2F2	17045	42622	144643	17048	55023	-162069
	380C2F3	17045	42010	144138	17047	52430	-157738
	GW / opgw	2313	6127	20040	2314	8887	-24681
	RTG	0	0	0	4621	14847	-43970
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	17036	45284	164144	17036	48403	-166070
	380C2F2	17036	45164	164118	17036	47959	-165679
	380C2F3	17036	45010	164091	17036	47399	-165232
	GW / opgw	2312	6141	22048	2312	6741	-22549
	RTG	0	0	0	4618	12745	-44049
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19803	49854	172487	19805	60671	-185710
	380C2F2	19803	49470	172230	19804	59078	-183295
	380C2F3	19803	48982	171940	19804	57080	-180431
	GW / opgw	3883	9674	31635	3884	13699	-37715
	RTG	0	0	0	7768	23103	-68204
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19451	44713	162011	19451	47708	-163468
	380C2F2	19451	44596	161995	19451	47287	-163163
	380C2F3	19451	44445	161980	19451	46754	-162817
	GW / opgw	2915	6635	23893	2915	7190	-24224
	RTG	0	0	0	5823	13789	-47942

NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	17050	63147	176706	17050	63147	-176706
	380C2F2	17049	60425	171664	17049	60425	-171664
	380C2F3	17048	56986	165479	17048	56986	-165479
	GW / opgw	2314	10058	26978	2314	10058	-26978
	RTG	0	0	0	4621	16285	-46547
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	17036	49708	167384	17036	49708	-167384
	380C2F2	17036	49120	166764	17036	49120	-166764
	380C2F3	17036	48381	166050	17036	48381	-166050
	GW / opgw	2312	6998	22872	2312	6998	-22872
	RTG	0	0	0	4618	13053	-44337
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	19806	65386	193366	19806	65386	-193366
	380C2F2	19805	63262	189834	19805	63262	-189834
	380C2F3	19805	60594	185589	19805	60594	-185589
	GW / opgw	3885	15395	40771	3885	15395	-40771
	RTG	0	0	0	7769	25184	-71570
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	19451	48940	164507	19451	48940	-164507
	380C2F2	19451	48386	164016	19451	48386	-164016
	380C2F3	19451	47688	163453	19451	47688	-163453
	GW / opgw	2915	7422	24450	2915	7422	-24450
	RTG	0	0	0	5823	14071	-48136
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	17048	57086	165656	17045	43107	-145083
	380C2F2	17048	55023	162069	17045	42622	-144643
	380C2F3	17047	52430	157738	17045	42010	-144138
	GW / opgw	2314	8887	24681	2313	6127	-20040
	RTG	0	0	0	4620	11559	-39325
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	17036	48403	166070	17036	45284	-164144
	380C2F2	17036	47959	165679	17036	45164	-164118
	380C2F3	17036	47399	165232	17036	45010	-164091
	GW / opgw	2312	6741	22549	2312	6141	-22048
	RTG	0	0	0	4618	12006	-43634
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	19805	60671	185710	19803	49854	-172487
	380C2F2	19804	59078	183295	19803	49470	-172230
	380C2F3	19804	57080	180431	19803	48982	-171940
	GW / opgw	3884	13699	37715	3883	9674	-31635
	RTG	0	0	0	7767	18287	-62242
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	19451	47708	163468	19451	44713	-162011
	380C2F2	19451	47287	163163	19451	44596	-161995
	380C2F3	19451	46754	162817	19451	44445	-161980
	GW / opgw	2915	7190	24224	2915	6635	-23893
	RTG	0	0	0	5823	13092	-47687

NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	12781	31423	113041	12781	31423	-113041	
	380C2F2	12781	31316	113009	12781	31316	-113009	
	380C2F3	12781	31179	112975	12781	31179	-112975	
	GW / opgw	1735	4313	15338	1735	4313	-15338	
	RTG	0	0	0	3464	8465	-30571	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	12774	35889	132638	12774	35889	-132638	
	380C2F2	12774	35859	132640	12774	35859	-132640	
	380C2F3	12774	35821	132643	12774	35821	-132643	
	GW / opgw	1734	4790	17643	1734	4790	-17643	
	RTG	0	0	0	3463	9432	-34887	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	15538	39043	142075	15538	39043	-142075	
	380C2F2	15538	38955	142062	15538	38955	-142062	
	380C2F3	15538	38842	142050	15538	38842	-142050	
	GW / opgw	3304	7640	27316	3304	7640	-27316	
	RTG	0	0	0	6610	15024	-54460	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	15186	36000	133052	15186	36000	-133052	
	380C2F2	15186	35971	133056	15186	35971	-133056	
	380C2F3	15186	35933	133060	15186	35933	-133060	
	GW / opgw	2336	5416	19980	2336	5416	-19980	
	RTG	0	0	0	4667	10771	-39885	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	12781	35461	116551	12784	51340	-144218	
	380C2F2	12781	34918	115894	12784	49016	-139656	
	380C2F3	12781	34237	115133	12783	46076	-134031	
	GW / opgw	1735	5101	16208	1735	8210	-22156	
	RTG	0	0	0	3465	13155	-37657	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	12774	36896	132843	12774	40320	-135907	
	380C2F2	12774	36770	132792	12774	39822	-135311	
	380C2F3	12774	36608	132736	12774	39197	-134622	
	GW / opgw	1734	4978	17707	1734	5648	-18470	
	RTG	0	0	0	3463	10479	-35592	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	15539	42217	143988	15541	54258	-161780	
	380C2F2	15539	41801	143612	15541	52474	-158656	
	380C2F3	15539	41276	143181	15540	50235	-154893	
	GW / opgw	3304	8767	28251	3305	13070	-35370	
	RTG	0	0	0	6612	21564	-62463	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	15186	36980	133154	15186	40180	-135376	
	380C2F2	15186	36859	133121	15186	39722	-134931	
	380C2F3	15186	36703	133088	15186	39145	-134421	
	GW / opgw	2336	5594	20007	2336	6187	-20478	
	RTG	0	0	0	4667	11735	-40278	

NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	12785	58092	157850	12785	58092	-157850	
	380C2F2	12785	55074	151702	12785	55074	-151702	
	380C2F3	12784	51227	143995	12784	51227	-143995	
	GW / opgw	1736	9484	24837	1736	9484	-24837	
	RTG	0	0	0	3465	14771	-40897	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	12774	41799	137871	12774	41799	-137871	
	380C2F2	12774	41131	136951	12774	41131	-136951	
	380C2F3	12774	40295	135877	12774	40295	-135877	
	GW / opgw	1734	5943	18935	1734	5943	-18935	
	RTG	0	0	0	3463	10825	-36025	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	15542	59513	171455	15542	59513	-171455	
	380C2F2	15542	57150	167032	15542	57150	-167032	
	380C2F3	15541	54171	161626	15541	54171	-161626	
	GW / opgw	3306	14856	38760	3306	14856	-38760	
	RTG	0	0	0	6612	23789	-66366	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	15187	41531	136860	15187	41531	-136860	
	380C2F2	15187	40922	136162	15187	40922	-136162	
	380C2F3	15186	40157	135353	15186	40157	-135353	
	GW / opgw	2336	6440	20785	2336	6440	-20785	
	RTG	0	0	0	4667	12038	-40549	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	12784	51340	144218	12781	35461	-116551	
	380C2F2	12784	49016	139656	12781	34918	-115894	
	380C2F3	12783	46076	134031	12781	34237	-115133	
	GW / opgw	1735	8210	22156	1735	5101	-16208	
	RTG	0	0	0	3464	9416	-31331	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	12774	40320	135907	12774	36896	-132843	
	380C2F2	12774	39822	135311	12774	36770	-132792	
	380C2F3	12774	39197	134622	12774	36608	-132736	
	GW / opgw	1734	5648	18470	1734	4978	-17707	
	RTG	0	0	0	3463	9673	-34927	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	15541	54258	161780	15539	42217	-143988	
	380C2F2	15541	52474	158656	15539	41801	-143612	
	380C2F3	15540	50235	154893	15539	41276	-143181	
	GW / opgw	3305	13070	35370	3304	8767	-28251	
	RTG	0	0	0	6610	16408	-55232	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	15186	40180	135376	15186	36980	-133154	
	380C2F2	15186	39722	134931	15186	36859	-133121	
	380C2F3	15186	39145	134421	15186	36703	-133088	
	GW / opgw	2336	6187	20478	2336	5594	-20007	
	RTG	0	0	0	4667	11003	-39891	

ZWM6HK400

Appendix AZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5417	19458	0	0	0
	380C1F1	17045	39408	142840	0	0	0
	380C1F2	17045	39305	142825	0	0	0
	380C1F3	17045	39174	142811	0	0	0
	380C2F1	0	0	0	17045	39408	-142840
	380C2F2	0	0	0	17045	39305	-142825
	380C2F3	0	0	0	17045	39174	-142811
	GW / opgw	0	0	0	2313	5417	-19458
	RTG	0	0	0	4620	10682	-38844
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5962	22017	0	0	0
	380C1F1	17036	44313	164078	0	0	0
	380C1F2	17036	44284	164082	0	0	0
	380C1F3	17036	44246	164087	0	0	0
	380C2F1	0	0	0	17036	44313	-164078
	380C2F2	0	0	0	17036	44284	-164082
	380C2F3	0	0	0	17036	44246	-164087
	GW / opgw	0	0	0	2312	5962	-22017
	RTG	0	0	0	4618	11773	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8603	30909	0	0	0
	380C1F1	19802	46863	171258	0	0	0
	380C1F2	19802	46777	171255	0	0	0
	380C1F3	19802	46667	171253	0	0	0
	380C2F1	0	0	0	19802	46863	-171258
	380C2F2	0	0	0	19802	46777	-171255
	380C2F3	0	0	0	19802	46667	-171253
	GW / opgw	0	0	0	3883	8603	-30909
	RTG	0	0	0	7767	16955	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6462	23882	0	0	0
	380C1F1	19451	43757	162002	0	0	0
	380C1F2	19451	43728	162006	0	0	0
	380C1F3	19451	43690	162012	0	0	0
	380C2F1	0	0	0	19451	43757	-162002
	380C2F2	0	0	0	19451	43728	-162006
	380C2F3	0	0	0	19451	43690	-162012
	GW / opgw	0	0	0	2915	6462	-23882
	RTG	0	0	0	5823	12864	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6127	20040	0	0	0
	380C1F1	17045	43107	145083	0	0	0
	380C1F2	17045	42622	144643	0	0	0
	380C1F3	17045	42010	144138	0	0	0
	380C2F1	0	0	0	17048	57086	-165656
	380C2F2	0	0	0	17048	55023	-162069
	380C2F3	0	0	0	17047	52430	-157738
	GW / opgw	0	0	0	2314	8887	-24681
	RTG	0	0	0	4621	14847	-43970
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6141	22048	0	0	0
	380C1F1	17036	45284	164144	0	0	0
	380C1F2	17036	45164	164118	0	0	0
	380C1F3	17036	45010	164091	0	0	0
	380C2F1	0	0	0	17036	48403	-166070
	380C2F2	0	0	0	17036	47959	-165679
	380C2F3	0	0	0	17036	47399	-165232
	GW / opgw	0	0	0	2312	6741	-22549
	RTG	0	0	0	4618	12745	-44049
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9674	31635	0	0	0
	380C1F1	19803	49854	172487	0	0	0
	380C1F2	19803	49470	172230	0	0	0
	380C1F3	19803	48982	171940	0	0	0
	380C2F1	0	0	0	19805	60671	-185710
	380C2F2	0	0	0	19804	59078	-183295
	380C2F3	0	0	0	19804	57080	-180431
	GW / opgw	0	0	0	3884	13699	-37715
	RTG	0	0	0	7768	23103	-68204
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6635	23893	0	0	0
	380C1F1	19451	44713	162011	0	0	0
	380C1F2	19451	44596	161995	0	0	0
	380C1F3	19451	44445	161980	0	0	0
	380C2F1	0	0	0	19451	47708	-163468
	380C2F2	0	0	0	19451	47287	-163163
	380C2F3	0	0	0	19451	46754	-162817
	GW / opgw	0	0	0	2915	7190	-24224
	RTG	0	0	0	5823	13789	-47942

NL3/1a	GW / opgw	2314	10058	26978	0	0	0
Wind, 10°C	380C1F1	17050	63147	176706	0	0	0
Permanent loads yg= 1.2	380C1F2	17049	60425	171664	0	0	0
Wind angle: 90°	380C1F3	17048	56986	165479	0	0	0
	380C2F1	0	0	0	17050	63147	-176706
	380C2F2	0	0	0	17049	60425	-171664
	380C2F3	0	0	0	17048	56986	-165479
	GW / opgw	0	0	0	2314	10058	-26978
	RTG	0	0	0	4621	16285	-46547
NL3/1b	GW / opgw	2312	6998	22872	0	0	0
Wind, -20°C	380C1F1	17036	49708	167384	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	49120	166764	0	0	0
Wind angle: 90°	380C1F3	17036	48381	166050	0	0	0
	380C2F1	0	0	0	17036	49708	-167384
	380C2F2	0	0	0	17036	49120	-166764
	380C2F3	0	0	0	17036	48381	-166050
	GW / opgw	0	0	0	2312	6998	-22872
	RTG	0	0	0	4618	13053	-44337
NL3/3	GW / opgw	3885	15395	40771	0	0	0
Wind, -5°C	380C1F1	19806	65386	193366	0	0	0
Permanent loads yg= 1.2	380C1F2	19805	63262	189834	0	0	0
Wind angle: 90°	380C1F3	19805	60594	185589	0	0	0
	380C2F1	0	0	0	19806	65386	-193366
	380C2F2	0	0	0	19805	63262	-189834
	380C2F3	0	0	0	19805	60594	-185589
	GW / opgw	0	0	0	3885	15395	-40771
	RTG	0	0	0	7769	25184	-71570
NL3/4	GW / opgw	2915	7422	24450	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	48940	164507	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	48386	164016	0	0	0
Wind angle: 90°	380C1F3	19451	47688	163453	0	0	0
	380C2F1	0	0	0	19451	48940	-164507
	380C2F2	0	0	0	19451	48386	-164016
	380C2F3	0	0	0	19451	47688	-163453
	GW / opgw	0	0	0	2915	7422	-24450
	RTG	0	0	0	5823	14071	-48136
NL3/1a	GW / opgw	2314	8887	24681	0	0	0
Wind, 10°C	380C1F1	17048	57086	165656	0	0	0
Permanent loads yg= 1.2	380C1F2	17048	55023	162069	0	0	0
Wind angle: -45°	380C1F3	17047	52430	157738	0	0	0
	380C2F1	0	0	0	17045	43107	-145083
	380C2F2	0	0	0	17045	42622	-144643
	380C2F3	0	0	0	17045	42010	-144138
	GW / opgw	0	0	0	2313	6127	-20040
	RTG	0	0	0	4620	11559	-39325
NL3/1b	GW / opgw	2312	6741	22549	0	0	0
Wind, -20°C	380C1F1	17036	48403	166070	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	47959	165679	0	0	0
Wind angle: -45°	380C1F3	17036	47399	165232	0	0	0
	380C2F1	0	0	0	17036	45284	-164144
	380C2F2	0	0	0	17036	45164	-164118
	380C2F3	0	0	0	17036	45010	-164091
	GW / opgw	0	0	0	2312	6141	-22048
	RTG	0	0	0	4618	12006	-43634
NL3/3	GW / opgw	3884	13699	37715	0	0	0
Wind, -5°C	380C1F1	19805	60671	185710	0	0	0
Permanent loads yg= 1.2	380C1F2	19804	59078	183295	0	0	0
Wind angle: -45°	380C1F3	19804	57080	180431	0	0	0
	380C2F1	0	0	0	19803	49854	-172487
	380C2F2	0	0	0	19803	49470	-172230
	380C2F3	0	0	0	19803	48982	-171940
	GW / opgw	0	0	0	3883	9674	-31635
	RTG	0	0	0	7767	18287	-62242
NL3/4	GW / opgw	2915	7190	24224	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	47708	163468	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	47287	163163	0	0	0
Wind angle: -45°	380C1F3	19451	46754	162817	0	0	0
	380C2F1	0	0	0	19451	44713	-162011
	380C2F2	0	0	0	19451	44596	-161995
	380C2F3	0	0	0	19451	44445	-161980
	GW / opgw	0	0	0	2915	6635	-23893
	RTG	0	0	0	5823	13092	-47687

NL3/1a	GW / opgw	1735	4313	15338	0	0	0
Wind, 10°C	380C1F1	12781	31423	113041	0	0	0
Permanent loads yg= 0.9	380C1F2	12781	31316	113009	0	0	0
Wind angle: 0°	380C1F3	12781	31179	112975	0	0	0
	380C2F1	0	0	0	12781	31423	-113041
	380C2F2	0	0	0	12781	31316	-113009
	380C2F3	0	0	0	12781	31179	-112975
	GW / opgw	0	0	0	1735	4313	-15338
	RTG	0	0	0	3464	8465	-30571
NL3/1b	GW / opgw	1734	4790	17643	0	0	0
Wind, -20°C	380C1F1	12774	35889	132638	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	35859	132640	0	0	0
Wind angle: 0°	380C1F3	12774	35821	132643	0	0	0
	380C2F1	0	0	0	12774	35889	-132638
	380C2F2	0	0	0	12774	35859	-132640
	380C2F3	0	0	0	12774	35821	-132643
	GW / opgw	0	0	0	1734	4790	-17643
	RTG	0	0	0	3463	9432	-34887
NL3/3	GW / opgw	3304	7640	27316	0	0	0
Wind, -5°C	380C1F1	15538	39043	142075	0	0	0
Permanent loads yg= 0.9	380C1F2	15538	38955	142062	0	0	0
Wind angle: 0°	380C1F3	15538	38842	142050	0	0	0
	380C2F1	0	0	0	15538	39043	-142075
	380C2F2	0	0	0	15538	38955	-142062
	380C2F3	0	0	0	15538	38842	-142050
	GW / opgw	0	0	0	3304	7640	-27316
	RTG	0	0	0	6610	15024	-54460
NL3/4	GW / opgw	2336	5416	19980	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	36000	133052	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	35971	133056	0	0	0
Wind angle: 0°	380C1F3	15186	35933	133060	0	0	0
	380C2F1	0	0	0	15186	36000	-133052
	380C2F2	0	0	0	15186	35971	-133056
	380C2F3	0	0	0	15186	35933	-133060
	GW / opgw	0	0	0	2336	5416	-19980
	RTG	0	0	0	4667	10771	-39885
NL3/1a	GW / opgw	1735	5101	16208	0	0	0
Wind, 10°C	380C1F1	12781	35461	116551	0	0	0
Permanent loads yg= 0.9	380C1F2	12781	34918	115894	0	0	0
Wind angle: 45°	380C1F3	12781	34237	115133	0	0	0
	380C2F1	0	0	0	12781	51340	-144218
	380C2F2	0	0	0	12781	49016	-139656
	380C2F3	0	0	0	12783	46076	-134031
	GW / opgw	0	0	0	1735	8210	-22156
	RTG	0	0	0	3465	13155	-37657
NL3/1b	GW / opgw	1734	4978	17707	0	0	0
Wind, -20°C	380C1F1	12774	36896	132843	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	36770	132792	0	0	0
Wind angle: 45°	380C1F3	12774	36608	132736	0	0	0
	380C2F1	0	0	0	12774	40320	-135907
	380C2F2	0	0	0	12774	39822	-135311
	380C2F3	0	0	0	12774	39197	-134622
	GW / opgw	0	0	0	1734	5648	-18470
	RTG	0	0	0	3463	10479	-35592
NL3/3	GW / opgw	3304	8767	28251	0	0	0
Wind, -5°C	380C1F1	15539	42217	143988	0	0	0
Permanent loads yg= 0.9	380C1F2	15539	41801	143612	0	0	0
Wind angle: 45°	380C1F3	15539	41276	143181	0	0	0
	380C2F1	0	0	0	15541	54258	-161780
	380C2F2	0	0	0	15541	52474	-158656
	380C2F3	0	0	0	15540	50235	-154893
	GW / opgw	0	0	0	3305	13070	-35370
	RTG	0	0	0	6612	21564	-62463
NL3/4	GW / opgw	2336	5594	20007	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	36980	133154	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	36859	133121	0	0	0
Wind angle: 45°	380C1F3	15186	36703	133088	0	0	0
	380C2F1	0	0	0	15186	40180	-135376
	380C2F2	0	0	0	15186	39722	-134931
	380C2F3	0	0	0	15186	39145	-134421
	GW / opgw	0	0	0	2336	6187	-20478
	RTG	0	0	0	4667	11735	-40278

NL3/1a	GW / opgw	1736	9484	24837	0	0	0
Wind, 10°C	380C1F1	12785	58092	157850	0	0	0
Permanent loads yg= 0.9	380C1F2	12785	55074	151702	0	0	0
Wind angle: 90°	380C1F3	12784	51227	143995	0	0	0
	380C2F1	0	0	0	12785	58092	-157850
	380C2F2	0	0	0	12785	55074	-151702
	380C2F3	0	0	0	12784	51227	-143995
	GW / opgw	0	0	0	1736	9484	-24837
	RTG	0	0	0	3465	14771	-40897
NL3/1b	GW / opgw	1734	5943	18935	0	0	0
Wind, -20°C	380C1F1	12774	41799	137871	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	41131	136951	0	0	0
Wind angle: 90°	380C1F3	12774	40295	135877	0	0	0
	380C2F1	0	0	0	12774	41799	-137871
	380C2F2	0	0	0	12774	41131	-136951
	380C2F3	0	0	0	12774	40295	-135877
	GW / opgw	0	0	0	1734	5943	-18935
	RTG	0	0	0	3463	10825	-36025
NL3/3	GW / opgw	3306	14856	38760	0	0	0
Wind, -5°C	380C1F1	15542	59513	171455	0	0	0
Permanent loads yg= 0.9	380C1F2	15542	57150	167032	0	0	0
Wind angle: 90°	380C1F3	15541	54171	161626	0	0	0
	380C2F1	0	0	0	15542	59513	-171455
	380C2F2	0	0	0	15542	57150	-167032
	380C2F3	0	0	0	15541	54171	-161626
	GW / opgw	0	0	0	3306	14856	-38760
	RTG	0	0	0	6612	23789	-66366
NL3/4	GW / opgw	2336	6440	20785	0	0	0
Construction/maintenance, +5°C	380C1F1	15187	41531	136860	0	0	0
Permanent loads yg= 0.9	380C1F2	15187	40922	136162	0	0	0
Wind angle: 90°	380C1F3	15186	40157	135353	0	0	0
	380C2F1	0	0	0	15187	41531	-136860
	380C2F2	0	0	0	15187	40922	-136162
	380C2F3	0	0	0	15186	40157	-135353
	GW / opgw	0	0	0	2336	6440	-20785
	RTG	0	0	0	4667	12038	-40549
NL3/1a	GW / opgw	1735	8210	22156	0	0	0
Wind, 10°C	380C1F1	12784	51340	144218	0	0	0
Permanent loads yg= 0.9	380C1F2	12784	49016	139656	0	0	0
Wind angle: -45°	380C1F3	12783	46076	134031	0	0	0
	380C2F1	0	0	0	12781	35461	-116551
	380C2F2	0	0	0	12781	34918	-115894
	380C2F3	0	0	0	12781	34237	-115133
	GW / opgw	0	0	0	1735	5101	-16208
	RTG	0	0	0	3464	9416	-31331
NL3/1b	GW / opgw	1734	5648	18470	0	0	0
Wind, -20°C	380C1F1	12774	40320	135907	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	39822	135311	0	0	0
Wind angle: -45°	380C1F3	12774	39197	134622	0	0	0
	380C2F1	0	0	0	12774	36896	-132843
	380C2F2	0	0	0	12774	36770	-132792
	380C2F3	0	0	0	12774	36608	-132736
	GW / opgw	0	0	0	1734	4978	-17707
	RTG	0	0	0	3463	9673	-34927
NL3/3	GW / opgw	3305	13070	35370	0	0	0
Wind, -5°C	380C1F1	15541	54258	161780	0	0	0
Permanent loads yg= 0.9	380C1F2	15541	52474	158656	0	0	0
Wind angle: -45°	380C1F3	15540	50235	154893	0	0	0
	380C2F1	0	0	0	15539	42217	-143988
	380C2F2	0	0	0	15539	41801	-143612
	380C2F3	0	0	0	15539	41276	-143181
	GW / opgw	0	0	0	3304	8767	-28251
	RTG	0	0	0	6610	16408	-55232
NL3/4	GW / opgw	2336	6187	20478	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	40180	135376	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	39722	134931	0	0	0
Wind angle: -45°	380C1F3	15186	39145	134421	0	0	0
	380C2F1	0	0	0	15186	36980	-133154
	380C2F2	0	0	0	15186	36859	-133121
	380C2F3	0	0	0	15186	36703	-133088
	GW / opgw	0	0	0	2336	5594	-20007
	RTG	0	0	0	4667	11003	-39891

ZWM6HK400

Appendix AZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2313	5417	-19458
	380C1F1	0	0	0	17045	39408	-142840
	380C1F2	0	0	0	17045	39305	-142825
	380C1F3	0	0	0	17045	39174	-142811
	380C2F1	17045	39408	142840	0	0	0
	380C2F2	17045	39305	142825	0	0	0
	380C2F3	17045	39174	142811	0	0	0
	GW / opgw	2313	5417	19458	0	0	0
	RTG	0	0	0	4620	10682	-38844
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2312	5962	-22017
	380C1F1	0	0	0	17036	44313	-164078
	380C1F2	0	0	0	17036	44284	-164082
	380C1F3	0	0	0	17036	44246	-164087
	380C2F1	17036	44313	164078	0	0	0
	380C2F2	17036	44284	164082	0	0	0
	380C2F3	17036	44246	164087	0	0	0
	GW / opgw	2312	5962	22017	0	0	0
	RTG	0	0	0	4618	11773	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3883	8603	-30909
	380C1F1	0	0	0	19802	46863	-171258
	380C1F2	0	0	0	19802	46777	-171255
	380C1F3	0	0	0	19802	46667	-171253
	380C2F1	19802	46863	171258	0	0	0
	380C2F2	19802	46777	171255	0	0	0
	380C2F3	19802	46667	171253	0	0	0
	GW / opgw	3883	8603	30909	0	0	0
	RTG	0	0	0	7767	16955	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2915	6462	-23882
	380C1F1	0	0	0	19451	43757	-162002
	380C1F2	0	0	0	19451	43728	-162006
	380C1F3	0	0	0	19451	43690	-162012
	380C2F1	19451	43757	162002	0	0	0
	380C2F2	19451	43728	162006	0	0	0
	380C2F3	19451	43690	162012	0	0	0
	GW / opgw	2915	6462	23882	0	0	0
	RTG	0	0	0	5823	12864	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2314	8887	-24681
	380C1F1	0	0	0	17048	57086	-165656
	380C1F2	0	0	0	17048	55023	-162069
	380C1F3	0	0	0	17047	52430	-157738
	380C2F1	17045	43107	145083	0	0	0
	380C2F2	17045	42622	144643	0	0	0
	380C2F3	17045	42010	144138	0	0	0
	GW / opgw	2313	6127	20040	0	0	0
	RTG	0	0	0	4621	14847	-43970
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2312	6741	-22549
	380C1F1	0	0	0	17036	48403	-166070
	380C1F2	0	0	0	17036	47959	-165679
	380C1F3	0	0	0	17036	47399	-165232
	380C2F1	17036	45284	164144	0	0	0
	380C2F2	17036	45164	164118	0	0	0
	380C2F3	17036	45010	164091	0	0	0
	GW / opgw	2312	6141	22048	0	0	0
	RTG	0	0	0	4618	12745	-44049
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3884	13699	-37715
	380C1F1	0	0	0	19805	60671	-185710
	380C1F2	0	0	0	19804	59078	-183295
	380C1F3	0	0	0	19804	57080	-180431
	380C2F1	19803	49854	172487	0	0	0
	380C2F2	19803	49470	172230	0	0	0
	380C2F3	19803	48982	171940	0	0	0
	GW / opgw	3883	9674	31635	0	0	0
	RTG	0	0	0	7768	23103	-68204
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2915	7190	-24224
	380C1F1	0	0	0	19451	47708	-163468
	380C1F2	0	0	0	19451	47287	-163163
	380C1F3	0	0	0	19451	46754	-162817
	380C2F1	19451	44713	162011	0	0	0
	380C2F2	19451	44596	161995	0	0	0
	380C2F3	19451	44445	161980	0	0	0
	GW / opgw	2915	6635	23893	0	0	0
	RTG	0	0	0	5823	13789	-47942

NL3/1a	GW / opgw	0	0	0	2314	10058	-26978
Wind, 10°C	380C1F1	0	0	0	17050	63147	-176706
Permanent loads yg= 1.2	380C1F2	0	0	0	17049	60425	-171664
Wind angle: 90°	380C1F3	0	0	0	17048	56986	-165479
	380C2F1	17050	63147	176706	0	0	0
	380C2F2	17049	60425	171664	0	0	0
	380C2F3	17048	56986	165479	0	0	0
	GW / opgw	2314	10058	26978	0	0	0
	RTG	0	0	0	4621	16285	-46547
NL3/1b	GW / opgw	0	0	0	2312	6998	-22872
Wind, -20°C	380C1F1	0	0	0	17036	49708	-167384
Permanent loads yg= 1.2	380C1F2	0	0	0	17036	49120	-166764
Wind angle: 90°	380C1F3	0	0	0	17036	48381	-166050
	380C2F1	17036	49708	167384	0	0	0
	380C2F2	17036	49120	166764	0	0	0
	380C2F3	17036	48381	166050	0	0	0
	GW / opgw	2312	6998	22872	0	0	0
	RTG	0	0	0	4618	13053	-44337
NL3/3	GW / opgw	0	0	0	3885	15395	-40771
Wind, -5°C	380C1F1	0	0	0	19806	65386	-193366
Permanent loads yg= 1.2	380C1F2	0	0	0	19805	63262	-189834
Wind angle: 90°	380C1F3	0	0	0	19805	60594	-185589
	380C2F1	19806	65386	193366	0	0	0
	380C2F2	19805	63262	189834	0	0	0
	380C2F3	19805	60594	185589	0	0	0
	GW / opgw	3885	15395	40771	0	0	0
	RTG	0	0	0	7769	25184	-71570
NL3/4	GW / opgw	0	0	0	2915	7422	-24450
Construction/maintenance, +5°C	380C1F1	0	0	0	19451	48940	-164507
Permanent loads yg= 1.2	380C1F2	0	0	0	19451	48386	-164016
Wind angle: 90°	380C1F3	0	0	0	19451	47688	-163453
	380C2F1	19451	48940	164507	0	0	0
	380C2F2	19451	48386	164016	0	0	0
	380C2F3	19451	47688	163453	0	0	0
	GW / opgw	2915	7422	24450	0	0	0
	RTG	0	0	0	5823	14071	-48136
NL3/1a	GW / opgw	0	0	0	2313	6127	-20040
Wind, 10°C	380C1F1	0	0	0	17045	43107	-145083
Permanent loads yg= 1.2	380C1F2	0	0	0	17045	42622	-144643
Wind angle: -45°	380C1F3	0	0	0	17045	42010	-144138
	380C2F1	17048	57086	165656	0	0	0
	380C2F2	17048	55023	162069	0	0	0
	380C2F3	17047	52430	157738	0	0	0
	GW / opgw	2314	8887	24681	0	0	0
	RTG	0	0	0	4620	11559	-39325
NL3/1b	GW / opgw	0	0	0	2312	6141	-22048
Wind, -20°C	380C1F1	0	0	0	17036	45284	-164144
Permanent loads yg= 1.2	380C1F2	0	0	0	17036	45164	-164118
Wind angle: -45°	380C1F3	0	0	0	17036	45010	-164091
	380C2F1	17036	48403	166070	0	0	0
	380C2F2	17036	47959	165679	0	0	0
	380C2F3	17036	47399	165232	0	0	0
	GW / opgw	2312	6741	22549	0	0	0
	RTG	0	0	0	4618	12006	-43634
NL3/3	GW / opgw	0	0	0	3883	9674	-31635
Wind, -5°C	380C1F1	0	0	0	19803	49854	-172487
Permanent loads yg= 1.2	380C1F2	0	0	0	19803	49470	-172230
Wind angle: -45°	380C1F3	0	0	0	19803	48982	-171940
	380C2F1	19805	60671	185710	0	0	0
	380C2F2	19804	59078	183295	0	0	0
	380C2F3	19804	57080	180431	0	0	0
	GW / opgw	3884	13699	37715	0	0	0
	RTG	0	0	0	7767	18287	-62242
NL3/4	GW / opgw	0	0	0	2915	6635	-23893
Construction/maintenance, +5°C	380C1F1	0	0	0	19451	44713	-162011
Permanent loads yg= 1.2	380C1F2	0	0	0	19451	44596	-161995
Wind angle: -45°	380C1F3	0	0	0	19451	44445	-161980
	380C2F1	19451	47708	163468	0	0	0
	380C2F2	19451	47287	163163	0	0	0
	380C2F3	19451	46754	162817	0	0	0
	GW / opgw	2915	7190	24224	0	0	0
	RTG	0	0	0	5823	13092	-47687

NL3/1a	GW / opgw	0	0	0	1735	4313	-15338
Wind, 10°C	380C1F1	0	0	0	12781	31423	-113041
Permanent loads yg= 0.9	380C1F2	0	0	0	12781	31316	-113009
Wind angle: 0°	380C1F3	0	0	0	12781	31179	-112975
	380C2F1	12781	31423	113041	0	0	0
	380C2F2	12781	31316	113009	0	0	0
	380C2F3	12781	31179	112975	0	0	0
	GW / opgw	1735	4313	15338	0	0	0
	RTG	0	0	0	3464	8465	-30571
NL3/1b	GW / opgw	0	0	0	1734	4790	-17643
Wind, -20°C	380C1F1	0	0	0	12774	35889	-132638
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	35859	-132640
Wind angle: 0°	380C1F3	0	0	0	12774	35821	-132643
	380C2F1	12774	35889	132638	0	0	0
	380C2F2	12774	35859	132640	0	0	0
	380C2F3	12774	35821	132643	0	0	0
	GW / opgw	1734	4790	17643	0	0	0
	RTG	0	0	0	3463	9432	-34887
NL3/3	GW / opgw	0	0	0	3304	7640	-27316
Wind, -5°C	380C1F1	0	0	0	15538	39043	-142075
Permanent loads yg= 0.9	380C1F2	0	0	0	15538	38955	-142062
Wind angle: 0°	380C1F3	0	0	0	15538	38842	-142050
	380C2F1	15538	39043	142075	0	0	0
	380C2F2	15538	38955	142062	0	0	0
	380C2F3	15538	38842	142050	0	0	0
	GW / opgw	3304	7640	27316	0	0	0
	RTG	0	0	0	6610	15024	-54460
NL3/4	GW / opgw	0	0	0	2336	5416	-19980
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	36000	-133052
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	35971	-133056
Wind angle: 0°	380C1F3	0	0	0	15186	35933	-133060
	380C2F1	15186	36000	133052	0	0	0
	380C2F2	15186	35971	133056	0	0	0
	380C2F3	15186	35933	133060	0	0	0
	GW / opgw	2336	5416	19980	0	0	0
	RTG	0	0	0	4667	10771	-39885
NL3/1a	GW / opgw	0	0	0	1735	8210	-22156
Wind, 10°C	380C1F1	0	0	0	12784	51340	-144218
Permanent loads yg= 0.9	380C1F2	0	0	0	12784	49016	-139656
Wind angle: 45°	380C1F3	0	0	0	12783	46076	-134031
	380C2F1	12781	35461	116551	0	0	0
	380C2F2	12781	34918	115894	0	0	0
	380C2F3	12781	34237	115133	0	0	0
	GW / opgw	1735	5101	16208	0	0	0
	RTG	0	0	0	3465	13155	-37657
NL3/1b	GW / opgw	0	0	0	1734	5648	-18470
Wind, -20°C	380C1F1	0	0	0	12774	40320	-135907
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	39822	-135311
Wind angle: 45°	380C1F3	0	0	0	12774	39197	-134622
	380C2F1	12774	36896	132843	0	0	0
	380C2F2	12774	36770	132792	0	0	0
	380C2F3	12774	36608	132736	0	0	0
	GW / opgw	1734	4978	17707	0	0	0
	RTG	0	0	0	3463	10479	-35592
NL3/3	GW / opgw	0	0	0	3305	13070	-35370
Wind, -5°C	380C1F1	0	0	0	15541	54258	-161780
Permanent loads yg= 0.9	380C1F2	0	0	0	15541	52474	-158656
Wind angle: 45°	380C1F3	0	0	0	15540	50235	-154893
	380C2F1	15539	42217	143988	0	0	0
	380C2F2	15539	41801	143612	0	0	0
	380C2F3	15539	41276	143181	0	0	0
	GW / opgw	3304	8767	28251	0	0	0
	RTG	0	0	0	6612	21564	-62463
NL3/4	GW / opgw	0	0	0	2336	6187	-20478
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	40180	-135376
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	39722	-134931
Wind angle: 45°	380C1F3	0	0	0	15186	39145	-134421
	380C2F1	15186	36980	133154	0	0	0
	380C2F2	15186	36859	133121	0	0	0
	380C2F3	15186	36703	133088	0	0	0
	GW / opgw	2336	5594	20007	0	0	0
	RTG	0	0	0	4667	11735	-40278

NL3/1a	GW / opgw	0	0	0	1736	9484	-24837
Wind, 10°C	380C1F1	0	0	0	12785	58092	-157850
Permanent loads yg= 0.9	380C1F2	0	0	0	12785	55074	-151702
Wind angle: 90°	380C1F3	0	0	0	12784	51227	-143995
	380C2F1	12785	58092	157850	0	0	0
	380C2F2	12785	55074	151702	0	0	0
	380C2F3	12784	51227	143995	0	0	0
	GW / opgw	1736	9484	24837	0	0	0
	RTG	0	0	0	3465	14771	-40897
NL3/1b	GW / opgw	0	0	0	1734	5943	-18935
Wind, -20°C	380C1F1	0	0	0	12774	41799	-137871
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	41131	-136951
Wind angle: 90°	380C1F3	0	0	0	12774	40295	-135877
	380C2F1	12774	41799	137871	0	0	0
	380C2F2	12774	41131	136951	0	0	0
	380C2F3	12774	40295	135877	0	0	0
	GW / opgw	1734	5943	18935	0	0	0
	RTG	0	0	0	3463	10825	-36025
NL3/3	GW / opgw	0	0	0	3306	14856	-38760
Wind, -5°C	380C1F1	0	0	0	15542	59513	-171455
Permanent loads yg= 0.9	380C1F2	0	0	0	15542	57150	-167032
Wind angle: 90°	380C1F3	0	0	0	15541	54171	-161626
	380C2F1	15542	59513	171455	0	0	0
	380C2F2	15542	57150	167032	0	0	0
	380C2F3	15541	54171	161626	0	0	0
	GW / opgw	3306	14856	38760	0	0	0
	RTG	0	0	0	6612	23789	-66366
NL3/4	GW / opgw	0	0	0	2336	6440	-20785
Construction/maintenance, +5°C	380C1F1	0	0	0	15187	41531	-136860
Permanent loads yg= 0.9	380C1F2	0	0	0	15187	40922	-136162
Wind angle: 90°	380C1F3	0	0	0	15186	40157	-135353
	380C2F1	15187	41531	136860	0	0	0
	380C2F2	15187	40922	136162	0	0	0
	380C2F3	15186	40157	135353	0	0	0
	GW / opgw	2336	6440	20785	0	0	0
	RTG	0	0	0	4667	12038	-40549
NL3/1a	GW / opgw	0	0	0	1735	5101	-16208
Wind, 10°C	380C1F1	0	0	0	12781	35461	-116551
Permanent loads yg= 0.9	380C1F2	0	0	0	12781	34918	-115894
Wind angle: -45°	380C1F3	0	0	0	12781	34237	-115133
	380C2F1	12784	51340	144218	0	0	0
	380C2F2	12784	49016	139656	0	0	0
	380C2F3	12783	46076	134031	0	0	0
	GW / opgw	1735	8210	22156	0	0	0
	RTG	0	0	0	3464	9416	-31331
NL3/1b	GW / opgw	0	0	0	1734	4978	-17707
Wind, -20°C	380C1F1	0	0	0	12774	36896	-132843
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	36770	-132792
Wind angle: -45°	380C1F3	0	0	0	12774	36608	-132736
	380C2F1	12774	40320	135907	0	0	0
	380C2F2	12774	39822	135311	0	0	0
	380C2F3	12774	39197	134622	0	0	0
	GW / opgw	1734	5648	18470	0	0	0
	RTG	0	0	0	3463	9673	-34927
NL3/3	GW / opgw	0	0	0	3304	8767	-28251
Wind, -5°C	380C1F1	0	0	0	15539	42217	-143988
Permanent loads yg= 0.9	380C1F2	0	0	0	15539	41801	-143612
Wind angle: -45°	380C1F3	0	0	0	15539	41276	-143181
	380C2F1	15541	54258	161780	0	0	0
	380C2F2	15541	52474	158656	0	0	0
	380C2F3	15540	50235	154893	0	0	0
	GW / opgw	3305	13070	35370	0	0	0
	RTG	0	0	0	6610	16408	-55232
NL3/4	GW / opgw	0	0	0	2336	5594	-20007
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	36980	-133154
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	36859	-133121
Wind angle: -45°	380C1F3	0	0	0	15186	36703	-133088
	380C2F1	15186	40180	135376	0	0	0
	380C2F2	15186	39722	134931	0	0	0
	380C2F3	15186	39145	134421	0	0	0
	GW / opgw	2336	6187	20478	0	0	0
	RTG	0	0	0	4667	11003	-39891

ZWM6HK400

Appendix AZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	0	0	0	17045	39408	-142840
	380C2F2	0	0	0	17045	39305	-142825
	380C2F3	0	0	0	17045	39174	-142811
	GW / opgw	0	0	0	2313	5417	-19458
	RTG	0	0	0	4620	10682	-38844
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	0	0	0	17036	44313	-164078
	380C2F2	0	0	0	17036	44284	-164082
	380C2F3	0	0	0	17036	44246	-164087
	GW / opgw	0	0	0	2312	5962	-22017
	RTG	0	0	0	4618	11773	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	0	0	0	19802	46863	-171258
	380C2F2	0	0	0	19802	46777	-171255
	380C2F3	0	0	0	19802	46667	-171253
	GW / opgw	0	0	0	3883	8603	-30909
	RTG	0	0	0	7767	16955	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	0	0	0	19451	43757	-162002
	380C2F2	0	0	0	19451	43728	-162006
	380C2F3	0	0	0	19451	43690	-162012
	GW / opgw	0	0	0	2915	6462	-23882
	RTG	0	0	0	5823	12864	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	0	0	0	17048	57086	-165656
	380C2F2	0	0	0	17048	55023	-162069
	380C2F3	0	0	0	17047	52430	-157738
	GW / opgw	0	0	0	2314	8887	-24681
	RTG	0	0	0	4621	14847	-43970
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	0	0	0	17036	48403	-166070
	380C2F2	0	0	0	17036	47959	-165679
	380C2F3	0	0	0	17036	47399	-165232
	GW / opgw	0	0	0	2312	6741	-22549
	RTG	0	0	0	4618	12745	-44049
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	0	0	0	19805	60671	-185710
	380C2F2	0	0	0	19804	59078	-183295
	380C2F3	0	0	0	19804	57080	-180431
	GW / opgw	0	0	0	3884	13699	-37715
	RTG	0	0	0	7768	23103	-68204
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	0	0	0	19451	47708	-163468
	380C2F2	0	0	0	19451	47287	-163163
	380C2F3	0	0	0	19451	46754	-162817
	GW / opgw	0	0	0	2915	7190	-24224
	RTG	0	0	0	5823	13789	-47942

NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	17050	63147	-176706	
	380C2F2	0	0	0	17049	60425	-171664	
	380C2F3	0	0	0	17048	56986	-165479	
	GW / opgw	0	0	0	2314	10058	-26978	
	RTG	0	0	0	4621	16285	-46547	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	17036	49708	-167384	
	380C2F2	0	0	0	17036	49120	-166764	
	380C2F3	0	0	0	17036	48381	-166050	
	GW / opgw	0	0	0	2312	6998	-22872	
	RTG	0	0	0	4618	13053	-44337	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	19806	65386	-193366	
	380C2F2	0	0	0	19805	63262	-189834	
	380C2F3	0	0	0	19805	60594	-185589	
	GW / opgw	0	0	0	3885	15395	-40771	
	RTG	0	0	0	7769	25184	-71570	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	19451	48940	-164507	
	380C2F2	0	0	0	19451	48386	-164016	
	380C2F3	0	0	0	19451	47688	-163453	
	GW / opgw	0	0	0	2915	7422	-24450	
	RTG	0	0	0	5823	14071	-48136	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	17045	43107	-145083	
	380C2F2	0	0	0	17045	42622	-144643	
	380C2F3	0	0	0	17045	42010	-144138	
	GW / opgw	0	0	0	2313	6127	-20040	
	RTG	0	0	0	4620	11559	-39325	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	17036	45284	-164144	
	380C2F2	0	0	0	17036	45164	-164118	
	380C2F3	0	0	0	17036	45010	-164091	
	GW / opgw	0	0	0	2312	6141	-22048	
	RTG	0	0	0	4618	12006	-43634	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	19803	49854	-172487	
	380C2F2	0	0	0	19803	49470	-172230	
	380C2F3	0	0	0	19803	48982	-171940	
	GW / opgw	0	0	0	3883	9674	-31635	
	RTG	0	0	0	7767	18287	-62242	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	19451	44713	-162011	
	380C2F2	0	0	0	19451	44596	-161995	
	380C2F3	0	0	0	19451	44445	-161980	
	GW / opgw	0	0	0	2915	6635	-23893	
	RTG	0	0	0	5823	13092	-47687	

NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	12781	31423	-113041	
	380C2F2	0	0	0	12781	31316	-113009	
	380C2F3	0	0	0	12781	31179	-112975	
	GW / opgw	0	0	0	1735	4313	-15338	
	RTG	0	0	0	3464	8465	-30571	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	12774	35889	-132638	
	380C2F2	0	0	0	12774	35859	-132640	
	380C2F3	0	0	0	12774	35821	-132643	
	GW / opgw	0	0	0	1734	4790	-17643	
	RTG	0	0	0	3463	9432	-34887	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	15538	39043	-142075	
	380C2F2	0	0	0	15538	38955	-142062	
	380C2F3	0	0	0	15538	38842	-142050	
	GW / opgw	0	0	0	3304	7640	-27316	
	RTG	0	0	0	6610	15024	-54460	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	15186	36000	-133052	
	380C2F2	0	0	0	15186	35971	-133056	
	380C2F3	0	0	0	15186	35933	-133060	
	GW / opgw	0	0	0	2336	5416	-19980	
	RTG	0	0	0	4667	10771	-39885	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	12784	51340	-144218	
	380C2F2	0	0	0	12784	49016	-139656	
	380C2F3	0	0	0	12783	46076	-134031	
	GW / opgw	0	0	0	1735	8210	-22156	
	RTG	0	0	0	3465	13155	-37657	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	12774	40320	-135907	
	380C2F2	0	0	0	12774	39822	-135311	
	380C2F3	0	0	0	12774	39197	-134622	
	GW / opgw	0	0	0	1734	5648	-18470	
	RTG	0	0	0	3463	10479	-35592	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	15541	54258	-161780	
	380C2F2	0	0	0	15541	52474	-158656	
	380C2F3	0	0	0	15540	50235	-154893	
	GW / opgw	0	0	0	3305	13070	-35370	
	RTG	0	0	0	6612	21564	-62463	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	15186	40180	-135376	
	380C2F2	0	0	0	15186	39722	-134931	
	380C2F3	0	0	0	15186	39145	-134421	
	GW / opgw	0	0	0	2336	6187	-20478	
	RTG	0	0	0	4667	11735	-40278	

NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	12785	58092	-157850	
	380C2F2	0	0	0	12785	55074	-151702	
	380C2F3	0	0	0	12784	51227	-143995	
	GW / opgw	0	0	0	1736	9484	-24837	
	RTG	0	0	0	3465	14771	-40897	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	12774	41799	-137871	
	380C2F2	0	0	0	12774	41131	-136951	
	380C2F3	0	0	0	12774	40295	-135877	
	GW / opgw	0	0	0	1734	5943	-18935	
	RTG	0	0	0	3463	10825	-36025	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	15542	59513	-171455	
	380C2F2	0	0	0	15542	57150	-167032	
	380C2F3	0	0	0	15541	54171	-161626	
	GW / opgw	0	0	0	3306	14856	-38760	
	RTG	0	0	0	6612	23789	-66366	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	15187	41531	-136860	
	380C2F2	0	0	0	15187	40922	-136162	
	380C2F3	0	0	0	15186	40157	-135353	
	GW / opgw	0	0	0	2336	6440	-20785	
	RTG	0	0	0	4667	12038	-40549	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	12781	35461	-116551	
	380C2F2	0	0	0	12781	34918	-115894	
	380C2F3	0	0	0	12781	34237	-115133	
	GW / opgw	0	0	0	1735	5101	-16208	
	RTG	0	0	0	3464	9416	-31331	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	12774	36896	-132843	
	380C2F2	0	0	0	12774	36770	-132792	
	380C2F3	0	0	0	12774	36608	-132736	
	GW / opgw	0	0	0	1734	4978	-17707	
	RTG	0	0	0	3463	9673	-34927	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	15539	42217	-143988	
	380C2F2	0	0	0	15539	41801	-143612	
	380C2F3	0	0	0	15539	41276	-143181	
	GW / opgw	0	0	0	3304	8767	-28251	
	RTG	0	0	0	6610	16408	-55232	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0	0
	380C2F1	0	0	0	15186	36980	-133154	
	380C2F2	0	0	0	15186	36859	-133121	
	380C2F3	0	0	0	15186	36703	-133088	
	GW / opgw	0	0	0	2336	5594	-20007	
	RTG	0	0	0	4667	11003	-39891	

ZWM6HK400

Appendix AZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2313	5417	-19458
	380C1F1	0	0	0	17045	39408	-142840
	380C1F2	0	0	0	17045	39305	-142825
	380C1F3	0	0	0	17045	39174	-142811
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4620	10682	-38844
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2312	5962	-22017
	380C1F1	0	0	0	17036	44313	-164078
	380C1F2	0	0	0	17036	44284	-164082
	380C1F3	0	0	0	17036	44246	-164087
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4618	11773	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3883	8603	-30909
	380C1F1	0	0	0	19802	46863	-171258
	380C1F2	0	0	0	19802	46777	-171255
	380C1F3	0	0	0	19802	46667	-171253
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	7767	16955	-61668
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2915	6462	-23882
	380C1F1	0	0	0	19451	43757	-162002
	380C1F2	0	0	0	19451	43728	-162006
	380C1F3	0	0	0	19451	43690	-162012
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	5823	12864	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2314	8887	-24681
	380C1F1	0	0	0	17048	57086	-165656
	380C1F2	0	0	0	17048	55023	-162069
	380C1F3	0	0	0	17047	52430	-157738
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4621	14847	-43970
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2312	6741	-22549
	380C1F1	0	0	0	17036	48403	-166070
	380C1F2	0	0	0	17036	47959	-165679
	380C1F3	0	0	0	17036	47399	-165232
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4618	12745	-44049
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3884	13699	-37715
	380C1F1	0	0	0	19805	60671	-185710
	380C1F2	0	0	0	19804	59078	-183295
	380C1F3	0	0	0	19804	57080	-180431
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	7768	23103	-68204
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2915	7190	-24224
	380C1F1	0	0	0	19451	47708	-163468
	380C1F2	0	0	0	19451	47287	-163163
	380C1F3	0	0	0	19451	46754	-162817
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	5823	13789	-47942

NL3/1a	GW / opgw	0	0	0	2314	10058	-26978
Wind, 10°C	380C1F1	0	0	0	17050	63147	-176706
Permanent loads yg= 1.2	380C1F2	0	0	0	17049	60425	-171664
Wind angle: 90°	380C1F3	0	0	0	17048	56986	-165479
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4621	16285	-46547
NL3/1b	GW / opgw	0	0	0	2312	6998	-22872
Wind, -20°C	380C1F1	0	0	0	17036	49708	-167384
Permanent loads yg= 1.2	380C1F2	0	0	0	17036	49120	-166764
Wind angle: 90°	380C1F3	0	0	0	17036	48381	-166050
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4618	13053	-44337
NL3/3	GW / opgw	0	0	0	3885	15395	-40771
Wind, -5°C	380C1F1	0	0	0	19806	65386	-193366
Permanent loads yg= 1.2	380C1F2	0	0	0	19805	63262	-189834
Wind angle: 90°	380C1F3	0	0	0	19805	60594	-185589
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	7769	25184	-71570
NL3/4	GW / opgw	0	0	0	2915	7422	-24450
Construction/maintenance, +5°C	380C1F1	0	0	0	19451	48940	-164507
Permanent loads yg= 1.2	380C1F2	0	0	0	19451	48386	-164016
Wind angle: 90°	380C1F3	0	0	0	19451	47688	-163453
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	5823	14071	-48136
NL3/1a	GW / opgw	0	0	0	2313	6127	-20040
Wind, 10°C	380C1F1	0	0	0	17045	43107	-145083
Permanent loads yg= 1.2	380C1F2	0	0	0	17045	42622	-144643
Wind angle: -45°	380C1F3	0	0	0	17045	42010	-144138
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4620	11559	-39325
NL3/1b	GW / opgw	0	0	0	2312	6141	-22048
Wind, -20°C	380C1F1	0	0	0	17036	45284	-164144
Permanent loads yg= 1.2	380C1F2	0	0	0	17036	45164	-164118
Wind angle: -45°	380C1F3	0	0	0	17036	45010	-164091
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4618	12006	-43634
NL3/3	GW / opgw	0	0	0	3883	9674	-31635
Wind, -5°C	380C1F1	0	0	0	19803	49854	-172487
Permanent loads yg= 1.2	380C1F2	0	0	0	19803	49470	-172230
Wind angle: -45°	380C1F3	0	0	0	19803	48982	-171940
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	7767	18287	-62242
NL3/4	GW / opgw	0	0	0	2915	6635	-23893
Construction/maintenance, +5°C	380C1F1	0	0	0	19451	44713	-162011
Permanent loads yg= 1.2	380C1F2	0	0	0	19451	44596	-161995
Wind angle: -45°	380C1F3	0	0	0	19451	44445	-161980
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	5823	13092	-47687

NL3/1a	GW / opgw	0	0	0	1735	4313	-15338
Wind, 10°C	380C1F1	0	0	0	12781	31423	-113041
Permanent loads yg= 0.9	380C1F2	0	0	0	12781	31316	-113009
Wind angle: 0°	380C1F3	0	0	0	12781	31179	-112975
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	3464	8465	-30571
NL3/1b	GW / opgw	0	0	0	1734	4790	-17643
Wind, -20°C	380C1F1	0	0	0	12774	35889	-132638
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	35859	-132640
Wind angle: 0°	380C1F3	0	0	0	12774	35821	-132643
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	3463	9432	-34887
NL3/3	GW / opgw	0	0	0	3304	7640	-27316
Wind, -5°C	380C1F1	0	0	0	15538	39043	-142075
Permanent loads yg= 0.9	380C1F2	0	0	0	15538	38955	-142062
Wind angle: 0°	380C1F3	0	0	0	15538	38842	-142050
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	6610	15024	-54460
NL3/4	GW / opgw	0	0	0	2336	5416	-19980
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	36000	-133052
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	35971	-133056
Wind angle: 0°	380C1F3	0	0	0	15186	35933	-133060
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4667	10771	-39885
NL3/1a	GW / opgw	0	0	0	1735	8210	-22156
Wind, 10°C	380C1F1	0	0	0	12784	51340	-144218
Permanent loads yg= 0.9	380C1F2	0	0	0	12784	49016	-139656
Wind angle: 45°	380C1F3	0	0	0	12783	46076	-134031
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	3465	13155	-37657
NL3/1b	GW / opgw	0	0	0	1734	5648	-18470
Wind, -20°C	380C1F1	0	0	0	12774	40320	-135907
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	39822	-135311
Wind angle: 45°	380C1F3	0	0	0	12774	39197	-134622
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	3463	10479	-35592
NL3/3	GW / opgw	0	0	0	3305	13070	-35370
Wind, -5°C	380C1F1	0	0	0	15541	54258	-161780
Permanent loads yg= 0.9	380C1F2	0	0	0	15541	52474	-158656
Wind angle: 45°	380C1F3	0	0	0	15540	50235	-154893
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	6612	21564	-62463
NL3/4	GW / opgw	0	0	0	2336	6187	-20478
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	40180	-135376
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	39722	-134931
Wind angle: 45°	380C1F3	0	0	0	15186	39145	-134421
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4667	11735	-40278

NL3/1a	GW / opgw	0	0	0	1736	9484	-24837
Wind, 10°C	380C1F1	0	0	0	12785	58092	-157850
Permanent loads yg= 0.9	380C1F2	0	0	0	12785	55074	-151702
Wind angle: 90°	380C1F3	0	0	0	12784	51227	-143995
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	3465	14771	-40897
NL3/1b	GW / opgw	0	0	0	1734	5943	-18935
Wind, -20°C	380C1F1	0	0	0	12774	41799	-137871
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	41131	-136951
Wind angle: 90°	380C1F3	0	0	0	12774	40295	-135877
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	3463	10825	-36025
NL3/3	GW / opgw	0	0	0	3306	14856	-38760
Wind, -5°C	380C1F1	0	0	0	15542	59513	-171455
Permanent loads yg= 0.9	380C1F2	0	0	0	15542	57150	-167032
Wind angle: 90°	380C1F3	0	0	0	15541	54171	-161626
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	6612	23789	-66366
NL3/4	GW / opgw	0	0	0	2336	6440	-20785
Construction/maintenance, +5°C	380C1F1	0	0	0	15187	41531	-136860
Permanent loads yg= 0.9	380C1F2	0	0	0	15187	40922	-136162
Wind angle: 90°	380C1F3	0	0	0	15186	40157	-135353
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4667	12038	-40549
NL3/1a	GW / opgw	0	0	0	1735	5101	-16208
Wind, 10°C	380C1F1	0	0	0	12781	35461	-116551
Permanent loads yg= 0.9	380C1F2	0	0	0	12781	34918	-115894
Wind angle: -45°	380C1F3	0	0	0	12781	34237	-115133
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	3464	9416	-31331
NL3/1b	GW / opgw	0	0	0	1734	4978	-17707
Wind, -20°C	380C1F1	0	0	0	12774	36896	-132843
Permanent loads yg= 0.9	380C1F2	0	0	0	12774	36770	-132792
Wind angle: -45°	380C1F3	0	0	0	12774	36608	-132736
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	3463	9673	-34927
NL3/3	GW / opgw	0	0	0	3304	8767	-28251
Wind, -5°C	380C1F1	0	0	0	15539	42217	-143988
Permanent loads yg= 0.9	380C1F2	0	0	0	15539	41801	-143612
Wind angle: -45°	380C1F3	0	0	0	15539	41276	-143181
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	6610	16408	-55232
NL3/4	GW / opgw	0	0	0	2336	5594	-20007
Construction/maintenance, +5°C	380C1F1	0	0	0	15186	36980	-133154
Permanent loads yg= 0.9	380C1F2	0	0	0	15186	36859	-133121
Wind angle: -45°	380C1F3	0	0	0	15186	36703	-133088
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	4667	11003	-39891

ZWM6HK400

Appendix AZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5417	19458	0	0	0
	380C1F1	17045	39408	142840	0	0	0
	380C1F2	17045	39305	142825	0	0	0
	380C1F3	17045	39174	142811	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5962	22017	0	0	0
	380C1F1	17036	44313	164078	0	0	0
	380C1F2	17036	44284	164082	0	0	0
	380C1F3	17036	44246	164087	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8603	30909	0	0	0
	380C1F1	19802	46863	171258	0	0	0
	380C1F2	19802	46777	171255	0	0	0
	380C1F3	19802	46667	171253	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6462	23882	0	0	0
	380C1F1	19451	43757	162002	0	0	0
	380C1F2	19451	43728	162006	0	0	0
	380C1F3	19451	43690	162012	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6127	20040	0	0	0
	380C1F1	17045	43107	145083	0	0	0
	380C1F2	17045	42622	144643	0	0	0
	380C1F3	17045	42010	144138	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6141	22048	0	0	0
	380C1F1	17036	45284	164144	0	0	0
	380C1F2	17036	45164	164118	0	0	0
	380C1F3	17036	45010	164091	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9674	31635	0	0	0
	380C1F1	19803	49854	172487	0	0	0
	380C1F2	19803	49470	172230	0	0	0
	380C1F3	19803	48962	171940	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6635	23893	0	0	0
	380C1F1	19451	44713	162011	0	0	0
	380C1F2	19451	44596	161995	0	0	0
	380C1F3	19451	44445	161980	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	2314	10058	26978	0	0	0
Wind, 10°C	380C1F1	17050	63147	176706	0	0	0
Permanent loads yg= 1.2	380C1F2	17049	60425	171664	0	0	0
Wind angle: 90°	380C1F3	17048	56986	165479	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2312	6998	22872	0	0	0
Wind, -20°C	380C1F1	17036	49708	167384	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	49120	166764	0	0	0
Wind angle: 90°	380C1F3	17036	48381	166050	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3885	15395	40771	0	0	0
Wind, -5°C	380C1F1	19806	65386	193366	0	0	0
Permanent loads yg= 1.2	380C1F2	19805	63262	189834	0	0	0
Wind angle: 90°	380C1F3	19805	60594	185589	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2915	7422	24450	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	48940	164507	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	48386	164016	0	0	0
Wind angle: 90°	380C1F3	19451	47688	163453	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2314	8887	24681	0	0	0
Wind, 10°C	380C1F1	17048	57086	165656	0	0	0
Permanent loads yg= 1.2	380C1F2	17048	55023	162069	0	0	0
Wind angle: -45°	380C1F3	17047	52430	157738	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2312	6741	22549	0	0	0
Wind, -20°C	380C1F1	17036	48403	166070	0	0	0
Permanent loads yg= 1.2	380C1F2	17036	47959	165679	0	0	0
Wind angle: -45°	380C1F3	17036	47399	165232	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3884	13699	37715	0	0	0
Wind, -5°C	380C1F1	19805	60671	185710	0	0	0
Permanent loads yg= 1.2	380C1F2	19804	59078	183295	0	0	0
Wind angle: -45°	380C1F3	19804	57080	180431	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2915	7190	24224	0	0	0
Construction/maintenance, +5°C	380C1F1	19451	47708	163468	0	0	0
Permanent loads yg= 1.2	380C1F2	19451	47287	163163	0	0	0
Wind angle: -45°	380C1F3	19451	46754	162817	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	1735	4313	15338	0	0	0
Wind, 10°C	380C1F1	12781	31423	113041	0	0	0
Permanent loads yg= 0.9	380C1F2	12781	31316	113009	0	0	0
Wind angle: 0°	380C1F3	12781	31179	112975	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	4790	17643	0	0	0
Wind, -20°C	380C1F1	12774	35889	132638	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	35859	132640	0	0	0
Wind angle: 0°	380C1F3	12774	35821	132643	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3304	7640	27316	0	0	0
Wind, -5°C	380C1F1	15538	39043	142075	0	0	0
Permanent loads yg= 0.9	380C1F2	15538	38955	142062	0	0	0
Wind angle: 0°	380C1F3	15538	38842	142050	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	5416	19980	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	36000	133052	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	35971	133056	0	0	0
Wind angle: 0°	380C1F3	15186	35933	133060	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1735	5101	16208	0	0	0
Wind, 10°C	380C1F1	12781	35461	116551	0	0	0
Permanent loads yg= 0.9	380C1F2	12781	34918	115894	0	0	0
Wind angle: 45°	380C1F3	12781	34237	115133	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	4978	17707	0	0	0
Wind, -20°C	380C1F1	12774	36896	132843	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	36770	132792	0	0	0
Wind angle: 45°	380C1F3	12774	36608	132736	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3304	8767	28251	0	0	0
Wind, -5°C	380C1F1	15539	42217	143988	0	0	0
Permanent loads yg= 0.9	380C1F2	15539	41801	143612	0	0	0
Wind angle: 45°	380C1F3	15539	41276	143181	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	5594	20007	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	36980	133154	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	36859	133121	0	0	0
Wind angle: 45°	380C1F3	15186	36703	133088	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	1736	9484	24837	0	0	0
Wind, 10°C	380C1F1	12785	58092	157850	0	0	0
Permanent loads yg= 0.9	380C1F2	12785	55074	151702	0	0	0
Wind angle: 90°	380C1F3	12784	51227	143995	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	5943	18935	0	0	0
Wind, -20°C	380C1F1	12774	41799	137871	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	41131	136951	0	0	0
Wind angle: 90°	380C1F3	12774	40295	135877	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3306	14856	38760	0	0	0
Wind, -5°C	380C1F1	15542	59513	171455	0	0	0
Permanent loads yg= 0.9	380C1F2	15542	57150	167032	0	0	0
Wind angle: 90°	380C1F3	15541	54171	161626	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	6440	20785	0	0	0
Construction/maintenance, +5°C	380C1F1	15187	41531	136860	0	0	0
Permanent loads yg= 0.9	380C1F2	15187	40922	136162	0	0	0
Wind angle: 90°	380C1F3	15186	40157	135353	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1735	8210	22156	0	0	0
Wind, 10°C	380C1F1	12784	51340	144218	0	0	0
Permanent loads yg= 0.9	380C1F2	12784	49016	136656	0	0	0
Wind angle: -45°	380C1F3	12783	46076	134031	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	5648	18470	0	0	0
Wind, -20°C	380C1F1	12774	40320	135907	0	0	0
Permanent loads yg= 0.9	380C1F2	12774	39822	135311	0	0	0
Wind angle: -45°	380C1F3	12774	39197	134622	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3305	13070	35370	0	0	0
Wind, -5°C	380C1F1	15541	54258	161780	0	0	0
Permanent loads yg= 0.9	380C1F2	15541	52474	158656	0	0	0
Wind angle: -45°	380C1F3	15540	50235	154893	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	6187	20478	0	0	0
Construction/maintenance, +5°C	380C1F1	15186	40180	135376	0	0	0
Permanent loads yg= 0.9	380C1F2	15186	39722	134931	0	0	0
Wind angle: -45°	380C1F3	15186	39145	134421	0	0	0
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	GW / opgw	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

ZWM6HK400

Appendix AZ1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	17045	39408	142840	0	0	0
	380C2F2	17045	39305	142825	0	0	0
	380C2F3	17045	39174	142811	0	0	0
	GW / opgw	2313	5417	19458	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	17036	44313	164078	0	0	0
	380C2F2	17036	44284	164082	0	0	0
	380C2F3	17036	44246	164087	0	0	0
	GW / opgw	2312	5962	22017	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19802	46863	171258	0	0	0
	380C2F2	19802	46777	171255	0	0	0
	380C2F3	19802	46667	171253	0	0	0
	GW / opgw	3883	8603	30909	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19451	43757	162002	0	0	0
	380C2F2	19451	43728	162006	0	0	0
	380C2F3	19451	43690	162012	0	0	0
	GW / opgw	2915	6462	23882	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	17045	43107	145083	0	0	0
	380C2F2	17045	42622	144643	0	0	0
	380C2F3	17045	42010	144138	0	0	0
	GW / opgw	2313	6127	20040	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	17036	45284	164144	0	0	0
	380C2F2	17036	45164	164118	0	0	0
	380C2F3	17036	45010	164091	0	0	0
	GW / opgw	2312	6141	22048	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19803	49854	172487	0	0	0
	380C2F2	19803	49470	172230	0	0	0
	380C2F3	19803	48982	171940	0	0	0
	GW / opgw	3883	9674	31635	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	380C1F1	0	0	0	0	0	0
	380C1F2	0	0	0	0	0	0
	380C1F3	0	0	0	0	0	0
	380C2F1	19451	44713	162011	0	0	0
	380C2F2	19451	44596	161995	0	0	0
	380C2F3	19451	44445	161980	0	0	0
	GW / opgw	2915	6635	23893	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	17050	63147	176706	0	0	0
	380C2F2	17049	60425	171664	0	0	0
	380C2F3	17048	56986	165479	0	0	0
	GW / opgw	2314	10058	26978	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	17036	49708	167384	0	0	0
	380C2F2	17036	49120	166764	0	0	0
	380C2F3	17036	48381	166050	0	0	0
	GW / opgw	2312	6998	22872	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	19806	65386	193366	0	0	0
	380C2F2	19805	63262	189834	0	0	0
	380C2F3	19805	60594	185589	0	0	0
	GW / opgw	3885	15395	40771	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	19451	48940	164507	0	0	0
	380C2F2	19451	48386	164016	0	0	0
	380C2F3	19451	47688	163453	0	0	0
	GW / opgw	2915	7422	24450	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	17048	57086	165656	0	0	0
	380C2F2	17048	55023	162069	0	0	0
	380C2F3	17047	52430	157738	0	0	0
	GW / opgw	2314	8887	24681	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	17036	48403	166070	0	0	0
	380C2F2	17036	47959	165679	0	0	0
	380C2F3	17036	47399	165232	0	0	0
	GW / opgw	2312	6741	22549	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	19805	60671	185710	0	0	0
	380C2F2	19804	59078	183295	0	0	0
	380C2F3	19804	57080	180431	0	0	0
	GW / opgw	3884	13699	37715	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 1.2	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	19451	47708	163468	0	0	0
	380C2F2	19451	47287	163163	0	0	0
	380C2F3	19451	46754	162817	0	0	0
	GW / opgw	2915	7190	24224	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0
	380C2F1	12781	31423	113041	0	0	0
	380C2F2	12781	31316	113009	0	0	0
	380C2F3	12781	31179	112975	0	0	0
	GW / opgw	1735	4313	15338	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0
	380C2F1	12774	35889	132638	0	0	0
	380C2F2	12774	35859	132640	0	0	0
	380C2F3	12774	35821	132643	0	0	0
	GW / opgw	1734	4790	17643	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0
	380C2F1	15538	39043	142075	0	0	0
	380C2F2	15538	38955	142062	0	0	0
	380C2F3	15538	38842	142050	0	0	0
	GW / opgw	3304	7640	27316	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 0°	380C1F3	0	0	0	0	0	0
	380C2F1	15186	36000	133052	0	0	0
	380C2F2	15186	35971	133056	0	0	0
	380C2F3	15186	35933	133060	0	0	0
	GW / opgw	2336	5416	19980	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0
	380C2F1	12781	35461	116551	0	0	0
	380C2F2	12781	34918	115894	0	0	0
	380C2F3	12781	34237	115133	0	0	0
	GW / opgw	1735	5101	16208	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0
	380C2F1	12774	36896	132843	0	0	0
	380C2F2	12774	36770	132792	0	0	0
	380C2F3	12774	36608	132736	0	0	0
	GW / opgw	1734	4978	17707	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0
	380C2F1	15539	42217	143988	0	0	0
	380C2F2	15539	41801	143612	0	0	0
	380C2F3	15539	41276	143181	0	0	0
	GW / opgw	3304	8767	28251	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 45°	380C1F3	0	0	0	0	0	0
	380C2F1	15186	36980	133154	0	0	0
	380C2F2	15186	36859	133121	0	0	0
	380C2F3	15186	36703	133088	0	0	0
	GW / opgw	2336	5594	20007	0	0	0
	RTG	0	0	0	0	0	0

NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	12785	58092	157850	0	0	0
	380C2F2	12785	55074	151702	0	0	0
	380C2F3	12784	51227	143995	0	0	0
	GW / opgw	1736	9484	24837	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	12774	41799	137871	0	0	0
	380C2F2	12774	41131	136951	0	0	0
	380C2F3	12774	40295	135877	0	0	0
	GW / opgw	1734	5943	18935	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	15542	59513	171455	0	0	0
	380C2F2	15542	57150	167032	0	0	0
	380C2F3	15541	54171	161626	0	0	0
	GW / opgw	3306	14856	38760	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: 90°	380C1F3	0	0	0	0	0	0
	380C2F1	15187	41531	136860	0	0	0
	380C2F2	15187	40922	136162	0	0	0
	380C2F3	15186	40157	135353	0	0	0
	GW / opgw	2336	6440	20785	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	12784	51340	144218	0	0	0
	380C2F2	12784	49016	139656	0	0	0
	380C2F3	12783	46076	134031	0	0	0
	GW / opgw	1735	8210	22156	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	12774	40320	135907	0	0	0
	380C2F2	12774	39822	135311	0	0	0
	380C2F3	12774	39197	134622	0	0	0
	GW / opgw	1734	5648	18470	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	15541	54258	161780	0	0	0
	380C2F2	15541	52474	158656	0	0	0
	380C2F3	15540	50235	154893	0	0	0
	GW / opgw	3305	13070	35370	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	380C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	380C1F2	0	0	0	0	0	0
Wind angle: -45°	380C1F3	0	0	0	0	0	0
	380C2F1	15186	40180	135376	0	0	0
	380C2F2	15186	39722	134931	0	0	0
	380C2F3	15186	39145	134421	0	0	0
	GW / opgw	2336	6187	20478	0	0	0
	RTG	0	0	0	0	0	0

ZWM6HK400

Appendix AZ2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1928	4755	16775	1928	4755	-16775
	380C1F1	14202	34502	123337	14202	34502	-123337
	380C1F2	14202	34362	123287	14202	34362	-123287
	380C1F3	14202	34184	123233	14202	34184	-123233
	380C2F1	14202	34502	123337	14202	34502	-123337
	380C2F2	14202	34362	123287	14202	34362	-123287
	380C2F3	14202	34184	123233	14202	34184	-123233
	GW / opgw	1928	4755	16775	1928	4755	-16775
	RTG	0	0	0	3850	9305	-33417
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1927	5182	19144	1927	5182	-19144
	380C1F1	14194	38727	143447	14194	38727	-143447
	380C1F2	14194	38703	143450	14194	38703	-143450
	380C1F3	14194	38671	143454	14194	38671	-143454
	380C2F1	14194	38727	143447	14194	38727	-143447
	380C2F2	14194	38703	143450	14194	38703	-143450
	380C2F3	14194	38671	143454	14194	38671	-143454
	GW / opgw	1927	5182	19144	1927	5182	-19144
	RTG	0	0	0	3848	10222	-37885
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	6603	12600	46026	6603	12600	-46026
	380C1F1	22419	51246	188221	22419	51246	-188221
	380C1F2	22419	51176	188224	22419	51176	-188224
	380C1F3	22419	51086	188230	22419	51086	-188230
	380C2F1	22419	51246	188221	22419	51246	-188221
	380C2F2	22419	51176	188224	22419	51176	-188224
	380C2F3	22419	51086	188230	22419	51086	-188230
	GW / opgw	6603	12600	46026	6603	12600	-46026
	RTG	0	0	0	13222	25038	-92101
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	2429	5578	20622	2429	5578	-20622
	380C1F1	16206	37850	140174	16206	37850	-140174
	380C1F2	16206	37826	140178	16206	37826	-140178
	380C1F3	16206	37795	140183	16206	37795	-140183
	380C2F1	16206	37850	140174	16206	37850	-140174
	380C2F2	16206	37826	140178	16206	37826	-140178
	380C2F3	16206	37795	140183	16206	37795	-140183
	GW / opgw	2429	5578	20622	2429	5578	-20622
	RTG	0	0	0	4852	11101	-41167
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1928	5801	18026	1928	9861	-25919
	380C1F1	14203	39842	128444	14207	60753	-165973
	380C1F2	14203	39119	127503	14206	57733	-159977
	380C1F3	14202	38214	126407	14205	53894	-152503
	380C2F1	14203	39842	128444	14207	60753	-165973
	380C2F2	14203	39119	127503	14206	57733	-159977
	380C2F3	14202	38214	126407	14205	53894	-152503
	GW / opgw	1928	5801	18026	1928	9861	-25919
	RTG	0	0	0	3850	15509	-43216
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1927	5332	19173	1927	5840	-19620
	380C1F1	14194	39540	143517	14195	42173	-145250
	380C1F2	14194	39439	143493	14195	41797	-144901
	380C1F3	14194	39310	143467	14194	41323	-144501
	380C2F1	14194	39540	143517	14195	42173	-145250
	380C2F2	14194	39439	143493	14195	41797	-144901
	380C2F3	14194	39310	143467	14194	41323	-144501
	GW / opgw	1927	5332	19173	1927	5840	-19620
	RTG	0	0	0	3848	11039	-38269
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	6603	13372	46178	6604	15965	-48403
	380C1F1	22419	53617	188791	22420	61752	-196526
	380C1F2	22419	53318	188657	22420	60568	-195053
	380C1F3	22419	52937	188509	22420	59082	-193333
	380C2F1	22419	53617	188791	22420	61752	-196526
	380C2F2	22419	53318	188657	22420	60568	-195053
	380C2F3	22419	52937	188509	22420	59082	-193333
	GW / opgw	6603	13372	46178	6604	15965	-48403
	RTG	0	0	0	13223	29224	-94040
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	2429	5723	20633	2429	6191	-20928
	380C1F1	16206	38650	140193	16207	41170	-141501
	380C1F2	16206	38551	140178	16206	40815	-141229
	380C1F3	16206	38425	140163	16206	40365	-140920
	380C2F1	16206	38650	140193	16207	41170	-141501
	380C2F2	16206	38551	140178	16206	40815	-141229
	380C2F3	16206	38425	140163	16206	40365	-140920
	GW / opgw	2429	5723	20633	2429	6191	-20928
	RTG	0	0	0	4852	11877	-41392

NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1929	11480	29306	1929	11480	-29306
	380C1F1	14209	69452	183601	14209	69452	-183601
	380C1F2	14208	65576	175697	14208	65576	-175697
	380C1F3	14207	60607	165681	14207	60607	-165681
	380C2F1	14209	69452	183601	14209	69452	-183601
	380C2F2	14208	65576	175697	14208	65576	-175697
	380C2F3	14207	60607	165681	14207	60607	-165681
	GW / opgw	1929	11480	29306	1929	11480	-29306
	RTG	0	0	0	3851	17607	-47467
	NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1927	6059	19908	1927	6059
380C1F1		14195	43281	146423	14195	43281	-146423
380C1F2		14195	42782	145870	14195	42782	-145870
380C1F3		14195	42155	145233	14195	42155	-145233
380C2F1		14195	43281	146423	14195	43281	-146423
380C2F2		14195	42782	145870	14195	42782	-145870
380C2F3		14195	42155	145233	14195	42155	-145233
GW / opgw		1927	6059	19908	1927	6059	-19908
RTG		0	0	0	3848	11300	-38525
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°		GW / opgw	6604	17063	49773	6604	17063
	380C1F1	22421	65255	201318	22421	65255	-201318
	380C1F2	22421	63676	199086	22421	63676	-199086
	380C1F3	22420	61694	196452	22420	61694	-196452
	380C2F1	22421	65255	201318	22421	65255	-201318
	380C2F2	22421	63676	199086	22421	63676	-199086
	380C2F3	22420	61694	196452	22420	61694	-196452
	GW / opgw	6604	17063	49773	6604	17063	-49773
	RTG	0	0	0	13223	30546	-95307
	NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2429	6386	21128	2429	6386
380C1F1		16207	42212	142424	16207	42212	-142424
380C1F2		16207	41744	141988	16207	41744	-141988
380C1F3		16207	41153	141488	16207	41153	-141488
380C2F1		16207	42212	142424	16207	42212	-142424
380C2F2		16207	41744	141988	16207	41744	-141988
380C2F3		16207	41153	141488	16207	41153	-141488
GW / opgw		2429	6386	21128	2429	6386	-21128
RTG		0	0	0	4852	12115	-41564
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°		GW / opgw	1928	9861	25919	1928	5801
	380C1F1	14207	60753	165973	14203	39842	-128444
	380C1F2	14206	57733	159977	14203	39119	-127503
	380C1F3	14205	53894	152503	14202	38214	-126407
	380C2F1	14207	60753	165973	14203	39842	-128444
	380C2F2	14206	57733	159977	14203	39119	-127503
	380C2F3	14205	53894	152503	14202	38214	-126407
	GW / opgw	1928	9861	25919	1928	5801	-18026
	RTG	0	0	0	3850	10562	-34530
	NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1927	5840	19620	1927	5332
380C1F1		14195	42173	145250	14194	39540	-143517
380C1F2		14195	41797	144901	14194	39439	-143493
380C1F3		14194	41323	144501	14194	39310	-143467
380C2F1		14195	42173	145250	14194	39540	-143517
380C2F2		14195	41797	144901	14194	39439	-143493
380C2F3		14194	41323	144501	14194	39310	-143467
GW / opgw		1927	5840	19620	1927	5332	-19173
RTG		0	0	0	3848	10416	-37897
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°		GW / opgw	6604	15965	48403	6603	13372
	380C1F1	22420	61752	196526	22419	53617	-188791
	380C1F2	22420	60568	195053	22419	53318	-188657
	380C1F3	22420	59082	193333	22419	52937	-188509
	380C2F1	22420	61752	196526	22419	53617	-188791
	380C2F2	22420	60568	195053	22419	53318	-188657
	380C2F3	22420	59082	193333	22419	52937	-188509
	GW / opgw	6604	15965	48403	6603	13372	-46178
	RTG	0	0	0	13222	26036	-92159
	NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2429	6191	20928	2429	5723
380C1F1		16207	41170	141501	16206	38650	-140193
380C1F2		16206	40815	141229	16206	38551	-140178
380C1F3		16206	40365	140920	16206	38425	-140163
380C2F1		16207	41170	141501	16206	38650	-140193
380C2F2		16206	40815	141229	16206	38551	-140178
380C2F3		16206	40365	140920	16206	38425	-140163
GW / opgw		2429	6191	20928	2429	5723	-20633
RTG		0	0	0	4852	11291	-41162



ZWM6HK400

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte		h		59.3	m
Diameter voet		d voet		3.2	m
top		d top		0.8	m
gem		d gem		2.0	m
wanddikte		t		30	mm
Oppervlakte aan voet		A		298765	mm ²
Traagheidsmoment aan voet		W _x		2.35E+08	mm ⁴
Weerstandsmoment aan voet		I _x		3.71E+11	mm ⁶
Mast: Gewicht		2 ^{de} orde		10.0	%
		F _{rep,ver}		864	kN

Bijlage BAZ

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	59.3	4.6	15.4	-40.8	43.6	2584	kNm
380C1F1	49.3	34.1	65.4	-193.4	204.1	10063	kNm
380C1F2	39.1	34.1	63.3	-189.8	200.1	7824	kNm
380C1F3	28.9	34.1	60.6	-185.6	195.2	5642	kNm
380C2F1	49.3	34.1	65.4	-193.4	204.1	10063	kNm
380C2F2	39.1	34.1	63.3	-189.8	200.1	7824	kNm
380C2F3	28.9	34.1	60.6	-185.6	195.2	5642	kNm
GW / opgw	59.3	4.6	15.4	-40.8	43.6	2584	kNm
RTG	23.3	4.6	25.2	-71.6	75.9	1768	kNm
Stuwdruk				F _{hor.}		34.3	kN
				M _{d,wind}		921	kNm
Totaal				M _{d,tot}		54278	kNm
Totaal moment incl. 2 ^{de} orde effect				M _{d,tot}		59706	kNm

Normaalkracht;

Optredende normaalkracht							
N _{d,geluiders}						214	kN
N _{d, e.g. mast}						1037	kN
N _{s,d,totaal}						1256	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
β_a	0.69	
A _{eff}	206440	mm ²

Optredende spanning tgv normaalkracht

N _{d,d/A_{eff} = f_{yd}/γ_{m1}}	6	N/mm ²
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Moment;

Optredende moment in de voet:			
M _{d,tot}	59706	kNm	

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

	JA	
β_a	0.99	
W _{eff}	2.32E+08	mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /γ _{m1}	263	N/mm ²
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Totale spanning:

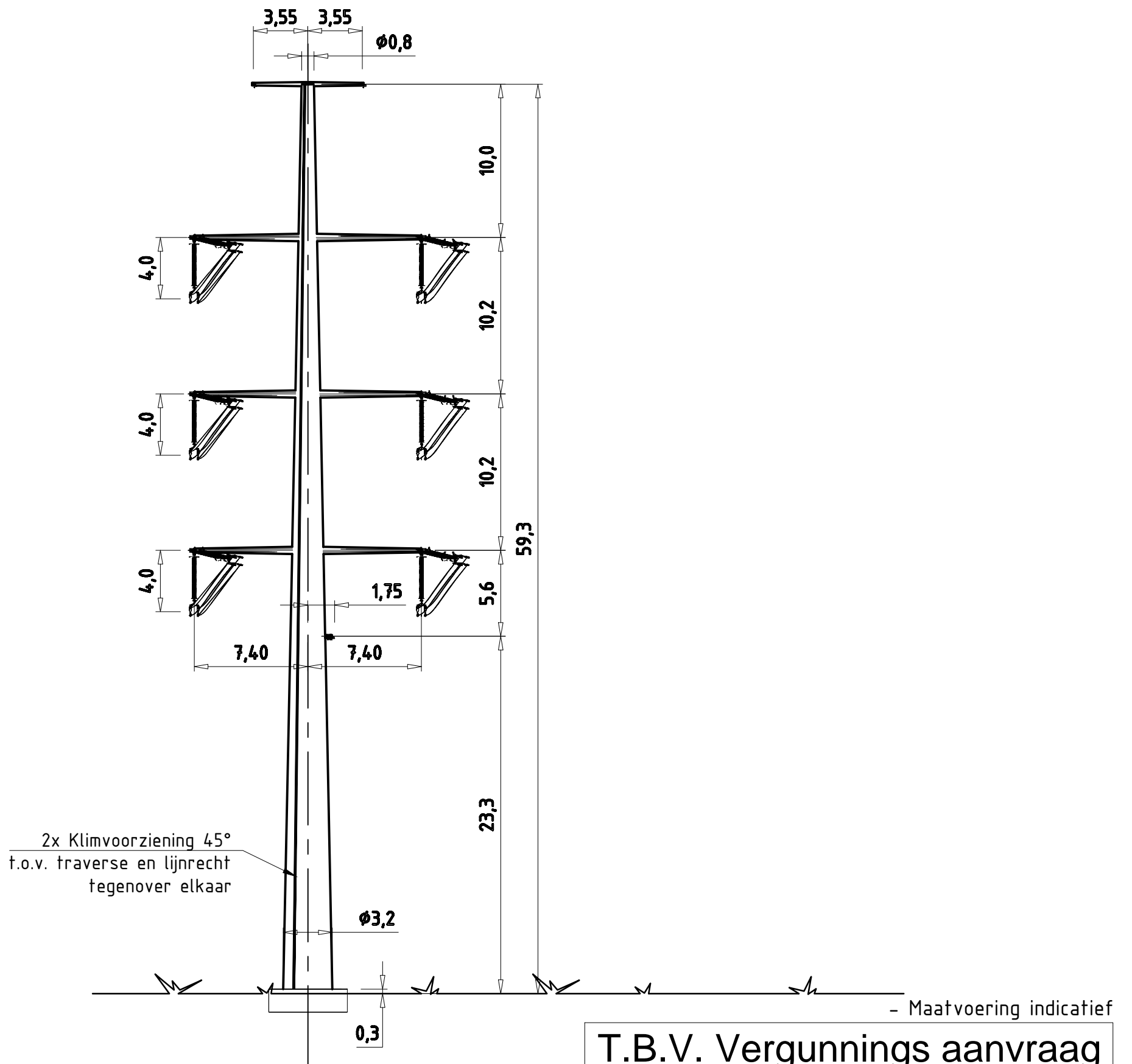
σ_d	263	N/mm ²	< 284 N/mm ² = ACCOORD
$\sigma_{d,toegestaan}$	284	N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	59.3	13.2	34.1	0.0	34.1	2024	kNm
380C1F1	49.3	44.8	130.5	0.0	130.5	6434	kNm
380C1F2	39.1	44.8	127.4	0.0	127.4	4979	kNm
380C1F3	28.9	44.8	123.4	0.0	123.4	3566	kNm
380C2F1	49.3	44.8	130.5	0.0	130.5	6434	kNm
380C2F2	39.1	44.8	127.4	0.0	127.4	4979	kNm
380C2F3	28.9	44.8	123.4	0.0	123.4	3566	kNm
GW / opgw	59.3	13.2	34.1	0.0	34.1	2024	kNm
RTG	23.3	13.2	30.5	-95.3	100.1	2332	kNm
RTG	23.3	0.0	0.0	0.0	0.0	0	kNm
Stuwdruk				F _{hor.}		276	kN

Verplaatsing	0.97	m
Percentage van de verplaatsing	1.63%	
Hoek	1.72	graden
Kromming	0.35%	
Fundatie rotatiestijfheid	0.005	rad

3.26	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341



Wintrack
Masttype: ZWM6HK400

- Trekparameter 1800m
- 2x380 Hoekmast
- 400m Veldlengte
- 150°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement: Ral 9018 Papyrus white
- Kleurstelling Appendages: Ral 7021 Black grey

4.0	05-06-2014	Edit post in bretel
3.0	04-03-2014	Small modification
2.0	29-01-2014	Modification top traverse length
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection:
Drawn by: RBE 05-06-2014	Scale: 1:300	Drawing no.: 74102194-035-171V
Checked by: AJP 05-06-2014	Units: m	Description: Wintrack Masttype ZWM6HK400
Approved by: AW 05-06-2014	Project no: 000.145 Company: TenneT	
		Revision: 4.0
		Format: A3

ZWM6S350

Fundatie berekening

Bijlage CBB

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p, gem}$	1,6	m

schoorstand		8	:1
α		7,125	graden

Opstort	Diameter	3,8	m
	Hoogte	1,8	m
	Inhoud	20,4	m ³
	e.g.	490	kN

Onderplaat	Diameter	9,0	m
	Hoogte	1,0	m
	Inhoud	64	m ³
	e.g.	1527	kN

Hart paal tov rand fund.		0,6	m
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Optreden krachten

e.g. mast		397	kN
Fgeleiders		195	kN
Maximale dwarskracht		563	kN
Fmax vert (druk)		672	kN
Fmin vert (trek)		504	kN
Maximale moment		20832	kNm

Moment

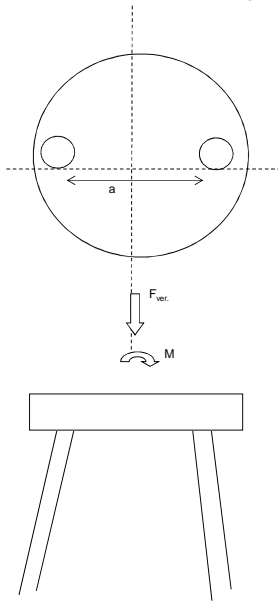
F_{drag}		2895	kN
F_{hor}		563	kN
F_{ver}		2873	kN
M_{hor} (tgv F_{hor})		1577	kNm
M_{tot}		22409	kNm
$F=M/a$		2873	kN

Verticaal reactiekracht

F_{water} (trek)		840	kN
F_{grond} (druk)		1411	kN
F_{grond} (trek)		1176	kN
F_{dmax} (druk)		2393	kN
F_{tmax} (trek)		1184	kN
F_{dtot} (druk)		5266	kN
F_{ttot} (trek)		1689	kN

Palen druk	5	(-)
Palen trek	6	(-)

Totaal palen	12	(-)	Per fundering
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reductie door opwaarste kracht water



ZWM6S350

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r,trek;d} = \int_0^L O_{p;gem} \times p_{r,z;d} \times dz$$

Bijlage CBB

Bepaling opneembare paalbelasting op druk

heipaal

Afmeting paal	b	0,40 m
	b	0,40 m
omtrek paal	O _{p;gem}	1,60 m

paalfactor	α t	0,007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0,75

conusweerstand over wrijvingstraject q_{c,z,max} 15 MPa

q_{c,z,rep} 11,25 MPa

materiaalfactor γ_{m,b4} 1,4

factor, wisselende belastingen γ_{m,var,qe} 1,5

q_{c,z,d} 5,36 MPa

p_{r,z,d} 37,5 kN/m²

F_{r,trek;d,i} 60,0 kN/m¹

F_{trek,d} 596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		q _{c,z}		P _{r,max,z} (schacht)	F _{r,trek;d,i}	F _{trek,d}
	m	m	MPa	α t			
	0	-1	0	0,007	0,00	0,00	0
	-1	-2	0	0,007	0,00	0,00	0
	-2	-3	0	0,007	0,00	0,00	0
	-3	-4	0	0,007	0,00	0,00	0
	-4	-5	0	0,007	0,00	0,00	0
	-5	-6	0	0,007	0,00	0,00	0
	-6	-7	0	0,007	0,00	0,00	0
	-7	-8	0	0,007	0,00	0,00	0
	-8	-9	1	0,007	2,50	4,00	4
	-9	-10	3	0,007	7,50	12,00	16
	-10	-11	2	0,007	5,00	8,00	24
	-11	-12	0	0,007	0,00	0,00	24
	-12	-13	3	0,007	7,50	12,00	36
	-13	-14	2	0,007	5,00	8,00	44
	-14	-15	4	0,007	10,00	16,00	60
	-15	-16	10	0,007	25,00	40,00	100
	-16	-17	9	0,007	22,50	36,00	136
	-17	-18	8	0,007	20,00	32,00	168
	-18	-19	12	0,007	30,00	48,00	216
	-19	-20	12	0,007	30,00	48,00	264
	-20	-21	10	0,007	25,00	40,00	304
	-21	-22	11	0,007	27,50	44,00	348
	-22	-23	11	0,007	27,50	44,00	392
	-23	-24	12	0,007	30,00	48,00	440
	-24	-25	12	0,007	30,00	48,00	488
	-25	-26	12	0,007	30,00	48,00	536
	-26	-27	15	0,007	37,50	60,00	596

F _{trek,d}	596 kN	paalafmeting	400 mm, paalpuntivo	-27,00 m
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Paalgroep factor 10%

F _{trek,d}	536,4 kN
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ZWM6S350

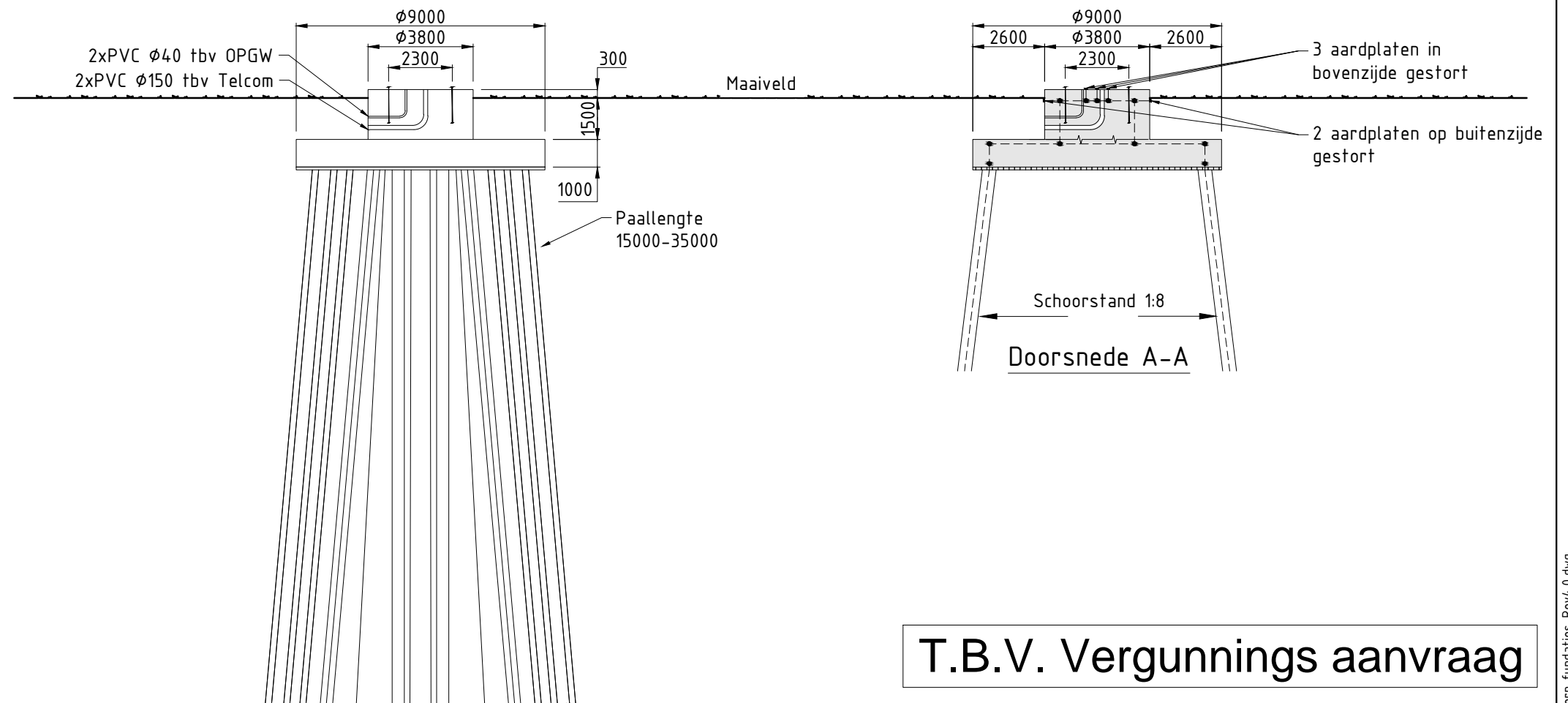
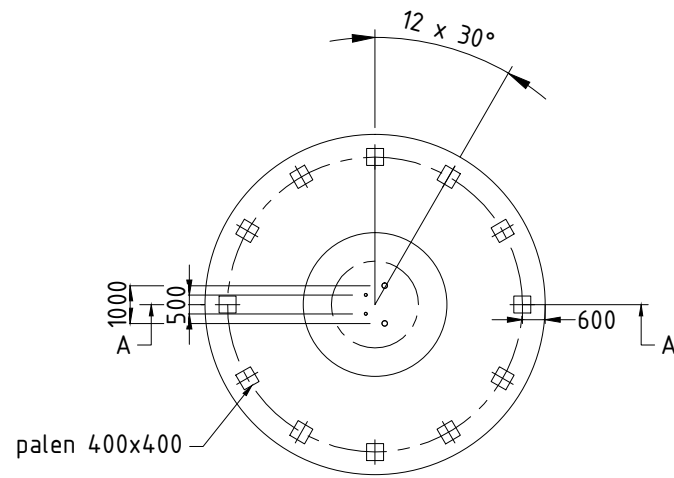
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CBB

Bepaling opneembare paalbelasting op druk

heipaal	diameter	v a	2 mm 2 mm
	Deq		0,001808
maximale puntweerstand			
$P_{r,max,punt}$			11,25 MN/m ²
paalklasse factor	α_p		1,00
factor paalvoet	β		1
hoek van inwendige vrijwing van paalvoet	ϕ		40
factor dwarsdoorsnede paalvoet	s		1,00
minimale waarde neergaande deel	$q_{c,lgem}$		9,00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,lgem}$		14,00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,lgem}$		11,00 MN/m ²
maximale paalschachtwrijving			
$P_{r,max,schacht}$			0,05 MN/m ²
waarin:			
paalfactor	α_s		0,010
conusweerstand over wrijvingstraject	$q_{c,z,a}$		5,00 MN/m ²
maximale draagkracht alleenstaande paal			
$F_{r,max}$			0,00 MN
waarin:			
$F_{r,max,punt}$			0,00 MN
paalpunt oppervlak	A_{punt}		0,00 m ²
$F_{r,max,schacht}$			0,00 MN
gemiddelde paalomtrek	$O_{p,lgem}$		0,01 m
lengte schachtwrijving	Δl		15,00 m
Bepaling rekenwaarde van de maximale draagkracht			
$F_{r,paal,max,d}$		MN	0,00 MN
materiaalfactor grond			
waarde afhankelijk van aantal palen en aantal sonderingen	γ_{mb} $\xi_{1,N}$		1,20 0,75
$F_{r,paal,max,d}$	3 kN	mm, paalpuntivo	-27,00 m



T.B.V. Vergunnings aanvraag

Verklaring

- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding $\phi 16\text{mm}$ (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

4.0	13-03-2014	Diverse aanpassingen
3.0	13-02-2014	Diverse aanpassingen
2.0	26-07-2013	Diverse aanpassingen

		Projectname: Engineering verbindingen ZW380	
		Drawing no.: 74102194-032-181V	
Design state: Definitief		Scale: 1:200	
Drawn by: RBE 13-03-2014		Units: mm	
Checked by: AJP 13-03-2014		Project no: 000.145	
Approved by: AW 13-03-2014		Company: TenneT	
Description: Principe ontwerp fundatie steunmast ZWM6S350 masten familie			Revision: 4.0
			Format: A3

ZWM6S350

Appendix BB / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2023	883	20006	2023	883	-20006
Wind, 10°C	380C1F1	14907	6465	146903	14907	6465	-146903
Permanent loads yg= 1.2	380C1F2	14907	6461	146903	14907	6461	-146903
	380C1F3	14907	6455	146903	14907	6455	-146903
Wind angle: 0°	380C2F1	14907	6465	146903	14907	6465	-146903
	380C2F2	14907	6461	146903	14907	6461	-146903
	380C2F3	14907	6455	146903	14907	6455	-146903
	RTG	4041	1758	39969	4041	1758	-39969
NL1/1b	GW / opgw	2022	1014	23186	2022	1014	-23186
Wind, -20°C	380C1F1	14900	7566	173044	14900	7566	-173044
Permanent loads yg= 1.2	380C1F2	14900	7565	173044	14900	7565	-173044
	380C1F3	14900	7564	173044	14900	7564	-173044
Wind angle: 0°	380C2F1	14900	7566	173044	14900	7566	-173044
	380C2F2	14900	7565	173044	14900	7565	-173044
	380C2F3	14900	7564	173044	14900	7564	-173044
	RTG	4039	2005	45870	4039	2005	-45870
NL1/3	GW / opgw	8159	2593	59181	8159	2593	-59181
Wind, -5°C	380C1F1	25690	10297	235183	25690	10297	-235183
Permanent loads yg= 1.2	380C1F2	25690	10295	235183	25690	10295	-235183
	380C1F3	25690	10291	235183	25690	10291	-235183
Wind angle: 0°	380C2F1	25690	10297	235183	25690	10297	-235183
	380C2F2	25690	10295	235183	25690	10295	-235183
	380C2F3	25690	10291	235183	25690	10291	-235183
	RTG	16341	5187	118498	16341	5187	-118498
NL1/4	GW / opgw	2775	1142	26120	2775	1142	-26120
Construction/maintenance, +5°C	380C1F1	17913	7568	173095	17913	7568	-173095
Permanent loads yg= 1.2	380C1F2	17913	7567	173095	17913	7567	-173095
	380C1F3	17913	7566	173095	17913	7566	-173095
Wind angle: 0°	380C2F1	17913	7568	173095	17913	7568	-173095
	380C2F2	17913	7567	173095	17913	7567	-173095
	380C2F3	17913	7566	173095	17913	7566	-173095
	RTG	5544	2280	52168	5544	2280	-52168
NL1/6	GW / opgw	2276	959	21955	2276	959	-21955
Permanent, +10°C	380C1F1	16772	7024	160876	16772	7024	-160876
Permanent loads yg= 1.35	380C1F2	16772	7024	160876	16772	7024	-160876
	380C1F3	16772	7024	160876	16772	7024	-160876
	380C2F1	16772	7024	160876	16772	7024	-160876
	380C2F2	16772	7024	160876	16772	7024	-160876
	380C2F3	16772	7024	160876	16772	7024	-160876
	RTG	4546	1916	43873	4546	1916	-43873
NL1/1a	GW / opgw	2024	3391	27071	2024	3909	-29272
Wind, 10°C	380C1F1	14910	20160	178916	14911	22996	-189826
Permanent loads yg= 1.2	380C1F2	14910	18918	174373	14911	21497	-183979
	380C1F3	14909	17320	168803	14910	19566	-176723
Wind angle: 45°	380C2F1	14910	20160	178916	14911	22996	-189826
	380C2F2	14910	18918	174373	14911	21497	-183979
	380C2F3	14909	17320	168803	14910	19566	-176723
	RTG	4041	5158	47701	4041	5863	-50407
NL1/1b	GW / opgw	2022	1470	23553	2022	1561	-23707
Wind, -20°C	380C1F1	14900	10088	174528	14900	10587	-175165
Permanent loads yg= 1.2	380C1F2	14900	9869	174281	14900	10324	-174816
	380C1F3	14900	9586	173994	14900	9983	-174408
Wind angle: 45°	380C2F1	14900	10088	174528	14900	10587	-175165
	380C2F2	14900	9869	174281	14900	10324	-174816
	380C2F3	14900	9586	173994	14900	9983	-174408
	RTG	4039	2633	46222	4039	2757	-46373
NL1/3	GW / opgw	8160	4919	60657	8160	5379	-61274
Wind, -5°C	380C1F1	25691	17411	240781	25692	18830	-243112
Permanent loads yg= 1.2	380C1F2	25691	16788	239870	25691	18080	-241837
	380C1F3	25691	15985	238802	25691	17114	-240336
Wind angle: 45°	380C2F1	25691	17411	240781	25692	18830	-243112
	380C2F2	25691	16788	239870	25691	18080	-241837
	380C2F3	25691	15985	238802	25691	17114	-240336
	RTG	16342	8387	119900	16342	9015	-120507
NL1/4	GW / opgw	2775	1592	26351	2775	1681	-26451
Construction/maintenance, +5°C	380C1F1	17913	10076	174215	17913	10569	-174703
Permanent loads yg= 1.2	380C1F2	17913	9859	174027	17913	10308	-174435
	380C1F3	17913	9578	173807	17913	9972	-174123
Wind angle: 45°	380C2F1	17913	10076	174215	17913	10569	-174703
	380C2F2	17913	9859	174027	17913	10308	-174435
	380C2F3	17913	9578	173807	17913	9972	-174123
	RTG	5544	2902	52386	5544	3024	-52482

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2025	6632	41213	2025	6632	-41213
	380C1F1	14918	38072	253186	14918	38072	-253186
	380C1F2	14916	35261	241123	14916	35261	-241123
	380C1F3	14915	31614	225530	14915	31614	-225530
	380C2F1	14918	38072	253186	14918	38072	-253186
	380C2F2	14916	35261	241123	14916	35261	-241123
	380C2F3	14915	31614	225530	14915	31614	-225530
	RTG	4043	9632	66522	4043	9632	-66522
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2022	2052	24892	2022	2052	-24892
	380C1F1	14900	13264	180176	14900	13264	-180176
	380C1F2	14900	12758	179044	14900	12758	-179044
	380C1F3	14900	12108	177706	14900	12108	-177706
	380C2F1	14900	13264	180176	14900	13264	-180176
	380C2F2	14900	12758	179044	14900	12758	-179044
	380C2F3	14900	12108	177706	14900	12108	-177706
	RTG	4039	3421	47572	4039	3421	-47572
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	8162	7843	65892	8162	7843	-65892
	380C1F1	25695	26466	260608	25695	26466	-260608
	380C1F2	25694	25023	256771	25694	25023	-256771
	380C1F3	25693	23166	252157	25693	23166	-252157
	380C2F1	25695	26466	260608	25695	26466	-260608
	380C2F2	25694	25023	256771	25694	25023	-256771
	380C2F3	25693	23166	252157	25693	23166	-252157
	RTG	16344	12361	125246	16344	12361	-125246
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2775	2155	27239	2775	2155	-27239
	380C1F1	17914	13198	178597	17914	13198	-178597
	380C1F2	17914	12703	177710	17914	12703	-177710
	380C1F3	17914	12065	176668	17914	12065	-176668
	380C2F1	17914	13198	178597	17914	13198	-178597
	380C2F2	17914	12703	177710	17914	12703	-177710
	380C2F3	17914	12065	176668	17914	12065	-176668
	RTG	5544	3670	53262	5544	3670	-53262
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2024	3909	29272	2024	3391	-27071
	380C1F1	14911	22996	189826	14910	20160	-178916
	380C1F2	14911	21497	183979	14910	18918	-174373
	380C1F3	14910	19566	176723	14909	17320	-168803
	380C2F1	14911	22996	189826	14910	20160	-178916
	380C2F2	14911	21497	183979	14910	18918	-174373
	380C2F3	14910	19566	176723	14909	17320	-168803
	RTG	4041	5863	50407	4041	5158	-47701
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2022	1561	23707	2022	1470	-23553
	380C1F1	14900	10587	175165	14900	10088	-174528
	380C1F2	14900	10324	174816	14900	9869	-174281
	380C1F3	14900	9983	174408	14900	9586	-173994
	380C2F1	14900	10587	175165	14900	10088	-174528
	380C2F2	14900	10324	174816	14900	9869	-174281
	380C2F3	14900	9983	174408	14900	9586	-173994
	RTG	4039	2757	46373	4039	2633	-46222
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	8160	5379	61274	8160	4919	-60657
	380C1F1	25692	18830	243112	25691	17411	-240781
	380C1F2	25691	18080	241837	25691	16788	-239870
	380C1F3	25691	17114	240336	25691	15985	-238802
	380C2F1	25692	18830	243112	25691	17411	-240781
	380C2F2	25691	18080	241837	25691	16788	-239870
	380C2F3	25691	17114	240336	25691	15985	-238802
	RTG	16342	9015	120507	16342	8387	-119900
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2775	1681	26451	2775	1592	-26351
	380C1F1	17913	10569	174703	17913	10076	-174215
	380C1F2	17913	10308	174435	17913	9859	-174027
	380C1F3	17913	9972	174123	17913	9578	-173807
	380C2F1	17913	10569	174703	17913	10076	-174215
	380C2F2	17913	10308	174435	17913	9859	-174027
	380C2F3	17913	9972	174123	17913	9578	-173807
	RTG	5544	3024	52482	5544	2902	-52386
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1517	703	15884	1517	703	-15884
	380C1F1	11178	5172	117275	11178	5172	-117275
	380C1F2	11178	5167	117275	11178	5167	-117275
	380C1F3	11178	5162	117275	11178	5162	-117275
	380C2F1	11178	5172	117275	11178	5172	-117275
	380C2F2	11178	5167	117275	11178	5167	-117275
	380C2F3	11178	5162	117275	11178	5162	-117275
	RTG	3030	1398	31716	3030	1398	-31716

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1516	826	18875	1516	826	-18875
	380C1F1	11172	6225	142343	11172	6225	-142343
	380C1F2	11172	6224	142343	11172	6224	-142343
	380C1F3	11172	6223	142343	11172	6223	-142343
	380C2F1	11172	6225	142343	11172	6225	-142343
	380C2F2	11172	6224	142343	11172	6224	-142343
	380C2F3	11172	6223	142343	11172	6223	-142343
	RTG	3029	1629	37244	3029	1629	-37244
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	7652	2479	56560	7652	2479	-56560
	380C1F1	21959	9207	210225	21959	9207	-210225
	380C1F2	21959	9205	210225	21959	9205	-210225
	380C1F3	21959	9202	210225	21959	9202	-210225
	380C2F1	21959	9207	210225	21959	9207	-210225
	380C2F2	21959	9205	210225	21959	9205	-210225
	380C2F3	21959	9202	210225	21959	9202	-210225
	RTG	15328	4958	113249	15328	4958	-113249
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2269	979	22373	2269	979	-22373
	380C1F1	14184	6343	145048	14184	6343	-145048
	380C1F2	14184	6342	145048	14184	6342	-145048
	380C1F3	14184	6341	145048	14184	6341	-145048
	380C2F1	14184	6343	145048	14184	6343	-145048
	380C2F2	14184	6342	145048	14184	6342	-145048
	380C2F3	14184	6341	145048	14184	6341	-145048
	RTG	4533	1953	44666	4533	1953	-44666
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1517	694	15884	1517	694	-15884
	380C1F1	11178	5120	117276	11178	5120	-117276
	380C1F2	11178	5120	117276	11178	5120	-117276
	380C1F3	11178	5120	117276	11178	5120	-117276
	380C2F1	11178	5120	117276	11178	5120	-117276
	380C2F2	11178	5120	117276	11178	5120	-117276
	380C2F3	11178	5120	117276	11178	5120	-117276
	RTG	3030	1385	31716	3030	1385	-31716
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1518	3292	24827	1518	3824	-27336
	380C1F1	11181	19308	159431	11182	22238	-172505
	380C1F2	11181	18021	153849	11182	20691	-165550
	380C1F3	11180	16361	146871	11181	18693	-156747
	380C2F1	11181	19308	159431	11182	22238	-172505
	380C2F2	11181	18021	153849	11182	20691	-165550
	380C2F3	11180	16361	146871	11181	18693	-156747
	RTG	3031	4907	41972	3031	5638	-45259
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1516	1289	19414	1516	1383	-19636
	380C1F1	11173	8779	144555	11173	9291	-145483
	380C1F2	11173	8555	144194	11173	9020	-144975
	380C1F3	11173	8266	143771	11173	8672	-144379
	380C2F1	11173	8779	144555	11173	9291	-145483
	380C2F2	11173	8555	144194	11173	9020	-144975
	380C2F3	11173	8266	143771	11173	8672	-144379
	RTG	3029	2264	37768	3029	2391	-37989
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	7653	4810	58170	7653	5273	-58839
	380C1F1	21960	16377	217126	21960	17818	-219954
	380C1F2	21960	15746	216016	21960	17056	-218410
	380C1F3	21960	14932	214710	21960	16075	-216585
	380C2F1	21960	16377	217126	21960	17818	-219954
	380C2F2	21960	15746	216016	21960	17056	-218410
	380C2F3	21960	14932	214710	21960	16075	-216585
	RTG	15328	8163	114784	15329	8793	-115445
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2269	1432	22678	2269	1522	-22808
	380C1F1	14184	8870	146600	14184	9370	-147264
	380C1F2	14184	8650	146342	14184	9106	-146899
	380C1F3	14184	8366	146042	14184	8765	-146474
	380C2F1	14184	8870	146600	14184	9370	-147264
	380C2F2	14184	8650	146342	14184	9106	-146899
	380C2F3	14184	8366	146042	14184	8765	-146474
	RTG	4533	2578	44956	4533	2701	-45082
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1519	6587	40184	1519	6587	-40184
	380C1F1	11188	37635	243221	11188	37635	-243221
	380C1F2	11187	34782	230194	11187	34782	-230194
	380C1F3	11185	31070	213121	11185	31070	-213121
	380C2F1	11188	37635	243221	11188	37635	-243221
	380C2F2	11187	34782	230194	11187	34782	-230194
	380C2F3	11185	31070	213121	11185	31070	-213121
	RTG	3032	9497	63461	3032	9497	-63461

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1517	1894	21275	1517	1894	-21275
	380C1F1	11173	12059	152600	11173	12059	-152600
	380C1F2	11173	11534	151018	11173	11534	-151018
	380C1F3	11173	10859	149130	11173	10859	-149130
	380C2F1	11173	12059	152600	11173	12059	-152600
	380C2F2	11173	11534	151018	11173	11534	-151018
	380C2F3	11173	10859	149130	11173	10859	-149130
	RTG	3029	3077	39697	3029	3077	-39697
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	7654	7750	63790	7654	7750	-63790
	380C1F1	21963	25593	240665	21963	25593	-240665
	380C1F2	21963	24123	236189	21963	24123	-236189
	380C1F3	21962	22230	230761	21962	22230	-230761
	380C2F1	21963	25593	240665	21963	25593	-240665
	380C2F2	21963	24123	236189	21963	24123	-236189
	380C2F3	21962	22230	230761	21962	22230	-230761
	RTG	15330	12156	120568	15330	12156	-120568
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2269	2006	23815	2269	2006	-23815
	380C1F1	14184	12056	152473	14184	12056	-152473
	380C1F2	14184	11549	151298	14184	11549	-151298
	380C1F3	14184	10896	149908	14184	10896	-149908
	380C2F1	14184	12056	152473	14184	12056	-152473
	380C2F2	14184	11549	151298	14184	11549	-151298
	380C2F3	14184	10896	149908	14184	10896	-149908
	RTG	4533	3357	46090	4533	3357	-46090
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1518	3824	27336	1518	3292	-24827
	380C1F1	11182	22238	172505	11181	19308	-159431
	380C1F2	11182	20691	165550	11181	18021	-153849
	380C1F3	11181	18693	156747	11180	16361	-146871
	380C2F1	11182	22238	172505	11181	19308	-159431
	380C2F2	11182	20691	165550	11181	18021	-153849
	380C2F3	11181	18693	156747	11180	16361	-146871
	RTG	3031	5638	45259	3031	4907	-41972
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1516	1383	19636	1516	1289	-19414
	380C1F1	11173	9291	145483	11173	8779	-144555
	380C1F2	11173	9020	144975	11173	8555	-144194
	380C1F3	11173	8672	144379	11173	8266	-143771
	380C2F1	11173	9291	145483	11173	8779	-144555
	380C2F2	11173	9020	144975	11173	8555	-144194
	380C2F3	11173	8672	144379	11173	8266	-143771
	RTG	3029	2391	37989	3029	2264	-37768
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	7653	5273	58839	7653	4810	-58170
	380C1F1	21960	17818	219954	21960	16377	-217126
	380C1F2	21960	17056	218410	21960	15746	-216016
	380C1F3	21960	16075	216585	21960	14932	-214710
	380C2F1	21960	17818	219954	21960	16377	-217126
	380C2F2	21960	17056	218410	21960	15746	-216016
	380C2F3	21960	16075	216585	21960	14932	-214710
	RTG	15329	8793	115445	15328	8163	-114784
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2269	1522	22808	2269	1432	-22678
	380C1F1	14184	9370	147264	14184	8870	-146600
	380C1F2	14184	9106	146899	14184	8650	-146342
	380C1F3	14184	8765	146474	14184	8366	-146042
	380C2F1	14184	9370	147264	14184	8870	-146600
	380C2F2	14184	9106	146899	14184	8650	-146342
	380C2F3	14184	8765	146474	14184	8366	-146042
	RTG	4533	2701	45082	4533	2578	-44956

ZWM6S350

Appendix BB2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1686	761	17296	1686	761	-17296
	380C1F1	12421	5598	127433	12421	5598	-127433
	380C1F2	12421	5595	127433	12421	5595	-127433
	380C1F3	12421	5591	127433	12421	5591	-127433
	380C2F1	12421	5598	127433	12421	5598	-127433
	380C2F2	12421	5595	127433	12421	5595	-127433
	380C2F3	12421	5591	127433	12421	5591	-127433
	RTG	3367	1517	34541	3367	1517	-34541
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1685	890	20358	1685	890	-20358
	380C1F1	12415	6683	152909	12415	6683	-152909
	380C1F2	12415	6682	152909	12415	6682	-152909
	380C1F3	12415	6682	152909	12415	6682	-152909
	380C2F1	12415	6683	152909	12415	6683	-152909
	380C2F2	12415	6682	152909	12415	6682	-152909
	380C2F3	12415	6682	152909	12415	6682	-152909
	RTG	3365	1757	40210	3365	1757	-40210
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	5774	2028	46309	5774	2028	-46309
	380C1F1	19606	8480	193777	19606	8480	-193777
	380C1F2	19606	8478	193777	19606	8478	-193777
	380C1F3	19606	8476	193777	19606	8476	-193777
	380C2F1	19606	8480	193777	19606	8480	-193777
	380C2F2	19606	8478	193777	19606	8478	-193777
	380C2F3	19606	8476	193777	19606	8476	-193777
	RTG	11562	4053	92635	11562	4053	-92635
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	2187	951	21745	2187	951	-21745
	380C1F1	14424	6422	146922	14424	6422	-146922
	380C1F2	14424	6421	146922	14424	6421	-146922
	380C1F3	14424	6420	146922	14424	6420	-146922
	380C2F1	14424	6422	146922	14424	6422	-146922
	380C2F2	14424	6421	146922	14424	6421	-146922
	380C2F3	14424	6420	146922	14424	6420	-146922
	RTG	4369	1897	43401	4369	1897	-43401
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1686	2415	21596	1686	2759	-23042
	380C1F1	12422	14626	146473	12423	16499	-153373
	380C1F2	12422	13807	143653	12423	15508	-149653
	380C1F3	12422	12755	140243	12422	14234	-145108
	380C2F1	12422	14626	146473	12423	16499	-153373
	380C2F2	12422	13807	143653	12423	15508	-149653
	380C2F3	12422	12755	140243	12422	14234	-145108
	RTG	3367	3756	39094	3367	4222	-40779
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1685	1192	20565	1685	1252	-20653
	380C1F1	12415	8358	153743	12415	8688	-154104
	380C1F2	12415	8213	153603	12415	8513	-153906
	380C1F3	12415	8025	153440	12415	8288	-153674
	380C2F1	12415	8358	153743	12415	8688	-154104
	380C2F2	12415	8213	153603	12415	8513	-153906
	380C2F3	12415	8025	153440	12415	8288	-153674
	RTG	3365	2174	40407	3365	2256	-40493
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	5774	3580	47353	5774	3888	-47790
	380C1F1	19607	13214	197347	19607	14157	-198847
	380C1F2	19607	12800	196763	19607	13659	-198026
	380C1F3	19607	12266	196079	19607	13016	-197062
	380C2F1	19607	13214	197347	19607	14157	-198847
	380C2F2	19607	12800	196763	19607	13659	-198026
	380C2F3	19607	12266	196079	19607	13016	-197062
	RTG	11562	6188	93627	11562	6607	-94056
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	2187	1250	21884	2187	1309	-21944
	380C1F1	14424	8089	147575	14424	8416	-147863
	380C1F2	14424	7945	147465	14424	8244	-147705
	380C1F3	14424	7759	147336	14424	8021	-147521
	380C2F1	14424	8089	147575	14424	8416	-147863
	380C2F2	14424	7945	147465	14424	8244	-147705
	380C2F3	14424	7759	147336	14424	8021	-147521
	RTG	4369	2311	43532	4369	2391	-43590
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1687	4589	31351	1687	4589	-31351
	380C1F1	12427	26563	196022	12427	26563	-196022
	380C1F2	12426	24675	187644	12426	24675	-187644
	380C1F3	12425	22233	176967	12425	22233	-176967
	380C2F1	12427	26563	196022	12427	26563	-196022
	380C2F2	12426	24675	187644	12426	24675	-187644
	380C2F3	12425	22233	176967	12425	22233	-176967
	RTG	3368	6730	51463	3368	6730	-51463

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1685	1575	21343	1685	1575	-21343
	380C1F1	12415	10452	156989	12415	10452	-156989
	380C1F2	12415	10119	156331	12415	10119	-156331
	380C1F3	12415	9691	155559	12415	9691	-155559
	380C2F1	12415	10452	156989	12415	10452	-156989
	380C2F2	12415	10119	156331	12415	10119	-156331
	380C2F3	12415	9691	155559	12415	9691	-155559
	RTG	3365	2694	41180	3365	2694	-41180
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	5775	5539	51088	5775	5539	-51088
	380C1F1	19609	19236	210291	19609	19236	-210291
	380C1F2	19608	18276	207754	19608	18276	-207754
	380C1F3	19608	17040	204723	19608	17040	-204723
	380C2F1	19609	19236	210291	19609	19236	-210291
	380C2F2	19608	18276	207754	19608	18276	-207754
	380C2F3	19608	17040	204723	19608	17040	-204723
	RTG	11563	8846	97418	11563	8846	-97418
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	2187	1623	22428	2187	1623	-22428
	380C1F1	14425	10156	150180	14425	10156	-150180
	380C1F2	14424	9829	149649	14424	9829	-149649
	380C1F3	14424	9407	149028	14424	9407	-149028
	380C2F1	14425	10156	150180	14425	10156	-150180
	380C2F2	14424	9829	149649	14424	9829	-149649
	380C2F3	14424	9407	149028	14424	9407	-149028
	RTG	4369	2820	44064	4369	2820	-44064
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1686	2759	23042	1686	2415	-21596
	380C1F1	12423	16499	153373	12422	14626	-146473
	380C1F2	12423	15508	149653	12422	13807	-143653
	380C1F3	12422	14234	145108	12422	12755	-140243
	380C2F1	12423	16499	153373	12422	14626	-146473
	380C2F2	12423	15508	149653	12422	13807	-143653
	380C2F3	12422	14234	145108	12422	12755	-140243
	RTG	3367	4222	40779	3367	3756	-39094
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1685	1252	20653	1685	1192	-20565
	380C1F1	12415	8688	154104	12415	8358	-153743
	380C1F2	12415	8513	153906	12415	8213	-153603
	380C1F3	12415	8288	153674	12415	8025	-153440
	380C2F1	12415	8688	154104	12415	8358	-153743
	380C2F2	12415	8513	153906	12415	8213	-153603
	380C2F3	12415	8288	153674	12415	8025	-153440
	RTG	3365	2256	40493	3365	2174	-40407
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	5774	3888	47790	5774	3580	-47353
	380C1F1	19607	14157	198847	19607	13214	-197347
	380C1F2	19607	13659	198026	19607	12800	-196763
	380C1F3	19607	13016	197062	19607	12266	-196079
	380C2F1	19607	14157	198847	19607	13214	-197347
	380C2F2	19607	13659	198026	19607	12800	-196763
	380C2F3	19607	13016	197062	19607	12266	-196079
	RTG	11562	6607	94056	11562	6188	-93627
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	2187	1309	21944	2187	1250	-21884
	380C1F1	14424	8416	147863	14424	8089	-147575
	380C1F2	14424	8244	147705	14424	7945	-147465
	380C1F3	14424	8021	147521	14424	7759	-147336
	380C2F1	14424	8416	147863	14424	8089	-147575
	380C2F2	14424	8244	147705	14424	7945	-147465
	380C2F3	14424	8021	147521	14424	7759	-147336
	RTG	4369	2391	43590	4369	2311	-43532



ZWM6S350

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category				O	
Hoogte			h	53.3	m
Diameter voet			d voet	2.3	m
top			d top	0.8	m
gem			d gem	1.6	m
wanddikte			t	20	mm
Oppervlakte aan voet			A	143257	mm ²
Traagheidsmoment aan voet			W _x	8.10E+07	mm ⁴
Weerstandsmoment aan voet			I _x	9.22E+10	mm ⁶
Mast: Gewicht			2 ^{de} orde F _{rep,ver}	10.0	%
				397	kN

Bijlage BBB

Ultimate limit state	hoogte	F _{ver}	F _{tloodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	52.6	4.1	13.3	0.0	13.3	698	kNm
380C1F1	43.8	29.8	76.1	0.0	76.1	3335	kNm
380C1F2	34.8	29.8	70.5	0.0	70.5	2454	kNm
380C1F3	25.8	29.8	63.2	0.0	63.2	1631	kNm
380C2F1	43.8	29.8	76.1	0.0	76.1	3335	kNm
380C2F2	34.8	29.8	70.5	0.0	70.5	2454	kNm
380C2F3	25.8	29.8	63.2	0.0	63.2	1631	kNm
RTG	21.6	8.1	19.3	0.0	19.3	416	kNm
GW / opgw	52.6	4.1	13.3	0.0	13.3	698	kNm
Stuwdruk					F _{hor.}	23.3	kN
					M _{d,wind}	579	kNm
Totaal					M _{d,tot}	18939	kNm
Totaal moment incl. 2 ^{de} orde effect					M _{d,tot}	20832	kNm

Normaalkracht;

Optredende normaalkracht							
N _{d,geluiders}						191	kN
N _{d, e.g. mast}						476	kN
N _{s,d,totaal}						672	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

						JA	
						0.66	
Optredende spanning tgv normaalkracht						A _{eff}	94928 mm ²
N _d /A _{eff} = f _{yd} /γ _{m1}							7 N/mm ²

Moment;

Optredende moment in de voet:							
M _{d,tot}						20832	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

						JA	
						0.96	
Optredende spanning tgv moment:						W _{eff}	7.79E+07 mm ³
M _d /W _{eff} = f _{yd} /γ _{m1}							267 N/mm ²

Totale spanning:

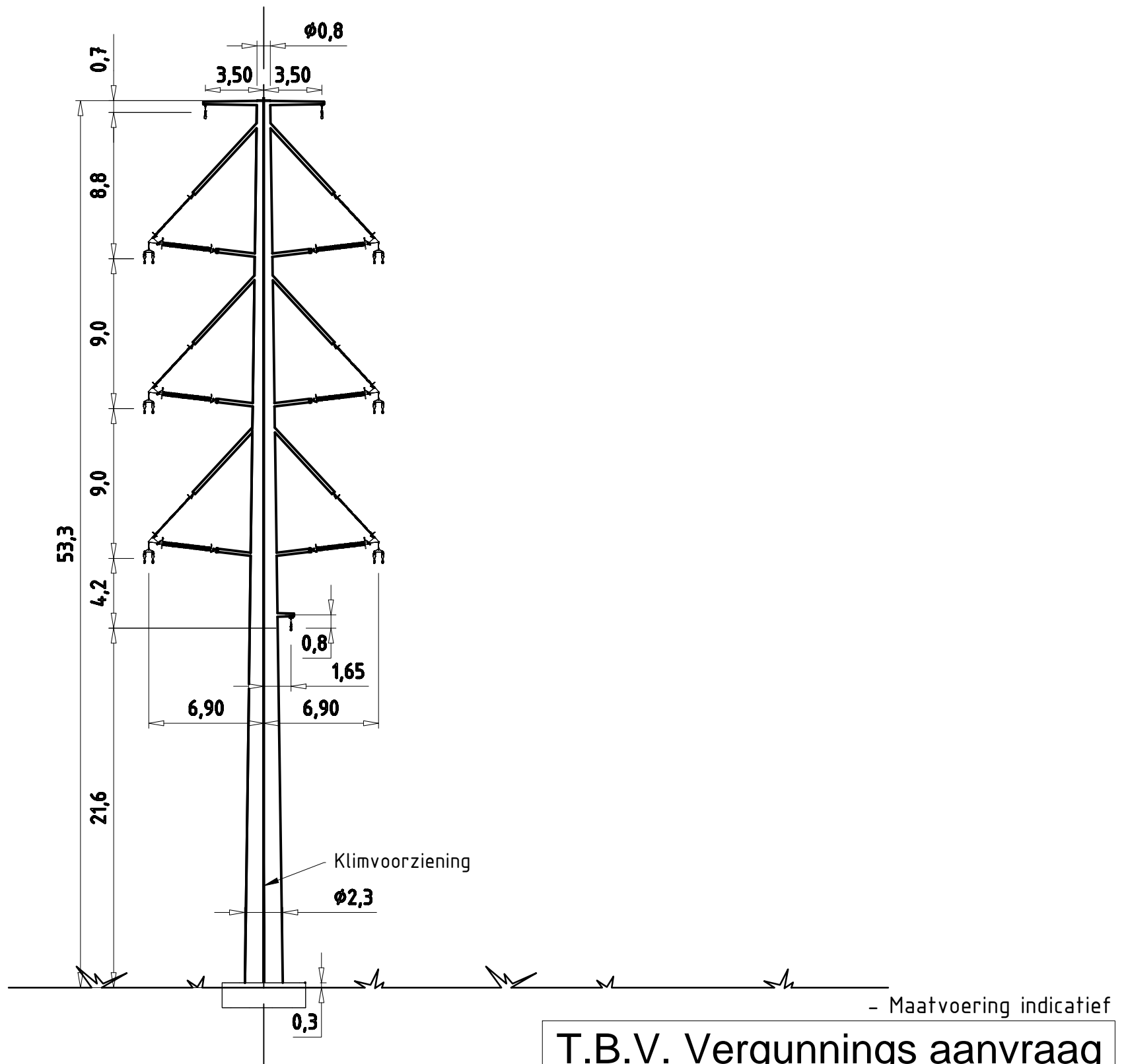
						σ _d	274 N/mm ²	< 284 N/mm ² = ACCOORD
						σ _{d,toegestaan}	284 N/mm ²	==> 80% van 355 N/mm ²

Special limit state

	hoogte	F _{ver}	F _{tloodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	52.6	3.4	9.2	0.0	9.2	483	kNm
380C1F1	43.8	24.9	53.1	0.0	53.1	2327	kNm
380C1F2	34.8	24.9	49.4	0.0	49.4	1717	kNm
380C1F3	25.8	24.8	44.5	0.0	44.5	1147	kNm
380C2F1	43.8	24.9	53.1	0.0	53.1	2327	kNm
380C2F2	34.8	24.9	49.4	0.0	49.4	1717	kNm
380C2F3	25.8	24.8	44.5	0.0	44.5	1147	kNm
RTG	21.6	6.7	13.5	0.0	13.5	291	kNm
GW / opgw	52.6	3.4	9.2	0.0	9.2	483	kNm
GW / opgw	52.6	0.0	0.0	0.0	0.0	0	kNm
Stuwdruk					F _{hor.}	642	kN

Verplaatsing						0.93	m
Percentage van de verplaatsing						1.75%	
Hoek						1.70	graden
Kromming						0.34%	
Fundatie rotatiestijfheid						0.005	rad


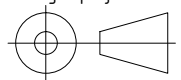
2.89	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341



T.B.V. Vergunnings aanvraag

Wintrack
Masttype: ZWM6S350

- Trekparameter 1800m
- 2x380 Steunmast
- 350m Veldlengte
- 175°-180° Lijnhoek
- Uitvoering Staal of Beton
- Kleurstelling hoofdelement:
Ral 9018 Papyrus white
- Kleurstelling Appendages:
Ral 7021 Black grey

3.0	06-03-2014	New 380kV braced-V
2.0	03-02-2014	Modified top/botom diameter
1.0	16-04-2013	First edition
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection: 
Drawn by: RBE 06-03-2014	Scale: 1:300	Drawing no.: 74102194-035-181V
Checked by: AJP 06-03-2014	Units: m	
Approved by: AW 06-03-2014	Project no: 000.145	
Company: TenneT		Description: Wintrack Masttype ZWM6S350
		Revision: 3.0
		Format: A3
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		

ZWW4AA400

Bijlage CAY

Fundatie berekening

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m
schoorstand		8	:1
α		7.125	graden

Opstort	Diameter	5.3	m
	Hoogte	1.8	m
	Inhoud	39.7	m ³
	e.g.	953	kN

Onderplaat	Diameter	12.0	m
	Hoogte	1.2	m
	Inhoud	136	m ³
	e.g.	3257	kN

Hart paal tov rand fund.	0.6	m
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Optreden krachten

e.g. mast	751	kN
Fgeleiders	163	kN
Maximale dwarskracht	1064	kN
Fmax vert (druk)	1064	kN
Fmin vert (trek)	798	kN
Maximale moment	47979	kNm

Moment

F_{diag}	4775	kN
F_{hor}	1064	kN
F_{ver}	4738	kN
M_{hor} (tgv F_{hor})	3191	kNm
M_{tot}	51170	kNm
$F=M/a$	4738	kN

Verticaal reactiekracht

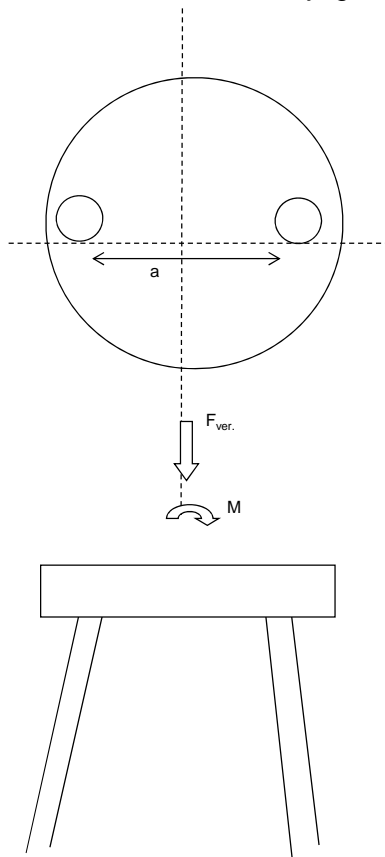
F_{water} (trek)	1754	kN
F_{grond} (druk)	2458	kN
F_{grond} (trek)	2048	kN

F_{dmax} (druk)	4533	kN
F_{tmax} (trek)	2163	kN

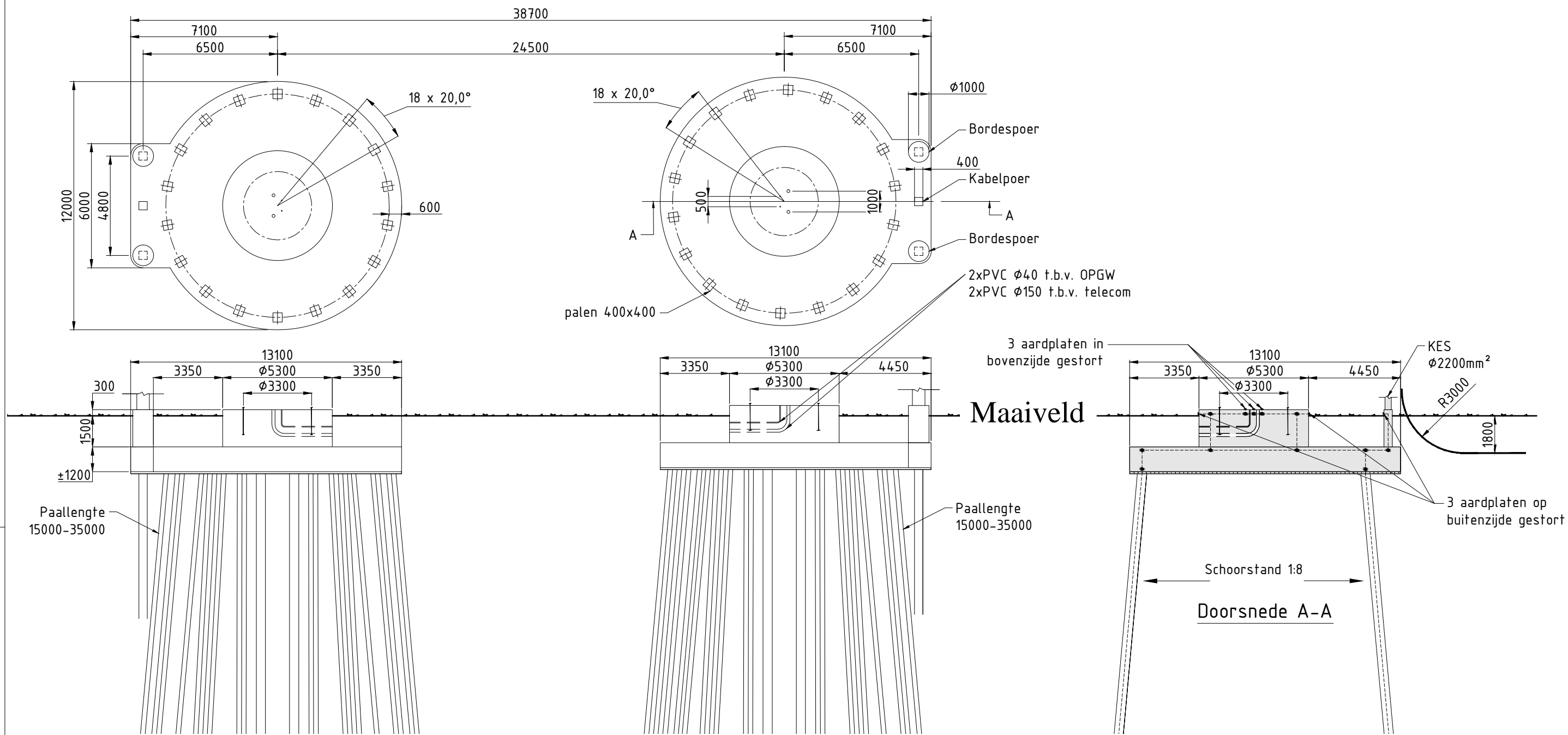
F_{dtot} (druk)	9271	kN
F_{ttot} (trek)	2575	kN

Palen druk	9	(-)
Palen trek	9	(-)

Totaal palen	18	(-)	Per fundering
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reductie door opwaarste kracht water



T.B.V. Vergunnings aanvraag

Verklaring


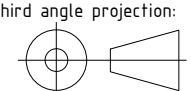
- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding Ø16mm (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

Maten in mm
 Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
 Maatvoering in het 360 graden stelsel
 Vellingkanten niet getekend
 Ringleiding in bovenkant poer op het bovennet
 plaatsen in de eerste laag
 Mastvoetanker afmeting exclusief mastvoetflens breedte
 Afmetingen indicatief

7.0	25-06-2014	Paal-paal afstand aangepast
6.0	02-06-2014	Diverse aanpassingen
5.0	07-04-2014	Diverse aanpassingen
		Projectname: Engineering verbinding ZW380
		Drawing no.: 74102194-032-401V
Design state: Definitief		Scale: 1:200
Drawn by: RBE 25-06-2014		Units: mm
Checked by: AJP 25-06-2014		Project no: 000.145
Approved by: AW 25-06-2014		Company: TenneT
		Description: Principe ontwerp fundatie hoekmast ZWW4AA400 masten familie
		Revision: 7.0
		Format: A3
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com		

ZWW4AA400

Appendix AY / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL1/1a	GW / opgw	2313	5642	19572	2313	5642	-19572
Wind, 10°C	150C1F1	8522	20309	71623	8522	20309	-71623
Permanent loads yg= 1.2	150C1F2	8522	20208	71576	8522	20208	-71576
Wind angle: 0°	150C1F3	8522	20082	71524	8522	20082	-71524
	380C2F1	17045	40618	143247	17045	40618	-143247
	380C2F2	17045	40417	143152	17045	40417	-143152
	380C2F3	17045	40164	143048	17045	40164	-143048
	RTG	0	0	0	4620	10939	-38915
NL1/1b	GW / opgw	2312	5979	22016	2312	5979	-22016
Wind, -20°C	150C1F1	8518	22204	82034	8518	22204	-82034
Permanent loads yg= 1.2	150C1F2	8518	22187	82036	8518	22187	-82036
Wind angle: 0°	150C1F3	8518	22165	82038	8518	22165	-82038
	380C2F1	17036	44409	164069	17036	44409	-164069
	380C2F2	17036	44375	164072	17036	44375	-164072
	380C2F3	17036	44331	164076	17036	44331	-164076
	RTG	0	0	0	4618	11791	-43623
NL1/3	GW / opgw	9331	16292	59274	9331	16292	-59274
Wind, -5°C	150C1F1	14688	31519	115300	14688	31519	-115300
Permanent loads yg= 1.2	150C1F2	14688	31470	115301	14688	31470	-115301
Wind angle: 0°	150C1F3	14688	31408	115304	14688	31408	-115304
	380C2F1	29376	63038	230599	29376	63038	-230599
	380C2F2	29376	62940	230602	29376	62940	-230602
	380C2F3	29376	62816	230608	29376	62816	-230608
	RTG	0	0	0	18688	32337	-118727
NL1/4	GW / opgw	3065	6740	24858	3065	6740	-24858
Construction/maintenance, +5°C	150C1F1	10026	22453	82960	10026	22453	-82960
Permanent loads yg= 1.2	150C1F2	10026	22436	82962	10026	22436	-82962
Wind angle: 0°	150C1F3	10026	22414	82965	10026	22414	-82965
	380C2F1	20053	44905	165920	20053	44905	-165920
	380C2F2	20053	44871	165924	20053	44871	-165924
	380C2F3	20053	44828	165930	20053	44828	-165930
	RTG	0	0	0	6124	13407	-49654
NL1/6	GW / opgw	2603	5740	21422	2603	5740	-21422
Permanent, +10°C	150C1F1	9589	21041	78528	9589	21041	-78528
Permanent loads yg= 1.35	150C1F2	9589	21041	78528	9589	21041	-78528
	150C1F3	9589	21041	78528	9589	21041	-78528
	380C2F1	19177	42083	157056	19177	42083	-157056
	380C2F2	19177	42083	157056	19177	42083	-157056
	380C2F3	19177	42083	157056	19177	42083	-157056
	RTG	0	0	0	5198	11469	-42804
NL1/1a	GW / opgw	2314	7341	21850	2315	13636	-34239
Wind, 10°C	150C1F1	8523	24649	76427	8527	41255	-107248
Permanent loads yg= 1.2	150C1F2	8523	24112	75647	8527	39143	-103042
Wind angle: 45°	150C1F3	8523	23449	74733	8526	36475	-97775
	380C2F1	17046	49298	152854	17055	82509	-214495
	380C2F2	17046	48224	151293	17054	78286	-206083
	380C2F3	17046	46898	149466	17052	72950	-195550
	RTG	0	0	0	4622	20280	-54290
NL1/1b	GW / opgw	2312	6214	22081	2312	7032	-22918
Wind, -20°C	150C1F1	8518	22840	82131	8518	24956	-83805
Permanent loads yg= 1.2	150C1F2	8518	22769	82107	8518	24680	-83505
Wind angle: 45°	150C1F3	8518	22678	82081	8518	24336	-83161
	380C2F1	17036	45681	164262	17036	49913	-167610
	380C2F2	17036	45537	164214	17036	49359	-167011
	380C2F3	17036	45356	164162	17036	48672	-166322
	RTG	0	0	0	4618	13016	-44300
NL1/3	GW / opgw	9332	17469	59491	9333	21392	-62725
Wind, -5°C	150C1F1	14688	33360	115804	14690	39726	-122166
Permanent loads yg= 1.2	150C1F2	14688	33148	115699	14689	38885	-121082
Wind angle: 45°	150C1F3	14688	32883	115583	14689	37844	-119815
	380C2F1	29376	66719	231608	29380	79451	-244332
	380C2F2	29376	66297	231398	29379	77771	-242163
	380C2F3	29376	65767	231166	29378	75688	-239630
	RTG	0	0	0	18690	38360	-121234
NL1/4	GW / opgw	3066	6965	24884	3066	7701	-25412
Construction/maintenance, +5°C	150C1F1	10026	23075	83003	10027	25074	-84237
Permanent loads yg= 1.2	150C1F2	10026	23005	82987	10027	24816	-84010
Wind angle: 45°	150C1F3	10026	22917	82972	10026	24495	-83750
	380C2F1	20053	46149	166005	20053	50147	-168475
	380C2F2	20053	46010	165975	20053	49632	-168019
	380C2F3	20053	45834	165943	20053	48990	-167500
	RTG	0	0	0	6124	14552	-50029

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2316	16038	39137	2316	16038	-39137
	150C1F1	8529	47872	120531	8529	47872	-120531
	150C1F2	8528	45214	115185	8528	45214	-115185
	150C1F3	8527	41832	108401	8527	41832	-108401
	380C2F1	17058	95743	241062	17058	95743	-241062
	380C2F2	17057	90427	230369	17057	90427	-230369
	380C2F3	17055	83663	216802	17055	83663	-216802
	RTG	0	0	0	4623	23333	-60459
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	7388	23436	2312	7388	-23436
	150C1F1	8518	25859	84895	8518	25859	-84895
	150C1F2	8518	25490	84430	8518	25490	-84430
	150C1F3	8518	25033	83891	8518	25033	-83891
	380C2F1	17037	51718	169791	17037	51718	-169791
	380C2F2	17037	50979	168860	17037	50979	-168860
	380C2F3	17036	50066	167782	17036	50066	-167782
	RTG	0	0	0	4618	13411	-44734
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	9334	23040	64696	9334	23040	-64696
	150C1F1	14691	42459	126000	14691	42459	-126000
	150C1F2	14690	41342	124384	14690	41342	-124384
	150C1F3	14690	39958	122475	14690	39958	-122475
	380C2F1	29381	84919	252000	29381	84919	-252000
	380C2F2	29381	82685	248768	29381	82685	-248768
	380C2F3	29380	79915	244949	29380	79915	-244949
	RTG	0	0	0	18691	40243	-122907
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3066	8012	25760	3066	8012	-25760
	150C1F1	10027	25909	85076	10027	25909	-85076
	150C1F2	10027	25568	84717	10027	25568	-84717
	150C1F3	10027	25145	84303	10027	25145	-84303
	380C2F1	20053	51818	170153	20053	51818	-170153
	380C2F2	20053	51136	169433	20053	51136	-169433
	380C2F3	20053	50290	168606	20053	50290	-168606
	RTG	0	0	0	6124	14905	-50305
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2315	13636	34239	2314	7341	-21850
	150C1F1	8527	41255	107248	8523	24649	-76427
	150C1F2	8527	39143	103042	8523	24112	-75647
	150C1F3	8526	36475	97775	8523	23449	-74733
	380C2F1	17055	82509	214495	17046	49298	-152854
	380C2F2	17054	78286	206083	17046	48224	-151293
	380C2F3	17052	72950	195550	17046	46898	-149466
	RTG	0	0	0	4620	12848	-40820
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	7032	22918	2312	6214	-22081
	150C1F1	8518	24956	83805	8518	22840	-82131
	150C1F2	8518	24680	83505	8518	22769	-82107
	150C1F3	8518	24336	83161	8518	22678	-82081
	380C2F1	17036	49913	167610	17036	45681	-164262
	380C2F2	17036	49359	167011	17036	45537	-164214
	380C2F3	17036	48672	166322	17036	45356	-164162
	RTG	0	0	0	4618	12078	-43652
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	9333	21392	62725	9332	17469	-59491
	150C1F1	14690	39726	122166	14688	33360	-115804
	150C1F2	14689	38885	121082	14688	33148	-115699
	150C1F3	14689	37844	119815	14688	32883	-115583
	380C2F1	29380	79451	244332	29376	66719	-231608
	380C2F2	29379	77771	242163	29376	66297	-231398
	380C2F3	29378	75688	239630	29376	65767	-231166
	RTG	0	0	0	18688	33785	-118778
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3066	7701	25412	3066	6965	-24884
	150C1F1	10027	25074	84237	10026	23075	-83003
	150C1F2	10027	24816	84010	10026	23005	-82987
	150C1F3	10026	24495	83750	10026	22917	-82972
	380C2F1	20053	50147	168475	20053	46149	-166005
	380C2F2	20053	49632	168019	20053	46010	-165975
	380C2F3	20053	48990	167500	20053	45834	-165943
	RTG	0	0	0	6124	13686	-49651
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1735	4557	15520	1735	4557	-15520
	150C1F1	6390	16356	56872	6390	16356	-56872
	150C1F2	6390	16247	56795	6390	16247	-56795
	150C1F3	6390	16112	56708	6390	16112	-56708
	380C2F1	12781	32712	113743	12781	32712	-113743
	380C2F2	12781	32495	113589	12781	32495	-113589
	380C2F3	12781	32224	113416	12781	32224	-113416
	RTG	0	0	0	3464	8737	-30698

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	4807	17644	1734	4807	-17644
	150C1F1	6387	17993	66318	6387	17993	-66318
	150C1F2	6387	17976	66318	6387	17976	-66318
	150C1F3	6387	17953	66318	6387	17953	-66318
	380C2F1	12774	35986	132635	12774	35986	-132635
	380C2F2	12774	35951	132635	12774	35951	-132635
	380C2F3	12774	35907	132637	12774	35907	-132637
	RTG	0	0	0	3463	9450	-34887
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	8751	15568	56573	8751	15568	-56573
	150C1F1	12554	28094	102519	12554	28094	-102519
	150C1F2	12554	28045	102518	12554	28045	-102518
	150C1F3	12554	27982	102518	12554	27982	-102518
	380C2F1	25109	56188	205038	25109	56188	-205038
	380C2F2	25109	56089	205035	25109	56089	-205035
	380C2F3	25109	55964	205036	25109	55964	-205036
	RTG	0	0	0	17529	30887	-113313
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	2487	5711	21016	2487	5711	-21016
	150C1F1	7894	18612	68628	7894	18612	-68628
	150C1F2	7894	18595	68629	7894	18595	-68629
	150C1F3	7894	18573	68631	7894	18573	-68631
	380C2F1	15788	37224	137256	15788	37224	-137256
	380C2F2	15788	37190	137258	15788	37190	-137258
	380C2F3	15788	37146	137262	15788	37146	-137262
	RTG	0	0	0	4968	11346	-41962
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw	1735	4102	15307	1735	4102	-15307
	150C1F1	6390	15137	56492	6390	15137	-56492
	150C1F2	6390	15137	56492	6390	15137	-56492
	150C1F3	6390	15137	56492	6390	15137	-56492
	380C2F1	12781	30274	112983	12781	30274	-112983
	380C2F2	12781	30274	112983	12781	30274	-112983
	380C2F3	12781	30274	112983	12781	30274	-112983
	RTG	0	0	0	3464	8190	-30564
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1735	6484	18653	1736	13263	-32850
	150C1F1	6391	21253	63754	6395	39507	-100730
	150C1F2	6391	20639	62687	6394	37259	-96016
	150C1F3	6391	19881	61420	6394	34395	-90018
	380C2F1	12782	42505	127508	12790	79014	-201459
	380C2F2	12782	41278	125374	12789	74519	-192033
	380C2F3	12782	39762	122840	12788	68790	-180036
	RTG	0	0	0	3466	19144	-50054
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	1734	5057	17763	1734	5982	-19000
	150C1F1	6387	18659	66528	6387	21016	-69102
	150C1F2	6387	18583	66485	6387	20701	-68659
	150C1F3	6387	18486	66438	6387	20312	-68144
	380C2F1	12774	37319	133056	12774	42032	-138204
	380C2F2	12774	37165	132971	12774	41402	-137318
	380C2F3	12774	36973	132876	12774	40624	-136288
	RTG	0	0	0	3463	10783	-35969
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	8751	16756	56833	8753	20763	-60379
	150C1F1	12555	29991	103232	12556	36758	-111097
	150C1F2	12554	29771	103094	12556	35859	-109790
	150C1F3	12554	29495	102939	12556	34744	-108250
	380C2F1	25109	59981	206465	25112	73517	-222195
	380C2F2	25109	59541	206188	25112	71717	-219580
	380C2F3	25109	58990	205878	25111	69489	-216500
	RTG	0	0	0	17531	36995	-116144
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw	2487	5942	21067	2487	6730	-21790
	150C1F1	7894	19253	68740	7894	21403	-70542
	150C1F2	7894	19180	68714	7894	21121	-70222
	150C1F3	7894	19089	68685	7894	20771	-69853
	380C2F1	15788	38506	137480	15788	42807	-141084
	380C2F2	15788	38360	137427	15788	42242	-140444
	380C2F3	15788	38177	137369	15788	41542	-139707
	RTG	0	0	0	4968	12541	-42527
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1737	15745	38044	1737	15745	-38044
	150C1F1	6396	46464	115283	6396	46464	-115283
	150C1F2	6396	43683	109477	6396	43683	-109477
	150C1F3	6395	40118	102012	6395	40118	-102012
	380C2F1	12793	92929	230566	12793	92929	-230566
	380C2F2	12791	87366	218954	12791	87366	-218954
	380C2F3	12790	80237	204024	12790	80237	-204024
	RTG	0	0	0	3467	22399	-56976

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	1734	6393	19722	1734	6393	-19722
	150C1F1	6387	22050	70684	6387	22050	-70684
	150C1F2	6387	21626	70014	6387	21626	-70014
	150C1F3	6387	21103	69228	6387	21103	-69228
	380C2F1	12775	44101	141369	12775	44101	-141369
	380C2F2	12775	43253	140028	12775	43253	-140028
	380C2F3	12775	42207	138457	12775	42207	-138457
	RTG	0	0	0	3463	11234	-36607
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	8754	22451	62501	8754	22451	-62501
	150C1F1	12557	39686	115656	12557	39686	-115656
	150C1F2	12557	38491	113745	12557	38491	-113745
	150C1F3	12556	37007	111468	12556	37007	-111468
	380C2F1	25114	79372	231311	25114	79372	-231311
	380C2F2	25113	76981	227490	25113	76981	-227490
	380C2F3	25113	74015	222935	25113	74015	-222935
	RTG	0	0	0	17532	38920	-117975
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2487	7070	22246	2487	7070	-22246
	150C1F1	7894	22325	71703	7894	22325	-71703
	150C1F2	7894	21948	71208	7894	21948	-71208
	150C1F3	7894	21482	70634	7894	21482	-70634
	380C2F1	15789	44650	143406	15789	44650	-143406
	380C2F2	15789	43896	142416	15789	43896	-142416
	380C2F3	15788	42963	141268	15788	42963	-141268
	RTG	0	0	0	4968	12922	-42903
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1736	13263	32850	1735	6484	-18653
	150C1F1	6395	39507	100730	6391	21253	-63754
	150C1F2	6394	37259	96016	6391	20639	-62687
	150C1F3	6394	34395	90018	6391	19881	-61420
	380C2F1	12790	79014	201459	12782	42505	-127508
	380C2F2	12789	74519	192033	12782	41278	-125374
	380C2F3	12788	68790	180036	12782	39762	-122840
	RTG	0	0	0	3465	10877	-33467
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	5982	19000	1734	5057	-17763
	150C1F1	6387	21016	69102	6387	18659	-66528
	150C1F2	6387	20701	68659	6387	18583	-66485
	150C1F3	6387	20312	68144	6387	18486	-66438
	380C2F1	12774	42032	138204	12774	37319	-133056
	380C2F2	12774	41402	137318	12774	37165	-132971
	380C2F3	12774	40624	136288	12774	36973	-132876
	RTG	0	0	0	3463	9749	-34960
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	8753	20763	60379	8751	16756	-56833
	150C1F1	12556	36758	111097	12555	29991	-103232
	150C1F2	12556	35859	109790	12554	29771	-103094
	150C1F3	12556	34744	108250	12554	29495	-102939
	380C2F1	25112	73517	222195	25109	59981	-206465
	380C2F2	25112	71717	219580	25109	59541	-206188
	380C2F3	25111	69489	216500	25109	58990	-205878
	RTG	0	0	0	17529	32344	-113401
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2487	6730	21790	2487	5942	-21067
	150C1F1	7894	21403	70542	7894	19253	-68740
	150C1F2	7894	21121	70222	7894	19180	-68714
	150C1F3	7894	20771	69853	7894	19089	-68685
	380C2F1	15788	42807	141084	15788	38506	-137480
	380C2F2	15788	42242	140444	15788	38360	-137427
	380C2F3	15788	41542	139707	15788	38177	-137369
	RTG	0	0	0	4968	11630	-41979

ZWW4AA400

Appendix AY1 / NL3

Loadcases for tower strength (Special limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2313	5421	-19460
	150C1F1	0	0	0	8522	19719	-71422
	150C1F2	0	0	0	8522	19671	-71415
	150C1F3	0	0	0	8522	19611	-71408
	380C2F1	0	0	0	17045	39437	-142845
	380C2F2	0	0	0	17045	39342	-142830
	380C2F3	0	0	0	17045	39221	-142815
RTG	0	0	0	4620	10674	-38843	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2312	5963	-22016
	150C1F1	0	0	0	8518	22161	-82039
	150C1F2	0	0	0	8518	22147	-82040
	150C1F3	0	0	0	8518	22130	-82043
	380C2F1	0	0	0	17036	44322	-164077
	380C2F2	0	0	0	17036	44295	-164081
	380C2F3	0	0	0	17036	44260	-164085
RTG	0	0	0	4618	11771	-43625	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3883	8610	-30911
	150C1F1	0	0	0	9901	23444	-85630
	150C1F2	0	0	0	9901	23404	-85628
	150C1F3	0	0	0	9901	23354	-85627
	380C2F1	0	0	0	19802	46887	-171259
	380C2F2	0	0	0	19802	46808	-171256
	380C2F3	0	0	0	19802	46707	-171253
RTG	0	0	0	7767	16943	-61667	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2915	6463	-23882
	150C1F1	0	0	0	9725	21883	-81000
	150C1F2	0	0	0	9725	21869	-81002
	150C1F3	0	0	0	9725	21852	-81005
	380C2F1	0	0	0	19451	43765	-162000
	380C2F2	0	0	0	19451	43738	-162004
	380C2F3	0	0	0	19451	43704	-162010
RTG	0	0	0	5823	12862	-47696	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2314	8980	-24860
	150C1F1	0	0	0	8524	28843	-83359
	150C1F2	0	0	0	8524	27877	-81663
	150C1F3	0	0	0	8524	26679	-79631
	380C2F1	0	0	0	17048	57685	-166717
	380C2F2	0	0	0	17048	55754	-163327
	380C2F3	0	0	0	17047	53358	-159262
RTG	0	0	0	4621	14690	-43701	
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2312	6761	-22572
	150C1F1	0	0	0	8518	24266	-83095
	150C1F2	0	0	0	8518	24058	-82907
	150C1F3	0	0	0	8518	23800	-82693
	380C2F1	0	0	0	17036	48532	-166189
	380C2F2	0	0	0	17036	48117	-165814
	380C2F3	0	0	0	17036	47600	-165386
RTG	0	0	0	4618	12712	-44021	
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3884	13833	-37952
	150C1F1	0	0	0	9902	30568	-93216
	150C1F2	0	0	0	9902	29821	-92068
	150C1F3	0	0	0	9902	28897	-90716
	380C2F1	0	0	0	19805	61135	-186431
	380C2F2	0	0	0	19805	59641	-184137
	380C2F3	0	0	0	19804	57794	-181432
RTG	0	0	0	7768	22876	-67855	
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2915	7208	-24240
	150C1F1	0	0	0	9726	23915	-81781
	150C1F2	0	0	0	9725	23718	-81634
	150C1F3	0	0	0	9725	23473	-81468
	380C2F1	0	0	0	19451	47830	-163562
	380C2F2	0	0	0	19451	47436	-163268
	380C2F3	0	0	0	19451	46945	-162935
RTG	0	0	0	5823	13758	-47923	
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2314	10178	-27217
	150C1F1	0	0	0	8525	31968	-89093
	150C1F2	0	0	0	8525	30695	-86719
	150C1F3	0	0	0	8524	29109	-83834
	380C2F1	0	0	0	17050	63935	-178185
	380C2F2	0	0	0	17049	61390	-173439
	380C2F3	0	0	0	17048	58219	-167668
RTG	0	0	0	4621	16077	-46164	

NL3/1b	GW / opgw	0	0	0	2312	7025	-22909
Wind, -20°C	150C1F1	0	0	0	8518	24939	-83786
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	24664	-83489
Wind angle: 90°	150C1F3	0	0	0	8518	24323	-83149
	380C2F1	0	0	0	17036	49879	-167572
	380C2F2	0	0	0	17036	49328	-166979
	380C2F3	0	0	0	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3	GW / opgw	0	0	0	3885	15569	-41090
Wind, -5°C	150C1F1	0	0	0	9903	33002	-97207
Permanent loads yg= 1.2	150C1F2	0	0	0	9903	32007	-95535
Wind angle: 90°	150C1F3	0	0	0	9903	30774	-93540
	380C2F1	0	0	0	19806	66003	-194414
	380C2F2	0	0	0	19806	64014	-191070
	380C2F3	0	0	0	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4	GW / opgw	0	0	0	2915	7446	-24476
Construction/maintenance, +5°C	150C1F1	0	0	0	9726	24550	-82329
Permanent loads yg= 1.2	150C1F2	0	0	0	9726	24291	-82093
Wind angle: 90°	150C1F3	0	0	0	9726	23969	-81824
	380C2F1	0	0	0	19451	49100	-164657
	380C2F2	0	0	0	19451	48582	-164186
	380C2F3	0	0	0	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a	GW / opgw	0	0	0	2313	6149	-20066
Wind, 10°C	150C1F1	0	0	0	8523	21624	-72609
Permanent loads yg= 1.2	150C1F2	0	0	0	8523	21397	-72397
Wind angle: -45°	150C1F3	0	0	0	8523	21115	-72156
	380C2F1	0	0	0	17045	43248	-145217
	380C2F2	0	0	0	17045	42794	-144795
	380C2F3	0	0	0	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293
NL3/1b	GW / opgw	0	0	0	2312	6146	-22050
Wind, -20°C	150C1F1	0	0	0	8518	22659	-82076
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	22603	-82063
Wind angle: -45°	150C1F3	0	0	0	8518	22533	-82050
	380C2F1	0	0	0	17036	45318	-164152
	380C2F2	0	0	0	17036	45207	-164127
	380C2F3	0	0	0	17036	45066	-164100
	RTG	0	0	0	4618	11997	-43633
NL3/3	GW / opgw	0	0	0	3883	9707	-31669
Wind, -5°C	150C1F1	0	0	0	9901	24983	-86283
Permanent loads yg= 1.2	150C1F2	0	0	0	9901	24803	-86159
Wind angle: -45°	150C1F3	0	0	0	9901	24579	-86020
	380C2F1	0	0	0	19803	49966	-172566
	380C2F2	0	0	0	19803	49606	-172319
	380C2F3	0	0	0	19803	49157	-172039
	RTG	0	0	0	7767	18232	-62203
NL3/4	GW / opgw	0	0	0	2915	6640	-23894
Construction/maintenance, +5°C	150C1F1	0	0	0	9725	22373	-81008
Permanent loads yg= 1.2	150C1F2	0	0	0	9725	22319	-81000
Wind angle: -45°	150C1F3	0	0	0	9725	22250	-80992
	380C2F1	0	0	0	19451	44747	-162016
	380C2F2	0	0	0	19451	44637	-162000
	380C2F3	0	0	0	19451	44499	-161985
	RTG	0	0	0	5823	13083	-47686
NL3/1a	GW / opgw	0	0	0	1735	4318	-15341
Wind, 10°C	150C1F1	0	0	0	6390	15727	-56526
Permanent loads yg= 0.9	150C1F2	0	0	0	6390	15677	-56510
Wind angle: 0°	150C1F3	0	0	0	6390	15614	-56493
	380C2F1	0	0	0	12781	31454	-113052
	380C2F2	0	0	0	12781	31354	-113020
	380C2F3	0	0	0	12781	31229	-112987
	RTG	0	0	0	3464	8457	-30569
NL3/1b	GW / opgw	0	0	0	1734	4791	-17643
Wind, -20°C	150C1F1	0	0	0	6387	17949	-66319
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	17935	-66319
Wind angle: 0°	150C1F3	0	0	0	6387	17917	-66321
	380C2F1	0	0	0	12774	35897	-132637
	380C2F2	0	0	0	12774	35870	-132639
	380C2F3	0	0	0	12774	35835	-132641
	RTG	0	0	0	3463	9430	-34888

NL3/3	GW / opgw	0	0	0	3304	7647	-27318
Wind, -5°C	150C1F1	0	0	0	7769	19534	-71039
Permanent loads yg= 0.9	150C1F2	0	0	0	7769	19493	-71033
Wind angle: 0°	150C1F3	0	0	0	7769	19441	-71027
	380C2F1	0	0	0	15538	39068	-142079
	380C2F2	0	0	0	15538	38986	-142066
	380C2F3	0	0	0	15538	38883	-142054
	RTG	0	0	0	6610	15011	-54458
NL3/4	GW / opgw	0	0	0	2336	5417	-19980
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	18004	-66526
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	17991	-66527
Wind angle: 0°	150C1F3	0	0	0	7593	17973	-66529
	380C2F1	0	0	0	15186	36009	-133052
	380C2F2	0	0	0	15186	35981	-133054
	380C2F3	0	0	0	15186	35946	-133059
	RTG	0	0	0	4667	10769	-39885
NL3/1a	GW / opgw	0	0	0	1735	8312	-22368
Wind, 10°C	150C1F1	0	0	0	6392	26006	-72777
Permanent loads yg= 0.9	150C1F2	0	0	0	6392	24920	-70632
Wind angle: 45°	150C1F3	0	0	0	6392	23565	-68013
	380C2F1	0	0	0	12784	52013	-145554
	380C2F2	0	0	0	12784	49840	-141264
	380C2F3	0	0	0	12783	47130	-136026
	RTG	0	0	0	3465	12977	-37311
NL3/1b	GW / opgw	0	0	0	1734	5671	-18504
Wind, -20°C	150C1F1	0	0	0	6387	20232	-68043
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	19999	-67759
Wind angle: 45°	150C1F3	0	0	0	6387	19710	-67430
	380C2F1	0	0	0	12774	40465	-136087
	380C2F2	0	0	0	12774	39998	-135518
	380C2F3	0	0	0	12774	39420	-134861
	RTG	0	0	0	3463	10442	-35549
NL3/3	GW / opgw	0	0	0	3305	13212	-35636
Wind, -5°C	150C1F1	0	0	0	7771	27388	-81353
Permanent loads yg= 0.9	150C1F2	0	0	0	7770	26553	-79875
Wind angle: 45°	150C1F3	0	0	0	7770	25518	-78108
	380C2F1	0	0	0	15541	54776	-162707
	380C2F2	0	0	0	15541	53105	-159750
	380C2F3	0	0	0	15540	51036	-156216
	RTG	0	0	0	6611	21321	-62052
NL3/4	GW / opgw	0	0	0	2336	6206	-20501
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	20156	-67755
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	19942	-67542
Wind angle: 45°	150C1F3	0	0	0	7593	19676	-67299
	380C2F1	0	0	0	15186	40313	-135511
	380C2F2	0	0	0	15186	39884	-135085
	380C2F3	0	0	0	15186	39352	-134597
	RTG	0	0	0	4667	11702	-40251
NL3/1a	GW / opgw	0	0	0	1736	9613	-25111
Wind, 10°C	150C1F1	0	0	0	6393	29481	-79817
Permanent loads yg= 0.9	150C1F2	0	0	0	6393	28073	-76939
Wind angle: 90°	150C1F3	0	0	0	6392	26305	-73373
	380C2F1	0	0	0	12786	58962	-159635
	380C2F2	0	0	0	12785	56147	-153879
	380C2F3	0	0	0	12784	52610	-146746
	RTG	0	0	0	3465	14539	-40424
NL3/1b	GW / opgw	0	0	0	1734	5974	-18987
Wind, -20°C	150C1F1	0	0	0	6387	20997	-69074
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	20683	-68635
Wind angle: 90°	150C1F3	0	0	0	6387	20297	-68125
	380C2F1	0	0	0	12774	41993	-138148
	380C2F2	0	0	0	12774	41367	-137270
	380C2F3	0	0	0	12774	40594	-136250
	RTG	0	0	0	3463	10775	-35958
NL3/3	GW / opgw	0	0	0	3306	15037	-39110
Wind, -5°C	150C1F1	0	0	0	7771	30099	-86377
Permanent loads yg= 0.9	150C1F2	0	0	0	7771	28994	-84294
Wind angle: 90°	150C1F3	0	0	0	7771	27619	-81769
	380C2F1	0	0	0	15542	60198	-172755
	380C2F2	0	0	0	15542	57987	-168588
	380C2F3	0	0	0	15541	55238	-163537
	RTG	0	0	0	6612	23468	-65790

NL3/4	GW / opgw	0	0	0	2336	6466	-20820
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	20854	-68536
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	20569	-68202
Wind angle: 90°	150C1F3	0	0	0	7593	20216	-67817
	380C2F1	0	0	0	15187	41708	-137072
	380C2F2	0	0	0	15187	41137	-136404
	380C2F3	0	0	0	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40507
NL3/1a	GW / opgw	0	0	0	1735	5126	-16245
Wind, 10°C	150C1F1	0	0	0	6391	17810	-58375
Permanent loads yg= 0.9	150C1F2	0	0	0	6391	17555	-58061
Wind angle: -45°	150C1F3	0	0	0	6391	17240	-57698
	380C2F1	0	0	0	12781	35619	-116750
	380C2F2	0	0	0	12781	35110	-116122
	380C2F3	0	0	0	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b	GW / opgw	0	0	0	1734	4983	-17711
Wind, -20°C	150C1F1	0	0	0	6387	18466	-66429
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	18407	-66405
Wind angle: -45°	150C1F3	0	0	0	6387	18333	-66378
	380C2F1	0	0	0	12774	36933	-132858
	380C2F2	0	0	0	12774	36815	-132809
	380C2F3	0	0	0	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3	GW / opgw	0	0	0	3304	8802	-28293
Wind, -5°C	150C1F1	0	0	0	7769	21169	-72052
Permanent loads yg= 0.9	150C1F2	0	0	0	7769	20974	-71871
Wind angle: -45°	150C1F3	0	0	0	7769	20732	-71665
	380C2F1	0	0	0	15539	42338	-144103
	380C2F2	0	0	0	15539	41948	-143742
	380C2F3	0	0	0	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4	GW / opgw	0	0	0	2336	5599	-20009
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	18508	-66582
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	18451	-66566
Wind angle: -45°	150C1F3	0	0	0	7593	18380	-66549
	380C2F1	0	0	0	15186	37015	-133164
	380C2F2	0	0	0	15186	36902	-133132
	380C2F3	0	0	0	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5421	19460	0	0	0
	150C1F1	8522	19719	71422	0	0	0
	150C1F2	8522	19671	71415	0	0	0
	150C1F3	8522	19611	71408	0	0	0
	380C2F1	17045	39437	142845	0	0	0
	380C2F2	17045	39342	142830	0	0	0
	380C2F3	17045	39221	142815	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5963	22016	0	0	0
	150C1F1	8518	22161	82039	0	0	0
	150C1F2	8518	22147	82040	0	0	0
	150C1F3	8518	22130	82043	0	0	0
	380C2F1	17036	44322	164077	0	0	0
	380C2F2	17036	44295	164081	0	0	0
	380C2F3	17036	44260	164085	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8610	30911	0	0	0
	150C1F1	9901	23444	85630	0	0	0
	150C1F2	9901	23404	85628	0	0	0
	150C1F3	9901	23354	85627	0	0	0
	380C2F1	19802	46887	171259	0	0	0
	380C2F2	19802	46808	171256	0	0	0
	380C2F3	19802	46707	171253	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6463	23882	0	0	0
	150C1F1	9725	21883	81000	0	0	0
	150C1F2	9725	21869	81002	0	0	0
	150C1F3	9725	21852	81005	0	0	0
	380C2F1	19451	43765	162000	0	0	0
	380C2F2	19451	43738	162004	0	0	0
	380C2F3	19451	43704	162010	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6149	20066	0	0	0
	150C1F1	8523	21624	72609	0	0	0
	150C1F2	8523	21397	72397	0	0	0
	150C1F3	8523	21115	72156	0	0	0
	380C2F1	17045	43248	145217	0	0	0
	380C2F2	17045	42794	144795	0	0	0
	380C2F3	17045	42229	144312	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6146	22050	0	0	0
	150C1F1	8518	22659	82076	0	0	0
	150C1F2	8518	22603	82063	0	0	0
	150C1F3	8518	22533	82050	0	0	0
	380C2F1	17036	45318	164152	0	0	0
	380C2F2	17036	45207	164127	0	0	0
	380C2F3	17036	45066	164100	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9707	31669	0	0	0
	150C1F1	9901	24983	86283	0	0	0
	150C1F2	9901	24803	86159	0	0	0
	150C1F3	9901	24579	86020	0	0	0
	380C2F1	19803	49966	172566	0	0	0
	380C2F2	19803	49606	172319	0	0	0
	380C2F3	19803	49157	172039	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6640	23894	0	0	0
	150C1F1	9725	22373	81008	0	0	0
	150C1F2	9725	22319	81000	0	0	0
	150C1F3	9725	22250	80992	0	0	0
	380C2F1	19451	44747	162016	0	0	0
	380C2F2	19451	44637	162000	0	0	0
	380C2F3	19451	44499	161985	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	10178	27217	0	0	0
	150C1F1	8525	31968	89093	0	0	0
	150C1F2	8525	30695	86719	0	0	0
	150C1F3	8524	29109	83834	0	0	0
	380C2F1	17050	63935	178185	0	0	0
	380C2F2	17049	61390	173439	0	0	0
	380C2F3	17048	58219	167668	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	7025	22909	0	0	0
	150C1F1	8518	24939	83786	0	0	0
	150C1F2	8518	24664	83489	0	0	0
	150C1F3	8518	24323	83149	0	0	0
	380C2F1	17036	49879	167572	0	0	0
	380C2F2	17036	49328	166979	0	0	0
	380C2F3	17036	48646	166297	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	15569	41090	0	0	0
	150C1F1	9903	33002	97207	0	0	0
	150C1F2	9903	32007	95535	0	0	0
	150C1F3	9903	30774	93540	0	0	0
	380C2F1	19806	66003	194414	0	0	0
	380C2F2	19806	64014	191070	0	0	0
	380C2F3	19805	61548	187080	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	7446	24476	0	0	0
	150C1F1	9726	24550	82329	0	0	0
	150C1F2	9726	24291	82093	0	0	0
	150C1F3	9726	23969	81824	0	0	0
	380C2F1	19451	49100	164657	0	0	0
	380C2F2	19451	48582	164186	0	0	0
	380C2F3	19451	47938	163647	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2314	8980	24860	0	0	0
	150C1F1	8524	28843	83359	0	0	0
	150C1F2	8524	27877	81663	0	0	0
	150C1F3	8524	26679	79631	0	0	0
	380C2F1	17048	57685	166717	0	0	0
	380C2F2	17048	55754	163327	0	0	0
	380C2F3	17047	53358	159262	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	6761	22572	0	0	0
	150C1F1	8518	24266	83095	0	0	0
	150C1F2	8518	24058	82907	0	0	0
	150C1F3	8518	23800	82693	0	0	0
	380C2F1	17036	48532	166189	0	0	0
	380C2F2	17036	48117	165814	0	0	0
	380C2F3	17036	47600	165386	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3884	13833	37952	0	0	0
	150C1F1	9902	30568	93216	0	0	0
	150C1F2	9902	29821	92068	0	0	0
	150C1F3	9902	28897	90716	0	0	0
	380C2F1	19805	61135	186431	0	0	0
	380C2F2	19805	59641	184137	0	0	0
	380C2F3	19804	57794	181432	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2915	7208	24240	0	0	0
	150C1F1	9726	23915	81781	0	0	0
	150C1F2	9725	23718	81634	0	0	0
	150C1F3	9725	23473	81468	0	0	0
	380C2F1	19451	47830	163562	0	0	0
	380C2F2	19451	47436	163268	0	0	0
	380C2F3	19451	46945	162935	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1735	4318	15341	0	0	0
	150C1F1	6390	15727	56526	0	0	0
	150C1F2	6390	15677	56510	0	0	0
	150C1F3	6390	15614	56493	0	0	0
	380C2F1	12781	31454	113052	0	0	0
	380C2F2	12781	31354	113020	0	0	0
	380C2F3	12781	31229	112987	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	4791	17643	0	0	0
	150C1F1	6387	17949	66319	0	0	0
	150C1F2	6387	17935	66319	0	0	0
	150C1F3	6387	17917	66321	0	0	0
	380C2F1	12774	35897	132637	0	0	0
	380C2F2	12774	35870	132639	0	0	0
	380C2F3	12774	35835	132641	0	0	0
	RTG	0	0	0	0	0	0

NL3/3	GW / opgw	3304	7647	27318	0	0	0
Wind, -5°C	150C1F1	7769	19534	71039	0	0	0
Permanent loads yg= 0.9	150C1F2	7769	19493	71033	0	0	0
Wind angle: 0°	150C1F3	7769	19441	71027	0	0	0
	380C2F1	15538	39068	142079	0	0	0
	380C2F2	15538	38986	142066	0	0	0
	380C2F3	15538	38883	142054	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	5417	19980	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	18004	66526	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	17991	66527	0	0	0
Wind angle: 0°	150C1F3	7593	17973	66529	0	0	0
	380C2F1	15186	36009	133052	0	0	0
	380C2F2	15186	35981	133054	0	0	0
	380C2F3	15186	35946	133059	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1735	5126	16245	0	0	0
Wind, 10°C	150C1F1	6391	17810	58375	0	0	0
Permanent loads yg= 0.9	150C1F2	6391	17555	58061	0	0	0
Wind angle: 45°	150C1F3	6391	17240	57698	0	0	0
	380C2F1	12781	35619	116750	0	0	0
	380C2F2	12781	35110	116122	0	0	0
	380C2F3	12781	34481	115397	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	4983	17711	0	0	0
Wind, -20°C	150C1F1	6387	18466	66429	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	18407	66405	0	0	0
Wind angle: 45°	150C1F3	6387	18333	66378	0	0	0
	380C2F1	12774	36933	132858	0	0	0
	380C2F2	12774	36815	132809	0	0	0
	380C2F3	12774	36666	132755	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3304	8802	28293	0	0	0
Wind, -5°C	150C1F1	7769	21169	72052	0	0	0
Permanent loads yg= 0.9	150C1F2	7769	20974	71871	0	0	0
Wind angle: 45°	150C1F3	7769	20732	71665	0	0	0
	380C2F1	15539	42338	144103	0	0	0
	380C2F2	15539	41948	143742	0	0	0
	380C2F3	15539	41464	143329	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	5599	20009	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	18508	66582	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	18451	66566	0	0	0
Wind angle: 45°	150C1F3	7593	18380	66549	0	0	0
	380C2F1	15186	37015	133164	0	0	0
	380C2F2	15186	36902	133132	0	0	0
	380C2F3	15186	36759	133099	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1736	9613	25111	0	0	0
Wind, 10°C	150C1F1	6393	29481	79817	0	0	0
Permanent loads yg= 0.9	150C1F2	6393	28073	76939	0	0	0
Wind angle: 90°	150C1F3	6392	26305	73373	0	0	0
	380C2F1	12786	58962	159635	0	0	0
	380C2F2	12785	56147	153879	0	0	0
	380C2F3	12784	52610	146746	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	5974	18987	0	0	0
Wind, -20°C	150C1F1	6387	20997	69074	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	20683	68635	0	0	0
Wind angle: 90°	150C1F3	6387	20297	68125	0	0	0
	380C2F1	12774	41993	138148	0	0	0
	380C2F2	12774	41367	137270	0	0	0
	380C2F3	12774	40594	136250	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3306	15037	39110	0	0	0
Wind, -5°C	150C1F1	7771	30099	86377	0	0	0
Permanent loads yg= 0.9	150C1F2	7771	28994	84294	0	0	0
Wind angle: 90°	150C1F3	7771	27619	81769	0	0	0
	380C2F1	15542	60198	172755	0	0	0
	380C2F2	15542	57987	168588	0	0	0
	380C2F3	15541	55238	163537	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2336	6466	20820	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20854	68536	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	20569	68202	0	0	0
Wind angle: 90°	150C1F3	7593	20216	67817	0	0	0
	380C2F1	15187	41708	137072	0	0	0
	380C2F2	15187	41137	136404	0	0	0
	380C2F3	15186	40431	135633	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1735	8312	22368	0	0	0
Wind, 10°C	150C1F1	6392	26006	72777	0	0	0
Permanent loads yg= 0.9	150C1F2	6392	24920	70632	0	0	0
Wind angle: -45°	150C1F3	6392	23565	68013	0	0	0
	380C2F1	12784	52013	145554	0	0	0
	380C2F2	12784	49840	141264	0	0	0
	380C2F3	12783	47130	136026	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	5671	18504	0	0	0
Wind, -20°C	150C1F1	6387	20232	68043	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	19999	67759	0	0	0
Wind angle: -45°	150C1F3	6387	19710	67430	0	0	0
	380C2F1	12774	40465	136087	0	0	0
	380C2F2	12774	39998	135518	0	0	0
	380C2F3	12774	39420	134861	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3305	13212	35636	0	0	0
Wind, -5°C	150C1F1	7771	27388	81353	0	0	0
Permanent loads yg= 0.9	150C1F2	7770	26553	79875	0	0	0
Wind angle: -45°	150C1F3	7770	25518	78108	0	0	0
	380C2F1	15541	54776	162707	0	0	0
	380C2F2	15541	53105	159750	0	0	0
	380C2F3	15540	51036	156216	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	6206	20501	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20156	67755	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	19942	67542	0	0	0
Wind angle: -45°	150C1F3	7593	19676	67299	0	0	0
	380C2F1	15186	40313	135511	0	0	0
	380C2F2	15186	39884	135085	0	0	0
	380C2F3	15186	39352	134597	0	0	0
	RTG	0	0	0	0	0	0

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5421	19460	2313	5421	-19460
	150C1F1	8522	19719	71422	8522	19719	-71422
	150C1F2	8522	19671	71415	8522	19671	-71415
	150C1F3	8522	19611	71408	8522	19611	-71408
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5963	22016	2312	5963	-22016
	150C1F1	8518	22161	82039	8518	22161	-82039
	150C1F2	8518	22147	82040	8518	22147	-82040
	150C1F3	8518	22130	82043	8518	22130	-82043
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8610	30911	3883	8610	-30911
	150C1F1	9901	23444	85630	9901	23444	-85630
	150C1F2	9901	23404	85628	9901	23404	-85628
	150C1F3	9901	23354	85627	9901	23354	-85627
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6463	23882	2915	6463	-23882
	150C1F1	9725	21883	81000	9725	21883	-81000
	150C1F2	9725	21869	81002	9725	21869	-81002
	150C1F3	9725	21852	81005	9725	21852	-81005
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6149	20066	2314	8980	-24860
	150C1F1	8523	21624	72609	8524	28843	-83359
	150C1F2	8523	21397	72397	8524	27877	-81663
	150C1F3	8523	21115	72156	8524	26679	-79631
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6146	22050	2312	6761	-22572
	150C1F1	8518	22659	82076	8518	24266	-83095
	150C1F2	8518	22603	82063	8518	24058	-82907
	150C1F3	8518	22533	82050	8518	23800	-82693
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9707	31669	3884	13833	-37952
	150C1F1	9901	24983	86283	9902	30568	-93216
	150C1F2	9901	24803	86159	9902	29821	-92068
	150C1F3	9901	24579	86020	9902	28897	-90716
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6640	23894	2915	7208	-24240
	150C1F1	9725	22373	81008	9726	23915	-81781
	150C1F2	9725	22319	81000	9725	23718	-81634
	150C1F3	9725	22250	80992	9725	23473	-81468
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	10178	27217	2314	10178	-27217
	150C1F1	8525	31968	89093	8525	31968	-89093
	150C1F2	8525	30695	86719	8525	30695	-86719
	150C1F3	8524	29109	83834	8524	29109	-83834
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/1b	GW / opgw	2312	7025	22909	2312	7025	-22909
Wind, -20°C	150C1F1	8518	24939	83786	8518	24939	-83786
Permanent loads yg= 1.2	150C1F2	8518	24664	83489	8518	24664	-83489
Wind angle: 90°	150C1F3	8518	24323	83149	8518	24323	-83149
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3885	15569	41090	3885	15569	-41090
Wind, -5°C	150C1F1	9903	33002	97207	9903	33002	-97207
Permanent loads yg= 1.2	150C1F2	9903	32007	95535	9903	32007	-95535
Wind angle: 90°	150C1F3	9903	30774	93540	9903	30774	-93540
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2915	7446	24476	2915	7446	-24476
Construction/maintenance, +5°C	150C1F1	9726	24550	82329	9726	24550	-82329
Permanent loads yg= 1.2	150C1F2	9726	24291	82093	9726	24291	-82093
Wind angle: 90°	150C1F3	9726	23969	81824	9726	23969	-81824
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	2314	8980	24860	2313	6149	-20066
Wind, 10°C	150C1F1	8524	28843	83359	8523	21624	-72609
Permanent loads yg= 1.2	150C1F2	8524	27877	81663	8523	21397	-72397
Wind angle: -45°	150C1F3	8524	26679	79631	8523	21115	-72156
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	2312	6761	22572	2312	6146	-22050
Wind, -20°C	150C1F1	8518	24266	83095	8518	22659	-82076
Permanent loads yg= 1.2	150C1F2	8518	24058	82907	8518	22603	-82063
Wind angle: -45°	150C1F3	8518	23800	82693	8518	22533	-82050
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3884	13833	37952	3883	9707	-31669
Wind, -5°C	150C1F1	9902	30568	93216	9901	24983	-86283
Permanent loads yg= 1.2	150C1F2	9902	29821	92068	9901	24803	-86159
Wind angle: -45°	150C1F3	9902	28897	90716	9901	24579	-86020
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2915	7208	24240	2915	6640	-23894
Construction/maintenance, +5°C	150C1F1	9726	23915	81781	9725	22373	-81008
Permanent loads yg= 1.2	150C1F2	9725	23718	81634	9725	22319	-81000
Wind angle: -45°	150C1F3	9725	23473	81468	9725	22250	-80992
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1735	4318	15341	1735	4318	-15341
Wind, 10°C	150C1F1	6390	15727	56526	6390	15727	-56526
Permanent loads yg= 0.9	150C1F2	6390	15677	56510	6390	15677	-56510
Wind angle: 0°	150C1F3	6390	15614	56493	6390	15614	-56493
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	4791	17643	1734	4791	-17643
Wind, -20°C	150C1F1	6387	17949	66319	6387	17949	-66319
Permanent loads yg= 0.9	150C1F2	6387	17935	66319	6387	17935	-66319
Wind angle: 0°	150C1F3	6387	17917	66321	6387	17917	-66321
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/3	GW / opgw	3304	7647	27318	3304	7647	-27318
Wind, -5°C	150C1F1	7769	19534	71039	7769	19534	-71039
Permanent loads yg= 0.9	150C1F2	7769	19493	71033	7769	19493	-71033
Wind angle: 0°	150C1F3	7769	19441	71027	7769	19441	-71027
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	5417	19980	2336	5417	-19980
Construction/maintenance, +5°C	150C1F1	7593	18004	66526	7593	18004	-66526
Permanent loads yg= 0.9	150C1F2	7593	17991	66527	7593	17991	-66527
Wind angle: 0°	150C1F3	7593	17973	66529	7593	17973	-66529
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1735	5126	16245	1735	8312	-22368
Wind, 10°C	150C1F1	6391	17810	58375	6392	26006	-72777
Permanent loads yg= 0.9	150C1F2	6391	17555	58061	6392	24920	-70632
Wind angle: 45°	150C1F3	6391	17240	57698	6392	23565	-68013
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	4983	17711	1734	5671	-18504
Wind, -20°C	150C1F1	6387	18466	66429	6387	20232	-68043
Permanent loads yg= 0.9	150C1F2	6387	18407	66405	6387	19999	-67759
Wind angle: 45°	150C1F3	6387	18333	66378	6387	19710	-67430
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3304	8802	28293	3305	13212	-35636
Wind, -5°C	150C1F1	7769	21169	72052	7771	27388	-81353
Permanent loads yg= 0.9	150C1F2	7769	20974	71871	7770	26553	-79875
Wind angle: 45°	150C1F3	7769	20732	71665	7770	25518	-78108
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	5599	20009	2336	6206	-20501
Construction/maintenance, +5°C	150C1F1	7593	18508	66582	7593	20156	-67755
Permanent loads yg= 0.9	150C1F2	7593	18451	66566	7593	19942	-67542
Wind angle: 45°	150C1F3	7593	18380	66549	7593	19676	-67299
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1736	9613	25111	1736	9613	-25111
Wind, 10°C	150C1F1	6393	29481	79817	6393	29481	-79817
Permanent loads yg= 0.9	150C1F2	6393	28073	76939	6393	28073	-76939
Wind angle: 90°	150C1F3	6392	26305	73373	6392	26305	-73373
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	5974	18987	1734	5974	-18987
Wind, -20°C	150C1F1	6387	20997	69074	6387	20997	-69074
Permanent loads yg= 0.9	150C1F2	6387	20683	68635	6387	20683	-68635
Wind angle: 90°	150C1F3	6387	20297	68125	6387	20297	-68125
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3306	15037	39110	3306	15037	-39110
Wind, -5°C	150C1F1	7771	30099	86377	7771	30099	-86377
Permanent loads yg= 0.9	150C1F2	7771	28994	84294	7771	28994	-84294
Wind angle: 90°	150C1F3	7771	27619	81769	7771	27619	-81769
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

NL3/4	GW / opgw	2336	6466	20820	2336	6466	-20820
Construction/maintenance, +5°C	150C1F1	7593	20854	68536	7593	20854	-68536
Permanent loads yg= 0.9	150C1F2	7593	20569	68202	7593	20569	-68202
Wind angle: 90°	150C1F3	7593	20216	67817	7593	20216	-67817
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1a	GW / opgw	1735	8312	22368	1735	5126	-16245
Wind, 10°C	150C1F1	6392	26006	72777	6391	17810	-58375
Permanent loads yg= 0.9	150C1F2	6392	24920	70632	6391	17555	-58061
Wind angle: -45°	150C1F3	6392	23565	68013	6391	17240	-57698
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/1b	GW / opgw	1734	5671	18504	1734	4983	-17711
Wind, -20°C	150C1F1	6387	20232	68043	6387	18466	-66429
Permanent loads yg= 0.9	150C1F2	6387	19999	67759	6387	18407	-66405
Wind angle: -45°	150C1F3	6387	19710	67430	6387	18333	-66378
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/3	GW / opgw	3305	13212	35636	3304	8802	-28293
Wind, -5°C	150C1F1	7771	27388	81353	7769	21169	-72052
Permanent loads yg= 0.9	150C1F2	7770	26553	79875	7769	20974	-71871
Wind angle: -45°	150C1F3	7770	25518	78108	7769	20732	-71665
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0
NL3/4	GW / opgw	2336	6206	20501	2336	5599	-20009
Construction/maintenance, +5°C	150C1F1	7593	20156	67755	7593	18508	-66582
Permanent loads yg= 0.9	150C1F2	7593	19942	67542	7593	18451	-66566
Wind angle: -45°	150C1F3	7593	19676	67299	7593	18380	-66549
	380C2F1	0	0	0	0	0	0
	380C2F2	0	0	0	0	0	0
	380C2F3	0	0	0	0	0	0
	RTG	0	0	0	0	0	0

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17045	39437	142845	17045	39437	-142845
	380C2F2	17045	39342	142830	17045	39342	-142830
	380C2F3	17045	39221	142815	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	44322	164077	17036	44322	-164077
	380C2F2	17036	44295	164081	17036	44295	-164081
	380C2F3	17036	44260	164085	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19802	46887	171259	19802	46887	-171259
	380C2F2	19802	46808	171256	19802	46808	-171256
	380C2F3	19802	46707	171253	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19451	43765	162000	19451	43765	-162000
	380C2F2	19451	43738	162004	19451	43738	-162004
	380C2F3	19451	43704	162010	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17045	43248	145217	17048	57685	-166717
	380C2F2	17045	42794	144795	17048	55754	-163327
	380C2F3	17045	42229	144312	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	45318	164152	17036	48532	-166189
	380C2F2	17036	45207	164127	17036	48117	-165814
	380C2F3	17036	45066	164100	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19803	49966	172566	19805	61135	-186431
	380C2F2	19803	49606	172319	19805	59641	-184137
	380C2F3	19803	49157	172039	19804	57794	-181432
	RTG	0	0	0	7768	22876	-67855
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19451	44747	162016	19451	47830	-163562
	380C2F2	19451	44637	162000	19451	47436	-163268
	380C2F3	19451	44499	161985	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17050	63935	178185	17050	63935	-178185
	380C2F2	17049	61390	173439	17049	61390	-173439
	380C2F3	17048	58219	167668	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	49879	167572	17036	49879	-167572
	380C2F2	17036	49328	166979	17036	49328	-166979
	380C2F3	17036	48646	166297	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19806	66003	194414	19806	66003	-194414
	380C2F2	19806	64014	191070	19806	64014	-191070
	380C2F3	19805	61548	187080	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19451	49100	164657	19451	49100	-164657
	380C2F2	19451	48582	164186	19451	48582	-164186
	380C2F3	19451	47938	163647	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17048	57685	166717	17045	43248	-145217
	380C2F2	17048	55754	163327	17045	42794	-144795
	380C2F3	17047	53358	159262	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	48532	166189	17036	45318	-164152
	380C2F2	17036	48117	165814	17036	45207	-164127
	380C2F3	17036	47600	165386	17036	45066	-164100
	RTG	0	0	0	4618	11997	-43633
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19805	61135	186431	19803	49966	-172566
	380C2F2	19805	59641	184137	19803	49606	-172319
	380C2F3	19804	57794	181432	19803	49157	-172039
	RTG	0	0	0	7767	18232	-62203
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19451	47830	163562	19451	44747	-162016
	380C2F2	19451	47436	163268	19451	44637	-162000
	380C2F3	19451	46945	162935	19451	44499	-161985
	RTG	0	0	0	5823	13083	-47686
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	12781	31454	113052	12781	31454	-113052
	380C2F2	12781	31354	113020	12781	31354	-113020
	380C2F3	12781	31229	112987	12781	31229	-112987
	RTG	0	0	0	3464	8457	-30569
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	12774	35897	132637	12774	35897	-132637
	380C2F2	12774	35870	132639	12774	35870	-132639
	380C2F3	12774	35835	132641	12774	35835	-132641
	RTG	0	0	0	3463	9430	-34888

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15538	39068	142079	15538	39068	-142079	
	380C2F2	15538	38986	142066	15538	38986	-142066	
	380C2F3	15538	38883	142054	15538	38883	-142054	
	RTG	0	0	0	6610	15011	-54458	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	36009	133052	15186	36009	-133052	
	380C2F2	15186	35981	133054	15186	35981	-133054	
	380C2F3	15186	35946	133059	15186	35946	-133059	
	RTG	0	0	0	4667	10769	-39885	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12781	35619	116750	12784	52013	-145554	
	380C2F2	12781	35110	116122	12784	49840	-141264	
	380C2F3	12781	34481	115397	12783	47130	-136026	
	RTG	0	0	0	3465	12977	-37311	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	36933	132858	12774	40465	-136087	
	380C2F2	12774	36815	132809	12774	39998	-135518	
	380C2F3	12774	36666	132755	12774	39420	-134861	
	RTG	0	0	0	3463	10442	-35549	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15539	42338	144103	15541	54776	-162707	
	380C2F2	15539	41948	143742	15541	53105	-159750	
	380C2F3	15539	41464	143329	15540	51036	-156216	
	RTG	0	0	0	6611	21321	-62052	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	37015	133164	15186	40313	-135511	
	380C2F2	15186	36902	133132	15186	39884	-135085	
	380C2F3	15186	36759	133099	15186	39352	-134597	
	RTG	0	0	0	4667	11702	-40251	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12786	58962	159635	12786	58962	-159635	
	380C2F2	12785	56147	153879	12785	56147	-153879	
	380C2F3	12784	52610	146746	12784	52610	-146746	
	RTG	0	0	0	3465	14539	-40424	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	41993	138148	12774	41993	-138148	
	380C2F2	12774	41367	137270	12774	41367	-137270	
	380C2F3	12774	40594	136250	12774	40594	-136250	
	RTG	0	0	0	3463	10775	-35958	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15542	60198	172755	15542	60198	-172755	
	380C2F2	15542	57987	168588	15542	57987	-168588	
	380C2F3	15541	55238	163537	15541	55238	-163537	
	RTG	0	0	0	6612	23468	-65790	

NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	15187	41708	137072	15187	41708	-137072
	380C2F2	15187	41137	136404	15187	41137	-136404
	380C2F3	15186	40431	135633	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40507
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	12784	52013	145554	12781	35619	-116750
	380C2F2	12784	49840	141264	12781	35110	-116122
	380C2F3	12783	47130	136026	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	12774	40465	136087	12774	36933	-132858
	380C2F2	12774	39998	135518	12774	36815	-132809
	380C2F3	12774	39420	134861	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	15541	54776	162707	15539	42338	-144103
	380C2F2	15541	53105	159750	15539	41948	-143742
	380C2F3	15540	51036	156216	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	15186	40313	135511	15186	37015	-133164
	380C2F2	15186	39884	135085	15186	36902	-133132
	380C2F3	15186	39352	134597	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17045	39437	142845	17045	39437	-142845
	380C2F2	17045	39342	142830	17045	39342	-142830
	380C2F3	17045	39221	142815	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	44322	164077	17036	44322	-164077
	380C2F2	17036	44295	164081	17036	44295	-164081
	380C2F3	17036	44260	164085	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19802	46887	171259	19802	46887	-171259
	380C2F2	19802	46808	171256	19802	46808	-171256
	380C2F3	19802	46707	171253	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19451	43765	162000	19451	43765	-162000
	380C2F2	19451	43738	162004	19451	43738	-162004
	380C2F3	19451	43704	162010	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17045	43248	145217	17048	57685	-166717
	380C2F2	17045	42794	144795	17048	55754	-163327
	380C2F3	17045	42229	144312	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17036	45318	164152	17036	48532	-166189
	380C2F2	17036	45207	164127	17036	48117	-165814
	380C2F3	17036	45066	164100	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19803	49966	172566	19805	61135	-186431
	380C2F2	19803	49606	172319	19805	59641	-184137
	380C2F3	19803	49157	172039	19804	57794	-181432
	RTG	0	0	0	7768	22876	-67855
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	19451	44747	162016	19451	47830	-163562
	380C2F2	19451	44637	162000	19451	47436	-163268
	380C2F3	19451	44499	161985	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	0	0	0
	150C1F1	0	0	0	0	0	0
	150C1F2	0	0	0	0	0	0
	150C1F3	0	0	0	0	0	0
	380C2F1	17050	63935	178185	17050	63935	-178185
	380C2F2	17049	61390	173439	17049	61390	-173439
	380C2F3	17048	58219	167668	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164

NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17036	49879	167572	17036	49879	-167572	
	380C2F2	17036	49328	166979	17036	49328	-166979	
	380C2F3	17036	48646	166297	17036	48646	-166297	
	RTG	0	0	0	4618	13008	-44292	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19806	66003	194414	19806	66003	-194414	
	380C2F2	19806	64014	191070	19806	64014	-191070	
	380C2F3	19805	61548	187080	19805	61548	-187080	
	RTG	0	0	0	7769	24883	-71068	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19451	49100	164657	19451	49100	-164657	
	380C2F2	19451	48582	164186	19451	48582	-164186	
	380C2F3	19451	47938	163647	19451	47938	-163647	
	RTG	0	0	0	5823	14030	-48105	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17048	57685	166717	17045	43248	-145217	
	380C2F2	17048	55754	163327	17045	42794	-144795	
	380C2F3	17047	53358	159262	17045	42229	-144312	
	RTG	0	0	0	4620	11522	-39293	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	17036	48532	166189	17036	45318	-164152	
	380C2F2	17036	48117	165814	17036	45207	-164127	
	380C2F3	17036	47600	165386	17036	45066	-164100	
	RTG	0	0	0	4618	11997	-43633	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19805	61135	186431	19803	49966	-172566	
	380C2F2	19805	59641	184137	19803	49606	-172319	
	380C2F3	19804	57794	181432	19803	49157	-172039	
	RTG	0	0	0	7767	18232	-62203	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 1.2	150C1F2	0	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	19451	47830	163562	19451	44747	-162016	
	380C2F2	19451	47436	163268	19451	44637	-162000	
	380C2F3	19451	46945	162935	19451	44499	-161985	
	RTG	0	0	0	5823	13083	-47686	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12781	31454	113052	12781	31454	-113052	
	380C2F2	12781	31354	113020	12781	31354	-113020	
	380C2F3	12781	31229	112987	12781	31229	-112987	
	RTG	0	0	0	3464	8457	-30569	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	35897	132637	12774	35897	-132637	
	380C2F2	12774	35870	132639	12774	35870	-132639	
	380C2F3	12774	35835	132641	12774	35835	-132641	
	RTG	0	0	0	3463	9430	-34888	

NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15538	39068	142079	15538	39068	-142079	
	380C2F2	15538	38986	142066	15538	38986	-142066	
	380C2F3	15538	38883	142054	15538	38883	-142054	
	RTG	0	0	0	6610	15011	-54458	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 0°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	36009	133052	15186	36009	-133052	
	380C2F2	15186	35981	133054	15186	35981	-133054	
	380C2F3	15186	35946	133059	15186	35946	-133059	
	RTG	0	0	0	4667	10769	-39885	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12781	35619	116750	12784	52013	-145554	
	380C2F2	12781	35110	116122	12784	49840	-141264	
	380C2F3	12781	34481	115397	12783	47130	-136026	
	RTG	0	0	0	3465	12977	-37311	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	36933	132858	12774	40465	-136087	
	380C2F2	12774	36815	132809	12774	39998	-135518	
	380C2F3	12774	36666	132755	12774	39420	-134861	
	RTG	0	0	0	3463	10442	-35549	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15539	42338	144103	15541	54776	-162707	
	380C2F2	15539	41948	143742	15541	53105	-159750	
	380C2F3	15539	41464	143329	15540	51036	-156216	
	RTG	0	0	0	6611	21321	-62052	
NL3/4	GW / opgw	0	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 45°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15186	37015	133164	15186	40313	-135511	
	380C2F2	15186	36902	133132	15186	39884	-135085	
	380C2F3	15186	36759	133099	15186	39352	-134597	
	RTG	0	0	0	4667	11702	-40251	
NL3/1a	GW / opgw	0	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12786	58962	159635	12786	58962	-159635	
	380C2F2	12785	56147	153879	12785	56147	-153879	
	380C2F3	12784	52610	146746	12784	52610	-146746	
	RTG	0	0	0	3465	14539	-40424	
NL3/1b	GW / opgw	0	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	12774	41993	138148	12774	41993	-138148	
	380C2F2	12774	41367	137270	12774	41367	-137270	
	380C2F3	12774	40594	136250	12774	40594	-136250	
	RTG	0	0	0	3463	10775	-35958	
NL3/3	GW / opgw	0	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0	0
	380C2F1	15542	60198	172755	15542	60198	-172755	
	380C2F2	15542	57987	168588	15542	57987	-168588	
	380C2F3	15541	55238	163537	15541	55238	-163537	
	RTG	0	0	0	6612	23468	-65790	

NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: 90°	150C1F3	0	0	0	0	0	0
	380C2F1	15187	41708	137072	15187	41708	-137072
	380C2F2	15187	41137	136404	15187	41137	-136404
	380C2F3	15186	40431	135633	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40507
NL3/1a	GW / opgw	0	0	0	0	0	0
Wind, 10°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	12784	52013	145554	12781	35619	-116750
	380C2F2	12784	49840	141264	12781	35110	-116122
	380C2F3	12783	47130	136026	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b	GW / opgw	0	0	0	0	0	0
Wind, -20°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	12774	40465	136087	12774	36933	-132858
	380C2F2	12774	39998	135518	12774	36815	-132809
	380C2F3	12774	39420	134861	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3	GW / opgw	0	0	0	0	0	0
Wind, -5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	15541	54776	162707	15539	42338	-144103
	380C2F2	15541	53105	159750	15539	41948	-143742
	380C2F3	15540	51036	156216	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4	GW / opgw	0	0	0	0	0	0
Construction/maintenance, +5°C	150C1F1	0	0	0	0	0	0
Permanent loads yg= 0.9	150C1F2	0	0	0	0	0	0
Wind angle: -45°	150C1F3	0	0	0	0	0	0
	380C2F1	15186	40313	135511	15186	37015	-133164
	380C2F2	15186	39884	135085	15186	36902	-133132
	380C2F3	15186	39352	134597	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5421	19460	0	0	0
	150C1F1	8522	19719	71422	0	0	0
	150C1F2	8522	19671	71415	0	0	0
	150C1F3	8522	19611	71408	0	0	0
	380C2F1	0	0	0	17045	39437	-142845
	380C2F2	0	0	0	17045	39342	-142830
	380C2F3	0	0	0	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5963	22016	0	0	0
	150C1F1	8518	22161	82039	0	0	0
	150C1F2	8518	22147	82040	0	0	0
	150C1F3	8518	22130	82043	0	0	0
	380C2F1	0	0	0	17036	44322	-164077
	380C2F2	0	0	0	17036	44295	-164081
	380C2F3	0	0	0	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8610	30911	0	0	0
	150C1F1	9901	23444	85630	0	0	0
	150C1F2	9901	23404	85628	0	0	0
	150C1F3	9901	23354	85627	0	0	0
	380C2F1	0	0	0	19802	46887	-171259
	380C2F2	0	0	0	19802	46808	-171256
	380C2F3	0	0	0	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6463	23882	0	0	0
	150C1F1	9725	21883	81000	0	0	0
	150C1F2	9725	21869	81002	0	0	0
	150C1F3	9725	21852	81005	0	0	0
	380C2F1	0	0	0	19451	43765	-162000
	380C2F2	0	0	0	19451	43738	-162004
	380C2F3	0	0	0	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6149	20066	0	0	0
	150C1F1	8523	21624	72609	0	0	0
	150C1F2	8523	21397	72397	0	0	0
	150C1F3	8523	21115	72156	0	0	0
	380C2F1	0	0	0	17048	57685	-166717
	380C2F2	0	0	0	17048	55754	-163327
	380C2F3	0	0	0	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6146	22050	0	0	0
	150C1F1	8518	22659	82076	0	0	0
	150C1F2	8518	22603	82063	0	0	0
	150C1F3	8518	22533	82050	0	0	0
	380C2F1	0	0	0	17036	48532	-166189
	380C2F2	0	0	0	17036	48117	-165814
	380C2F3	0	0	0	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9707	31669	0	0	0
	150C1F1	9901	24983	86283	0	0	0
	150C1F2	9901	24803	86159	0	0	0
	150C1F3	9901	24579	86020	0	0	0
	380C2F1	0	0	0	19805	61135	-186431
	380C2F2	0	0	0	19805	59641	-184137
	380C2F3	0	0	0	19804	57794	-181432
	RTG	0	0	0	7768	22876	-67855
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6640	23894	0	0	0
	150C1F1	9725	22373	81008	0	0	0
	150C1F2	9725	22319	81000	0	0	0
	150C1F3	9725	22250	80992	0	0	0
	380C2F1	0	0	0	19451	47830	-163562
	380C2F2	0	0	0	19451	47436	-163268
	380C2F3	0	0	0	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	10178	27217	0	0	0
	150C1F1	8525	31968	89093	0	0	0
	150C1F2	8525	30695	86719	0	0	0
	150C1F3	8524	29109	83834	0	0	0
	380C2F1	0	0	0	17050	63935	-178185
	380C2F2	0	0	0	17049	61390	-173439
	380C2F3	0	0	0	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	7025	22909	0	0	0
	150C1F1	8518	24939	83786	0	0	0
	150C1F2	8518	24664	83489	0	0	0
	150C1F3	8518	24323	83149	0	0	0
	380C2F1	0	0	0	17036	49879	-167572
	380C2F2	0	0	0	17036	49328	-166979
	380C2F3	0	0	0	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	15569	41090	0	0	0
	150C1F1	9903	33002	97207	0	0	0
	150C1F2	9903	32007	95535	0	0	0
	150C1F3	9903	30774	93540	0	0	0
	380C2F1	0	0	0	19806	66003	-194414
	380C2F2	0	0	0	19806	64014	-191070
	380C2F3	0	0	0	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	7446	24476	0	0	0
	150C1F1	9726	24550	82329	0	0	0
	150C1F2	9726	24291	82093	0	0	0
	150C1F3	9726	23969	81824	0	0	0
	380C2F1	0	0	0	19451	49100	-164657
	380C2F2	0	0	0	19451	48582	-164186
	380C2F3	0	0	0	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2314	8980	24860	0	0	0
	150C1F1	8524	28843	83359	0	0	0
	150C1F2	8524	27877	81663	0	0	0
	150C1F3	8524	26679	79631	0	0	0
	380C2F1	0	0	0	17045	43248	-145217
	380C2F2	0	0	0	17045	42794	-144795
	380C2F3	0	0	0	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	6761	22572	0	0	0
	150C1F1	8518	24266	83095	0	0	0
	150C1F2	8518	24058	82907	0	0	0
	150C1F3	8518	23800	82693	0	0	0
	380C2F1	0	0	0	17036	45318	-164152
	380C2F2	0	0	0	17036	45207	-164127
	380C2F3	0	0	0	17036	45066	-164100
	RTG	0	0	0	4618	11997	-43633
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3884	13833	37952	0	0	0
	150C1F1	9902	30568	93216	0	0	0
	150C1F2	9902	29821	92068	0	0	0
	150C1F3	9902	28897	90716	0	0	0
	380C2F1	0	0	0	19803	49966	-172566
	380C2F2	0	0	0	19803	49606	-172319
	380C2F3	0	0	0	19803	49157	-172039
	RTG	0	0	0	7767	18232	-62203
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2915	7208	24240	0	0	0
	150C1F1	9726	23915	81781	0	0	0
	150C1F2	9725	23718	81634	0	0	0
	150C1F3	9725	23473	81468	0	0	0
	380C2F1	0	0	0	19451	44747	-162016
	380C2F2	0	0	0	19451	44637	-162000
	380C2F3	0	0	0	19451	44499	-161985
	RTG	0	0	0	5823	13083	-47686
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1735	4318	15341	0	0	0
	150C1F1	6390	15727	56526	0	0	0
	150C1F2	6390	15677	56510	0	0	0
	150C1F3	6390	15614	56493	0	0	0
	380C2F1	0	0	0	12781	31454	-113052
	380C2F2	0	0	0	12781	31354	-113020
	380C2F3	0	0	0	12781	31229	-112987
	RTG	0	0	0	3464	8457	-30569
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	4791	17643	0	0	0
	150C1F1	6387	17949	66319	0	0	0
	150C1F2	6387	17935	66319	0	0	0
	150C1F3	6387	17917	66321	0	0	0
	380C2F1	0	0	0	12774	35897	-132637
	380C2F2	0	0	0	12774	35870	-132639
	380C2F3	0	0	0	12774	35835	-132641
	RTG	0	0	0	3463	9430	-34888

NL3/3	GW / opgw	3304	7647	27318	0	0	0
Wind, -5°C	150C1F1	7769	19534	71039	0	0	0
Permanent loads yg= 0.9	150C1F2	7769	19493	71033	0	0	0
Wind angle: 0°	150C1F3	7769	19441	71027	0	0	0
	380C2F1	0	0	0	15538	39068	-142079
	380C2F2	0	0	0	15538	38986	-142066
	380C2F3	0	0	0	15538	38883	-142054
	RTG	0	0	0	6610	15011	-54458
NL3/4	GW / opgw	2336	5417	19980	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	18004	66526	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	17991	66527	0	0	0
Wind angle: 0°	150C1F3	7593	17973	66529	0	0	0
	380C2F1	0	0	0	15186	36009	-133052
	380C2F2	0	0	0	15186	35981	-133054
	380C2F3	0	0	0	15186	35946	-133059
	RTG	0	0	0	4667	10769	-39885
NL3/1a	GW / opgw	1735	5126	16245	0	0	0
Wind, 10°C	150C1F1	6391	17810	58375	0	0	0
Permanent loads yg= 0.9	150C1F2	6391	17555	58061	0	0	0
Wind angle: 45°	150C1F3	6391	17240	57698	0	0	0
	380C2F1	0	0	0	12784	52013	-145554
	380C2F2	0	0	0	12784	49840	-141264
	380C2F3	0	0	0	12783	47130	-136026
	RTG	0	0	0	3465	12977	-37311
NL3/1b	GW / opgw	1734	4983	17711	0	0	0
Wind, -20°C	150C1F1	6387	18466	66429	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	18407	66405	0	0	0
Wind angle: 45°	150C1F3	6387	18333	66378	0	0	0
	380C2F1	0	0	0	12774	40465	-136087
	380C2F2	0	0	0	12774	39998	-135518
	380C2F3	0	0	0	12774	39420	-134861
	RTG	0	0	0	3463	10442	-35549
NL3/3	GW / opgw	3304	8802	28293	0	0	0
Wind, -5°C	150C1F1	7769	21169	72052	0	0	0
Permanent loads yg= 0.9	150C1F2	7769	20974	71871	0	0	0
Wind angle: 45°	150C1F3	7769	20732	71665	0	0	0
	380C2F1	0	0	0	15541	54776	-162707
	380C2F2	0	0	0	15541	53105	-159750
	380C2F3	0	0	0	15540	51036	-156216
	RTG	0	0	0	6611	21321	-62052
NL3/4	GW / opgw	2336	5599	20009	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	18508	66582	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	18451	66566	0	0	0
Wind angle: 45°	150C1F3	7593	18380	66549	0	0	0
	380C2F1	0	0	0	15186	40313	-135511
	380C2F2	0	0	0	15186	39884	-135085
	380C2F3	0	0	0	15186	39352	-134597
	RTG	0	0	0	4667	11702	-40251
NL3/1a	GW / opgw	1736	9613	25111	0	0	0
Wind, 10°C	150C1F1	6393	29481	79817	0	0	0
Permanent loads yg= 0.9	150C1F2	6393	28073	76939	0	0	0
Wind angle: 90°	150C1F3	6392	26305	73373	0	0	0
	380C2F1	0	0	0	12786	58962	-159635
	380C2F2	0	0	0	12785	56147	-153879
	380C2F3	0	0	0	12784	52610	-146746
	RTG	0	0	0	3465	14539	-40424
NL3/1b	GW / opgw	1734	5974	18987	0	0	0
Wind, -20°C	150C1F1	6387	20997	69074	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	20683	68635	0	0	0
Wind angle: 90°	150C1F3	6387	20297	68125	0	0	0
	380C2F1	0	0	0	12774	41993	-138148
	380C2F2	0	0	0	12774	41367	-137270
	380C2F3	0	0	0	12774	40594	-136250
	RTG	0	0	0	3463	10775	-35958
NL3/3	GW / opgw	3306	15037	39110	0	0	0
Wind, -5°C	150C1F1	7771	30099	86377	0	0	0
Permanent loads yg= 0.9	150C1F2	7771	28994	84294	0	0	0
Wind angle: 90°	150C1F3	7771	27619	81769	0	0	0
	380C2F1	0	0	0	15542	60198	-172755
	380C2F2	0	0	0	15542	57987	-168588
	380C2F3	0	0	0	15541	55238	-163537
	RTG	0	0	0	6612	23468	-65790

NL3/4	GW / opgw	2336	6466	20820	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20854	68536	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	20569	68202	0	0	0
Wind angle: 90°	150C1F3	7593	20216	67817	0	0	0
	380C2F1	0	0	0	15187	41708	-137072
	380C2F2	0	0	0	15187	41137	-136404
	380C2F3	0	0	0	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40507
NL3/1a	GW / opgw	1735	8312	22368	0	0	0
Wind, 10°C	150C1F1	6392	26006	72777	0	0	0
Permanent loads yg= 0.9	150C1F2	6392	24920	70632	0	0	0
Wind angle: -45°	150C1F3	6392	23565	68013	0	0	0
	380C2F1	0	0	0	12781	35619	-116750
	380C2F2	0	0	0	12781	35110	-116122
	380C2F3	0	0	0	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b	GW / opgw	1734	5671	18504	0	0	0
Wind, -20°C	150C1F1	6387	20232	68043	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	19999	67759	0	0	0
Wind angle: -45°	150C1F3	6387	19710	67430	0	0	0
	380C2F1	0	0	0	12774	36933	-132858
	380C2F2	0	0	0	12774	36815	-132809
	380C2F3	0	0	0	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3	GW / opgw	3305	13212	35636	0	0	0
Wind, -5°C	150C1F1	7771	27388	81353	0	0	0
Permanent loads yg= 0.9	150C1F2	7770	26553	79875	0	0	0
Wind angle: -45°	150C1F3	7770	25518	78108	0	0	0
	380C2F1	0	0	0	15539	42338	-144103
	380C2F2	0	0	0	15539	41948	-143742
	380C2F3	0	0	0	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4	GW / opgw	2336	6206	20501	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20156	67755	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	19942	67542	0	0	0
Wind angle: -45°	150C1F3	7593	19676	67299	0	0	0
	380C2F1	0	0	0	15186	37015	-133164
	380C2F2	0	0	0	15186	36902	-133132
	380C2F3	0	0	0	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2313	5421	-19460
	150C1F1	0	0	0	8522	19719	-71422
	150C1F2	0	0	0	8522	19671	-71415
	150C1F3	0	0	0	8522	19611	-71408
	380C2F1	17045	39437	142845	17045	39437	-142845
	380C2F2	17045	39342	142830	17045	39342	-142830
	380C2F3	17045	39221	142815	17045	39221	-142815
	RTG	4620	10674	38843	4620	10674	-38843
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2312	5963	-22016
	150C1F1	0	0	0	8518	22161	-82039
	150C1F2	0	0	0	8518	22147	-82040
	150C1F3	0	0	0	8518	22130	-82043
	380C2F1	17036	44322	164077	17036	44322	-164077
	380C2F2	17036	44295	164081	17036	44295	-164081
	380C2F3	17036	44260	164085	17036	44260	-164085
	RTG	4618	11771	43625	4618	11771	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	3883	8610	-30911
	150C1F1	0	0	0	9901	23444	-85630
	150C1F2	0	0	0	9901	23404	-85628
	150C1F3	0	0	0	9901	23354	-85627
	380C2F1	19802	46887	171259	19802	46887	-171259
	380C2F2	19802	46808	171256	19802	46808	-171256
	380C2F3	19802	46707	171253	19802	46707	-171253
	RTG	7767	16943	61667	7767	16943	-61667
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	0	0	0	2915	6463	-23882
	150C1F1	0	0	0	9725	21883	-81000
	150C1F2	0	0	0	9725	21869	-81002
	150C1F3	0	0	0	9725	21852	-81005
	380C2F1	19451	43765	162000	19451	43765	-162000
	380C2F2	19451	43738	162004	19451	43738	-162004
	380C2F3	19451	43704	162010	19451	43704	-162010
	RTG	5823	12862	47696	5823	12862	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2314	8980	-24860
	150C1F1	0	0	0	8524	28843	-83359
	150C1F2	0	0	0	8524	27877	-81663
	150C1F3	0	0	0	8524	26679	-79631
	380C2F1	17045	43248	145217	17048	57685	-166717
	380C2F2	17045	42794	144795	17048	55754	-163327
	380C2F3	17045	42229	144312	17047	53358	-159262
	RTG	4620	11522	39293	4621	14690	-43701
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2312	6761	-22572
	150C1F1	0	0	0	8518	24266	-83095
	150C1F2	0	0	0	8518	24058	-82907
	150C1F3	0	0	0	8518	23800	-82693
	380C2F1	17036	45318	164152	17036	48532	-166189
	380C2F2	17036	45207	164127	17036	48117	-165814
	380C2F3	17036	45066	164100	17036	47600	-165386
	RTG	4618	11997	43633	4618	12712	-44021
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	3884	13833	-37952
	150C1F1	0	0	0	9902	30568	-93216
	150C1F2	0	0	0	9902	29821	-92068
	150C1F3	0	0	0	9902	28897	-90716
	380C2F1	19803	49966	172566	19805	61135	-186431
	380C2F2	19803	49606	172319	19805	59641	-184137
	380C2F3	19803	49157	172039	19804	57794	-181432
	RTG	7767	18232	62203	7768	22876	-67855
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	0	0	0	2915	7208	-24240
	150C1F1	0	0	0	9726	23915	-81781
	150C1F2	0	0	0	9725	23718	-81634
	150C1F3	0	0	0	9725	23473	-81468
	380C2F1	19451	44747	162016	19451	47830	-163562
	380C2F2	19451	44637	162000	19451	47436	-163268
	380C2F3	19451	44499	161985	19451	46945	-162935
	RTG	5823	13083	47686	5823	13758	-47923
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	0	0	0	2314	10178	-27217
	150C1F1	0	0	0	8525	31968	-89093
	150C1F2	0	0	0	8525	30695	-86719
	150C1F3	0	0	0	8524	29109	-83834
	380C2F1	17050	63935	178185	17050	63935	-178185
	380C2F2	17049	61390	173439	17049	61390	-173439
	380C2F3	17048	58219	167668	17048	58219	-167668
	RTG	4621	16077	46164	4621	16077	-46164

NL3/1b	GW / opgw	0	0	0	2312	7025	-22909
Wind, -20°C	150C1F1	0	0	0	8518	24939	-83786
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	24664	-83489
Wind angle: 90°	150C1F3	0	0	0	8518	24323	-83149
	380C2F1	17036	49879	167572	17036	49879	-167572
	380C2F2	17036	49328	166979	17036	49328	-166979
	380C2F3	17036	48646	166297	17036	48646	-166297
	RTG	4618	13008	44292	4618	13008	-44292
NL3/3	GW / opgw	0	0	0	3885	15569	-41090
Wind, -5°C	150C1F1	0	0	0	9903	33002	-97207
Permanent loads yg= 1.2	150C1F2	0	0	0	9903	32007	-95535
Wind angle: 90°	150C1F3	0	0	0	9903	30774	-93540
	380C2F1	19806	66003	194414	19806	66003	-194414
	380C2F2	19806	64014	191070	19806	64014	-191070
	380C2F3	19805	61548	187080	19805	61548	-187080
	RTG	7769	24883	71068	7769	24883	-71068
NL3/4	GW / opgw	0	0	0	2915	7446	-24476
Construction/maintenance, +5°C	150C1F1	0	0	0	9726	24550	-82329
Permanent loads yg= 1.2	150C1F2	0	0	0	9726	24291	-82093
Wind angle: 90°	150C1F3	0	0	0	9726	23969	-81824
	380C2F1	19451	49100	164657	19451	49100	-164657
	380C2F2	19451	48582	164186	19451	48582	-164186
	380C2F3	19451	47938	163647	19451	47938	-163647
	RTG	5823	14030	48105	5823	14030	-48105
NL3/1a	GW / opgw	0	0	0	2313	6149	-20066
Wind, 10°C	150C1F1	0	0	0	8523	21624	-72609
Permanent loads yg= 1.2	150C1F2	0	0	0	8523	21397	-72397
Wind angle: -45°	150C1F3	0	0	0	8523	21115	-72156
	380C2F1	17048	57685	166717	17048	57685	-166717
	380C2F2	17048	55754	163327	17048	55754	-163327
	380C2F3	17047	53358	159262	17047	53358	-159262
	RTG	4621	14690	43701	4620	11522	-39293
NL3/1b	GW / opgw	0	0	0	2312	6146	-22050
Wind, -20°C	150C1F1	0	0	0	8518	22659	-82076
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	22603	-82063
Wind angle: -45°	150C1F3	0	0	0	8518	22533	-82050
	380C2F1	17036	48532	166189	17036	45318	-164152
	380C2F2	17036	48117	165814	17036	45207	-164127
	380C2F3	17036	47600	165386	17036	45066	-164100
	RTG	4618	12712	44021	4618	11997	-43633
NL3/3	GW / opgw	0	0	0	3883	9707	-31669
Wind, -5°C	150C1F1	0	0	0	9901	24983	-86283
Permanent loads yg= 1.2	150C1F2	0	0	0	9901	24803	-86159
Wind angle: -45°	150C1F3	0	0	0	9901	24579	-86020
	380C2F1	19805	61135	186431	19803	49966	-172566
	380C2F2	19805	59641	184137	19803	49606	-172319
	380C2F3	19804	57794	181432	19803	49157	-172039
	RTG	7768	22876	67855	7767	18232	-62203
NL3/4	GW / opgw	0	0	0	2915	6640	-23894
Construction/maintenance, +5°C	150C1F1	0	0	0	9725	22373	-81008
Permanent loads yg= 1.2	150C1F2	0	0	0	9725	22319	-81000
Wind angle: -45°	150C1F3	0	0	0	9725	22250	-80992
	380C2F1	19451	47830	163562	19451	44747	-162016
	380C2F2	19451	47436	163268	19451	44637	-162000
	380C2F3	19451	46945	162935	19451	44499	-161985
	RTG	5823	13758	47923	5823	13083	-47686
NL3/1a	GW / opgw	0	0	0	1735	4318	-15341
Wind, 10°C	150C1F1	0	0	0	6390	15727	-56526
Permanent loads yg= 0.9	150C1F2	0	0	0	6390	15677	-56510
Wind angle: 0°	150C1F3	0	0	0	6390	15614	-56493
	380C2F1	12781	31454	113052	12781	31454	-113052
	380C2F2	12781	31354	113020	12781	31354	-113020
	380C2F3	12781	31229	112987	12781	31229	-112987
	RTG	3464	8457	30569	3464	8457	-30569
NL3/1b	GW / opgw	0	0	0	1734	4791	-17643
Wind, -20°C	150C1F1	0	0	0	6387	17949	-66319
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	17935	-66319
Wind angle: 0°	150C1F3	0	0	0	6387	17917	-66321
	380C2F1	12774	35897	132637	12774	35897	-132637
	380C2F2	12774	35870	132639	12774	35870	-132639
	380C2F3	12774	35835	132641	12774	35835	-132641
	RTG	3463	9430	34888	3463	9430	-34888

NL3/3	GW / opgw	0	0	0	3304	7647	-27318
Wind, -5°C	150C1F1	0	0	0	7769	19534	-71039
Permanent loads yg= 0.9	150C1F2	0	0	0	7769	19493	-71033
Wind angle: 0°	150C1F3	0	0	0	7769	19441	-71027
	380C2F1	15538	39068	142079	15538	39068	-142079
	380C2F2	15538	38986	142066	15538	38986	-142066
	380C2F3	15538	38883	142054	15538	38883	-142054
	RTG	6610	15011	54458	6610	15011	-54458
NL3/4	GW / opgw	0	0	0	2336	5417	-19980
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	18004	-66526
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	17991	-66527
Wind angle: 0°	150C1F3	0	0	0	7593	17973	-66529
	380C2F1	15186	36009	133052	15186	36009	-133052
	380C2F2	15186	35981	133054	15186	35981	-133054
	380C2F3	15186	35946	133059	15186	35946	-133059
	RTG	4667	10769	39885	4667	10769	-39885
NL3/1a	GW / opgw	0	0	0	1735	8312	-22368
Wind, 10°C	150C1F1	0	0	0	6392	26006	-72777
Permanent loads yg= 0.9	150C1F2	0	0	0	6392	24920	-70632
Wind angle: 45°	150C1F3	0	0	0	6392	23565	-68013
	380C2F1	12781	35619	116750	12784	52013	-145554
	380C2F2	12781	35110	116122	12784	49840	-141264
	380C2F3	12781	34481	115397	12783	47130	-136026
	RTG	3464	9375	31283	3465	12977	-37311
NL3/1b	GW / opgw	0	0	0	1734	5671	-18504
Wind, -20°C	150C1F1	0	0	0	6387	20232	-68043
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	19999	-67759
Wind angle: 45°	150C1F3	0	0	0	6387	19710	-67430
	380C2F1	12774	36933	132858	12774	40465	-136087
	380C2F2	12774	36815	132809	12774	39998	-135518
	380C2F3	12774	36666	132755	12774	39420	-134861
	RTG	3463	9663	34924	3463	10442	-35549
NL3/3	GW / opgw	0	0	0	3305	13212	-35636
Wind, -5°C	150C1F1	0	0	0	7771	27388	-81353
Permanent loads yg= 0.9	150C1F2	0	0	0	7770	26553	-79875
Wind angle: 45°	150C1F3	0	0	0	7770	25518	-78108
	380C2F1	15539	42338	144103	15541	54776	-162707
	380C2F2	15539	41948	143742	15541	53105	-159750
	380C2F3	15539	41464	143329	15540	51036	-156216
	RTG	6610	16350	55181	6611	21321	-62052
NL3/4	GW / opgw	0	0	0	2336	6206	-20501
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	20156	-67755
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	19942	-67542
Wind angle: 45°	150C1F3	0	0	0	7593	19676	-67299
	380C2F1	15186	37015	133164	15186	40313	-135511
	380C2F2	15186	36902	133132	15186	39884	-135085
	380C2F3	15186	36759	133099	15186	39352	-134597
	RTG	4667	10994	39889	4667	11702	-40251
NL3/1a	GW / opgw	0	0	0	1736	9613	-25111
Wind, 10°C	150C1F1	0	0	0	6393	29481	-79817
Permanent loads yg= 0.9	150C1F2	0	0	0	6393	28073	-76939
Wind angle: 90°	150C1F3	0	0	0	6392	26305	-73373
	380C2F1	12786	58962	159635	12786	58962	-159635
	380C2F2	12785	56147	153879	12785	56147	-153879
	380C2F3	12784	52610	146746	12784	52610	-146746
	RTG	3465	14539	40424	3465	14539	-40424
NL3/1b	GW / opgw	0	0	0	1734	5974	-18987
Wind, -20°C	150C1F1	0	0	0	6387	20997	-69074
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	20683	-68635
Wind angle: 90°	150C1F3	0	0	0	6387	20297	-68125
	380C2F1	12774	41993	138148	12774	41993	-138148
	380C2F2	12774	41367	137270	12774	41367	-137270
	380C2F3	12774	40594	136250	12774	40594	-136250
	RTG	3463	10775	35958	3463	10775	-35958
NL3/3	GW / opgw	0	0	0	3306	15037	-39110
Wind, -5°C	150C1F1	0	0	0	7771	30099	-86377
Permanent loads yg= 0.9	150C1F2	0	0	0	7771	28994	-84294
Wind angle: 90°	150C1F3	0	0	0	7771	27619	-81769
	380C2F1	15542	60198	172755	15542	60198	-172755
	380C2F2	15542	57987	168588	15542	57987	-168588
	380C2F3	15541	55238	163537	15541	55238	-163537
	RTG	6612	23468	65790	6612	23468	-65790

NL3/4	GW / opgw	0	0	0	2336	6466	-20820
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	20854	-68536
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	20569	-68202
Wind angle: 90°	150C1F3	0	0	0	7593	20216	-67817
	380C2F1	15187	41708	137072	15187	41708	-137072
	380C2F2	15187	41137	136404	15187	41137	-136404
	380C2F3	15186	40431	135633	15186	40431	-135633
	RTG	4667	11994	40507	4667	11994	-40507
NL3/1a	GW / opgw	0	0	0	1735	5126	-16245
Wind, 10°C	150C1F1	0	0	0	6391	17810	-58375
Permanent loads yg= 0.9	150C1F2	0	0	0	6391	17555	-58061
Wind angle: -45°	150C1F3	0	0	0	6391	17240	-57698
	380C2F1	12784	52013	145554	12781	35619	-116750
	380C2F2	12784	49840	141264	12781	35110	-116122
	380C2F3	12783	47130	136026	12781	34481	-115397
	RTG	3465	12977	37311	3464	9375	-31283
NL3/1b	GW / opgw	0	0	0	1734	4983	-17711
Wind, -20°C	150C1F1	0	0	0	6387	18466	-66429
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	18407	-66405
Wind angle: -45°	150C1F3	0	0	0	6387	18333	-66378
	380C2F1	12774	40465	136087	12774	36933	-132858
	380C2F2	12774	39998	135518	12774	36815	-132809
	380C2F3	12774	39420	134861	12774	36666	-132755
	RTG	3463	10442	35549	3463	9663	-34924
NL3/3	GW / opgw	0	0	0	3304	8802	-28293
Wind, -5°C	150C1F1	0	0	0	7769	21169	-72052
Permanent loads yg= 0.9	150C1F2	0	0	0	7769	20974	-71871
Wind angle: -45°	150C1F3	0	0	0	7769	20732	-71665
	380C2F1	15541	54776	162707	15539	42338	-144103
	380C2F2	15541	53105	159750	15539	41948	-143742
	380C2F3	15540	51036	156216	15539	41464	-143329
	RTG	6611	21321	62052	6610	16350	-55181
NL3/4	GW / opgw	0	0	0	2336	5599	-20009
Construction/maintenance, +5°C	150C1F1	0	0	0	7593	18508	-66582
Permanent loads yg= 0.9	150C1F2	0	0	0	7593	18451	-66566
Wind angle: -45°	150C1F3	0	0	0	7593	18380	-66549
	380C2F1	15186	40313	135511	15186	37015	-133164
	380C2F2	15186	39884	135085	15186	36902	-133132
	380C2F3	15186	39352	134597	15186	36759	-133099
	RTG	4667	11702	40251	4667	10994	-39889

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5421	19460	2313	5421	-19460
	150C1F1	8522	19719	71422	8522	19719	-71422
	150C1F2	8522	19671	71415	8522	19671	-71415
	150C1F3	8522	19611	71408	8522	19611	-71408
	380C2F1	0	0	0	17045	39437	-142845
	380C2F2	0	0	0	17045	39342	-142830
	380C2F3	0	0	0	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5963	22016	2312	5963	-22016
	150C1F1	8518	22161	82039	8518	22161	-82039
	150C1F2	8518	22147	82040	8518	22147	-82040
	150C1F3	8518	22130	82043	8518	22130	-82043
	380C2F1	0	0	0	17036	44322	-164077
	380C2F2	0	0	0	17036	44295	-164081
	380C2F3	0	0	0	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8610	30911	3883	8610	-30911
	150C1F1	9901	23444	85630	9901	23444	-85630
	150C1F2	9901	23404	85628	9901	23404	-85628
	150C1F3	9901	23354	85627	9901	23354	-85627
	380C2F1	0	0	0	19802	46887	-171259
	380C2F2	0	0	0	19802	46808	-171256
	380C2F3	0	0	0	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6463	23882	2915	6463	-23882
	150C1F1	9725	21883	81000	9725	21883	-81000
	150C1F2	9725	21869	81002	9725	21869	-81002
	150C1F3	9725	21852	81005	9725	21852	-81005
	380C2F1	0	0	0	19451	43765	-162000
	380C2F2	0	0	0	19451	43738	-162004
	380C2F3	0	0	0	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6149	20066	2314	8980	-24860
	150C1F1	8523	21624	72609	8524	28843	-83359
	150C1F2	8523	21397	72397	8524	27877	-81663
	150C1F3	8523	21115	72156	8524	26679	-79631
	380C2F1	0	0	0	17048	57685	-166717
	380C2F2	0	0	0	17048	55754	-163327
	380C2F3	0	0	0	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6146	22050	2312	6761	-22572
	150C1F1	8518	22659	82076	8518	24266	-83095
	150C1F2	8518	22603	82063	8518	24058	-82907
	150C1F3	8518	22533	82050	8518	23800	-82693
	380C2F1	0	0	0	17036	48532	-166189
	380C2F2	0	0	0	17036	48117	-165814
	380C2F3	0	0	0	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9707	31669	3884	13833	-37952
	150C1F1	9901	24983	86283	9902	30568	-93216
	150C1F2	9901	24803	86159	9902	29821	-92068
	150C1F3	9901	24579	86020	9902	28897	-90716
	380C2F1	0	0	0	19805	61135	-186431
	380C2F2	0	0	0	19805	59641	-184137
	380C2F3	0	0	0	19804	57794	-181432
	RTG	0	0	0	7768	22876	-67855
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6640	23894	2915	7208	-24240
	150C1F1	9725	22373	81008	9726	23915	-81781
	150C1F2	9725	22319	81000	9725	23718	-81634
	150C1F3	9725	22250	80992	9725	23473	-81468
	380C2F1	0	0	0	19451	47830	-163562
	380C2F2	0	0	0	19451	47436	-163268
	380C2F3	0	0	0	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	10178	27217	2314	10178	-27217
	150C1F1	8525	31968	89093	8525	31968	-89093
	150C1F2	8525	30695	86719	8525	30695	-86719
	150C1F3	8524	29109	83834	8524	29109	-83834
	380C2F1	0	0	0	17050	63935	-178185
	380C2F2	0	0	0	17049	61390	-173439
	380C2F3	0	0	0	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164

NL3/1b	GW / opgw	2312	7025	22909	2312	7025	-22909
Wind, -20°C	150C1F1	8518	24939	83786	8518	24939	-83786
Permanent loads yg= 1.2	150C1F2	8518	24664	83489	8518	24664	-83489
Wind angle: 90°	150C1F3	8518	24323	83149	8518	24323	-83149
	380C2F1	0	0	0	17036	49879	-167572
	380C2F2	0	0	0	17036	49328	-166979
	380C2F3	0	0	0	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3	GW / opgw	3885	15569	41090	3885	15569	-41090
Wind, -5°C	150C1F1	9903	33002	97207	9903	33002	-97207
Permanent loads yg= 1.2	150C1F2	9903	32007	95535	9903	32007	-95535
Wind angle: 90°	150C1F3	9903	30774	93540	9903	30774	-93540
	380C2F1	0	0	0	19806	66003	-194414
	380C2F2	0	0	0	19806	64014	-191070
	380C2F3	0	0	0	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4	GW / opgw	2915	7446	24476	2915	7446	-24476
Construction/maintenance, +5°C	150C1F1	9726	24550	82329	9726	24550	-82329
Permanent loads yg= 1.2	150C1F2	9726	24291	82093	9726	24291	-82093
Wind angle: 90°	150C1F3	9726	23969	81824	9726	23969	-81824
	380C2F1	0	0	0	19451	49100	-164657
	380C2F2	0	0	0	19451	48582	-164186
	380C2F3	0	0	0	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a	GW / opgw	2314	8980	24860	2313	6149	-20066
Wind, 10°C	150C1F1	8524	28843	83359	8523	21624	-72609
Permanent loads yg= 1.2	150C1F2	8524	27877	81663	8523	21397	-72397
Wind angle: -45°	150C1F3	8524	26679	79631	8523	21115	-72156
	380C2F1	0	0	0	17045	43248	-145217
	380C2F2	0	0	0	17045	42794	-144795
	380C2F3	0	0	0	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293
NL3/1b	GW / opgw	2312	6761	22572	2312	6146	-22050
Wind, -20°C	150C1F1	8518	24266	83095	8518	22659	-82076
Permanent loads yg= 1.2	150C1F2	8518	24058	82907	8518	22603	-82063
Wind angle: -45°	150C1F3	8518	23800	82693	8518	22533	-82050
	380C2F1	0	0	0	17036	45318	-164152
	380C2F2	0	0	0	17036	45207	-164127
	380C2F3	0	0	0	17036	45066	-164100
	RTG	0	0	0	4618	11997	-43633
NL3/3	GW / opgw	3884	13833	37952	3883	9707	-31669
Wind, -5°C	150C1F1	9902	30568	93216	9901	24983	-86283
Permanent loads yg= 1.2	150C1F2	9902	29821	92068	9901	24803	-86159
Wind angle: -45°	150C1F3	9902	28897	90716	9901	24579	-86020
	380C2F1	0	0	0	19803	49966	-172566
	380C2F2	0	0	0	19803	49606	-172319
	380C2F3	0	0	0	19803	49157	-172039
	RTG	0	0	0	7767	18232	-62203
NL3/4	GW / opgw	2915	7208	24240	2915	6640	-23894
Construction/maintenance, +5°C	150C1F1	9726	23915	81781	9725	22373	-81008
Permanent loads yg= 1.2	150C1F2	9725	23718	81634	9725	22319	-81000
Wind angle: -45°	150C1F3	9725	23473	81468	9725	22250	-80992
	380C2F1	0	0	0	19451	44747	-162016
	380C2F2	0	0	0	19451	44637	-162000
	380C2F3	0	0	0	19451	44499	-161985
	RTG	0	0	0	5823	13083	-47686
NL3/1a	GW / opgw	1735	4318	15341	1735	4318	-15341
Wind, 10°C	150C1F1	6390	15727	56526	6390	15727	-56526
Permanent loads yg= 0.9	150C1F2	6390	15677	56510	6390	15677	-56510
Wind angle: 0°	150C1F3	6390	15614	56493	6390	15614	-56493
	380C2F1	0	0	0	12781	31454	-113052
	380C2F2	0	0	0	12781	31354	-113020
	380C2F3	0	0	0	12781	31229	-112987
	RTG	0	0	0	3464	8457	-30569
NL3/1b	GW / opgw	1734	4791	17643	1734	4791	-17643
Wind, -20°C	150C1F1	6387	17949	66319	6387	17949	-66319
Permanent loads yg= 0.9	150C1F2	6387	17935	66319	6387	17935	-66319
Wind angle: 0°	150C1F3	6387	17917	66321	6387	17917	-66321
	380C2F1	0	0	0	12774	35897	-132637
	380C2F2	0	0	0	12774	35870	-132639
	380C2F3	0	0	0	12774	35835	-132641
	RTG	0	0	0	3463	9430	-34888

NL3/3	GW / opgw	3304	7647	27318	3304	7647	-27318
Wind, -5°C	150C1F1	7769	19534	71039	7769	19534	-71039
Permanent loads yg= 0.9	150C1F2	7769	19493	71033	7769	19493	-71033
Wind angle: 0°	150C1F3	7769	19441	71027	7769	19441	-71027
	380C2F1	0	0	0	15538	39068	-142079
	380C2F2	0	0	0	15538	38986	-142066
	380C2F3	0	0	0	15538	38883	-142054
	RTG	0	0	0	6610	15011	-54458
NL3/4	GW / opgw	2336	5417	19980	2336	5417	-19980
Construction/maintenance, +5°C	150C1F1	7593	18004	66526	7593	18004	-66526
Permanent loads yg= 0.9	150C1F2	7593	17991	66527	7593	17991	-66527
Wind angle: 0°	150C1F3	7593	17973	66529	7593	17973	-66529
	380C2F1	0	0	0	15186	36009	-133052
	380C2F2	0	0	0	15186	35981	-133054
	380C2F3	0	0	0	15186	35946	-133059
	RTG	0	0	0	4667	10769	-39885
NL3/1a	GW / opgw	1735	5126	16245	1735	8312	-22368
Wind, 10°C	150C1F1	6391	17810	58375	6392	26006	-72777
Permanent loads yg= 0.9	150C1F2	6391	17555	58061	6392	24920	-70632
Wind angle: 45°	150C1F3	6391	17240	57698	6392	23565	-68013
	380C2F1	0	0	0	12784	52013	-145554
	380C2F2	0	0	0	12784	49840	-141264
	380C2F3	0	0	0	12783	47130	-136026
	RTG	0	0	0	3465	12977	-37311
NL3/1b	GW / opgw	1734	4983	17711	1734	5671	-18504
Wind, -20°C	150C1F1	6387	18466	66429	6387	20232	-68043
Permanent loads yg= 0.9	150C1F2	6387	18407	66405	6387	19999	-67759
Wind angle: 45°	150C1F3	6387	18333	66378	6387	19710	-67430
	380C2F1	0	0	0	12774	40465	-136087
	380C2F2	0	0	0	12774	39998	-135518
	380C2F3	0	0	0	12774	39420	-134861
	RTG	0	0	0	3463	10442	-35549
NL3/3	GW / opgw	3304	8802	28293	3305	13212	-35636
Wind, -5°C	150C1F1	7769	21169	72052	7771	27388	-81353
Permanent loads yg= 0.9	150C1F2	7769	20974	71871	7770	26553	-79875
Wind angle: 45°	150C1F3	7769	20732	71665	7770	25518	-78108
	380C2F1	0	0	0	15541	54776	-162707
	380C2F2	0	0	0	15541	53105	-159750
	380C2F3	0	0	0	15540	51036	-156216
	RTG	0	0	0	6611	21321	-62052
NL3/4	GW / opgw	2336	5599	20009	2336	6206	-20501
Construction/maintenance, +5°C	150C1F1	7593	18508	66582	7593	20156	-67755
Permanent loads yg= 0.9	150C1F2	7593	18451	66566	7593	19942	-67542
Wind angle: 45°	150C1F3	7593	18380	66549	7593	19676	-67299
	380C2F1	0	0	0	15186	40313	-135511
	380C2F2	0	0	0	15186	39884	-135085
	380C2F3	0	0	0	15186	39352	-134597
	RTG	0	0	0	4667	11702	-40251
NL3/1a	GW / opgw	1736	9613	25111	1736	9613	-25111
Wind, 10°C	150C1F1	6393	29481	79817	6393	29481	-79817
Permanent loads yg= 0.9	150C1F2	6393	28073	76939	6393	28073	-76939
Wind angle: 90°	150C1F3	6392	26305	73373	6392	26305	-73373
	380C2F1	0	0	0	12786	58962	-159635
	380C2F2	0	0	0	12785	56147	-153879
	380C2F3	0	0	0	12784	52610	-146746
	RTG	0	0	0	3465	14539	-40424
NL3/1b	GW / opgw	1734	5974	18987	1734	5974	-18987
Wind, -20°C	150C1F1	6387	20997	69074	6387	20997	-69074
Permanent loads yg= 0.9	150C1F2	6387	20683	68635	6387	20683	-68635
Wind angle: 90°	150C1F3	6387	20297	68125	6387	20297	-68125
	380C2F1	0	0	0	12774	41993	-138148
	380C2F2	0	0	0	12774	41367	-137270
	380C2F3	0	0	0	12774	40594	-136250
	RTG	0	0	0	3463	10775	-35958
NL3/3	GW / opgw	3306	15037	39110	3306	15037	-39110
Wind, -5°C	150C1F1	7771	30099	86377	7771	30099	-86377
Permanent loads yg= 0.9	150C1F2	7771	28994	84294	7771	28994	-84294
Wind angle: 90°	150C1F3	7771	27619	81769	7771	27619	-81769
	380C2F1	0	0	0	15542	60198	-172755
	380C2F2	0	0	0	15542	57987	-168588
	380C2F3	0	0	0	15541	55238	-163537
	RTG	0	0	0	6612	23468	-65790

NL3/4	GW / opgw	2336	6466	20820	2336	6466	-20820
Construction/maintenance, +5°C	150C1F1	7593	20854	68536	7593	20854	-68536
Permanent loads yg= 0.9	150C1F2	7593	20569	68202	7593	20569	-68202
Wind angle: 90°	150C1F3	7593	20216	67817	7593	20216	-67817
	380C2F1	0	0	0	15187	41708	-137072
	380C2F2	0	0	0	15187	41137	-136404
	380C2F3	0	0	0	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40507
NL3/1a	GW / opgw	1735	8312	22368	1735	5126	-16245
Wind, 10°C	150C1F1	6392	26006	72777	6391	17810	-58375
Permanent loads yg= 0.9	150C1F2	6392	24920	70632	6391	17555	-58061
Wind angle: -45°	150C1F3	6392	23565	68013	6391	17240	-57698
	380C2F1	0	0	0	12781	35619	-116750
	380C2F2	0	0	0	12781	35110	-116122
	380C2F3	0	0	0	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b	GW / opgw	1734	5671	18504	1734	4983	-17711
Wind, -20°C	150C1F1	6387	20232	68043	6387	18466	-66429
Permanent loads yg= 0.9	150C1F2	6387	19999	67759	6387	18407	-66405
Wind angle: -45°	150C1F3	6387	19710	67430	6387	18333	-66378
	380C2F1	0	0	0	12774	36933	-132858
	380C2F2	0	0	0	12774	36815	-132809
	380C2F3	0	0	0	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3	GW / opgw	3305	13212	35636	3304	8802	-28293
Wind, -5°C	150C1F1	7771	27388	81353	7769	21169	-72052
Permanent loads yg= 0.9	150C1F2	7770	26553	79875	7769	20974	-71871
Wind angle: -45°	150C1F3	7770	25518	78108	7769	20732	-71665
	380C2F1	0	0	0	15539	42338	-144103
	380C2F2	0	0	0	15539	41948	-143742
	380C2F3	0	0	0	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4	GW / opgw	2336	6206	20501	2336	5599	-20009
Construction/maintenance, +5°C	150C1F1	7593	20156	67755	7593	18508	-66582
Permanent loads yg= 0.9	150C1F2	7593	19942	67542	7593	18451	-66566
Wind angle: -45°	150C1F3	7593	19676	67299	7593	18380	-66549
	380C2F1	0	0	0	15186	37015	-133164
	380C2F2	0	0	0	15186	36902	-133132
	380C2F3	0	0	0	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5421	19460	0	0	0
	150C1F1	8522	19719	71422	0	0	0
	150C1F2	8522	19671	71415	0	0	0
	150C1F3	8522	19611	71408	0	0	0
	380C2F1	17045	39437	142845	17045	39437	-142845
	380C2F2	17045	39342	142830	17045	39342	-142830
	380C2F3	17045	39221	142815	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5963	22016	0	0	0
	150C1F1	8518	22161	82039	0	0	0
	150C1F2	8518	22147	82040	0	0	0
	150C1F3	8518	22130	82043	0	0	0
	380C2F1	17036	44322	164077	17036	44322	-164077
	380C2F2	17036	44295	164081	17036	44295	-164081
	380C2F3	17036	44260	164085	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8610	30911	0	0	0
	150C1F1	9901	23444	85630	0	0	0
	150C1F2	9901	23404	85628	0	0	0
	150C1F3	9901	23354	85627	0	0	0
	380C2F1	19802	46887	171259	19802	46887	-171259
	380C2F2	19802	46808	171256	19802	46808	-171256
	380C2F3	19802	46707	171253	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6463	23882	0	0	0
	150C1F1	9725	21883	81000	0	0	0
	150C1F2	9725	21869	81002	0	0	0
	150C1F3	9725	21852	81005	0	0	0
	380C2F1	19451	43765	162000	19451	43765	-162000
	380C2F2	19451	43738	162004	19451	43738	-162004
	380C2F3	19451	43704	162010	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6149	20066	0	0	0
	150C1F1	8523	21624	72609	0	0	0
	150C1F2	8523	21397	72397	0	0	0
	150C1F3	8523	21115	72156	0	0	0
	380C2F1	17045	43248	145217	17048	57685	-166717
	380C2F2	17045	42794	144795	17048	55754	-163327
	380C2F3	17045	42229	144312	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6146	22050	0	0	0
	150C1F1	8518	22659	82076	0	0	0
	150C1F2	8518	22603	82063	0	0	0
	150C1F3	8518	22533	82050	0	0	0
	380C2F1	17036	45318	164152	17036	48532	-166189
	380C2F2	17036	45207	164127	17036	48117	-165814
	380C2F3	17036	45066	164100	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9707	31669	0	0	0
	150C1F1	9901	24983	86283	0	0	0
	150C1F2	9901	24803	86159	0	0	0
	150C1F3	9901	24579	86020	0	0	0
	380C2F1	19803	49966	172566	19805	61135	-186431
	380C2F2	19803	49606	172319	19805	59641	-184137
	380C2F3	19803	49157	172039	19804	57794	-181432
	RTG	0	0	0	7768	22876	-67855
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6640	23894	0	0	0
	150C1F1	9725	22373	81008	0	0	0
	150C1F2	9725	22319	81000	0	0	0
	150C1F3	9725	22250	80992	0	0	0
	380C2F1	19451	44747	162016	19451	47830	-163562
	380C2F2	19451	44637	162000	19451	47436	-163268
	380C2F3	19451	44499	161985	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	10178	27217	0	0	0
	150C1F1	8525	31968	89093	0	0	0
	150C1F2	8525	30695	86719	0	0	0
	150C1F3	8524	29109	83834	0	0	0
	380C2F1	17050	63935	178185	17050	63935	-178185
	380C2F2	17049	61390	173439	17049	61390	-173439
	380C2F3	17048	58219	167668	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164

NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2312	7025	22909	0	0	0
	150C1F1	8518	24939	83786	0	0	0
	150C1F2	8518	24664	83489	0	0	0
	150C1F3	8518	24323	83149	0	0	0
	380C2F1	17036	49879	167572	17036	49879	-167572
	380C2F2	17036	49328	166979	17036	49328	-166979
	380C2F3	17036	48646	166297	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	3885	15569	41090	0	0	0
	150C1F1	9903	33002	97207	0	0	0
	150C1F2	9903	32007	95535	0	0	0
	150C1F3	9903	30774	93540	0	0	0
	380C2F1	19806	66003	194414	19806	66003	-194414
	380C2F2	19806	64014	191070	19806	64014	-191070
	380C2F3	19805	61548	187080	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2915	7446	24476	0	0	0
	150C1F1	9726	24550	82329	0	0	0
	150C1F2	9726	24291	82093	0	0	0
	150C1F3	9726	23969	81824	0	0	0
	380C2F1	19451	49100	164657	19451	49100	-164657
	380C2F2	19451	48582	164186	19451	48582	-164186
	380C2F3	19451	47938	163647	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2314	8980	24860	0	0	0
	150C1F1	8524	28843	83359	0	0	0
	150C1F2	8524	27877	81663	0	0	0
	150C1F3	8524	26679	79631	0	0	0
	380C2F1	17048	57685	166717	17045	43248	-145217
	380C2F2	17048	55754	163327	17045	42794	-144795
	380C2F3	17047	53358	159262	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2312	6761	22572	0	0	0
	150C1F1	8518	24266	83095	0	0	0
	150C1F2	8518	24058	82907	0	0	0
	150C1F3	8518	23800	82693	0	0	0
	380C2F1	17036	48532	166189	17036	45318	-164152
	380C2F2	17036	48117	165814	17036	45207	-164127
	380C2F3	17036	47600	165386	17036	45066	-164100
	RTG	0	0	0	4618	11997	-43633
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	3884	13833	37952	0	0	0
	150C1F1	9902	30568	93216	0	0	0
	150C1F2	9902	29821	92068	0	0	0
	150C1F3	9902	28897	90716	0	0	0
	380C2F1	19805	61135	186431	19803	49966	-172566
	380C2F2	19805	59641	184137	19803	49606	-172319
	380C2F3	19804	57794	181432	19803	49157	-172039
	RTG	0	0	0	7767	18232	-62203
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw	2915	7208	24240	0	0	0
	150C1F1	9726	23915	81781	0	0	0
	150C1F2	9725	23718	81634	0	0	0
	150C1F3	9725	23473	81468	0	0	0
	380C2F1	19451	47830	163562	19451	44747	-162016
	380C2F2	19451	47436	163268	19451	44637	-162000
	380C2F3	19451	46945	162935	19451	44499	-161985
	RTG	0	0	0	5823	13083	-47686
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1735	4318	15341	0	0	0
	150C1F1	6390	15727	56526	0	0	0
	150C1F2	6390	15677	56510	0	0	0
	150C1F3	6390	15614	56493	0	0	0
	380C2F1	12781	31454	113052	12781	31454	-113052
	380C2F2	12781	31354	113020	12781	31354	-113020
	380C2F3	12781	31229	112987	12781	31229	-112987
	RTG	0	0	0	3464	8457	-30569
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw	1734	4791	17643	0	0	0
	150C1F1	6387	17949	66319	0	0	0
	150C1F2	6387	17935	66319	0	0	0
	150C1F3	6387	17917	66321	0	0	0
	380C2F1	12774	35897	132637	12774	35897	-132637
	380C2F2	12774	35870	132639	12774	35870	-132639
	380C2F3	12774	35835	132641	12774	35835	-132641
	RTG	0	0	0	3463	9430	-34888

NL3/3	GW / opgw	3304	7647	27318	0	0	0
Wind, -5°C	150C1F1	7769	19534	71039	0	0	0
Permanent loads yg= 0.9	150C1F2	7769	19493	71033	0	0	0
Wind angle: 0°	150C1F3	7769	19441	71027	0	0	0
	380C2F1	15538	39068	142079	15538	39068	-142079
	380C2F2	15538	38986	142066	15538	38986	-142066
	380C2F3	15538	38883	142054	15538	38883	-142054
	RTG	0	0	0	6610	15011	-54458
NL3/4	GW / opgw	2336	5417	19980	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	18004	66526	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	17991	66527	0	0	0
Wind angle: 0°	150C1F3	7593	17973	66529	0	0	0
	380C2F1	15186	36009	133052	15186	36009	-133052
	380C2F2	15186	35981	133054	15186	35981	-133054
	380C2F3	15186	35946	133059	15186	35946	-133059
	RTG	0	0	0	4667	10769	-39885
NL3/1a	GW / opgw	1735	5126	16245	0	0	0
Wind, 10°C	150C1F1	6391	17810	58375	0	0	0
Permanent loads yg= 0.9	150C1F2	6391	17555	58061	0	0	0
Wind angle: 45°	150C1F3	6391	17240	57698	0	0	0
	380C2F1	12781	35619	116750	12784	52013	-145554
	380C2F2	12781	35110	116122	12784	49840	-141264
	380C2F3	12781	34481	115397	12783	47130	-136026
	RTG	0	0	0	3465	12977	-37311
NL3/1b	GW / opgw	1734	4983	17711	0	0	0
Wind, -20°C	150C1F1	6387	18466	66429	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	18407	66405	0	0	0
Wind angle: 45°	150C1F3	6387	18333	66378	0	0	0
	380C2F1	12774	36933	132858	12774	40465	-136087
	380C2F2	12774	36815	132809	12774	39998	-135518
	380C2F3	12774	36666	132755	12774	39420	-134861
	RTG	0	0	0	3463	10442	-35549
NL3/3	GW / opgw	3304	8802	28293	0	0	0
Wind, -5°C	150C1F1	7769	21169	72052	0	0	0
Permanent loads yg= 0.9	150C1F2	7769	20974	71871	0	0	0
Wind angle: 45°	150C1F3	7769	20732	71665	0	0	0
	380C2F1	15539	42338	144103	15541	54776	-162707
	380C2F2	15539	41948	143742	15541	53105	-159750
	380C2F3	15539	41464	143329	15540	51036	-156216
	RTG	0	0	0	6611	21321	-62052
NL3/4	GW / opgw	2336	5599	20009	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	18508	66582	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	18451	66566	0	0	0
Wind angle: 45°	150C1F3	7593	18380	66549	0	0	0
	380C2F1	15186	37015	133164	15186	40313	-135511
	380C2F2	15186	36902	133132	15186	39884	-135085
	380C2F3	15186	36759	133099	15186	39352	-134597
	RTG	0	0	0	4667	11702	-40251
NL3/1a	GW / opgw	1736	9613	25111	0	0	0
Wind, 10°C	150C1F1	6393	29481	79817	0	0	0
Permanent loads yg= 0.9	150C1F2	6393	28073	76939	0	0	0
Wind angle: 90°	150C1F3	6392	26305	73373	0	0	0
	380C2F1	12786	58962	159635	12786	58962	-159635
	380C2F2	12785	56147	153879	12785	56147	-153879
	380C2F3	12784	52610	146746	12784	52610	-146746
	RTG	0	0	0	3465	14539	-40424
NL3/1b	GW / opgw	1734	5974	18987	0	0	0
Wind, -20°C	150C1F1	6387	20997	69074	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	20683	68635	0	0	0
Wind angle: 90°	150C1F3	6387	20297	68125	0	0	0
	380C2F1	12774	41993	138148	12774	41993	-138148
	380C2F2	12774	41367	137270	12774	41367	-137270
	380C2F3	12774	40594	136250	12774	40594	-136250
	RTG	0	0	0	3463	10775	-35958
NL3/3	GW / opgw	3306	15037	39110	0	0	0
Wind, -5°C	150C1F1	7771	30099	86377	0	0	0
Permanent loads yg= 0.9	150C1F2	7771	28994	84294	0	0	0
Wind angle: 90°	150C1F3	7771	27619	81769	0	0	0
	380C2F1	15542	60198	172755	15542	60198	-172755
	380C2F2	15542	57987	168588	15542	57987	-168588
	380C2F3	15541	55238	163537	15541	55238	-163537
	RTG	0	0	0	6612	23468	-65790

NL3/4	GW / opgw	2336	6466	20820	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20854	68536	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	20569	68202	0	0	0
Wind angle: 90°	150C1F3	7593	20216	67817	0	0	0
	380C2F1	15187	41708	137072	15187	41708	-137072
	380C2F2	15187	41137	136404	15187	41137	-136404
	380C2F3	15186	40431	135633	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40507
NL3/1a	GW / opgw	1735	8312	22368	0	0	0
Wind, 10°C	150C1F1	6392	26006	72777	0	0	0
Permanent loads yg= 0.9	150C1F2	6392	24920	70632	0	0	0
Wind angle: -45°	150C1F3	6392	23565	68013	0	0	0
	380C2F1	12784	52013	145554	12781	35619	-116750
	380C2F2	12784	49840	141264	12781	35110	-116122
	380C2F3	12783	47130	136026	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b	GW / opgw	1734	5671	18504	0	0	0
Wind, -20°C	150C1F1	6387	20232	68043	0	0	0
Permanent loads yg= 0.9	150C1F2	6387	19999	67759	0	0	0
Wind angle: -45°	150C1F3	6387	19710	67430	0	0	0
	380C2F1	12774	40465	136087	12774	36933	-132858
	380C2F2	12774	39998	135518	12774	36815	-132809
	380C2F3	12774	39420	134861	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3	GW / opgw	3305	13212	35636	0	0	0
Wind, -5°C	150C1F1	7771	27388	81353	0	0	0
Permanent loads yg= 0.9	150C1F2	7770	26553	79875	0	0	0
Wind angle: -45°	150C1F3	7770	25518	78108	0	0	0
	380C2F1	15541	54776	162707	15539	42338	-144103
	380C2F2	15541	53105	159750	15539	41948	-143742
	380C2F3	15540	51036	156216	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4	GW / opgw	2336	6206	20501	0	0	0
Construction/maintenance, +5°C	150C1F1	7593	20156	67755	0	0	0
Permanent loads yg= 0.9	150C1F2	7593	19942	67542	0	0	0
Wind angle: -45°	150C1F3	7593	19676	67299	0	0	0
	380C2F1	15186	40313	135511	15186	37015	-133164
	380C2F2	15186	39884	135085	15186	36902	-133132
	380C2F3	15186	39352	134597	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversa [N]	Longitudinal [N]	Vertical [N]	Transversa [N]	Longitudinal [N]
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2313	5421	19460	2313	5421	-19460
	150C1F1	8522	19719	71422	8522	19719	-71422
	150C1F2	8522	19671	71415	8522	19671	-71415
	150C1F3	8522	19611	71408	8522	19611	-71408
	380C2F1	17045	39437	142845	17045	39437	-142845
	380C2F2	17045	39342	142830	17045	39342	-142830
	380C2F3	17045	39221	142815	17045	39221	-142815
	RTG	0	0	0	4620	10674	-38843
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2312	5963	22016	2312	5963	-22016
	150C1F1	8518	22161	82039	8518	22161	-82039
	150C1F2	8518	22147	82040	8518	22147	-82040
	150C1F3	8518	22130	82043	8518	22130	-82043
	380C2F1	17036	44322	164077	17036	44322	-164077
	380C2F2	17036	44295	164081	17036	44295	-164081
	380C2F3	17036	44260	164085	17036	44260	-164085
	RTG	0	0	0	4618	11771	-43625
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	3883	8610	30911	3883	8610	-30911
	150C1F1	9901	23444	85630	9901	23444	-85630
	150C1F2	9901	23404	85628	9901	23404	-85628
	150C1F3	9901	23354	85627	9901	23354	-85627
	380C2F1	19802	46887	171259	19802	46887	-171259
	380C2F2	19802	46808	171256	19802	46808	-171256
	380C2F3	19802	46707	171253	19802	46707	-171253
	RTG	0	0	0	7767	16943	-61667
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw	2915	6463	23882	2915	6463	-23882
	150C1F1	9725	21883	81000	9725	21883	-81000
	150C1F2	9725	21869	81002	9725	21869	-81002
	150C1F3	9725	21852	81005	9725	21852	-81005
	380C2F1	19451	43765	162000	19451	43765	-162000
	380C2F2	19451	43738	162004	19451	43738	-162004
	380C2F3	19451	43704	162010	19451	43704	-162010
	RTG	0	0	0	5823	12862	-47696
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2313	6149	20066	2314	8980	-24860
	150C1F1	8523	21624	72609	8524	28843	-83359
	150C1F2	8523	21397	72397	8524	27877	-81663
	150C1F3	8523	21115	72156	8524	26679	-79631
	380C2F1	17045	43248	145217	17048	57685	-166717
	380C2F2	17045	42794	144795	17048	55754	-163327
	380C2F3	17045	42229	144312	17047	53358	-159262
	RTG	0	0	0	4621	14690	-43701
NL3/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2312	6146	22050	2312	6761	-22572
	150C1F1	8518	22659	82076	8518	24266	-83095
	150C1F2	8518	22603	82063	8518	24058	-82907
	150C1F3	8518	22533	82050	8518	23800	-82693
	380C2F1	17036	45318	164152	17036	48532	-166189
	380C2F2	17036	45207	164127	17036	48117	-165814
	380C2F3	17036	45066	164100	17036	47600	-165386
	RTG	0	0	0	4618	12712	-44021
NL3/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	3883	9707	31669	3884	13833	-37952
	150C1F1	9901	24983	86283	9902	30568	-93216
	150C1F2	9901	24803	86159	9902	29821	-92068
	150C1F3	9901	24579	86020	9902	28897	-90716
	380C2F1	19803	49966	172566	19805	61135	-186431
	380C2F2	19803	49606	172319	19805	59641	-184137
	380C2F3	19803	49157	172039	19804	57794	-181432
	RTG	0	0	0	7768	22876	-67855
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw	2915	6640	23894	2915	7208	-24240
	150C1F1	9725	22373	81008	9726	23915	-81781
	150C1F2	9725	22319	81000	9725	23718	-81634
	150C1F3	9725	22250	80992	9725	23473	-81468
	380C2F1	19451	44747	162016	19451	47830	-163562
	380C2F2	19451	44637	162000	19451	47436	-163268
	380C2F3	19451	44499	161985	19451	46945	-162935
	RTG	0	0	0	5823	13758	-47923
NL3/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw	2314	10178	27217	2314	10178	-27217
	150C1F1	8525	31968	89093	8525	31968	-89093
	150C1F2	8525	30695	86719	8525	30695	-86719
	150C1F3	8524	29109	83834	8524	29109	-83834
	380C2F1	17050	63935	178185	17050	63935	-178185
	380C2F2	17049	61390	173439	17049	61390	-173439
	380C2F3	17048	58219	167668	17048	58219	-167668
	RTG	0	0	0	4621	16077	-46164

NL3/1b	GW / opgw	2312	7025	22909	2312	7025	-22909
Wind, -20°C	150C1F1	8518	24939	83786	8518	24939	-83786
Permanent loads yg= 1.2	150C1F2	8518	24664	83489	8518	24664	-83489
Wind angle: 90°	150C1F3	8518	24323	83149	8518	24323	-83149
	380C2F1	17036	49879	167572	17036	49879	-167572
	380C2F2	17036	49328	166979	17036	49328	-166979
	380C2F3	17036	48646	166297	17036	48646	-166297
	RTG	0	0	0	4618	13008	-44292
NL3/3	GW / opgw	3885	15569	41090	3885	15569	-41090
Wind, -5°C	150C1F1	9903	33002	97207	9903	33002	-97207
Permanent loads yg= 1.2	150C1F2	9903	32007	95535	9903	32007	-95535
Wind angle: 90°	150C1F3	9903	30774	93540	9903	30774	-93540
	380C2F1	19806	66003	194414	19806	66003	-194414
	380C2F2	19806	64014	191070	19806	64014	-191070
	380C2F3	19805	61548	187080	19805	61548	-187080
	RTG	0	0	0	7769	24883	-71068
NL3/4	GW / opgw	2915	7446	24476	2915	7446	-24476
Construction/maintenance, +5°C	150C1F1	9726	24550	82329	9726	24550	-82329
Permanent loads yg= 1.2	150C1F2	9726	24291	82093	9726	24291	-82093
Wind angle: 90°	150C1F3	9726	23969	81824	9726	23969	-81824
	380C2F1	19451	49100	164657	19451	49100	-164657
	380C2F2	19451	48582	164186	19451	48582	-164186
	380C2F3	19451	47938	163647	19451	47938	-163647
	RTG	0	0	0	5823	14030	-48105
NL3/1a	GW / opgw	2314	8980	24860	2313	6149	-20066
Wind, 10°C	150C1F1	8524	28843	83359	8523	21624	-72609
Permanent loads yg= 1.2	150C1F2	8524	27877	81663	8523	21397	-72397
Wind angle: -45°	150C1F3	8524	26679	79631	8523	21115	-72156
	380C2F1	17048	57685	166717	17045	43248	-145217
	380C2F2	17048	55754	163327	17045	42794	-144795
	380C2F3	17047	53358	159262	17045	42229	-144312
	RTG	0	0	0	4620	11522	-39293
NL3/1b	GW / opgw	2312	6761	22572	2312	6146	-22050
Wind, -20°C	150C1F1	8518	24266	83095	8518	22659	-82076
Permanent loads yg= 1.2	150C1F2	8518	24058	82907	8518	22603	-82063
Wind angle: -45°	150C1F3	8518	23800	82693	8518	22533	-82050
	380C2F1	17036	48532	166189	17036	45318	-164152
	380C2F2	17036	48117	165814	17036	45207	-164127
	380C2F3	17036	47600	165386	17036	45066	-164100
	RTG	0	0	0	4618	11997	-43633
NL3/3	GW / opgw	3884	13833	37952	3883	9707	-31669
Wind, -5°C	150C1F1	9902	30568	93216	9901	24983	-86283
Permanent loads yg= 1.2	150C1F2	9902	29821	92068	9901	24803	-86159
Wind angle: -45°	150C1F3	9902	28897	90716	9901	24579	-86020
	380C2F1	19805	61135	186431	19803	49966	-172566
	380C2F2	19805	59641	184137	19803	49606	-172319
	380C2F3	19804	57794	181432	19803	49157	-172039
	RTG	0	0	0	7767	18232	-62203
NL3/4	GW / opgw	2915	7208	24240	2915	6640	-23894
Construction/maintenance, +5°C	150C1F1	9726	23915	81781	9725	22373	-81008
Permanent loads yg= 1.2	150C1F2	9725	23718	81634	9725	22319	-81000
Wind angle: -45°	150C1F3	9725	23473	81468	9725	22250	-80992
	380C2F1	19451	47830	163562	19451	44747	-162016
	380C2F2	19451	47436	163268	19451	44637	-162000
	380C2F3	19451	46945	162935	19451	44499	-161985
	RTG	0	0	0	5823	13083	-47686
NL3/1a	GW / opgw	1735	4318	15341	1735	4318	-15341
Wind, 10°C	150C1F1	6390	15727	56526	6390	15727	-56526
Permanent loads yg= 0.9	150C1F2	6390	15677	56510	6390	15677	-56510
Wind angle: 0°	150C1F3	6390	15614	56493	6390	15614	-56493
	380C2F1	12781	31454	113052	12781	31454	-113052
	380C2F2	12781	31354	113020	12781	31354	-113020
	380C2F3	12781	31229	112987	12781	31229	-112987
	RTG	0	0	0	3464	8457	-30569
NL3/1b	GW / opgw	1734	4791	17643	1734	4791	-17643
Wind, -20°C	150C1F1	6387	17949	66319	6387	17949	-66319
Permanent loads yg= 0.9	150C1F2	6387	17935	66319	6387	17935	-66319
Wind angle: 0°	150C1F3	6387	17917	66321	6387	17917	-66321
	380C2F1	12774	35897	132637	12774	35897	-132637
	380C2F2	12774	35870	132639	12774	35870	-132639
	380C2F3	12774	35835	132641	12774	35835	-132641
	RTG	0	0	0	3463	9430	-34888

NL3/3	GW / opgw	3304	7647	27318	3304	7647	-27318
Wind, -5°C	150C1F1	7769	19534	71039	7769	19534	-71039
Permanent loads yg= 0.9	150C1F2	7769	19493	71033	7769	19493	-71033
Wind angle: 0°	150C1F3	7769	19441	71027	7769	19441	-71027
	380C2F1	15538	39068	142079	15538	39068	-142079
	380C2F2	15538	38986	142066	15538	38986	-142066
	380C2F3	15538	38883	142054	15538	38883	-142054
	RTG	0	0	0	6610	15011	-54458
NL3/4	GW / opgw	2336	5417	19980	2336	5417	-19980
Construction/maintenance, +5°C	150C1F1	7593	18004	66526	7593	18004	-66526
Permanent loads yg= 0.9	150C1F2	7593	17991	66527	7593	17991	-66527
Wind angle: 0°	150C1F3	7593	17973	66529	7593	17973	-66529
	380C2F1	15186	36009	133052	15186	36009	-133052
	380C2F2	15186	35981	133054	15186	35981	-133054
	380C2F3	15186	35946	133059	15186	35946	-133059
	RTG	0	0	0	4667	10769	-39885
NL3/1a	GW / opgw	1735	5126	16245	1735	8312	-22368
Wind, 10°C	150C1F1	6391	17810	58375	6392	26006	-72777
Permanent loads yg= 0.9	150C1F2	6391	17555	58061	6392	24920	-70632
Wind angle: 45°	150C1F3	6391	17240	57698	6392	23565	-68013
	380C2F1	12781	35619	116750	12784	52013	-145554
	380C2F2	12781	35110	116122	12784	49840	-141264
	380C2F3	12781	34481	115397	12783	47130	-136026
	RTG	0	0	0	3465	12977	-37311
NL3/1b	GW / opgw	1734	4983	17711	1734	5671	-18504
Wind, -20°C	150C1F1	6387	18466	66429	6387	20232	-68043
Permanent loads yg= 0.9	150C1F2	6387	18407	66405	6387	19999	-67759
Wind angle: 45°	150C1F3	6387	18333	66378	6387	19710	-67430
	380C2F1	12774	36933	132858	12774	40465	-136087
	380C2F2	12774	36815	132809	12774	39998	-135518
	380C2F3	12774	36666	132755	12774	39420	-134861
	RTG	0	0	0	3463	10442	-35549
NL3/3	GW / opgw	3304	8802	28293	3305	13212	-35636
Wind, -5°C	150C1F1	7769	21169	72052	7771	27388	-81353
Permanent loads yg= 0.9	150C1F2	7769	20974	71871	7770	26553	-79875
Wind angle: 45°	150C1F3	7769	20732	71665	7770	25518	-78108
	380C2F1	15539	42338	144103	15541	54776	-162707
	380C2F2	15539	41948	143742	15541	53105	-159750
	380C2F3	15539	41464	143329	15540	51036	-156216
	RTG	0	0	0	6611	21321	-62052
NL3/4	GW / opgw	2336	5599	20009	2336	6206	-20501
Construction/maintenance, +5°C	150C1F1	7593	18508	66582	7593	20156	-67755
Permanent loads yg= 0.9	150C1F2	7593	18451	66566	7593	19942	-67542
Wind angle: 45°	150C1F3	7593	18380	66549	7593	19676	-67299
	380C2F1	15186	37015	133164	15186	40313	-135511
	380C2F2	15186	36902	133132	15186	39884	-135085
	380C2F3	15186	36759	133099	15186	39352	-134597
	RTG	0	0	0	4667	11702	-40251
NL3/1a	GW / opgw	1736	9613	25111	1736	9613	-25111
Wind, 10°C	150C1F1	6393	29481	79817	6393	29481	-79817
Permanent loads yg= 0.9	150C1F2	6393	28073	76939	6393	28073	-76939
Wind angle: 90°	150C1F3	6392	26305	73373	6392	26305	-73373
	380C2F1	12786	58962	159635	12786	58962	-159635
	380C2F2	12785	56147	153879	12785	56147	-153879
	380C2F3	12784	52610	146746	12784	52610	-146746
	RTG	0	0	0	3465	14539	-40424
NL3/1b	GW / opgw	1734	5974	18987	1734	5974	-18987
Wind, -20°C	150C1F1	6387	20997	69074	6387	20997	-69074
Permanent loads yg= 0.9	150C1F2	6387	20683	68635	6387	20683	-68635
Wind angle: 90°	150C1F3	6387	20297	68125	6387	20297	-68125
	380C2F1	12774	41993	138148	12774	41993	-138148
	380C2F2	12774	41367	137270	12774	41367	-137270
	380C2F3	12774	40594	136250	12774	40594	-136250
	RTG	0	0	0	3463	10775	-35958
NL3/3	GW / opgw	3306	15037	39110	3306	15037	-39110
Wind, -5°C	150C1F1	7771	30099	86377	7771	30099	-86377
Permanent loads yg= 0.9	150C1F2	7771	28994	84294	7771	28994	-84294
Wind angle: 90°	150C1F3	7771	27619	81769	7771	27619	-81769
	380C2F1	15542	60198	172755	15542	60198	-172755
	380C2F2	15542	57987	168588	15542	57987	-168588
	380C2F3	15541	55238	163537	15541	55238	-163537
	RTG	0	0	0	6612	23468	-65790

NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw	2336	6466	20820	2336	6466	-20820
	150C1F1	7593	20854	68536	7593	20854	-68536
	150C1F2	7593	20569	68202	7593	20569	-68202
	150C1F3	7593	20216	67817	7593	20216	-67817
	380C2F1	15187	41708	137072	15187	41708	-137072
	380C2F2	15187	41137	136404	15187	41137	-136404
	380C2F3	15186	40431	135633	15186	40431	-135633
	RTG	0	0	0	4667	11994	-40507
NL3/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1735	8312	22368	1735	5126	-16245
	150C1F1	6392	26006	72777	6391	17810	-58375
	150C1F2	6392	24920	70632	6391	17555	-58061
	150C1F3	6392	23565	68013	6391	17240	-57698
	380C2F1	12784	52013	145554	12781	35619	-116750
	380C2F2	12784	49840	141264	12781	35110	-116122
	380C2F3	12783	47130	136026	12781	34481	-115397
	RTG	0	0	0	3464	9375	-31283
NL3/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	1734	5671	18504	1734	4983	-17711
	150C1F1	6387	20232	68043	6387	18466	-66429
	150C1F2	6387	19999	67759	6387	18407	-66405
	150C1F3	6387	19710	67430	6387	18333	-66378
	380C2F1	12774	40465	136087	12774	36933	-132858
	380C2F2	12774	39998	135518	12774	36815	-132809
	380C2F3	12774	39420	134861	12774	36666	-132755
	RTG	0	0	0	3463	9663	-34924
NL3/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	3305	13212	35636	3304	8802	-28293
	150C1F1	7771	27388	81353	7769	21169	-72052
	150C1F2	7770	26553	79875	7769	20974	-71871
	150C1F3	7770	25518	78108	7769	20732	-71665
	380C2F1	15541	54776	162707	15539	42338	-144103
	380C2F2	15541	53105	159750	15539	41948	-143742
	380C2F3	15540	51036	156216	15539	41464	-143329
	RTG	0	0	0	6610	16350	-55181
NL3/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw	2336	6206	20501	2336	5599	-20009
	150C1F1	7593	20156	67755	7593	18508	-66582
	150C1F2	7593	19942	67542	7593	18451	-66566
	150C1F3	7593	19676	67299	7593	18380	-66549
	380C2F1	15186	40313	135511	15186	37015	-133164
	380C2F2	15186	39884	135085	15186	36902	-133132
	380C2F3	15186	39352	134597	15186	36759	-133099
	RTG	0	0	0	4667	10994	-39889

ZWW4AA400

Appendix AY2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1928	4761	16779	1928	4761	-16779
	150C1F1	7101	17271	61676	7101	17271	-61676
	150C1F2	7101	17206	61652	7101	17206	-61652
	150C1F3	7101	17124	61626	7101	17124	-61626
	380C2F1	14202	34542	123352	14202	34542	-123352
	380C2F2	14202	34412	123304	14202	34412	-123304
	380C2F3	14202	34248	123251	14202	34248	-123251
	RTG	0	0	0	3850	9294	-33413
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	1927	5183	19144	1927	5183	-19144
	150C1F1	7097	19367	71723	7097	19367	-71723
	150C1F2	7097	19356	71724	7097	19356	-71724
	150C1F3	7097	19341	71726	7097	19341	-71726
	380C2F1	14194	38734	143446	14194	38734	-143446
	380C2F2	14194	38711	143449	14194	38711	-143449
	380C2F3	14194	38682	143453	14194	38682	-143453
	RTG	0	0	0	3848	10220	-37886
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	6603	12605	46025	6603	12605	-46025
	150C1F1	11209	25633	94110	11209	25633	-94110
	150C1F2	11209	25601	94112	11209	25601	-94112
	150C1F3	11209	25559	94114	11209	25559	-94114
	380C2F1	22419	51266	188221	22419	51266	-188221
	380C2F2	22419	51201	188223	22419	51201	-188223
	380C2F3	22419	51119	188228	22419	51119	-188228
	RTG	0	0	0	13222	25028	-92102
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw	2429	5579	20622	2429	5579	-20622
	150C1F1	8103	18929	70087	8103	18929	-70087
	150C1F2	8103	18917	70088	8103	18917	-70088
	150C1F3	8103	18903	70090	8103	18903	-70090
	380C2F1	16206	37857	140173	16206	37857	-140173
	380C2F2	16206	37835	140176	16206	37835	-140176
	380C2F3	16206	37806	140181	16206	37806	-140181
	RTG	0	0	0	4852	11099	-41168
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1928	5835	18079	1928	9991	-26190
	150C1F1	7101	20026	64364	7104	30812	-83859
	150C1F2	7101	19687	63915	7103	29403	-81049
	150C1F3	7101	19269	63394	7103	27637	-77583
	380C2F1	14203	40052	128727	14207	61624	-167718
	380C2F2	14203	39375	127830	14206	58806	-162097
	380C2F3	14202	38537	126788	14206	55274	-155165
	RTG	0	0	0	3850	15277	-42756
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	1927	5336	19175	1927	5857	-19641
	150C1F1	7097	19784	71762	7097	21141	-72678
	150C1F2	7097	19737	71750	7097	20965	-72511
	150C1F3	7097	19678	71738	7097	20747	-72319
	380C2F1	14194	39569	143525	14195	42282	-145357
	380C2F2	14194	39475	143501	14195	41930	-145022
	380C2F3	14194	39357	143476	14194	41493	-144639
	RTG	0	0	0	3848	11011	-38244
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	6603	13394	46187	6604	16051	-48504
	150C1F1	11209	26852	94417	11210	31048	-98485
	150C1F2	11209	26712	94351	11210	30494	-97782
	150C1F3	11209	26537	94279	11210	29807	-96965
	380C2F1	22419	53704	188833	22420	62096	-196970
	380C2F2	22419	53425	188703	22420	60987	-195564
	380C2F3	22419	53074	188559	22420	59614	-193930
	RTG	0	0	0	13222	29079	-93915
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw	2429	5727	20634	2429	6206	-20942
	150C1F1	8103	19339	70099	8103	20637	-70792
	150C1F2	8103	19293	70091	8103	20470	-70662
	150C1F3	8103	19235	70084	8103	20263	-70513
	380C2F1	16206	38678	140198	16207	41273	-141585
	380C2F2	16206	38586	140183	16206	40941	-141323
	380C2F3	16206	38471	140168	16206	40527	-141027
	RTG	0	0	0	4852	11850	-41375
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1929	11643	29647	1929	11643	-29647
	150C1F1	7105	35283	92941	7105	35283	-92941
	150C1F2	7104	33478	89252	7104	33478	-89252
	150C1F3	7104	31199	84636	7104	31199	-84636
	380C2F1	14209	70565	185882	14209	70565	-185882
	380C2F2	14208	66956	178504	14208	66956	-178504
	380C2F3	14207	62398	169272	14207	62398	-169272
	RTG	0	0	0	3851	17307	-46852

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	1927	6082	19940	1927	6082	-19940
	150C1F1	7097	21713	73295	7097	21713	-73295
	150C1F2	7097	21479	73031	7097	21479	-73031
	150C1F3	7097	21190	72727	7097	21190	-72727
	380C2F1	14195	43426	146590	14195	43426	-146590
	380C2F2	14195	42959	146062	14195	42959	-146062
	380C2F3	14195	42379	145453	14195	42379	-145453
	RTG	0	0	0	3848	11262	-38485
	NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw	6604	17177	49924	6604	17177
150C1F1		11211	32857	100993	11211	32857	-100993
150C1F2		11210	32117	99932	11210	32117	-99932
150C1F3		11210	31201	98686	11210	31201	-98686
380C2F1		22421	65715	201986	22421	65715	-201986
380C2F2		22421	64234	199863	22421	64234	-199863
380C2F3		22420	62403	197371	22420	62403	-197371
RTG		0	0	0	13223	30355	-95112
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°		GW / opgw	2429	6407	21151	2429	6407
	150C1F1	8103	21174	71279	8103	21174	-71279
	150C1F2	8103	20955	71069	8103	20955	-71069
	150C1F3	8103	20682	70830	8103	20682	-70830
	380C2F1	16207	42348	142557	16207	42348	-142557
	380C2F2	16207	41910	142139	16207	41910	-142139
	380C2F3	16207	41365	141660	16207	41365	-141660
	RTG	0	0	0	4852	12080	-41537
	NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	1928	9991	26190	1928	5835
150C1F1		7104	30812	83859	7101	20026	-64364
150C1F2		7103	29403	81049	7101	19687	-63915
150C1F3		7103	27637	77583	7101	19269	-63394
380C2F1		14207	61624	167718	14203	40052	-128727
380C2F2		14206	58806	162097	14203	39375	-127830
380C2F3		14206	55274	155165	14202	38537	-126788
RTG		0	0	0	3850	10507	-34462
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°		GW / opgw	1927	5857	19641	1927	5336
	150C1F1	7097	21141	72678	7097	19784	-71762
	150C1F2	7097	20965	72511	7097	19737	-71750
	150C1F3	7097	20747	72319	7097	19678	-71738
	380C2F1	14195	42282	145357	14194	39569	-143525
	380C2F2	14195	41930	145022	14194	39475	-143501
	380C2F3	14194	41493	144639	14194	39357	-143476
	RTG	0	0	0	3848	10408	-37895
	NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw	6604	16051	48504	6603	13394
150C1F1		11210	31048	98485	11209	26852	-94417
150C1F2		11210	30494	97782	11209	26712	-94351
150C1F3		11210	29807	96965	11209	26537	-94279
380C2F1		22420	62096	196970	22419	53704	-188833
380C2F2		22420	60987	195564	22419	53425	-188703
380C2F3		22420	59614	193930	22419	53074	-188559
RTG		0	0	0	13222	25996	-92151
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°		GW / opgw	2429	6206	20942	2429	5727
	150C1F1	8103	20637	70792	8103	19339	-70099
	150C1F2	8103	20470	70662	8103	19293	-70091
	150C1F3	8103	20263	70513	8103	19235	-70084
	380C2F1	16207	41273	141585	16206	38678	-140198
	380C2F2	16206	40941	141323	16206	38586	-140183
	380C2F3	16206	40527	141027	16206	38471	-140168
	RTG	0	0	0	4852	11284	-41161



ZWW4AA400

Location dependent data to obtain pressures

Wind area		O=onbebouwd, B=bebouwd		2	
Terrain category		O			
Hoogte		h	63.2	m	
Diameter voet		d voet	3.3	m	
top		d top	0.8	m	
gem		d gem	2.1	m	
wanddikte		t	24	mm	
Oppervlakte aan voet		A	247005	mm ²	
Traagheidsmoment aan voet		W _x	2.01E+08	mm ⁴	
Weerstandsmoment aan voet		I _x	3.28E+11	mm ⁶	
Mast: Gewicht		2 ^{de} orde F _{rep/ver}	10.0	%	
			751	kN	

Bijlage BAY

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	62.6	3.9	15.6	-41.1	43.9	2751	kNm
150C1F1	52.6	9.9	33.0	-97.2	102.7	5400	kNm
150C1F2	42.4	9.9	32.0	-95.5	100.8	4272	kNm
150C1F3	32.2	9.9	30.8	-93.5	98.5	3171	kNm
380C2F1	52.6	19.8	66.0	-194.4	205.3	10799	kNm
380C2F2	42.4	19.8	64.0	-191.1	201.5	8544	kNm
380C2F3	32.2	19.8	61.5	-187.1	196.9	6342	kNm
RTG	22.1	7.8	24.9	-71.1	75.3	1664	kNm

Stuwdruk	F _{hor.}	37.6	kN
	M _{d,wind}	1063	kNm
Totaal	M _{d,tot}	43617	kNm
Totaal moment incl. 2 ^{de} orde effect	M _{d,tot}	47979	kNm

Normaalkracht;

Optredende normaalkracht			
N _{d,geleiders}		101	kN
N _{d, e.g. mast}		901	kN
N _{s,d,totaal}		1064	kN

Is buis plooi gevoelig tgv normaalkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA
A _{eff}	149019 mm ²

Optredende spanning tgv normaalkracht

N _d /A _{eff} = f _{yd} /Y _{m1}	7	N/mm ²
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Moment;

Optredende moment in de voet:		
M _{d,tot}	47979	kNm

Is buis plooi gevoelig tgv momentkracht: conform NEN-EN 50341 par. 7.4.5.4

r _a	JA
W _{eff}	1.81E+08 mm ³

Optredende spanning tgv moment:

M _d /W _{eff} = f _{yd} /Y _{m1}	271	N/mm ²
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Totale spanning:

S _d	271	N/mm ²	< 284 N/mm ² = ACCOORD
S _{d,toegeestaan}	284	N/mm ²	==> 80% van 355 N/mm ²

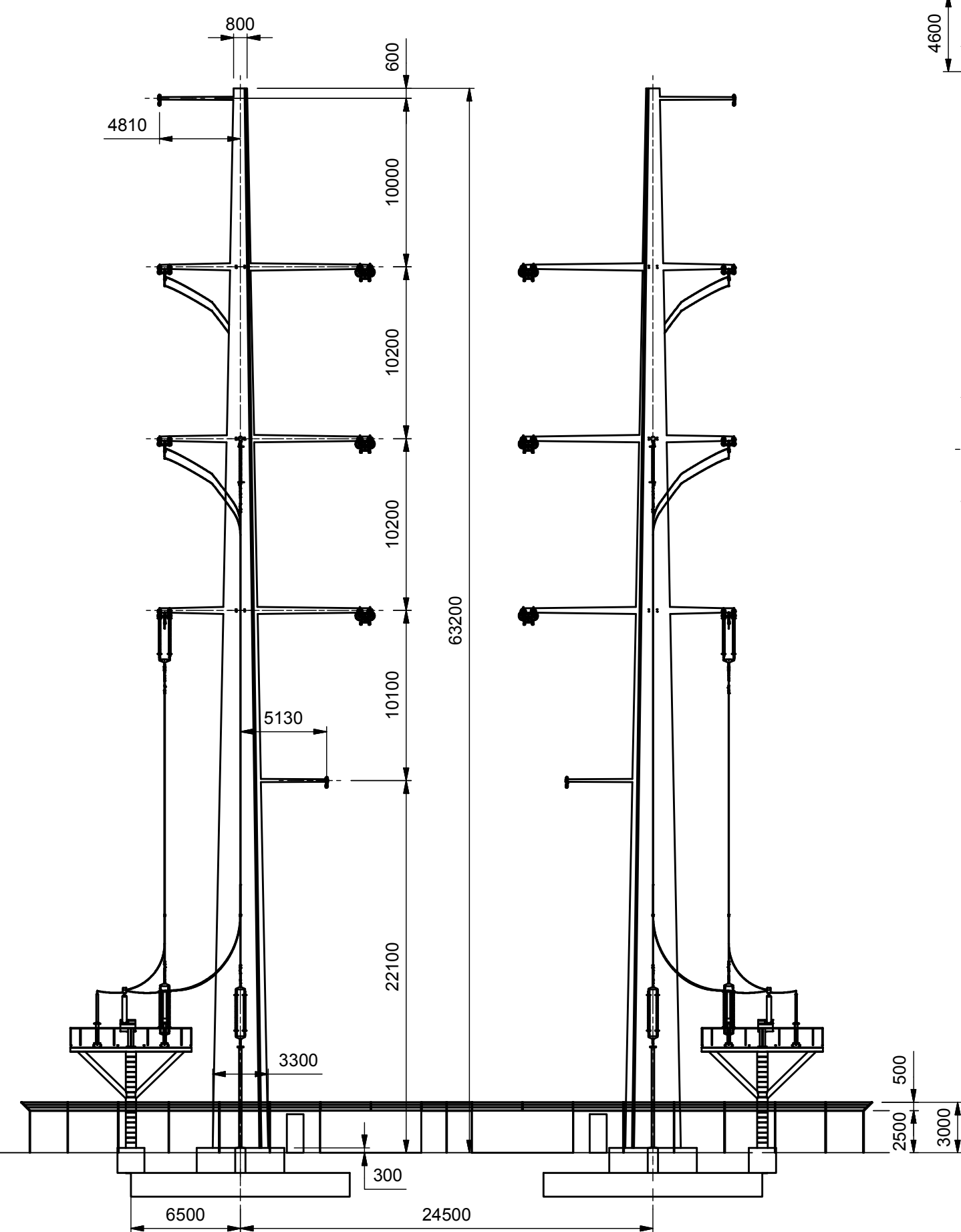
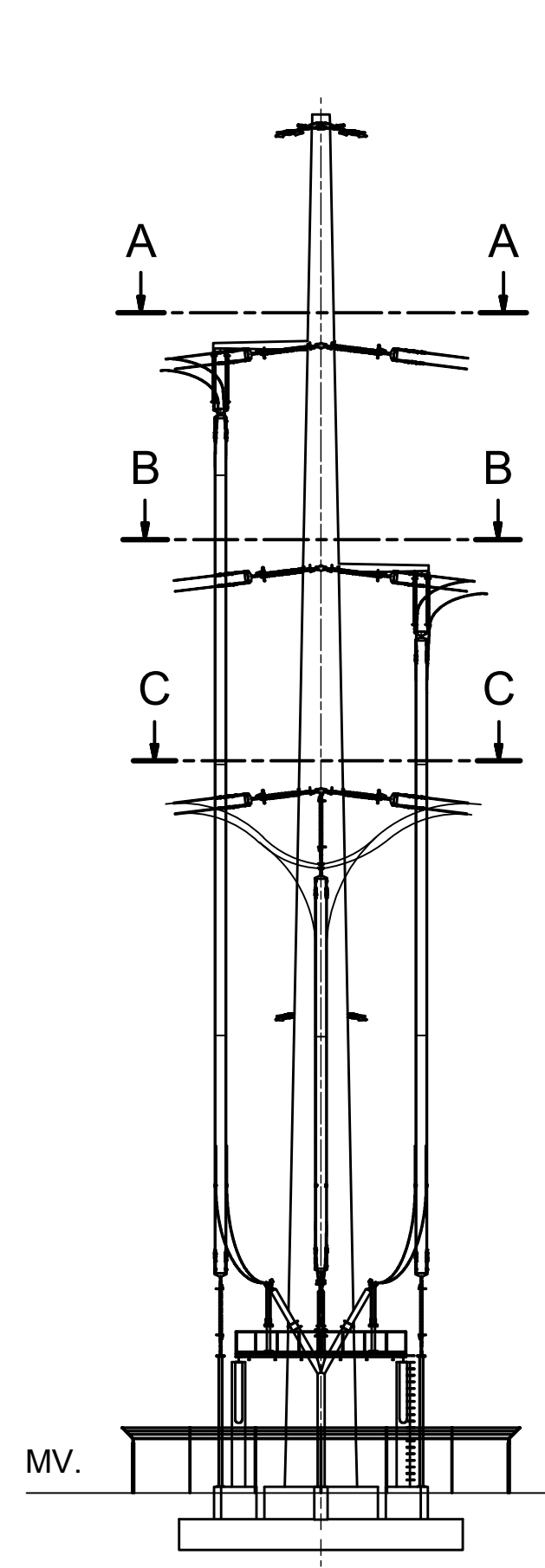
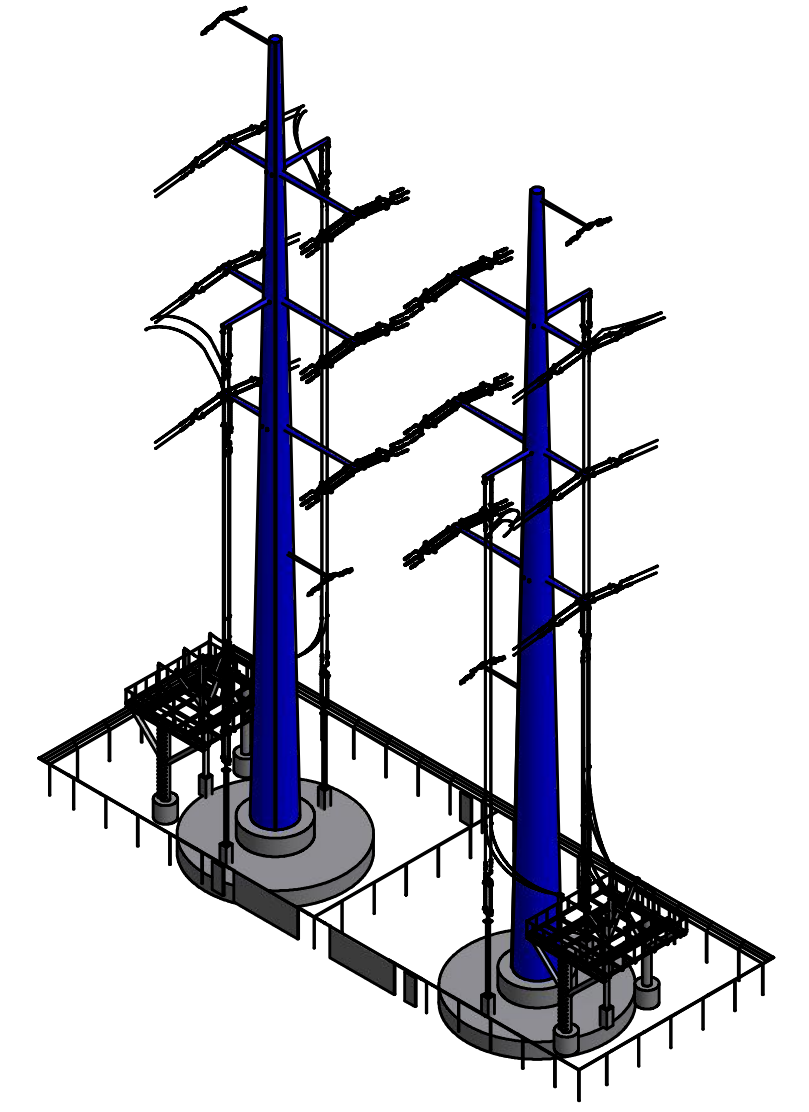
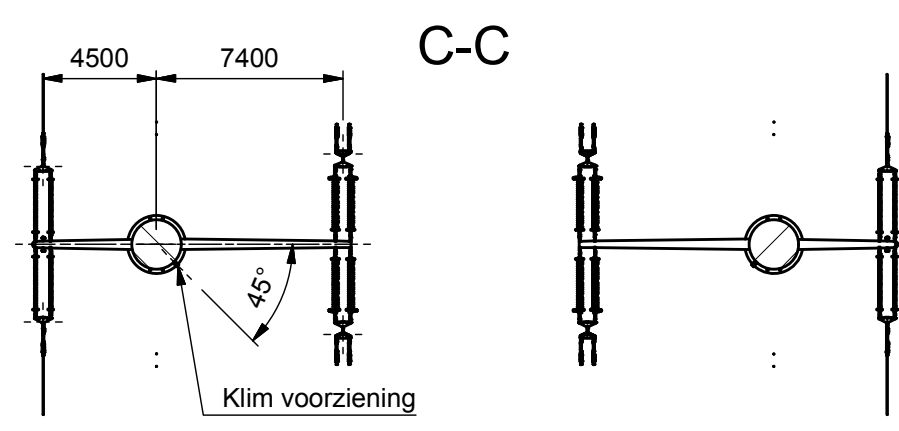
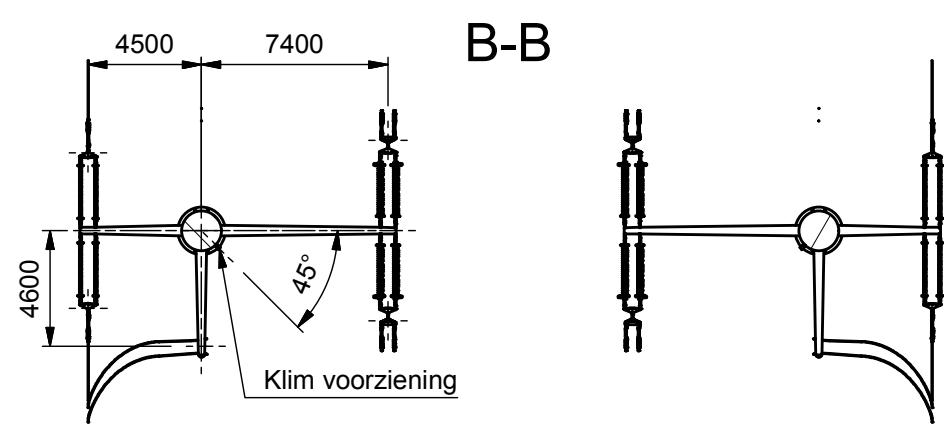
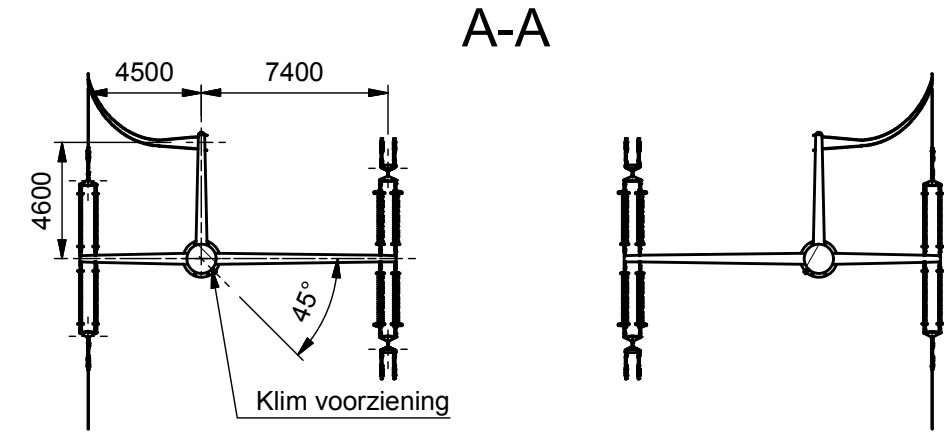
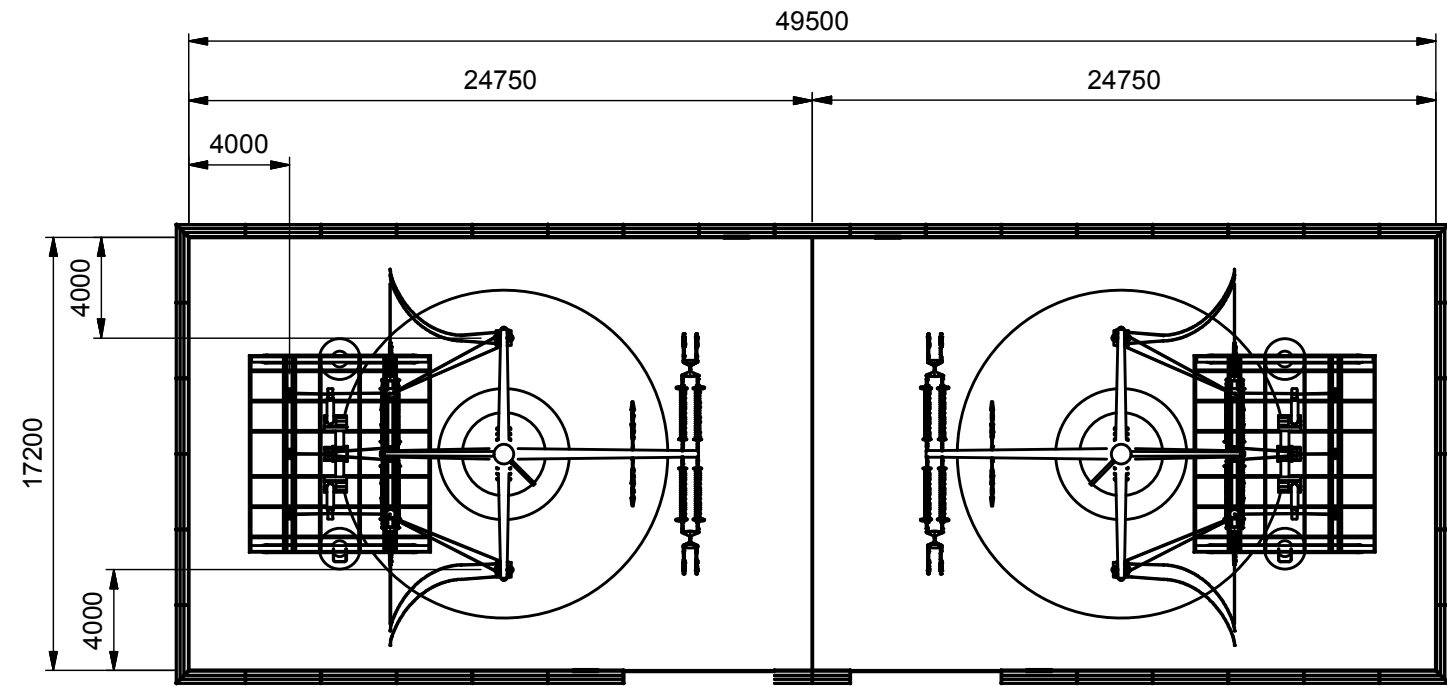
Special limit state

	hoogte	F _{ver}	F _{floodrecht}	F _#	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	62.6	3.9	23.3	0.0	23.3	1458	kNm
150C1F1	52.6	14.2	70.6	0.0	70.6	3712	kNm
150C1F2	42.4	14.2	67.0	0.0	67.0	2839	kNm
150C1F3	32.2	14.2	62.4	0.0	62.4	2009	kNm
380C2F1	52.6	28.4	141.1	0.0	141.1	7423	kNm
380C2F2	42.4	28.4	133.9	0.0	133.9	5678	kNm
380C2F3	32.2	28.4	124.8	0.0	124.8	4018	kNm
RTG	22.1	3.9	17.3	-46.9	49.9	1104	kNm

Stuwdruk	F _{hor.}	1010	kN
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Verplaatsing		1.06	m
Percentage van de verplaatsing		1.67%	
Hoek		1.72	graden
Kromming		0.35%	
Fundatie rotatiestijfheid		0.005	rad

3.44	EIS TENNET VISUEE
5.5%	NEN-EN-50341
1%	NEN-EN-50341



Opmerking:

Lijnhoek: 150 graden
 Voor Detail bordes zie tekening: 74102194-035-708

Vergunning

Revision history		Description	
Rev.	Date		
1.0	26-03-2014	First edition	
2.0	7-4-2014	Modification traverse	

 	Projectname:	Engineering verbinding ZW380	
	Third angle projection:		
Drawing no.:		74102194-035-401	
Design state:	WorkInProgress	Scale:	1:300
Drawn by:	SGR 7-4-2014	Units:	mm
Checked by:	APE 7-4-2014	Project no.:	145.11
Approved by:	AW 7-4-2014	Company:	TenneT
Description:		Mast type: ZWW4AA400 aftakking 150kV tbv inlusing (380kV steunmast;150kV aftakking)	Revision: 2.0
			Format: A2

KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com

ZWW4AE400

Bijlage CAR

Fundatie berekening

Fundatie ontwerp:

Heipaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m
schoorstand		8	:1
α		7.125	graden

Opstort	Diameter	5.3	m
	Hoogte	1.8	m
	Inhoud	39.7	m ³
	e.g.	953	kN

Onderplaat	Diameter	13.0	m
	Hoogte	1.3	m
	Inhoud	173	m ³
	e.g.	4141	kN

Hart paal tov rand fund.		0.6	m
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Optreden krachten

e.g. mast		874	kN
Fgeleiders		84	kN
Maximale dwarskracht		1373	kN
Fmax vert (druk)		1133	kN
Fmin vert (trek)		849	kN
Maximale moment		60975	kNm

Moment

F_{diag}		5571	kN
F_{hor}		1373	kN
F_{ver}		5528	kN
M_{hor} (tgv F_{hor})		4257	kNm
M_{tot}		65232	kNm
$F=M/a$		5528	kN

Verticaal reactiekracht

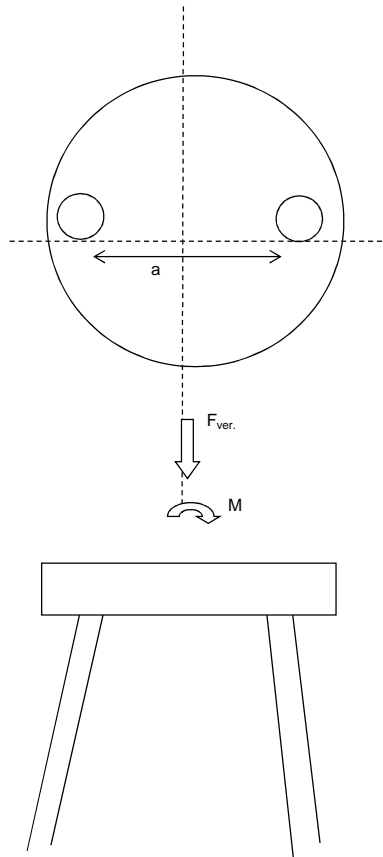
F_{water} (trek)		2123	kN
F_{grond} (druk)		2988	kN
F_{grond} (trek)		2490	kN

F_{dmax} (druk)		5416	kN
F_{tmax} (trek)		2564	kN

F_{dtot} (druk)		10944	kN
F_{ttot} (trek)		2964	kN

Palen druk		10	(-)
Palen trek		10	(-)

Totaal palen		20	(-)	Per fundering
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reductie door opwaarste kracht water



ZWW4AE400

TREKPALEN volgens CUR 2001-4 par. 8.

$$F_{r;trek;d} = \int_0^L O_{p;gem} \times P_{r;z;d} \times dz$$

Bijlage CAR

Bepaling opneembare paalbelasting op druk

heipaal		
Afmeting paal	b	0.40 m
	b	0.40 m
omtrek paal	$O_{p;gem}$	1.60 m
paalfactor	αt	0.007
aantal palen	M	1
aantal sonderingen	N	1
factor invloed aantal sonderingen	ξ	0.75
conusweerstand over wrijvingstraject	$q_{c;z,max}$	15 MPa
	$q_{c;z,rep}$	11.25 MPa
materiaalfactor	$\gamma_{m,b4}$	1.4
factor, wisselende belastingen	$\gamma_{m,var,qc}$	1.5
	$q_{c;z,d}$	5.36 MPa
	$P_{rz,d}$	37.5 kN/m ²
	$F_{r;trek,d,i}$	60.0 kN/m ¹
	$F_{trek,d}$	596 kN/m

Bepaling opneembare trekbelasting paal

sondering	diepte		$q_{c;z}$		$P_{r,maxschacht,i}$	$F_{r;trek,d,i}$	$F_{trek,d}$
	m	m	MPa	αt	kPa	kN	kN
	0	-1	0	0.007	0.00	0.00	0
	-1	-2	0	0.007	0.00	0.00	0
	-2	-3	0	0.007	0.00	0.00	0
	-3	-4	0	0.007	0.00	0.00	0
	-4	-5	0	0.007	0.00	0.00	0
	-5	-6	0	0.007	0.00	0.00	0
	-6	-7	0	0.007	0.00	0.00	0
	-7	-8	0	0.007	0.00	0.00	0
	-8	-9	1	0.007	2.50	4.00	4
	-9	-10	3	0.007	7.50	12.00	16
	-10	-11	2	0.007	5.00	8.00	24
	-11	-12	0	0.007	0.00	0.00	24
	-12	-13	3	0.007	7.50	12.00	36
	-13	-14	2	0.007	5.00	8.00	44
	-14	-15	4	0.007	10.00	16.00	60
	-15	-16	10	0.007	25.00	40.00	100
	-16	-17	9	0.007	22.50	36.00	136
	-17	-18	8	0.007	20.00	32.00	168
	-18	-19	12	0.007	30.00	48.00	216
	-19	-20	12	0.007	30.00	48.00	264
	-20	-21	10	0.007	25.00	40.00	304
	-21	-22	11	0.007	27.50	44.00	348
	-22	-23	11	0.007	27.50	44.00	392
	-23	-24	12	0.007	30.00	48.00	440
	-24	-25	12	0.007	30.00	48.00	488
	-25	-26	12	0.007	30.00	48.00	536
	-26	-27	15	0.007	37.50	60.00	596

$F_{trek,d}$	596 kN	paalafmeting	400 mm, paalpuntivo	-27.00 m
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Paalgroep factor 10%

$F_{trek,d}$	536.4 kN
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ZWW4AE400

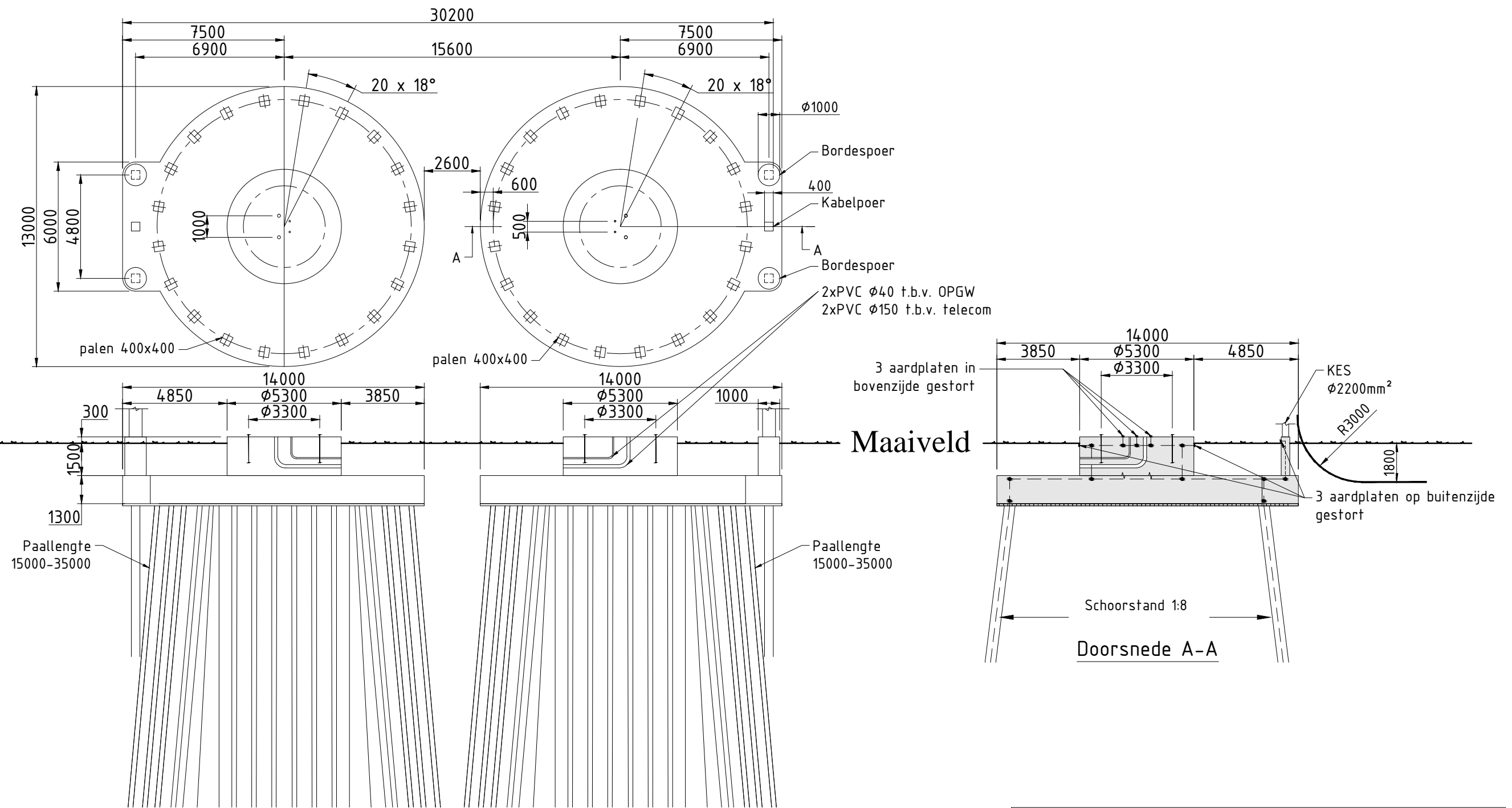
DRUKPALEN

FUNDERINGSCONSTRUCTIE Toelaatbare paalbelastingen

Bijlage CAR

Bepaling opneembare paalbelasting op druk

heipaal	v	
diameter	a	2 mm
		2 mm
Deq		0.001808
maximale puntweerstand		
$P_{r,max;punt;i}$		11.25 MN/m ²
paalklasse factor	α_p	1.00
factor paalvoet	β	1
hoek van inwendige vrijwing van paalvoet	ϕ	40
factor dwarsdoorsnede paalvoet	s	1.00
minimale waarde neergaande deel	$q_{c,II;gem}$	9.00 MN/m ²
gem. sondeerwaarde neergaande deel	$q_{c,I;gem}$	14.00 MN/m ²
gem. sondeerwaarde opgaande deel	$q_{c,III;gem}$	11.00 MN/m ²
maximale paalschachtwrijving		
$P_{r,max;schacht;i}$		0.05 MN/m ²
waarin:		
paalfactor	α_s	0.010
conusweerstand over wrijvingstraject	$q_{c,z;a}$	5.00 MN/m ²
maximale draagkracht alleenstaande paal		
$F_{r,max;i}$		0.00 MN
waarin:		
$F_{r,max;punt;i}$		0.00 MN
paalpunt oppervlak	A_{punt}	0.00 m ²
$F_{r,max;schacht;i}$		0.00 MN
gemiddelde paalomtrek	$O_{p;gem}$	0.01 m
lengte schachtwrijving	Δl	15.00 m
Bepaling rekenwaarde van de maximale draagkracht		
$F_{r,paal,max;d}$	MN	0.00 MN
materiaalfactor grond	γ_{mb}	1.20
waarde afhankelijk van aantal palen en aantal sonderingen	$\xi_{1,N}$	0.75
$F_{r,paal,max;d}$	3 kN	mm, paalpuntnivo -27.00 m



T.B.V. Vergunnings aanvraag

Verklaring


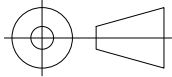
- Gewapend beton
- Werkvloer

Verklaring aarding

- Ringleiding Ø16mm (FeB220) glad
- Koppeling met aardstaaf in paal
- Aardplaten

Opmerkingen

- Maten in mm
- Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
- Maatvoering in het 360 graden stelsel
- Vellingkanten niet getekend
- Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
- Mastvoetanker afmeting exclusief mastvoetflens breedte
- Afmetingen indicatief

3.0	02-06-2014	Diverse aanpassingen
2.0	25-03-2014	Diverse aanpassingen
1.0	26-07-2013	Eerste uitgave
		Projectname: Engineering verbinding ZW380
Design state: Definitief		Third angle projection: 
Drawn by: RBE 02-06-2014	Scale: 1:200	Drawing no.: 74102194-032-403
Checked by: AJP 02-06-2014	Units: mm	Description: Principe ontwerp fundatie eindmast ZWW4AE400 masten familie
Approved by: AW 02-06-2014	Project no: 000.145 Company: TenneT	
		Revision: 3.0
		Format: A3

ZWW4AE400

AR / NL1

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL1/1a	GW / opgw	0	0	0	2313	5642	-19572
Wind, 10°C	150C1F1	0	0	0	8522	20309	-71623
Permanent loads yg= 1.2	150C1F2	0	0	0	8522	20208	-71576
Wind angle: 0°	150C1F3	0	0	0	8522	20082	-71524
	380C2F1	0	0	0	17045	40618	-143247
	380C2F2	0	0	0	17045	40417	-143152
	380C2F3	0	0	0	17045	40164	-143048
	RTG	0	0	0	4620	10939	-38915
NL1/1b	GW / opgw	0	0	0	2312	5979	-22016
Wind, -20°C	150C1F1	0	0	0	8518	22204	-82034
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	22187	-82036
Wind angle: 0°	150C1F3	0	0	0	8518	22165	-82038
	380C2F1	0	0	0	17036	44409	-164069
	380C2F2	0	0	0	17036	44375	-164072
	380C2F3	0	0	0	17036	44331	-164076
	RTG	0	0	0	4618	11791	-43623
NL1/3	GW / opgw	0	0	0	9331	16292	-59274
Wind, -5°C	150C1F1	0	0	0	14688	31519	-115300
Permanent loads yg= 1.2	150C1F2	0	0	0	14688	31470	-115301
Wind angle: 0°	150C1F3	0	0	0	14688	31408	-115304
	380C2F1	0	0	0	29376	63038	-230599
	380C2F2	0	0	0	29376	62940	-230602
	380C2F3	0	0	0	29376	62816	-230608
	RTG	0	0	0	18688	32337	-118727
NL1/4	GW / opgw	0	0	0	3065	6740	-24858
Construction/maintenance, +5°C	150C1F1	0	0	0	10026	22453	-82960
Permanent loads yg= 1.2	150C1F2	0	0	0	10026	22436	-82962
Wind angle: 0°	150C1F3	0	0	0	10026	22414	-82965
	380C2F1	0	0	0	20053	44905	-165920
	380C2F2	0	0	0	20053	44871	-165924
	380C2F3	0	0	0	20053	44828	-165930
	RTG	0	0	0	6124	13407	-49654
NL1/6	GW / opgw	0	0	0	2603	5740	-21422
Permanent, +10°C	150C1F1	0	0	0	9589	21041	-78528
Permanent loads yg= 1.35	150C1F2	0	0	0	9589	21041	-78528
	150C1F3	0	0	0	9589	21041	-78528
	380C2F1	0	0	0	19177	42083	-157056
	380C2F2	0	0	0	19177	42083	-157056
	380C2F3	0	0	0	19177	42083	-157056
	RTG	0	0	0	5198	11469	-42804
NL1/1a	GW / opgw	0	0	0	2315	13636	-34239
Wind, 10°C	150C1F1	0	0	0	8527	41255	-107248
Permanent loads yg= 1.2	150C1F2	0	0	0	8527	39143	-103042
Wind angle: 45°	150C1F3	0	0	0	8526	36475	-97775
	380C2F1	0	0	0	17055	82509	-214495
	380C2F2	0	0	0	17054	78286	-206083
	380C2F3	0	0	0	17052	72950	-195550
	RTG	0	0	0	4622	20280	-54290
NL1/1b	GW / opgw	0	0	0	2312	7032	-22918
Wind, -20°C	150C1F1	0	0	0	8518	24956	-83805
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	24680	-83505
Wind angle: 45°	150C1F3	0	0	0	8518	24336	-83161
	380C2F1	0	0	0	17036	49913	-167610
	380C2F2	0	0	0	17036	49359	-167011
	380C2F3	0	0	0	17036	48672	-166322
	RTG	0	0	0	4618	13016	-44300
NL1/3	GW / opgw	0	0	0	9333	21392	-62725
Wind, -5°C	150C1F1	0	0	0	14690	39726	-122166
Permanent loads yg= 1.2	150C1F2	0	0	0	14689	38885	-121082
Wind angle: 45°	150C1F3	0	0	0	14689	37844	-119815
	380C2F1	0	0	0	29380	79451	-244332
	380C2F2	0	0	0	29379	77771	-242163
	380C2F3	0	0	0	29378	75688	-239630
	RTG	0	0	0	18690	38360	-121234
NL1/4	GW / opgw	0	0	0	3066	7701	-25412
Construction/maintenance, +5°C	150C1F1	0	0	0	10027	25074	-84237
Permanent loads yg= 1.2	150C1F2	0	0	0	10027	24816	-84010
Wind angle: 45°	150C1F3	0	0	0	10026	24495	-83750
	380C2F1	0	0	0	20053	50147	-168475
	380C2F2	0	0	0	20053	49632	-168019
	380C2F3	0	0	0	20053	48990	-167500
	RTG	0	0	0	6124	14552	-50029

NL1/1a	GW / opgw	0	0	0	2316	16038	-39137
Wind, 10°C	150C1F1	0	0	0	8529	47872	-120531
Permanent loads yg= 1.2	150C1F2	0	0	0	8528	45214	-115185
Wind angle: 90°	150C1F3	0	0	0	8527	41832	-108401
	380C2F1	0	0	0	17058	95743	-241062
	380C2F2	0	0	0	17057	90427	-230369
	380C2F3	0	0	0	17055	83663	-216802
	RTG	0	0	0	4623	23333	-60459
NL1/1b	GW / opgw	0	0	0	2312	7388	-23436
Wind, -20°C	150C1F1	0	0	0	8518	25859	-84895
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	25490	-84430
Wind angle: 90°	150C1F3	0	0	0	8518	25033	-83891
	380C2F1	0	0	0	17037	51718	-169791
	380C2F2	0	0	0	17037	50979	-168860
	380C2F3	0	0	0	17036	50066	-167782
	RTG	0	0	0	4618	13411	-44734
NL1/3	GW / opgw	0	0	0	9334	23040	-64696
Wind, -5°C	150C1F1	0	0	0	14691	42459	-126000
Permanent loads yg= 1.2	150C1F2	0	0	0	14690	41342	-124384
Wind angle: 90°	150C1F3	0	0	0	14690	39958	-122475
	380C2F1	0	0	0	29381	84919	-252000
	380C2F2	0	0	0	29381	82685	-248768
	380C2F3	0	0	0	29380	79915	-244949
	RTG	0	0	0	18691	40243	-122907
NL1/4	GW / opgw	0	0	0	3066	8012	-25760
Construction/maintenance, +5°C	150C1F1	0	0	0	10027	25909	-85076
Permanent loads yg= 1.2	150C1F2	0	0	0	10027	25568	-84717
Wind angle: 90°	150C1F3	0	0	0	10027	25145	-84303
	380C2F1	0	0	0	20053	51818	-170153
	380C2F2	0	0	0	20053	51136	-169433
	380C2F3	0	0	0	20053	50290	-168606
	RTG	0	0	0	6124	14905	-50305
NL1/1a	GW / opgw	0	0	0	2314	7341	-21850
Wind, 10°C	150C1F1	0	0	0	8523	24649	-76427
Permanent loads yg= 1.2	150C1F2	0	0	0	8523	24112	-75647
Wind angle: -45°	150C1F3	0	0	0	8523	23449	-74733
	380C2F1	0	0	0	17046	49298	-152854
	380C2F2	0	0	0	17046	48224	-151293
	380C2F3	0	0	0	17046	46898	-149466
	RTG	0	0	0	4620	12848	-40820
NL1/1b	GW / opgw	0	0	0	2312	6214	-22081
Wind, -20°C	150C1F1	0	0	0	8518	22840	-82131
Permanent loads yg= 1.2	150C1F2	0	0	0	8518	22769	-82107
Wind angle: -45°	150C1F3	0	0	0	8518	22678	-82081
	380C2F1	0	0	0	17036	45681	-164262
	380C2F2	0	0	0	17036	45537	-164214
	380C2F3	0	0	0	17036	45356	-164162
	RTG	0	0	0	4618	12078	-43652
NL1/3	GW / opgw	0	0	0	9332	17469	-59491
Wind, -5°C	150C1F1	0	0	0	14688	33360	-115804
Permanent loads yg= 1.2	150C1F2	0	0	0	14688	33148	-115699
Wind angle: -45°	150C1F3	0	0	0	14688	32883	-115583
	380C2F1	0	0	0	29376	66719	-231608
	380C2F2	0	0	0	29376	66297	-231398
	380C2F3	0	0	0	29376	65767	-231166
	RTG	0	0	0	18688	33785	-118778
NL1/4	GW / opgw	0	0	0	3066	6965	-24884
Construction/maintenance, +5°C	150C1F1	0	0	0	10026	23075	-83003
Permanent loads yg= 1.2	150C1F2	0	0	0	10026	23005	-82987
Wind angle: -45°	150C1F3	0	0	0	10026	22917	-82972
	380C2F1	0	0	0	20053	46149	-166005
	380C2F2	0	0	0	20053	46010	-165975
	380C2F3	0	0	0	20053	45834	-165943
	RTG	0	0	0	6124	13686	-49651
NL1//1a	GW / opgw	0	0	0	1735	4557	-15520
Wind, 10°C	150C1F1	0	0	0	6390	16356	-56872
Permanent loads yg= 0.9	150C1F2	0	0	0	6390	16247	-56795
Wind angle: 0°	150C1F3	0	0	0	6390	16112	-56708
	380C2F1	0	0	0	12781	32712	-113743
	380C2F2	0	0	0	12781	32495	-113589
	380C2F3	0	0	0	12781	32224	-113416
	RTG	0	0	0	3464	8737	-30698

NL1/1b	GW / opgw	0	0	0	1734	4807	-17644
Wind, -20°C	150C1F1	0	0	0	6387	17993	-66318
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	17976	-66318
Wind angle: 0°	150C1F3	0	0	0	6387	17953	-66318
	380C2F1	0	0	0	12774	35986	-132635
	380C2F2	0	0	0	12774	35951	-132635
	380C2F3	0	0	0	12774	35907	-132637
	RTG	0	0	0	3463	9450	-34887
NL1/3	GW / opgw	0	0	0	8751	15568	-56573
Wind, -5°C	150C1F1	0	0	0	12554	28094	-102519
Permanent loads yg= 0.9	150C1F2	0	0	0	12554	28045	-102518
Wind angle: 0°	150C1F3	0	0	0	12554	27982	-102518
	380C2F1	0	0	0	25109	56188	-205038
	380C2F2	0	0	0	25109	56089	-205035
	380C2F3	0	0	0	25109	55964	-205036
	RTG	0	0	0	17529	30887	-113313
NL1/4	GW / opgw	0	0	0	2487	5711	-21016
Construction/maintenance, +5°C	150C1F1	0	0	0	7894	18612	-68628
Permanent loads yg= 0.9	150C1F2	0	0	0	7894	18595	-68629
Wind angle: 0°	150C1F3	0	0	0	7894	18573	-68631
	380C2F1	0	0	0	15788	37224	-137256
	380C2F2	0	0	0	15788	37190	-137258
	380C2F3	0	0	0	15788	37146	-137262
	RTG	0	0	0	4968	11346	-41962
NL1/6	GW / opgw	0	0	0	1735	4102	-15307
Permanent, +10°C	150C1F1	0	0	0	6390	15137	-56492
Permanent loads yg= 0.9	150C1F2	0	0	0	6390	15137	-56492
	150C1F3	0	0	0	6390	15137	-56492
	380C2F1	0	0	0	12781	30274	-112983
	380C2F2	0	0	0	12781	30274	-112983
	380C2F3	0	0	0	12781	30274	-112983
	RTG	0	0	0	3464	8190	-30564
NL1/1a	GW / opgw	0	0	0	1736	13263	-32850
Wind, 10°C	150C1F1	0	0	0	6395	39507	-100730
Permanent loads yg= 0.9	150C1F2	0	0	0	6394	37259	-96016
Wind angle: 45°	150C1F3	0	0	0	6394	34395	-90018
	380C2F1	0	0	0	12790	79014	-201459
	380C2F2	0	0	0	12789	74519	-192033
	380C2F3	0	0	0	12788	68790	-180036
	RTG	0	0	0	3466	19144	-50054
NL1/1b	GW / opgw	0	0	0	1734	5982	-19000
Wind, -20°C	150C1F1	0	0	0	6387	21016	-69102
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	20701	-68659
Wind angle: 45°	150C1F3	0	0	0	6387	20312	-68144
	380C2F1	0	0	0	12774	42032	-138204
	380C2F2	0	0	0	12774	41402	-137318
	380C2F3	0	0	0	12774	40624	-136288
	RTG	0	0	0	3463	10783	-35969
NL1/3	GW / opgw	0	0	0	8753	20763	-60379
Wind, -5°C	150C1F1	0	0	0	12556	36758	-111097
Permanent loads yg= 0.9	150C1F2	0	0	0	12556	35859	-109790
Wind angle: 45°	150C1F3	0	0	0	12556	34744	-108250
	380C2F1	0	0	0	25112	73517	-222195
	380C2F2	0	0	0	25112	71717	-219580
	380C2F3	0	0	0	25111	69489	-216500
	RTG	0	0	0	17531	36995	-116144
NL1/4	GW / opgw	0	0	0	2487	6730	-21790
Construction/maintenance, +5°C	150C1F1	0	0	0	7894	21403	-70542
Permanent loads yg= 0.9	150C1F2	0	0	0	7894	21121	-70222
Wind angle: 45°	150C1F3	0	0	0	7894	20771	-69853
	380C2F1	0	0	0	15788	42807	-141084
	380C2F2	0	0	0	15788	42242	-140444
	380C2F3	0	0	0	15788	41542	-139707
	RTG	0	0	0	4968	12541	-42527
NL1/1a	GW / opgw	0	0	0	1737	15745	-38044
Wind, 10°C	150C1F1	0	0	0	6396	46464	-115283
Permanent loads yg= 0.9	150C1F2	0	0	0	6396	43683	-109477
Wind angle: 90°	150C1F3	0	0	0	6395	40118	-102012
	380C2F1	0	0	0	12793	92929	-230566
	380C2F2	0	0	0	12791	87366	-218954
	380C2F3	0	0	0	12790	80237	-204024
	RTG	0	0	0	3467	22399	-56976

NL1/1b	GW / opgw	0	0	0	1734	6393	-19722
Wind, -20°C	150C1F1	0	0	0	6387	22050	-70684
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	21626	-70014
Wind angle: 90°	150C1F3	0	0	0	6387	21103	-69228
	380C2F1	0	0	0	12775	44101	-141369
	380C2F2	0	0	0	12775	43253	-140028
	380C2F3	0	0	0	12775	42207	-138457
	RTG	0	0	0	3463	11234	-36607
NL1/3	GW / opgw	0	0	0	8754	22451	-62501
Wind, -5°C	150C1F1	0	0	0	12557	39686	-115656
Permanent loads yg= 0.9	150C1F2	0	0	0	12557	38491	-113745
Wind angle: 90°	150C1F3	0	0	0	12556	37007	-111468
	380C2F1	0	0	0	25114	79372	-231311
	380C2F2	0	0	0	25113	76981	-227490
	380C2F3	0	0	0	25113	74015	-222935
	RTG	0	0	0	17532	38920	-117975
NL1/4	GW / opgw	0	0	0	2487	7070	-22246
Construction/maintenance, +5°C	150C1F1	0	0	0	7894	22325	-71703
Permanent loads yg= 0.9	150C1F2	0	0	0	7894	21948	-71208
Wind angle: 90°	150C1F3	0	0	0	7894	21482	-70634
	380C2F1	0	0	0	15789	44650	-143406
	380C2F2	0	0	0	15789	43896	-142416
	380C2F3	0	0	0	15788	42963	-141268
	RTG	0	0	0	4968	12922	-42903
NL1/1a	GW / opgw	0	0	0	1735	6484	-18653
Wind, 10°C	150C1F1	0	0	0	6391	21253	-63754
Permanent loads yg= 0.9	150C1F2	0	0	0	6391	20639	-62687
Wind angle: -45°	150C1F3	0	0	0	6391	19881	-61420
	380C2F1	0	0	0	12782	42505	-127508
	380C2F2	0	0	0	12782	41278	-125374
	380C2F3	0	0	0	12782	39762	-122840
	RTG	0	0	0	3465	10877	-33467
NL1/1b	GW / opgw	0	0	0	1734	5057	-17763
Wind, -20°C	150C1F1	0	0	0	6387	18659	-66528
Permanent loads yg= 0.9	150C1F2	0	0	0	6387	18583	-66485
Wind angle: -45°	150C1F3	0	0	0	6387	18486	-66438
	380C2F1	0	0	0	12774	37319	-133056
	380C2F2	0	0	0	12774	37165	-132971
	380C2F3	0	0	0	12774	36973	-132876
	RTG	0	0	0	3463	9749	-34960
NL1/3	GW / opgw	0	0	0	8751	16756	-56833
Wind, -5°C	150C1F1	0	0	0	12555	29991	-103232
Permanent loads yg= 0.9	150C1F2	0	0	0	12554	29771	-103094
Wind angle: -45°	150C1F3	0	0	0	12554	29495	-102939
	380C2F1	0	0	0	25109	59981	-206465
	380C2F2	0	0	0	25109	59541	-206188
	380C2F3	0	0	0	25109	58990	-205878
	RTG	0	0	0	17529	32344	-113401
NL1/4	GW / opgw	0	0	0	2487	5942	-21067
Construction/maintenance, +5°C	150C1F1	0	0	0	7894	19253	-68740
Permanent loads yg= 0.9	150C1F2	0	0	0	7894	19180	-68714
Wind angle: -45°	150C1F3	0	0	0	7894	19089	-68685
	380C2F1	0	0	0	15788	38506	-137480
	380C2F2	0	0	0	15788	38360	-137427
	380C2F3	0	0	0	15788	38177	-137369
	RTG	0	0	0	4968	11630	-41979

ZWW4AE400

Appendix AR2 / NL4

Loadcases for tower strength (serviceability limit state)

Loadcase according to 50341-3-15		Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
	Att. Point						
NL4/1a	GW / opgw	0	0	0	1928	4761	-16779
Wind, 10°C	150C1F1	0	0	0	7101	17271	-61676
Permanent loads yg= 1.0	150C1F2	0	0	0	7101	17206	-61652
Wind angle: 0°	150C1F3	0	0	0	7101	17124	-61626
	380C2F1	0	0	0	14202	34542	-123352
	380C2F2	0	0	0	14202	34412	-123304
	380C2F3	0	0	0	14202	34248	-123251
	RTG	0	0	0	3850	9294	-33413
NL4/1b	GW / opgw	0	0	0	1927	5183	-19144
Wind, -20°C	150C1F1	0	0	0	7097	19367	-71723
Permanent loads yg= 1.0	150C1F2	0	0	0	7097	19356	-71724
Wind angle: 0°	150C1F3	0	0	0	7097	19341	-71726
	380C2F1	0	0	0	14194	38734	-143446
	380C2F2	0	0	0	14194	38711	-143449
	380C2F3	0	0	0	14194	38682	-143453
	RTG	0	0	0	3848	10220	-37886
NL4/3	GW / opgw	0	0	0	6603	12605	-46025
Wind, -5°C	150C1F1	0	0	0	11209	25633	-94110
Permanent loads yg= 1.0	150C1F2	0	0	0	11209	25601	-94112
Wind angle: 0°	150C1F3	0	0	0	11209	25559	-94114
	380C2F1	0	0	0	22419	51266	-188221
	380C2F2	0	0	0	22419	51201	-188223
	380C2F3	0	0	0	22419	51119	-188228
	RTG	0	0	0	13222	25028	-92102
NL4/4	GW / opgw	0	0	0	2429	5579	-20622
Construction/maintenance, +5°C	150C1F1	0	0	0	8103	18929	-70087
Permanent loads yg= 1.0	150C1F2	0	0	0	8103	18917	-70088
Wind angle: 0°	150C1F3	0	0	0	8103	18903	-70090
	380C2F1	0	0	0	16206	37857	-140173
	380C2F2	0	0	0	16206	37835	-140176
	380C2F3	0	0	0	16206	37806	-140181
	RTG	0	0	0	4852	11099	-41168
NL4/1a	GW / opgw	0	0	0	1928	9991	-26190
Wind, 10°C	150C1F1	0	0	0	7104	30812	-83859
Permanent loads yg= 1.0	150C1F2	0	0	0	7103	29403	-81049
Wind angle: 45°	150C1F3	0	0	0	7103	27637	-77583
	380C2F1	0	0	0	14207	61624	-167718
	380C2F2	0	0	0	14206	58806	-162097
	380C2F3	0	0	0	14206	55274	-155165
	RTG	0	0	0	3850	15277	-42756
NL4/1b	GW / opgw	0	0	0	1927	5877	-19641
Wind, -20°C	150C1F1	0	0	0	7097	21141	-72678
Permanent loads yg= 1.0	150C1F2	0	0	0	7097	20965	-72511
Wind angle: 45°	150C1F3	0	0	0	7097	20747	-72319
	380C2F1	0	0	0	14195	42282	-145357
	380C2F2	0	0	0	14195	41930	-145022
	380C2F3	0	0	0	14194	41493	-144639
	RTG	0	0	0	3848	11011	-38244
NL4/3	GW / opgw	0	0	0	6604	16051	-48504
Wind, -5°C	150C1F1	0	0	0	11210	31048	-98485
Permanent loads yg= 1.0	150C1F2	0	0	0	11210	30494	-97782
Wind angle: 45°	150C1F3	0	0	0	11210	29807	-96965
	380C2F1	0	0	0	22420	62096	-196970
	380C2F2	0	0	0	22420	60987	-195564
	380C2F3	0	0	0	22420	59614	-193930
	RTG	0	0	0	13222	29079	-93915
NL4/4	GW / opgw	0	0	0	2429	6206	-20942
Construction/maintenance, +5°C	150C1F1	0	0	0	8103	20637	-70792
Permanent loads yg= 1.0	150C1F2	0	0	0	8103	20470	-70662
Wind angle: 45°	150C1F3	0	0	0	8103	20263	-70513
	380C2F1	0	0	0	16207	41273	-141585
	380C2F2	0	0	0	16206	40941	-141323
	380C2F3	0	0	0	16206	40527	-141027
	RTG	0	0	0	4852	11850	-41375
NL4/1a	GW / opgw	0	0	0	1929	11643	-29647
Wind, 10°C	150C1F1	0	0	0	7105	35283	-92941
Permanent loads yg= 1.0	150C1F2	0	0	0	7104	33478	-89252
Wind angle: 90°	150C1F3	0	0	0	7104	31199	-84636
	380C2F1	0	0	0	14209	70565	-185882
	380C2F2	0	0	0	14208	69596	-178504
	380C2F3	0	0	0	14207	62398	-169272
	RTG	0	0	0	3851	17307	-46852

NL4/1b	GW / opgw	0	0	0	1927	6082	-19940
Wind, -20°C	150C1F1	0	0	0	7097	21713	-73295
Permanent loads yg= 1.0	150C1F2	0	0	0	7097	21479	-73031
Wind angle: 90°	150C1F3	0	0	0	7097	21190	-72727
	380C2F1	0	0	0	14195	43426	-146590
	380C2F2	0	0	0	14195	42959	-146062
	380C2F3	0	0	0	14195	42379	-145453
	RTG	0	0	0	3848	11262	-38485
NL4/3	GW / opgw	0	0	0	6604	17177	-49924
Wind, -5°C	150C1F1	0	0	0	11211	32857	-100993
Permanent loads yg= 1.0	150C1F2	0	0	0	11210	32117	-99932
Wind angle: 90°	150C1F3	0	0	0	11210	31201	-98686
	380C2F1	0	0	0	22421	65715	-201986
	380C2F2	0	0	0	22421	64234	-199863
	380C2F3	0	0	0	22420	62403	-197371
	RTG	0	0	0	13223	30355	-95112
NL4/4	GW / opgw	0	0	0	2429	6407	-21151
Construction/maintenance, +5°C	150C1F1	0	0	0	8103	21174	-71279
Permanent loads yg= 1.0	150C1F2	0	0	0	8103	20955	-71069
Wind angle: 90°	150C1F3	0	0	0	8103	20682	-70830
	380C2F1	0	0	0	16207	42348	-142557
	380C2F2	0	0	0	16207	41910	-142139
	380C2F3	0	0	0	16207	41365	-141660
	RTG	0	0	0	4852	12080	-41537
NL4/1a	GW / opgw	0	0	0	1928	5835	-18079
Wind, 10°C	150C1F1	0	0	0	7101	20026	-64364
Permanent loads yg= 1.0	150C1F2	0	0	0	7101	19687	-63915
Wind angle: -45°	150C1F3	0	0	0	7101	19269	-63394
	380C2F1	0	0	0	14203	40052	-128727
	380C2F2	0	0	0	14203	39375	-127830
	380C2F3	0	0	0	14202	38537	-126788
	RTG	0	0	0	3850	10507	-34462
NL4/1b	GW / opgw	0	0	0	1927	5336	-19175
Wind, -20°C	150C1F1	0	0	0	7097	19784	-71762
Permanent loads yg= 1.0	150C1F2	0	0	0	7097	19737	-71750
Wind angle: -45°	150C1F3	0	0	0	7097	19678	-71738
	380C2F1	0	0	0	14194	39569	-143525
	380C2F2	0	0	0	14194	39475	-143501
	380C2F3	0	0	0	14194	39357	-143476
	RTG	0	0	0	3848	10408	-37895
NL4/3	GW / opgw	0	0	0	6603	13394	-46187
Wind, -5°C	150C1F1	0	0	0	11209	26852	-94417
Permanent loads yg= 1.0	150C1F2	0	0	0	11209	26712	-94351
Wind angle: -45°	150C1F3	0	0	0	11209	26537	-94279
	380C2F1	0	0	0	22419	53704	-188833
	380C2F2	0	0	0	22419	53425	-188703
	380C2F3	0	0	0	22419	53074	-188559
	RTG	0	0	0	13222	25996	-92151
NL4/4	GW / opgw	0	0	0	2429	5727	-20634
Construction/maintenance, +5°C	150C1F1	0	0	0	8103	19339	-70099
Permanent loads yg= 1.0	150C1F2	0	0	0	8103	19293	-70091
Wind angle: -45°	150C1F3	0	0	0	8103	19235	-70084
	380C2F1	0	0	0	16206	38678	-140198
	380C2F2	0	0	0	16206	38586	-140183
	380C2F3	0	0	0	16206	38471	-140168
	RTG	0	0	0	4852	11284	-41161



ZWW4AE400

Bijlage BAR

Location dependent data to obtain pressures

Wind area					2	
Terrain category		O=onbebouwd, B=bebouwd			O	
Hoogte		h			63.2	m
Diameter voet		d voet			3.3	m
top		d top			0.8	m
gem		d gem			2.1	m
wanddikte		t			28	mm
Oppervlakte aan voet		A			287820	mm ²
Traagheidsmoment aan voet		W _x			2.33E+08	mm ⁴
Weerstandsmoment aan voet		I _x			3.81E+11	mm ⁴
Mast: Gewicht		2 ^{de} orde			10.0	%
		F _{rep,ver}			874	kN

Ultimate limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	62.6	2.3	16.0	-39.1	42.3	2751	kNm
150C1F1	52.6	8.5	47.9	-120.5	129.7	5400	kNm
150C1F2	42.4	8.5	45.2	-115.2	123.7	4272	kNm
150C1F3	32.2	8.5	41.8	-108.4	116.2	3171	kNm
380C2F1	52.6	17.1	95.7	-241.1	259.4	10799	kNm
380C2F2	42.4	17.1	90.4	-230.4	247.5	8544	kNm
380C2F3	32.2	17.1	83.7	-216.8	232.4	6342	kNm
RTG	22.1	4.6	23.3	-60.5	64.8	1664	kNm

Stuwdruk		F _{hor.}	37.6	kN
Totaal		M _{d,wind}	1063	kNm
Totaal moment incl. 2 ^{de} orde effect		M _{d,tot}	55432	kNm
		M _{d,tot}	60975	kNm

Normaalkracht;

Optredende normaalkracht						
N _{d,geleiders}					84	kN
N _{d, e.g. mast}					1049	kN
N _{s,d,totaal}					1133	kN

Is buis plooi gevoelig tgv normaalkracht:	conform NEN-EN 50341 par. 7.4.5.4				JA	
					ρ _a	0.65
					A _{eff}	188192 mm ²
Optredende spanning tgv normaalkracht						
N _{sd} /A _{eff} = f _{yd} /y _{m1}						6 N/mm ²

Moment;

Optredende moment in de voet:						
M _{d,tot}					60975	kNm

Is buis plooi gevoelig tgv momentkracht:	conform NEN-EN 50341 par. 7.4.5.4				JA	
					ρ _a	0.95
					W _{eff}	2.23E+08 mm ³

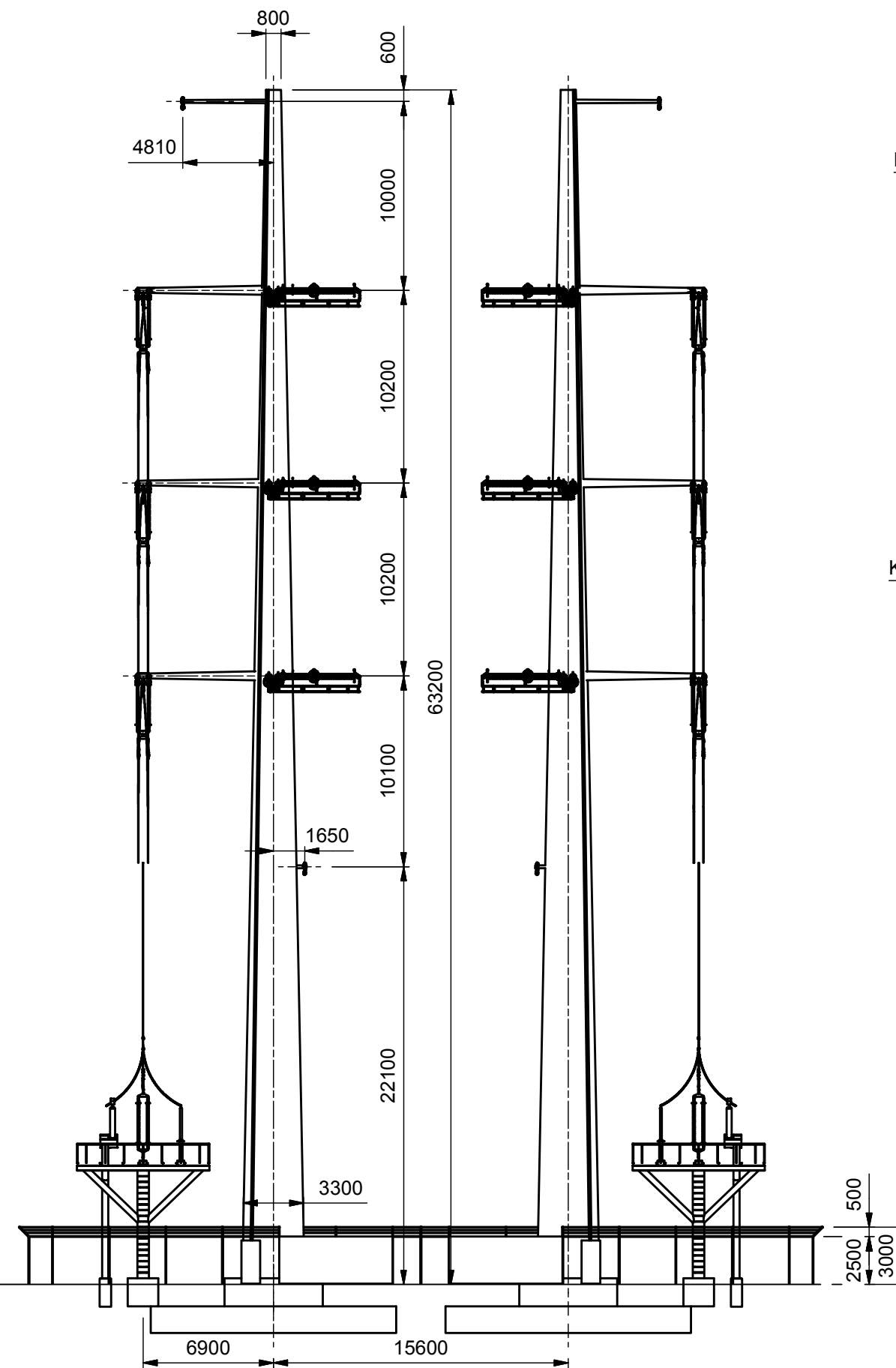
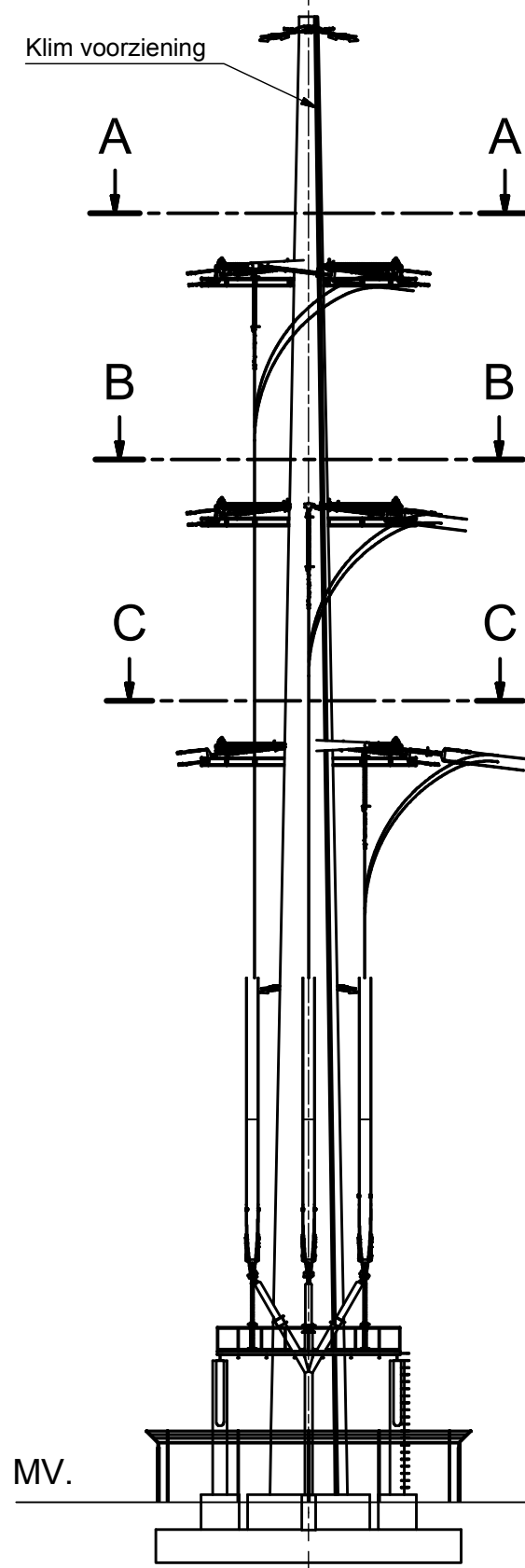
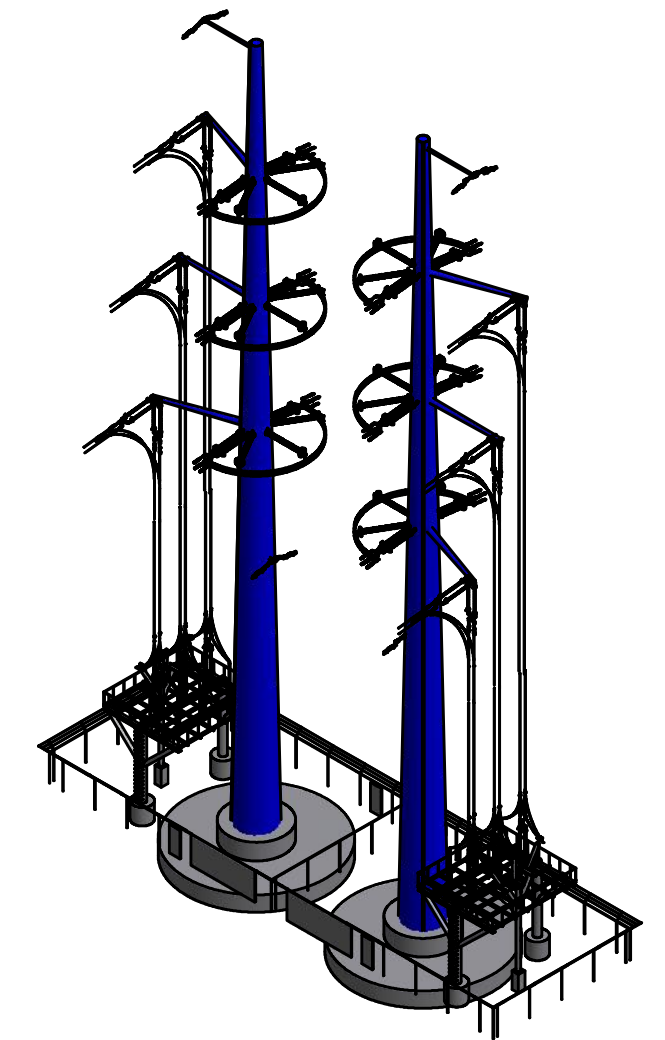
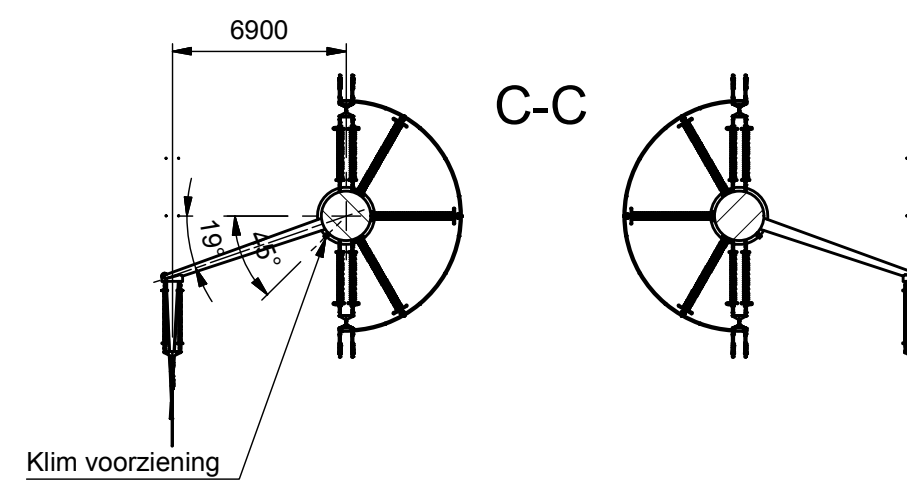
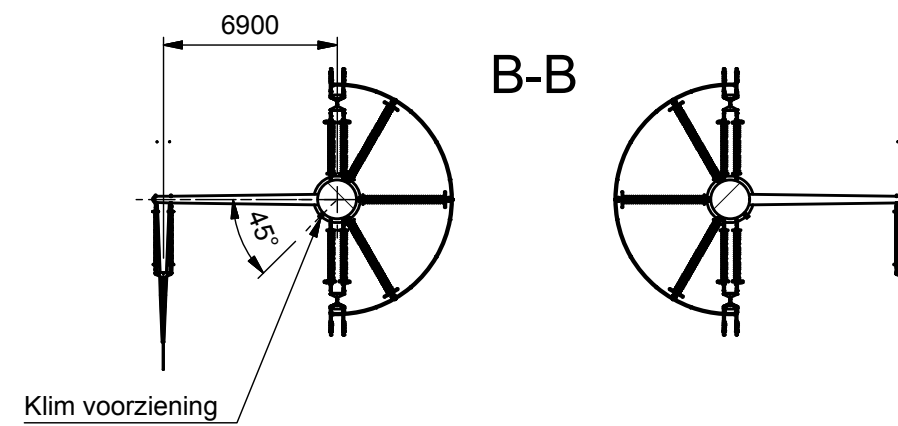
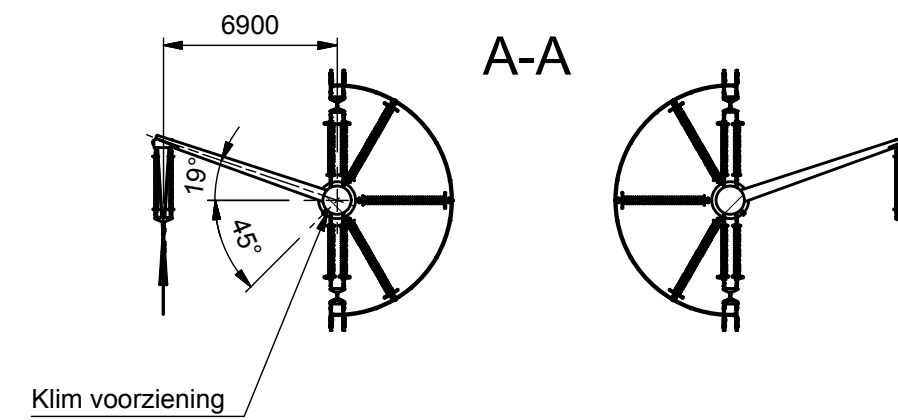
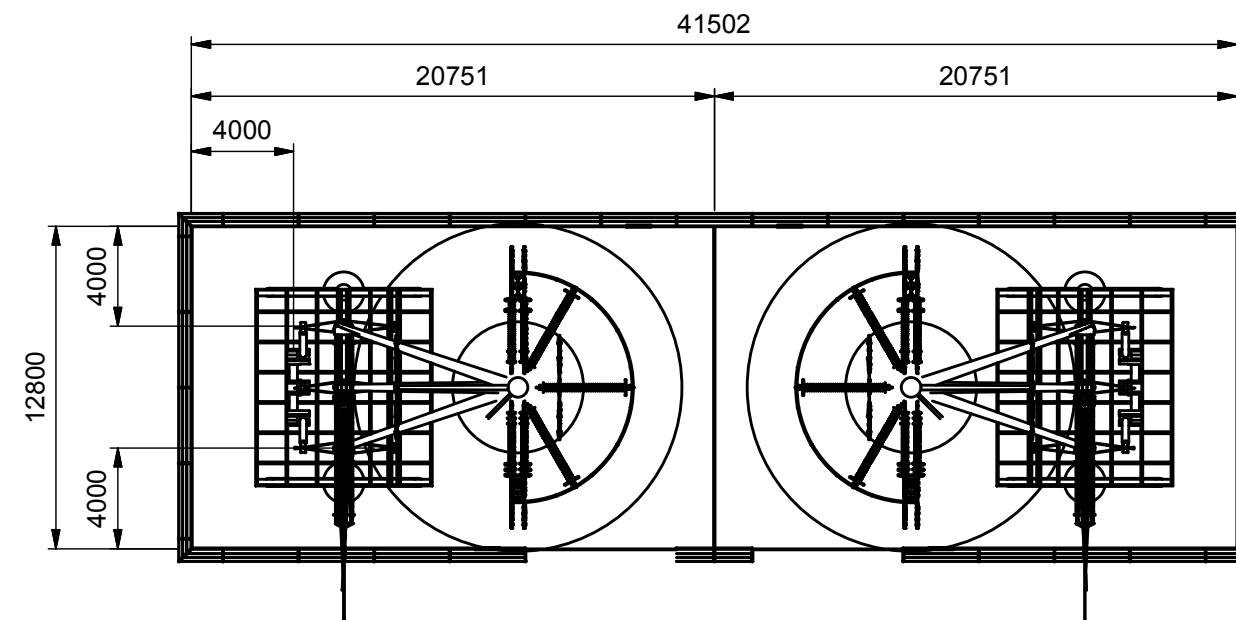
Optredende spanning tgv moment:						
M _d /W _{eff} = f _{yd} /y _{m1}						274 N/mm ²

Totale spanning:							
					σ _d	280	N/mm ²
					σ _{d,toegestaan}	284	N/mm ²
							< 284 N/mm ² = ACCOORD
							==> 80% van 355 N/mm ²

Special limit state	hoogte	F _{ver}	F _{floodrecht}	F _{//}	F _{Samengesteld}		
	m	kN	kN	kN	kN		
GW / opgw	62.6	1.9	11.6	-29.6	31.9	1994	kNm
150C1F1	52.6	7.1	35.3	-92.9	99.4	5229	kNm
150C1F2	42.4	7.1	33.5	-89.3	95.3	4042	kNm
150C1F3	32.2	7.1	31.2	-84.6	90.2	2905	kNm
380C2F1	52.6	14.2	70.6	-185.9	198.8	10458	kNm
380C2F2	42.4	14.2	67.0	-178.5	190.6	8083	kNm
380C2F3	32.2	14.2	62.4	-169.3	180.4	5809	kNm
RTG	22.1	3.9	17.3	-46.9	49.9	1104	kNm


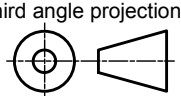
Stuwdruk		F _{hor.}	1010	kN
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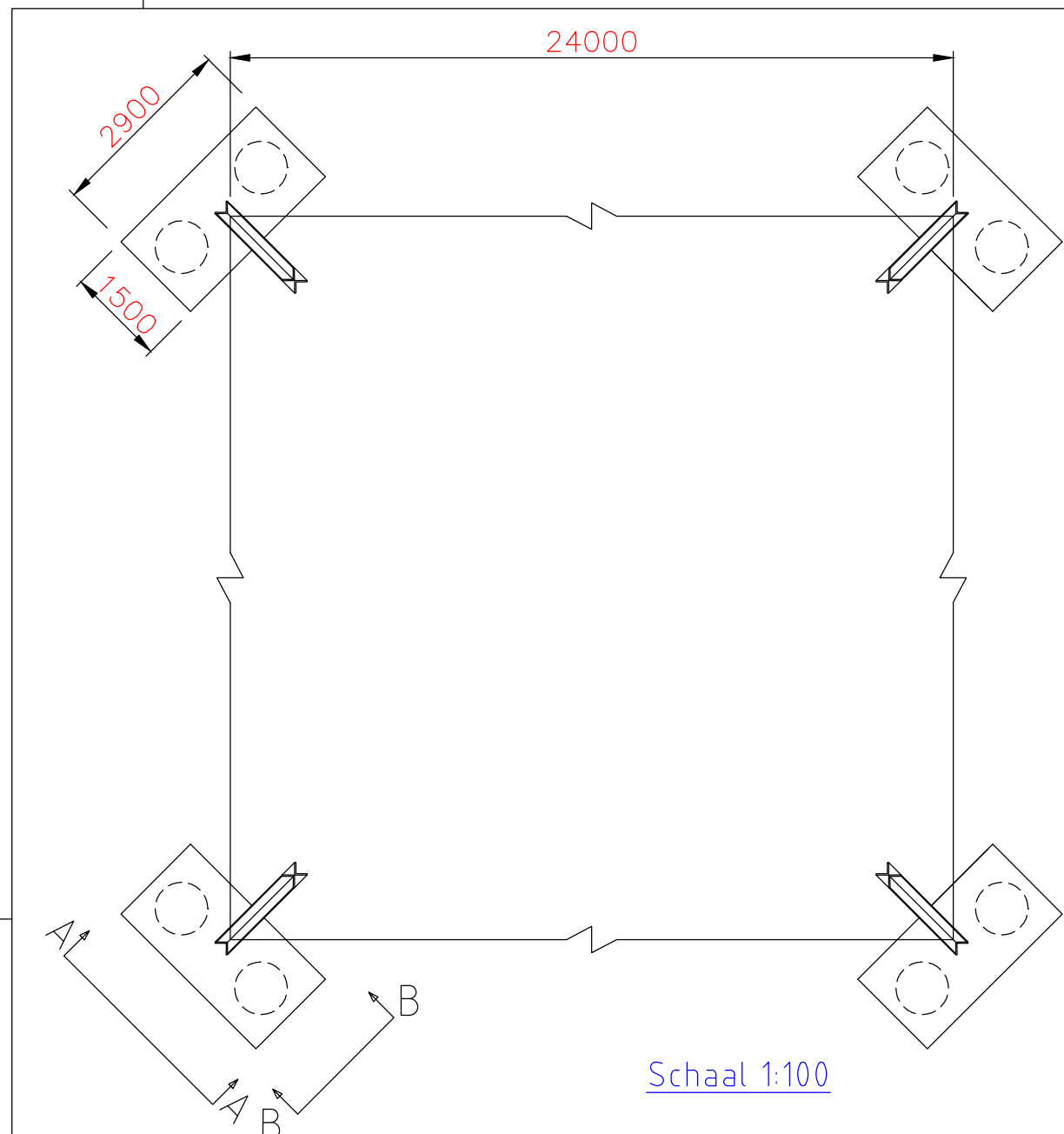
Verplaatsing			1.20	m	3.44	EIS TENNET VISUEEL
Percentage van de verplaatsing			1.90%		5.5%	NEN-EN-50341
Hoek			1.98	graden		
Kromming			0.42%		1%	NEN-EN-50341
Fundatie rotatiestijfheid			0.005	rad		



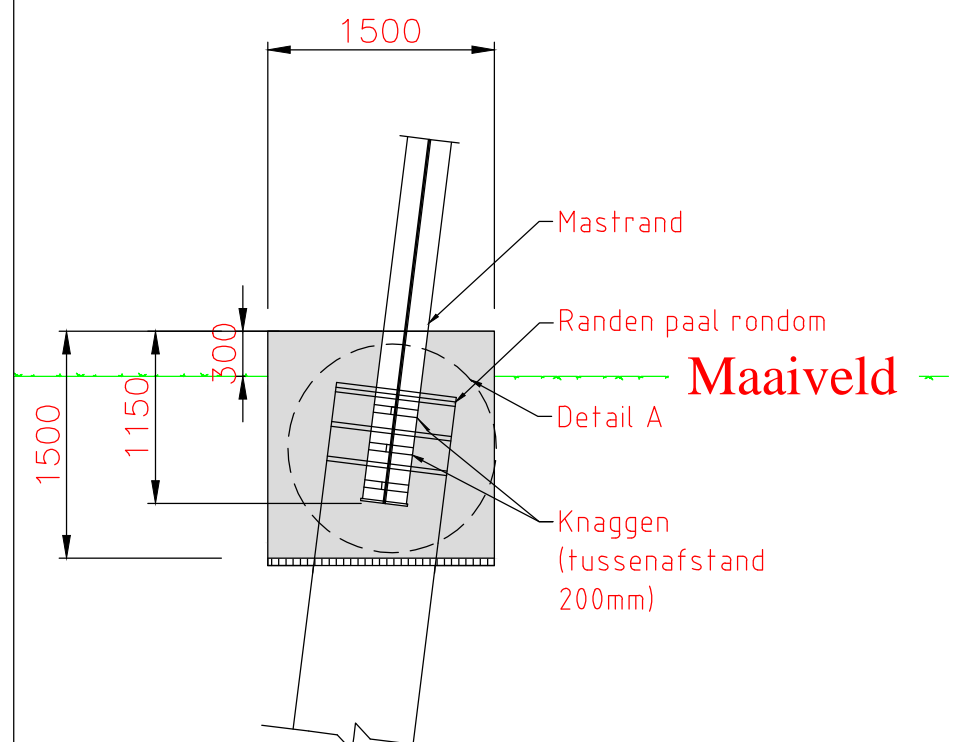
Opmerking:
Lijnhoek 150 graden
Voor Detail bordes zie tekening: 74102194-035-709

Vergunning

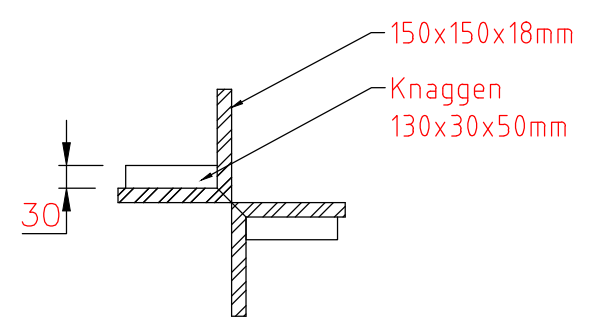
Revision history		Description	
Rev.	Date		
1.0	26-03-2014	First edition	
2.0	7-4-2014	Modification traverse	
		Projectname:	Engineering verbinding ZW380
		Third angle projection:	
		Drawing no.:	74102194-035-403
Design state:	WorkInProgress	Scale:	1:300
Drawn by:	SGR 7-4-2014	Units:	mm
Checked by:	APE 7-4-2014	Project no.:	145.11
Approved by:	AW 7-4-2014	Company:	TenneT
Description:			Revision:
Masttype: ZWW4AE400 opstijgpunt			2.0
150kV tbv inlusing (380kV eindmast;150kV eindmast)			Format:
			A2
KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com			



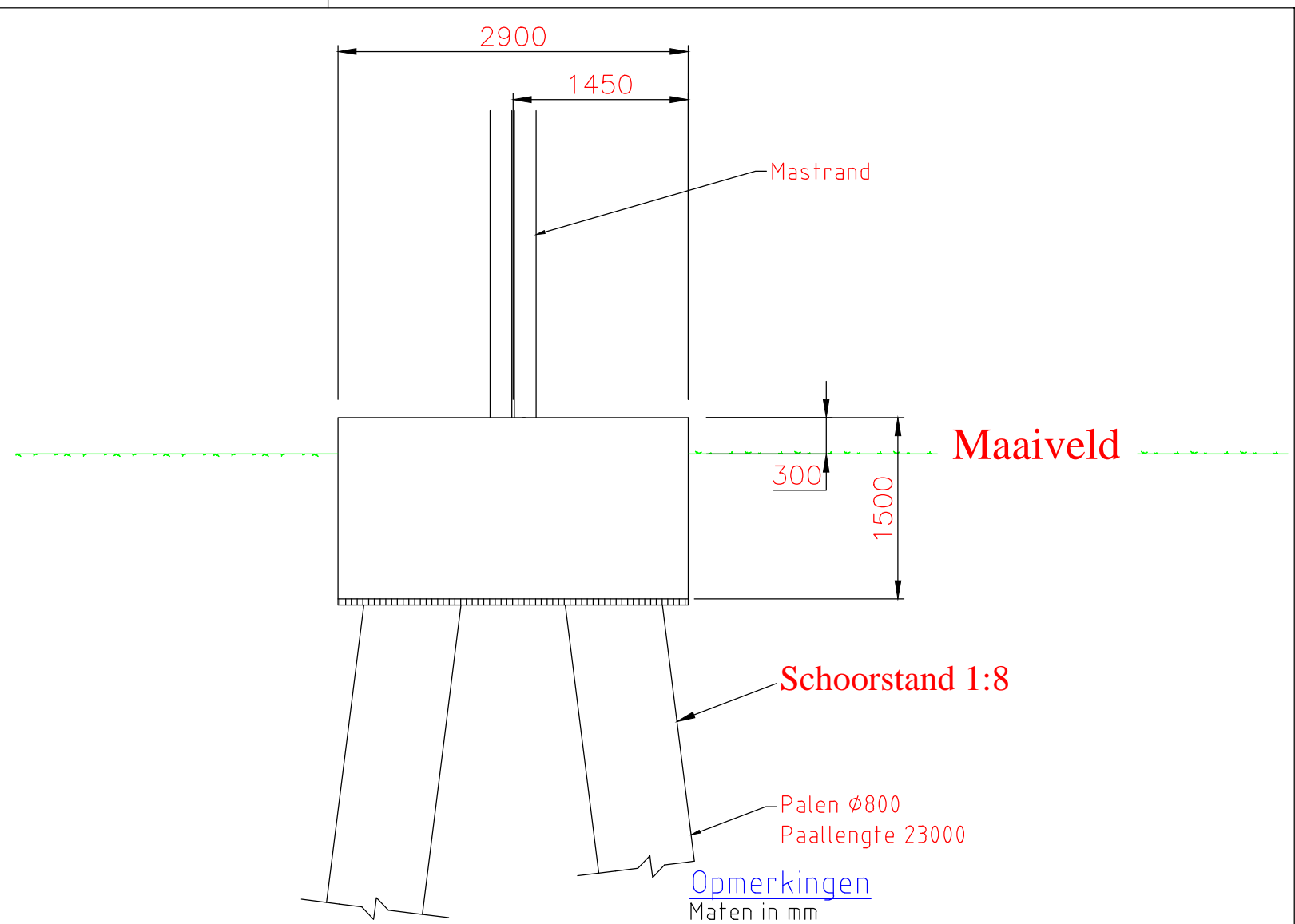
Schaal 1:100



Doorsnede B-B
Schaal 1:50



Detail A
Schaal 1:10



Aanzicht A-A

Schaal 1:50


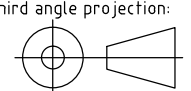
Verklaring

- Gewapend beton
- Werkvloer

Opmerkingen
 Maten in mm
 Hoogtematen in mm t.o.v. maaiveld
 Coördinaten in mm, in het stelsel van de rijkdriehoekmeting
 Maatvoering in het 360 graden stelsel
 Vellingkanten niet getekend
 Ringleiding in bovenkant poer op het bovennet plaatsen in de eerste laag
 Caldwellplaten toepassen tbv aarding
 Ontwerp fundatie conform SPE.05.344 Algemene Specificatie ontwerp axiaal belaste paalfunderingen

Opmerking: Afmetingen indicatief

T.B.V. Aanvraag

2.0	24-02-2014	Diverse aanpassingen	Projectname: Engineering verbinding ZW380	
1.0	19-12-2013	Eerste versie	Drawing no.: 74102194-032-670	
		Third angle projection:		
		Description: Principe ontwerp fundatie ZBK		
Design state: DEFINITIEF		Scale: 1:10 / 1:50 / 1:100		Format: A3
Drawn by: BJT	19-12-2013	Units: mm		
Checked by: AJP	19-12-2013	Project no: 000.145		
Approved by: AW	19-12-2013	Company: TenneT		
DNV KEMA Energy & Sustainability, Utrechtseweg 310, 6812 AR Arnhem, tel: +31 26 3 56 91 11, www.dnvkema.com				

Loadcases for tower strength (ultimate limit state)

Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw 1/2	2235	0	20055	3543	0	-20055
	150C1/2F1	8245	0	73723	13969	0	-73723
	150C1/2F2	8245	0	73723	13763	0	-73723
	150C1/2F3	8245	0	73723	13558	0	-73723
	380C2/4F1	16490	0	147446	27937	0	-147446
	380C2/4F2	16490	0	147446	27527	0	-147446
	380C2/4F3	16490	0	147446	27116	0	-147446
	RTG 1/2	4476	0	40154	6851	0	-40154
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw 1/2	2234	0	22789	3708	0	-22789
	150C1/2F1	8241	0	85855	14849	0	-85855
	150C1/2F2	8241	0	85855	14611	0	-85855
	150C1/2F3	8241	0	85855	14372	0	-85855
	380C2/4F1	16481	0	171710	29698	0	-171710
	380C2/4F2	16481	0	171710	29221	0	-171710
	380C2/4F3	16481	0	171710	28744	0	-171710
	RTG 1/2	4474	0	46045	7172	0	-46045
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw 1/2	9040	0	60282	13068	0	-60282
	150C1/2F1	14210	0	118491	23450	0	-118491
	150C1/2F2	14210	0	118491	23119	0	-118491
	150C1/2F3	14210	0	118491	22789	0	-118491
	380C2/4F1	28420	0	236981	46900	0	-236981
	380C2/4F2	28420	0	236981	46239	0	-236981
	380C2/4F3	28420	0	236981	45578	0	-236981
	RTG 1/2	18056	0	120420	25366	0	-120420
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 0°	GW / opgw 1/2	2987	0	25721	3567	0	-20456
	150C1/2F1	9749	0	85893	14095	0	-75470
	150C1/2F2	9749	0	85893	13885	0	-75470
	150C1/2F3	9749	0	85893	13675	0	-75470
	380C2/4F1	19498	0	171786	28190	0	-150939
	380C2/4F2	19498	0	171786	27770	0	-150939
	380C2/4F3	19498	0	171786	27350	0	-150939
	RTG 1/2	5980	0	51516	6898	0	-41011
NL1/6 Permanent, +10°C Permanent loads yg= 1.35	GW / opgw 1/2	2514	0	22048	3955	0	-22048
	150C1/2F1	9277	0	80870	15565	0	-80870
	150C1/2F2	9277	0	80870	15340	0	-80870
	150C1/2F3	9277	0	80870	15114	0	-80870
	380C2/4F1	18553	0	161740	31130	0	-161740
	380C2/4F2	18553	0	161740	30679	0	-161740
	380C2/4F3	18553	0	161740	30229	0	-161740
	RTG 1/2	5036	0	44135	7651	0	-44135
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw 1/2	2236	3229	31310	2959	3196	-30620
	150C1/2F1	8249	9438	102044	11925	9217	-99630
	150C1/2F2	8248	9051	100241	11903	8769	-97643
	150C1/2F3	8248	8617	98244	11896	8242	-95352
	380C2/4F1	16497	18876	204088	23850	18434	-199260
	380C2/4F2	16497	18102	200482	23806	17537	-195285
	380C2/4F3	16496	17234	196488	23791	16484	-190705
	RTG 1/2	4478	5298	56808	6024	5011	-54647
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw 1/2	2234	645	23475	3644	639	-23420
	150C1/2F1	8241	1886	87409	14665	1842	-87246
	150C1/2F2	8241	1809	87287	14449	1752	-87116
	150C1/2F3	8241	1722	87155	14235	1647	-86971
	380C2/4F1	16481	3772	174819	29329	3683	-174492
	380C2/4F2	16481	3617	174573	28899	3504	-174231
	380C2/4F3	16481	3444	174309	28469	3294	-173941
	RTG 1/2	4474	1059	46975	7099	1001	-46826
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw 1/2	9041	3310	63059	12803	3276	-62838
	150C1/2F1	14211	5272	124175	22829	5148	-123590
	150C1/2F2	14211	5056	123736	22574	4898	-123122
	150C1/2F3	14211	4813	123262	22322	4604	-122599
	380C2/4F1	28422	10543	248350	45659	10297	-247180
	380C2/4F2	28422	10111	247472	45149	9796	-246245
	380C2/4F3	28422	9627	246525	44644	9208	-245199
	RTG 1/2	18057	5446	124224	25060	5153	-123622
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 45°	GW / opgw 1/2	2987	646	26184	3513	639	-21067
	150C1/2F1	9749	1887	87114	13942	1842	-76821
	150C1/2F2	9749	1810	87017	13751	1753	-76695
	150C1/2F3	9749	1723	86913	13561	1648	-76554
	380C2/4F1	19498	3774	174227	27884	3685	-153642
	380C2/4F2	19498	3619	174034	27502	3506	-153389
	380C2/4F3	19498	3446	173825	27122	3295	-153107
	RTG 1/2	5980	1059	52139	6836	1002	-41766

NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw 1/2	2238	6464	47683	2645	6398	-46336
	150C1/2F1	8254	18889	148330	10410	18447	-143242
	150C1/2F2	8254	18114	144540	10432	17549	-138968
	150C1/2F3	8253	17245	140270	10472	16495	-133932
	380C2/4F1	16509	37777	296660	20820	36894	-286484
	380C2/4F2	16508	36228	289079	20863	35098	-277935
	380C2/4F3	16507	34490	280540	20943	32989	-267865
	RTG 1/2	4481	10603	83673	5406	10029	-79131
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw 1/2	2234	1291	25347	3492	1277	-25153
	150C1/2F1	8241	3772	91784	14184	3683	-91185
	150C1/2F2	8241	3617	91335	14024	3504	-90704
	150C1/2F3	8241	3444	90848	13867	3294	-90165
	380C2/4F1	16483	7544	183568	28368	7367	-182369
	380C2/4F2	16482	7235	182669	28048	7009	-181408
	380C2/4F3	16482	6888	181697	27734	6588	-180329
	RTG 1/2	4474	2117	49582	6910	2003	-49040
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw 1/2	9045	6621	70265	12233	6554	-69537
	150C1/2F1	14214	10546	138882	21488	10299	-136960
	150C1/2F2	14214	10113	137444	21365	9798	-135399
	150C1/2F3	14214	9629	135869	21254	9210	-133627
	380C2/4F1	28429	21091	277765	42977	20598	-273920
	380C2/4F2	28428	20227	274887	42730	19596	-270798
	380C2/4F3	28427	19257	271739	42508	18420	-267253
	RTG 1/2	18062	10896	134506	24323	10308	-132408
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: 90°	GW / opgw 1/2	2987	1291	27496	3381	1278	-22747
	150C1/2F1	9749	3774	90612	13541	3685	-80654
	150C1/2F2	9749	3619	90248	13396	3506	-80186
	150C1/2F3	9749	3446	89856	13254	3296	-79661
	380C2/4F1	19499	7548	181223	27082	7370	-161308
	380C2/4F2	19499	7239	180497	26793	7012	-160372
	380C2/4F3	19499	6892	179712	26509	6591	-159321
	RTG 1/2	5981	2119	53938	6675	2004	-43909
NL1/1a Wind, 10°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 1/2	2236	3229	31310	2959	3196	-30620
	150C1/2F1	8249	9438	102044	11925	9217	-99630
	150C1/2F2	8248	9051	100241	11903	8769	-97643
	150C1/2F3	8248	8617	98244	11896	8242	-95352
	380C2/4F1	16497	18876	204088	23850	18434	-199260
	380C2/4F2	16497	18102	200482	23806	17537	-195285
	380C2/4F3	16496	17234	196488	23791	16484	-190705
	RTG 1/2	4478	5298	56808	6024	5011	-54647
NL1/1b Wind, -20°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 1/2	2234	645	23475	3644	639	-23420
	150C1/2F1	8241	1886	87409	14665	1842	-87246
	150C1/2F2	8241	1809	87287	14449	1752	-87116
	150C1/2F3	8241	1722	87155	14235	1647	-86971
	380C2/4F1	16481	3772	174819	29329	3683	-174492
	380C2/4F2	16481	3617	174573	28899	3504	-174231
	380C2/4F3	16481	3444	174309	28469	3294	-173941
	RTG 1/2	4474	1059	46975	7099	1001	-46826
NL1/3 Wind, -5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 1/2	9041	3310	63059	12803	3276	-62838
	150C1/2F1	14211	5272	124175	22829	5148	-123590
	150C1/2F2	14211	5056	123736	22574	4898	-123122
	150C1/2F3	14211	4813	123262	22322	4604	-122599
	380C2/4F1	28422	10543	248350	45659	10297	-247180
	380C2/4F2	28422	10111	247472	45149	9796	-246245
	380C2/4F3	28422	9627	246525	44644	9208	-245199
	RTG 1/2	18057	5446	124224	25060	5153	-123622
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 1.2 Wind angle: -45°	GW / opgw 1/2	2987	646	26184	3513	639	-21067
	150C1/2F1	9749	1887	87114	13942	1842	-76821
	150C1/2F2	9749	1810	87017	13751	1753	-76695
	150C1/2F3	9749	1723	86913	13561	1648	-76554
	380C2/4F1	19498	3774	174227	27884	3685	-153642
	380C2/4F2	19498	3619	174034	27502	3506	-153389
	380C2/4F3	19498	3446	173825	27122	3295	-153107
	RTG 1/2	5980	1059	52139	6836	1002	-41766
NL1//1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 1/2	1676	0	15849	2706	0	-15849
	150C1/2F1	6182	0	58598	10716	0	-58598
	150C1/2F2	6182	0	58598	10553	0	-58598
	150C1/2F3	6182	0	58598	10390	0	-58598
	380C2/4F1	12365	0	117195	21432	0	-117195
	380C2/4F2	12365	0	117195	21106	0	-117195
	380C2/4F3	12365	0	117195	20780	0	-117195
	RTG 1/2	3356	0	31751	5227	0	-31751

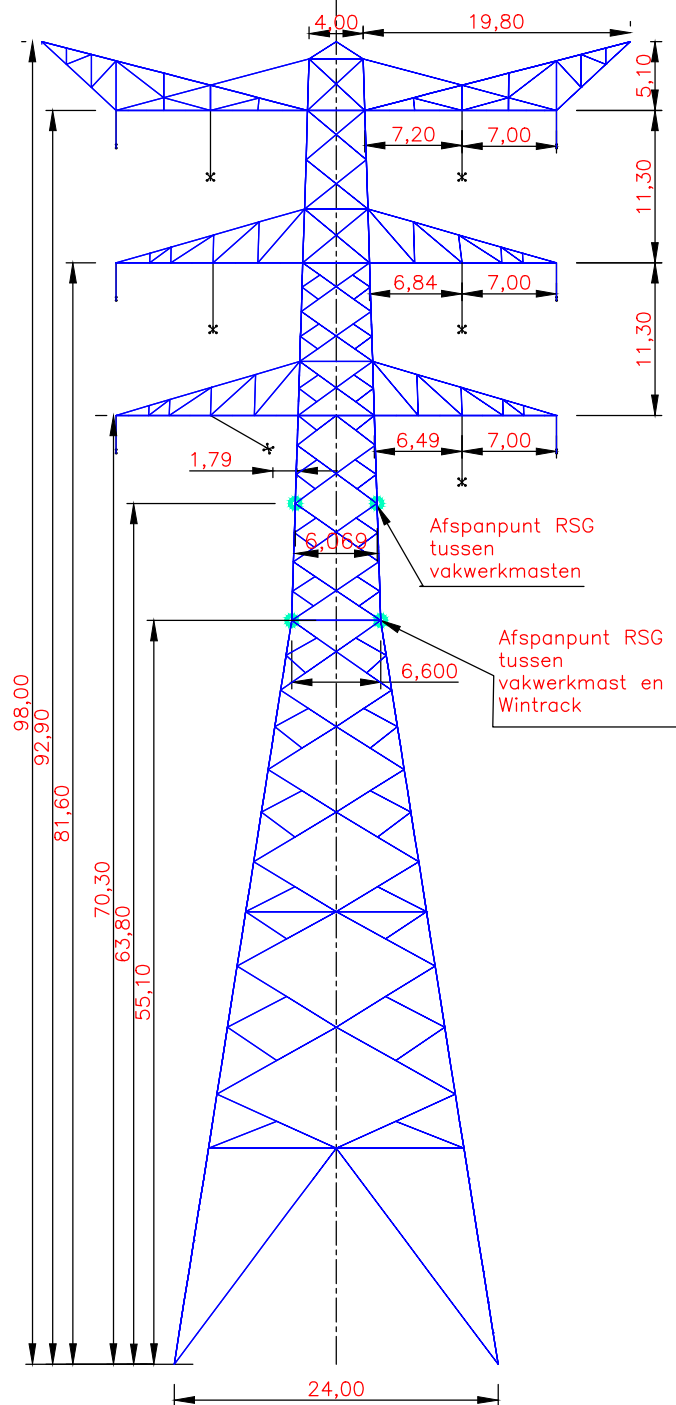
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 1/2	1675	0	18374	2858	0	-18374
	150C1/2F1	6179	0	70059	11549	0	-70059
	150C1/2F2	6179	0	70059	11355	0	-70059
	150C1/2F3	6179	0	70059	11160	0	-70059
	380C2/4F1	12358	0	140117	23099	0	-140117
	380C2/4F2	12358	0	140117	22710	0	-140117
	380C2/4F3	12358	0	140117	22321	0	-140117
	RTG 1/2	3355	0	37211	5525	0	-37211
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 1/2	8480	0	57578	12320	0	-57578
	150C1/2F1	12146	0	105661	20363	0	-105661
	150C1/2F2	12146	0	105661	20068	0	-105661
	150C1/2F3	12146	0	105661	19774	0	-105661
	380C2/4F1	24291	0	211322	40725	0	-211322
	380C2/4F2	24291	0	211322	40136	0	-211322
	380C2/4F3	24291	0	211322	39548	0	-211322
	RTG 1/2	16933	0	115018	23902	0	-115018
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 0°	GW / opgw 1/2	2428	0	21850	2728	0	-16211
	150C1/2F1	7686	0	71458	10832	0	-60201
	150C1/2F2	7686	0	71458	10665	0	-60201
	150C1/2F3	7686	0	71458	10498	0	-60201
	380C2/4F1	15371	0	142916	21665	0	-120402
	380C2/4F2	15371	0	142916	21330	0	-120402
	380C2/4F3	15371	0	142916	20995	0	-120402
	RTG 1/2	4860	0	43781	5269	0	-32526
NL1/6 Permanent, +10°C Permanent loads yg= 0.9	GW / opgw 1/2	1676	0	15849	2706	0	-15849
	150C1/2F1	6182	0	58598	10716	0	-58598
	150C1/2F2	6182	0	58598	10553	0	-58598
	150C1/2F3	6182	0	58598	10390	0	-58598
	380C2/4F1	12365	0	117195	21432	0	-117195
	380C2/4F2	12365	0	117195	21106	0	-117195
	380C2/4F3	12365	0	117195	20780	0	-117195
	RTG 1/2	3356	0	31751	5227	0	-31751
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 1/2	1677	3229	29507	2136	3196	-28742
	150C1/2F1	6186	9437	94135	8590	9216	-91354
	150C1/2F2	6185	9050	92061	8594	8767	-89043
	150C1/2F3	6185	8616	89745	8612	8241	-86353
	380C2/4F1	12371	18873	188271	17181	18432	-182708
	380C2/4F2	12371	18100	184121	17188	17535	-178086
	380C2/4F3	12371	17232	179490	17223	16482	-172707
	RTG 1/2	3358	5297	52507	4371	5011	-50028
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 1/2	1675	645	19357	2772	638	-19279
	150C1/2F1	6179	1885	72307	11290	1841	-72073
	150C1/2F2	6179	1808	72132	11128	1752	-71886
	150C1/2F3	6179	1721	71942	10966	1647	-71678
	380C2/4F1	12358	3771	144615	22581	3682	-144146
	380C2/4F2	12358	3616	144263	22256	3503	-143773
	380C2/4F3	12358	3443	143885	21933	3293	-143356
	RTG 1/2	3355	1058	38551	5424	1001	-38339
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 1/2	8481	3309	60584	12037	3276	-60346
	150C1/2F1	12147	5271	112550	19633	5147	-111850
	150C1/2F2	12147	5055	112025	19426	4897	-111289
	150C1/2F3	12147	4813	111457	19221	4603	-110660
	380C2/4F1	24294	10541	225100	39266	10295	-223700
	380C2/4F2	24294	10110	224050	38851	9794	-222578
	380C2/4F3	24293	9625	222914	38443	9207	-221320
	RTG 1/2	16934	5446	119144	23573	5152	-118493
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 45°	GW / opgw 1/2	2428	646	22450	2655	639	-17077
	150C1/2F1	7686	1887	73108	10624	1842	-62138
	150C1/2F2	7686	1809	72978	10482	1752	-61959
	150C1/2F3	7686	1723	72838	10341	1647	-61758
	380C2/4F1	15372	3773	146216	21248	3684	-124277
	380C2/4F2	15372	3618	145956	20964	3505	-123918
	380C2/4F3	15372	3445	145676	20683	3295	-123517
	RTG 1/2	4860	1059	44592	5186	1002	-33604
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw 1/2	1678	6464	46837	1928	6397	-45446
	150C1/2F1	6190	18888	144380	7512	18446	-139030
	150C1/2F2	6190	18113	140397	7530	17548	-134514
	150C1/2F3	6190	17244	135892	7560	16493	-129165
	380C2/4F1	12381	37775	288759	15025	36891	-278059
	380C2/4F2	12380	36226	280793	15060	35095	-269027
	380C2/4F3	12379	34488	271784	15120	32987	-258330
	RTG 1/2	3361	10602	81538	3932	10029	-76771

NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw 1/2	1675	1290	21879	2591	1277	-21626
	150C1/2F1	6180	3771	78371	10677	3683	-77560
	150C1/2F2	6180	3617	77764	10580	3504	-76906
	150C1/2F3	6180	3443	77103	10487	3293	-76167
	380C2/4F1	12359	7542	156741	21354	7365	-155120
	380C2/4F2	12359	7233	155527	21160	7007	-153812
	380C2/4F3	12359	6886	154205	20975	6587	-152334
	RTG 1/2	3355	2117	42145	5185	2002	-41415
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw 1/2	8484	6621	68261	11448	6554	-67492
	150C1/2F1	12150	10544	129643	18197	10298	-127456
	150C1/2F2	12150	10112	128007	18119	9797	-125671
	150C1/2F3	12149	9627	126210	18056	9208	-123634
	380C2/4F1	24300	21088	259286	36393	20595	-254911
	380C2/4F2	24300	20224	256014	36238	19593	-251342
	380C2/4F3	24299	19254	252419	36112	18417	-247268
	RTG 1/2	16939	10894	130159	22800	10306	-127926
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: 90°	GW / opgw 1/2	2428	1291	24109	2502	1278	-19334
	150C1/2F1	7686	3773	77720	10126	3684	-67431
	150C1/2F2	7686	3619	77248	10037	3505	-66799
	150C1/2F3	7686	3445	76737	9953	3295	-66085
	380C2/4F1	15373	7547	155440	20251	7369	-134863
	380C2/4F2	15373	7237	154497	20075	7010	-133598
	380C2/4F3	15373	6891	153475	19906	6590	-132171
	RTG 1/2	4860	2118	46889	4987	2003	-36551
NL1/1a Wind, 10°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw 1/2	1677	3229	29507	2136	3196	-28742
	150C1/2F1	6186	9437	94135	8590	9216	-91354
	150C1/2F2	6185	9050	92061	8594	8767	-89043
	150C1/2F3	6185	8616	89745	8612	8241	-86353
	380C2/4F1	12371	18873	188271	17181	18432	-182708
	380C2/4F2	12371	18100	184121	17188	17535	-178086
	380C2/4F3	12371	17232	179490	17223	16482	-172707
	RTG 1/2	3358	5297	52507	4371	5011	-50028
NL1/1b Wind, -20°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw 1/2	1675	645	19357	2772	638	-19279
	150C1/2F1	6179	1885	72307	11290	1841	-72073
	150C1/2F2	6179	1808	72132	11128	1752	-71886
	150C1/2F3	6179	1721	71942	10966	1647	-71678
	380C2/4F1	12358	3771	144615	22581	3682	-144146
	380C2/4F2	12358	3616	144263	22256	3503	-143773
	380C2/4F3	12358	3443	143885	21933	3293	-143356
	RTG 1/2	3355	1058	38551	5424	1001	-38339
NL1/3 Wind, -5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw 1/2	8481	3309	60584	12037	3276	-60346
	150C1/2F1	12147	5271	112550	19633	5147	-111850
	150C1/2F2	12147	5055	112025	19426	4897	-111289
	150C1/2F3	12147	4813	111457	19221	4603	-110660
	380C2/4F1	24294	10541	225100	39266	10295	-223700
	380C2/4F2	24294	10110	224050	38851	9794	-222578
	380C2/4F3	24293	9625	222914	38443	9207	-221320
	RTG 1/2	16934	5446	119144	23573	5152	-118493
NL1/4 Construction/maintenance, +5°C Permanent loads yg= 0.9 Wind angle: -45°	GW / opgw 1/2	2428	646	22450	2655	639	-17077
	150C1/2F1	7686	1887	73108	10624	1842	-62138
	150C1/2F2	7686	1809	72978	10482	1752	-61959
	150C1/2F3	7686	1723	72838	10341	1647	-61758
	380C2/4F1	15372	3773	146216	21248	3684	-124277
	380C2/4F2	15372	3618	145956	20964	3505	-123918
	380C2/4F3	15372	3445	145676	20683	3295	-123517
	RTG 1/2	4860	1059	44592	5186	1002	-33604


Loadcases for tower strength (serviceability limit state)

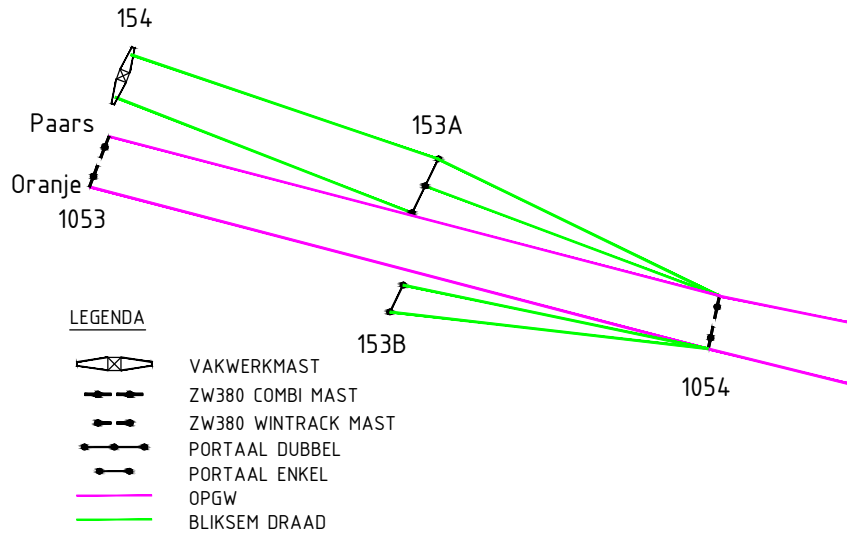
Loadcase according to 50341-3-15	Att. Point	Ahead			Back		
		Vertical [N]	Transversal [N]	Longitudinal [N]	Vertical [N]	Transversal [N]	Longitudinal [N]
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw 1/2	1862	0	17287	2987	0	-17287
	150C1/2F1	6870	0	63778	11810	0	-63778
	150C1/2F2	6870	0	63778	11633	0	-63778
	150C1/2F3	6870	0	63778	11455	0	-63778
	380C2/4F1	13740	0	127555	23620	0	-127555
	380C2/4F2	13740	0	127555	23265	0	-127555
	380C2/4F3	13740	0	127555	22910	0	-127555
RTG 1/2	3730	0	34624	5773	0	-34624	
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw 1/2	1861	0	19890	3144	0	-19890
	150C1/2F1	6866	0	75493	12661	0	-75493
	150C1/2F2	6866	0	75493	12452	0	-75493
	150C1/2F3	6866	0	75493	12242	0	-75493
	380C2/4F1	13732	0	150986	25323	0	-150986
	380C2/4F2	13732	0	150986	24904	0	-150986
	380C2/4F3	13732	0	150986	24484	0	-150986
RTG 1/2	3728	0	40247	6079	0	-40247	
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw 1/2	6396	0	46963	9506	0	-46963
	150C1/2F1	10844	0	97212	18390	0	-97212
	150C1/2F2	10844	0	97212	18120	0	-97212
	150C1/2F3	10844	0	97212	17849	0	-97212
	380C2/4F1	21689	0	194424	36781	0	-194424
	380C2/4F2	21689	0	194424	36239	0	-194424
	380C2/4F3	21689	0	194424	35698	0	-194424
RTG 1/2	12776	0	93900	18423	0	-93900	
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 0°	GW / opgw 1/2	2363	0	21389	3010	0	-17664
	150C1/2F1	7872	0	72804	11930	0	-65435
	150C1/2F2	7872	0	72804	11748	0	-65435
	150C1/2F3	7872	0	72804	11566	0	-65435
	380C2/4F1	15744	0	145609	23861	0	-130869
	380C2/4F2	15744	0	145609	23497	0	-130869
	380C2/4F3	15744	0	145609	23133	0	-130869
RTG 1/2	4732	0	42865	5816	0	-35430	
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw 1/2	1863	2152	24336	2586	2130	-23872
	150C1/2F1	6872	6290	81136	10466	6143	-79565
	150C1/2F2	6872	6032	79961	10421	5844	-78283
	150C1/2F3	6871	5743	78670	10386	5493	-76817
	380C2/4F1	13743	12580	162271	20932	12285	-159131
	380C2/4F2	13743	12064	159923	20843	11688	-156565
	380C2/4F3	13743	11486	157340	20771	10986	-153634
RTG 1/2	3731	3531	44836	5231	3340	-43431	
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw 1/2	1861	430	20282	3108	426	-20250
	150C1/2F1	6866	1257	76378	12557	1228	-76285
	150C1/2F2	6866	1205	76308	12360	1168	-76210
	150C1/2F3	6866	1148	76233	12164	1098	-76127
	380C2/4F1	13732	2514	152757	25113	2455	-152569
	380C2/4F2	13732	2411	152616	24720	2336	-152420
	380C2/4F3	13732	2295	152465	24329	2196	-152255
RTG 1/2	3728	706	40776	6038	667	-40691	
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw 1/2	6396	2205	48921	9323	2182	-48765
	150C1/2F1	10845	3513	100856	17997	3431	-100478
	150C1/2F2	10845	3369	100572	17775	3264	-100176
	150C1/2F3	10845	3208	100266	17554	3068	-99839
	380C2/4F1	21690	7026	201712	35994	6862	-200955
	380C2/4F2	21690	6739	201144	35549	6528	-200352
	380C2/4F3	21690	6416	200532	35108	6137	-199678
RTG 1/2	12777	3628	96580	18212	3433	-96154	
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 45°	GW / opgw 1/2	2363	430	21668	2979	426	-18009
	150C1/2F1	7872	1258	73523	11845	1228	-66199
	150C1/2F2	7872	1206	73466	11674	1168	-66127
	150C1/2F3	7872	1148	73404	11503	1098	-66047
	380C2/4F1	15744	2515	147046	23690	2456	-132398
	380C2/4F2	15744	2412	146932	23348	2337	-132254
	380C2/4F3	15744	2297	146809	23006	2197	-132094
RTG 1/2	4732	706	43241	5782	668	-35856	
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw 1/2	1864	4307	35894	2292	4263	-34917
	150C1/2F1	6875	12586	113052	9138	12291	-109425
	150C1/2F2	6875	12070	110348	9152	11693	-106394
	150C1/2F3	6874	11491	107316	9181	10991	-102845
	380C2/4F1	13750	25172	226105	18277	24583	-218849
	380C2/4F2	13749	24140	220696	18304	23386	-212787
	380C2/4F3	13749	22982	214631	18363	21982	-205691
RTG 1/2	3732	7065	63382	4693	6683	-60147	

NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw 1/2	1861	860	21384	3015	851	-21267
	150C1/2F1	6866	2514	78926	12270	2455	-78572
	150C1/2F2	6866	2411	78660	12108	2336	-78289
	150C1/2F3	6866	2296	78374	11947	2196	-77974
	380C2/4F1	13733	5028	157851	24539	4910	-157144
	380C2/4F2	13733	4822	157321	24216	4671	-156579
	380C2/4F3	13733	4591	156748	23895	4391	-155947
	RTG 1/2	3728	1411	42293	5926	1335	-41974
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw 1/2	6398	4411	54076	8915	4366	-53551
	150C1/2F1	10847	7027	110576	17086	6863	-109284
	150C1/2F2	10846	6739	109609	16959	6529	-108240
	150C1/2F3	10846	6416	108554	16839	6137	-107059
	380C2/4F1	21693	14055	221151	34172	13726	-218568
	380C2/4F2	21693	13479	219217	33918	13058	-216480
	380C2/4F3	21693	12833	217108	33678	12275	-214118
	RTG 1/2	12779	7258	103900	17691	6866	-102398
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: 90°	GW / opgw 1/2	2363	861	22472	2900	852	-18988
	150C1/2F1	7872	2515	75612	11611	2456	-68410
	150C1/2F2	7872	2412	75393	11468	2337	-68136
	150C1/2F3	7872	2297	75157	11326	2197	-67831
	380C2/4F1	15744	5031	151225	23221	4913	-136819
	380C2/4F2	15744	4825	150787	22935	4674	-136273
	380C2/4F3	15744	4594	150315	22652	4393	-135662
	RTG 1/2	4732	1412	44337	5688	1336	-37088
NL4/1a Wind, 10°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw 1/2	1863	2152	24336	2586	2130	-23872
	150C1/2F1	6872	6290	81136	10466	6143	-79565
	150C1/2F2	6872	6032	79961	10421	5844	-78283
	150C1/2F3	6871	5743	78670	10386	5493	-76817
	380C2/4F1	13743	12580	162271	20932	12285	-159131
	380C2/4F2	13743	12064	159923	20843	11688	-156565
	380C2/4F3	13743	11486	157340	20771	10986	-153634
	RTG 1/2	3731	3531	44836	5231	3340	-43431
NL4/1b Wind, -20°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw 1/2	1861	430	20282	3108	426	-20250
	150C1/2F1	6866	1257	76378	12557	1228	-76285
	150C1/2F2	6866	1205	76308	12360	1168	-76210
	150C1/2F3	6866	1148	76233	12164	1098	-76127
	380C2/4F1	13732	2514	152757	25113	2455	-152569
	380C2/4F2	13732	2411	152616	24720	2336	-152420
	380C2/4F3	13732	2295	152465	24329	2196	-152255
	RTG 1/2	3728	706	40776	6038	667	-40691
NL4/3 Wind, -5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw 1/2	6396	2205	48921	9323	2182	-48765
	150C1/2F1	10845	3513	100856	17997	3431	-100478
	150C1/2F2	10845	3369	100572	17775	3264	-100176
	150C1/2F3	10845	3208	100266	17554	3068	-99839
	380C2/4F1	21690	7026	201712	35994	6862	-200955
	380C2/4F2	21690	6739	201144	35549	6528	-200352
	380C2/4F3	21690	6416	200532	35108	6137	-199678
	RTG 1/2	12777	3628	96580	18212	3433	-96154
NL4/4 Construction/maintenance, +5°C Permanent loads yg= 1.0 Wind angle: -45°	GW / opgw 1/2	2363	430	21668	2979	426	-18009
	150C1/2F1	7872	1258	73523	11845	1228	-66199
	150C1/2F2	7872	1206	73466	11674	1168	-66127
	150C1/2F3	7872	1148	73404	11503	1098	-66047
	380C2/4F1	15744	2515	147046	23690	2456	-132398
	380C2/4F2	15744	2412	146932	23348	2337	-132254
	380C2/4F3	15744	2297	146809	23006	2197	-132094
	RTG 1/2	4732	706	43241	5782	668	-35856



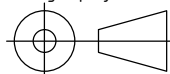
Basisontwerp mastbeeld verhoogde vakwerk mast Kruising Zuid-Bevelandkanaal

Rev 4.0	06-02-2014	Mastbeeld definitief	Projectname: ZW380 Engineering	
		Third angle projection:	Drawing no.: 74102194-35-901	
Design state: Basisontwerp	Scale: 1:1	Description: Mastbeeld ZWV4S400+33 verhoogde vakwerkmast Zuid-Bevelandkruising		
Drawn by: AJP 06-02-2014	Units: m	Revision: 4.0		
Checked by: TvdW 06-02-2014	Project no: 74102194			
Approved by: AW 06-02-2014	Company: TenneT	© 2012 - Filename: 74102194-035-900-901 mastbeeld verhoogde vakwerkmast Zuid-Bevelandkanaal Rev4.0.dwg		



Projectname:
Engineering verbinding ZW380

Third angle projection:



Drawing no.:
74102194-031-305

Design state: Concept	Scale: N.V.T.	Description: Verloop Bliksemraden inlussing WAP150	Revision: 1.0
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74102194-ETD/POL 13-2623 V4.0 Definitief

Engineering ZW380

**Constructieberekening hybride masten ten
behoefte van vergunningaanvraag**

Arnhem, 6 maart 2014

Auteur(s) E.J. Platenkamp

In opdracht van Tennet TSO B.V. Projectnummer 000.145.11

auteur : EJ Platenkamp
34 blz. 10 bijl. EJP/JEH

beoordeeld : AJP van der Wekken
goedgekeurd : A. van der Wal

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INHOUD

	Pagina
1	Inleiding4
2	Uitgangspunten5
2.1	Gebruikte normen5
2.2	Materiaal typeringen mast5
2.3	Constructie typering.....6
2.4	Uitgangspunten uit de beschouwde normen6
2.5	Veldlengte.....10
3	Mastafmetingen10
4	Beschrijving constructie18
4.1	Materiaalklassen19
5	Conclusie Hybride masten24
Bijlage A	Berekening W2S40025
Bijlage B	Berekening W2HL40026
Bijlage C	Berekening W4S35027
Bijlage D	Berekening W4HL35028
Bijlage E	Berekening W4S40029
Bijlage F	Berekening W4HL40030
Bijlage G	Berekening W4S45031
Bijlage H	Berekening W4HK45032
Bijlage I	Berekening W6S40033
Bijlage J	Berekening W6HL40034

1 INLEIDING

Dit document geeft een samenvatting van de ontwerpbelastingen en berekeningen van de volgende hybride masttypen, geschikt voor de bouwaanvraag:

- Steunmast geschikt voor twee-circuits, 2x 380 kV, 400 meter veldlengte; type W2S400;
- Hoekmast geschikt voor twee-circuits, 2x 380kV, 400 meter veldlengte, lijnhoek van 130 graden, type W2HL400;
- Steunmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 350 meter veldlengte; type W4S350;
- Hoekmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 350 meter veldlengte, lijnhoek van 130 graden, type W4HL350;
- Steunmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 400 meter veldlengte; type W4S400;
- Hoekmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 400 meter veldlengte, lijnhoek van 130 graden, type W4HL400;
- Steunmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 450 meter veldlengte; type W4S450;
- Hoekmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 450 meter veldlengte, lijnhoek van 150 graden, type W4HK450;
- Steunmast geschikt voor vier-circuits, 4x 380 kV, 400 meter veldlengte; type W6S400;
- Hoekmast geschikt voor vier-circuits, 4x 380kV, 400 meter veldlengte, lijnhoek van 130 graden, type W6HL400.

De ontwerpbelastingen voor de betonnen Wintrack masten zijn gebaseerd op de DNV KEMA vergunningsdocumenten voor de stalen varianten.

Voor alle masttypes zijn de ontwerpbelastingen bepaald. De belastingen zijn zo opgesteld dat deze niet locatie specifiek worden bepaald maar generiek met maximale veldlengte en maximale lijnhoek, tussen opeenvolgende masten. Het effect op de belastingen door verschil in hoogte van opeenvolgende masten wordt niet meegenomen.

De aanpak is gebaseerd op Bijlage IV B95-STA-KA-1300143 Berekening Wintrack hybride masten van 20 februari 2013 versie 0.3.

2 UITGANGSPUNTEN

De in dit document gepresenteerde belastingen zijn niet bepaald op basis van analyse van alle door NEN-EN 50341 voorgeschreven belastinggevallen maar door DNV KEMA zijn die belastinggevallen of combinaties daarvan geselecteerd die de maatgevende belastingen veroorzaken.

Voor steunmasten met een verhoging tot maximaal 10 meter geldt dat deze berekend worden voor een maximale lijnhoek van 2 x 2.5. Voor hoekmasten wordt er een onderscheid gemaakt in de maximaal toelaatbare hoek op de mast, kenbaar gemaakt met een codering in het masttype met K (150°), L (130°) en M (120°).

Overige uitgangspunten en aannames zijn:

- trekparameter bij 10 °C: 1800 m
- geleider 380 kV: 4 bundel AMS620
- geleider 150 kV: 2 bundel AMS620
- bliksemgeleider/OPGW: 1 bundel BRUGG OPGW 226-AL3/38-A20SA
- retour stroomgeleider: 2 bundel WDI AACSR 242-39 Hawk
- hoogte mast en ophangpunten conform de documenten: 12-00570 rapport “mastafmetingen 4x380 kv + 220-380 kV rev 3.0” en 12-00572 rapport “mastafmetingen 2x380+150-380 rev 3.0”
- belastingen zijn inclusief belastingfactoren volgens de NEN-EN 50341-3-15
- Maximum mastsegment gewicht van 35 ton

2.1 Gebruikte normen

- NEN - EN50341-1, “Bovengrondse elektrische lijnen boven 45 kV wisselspanning – Deel 1: Algemene eisen - Gemeenschappelijke specificaties
- NEN - EN50341-3-15, “Bovengrondse elektrische lijnen boven 45 kV wisselspanning - Deel 3: Verzameling van nationale normatieve aspecten”
- NEN-EN 1990:2002- "Eurocode - Grondslagen van het constructief ontwerp”
- NEN-EN 1991-1-1: Belastingen op constructies
- NEN-EN 1992-1-1: Ontwerp en berekening Betonconstructies
- NEN-EN 1994-1-1: Ontwerp en berekening van staal-betonconstructies

2.2 Materiaal typering mast

Staal:

- S355J2G3 bij wanddikten kleiner dan 15 mm ($t < 15\text{mm}$)
- S355K2G3 bij wanddikten groter dan 15 mm ($t > 15\text{mm}$).

Beton:

- Betonkwaliteit: C55/67 t/m C90/105
- Wapening B550B
- Nagerekt voorspanstaal kwaliteit FeP1860 uitgaande van 150 mm² per streng
- Dekking 50 mm,
- Levensduur 50 jaar conform NEN-EN 50341
- Milieuklasse: XC4, XD3, eventueel XF2 afhankelijk van de locaties
- Materiaalfactor van 1,5 voor beton
- Materiaalfactor van 1,5 voor voorgerekt en nagerekt staal
- Materiaalfactor van 1,15 voor betonwapening

2.3 Constructie typering

Veiligheidsklasse	3	1) $\gamma_{f,g} = 1.20$	$\gamma_{f,q} = 1.50$
		2) $\gamma_{f,g} = 1.35$	
Referentie periode	50 jaar		
Windtracé	II	onbebouwd	
Ijsgebied	B		
Ijsgebied A voor bliksem draad en OPGW			$5\sqrt{d}$
Ijsgebied A voor retourstroom geleider			$5\sqrt{d}$
Ijsgebied B voor fase geleider			$1,8\sqrt{d}$

2.4 Uitgangspunten uit de beschouwde normen

Berekening capaciteit stalen secties

Of de capaciteit van de stalen mast voldoende is voor de optredende belasting wordt als volgt geverifieerd (NEN-EN 50341-3-15, paragraaf 7.4.5.4):

Tabel 1 - Capaciteit conform NEN-EN 50341-3

Normaalkracht (N)			Buigend Moment (M)		
Voorwaarde:	$d/t < 90 \cdot \epsilon^2$	$90 \cdot \epsilon^2$ $< d/t < 315 \cdot \epsilon^2$	Voorwaarde:	$d/t < 157.5 \cdot \epsilon^2$	$157.5 \cdot \epsilon^2$ $< d/t < 315 \cdot \epsilon^2$
Reductiefactor ρ_A	1,0	$0,3 + 63 \cdot \epsilon^2 \cdot t/d$	Reductiefactor ρ_W	1,0	$0,6 + 63 \cdot \epsilon^2 \cdot t/d$

Met:

$$A_{eff} = \rho_A \times A$$

$$W_{eff} = \rho_W \times W$$

Aan het volgende criterium moet voldaan worden:

$$\frac{N}{A_{eff}} + \frac{M}{W_{eff}} = \frac{f_y}{\gamma_{M1}}$$

Met: $\gamma_{M1} = 1,0$

De factor ε voor staal S355 wordt als volgt bepaald:

$$\varepsilon = \left(\frac{235}{f_y} \right)^{0.5} \rightarrow 0.814$$

Berekening wanddikte masten:

$$W_{ben} = \frac{M_{tot}}{f_{y;d}}$$

Weerstandsmoment voor een cirkelvormige doorsnede is:

$$W = \frac{1}{4} \times \pi \times D^2 \times t$$

Bepaling binnendiameter d:

$$d = \sqrt[4]{D^4 - \left(\frac{32 \times W_{ben} \times D}{\pi} \right)}$$

Voor de wanddikte geldt dan:

$$t = \left(\frac{D - d}{2} \right)$$

Berekening capaciteit betonnen secties

Berekening van benodigde weerstandsmoment en wanddikte tegen maximaal optredend moment:

$$W_{ben} = \frac{M_{tot}}{f_{cd}}$$

Waarin:

M_{tot} = Maximaal voermoment uit de belastingen

f_{cd} = Rekenwaarde van tegenstaande betondruk spanning

$$f_{cd} = \frac{f_{ck}}{1.5}$$

f_{ck} = drukcapaciteit van beton

Weerstandsmoment voor een cirkelvormige doorsnede:

$$W = \frac{1}{32} \cdot D \times \pi \times (D^4 - d^4)$$

Bepaling binnendiameter d:

$$d = \sqrt[4]{D^4 - \left(\frac{32 \times W_{ben} \times D}{\pi} \right)}$$

Bepaling voorspankracht ankers

$P_{benodigd}$ = Benodigde voorspankracht

Aantal strengen is afhankelijk van de dwarsdoorsnede per streng en de maximaal toelaatbare spanning per streng (ook nog de materiaalfactor toevoegen in de formule).

$$P_{benodigd} = A_{streng} \cdot \sigma_{streng} \cdot n_{strengen}$$

Aantal ankers hangt van het aantal strengen per kabel af

$$n_{ankers} = \frac{n_{strengen}}{\text{streng / kabel}}$$

Bepaling benodigde dwarswapening

De weerstand V_{RD} tegen afschuiving wordt met onderstaande formule bepaald.

$$V_{RD,max} = \frac{A_{sw}}{s} \cdot z \cdot f_{ywd} \cdot \cot \theta$$

Waarin:

A_{sw} = oppervlakte van de dwarsdoorsnede van de dwarskrachtwapening

s = hart op hartafstand van de beugels

f_{ywd} = rekenwaarde van de vloeigrens van de dwarskrachtwapening

z = Bij dwarskracht diameter van de ringwapening en bij afschuiving door torsie is de omtrek van de ringwapening.

θ = Hoek tussen de drukdiagonaal van beton en de as van de ligger loodrecht op de dwarskrachtwapening

De torsieweerstand T_{RD} wordt met onderstaande formule bepaald.

Waarin:

$v = 0.6$ (sterkte reductiefactor)

$\alpha_{cw} = 2.5 (1 - \sigma_{cp}/f_{cd})$ factor waarmee met de spanning in de op druk belaste rand rekening is gehouden

f_{cd} = rekenwaarde van de drukspanning van beton

σ_{cp} = gemiddelde waarde betondrukspanning

A_k = Omsloten oppervlak inclusief de holle delen

t_{ef} = meewerkende wanddikte

$\Theta = (21.8 - 45 \text{ graden})$ hoek tussen de drukdiagonaal van beton en de as van de ligger loodrecht op de dwarskrachtwapening. De berekeningen zijn uitgevoerd bij een hoek van 30 graden.

De capaciteit van een op wringing en afschuiving belast element wordt met de onderstaande voorwaarde getoetst.

$$\frac{T_{ed}}{T_{RD,max}} + \frac{V_{ed}}{V_{RD,max}} \leq 1.0$$

T_{ed} = rekenwaarde van het aangrijpend wringend moment

V_{ed} = rekenwaarde van de aangrijpende dwarskracht

2.5 Bepaling maximale belasting op mastsegmenten

De belastingen op de mastsegmenten zijn gebaseerd op het buigmoment uit de geleiders, de wind en het eigengewicht van de mast. Dit is per segment bepaald. De krachten zijn gebaseerd op de NEN-EN-50341-3. Zie hiervoor de tabellen in hoofdstuk 3.

2.6 Veldlengte

De beschouwde masttypen zijn opgenomen in onderstaande tabel:

Tabel 2 – Masttypen

Mast type	Max. ahead span (m)	Max. back span (m)	Max. Lijn hoek (deg)	Mast type aangrenzende mast
W2S400	400	400	2 x 2.5	W2S400
W2HL400	400	400	2 x 25	W2S400
W4S350	350	350	2 x 2.5	W4S350
W4HL350	350	350	2 x 25	W4S350
W4S400	400	400	2 x 2.5	W4S400
W4HL400	400	400	2 x 25	W4S400
W4S450	450	450	2 x 2.5	W4S450
W4HK450	450	450	2 x 15	W4S450
W6S400	400	400	2 x 2.5	W6S400
W6HL400	400	400	2 x 25	W6S400

3 MASTAFMETINGEN

In de volgende tabellen zijn de afmetingen en de belangrijke parameters per hybride mast weergegeven. De resultaten van de berekening dienen als input voor het ontwerp van de fundering. De overgang van het betonnen deel naar het stalen deel zit net onder de retourstroomafspanning.

- Overgang bij W2S400 is op 23 meter vanaf mastvoet;
- Overgang bij W2HL400 is op 22 meter vanaf mastvoet;
- Overgang bij W4S350 is op 19 meter vanaf mastvoet.
- Overgang bij W4HL350 is op 19 meter vanaf mastvoet;
- Overgang bij W4S400 is op 22 meter vanaf mastvoet;
- Overgang bij W4HL400 is op 22 meter vanaf mastvoet.
- Overgang bij W4S450 is op 25 meter vanaf mastvoet;
- Overgang bij W4HK450 is op 25 meter vanaf mastvoet;
- Overgang bij W6S400 is op 23 meter vanaf mastvoet.
- Overgang bij W6HL400 is op 23 meter vanaf mastvoet.

Tabel 3 - Afmetingen en belangrijke parameters van betonnen deel mast W2S400

	Segment	
	1	2
Betonklasse	C55/67	C55/67
Lengte (mm)	12000	11000
Voetdiameter (mm)	2200	1893
Topdiameter (mm)	1893	1612
Wanddikte (mm)	400	350
Massa (kN)	598	406
Segment voet moment (kNm)	14361	9661
Dwarskracht (kN)	366	344
Torsiemoment (kNm)	0	0

Tabel 4 - Afmetingen en belangrijke parameters van stalen deel mast W2S400

	Segment
Staalklasse	S355
Lengte (mm)	31800
Voetdiameter (mm)	1612
Topdiameter (mm)	800
Wanddikte (mm)	12
Massa (kN)	189
Segment voet moment (kNm)	6314

Tabel 5 - Afmetingen en belangrijke parameters van mast W2HL400

	Segment	
	1	2
Betonklasse	C70/85	C70/85
Lengte (mm)	12000	10000
Voetdiameter (mm)	2800	2420
Topdiameter (mm)	2420	2104
Wanddikte (mm)	500	450
Massa (kN)	955	622
Segment voet moment (kNm)	39217	26497
Dwarskracht (kN)	968	959
Torsiemoment (kNm)	15	15

Tabel 6 - Afmetingen en belangrijke parameters van stalen deel mast W2HL400

	Segment
Staalklasse	S355
Lengte (mm)	41200
Voetdiameter (mm)	2100
Topdiameter (mm)	800
Wanddikte (mm)	18
Massa (kN)	352
Segment voet moment (kNm)	16083

Tabel 7 - Afmetingen en belangrijke parameters van betonnen deel mast W4S350

	Segment	
	1	2
Betonklasse	C55/67	C55/67
Lengte (mm)	12000	7000
Voetdiameter (mm)	2200	1898
Topdiameter (mm)	1898	1722
Wanddikte (mm)	450	400
Massa (kN)	662	306
Segment voet moment (kNm)	17392	11481
Dwarskracht (kN)	452	429
Torsiemoment (kNm)	0	0

Tabel 8 - Afmetingen en belangrijke parameters van stalen deel mast W4S350

	Segment
Staalklasse	S355
Lengte (mm)	36600
Voetdiameter (mm)	1710
Topdiameter (mm)	800
Wanddikte (mm)	14
Massa (kN)	250
Segment voet moment (kNm)	9019

Tabel 9 - Afmetingen en belangrijke parameters van betonnen deel mast W4HL350

	Segment	
	1	2
Betonklasse	C70/85	C70/85
Lengte (mm)	12000	7000
Voetdiameter (mm)	3000	2524
Topdiameter (mm)	2524	2247
Wanddikte (mm)	500	450
Massa (kN)	1039	472
Segment voet moment (kNm)	50452	33517
Dwarskracht (kN)	1266	1257
Torsiemoment (kNm)	1740	1740

Tabel 10 - Afmetingen en belangrijke parameters van stalen deel mast W4HL350

	Segment
Staalklasse	S355
Lengte (mm)	36500
Voetdiameter (mm)	2230
Topdiameter (mm)	800
Wanddikte (mm)	22
Massa (kN)	324
Segment voet moment (kNm)	24085

Tabel 11 - Afmetingen en belangrijke parameters van betonnen deel mast W4S400

	Segment	
	1	2
Betonklasse	C55/67	C55/67
Lengte (mm)	12000	10000
Voetdiameter (mm)	2400	2097
Topdiameter (mm)	2097	1844
Wanddikte (mm)	500	450
Massa (kN)	793	523
Segment voet moment (kNm)	22868	16128
Dwarskracht (kN)	523	498
Torsiemoment (kNm)	0	0

Tabel 12 - Afmetingen en belangrijke parameters van stalen deel mast W4S400

	Segment
Staalklasse	S355
Lengte (mm)	41300
Voetdiameter (mm)	1840
Topdiameter (mm)	800
Wanddikte (mm)	16
Massa (kN)	362
Segment voet moment (kNm)	11768

Tabel 13 - Afmetingen en belangrijke parameters van betonnen deel mast W4HL400

	Segment	
	1	2
Betonklasse	C70/85	C70/85
Lengte (mm)	12000	10000
Voetdiameter (mm)	3200	2744
Topdiameter (mm)	2744	2365
Wanddikte (mm)	500	450
Massa (kN)	1118	842
Segment voet moment (kNm)	60347	42920
Dwarskracht (kN)	1325	1315
Torsiemoment (kNm)	1837	1837

Tabel 14 - Afmetingen en belangrijke parameters van stalen deel mast W4HL400

	Segment
Staalklasse	S355
Lengte (mm)	41200
Voetdiameter (mm)	2360
Topdiameter (mm)	800
Wanddikte (mm)	24
Massa (kN)	385
Segment voet moment (kNm)	28431

Tabel 15 - Afmetingen en belangrijke parameters van betonnen deel mast W4S450

	Segment		
	1	2	3
Betonklasse	C55/67	C55/67	C55/67
Lengte (mm)	12000	7000	6000
Voetdiameter (mm)	2800	2463	2266
Topdiameter (mm)	2463	2266	2098
Wanddikte (mm)	500	450	400
Massa (kN)	971	460	342
Segment voet moment (kNm)	29677	21824	17384
Dwarskracht (kN)	606	576	559
Torsiemoment (kNm)	0	0	0

Tabel 16 - Afmetingen en belangrijke parameters van stalen deel mast W4S450

	Segment
Staalklasse	S355
Lengte (mm)	46200
Voetdiameter (mm)	2100
Topdiameter (mm)	800
Wanddikte (mm)	16
Massa (kN)	332
Segment voet moment (kNm)	15232

Tabel 17 - Afmetingen en belangrijke parameters van betonnen deel mast W4HK450

	Segment		
	1	2	3
Betonklasse	C70/85	C70/85	C70/85
Lengte (mm)	12000	7000	6000
Voetdiameter (mm)	3300	2878	2632
Topdiameter (mm)	2878	2632	2421
Wanddikte (mm)	500	450	400
Massa (kN)	1178	553	408
Segment voet moment (kNm)	57412	42426	33820
Dwarskracht (kN)	1146	1111	1091
Torsiemoment (kNm)	1737	1737	1737

Tabel 18 - Afmetingen en belangrijke parameters van stalen deel mast W4HK450

	Segment
Staalklasse	S355
Lengte (mm)	46100
Voetdiameter (mm)	2425
Topdiameter (mm)	800
Wanddikte (mm)	22
Massa (kN)	369
Segment voet moment (kNm)	28255

Tabel 19 - Afmetingen en belangrijke parameters van betonnen deel mast W6S400

	Segment	
	1	2
Betonklasse	C55/67	C55/67
Lengte (mm)	12000	11000
Voetdiameter (mm)	2400	2079
Topdiameter (mm)	2079	1786
Wanddikte (mm)	500	450
Massa (kN)	821	591
Segment voet moment (kNm)	22718	15287
Dwarskracht (kN)	541	533
Torsiemoment (kNm)	0	0

Tabel 20 - Afmetingen en belangrijke parameters van stalen deel mast W6S400

	Segment
Staalklasse	S355
Lengte (mm)	36900
Voetdiameter (mm)	1776
Topdiameter (mm)	800
Wanddikte (mm)	15
Massa (kN)	277
Segment voet moment (kNm)	9251

Tabel 21 - Afmetingen en belangrijke parameters van betonnen mast W6HL400

	Segment	
	1	2
Betonklasse	C70/85	C70/85
Lengte (mm)	12000	11000
Voetdiameter (mm)	3500	2954
Topdiameter (mm)	2954	2453
Wanddikte (mm)	500	450
Massa (kN)	1275	812
Segment voet moment (kNm)	71341	48470
Dwarskracht (kN)	1676	1665
Torsiemoment (kNm)	3994	3994

Tabel 22 - Afmetingen en belangrijke parameters van stalen mast W6HL400

	Segment
Staalklasse	S355
Lengte (mm)	36300
Voetdiameter (mm)	2447
Topdiameter (mm)	800
Wanddikte (mm)	24
Massa (kN)	348
Segment voet moment (kNm)	29173

Een aantal afmetingen zijn t.o.v. de stalen mast uitvoeringen gewijzigd. Deze wijzigingen zijn doorgevoerd vanwege de anders te hoge betondruk in de wand. De masttop diameter zijn voor alle masten vergroot naar 0.8 meter omdat uit studies van architect Z&J blijkt dat bij een vergrote mastvoet diameter een grotere masttop diameter esthetisch passender is.

Het is mogelijk is om de voetdiameter nog meer te vergroten om de betondruk in de wand te verlagen. Dit is niet toegepast vanwege dan de afmetingen teveel afwijken van de stalen varianten.

4 BESCHRIJVING CONSTRUCTIE

De masten bestaan per mastlocatie uit twee afzonderlijke taps toelopende buismasten, het zogenaamde bipole mastprincipe. De beschrijving van de constructie komt overeen met paragraaf 4.2 masten uit Bijlage IV B95-STA-KA-1300143_Wintrack – hybride masten.

De hybride Wintrack masten worden opgebouwd uit beton en staal. Het onderstuk, tot net onder het onderste ophangpunt ten behoeve van de retourstroomgeleider, zal uit betonnen voorgespannen elementen bestaan. Vanaf bovenzijde beton, zal de rest van de mast opgebouwd worden uit staal. De staal doorsnede wordt aangepast op de minimale betondoorsnede, zodat een zuivere conische vorm ontstaat.

De belangrijkste randvoorwaarden uit dit document zijn:

- Trekspanning in de wand komende uit het moment moet volledig door voorspanning opgenomen worden
- De segmenten hebben een maximale lengte van 12 meter. Indien een verticaal element meer dan 35 ton weegt, heeft het de voorkeur de verticale betonnen elementen in losse cirkelsegmenten te vervaardigen. Voor de W4S450 en de W4HK450 masten zijn de segmenten opgedeeld in 12, 7 en 6 meter lengte. Dit om een lengte van 1 meter voor het derde segment te voorkomen.
- Alle betonnen segmenten worden uitgevoerd met een doorgaande ronde sparing. In de doorgaande ronde sparing worden verticale voorspankabels aangebracht met verankeringen in de fundatiepoer
- De uitwendige voorspanning wordt op drie niveaus voor de W4S450 en de W4HK450 in fasen aangebracht. Voor de resterende masttypen wordt dit op twee niveaus uitgevoerd. Vanwege beperkte ruimte in de doorgaande sparing is het niet mogelijk alle voorspankabels langs de omtrek van de sparing te positioneren. De voorspankabels worden binnen de omtrek gelijkmatig verdeeld. Om de voorspankracht naar het beton te kunnen overdragen is het noodzakelijk een in het beton geïntegreerde stalen plaat aan te brengen onder de ankerplaten van de voorspanelementen
- Per segment worden de optredende spanningen, inclusief de voorspanspanning getoetst op de capaciteit. De bepaling van de capaciteit per segment is weergegeven in hoofdstuk 2.4.

Opmerking die hierbij gemaakt moet worden is het dwarskrachtmiddelpunt van de voorspanstrengen niet samenvalt met de betonnen wand. Voor de herverdeling van belasting is een extra stalen eindplaat in het beton nodig. In een vervolgstudie, of mastdetailering, zal de herverdeling tussen voorspanning en beton verder uitgezocht moeten worden.

Afwijkingen ten opzichte van document Bijlage IV B95-STA-KA-1300143_Wintrack – hybride masten zijn de volgende:

- De ankerbouten in de mastsegmenten worden zodanig voorgespannen dat bij een belasting uit mast en geleiders tot de Ultimate Limit State (ULS) de voorspanning niet opgeheven wordt. De ULS belasting is in de ontwerpnorm NEN-EN 50341 gedefinieerd als de maximale belasting uit mast en geleiders met toepassing van belastingsfactoren. De ankerbouten worden gedimensioneerd op de uiterste grenstoestand (ULS) trekbelasting als gedefinieerd in de ontwerpnorm. De maximale betondruk in de wand is de optelsom van de druk door voorspanning, uitwendige belasting op de mast en een reductie door de afname van voorspanning bij een uitwendige druk.

$$\frac{\Delta P_{beton} \cdot l_{beton}}{E_{beton} \cdot A_{beton}} = \Delta L = \frac{\Delta P_{anker} \cdot l_{anker}}{E_{anker} \cdot A_{anker}}$$

$$P_{uitw} = \Delta P_{beton} + \Delta P_{anker}$$

De belastingsverdeling is afhankelijk van de stijfheidsverhouding tussen de betonnen wand en de voorspanankers. De indrukking van het beton (ΔL) en de ankers geeft toename van de kracht op het beton P_{beton} en afname van de voorspanning in de ankers (P_{anker}). Verhouding van deze krachten is afhankelijk van de verhouding tussen EA_{beton} en EA_{anker} aangezien de lengtes L_{beton} en L_{anker} gelijk zijn.

- De schuifspanning komende uit torsiemoment en dwarskracht zijn in de berekeningen ook meegenomen. Voor steunmasten wordt het torsiemoment verwaarloosd. Voor hoek- of afspanmasten treedt de maximale schuifspanning door torsie en dwarskracht op bij eenzijdige afspanning en het afvallen van één circuit. Dit is conform NEN-EN-50341-3-15 belastingsituatie NL3 (Tabel 4.2.11/NL.3). Voor steunmasten treedt de maximale schuifspanning op komende uit de maximale dwarskracht (Belastingsituatie NL1, tabel 4.2.11/NL1). Om de genoemde schuifspanning te weerstaan worden de betonnen elementen met rond 12 mm ringwapening uitgevoerd. De ringwapening dient voldoende capaciteit te hebben om de schuifspanning te weerstaan. Per betonnen element wordt per meter hoogte het aantal het aantal ringen bepaald. Aangenomen wordt een minimale hart op hart afstand van 100 mm tussen de ringen.

4.1 Materiaalklassen

In de bijlagen zijn de afmetingen, materiaalklassen en unity checks opgenomen. De belangrijkste gegevens per mast zijn hieronder gesommeerd. De resterende gegevens zijn in de bijlagen opgenomen.

Tabel 23 - Hoofdparameters wapening mast W2S400

	Segment	
	1	2
Betonklasse	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860
Aantal anker buitenring	15	15
Aantal anker binnenring	0	0
Diameter dwarswapening (mm)	12	12
Materiaal	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5

Tabel 24 - Hoofdparameters wapening mast W2HL400

	Segment	
	1	2
Betonklasse	C70/85	C70/85
Type voorspananker	FeP1860	FeP1860
Aantal anker buitenring	18	12
Aantal anker binnenring	8	8
Diameter dwarswapening (mm)	12	12
Materiaal	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5

Tabel 25 - Hoofdparameters wapening mast W4S350

	Segment	
	1	2
Betonklasse	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860
Aantal anker buitenring	12	8
Aantal anker binnenring	4	4
Diameter dwarswapening (mm)	12	12
Materiaal	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5

Tabel 26 - Hoofdparameters wapening mast W4HL350

	Segment	
	1	2
Betonklasse	C70/85	C70/85
Type voorspananker	FeP1860	FeP1860
Aantal anker buitenring	20	16
Aantal anker binnenring	8	8
Diameter dwarswapening (mm)	12	12
Materiaal	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5

Tabel 27 - Hoofdparameters wapening mast W4S400

	Segment	
	1	2
Betonklasse	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860
Aantal anker buitenring	12	10
Aantal anker binnenring	8	6
Diameter dwarswapening (mm)	12	12
Materiaal	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5

Tabel 28 - Hoofdparameters wapening mast W4HL400

	Segment	
	1	2
Betonklasse	C70/85	C70/85
Type voorspananker	FeP1860	FeP1860
Aantal anker buitenring	20	16
Aantal anker binnenring	8	8
Diameter dwarswapening (mm)	12	12
Materiaal	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5

Tabel 29 - Hoofdparameters wapening mast W4S450

	Segment		
	1	2	3
Betonklasse	C55/67	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860	FeP1860
Aantal anker buitenring	12	10	10
Aantal anker binnenring	8	6	4
Diameter dwarswapening (mm)	12	12	12
Materiaal	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5

Tabel 30 - Hoofdparameters wapening mast W4HK450

	Segment		
	1	2	3
Betonklasse	C70/85	C70/85	C70/85
Type voorspananker	FeP1860	FeP1860	FeP1860
Aantal anker buitenring	20	16	14
Aantal anker binnenring	8	8	6
Diameter dwarswapening (mm)	12	12	12
Materiaal	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5

Tabel 31 - Hoofdparameters wapening mast W6S400

	Segment	
	1	2
Betonklasse	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860
Aantal anker buitenring	12	12
Aantal anker binnenring	4	4
Diameter dwarswapening (mm)	12	12
Materiaal	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5

Tabel 32 - Hoofdparameters wapening mast W6HL400

	Segment	
	1	2
Betonklasse	C70/85	C70/85
Type voorspananker	FeP1860	FeP1860
Aantal anker buitenring	25	18
Aantal anker binnenring	8	8
Diameter dwarswapening (mm)	12	12
Materiaal	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5

Overzicht van de gegevens van de genoemde masten zijn opgenomen in de bijlagen.

4.2 Elektrische aarding

Het hybride mastlichaam en fundament dient aan de onderstaande aardingseisen te voldoen:

- De aarding van het mastlichaam en de aarding in het fundament moet één geheel vormen;
- De geleiding van bliksem- en kortsluitstromen, zal door separate geleiders aan de binnenzijde van de mast geschieden. Deze geleiding zal afgeschermd moeten worden van de betonwapening en de voorspanstrengen;
- Blikseminslag en kortsluitstromen moeten voldoende afgevoerd worden naar de grond zonder schade aan de mast of fundament te bewerkstelligen;
- Het aardingssysteem moet aan de eisen van isolatie coördinatie voldoen;
- Aan de rand van de ZRO grens, dient bij kortsluiting of blikseminslag de potentiaal aan de gestelde eisen te voldoen;
- De stap- en aanraakspanning van het mastlichaam en fundament moet aan de gestelde eisen voldoen;
- Alle stalen elementen in het mastlichaam moet elektrisch gekoppeld zijn aan het interne aardingssysteem.

5 CONCLUSIE HYBRIDE MASTEN

Controle van de masten is opgenomen in de bijlagen. Het betonnen onderstuk wordt evenals de rapportage van de masten geheel uit beton uitgevoerd, getoetst op betonspanning en afschuiving. Het stalen bovendeel wordt getoetst op sterkte, inclusief plooi. De achterliggende formules uit deze controle zijn tevens in de bijlagen opgenomen.

Type mast	Maximale betonspanning (UC)	Maximale betonafschuiving (UC)	Maximale plooi belasting (UC)
W2S400	0.83	0.08	0.92
W2HL400	0.87	0.18	0.95
W4S350	0.96	0.10	0.98
W4HL350	0.98	0.24	0.98
W4S400	0.98	0.10	0.96
W4HL400	0.98	0.24	0.98
W4S450	0.90	0.11	1.00
W4HK450	0.94	0.20	0.98
W6S400	0.97	0.12	0.92
W6HL400	0.97	0.37	0.92

Voor het betondeel gelden de volgende twee aanvullende conclusies.

- 1) Een aantal mastelementen voldoet niet aan het criterium van maximaal 35 ton, het zwaarste element is meer dan driemaal dit gewicht. Een oplossing is de hoogte van de elementen te reduceren. In de praktijk betekent dit dat een aantal elementen gelimiteerd wordt tot 3 a 4 meter hoogte. Een andere oplossing is om de elementen op locatie uit een aantal twee tot vier, segmenten samen te stellen. Deze opties zijn momenteel niet verder uitgewerkt.
- 2) De optredende spanning in het beton zit tegen de toelaatbare grens aan, dit is zichtbaar gemaakt in de Unity Check. In de ontwerpfase kan voor een ruimere marge gekozen worden.



BIJLAGE A BEREKENING W2S400



BIJLAGE B BEREKENING W2HL400



BIJLAGE C BEREKENING W4S350



BIJLAGE D BEREKENING W4HL350



BIJLAGE E BEREKENING W4S400



BIJLAGE F BEREKENING W4HL400



BIJLAGE G BEREKENING W4S450



BIJLAGE H BEREKENING W4HK450



BIJLAGE I BEREKENING W6S400



BIJLAGE J BEREKENING W6HL400

W2HL400

Bijlage B

Segment	1
Lengte	12 m
Gewicht	97.3 ton
Betonklasse	B Voldoet
Voorspananker	FeP1860
Nkabel; toegepast Buiten	18 Voldoet
Nkabel; toegepast Binnen	8
Dwarswapening	12 rond
Materiaal	550 Fb550
Aantal ringbeugels/meter hoogte	5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen			
Segment	1		
Ingevulde wanddikte	500		
	Voet Top		
Buitendiameter	2800	2420 mm	
Buitenomtrek	8796	7603 mm	
Wanddikte	500	500 mm	
Binnendiameter	1800	1420 mm	
Doorsnede	Hol	Hol	
Omtrek/dikte	17.59	15.21	Verhouding
Oppervlak	3612832	3016327	mm ²
Weerstandsmoment	1787061321	1226772553	mm ³
Maximale moment	35651	kNm	
Maximale moment + 2de orde	39217	kNm	
Maximaal dwarskracht	968	kN	
Maximaal torsiemoment	14750	kNm	
Maximaal normaalkracht	3491	kN	
Spanning tgv normaalkracht	1.0	N/mm ²	
Spanning tgv moment	22.0	N/mm ²	
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-23.0	Mpa	
Toelaatbare spanning	-46.7	Komende uit betonklasse	
Maximale trekspanning	21.3	MPa	
Toelaatbare trekspanning	0.0	MPa	

Voorspanning	
Benodigde voorspanning ULS	21.3 Mpa
Benodigde voorspanning SLS	18 Mpa
Benodigde voorspankracht	76664 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-44 Mpa
Na relaxatie	-40 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	76664 kN
Nkabel; benodigd	23
Nkabel; toegepast Buiten	18
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	1960 mm
Anker circl binnen	1360 mm
Omtrek ankercircl buiten	6158 mm
Omtrek ankercircl binnen	4273 mm
Aantal plaatsbare ankers buitenring	20
Aantal plaatsbare ankers binnenring	14

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	968 kN
Max. dwarskracht / doorsnede	959 kN
Maximale optredende afschuiving in de wand	959 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2430 mm
fywd	478 Mpa
VRD,S	6176 kN
Toetsing afschuiving door dwarskracht	0.16

Afschuiving in wapening door torsie	
Maximaal torsie	14750 kNm
Maximaal afschuiving torsie / doorsnede	15 kN
Maximaal dwarskracht bij torsie	435 kN
Max. afschuiving wand door dwarskracht	435 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2430 mm
z (torsie)	6063 mm
fywd	478 Mpa
VRD,max (dwarskracht)	6176 kN
VRD,max (torsie)	15409 kN
Toetsing afschuiving door dwarskracht	0.07
Toetsing afschuiving door torsie	0.00
Totaal	0.07

Toetsing betonspanning	0.85 Voldoet
Toetsing afschuiving in wand	0.16 Voldoet

W2HL400

Bijlage B

Segment **2**
 Lengte **10 m**
 Gewicht **63.4 ton**

Betonklasse **B** Voldoet
 Voorspananker **FeP1860**
 Nkabel; `toegepast Buiten **12** Voldoet
 Nkabel; `toegepast Binnen **8**
 Dwarswapening **12** rond
 Materiaal **550** Fb550
 Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2420 2104 mm
Buitenomtrek	7803 6609 mm
Wanddikte	450 450 mm
Binnendiameter	1520 1204 mm
Doorsnede	Hol Hol
Omtrek/dikte	16.90 14.69 Verhouding
Oppervlak	2785380 2338001 mm ²
Weerstandsmoment	1175145488 816141526 mm ³
Maximale moment	24088 kNm
Maximale moment + 2de orde	26497 kNm
Maximaal dwarskracht	959 kN
Maximaal torsiemoment	14750 kNm
Maximaal normaalkracht	2345 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	22.6 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-23.4 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	21.9 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	959 kN
Max. dwarskracht / doorsnede	952 kN
Maximale optredende afschuiving in de wand	952 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2090 mm
fywd	478 Mpa
VRD,S	5312 kN
Toetsing afschuiving door dwarskracht	0.18

Toetsing betonspanning	0.87 Voldoet
Toetsing afschuiving in wand	0.18 Voldoet

Voorspanning

Benodigde voorspanning ULS	21.9 Mpa
Benodigde voorspanning SLS	18 Mpa
Benodigde voorspankracht	61053 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukszijde	-45 Mpa
Na relaxatie	-40 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	61053 kN
Nkabel; benodigd	18
Nkabel; `toegepast Buiten	12
Nkabel; `toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1644 mm
Anker cirkel binnen	1044 mm
Omtrek ankercirkel buiten	5164 mm
Omtrek ankercirkel binnen	3279 mm
Aantal plaatsbare ankers buitenring	17
Aantal plaatsbare ankers binnering	10

Afschuiving in wapening door torsie

Maximaal torsie	14750 kNm
Maximaal afschuiving torsie / doorsnede	18 kN
Maximaal dwarskracht bij torsie	432 kN
Max. afschuiving wand door dwarskracht	432 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2090 mm
z (torsie)	5215 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5312 kN
VRD,max (torsie)	13254 kN
Toetsing afschuiving door dwarskracht	0.08
Toetsing afschuiving door torsie	0.00
Totaal	0.08



W2HL400 Bijlage B

Hoogte overgang Beton/Staal 22000 mm

Eigenschappen mast

Type mast W2HL400
 Staalkwaliteit S355
 Toelaatbare spanning 284
 Epsilon staal 0.81

Uitgangspunten

Windgebied II
 Bebouwd of onbebouwd Onbebouwd
 2e orde 10%

Afmetingen

Topdiameter 0.80 m
 Voetdiameter 2.1 m
 Hoogte overgang beton/staal 22.00 m
 Hoogte mast 63.20 m
 Wanddikte 18 mm
 Gewicht 35965 kg

Hoogte

GW / opgw 40.60 m
 380C1F1 30.60 m
 380C1F2 20.40 m
 380C1F3 10.20 m
 RTG 0.10 m
 380C2F1 30.60 m
 380C2F2 20.40 m
 380C2F3 10.20 m

Krachten	hoogte m	Fver kN	Floodrecht kN	F// kN	FSamengesteld kN	Moment per geleider kN
GW / opgw	40.6	18.7	65.5	0.0	65.5	2660.0
380C1F1	30.6	37.4	119.3	0.0	119.3	3650.3
380C1F2	20.4	58.8	246.4	0.0	246.4	5027.4
380C1F3	10.2	58.8	241.8	0.0	241.8	2466.6
RTG	0.1	29.4	118.1	-224.5	253.6	25.4
380C2F1	30.6	0.0	0.0	0.0	0.0	0.0
380C2F2	20.4	0.0	0.0	0.0	0.0	0.0
380C2F3	10.2	0.0	0.0	0.0	0.0	0.0

Stuwdruk

791.3 N

Moment overgang Beton/Staal (Inclusief 2e orde)

16083 kNm

Controle spanning ten gevolge van normaalkracht

Plooi gevoeligheid normaalkracht
 Reductiefactor normaalkracht pa 0.66
 Effectieve oppervlakte Aeff 77406 mm²
 Optredende spanning t.g.v. normaalkracht

Controle spanning ten gevolge van buigend moment

Buigend moment plooi gevoeligheid
 Reductiefactor buigend moment pa 0.96
 Effectieve weerstandmoment Weff 58175556 mm³
 Optredende spanning t.g.v. buigend moment

Controle spanning ten gevolge van normaalkracht en buigend moment

Totaal optredende spanning 271 N/mm²
 Unity check 0.95 Voldoet

W2S400

Bijlage A

Segment	1
Lengte	12 m
Gewicht	61.0 ton
Betonklasse	A Voldoet
Voorspananker	FeP1860
Nkabel; toegepast Buiten	12 Voldoet
Nkabel; toegepast Binnen	8
Dwarswapening	12 rond
Materiaal	550 Fb550
Aantal ringbeugels/meter hoogte	5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen	
Segment	1
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	2200 1893 mm
Buitenomtrek	6912 5948 mm
Wanddikte	400 400 mm
Binnendiameter	1400 1093 mm
Doorsnede	Hol Hol
Omtrek/dikte	17.28 14.87 Verhouding
Oppervlak	2261947 1876700 mm ²
Weerstandsmoment	873933956 592303534 mm ³
Maximale moment	13055 kNm
Maximale moment + 2de orde	14361 kNm
Maximaal dwarskracht	366 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	2078 kN
Spanning tgv normaalkracht	0.9 N/mm ²
Spanning tgv moment	16.5 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-17.4 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	15.8 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning	
Benodigde voorspanning ULS	15.8 Mpa
Benodigde voorspanning SLS	11 Mpa
Benodigde voorspankracht	35610 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-33 Mpa
Na relaxatie	-29 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	35610 kN
Nkabel; benodigd	11
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	1433 mm
Anker circl binnen	833 mm
Omtrek ankercircl buiten	4503 mm
Omtrek ankercircl binnen	2618 mm
Aantal plaatsbare ankers buitenring	15
Aantal plaatsbare ankers binnenring	8

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	366 kN
Max. dwarskracht / doorsnede	345 kN
Maximale optredende afschuiving in de wand	345 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1899 mm
fywd	478 Mpa
VRD,S	4826 kN
Toetsing afschuiving door dwarskracht	0.07

Afschuiving in wapening door torsie	
Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1899 mm
z (torsie)	1257 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4826 kN
VRD,max (torsie)	3194 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

Toetsing betonspanning	0.80 Voldoet
Toetsing afschuiving in wand	0.07 Voldoet

W2S400

Bijlage A

Segment 2
Lengte 11 m
Gewicht 41.4 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 10 Voldoet
Nkabel; toegepast Binnen 4
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	350
	Voet Top
Buitendiameter	1893 1612 mm
Buitenomtrek	5948 5066 mm
Wanddikte	350 350 mm
Binnendiameter	1193 912 mm
Doorsnede	Hol Hol
Omtrek/dikte	17.00 14.47 Verhouding
Oppervlak	1697091 1388091 mm ²
Weerstandsmoment	561238659 369355499 mm ³
Maximale moment	8783 kNm
Maximale moment + 2de orde	9661 kNm
Maximaal dwarskracht	344 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	1360 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	17.2 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-18.0 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	16.6 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	344 kN
Max. dwarskracht / doorsnede	322 kN
Maximale optredende afschuiving in de wand	322 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1591 mm
fywd	478 Mpa
VRD,S	4043 kN
Toetsing afschuiving door dwarskracht	0.08

Toetsing betonspanning	0.83 Voldoet
Toetsing afschuiving in wand	0.08 Voldoet

Voorspanning

Benodigde voorspanning ULS	16.6 Mpa
Benodigde voorspanning SLS	11 Mpa
Benodigde voorspankracht	28224 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukszijde	-35 Mpa
Na relaxatie	-30 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	28224 kN
Nkabel; benodigd	9
Nkabel; toegepast Buiten	10
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1152 mm
Anker cirkel binnen	552 mm
Omtrek ankercirkel buiten	3620 mm
Omtrek ankercirkel binnen	1735 mm
Aantal plaatsbare ankers buitenring	12
Aantal plaatsbare ankers binnenring	5

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1591 mm
z (torsie)	1414 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4043 kN
VRD,max (torsie)	3593 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00



W2S400

Bijlage A

Hoogte overgang Beton/Staal 23000 mm

Eigenschappen mast

Type mast W2S400
 Staalkwaliteit S355
 Toelaatbare spanning 284
 Epsilon staal 0.81

Uitgangspunten

Windgebied II
 Bebouwd of onbebouwd Onbebouwd
 2e orde 10%

Afmetingen

Topdiameter 0.80 m
 Voetdiameter 1.612 m
 Hoogte overgang beton/staal 23.00 m
 Hoogte mast 54.80 m
 Wanddikte 12 mm
 Gewicht 19286 kg

Hoogte

GW / opgw 31.10 m
 RTG 0.10 m
 380C1F1 25.80 m
 380C1F2 15.60 m
 380C1F3 5.40 m
 380C2F1 25.80 m
 380C2F2 15.60 m
 380C2F3 5.40 m

Krachten	hoogte m	Fver kN	Floodrecht kN	F// kN	FSamengesteld kN	Moment per geleider kN
GW / opgw	31.1	4.6	14.6	0.0	14.6	454.4
RTG	0.1	9.2	21.0	0.0	21.0	2.1
380C1F1	25.8	34.1	85.5	0.0	85.5	2206.5
380C1F2	15.6	34.1	78.8	0.0	78.8	1229.3
380C1F3	5.4	34.1	70.0	0.0	70.0	378.0
380C2F1	25.8	0.0	0.0	0.0	0.0	0.0
380C2F2	15.6	0.0	0.0	0.0	0.0	0.0
380C2F3	5.4	0.0	0.0	0.0	0.0	0.0

Stuwdruk

1469.2 N

Moment overgang Beton/Staal (Inclusief 2e orde)

6314 kNm

Controle spanning ten gevolge van normaalkracht

Plooi gevoeligheid normaalkracht
 Reductiefactor normaalkracht pa 0.61
 Effectieve oppervlakte Aeff 36822 mm²
 Optredende spanning t.g.v. normaalkracht

Controle spanning ten gevolge van buigend moment

Buigend moment plooi gevoeligheid
 Reductiefactor buigend moment pa 0.91
 Effectieve weerstandmoment Weff 21804601 mm³
 Optredende spanning t.g.v. buigend moment

Controle spanning ten gevolge van normaalkracht en buigend moment

Totaal optredende spanning 261 N/mm²
 Unity check 0.92 Voldoet

W4HK450

Bijlage H

Segment	1
Lengte	12 m
Gewicht	120.1 ton
Betonklasse	B Voldoet
Voorspananker	FeP1860
Nkabel: 'toegepast Buiten	20 Voldoet
Nkabel: 'toegepast Binnen	8
Dwarswapening	12 rond
Materiaal	550 Fb550
Aantal ringbeugels/meter hoogte	5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
yck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen			
Segment	1		
Ingevulde wanddikte	500		
	Voet Top		
Buitendiameter	3300	2878 mm	
Buitenomtrek	10367	9042 mm	
Wanddikte	500	500 mm	
Binnendiameter	2300	1878 mm	
Doorsnede	Hol	Hol	
Omtrek/dikte	20.73	18.08	Verhouding
Oppervlak	4398230	3735446	mm2
Weerstandsmoment	2695581697	1916085365	mm3
Maximale moment	52192	kNm	
Maximale moment + 2de orde	57412	kNm	
Maximaal dwarskracht	1146	kN	
Maximaal torsiemoment	1736695	kNm	
Maximaal normaalkracht	4447	kN	
Spanning tgv normaalkracht	1.0	N/mm2	
Spanning tgv moment	22.2	N/mm2	
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-23.2	Mpa	
Toelaatbare spanning	-46.7	Komende uit betonklasse	
Maximale trekspanning	21.4	MPa	
Toelaatbare trekspanning	0.0	MPa	

Voorspanning	
Benodigde voorspanning ULS	21.4 Mpa
Benodigde voorspanning SLS	16 Mpa
Benodigde voorspankracht	90340 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-45 Mpa
Na relaxatie	-41 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	90340 kN
Nkabel; benodigd	27
Nkabel; 'toegepast Buiten	20
Nkabel; 'toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circlen buiten	2418 mm
Anker circlen binnen	1818 mm
Omtrek ankercirclen buiten	7597 mm
Omtrek ankercirclen binnen	5712 mm
Aantal plaatsbare ankers buitenring	25
Aantal plaatsbare ankers binnenring	19

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	1146 kN
Max. dwarskracht / doorsnede	1113 kN
Maximale optredende afschuiving in de wand	1113 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	2887 mm
fywd	478 Mpa
VRD,S	7338 kN
Toetsing afschuiving door dwarskracht	0.15

Afschuiving in wapening door torsie	
Maximaal torsie	1736695 kNm
Maximaal afschuiving torsie / doorsnede	1455 kN
Maximaal dwarskracht bij torsie	516 kN
Max. afschuiving wand door dwarskracht	516 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	2887 mm
z (torsie)	7501 mm
fywd	478 Mpa
VRD,max (dwarskracht)	7338 kN
VRD,max (torsie)	19062 kN
Toetsing afschuiving door dwarskracht	0.07
Toetsing afschuiving door torsie	0.08
Totaal	0.15

Toetsing betonspanning	0.87 Voldoet
Toetsing afschuiving in wand	0.15 Voldoet

W4HK450

Bijlage H

Segment 2
Lengte 7 m
Gewicht 56.4 ton

Betonklasse **B** Voldoet
Voorspananker **FeP1860**
Nkabel; 'toegepast Buiten 16 Voldoet
Nkabel; 'toegepast Binnen 8
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
yck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2878 2632 mm
Buitenomtrek	9042 8268 mm
Wanddikte	450 450 mm
Binnendiameter	1978 1732 mm
Doorsnede	Hol Hol 18.37
Omtrek/dikte	20.09 3432588 3084626 Verhouding mm2
Oppervlak	1818223575 1454252159 mm3
Weerstandsmoment	
Maximale moment	38569 kNm
Maximale moment + 2de orde	42426 kNm
Maximaal dwarskracht	1111 kN
Maximaal torsiemoment	1736695 kNm
Maximaal normaalkracht	3033 kN
Spanning tgv normaalkracht	0.9 N/mm2
Spanning tgv moment	23.5 N/mm2
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-24.4 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	22.8 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1111 kN
Max. dwarskracht / doorsnede	1093 kN
Maximale optredende afschuiving in de wand	1093 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	2637 mm
fywd	478 Mpa
VRD,S	6703 kN
Toetsing afschuiving door dwarskracht	0.16

Toetsing betonspanning	0.91 Voldoet
Toetsing afschuiving in wand	0.17 Voldoet

Voorspanning

Benodigde voorspanning ULS	22.8 Mpa
Benodigde voorspanning SLS	17 Mpa
Benodigde voorspankracht	77930 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-47 Mpa
Na relaxatie	-42 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	77930 kN
Nkabel; benodigd	23
Nkabel; 'toegepast Buiten	16
Nkabel; 'toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	2172 mm
Anker circl binnen	1572 mm
Omtrek ankercircl buiten	6823 mm
Omtrek ankercircl binnen	4938 mm
Aantal plaatsbare ankers buitenring	22
Aantal plaatsbare ankers binnenring	16

Afschuiving in wapening door torsie

Maximaal torsie	1736695 kNm
Maximaal afschuiving torsie / doorsnede	1588 kN
Maximaal dwarskracht bij torsie	500 kN
Max. afschuiving wand door dwarskracht	500 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	2637 mm
z (torsie)	6872 mm
fywd	478 Mpa
VRD,max (dwarskracht)	6703 kN
VRD,max (torsie)	17465 kN
Toetsing afschuiving door dwarskracht	0.07
Toetsing afschuiving door torsie	0.09
Totaal	0.17

W4HK450

Bijlage H

Segment 3
Lengte 6 m
Gewicht 41.6 ton

Betonklasse B Voldoet
Voorspananker FeP1860
Nkabel: toegepast Buiten 14 Voldoet
Nkabel: toegepast Binnen 6
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
yck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	2632 2421 mm
Buitenomtrek	8268 7606 mm
Wanddikte	400 400 mm
Binnendiameter	1832 1621 mm
Doorsnede	Hol Hol
Omtrek/dikte	20.67 19.01 Verhouding
Oppervlak	2804722 2539609 mm2
Weerstandsmoment	1369763679 1113069589 mm3
Maximale moment	30745 kNm
Maximale moment + 2de orde	33820 kNm
Maximaal dwarskracht	1091 kN
Maximaal torsiemoment	1736695 kNmm
Maximaal normaalkracht	2369 kN
Spanning tgv normaalkracht	0.8 N/mm2
Spanning tgv moment	24.9 N/mm2
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-25.7 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	24.2 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	24.2 Mpa
Benodigde voorspanning SLS	18 Mpa
Benodigde voorspankracht	67707 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-50 Mpa
Na relaxatie	-45 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	67707 kN
Nkabel; benodigd	20
Nkabel; toegepast Buiten	14
Nkabel; toegepast Binnen	6
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1961 mm
Anker cirkel binnen	1361 mm
Omtrek ankercirkel buiten	6161 mm
Omtrek ankercirkel binnen	4276 mm
Aantal plaatsbare ankers buitenring	20
Aantal plaatsbare ankers binnenring	14

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1091 kN
Max. dwarskracht / doorsnede	977 kN
Maximale optredende afschuiving in de wand	977 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	2038 mm
fywd	478 Mpa
VRD,S	5178 kN
Toetsing afschuiving door dwarskracht	0.19

Toetsing betonspanning	0.96 Voldoet
Toetsing afschuiving in wand	0.20 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	1736695 kNmm
Maximaal afschuiving torsie / doorsnede	1726 kN
Maximaal dwarskracht bij torsie	491 kN
Max. afschuiving wand door dwarskracht	491 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	2038 mm
z (torsie)	6322 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5178 kN
VRD,max (torsie)	16068 kN
Toetsing afschuiving door dwarskracht	0.09
Toetsing afschuiving door torsie	0.11
Totaal	0.20



W4HK450

Bijlage H

Hoogte overgang Beton/Staal 25000 mm

Eigenschappen mast

Type mast W4HK450
 Staalkwaliteit S355
 Toelaatbare spanning 284
 Epsilon staal 0.81

Uitgangspunten

Windgebied II
 Bebouwd of onbebouwd Onbebouwd
 2e orde 10%

Afmetingen

Topdiameter 0.80 m
 Voetdiameter 2.425 m
 Hoogte overgang beton/staal 25.00 m
 Hoogte mast 71.10 m
 Wanddikte 22 mm
 Gewicht 37694 kg

Hoogte

GW / opgw 45.50 m
 150C1F1 34.30 m
 150C1F2 22.90 m
 150C1F3 11.50 m
 RTG 0.20 m
 380C1F1 34.30 m
 380C1F2 22.90 m
 380C1F3 11.50 m

Krachten	hoogte m	Fver kN	Floodrecht kN	F// kN	FSamengesteld kN	Moment per geleider kN
GW / opgw	45.5	5.2	34.7	0.0	34.7	1577.8
150C1F1	34.3	19.2	102.7	0.0	102.7	3523.2
150C1F2	22.9	19.2	96.7	0.0	96.7	2215.4
150C1F3	11.5	19.2	89.2	0.0	89.2	1025.7
RTG	0.2	5.2	24.8	-62.1	66.8	13.4
380C1F1	34.3	38.4	205.4	0.0	205.4	7046.5
380C1F2	22.9	38.4	193.5	0.0	193.5	4430.9
380C1F3	11.5	38.4	178.4	0.0	178.4	2051.4

Stuwdruk

3802.4 N

Moment overgang Beton/Staal (Inclusief 2e orde)

28255 kNm

Controle spanning ten gevolge van normaalkracht

Plooi gevoeligheid normaalkracht
 Reductiefactor normaalkracht pa 0.68
 Effectieve oppervlakte Aeff 112662 mm²
 Optredende spanning t.g.v. normaalkracht

Controle spanning ten gevolge van buigend moment

Buigend moment plooi gevoeligheid
 Reductiefactor buigend moment pa 0.98
 Effectieve weerstandmoment Weff 96736801 mm³
 Optredende spanning t.g.v. buigend moment

Controle spanning ten gevolge van normaalkracht en buigend moment

Totaal optredende spanning 277 N/mm²
 Unity check 0.98 Voldoet

W4HL350

Bijlage D

Segment	1	
Lengte	12 m	
Gewicht	105.9 ton	
Betonklasse	B	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	20	Voldoet
Nkabel; toegepast Binnen	8	
Dwarswapening	12	rond
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen			
Segment	1		
Ingevulde wanddikte	500		
	Voet Top		
Buitendiameter	3000	2524 mm	
Buitenomtrek	9425	7930 mm	
Wanddikte	500	500 mm	
Binnendiameter	2000	1524 mm	
Doorsnede	Hol Hol		
Omtrek/dikte	18.85	15.86	Verhouding
Oppervlak	3926991	3179801	mm2
Weerstandsmoment	2127120026	1369220120	mm3
Maximale moment	45865		kNm
Maximale moment + 2de orde	50452		kNm
Maximaal dwarskracht	1266		kN
Maximaal torsiemoment	1740354		kNm
Maximaal normaalkracht	3468		kN
Spanning tgv normaalkracht	0.9		N/mm2
Spanning tgv moment	24.7		N/mm2
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-25.6		Mpa
Toelaatbare spanning	-46.7		Komende uit betonklasse
Maximale trekspanning	24.0		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning		
Benodigde voorspanning ULS	24.0	Mpa
Benodigde voorspanning SLS	20	Mpa
Benodigde voorspankracht	90541	kN
<i>Resulterende betonspanningen</i>		
Trekzijde	0	Mpa
Drukzijde	-50	Mpa
Na relaxatie	-45	MPa
Keuze voorspankabels	FeP1860	
Toelaatbare spanning	1200	MPa
Astreng	150	mm2
streng/kabel	19	
Akabel	2850	mm2
Benodigde voorspankracht	90541	kN
Nkabel; benodigd	27	
Nkabel; toegepast Buiten	20	
Nkabel; toegepast Binnen	8	
<i>Ankerverdeling top</i>		
Gegeven E6-19		
Randafstand ankers	230	mm
Minimale hoh-afstand ankers	300	mm
Anker circl buiten	2064	mm
Anker circl binnen	1464	mm
Omtrek ankercircl buiten	6485	mm
Omtrek ankercircl binnen	4600	mm
Aantal plaatsbare ankers buitenring	21	
Aantal plaatsbare ankers binnenring	15	

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	1266 kN
Max. dwarskracht / doorsnede	1257 kN
Maximale optredende afschuiving in de wand	1257 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	2527 mm
fywd	478 Mpa
VRD,S	6422 kN
Toetsing afschuiving door dwarskracht	0.20

Afschuiving in wapening door torsie	
Maximaal torsie	1740354 kNm
Maximaal afschuiving torsie / doorsnede	1717 kN
Maximaal dwarskracht bij torsie	570 kN
Max. afschuiving wand door dwarskracht	570 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	2527 mm
z (torsie)	6368 mm
fywd	478 Mpa
VRD,max (dwarskracht)	6422 kN
VRD,max (torsie)	16184 kN
Toetsing afschuiving door dwarskracht	0.09
Toetsing afschuiving door torsie	0.11
Totaal	0.19

Toetsing betonspanning	0.96	Voldoet
Toetsing afschuiving in wand	0.20	Voldoet

W4HL350

Bijlage D

Segment 2
Lengte 7 m
Gewicht 48.1 ton

Betonklasse **B** Voldoet
Voorspananker **FeP1860**
Nkabel; toegepast Buiten 16 Voldoet
Nkabel; toegepast Binnen 8
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2524 2247 mm
Buitenomtrek	7930 7059 mm
Wanddikte	450 450 mm
Binnendiameter	1624 1347 mm
Doorsnede	Hol Hol
Omtrek/dikte	17.62 15.69 Verhouding
Oppervlak	2932507 2540232 mm ²
Weerstandsmoment	1308457682 969796871 mm ³
Maximale moment	30470 kNm
Maximale moment + 2de orde	33517 kNm
Maximaal dwarskracht	1257 kN
Maximaal torsiemoment	1740354 kNm
Maximaal normaalkracht	2221 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	25.8 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-26.6 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	25.3 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1257 kN
Max. dwarskracht / doorsnede	1251 kN
Maximale optredende afschuiving in de wand	1251 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2219 mm
fywd	478 Mpa
VRD,S	5639 kN
Toetsing afschuiving door dwarskracht	0.22

Toetsing betonspanning	0.98 Voldoet
Toetsing afschuiving in wand	0.24 Voldoet

Voorspanning

Benodigde voorspanning ULS	25.3 Mpa
Benodigde voorspanning SLS	21 Mpa
Benodigde voorspankracht	73782 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-52 Mpa
Na relaxatie	-46 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	73782 kN
Nkabel; benodigd	22
Nkabel; toegepast Buiten	16
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1787 mm
Anker cirkel binnen	1187 mm
Omtrek ankercirkel buiten	5614 mm
Omtrek ankercirkel binnen	3729 mm
Aantal plaatsbare ankers buitenring	18
Aantal plaatsbare ankers binnering	12

Afschuiving in wapening door torsie

Maximaal torsie	1740354 kNm
Maximaal afschuiving torsie / doorsnede	1943 kN
Maximaal dwarskracht bij torsie	565 kN
Max. afschuiving wand door dwarskracht	565 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2219 mm
z (torsie)	5627 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5639 kN
VRD,max (torsie)	14299 kN
Toetsing afschuiving door dwarskracht	0.10
Toetsing afschuiving door torsie	0.14
Totaal	0.24



W4HL350 Bijlage D

Hoogte overgang Beton/Staal 19000 mm

Eigenschappen mast

Type mast W4HL350
 Staalkwaliteit S355
 Toelaatbare spanning 284
 Epsilon staal 0.81

Uitgangspunten

Windgebied II
 Bebouwd of onbebouwd Onbebouwd
 2e orde 10%

Afmetingen

Topdiameter 0.80 m
 Voetdiameter 2.23 m
 Hoogte overgang beton/staal 19.00 m
 Hoogte mast 55.50 m
 Wanddikte 22 mm
 Gewicht 33029 kg

Hoogte

GW / opgw 35.90 m
 150C1F1 27.10 m
 150C1F2 18.10 m
 150C1F3 9.10 m
 RTG 0.20 m
 380C1F1 27.10 m
 380C1F2 18.10 m
 380C1F3 9.10 m

Krachten	hoogte m	Fver kN	Floodrecht kN	F// kN	FSamengesteld kN	Moment per geleider kN	
GW / opgw		35.9	16.3	61.3	0.0	61.3	2201.6
150C1F1		27.1	25.7	118.4	0.0	118.4	3208.2
150C1F2		18.1	25.7	116.4	0.0	116.4	2106.6
150C1F3		9.1	25.7	113.9	0.0	113.9	1036.6
RTG		0.2	16.3	56.3	-108.0	121.8	24.4
380C1F1		27.1	51.4	236.8	0.0	236.8	6416.4
380C1F2		18.1	51.4	232.8	0.0	232.8	4213.1
380C1F3		9.1	51.4	227.8	0.0	227.8	2073.3

Stuwdruk

614.8 N

Moment overgang Beton/Staal (Inclusief 2e orde)

24085 kNm

Controle spanning ten gevolge van normaalkracht

Plooi gevoeligheid normaalkracht
 Reductiefactor normaalkracht pa 0.71
 Effectieve oppervlakte Aeff 108569 mm²
 Optredende spanning t.g.v. normaalkracht

Controle spanning ten gevolge van buigend moment

Buigend moment plooi gevoeligheid
 Reductiefactor buigend moment pa 1.00
 Effectieve weerstandmoment Weff 83415742 mm³
 Optredende spanning t.g.v. buigend moment

Controle spanning ten gevolge van normaalkracht en buigend moment

Totaal optredende spanning 279 N/mm²
 Unity check 0.98 Voldoet

W4HL400

Bijlage F

Segment	1
Lengte	12 m
Gewicht	114.0 ton
Betonklasse	B Voldoet
Voorspananker	FeP1860
Nkabel: 'toegepast Buiten	20 Voldoet
Nkabel: 'toegepast Binnen	12
Dwarswapening	12 rond
Materiaal	550 Fb550
Aantal ringbeugels/meter hoogte	5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
yck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning	0	0	0	0

Optredende spanningen

Segment	1		
Ingevulde wanddikte	500		
	Voet Top		
Buitendiameter	3200	2744 mm	
Buitenomtrek	10053	8621 mm	
Wanddikte	500	500 mm	
Binnendiameter	2200	1744 mm	
Doorsnede	Hol	Hol	
Omtrek/dikte	20.11	17.24	Verhouding
Oppervlak	4241150	3525344	mm2
Weerstandsmoment	2498302470	1697893326	mm3
Maximale moment	54861	kNm	
Maximale moment + 2de orde	60347	kNm	
Maximaal dwarskracht	1325	kN	
Maximaal torsiemoment	1836522	kNm	
Maximaal normaalkracht	4076	kN	
Spanning tgv normaalkracht	1.0	N/mm2	
Spanning tgv moment	25.3	N/mm2	
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-26.2	Mpa	
Toelaatbare spanning	-46.7	Komende uit betonklasse	
Maximale trekspanning	24.5	MPa	
Toelaatbare trekspanning	0.0	MPa	

Voorspanning

Benodigde voorspanning ULS	24.5	Mpa
Benodigde voorspanning SLS	20	Mpa
Benodigde voorspankracht	99389	kN
Resulterende betonspanningen		
Trekzijde	0	Mpa
Drukzijde	-51	Mpa
Na relaxatie	-45	MPa
Keuze voorspankabels	FeP1860	
Toelaatbare spanning	1200	MPa
Astreng	150	mm2
streng/kabel	19	
Akabel	2850	mm2
Benodigde voorspankracht	99389	kN
Nkabel; benodigd	30	
Nkabel; 'toegepast Buiten	20	
Nkabel; 'toegepast Binnen	12	
Ankerverdeling top		
Gegeven E6-19		
Randafstand ankers	230	mm
Minimale hoh-afstand ankers	300	mm
Anker circlen buiten	2284	mm
Anker circlen binnen	1684	mm
Omtrek ankercirclen buiten	7176	mm
Omtrek ankercirclen binnen	5291	mm
Aantal plaatsbare ankers buitenring	23	
Aantal plaatsbare ankers binnenring	17	

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1325	kN
Max. dwarskracht / doorsnede	1315	kN
Maximale optredende afschuiving in de wand	1315	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm2
s	200	mm
z (horende max. dwarskracht)	2756	mm
fywd	478	Mpa
VRD,S	7004	kN
Toetsing afschuiving door dwarskracht	0.19	

Afschuiving in wapening door torsie

Maximaal torsie	1836522	kNm
Maximaal afschuiving torsie / doorsnede	1628	kN
Maximaal dwarskracht bij torsie	596	kN
Max. afschuiving wand door dwarskracht	596	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm2
s	200	mm
z (dwarskracht)	2756	mm
z (torsie)	7087	mm
fywd	478	Mpa
VRD_max (dwarskracht)	7004	kN
VRD_max (torsie)	18012	kN
Toetsing afschuiving door dwarskracht	0.09	
Toetsing afschuiving door torsie	0.09	
Totaal	0.18	

Toetsing betonspanning	0.97	Voldoet
Toetsing afschuiving in wand	0.19	Voldoet

W4HL400

Bijlage F

Segment **2**
Lengte **10 m**
Gewicht **85.8 ton**

Betonklasse **B** Voldoet
Voorspananker **FeP1860**
Nkabel; 'toegepast Buiten' **18** Voldoet
Nkabel; 'toegepast Binnen' **8**
Dwarswapening **12** rond
Materiaal **550** Fb550
Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
yck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2744 2365 mm
Buitenomtrek	8621 7428 mm
Wanddikte	450 450 mm
Binnendiameter	1844 1465 mm
Doorsnede	Hol Hol
Omtrek/dikte	19.16 16.51 Verhouding
Oppervlak	3243496 2706641 mm2
Weerstandsmoment	1615165287 1106905528 mm3
Maximale moment	39018 kNm
Maximale moment + 2de orde	42920 kNm
Maximaal dwarskracht	1315 kN
Maximaal torsiemoment	1836522 kNm
Maximaal normaalkracht	2734 kN
Spanning tgv normaalkracht	0.8 N/mm2
Spanning tgv moment	26.6 N/mm2
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-27.4 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	26.0 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1315 kN
Max. dwarskracht / doorsnede	1307 kN
Maximale optredende afschuiving in de wand	1307 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	2348 mm
fywd	478 Mpa
VRD,S	5967 kN
Toetsing afschuiving door dwarskracht	0.22

Toetsing betonspanning	0.97 Voldoet
Toetsing afschuiving in wand	0.22 Voldoet

Voorspanning

Benodigde voorspanning ULS	26.0 Mpa
Benodigde voorspanning SLS	21 Mpa
Benodigde voorspankracht	84152 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-53 Mpa
Na relaxatie	-45 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	84152 kN
Nkabel; benodigd	25
Nkabel; 'toegepast Buiten'	18
Nkabel; 'toegepast Binnen'	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	1905 mm
Anker circl binnen	1305 mm
Omtrek ankercircl buiten	5983 mm
Omtrek ankercircl binnen	4098 mm
Aantal plaatsbare ankers buitenring	19
Aantal plaatsbare ankers binnering	13

Afschuiving in wapening door torsie

Maximaal torsie	1836522 kNm
Maximaal afschuiving torsie / doorsnede	1911 kN
Maximaal dwarskracht bij torsie	592 kN
Max. afschuiving wand door dwarskracht	592 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	2348 mm
z (torsie)	6038 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5967 kN
VRD,max (torsie)	15345 kN
Toetsing afschuiving door dwarskracht	0.10
Toetsing afschuiving door torsie	0.12
Totaal	0.22



W4HL400

Hoogte overgang Beton/Staal 22000 mm

Eigenschappen mast

Type mast W4HL400
 Staalkwaliteit S355
 Toelaatbare spanning 284
 Epsilon staal 0.81

Uitgangspunten

Windgebied II
 Bebouwd of onbebouwd Onbebouwd
 2e orde 10%

Afmetingen

Topdiameter 0.80 m
 Voetdiameter 2.36 m
 Hoogte overgang beton/staal 22.00 m
 Hoogte mast 63.20 m
 Wanddikte 24 mm
 Gewicht 39257 kg

Hoogte

GW / opgw 40.60 m
 150C1F1 30.60 m
 150C1F2 20.40 m
 150C1F3 10.20 m
 RTG 0.10 m
 380C1F1 30.60 m
 380C1F2 20.40 m
 380C1F3 10.20 m

Krachten	hoogte m	Fver kN	Floodrecht kN	F// kN	FSamengesteld kN	Moment per geleider kN
GW / opgw	40.6	18.7	65.3	0.0	65.3	2652.1
150C1F1	30.6	29.4	123.2	0.0	123.2	3770.6
150C1F2	20.4	29.4	120.9	0.0	120.9	2466.6
150C1F3	10.2	29.4	118.1	0.0	118.1	1204.4
RTG	0.1	18.7	59.5	-112.8	127.5	12.8
380C1F1	30.6	58.8	246.4	0.0	246.4	7541.2
380C1F2	20.4	58.8	241.8	0.0	241.8	4933.2
380C1F3	10.2	58.8	236.2	0.0	236.2	2408.8

Stuwdruk

856.4 N

Moment overgang Beton/Staal (Inclusief 2e orde)

28431 kNm

Controle spanning ten gevolge van normaalkracht

Plooi gevoeligheid normaalkracht
 Reductiefactor normaalkracht pa 0.72
 Effectieve oppervlakte Aeff 127538 mm²
 Optredende spanning t.g.v. normaalkracht

Controle spanning ten gevolge van buigend moment

Buigend moment plooi gevoeligheid
 Reductiefactor buigend moment pa 1.00
 Effectieve weerstandmoment Weff 101824779 mm³
 Optredende spanning t.g.v. buigend moment

Controle spanning ten gevolge van normaalkracht en buigend moment

Totaal optredende spanning 275 N/mm²
 Unity check 0.97 **Volddoet**

W4S350

Bijlage C

Segment	1	
Lengte	12 m	
Gewicht	67.5 ton	
Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	12	Voldoet
Nkabel; toegepast Binnen	4	
Dwarswapening	12	rond
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Opretende spanningen			
Segment	1		
Ingevulde wanddikte	450		
	Voet Top		
Buitendiameter	2200	1898 mm	
Buitenomtrek	6912	5962 mm	
Wanddikte	450	450 mm	
Binnendiameter	1300	998 mm	
Doorsnede	Hol	Hol	
Omtrek/dikte	15.36	13.25	Verhouding
Oppervlak	2474004	2046838	mm ²
Weerstandsmoment	917911791	619804059	mm ³
Maximale moment	15811	kNm	
Maximale moment + 2de orde	17392	kNm	
Maximaal dwarskracht	452	kN	
Maximaal torsiemoment	0	kNm	
Maximaal normaalkracht	2253	kN	
Spanning tgv normaalkracht	0.9	N/mm ²	
Spanning tgv moment	19.0	N/mm ²	
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-19.9	Mpa	
Toelaatbare spanning	-36.7	Komende uit betonklasse	
Maximale trekspanning	18.3	MPa	
Toelaatbare trekspanning	0.0	MPa	

Voorspanning	
Benodigde voorspanning ULS	18.3 Mpa
Benodigde voorspanning SLS	13 Mpa
Benodigde voorspankracht	45185 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-38 Mpa
Na relaxatie	-35 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	45185 kN
Nkabel; benodigd	14
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	1438 mm
Anker circl binnen	838 mm
Omtrek ankercircl buiten	4517 mm
Omtrek ankercircl binnen	2632 mm
Aantal plaatsbare ankers buitenring	15
Aantal plaatsbare ankers binnenring	8

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	452 kN
Max. dwarskracht / doorsnede	430 kN
Maximale opretende afschuiving in de wand	430 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1899 mm
fywd	478 Mpa
VRD,S	4826 kN
Toetsing afschuiving door dwarskracht	0.09

Afschuiving in wapening door torsie	
Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1899 mm
z (torsie)	1100 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4826 kN
VRD,max (torsie)	2794 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

Toetsing betonspanning	0.95	Voldoet
Toetsing afschuiving in wand	0.09	Voldoet

W4S350

Bijlage C

Segment 2
Lengte 7 m
Gewicht 31.2 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 8 Voldoet
Nkabel; toegepast Binnen 4
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	1898 1722 mm
Buitentrek	5962 5409 mm
Wanddikte	400 400 mm
Binnendiameter	1098 922 mm
Doorsnede	Hol Hol
Omtrek/dikte	14.91 13.52 Verhouding
Oppervlak	1882243 1660750 mm ²
Weerstandsmoment	595943826 459802760 mm ³
Maximale moment	10437 kNm
Maximale moment + 2de orde	11481 kNm
Maximaal dwarskracht	429 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	1459 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	19.4 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-20.2 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	18.8 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	429 kN
Max. dwarskracht / doorsnede	388 kN
Maximale optredende afschuiving in de wand	388 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1591 mm
fywd	478 Mpa
VRD,S	4043 kN
Toetsing afschuiving door dwarskracht	0.10

Toetsing betonspanning	0.96 Voldoet
Toetsing afschuiving in wand	0.10 Voldoet

Voorspanning

Benodigde voorspanning ULS	18.8 Mpa
Benodigde voorspanning SLS	13 Mpa
Benodigde voorspankracht	35319 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-39 Mpa
Na relaxatie	-35 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	35319 kN
Nkabel; benodigd	11
Nkabel; toegepast Buiten	8
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1262 mm
Anker cirkel binnen	662 mm
Omtrek ankercirkel buiten	3963 mm
Omtrek ankercirkel binnen	2078 mm
Aantal plaatsbare ankers buitenring	13
Aantal plaatsbare ankers binnenring	6

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1591 mm
z (torsie)	1257 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4043 kN
VRD,max (torsie)	3194 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00



W4S350 Bijlage C

Hoogte overgang Beton/Staal 19000 mm

Eigenschappen mast

Type mast W4S350
 Staalkwaliteit S355
 Toelaatbare spanning 284
 Epsilon staal 0.81

Uitgangspunten

Windgebied II
 Bebouwd of onbebouwd Onbebouwd
 2e orde 10%

Afmetingen

Topdiameter 0.80 m
 Voetdiameter 1.71 m
 Hoogte overgang beton/staal 19.00 m
 Hoogte mast 55.60 m
 Wanddikte 14 mm
 Gewicht 25517 kg

Hoogte

GW / opgw 35.90 m
 150C1F1 27.10 m
 150C1F2 18.10 m
 150C1F3 9.10 m
 RTG 0.20 m
 380C1F1 27.10 m
 380C1F2 18.10 m
 380C1F3 9.10 m

Krachten	hoogte m	Fver kN	Floodrecht kN	F// kN	FSamengesteld kN	Moment per geleider kN
GW / opgw	35.9	4.0	13.5	0.0	13.5	483.9
150C1F1	27.1	14.9	38.6	0.0	38.6	1046.6
150C1F2	18.1	14.9	36.0	0.0	36.0	651.3
150C1F3	9.1	14.9	32.6	0.0	32.6	296.6
RTG	0.2	8.1	18.2	0.0	18.2	3.6
380C1F1	27.1	29.8	77.2	0.0	77.2	2093.2
380C1F2	18.1	29.8	72.0	0.0	72.0	1302.6
380C1F3	9.1	29.8	65.2	0.0	65.2	593.3

Stuwdruk

1728.3 N

Moment overgang Beton/Staal (Inclusief 2e orde)

9019 kNm

Controle spanning ten gevolge van normaalkracht

Plooi gevoeligheid normaalkracht
 Reductiefactor normaalkracht pa 0.64
 Effectieve oppervlakte Aeff 47847 mm²
 Optredende spanning t.g.v. normaalkracht

Controle spanning ten gevolge van buigend moment

Buigend moment plooi gevoeligheid
 Reductiefactor buigend moment pa 0.94
 Effectieve weerstandmoment Weff 29533894 mm³
 Optredende spanning t.g.v. buigend moment

Controle spanning ten gevolge van normaalkracht en buigend moment

Totaal optredende spanning 278 N/mm²
 Unity check 0.98 Voldoet

W4S400

Bijlage E

Segment	1	
Lengte	12 m	
Gewicht	80.8 ton	
Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	12	Voldoet
Nkabel; toegepast Binnen	8	
Dwarswapening	12	rond
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen		
Segment	1	
Ingevulde wanddikte	500	
	Voet Top	
Buitendiameter	2400	2097 mm
Buitenomtrek	7540	6587 mm
Wanddikte	500	500 mm
Binnendiameter	1400	1097 mm
Doorsnede	Hol Hol	
Omtrek/dikte	15.08	13.17 Verhouding
Oppervlak	2984513	2508063 mm ²
Weerstandsmoment	1200022944	837162843 mm ³
Maximale moment	20789	kNm
Maximale moment + 2de orde	22868	kNm
Maximaal dwarskracht	523	kN
Maximaal torsiemoment	0	kNm
Maximaal normaalkracht	2974	kN
Spanning tgv normaalkracht	1.0	N/mm ²
Spanning tgv moment	19.3	N/mm ²
2de orde effect verrekening	10%	
Factor e.g	1.2	
Maximale drukspanning	-20.3	Mpa
Toelaatbare spanning	-36.7	Komende uit betonklasse
Maximale trekspanning	18.6	MPa
Toelaatbare trekspanning	0.0	MPa

Voorspanning	
Benodigde voorspanning ULS	18.6 Mpa
Benodigde voorspanning SLS	13 Mpa
Benodigde voorspankracht	54643 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-39 Mpa
Na relaxatie	-35 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	54643 kN
Nkabel; benodigd	16
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	1637 mm
Anker circl binnen	1037 mm
Omtrek ankercircl buiten	5142 mm
Omtrek ankercircl binnen	3257 mm
Aantal plaatsbare ankers buitenring	17
Aantal plaatsbare ankers binnenring	10

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	523 kN
Max. dwarskracht / doorsnede	499 kN
Maximale optredende afschuiving in de wand	499 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2104 mm
fywd	478 Mpa
VRD,S	5347 kN
Toetsing afschuiving door dwarskracht	0.09

Afschuiving in wapening door torsie	
Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2104 mm
z (torsie)	942 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5347 kN
VRD,max (torsie)	2395 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

Toetsing betonspanning	0.96	Voldoet
Toetsing afschuiving in wand	0.09	Voldoet

W4S400

Bijlage E

Segment **2**
Lengte **10 m**
Gewicht **53.3 ton**

Betonklasse **A** Voldoet
Voorspananker **FeP1860**
Nkabel; `toegepast Buiten **10** Voldoet
Nkabel; `toegepast Binnen **6**
Dwarswapening **12** rond
Materiaal **550** Fb550
Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2097 1844 mm
Buitenomtrek	6587 5793 mm
Wanddikte	450 450 mm
Binnendiameter	1197 944 mm
Doorsnede	Hol Hol
Omtrek/dikte	14.64 12.87 Verhouding
Oppervlak	2327942 1970605 mm ²
Weerstandsmoment	808869668 573228715 mm ³
Maximale moment	14662 kNm
Maximale moment + 2de orde	16128 kNm
Maximaal dwarskracht	498 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	2023 kN
Spanning tgv normaalkracht	0.9 N/mm ²
Spanning tgv moment	20.0 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-20.8 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	19.3 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	498 kN
Max. dwarskracht / doorsnede	477 kN
Maximale optredende afschuiving in de wand	477 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1832 mm
fywd	478 Mpa
VRD,S	4656 kN
Toetsing afschuiving door dwarskracht	0.10

Toetsing betonspanning	0.98 Voldoet
Toetsing afschuiving in wand	0.10 Voldoet

Voorspanning

Benodigde voorspanning ULS	19.3 Mpa
Benodigde voorspanning SLS	13 Mpa
Benodigde voorspankracht	44921 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukszijde	-40 Mpa
Na relaxatie	-36 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	44921 kN
Nkabel; benodigd	14
Nkabel; `toegepast Buiten	10
Nkabel; `toegepast Binnen	6
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1384 mm
Anker cirkel binnen	784 mm
Omtrek ankercirkel buiten	4348 mm
Omtrek ankercirkel binnen	2463 mm
Aantal plaatsbare ankers buitenring	14
Aantal plaatsbare ankers binnering	8

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1832 mm
z (torsie)	1100 mm
fywd	478 Mpa
VRD_max (dwarskracht)	4656 kN
VRD_max (torsie)	2794 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00



W4S400 Bijlage E

Hoogte overgang Beton/Staal 22000 mm

Eigenschappen mast

Type mast W4S400
 Staalkwaliteit S355
 Toelaatbare spanning 284
 Epsilon staal 0.81

Uitgangspunten

Windgebied II
 Bebouwd of onbebouwd Onbebouwd
 2e orde 10%

Afmetingen

Topdiameter 0.80 m
 Voetdiameter 1.84 m
 Hoogte overgang beton/staal 22.00 m
 Hoogte mast 63.30 m
 Wanddikte 16 mm
 Gewicht 36972 kg

Hoogte

GW / opgw 40.60 m
 150C1F1 30.60 m
 150C1F2 20.40 m
 150C1F3 10.20 m
 RTG 0.10 m
 380C1F1 30.60 m
 380C1F2 20.40 m
 380C1F3 10.20 m

Krachten	hoogte m	Fver kN	Floodrecht kN	F// kN	FSamengesteld kN	Moment per geleider kN
GW / opgw	40.6	4.6	15.3	0.0	15.3	622.4
150C1F1	30.6	17.1	43.9	0.0	43.9	1341.9
150C1F2	20.4	17.1	40.8	0.0	40.8	831.8
150C1F3	10.2	17.1	36.8	0.0	36.8	375.8
RTG	0.1	9.2	20.5	0.0	20.5	2.1
380C1F1	30.6	34.1	87.7	0.0	87.7	2683.7
380C1F2	20.4	34.1	81.5	0.0	81.5	1663.6
380C1F3	10.2	34.1	73.7	0.0	73.7	751.7

Stuwdruk 2425.1 N

Moment overgang Beton/Staal (Inclusief 2e orde) 11768 kNm

Controle spanning ten gevolge van normaalkracht

Plooi gevoeligheid normaalkracht
 Reductiefactor normaalkracht pa 0.66
 Effectieve oppervlakte Aeff 60754 mm²
 Optredende spanning t.g.v. normaalkracht

Controle spanning ten gevolge van buigend moment

Buigend moment plooi gevoeligheid
 Reductiefactor buigend moment pa 0.96
 Effectieve weerstandmoment Weff 39899396 mm³
 Optredende spanning t.g.v. buigend moment

Controle spanning ten gevolge van normaalkracht en buigend moment

Totaal optredende spanning 272 N/mm²
 Unity check 0.96 **Voldoet**

W4S450

Bijlage G

Segment	1
Lengte	12 m
Gewicht	99.0 ton
Betonklasse	A Voldoet
Voorspananker	FeP1860
Nkabel: 'toegepast Buiten	12 Voldoet
Nkabel: 'toegepast Binnen	8
Dwarswapening	12 rond
Materiaal	550 Fb550
Aantal ringbeugels/meter hoogte	5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
yck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen	
Segment	1
Ingevulde wanddikte	500
	Voet Top
Buitendiameter	2800 2463 mm
Buitenomtrek	8796 7737 mm
Wanddikte	500 500 mm
Binnendiameter	1800 1463 mm
Doorsnede	Hol Hol
Omtrek/dikte	17.59 15.47 Verhouding
Oppervlak	3612832 3083350 mm2
Weerstandsmoment	1787061321 1284162939 mm3
Maximale moment	26979 kNm
Maximale moment + 2de orde	29677 kNm
Maximaal dwarskracht	606 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	3738 kN
Spanning tgv normaalkracht	1.0 N/mm2
Spanning tgv moment	17.0 N/mm2
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-18.1 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	16.3 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning	
Benodigde voorspanning ULS	16.3 Mpa
Benodigde voorspanning SLS	11 Mpa
Benodigde voorspankracht	57194 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-34 Mpa
Na relaxatie	-32 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	57194 kN
Nkabel; benodigd	17
Nkabel; 'toegepast Buiten	12
Nkabel; 'toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	2003 mm
Anker circl binnen	1403 mm
Omtrek ankercircl buiten	6292 mm
Omtrek ankercircl binnen	4407 mm
Aantal plaatsbare ankers buitenring	20
Aantal plaatsbare ankers binnenring	14

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	606 kN
Max. dwarskracht / doorsnede	578 kN
Maximale optredende afschuiving in de wand	578 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	2470 mm
fywd	478 Mpa
VRD,S	6277 kN
Toetsing afschuiving door dwarskracht	0.09

Afschuiving in wapening door torsie	
Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	2470 mm
z (torsie)	942 mm
fywd	478 Mpa
VRD_max (dwarskracht)	6277 kN
VRD_max (torsie)	2395 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

Toetsing betonspanning	0.86 Voldoet
Toetsing afschuiving in wand	0.09 Voldoet

W4S450

Bijlage G

Segment 2
Lengte 7 m
Gewicht 46.9 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; 'toegepast Buiten 10 Voldoet
Nkabel; 'toegepast Binnen 6
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
yck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2463 2266 mm
Buitenomtrek	7737 7120 mm
Wanddikte	450 450 mm
Binnendiameter	1563 1366 mm
Doorsnede	Hol Hol
Omtrek/dikte	17.19 15.82 Verhouding
Oppervlak	2845701 2567723 mm2
Weerstandsmoment	1228887464 991781622 mm3
Maximale moment	19840 kNm
Maximale moment + 2de orde	21824 kNm
Maximaal dwarskracht	576 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	2573 kN
Spanning tgv normaalkracht	0.9 N/mm2
Spanning tgv moment	17.8 N/mm2
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-18.7 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	17.1 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	576 kN
Max. dwarskracht / doorsnede	561 kN
Maximale optredende afschuiving in de wand	561 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	2270 mm
fywd	478 Mpa
VRD,S	5769 kN
Toetsing afschuiving door dwarskracht	0.10

Toetsing betonspanning	0.90 Voldoet
Toetsing afschuiving in wand	0.10 Voldoet

Voorspanning

Benodigde voorspanning ULS	17.1 Mpa
Benodigde voorspanning SLS	12 Mpa
Benodigde voorspankracht	48687 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-36 Mpa
Na relaxatie	-33 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	48687 kN
Nkabel; benodigd	15
Nkabel; 'toegepast Buiten	10
Nkabel; 'toegepast Binnen	6
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1806 mm
Anker cirkel binnen	1208 mm
Omtrek ankercirkel buiten	5675 mm
Omtrek ankercirkel binnen	3790 mm
Aantal plaatsbare ankers buitenring	18
Aantal plaatsbare ankers binnenring	12

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	2270 mm
z (torsie)	1100 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5769 kN
VRD,max (torsie)	2794 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4S450

Bijlage G

Segment 3
Lengte 6 m
Gewicht 34.9 ton

Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel: toegepast Buiten	10	Voldoet
Nkabel: toegepast Binnen	4	
Dwarswapening	12 rond	
Materiaal	550 Fb550	
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
yck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	2266 2098 mm
Buitenomtrek	7120 6590 mm
Wanddikte	400 400 mm
Binnendiameter	1466 1298 mm
Doorsnede	Hol Hol
Omtrek/dikte	17.80 16.48 Verhouding
Oppervlak	2345252 2133459 mm2
Weerstandsmoment	942493365 773537332 mm3
Maximale moment	15803 kNm
Maximale moment + 2de orde	17384 kNm
Maximaal dwarskracht	559 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	2020 kN
Spanning tgv normaalkracht	0.9 N/mm2
Spanning tgv moment	18.6 N/mm2
2de orde effect verrekking	10%
Factor e.g	1.2
Maximale drukspanning	-19.4 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	17.9 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	17.9 Mpa
Benodigde voorspanning SLS	12 Mpa
Benodigde voorspankracht	41901 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-37 Mpa
Na relaxatie	-34 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	41901 kN
Nkabel; benodigd	13
Nkabel; toegepast Buiten	10
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1638 mm
Anker cirkel binnen	1038 mm
Omtrek ankercirkel buiten	5145 mm
Omtrek ankercirkel binnen	3260 mm
Aantal plaatsbare ankers buitenring	17
Aantal plaatsbare ankers binnenring	10

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	559 kN
Max. dwarskracht / doorsnede	495 kN
Maximale optredende afschuiving in de wand	495 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	1790 mm
fywd	478 Mpa
VRD,S	4549 kN
Toetsing afschuiving door dwarskracht	0.11

Toetsing betonspanning	0.93 Voldoet
Toetsing afschuiving in wand	0.11 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	1790 mm
z (torsie)	1257 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4549 kN
VRD,max (torsie)	3194 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00



W4S450

Bijlage G

Hoogte overgang Beton/Staal 25000 mm

Eigenschappen mast

Type mast W4S450
 Staalkwaliteit S355
 Toelaatbare spanning 284
 Epsilon staal 0.81

Uitgangspunten

Windgebied II
 Bebouwd of onbebouwd Onbebouwd
 2e orde 10%

Afmetingen

Topdiameter 0.80 m
 Voetdiameter 2.1 m
 Hoogte overgang beton/staal 25.00 m
 Hoogte mast 71.20 m
 Wanddikte 16 mm
 Gewicht 33883 kg

Hoogte

GW / opgw 45.50 m
 150C1F1 34.30 m
 150C1F2 22.90 m
 150C1F3 11.50 m
 RTG 0.20 m
 380C1F1 34.30 m
 380C1F2 22.90 m
 380C1F3 11.50 m

Krachten	hoogte m	Fver kN	Floodrecht kN	F// kN	FSamengesteld kN	Moment per geleider kN
GW / opgw	45.5	5.2	17.2	0.0	17.2	783.6
150C1F1	34.3	19.2	49.1	0.0	49.1	1684.9
150C1F2	22.9	19.2	45.6	0.0	45.6	1044.0
150C1F3	11.5	19.2	41.1	0.0	41.1	472.7
RTG	0.2	10.4	22.9	0.0	22.9	4.6
380C1F1	34.3	38.4	98.2	0.0	98.2	3369.9
380C1F2	22.9	38.4	91.2	0.0	91.2	2087.9
380C1F3	11.5	38.4	82.2	0.0	82.2	945.4

Stuwdruk

3454.7 N

Moment overgang Beton/Staal (Inclusief 2e orde)

15232 kNm

Controle spanning ten gevolge van normaalkracht

Plooi gevoeligheid normaalkracht
 Reductiefactor normaalkracht pa 0.62
 Effectieve oppervlakte Aeff 64711 mm²
 Optredende spanning t.g.v. normaalkracht

Controle spanning ten gevolge van buigend moment

Buigend moment plooi gevoeligheid
 Reductiefactor buigend moment pa 0.92
 Effectieve weerstandmoment Weff 49708658 mm³
 Optredende spanning t.g.v. buigend moment

Controle spanning ten gevolge van normaalkracht en buigend moment

Totaal optredende spanning 283 N/mm²
 Unity check 1.00 Voldoet

W6HL400

Bijlage J

Segment	1	
Lengte	12 m	
Gewicht	130.0 ton	
Betonklasse	B	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	25	Voldoet
Nkabel; toegepast Binnen	8	
Dwarswapening	12	rond
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen			
Segment	1		
Ingevulde wanddikte	500		
	Voet Top		
Buitendiameter	3500	2954 mm	
Buitenomtrek	10996	9279 mm	
Wanddikte	500	500 mm	
Binnendiameter	2500	1954 mm	
Doorsnede			
Omtrek/dikte	21.99	18.56	Verhouding
Oppervlak	4712389	3854146	mm ²
Weerstandsmoment	3113542719	2045500477	mm ³
Maximale moment	64856		kNm
Maximale moment + 2de orde	71341		kNm
Maximaal dwarskracht	1676		kN
Maximaal torsiemoment	3993683		kNm
Maximaal normaalkracht	4325		kN
Spanning tgv normaalkracht	0.9		N/mm ²
Spanning tgv moment	24.1		N/mm ²
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-25.0		Mpa
Toelaatbare spanning	-46.7		Komende uit betonklasse
Maximale trekspanning	23.4		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning	
Benodigde voorspanning ULS	23.4 Mpa
Benodigde voorspanning SLS	24 Mpa
Benodigde voorspankracht	104732 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-48 Mpa
Na relaxatie	-44 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	104732 kN
Nkabel; benodigd	31
Nkabel; toegepast Buiten	25
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	2494 mm
Anker circl binnen	1894 mm
Omtrek ankercircl buiten	7834 mm
Omtrek ankercircl binnen	5949 mm
Aantal plaatsbare ankers buitenring	26
Aantal plaatsbare ankers binnenring	19

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	1676 kN
Max. dwarskracht / doorsnede	1665 kN
Maximale optredende afschuiving in de wand	1665 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2947 mm
fywd	478 Mpa
VRD,S	7488 kN
Toetsing afschuiving door dwarskracht	0.22

Afschuiving in wapening door torsie	
Maximaal torsie	3993683 kNm
Maximaal afschuiving torsie / doorsnede	3265 kN
Maximaal dwarskracht bij torsie	754 kN
Max. afschuiving wand door dwarskracht	754 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2947 mm
z (torsie)	7686 mm
fywd	478 Mpa
VRD,max (dwarskracht)	7488 kN
VRD,max (torsie)	19533 kN
Toetsing afschuiving door dwarskracht	0.10
Toetsing afschuiving door torsie	0.17
Totaal	0.27

Toetsing betonspanning	0.94	Voldoet
Toetsing afschuiving in wand	0.27	Voldoet

W6HL400

Bijlage J

Segment **2**
 Lengte **11 m**
 Gewicht **82.8 ton**

Betonklasse **B** Voldoet
 Voorspananker **FeP1860**
 Nkabel; toegepast Buiten **18** Voldoet
 Nkabel; toegepast Binnen **8**
 Dwarswapening **12** rond
 Materiaal **550** Fb550
 Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2954 2453 mm
Buitenontrek	9279 7706 mm
Wanddikte	450 450 mm
Binnendiameter	2054 1553 mm
Doorsnede	Hol Hol
Omtrek/dikte	20.62 17.12 Verhouding
Oppervlak	3539417 2831367 mm ²
Weerstandsmoment	1938490433 1216002093 mm ³
Maximale moment	44063 kNm
Maximale moment + 2de orde	48470 kNm
Maximaal dwarskracht	1665 kN
Maximaal torsiemoment	3993683 kNm
Maximaal normaalkracht	2795 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	25.4 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-26.2 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	24.8 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1665 kN
Max. dwarskracht / doorsnede	1655 kN
Maximale optredende afschuiving in de wand	1655 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2407 mm
fywd	478 Mpa
VRD,S	6116 kN
Toetsing afschuiving door dwarskracht	0.27

Toetsing betonspanning	0.97 Voldoet
Toetsing afschuiving in wand	0.37 Voldoet

Voorspanning

Benodigde voorspanning ULS	24.8 Mpa
Benodigde voorspanning SLS	25 Mpa
Benodigde voorspankracht	87204 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-51 Mpa
Na relaxatie	-45 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	87204 kN
Nkabel; benodigd	26
Nkabel; toegepast Buiten	18
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1993 mm
Anker cirkel binnen	1393 mm
Omtrek ankercirkel buiten	6261 mm
Omtrek ankercirkel binnen	4376 mm
Aantal plaatsbare ankers buitenring	20
Aantal plaatsbare ankers binnering	14

Afschuiving in wapening door torsie

Maximaal torsie	3993683 kNm
Maximaal afschuiving torsie / doorsnede	3973 kN
Maximaal dwarskracht bij torsie	749 kN
Max. afschuiving wand door dwarskracht	749 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2407 mm
z (torsie)	6316 mm
fywd	478 Mpa
VRD,max (dwarskracht)	6116 kN
VRD,max (torsie)	16052 kN
Toetsing afschuiving door dwarskracht	0.12
Toetsing afschuiving door torsie	0.25
Totaal	0.37



W6HL400 Bijlage J

Hoogte overgang Beton/Staal 23000 mm

Eigenschappen mast

Type mast W6HL400
 Staalkwaliteit S355
 Toelaatbare spanning 284
 Epsilon staal 0.81

Uitgangspunten

Windgebied II
 Bebouwd of onbebouwd Onbebouwd
 2e orde 10%

Afmetingen

Topdiameter 0.80 m
 Voetdiameter 2.447 m
 Hoogte overgang beton/staal 23.00 m
 Hoogte mast 59.30 m
 Wanddikte 24 mm
 Gewicht 35538 kg

Hoogte

GW / opgw 36.30 m
 380C1F1 26.30 m
 380C1F2 16.10 m
 380C1F3 5.90 m
 RTG 0.30 m
 380C2F1 26.30 m
 380C2F2 16.10 m
 380C2F3 5.90 m

Krachten	hoogte m	Fver kN	Floodrecht kN	F// kN	FSamengesteld kN	Moment per geleider kN	
GW / opgw		36.3	18.7	65.0	0.0	65.0	2359.0
380C1F1		26.3	58.8	245.0	0.0	245.0	6443.6
380C1F2		16.1	58.8	240.1	0.0	240.1	3865.4
380C1F3		5.9	58.8	234.0	0.0	234.0	1380.5
RTG		0.3	18.7	59.7	-113.0	127.8	38.3
380C2F1		26.3	58.8	245.0	0.0	245.0	6443.6
380C2F2		16.1	58.8	240.1	0.0	240.1	3865.4
380C2F3		5.9	58.8	234.0	0.0	234.0	1380.5

Stuwdruk 744.6 N

Moment overgang Beton/Staal (Inclusief 2e orde) 29173 kNm

Controle spanning ten gevolge van normaalkracht

Plooi gevoeligheid normaalkracht
 Reductiefactor normaalkracht pa 0.71
 Effectieve oppervlakte Aeff 129533 mm²
 Optredende spanning t.g.v. normaalkracht

Controle spanning ten gevolge van buigend moment

Buigend moment plooi gevoeligheid
 Reductiefactor buigend moment pa 1.00
 Effectieve weerstandmoment Weff 109589767 mm³
 Optredende spanning t.g.v. buigend moment

Controle spanning ten gevolge van normaalkracht en buigend moment

Totaal optredende spanning 260 N/mm²
 Unity check 0.92 Voldoet

W6S400

Bijlage I

Segment 1
Lengte 12 m
Gewicht 83.7 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 12 Voldoet
Nkabel; toegepast Binnen 4
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	1
Ingevulde wanddikte	500
	Voet Top
Buitendiameter	2400 2079 mm
Buitenomtrek	7540 6533 mm
Wanddikte	500 500 mm
Binnendiameter	1400 1079 mm
Doorsnede	Hol Hol
Omtrek/dikte	15.08 13.07 Verhouding
Oppervlak	2984513 2481019 mm ²
Weerstandsmoment	1200022944 818681792 mm ³
Maximale moment	20652 kNm
Maximale moment + 2de orde	22718 kNm
Maximaal dwarskracht	541 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	2904 kN
Spanning tgv normaalkracht	1.0 N/mm ²
Spanning tgv moment	19.2 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-20.2 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	18.5 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	541 kN
Max. dwarskracht / doorsnede	534 kN
Maximale optredende afschuiving in de wand	534 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2072 mm
fywd	478 Mpa
VRD,S	5266 kN
Toetsing afschuiving door dwarskracht	0.10

Toetsing betonspanning	0.97 Voldoet
Toetsing afschuiving in wand	0.10 Voldoet

Voorspanning

Benodigde voorspanning ULS	18.5 Mpa
Benodigde voorspanning SLS	15 Mpa
Benodigde voorspankracht	54322 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-39 Mpa
Na relaxatie	-36 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	54322 kN
Nkabel; benodigd	16
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	1619 mm
Anker circl binnen	1019 mm
Omtrek ankercircl buiten	5088 mm
Omtrek ankercircl binnen	3203 mm
Aantal plaatsbare ankers buitenring	16
Aantal plaatsbare ankers binnenring	10

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2072 mm
z (torsie)	942 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5266 kN
VRD,max (torsie)	2395 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W6S400

Bijlage I

Segment 2
Lengte 11 m
Gewicht 60.2 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 12 Voldoet
Nkabel; toegepast Binnen 4
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2079 1786 mm
Buitenomtrek	6533 5610 mm
Wanddikte	450 450 mm
Binnendiameter	1179 886 mm
Doorsnede	Hol Hol
Omtrek/dikte	14.52 12.47 Verhouding
Oppervlak	2303603 1888220 mm ²
Weerstandsmoment	791418544 525138568 mm ³
Maximale moment	13897 kNm
Maximale moment + 2de orde	15287 kNm
Maximaal dwarskracht	533 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	1918 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	19.7 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-20.5 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	19.1 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	533 kN
Max. dwarskracht / doorsnede	527 kN
Maximale optredende afschuiving in de wand	527 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1768 mm
fywd	478 Mpa
VRD,S	4493 kN
Toetsing afschuiving door dwarskracht	0.12

Toetsing betonspanning	0.97 Voldoet
Toetsing afschuiving in wand	0.12 Voldoet

Voorspanning

Benodigde voorspanning ULS	19.1 Mpa
Benodigde voorspanning SLS	15 Mpa
Benodigde voorspankracht	43517 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukszijde	-40 Mpa
Na relaxatie	-35 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	43517 kN
Nkabel; benodigd	13
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1326 mm
Anker cirkel binnen	726 mm
Omtrek ankercirkel buiten	4165 mm
Omtrek ankercirkel binnen	2280 mm
Aantal plaatsbare ankers buitenring	13
Aantal plaatsbare ankers binnering	7

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1768 mm
z (torsie)	1100 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4493 kN
VRD,max (torsie)	2794 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00



W6S400 Bijlage I

Hoogte overgang Beton/Staal 23000 mm

Eigenschappen mast

Type mast W6S400
 Staalkwaliteit S355
 Toelaatbare spanning 284
 Epsilon staal 0.81

Uitgangspunten

Windgebied II
 Bebouwd of onbebouwd Onbebouwd
 2e orde 10%

Afmetingen

Topdiameter 0.80 m
 Voetdiameter 1.776 m
 Hoogte overgang beton/staal 23.00 m
 Hoogte mast 59.90 m
 Wanddikte 15 mm
 Gewicht 28340 kg

Hoogte

GW / opgw 36.20 m
 380C1F1 26.20 m
 380C1F2 16.00 m
 380C1F3 5.80 m
 RTG 0.20 m
 380C2F1 26.20 m
 380C2F2 16.00 m
 380C2F3 5.80 m

Krachten	hoogte m	Fver kN	Floodrecht kN	F// kN	FSamengesteld kN	Moment per geleider kN
GW / opgw	36.2	4.6	15.1	0.0	15.1	545.1
380C1F1	26.2	34.1	85.8	0.0	85.8	2248.2
380C1F2	16.0	34.1	79.1	0.0	79.1	1265.4
380C1F3	5.8	34.1	70.5	0.0	70.5	408.8
RTG	0.2	34.1	85.8	0.0	85.8	17.2
380C2F1	26.2	34.1	79.1	0.0	79.1	2072.1
380C2F2	16.0	34.1	70.5	0.0	70.5	1127.7
380C2F3	5.8	9.2	21.0	0.0	21.0	121.8

Stuwdruk

603.5 N

Moment overgang Beton/Staal (Inclusief 2e orde)

9251 kNm

Controle spanning ten gevolge van normaalkracht

Plooi gevoeligheid normaalkracht
 Reductiefactor normaalkracht pa 0.65
 Effectieve oppervlakte Aeff 54126 mm²
 Optredende spanning t.g.v. normaalkracht

Controle spanning ten gevolge van buigend moment

Buigend moment plooi gevoeligheid
 Reductiefactor buigend moment pa 0.95
 Effectieve weerstandmoment Weff 34497717 mm³
 Optredende spanning t.g.v. buigend moment

Controle spanning ten gevolge van normaalkracht en buigend moment

Totaal optredende spanning 261 N/mm²
 Unity check 0.92 Voldoet

74102194-ETD/POL 13-2622 V4.0 Definitief

Engineering ZW380

**Constructieberekening betonnen masten ten
behoefte van vergunningaanvraag**

Arnhem, 6 maart 2014

Auteur(s) E.J. Platenkamp

In opdracht van Tennet TSO B.V. Projectnummer 000.145.11

auteur : EJ Platenkamp
30 blz. 10 bijl. EJP/JEH

beoordeeld : AJP van der Wekken
goedgekeurd : A. van der Wal

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INHOUD

	Pagina
1	Inleiding4
2	Uitgangspunten5
2.1	Gebruikte normen5
2.2	Materiaal typeringen mast5
2.3	Constructie typering.....6
2.4	Uitgangspunten uit de beschouwde normen6
2.5	Veldlengte.....8
3	Mastafmetingen9
4	Beschrijving constructie14
4.1	Materiaalklassen15
4.2	Elektrische aarding19
5	Conclusie betonnen masten20
Bijlage A	Berekening W2S400.....21
Bijlage B	Berekening W2HL400.....22
Bijlage C	Berekening W4S350.....23
Bijlage D	Berekening W4HL350.....24
Bijlage E	Berekening W4S400.....25
Bijlage F	Berekening W4HL400.....26
Bijlage G	Berekening W4S450.....27
Bijlage H	Berekening W4HK45028
Bijlage I	Berekening W6S400.....29
Bijlage J	Berekening W6HL400.....30

1 INLEIDING

Dit document geeft een samenvatting van de ontwerpbelastingen en berekeningen van de volgende betonnen masttypen, geschikt voor de bouwaanvraag:

- Steunmast geschikt voor twee-circuits, 2x 380 kV, 400 meter veldlengte; type W2S400;
- Hoekmast geschikt voor twee-circuits, 2x 380kV, 400 meter veldlengte, lijnhoek van 130 graden, type W2HL400;
- Steunmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 350 meter veldlengte; type W4S350;
- Hoekmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 350 meter veldlengte, lijnhoek van 130 graden, type W4HL350;
- Steunmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 400 meter veldlengte; type W4S400;
- Hoekmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 400 meter veldlengte, lijnhoek van 130 graden, type W4HL400;
- Steunmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 450 meter veldlengte; type W4S450;
- Hoekmast geschikt voor vier-circuits, 2x 380 kV en 2x 150 kV, 450 meter veldlengte, lijnhoek van 150 graden, type W4HK450;
- Steunmast geschikt voor vier-circuits, 4x 380 kV, 400 meter veldlengte; type W6S400;
- Hoekmast geschikt voor vier-circuits, 4x 380 kV, 400 meter veldlengte, lijnhoek van 130 graden, type W6HL400.

De ontwerpbelastingen voor de betonnen Wintrack masten zijn gebaseerd op de DNV KEMA vergunningsdocumenten voor de stalen varianten.

Voor alle masttypes zijn de ontwerpbelastingen bepaald. De belastingen zijn zo opgesteld dat deze niet locatie specifiek worden bepaald maar generiek met maximale veldlengte en maximale lijnhoek, tussen opeenvolgende masten. Het effect op de belastingen door verschil in hoogte van opeenvolgende masten wordt niet meegenomen.

De aanpak is gebaseerd op Bijlage IV B95-STA-KA-1300165 Berekening Wintrack betonnen masten van 20 februari 2013 versie 0.3.

2 UITGANGSPUNTEN

De in dit document gepresenteerde belastingen zijn niet bepaald op basis van analyse van alle door NEN-EN 50341 voorgeschreven belastinggevallen maar door DNV KEMA zijn die belastinggevallen of combinaties daarvan geselecteerd die de maatgevende belastingen veroorzaken.

Voor steunmasten met een verhoging tot maximaal 10 meter geldt dat deze berekend worden voor een maximale lijnhoek van 2 x 2.5. Voor hoekmasten wordt er een onderscheid gemaakt in de maximaal toelaatbare hoek op de mast, kenbaar gemaakt met een codering in het masttype met K (150°), L (130°) en M (120°).

Overige uitgangspunten en aannames zijn:

- trekparameter bij 10 °C: 1800 m
- geleider 380 kV: 4 bundel AMS620
- geleider 150 kV: 2 bundel AMS620
- bliksemgeleider/OPGW: 1 bundel BRUGG OPGW 226-AL3/38-A20SA
- retour stroomgeleider: 2 bundel WDI AACSR 242-39 Hawk
- hoogte mast en ophangpunten conform de documenten: 12-00570 rapport “mastafmetingen 4x380 kv + 220-380 kV rev 3.0” en 12-00572 rapport “mastafmetingen 2x380+150-380 rev 3.0”
- belastingen zijn inclusief belastingfactoren volgens de NEN-EN 50341-3-15
- Maximum mastsegment gewicht van 35 ton.

2.1 Gebruikte normen

- NEN - EN50341-1, “Bovengrondse elektrische lijnen boven 45 kV wisselspanning – Deel 1: Algemene eisen - Gemeenschappelijke specificaties
- NEN - EN50341-3-15, “Bovengrondse elektrische lijnen boven 45 kV wisselspanning - Deel 3: Verzameling van nationale normatieve aspecten”
- NEN-EN 1990:2002, "Eurocode - Grondslagen van het constructief ontwerp"
- NEN-EN 1992-1-1: Ontwerp en berekening Betonconstructies.

2.2 Materiaal typering mast

- Betonkwaliteit: C55/67, C70/85, C80/95 en C90/105
- Wapening Fe550B
- Nagerekt voorspanstaal kwaliteit FeP1860 uitgaande van 150 mm² per streng

- Dekking 50 mm
- Levensduur 50 jaar conform NEN-EN 50341
- Milieuklasse: XC4, XD3, eventueel XF2 afhankelijk van de locaties
- Materiaalfactor van 1,5 voor beton
- Materiaalfactor van 1,5 voor voorgerekt en nagerekt staal
- Materiaalfactor van 1,15 voor wapeningstaal

2.3 Constructie typering

Veiligheidsklasse	3	1) $\gamma_{f,g} = 1.20$	$\gamma_{f,q} = 1.50$
		2) $\gamma_{f,g} = 1.35$	
Referentie periode	50 jaar		
Windtracé	II	onbebouwd	
Ijsgebied A voor bliksemdraad en OPGW			$5\sqrt{d}$
Ijsgebied A voor retourstroom geleider			$5\sqrt{d}$
Ijsgebied B voor fase geleider			$1,8\sqrt{d}$

2.4 Uitgangspunten uit de beschouwde normen

Berekening capaciteit betonnen secties

Berekening van benodigde weerstandsmoment en wanddikte tegen maximaal optredend moment:

$$W_{ben} = \frac{M_{tot}}{f_{cd}}$$

Waarin:

M_{tot} = Maximaal voetmoment uit de belastingen

f_{cd} = Rekenwaarde van tegenstaande betondruk spanning

$$f_{cd} = \frac{f_{ck}}{1.5}$$

f_{ck} = drukcapaciteit van beton

Weerstandsmoment voor een cirkelvormige doorsnede:

$$W = \frac{1}{32} \cdot D \times \pi \times (D^4 - d^4)$$

Bepaling voorspankracht ankers

$P_{benodigd}$ = Benodigde voorspankracht

Aantal strengen is afhankelijk van de dwarsdoorsnede per streng en de maximaal toelaatbare spanning per streng

$$P_{benodigd} = A_{streng} \cdot \sigma_{streng} \cdot n_{strengen}$$

Aantal ankers hangt van het aantal strengen per kabel af

$$n_{ankers} = \frac{n_{strengen}}{\text{streng / kabel}}$$

Bepaling benodigde dwarswapening

De weerstand V_{RD} tegen afschuiving wordt met onderstaande formule bepaald.

$$V_{RD,max} = \frac{A_{sw}}{s} \cdot z \cdot f_{ywd} \cdot \cot \theta$$

Waarin:

A_{sw} = oppervlakte van de dwarsdoorsnede van de dwarskrachtwapening

s = hart op hartafstand van de beugels

f_{ywd} = rekenwaarde van de vloeigrens van de dwarskrachtwapening

z = Bij dwarskracht diameter van de ringwapening en bij afschuiving door torsie is de omtrek van de ringwapening.

θ = Hoek tussen de drukdiagonaal van beton en de as van de ligger loodrecht op de dwarskrachtwapening

De torsieweerstand T_{RD} wordt met onderstaande formule bepaald.

$$T_{RD,max} = 2 \cdot v \cdot \alpha_{cw} \cdot f_{cd} \cdot A_k \cdot t_{ef} \cdot \sin \theta \cdot \cos \theta$$

Waarin:

v = 0.6 (sterkte reductiefactor)

α_{cw} = 2.5 ($1 - \sigma_{cp}/f_{cd}$) factor waarmee met de spanning in de op druk belaste rand rekening is gehouden

f_{cd} = rekenwaarde van de drukspanning van beton

σ_{cp} = gemiddelde waarde betondrukspanning

A_k = Omsloten oppervlak inclusief de holle delen

t_{ef} = meewerkende wanddikte

θ = (21,8 – 45 graden) hoek tussen de drukdiagonaal van beton en de as van de ligger loodrecht op de dwarskrachtwapening. De berekeningen zijn uitgevoerd bij een hoek van 30 graden.

De capaciteit van een op wringing en afschuiving belast element wordt met de onderstaande voorwaarde getoetst.

$$\frac{T_{ed}}{T_{RD,max}} + \frac{V_{ed}}{V_{RD,max}} \leq 1.0$$

T_{ed} = rekenwaarde van het aangrijpend wringend moment

V_{ed} = rekenwaarde van de aangrijpende dwarskracht

2.5 Bepaling maximale belasting op mastsegmenten

De belastingen op de mastsegmenten zijn gebaseerd op het buigmoment uit de geleiders, de wind en het eigengewicht van de mast. Dit is per segment bepaald. De krachten zijn gebaseerd op de NEN-EN-50341-3. Zie hiervoor de tabellen in hoofdstuk 3.

2.6 Veldlengte

De beschouwde masttypen zijn opgenomen in onderstaande tabel:

Tabel 1 – Masttypen

Mast type	Max. ahead span (m)	Max. back span (m)	Max. Lijn hoek (deg)	Mast type aangrenzende mast
W2S400	400	400	2 x 2.5	W2S400
W2HL400	400	400	2 x 25	W2S400
W4S350	350	350	2 x 2.5	W4S350
W4HL350	350	350	2 x 25	W4S350
W4S400	400	400	2 x 2.5	W4S400
W4HL400	400	400	2 x 25	W4S400
W4S450	450	450	2 x 2.5	W4S450
W4HK450	450	450	2 x 15	W4S450
W6S400	400	400	2 x 2.5	W6S400
W6HL400	400	400	2 x 25	W6S400

3 MASTAFMETINGEN

In de volgende tabel zijn de afmetingen en de belangrijke parameters per betonnen mast weergegeven. De resultaten van de berekening dienen als input voor het ontwerp van de fundering.

Tabel 2 - Afmetingen en belangrijke parameters van mast W2S400

	Segment				
	1	2	3	4	5
Betonklasse	C55/67	C55/67	C55/67	C55/67	C55/67
Lengte (mm)	12000	12000	12000	12000	6800
Voetdiameter (mm)	2200	1893	1587	1280	974
Topdiameter (mm)	1893	1587	1280	974	800
Wanddikte (mm)	400	350	300	250	200
Massa (kN)	598	441	308	198	89
Segment voet moment (kNm)	14361	9661	5273	2042	233
Dwarskracht (kN)	366	344	300	208	110
Torsiemoment (kNm)	0	0	0	0	0

Tabel 3 - Afmetingen en belangrijke parameters van mast W2HL400

	Segment					
	1	2	3	4	5	6
Betonklasse	C70/85	C70/85	C55/67	C55/67	C55/67	C55/67
Lengte (mm)	12000	12000	12000	12000	12000	3200
Voetdiameter (mm)	2800	2420	2041	1661	1281	901
Topdiameter (mm)	2420	2041	1661	1281	901	800
Wanddikte (mm)	500	450	400	300	200	150
Massa (kN)	955	725	524	317	178	43
Segment voet moment (kNm)	39217	26497	14419	6286	1815	230
Dwarskracht (kN)	968	959	697	446	192	67
Torsiemoment (kNm)	15	15	15	15	15	15

Tabel 4 - Afmetingen en belangrijke parameters van mast W4S350

	Segment				
	1	2	3	4	5
Betonklasse	C55/67	C55/67	C55/67	C55/67	C55/67
Lengte (mm)	12000	12000	12000	12000	7600
Voetdiameter (mm)	2200	1898	1596	1294	991
Topdiameter (mm)	1898	1596	1294	991	800
Wanddikte (mm)	450	400	300	250	200
Massa (kN)	662	492	300	204	97
Segment voet moment (kNm)	17392	11481	5977	1992	139
Dwarskracht (kN)	452	429	387	268	24
Torsiemoment (kNm)	0	0	0	0	0

Tabel 5 - Afmetingen en belangrijke parameters van mast W4HL350

	Segment				
	1	2	3	4	5
Betonklasse	C70/85	C70/85	C70/85	C70/85	C55/67
Lengte (mm)	12000	12000	12000	12000	7500
Voetdiameter (mm)	3000	2524	2049	1573	1097
Topdiameter (mm)	2524	2049	1573	1097	800
Wanddikte (mm)	500	450	400	300	150
Massa (kN)	1039	755	491	283	101
Segment voet moment (kNm)	50452	33517	17373	5918	462
Dwarskracht (kN)	1266	1257	1126	776	65
Torsiemoment (kNm)	1740	1740	1740	1210	125

Tabel 6 - Afmetingen en belangrijke parameters van mast W4S400

	Segment					
	1	2	3	4	5	6
Betonklasse	C55/67	C55/67	C55/67	C55/67	C55/67	C55/67
Lengte (mm)	12000	12000	12000	12000	12000	3300
Voetdiameter (mm)	2400	2097	1793	1490	1187	883
Topdiameter (mm)	2097	1793	1490	1187	883	800
Wanddikte (mm)	500	450	400	300	200	150
Massa (kN)	793	609	448	281	166	42
Segment voet moment (kNm)	22868	16128	9759	4420	1168	51
Dwarskracht (kN)	523	498	452	316	171	20
Torsiemoment (kNm)	0	0	0	0	0	0

Tabel 7 - Afmetingen en belangrijke parameters van mast W4HL400

	Segment					
	1	2	3	4	5	6
Betonklasse	C70/85	C70/85	C70/85	C70/85	C55/67	C55/67
Lengte (mm)	12000	12000	12000	12000	12000	3200
Voetdiameter (mm)	3200	2744	2289	1833	1377	922
Topdiameter (mm)	2744	2289	1833	1377	922	800
Wanddikte (mm)	500	450	400	300	200	150
Massa (kN)	1118	842	599	352	189	44
Segment voet moment (kNm)	60347	42920	25887	11879	3206	230
Dwarskracht (kN)	1325	1315	1177	814	443	67
Torsiemoment (kNm)	1836	18365	1836	1277	707	0

Tabel 8 - Afmetingen en belangrijke parameters van mast W4S450

	Segment					
	1	2	3	4	5	6
Betonklasse	C55/67	C55/67	C55/67	C55/67	C55/67	C55/67
Lengte (mm)	12000	12000	12000	12000	12000	11200
Voetdiameter (mm)	2800	2463	2126	1789	1452	1115
Topdiameter (mm)	2463	2126	1789	1452	1115	800
Wanddikte (mm)	500	450	400	300	200	150
Massa (kN)	970	755	564	357	194	142
Segment voet moment (kNm)	29677	21824	14359	7570	2748	299
Dwarskracht (kN)	606	576	546	493	342	35
Torsiemoment (kNm)	0	0	0	0	0	0

Tabel 9 - Afmetingen en belangrijke parameters van mast W4HK450

	Segment					
	1	2	3	4	5	6
Betonklasse	C70/85	C70/85	C70/85	C70/85	C55/67	C55/67
Lengte (mm)	12000	12000	12000	12000	12000	11100
Voetdiameter (mm)	3300	2878	2456	2034	1612	1190
Topdiameter (mm)	2878	2456	2034	1612	1190	800
Wanddikte (mm)	500	450	400	300	250	200
Massa (kN)	1178	906	667	413	259	162
Segment voet moment (kNm)	57412	42426	27892	14608	5214	557
Dwarskracht (kN)	1146	1111	1077	975	677	53
Torsiemoment (kNm)	1737	1737	1737	1737	1219	148

Tabel 10 - Afmetingen en belangrijke parameters van mast W6S400

	Segment				
	1	2	3	4	5
Betonklasse	C55/67	C55/67	C55/67	C55/67	C55/67
Lengte (mm)	12000	12000	12000	12000	11900
Voetdiameter (mm)	2400	2079	1759	1438	1118
Topdiameter (mm)	2079	1759	1438	1118	800
Wanddikte (mm)	500	450	400	300	150
Massa (kN)	821	591	427	259	139
Segment voet moment (kNm)	22718	15287	8423	3399	427
Dwarskracht (kN)	541	533	440	341	185
Torsiemoment (kNm)	0	0	0	0	0

Tabel 11 - Afmetingen en belangrijke parameters van mast W6HL400

	Segment				
	1	2	3	4	5
Betonklasse	C70/85	C70/85	C70/85	C70/85	C55/67
Lengte (mm)	12000	12000	12000	12000	11300
Voetdiameter (mm)	3500	2954	2407	1861	1315
Topdiameter (mm)	2954	2407	1861	1315	800
Wanddikte (mm)	500	450	400	300	150
Massa (kN)	1274	888	614	341	158
Segment voet moment (kNm)	71341	48470	26908	10724	1797
Dwarskracht (kN)	1676	1665	1526	1049	561
Torsiemoment (kNm)	3994	3994	3994	2729	1439

Een aantal afmetingen zijn t.o.v. de stalen mast uitvoeringen gewijzigd. Deze wijzigingen zijn doorgevoerd vanwege de anders te hoge betondruk in de wand. Gemiddeld genomen zijn voor alle masten de voetdiameters met 10 % vergroot. Daarnaast zijn de masttop diameters vergroot naar 0.8 meter omdat uit studies van architect Z&J blijkt dat bij een vergrote mastvoet diameter een grotere masttop diameter esthetisch passender is.

Het is mogelijk is om de voetdiameter nog meer te vergroten om de betondruk in de wand te verlagen. Dit is niet toegepast vanwege dan de afmetingen teveel afwijken van de stalen varianten.

4 BESCHRIJVING CONSTRUCTIE

De masten bestaan per mastlocatie uit twee afzonderlijke taps toelopende buismasten, het zogenaamde bipole mastprincipe. De beschrijving van de constructie komt overeen met paragraaf 4.2 masten uit Bijlage IV B95-STA-KA-1300165_Wintrack – betonnen masten.

De belangrijkste randvoorwaarden uit dit document zijn:

- Trekspanning in de wand komende uit het moment moet volledig door voorspanning opgenomen worden
- De segmenten hebben een maximale lengte van 12 meter. Indien een verticaal element meer dan 35 ton weegt, heeft het de voorkeur de verticale betonnen elementen in losse cirkelsegmenten te vervaardigen.
- Alle segmenten worden in gewapend beton uitgevoerd met een doorgaande ronde sparing. In de doorgaande ronde sparing worden verticale voorspankabels aangebracht met verankeringen in de fundatiepoer
- De uitwendige voorspanning wordt op vijf niveaus voor 350 meter en 400 meter velden masten in fasen aangebracht. Voor de 450 meter velden masten wordt dit op zes niveaus aangebracht. Vanwege beperkte ruimte in de doorgaande sparing is het niet mogelijk alle voorspankabels langs de omtrek van de sparing te positioneren. De voorspankabels worden binnen de omtrek gelijkmatig verdeeld. Om de voorspankracht naar het beton te kunnen overdragen is het noodzakelijk een in het beton geïntegreerde stalen plaat aan te brengen onder de ankerplaten van de voorspanelementen.
Per segment worden de optredende spanningen, inclusief de voorspanspanning getoetst op de capaciteit. De bepaling van de capaciteit per segment is weergegeven in hoofdstuk 2.4.

De opmerking die hierbij gemaakt moet worden is dat het dwarskrachtmiddelpunt van de voorspanstrengen niet samenvalt met dat van de betonnen wand. Voor de herverdeling van belasting is een extra stalen eindplaat in het beton nodig. In een vervolgstudie, of mastdetailering, zal de herverdeling tussen voorspanning en beton verder uitgezocht moeten worden.

Afwijkingen ten opzichte van document Bijlage III B95-STA-KA-1300165_Wintrack – betonnen masten zijn de volgende:

- De ankerbouten in de mastsegmenten worden zodanig voorgespannen dat bij een belasting uit mast en geleiders tot de Ultimate Limit State (ULS) de voorspanning niet opgeheven wordt. De ULS belasting is in de ontwerpnorm NEN-EN 50341 gedefinieerd als de maximale belasting uit mast en geleiders met toepassing van belastingsfactoren. De ankerbouten worden gedimensioneerd op de uiterste grenstoestand (ULS) trekbelasting als gedefinieerd in de ontwerpnorm. De maximale betondruk in de wand is de optelsom van de druk door voorspanning, uitwendige belasting op de mast en een reductie door de afname van voorspanning bij een uitwendige druk.

$$\frac{\Delta P_{beton} \cdot l_{beton}}{E_{beton} \cdot A_{beton}} = \Delta L = \frac{\Delta P_{anker} \cdot l_{anker}}{E_{anker} \cdot A_{anker}}$$

$$P_{uitw} = \Delta P_{beton} + \Delta P_{anker}$$

De belastingsverdeling is afhankelijk van de stijfheidsverhouding tussen de betonnen wand en de voorspanners. De indrukking van het beton (ΔL) en de ankers geeft toename van de kracht op het beton P_{beton} en afname van de voorspanning in de ankers (P_{anker}). De verhouding van deze krachten is afhankelijk van de verhouding tussen EA_{beton} en EA_{anker} aangezien de lengtes L_{beton} en L_{anker} gelijk zijn.

- De schuifspanning komende uit torsiemoment en dwarskracht zijn in de berekeningen ook meegenomen. Voor steunmasten wordt het torsiemoment verwaarloosd. Voor hoek- of afspanmasten treedt de maximale schuifspanning door torsie en dwarskracht op bij eenzijdige afspanning en het afvallen van één circuit. Dit is conform NEN-EN-50341-3-15 belastingsituatie NL3 (Tabel 4.2.11/NL.3). Voor steunmasten treedt de maximale schuifspanning op komende uit de maximale dwarskracht (Belastingsituatie NL1, tabel 4.2.11/NL1). Om de genoemde schuifspanning te weerstaan worden de betonnen elementen met rond 12 mm ringwapening uitgevoerd. De ringwapening dient voldoende capaciteit te hebben om de schuifspanning te weerstaan. Per betonnen element wordt per meter hoogte het aantal ringen bepaald. Aangenomen wordt een minimaal hart op hart afstand van 100 mm tussen de ringen.

4.1 Materiaalklassen

In de bijlagen zijn de afmetingen, materiaalklassen en unity checks opgenomen. De belangrijkste gegevens per mast zijn hieronder gesommeerd:

Tabel 12 - Hoofdparameters wapening mast W2S400

	Segment				
	1	2	3	4	5
Betonklasse	C55/67	C55/67	C55/67	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860
Aantal ankers buitenring	12	10	6	4	2
Aantal ankers binnenring	8	4	2	0	0
Diameter dwarswapening (mm)	12	12	12	12	12
Materiaal	Fb550	Fb550	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5	5	5

Tabel 13 - Hoofdparameters wapening mast W2HL400

	Segment					
	1	2	3	4	5	6
Betonklasse	C70/85	C70/85	C55/67	C55/67	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860
Aantal anker buitenring	18	12	10	6	4	2
Aantal anker binnenring	8	8	4	2	0	0
Diameter dwarswapening (mm)	12	12	12	12	12	12
Materiaal	Fb550	Fb550	Fb550	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5	5	5	5

Tabel 14 - Hoofdparameters wapening mast W4S350

	Segment				
	1	2	3	4	5
Betonklasse	C55/67	C55/67	C55/67	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860
Aantal anker buitenring	12	8	6	4	2
Aantal anker binnenring	4	4	2	0	0
Diameter dwarswapening (mm)	12	12	12	12	12
Materiaal	Fb550	Fb550	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5	5	5

Tabel 15 - Hoofdparameters wapening mast W4HL350

	Segment				
	1	2	3	4	5
Betonklasse	C70/85	C70/85	C70/85	C70/85	C55/67
Type voorspananker	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860
Aantal anker buitenring	20	16	10	6	2
Aantal anker binnenring	8	8	5	1	0
Diameter dwarswapening (mm)	12	12	12	12	12
Materiaal	Fb550	Fb550	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5	5	5

Tabel 16 - Hoofdparameters wapening mast W4S400

	Segment				
	1	2	3	4	5
Betonklasse	C55/67	C55/67	C55/67	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860
Aantal anker buitenring	12	10	9	6	4
Aantal anker binnenring	8	6	2	1	1
Diameter dwarswapening (mm)	12	12	12	12	12
Materiaal	Fb550	Fb550	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5	5	5

Tabel 17 - Hoofdparameters wapening mast W4HL400

	Segment				
	1	2	3	4	5
Betonklasse	C70/85	C70/85	C70/85	C70/85	C55/67
Type voorspananker	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860
Aantal anker buitenring	20	16	10	6	2
Aantal anker binnenring	8	8	5	1	0
Diameter dwarswapening (mm)	12	12	12	12	12
Materiaal	Fb550	Fb550	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5	5	5

Tabel 18 - Hoofdparameters wapening mast W4S450

	Segment					6
	1	2	3	4	5	
Betonklasse	C55/67	C55/67	C55/67	C55/67	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860
Aantal anker buitenring	12	10	10	8	4	3
Aantal anker binnenring	8	6	4	2	1	0
Diameter dwarswapening (mm)	12	12	12	12	12	12
Materiaal	Fb550	Fb550	Fb550	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5	5	5	5

Tabel 19 - Hoofdparameters wapening mast W4HK450

	Segment					6
	1	2	3	4	5	
Betonklasse	C70/85	C70/85	C70/85	C70/85	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860
Aantal anker buitenring	20	16	12	10	6	2
Aantal anker binnenring	8	8	6	4	1	0
Diameter dwarswapening (mm)	12	12	12	12	12	12
Materiaal	Fb550	Fb550	Fb550	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5	5	5	5

Tabel 20 - Hoofdparameters wapening mast W6S400

	Segment				
	1	2	3	4	5
Betonklasse	C55/67	C55/67	C55/67	C55/67	C55/67
Type voorspananker	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860
Aantal anker buitenring	12	12	8	6	2
Aantal anker binnenring	4	4	2	0	0
Diameter dwarswapening (mm)	12	12	12	12	12
Materiaal	Fb550	Fb550	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5	5	5

Tabel 21 - Hoofdparameters wapening mast W6HL400

	Segment				
	1	2	3	4	5
Betonklasse	C70/85	C70/85	C70/85	C70/85	C55/67
Type voorspananker	FeP1860	FeP1860	FeP1860	FeP1860	FeP1860
Aantal anker buitenring	25	18	12	8	2
Aantal anker binnenring	8	8	6	2	0
Diameter dwarswapening (mm)	12	12	12	12	12
Materiaal	Fb550	Fb550	Fb550	Fb550	Fb550
Aantal ringbeugels / meter hoogte	5	5	5	5	5

Overzicht van de gegevens van de genoemde masten zijn opgenomen in de bijlagen.

4.2 Elektrische aarding

Het betonnen mastlichaam en fundament dient aan de onderstaande aardingseisen te voldoen:

- De aarding van het mastlichaam en de aarding in het fundament moet één geheel vormen;
- De geleiding van bliksem- en kortsluitstromen, zal door separate geleiders aan de binnenzijde van de mast geschieden. Deze geleiding zal afgeschermd moeten worden van het constructiestaal;
- Blikseminslag en kortsluitstromen moeten voldoende afgevoerd worden naar de grond zonder schade aan de mast of fundament te bewerkstelligen;
- Het aardingssysteem moet aan de eisen van isolatie coördinatie voldoen;
- Aan de rand van de ZRO grens, dient bij kortsluiting of blikseminslag de potentiaal aan de gestelde eisen te voldoen;
- De stap- en aanraakspanning van het mastlichaam en fundament moet aan de gestelde eisen voldoen;
- Alle stalen elementen in het mastlichaam moet elektrisch gekoppeld zijn aan het interne aardingssysteem.

5 CONCLUSIE BETONNEN MASTEN

De controle van de sterkte van de voorgespannen betonnen masten is opgenomen in Bijlage A t/m C. De volgende masten zijn gecontroleerd en leiden tot onderstaande unity checks (UC):

Tabel 22 - Overzicht "unity checks" masten

Type mast	Maximale betonspanning (UC)	Maximale betonafschuiving (UC)
W2S400	0.83	0.08
W2H400	0.96	0.18
W4S350	0.96	0.10
W4H350	0.97	0.33
W4S400	0.98	0.11
W4H400	0.97	0.33
W4S450	0.89	0.11
W4H450	0.93	0.27
W6S400	0.97	0.12
W6HL400	0.97	0.46

Voor de masten gelden de volgende twee aanvullende conclusies.

- 1) Een aantal mastelementen voldoet niet aan het criterium van maximaal 35 ton, het zwaarste element is meer dan driemaal dit gewicht. Een oplossing is de hoogte van de elementen te reduceren. In de praktijk betekent dit dat een aantal elementen gelimiteerd wordt tot 3 a 4 meter hoogte. Een andere oplossing is om de elementen op locatie uit een aantal twee tot vier, segmenten samen te stellen. Deze opties zijn momenteel niet verder uitgewerkt.
- 2) De optredende spanning in het beton zit tegen de toelaatbare grens aan, dit is zichtbaar gemaakt in de Unity Check. In de ontwerpfase kan voor een ruimere marge gekozen worden.



BIJLAGE A BEREKENING W2S400



BIJLAGE B BEREKENING W2HL400



BIJLAGE C BEREKENING W4S350



BIJLAGE D BEREKENING W4HL350



BIJLAGE E BEREKENING W4S400



BIJLAGE F BEREKENING W4HL400



BIJLAGE G BEREKENING W4S450



BIJLAGE H BEREKENING W4HK450



BIJLAGE I BEREKENING W6S400



BIJLAGE J BEREKENING W6HL400

W2HL400

Bijlage B

Segment	1	
Lengte	12 m	
Gewicht	97.3 ton	
Betonklasse	B	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	18	Voldoet
Nkabel; toegepast Binnen	8	
Dwarswapening	12	rond
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen			
Segment	1		
Ingevulde wanddikte	500		
	Voet Top		
Buitendiameter	2800	2420 mm	
Buitenomtrek	8796	7603 mm	
Wanddikte	500	500 mm	
Binnendiameter	1800	1420 mm	
Doorsnede			
Omtrek/dikte	17.59	15.21	Verhouding
Oppervlak	3612832	3016327	mm2
Weerstandsmoment	1787061321	1226772553	mm3
Maximale moment	35651	kNm	
Maximale moment + 2de orde	39217	kNm	
Maximaal dwarskracht	968	kN	
Maximaal torsiemoment	14750	kNm	
Maximaal normaalkracht	3491	kN	
Spanning tgv normaalkracht	1.0	N/mm2	
Spanning tgv moment	22.0	N/mm2	
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-23.0	Mpa	
Toelaatbare spanning	-46.7	Komende uit betonklasse	
Maximale trekspanning	21.3	MPa	
Toelaatbare trekspanning	0.0	MPa	

Voorspanning		
Benodigde voorspanning ULS	21.3	Mpa
Benodigde voorspanning SLS	18	Mpa
Benodigde voorspankracht	76664	kN
Resulterende betonspanningen		
Trekzijde	0	Mpa
Drukzijde	-44	Mpa
Na relaxatie	-40	MPa
Keuze voorspankabels	FeP1860	
Toelaatbare spanning	1200	MPa
Astreng	150	mm2
streng/kabel	19	
Akabel	2850	mm2
Benodigde voorspankracht	76664	kN
Nkabel; benodigd	23	
Nkabel; toegepast Buiten	18	
Nkabel; toegepast Binnen	8	
Ankerverdeling top		
Gegeven E6-19		
Randafstand ankers	230	mm
Minimale hoh-afstand ankers	300	mm
Anker circl buiten	1960	mm
Anker circl binnen	1360	mm
Omtrek ankercircl buiten	6158	mm
Omtrek ankercircl binnen	4273	mm
Aantal plaatsbare ankers buitenring	20	
Aantal plaatsbare ankers binnenring	14	

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	968 kN
Max. dwarskracht / doorsnede	959 kN
Maximale optredende afschuiving in de wand	959 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	2430 mm
fywd	478 Mpa
VRD,S	6176 kN
Toetsing afschuiving door dwarskracht	0.16

Afschuiving in wapening door torsie	
Maximaal torsie	14750 kNm
Maximaal afschuiving torsie / doorsnede	15 kN
Maximaal dwarskracht bij torsie	435 kN
Max. afschuiving wand door dwarskracht	435 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	2430 mm
z (torsie)	6063 mm
fywd	478 Mpa
VRD,max (dwarskracht)	6176 kN
VRD,max (torsie)	15409 kN
Toetsing afschuiving door dwarskracht	0.07
Toetsing afschuiving door torsie	0.00
Totaal	0.07

Toetsing betonspanning	0.85	Voldoet
Toetsing afschuiving in wand	0.16	Voldoet

W2HL400

Bijlage B

Segment **2**
Lengte **12 m**
Gewicht **73.9 ton**

Betonklasse **B** Voldoet
Voorspananker **FeP1860**
Nkabel; `toegepast Buiten **12** Voldoet
Nkabel; `toegepast Binnen **8**
Dwarswapening **12** rond
Materiaal **550** Fb550
Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2420 2041 mm
Buitenomtrek	7603 6410 mm
Wanddikte	450 450 mm
Binnendiameter	1520 1141 mm
Doorsnede	Hol Hol
Omtrek/dikte	16.90 14.25 Verhouding
Oppervlak	2785380 2248525 mm ²
Weerstandsmoment	1175145488 752686260 mm ³
Maximale moment	24088 kNm
Maximale moment + 2de orde	26497 kNm
Maximaal dwarskracht	959 kN
Maximaal torsiemoment	14750 kNm
Maximaal normaalkracht	2345 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	22.6 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-23.4 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	21.9 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	959 kN
Max. dwarskracht / doorsnede	952 kN
Maximale optredende afschuiving in de wand	952 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2090 mm
fywd	478 Mpa
VRD,S	5312 kN
Toetsing afschuiving door dwarskracht	0.18

Toetsing betonspanning	0.86 Voldoet
Toetsing afschuiving in wand	0.18 Voldoet

Voorspanning

Benodigde voorspanning ULS	21.9 Mpa
Benodigde voorspanning SLS	18 Mpa
Benodigde voorspankracht	61053 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-45 Mpa
Na relaxatie	-40 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	61053 kN
Nkabel; benodigd	18
Nkabel; `toegepast Buiten	12
Nkabel; `toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	1581 mm
Anker circl binnen	981 mm
Omtrek ankercircl buiten	4965 mm
Omtrek ankercircl binnen	3080 mm
Aantal plaatsbare ankers buitenring	16
Aantal plaatsbare ankers binnenring	10

Afschuiving in wapening door torsie

Maximaal torsie	14750 kNm
Maximaal afschuiving torsie / doorsnede	18 kN
Maximaal dwarskracht bij torsie	432 kN
Max. afschuiving wand door dwarskracht	432 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2090 mm
z (torsie)	5027 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5312 kN
VRD,max (torsie)	12774 kN
Toetsing afschuiving door dwarskracht	0.08
Toetsing afschuiving door torsie	0.00
Totaal	0.08

W2HL400

Bijlage B

Segment 3
Lengte 12 m
Gewicht 53.4 ton

Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	10	Voldoet
Nkabel; toegepast Binnen	4	
Dwarswapening	12 rond	
Materiaal	550 Fb550	
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	2041 1661 mm
Buitenomtrek	6410 5217 mm
Wanddikte	400 400 mm
Binnendiameter	1241 861 mm
Doorsnede	Hol Hol
Omtrek/dikte	16.03 13.04 Verhouding
Oppervlak	2061521 1584317 mm2
Weerstandsmoment	720156381 417246712 mm3
Maximale moment	13108 kNm
Maximale moment + 2de orde	14419 kNm
Maximaal dwarskracht	697 kN
Maximaal torsiemoment	14750 kNm
Maximaal normaalkracht	1446 kN
Spanning tgv normaalkracht	0.7 N/mm2
Spanning tgv moment	20.0 N/mm2
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-20.7 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	19.5 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	697 kN
Max. dwarskracht / doorsnede	691 kN
Maximale optredende afschuiving in de wand	691 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	1770 mm
fywd	478 Mpa
VRD,S	4498 kN
Toetsing afschuiving door dwarskracht	0.15

Toetsing betonspanning	0.98 Voldoet
Toetsing afschuiving in wand	0.15 Voldoet

Voorspanning

Benodigde voorspanning ULS	19.5 Mpa
Benodigde voorspanning SLS	16 Mpa
Benodigde voorspankracht	40204 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-40 Mpa
Na relaxatie	-36 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	40204 kN
Nkabel; benodigd	12
Nkabel; toegepast Buiten	10
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1201 mm
Anker cirkel binnen	601 mm
Omtrek ankercirkel buiten	3772 mm
Omtrek ankercirkel binnen	1887 mm
Aantal plaatsbare ankers buitenring	12
Aantal plaatsbare ankers binnenring	6

Afschuiving in wapening door torsie

Maximaal torsie	14750 kNm
Maximaal afschuiving torsie / doorsnede	23 kN
Maximaal dwarskracht bij torsie	313 kN
Max. afschuiving wand door dwarskracht	313 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	1770 mm
z (torsie)	3990 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4498 kN
VRD,max (torsie)	10140 kN
Toetsing afschuiving door dwarskracht	0.07
Toetsing afschuiving door torsie	0.00
Totaal	0.07

W2HL400

Bijlage B

Segment	4	
Lengte	12 m	
Gewicht	32.3 ton	
Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	6	Voldoet
Nkabel; toegepast Binnen	2	
Dwarswapening	12 rond	
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen	0	
Segment	4	
Ingevulde wanddikte	300	
	Voet	Top
Buitendiameter	1661	1281 mm
Buitenomtrek	5217	4024 mm
Wanddikte	300	300 mm
Binnendiameter	1061	681 mm
Doorsnede	Hol	Hol
Omtrek/dikte	17.39	13.41 Verhouding
Oppervlak	1282486	924583 mm ²
Weerstandsmoment	374852473	189892285 mm ³
Maximale moment	5714 kNm	
Maximale moment + 2de orde	6286 kNm	
Maximaal dwarskracht	446 kN	
Maximaal torsiemoment	14750 kNm	
Maximaal normaalkracht	759 kN	
Spanning tgv normaalkracht	0.6 N/mm ²	
Spanning tgv moment	16.8 N/mm ²	
2de orde effect verrekening	10%	
Factor e.g	1.2	
Maximale drukspanning	-17.4 Mpa	
Toelaatbare spanning	-36.7	Komende uit betonklasse
Maximale trekspanning	16.3 MPa	
Toelaatbare trekspanning	0.0 MPa	

Voorspanning	
Benodigde voorspanning ULS	16.3 Mpa
Benodigde voorspanning SLS	14 Mpa
Benodigde voorspankracht	20949 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-34 Mpa
Na relaxatie	-30 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	20949 kN
Nkabel; benodigd	7
Nkabel; toegepast Buiten	6
Nkabel; toegepast Binnen	2
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	821 mm
Anker cirkel binnen	221 mm
Omtrek ankercirkel buiten	2579 mm
Omtrek ankercirkel binnen	694 mm
Aantal plaatsbare ankers buitenring	8
Aantal plaatsbare ankers binnenring	2

Afschuiving in wapening door dwarskracht	(NEN-EN 1992-1-1 Hfst. 6.2.3)
Max. dwarskracht in segment	446 kN
Max. dwarskracht / doorsnede	442 kN
Maximale optredende afschuiving in de wand	442 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1430 mm
fywd	478 Mpa
VRD,S	3634 kN
Toetsing afschuiving door dwarskracht	0.12

Toetsing betonspanning	0.83 Voldoet
Toetsing afschuiving in wand	0.12 Voldoet

Afschuiving in wapening door torsie	
Maximaal torsie	14750 kNm
Maximaal afschuiving torsie / doorsned	30 kN
Maximaal dwarskracht bij torsie	201 kN
Max. afschuiving wand door dwarskracht	201 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1430 mm
z (torsie)	3110 mm
fywd	478 Mpa
VRD,max (dwarskracht)	3634 kN
VRD,max (torsie)	7904 kN
Toetsing afschuiving door dwarskracht	0.06
Toetsing afschuiving door torsie	0.00
Totaal	0.06

W2HL400

Bijlage B

Segment 5
Lengte 12 m
Gewicht 18.1 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 4 Voldoet
Nkabel; toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	5
Ingevulde wanddikte	200
	Voet Top
Buitendiameter	1281 901 mm
Buitenomtrek	4024 2831 mm
Wanddikte	200 200 mm
Binnendiameter	881 501 mm
Doorsnede	Hol Hol
Omtrek/dikte	20.12 14.16 Verhouding
Oppervlak	679220 440618 mm ²
Weerstandsmoment	160204845 64994491 mm ³
Maximale moment	1650 kNm
Maximale moment + 2de orde	1815 kNm
Maximaal dwarskracht	192 kN
Maximaal torsiemoment	14750 kNm
Maximaal normaalkracht	321 kN
Spanning tgv normaalkracht	0.5 N/mm ²
Spanning tgv moment	11.4 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-11.8 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	10.9 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	10.9 Mpa
Benodigde voorspanning SLS	9 Mpa
Benodigde voorspankracht	7462 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-23 Mpa
Na relaxatie	-20 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	7462 kN
Nkabel; benodigd	3
Nkabel; toegepast Buiten	4
Nkabel; toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	441 mm
Anker circl binnen	-159 mm
Omtrek ankercircl buiten	1386 mm
Omtrek ankercircl binnen	-499 mm
Aantal plaatsbare ankers buitenring	4
Aantal plaatsbare ankers binnenring	-1

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	192 kN
Max. dwarskracht / doorsnede	190 kN
Maximale optredende afschuiving in de wand	190 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1110 mm
fywd	478 Mpa
VRD,S	2821 kN
Toetsing afschuiving door dwarskracht	0.07 0

Toetsing betonspanning	0.56 Voldoet
Toetsing afschuiving in wand	0.07 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	14750 kNm
Maximaal afschuiving torsie / doorsnede	42 kN
Maximaal dwarskracht bij torsie	87 kN
Max. afschuiving wand door dwarskracht	87 kN
Hoek loodrecht dwarskracht/drukdiagc	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1110 mm
z (torsie)	2231 mm
fywd	478 Mpa
VRD,max (dwarskracht)	2821 kN
VRD,max (torsie)	5669 kN
Toetsing afschuiving door dwarskracht	0.03
Toetsing afschuiving door torsie	0.01
Totaal	0.04

W2HL400

Bijlage B

Segment	6	
Lengte	3.2 m	
Gewicht	4.4 ton	
Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; `toegepast Buiten	2	Voldoet
Nkabel; `toegepast Binnen	0	
Dwarswapening	12 rond	
Materiaal	550 Fb550	
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	6		
Ingevulde wanddikte	150		
	Voet	Top	
Buitendiameter	901	800	
Buitenomtrek	2831	2513	
Wanddikte	150	150	
Binnendiameter	601	500	
Doorsnede	Hol	Hol	
Omtrek/dikte	18.88	16.76	Verhouding
Oppervlak	354026	306305	mm2
Weerstandsmoment	57634991	42595579	mm3
Maximale moment	209		kNm
Maximale moment + 2de orde	230		kNm
Maximaal dwarskracht	67		kN
Maximaal torsiemoment	14750		kNm
Maximaal normaalkracht	70		kN
Spanning tgv normaalkracht	0.1		N/mm2
Spanning tgv moment	16.8		N/mm2
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-16.9		Mpa
Toelaatbare spanning	-36.7		Komende uit betonklasse
Maximale trekspanning	16.7		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning

Benodigde voorspanning ULS	16.7	Mpa
Benodigde voorspanning SLS	14	Mpa
Benodigde voorspankracht	1995	kN
<i>Resulterende betonspanningen</i>		
Trekzijde	0	Mpa
Drukzijde	-34	Mpa
Na relaxatie	-31	Mpa
Keuze voorspankabels	FeP1860	
Toelaatbare spanning	1200	MPa
Astreng	150	mm2
streng/kabel	19	
Akabel	2850	mm2
Benodigde voorspankracht	1995	kN
Nkabel; benodigd	1	
Nkabel; `toegepast Buiten	2	
Nkabel; `toegepast Binnen	0	
<i>Ankerverdeling top</i>		
Gegeven E6-19		
Randafstand ankers	230	mm
Minimale hoh-afstand ankers	300	mm
Anker cirkel buiten	340	mm
Anker cirkel binnen	-260	mm
Omtrek ankercirkel buiten	1068	mm
Omtrek ankercirkel binnen	-817	mm
Aantal plaatsbare ankers buitenring	3	
Aantal plaatsbare ankers binnenring	-2	

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	67	kN
Max. dwarskracht / doorsnede	66	kN
Maximale optredende afschuiving in de wand	66	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8sθ≤45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm2
s	200	mm
z (horende max. dwarskracht)	800	mm
fywd	478	Mpa
VRD,S	2033	kN
Toetsing afschuiving door dwarskracht	0.03	

Afschuiving in wapening door torsie

Maximaal torsie	14750	kNm
Maximaal afschuiving torsie / doorsnede	45	kN
Maximaal dwarskracht bij torsie	30	kN
Max. afschuiving wand door dwarskracht	30	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8sθ≤45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm2
s	200	mm
z (dwarskracht)	800	mm
z (torsie)	2042	mm
fywd	478	Mpa
VRD,max (dwarskracht)	2033	kN
VRD,max (torsie)	5190	kN
Toetsing afschuiving door dwarskracht	0.01	
Toetsing afschuiving door torsie	0.01	
Totaal	0.02	

Toetsing betonspanning	0.84	Voldoet
Toetsing afschuiving in wand	0.03	Voldoet

W2S400

Bijlage A

Segment	1
Lengte	12 m
Gewicht	61.0 ton
Betonklasse	A Voldoet
Voorspananker	FeP1860
Nkabel; `toegepast Buiten	12 Voldoet
Nkabel; `toegepast Binnen	8
Dwarswapening	12 rond
Materiaal	550 Fb550
Aantal ringbeugels/meter hoogte	5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	1	
Ingevulde wanddikte	400	
	Voet Top	
Buitendiameter	2200	1893 mm
Buitenomtrek	6912	5948 mm
Wanddikte	400	400 mm
Binnendiameter	1400	1093 mm
Doorsnede	Hol Hol	14.87 Verhouding
Omtrek/dikte	17.28	14.87
Oppervlak	2261947	1876700 mm2
Weerstandsmoment	873933956	592303534 mm3
Maximale moment	13055	kNm
Maximale moment + 2de orde	14361	kNm
Maximaal dwarskracht	366	kN
Maximaal torsiemoment	0	kNm
Maximaal normaalkracht	2078	kN
Spanning tgv normaalkracht	0.9	N/mm2
Spanning tgv moment	16.5	N/mm2
2de orde effect verrekening	10%	
Factor e.g	1.2	
Maximale drukspanning	-17.4	Mpa
Toelaatbare spanning	-36.7	Komende uit betonklasse
Maximale trekspanning	15.8	MPa
Toelaatbare trekspanning	0.0	MPa

Voorspanning

Benodigde voorspanning ULS	15.8	Mpa
Benodigde voorspanning SLS	11	Mpa
Benodigde voorspankracht	35610	kN
Resulterende betonspanningen		
Trekzijde	0	Mpa
Drukzijde	-33	Mpa
Na relaxatie	-29	MPa
Keuze voorspankabels	FeP1860	
Toelaatbare spanning	1200	MPa
Astreng	150	mm2
streng/kabel	19	
Akabel	2850	mm2
Benodigde voorspankracht	35610	kN
Nkabel; benodigd	11	
Nkabel; `toegepast Buiten	12	
Nkabel; `toegepast Binnen	8	
Ankerverdeling top		
Gegeven E6-19		
Randafstand ankers	230	mm
Minimale hoh-afstand ankers	300	mm
Anker circl buiten	1433	mm
Anker circl binnen	833	mm
Omtrek ankercircl buiten	4503	mm
Omtrek ankercircl binnen	2618	mm
Aantal plaatsbare ankers buitenring	15	
Aantal plaatsbare ankers binnenring	8	

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	366	kN
Max. dwarskracht / doorsnede	345	kN
Maximale optredende afschuiving in de wand	345	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm2
s	200	mm
z (horende max. dwarskracht)	1899	mm
fywd	478	Mpa
VRD,S	4826	kN
Toetsing afschuiving door dwarskracht	0.07	

Toetsing betonspanning	0.80	Voldoet
Toetsing afschuiving in wand	0.07	Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	0	kNm
Maximaal afschuiving torsie / doorsnede	0	kN
Maximaal dwarskracht bij torsie	0	kN
Max. afschuiving wand door dwarskracht	0	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm2
s	200	mm
z (dwarskracht)	1899	mm
z (torsie)	1257	mm
fywd	478	Mpa
VRD,max (dwarskracht)	4826	kN
VRD,max (torsie)	3194	kN
Toetsing afschuiving door dwarskracht	0.00	
Toetsing afschuiving door torsie	0.00	
Totaal	0.00	

W2S400

Bijlage A

Segment 2
Lengte 12 m
Gewicht 45.0 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 10 Voldoet
Nkabel; toegepast Binnen 4
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	350
	Voet Top
Buitendiameter	1893 1587 mm
Buitentrek	5948 4985 mm
Wanddikte	350 350 mm
Binnendiameter	1193 887 mm
Doorsnede	Hol Hol
Omtrek/dikte	17.00 14.24 Verhouding
Oppervlak	1697091 1360000 mm2
Weerstandsmoment	561238659 354026419 mm3
Maximale moment	8783 kNm
Maximale moment + 2de orde	9661 kNm
Maximaal dwarskracht	344 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	1360 kN
Spanning tgv normaalkracht	0.8 N/mm2
Spanning tgv moment	17.2 N/mm2
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-18.0 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	16.6 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	344 kN
Max. dwarskracht / doorsnede	322 kN
Maximale optredende afschuiving in de wand	322 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	1591 mm
fywd	478 Mpa
VRD,S	4043 kN
Toetsing afschuiving door dwarskracht	0.08

Toetsing betonspanning	0.83 Voldoet
Toetsing afschuiving in wand	0.08 Voldoet

Voorspanning

Benodigde voorspanning ULS	16.6 Mpa
Benodigde voorspanning SLS	11 Mpa
Benodigde voorspankracht	28224 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-35 Mpa
Na relaxatie	-30 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	28224 kN
Nkabel; benodigd	9
Nkabel; toegepast Buiten	10
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1127 mm
Anker cirkel binnen	527 mm
Omtrek ankercirkel buiten	3540 mm
Omtrek ankercirkel binnen	1655 mm
Aantal plaatsbare ankers buitenring	11
Aantal plaatsbare ankers binnenring	5

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	1591 mm
z (torsie)	1414 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4043 kN
VRD,max (torsie)	3593 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W2S400

Bijlage A

Segment 3
Lengte 12 m
Gewicht 31.4 ton

Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	6	Voldoet
Nkabel; toegepast Binnen	2	
Dwarswapening	12 rond	
Materiaal	550 Fb550	
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	300
	Voet Top
Buitendiameter	1587 1280 mm
Buitenomtrek	4985 4022 mm
Wanddikte	300 300 mm
Binnendiameter	987 680 mm
Doorsnede	Hol Hol
Omtrek/dikte	16.62 13.41 Verhouding
Oppervlak	1212838 923903 mm ²
Weerstandsmoment	333619282 189604591 mm ³
Maximale moment	4793 kNm
Maximale moment + 2de orde	5273 kNm
Maximaal dwarskracht	300 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	821 kN
Spanning tgv normaalkracht	0.7 N/mm ²
Spanning tgv moment	15.9 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-16.6 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	15.4 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	300 kN
Max. dwarskracht / doorsnede	292 kN
Maximale optredende afschuiving in de wand	292 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1465 mm
fywd	478 Mpa
VRD,S	3723 kN
Toetsing afschuiving door dwarskracht	0.08

Toetsing betonspanning	0.78 Voldoet
Toetsing afschuiving in wand	0.08 Voldoet

Voorspanning

Benodigde voorspanning ULS	15.4 Mpa
Benodigde voorspanning SLS	11 Mpa
Benodigde voorspankracht	18598 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-32 Mpa
Na relaxatie	-29 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	18598 kN
Nkabel; benodigd	6
Nkabel; toegepast Buiten	6
Nkabel; toegepast Binnen	2
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	820 mm
Anker cirkel binnen	220 mm
Omtrek ankercirkel buiten	2577 mm
Omtrek ankercirkel binnen	692 mm
Aantal plaatsbare ankers buitenring	8
Aantal plaatsbare ankers binnenring	2

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1465 mm
z (torsie)	1571 mm
fywd	478 Mpa
VRD,max (dwarskracht)	3723 kN
VRD,max (torsie)	3992 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W2S400

Bijlage A

Segment	4	
Lengte	12 m	
Gewicht	20.2 ton	
Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	4	Voldoet
Nkabel; toegepast Binnen	0	
Dwarswapening	12 rond	
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen		0	
Segment	4		
Ingevulde wanddikte	250		
	Voet	Top	
Buitendiameter	1280	974	mm
Buitenomtrek	4022	3059	mm
Wanddikte	250	250	mm
Binnendiameter	780	474	mm
Doorsnede	Hol	Hol	
Omtrek/dikte	16.09	12.24	Verhouding
Oppervlak	809189	568410	mm ²
Weerstandsmoment	177602098	85559402	mm ³
Maximale moment	1857		kNm
Maximale moment + 2de orde	2042		kNm
Maximaal dwarskracht	208		kN
Maximaal torsiemoment	0		kNm
Maximaal normaalkracht	418		kN
Spanning tgv normaalkracht	0.5		N/mm ²
Spanning tgv moment	11.6		N/mm ²
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-12.1		Mpa
Toelaatbare spanning	-36.7		Komende uit betonklasse
Maximale trekspanning	11.2		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning	
Benodigde voorspanning ULS	11.2 Mpa
Benodigde voorspanning SLS	8 Mpa
Benodigde voorspankracht	9035 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-23 Mpa
Na relaxatie	-21 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	9035 kN
Nkabel; benodigd	3
Nkabel; toegepast Buiten	4
Nkabel; toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	514 mm
Anker circl binnen	-86 mm
Omtrek ankercircl buiten	1614 mm
Omtrek ankercircl binnen	-271 mm
Aantal plaatsbare ankers buitenring	5
Aantal plaatsbare ankers binnenring	0

Afschuiving in wapening door dwarskracht		(NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	208		kN
Max. dwarskracht / doorsnede	203		kN
Maximale optredende afschuiving in de wand	203		kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ θ ≤ 45	
cot θ	2	hoek	
alfa	80		
cot alfa	0.18		
Asw	113		mm ²
s	200		mm
z (horende max. dwarskracht)	1199		mm
fywd	478		Mpa
VRD,S	3047		kN
Toetsing afschuiving door dwarskracht	0.07		

Toetsing betonspanning	0.58	Voldoet
Toetsing afschuiving in wand	0.07	Voldoet

Afschuiving in wapening door torsie			
Maximaal torsie	0 kNm		
Maximaal afschuiving torsie / doorsned	0 kN		
Maximaal dwarskracht bij torsie	0 kN		
Max. afschuiving wand door dwarskracht	0 kN		
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ θ ≤ 45	
cot θ	2	hoek	
alfa	80		
cot alfa	0.18		
Asw	113		mm ²
s	200		mm
z (dwarskracht)	1199		mm
z (torsie)	1728		mm
fywd	478		Mpa
VRD max (dwarskracht)	3047		kN
VRD max (torsie)	4391		kN
Toetsing afschuiving door dwarskracht	0.00		
Toetsing afschuiving door torsie	0.00		
Totaal	0.00		

W2S400

Bijlage A

Segment 5
Lengte 6.8 m
Gewicht 9.1 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 2 Voldoet
Nkabel; toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	5
Ingevulde wanddikte	200
	Voet Top
Buitendiameter	974 800 mm
Buitenomtrek	3059 2513 mm
Wanddikte	200 200 mm
Binnendiameter	574 400 mm
Doorsnede	Hol Hol
Omtrek/dikte	15.30 12.57 Verhouding
Oppervlak	486144 376991 mm ²
Weerstandsmoment	79713263 47123890 mm ³
Maximale moment	212 kNm
Maximale moment + 2de orde	233 kNm
Maximaal dwarskracht	110 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	146 kN
Spanning tgv normaalkracht	0.3 N/mm ²
Spanning tgv moment	3.0 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-3.3 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	2.7 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	2.7 Mpa
Benodigde voorspanning SLS	2 Mpa
Benodigde voorspankracht	1325 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukszijde	-6 Mpa
Na relaxatie	-6 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	1325 kN
Nkabel; benodigd	1
Nkabel; toegepast Buiten	2
Nkabel; toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	340 mm
Anker circl binnen	-260 mm
Omtrek ankercircl buiten	1068 mm
Omtrek ankercircl binnen	-817 mm
Aantal plaatsbare ankers buitenring	3
Aantal plaatsbare ankers binnenring	-2

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	110 kN
Max. dwarskracht / doorsnede	108 kN
Maximale optredende afschuiving in de wand	108 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	933 mm
fywd	478 Mpa
VRD,S	2371 kN
Toetsing afschuiving door dwarskracht	0.05 0

Toetsing betonspanning	0.15 Voldoet
Toetsing afschuiving in wand	0.05 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiag	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	933 mm
z (torsie)	1885 mm
fywd	478 Mpa
VRD,max (dwarskracht)	2371 kN
VRD,max (torsie)	4790 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4HK450

Bijlage H

Segment	1	
Lengte	12 m	
Gewicht	120.1 ton	
Betonklasse	B	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	20	Voldoet
Nkabel; toegepast Binnen	8	
Dwarswapening	12	rond
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen			
Segment	1		
Ingevulde wanddikte	500		
	Voet Top		
Buitendiameter	3300	2878 mm	
Buitenomtrek	10367	9042 mm	
Wanddikte	500	500 mm	
Binnendiameter	2300	1878 mm	
Doorsnede			
Omtrek/dikte	20.73	18.08	Verhouding
Oppervlak	4398230	3735446	mm ²
Weerstandsmoment	2695581697	1916085365	mm ³
Maximale moment	52192		kNm
Maximale moment + 2de orde	57412		kNm
Maximaal dwarskracht	1146		kN
Maximaal torsiemoment	1736695		kNm
Maximaal normaalkracht	4485		kN
Spanning tgv normaalkracht	1.0		N/mm ²
Spanning tgv moment	22.2		N/mm ²
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-23.2		Mpa
Toelaatbare spanning	-46.7		Komende uit betonklasse
Maximale trekspanning	21.4		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning	
Benodigde voorspanning ULS	21.4 Mpa
Benodigde voorspanning SLS	16 Mpa
Benodigde voorspankracht	90312 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-45 Mpa
Na relaxatie	-41 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	90312 kN
Nkabel; benodigd	27
Nkabel; toegepast Buiten	20
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	2418 mm
Anker cirkel binnen	1818 mm
Omtrek ankercirkel buiten	7597 mm
Omtrek ankercirkel binnen	5712 mm
Aantal plaatsbare ankers buitenring	25
Aantal plaatsbare ankers binnenring	19

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	1146 kN
Max. dwarskracht / doorsnede	1113 kN
Maximale optredende afschuiving in de wand	1113 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2887 mm
fywd	478 Mpa
VRD,S	7338 kN
Toetsing afschuiving door dwarskracht	0.15

Afschuiving in wapening door torsie	
Maximaal torsie	1736695 kNm
Maximaal afschuiving torsie / doorsnede	1455 kN
Maximaal dwarskracht bij torsie	516 kN
Max. afschuiving wand door dwarskracht	516 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2887 mm
z (torsie)	7501 mm
fywd	478 Mpa
VRD,max (dwarskracht)	7338 kN
VRD,max (torsie)	19062 kN
Toetsing afschuiving door dwarskracht	0.07
Toetsing afschuiving door torsie	0.08
Totaal	0.15

Toetsing betonspanning	0.87	Voldoet
Toetsing afschuiving in wand	0.15	Voldoet

W4HK450

Bijlage H

Segment 2
Lengte 12 m
Gewicht 92.4 ton

Betonklasse B Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 16 Voldoet
Nkabel; toegepast Binnen 8
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2878 2456 mm
Buitenontrek	9042 7716 mm
Wanddikte	450 450 mm
Binnendiameter	1978 1556 mm
Doorsnede	Hol Hol
Omtrek/dikte	20.09 17.15 Verhouding
Oppervlak	3432588 2836083 mm ²
Weerstandsmoment	1818223575 1220233443 mm ³
Maximale moment	38569 kNm
Maximale moment + 2de orde	42426 kNm
Maximaal dwarskracht	1111 kN
Maximaal torsiemoment	1736695 kNm
Maximaal normaalkracht	3071 kN
Spanning tgv normaalkracht	0.9 N/mm ²
Spanning tgv moment	23.5 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-24.4 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	22.8 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	22.8 Mpa
Benodigde voorspanning SLS	17 Mpa
Benodigde voorspankracht	77901 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-47 Mpa
Na relaxatie	-42 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	77901 kN
Nkabel; benodigd	23
Nkabel; toegepast Buiten	16
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1996 mm
Anker cirkel binnen	1396 mm
Omtrek ankercirkel buiten	6271 mm
Omtrek ankercirkel binnen	4386 mm
Aantal plaatsbare ankers buitenring	20
Aantal plaatsbare ankers binnenring	14

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1111 kN
Max. dwarskracht / doorsnede	1079 kN
Maximale optredende afschuiving in de wand	1079 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2462 mm
fywd	478 Mpa
VRD,S	6258 kN
Toetsing afschuiving door dwarskracht	0.17

Afschuiving in wapening door torsie

Maximaal torsie	1736695 kNm
Maximaal afschuiving torsie / doorsnede	1726 kN
Maximaal dwarskracht bij torsie	500 kN
Max. afschuiving wand door dwarskracht	500 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2462 mm
z (torsie)	6322 mm
fywd	478 Mpa
VRD,max (dwarskracht)	6258 kN
VRD,max (torsie)	16068 kN
Toetsing afschuiving door dwarskracht	0.08
Toetsing afschuiving door torsie	0.11
Totaal	0.19

Toetsing betonspanning	0.90 Voldoet
Toetsing afschuiving in wand	0.19 Voldoet

W4HK450

Bijlage H

Segment **3**
Lengte **12 m**
Gewicht **68.0 ton**

Betonklasse **B** Voldoet
Voorspananker **FeP1860**
Nkabel; toegepast Buiten **12** Voldoet
Nkabel; toegepast Binnen **6**
Dwarswapening **12** rond
Materiaal **550** Fb550
Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	2456 2034 mm
Buitenomtrek	7716 6391 mm
Wanddikte	400 400 mm
Binnendiameter	1656 1234 mm
Doorsnede	Hol Hol
Omtrek/dikte	19.29 15.98 Verhouding
Oppervlak	2583794 2053568 mm ²
Weerstandsmoment	1153925770 714379188 mm ³
Maximale moment	25356 kNm
Maximale moment + 2de orde	27892 kNm
Maximaal dwarskracht	1077 kN
Maximaal torsiemoment	1736695 kNm
Maximaal normaalkracht	1983 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	24.3 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-25.1 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	23.7 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1077 kN
Max. dwarskracht / doorsnede	977 kN
Maximale optredende afschuiving in de wand	977 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2038 mm
fywd	478 Mpa
VRD,S	5178 kN
Toetsing afschuiving door dwarskracht	0.19

Toetsing betonspanning	0.93 Voldoet
Toetsing afschuiving in wand	0.26 Voldoet

Voorspanning

Benodigde voorspanning ULS	23.7 Mpa
Benodigde voorspanning SLS	17 Mpa
Benodigde voorspankracht	61168 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-49 Mpa
Na relaxatie	-44 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	61168 kN
Nkabel; benodigd	18
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	6
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1574 mm
Anker cirkel binnen	974 mm
Omtrek ankercirkel buiten	4945 mm
Omtrek ankercirkel binnen	3060 mm
Aantal plaatsbare ankers buitenring	16
Aantal plaatsbare ankers binnenring	10

Afschuiving in wapening door torsie

Maximaal torsie	1736695 kNm
Maximaal afschuiving torsie / doorsnede	2121 kN
Maximaal dwarskracht bij torsie	484 kN
Max. afschuiving wand door dwarskracht	484 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2038 mm
z (torsie)	5144 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5178 kN
VRD,max (torsie)	13074 kN
Toetsing afschuiving door dwarskracht	0.09
Toetsing afschuiving door torsie	0.16
Totaal	0.26

W4HK450

Bijlage H

Segment	4
Lengte	12 m
Gewicht	42.1 ton
Betonklasse	B Voldoet
Voorspananker	FeP1860
Nkabel; toegepast Buiten	10 Voldoet
Nkabel; toegepast Binnen	4
Dwarswapening	12 rond
Materiaal	550 Fb550
Aantal ringbeugels/meter hoogte	5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen	0	
Segment	4	
Ingevulde wanddikte	300	
	Voet Top	
Buitendiameter	2034	1612 mm
Buitenomtrek	6391	5065 mm
Wanddikte	300	300 mm
Binnendiameter	1434	1012 mm
Doorsnede	Hol Hol	
Omtrek/dikte	21.30	16.88 Verhouding
Oppervlak	1634424	1236754 mm2
Weerstandsmoment	622169905	347491407 mm3
Maximale moment	13280	kNm
Maximale moment + 2de orde	14608	kNm
Maximaal dwarskracht	975	kN
Maximaal torsiemoment	1736695	kNm
Maximaal normaalkracht	1178	kN
Spanning tgv normaalkracht	0.7	N/mm2
Spanning tgv moment	23.7	N/mm2
2de orde effect verrekening	10%	
Factor e.g	1.2	
Maximale drukspanning	-24.5	Mpa
Toelaatbare spanning	-46.7	Komende uit betonklasse
Maximale trekspanning	23.2	MPa
Toelaatbare trekspanning	0.0	MPa

Voorspanning	
Benodigde voorspanning ULS	23.2 Mpa
Benodigde voorspanning SLS	17 Mpa
Benodigde voorspankracht	37714 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-48 Mpa
Na relaxatie	-41 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	37714 kN
Nkabel; benodigd	12
Nkabel; toegepast Buiten	10
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1152 mm
Anker cirkel binnen	552 mm
Omtrek ankercirkel buiten	3620 mm
Omtrek ankercirkel binnen	1735 mm
Aantal plaatsbare ankers buitenring	12
Aantal plaatsbare ankers binnenring	5

Afschuiving in wapening door dwarskracht	(NEN-EN 1992-1-1 Hfst. 6.2.3)
Max. dwarskracht in segment	975 kN
Max. dwarskracht / doorsnede	973 kN
Maximale optredende afschuiving in de wand	973 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	1988 mm
fywd	478 Mpa
VRD,S	5051 kN
Toetsing afschuiving door dwarskracht	0.19

Toetsing betonspanning	0.89 Voldoet
Toetsing afschuiving in wand	0.26 Voldoet

Afschuiving in wapening door torsie	
Maximaal torsie	1736695 kNm
Maximaal afschuiving torsie / doorsned	1857 kN
Maximaal dwarskracht bij torsie	439 kN
Max. afschuiving wand door dwarskracht	439 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	1988 mm
z (torsie)	4123 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5051 kN
VRD,max (torsie)	10479 kN
Toetsing afschuiving door dwarskracht	0.09
Toetsing afschuiving door torsie	0.18
Totaal	0.26

W4HK450

Bijlage H

Segment 5
Lengte 12 m
Gewicht 26.4 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 6 Voldoet
Nkabel; toegepast Binnen 1
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	5
Ingevulde wanddikte	250
	Voet Top
Buitendiameter	1612 1190 mm
Buitenomtrek	5065 3739 mm
Wanddikte	250 250 mm
Binnendiameter	1112 690 mm
Doorsnede	Hol Hol
Omtrek/dikte	20.26 14.96 Verhouding
Oppervlakt	1069898 738506 mm ²
Weerstandsmoment	318232657 146835593 mm ³
Maximale moment	4740 kNm
Maximale moment + 2de orde	5214 kNm
Maximaal dwarskracht	677 kN
Maximaal torsiemoment	1218516 kNm
Maximaal normaalkracht	625 kN
Spanning tgv normaalkracht	0.6 N/mm ²
Spanning tgv moment	16.7 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-17.3 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	16.1 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	16.1 Mpa
Benodigde voorspanning SLS	12 Mpa
Benodigde voorspankracht	17236 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-33 Mpa
Na relaxatie	-30 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	17236 kN
Nkabel; benodigd	6
Nkabel; toegepast Buiten	6
Nkabel; toegepast Binnen	1
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	730 mm
Anker circl binnen	130 mm
Omtrek ankercircl buiten	2294 mm
Omtrek ankercircl binnen	409 mm
Aantal plaatsbare ankers buitenring	7
Aantal plaatsbare ankers binnenring	1

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	677 kN
Max. dwarskracht / doorsnede	677 kN
Maximale optredende afschuiving in de wand	677 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8 ≤ θ ≤ 45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1588 mm
fywd	478 Mpa
VRD,S	4034 kN
Toetsing afschuiving door dwarskracht	0.17 0

Toetsing betonspanning	0.81 Voldoet
Toetsing afschuiving in wand	0.27 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	1218516 kNm
Maximaal afschuiving torsie / doorsnede	1469 kN
Maximaal dwarskracht bij torsie	304 kN
Max. afschuiving wand door dwarskracht	304 kN
Hoek loodrecht dwarskracht/drukdiag	30 21,8 ≤ θ ≤ 45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1588 mm
z (torsie)	2945 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4034 kN
VRD,max (torsie)	7485 kN
Toetsing afschuiving door dwarskracht	0.08
Toetsing afschuiving door torsie	0.20
Totaal	0.27

W4HK450

Bijlage H

Segment **6**
Lengte **11.1 m**
Gewicht **16.5 ton**

Betonklasse **A** Voldoet
Voorspananker **FeP1860**
Nkabel; `toegepast Buiten **2** Voldoet
Nkabel; `toegepast Binnen **0**
Dwarswapening **12** rond
Materiaal **550** Fb550
Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	6
Ingevulde wanddikte	200
	Voet Top
Buitendiameter	1190 800 mm
Buitenomtrek	3739 2513 mm
Wanddikte	200 200 mm
Binnendiameter	790 400 mm
Doorsnede	Hol Hol
Omtrek/dikte	18.70 12.57 Verhouding
Oppervlak	622221 376991 mm ²
Weerstandsmoment	133389477 47123890 mm ³
Maximale moment	506 kNm
Maximale moment + 2de orde	557 kNm
Maximaal dwarskracht	53 kN
Maximaal torsiemoment	148136 kNm
Maximaal normaalkracht	199 kN
Spanning tgv normaalkracht	0.3 N/mm ²
Spanning tgv moment	3.9 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-4.2 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	3.7 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	53 kN
Max. dwarskracht / doorsnede	37 kN
Maximale optredende afschuiving in de wand	37 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	813 mm
fywd	478 Mpa
VRD,S	2065 kN
Toetsing afschuiving door dwarskracht	0.02

Toetsing betonspanning	0.20 Voldoet
Toetsing afschuiving in wand	0.11 Voldoet

Voorspanning

Benodigde voorspanning ULS	3.7 Mpa
Benodigde voorspanning SLS	3 Mpa
Benodigde voorspankracht	2249 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-8 Mpa
Na relaxatie	-7 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	2249 kN
Nkabel; benodigd	1
Nkabel; `toegepast Buiten	2
Nkabel; `toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	340 mm
Anker cirkel binnen	-260 mm
Omtrek ankercirkel buiten	1068 mm
Omtrek ankercirkel binnen	-817 mm
Aantal plaatsbare ankers buitenring	3
Aantal plaatsbare ankers binnenring	-2

Afschuiving in wapening door torsie

Maximaal torsie	148136 kNm
Maximaal afschuiving torsie / doorsnede	494 kN
Maximaal dwarskracht bij torsie	24 kN
Max. afschuiving wand door dwarskracht	24 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	813 mm
z (torsie)	1885 mm
fywd	478 Mpa
VRD,max (dwarskracht)	2065 kN
VRD,max (torsie)	4790 kN
Toetsing afschuiving door dwarskracht	0.01
Toetsing afschuiving door torsie	0.10
Totaal	0.11

W4HL350

Bijlage D

Segment 1
Lengte 12 m
Gewicht 105.9 ton

Betonklasse **B** Voldoet
Voorspananker **FeP1860**
Nkabel; toegepast Buiten 20 Voldoet
Nkabel; toegepast Binnen 8
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen

Segment	1		
Ingevulde wanddikte	500		
	Voet Top		
Buitendiameter	3000	2524 mm	
Buitenomtrek	9425	7930 mm	
Wanddikte	500	500 mm	
Binnendiameter	2000	1524 mm	
Doorsnede	Hol Hol		
Omtrek/dikte	18.85	15.86	Verhouding
Oppervlak	3926991	3179801	mm ²
Weerstandsmoment	2127120026	1369220120	mm ³
Maximale moment	45865	kNm	
Maximale moment + 2de orde	50452	kNm	
Maximaal dwarskracht	1266	kN	
Maximaal torsiemoment	1740354	kNm	
Maximaal normaalkracht	3468	kN	
Spanning tgv normaalkracht	0.9	N/mm ²	
Spanning tgv moment	24.7	N/mm ²	
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-25.6	Mpa	
Toelaatbare spanning	-46.7	Komende uit betonklasse	
Maximale trekspanning	24.0	MPa	
Toelaatbare trekspanning	0.0	MPa	

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1266	kN
Max. dwarskracht / doorsnede	1257	kN
Maximale optredende afschuiving in de wand	1257	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm ²
s	200	mm
z (horende max. dwarskracht)	2527	mm
fywd	478	Mpa
VRD,S	6422	kN
Toetsing afschuiving door dwarskracht	0.20	

Toetsing betonspanning	0.96	Voldoet
Toetsing afschuiving in wand	0.20	Voldoet

Voorspanning

Benodigde voorspanning ULS	24.0	Mpa
Benodigde voorspanning SLS	20	Mpa
Benodigde voorspankracht	90541	kN
Resulterende betonspanningen		
Trekzijde	0	Mpa
Drukzijde	-50	Mpa
Na relaxatie	-45	MPa
Keuze voorspankabels	FeP1860	
Toelaatbare spanning	1200	MPa
Astreng	150	mm ²
streng/kabel	19	
Akabel	2850	mm ²
Benodigde voorspankracht	90541	kN
Nkabel; benodigd	27	
Nkabel; toegepast Buiten	20	
Nkabel; toegepast Binnen	8	
Ankerverdeling top		
Gegeven E6-19		
Randafstand ankers	230	mm
Minimale hoh-afstand ankers	300	mm
Anker circl buiten	2064	mm
Anker circl binnen	1464	mm
Omtrek ankercircl buiten	6485	mm
Omtrek ankercircl binnen	4600	mm
Aantal plaatsbare ankers buitenring	21	
Aantal plaatsbare ankers binnenring	15	

Afschuiving in wapening door torsie

Maximaal torsie	1740354	kNm
Maximaal afschuiving torsie / doorsnede	1717	kN
Maximaal dwarskracht bij torsie	570	kN
Max. afschuiving wand door dwarskracht	570	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm ²
s	200	mm
z (dwarskracht)	2527	mm
z (torsie)	6368	mm
fywd	478	Mpa
VRD,max (dwarskracht)	6422	kN
VRD,max (torsie)	16184	kN
Toetsing afschuiving door dwarskracht	0.09	
Toetsing afschuiving door torsie	0.11	
Totaal	0.19	

W4HL350

Bijlage D

Segment **2**
Lengte **12 m**
Gewicht **77.0 ton**

Betonklasse **B** Voldoet
Voorspananker **FeP1860**
Nkabel; toegepast Buiten **16** Voldoet
Nkabel; toegepast Binnen **8**
Dwarswapening **12** rond
Materiaal **550** Fb550
Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2524 2049 mm
Buitenotrek	7930 6436 mm
Wanddikte	450 450 mm
Binnendiameter	1624 1149 mm
Doorsnede	Hol Hol
Omtrek/dikte	17.62 14.30 Verhouding
Oppervlak	2932507 2260036 mm ²
Weerstandsmoment	1308457682 760694279 mm ³
Maximale moment	30470 kNm
Maximale moment + 2de orde	33517 kNm
Maximaal dwarskracht	1257 kN
Maximaal torsiemoment	1740354 kNm
Maximaal normaalkracht	2221 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	25.8 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-26.6 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	25.3 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1257 kN
Max. dwarskracht / doorsnede	1251 kN
Maximale optredende afschuiving in de wand	1251 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2219 mm
fywd	478 Mpa
VRD,S	5639 kN
Toetsing afschuiving door dwarskracht	0.22

Toetsing betonspanning	0.97 Voldoet
Toetsing afschuiving in wand	0.27 Voldoet

Voorspanning

Benodigde voorspanning ULS	25.3 Mpa
Benodigde voorspanning SLS	21 Mpa
Benodigde voorspankracht	73782 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-52 Mpa
Na relaxatie	-45 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	73782 kN
Nkabel; benodigd	22
Nkabel; toegepast Buiten	16
Nkabel; toegepast Binnen	8
<i>Ankerverdeling top</i>	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1589 mm
Anker cirkel binnen	989 mm
Omtrek ankercirkel buiten	4991 mm
Omtrek ankercirkel binnen	3106 mm
Aantal plaatsbare ankers buitenring	16
Aantal plaatsbare ankers binnering	10

Afschuiving in wapening door torsie

Maximaal torsie	1740354 kNm
Maximaal afschuiving torsie / doorsnede	2185 kN
Maximaal dwarskracht bij torsie	565 kN
Max. afschuiving wand door dwarskracht	565 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2219 mm
z (torsie)	5005 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5639 kN
VRD,max (torsie)	12719 kN
Toetsing afschuiving door dwarskracht	0.10
Toetsing afschuiving door torsie	0.17
Totaal	0.27

W4HL350

Bijlage D

Segment **3**
Lengte **12 m**
Gewicht **50.1 ton**

Betonklasse **B** Voldoet
Voorspananker **FeP1860**
Nkabel; toegepast Buiten **10** Voldoet
Nkabel; toegepast Binnen **5**
Dwarswapening **12** rond
Materiaal **550** Fb550
Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	2049 1573 mm
Buitenomtrek	6436 4942 mm
Wanddikte	400 400 mm
Binnendiameter	1249 773 mm
Doorsnede	Hol Hol
Omtrek/dikte	16.09 12.35 Verhouding
Oppervlak	2071753 1474001 mm ²
Weerstandsmoment	727625122 359807183 mm ³
Maximale moment	15794 kNm
Maximale moment + 2de orde	17373 kNm
Maximaal dwarskracht	1126 kN
Maximaal torsiemoment	1740354 kNm
Maximaal normaalkracht	1298 kN
Spanning tgv normaalkracht	0.6 N/mm ²
Spanning tgv moment	24.4 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-25.0 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	23.9 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1126 kN
Max. dwarskracht / doorsnede	1123 kN
Maximale optredende afschuiving in de wand	1123 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1867 mm
fywd	478 Mpa
VRD,S	4745 kN
Toetsing afschuiving door dwarskracht	0.24

Toetsing betonspanning	0.93 Voldoet
Toetsing afschuiving in wand	0.32 Voldoet

Voorspanning

Benodigde voorspanning ULS	23.9 Mpa
Benodigde voorspanning SLS	20 Mpa
Benodigde voorspankracht	49040 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-49 Mpa
Na relaxatie	-43 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	49040 kN
Nkabel; benodigd	15
Nkabel; toegepast Buiten	10
Nkabel; toegepast Binnen	5
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1113 mm
Anker cirkel binnen	513 mm
Omtrek ankercirkel buiten	3497 mm
Omtrek ankercirkel binnen	1612 mm
Aantal plaatsbare ankers buitenring	11
Aantal plaatsbare ankers binnenring	5

Afschuiving in wapening door torsie

Maximaal torsie	1740354 kNm
Maximaal afschuiving torsie / doorsnede	2050 kN
Maximaal dwarskracht bij torsie	507 kN
Max. afschuiving wand door dwarskracht	507 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1867 mm
z (torsie)	3710 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4745 kN
VRD,max (torsie)	9429 kN
Toetsing afschuiving door dwarskracht	0.11
Toetsing afschuiving door torsie	0.22
Totaal	0.32

W4HL350

Bijlage D

Segment	4	
Lengte	12 m	
Gewicht	28.8 ton	
Betonklasse	B	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	6	Voldoet
Nkabel; toegepast Binnen	1	
Dwarswapening	12 rond	
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen		0	
Segment	4		
Ingevulde wanddikte	300		
	Voet	Top	
Buitendiameter	1573	1097	mm
Buitenomtrek	4942	3447	mm
Wanddikte	300	300	mm
Binnendiameter	973	497	mm
Doorsnede	Hol	Hol	
Omtrek/dikte	16.47	11.49	Verhouding
Oppervlak	1199749	751435	mm ²
Weerstandsmoment	326153489	124237887	mm ³
Maximale moment	5380		kNm
Maximale moment + 2de orde	5918		kNm
Maximaal dwarskracht	776		kN
Maximaal torsiemoment	1210262		kNm
Maximaal normaalkracht	631		kN
Spanning tgv normaalkracht	0.5		N/mm ²
Spanning tgv moment	18.2		N/mm ²
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-18.8		Mpa
Toelaatbare spanning	-46.7		Komende uit betonklasse
Maximale trekspanning	17.8		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning	
Benodigde voorspanning ULS	17.8 Mpa
Benodigde voorspanning SLS	15 Mpa
Benodigde voorspankracht	21350 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-37 Mpa
Na relaxatie	-33 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	21350 kN
Nkabel; benodigd	7
Nkabel; toegepast Buiten	6
Nkabel; toegepast Binnen	1
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	637 mm
Anker cirkel binnen	37 mm
Omtrek ankercirkel buiten	2002 mm
Omtrek ankercirkel binnen	117 mm
Aantal plaatsbare ankers buitenring	6
Aantal plaatsbare ankers binnenring	0

Afschuiving in wapening door dwarskracht		(NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	776	kN	
Max. dwarskracht / doorsnede	775	kN	
Maximale optredende afschuiving in de wand	775	kN	
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ θ ≤ 45	
cot θ	2	hoek	
alfa	80		
cot alfa	0.18		
Asw	113	mm ²	
s	200	mm	
z (horende max. dwarskracht)	1515	mm	
fywd	478	Mpa	
VRD,S	3850	kN	
Toetsing afschuiving door dwarskracht	0.20		

Toetsing betonspanning	0.71	Voldoet
Toetsing afschuiving in wand	0.33	Voldoet

Afschuiving in wapening door torsie		
Maximaal torsie	1210262 kNm	
Maximaal afschuiving torsie / doorsned	1596 kN	
Maximaal dwarskracht bij torsie	349 kN	
Max. afschuiving wand door dwarskracht	349 kN	
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ θ ≤ 45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm ²
s	200	mm
z (dwarskracht)	1515	mm
z (torsie)	2642	mm
fywd	478	Mpa
VRD max (dwarskracht)	3850	kN
VRD max (torsie)	6715	kN
Toetsing afschuiving door dwarskracht	0.09	
Toetsing afschuiving door torsie	0.24	
Totaal	0.33	

W4HL350

Bijlage D

Segment 5
Lengte 7.5 m
Gewicht 10.3 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 2 Voldoet
Nkabel; toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	5
Ingevulde wanddikte	150
	Voet Top
Buitendiameter	1097 800 mm
Buitenomtrek	3447 2513 mm
Wanddikte	150 150 mm
Binnendiameter	797 500 mm
Doorsnede	Hol Hol
Omtrek/dikte	22.98 16.76 Verhouding
Oppervlak	446403 306305 mm ²
Weerstandsmoment	93555777 42595579 mm ³
Maximale moment	420 kNm
Maximale moment + 2de orde	462 kNm
Maximaal dwarskracht	65 kN
Maximaal torsiemoment	124919 kNm
Maximaal normaalkracht	138 kN
Spanning tgv normaalkracht	0.3 N/mm ²
Spanning tgv moment	5.1 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-5.4 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	4.7 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	4.7 Mpa
Benodigde voorspanning SLS	4 Mpa
Benodigde voorspankracht	2368 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-10 Mpa
Na relaxatie	-9 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	2368 kN
Nkabel; benodigd	1
Nkabel; toegepast Buiten	2
Nkabel; toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	340 mm
Anker circl binnen	-260 mm
Omtrek ankercircl buiten	1068 mm
Omtrek ankercircl binnen	-817 mm
Aantal plaatsbare ankers buitenring	3
Aantal plaatsbare ankers binnenring	-2

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	65 kN
Max. dwarskracht / doorsnede	62 kN
Maximale optredende afschuiving in de wand	62 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	811 mm
fywd	478 Mpa
VRD,S	2061 kN
Toetsing afschuiving door dwarskracht	0.03 0

Toetsing betonspanning	0.25 Voldoet
Toetsing afschuiving in wand	0.09 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	124919 kNm
Maximaal afschuiving torsie / doorsnede	378 kN
Maximaal dwarskracht bij torsie	29 kN
Max. afschuiving wand door dwarskracht	29 kN
Hoek loodrecht dwarskracht/drukdiag	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	811 mm
z (torsie)	2077 mm
fywd	478 Mpa
VRD,max (dwarskracht)	2061 kN
VRD,max (torsie)	5277 kN
Toetsing afschuiving door dwarskracht	0.01
Toetsing afschuiving door torsie	0.07
Totaal	0.09

W4HL400

Bijlage F

Segment	1
Lengte	12 m
Gewicht	114.0 ton
Betonklasse	B Voldoet
Voorspananker	FeP1860
Nkabel: 'toegepast Buiten	20 Voldoet
Nkabel: 'toegepast Binnen	12
Dwarswapening	12 rond
Materiaal	550 Fb550
Aantal ringbeugels/meter hoogte	5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γ _{ck}		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen

Segment	1		
Ingevulde wanddikte	500		
	Voet Top		
Buitendiameter	3200	2744 mm	
Buitenomtrek	10053	8621 mm	
Wanddikte	500	500 mm	
Binnendiameter	2200	1744 mm	
Doorsnede	Hol	Hol	
Omtrek/dikte	20.11	17.24	Verhouding
Oppervlak	4241150	3525344	mm ²
Weerstandsmoment	2498302470	1697893326	mm ³
Maximale moment	54861	kNm	
Maximale moment + 2de orde	60347	kNm	
Maximaal dwarskracht	1325	kN	
Maximaal torsiemoment	1836522	kNm	
Maximaal normaalkracht	4076	kN	
Spanning tgv normaalkracht	1.0	N/mm ²	
Spanning tgv moment	25.3	N/mm ²	
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-26.2	Mpa	
Toelaatbare spanning	-46.7	Komende uit betonklasse	
Maximale trekspanning	24.5	MPa	
Toelaatbare trekspanning	0.0	MPa	

Voorspanning

Benodigde voorspanning ULS	24.5	Mpa
Benodigde voorspanning SLS	20	Mpa
Benodigde voorspankracht	99389	kN
Resulterende betonspanningen		
Trekzijde	0	Mpa
Drukzijde	-51	Mpa
Na relaxatie	-45	MPa
Keuze voorspankabels	FeP1860	
Toelaatbare spanning	1200	MPa
Astreng	150	mm ²
streng/kabel	19	
Akabel	2850	mm ²
Benodigde voorspankracht	99389	kN
Nkabel; benodigd	30	
Nkabel; 'toegepast Buiten	20	
Nkabel; 'toegepast Binnen	12	
Ankerverdeling top		
Gegeven E6-19		
Randafstand ankers	230	mm
Minimale hoh-afstand ankers	300	mm
Anker circl buiten	2284	mm
Anker circl binnen	1684	mm
Omtrek ankercircl buiten	7176	mm
Omtrek ankercircl binnen	5291	mm
Aantal plaatsbare ankers buitenring	23	
Aantal plaatsbare ankers binnenring	17	

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1325	kN
Max. dwarskracht / doorsnede	1315	kN
Maximale optredende afschuiving in de wand	1315	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm ²
s	200	mm
z (horende max. dwarskracht)	2756	mm
fywd	478	Mpa
VRD,S	7004	kN
Toetsing afschuiving door dwarskracht	0.19	

Afschuiving in wapening door torsie

Maximaal torsie	1836522	kNm
Maximaal afschuiving torsie / doorsnede	1628	kN
Maximaal dwarskracht bij torsie	596	kN
Max. afschuiving wand door dwarskracht	596	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm ²
s	200	mm
z (dwarskracht)	2756	mm
z (torsie)	7087	mm
fywd	478	Mpa
VRD_max (dwarskracht)	7004	kN
VRD_max (torsie)	18012	kN
Toetsing afschuiving door dwarskracht	0.09	
Toetsing afschuiving door torsie	0.09	
Totaal	0.18	

Toetsing betonspanning	0.97	Voldoet
Toetsing afschuiving in wand	0.19	Voldoet

W4HL400

Bijlage F

Segment **2**
Lengte **12 m**
Gewicht **85.8 ton**

Betonklasse **B** Voldoet
Voorspananker **FeP1860**
Nkabel; 'toegepast Buiten' **18** Voldoet
Nkabel; 'toegepast Binnen' **8**
Dwarswapening **12** rond
Materiaal **550** Fb550
Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
yck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2744 2289 mm
Buitenomtrek	8621 7190 mm
Wanddikte	450 450 mm
Binnendiameter	1844 1389 mm
Doorsnede	Hol Hol
Omtrek/dikte	19.16 15.98 Verhouding
Oppervlak	3243496 2599270 mm2
Weerstandsmoment	1615165287 1017335590 mm3
Maximale moment	39018 kNm
Maximale moment + 2de orde	42920 kNm
Maximaal dwarskracht	1315 kN
Maximaal torsiemoment	1836522 kNm
Maximaal normaalkracht	2734 kN
Spanning tgv normaalkracht	0.8 N/mm2
Spanning tgv moment	26.6 N/mm2
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-27.4 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	26.0 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1315 kN
Max. dwarskracht / doorsnede	1307 kN
Maximale optredende afschuiving in de wand	1307 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	2348 mm
fywd	478 Mpa
VRD,S	5967 kN
Toetsing afschuiving door dwarskracht	0.22

Toetsing betonspanning	0.97 Voldoet
Toetsing afschuiving in wand	0.23 Voldoet

Voorspanning

Benodigde voorspanning ULS	26.0 Mpa
Benodigde voorspanning SLS	21 Mpa
Benodigde voorspankracht	84152 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-53 Mpa
Na relaxatie	-45 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	84152 kN
Nkabel; benodigd	25
Nkabel; 'toegepast Buiten'	18
Nkabel; 'toegepast Binnen'	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	1829 mm
Anker circl binnen	1229 mm
Omtrek ankercircl buiten	5745 mm
Omtrek ankercircl binnen	3860 mm
Aantal plaatsbare ankers buitenring	19
Aantal plaatsbare ankers binnenring	12

Afschuiving in wapening door torsie

Maximaal torsie	1836522 kNm
Maximaal afschuiving torsie / doorsnede	1985 kN
Maximaal dwarskracht bij torsie	592 kN
Max. afschuiving wand door dwarskracht	592 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	2348 mm
z (torsie)	5812 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5967 kN
VRD,max (torsie)	14770 kN
Toetsing afschuiving door dwarskracht	0.10
Toetsing afschuiving door torsie	0.13
Totaal	0.23

W4HL400

Bijlage F

Segment **3**
 Lengte **12 m**
 Gewicht **61.1 ton**

Betonklasse **B** Voldoet
 Voorspananker **FeP1860**
 Nkabel; toegepast Buiten **14** Voldoet
 Nkabel; toegepast Binnen **5**
 Dwarswapening **12** rond
 Materiaal **550** Fb550
 Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
yck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	2289 1833 mm
Buitenomtrek	7190 5758 mm
Wanddikte	400 400 mm
Binnendiameter	1489 1033 mm
Doorsnede	Hol Hol
Omtrek/dikte	17.97 14.40 Verhouding
Oppervlak	2373294 1800650 mm ²
Weerstandsmoment	966186267 543569748 mm ³
Maximale moment	23534 kNm
Maximale moment + 2de orde	25887 kNm
Maximaal dwarskracht	1177 kN
Maximaal torsiemoment	1836522 kNm
Maximaal normaalkracht	1706 kN
Spanning tgv normaalkracht	0.7 N/mm ²
Spanning tgv moment	26.8 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-27.5 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	26.3 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	26.3 Mpa
Benodigde voorspanning SLS	22 Mpa
Benodigde voorspankracht	62330 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-54 Mpa
Na relaxatie	-46 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	62330 kN
Nkabel; benodigd	19
Nkabel; toegepast Buiten	14
Nkabel; toegepast Binnen	5
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1373 mm
Anker cirkel binnen	773 mm
Omtrek ankercirkel buiten	4313 mm
Omtrek ankercirkel binnen	2428 mm
Aantal plaatsbare ankers buitenring	14
Aantal plaatsbare ankers binnenring	8

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1177 kN
Max. dwarskracht / doorsnede	1171 kN
Maximale optredende afschuiving in de wand	1171 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1964 mm
fywd	478 Mpa
VRD,S	4991 kN
Toetsing afschuiving door dwarskracht	0.23

Toetsing betonspanning	0.98 Voldoet
Toetsing afschuiving in wand	0.29 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	1836522 kNm
Maximaal afschuiving torsie / doorsnede	2348 kN
Maximaal dwarskracht bij torsie	530 kN
Max. afschuiving wand door dwarskracht	530 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1964 mm
z (torsie)	4913 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4991 kN
VRD,max (torsie)	12487 kN
Toetsing afschuiving door dwarskracht	0.11
Toetsing afschuiving door torsie	0.19
Totaal	0.29

W4HL400

Bijlage F

Segment	4	
Lengte	12 m	
Gewicht	35.9 ton	
Betonklasse	B	Voldoet
Voorspananker	FeP1860	
Nkabel: `toegepast Buiten	8	Voldoet
Nkabel: `toegepast Binnen	3	
Dwarswapening	12 rond	
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
yck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Opretende spanningen		0	
Segment	4		
Ingevulde wanddikte	300		
	Voet	Top	
Buitendiameter	1833	1377	mm
Buitenomtrek	5758	4327	mm
Wanddikte	300	300	mm
Binnendiameter	1233	777	mm
Doorsnede	Hol	Hol	
Omtrekdikte	19.19	14.42	Verhouding
Oppervlak	1444735	1015251	mm2
Weerstandsmoment	480777384	230440168	mm3
Maximale moment	10799		kNm
Maximale moment + 2de orde	11879		kNm
Maximaal dwarskracht	814		kN
Maximaal torsiemoment	1277140		kNm
Maximaal normaalkracht	899		kN
Spanning tgv normaalkracht	0.6		N/mm2
Spanning tgv moment	24.7		N/mm2
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-25.4		Mpa
Toelaatbare spanning	-46.7		Komende uit betonklasse
Maximale trekspanning	24.3		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning	
Benodigde voorspanning ULS	24.3 Mpa
Benodigde voorspanning SLS	20 Mpa
Benodigde voorspankracht	35044 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-50 Mpa
Na relaxatie	-44 MPa
Keuze voorspankabels	
Toelaatbare spanning	FeP1860 1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	35044 kN
Nkabel; benodigd	11
Nkabel; `toegepast Buiten	8
Nkabel; `toegepast Binnen	3
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	917 mm
Anker cirkel binnen	317 mm
Omtrek ankercirkel buiten	2882 mm
Omtrek ankercirkel binnen	997 mm
Aantal plaatsbare ankers buitenring	9
Aantal plaatsbare ankers binnenring	3

Afschuiving in wapening door dwarskracht		(NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	814	kN	
Max. dwarskracht / doorsnede	809	kN	
Maximale opretende afschuiving in de wand	809	kN	
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45	
cot θ	2	hoek	
alfa	80		
cot alfa	0.18		
Asw	113	mm2	
s	200	mm	
z (horende max. dwarskracht)	1556	mm	
fywd	478	Mpa	
VRD,S	3954	kN	
Toetsing afschuiving door dwarskracht	0.20		

Afschuiving in wapening door torsie		
Maximaal torsie	1277140 kNm	
Maximaal afschuiving torsie / doorsnede	2034 kN	
Maximaal dwarskracht bij torsie	366 kN	
Max. afschuiving wand door dwarskracht	366 kN	
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm2
s	200	mm
z (dwarskracht)	1556	mm
z (torsie)	3946	mm
fywd	478	Mpa
VRD,max (dwarskracht)	3954	kN
VRD,max (torsie)	10028	kN
Toetsing afschuiving door dwarskracht	0.09	
Toetsing afschuiving door torsie	0.20	
Totaal	0.30	

Toetsing betonspanning	0.93	Voldoet
Toetsing afschuiving in wand	0.30	Voldoet

W4HL400

Bijlage F

Segment 5
Lengte 12 m
Gewicht 19.3 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel: toegepast Buiten 4 Voldoet
Nkabel: toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
yck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	5
Ingevulde wanddikte	200
	Voet Top
Buitendiameter	1377 922 mm
Buitenomtrek	4327 2895 mm
Wanddikte	200 200 mm
Binnendiameter	977 522 mm
Doorsnede	Hol Hol
Omtrek/dikte	21.63 14.48 Verhouding
Oppervlak	739666 453344 mm2
Weerstandsmoment	191444716 68945897 mm3
Maximale moment	2915 kNm
Maximale moment + 2de orde	3206 kNm
Maximaal dwarskracht	443 kN
Maximaal torsiemoment	707445 kNm
Maximaal normaalkracht	387 kN
Spanning tgv normaalkracht	0.5 N/mm2
Spanning tgv moment	16.8 N/mm2
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-17.3 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	16.3 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	16.3 Mpa
Benodigde voorspanning SLS	13 Mpa
Benodigde voorspankracht	12110 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-34 Mpa
Na relaxatie	-30 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	12110 kN
Nkabel, benodigd	4
Nkabel: toegepast Buiten	4
Nkabel: toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	462 mm
Anker circl binnen	-138 mm
Omtrek ankercircl buiten	1450 mm
Omtrek ankercircl binnen	-435 mm
Aantal plaatsbare ankers buitenring	4
Aantal plaatsbare ankers binnenring	-1

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	443 kN
Max. dwarskracht / doorsnede	440 kN
Maximale optredende afschuiving in de wand	440 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	1172 mm
fywd	478 Mpa
VRD,S	2979 kN
Toetsing afschuiving door dwarskracht	0.15 0

Toetsing betonspanning	0.83 Voldoet
Toetsing afschuiving in wand	0.25 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	707445 kNm
Maximaal afschuiving torsie / doorsnede	1456 kN
Maximaal dwarskracht bij torsie	199 kN
Max. afschuiving wand door dwarskracht	199 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	1172 mm
z (torsie)	3054 mm
fywd	478 Mpa
VRD,max (dwarskracht)	2979 kN
VRD,max (torsie)	7760 kN
Toetsing afschuiving door dwarskracht	0.07
Toetsing afschuiving door torsie	0.19
Totaal	0.25

W4HL400

Bijlage F

Segment 6
Lengte 3.2 m
Gewicht 4.5 ton

Betonklasse A Voldoet niet
Voorspananker FeP1860
Nkabel: 'toegepast Buiten 2 Voldoet
Nkabel: 'toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
yck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	6
Ingevulde wanddikte	150
	Voet Top
Buitendiameter	922 800 mm
Buitenomtrek	2895 2513 mm
Wanddikte	150 150 mm
Binnendiameter	622 500 mm
Doorsnede	Hol Hol
Omtrek/dikte	19.30 16.76 Verhouding
Oppervlak	363570 306305 mm2
Weerstandsmoment	60929874 42595579 mm3
Maximale moment	209 kNm
Maximale moment + 2de orde	230 kNm
Maximaal dwarskracht	67 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	72 kN
Spanning tgv normaalkracht	0.1 N/mm2
Spanning tgv moment	24.7 N/mm2
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-24.8 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	24.7 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	67 kN
Max. dwarskracht / doorsnede	66 kN
Maximale optredende afschuiving in de wand	66 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	800 mm
fywd	478 Mpa
VRD,S	2033 kN
Toetsing afschuiving door dwarskracht	0.03

Toetsing betonspanning	1.24 Voldoet niet
Toetsing afschuiving in wand	0.08 Voldoet

Voorspanning

Benodigde voorspanning ULS	24.7 Mpa
Benodigde voorspanning SLS	20 Mpa
Benodigde voorspankracht	1943 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-50 Mpa
Na relaxatie	-45 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	1943 kN
Nkabel; benodigd	1
Nkabel; 'toegepast Buiten	2
Nkabel; 'toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	340 mm
Anker cirkel binnen	-260 mm
Omtrek ankercirkel buiten	1068 mm
Omtrek ankercirkel binnen	-817 mm
Aantal plaatsbare ankers buitenring	3
Aantal plaatsbare ankers binnenring	-2

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	397 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	800 mm
z (torsie)	2042 mm
fywd	478 Mpa
VRD,max (dwarskracht)	2033 kN
VRD,max (torsie)	5190 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.08
Totaal	0.08

W4S350

Bijlage C

Segment	1	
Lengte	12 m	
Gewicht	67.5 ton	
Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	12	Voldoet
Nkabel; toegepast Binnen	4	
Dwarswapening	12	rond
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Opretende spanningen			
Segment	1		
Ingevulde wanddikte	450		
	Voet Top		
Buitendiameter	2200	1898 mm	
Buitentrek	6912	5962 mm	
Wanddikte	450	450 mm	
Binnendiameter	1300	998 mm	
Doorsnede	Hol	Hol	
Omtrek/dikte	15.36	13.25	Verhouding
Oppervlak	2474004	2046838	mm ²
Weerstandsmoment	917911791	619804059	mm ³
Maximale moment	15811	kNm	
Maximale moment + 2de orde	17392	kNm	
Maximaal dwarskracht	452	kN	
Maximaal torsiemoment	0	kNm	
Maximaal normaalkracht	2253	kN	
Spanning tgv normaalkracht	0.9	N/mm ²	
Spanning tgv moment	19.0	N/mm ²	
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-19.9	Mpa	
Toelaatbare spanning	-36.7	Komende uit betonklasse	
Maximale trekspanning	18.3	MPa	
Toelaatbare trekspanning	0.0	MPa	

Voorspanning	
Benodigde voorspanning ULS	18.3 Mpa
Benodigde voorspanning SLS	13 Mpa
Benodigde voorspankracht	45185 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-38 Mpa
Na relaxatie	-35 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	45185 kN
Nkabel; benodigd	14
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	1438 mm
Anker circl binnen	838 mm
Omtrek ankercircl buiten	4517 mm
Omtrek ankercircl binnen	2632 mm
Aantal plaatsbare ankers buitenring	15
Aantal plaatsbare ankers binnenring	8

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	452 kN
Max. dwarskracht / doorsnede	430 kN
Maximale opretende afschuiving in de wand	430 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1899 mm
fywd	478 Mpa
VRD,S	4826 kN
Toetsing afschuiving door dwarskracht	0.09

Afschuiving in wapening door torsie	
Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1899 mm
z (torsie)	1100 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4826 kN
VRD,max (torsie)	2794 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

Toetsing betonspanning	0.95	Voldoet
Toetsing afschuiving in wand	0.09	Voldoet

W4S350

Bijlage C

Segment 2
Lengte 12 m
Gewicht 50.2 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 8 Voldoet
Nkabel; toegepast Binnen 4
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	1898 1596 mm
Buitentrek	5962 5013 mm
Wanddikte	400 400 mm
Binnendiameter	1098 796 mm
Doorsnede	Hol Hol
Omtrek/dikte	14.91 12.53 Verhouding
Oppervlak	1882243 1502540 mm ²
Weerstandsmoment	595943826 374216818 mm ³
Maximale moment	10437 kNm
Maximale moment + 2de orde	11481 kNm
Maximaal dwarskracht	429 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	1459 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	19.4 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-20.2 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	18.8 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	429 kN
Max. dwarskracht / doorsnede	388 kN
Maximale optredende afschuiving in de wand	388 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1591 mm
fywd	478 Mpa
VRD,S	4043 kN
Toetsing afschuiving door dwarskracht	0.10

Toetsing betonspanning	0.96 Voldoet
Toetsing afschuiving in wand	0.10 Voldoet

Voorspanning

Benodigde voorspanning ULS	18.8 Mpa
Benodigde voorspanning SLS	13 Mpa
Benodigde voorspankracht	35319 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukszijde	-39 Mpa
Na relaxatie	-35 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	35319 kN
Nkabel; benodigd	11
Nkabel; toegepast Buiten	8
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1136 mm
Anker cirkel binnen	536 mm
Omtrek ankercirkel buiten	3568 mm
Omtrek ankercirkel binnen	1683 mm
Aantal plaatsbare ankers buitenring	11
Aantal plaatsbare ankers binnenring	5

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1591 mm
z (torsie)	1257 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4043 kN
VRD,max (torsie)	3194 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4S350

Bijlage C

Segment 3
Lengte 12 m
Gewicht 30.6 ton

Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	6	Voldoet
Nkabel; toegepast Binnen	2	
Dwarswapening	12 rond	
Materiaal	550 Fb550	
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	300
	Voet Top
Buitendiameter	1596 1294 mm
Buitenomtrek	5013 4064 mm
Wanddikte	300 300 mm
Binnendiameter	996 694 mm
Doorsnede	Hol Hol
Omtrek/dikte	16.71 13.55 Verhouding
Oppervlak	1221153 936375 mm ²
Weerstandsmoment	338408263 194925224 mm ³
Maximale moment	5434 kNm
Maximale moment + 2de orde	5977 kNm
Maximaal dwarskracht	387 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	860 kN
Spanning tgv normaalkracht	0.7 N/mm ²
Spanning tgv moment	18.0 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-18.7 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	17.5 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	387 kN
Max. dwarskracht / doorsnede	380 kN
Maximale optredende afschuiving in de wand	380 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1479 mm
fywd	478 Mpa
VRD,S	3759 kN
Toetsing afschuiving door dwarskracht	0.10

Toetsing betonspanning	0.88 Voldoet
Toetsing afschuiving in wand	0.10 Voldoet

Voorspanning

Benodigde voorspanning ULS	17.5 Mpa
Benodigde voorspanning SLS	12 Mpa
Benodigde voorspankracht	21138 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-36 Mpa
Na relaxatie	-32 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	21138 kN
Nkabel; benodigd	7
Nkabel; toegepast Buiten	6
Nkabel; toegepast Binnen	2
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	834 mm
Anker cirkel binnen	234 mm
Omtrek ankercirkel buiten	2619 mm
Omtrek ankercirkel binnen	734 mm
Aantal plaatsbare ankers buitenring	8
Aantal plaatsbare ankers binnenring	2

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1479 mm
z (torsie)	1571 mm
fywd	478 Mpa
VRD,max (dwarskracht)	3759 kN
VRD,max (torsie)	3992 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4S350

Bijlage C

Segment 4
Lengte 12 m
Gewicht 20.8 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 4 Voldoet
Nkabel; toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen		0	
Segment	4		
Ingevulde wanddikte	250		
	Voet	Top	
Buitendiameter	1294	991	mm
Buitenomtrek	4064	3114	mm
Wanddikte	250	250	mm
Binnendiameter	794	491	mm
Doorsnede	Hol	Hol	
Omtrek/dikte	16.25	12.46	Verhouding
Oppervlak	819583	582268	mm2
Weerstandsmoment	182390015	89881168	mm3
Maximale moment	1811		kNm
Maximale moment + 2de orde	1992		kNm
Maximaal dwarskracht	268		kN
Maximaal torsiemoment	0		kNm
Maximaal normaalkracht	455		kN
Spanning tgv normaalkracht	0.6		N/mm2
Spanning tgv moment	11.0		N/mm2
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-11.6		Mpa
Toelaatbare spanning	-36.7		Komende uit betonklasse
Maximale trekspanning	10.6		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning	
Benodigde voorspanning ULS	10.6 Mpa
Benodigde voorspanning SLS	7 Mpa
Benodigde voorspankracht	8643 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-22 Mpa
Na relaxatie	-20 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	8643 kN
Nkabel; benodigd	3
Nkabel; toegepast Buiten	4
Nkabel; toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	531 mm
Anker cirkel binnen	-69 mm
Omtrek ankercirkel buiten	1669 mm
Omtrek ankercirkel binnen	-216 mm
Aantal plaatsbare ankers buitenring	5
Aantal plaatsbare ankers binnenring	0

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	268	kN
Max. dwarskracht / doorsnede	266	kN
Maximale optredende afschuiving in de wand	266	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ α ≤ 45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm2
s	200	mm
z (horende max. dwarskracht)	1255	mm
fywd	478	Mpa
VRD,S	3189	kN
Toetsing afschuiving door dwarskracht	0.08	

Toetsing betonspanning	0.55	Voldoet
Toetsing afschuiving in wand	0.08	Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	0	kNm
Maximaal afschuiving torsie / doorsnede	0	kN
Maximaal dwarskracht bij torsie	0	kN
Max. afschuiving wand door dwarskracht	0	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ α ≤ 45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm2
s	200	mm
z (dwarskracht)	1255	mm
z (torsie)	1728	mm
fywd	478	Mpa
VRD max (dwarskracht)	3189	kN
VRD max (torsie)	4391	kN
Toetsing afschuiving door dwarskracht	0.00	
Toetsing afschuiving door torsie	0.00	
Totaal	0.00	

W4S350

Bijlage C

Segment 5
Lengte 7.6 m
Gewicht 9.9 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 2 Voldoet
Nkabel; toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	5
Ingevulde wanddikte	200
	Voet Top
Buitendiameter	991 800 mm
Buitenomtrek	3114 2513 mm
Wanddikte	200 200 mm
Binnendiameter	591 400 mm
Doorsnede	Hol Hol
Omtrek/dikte	15.57 12.57 Verhouding
Oppervlak	497230 376991 mm ²
Weerstandsmoment	83542625 47123890 mm ³
Maximale moment	127 kNm
Maximale moment + 2de orde	139 kNm
Maximaal dwarskracht	24 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	121 kN
Spanning tgv normaalkracht	0.2 N/mm ²
Spanning tgv moment	1.7 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-2.0 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	1.5 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	1.5 Mpa
Benodigde voorspanning SLS	1 Mpa
Benodigde voorspankracht	749 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukszijde	-3 Mpa
Na relaxatie	-3 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	749 kN
Nkabel; benodigd	1
Nkabel; toegepast Buiten	2
Nkabel; toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	340 mm
Anker cirkel binnen	-260 mm
Omtrek ankercirkel buiten	1068 mm
Omtrek ankercirkel binnen	-817 mm
Aantal plaatsbare ankers buitenring	3
Aantal plaatsbare ankers binnenring	-2

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	24 kN
Max. dwarskracht / doorsnede	24 kN
Maximale optredende afschuiving in de wand	24 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	975 mm
fywd	478 Mpa
VRD,S	2478 kN
Toetsing afschuiving door dwarskracht	0.01 0

Toetsing betonspanning	0.09 Voldoet
Toetsing afschuiving in wand	0.01 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagc	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	975 mm
z (torsie)	1885 mm
fywd	478 Mpa
VRD,max (dwarskracht)	2478 kN
VRD,max (torsie)	4790 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4S400

Bijlage E

Segment	1
Lengte	12 m
Gewicht	80.8 ton
Betonklasse	A Voldoet
Voorspananker	FeP1860
Nkabel; toegepast Buiten	12 Voldoet
Nkabel; toegepast Binnen	8
Dwarswapening	12 rond
Materiaal	550 Fb550
Aantal ringbeugels/meter hoogte	5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Opretende spanningen	
Segment	1
Ingevulde wanddikte	500
	Voet Top
Buitendiameter	2400 2097 mm
Buitenomtrek	7540 6587 mm
Wanddikte	500 500 mm
Binnendiameter	1400 1097 mm
Doorsnede	Hol Hol
Omtrek/dikte	15.08 13.17 Verhouding
Oppervlak	2984513 2508063 mm ²
Weerstandsmoment	1200022944 837162843 mm ³
Maximale moment	20789 kNm
Maximale moment + 2de orde	22868 kNm
Maximaal dwarskracht	523 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	2974 kN
Spanning tgv normaalkracht	1.0 N/mm ²
Spanning tgv moment	19.3 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-20.3 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	18.6 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning	
Benodigde voorspanning ULS	18.6 Mpa
Benodigde voorspanning SLS	13 Mpa
Benodigde voorspankracht	54643 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-39 Mpa
Na relaxatie	-35 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	54643 kN
Nkabel; benodigd	16
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	1637 mm
Anker circl binnen	1037 mm
Omtrek ankercircl buiten	5142 mm
Omtrek ankercircl binnen	3257 mm
Aantal plaatsbare ankers buitenring	17
Aantal plaatsbare ankers binnenring	10

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	523 kN
Max. dwarskracht / doorsnede	499 kN
Maximale opretende afschuiving in de wand	499 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2104 mm
fywd	478 Mpa
VRD,S	5347 kN
Toetsing afschuiving door dwarskracht	0.09

Afschuiving in wapening door torsie	
Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2104 mm
z (torsie)	942 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5347 kN
VRD,max (torsie)	2395 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

Toetsing betonspanning	0.96 Voldoet
Toetsing afschuiving in wand	0.09 Voldoet

W4S400

Bijlage E

Segment **2**
 Lengte **12 m**
 Gewicht **62.1 ton**

Betonklasse **A** Voldoet
 Voorspananker **FeP1860**
 Nkabel; `toegepast Buiten **10** Voldoet
 Nkabel; `toegepast Binnen **6**
 Dwarswapening **12** rond
 Materiaal **550** Fb550
 Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2097 1793 mm
Buitenomtrek	6587 5634 mm
Wanddikte	450 450 mm
Binnendiameter	1197 893 mm
Doorsnede	Hol Hol
Omtrek/dikte	14.64 12.52 Verhouding
Oppervlak	2327942 1899137 mm ²
Weerstandsmoment	808869668 531377409 mm ³
Maximale moment	14662 kNm
Maximale moment + 2de orde	16128 kNm
Maximaal dwarskracht	498 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	2023 kN
Spanning tgv normaalkracht	0.9 N/mm ²
Spanning tgv moment	20.0 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-20.8 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	19.3 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	498 kN
Max. dwarskracht / doorsnede	477 kN
Maximale optredende afschuiving in de wand	477 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1832 mm
fywd	478 Mpa
VRD,S	4656 kN
Toetsing afschuiving door dwarskracht	0.10

Toetsing betonspanning	0.98 Voldoet
Toetsing afschuiving in wand	0.10 Voldoet

Voorspanning

Benodigde voorspanning ULS	19.3 Mpa
Benodigde voorspanning SLS	13 Mpa
Benodigde voorspankracht	44921 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukszijde	-40 Mpa
Na relaxatie	-36 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	44921 kN
Nkabel; benodigd	14
Nkabel; `toegepast Buiten	10
Nkabel; `toegepast Binnen	6
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1333 mm
Anker cirkel binnen	733 mm
Omtrek ankercirkel buiten	4189 mm
Omtrek ankercirkel binnen	2304 mm
Aantal plaatsbare ankers buitenring	13
Aantal plaatsbare ankers binnering	7

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1832 mm
z (torsie)	1100 mm
fywd	478 Mpa
VRD_max (dwarskracht)	4656 kN
VRD_max (torsie)	2794 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4S400

Bijlage E

Segment **3**
 Lengte **12 m**
 Gewicht **45.7 ton**

Betonklasse **A** Voldoet
 Voorspananker **FeP1860**
 Nkabel; toegepast Buiten **9** Voldoet
 Nkabel; toegepast Binnen **2**
 Dwarswapening **12** rond
 Materiaal **550** Fb550
 Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	1793 1490 mm
Buitenomtrek	5634 4681 mm
Wanddikte	400 400 mm
Binnendiameter	993 690 mm
Doorsnede	Hol Hol
Omtrek/dikte	14.09 11.70 Verhouding
Oppervlak	1750954 1369794 mm ²
Weerstandsmoment	512942173 309849332 mm ³
Maximale moment	8872 kNm
Maximale moment + 2de orde	9759 kNm
Maximaal dwarskracht	452 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	1282 kN
Spanning tgv normaalkracht	0.7 N/mm ²
Spanning tgv moment	19.1 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-19.8 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	18.5 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	452 kN
Max. dwarskracht / doorsnede	434 kN
Maximale optredende afschuiving in de wand	434 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1576 mm
fywd	478 Mpa
VRD,S	4005 kN
Toetsing afschuiving door dwarskracht	0.11

Toetsing betonspanning	0.94 Voldoet
Toetsing afschuiving in wand	0.11 Voldoet

Voorspanning

Benodigde voorspanning ULS	18.5 Mpa
Benodigde voorspanning SLS	13 Mpa
Benodigde voorspankracht	32387 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-38 Mpa
Na relaxatie	-35 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	32387 kN
Nkabel; benodigd	10
Nkabel; toegepast Buiten	9
Nkabel; toegepast Binnen	2
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1030 mm
Anker cirkel binnen	430 mm
Omtrek ankercirkel buiten	3236 mm
Omtrek ankercirkel binnen	1351 mm
Aantal plaatsbare ankers buitenring	10
Aantal plaatsbare ankers binnenring	4

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1576 mm
z (torsie)	1257 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4005 kN
VRD,max (torsie)	3194 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4S400

Bijlage E

Segment	4
Lengte	12 m
Gewicht	28.6 ton
Betonklasse	A Voldoet
Voorspananker	FeP1860
Nkabel; toegepast Buiten	6 Voldoet
Nkabel; toegepast Binnen	1
Dwarswapening	12 rond
Materiaal	550 Fb550
Aantal ringbeugels/meter hoogte	5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen		0	
Segment	4		
Ingevulde wanddikte	300		
	Voet	Top	
Buitendiameter	1490	1187	mm
Buitenomtrek	4681	3728	mm
Wanddikte	300	300	mm
Binnendiameter	890	587	mm
Doorsnede	Hol	Hol	
Omtrek/dikte	15.60	12.43	Verhouding
Oppervlak	1121593	835723	mm ²
Weerstandsmoment	283440330	154276002	mm ³
Maximale moment	4018		kNm
Maximale moment + 2de orde	4420		kNm
Maximaal dwarskracht	316		kN
Maximaal torsiemoment	0		kNm
Maximaal normaalkracht	693		kN
Spanning tgv normaalkracht	0.6		N/mm ²
Spanning tgv moment	15.7		N/mm ²
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-16.3		Mpa
Toelaatbare spanning	-36.7		Komende uit betonklasse
Maximale trekspanning	15.2		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning	
Benodigde voorspanning ULS	15.2 Mpa
Benodigde voorspanning SLS	10 Mpa
Benodigde voorspankracht	17004 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-31 Mpa
Na relaxatie	-28 MPa
Keuze voorspankabels	
Toelaatbare spanning	FeP1860 1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	17004 kN
Nkabel; benodigd	5
Nkabel; toegepast Buiten	6
Nkabel; toegepast Binnen	1
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	727 mm
Anker cirkel binnen	127 mm
Omtrek ankercirkel buiten	2283 mm
Omtrek ankercirkel binnen	398 mm
Aantal plaatsbare ankers buitenring	7
Aantal plaatsbare ankers binnenring	1

Afschuiving in wapening door dwarskracht		(NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	316		kN
Max. dwarskracht / doorsnede	304		kN
Maximale optredende afschuiving in de wand	304		kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ θ ≤ 45	
cot θ	2	hoek	
alfa	80		
cot alfa	0.18		
Asw	113		mm ²
s	200		mm
z (horende max. dwarskracht)	1320		mm
fywd	478		Mpa
VRD,S	3355		kN
Toetsing afschuiving door dwarskracht	0.09		

Toetsing betonspanning	0.77	Voldoet
Toetsing afschuiving in wand	0.09	Voldoet

Afschuiving in wapening door torsie			
Maximaal torsie	0 kNm		
Maximaal afschuiving torsie / doorsned	0 kN		
Maximaal dwarskracht bij torsie	0 kN		
Max. afschuiving wand door dwarskracht	0 kN		
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ θ ≤ 45	
cot θ	2	hoek	
alfa	80		
cot alfa	0.18		
Asw	113		mm ²
s	200		mm
z (dwarskracht)	1320		mm
z (torsie)	1571		mm
fywd	478		Mpa
VRD max (dwarskracht)	3355		kN
VRD max (torsie)	3992		kN
Toetsing afschuiving door dwarskracht	0.00		
Toetsing afschuiving door torsie	0.00		
Totaal	0.00		

W4S400

Bijlage E

Segment 5
Lengte 12 m
Gewicht 16.9 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 4 Voldoet
Nkabel; toegepast Binnen 1
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	5
Ingevulde wanddikte	200
	Voet Top
Buitendiameter	1187 883 mm
Buitenomtrek	3728 2775 mm
Wanddikte	200 200 mm
Binnendiameter	787 483 mm
Doorsnede	Hol Hol
Omtrek/dikte	18.64 13.88 Verhouding
Oppervlak	619981 429401 mm ²
Weerstandsmoment	132387879 61615798 mm ³
Maximale moment	1062 kNm
Maximale moment + 2de orde	1168 kNm
Maximaal dwarskracht	171 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	305 kN
Spanning tgv normaalkracht	0.5 N/mm ²
Spanning tgv moment	8.9 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-9.4 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	8.4 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	8.4 Mpa
Benodigde voorspanning SLS	6 Mpa
Benodigde voorspankracht	5257 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-18 Mpa
Na relaxatie	-15 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	5257 kN
Nkabel; benodigd	2
Nkabel; toegepast Buiten	4
Nkabel; toegepast Binnen	1
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	423 mm
Anker circl binnen	-177 mm
Omtrek ankercircl buiten	1330 mm
Omtrek ankercircl binnen	-555 mm
Aantal plaatsbare ankers buitenring	4
Aantal plaatsbare ankers binnenring	-1

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	171 kN
Max. dwarskracht / doorsnede	162 kN
Maximale optredende afschuiving in de wand	162 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1048 mm
fywd	478 Mpa
VRD,S	2663 kN
Toetsing afschuiving door dwarskracht	0.06 0

Toetsing betonspanning	0.42 Voldoet
Toetsing afschuiving in wand	0.06 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiag	30 21,8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1048 mm
z (torsie)	1885 mm
fywd	478 Mpa
VRD,max (dwarskracht)	2663 kN
VRD,max (torsie)	4790 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4S400

Bijlage E

Segment **6**
Lengte **3.3 m**
Gewicht **4.3 ton**

Betonklasse **A** Voldoet
Voorspananker **FeP1860**
Nkabel; `toegepast Buiten **3** Voldoet
Nkabel; `toegepast Binnen **0**
Dwarswapening **12** rond
Materiaal **550** Fb550
Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	6
Ingevulde wanddikte	150
	Voet Top
Buitendiameter	883 800 mm
Buitenomtrek	2775 2513 mm
Wanddikte	150 150 mm
Binnendiameter	583 500 mm
Doorsnede	Hol Hol
Omtrek/dikte	18.50 16.76 Verhouding
Oppervlak	345612 306305 mm ²
Weerstandsmoment	54809909 42595579 mm ³
Maximale moment	47 kNm
Maximale moment + 2de orde	51 kNm
Maximaal dwarskracht	20 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	55 kN
Spanning tgv normaalkracht	0.1 N/mm ²
Spanning tgv moment	15.7 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-15.7 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	15.6 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	20 kN
Max. dwarskracht / doorsnede	20 kN
Maximale optredende afschuiving in de wand	20 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sΘ≤45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	872 mm
fywd	478 Mpa
VRD,S	2216 kN
Toetsing afschuiving door dwarskracht	0.01

Toetsing betonspanning	0.75 Voldoet
Toetsing afschuiving in wand	0.01 Voldoet

Voorspanning

Benodigde voorspanning ULS	15.6 Mpa
Benodigde voorspanning SLS	11 Mpa
Benodigde voorspankracht	425 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-31 Mpa
Na relaxatie	-27 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	425 kN
Nkabel; benodigd	1
Nkabel; `toegepast Buiten	3
Nkabel; `toegepast Binnen	0
<i>Ankerverdeling top</i>	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	340 mm
Anker cirkel binnen	-260 mm
Omtrek ankercirkel buiten	1068 mm
Omtrek ankercirkel binnen	-817 mm
Aantal plaatsbare ankers buitenring	3
Aantal plaatsbare ankers binnenring	-2

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sΘ≤45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	872 mm
z (torsie)	2042 mm
fywd	478 Mpa
VRD,max (dwarskracht)	2216 kN
VRD,max (torsie)	5190 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4S450

Bijlage G

Segment	1
Lengte	12 m
Gewicht	99.0 ton
Betonklasse	A Voldoet
Voorspananker	FeP1860
Nkabel; toegepast Buiten	12 Voldoet
Nkabel; toegepast Binnen	8
Dwarswapening	12 rond
Materiaal	550 Fb550
Aantal ringbeugels/meter hoogte	5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Opretende spanningen	
Segment	1
Ingevulde wanddikte	500
	Voet Top
Buitendiameter	2800 2463 mm
Buitenomtrek	8796 7737 mm
Wanddikte	500 500 mm
Binnendiameter	1800 1463 mm
Doorsnede	Hol Hol
Omtrek/dikte	17.59 15.47 Verhouding
Oppervlak	3612832 3083350 mm ²
Weerstandsmoment	1787061321 1284162939 mm ³
Maximale moment	26979 kNm
Maximale moment + 2de orde	29677 kNm
Maximaal dwarskracht	606 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	3769 kN
Spanning tgv normaalkracht	1.0 N/mm ²
Spanning tgv moment	17.0 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-18.1 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	16.3 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning	
Benodigde voorspanning ULS	16.3 Mpa
Benodigde voorspanning SLS	11 Mpa
Benodigde voorspankracht	57171 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-34 Mpa
Na relaxatie	-32 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	57171 kN
Nkabel; benodigd	17
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	2003 mm
Anker circl binnen	1403 mm
Omtrek ankercircl buiten	6292 mm
Omtrek ankercircl binnen	4407 mm
Aantal plaatsbare ankers buitenring	20
Aantal plaatsbare ankers binnenring	14

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	606 kN
Max. dwarskracht / doorsnede	578 kN
Maximale opretende afschuiving in de wand	578 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2470 mm
fywd	478 Mpa
VRD,S	6277 kN
Toetsing afschuiving door dwarskracht	0.09

Afschuiving in wapening door torsie	
Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2470 mm
z (torsie)	942 mm
fywd	478 Mpa
VRD,max (dwarskracht)	6277 kN
VRD,max (torsie)	2395 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

Toetsing betonspanning	0.86 Voldoet
Toetsing afschuiving in wand	0.09 Voldoet

W4S450

Bijlage G

Segment **2**
Lengte **12 m**
Gewicht **77.0 ton**

Betonklasse **A** Voldoet
Voorspananker **FeP1860**
Nkabel; `toegepast Buiten **10** Voldoet
Nkabel; `toegepast Binnen **6**
Dwarswapening **12** rond
Materiaal **550** Fb550
Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2463 2126 mm
Buitenomtrek	7737 6679 mm
Wanddikte	450 450 mm
Binnendiameter	1563 1226 mm
Doorsnede	Hol Hol
Omtrek/dikte	17.19 14.84 Verhouding
Oppervlak	2845701 2369167 mm ²
Weerstandsmoment	1228887464 838895536 mm ³
Maximale moment	19840 kNm
Maximale moment + 2de orde	21824 kNm
Maximaal dwarskracht	576 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	2603 kN
Spanning tgv normaalkracht	0.9 N/mm ²
Spanning tgv moment	17.8 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-18.7 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	17.1 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	576 kN
Max. dwarskracht / doorsnede	548 kN
Maximale optredende afschuiving in de wand	548 kN
Hoek loodrecht dwarskracht/drukdiaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2130 mm
fywd	478 Mpa
VRD,S	5413 kN
Toetsing afschuiving door dwarskracht	0.10

Toetsing betonspanning	0.89 Voldoet
Toetsing afschuiving in wand	0.10 Voldoet

Voorspanning

Benodigde voorspanning ULS	17.1 Mpa
Benodigde voorspanning SLS	12 Mpa
Benodigde voorspankracht	48664 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukszijde	-36 Mpa
Na relaxatie	-33 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	48664 kN
Nkabel; benodigd	15
Nkabel; `toegepast Buiten	10
Nkabel; `toegepast Binnen	6
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1666 mm
Anker cirkel binnen	1066 mm
Omtrek ankercirkel buiten	5233 mm
Omtrek ankercirkel binnen	3348 mm
Aantal plaatsbare ankers buitenring	17
Aantal plaatsbare ankers binnering	11

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2130 mm
z (torsie)	1100 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5413 kN
VRD,max (torsie)	2794 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4S450

Bijlage G

Segment **3**
 Lengte **12 m**
 Gewicht **57.5 ton**

Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	10	Voldoet
Nkabel; toegepast Binnen	4	
Dwarswapening	12 rond	
Materiaal	550 Fb550	
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	2126 1789 mm
Buitenomtrek	6679 5620 mm
Wanddikte	400 400 mm
Binnendiameter	1326 989 mm
Doorsnede	Hol Hol
Omtrek/dikte	16.70 14.05 Verhouding
Oppervlak	2168758 1745172 mm ²
Weerstandsmoment	800472944 509441345 mm ³
Maximale moment	13054 kNm
Maximale moment + 2de orde	14359 kNm
Maximaal dwarskracht	546 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	1697 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	18.1 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-18.9 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	17.5 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	17.5 Mpa
Benodigde voorspanning SLS	12 Mpa
Benodigde voorspankracht	37775 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-36 Mpa
Na relaxatie	-33 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	37775 kN
Nkabel; benodigd	12
Nkabel; toegepast Buiten	10
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1329 mm
Anker cirkel binnen	729 mm
Omtrek ankercirkel buiten	4174 mm
Omtrek ankercirkel binnen	2289 mm
Aantal plaatsbare ankers buitenring	13
Aantal plaatsbare ankers binnenring	7

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	546 kN
Max. dwarskracht / doorsnede	495 kN
Maximale optredende afschuiving in de wand	495 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1790 mm
fywd	478 Mpa
VRD,S	4549 kN
Toetsing afschuiving door dwarskracht	0.11

Toetsing betonspanning	0.89 Voldoet
Toetsing afschuiving in wand	0.11 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1790 mm
z (torsie)	1257 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4549 kN
VRD,max (torsie)	3194 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4S450

Bijlage G

Segment 4
Lengte 12 m
Gewicht 36.4 ton

Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	8	Voldoet
Nkabel; toegepast Binnen	2	
Dwarswapening	12 rond	
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen		0	
Segment	4		
Ingevulde wanddikte	300		
	Voet	Top	
Buitendiameter	1789	1452	mm
Buitentrek	5620	4561	mm
Wanddikte	300	300	mm
Binnendiameter	1189	852	mm
Doorsnede	Hol	Hol	
Omtrek/dikte	18.73	15.20	Verhouding
Oppervlak	1403127	1085438	mm ²
Weerstandsmoment	452295265	264759799	mm ³
Maximale moment	6882		kNm
Maximale moment + 2de orde	7570		kNm
Maximaal dwarskracht	493		kN
Maximaal torsiemoment	0		kNm
Maximaal normaalkracht	1010		kN
Spanning tgv normaalkracht	0.7		N/mm ²
Spanning tgv moment	16.9		N/mm ²
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-17.7		Mpa
Toelaatbare spanning	-36.7		Komende uit betonklasse
Maximale trekspanning	16.4		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning	
Benodigde voorspanning ULS	16.4 Mpa
Benodigde voorspanning SLS	11 Mpa
Benodigde voorspankracht	22877 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-34 Mpa
Na relaxatie	-30 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	22877 kN
Nkabel; benodigd	7
Nkabel; toegepast Buiten	8
Nkabel; toegepast Binnen	2
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	992 mm
Anker cirkel binnen	392 mm
Omtrek ankercirkel buiten	3115 mm
Omtrek ankercirkel binnen	1231 mm
Aantal plaatsbare ankers buitenring	10
Aantal plaatsbare ankers binnenring	4

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	493	kN
Max. dwarskracht / doorsnede	491	kN
Maximale optredende afschuiving in de wand	491	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ θ ≤ 45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm ²
s	200	mm
z (horende max. dwarskracht)	1750	mm
fywd	478	Mpa
VRD,S	4447	kN
Toetsing afschuiving door dwarskracht	0.11	

Toetsing betonspanning	0.83	Voldoet
Toetsing afschuiving in wand	0.11	Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	0	kNm
Maximaal afschuiving torsie / doorsnede	0	kN
Maximaal dwarskracht bij torsie	0	kN
Max. afschuiving wand door dwarskracht	0	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ θ ≤ 45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm ²
s	200	mm
z (dwarskracht)	1750	mm
z (torsie)	1571	mm
fywd	478	Mpa
VRD max (dwarskracht)	4447	kN
VRD max (torsie)	3992	kN
Toetsing afschuiving door dwarskracht	0.00	
Toetsing afschuiving door torsie	0.00	
Totaal	0.00	

W4S450

Bijlage G

Segment 5
Lengte 12 m
Gewicht 19.8 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 4 Voldoet
Nkabel; toegepast Binnen 1
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	5
Ingevulde wanddikte	200
	Voet Top
Buitendiameter	1452 1115 mm
Buitenomtrek	4561 3502 mm
Wanddikte	200 200 mm
Binnendiameter	1052 715 mm
Doorsnede	Hol Hol
Omtrek/dikte	22.80 17.51 Verhouding
Oppervlak	786457 574664 mm ²
Weerstandsmoment	217611459 112976275 mm ³
Maximale moment	2498 kNm
Maximale moment + 2de orde	2748 kNm
Maximaal dwarskracht	342 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	525 kN
Spanning tgv normaalkracht	0.7 N/mm ²
Spanning tgv moment	12.9 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-13.6 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	12.2 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	342 kN
Max. dwarskracht / doorsnede	342 kN
Maximale optredende afschuiving in de wand	342 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8 ≤ θ ≤ 45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1430 mm
fywd	478 Mpa
VRD,S	3634 kN
Toetsing afschuiving door dwarskracht	0.09 0

Toetsing betonspanning	0.63 Voldoet
Toetsing afschuiving in wand	0.09 Voldoet

Voorspanning

Benodigde voorspanning ULS	12.2 Mpa
Benodigde voorspanning SLS	8 Mpa
Benodigde voorspankracht	9639 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-26 Mpa
Na relaxatie	-23 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	9639 kN
Nkabel; benodigd	3
Nkabel; toegepast Buiten	4
Nkabel; toegepast Binnen	1
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	655 mm
Anker circl binnen	55 mm
Omtrek ankercircl buiten	2057 mm
Omtrek ankercircl binnen	172 mm
Aantal plaatsbare ankers buitenring	6
Aantal plaatsbare ankers binnenring	0

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiag	30 21,8 ≤ θ ≤ 45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1430 mm
z (torsie)	1885 mm
fywd	478 Mpa
VRD,max (dwarskracht)	3634 kN
VRD,max (torsie)	4790 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W4S450

Bijlage G

Segment 6
Lengte 11.2 m
Gewicht 14.5 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 3 Voldoet
Nkabel; toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	6
Ingevulde wanddikte	150
	Voet Top
Buitendiameter	1115 800 mm
Buitenomtrek	3502 2513 mm
Wanddikte	150 150 mm
Binnendiameter	815 500 mm
Doorsnede	Hol Hol
Omtrek/dikte	23.34 16.76 Verhouding
Oppervlak	454560 306305 mm ²
Weerstandsmoment	97159943 42595579 mm ³
Maximale moment	272 kNm
Maximale moment + 2de orde	299 kNm
Maximaal dwarskracht	35 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	176 kN
Spanning tgv normaalkracht	0.4 N/mm ²
Spanning tgv moment	16.9 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-17.3 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	16.6 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	35 kN
Max. dwarskracht / doorsnede	35 kN
Maximale optredende afschuiving in de wand	35 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sΘ≤45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1090 mm
fywd	478 Mpa
VRD,S	2770 kN
Toetsing afschuiving door dwarskracht	0.01

Toetsing betonspanning	0.83 Voldoet
Toetsing afschuiving in wand	0.01 Voldoet

Voorspanning

Benodigde voorspanning ULS	16.6 Mpa
Benodigde voorspanning SLS	11 Mpa
Benodigde voorspankracht	1290 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-34 Mpa
Na relaxatie	-30 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	1290 kN
Nkabel; benodigd	1
Nkabel; toegepast Buiten	3
Nkabel; toegepast Binnen	0
<i>Ankerverdeling top</i>	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	340 mm
Anker cirkel binnen	-260 mm
Omtrek ankercirkel buiten	1068 mm
Omtrek ankercirkel binnen	-817 mm
Aantal plaatsbare ankers buitenring	3
Aantal plaatsbare ankers binnenring	-2

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sΘ≤45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1090 mm
z (torsie)	2042 mm
fywd	478 Mpa
VRD,max (dwarskracht)	2770 kN
VRD,max (torsie)	5190 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W6HL400

Bijlage J

Segment	1	
Lengte	12 m	
Gewicht	130.0 ton	
Betonklasse	B	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	25	Voldoet
Nkabel; toegepast Binnen	8	
Dwarswapening	12	rond
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen			
Segment	1		
Ingevulde wanddikte	500		
	Voet Top		
Buitendiameter	3500	2954 mm	
Buitenomtrek	10996	9279 mm	
Wanddikte	500	500 mm	
Binnendiameter	2500	1954 mm	
Doorsnede			
Omtrek/dikte	21.99	18.56	Verhouding
Oppervlak	4712389	3854146	mm ²
Weerstandsmoment	3113542719	2045500477	mm ³
Maximale moment	64856		kNm
Maximale moment + 2de orde	71341		kNm
Maximaal dwarskracht	1676		kN
Maximaal torsiemoment	3993683		kNm
Maximaal normaalkracht	4325		kN
Spanning tgv normaalkracht	0.9		N/mm ²
Spanning tgv moment	24.1		N/mm ²
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-25.0		Mpa
Toelaatbare spanning	-46.7		Komende uit betonklasse
Maximale trekspanning	23.4		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning	
Benodigde voorspanning ULS	23.4 Mpa
Benodigde voorspanning SLS	24 Mpa
Benodigde voorspankracht	104732 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-48 Mpa
Na relaxatie	-44 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	104732 kN
Nkabel; benodigd	31
Nkabel; toegepast Buiten	25
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	2494 mm
Anker circl binnen	1894 mm
Omtrek ankercircl buiten	7834 mm
Omtrek ankercircl binnen	5949 mm
Aantal plaatsbare ankers buitenring	26
Aantal plaatsbare ankers binnenring	19

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	1676 kN
Max. dwarskracht / doorsnede	1665 kN
Maximale optredende afschuiving in de wand	1665 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2947 mm
fywd	478 Mpa
VRD,S	7488 kN
Toetsing afschuiving door dwarskracht	0.22

Afschuiving in wapening door torsie	
Maximaal torsie	3993683 kNm
Maximaal afschuiving torsie / doorsnede	3265 kN
Maximaal dwarskracht bij torsie	754 kN
Max. afschuiving wand door dwarskracht	754 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2947 mm
z (torsie)	7686 mm
fywd	478 Mpa
VRD,max (dwarskracht)	7488 kN
VRD,max (torsie)	19533 kN
Toetsing afschuiving door dwarskracht	0.10
Toetsing afschuiving door torsie	0.17
Totaal	0.27

Toetsing betonspanning	0.94	Voldoet
Toetsing afschuiving in wand	0.27	Voldoet

W6HL400

Bijlage J

Segment 2
Lengte 12 m
Gewicht 90.7 ton

Betonklasse B Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 18 Voldoet
Nkabel; toegepast Binnen 8
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2954 2407 mm
Buitenotrek	9279 7563 mm
Wanddikte	450 450 mm
Binnendiameter	2054 1507 mm
Doorsnede	Hol Hol
Omtrek/dikte	20.62 16.81 Verhouding
Oppervlak	3539417 2766999 mm ²
Weerstandsmoment	1938490433 1159021738 mm ³
Maximale moment	44063 kNm
Maximale moment + 2de orde	48470 kNm
Maximaal dwarskracht	1665 kN
Maximaal torsiemoment	3993683 kNm
Maximaal normaalkracht	2795 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	25.4 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-26.2 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	24.8 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1665 kN
Max. dwarskracht / doorsnede	1655 kN
Maximale optredende afschuiving in de wand	1655 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2407 mm
fywd	478 Mpa
VRD,S	6116 kN
Toetsing afschuiving door dwarskracht	0.27

Toetsing betonspanning	0.97 Voldoet
Toetsing afschuiving in wand	0.38 Voldoet

Voorspanning

Benodigde voorspanning ULS	24.8 Mpa
Benodigde voorspanning SLS	25 Mpa
Benodigde voorspankracht	87204 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-51 Mpa
Na relaxatie	-45 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	87204 kN
Nkabel; benodigd	26
Nkabel; toegepast Buiten	18
Nkabel; toegepast Binnen	8
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1947 mm
Anker cirkel binnen	1347 mm
Omtrek ankercirkel buiten	6117 mm
Omtrek ankercirkel binnen	4233 mm
Aantal plaatsbare ankers buitenring	20
Aantal plaatsbare ankers binnenring	14

Afschuiving in wapening door torsie

Maximaal torsie	3993683 kNm
Maximaal afschuiving torsie / doorsnede	4082 kN
Maximaal dwarskracht bij torsie	749 kN
Max. afschuiving wand door dwarskracht	749 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2407 mm
z (torsie)	6147 mm
fywd	478 Mpa
VRD,max (dwarskracht)	6116 kN
VRD,max (torsie)	15621 kN
Toetsing afschuiving door dwarskracht	0.12
Toetsing afschuiving door torsie	0.26
Totaal	0.38

W6HL400

Bijlage J

Segment **3**
 Lengte **12 m**
 Gewicht **62.7 ton**

Betonklasse **B** Voldoet
 Voorspananker **FeP1860**
 Nkabel; toegepast Buiten **12** Voldoet
 Nkabel; toegepast Binnen **6**
 Dwarswapening **12** rond
 Materiaal **550** Fb550
 Aantal ringbeugels/meter hoogte **5** Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck		55	70	80
γck		1.5	1.5	1.5
fcd		-36.7	-46.7	-53.3
Trekspanning		0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	2407 1861 mm
Buitenomtrek	7563 5846 mm
Wanddikte	400 400 mm
Binnendiameter	1607 1061 mm
Doorsnede	Hol Hol
Omtrek/dikte	18.91 14.62 Verhouding
Oppervlak	2522386 1835792 mm ²
Weerstandsmoment	1097353430 565808934 mm ³
Maximale moment	24462 kNm
Maximale moment + 2de orde	26908 kNm
Maximaal dwarskracht	1526 kN
Maximaal torsiemoment	3993683 kNm
Maximaal normaalkracht	1709 kN
Spanning tgv normaalkracht	0.7 N/mm ²
Spanning tgv moment	24.9 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-25.6 Mpa
Toelaatbare spanning	-46.7 Komende uit betonklasse
Maximale trekspanning	24.4 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	1526 kN
Max. dwarskracht / doorsnede	1522 kN
Maximale optredende afschuiving in de wand	1522 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2164 mm
fywd	478 Mpa
VRD,S	5498 kN
Toetsing afschuiving door dwarskracht	0.28

Toetsing betonspanning	0.95 Voldoet
Toetsing afschuiving in wand	0.45 Voldoet

Voorspanning

Benodigde voorspanning ULS	24.4 Mpa
Benodigde voorspanning SLS	25 Mpa
Benodigde voorspankracht	61051 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-50 Mpa
Na relaxatie	-44 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	61051 kN
Nkabel; benodigd	18
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	6
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1401 mm
Anker cirkel binnen	801 mm
Omtrek ankercirkel buiten	4401 mm
Omtrek ankercirkel binnen	2516 mm
Aantal plaatsbare ankers buitenring	14
Aantal plaatsbare ankers binnenring	8

Afschuiving in wapening door torsie

Maximaal torsie	3993683 kNm
Maximaal afschuiving torsie / doorsnede	4529 kN
Maximaal dwarskracht bij torsie	687 kN
Max. afschuiving wand door dwarskracht	687 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2164 mm
z (torsie)	5540 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5498 kN
VRD,max (torsie)	14080 kN
Toetsing afschuiving door dwarskracht	0.12
Toetsing afschuiving door torsie	0.32
Totaal	0.45

W6HL400

Bijlage J

Segment	4	
Lengte	12 m	
Gewicht	34.8 ton	
Betonklasse	B	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	8	Voldoet
Nkabel; toegepast Binnen	2	
Dwarswapening	12 rond	
Materiaal	550	Fb550
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen		0	
Segment	4		
Ingevulde wanddikte	300		
	Voet	Top	
Buitendiameter	1861	1315	mm
Buitenomtrek	5846	4130	mm
Wanddikte	300	300	mm
Binnendiameter	1261	715	mm
Doorsnede	Hol	Hol	
Omtrek/dikte	19.49	13.77	Verhouding
Oppervlak	1471092	956146	mm ²
Weerstandsmoment	499290581	203524415	mm ³
Maximale moment	9749		kNm
Maximale moment + 2de orde	10724		kNm
Maximaal dwarskracht	1049		kN
Maximaal torsiemoment	2728723		kNm
Maximaal normaalkracht	854		kN
Spanning tgv normaalkracht	0.6		N/mm ²
Spanning tgv moment	21.7		N/mm ²
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-22.3		Mpa
Toelaatbare spanning	-46.7		Komende uit betonklasse
Maximale trekspanning	21.3		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning	
Benodigde voorspanning ULS	21.3 Mpa
Benodigde voorspanning SLS	22 Mpa
Benodigde voorspankracht	31132 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-44 Mpa
Na relaxatie	-39 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	31132 kN
Nkabel; benodigd	10
Nkabel; toegepast Buiten	8
Nkabel; toegepast Binnen	2
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	855 mm
Anker cirkel binnen	255 mm
Omtrek ankercirkel buiten	2684 mm
Omtrek ankercirkel binnen	800 mm
Aantal plaatsbare ankers buitenring	8
Aantal plaatsbare ankers binnenring	2

Afschuiving in wapening door dwarskracht		(NEN-EN 1992-1-1 Hfst. 6.2.3)	
Max. dwarskracht in segment	1049		kN
Max. dwarskracht / doorsnede	1047		kN
Maximale optredende afschuiving in de wand	1047		kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45	
cot θ	2	hoek	
alfa	80		
cot alfa	0.18		
Asw	113		mm ²
s	200		mm
z (horende max. dwarskracht)	1705		mm
fywd	478		Mpa
VRD,S	4332		kN
Toetsing afschuiving door dwarskracht	0.24		

Afschuiving in wapening door torsie			
Maximaal torsie	2728723 kNm		
Maximaal afschuiving torsie / doorsned	3886 kN		
Maximaal dwarskracht bij torsie	472 kN		
Max. afschuiving wand door dwarskracht	472 kN		
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8≤θ≤45	
cot θ	2	hoek	
alfa	80		
cot alfa	0.18		
Asw	113		mm ²
s	200		mm
z (dwarskracht)	1705		mm
z (torsie)	4412		mm
fywd	478		Mpa
VRD max (dwarskracht)	4332		kN
VRD max (torsie)	11214		kN
Toetsing afschuiving door dwarskracht	0.11		
Toetsing afschuiving door torsie	0.35		
Totaal	0.46		

Toetsing betonspanning	0.83	Voldoet
Toetsing afschuiving in wand	0.46	Voldoet

W6HL400

Bijlage J

Segment 5
Lengte 11.3 m
Gewicht 16.1 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 2 Voldoet
Nkabel; toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	5
Ingevulde wanddikte	150
	Voet Top
Buitendiameter	1315 800 mm
Buitenomtrek	4130 2513 mm
Wanddikte	150 150 mm
Binnendiameter	1015 500 mm
Doorsnede	Hol Hol
Omtrek/dikte	27.53 16.76 Verhouding
Oppervlak	548759 306305 mm ²
Weerstandsmoment	143875802 42595579 mm ³
Maximale moment	1633 kNm
Maximale moment + 2de orde	1797 kNm
Maximaal dwarskracht	561 kN
Maximaal torsiemoment	1438871 kNm
Maximaal normaalkracht	326 kN
Spanning tgv normaalkracht	0.6 N/mm ²
Spanning tgv moment	12.5 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-13.1 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	11.9 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	11.9 Mpa
Benodigde voorspanning SLS	12 Mpa
Benodigde voorspankracht	6618 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-25 Mpa
Na relaxatie	-23 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	6618 kN
Nkabel; benodigd	2
Nkabel; toegepast Buiten	2
Nkabel; toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	340 mm
Anker circl binnen	-260 mm
Omtrek ankercircl buiten	1068 mm
Omtrek ankercircl binnen	-817 mm
Aantal plaatsbare ankers buitenring	3
Aantal plaatsbare ankers binnenring	-2

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	561 kN
Max. dwarskracht / doorsnede	560 kN
Maximale optredende afschuiving in de wand	560 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8 ≤ θ ≤ 45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1219 mm
fywd	478 Mpa
VRD,S	3097 kN
Toetsing afschuiving door dwarskracht	0.18 0

Toetsing betonspanning	0.64 Voldoet
Toetsing afschuiving in wand	0.40 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	1438871 kNm
Maximaal afschuiving torsie / doorsnede	2693 kN
Maximaal dwarskracht bij torsie	252 kN
Max. afschuiving wand door dwarskracht	252 kN
Hoek loodrecht dwarskracht/drukdiag	30 21,8 ≤ θ ≤ 45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1219 mm
z (torsie)	3357 mm
fywd	478 Mpa
VRD,max (dwarskracht)	3097 kN
VRD,max (torsie)	8531 kN
Toetsing afschuiving door dwarskracht	0.08
Toetsing afschuiving door torsie	0.32
Totaal	0.40

W6HL400

Bijlage J

Segment 6
Lengte 0 m
Gewicht 0.0 ton

Betonklasse A Voldoet niet
Voorspananker FeP1860
Nkabel: `toegepast Buiten 2 Voldoet
Nkabel: `toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	6
Ingevulde wanddikte	0
	Voet Top
Buitendiameter	800 800 mm
Buitenomtrek	2513 2513 mm
Wanddikte	0 0 mm
Binnendiameter	0 0 mm
Doorsnede	Solid Solid
Omtrek/dikte	0.00 0.00 Verhouding
Oppervlak	502655 502655 mm2
Weerstandsmoment	50265482 50265482 mm3
Maximale moment	0 kNm
Maximale moment + 2de orde	0 kNm
Maximaal dwarskracht	0 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	0 kN
Spanning tgv normaalkracht	0.0 N/mm2
Spanning tgv moment	21.7 N/mm2
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-21.7 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	21.7 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	21.7 Mpa
Benodigde voorspanning SLS	22 Mpa
Benodigde voorspankracht	0 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukkzijde	-43 Mpa
Na relaxatie	-41 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm2
streng/kabel	19
Akabel	2850 mm2
Benodigde voorspankracht	0 kN
Nkabel; benodigd	0
Nkabel; `toegepast Buiten	2
Nkabel; `toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	340 mm
Anker cirkel binnen	-260 mm
Omtrek ankercirkel buiten	1068 mm
Omtrek ankercirkel binnen	-817 mm
Aantal plaatsbare ankers buitenring	3
Aantal plaatsbare ankers binnenring	-2

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	0 kN
Max. dwarskracht / doorsnede	#N/A kN
Maximale optredende afschuiving in de wand	#N/A kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (horende max. dwarskracht)	#N/A mm
fywd	478 Mpa
VRD,S	#N/A kN
Toetsing afschuiving door dwarskracht	#N/A

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	#N/A kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm2
s	200 mm
z (dwarskracht)	#N/A mm
z (torsie)	#N/A mm
fywd	478 Mpa
VRD,max (dwarskracht)	#N/A kN
VRD,max (torsie)	#N/A kN
Toetsing afschuiving door dwarskracht	#N/A
Toetsing afschuiving door torsie	#N/A
Totaal	#N/A

Toetsing betonspanning	1.12 Voldoet niet
Toetsing afschuiving in wand	#N/A #N/A

W6S400

Bijlage I

Segment 1
Lengte 12 m
Gewicht 83.7 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 12 Voldoet
Nkabel; toegepast Binnen 4
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	1
Ingevulde wanddikte	500
	Voet Top
Buitendiameter	2400 2079 mm
Buitenomtrek	7540 6533 mm
Wanddikte	500 500 mm
Binnendiameter	1400 1079 mm
Doorsnede	Hol Hol
Omtrek/dikte	15.08 13.07 Verhouding
Oppervlak	2984513 2481019 mm ²
Weerstandsmoment	1200022944 818681792 mm ³
Maximale moment	20652 kNm
Maximale moment + 2de orde	22718 kNm
Maximaal dwarskracht	541 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	2904 kN
Spanning tgv normaalkracht	1.0 N/mm ²
Spanning tgv moment	19.2 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-20.2 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	18.5 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	541 kN
Max. dwarskracht / doorsnede	534 kN
Maximale optredende afschuiving in de wand	534 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	2072 mm
fywd	478 Mpa
VRD,S	5266 kN
Toetsing afschuiving door dwarskracht	0.10

Toetsing betonspanning	0.97 Voldoet
Toetsing afschuiving in wand	0.10 Voldoet

Voorspanning

Benodigde voorspanning ULS	18.5 Mpa
Benodigde voorspanning SLS	15 Mpa
Benodigde voorspankracht	54322 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-39 Mpa
Na relaxatie	-36 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	54322 kN
Nkabel; benodigd	16
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	1619 mm
Anker circl binnen	1019 mm
Omtrek ankercircl buiten	5088 mm
Omtrek ankercircl binnen	3203 mm
Aantal plaatsbare ankers buitenring	16
Aantal plaatsbare ankers binnenring	10

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8≤θ≤45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	2072 mm
z (torsie)	942 mm
fywd	478 Mpa
VRD,max (dwarskracht)	5266 kN
VRD,max (torsie)	2395 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W6S400

Bijlage I

Segment 2
Lengte 12 m
Gewicht 60.2 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 12 Voldoet
Nkabel; toegepast Binnen 4
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	2
Ingevulde wanddikte	450
	Voet Top
Buitendiameter	2079 1759 mm
Buitenomtrek	6533 5526 mm
Wanddikte	450 450 mm
Binnendiameter	1179 859 mm
Doorsnede	Hol Hol
Omtrek/dikte	14.52 12.28 Verhouding
Oppervlak	2303603 1850458 mm ²
Weerstandsmoment	791418544 503872866 mm ³
Maximale moment	13897 kNm
Maximale moment + 2de orde	15287 kNm
Maximaal dwarskracht	533 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	1918 kN
Spanning tgv normaalkracht	0.8 N/mm ²
Spanning tgv moment	19.7 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-20.5 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	19.1 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	533 kN
Max. dwarskracht / doorsnede	527 kN
Maximale optredende afschuiving in de wand	527 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1768 mm
fywd	478 Mpa
VRD,S	4493 kN
Toetsing afschuiving door dwarskracht	0.12

Toetsing betonspanning	0.96 Voldoet
Toetsing afschuiving in wand	0.12 Voldoet

Voorspanning

Benodigde voorspanning ULS	19.1 Mpa
Benodigde voorspanning SLS	15 Mpa
Benodigde voorspankracht	43517 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-40 Mpa
Na relaxatie	-35 Mpa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	43517 kN
Nkabel; benodigd	13
Nkabel; toegepast Buiten	12
Nkabel; toegepast Binnen	4
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	1299 mm
Anker cirkel binnen	699 mm
Omtrek ankercirkel buiten	4081 mm
Omtrek ankercirkel binnen	2196 mm
Aantal plaatsbare ankers buitenring	13
Aantal plaatsbare ankers binnering	7

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8sθs45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1768 mm
z (torsie)	1100 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4493 kN
VRD,max (torsie)	2794 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W6S400

Bijlage I

Segment 3
Lengte 12 m
Gewicht 43.5 ton

Betonklasse	A	Voldoet
Voorspananker	FeP1860	
Nkabel; toegepast Buiten	8	Voldoet
Nkabel; toegepast Binnen	2	
Dwarswapening	12 rond	
Materiaal	550 Fb550	
Aantal ringbeugels/meter hoogte	5	Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	3
Ingevulde wanddikte	400
	Voet Top
Buitendiameter	1759 1438 mm
Buitenomtrek	5526 4519 mm
Wanddikte	400 400 mm
Binnendiameter	959 636 mm
Doorsnede	Hol Hol
Omtrek/dikte	13.81 11.30 Verhouding
Oppervlak	1707684 1304889 mm ²
Weerstandsmoment	487057098 280833926 mm ³
Maximale moment	7657 kNm
Maximale moment + 2de orde	8423 kNm
Maximaal dwarskracht	440 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	1175 kN
Spanning tgv normaalkracht	0.7 N/mm ²
Spanning tgv moment	17.7 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-18.4 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	17.2 MPa
Toelaatbare trekspanning	0.0 MPa

Afschuiving in wapening door dwarskracht

(NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	440 kN
Max. dwarskracht / doorsnede	437 kN
Maximale optredende afschuiving in de wand	437 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1608 mm
fywd	478 Mpa
VRD,S	4087 kN
Toetsing afschuiving door dwarskracht	0.11

Toetsing betonspanning	0.88	Voldoet
Toetsing afschuiving in wand	0.11	Voldoet

Voorspanning

Benodigde voorspanning ULS	17.2 Mpa
Benodigde voorspanning SLS	14 Mpa
Benodigde voorspankracht	29002 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukzijde	-36 Mpa
Na relaxatie	-32 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	29002 kN
Nkabel; benodigd	9
Nkabel; toegepast Buiten	8
Nkabel; toegepast Binnen	2
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	978 mm
Anker cirkel binnen	378 mm
Omtrek ankercirkel buiten	3074 mm
Omtrek ankercirkel binnen	1189 mm
Aantal plaatsbare ankers buitenring	10
Aantal plaatsbare ankers binnenring	3

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21.8sΘs45
cot Θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1608 mm
z (torsie)	1257 mm
fywd	478 Mpa
VRD,max (dwarskracht)	4087 kN
VRD,max (torsie)	3194 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

W6S400

Bijlage I

Segment 4
Lengte 12 m
Gewicht 26.4 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 6 Voldoet
Nkabel; toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen		0	
Segment	4		
Ingevulde wanddikte	300		
	Voet	Top	
Buitendiameter	1438	1118	mm
Buitenomtrek	4519	3512	mm
Wanddikte	300	300	mm
Binnendiameter	838	518	mm
Doorsnede	Hol	Hol	
Omtrek/dikte	15.06	11.71	Verhouding
Oppervlak	1072914	770818	mm ²
Weerstandsmoment	258448028	130824088	mm ³
Maximale moment	3090		kNm
Maximale moment + 2de orde	3399		kNm
Maximaal dwarskracht	341		kN
Maximaal torsiemoment	0		kNm
Maximaal normaalkracht	619		kN
Spanning tgv normaalkracht	0.6		N/mm ²
Spanning tgv moment	13.5		N/mm ²
2de orde effect verrekening	10%		
Factor e.g	1.2		
Maximale drukspanning	-14.1		Mpa
Toelaatbare spanning	-36.7		Komende uit betonklasse
Maximale trekspanning	13.1		MPa
Toelaatbare trekspanning	0.0		MPa

Voorspanning	
Benodigde voorspanning ULS	13.1 Mpa
Benodigde voorspanning SLS	10 Mpa
Benodigde voorspankracht	13841 kN
<i>Resulterende betonspanningen</i>	
Trekzijde	0 Mpa
Drukzijde	-27 Mpa
Na relaxatie	-25 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	13841 kN
Nkabel; benodigd	5
Nkabel; toegepast Buiten	6
Nkabel; toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker cirkel buiten	658 mm
Anker cirkel binnen	58 mm
Omtrek ankercirkel buiten	2067 mm
Omtrek ankercirkel binnen	182 mm
Aantal plaatsbare ankers buitenring	6
Aantal plaatsbare ankers binnenring	0

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	341	kN
Max. dwarskracht / doorsnede	339	kN
Maximale optredende afschuiving in de wand	339	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ θ ≤ 45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm ²
s	200	mm
z (horende max. dwarskracht)	1336	mm
fywd	478	Mpa
VRD,S	3395	kN
Toetsing afschuiving door dwarskracht	0.10	

Toetsing betonspanning	0.67	Voldoet
Toetsing afschuiving in wand	0.10	Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	0	kNm
Maximaal afschuiving torsie / doorsnede	0	kN
Maximaal dwarskracht bij torsie	0	kN
Max. afschuiving wand door dwarskracht	0	kN
Hoek loodrecht dwarskracht/drukdiagonaal	30	21,8 ≤ θ ≤ 45
cot θ	2	hoek
alfa	80	
cot alfa	0.18	
Asw	113	mm ²
s	200	mm
z (dwarskracht)	1336	mm
z (torsie)	1571	mm
fywd	478	Mpa
VRD max (dwarskracht)	3395	kN
VRD max (torsie)	3992	kN
Toetsing afschuiving door dwarskracht	0.00	
Toetsing afschuiving door torsie	0.00	
Totaal	0.00	

W6S400

Bijlage I

Segment 5
Lengte 11.9 m
Gewicht 14.2 ton

Betonklasse A Voldoet
Voorspananker FeP1860
Nkabel; toegepast Buiten 2 Voldoet
Nkabel; toegepast Binnen 0
Dwarswapening 12 rond
Materiaal 550 Fb550
Aantal ringbeugels/meter hoogte 5 Voldoet

Keuze Betonklasse	A	B	C	D
	C55/67	C70/85	C80/95	C90/105
fck	55	70	80	90
γck	1.5	1.5	1.5	1.5
fcd	-36.7	-46.7	-53.3	-60.0
Trekspanning	0	0	0	0

Optredende spanningen

Segment	5
Ingevulde wanddikte	150
	Voet Top
Buitendiameter	1118 800 mm
Buitenomtrek	3512 2513 mm
Wanddikte	150 150 mm
Binnendiameter	818 500 mm
Doorsnede	Hol Hol
Omtrek/dikte	23.41 16.76 Verhouding
Oppervlak	456095 306305 mm ²
Weerstandsmoment	97845832 42595579 mm ³
Maximale moment	388 kNm
Maximale moment + 2de orde	427 kNm
Maximaal dwarskracht	185 kN
Maximaal torsiemoment	0 kNm
Maximaal normaalkracht	240 kN
Spanning tgv normaalkracht	0.5 N/mm ²
Spanning tgv moment	4.5 N/mm ²
2de orde effect verrekening	10%
Factor e.g	1.2
Maximale drukspanning	-5.0 Mpa
Toelaatbare spanning	-36.7 Komende uit betonklasse
Maximale trekspanning	4.0 MPa
Toelaatbare trekspanning	0.0 MPa

Voorspanning

Benodigde voorspanning ULS	4.0 Mpa
Benodigde voorspanning SLS	3 Mpa
Benodigde voorspankracht	1842 kN
Resulterende betonspanningen	
Trekzijde	0 Mpa
Drukszijde	-9 Mpa
Na relaxatie	-8 MPa
Keuze voorspankabels	FeP1860
Toelaatbare spanning	1200 MPa
Astreng	150 mm ²
streng/kabel	19
Akabel	2850 mm ²
Benodigde voorspankracht	1842 kN
Nkabel; benodigd	1
Nkabel; toegepast Buiten	2
Nkabel; toegepast Binnen	0
Ankerverdeling top	
Gegeven E6-19	
Randafstand ankers	230 mm
Minimale hoh-afstand ankers	300 mm
Anker circl buiten	340 mm
Anker circl binnen	-260 mm
Omtrek ankercircl buiten	1068 mm
Omtrek ankercircl binnen	-817 mm
Aantal plaatsbare ankers buitenring	3
Aantal plaatsbare ankers binnenring	-2

Afschuiving in wapening door dwarskracht (NEN-EN 1992-1-1 Hfst. 6.2.3)

Max. dwarskracht in segment	185 kN
Max. dwarskracht / doorsnede	185 kN
Maximale optredende afschuiving in de wand	185 kN
Hoek loodrecht dwarskracht/drukdiagonaal	30 21,8 ≤ θ ≤ 45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (horende max. dwarskracht)	1064 mm
fywd	478 Mpa
VRD,S	2704 kN
Toetsing afschuiving door dwarskracht	0.07 0

Toetsing betonspanning	0.23 Voldoet
Toetsing afschuiving in wand	0.07 Voldoet

Afschuiving in wapening door torsie

Maximaal torsie	0 kNm
Maximaal afschuiving torsie / doorsnede	0 kN
Maximaal dwarskracht bij torsie	0 kN
Max. afschuiving wand door dwarskracht	0 kN
Hoek loodrecht dwarskracht/drukdiag	30 21,8 ≤ θ ≤ 45
cot θ	2 hoek
alfa	80
cot alfa	0.18
Asw	113 mm ²
s	200 mm
z (dwarskracht)	1064 mm
z (torsie)	2042 mm
fywd	478 Mpa
VRD,max (dwarskracht)	2704 kN
VRD,max (torsie)	5190 kN
Toetsing afschuiving door dwarskracht	0.00
Toetsing afschuiving door torsie	0.00
Totaal	0.00

Engineering ZW380 Constructieberekening funderingen voor betonnen en hybride masten ten behoeve van vergunningaanvraag

TenneT TSO B.V.

Rapport nr.: 13-3180, revisie 6.0

Datum: 2015-04-22



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betonnen en hybride masten ten behoeve van
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DNV GL - Energy
KEMA Nederland B.V.
Postbus 9035
6800 ET ARNHEM

Tel: +31 26 356 9111
KvK 09080262


Auteur:


E.J. Platenkamp

Beoordeeld:


A.J.P. van der Wekken

Goedgekeurd:


A. van der Wal

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Inhoud

1	INLEIDING.....	1
2	UITGANGSPUNTEN.....	1
2.1	Gebruikte normen	2
2.2	Materiaal typeringen mast	2
2.3	Constructie typering	2
3	ONTWERP FUNDERINGFAMILIE.....	2
3.1	Funderingsprincipe	3
3.2	Materialen	4
3.3	Overige uitgangspunten	4
3.4	Voorspanning	5
3.5	Berekening onderplaat betonfundering	6
3.6	Ondersteuning betonpoer	6
3.7	Fundering belastingen	7
3.8	ZW380 fundering afmetingen	7
Appendix A	Berekening W2S400	
Appendix B	Berekening W2H400	
Appendix C	Berekening W4S350	
Appendix D	Berekening W4H350	
Appendix E	Berekening W4S400	
Appendix F	Berekening W4H400	
Appendix G	Berekening W4S450	
Appendix H	Berekening W4H450	
Appendix I	Berekening W6S400	
Appendix J	Berekening W6HL400	
Appendix K	Voorbeeld sondering	
Appendix L	Voorbeeld berekening fundering W2S400	

1 INLEIDING

Dit document geeft een samenvatting van de ontwerpbelastingen en berekeningen van de funderingen gebaseerd op de hieronder genoemde betonnen en hybriden masttypen, geschikt voor de bouwaanvraag:

- steunmast geschikt voor twee-circuits, 2 x 380 kV, 400 meter veldlengte; type W2S400
- hoekmast geschikt voor twee-circuits, 2 x 380 kV, 400 meter veldlengte, lijnhoek van 130 graden, type W2HL400
- steunmast geschikt voor vier-circuits, 2 x 380 kV en 2x 150 kV, 350 meter veldlengte; type W4S350
- hoekmast geschikt voor vier-circuits, 2 x 380 kV en 2x 150 kV, 350 meter veldlengte, lijnhoek van 130 graden, type W4HL350
- steunmast geschikt voor vier-circuits, 2 x 380 kV en 2x 150 kV, 400 meter veldlengte; type W4S400
- hoekmast geschikt voor vier-circuits, 2 x 380 kV en 2x 150 kV, 400 meter veldlengte, lijnhoek van 130 graden, type W4HL400
- steunmast geschikt voor vier-circuits, 2 x 380 kV en 2x 150 kV, 450 meter veldlengte; type W4S450
- hoekmast geschikt voor vier-circuits, 2 x 380 kV en 2x 150 kV, 450 meter veldlengte, lijnhoek van 150 graden, type W4HK450
- steunmast geschikt voor vier-circuits, 4 x 380 kV, 400 meter veldlengte; type W6S400
- hoekmast geschikt voor vier-circuits, 4 x 380kV, 400 meter veldlengte, lijnhoek van 130 graden, type W6HL400.

De ontwerpbelastingen voor de betonnen Wintrack masten zijn gebaseerd op de DNV GL vergunningsdocumenten voor de stalen varianten.

Voor alle masttypes zijn de ontwerpbelastingen bepaald. De belastingen zijn zo opgesteld dat deze niet locatie specifiek worden bepaald maar generiek met maximale veldlengte en maximale lijnhoek, tussen opeenvolgende masten. Het effect op de belastingen door verschil in hoogte van opeenvolgende masten wordt niet meegenomen.

2 UITGANGSPUNTEN

De in dit document gepresenteerde belastingen zijn niet bepaald op basis van analyse van alle door NEN-EN 50341 voorgeschreven belastinggevallen maar door DNV GL zijn die belastinggevallen of combinaties daarvan geselecteerd die de maatgevende belastingen veroorzaken.

Voor steunmasten met een verhoging tot maximaal 10 meter geldt dat deze berekend worden voor een maximale lijnhoek van 2 x 2.5. Voor hoekmasten wordt er een onderscheid gemaakt in de maximaal toelaatbare hoek op de mast, kenbaar gemaakt met een codering in het masttype met K (150°), L (130°) en M (120°).

Overige uitgangspunten en aannames zijn:

- trekparameter bij 10 °C : 1800 m
- geleider 380 kV : 4 bundel AMS620
- geleider 150 kV : 2 bundel AMS620
- bliksemgeleider/OPGW : 1 bundel BRUGG OPGW 226-AL3/38-A20SA
- retour stroomgeleider : 2 bundel WDI AACSR 242-39 Hawk
- hoogte mast en ophangpunten conform de documenten: 12-00570 rapport "mastafmetingen 4 x 380 kV + 220-380 kV rev 3.0" en 12-00572 rapport "mastafmetingen 2x380+150-380 rev 3.0"
- belastingen zijn inclusief belastingfactor en volgens de NEN-EN 50341-3-15.

2.1 Gebruikte normen

- NEN - EN50341-1, "Bovengrondse elektrische lijnen boven 45 kV wisselspanning – Deel 1: Algemene eisen - Gemeenschappelijke specificaties
- NEN - EN50341-3-15, "Bovengrondse elektrische lijnen boven 45 kV wisselspanning - Deel 3: Verzameling van nationale normatieve aspecten"
- NEN-EN 1990:2002, "Eurocode - Grondslagen van het constructief ontwerp"
- NEN-EN 1992-1-1: Ontwerp en berekening Betonconstructies.

2.2 Materiaal typering mast

- Betonkwaliteit: C55/67, C70/85, C80/95 en C90/105
- wapening Fb550
- nagerekt voorspanstaal kwaliteit FeP1860 uitgaande van 150 mm² per streng
- dekking 50 mm
- levensduur 50 jaar conform NEN-EN 50341
- milieuklasse: XC4, XD3, eventueel XF2 afhankelijk van de locaties
- materiaalfactor van 1,5 voor beton
- materiaalfactor van 1,5 voor voorgerekt en nagerekt staal
- materiaalfactor van 1,15 voor wapeningstaal.

2.3 Constructie typering

Veiligheidsklasse	3	1)	$\gamma_{f,g} = 1.20$	$\gamma_{f,q} = 1.50$
		2)	$\gamma_{f,g} = 1.35$	
Referentie periode	50 jaar			
Windtracé	II		onbebouwd	
IJsgebied	B			

3 ONTWERP FUNDERINGFAMILIE

Het funderingontwerp is gebaseerd op een betonnen poer, samengesteld uit opstort en onderplaat, met een voorgespannen ingestort kooianker. Dit ontwerp is conform de funderingen voor de stalen masten.

Als alternatief voor de betonnen en hybride masten kan ook het funderingsontwerp gebaseerd op een "insertprincipe" worden voorgesteld. Hierbij wordt het onderste betonnen element met voetplaat in de betonnen funderingsplaat gestort. Hierbij is geen opstortpoer, maar enkel een onderplaat aanwezig.

De onderplaat zal eenzelfde diameter hebben als de onderplaat bij ingestorte kooianker principe. De dikte van de plaat zal tussen 1,5 en 2,5 meter liggen en de bovenzijde zal 0,3 meter boven het maaiveld liggen. Beide funderingsprincipes zijn weergegeven in figuur 1.

Aangezien bij deze masten de koppeling tussen mast en fundering, beton op beton is, kan dit een goed alternatief. Echter in dit document zijn alle funderingen gebaseerd op één en dezelfde funderingsontwerp en daarom zijn de "insert ring" varianten niet uitgewerkt.

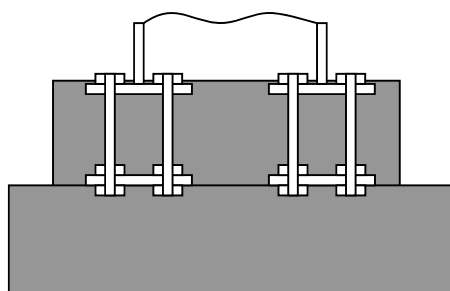
Uitgangspunt voor het funderingsontwerp gebaseerd op een kooianker, is een smalle opstort van 1,8 meter hoogte waarvan 0,3 meter boven maaiveld. Op deze wijze is het grondbeslag minimaal maar is relatief veel ontgraving nodig door de diepe ligging van de grondplaat.

Dit hoofdstuk beschrijft het voorontwerp van de funderingsconstructies. Uitgangspunt is dat zowel de opstort als de onderplaat cirkelvormig is. Voor de opstort is dat om esthetische redenen. Gezien de verschillende richtingen van de maatgevende belastingen is een cirkelvormige onderplaat bij een hoekmast het meest optimaal. Indien de hart op hart afstand van de masten minder is dan 10 meter wordt er een rechthoekige onderplaat toegepast. Deze wordt in de bissectrice van de lijn geprojecteerd.

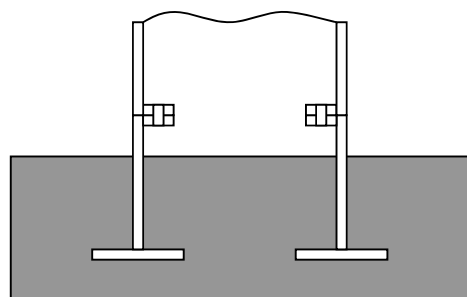
Uitgangspunt is dat betonkwaliteit C38/45 toegepast kan worden en dat naast het gebruikelijke wapeningsstaal geen splijtwapening nodig is. Om de druk op het beton binnen de toelaatbare grenzen te houden zonder toepassing van splijtwapening dient de mastvoetflens voldoende breedte te hebben.

3.1 Funderingsprincipe

Het funderingsprincipe is gebaseerd op een kooianker met een instorting en voorspanning op de bouten.



Figuur 1a Kooianker met instorting en voorspanning



Figuur 1b Insert ring met voetplaat

Een betonfundering met voorgespannen kooianker wordt toegepast in de Wintrack masten te Bleiswijk en is voorzien voor de verbinding Randstad 380 Zuid. Door deze toepassingen is dit principe een bewezen technologie. Op basis van een door KEMA in 2011 gehouden beperkte marktconsultatie blijkt dat een betonfundering met voorgespannen kooianker technisch de voorkeur verdient boven een ingestorte buis zoals wel bij windturbines wordt toegepast.

Het uitgangspunt is een betonnen fundering op palen met een kooianker als instortdeel. Het betondeel is opgebouwd uit een relatief smalle opstort met een brede onderplaat. In het standaard ontwerp heeft de opstort een hoogte van 1,8 meter waarvan 1,5 meter onder maaiveld, zoals weergegeven in tabel 1.

De hoogte van de funderingsopstort wordt bepaald aan de hand van de locatie, het gebruik van de naastgelegen grond en eventuele begrenzingen aan de ontgravingdiepte. In landbouwgebied wordt een opstort hoogte van 1,8 m aangehouden en voor gronden, zoals langs infrastructuur, die niet in gebruik zijn kan een lagere opstort aangehouden worden.

Tabel 1 Toepassing fundering

Hoogte van de opstort	Opstort	Gronddekking opstort meter boven maaiveld
[m]	[m]	[m]
1.8	1.5	0.3

3.2 Materialen

De materialen dienen minimaal te voldoen aan:

- kooi-ankers staalkwaliteit 8.8, bouttypes M42 en M48
- beton C38/45, milieuklasse XC4 en XF3, consistentieklasse 3
- ondersabeling met krimprijke gietmortel, kwaliteit vergelijkbaar met C80 of beter
- prefab beton palen afmeting 400 x 400.

Voor zowel de opstort als de funderingsplaat wordt betonkwaliteit C38/45 gehanteerd. Afmetingen van de mastvoetflens en de ankerbouten dienen zo gedimensioneerd te worden dat het aanbrengen van voorspanning niet tot een hogere betonkwaliteit leidt. Een reden dat toch betonkwaliteit C45/55 noodzakelijk kan zijn, is de hoge belasting uit de mast. Het betreft hier dan vooral de dwarskracht geïntroduceerd door het mastvoetmoment. Om deze reden dient de mastvoetdiameter niet kleiner te zijn dan de in dit rapport genoemde afmetingen. Dit geldt eveneens voor de hoogte van de onderplaat, indien de in het vervolg genoemde optimale afmetingen worden aangehouden is geen hogere betonkwaliteit nodig of aanvullende wapening.

Van betonkwaliteit C45/55 en hoger is de kwaliteit in het werk moeilijker te garanderen, om deze reden dient toepassing van betonkwaliteit C45/55 en hoger zoveel mogelijk vermeden te worden en bij voorkeur niet worden toegepast.

Een hogere betonkwaliteit, en extra wapening, voor de onderplaat is nodig indien de onderplaat dunner wordt gemaakt omdat er door bevoegd gezag beperkingen worden gesteld aan de ontgravingdiepte.

3.3 Overige uitgangspunten

De NW380 mastfunderingen voor speciale mastfunderingen dienen aan een aantal uitgangspunten te voldoen, waarvan de belangrijkste in onderstaande tabel worden samengevat. Uitgangspunt is dat de opstort cirkelvormig moet zijn. Voor de onderplaat is de keuze voor een rechthoekige of cirkelvormige plaat. Per tower site kunnen de onderplaten gekoppeld worden.

Tabel 2 Uitgangspunten fundering

Onderwerp	Uitgangspunten / Aannames
Hoogte fundering boven maaiveld	Bovenkant fundering, met of zonder opstort, 0,3 meter boven maaiveld
Lengte ankerbouten	Minimaal 1,6 waarvan minimaal 1,3 meter ingestort in fundatie
Diameter opstort	Steenmast Ø diameter buis + 2 x 0.75 m, incl. remming van 0.75 m Hoekmast Ø diameter buis + 2 x 1.0 m, incl. remming van 1.0 m
Funderingplaat	Indien rond: Steenmast Ø 8 m tot Ø 10 m, alternatief 6 x 9 m tot 6 x 10 m Hoekmast Ø 12 tot Ø 15 m (± 10%) Indien rechthoekig: Steenmasten: 7 x 23.9 tot 10 x 32.5 m. Hoekmasten: 11 x 19 tot 13 x 37.5 m.
Bovenkant funderingplaat	1,5 meter onder maaiveld Alternatief 1: 0,5 meter onder maaiveld Alternatief 2: geen opstort, 0,3 meter boven maaiveld, afschot bovenplaat 1,5 tot 2%
Hoogte funderingplaat (normale afmetingen)	Conform principetekeningen
Ontgravingsdiepte (optimale afmetingen)	Ontgravingdiepte gelijk aan diepte ligging onderplaat, vermeerderd met 0,4 meter
Gelimiteerde ontgravingsdieptes	3 meter in de meeste provincies 2 meter, onder andere in de provincie Friesland
Ontgravingsoppervlak (maaiveldhoogte)	Oppervlakte van de ontgraving op maaiveldhoogte is gelijk aan: Ø onderplaat + 2x diepteligging onderplaat + rondom 1 meter waarbij beide ontgravingen als een geheel worden uitgevoerd
Hoogte fundering boven maaiveld	Bovenkant fundering, met of zonder opstort, 0,3 meter boven maaiveld

Voor de ontgravingdiepte is 0,4 meter extra genomen ten behoeve van het zandbed en werkvloer.

3.4 Voorspanning

De ankerbouten worden zodanig voorgespannen dat bij een belasting uit mast en geleiders tot de Service Limit State (SLS) de voorspanning niet opgeheven wordt. De SLS belasting is in de ontwerpnorm NEN-EN 50341 gedefinieerd als de maximale belasting uit mast en geleiders zonder toepassing van een belastingsfactor.

De ankerbouten worden gedimensioneerd op de uiterste grenstoestand (ULS) trekbelasting als gedefinieerd in de ontwerpnorm. Deze is 1,5*SLS (of ULS).

De maximale betondruk op de bovenkant van de opstort is de optelsom van de druk door voorspanning, uitwendige belasting uit de mast en een reductie door de afname van voorspanning bij een uitwendige druk. De reductie op de voorspanning is 15%.

De maximale betondruk is gebaseerd op de belasting: $0,85 \cdot SLS + 1,5 \cdot SLS = 2,35 \text{ SLS}$ (of $1,57 \cdot ULS$). De maximale trekbelasting in de ankers blijft $1,5 \cdot SLS$ (of ULS).

De betondruk wordt gemaximeerd op 18,9 MPa, zodat geen splijtwapening nodig is.

3.5 Berekening onderplaat betonfundering

De onderplaat van de fundering wordt op het volledige buig- of kantelmoment uit de mast belast. De kosten van de onderplaat lopen onder de volgende omstandigheden sterk op:

- onder- en bovenwapening niet meer in prefab delen kan worden aangeleverd en door het hoge gewicht matig tot slecht hanteerbaar worden
- ponswapening nodig is.

Voor een kosteneffectieve fundering worden onder- en bovenwapening opgebouwd uit de volgende staven FeB500: $\varnothing 20$ -100 of $\varnothing 25$ -110. Dit type wapening is goed hanteerbaar en levert plaatdiktes waarbij geen splijtwapening nodig is en slechts een beperkte hoeveelheid ponswapening.

Met een omschrijving als $\varnothing 20$ -100, wordt bedoeld wapeningstaal met een diameter van 20 mm en een tussenruimte van 100 mm.

Een minimale plaatdikte kan bereikt worden bij een wapening van $\varnothing 32$ -120, deze is slecht hanteerbaar en wordt enkel in combinatie met splijtwapening en ponswapening toegepast.

Afmeting van de onderplaat dient conform de tekeningen uitgevoerd te worden.

3.6 Ondersteuning betonpoer

De funderingen worden ondersteund door palen. Afhankelijk van de bodemgesteldheid is de lengte van de palen tussen de 15 en 30 meter. De palen staan in schoorstand (1:8) naar buiten gericht. Het aantal palen is sterk verschillend bij steun- en hoekmasten. Voor het aantal benodigde palen wordt verwezen naar vergunningstekeningen. De palen worden gedimensioneerd op de maximaal optredende trekbelasting. De afmetingen van de funderingplaten zijn zodanig gekozen dat prefab betonpalen, vierkant 400 mm, voldoen. Voor de bepaling van de trekcapaciteit en de drukcapaciteit is sondering DKM-39 S01 gehanteerd, deze is opgenomen in appendix K. De paallengte voor deze sondering is 27 meter, deze lengte is gebaseerd op een draagkrachtige laag met een conusweerstand van minimaal 12 MPa met een lengte van minimaal 3 meter. Voor de overige sonderingen dienen de paallengte door de aannemer bepaald te worden. De maximale capaciteiten voor druk- en trekwaarde zijn in onderstaande tabel weergegeven.

Tabel 3 – Druk- en trekcapaciteit

	400 x 400
Max. druk [kN]	1875
Max. trek [kN]	584

3.7 Fundering belastingen

De in tabel 4 gegeven optredende mastvoet momenten en verticaal belastingen dienen als input voor de berekening van het fundament. De constructieberekening van de mastfundering is weergegeven in de bijlagen conform onderstaande tabel. In appendix L wordt de fundering berekening in stappen verder uitgewerkt door middel van een voorbeeld.

Tabel 1 Overzicht optredende belastingen op fundering

Type mast	Gewicht pole	Moment mastvoet
	[kN]	[MNm]
W2S400	1667	14.2
W2HL400	2794	38.6
W4S350	1791	17.2
W4HL350	3267	49.6
W4S400	2862	22.7
W4HL400	3207	59.4
W4S450	3034	29.5
W4HK450	3655	56.7
W6S400	2282	22.4
W6HL400	3344	70.1

3.8 ZW380 fundering afmetingen

Voor alle genoemde Wintrack masten zijn de afmetingen van de funderingen vastgesteld. De gegeven waarden zijn per pylon. Er zijn per mastlocatie 2 pylonen voorzien, dit betekent dat er per mastlocatie 2 funderingen gemaakt dienen te worden, met uitzondering van de 2 circuit eind- en hoekmasten.

Tabel 5 Funderingsafmetingen en tekeningnummer

Type mast	Diameter opstort (m)	Diameter fundatieplaat (m)	Dikte fundatieplaat (m)	Aantal fundatiepalen
W2S400	3.7	8	1.0	8
W2HL400	4.8	19 x 11	1.2	40*
W4S350	3.7	7	1.1	12
W4HL350	5	11	1.3	16
W4S400	3.9	9	1.1	10
W4HL400	5.2	12	1.4	12
W4S450	4.3	10	1.2	12
W4HK450	5.3	12	1.4	16
W6S400	3.9	9	1.1	10
W6HL400	5.5	13	1.6	18

* Fundatie niet rond in verband met hart op hart afstand van de pylonen. Fundatie worden rechthoekig uitgevoerd. Aantal palen gelden voor 2 pylonen



APPENDIX A

Berekening W2S400



APPENDIX B

Berekening W2H400



APPENDIX C

Berekening W4S350



APPENDIX D

Berekening W4H350



APPENDIX E

Berekening W4S400



APPENDIX F
Berekening W4H400



APPENDIX G

Berekening W4S450



APPENDIX H

Berekening W4H450



APPENDIX I

Berekening W6S400



APPENDIX J

Berekening W6HL400



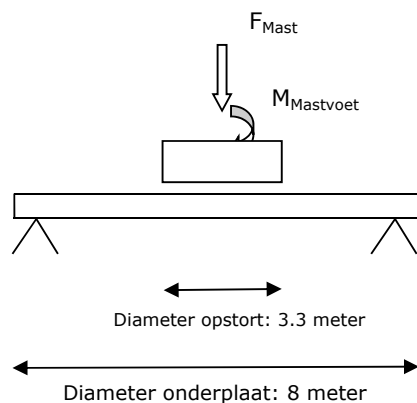
APPENDIX K

Voorbeeld sondering

APPENDIX L

Voorbeeld berekening fundering W2S400

Het fundament van mast W2S400 wordt als voorbeeld uitgewerkt. In onderstaande figuur is schematisch de fundering weergegeven. Het buigmoment op de fundering is voor mast W2S400 gelijk aan 13.253 kNm.



Eigen gewicht opstort

Afmetingen van de opstort:

Diameter: 3.7 meter

Hoogte: 1.8 meter

Eigen gewicht opstort: $1.8 * 0.25 * \pi * 3.7^2 * 19.6 = 379 \text{ kN}$

Er wordt in de berekening van de fundering een conservatief eigen gewicht van beton gehanteerd van $2000 \text{ kg/m}^3 = 19.6 \text{ kN/m}^3$.

Eigen gewicht onderplaat

Er wordt in de berekening van de fundering een conservatief eigen gewicht van beton gehanteerd van $2000 \text{ kg/m}^3 = 19.6 \text{ kN/m}^3$.

Afmetingen van de onderplaat:

Diameter: 8.0 meter

Hoogte: 1.0 meter

Eigen gewicht onderplaat: $1.0 * 0.25 * \pi * 8.0^2 * 19.6 = 986 \text{ kN}$

Optredende krachten

De optredende krachten zijn de maatgevende belastingen die optreden vanuit de mastvoet op de fundering. Hierin zijn alle belastingcombinaties meegenomen voor het bepalen van de maximale belastingen. Hierbij is rekening gehouden met bijvoorbeeld:

- belastingfactoren van wind en eigen gewicht conform de NEN-EN 50341

- wind op de pyloon conform de NEN-EN 50341
- belastingen uit geleiders.

Moment

Voor het bepalen van de druk en trekkracht op de palen is het moment de meest bepalende factor.

Het funderingsblok zelf geeft een moment tegengesteld aan het moment aan mastvoet. Het tegenwerkende moment is afhankelijk van het kantelpunt van de fundering. Voor opstort van de ZWW2S400 is deze als volgt bepaald.

$$M_{d;tegen} = 0.6 * \frac{(D_{onderplaat} - 2 * Randafstand)}{2} * e * g_{opstort}$$

$$M_{d;tegen} = 0.6 * \frac{(8.0 - 2 * 1)}{2} * 379$$

$$M_{d;tegen} = 682 \text{ kNm}$$

Het zwaartepunt van de palen is gesteld op 0.6 (zwaartepunt van een halve cirkel). Voor de onderplaat is eenzelfde berekening uitgevoerd wat een tegenwerkend moment oplevert van 1775 kNm. Hierbij is geen rekening gehouden met de opwaartse kracht van het water.

Er wordt als conservatief uitgangspunt genomen voor de trekbelasting dat het grondwater tot aan het maaiveld staat. Dit levert dan een reductie van 50% voor de opwaartse kracht van het water (eigen gewicht beton 2000 kg/m³, eigen gewicht water = 1000 kg/m³). Het totaal tegenwerkend moment wordt dan

$$M_{d;tegen;tot} = 1775 - 682 = 1093 \text{ kNm}$$

Het resulterende moment is gelijk aan het optredende moment aan de mastvoet minus het tegenwerkende moment rekening houdende met de reductie door de opwaartse kracht van het water.

$$M_{d;tot} = 13253 - 1093 = 12160 \text{ kNm}$$

De optredende reactiekracht vanuit het moment op de palen is afhankelijk van de schoorstand van de palen en de hart op hart afstand van de palen, afstand a.

$$F = \frac{M_{d;tot}}{a} = \frac{12160 \text{ kNm}}{(8-2*1)} = 2027 \text{ kN}$$

Verticaal

Voor de bepaling van de reactiekracht op de palen is een conservatieve waarde aangehouden van alleen het eigen gewicht van de pyloon en het eigen gewicht van de fundering welke zich verdeelt over de 2 palen, aan beide zijden van de fundering.

$$F = \frac{F_{mast} + F_{fund}}{2} = \frac{1667 + 1365}{2} = 1516 \text{ kN}$$

Maximale paalbelastingen

De maximale optredende drukbelasting op de palen is de sommatie van de optredende krachten uit de verticaalbelasting en het moment. $F_{druk,tot} = 1516 + 2027 = 3543$ kN. De maximale optredende trekbelasting op de palen is de optredende kracht uit het moment minus de optredende reactie kracht van de verticaalbelasting en het moment. $F_{trek,tot} = 1516 - 2048 = 511$ kN.

De paalschoorstand dient in rekening gebracht te worden. Er wordt vanuit gegaan dat er een paalschoorstand toegepast wordt van 8:1 (7.125 deg). Dit levert dan een optredende kracht op van

$$F_{druk;schoor} = \frac{F_{druk}}{\cos\alpha} = \frac{3543}{\cos(7.125)} = 3571 \text{ kN}$$

$$F_{trek;schoor} = \frac{F_{trek}}{\cos\alpha} = \frac{511}{\cos(7.125)} = 515 \text{ kN}$$

Het aantal palen is gebaseerd op de optredende belasting in de palen gedeeld door de maximale capaciteit van de palen zoals eerder bepaald.

$$Aantal \text{ palen } druk = \frac{3543}{1875 * 0.6} = 3.2 = 4 \text{ palen}$$

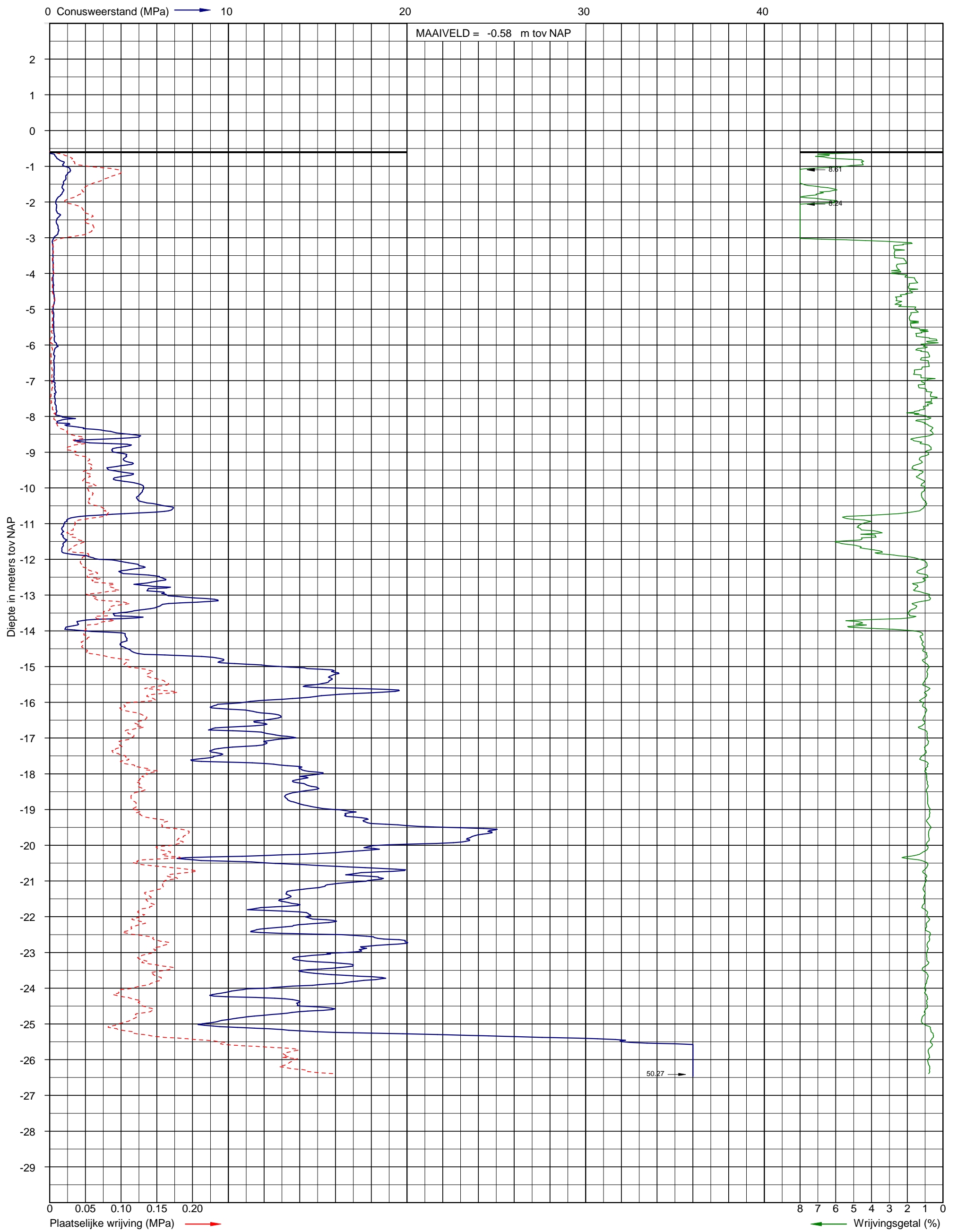
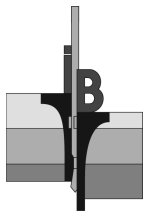
$$Aantal \text{ palen } trek = \frac{511}{584 * 0.6} = 1.5 = 2 \text{ palen}$$

Het aantal palen gecorrigeerd voor het feit dat het zwaartepunt van alle palen niet op de rand van de fundering ligt maar op ongeveer 0.6 van de rand (zwaartepunt halve cirkel). Het aantal palen is het maximum van de benodigde trek- of drukpalen. Het maximum geldt voor een zijde van de mast. Het totaal aantal palen is 2 x het maximum benodigde palen. Voor de ZWW2S400 is dat 8 palen verdeeld over de onderplaat.



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W2HL400

Bijlage B

Fundatie berekening

Fundatie ontwerp:

Helppaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m

schoorstand		8	:1
a		7.125	graden

Opstort	Diameter	4.6	m
	Hoogte	1.8	m
	Inhoud	29.9	m ³
	e.g.	587	kN

Onderplaat	Diameter	12.0	m
	Hoogte	1.2	m
	Inhoud	136	m ³
	e.g.	2663	kN

Paal afstand tov rand		1	m
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Optreden krachten

e.g. mast		2794	kN
Maximale dwarskracht		969	kN
Maximale verticaal kracht		1196	kN
Maximale moment		38576	kNm

MOMENT:

Tegenmoment uit eigen gewicht:

Opstort		1761	kNm
Onderplaat		7988	kNm

Totaal		4875	kNm
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Moment:

Totaal moment		33702	kNm
$F=M/a$		3370	kN

$F_{M,diag}$		3396	kN
$F_{M,hor}$		421	kN
$F_{M,ver}$		3370	kN

Vertikaal:

F_{mast}		3353	kN
F_{tund}		1625	kN
F_{grond}		1158	kN
F_{totaal}		3068	kN

reductie door opwaarste kracht water
reductie door grond (1200 kg/m³)
per zijde

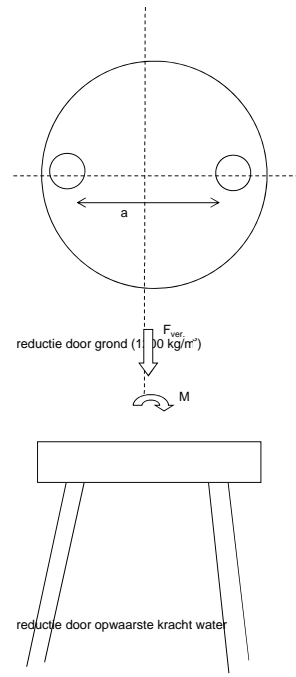
$F_{M,diag}$		3092	kN
$F_{M,hor}$		383	kN
$F_{M,ver}$		3068	kN

Maximale paalbelastingen:

Trekbelasting:		302	kN
Drukbelasting:		6438	kN

Aantal palen	trek	1	aantal	per zijde
	druk	6	aantal	per zijde

Totaal aantal	palen	12	per mastlocatie
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W2S400

Bijlage A

Fundatie berekening

Fundatie ontwerp:

Helppaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m

schoorstand		8	:1
a		7.125	graden

Opstort	Diameter	3.3	m
	Hoogte	1.8	m
	Inhoud	15.4	m ³
	e.g.	302	kN

Onderplaat	Diameter	8.0	m
	Hoogte	1.0	m
	Inhoud	50	m ³
	e.g.	986	kN

Paal afstand tov rand		1	m
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Optreden krachten

e.g. mast		1667	kN
Maximale dwarskracht		370	kN
Maximale verticaal kracht		714	kN
Maximale moment		14253	kNm

MOMENT:

Tegenmoment uit eigen gewicht:

Opstort		544	kNm
Onderplaat		1775	kNm

Totaal		1159	kNm
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Moment:

Totaal moment		13094	kNm
$F=M/a$		2182	kN

$F_{M,diag}$		2199	kN
$F_{M,hor}$		273	kN
$F_{M,ver}$		2182	kN

Vertikaal:

F_{mast}		2000	kN
F_{tund}		644	kN
F_{grond}		501	kN
F_{totaal}		1572	kN

reductie door opwaarste kracht water
reductie door grond (1200 kg/m³)
per zijde

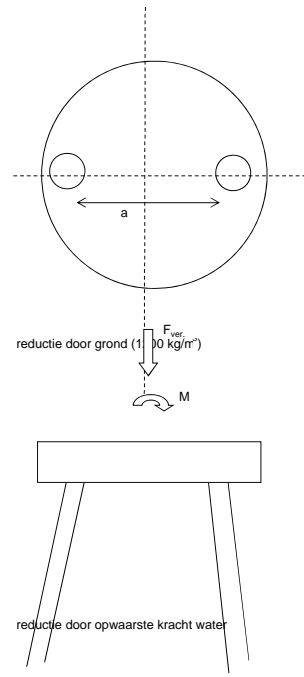
$F_{M,diag}$		1585	kN
$F_{M,hor}$		197	kN
$F_{M,ver}$		1572	kN

Maximale paalbelastingen:

Trekbelasting:		610	kN
Drukbelasting:		3755	kN

Aantal palen	trek	2	aantal	per zijde
	druk	4	aantal	per zijde

Totaal aantal	palen	8	per mastlocatie
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W4HK450

Bijlage H

Fundatie berekening

Fundatie ontwerp:

Helppaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m

schoorstand		8	:1
a		7.125	graden

Opstort	Diameter	5.3	m
	Hoogte	1.8	m
	Inhoud	39.7	m ³
	e.g.	779	kN

Onderplaat	Diameter	12.0	m
	Hoogte	1.4	m
	Inhoud	158	m ³
	e.g.	3107	kN

Paal afstand tov rand		1	m
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Optreden krachten

e.g. mast		3655	kN
Maximale dwarskracht		1152	kN
Maximale verticaal kracht		1248	kN
Maximale moment		56744	kNm

MOMENT:

Tegenmoment uit eigen gewicht:

Opstort		2337	kNm
Onderplaat		9320	kNm

Totaal		5829	kNm
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Moment:

Totaal moment		50915	kNm
$F=M/a$		5092	kN

$F_{M,diag}$		5131	kN
$F_{M,hor}$		636	kN
$F_{M,ver}$		5092	kN

Vertikaal:

F_{mast}		4386	kN
F_{tund}		1943	kN
F_{grond}		1092	kN
F_{totaal}		3711	kN

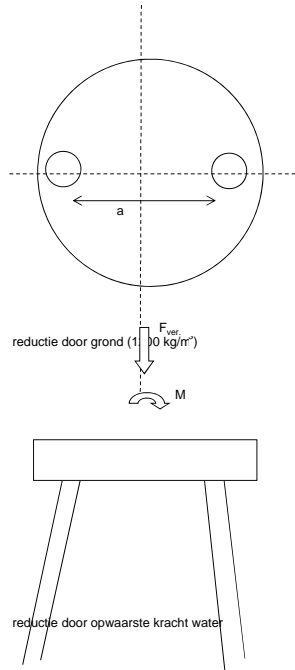
$F_{M,diag}$		3740	kN
$F_{M,hor}$		464	kN
$F_{M,ver}$		3711	kN

Maximale paalbelastingen:

Trekbelasting:		1381	kN
Drukbelasting:		8802	kN

Aantal palen	trek	4	aantal	per zijde
	druk	8	aantal	per zijde

Totaal aantal	palen	16	per mastlocatie
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W4HL400

Bijlage F

Fundatie berekening

Fundatie ontwerp:

Helppaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m

schoorstand		8	:1
a		7.125	graden

Opstort	Diameter	5.2	m
	Hoogte	1.8	m
	Inhoud	38.2	m ³
	e.g.	750	kN

Onderplaat	Diameter	12.0	m
	Hoogte	1.4	m
	Inhoud	158	m ³
	e.g.	3107	kN

Paal afstand tov rand		1	m
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Optreden krachten

e.g. mast	3849	kN
Maximale dwarskracht	1326	kN
Maximale verticaal kracht	1407	kN
Maximale moment	59387	kNm

MOMENT:

Tegenmoment uit eigen gewicht:

Opstort	2250	kNm
Onderplaat	9320	kNm

Totaal	5785	kNm
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Moment:

Totaal moment	53602	kNm
$F=M/a$	5360	kN

$F_{M,diag}$	5402	kN
$F_{M,hor}$	670	kN
$F_{M,ver}$	5360	kN

Vertikaal:

F_{mast}	3849	kN
F_{tund}	1928	kN
F_{grond}	1102	kN
F_{totaal}	3440	kN

reductie door opwaarste kracht water
reductie door grond (1200 kg/m³)
per zijde

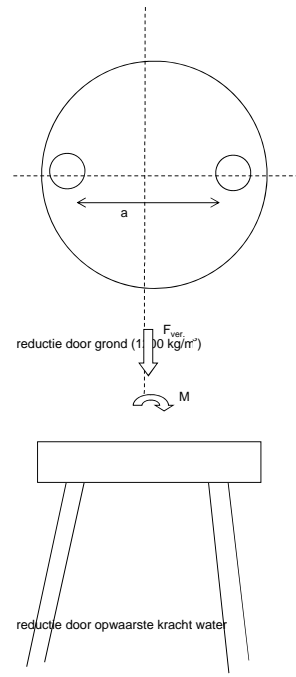
$F_{M,diag}$	3466	kN
$F_{M,hor}$	430	kN
$F_{M,ver}$	3440	kN

Maximale paalbelastingen:

Trekbelasting:	1921	kN
Drukbelasting:	8800	kN

Aantal palen	trek	6	aantal	per zijde
	druk	8	aantal	per zijde

Totaal aantal	palen	12	per mastlocatie
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W4S400

Bijlage E

Fundatie berekening

Fundatie ontwerp:

Helppaal

Afmetingen	b	400	mm
	d	400	mm
ontrek paal	$O_{p, gem}$	1.6	m

schoorstand		8	:1
a		7.125	graden

Opstort	Diameter	3.9	m
	Hoogte	1.8	m
	Inhoud	21.5	m ³
	e.g.	422	kN

Onderplaat	Diameter	9.0	m
	Hoogte	1.1	m
	Inhoud	70	m ³
	e.g.	1373	kN

Paal afstand tov rand		1	m
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Optreden krachten

e.g. mast		2862	kN
Maximale dwarskracht		527	kN
Maximale verticaal kracht		1165	kN
Maximale moment		22666	kNm

MOMENT:

Tegenmoment uit eigen gewicht:

Opstort		886	kNm
Onderplaat		2883	kNm

Totaal		1885	kNm	reductie door opwaartse kracht water
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Moment:

Totaal moment		20781	kNm
$F=M/a$		2969	kN

$F_{M, diag}$		2992	kN
$F_{M, hor}$		371	kN
$F_{M, ver}$		2969	kN

Vertikaal:

F_{mast}		2862	kN	
F_{tund}		897	kN	reductie door opwaartse kracht water
F_{grond}		620	kN	reductie door grond (1200 kg/m ³)
F_{totaal}		2189	kN	per zijde

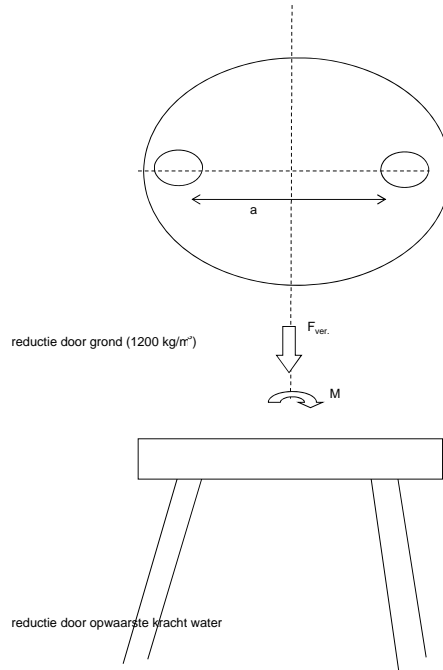
$F_{M, diag}$		2207	kN
$F_{M, hor}$		274	kN
$F_{M, ver}$		2189	kN

Maximale paalbelastingen:

Trekbelasting:		779	kN
Drukbelasting:		5158	kN

Aantal palen	trek	3	aantal	per zijde
	druk	5	aantal	per zijde

Totaal aantal	palen	10	per mastlocatie
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W4S450

Bijlage G

Fundatie berekening

Fundatie ontwerp:

Helppaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m

schoorstand		8	:1
a		7.125	graden

Opstort	Diameter	4.3	m
	Hoogte	1.8	m
	Inhoud	26.1	m ³
	e.g.	513	kN

Onderplaat	Diameter	10.0	m
	Hoogte	1.2	m
	Inhoud	94	m ³
	e.g.	1849	kN

Paal afstand tov rand		1	m
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Optreden krachten

e.g. mast		3043	kN
Maximale dwarskracht		612	kN
Maximale verticaal kracht		1123	kN
Maximale moment		29468	kNm

MOMENT:

Tegenmoment uit eigen gewicht:

Opstort		1231	kNm
Onderplaat		4438	kNm

Totaal		2834	kNm	reductie door opwaarste kracht water
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Moment:

Totaal moment		26634	kNm
$F=M/a$		3329	kN

$F_{M,diag}$		3355	kN
$F_{M,hor}$		416	kN
$F_{M,ver}$		3329	kN

Vertikaal:

F_{mast}		3651	kN	
F_{tund}		1181	kN	reductie door opwaarste kracht water
F_{grond}		768	kN	reductie door grond (1200 kg/m ³)
F_{totaal}		2800	kN	per zijde

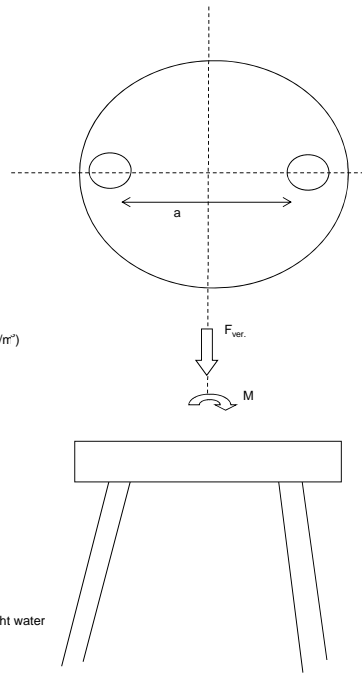
$F_{M,diag}$		2822	kN
$F_{M,hor}$		350	kN
$F_{M,ver}$		2800	kN

Maximale paalbelastingen:

Trekbelasting:		529	kN
Drukbelasting:		6129	kN

Aantal palen	trek	2	aantal	per zijde
	druk	6	aantal	per zijde

Totaal aantal	palen	12	per mastlocatie
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W6HL400

Bijlage J

Fundatie berekening

Fundatie ontwerp:

Helppaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m

schoorstand		8	:1
a		7.125	graden

Opstort	Diameter	5.5	m
	Hoogte	1.8	m
	Inhoud	42.8	m ³
	e.g.	839	kN

Onderplaat	Diameter	13.0	m
	Hoogte	1.6	m
	Inhoud	212	m ³
	e.g.	4167	kN

Paal afstand tov rand		1	m
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Optreden krachten

e.g. mast		3344	kN
Maximale dwarskracht		1677	kN
Maximale verticaal kracht		1506	kN
Maximale moment		70130	kNm

MOMENT:

Tegenmoment uit eigen gewicht:

Opstort		2769	kNm
Onderplaat		13750	kNm

Totaal		8260	kNm	reductie door opwaarste kracht water
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Moment:

Totaal moment		61871	kNm
$F=M/a$		5625	kN

$F_{M,diag}$		5668	kN
$F_{M,hor}$		703	kN
$F_{M,ver}$		5625	kN

Vertikaal:

F_{mast}		4013	kN	
F_{tund}		2503	kN	reductie door opwaarste kracht water
F_{grond}		1308	kN	reductie door grond (1200 kg/m ³)
F_{totaal}		3912	kN	per zijde

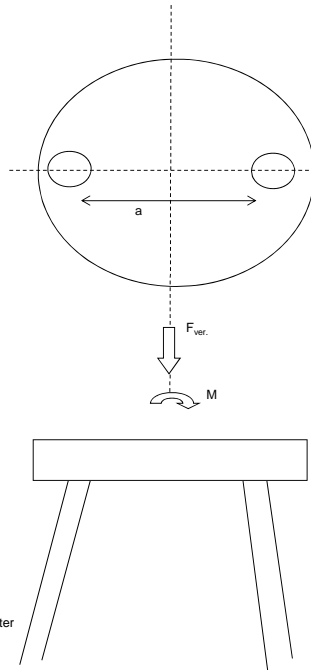
$F_{M,diag}$		3942	kN
$F_{M,hor}$		489	kN
$F_{M,ver}$		3912	kN

Maximale paalbelastingen:

Trekbelasting:		1713	kN
Drukbelasting:		9537	kN

Aantal palen	trek	5	aantal	per zijde
	druk	9	aantal	per zijde

Totaal aantal	palen	18	per mastlocatie
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W6S400

Bijlage I

Fundatie berekening

Fundatie ontwerp:

Helppaal

Afmetingen	b	400	mm
	d	400	mm
omtrek paal	$O_{p,gem}$	1.6	m

schoorstand		8	:1
a		7.125	graden

Opstort	Diameter	3.9	m
	Hoogte	1.8	m
	Inhoud	21.5	m ³
	e.g.	422	kN

Onderplaat	Diameter	9.0	m
	Hoogte	1.1	m
	Inhoud	70	m ³
	e.g.	1373	kN

reductie door grond (1200 kg/m³)

Paal afstand tov rand		1	m
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Optreden krachten

e.g. mast		2282	kN
Maximale dwarskracht		542	kN
Maximale verticaal kracht		1053	kN
Maximale moment		22358	kNm

MOMENT:

Tegenmoment uit eigen gewicht:

Opstort		886	kNm
Onderplaat		2883	kNm

Totaal		1885	kNm
--------	--	------	-----

reductie door opwaarste kracht water

Moment:

Totaal moment		20474	kNm
F=M/a		2925	kN

$F_{M,diag}$		2948	kN
$F_{M,hor}$		366	kN
$F_{M,ver}$		2925	kN

Vertikaal:

F_{mast}		2738	kN
F_{fund}		897	kN
F_{grond}		620	kN
F_{totaal}		2128	kN

reductie door opwaarste kracht water
reductie door grond (1200 kg/m³)
per zijde

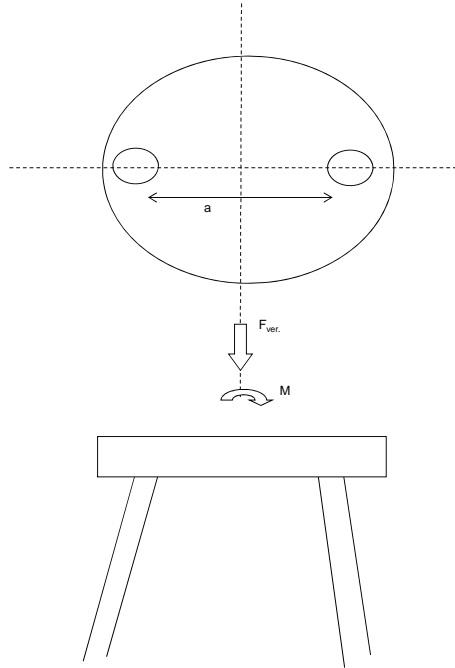
$F_{M,diag}$		2144	kN
$F_{M,hor}$		266	kN
$F_{M,ver}$		2128	kN

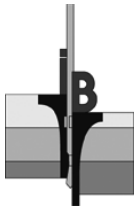
Maximale paalbelastingen:

Trekbelasting:		797	kN
Drukbelasting:		5053	kN

Aantal palen	trek	3	aantal	per zijde
	druk	5	aantal	per zijde

Totaal aantal	palen	10	per mastlocatie
---------------	-------	----	-----------------





Opdracht : 02P004479
Project : Onderzoek uitbreiding nabij station te Borssele

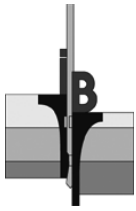
WATERPASSTAAT

Meetmethode : Uitgezet en gewaterpast middels dGPS
Datum meting : 17 maart 2014
Hoogte (Z) t.o.v. : NAP

<i>Meetpunten</i>	<i>x-coördinaat [m]</i>	<i>y-coördinaat [m]</i>	<i>z-coördinaat (hoogte) [m t.o.v. NAP]</i>
DKM-01	39.737	383.987	3,89
DKM-02	39.756	383.992	3,86
DKP-03	39.741	383.971	4,01
DKM-04	39.760	383.976	4,05
DKM-05	39.733	383.952	3,87
DKM-06	39.777	383.963	3,92
DKM-07	39.751	383.953	3,89
DKM-08	39.770	383.958	3,88
DKP-09	39.756	383.933	1,29
DKM-10	39.775	383.938	0,94
DKP-11	39.785	383.961	3,84
DKM-12	39.790	383.940	0,93
DKM-13	39.798	383.924	0,77
DKM-14	39.845	383.974	3,69
DKM-15	39.823	384.070	3,72
DKM-16	39.791	384.108	3,56
Peilbuis B-01:			
Maaiveld	---	---	4,01
Bovenkant stijgbuis 1	---	---	4,51
Grondwaterstand (18-03-2014)			0,54
Peilbuis B-02:			
Maaiveld	---	---	3,89
Bovenkant stijgbuis 1	---	---	4,39
Grondwaterstand (18-03-2014)			0,68
Peilbuis B-03:			
Maaiveld	---	---	0,93
Bovenkant stijgbuis 1	---	---	1,73
Grondwaterstand (21-03-2014)	---	---	-0,27

Let op:

Deze waterpasstaat dient om inzicht te geven in de hoogteligging en locaties van de meet- en onderzoekspunten ten opzichte van een referentiepunt. De resultaten dienen niet voor andere doeleinden te worden gebruikt.



Opdracht : 02P004479

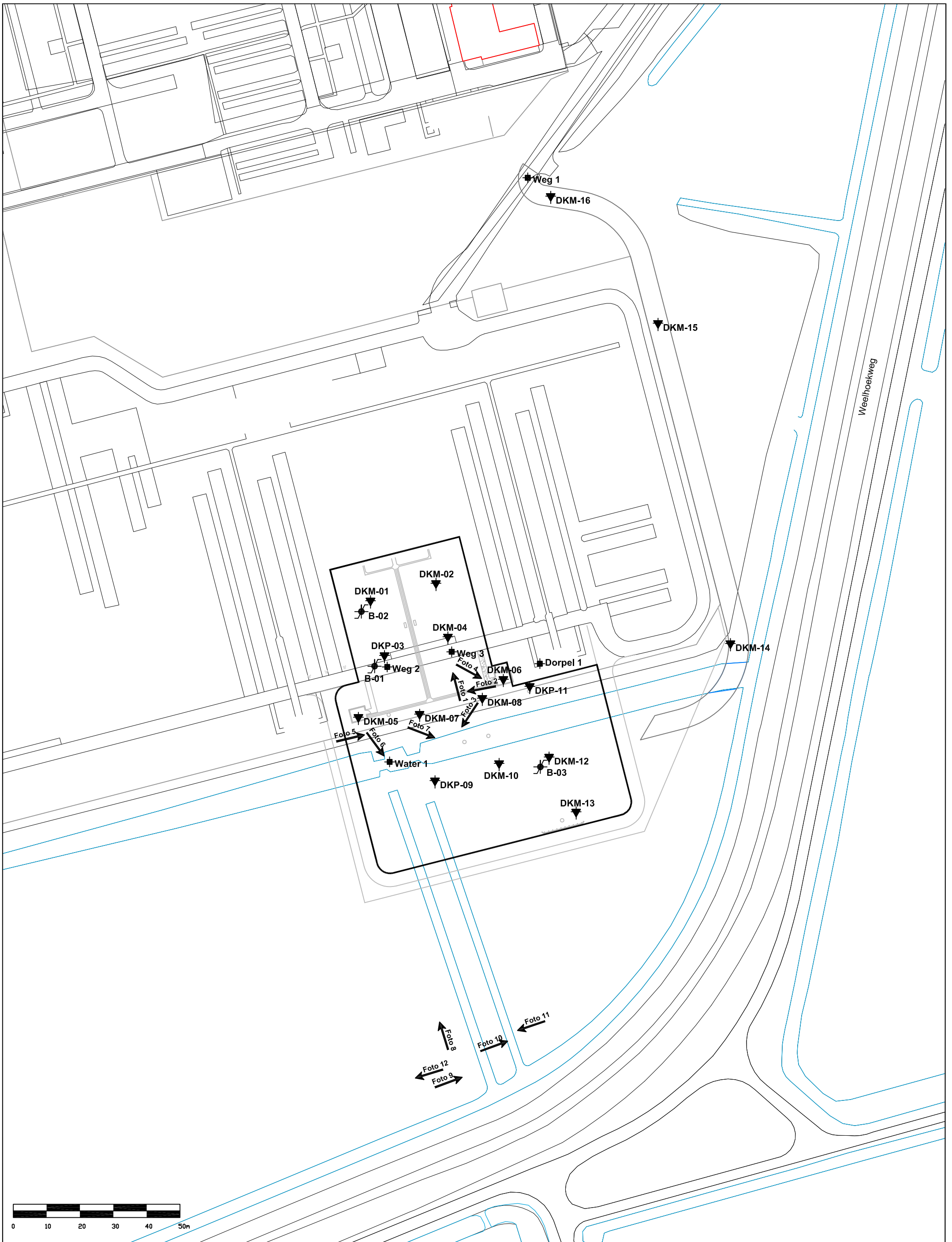
Project : Onderzoek uitbreiding nabij station te Borssele

-vervolg waterpassing-

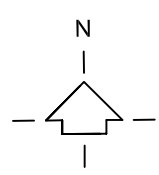
<i>Meetpunten</i>	<i>x-coördinaat [m]</i>	<i>y-coördinaat [m]</i>	<i>z-coördinaat (hoogte) [m t.o.v. NAP]</i>
Dorpel 1	39.788	383.968	4,09
Water 1 (d.d.: 17-03-2014)	39.742	383.939	0,44
Weg 1	39.784	384.114	3,87
Weg 2	39.742	383.967	4,09
Weg 3	39.761	383.972	4,05

Let op:

Deze waterpasstaat dient om inzicht te geven in de hoogteligging en locaties van de meet- en onderzoekspunten ten opzichte van een referentiepunt. De resultaten dienen niet voor andere doeleinden te worden gebruikt.



Bestaande bebouwing	
Bron: E-mail digitale tekening	
Bureau + vestigingsplaats: Grontmij	
Tekening- / bladnummer: 315112-B-002	
Datum laatste bewerking: 10-03-2014	

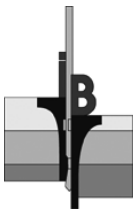


INPIJN-BLOKPOEL
Ingenieursbureau

Opdrachtnummer: 02P004479	Bijlage: SIT-01
Bewerkt: JBS/AKS	Datum: 24-03-2014
X, Y: RD / dGPS	Schaal: 1 : 1000
Formaat: A3	

Opdrachtnomschrijving / locatie:
Onderzoek uitbreiding nabij station te Borssele

Omschrijving tekening:
Situatietekening



Opdracht : 02P004479
Project : Onderzoek uitbreiding nabij station te Borssele



1.



2.



3.



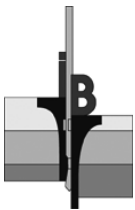
4.



5.



6.



Opdracht : 02P004479
Project : Onderzoek uitbreiding nabij station te Borssele



7.



8.



9.



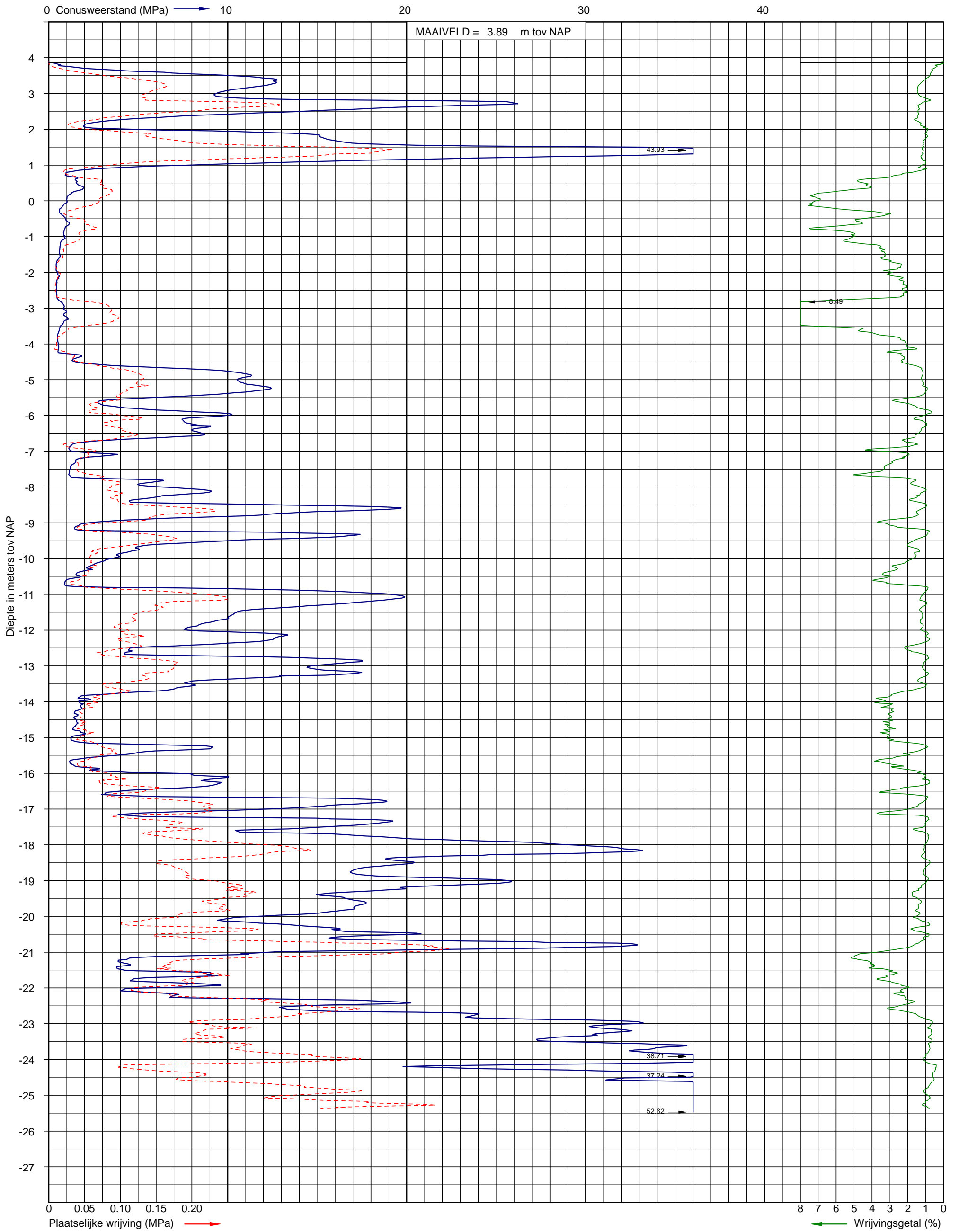
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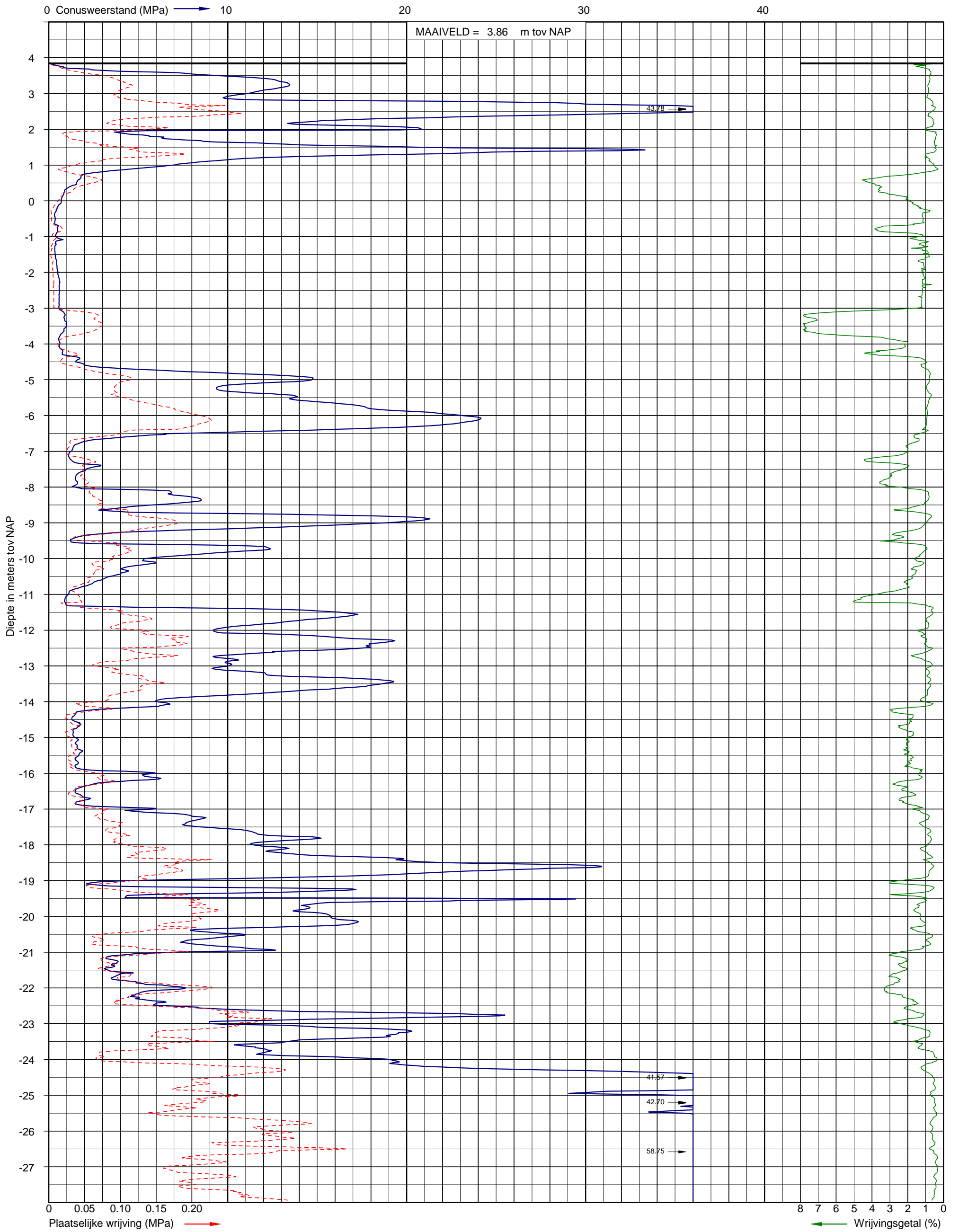


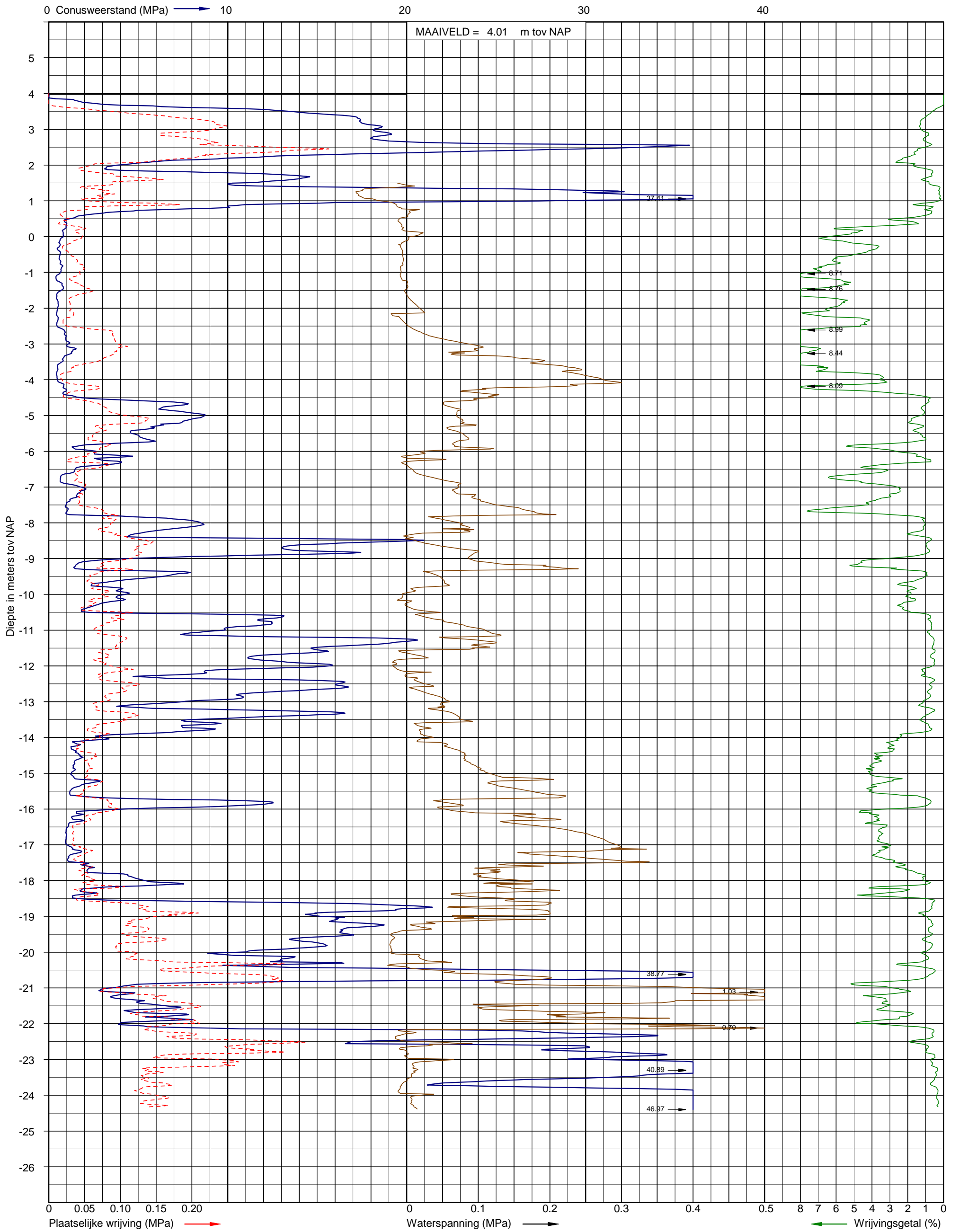
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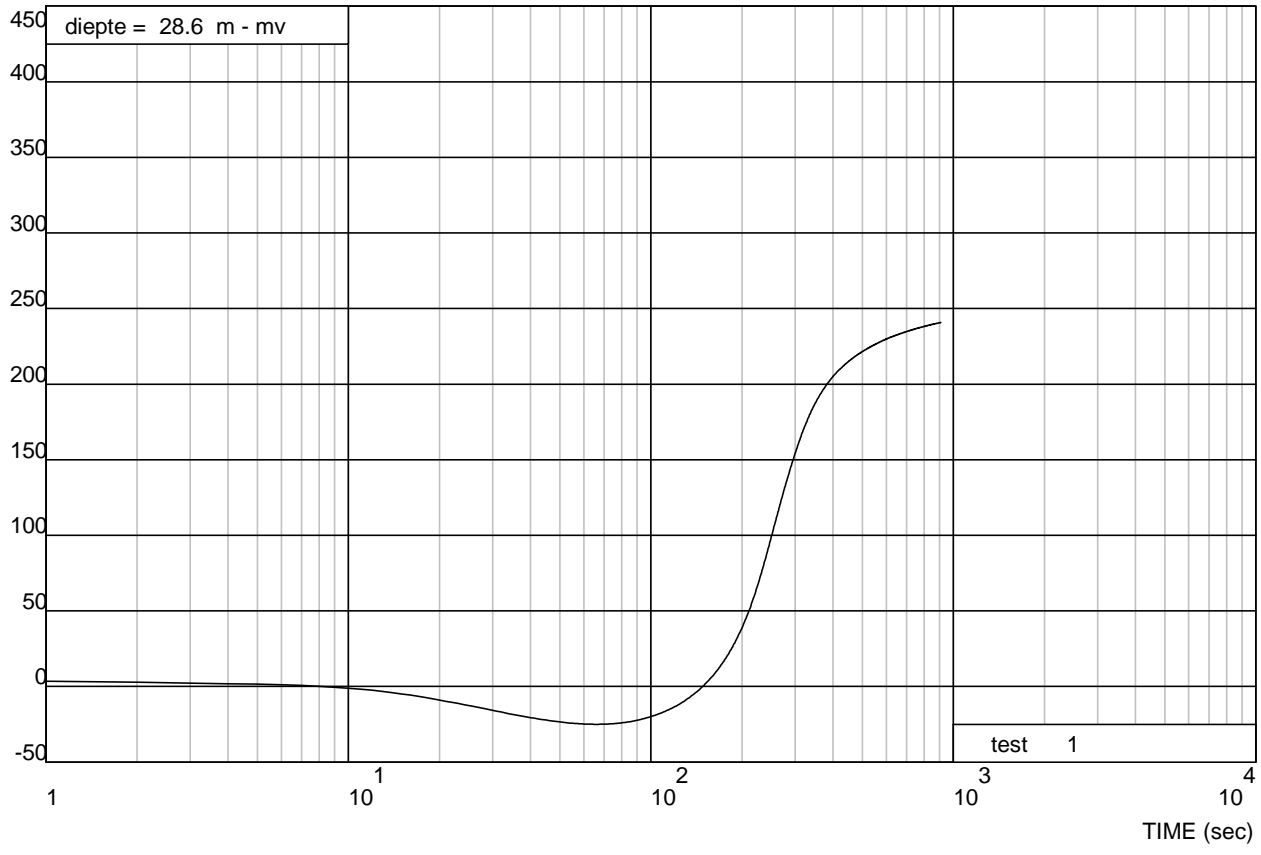
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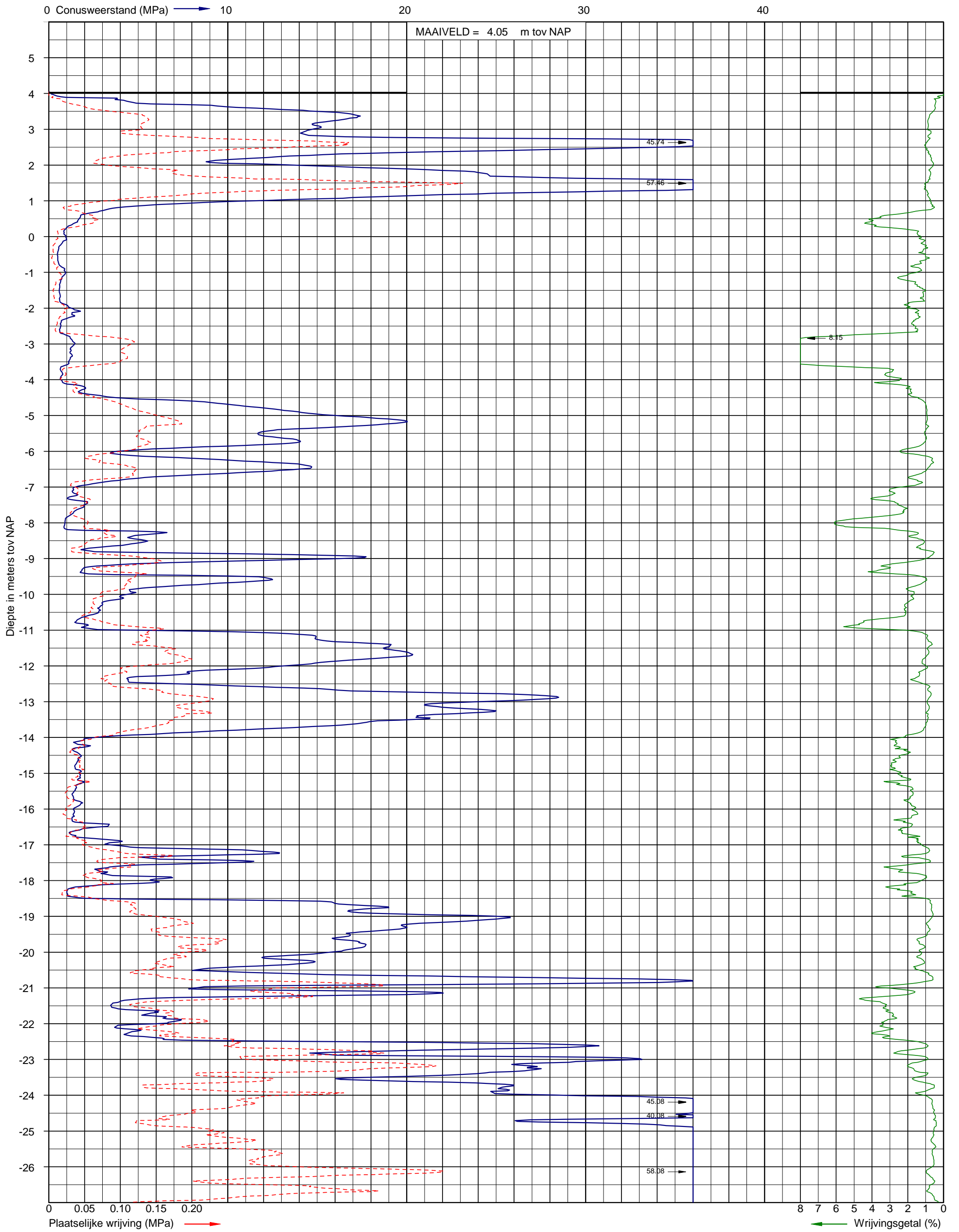


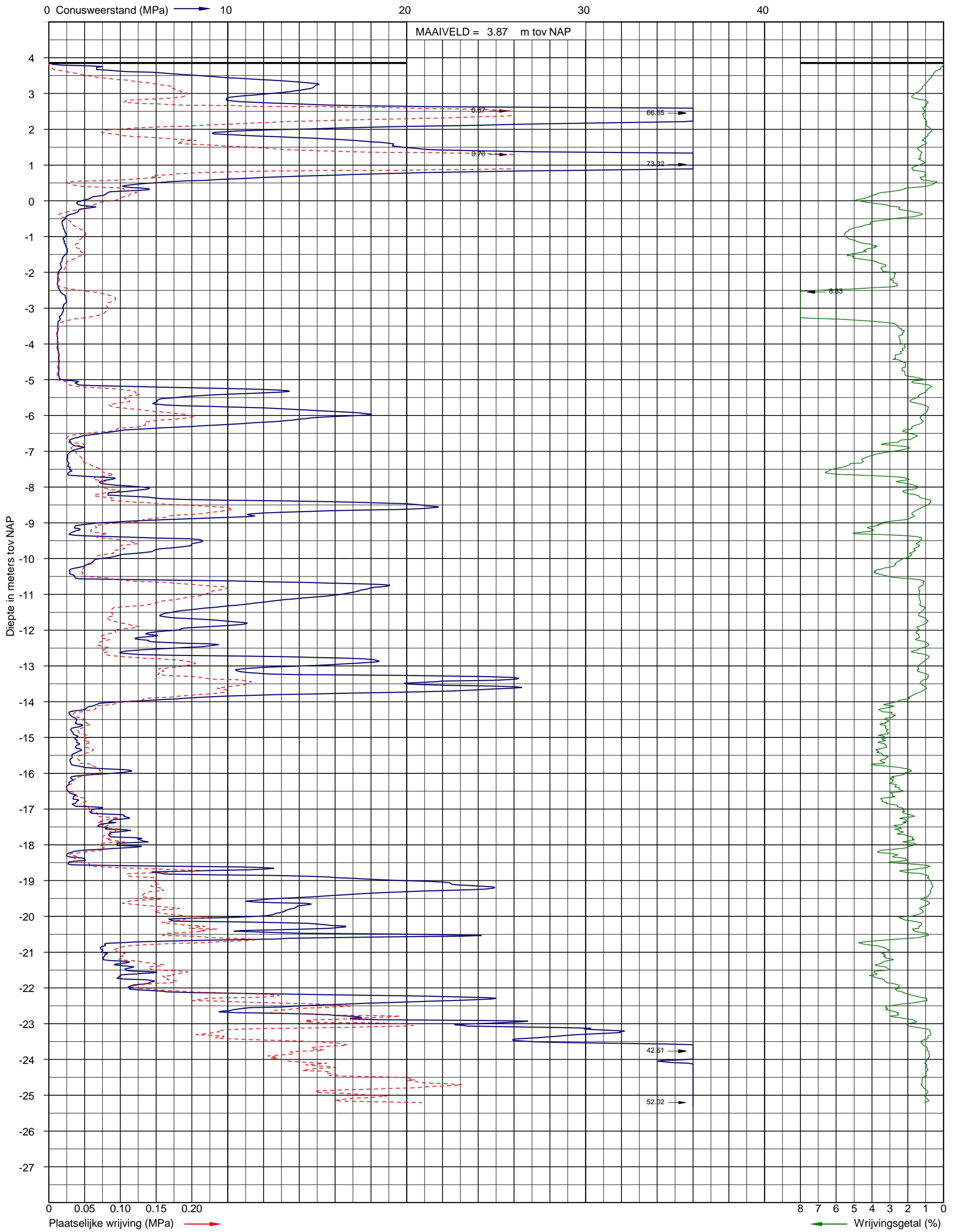


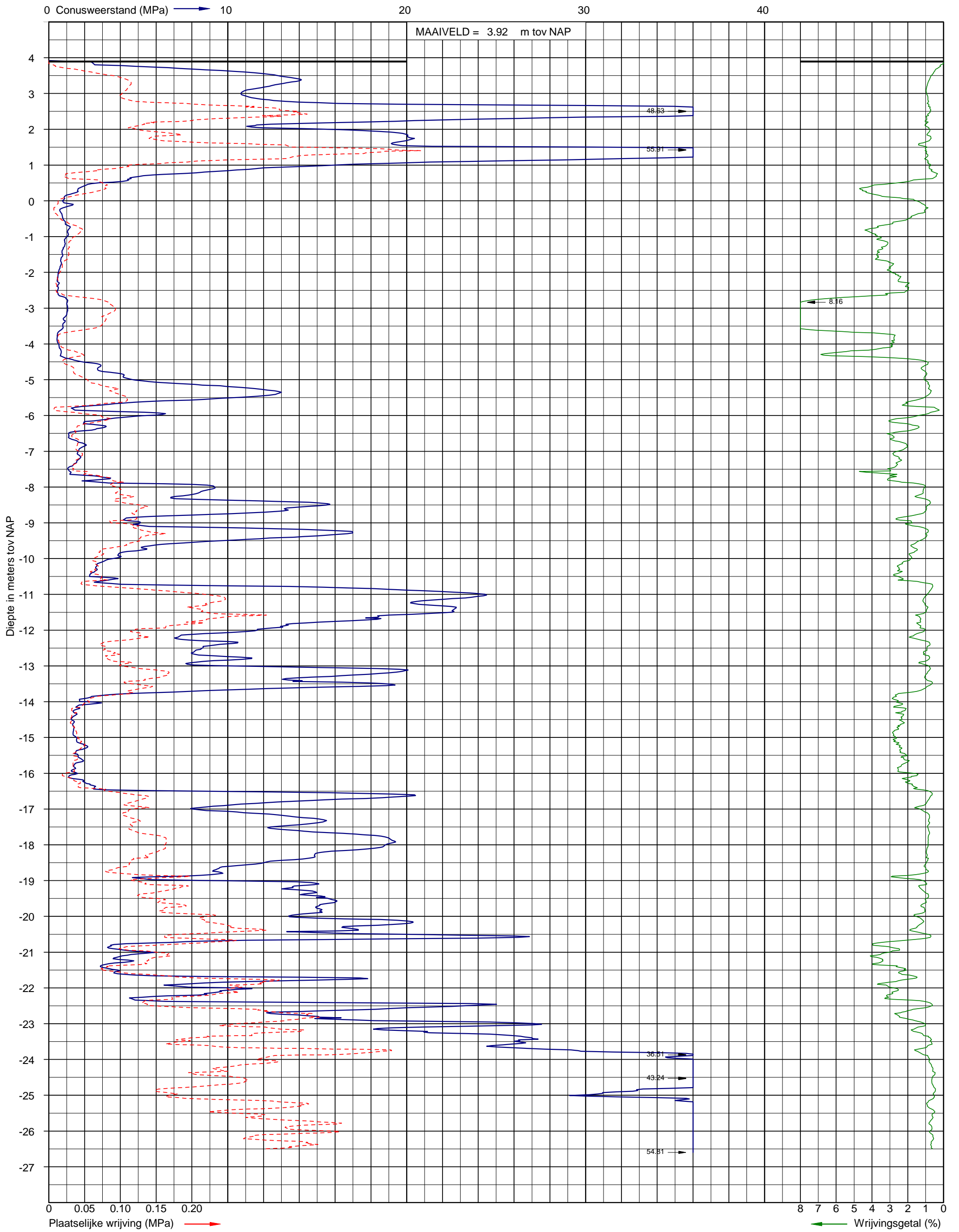
waterspanning (kPa)

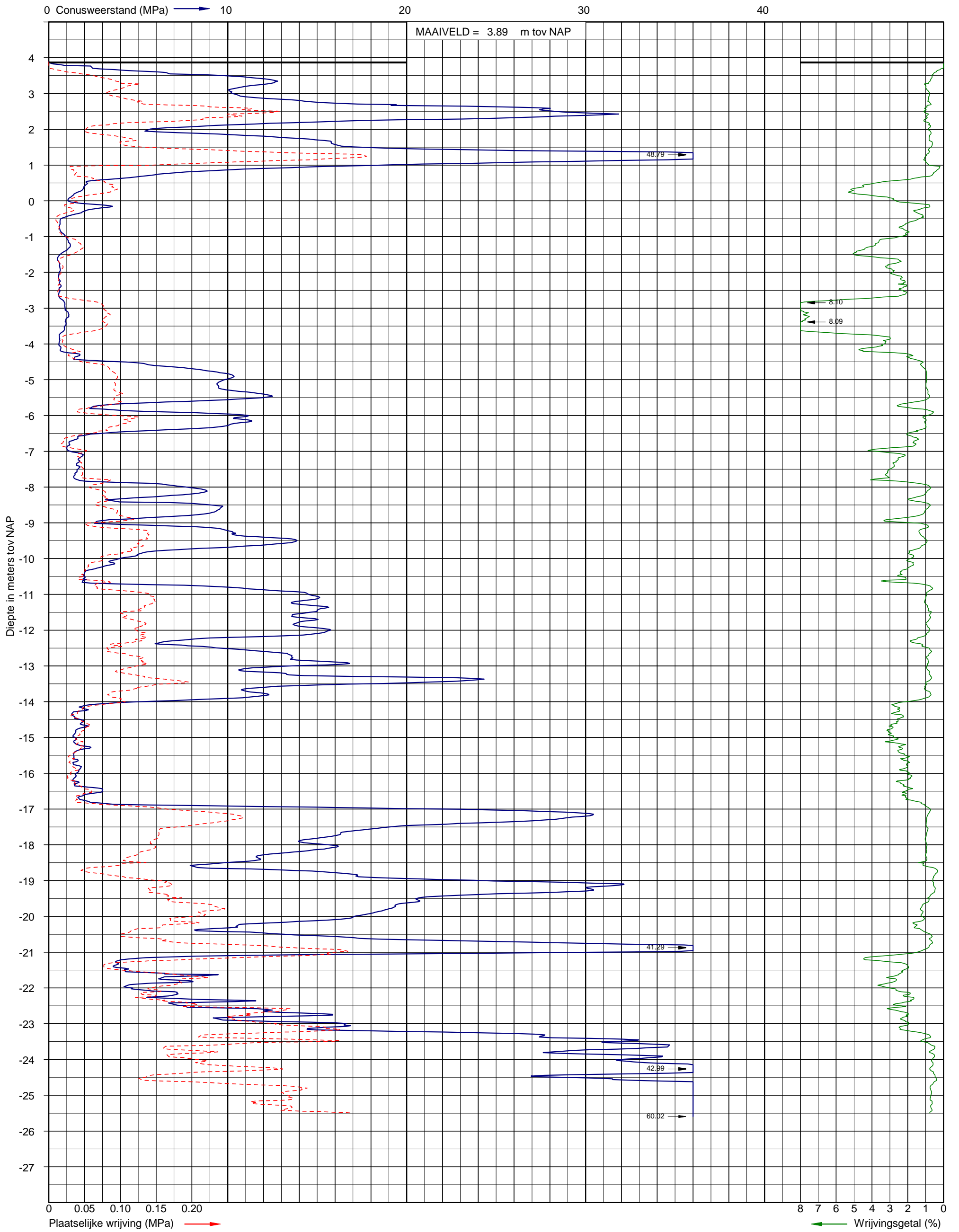


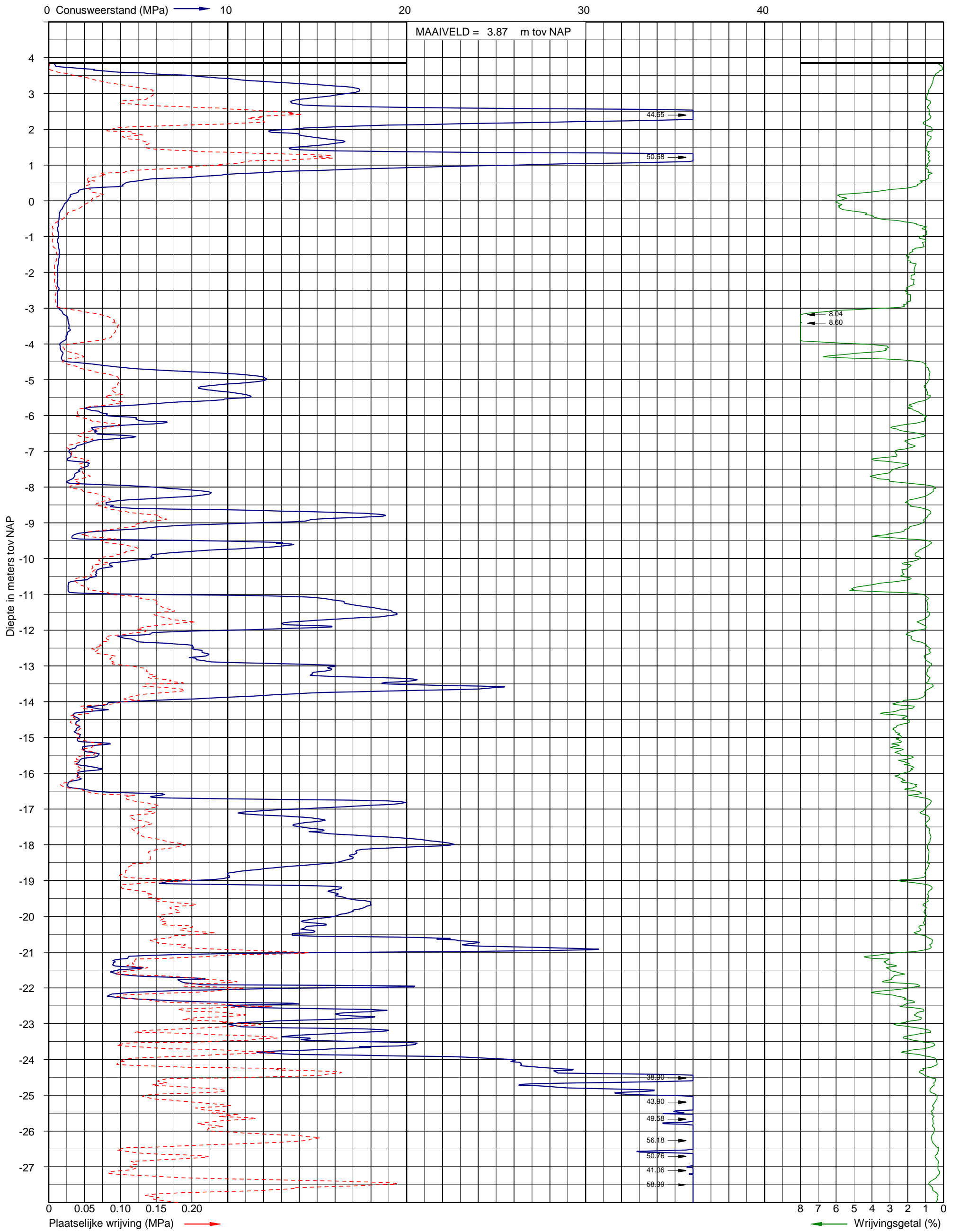
Onderzoek uitbreiding nabij station te Borssele	dissipatietest	uitv.: S22-RHL	sondering: 3
		mat.:	
INPIJN-BLOKPOEL Ingenieursbureau	datum: 17-3-2014		opdracht: 02P004479

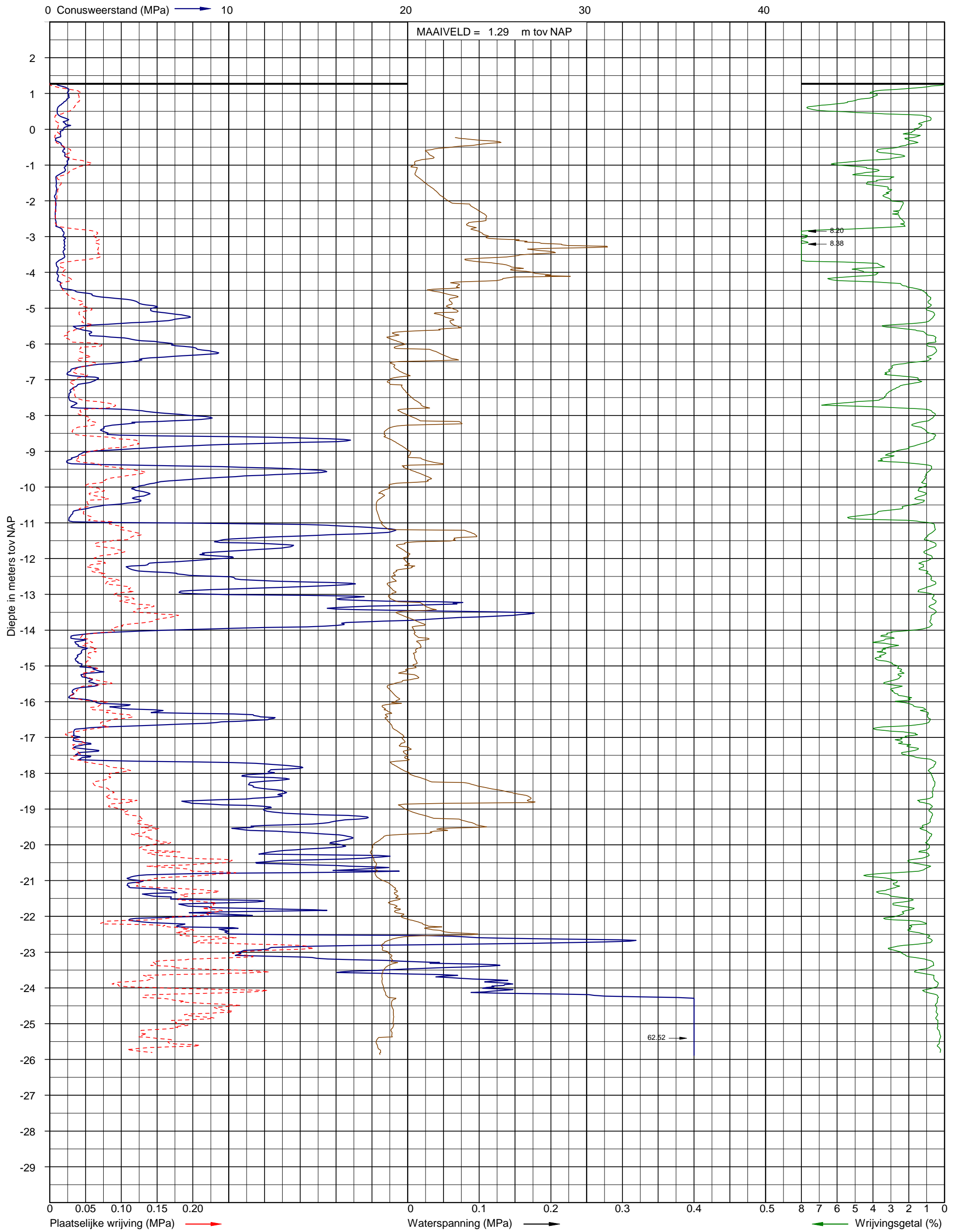


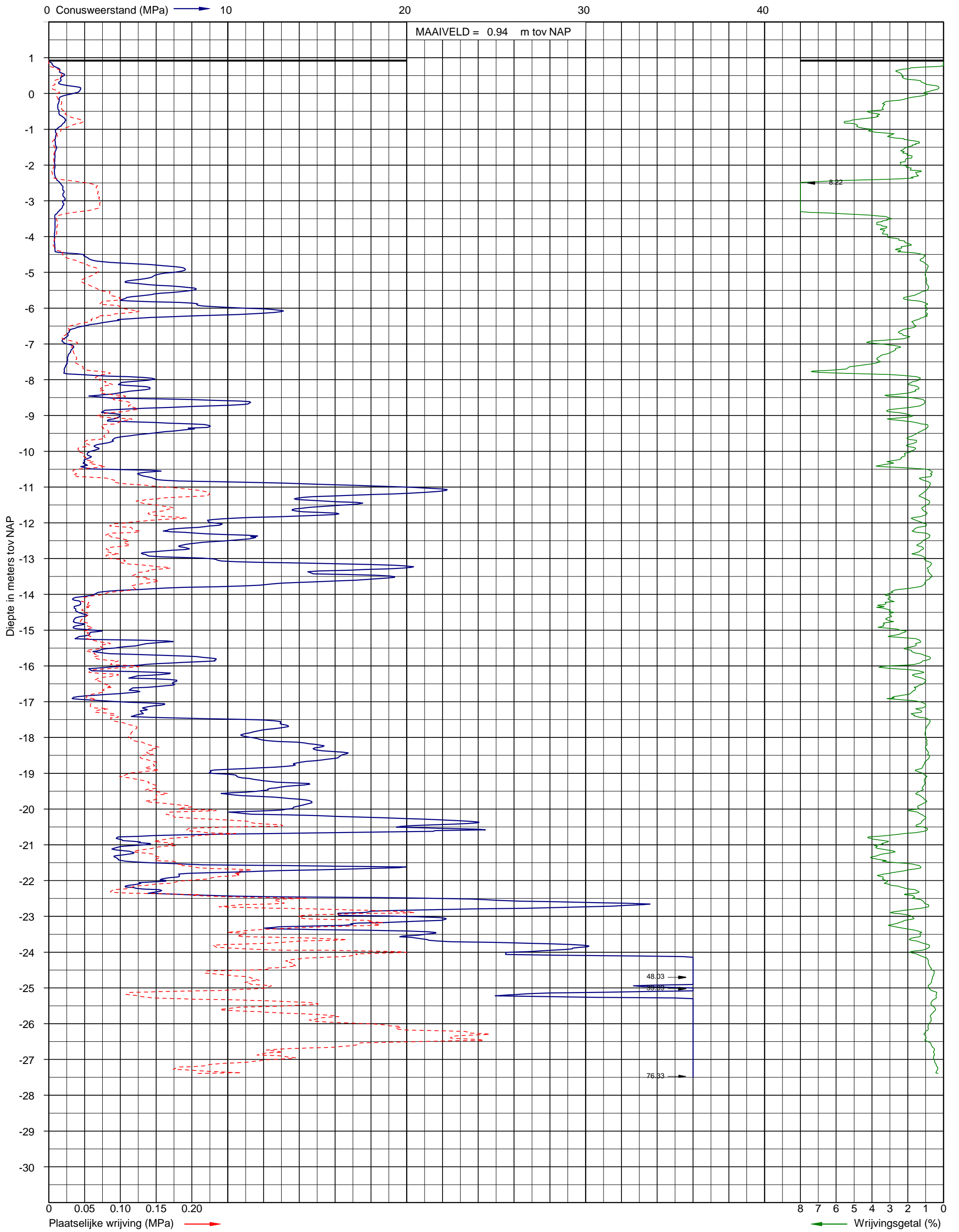




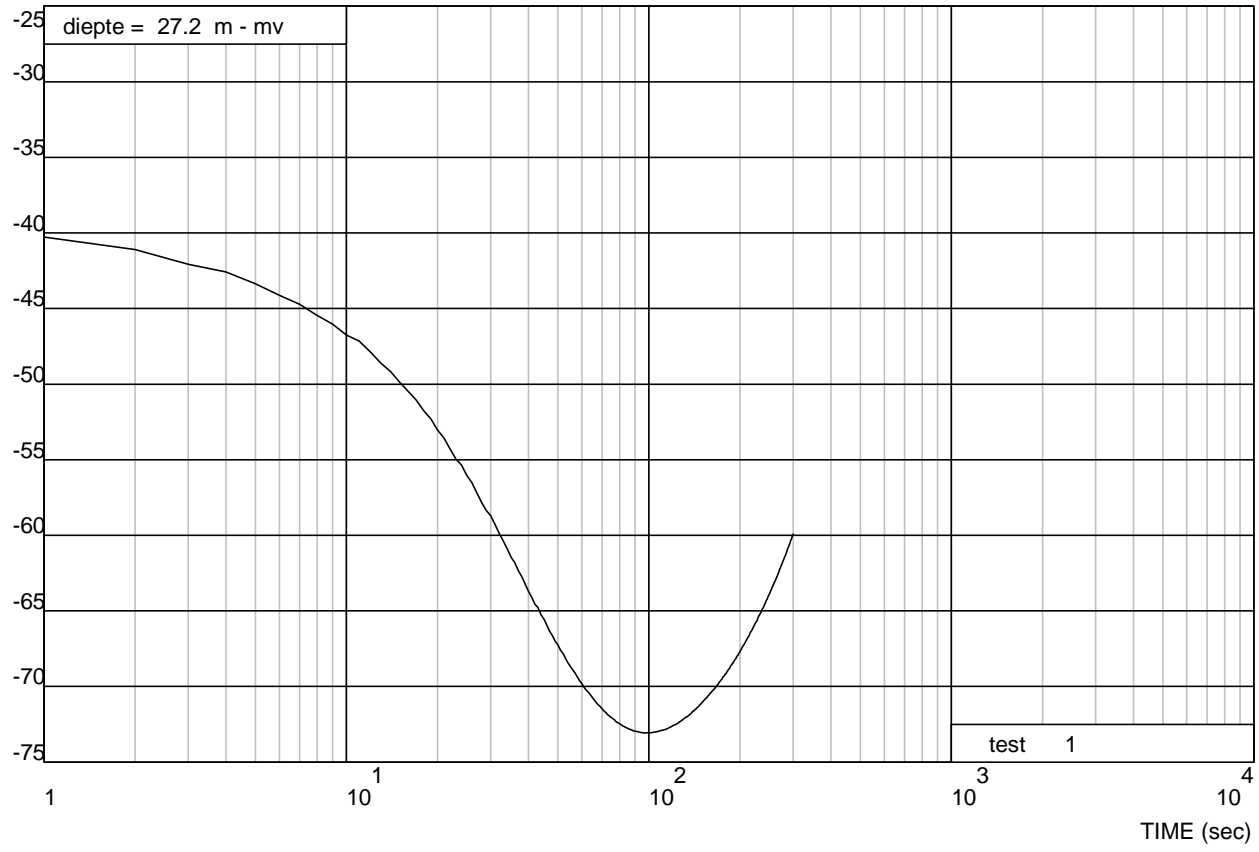




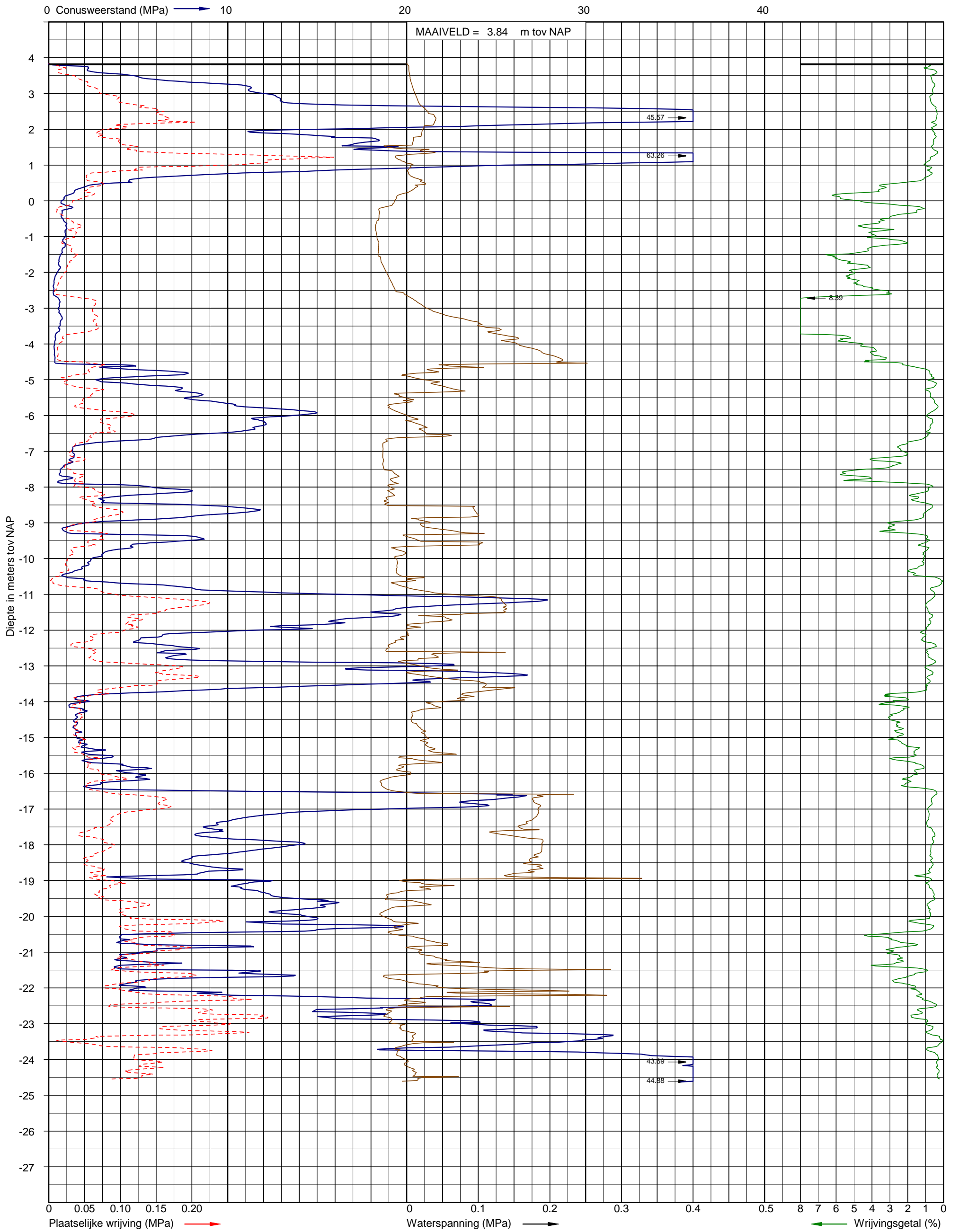




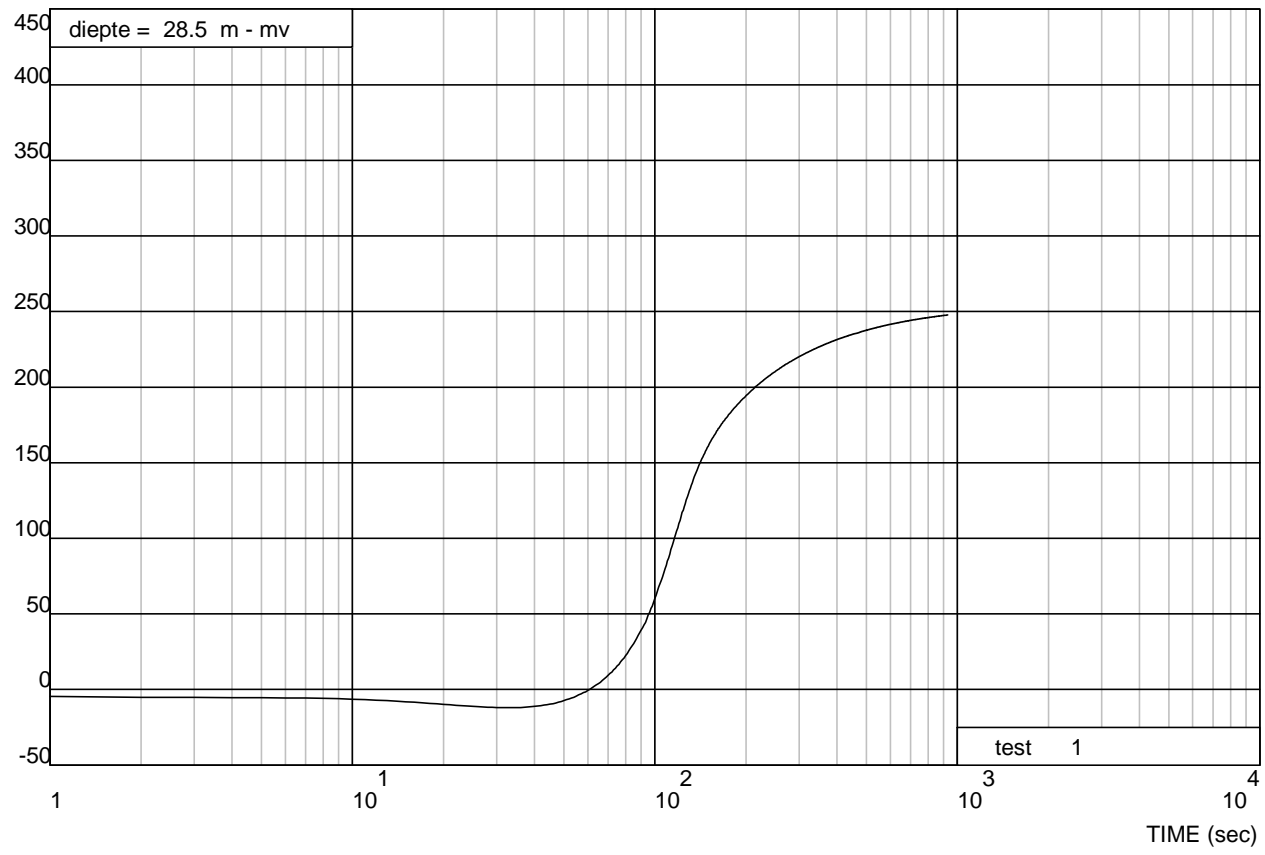
waterspanning (kPa)



Onderzoek uitbreiding nabij station te Borssele	dissipatietest	uitv.: MVO-S21	sondering: 9
		mat.:	
INPIJN-BLOKPOEL Ingenieursbureau	datum: 18-3-2014		opdracht: 02P004479



waterspanning (kPa)



Onderzoek uitbreiding nabij station te Borssele

dissipatietest

uitv.: S22-RHL

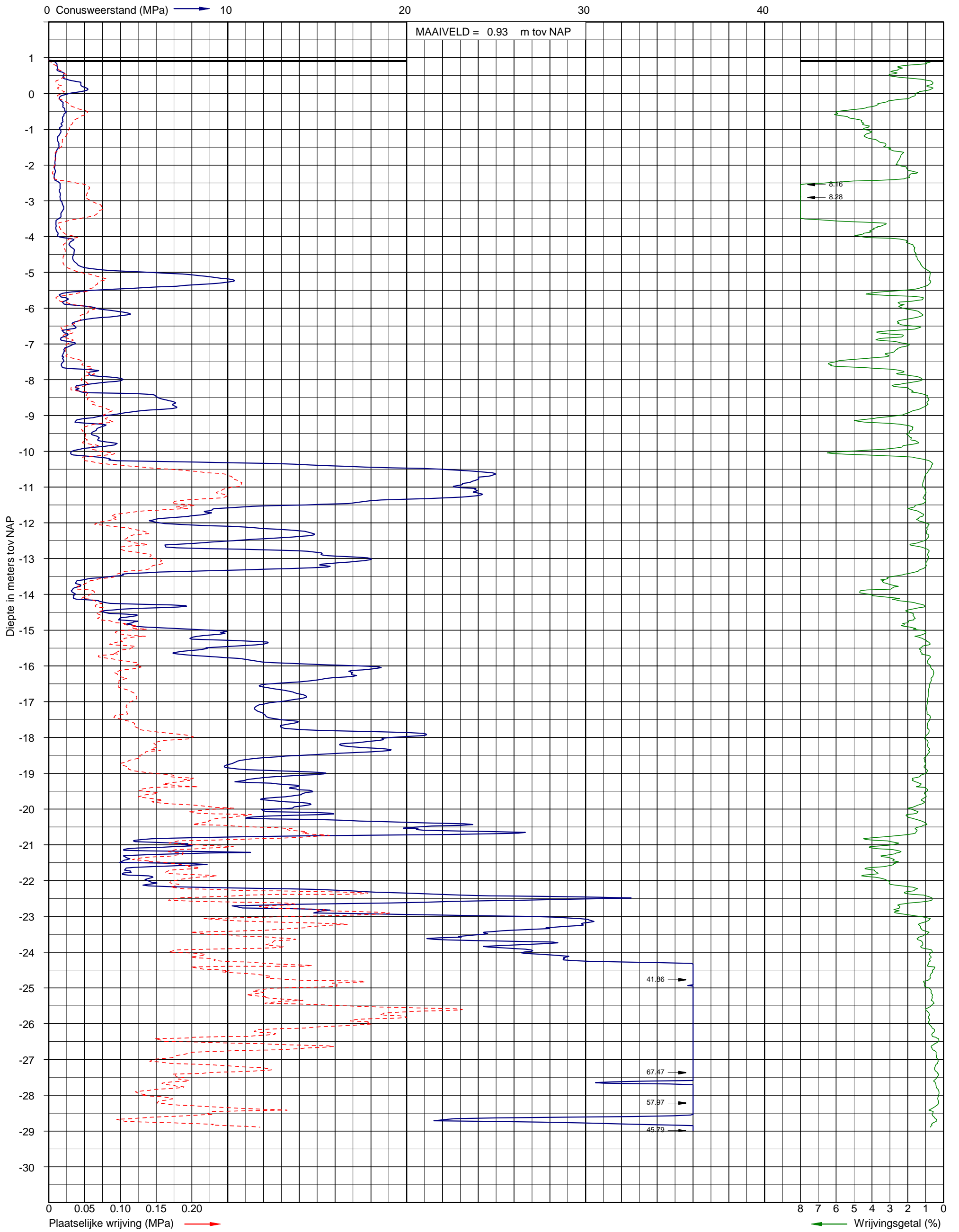
sondering: 11

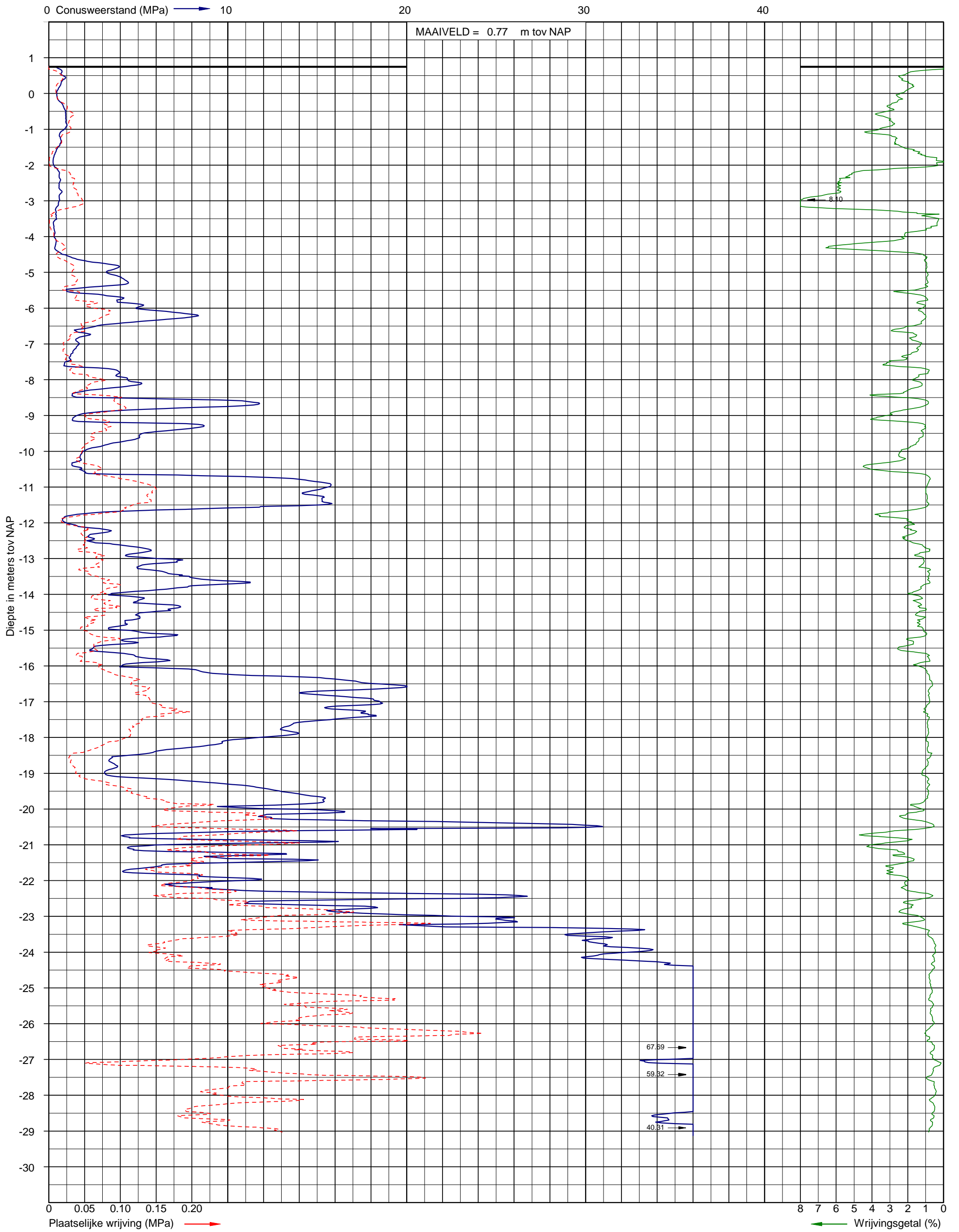
mat.:

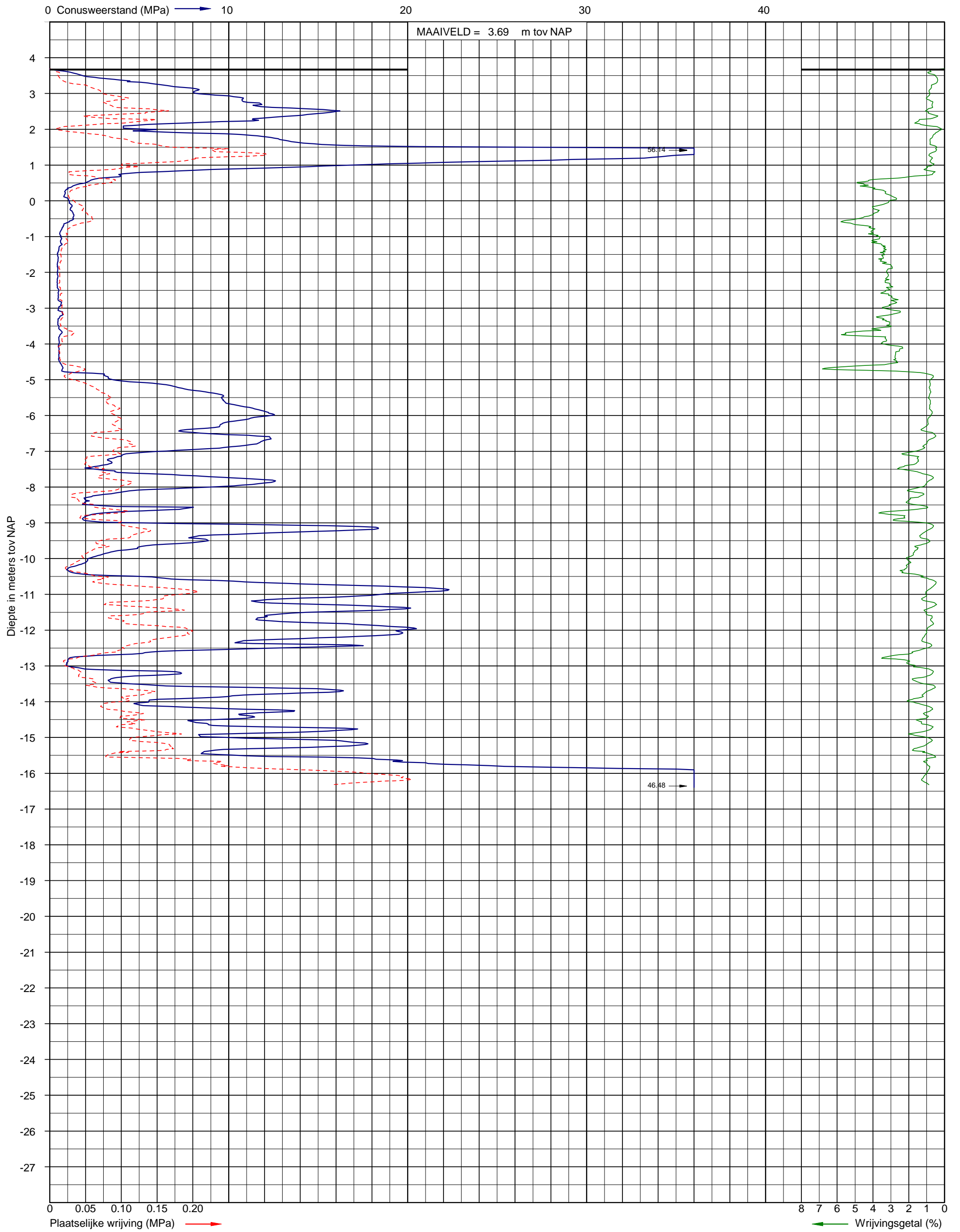
INPIJN-BLOKPOEL Ingenieursbureau

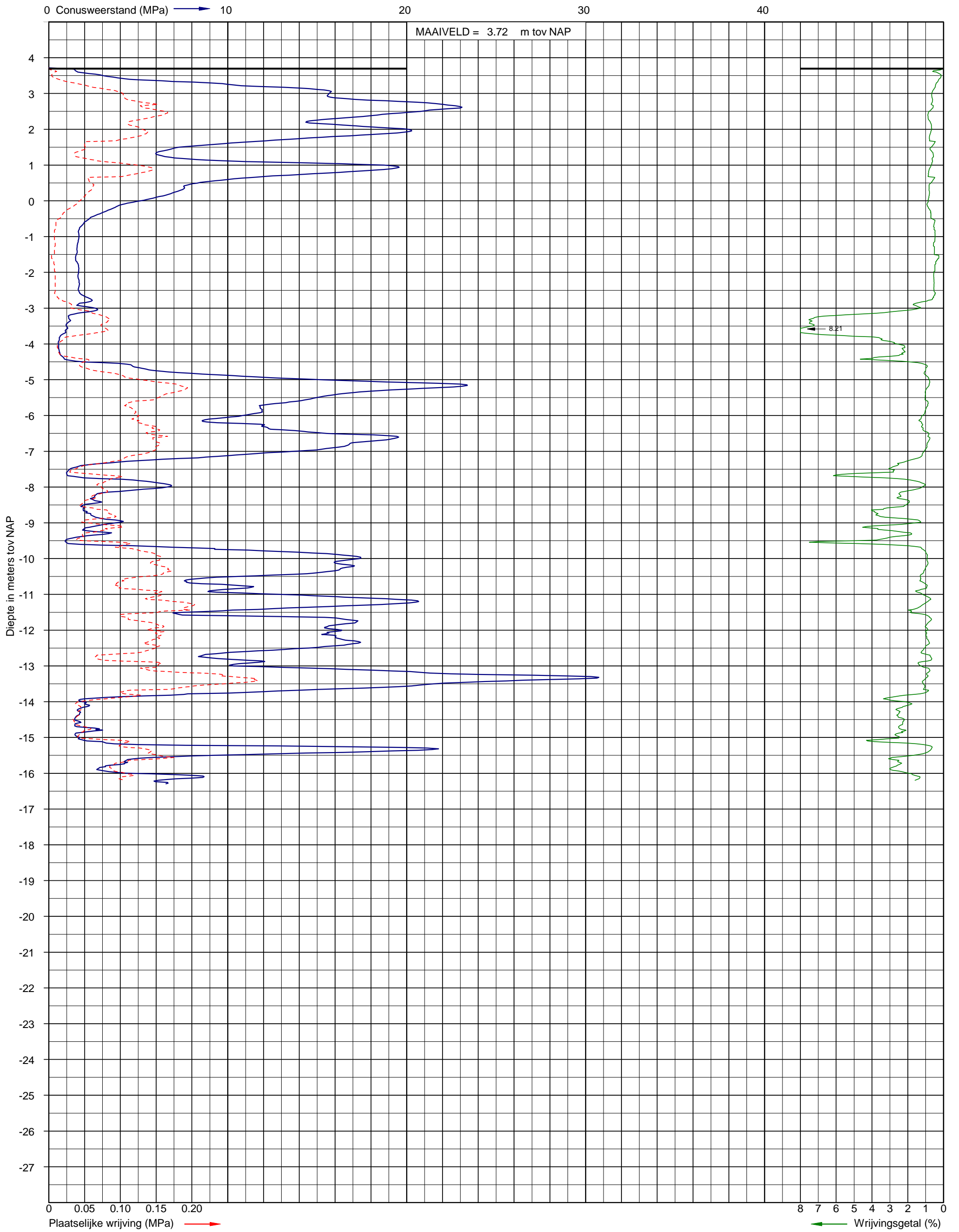
datum: 17-3-2014

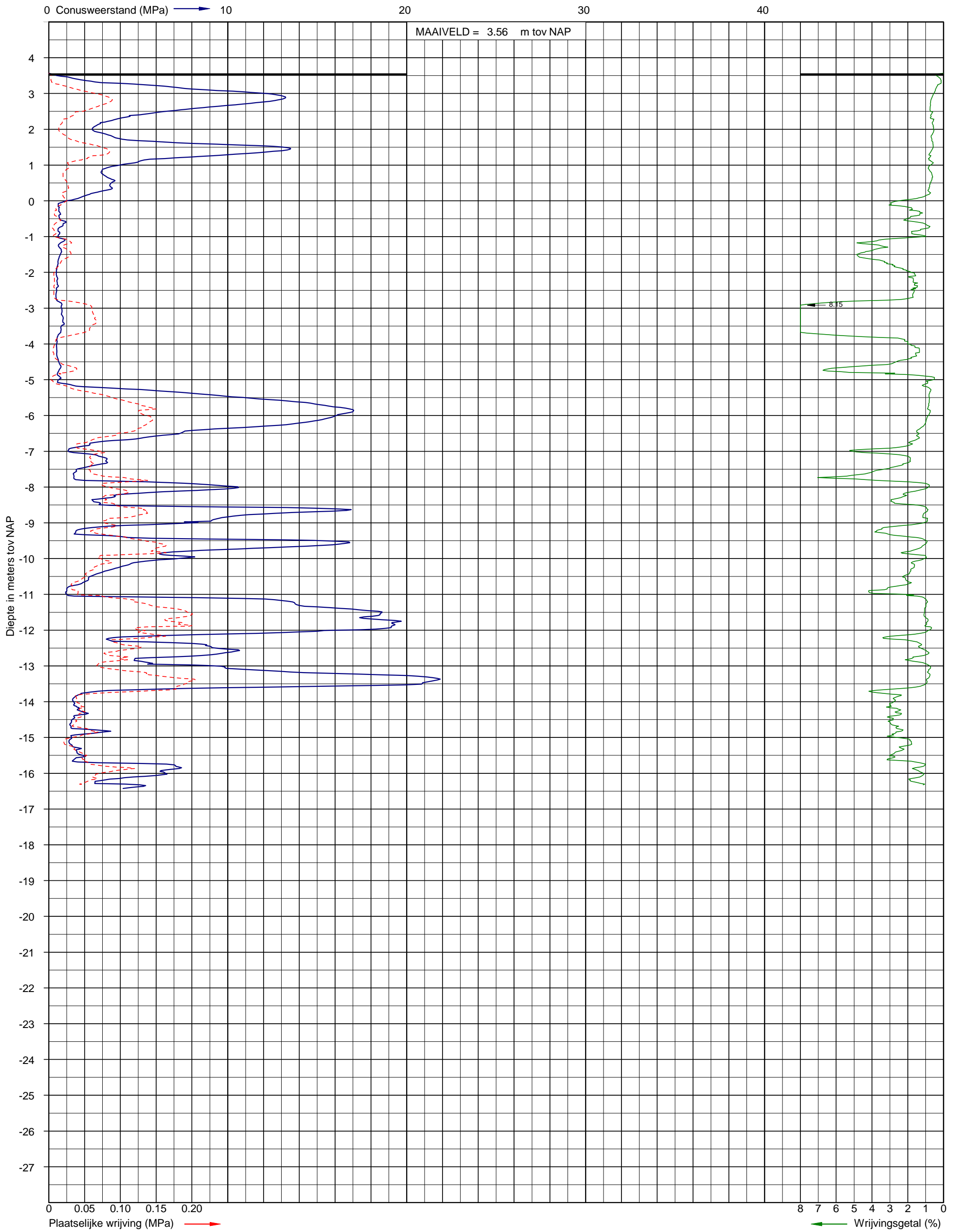
opdracht: 02P004479

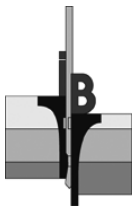












Opdracht: 02P004479
 Project: Onderzoek uitbreiding nabij station te Borssele

Boring: B-01

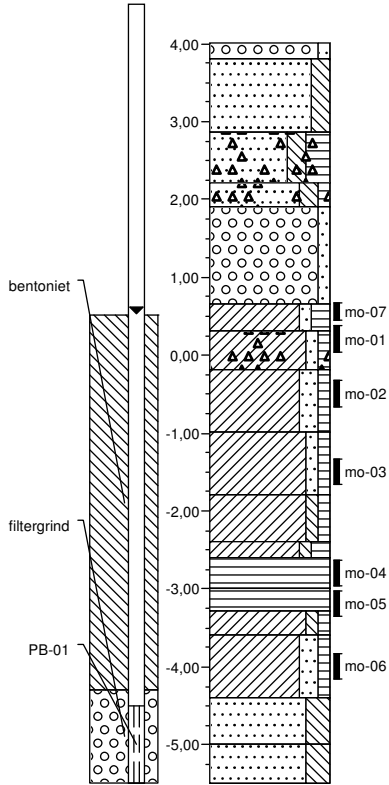
Uitvoering op: 18-03-2014
 Boring nabij: DKP-03
 Uitvoering door: RHS

Boring volgens NEN 5119

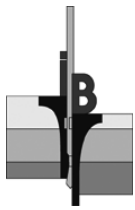
Maaiveldhoogte: 4,01 m t.o.v. N.A.P.
 Grondwaterstand: 300 cm - maaiveld

Classificatie volgen NEN 5104

x [m in RD]: 39736
 y [m in RD]: 383993



0,00	Grind, fijn, zwak zandig, grijs, (worteldoek)
0,20	Zand, matig fijn, matig siltig, grijs
1,15	Zand, matig fijn, matig siltig, sterk humeus, matig puinhoudend, zwart
▲ 1,80	
▲ 2,10	Zand, matig fijn, matig siltig, zwak humeus, zwak puinhoudend, zwart
	Grind, fijn, zwak zandig, grijszwart
3,35	Klei, zwak zandig, matig humeus, donkergrijs
▲ 3,70	Klei, zwak zandig, zwak humeus, resten puin, groengrijs
▲ 4,20	Klei, matig zandig, zwak humeus, resten schelpen, grijs
5,00	Klei, zwak zandig, zwak humeus, grijs
5,80	Klei, zwak siltig, zwak humeus, donkergrijs
6,40	
6,60	Klei, zwak siltig, matig humeus, bruingrijs
7,00	Veen, mineraalarm, sterk plantenhoudend, bruin
7,30	Veen, mineraalarm, bruin
7,60	Klei, zwak siltig, zwak humeus, bruingrijs
	Klei, matig zandig, zwak humeus, zwak schelphoudend, grijs
8,40	Zand, zeer fijn, sterk siltig, laagjes klei, grijs
9,00	Zand, matig fijn, sterk siltig, grijs
9,50	

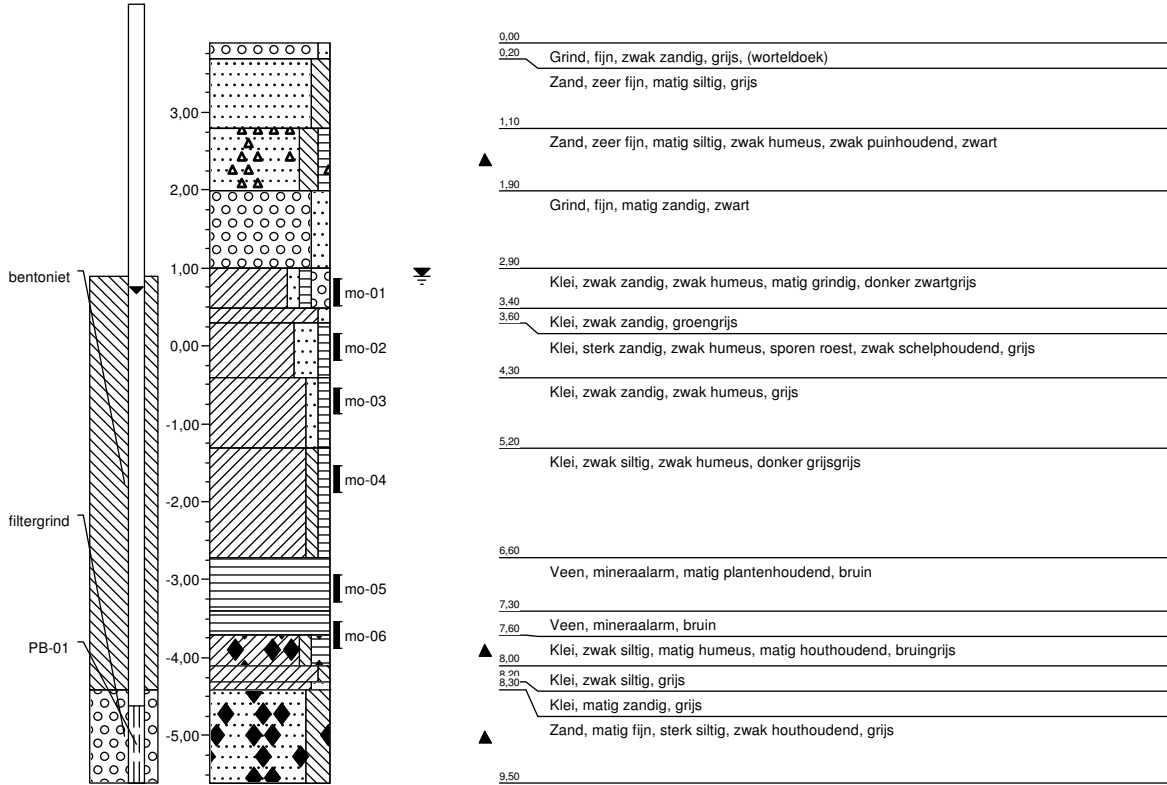


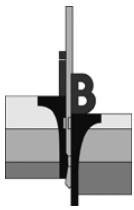
Opdracht: 02P004479
Project: Onderzoek uitbreiding nabij station te Borssele

Boring: B-02
Uitvoering op: 18-03-2014
Boring nabij: DKM-01
Uitvoering door: HSS

Boring volgens NEN 5119
Maaiveldhoogte: 3,89 m t.o.v. N.A.P.
Grondwaterstand: 300 cm - maaiveld

Classificatie volgen NEN 5104
x [m in RD]: 39755
y [m in RD]: 383997



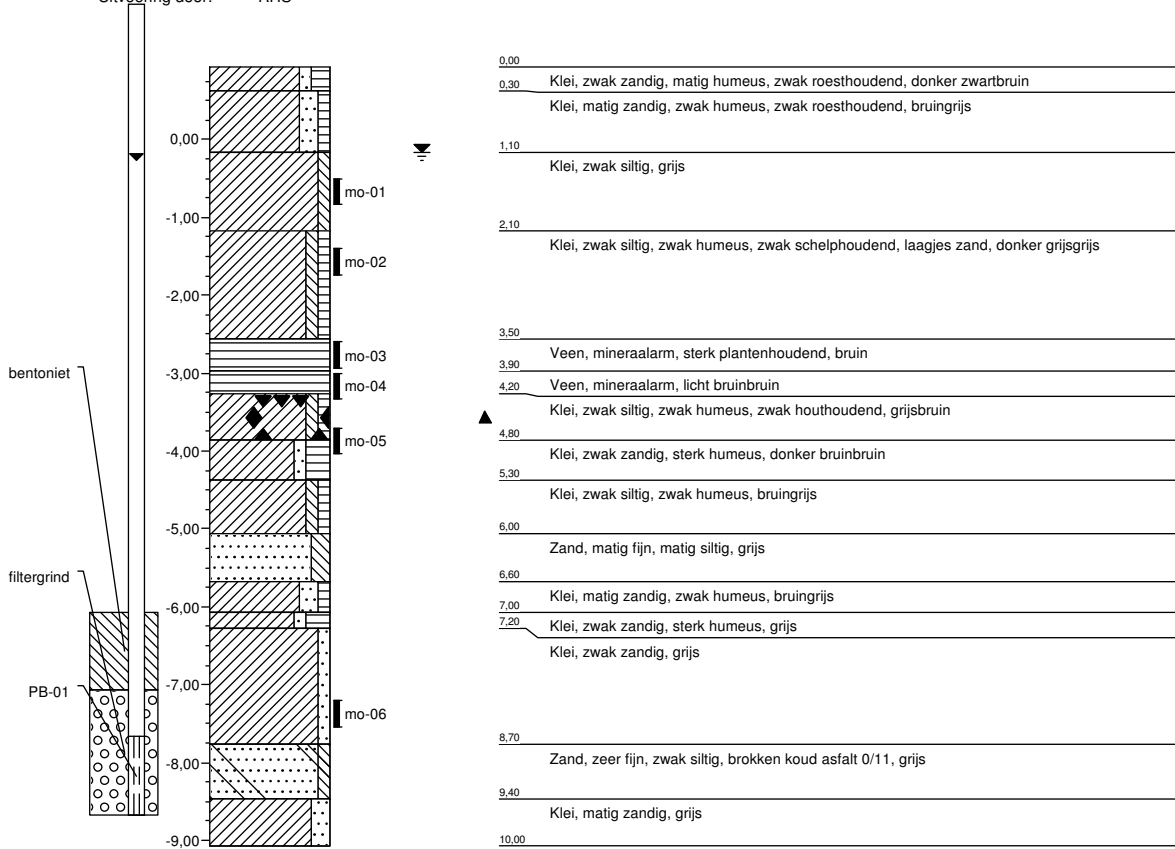


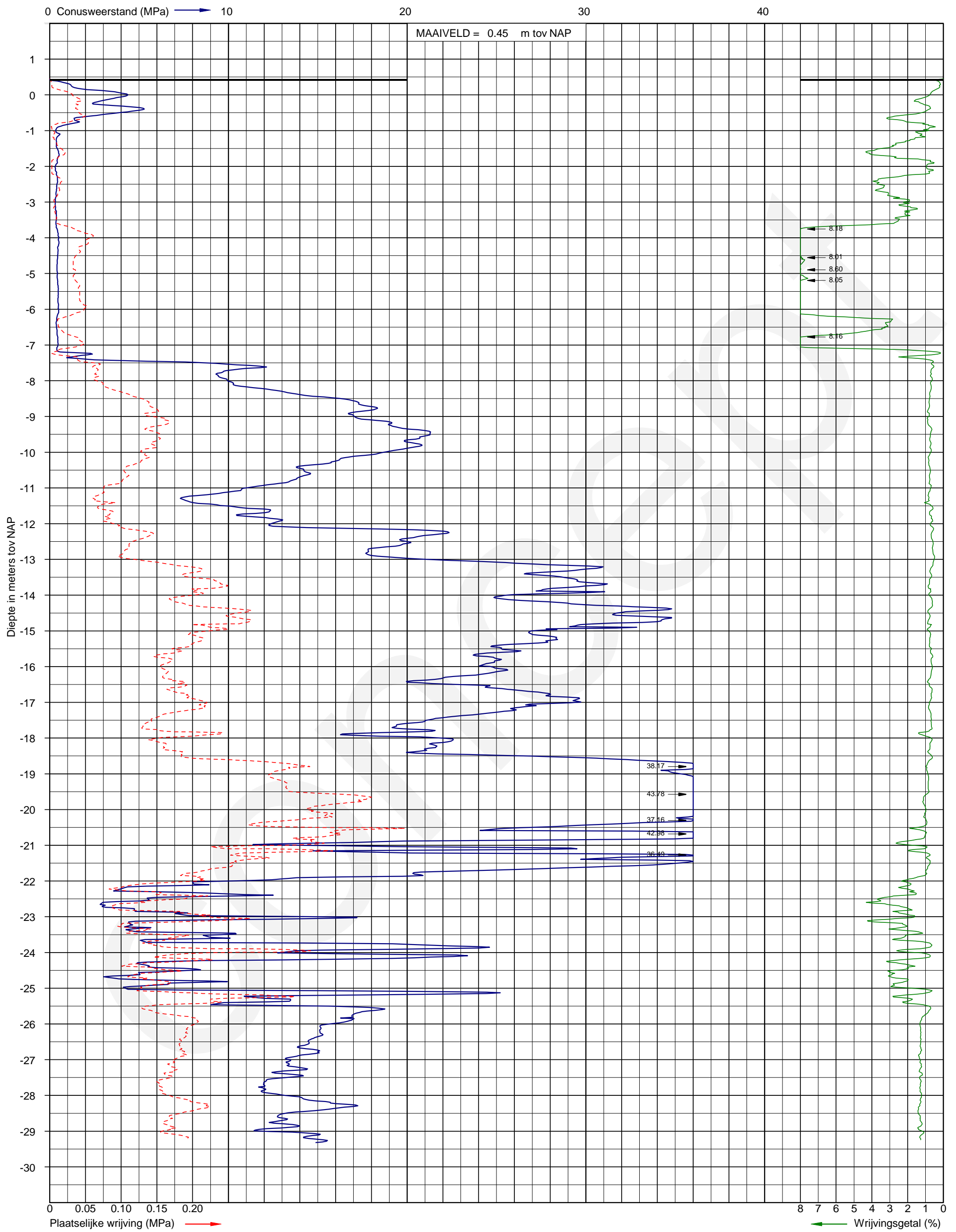
Opdracht: 02P004479
Project: Onderzoek uitbreiding nabij station te Borssele

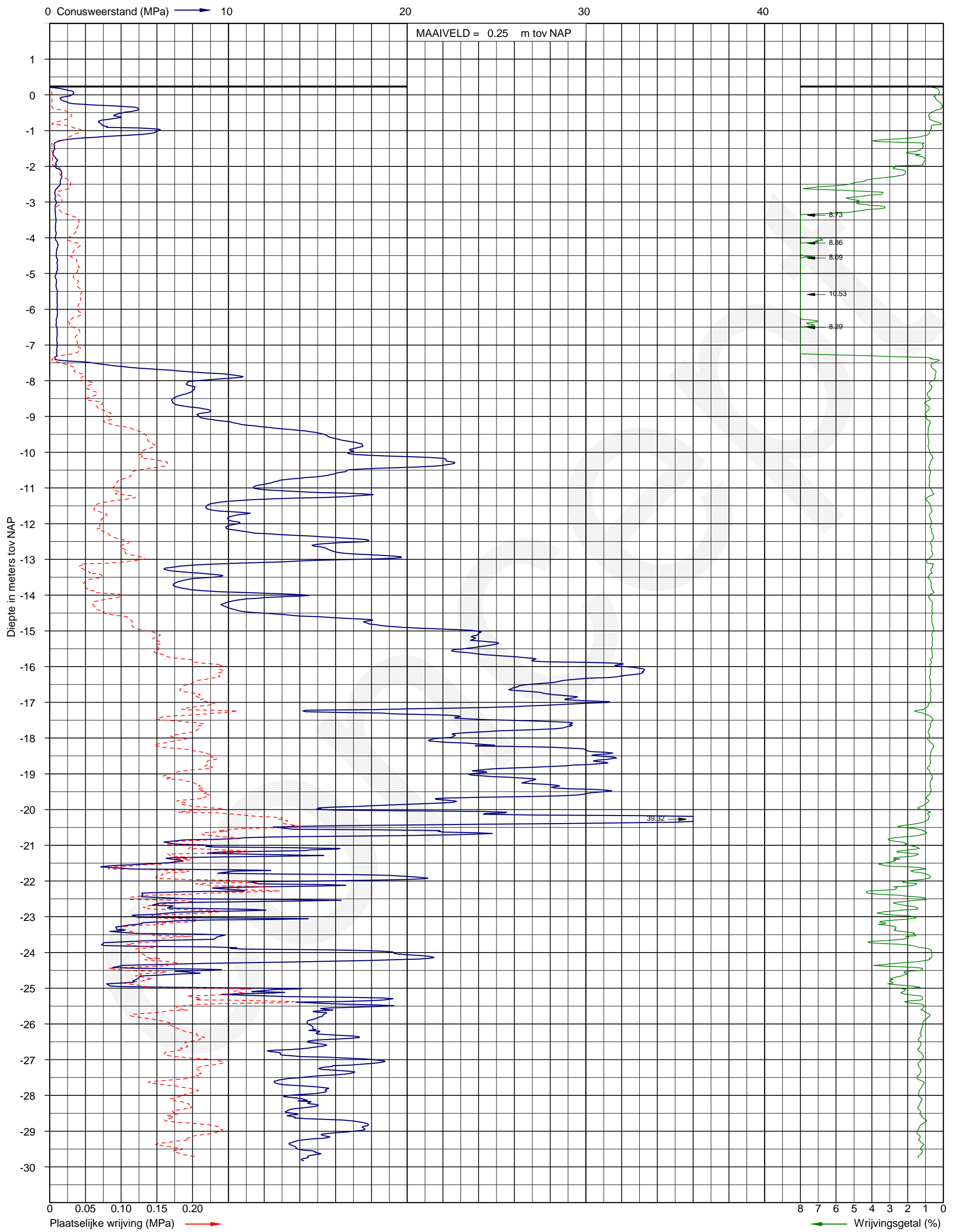
Boring: B-03
Uitvoering op: 21-03-2014
Boring nabij: DKM-12
Uitvoering door: RHS

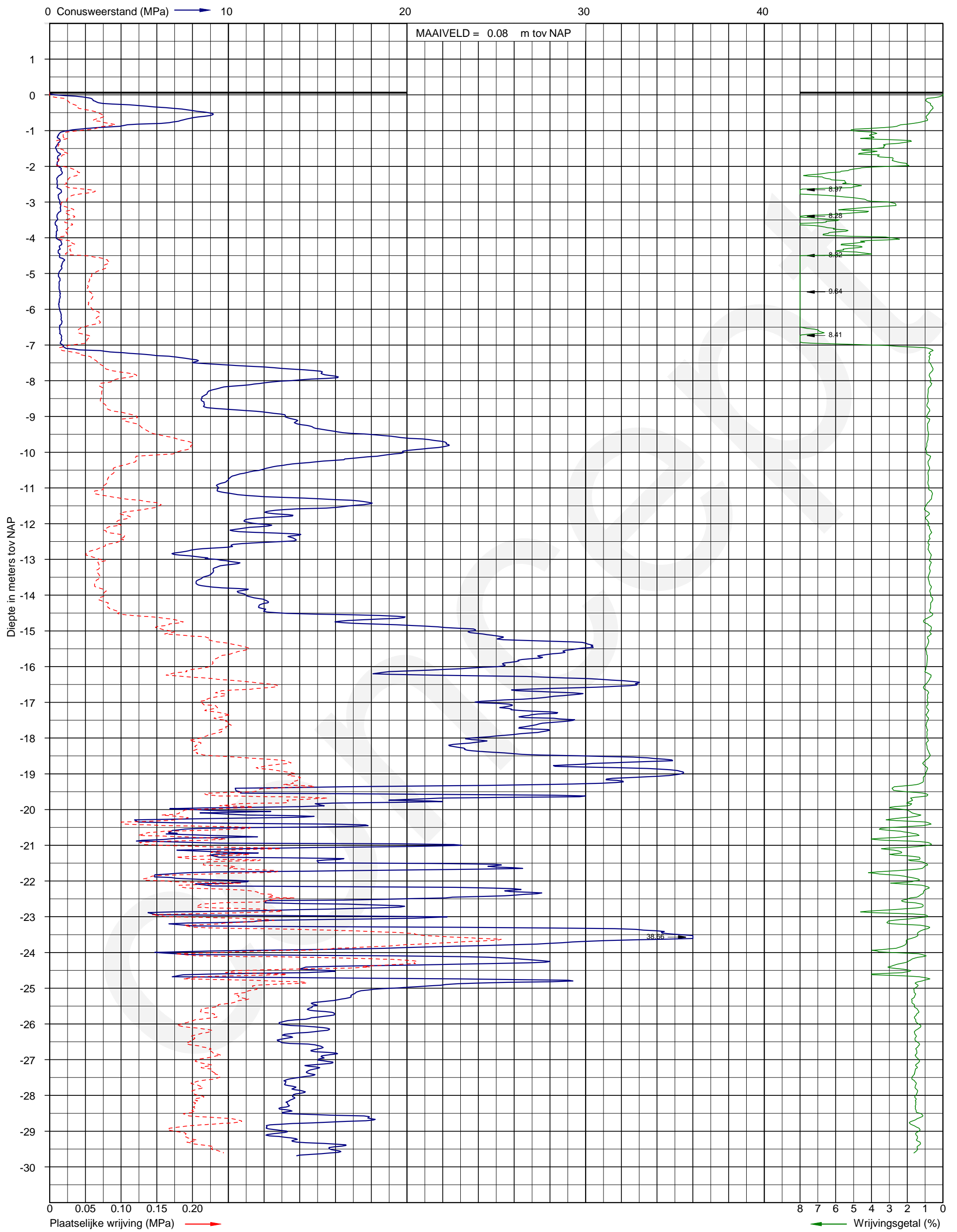
Boring volgens NEN 5119
Maaiveldhoogte: 0,93 m t.o.v. N.A.P.
Grondwaterstand: 110 cm - maaiveld

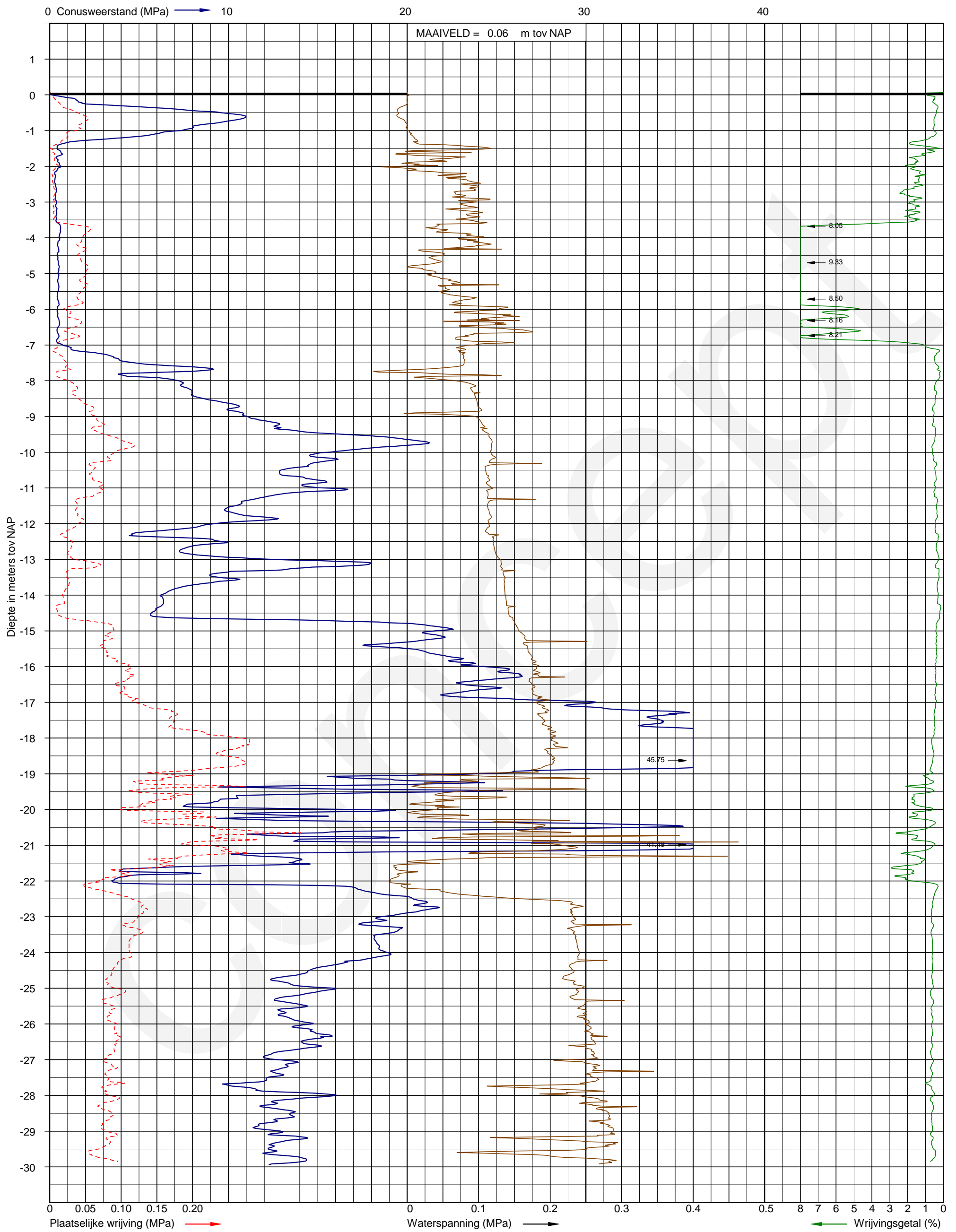
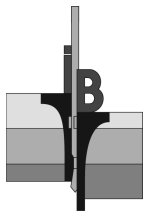
Classificatie volgen NEN 5104
x [m in RD]: 39761
y [m in RD]: 383988



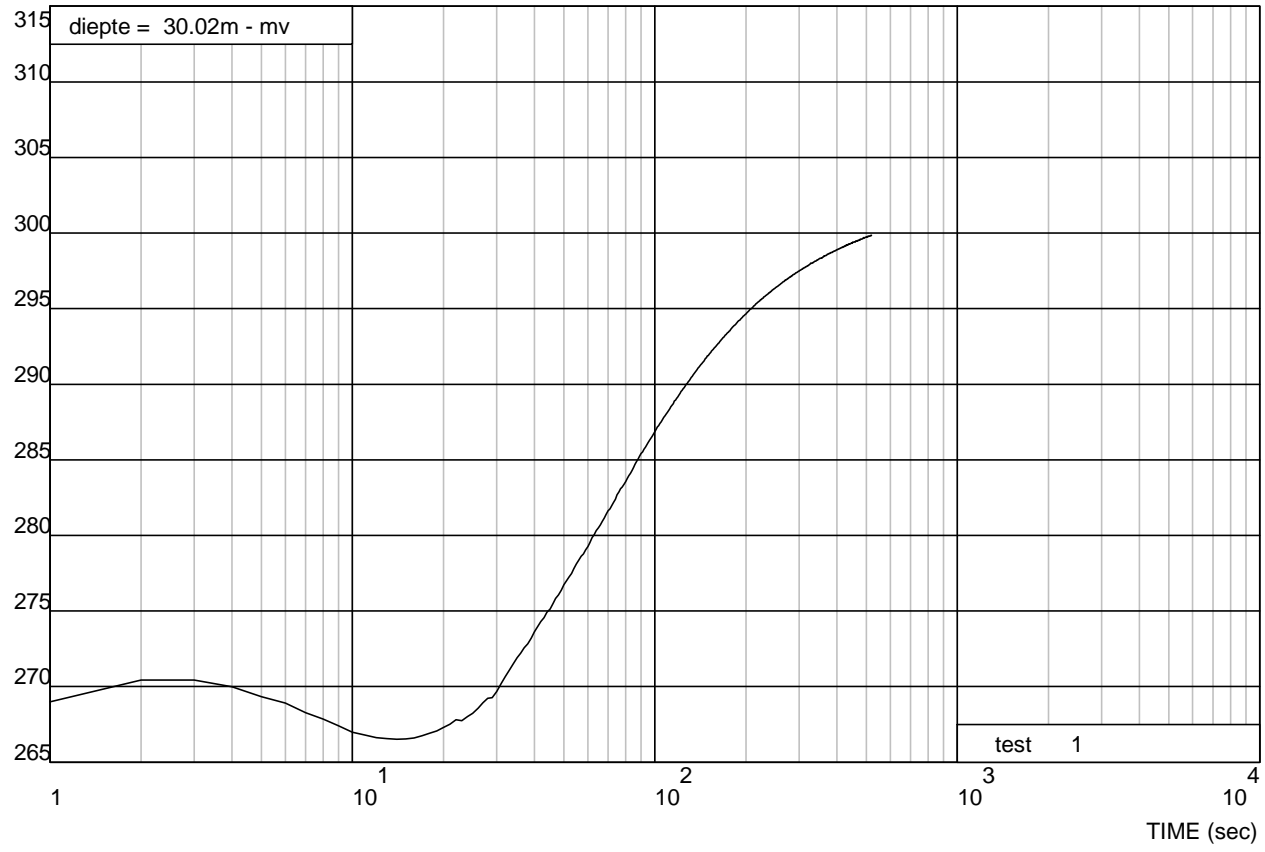




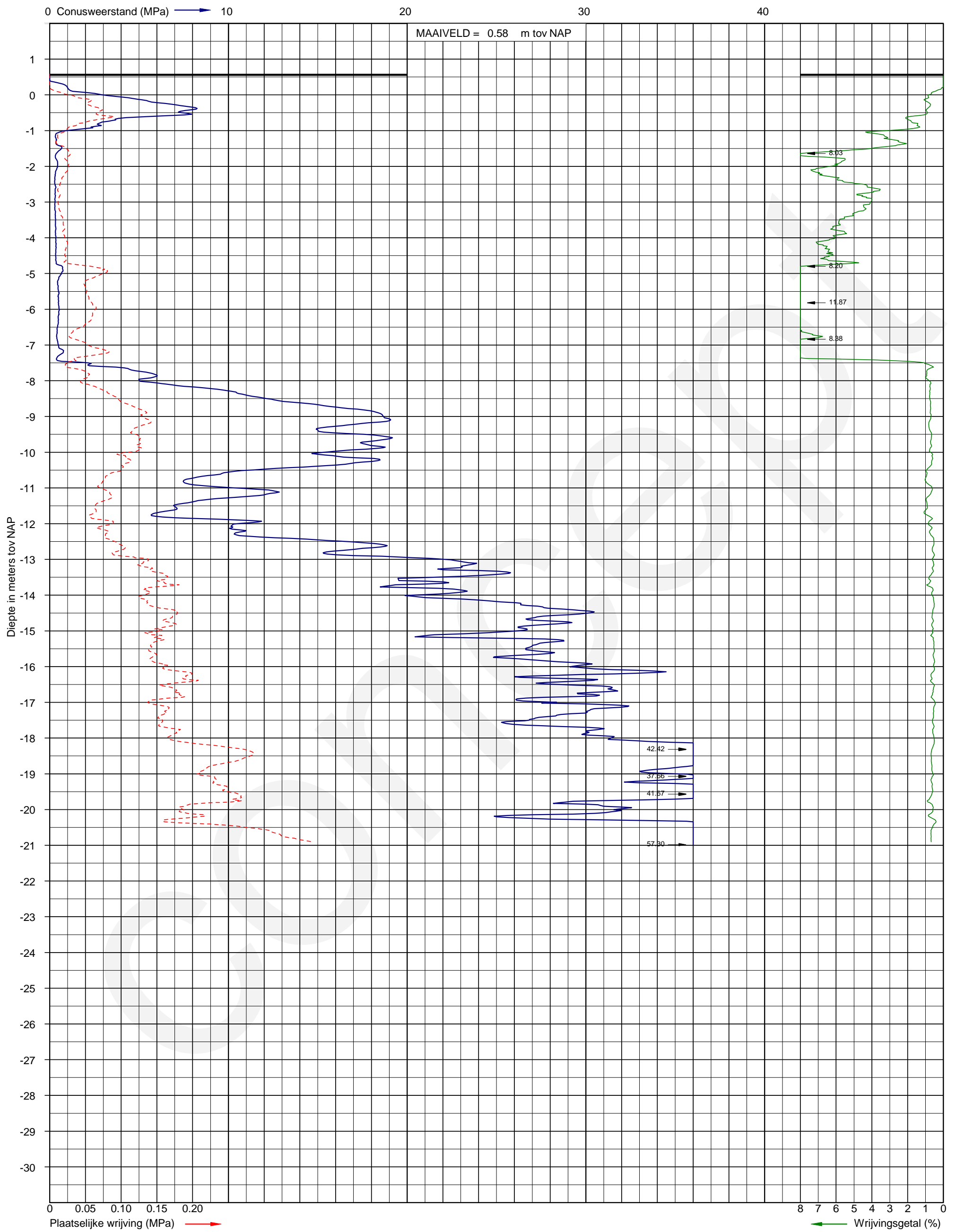


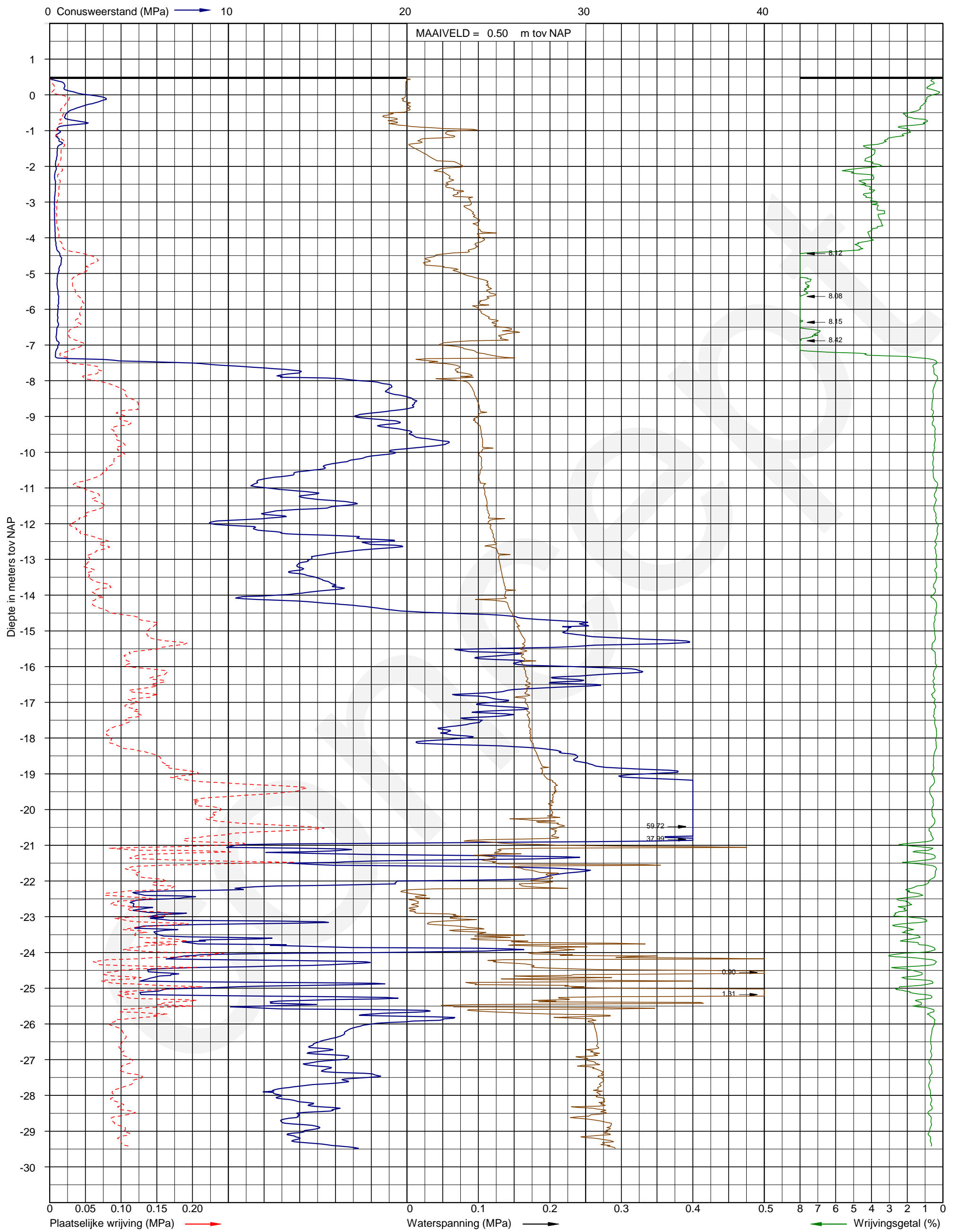


waterspanning (kPa)

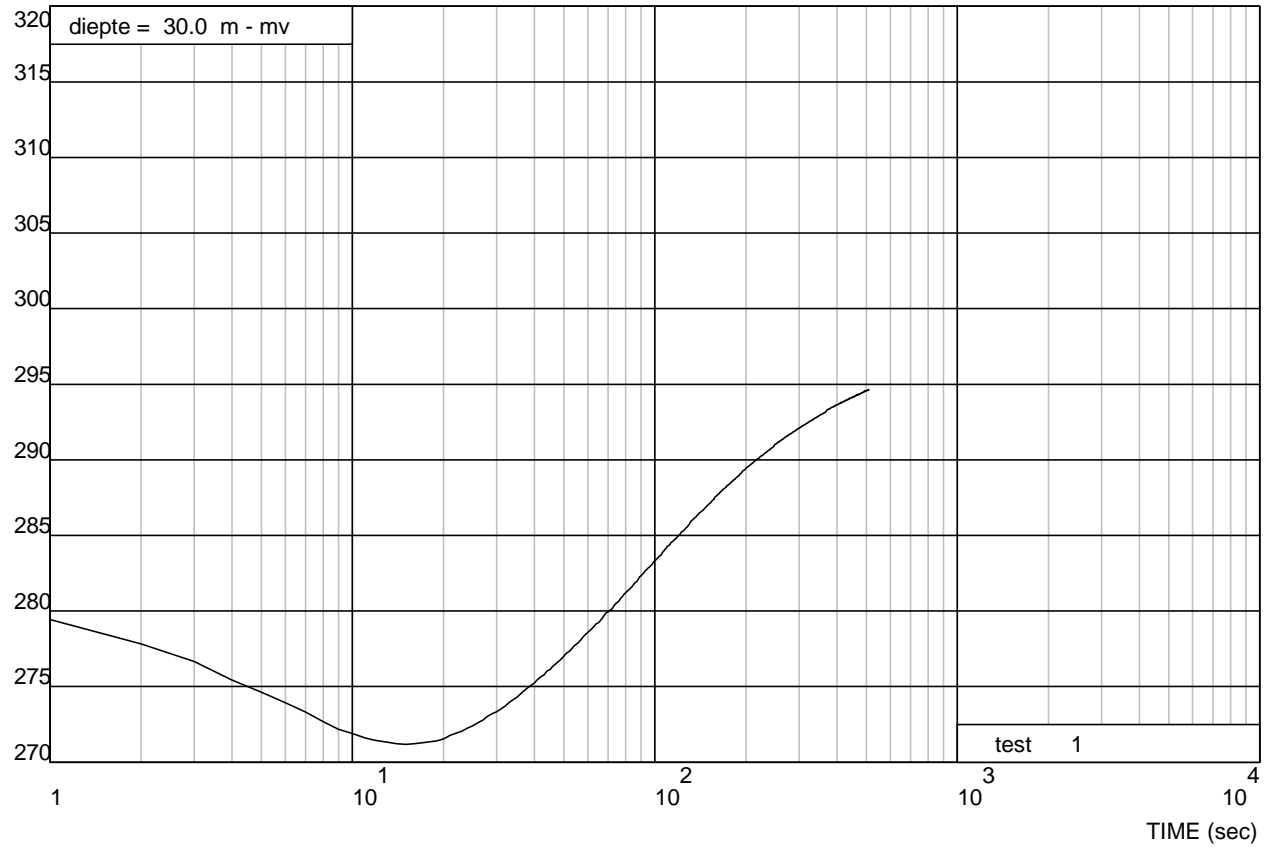


Grondonderzoek station te Rilland	dissipatietest	uitv.: RHL-S22	sondering: 4
		mat.:	
INPIJN-BLOKPOEL Ingenieursbureau	datum: 13-11-2014		opdracht: 02P001595-03





waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

uitv.: RHL-S22

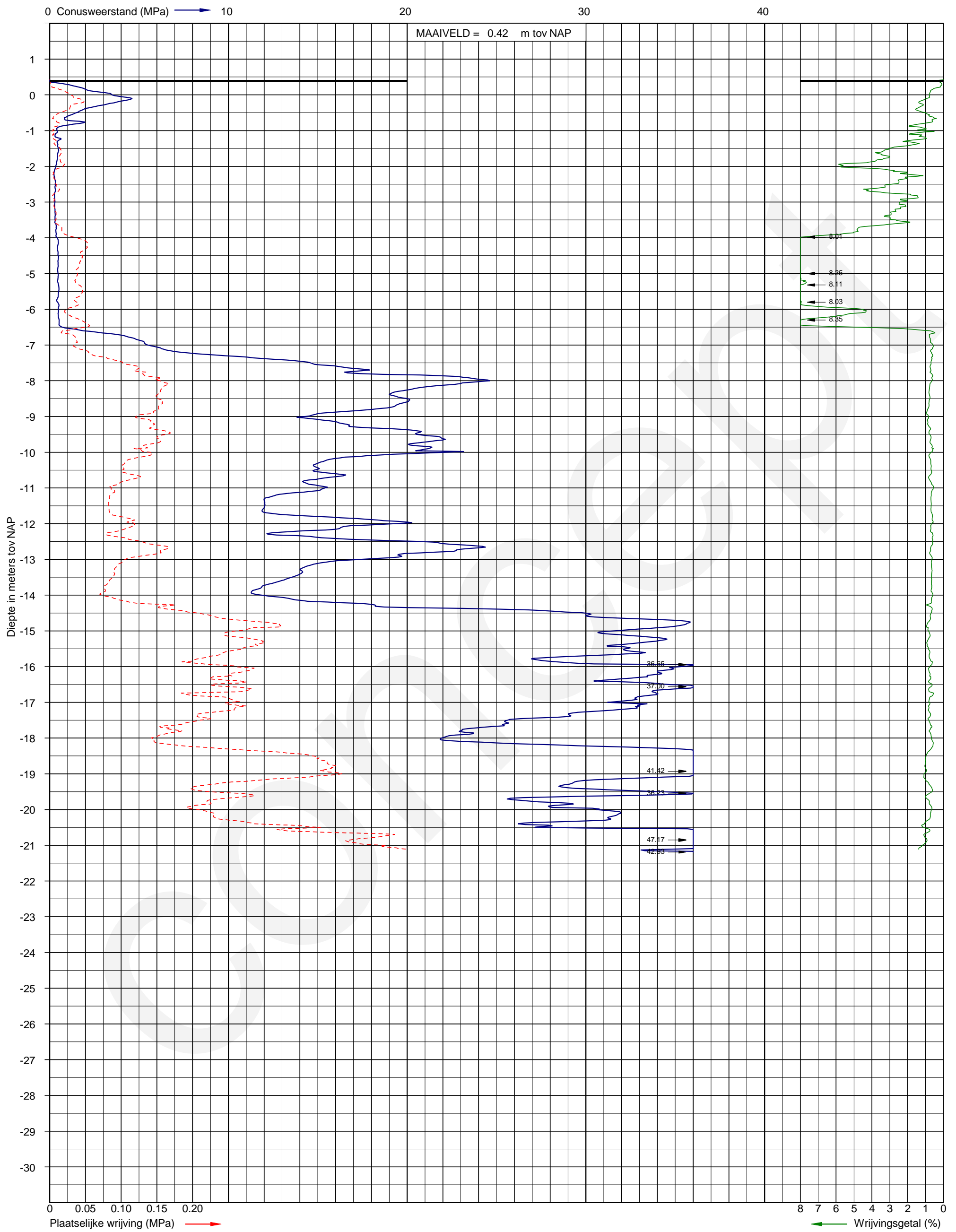
sondering: 6

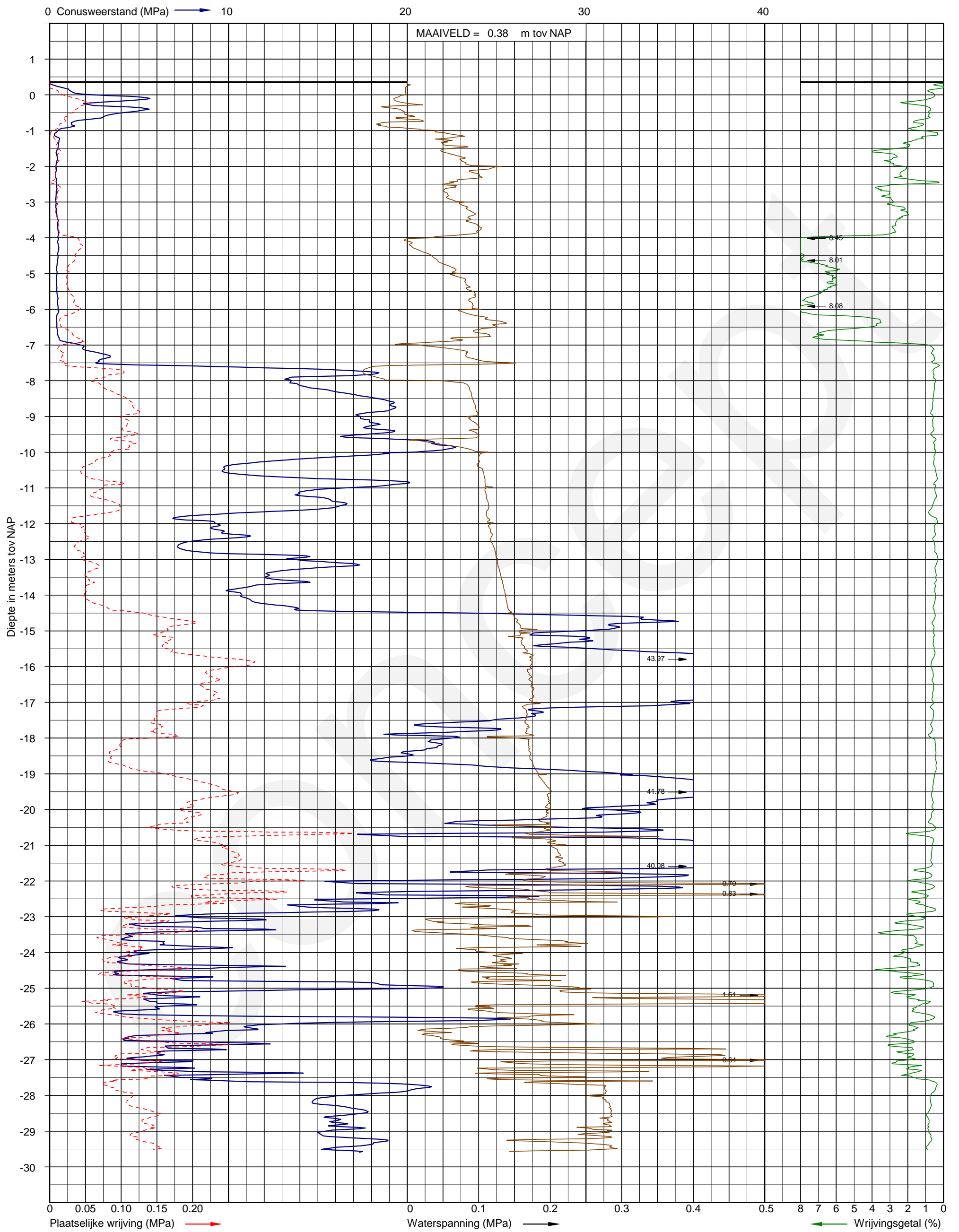
mat.:

INPIJN-BLOKPOEL Ingenieursbureau

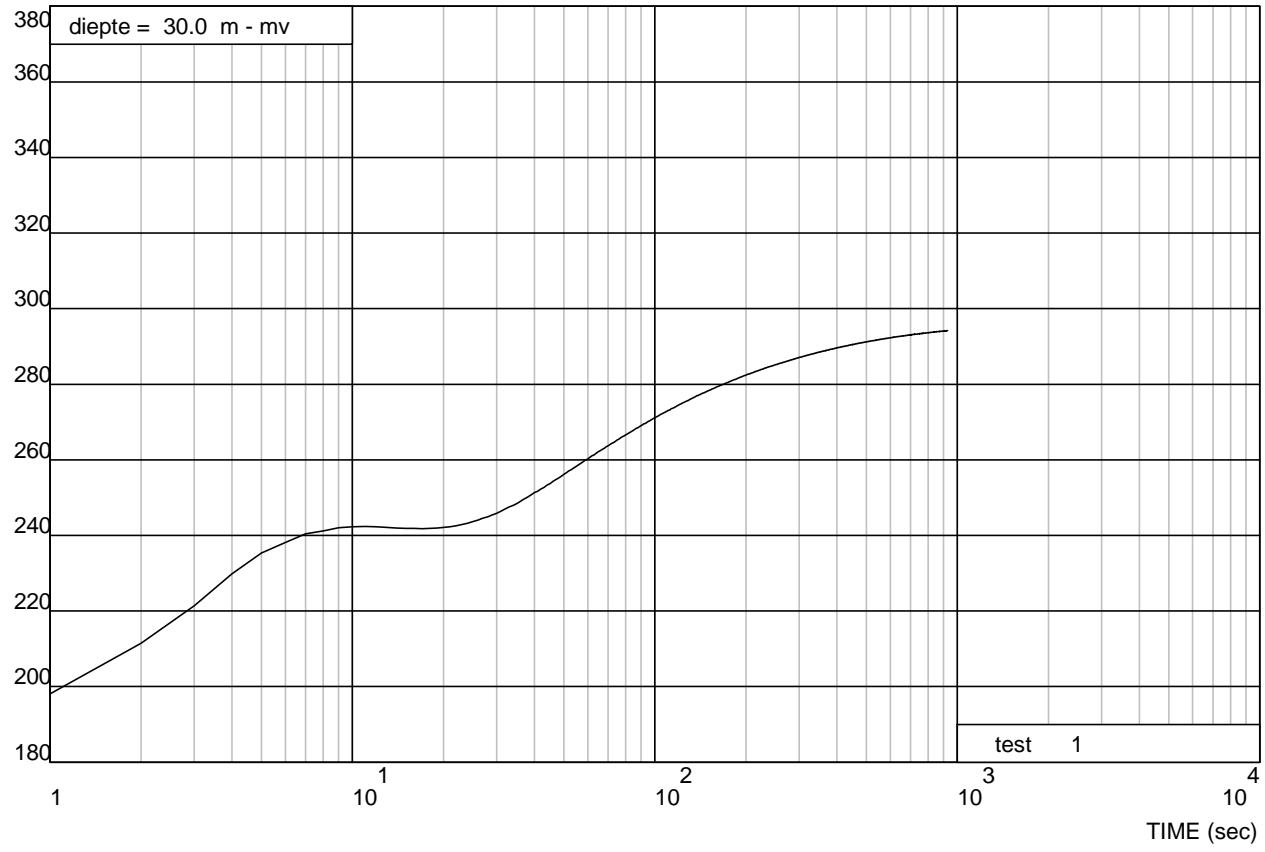
datum: 6-11-2014

opdracht: 02P001595-03





waterspanning (kPa)



Grondonderzoek station te Rilland

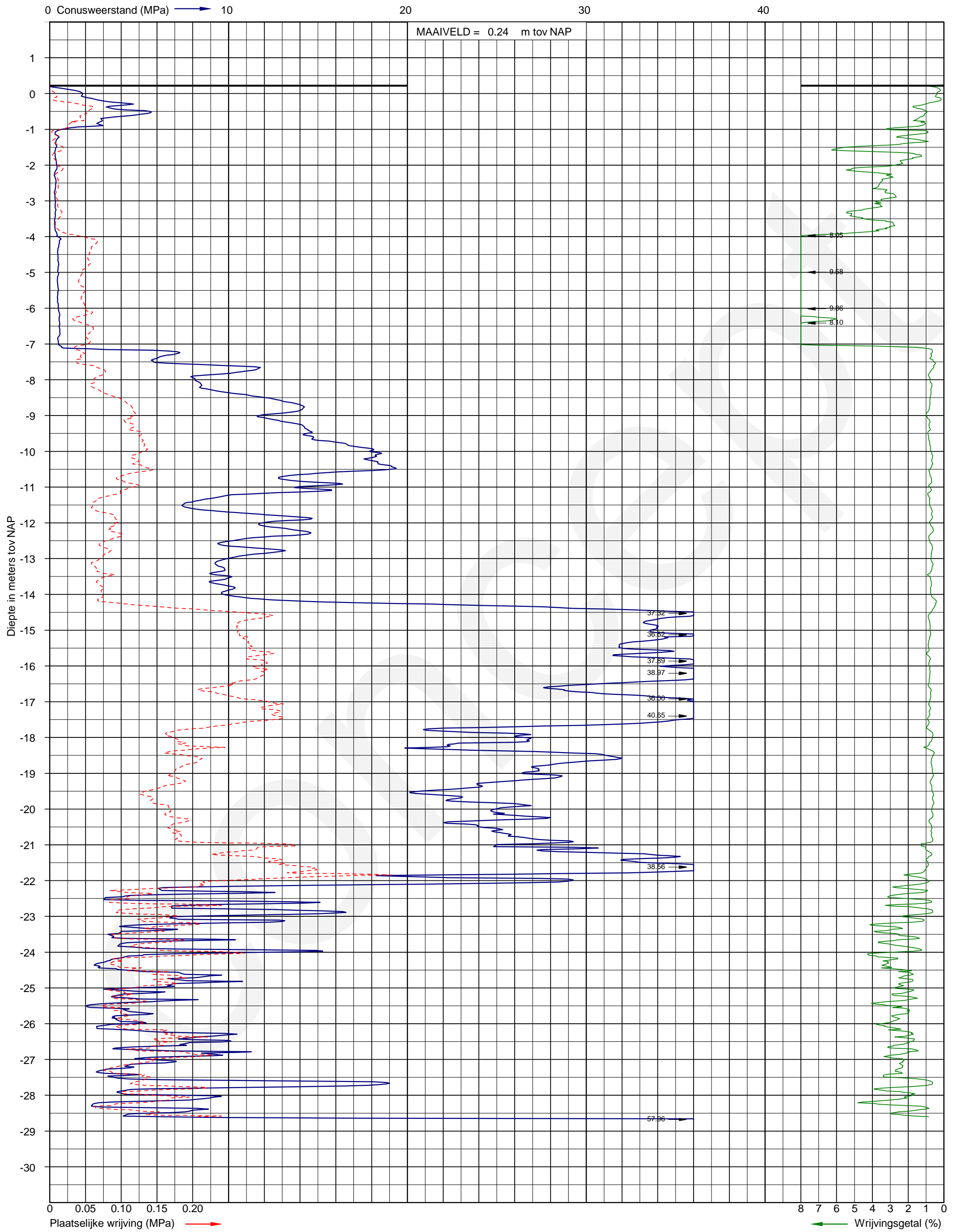
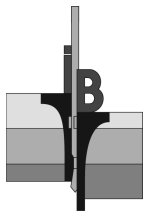
dissipatietest

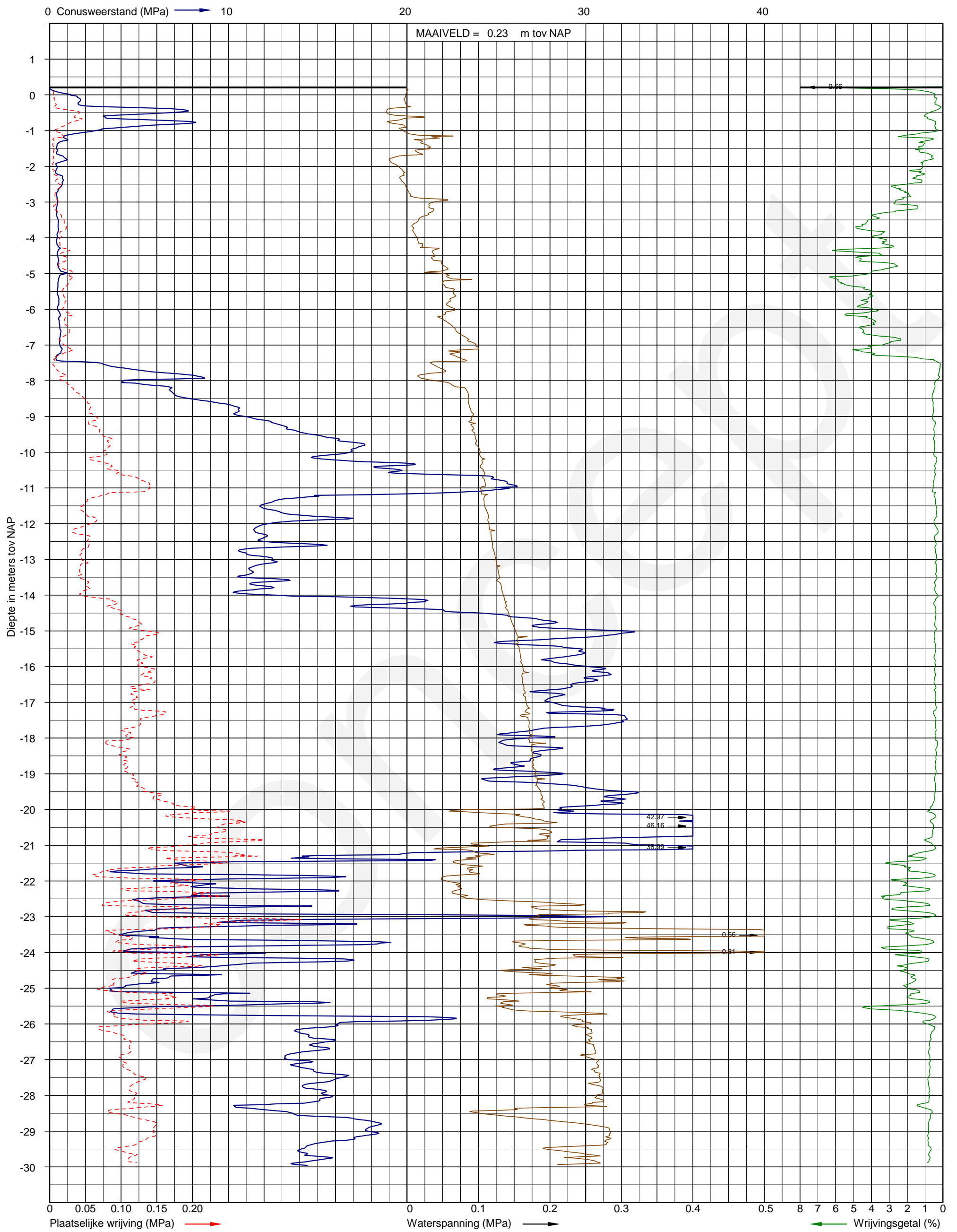
uitv.: RHL-S22
mat.: sondering: 8

INPIJN-BLOKPOEL Ingenieursbureau

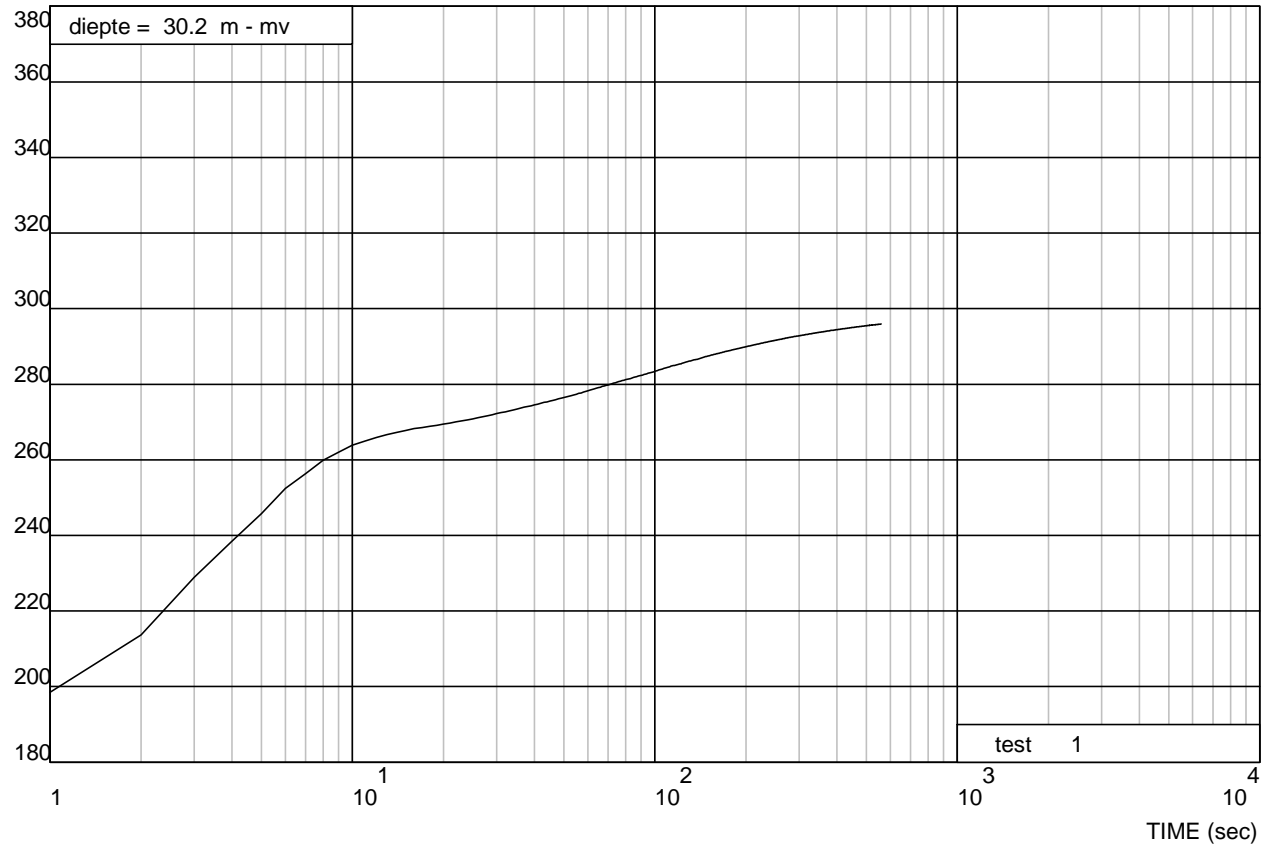
datum: 6-11-2014

opdracht: 02P001595-03





waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

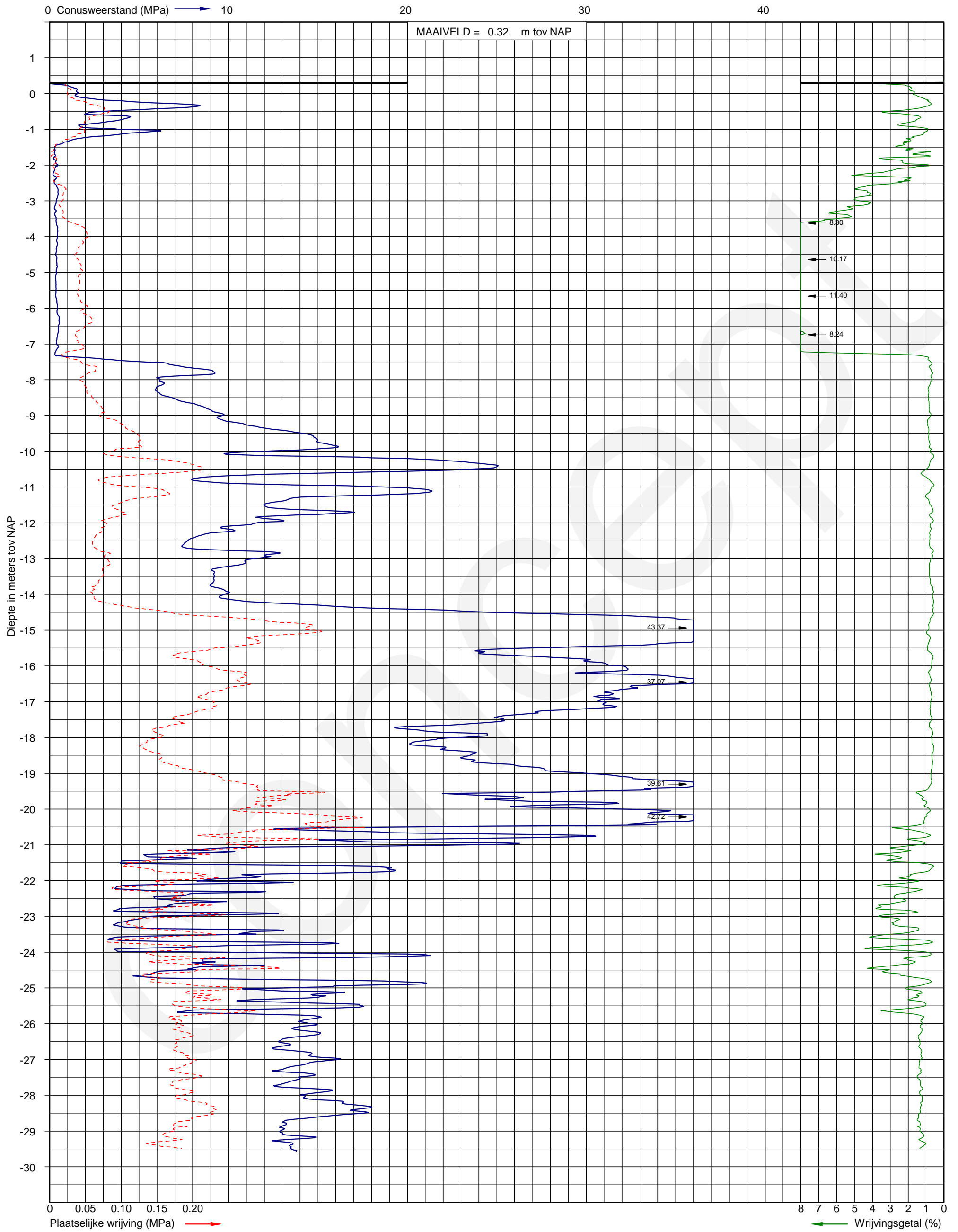
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mat.:

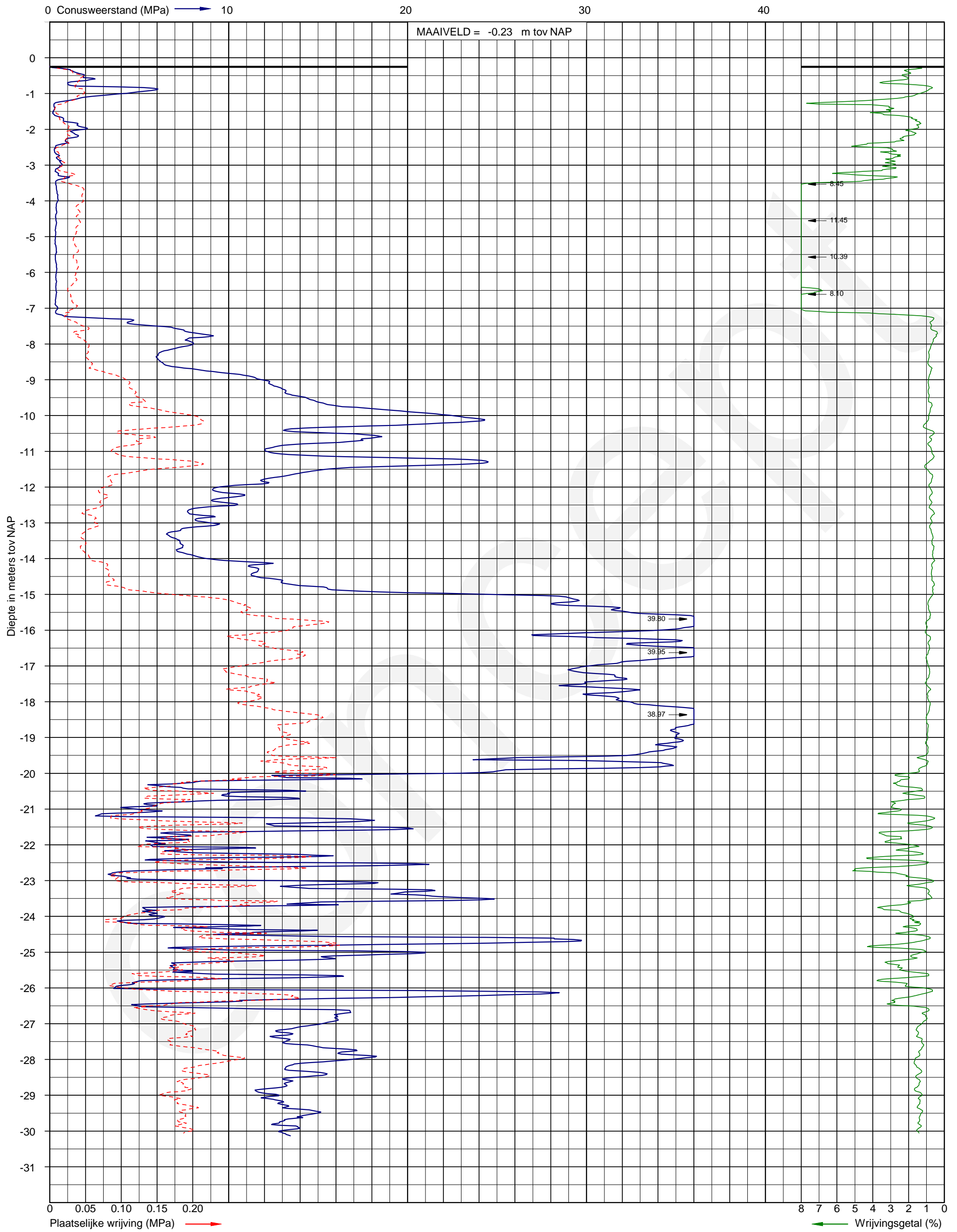
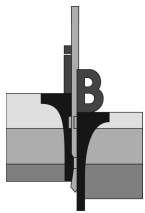
sondering: 10

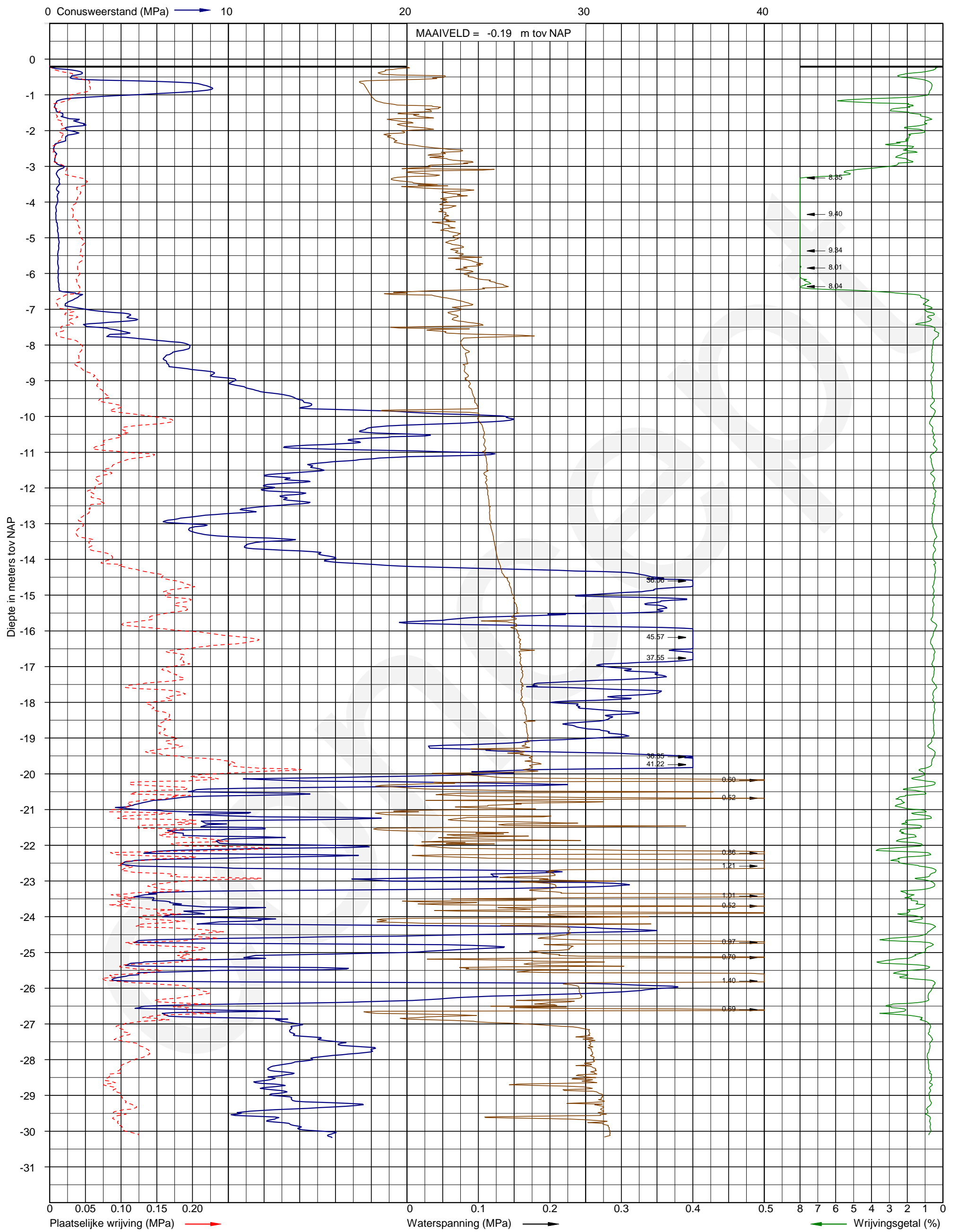
INPIJN-BLOKPOEL Ingenieursbureau

datum: 6-11-2014

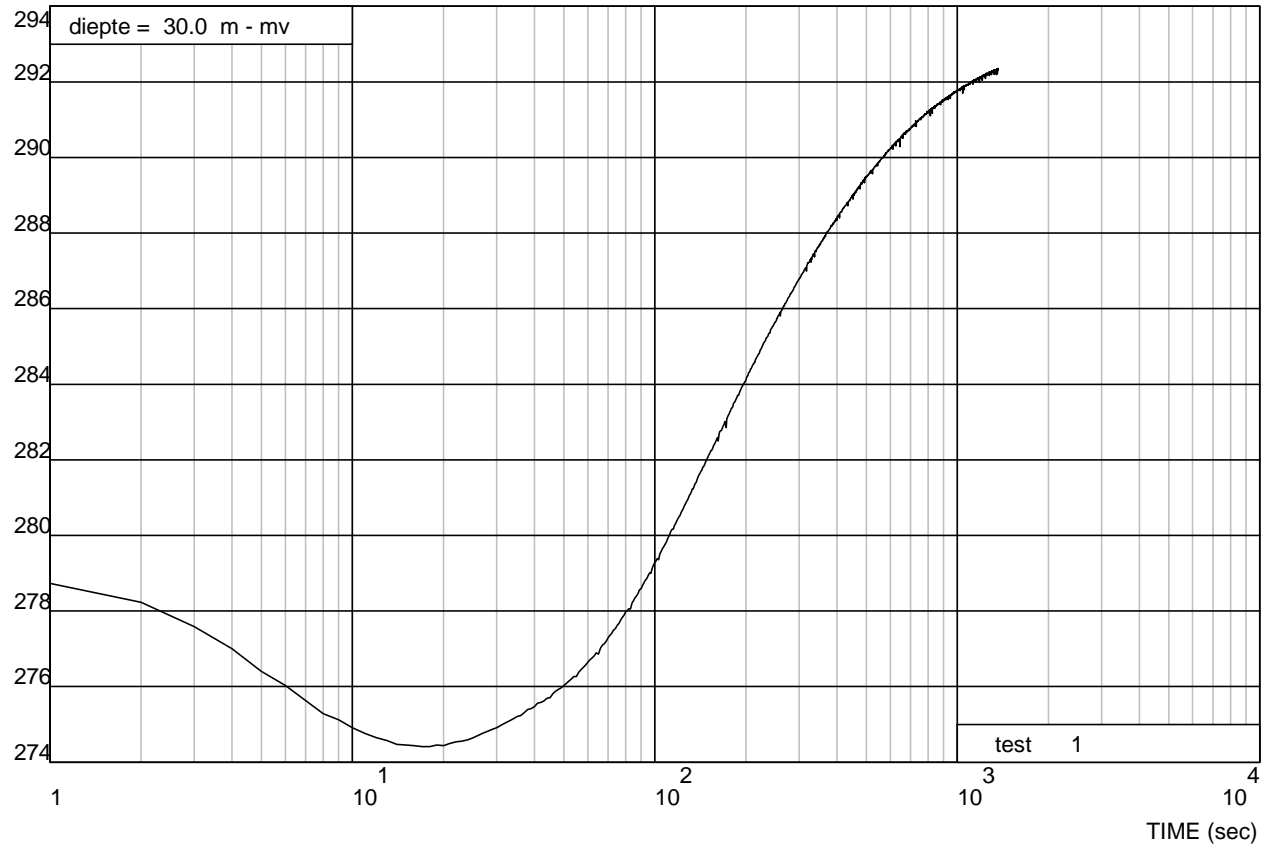
opdracht: 02P001595-03







waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

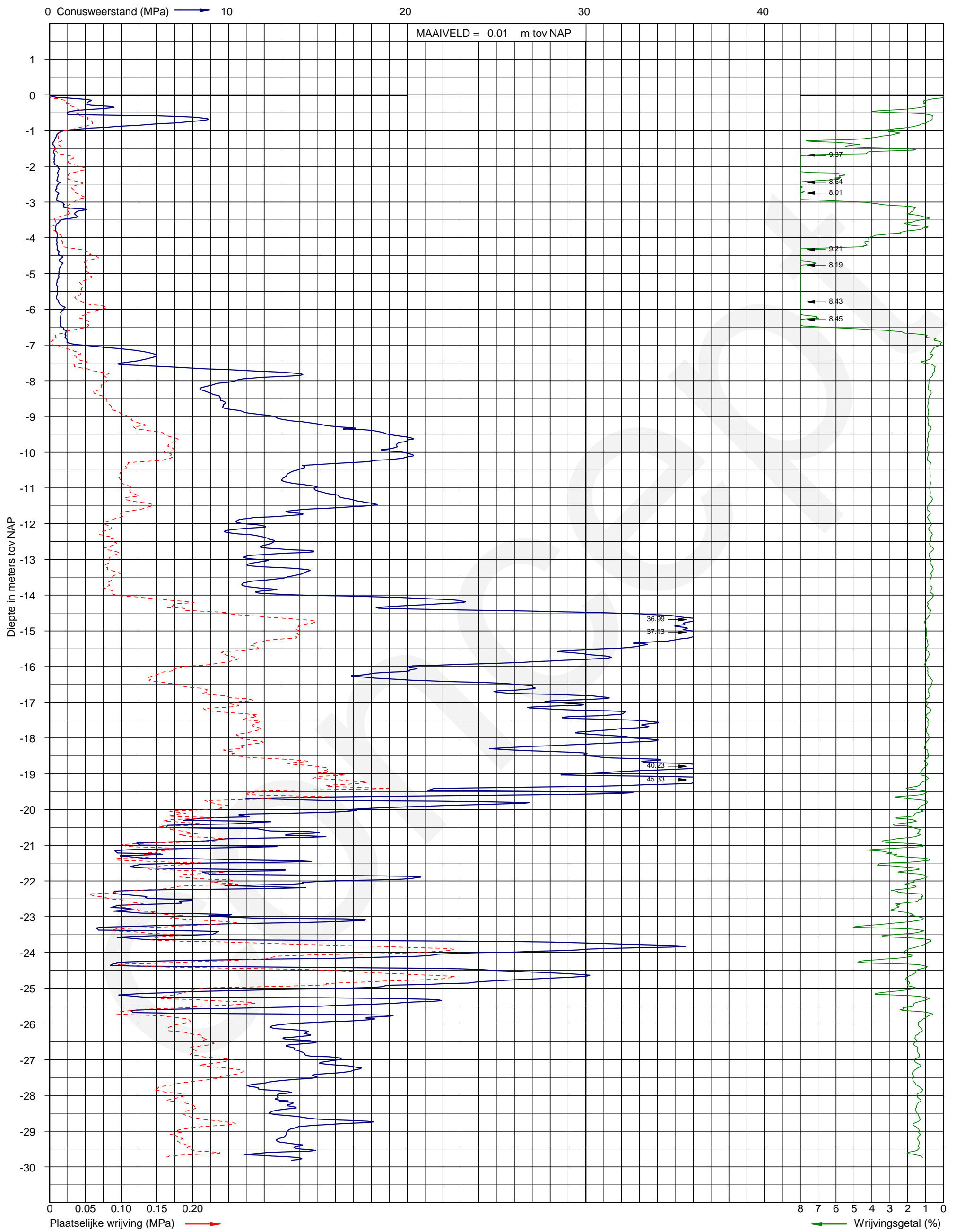
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mat.:

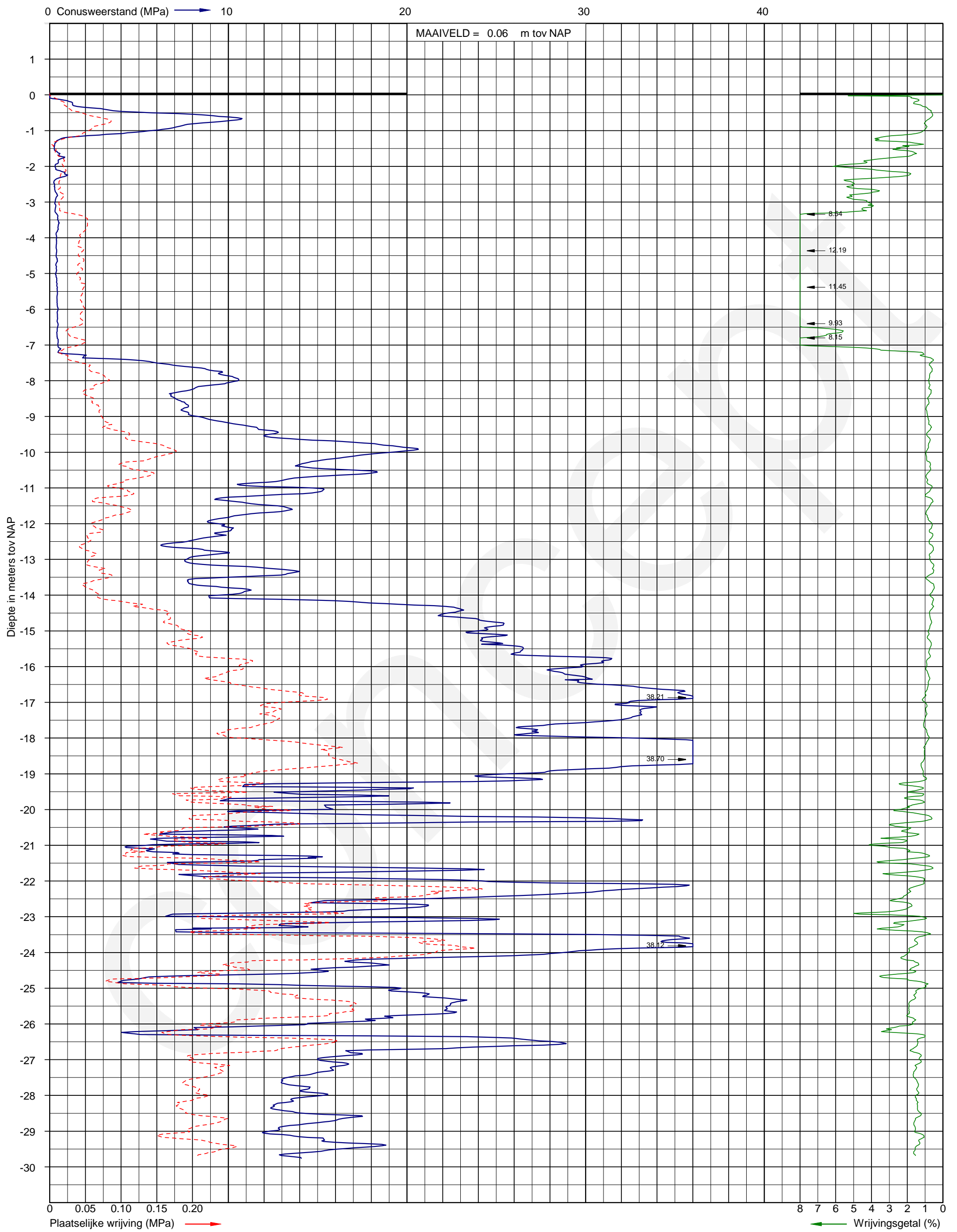
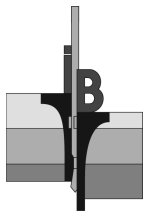
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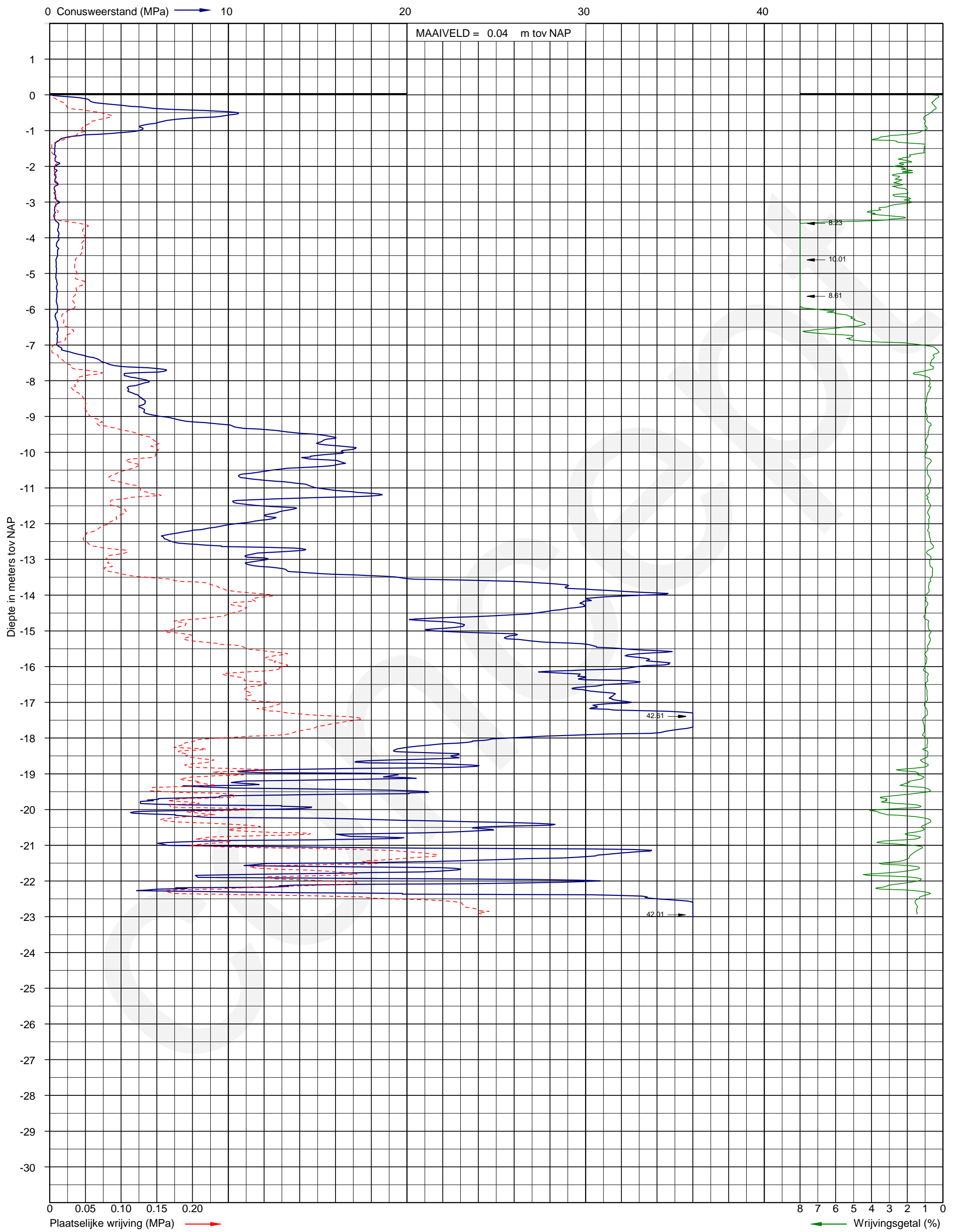
INPIJN-BLOKPOEL Ingenieursbureau

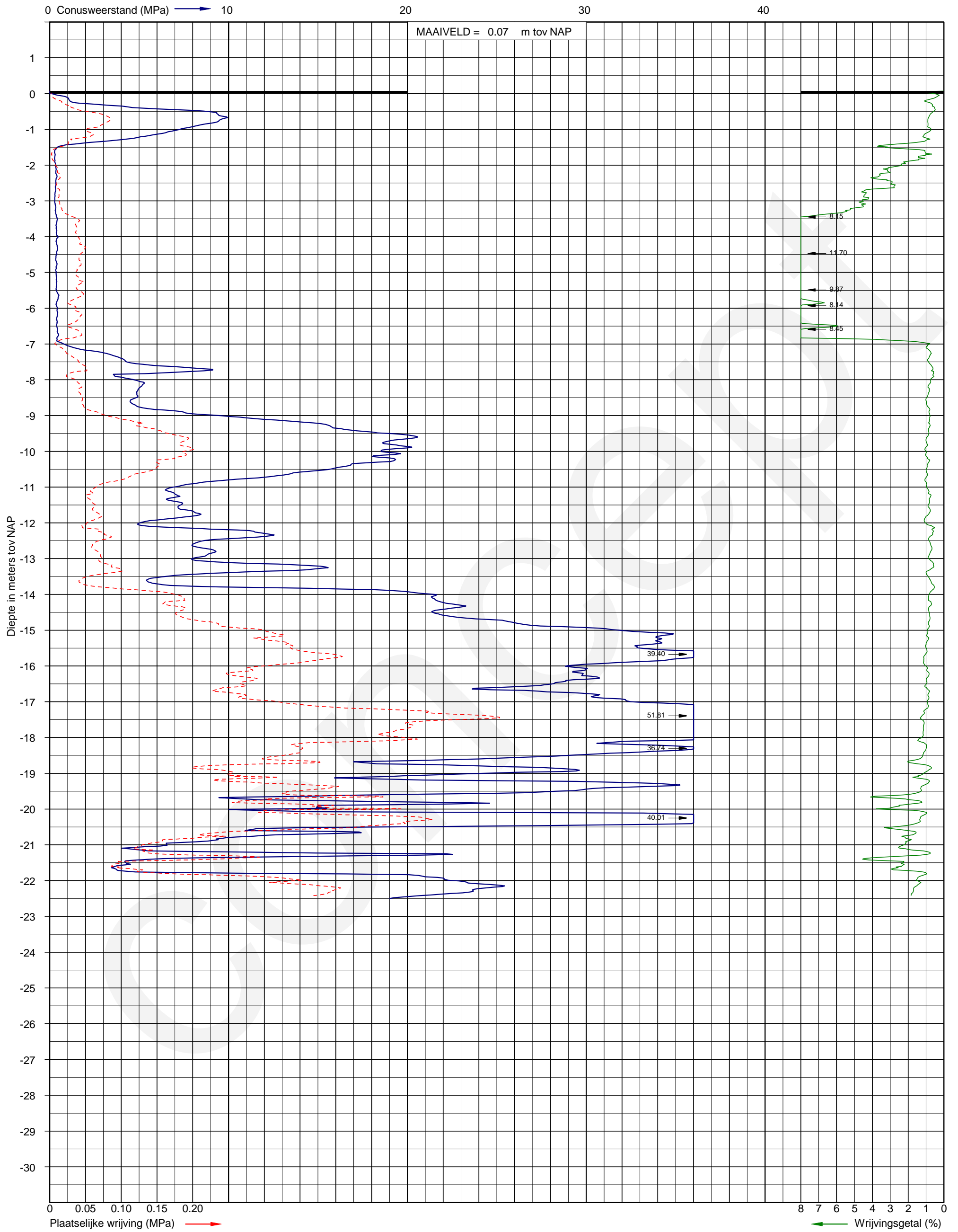
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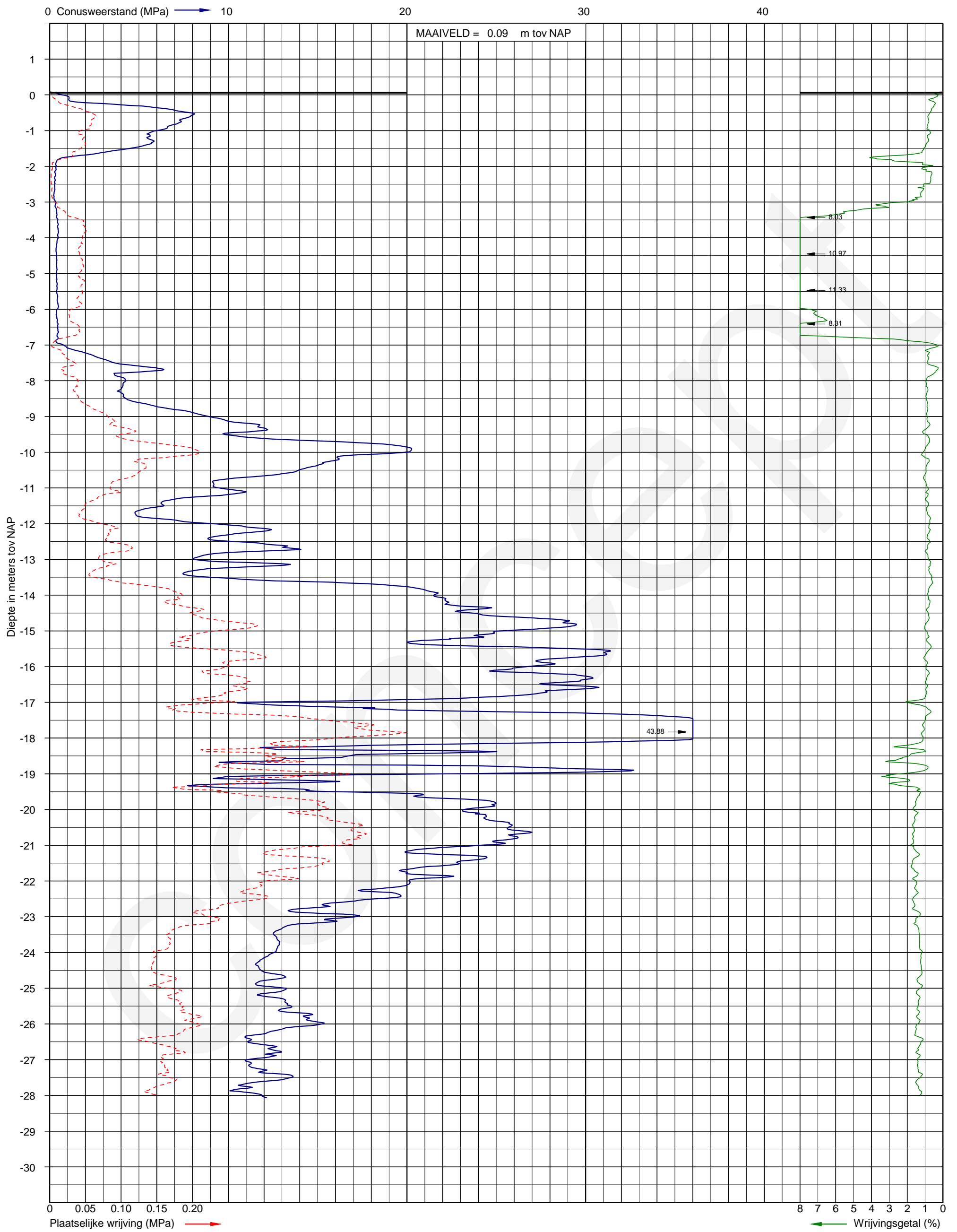
opdracht: 02P001595-03

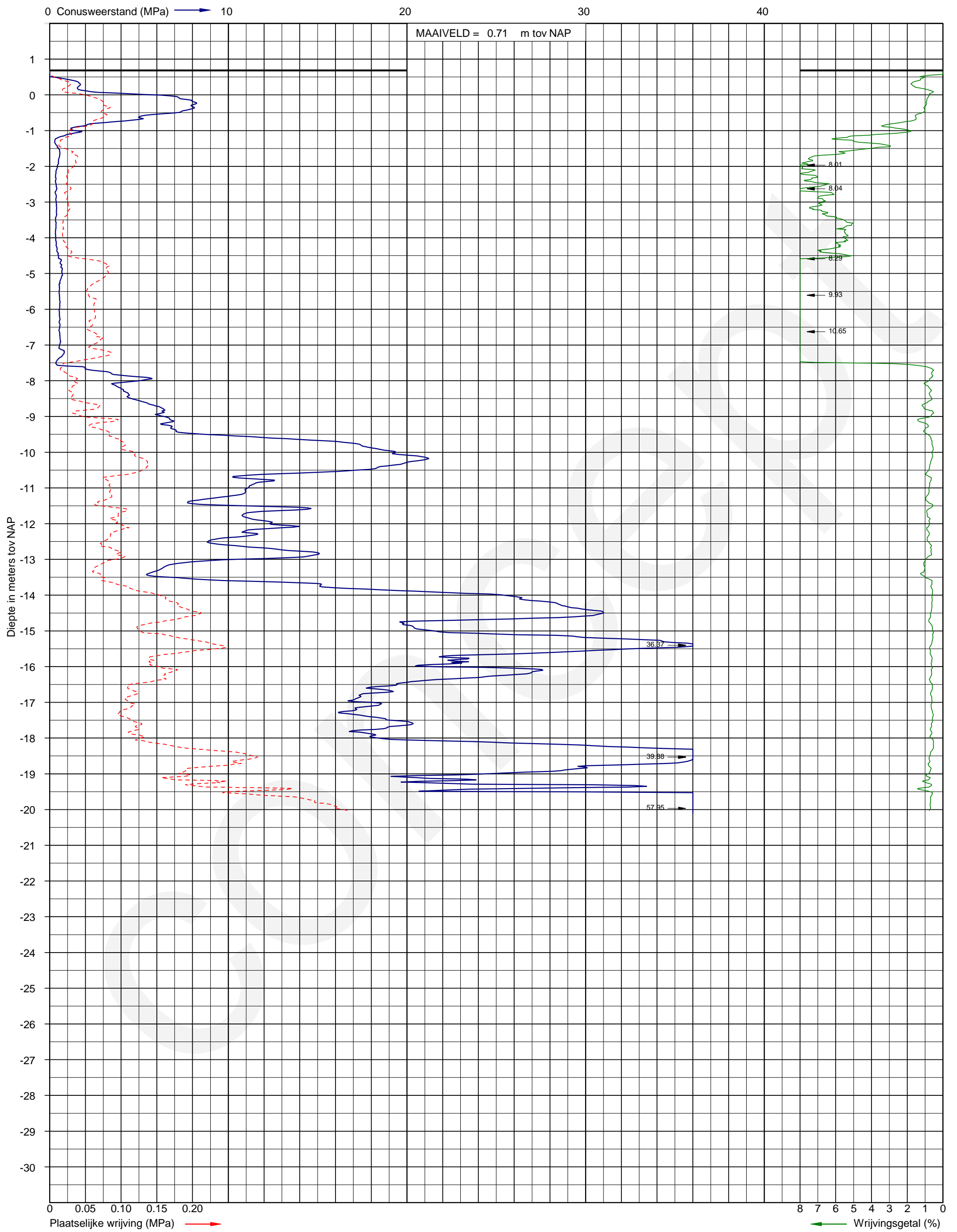
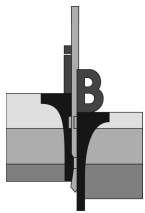


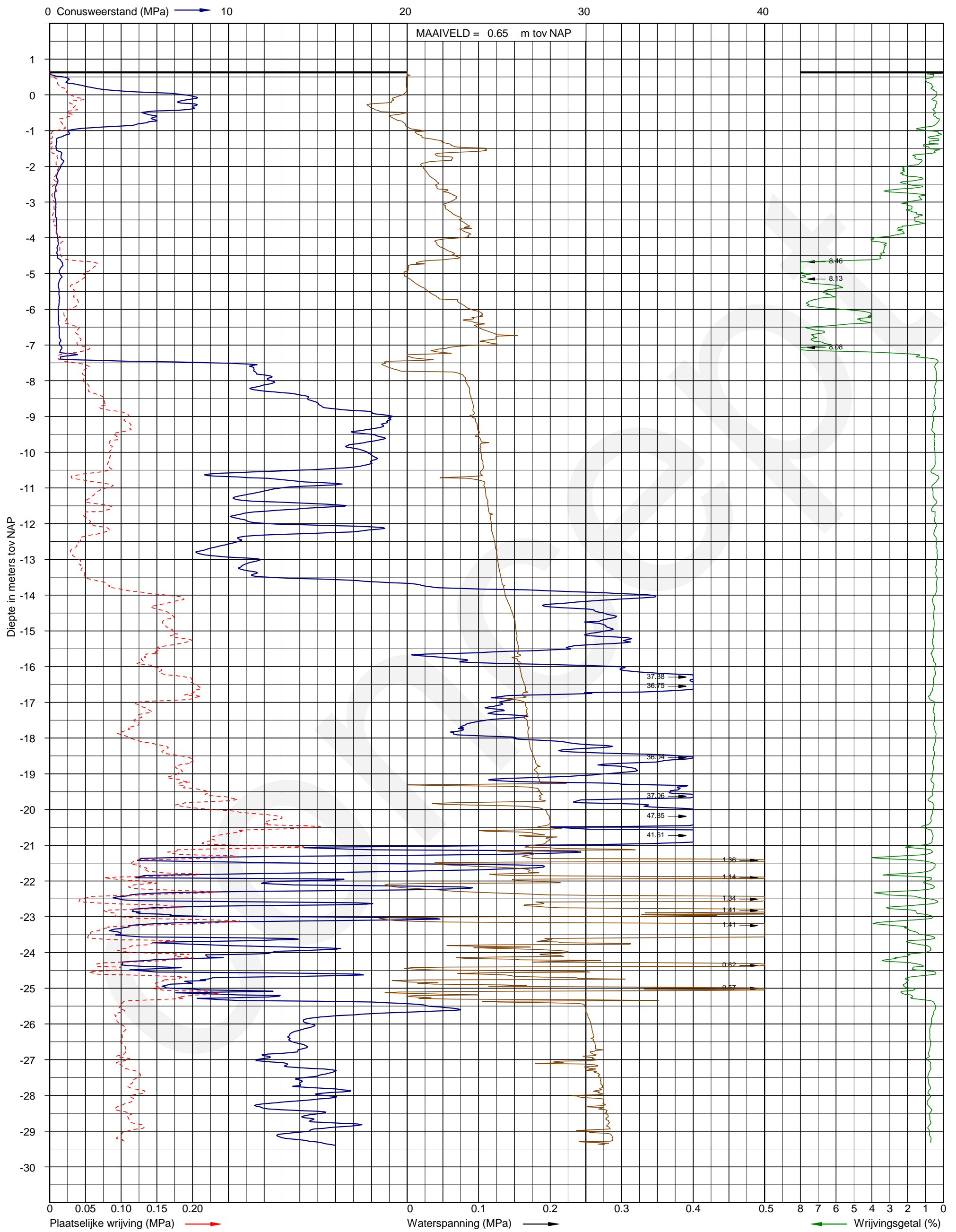




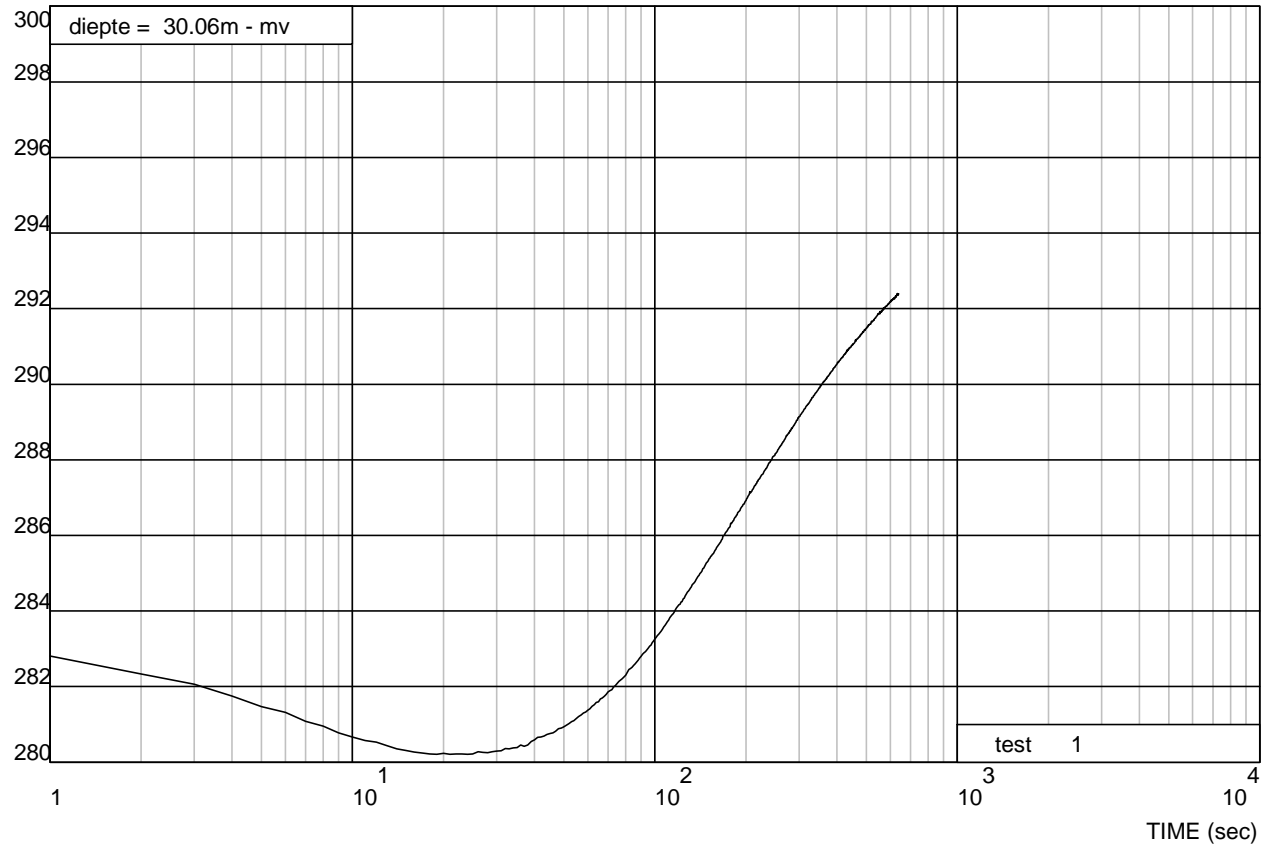




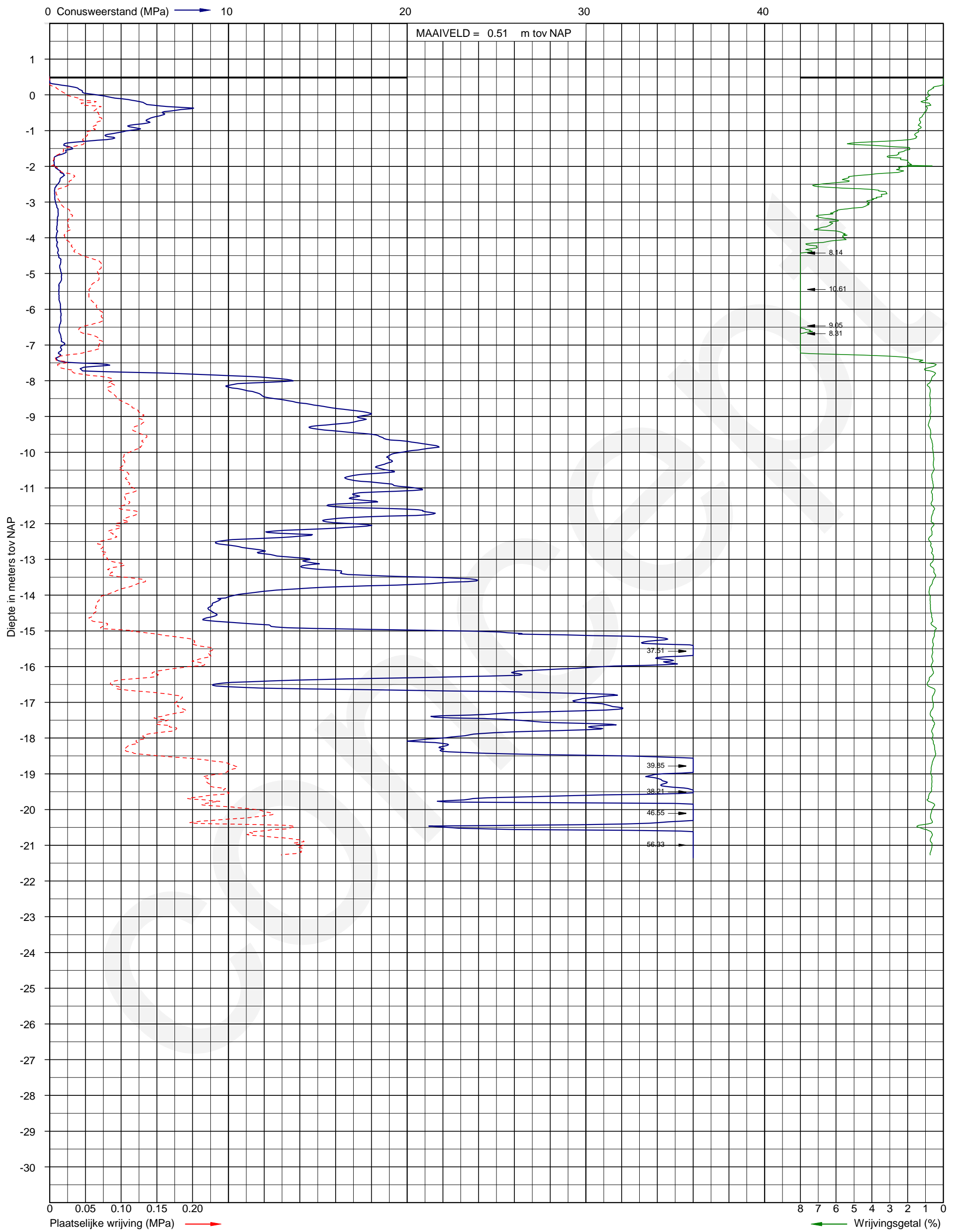


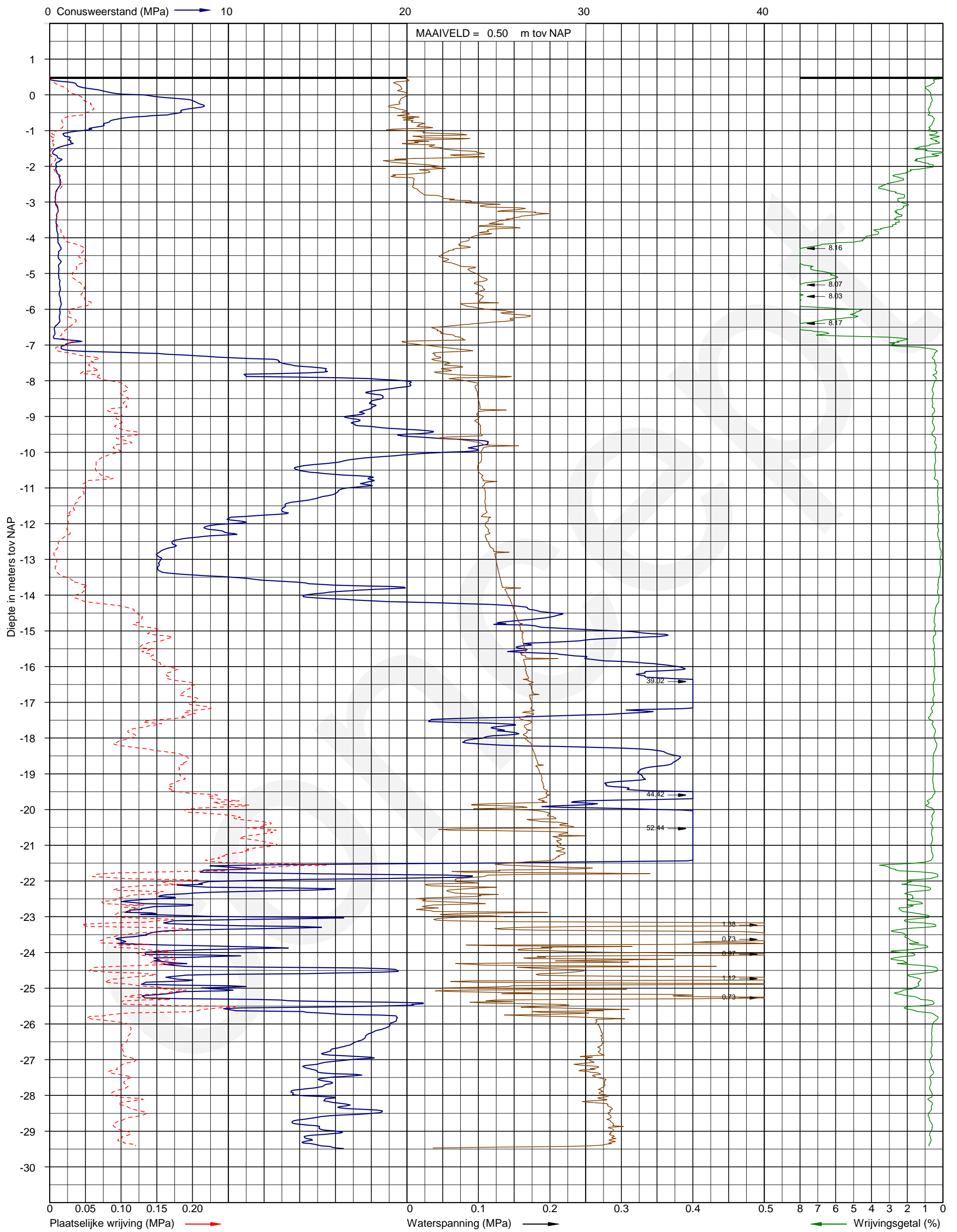
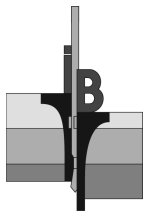


waterspanning (kPa)

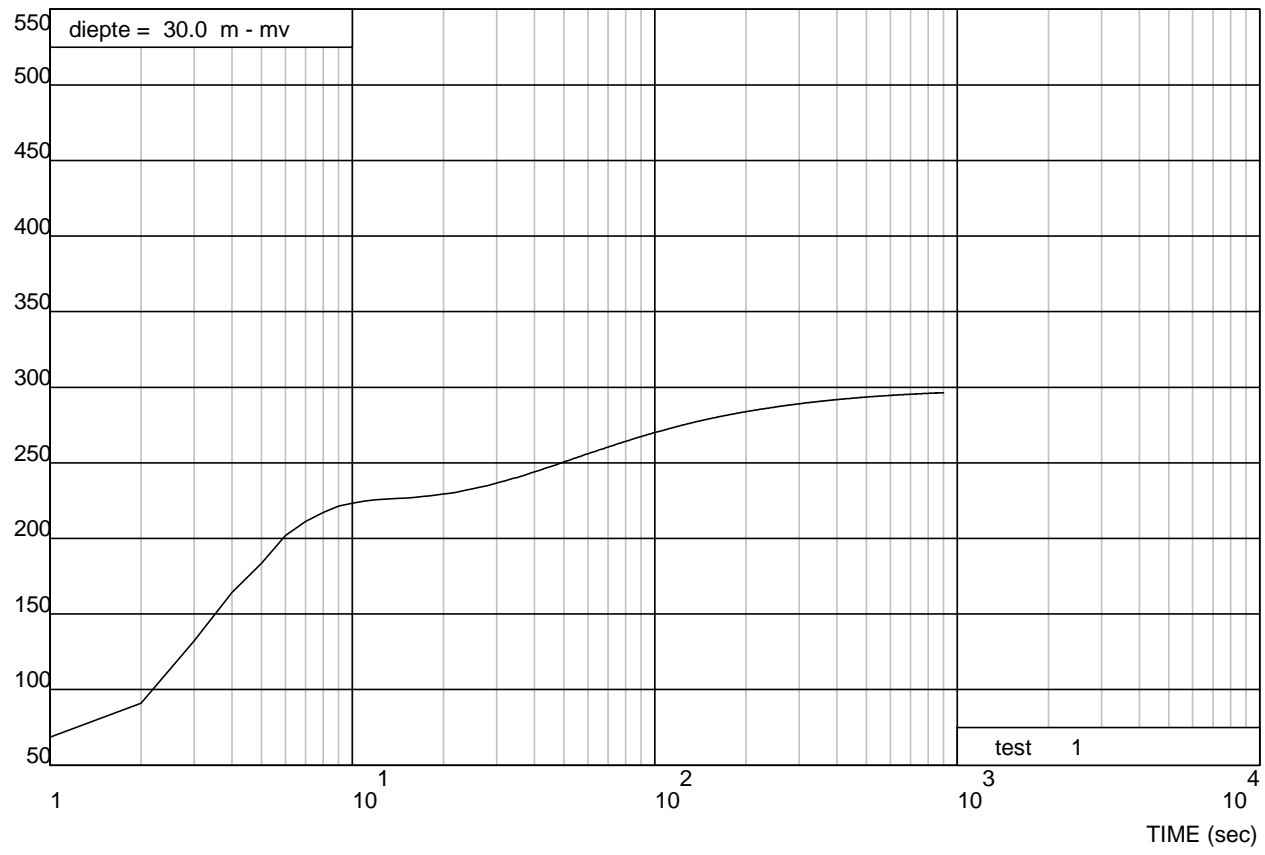


Grondonderzoek station te Rilland	dissipatietest	uitv.: RHL-S22	sondering: 20
		mat.:	
INPIJN-BLOKPOEL Ingenieursbureau	datum: 6-11-2014		opdracht: 02P001595-03





waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

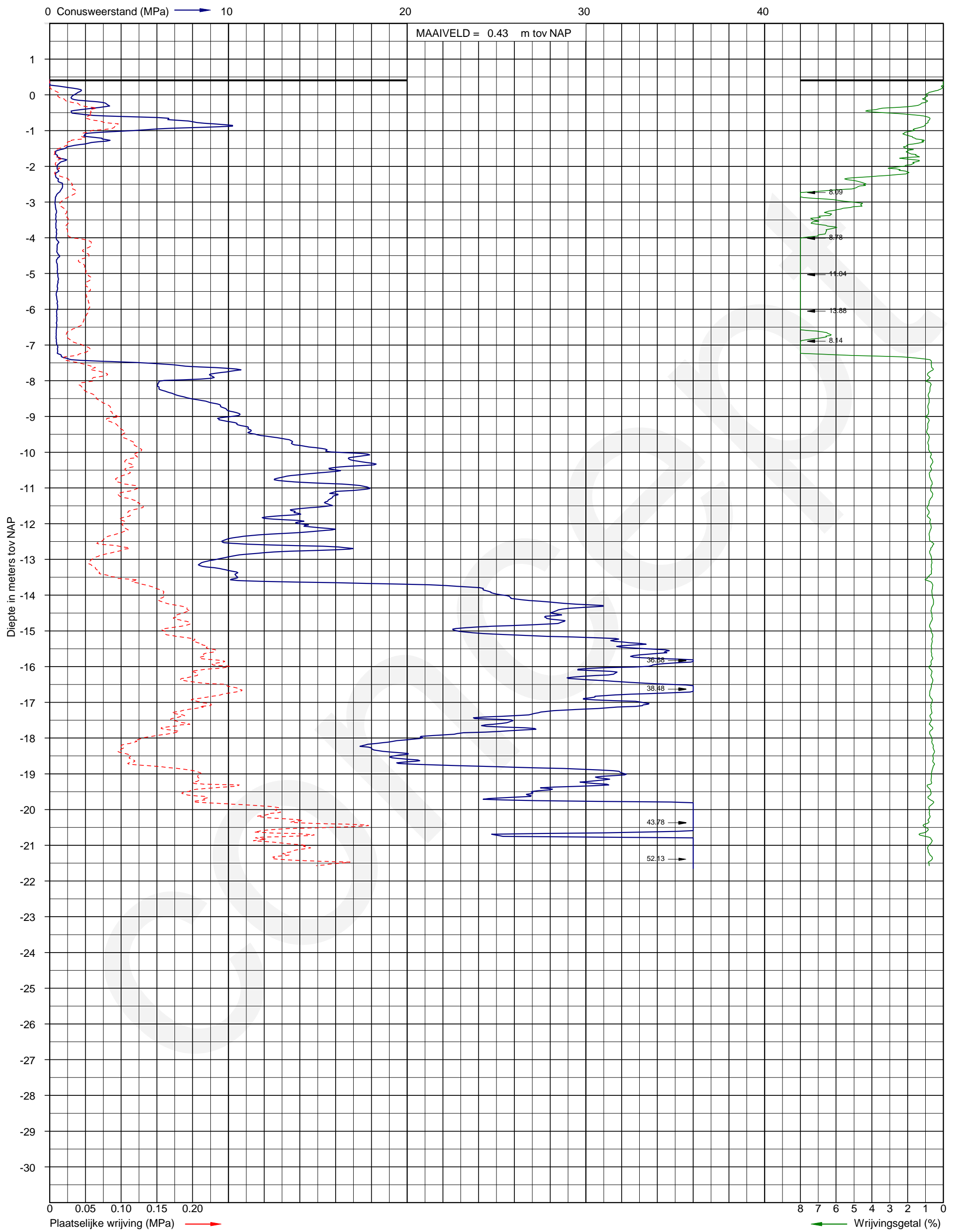
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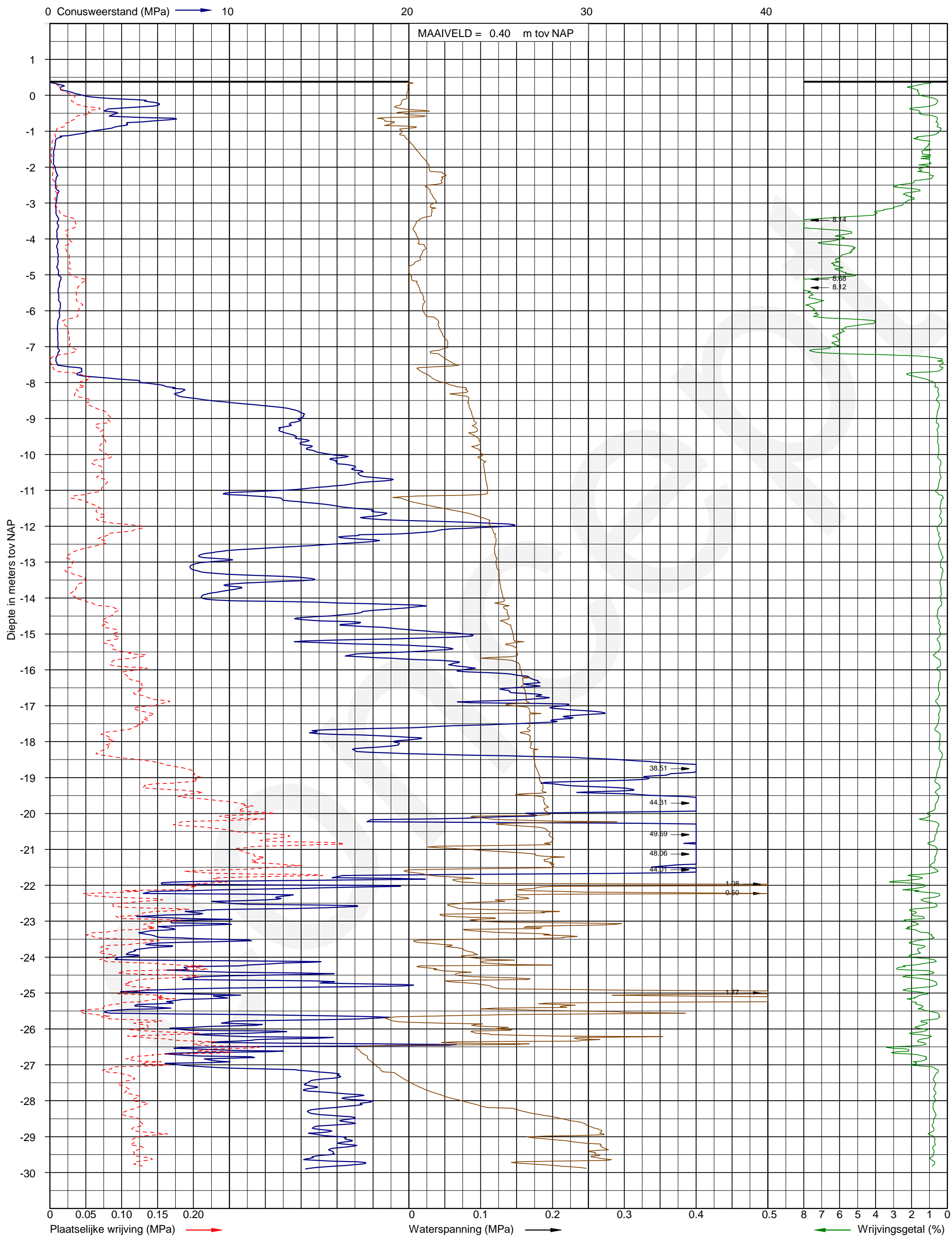
sondering: 22

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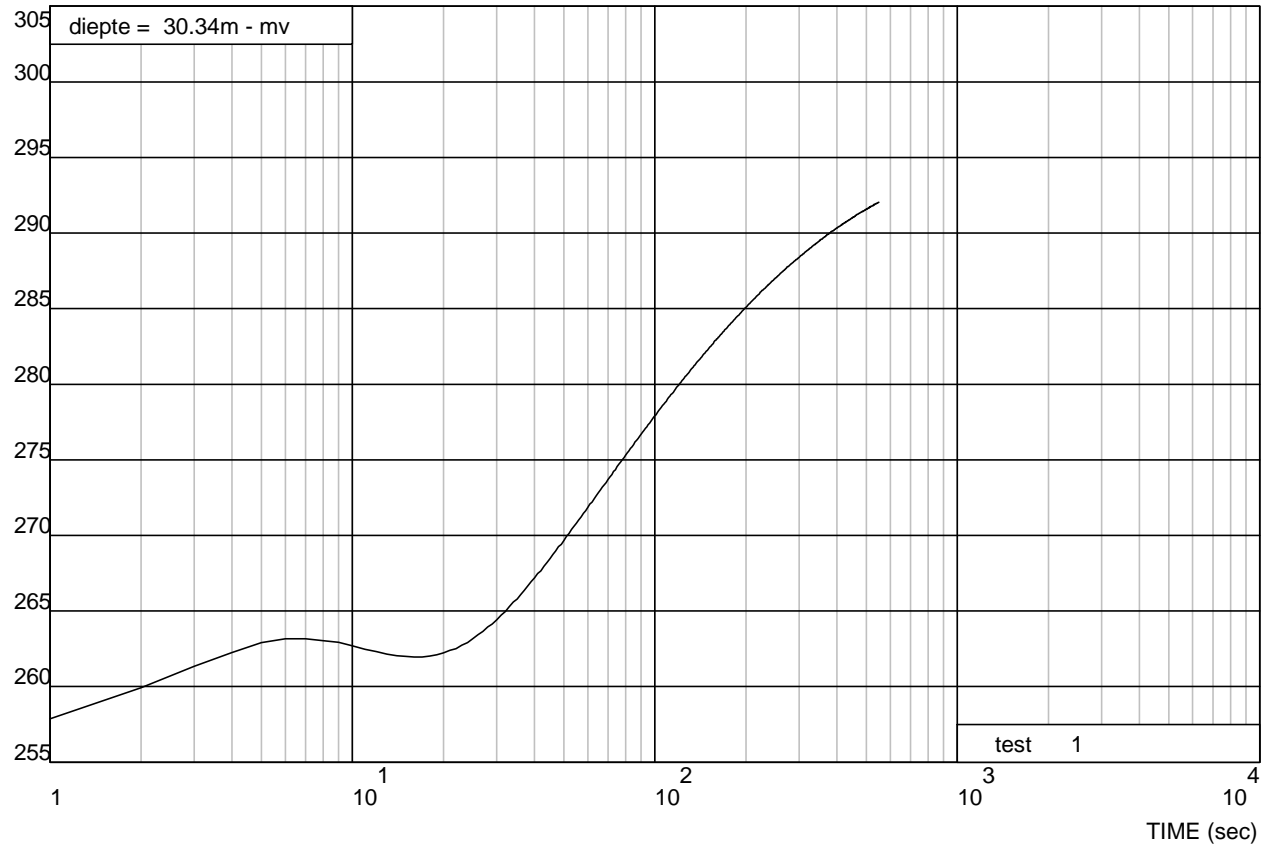
datum: 6-11-2014

opdracht: 02P001595-03





waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

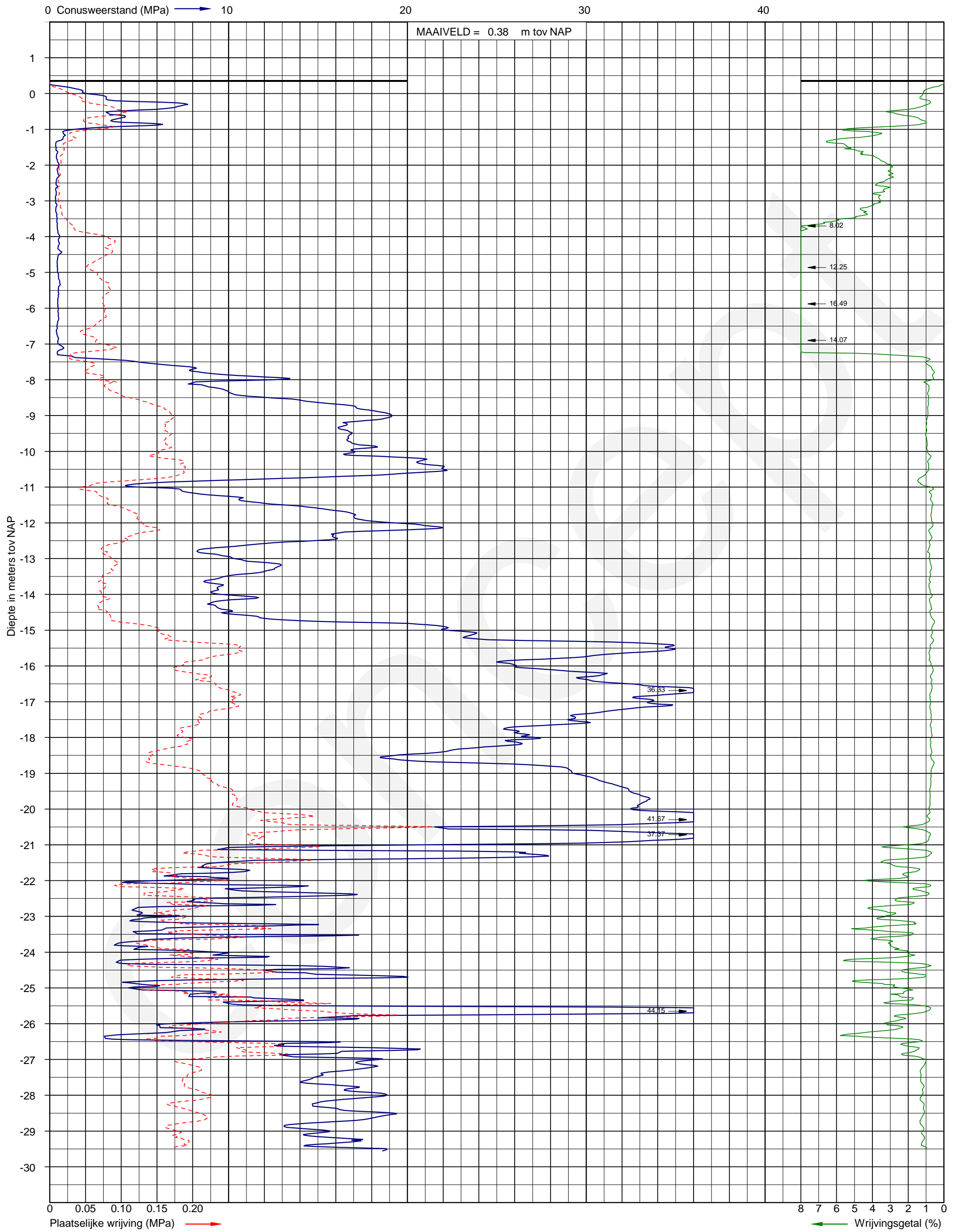
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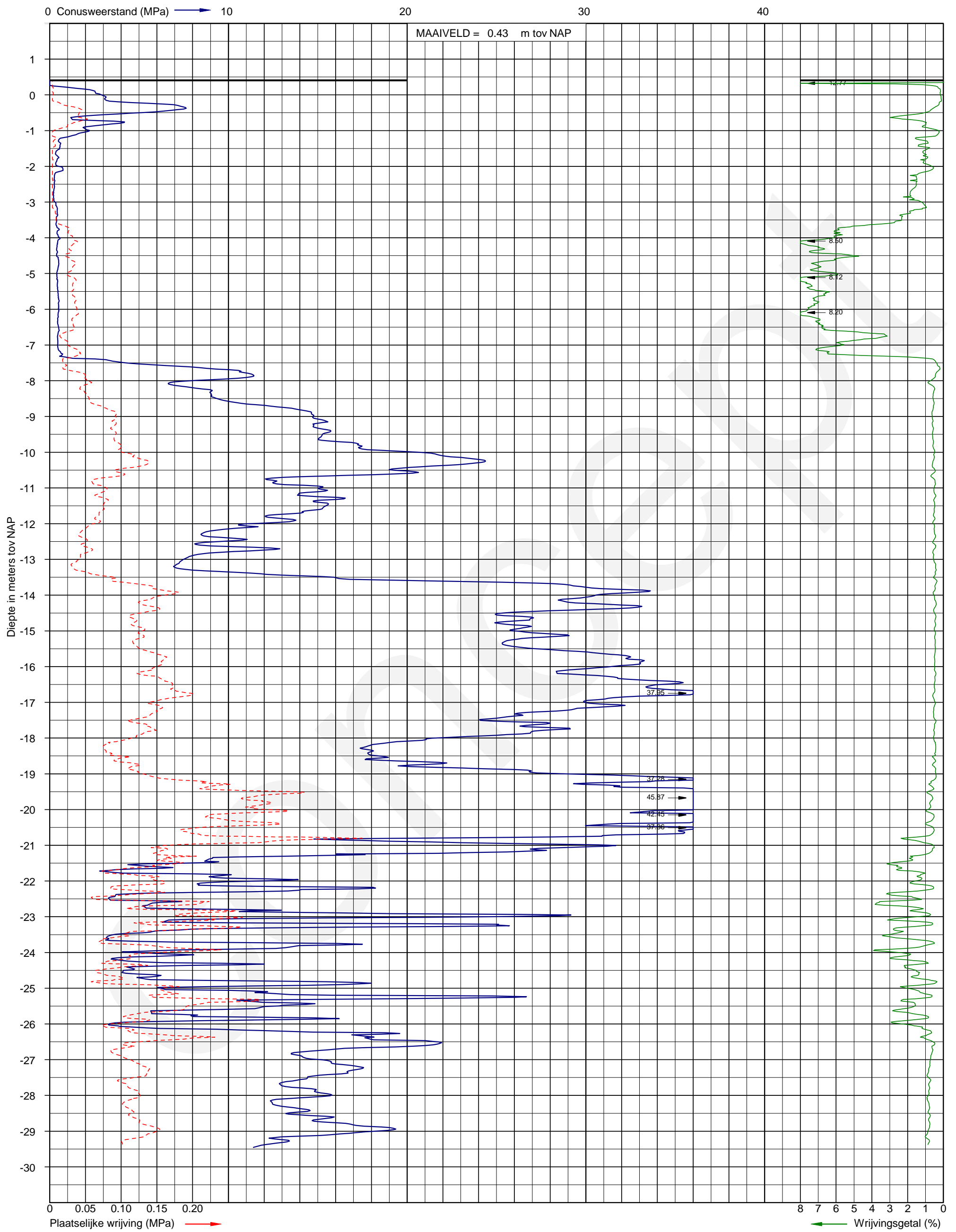
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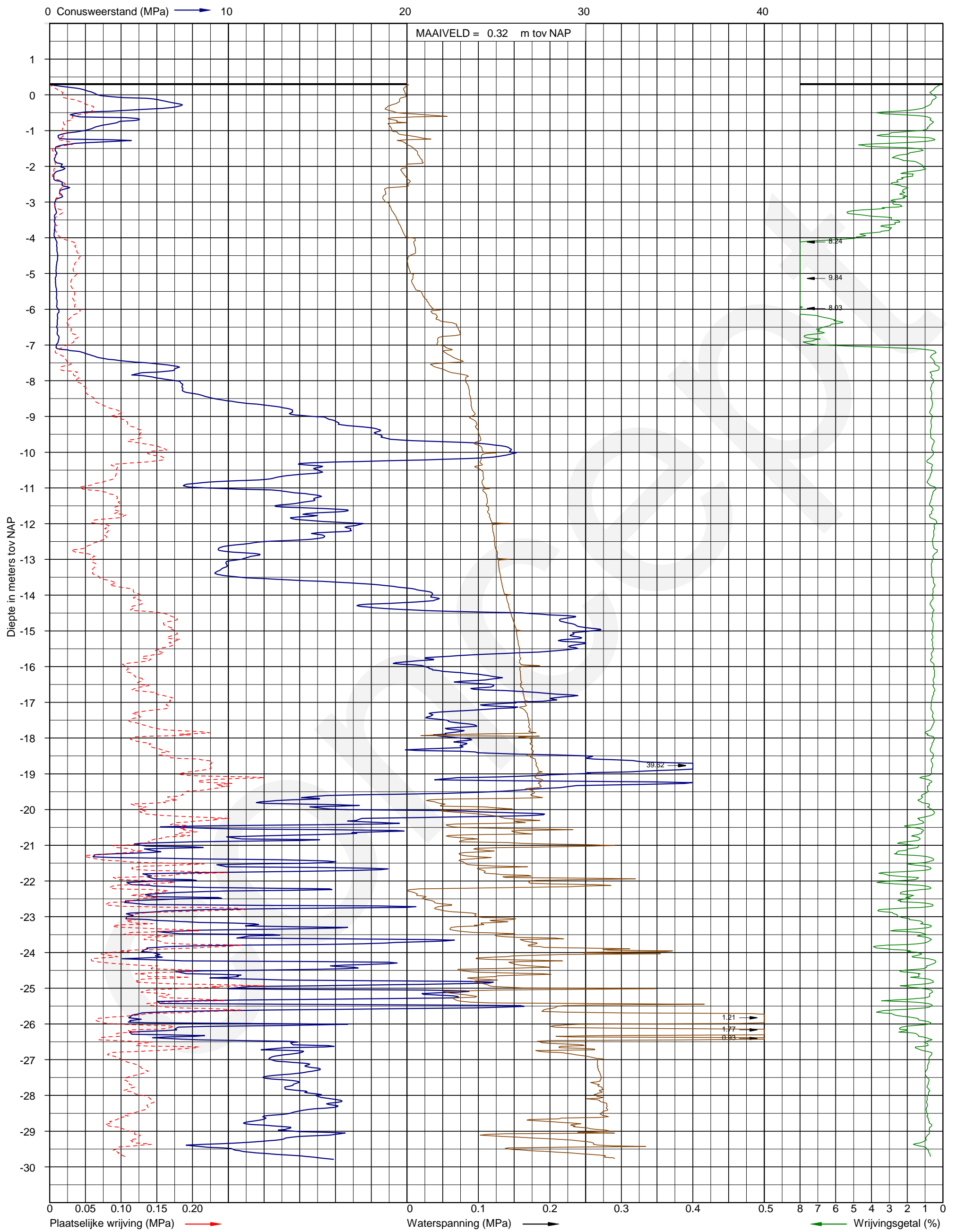
INPIJN-BLOKPOEL Ingenieursbureau

datum: 7-11-2014

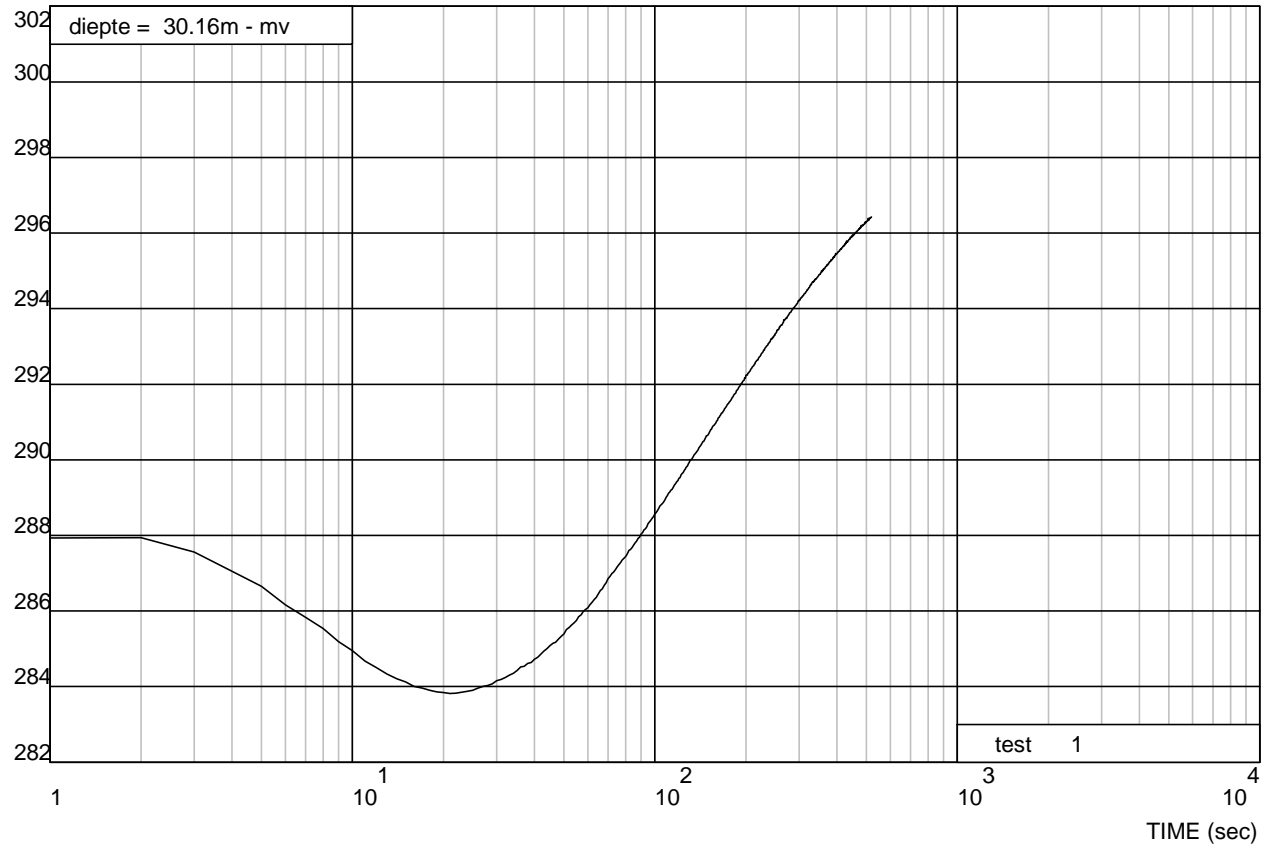
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waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

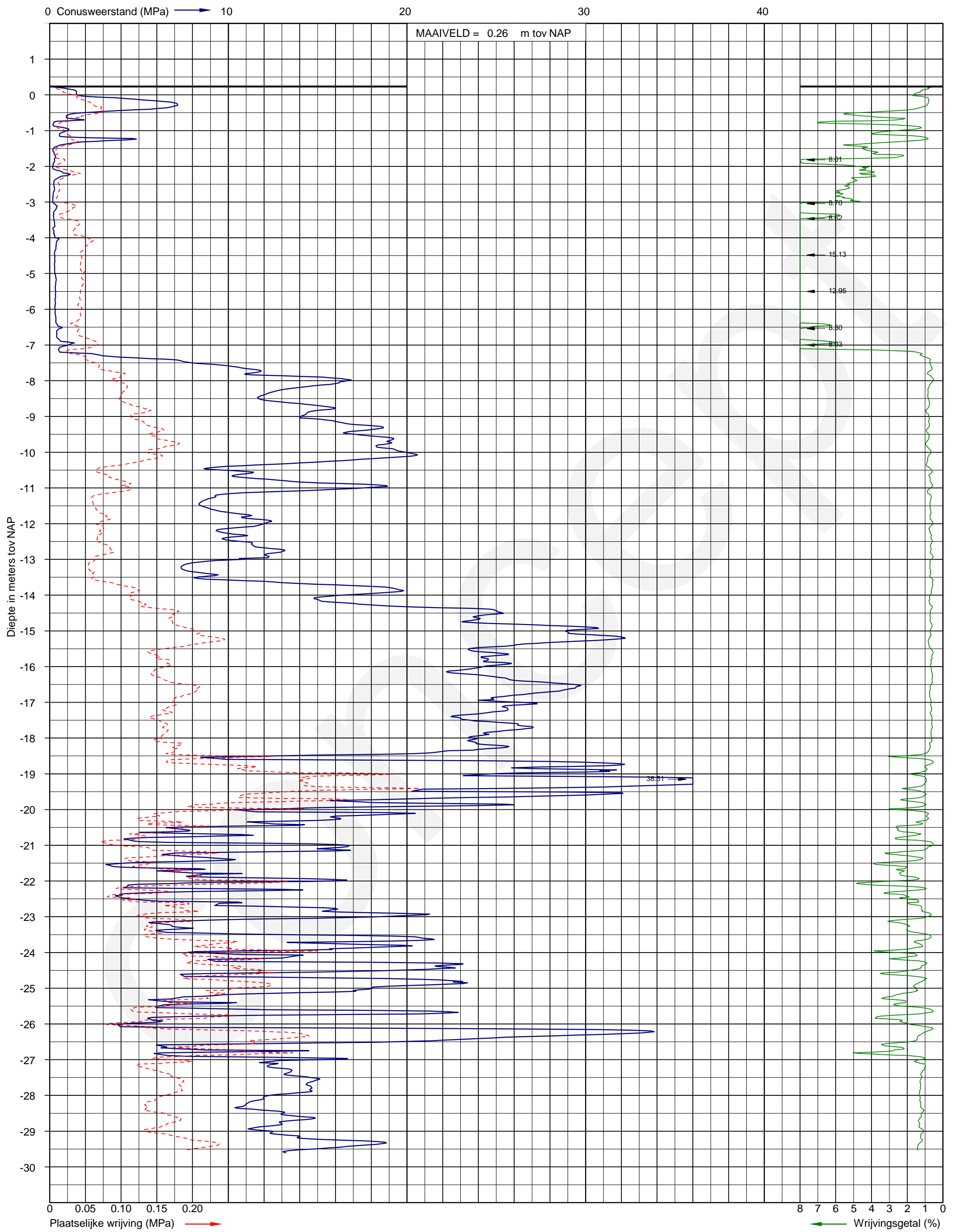
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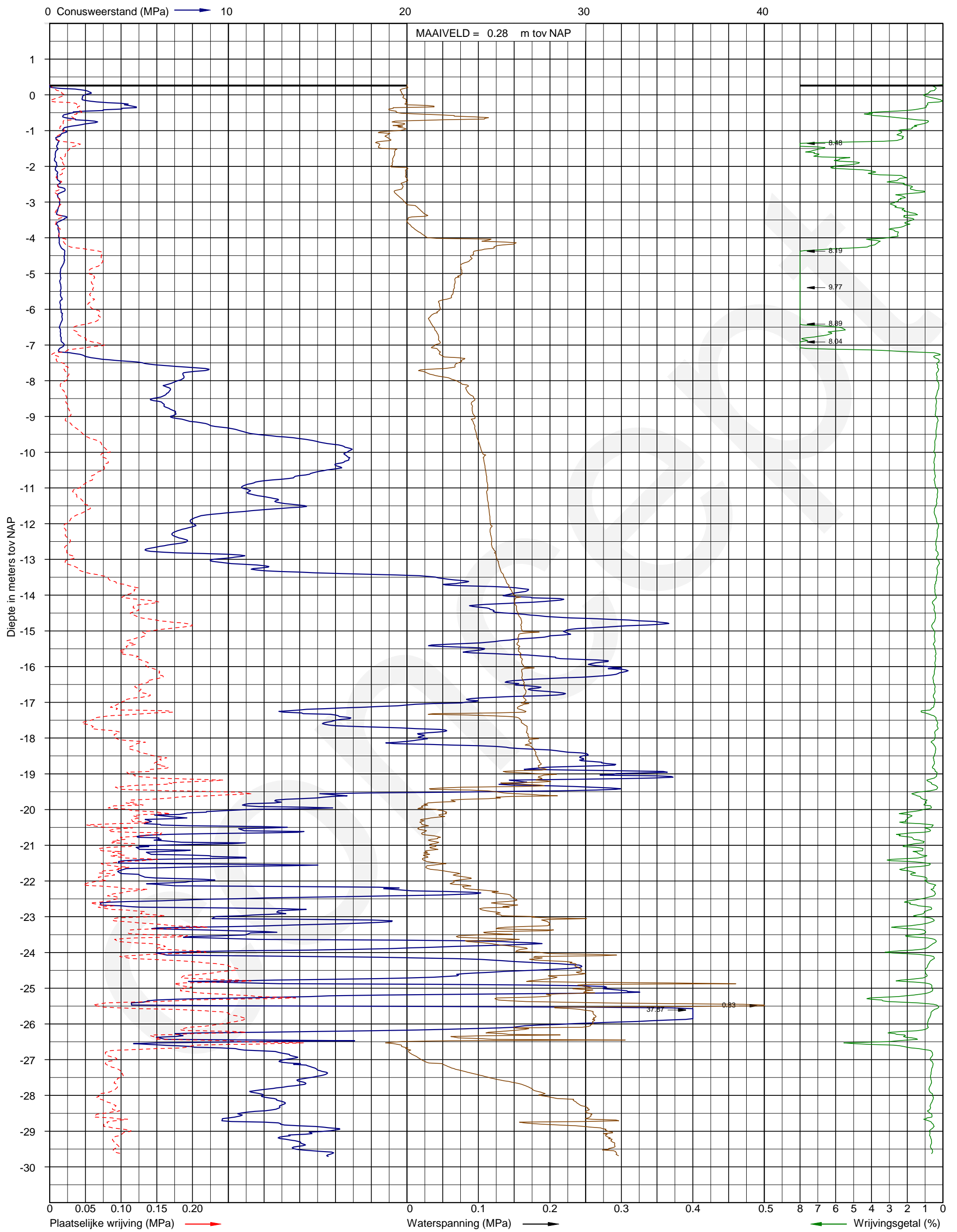
sondering: 27

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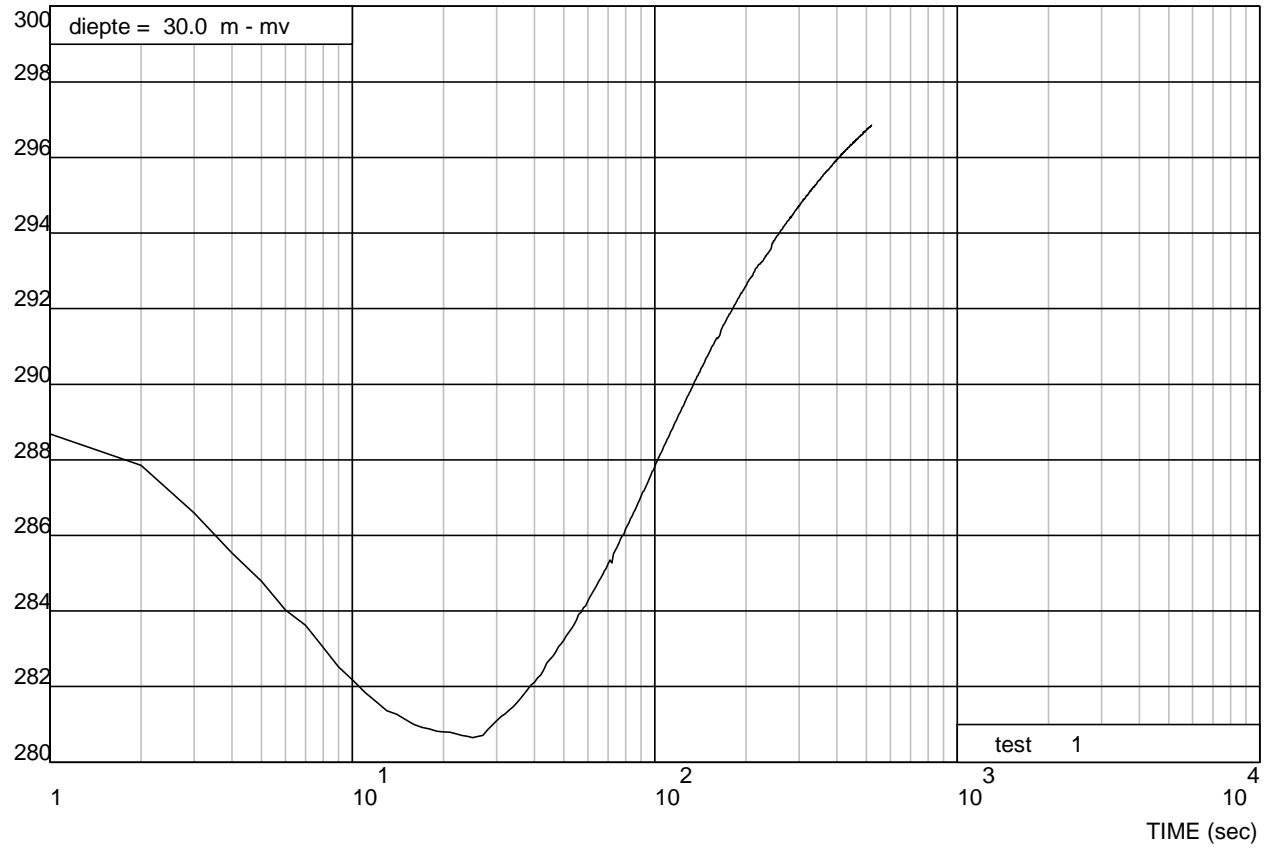
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opdracht: 02P001595-03





waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

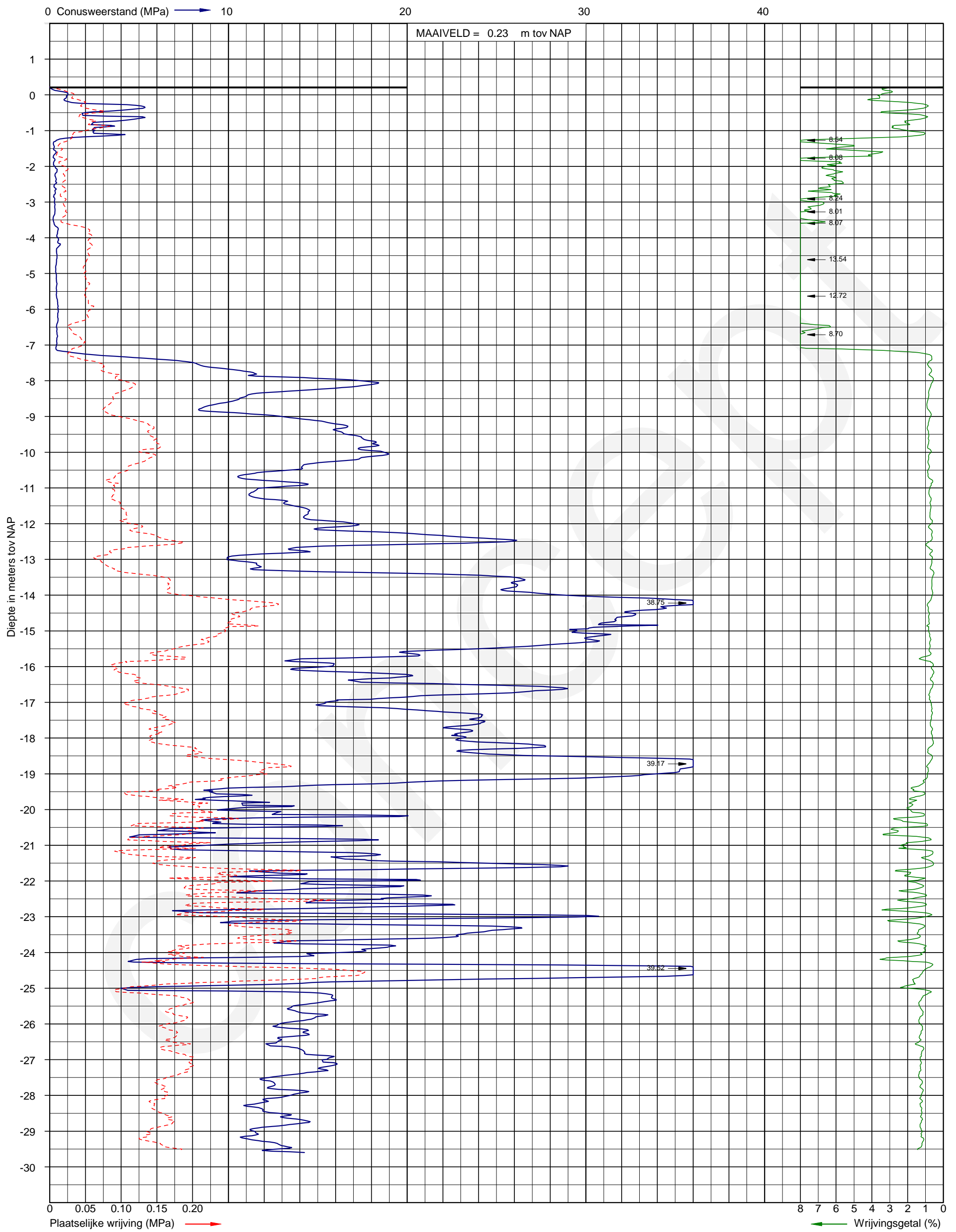
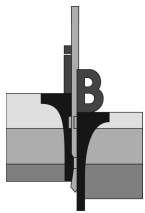
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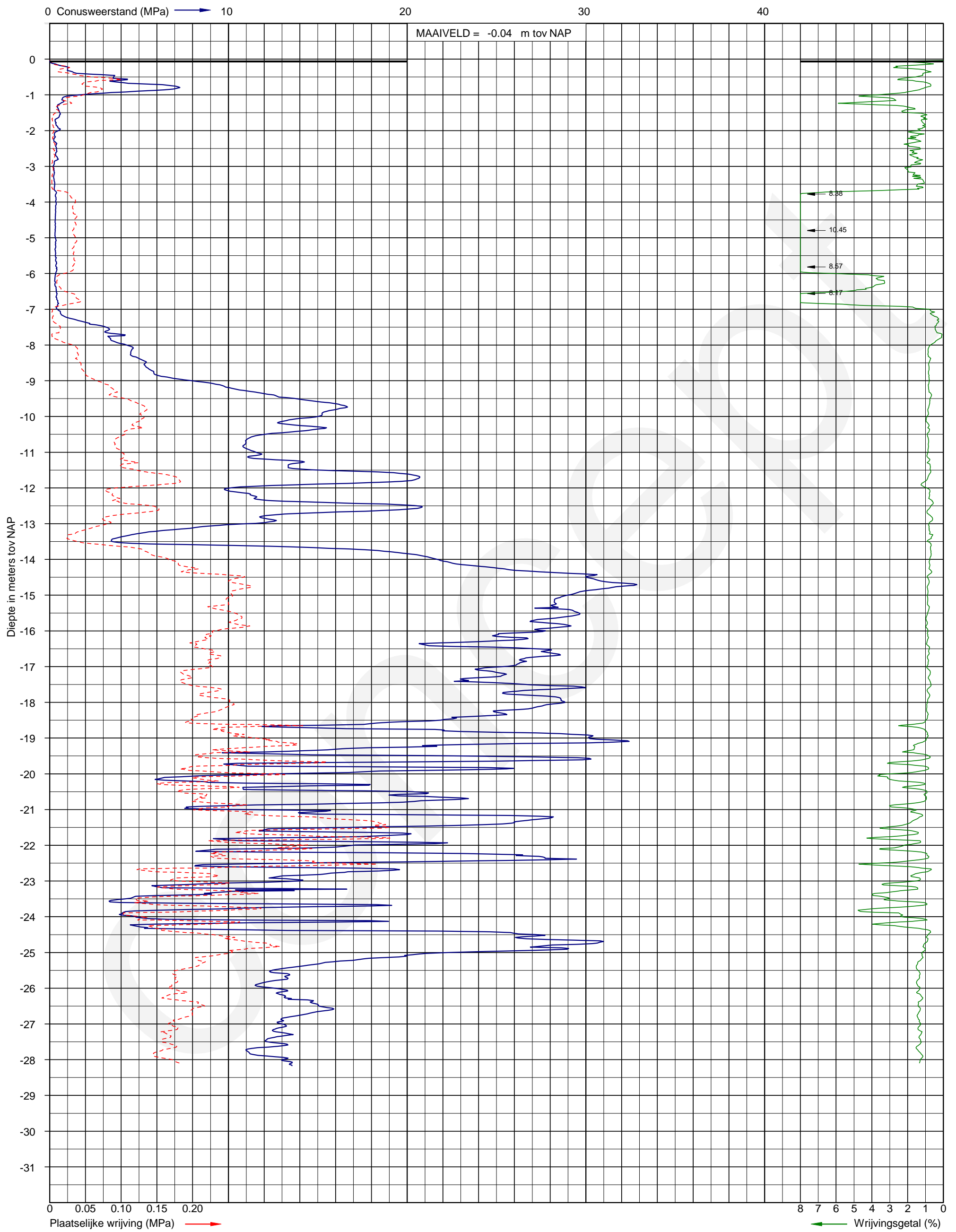
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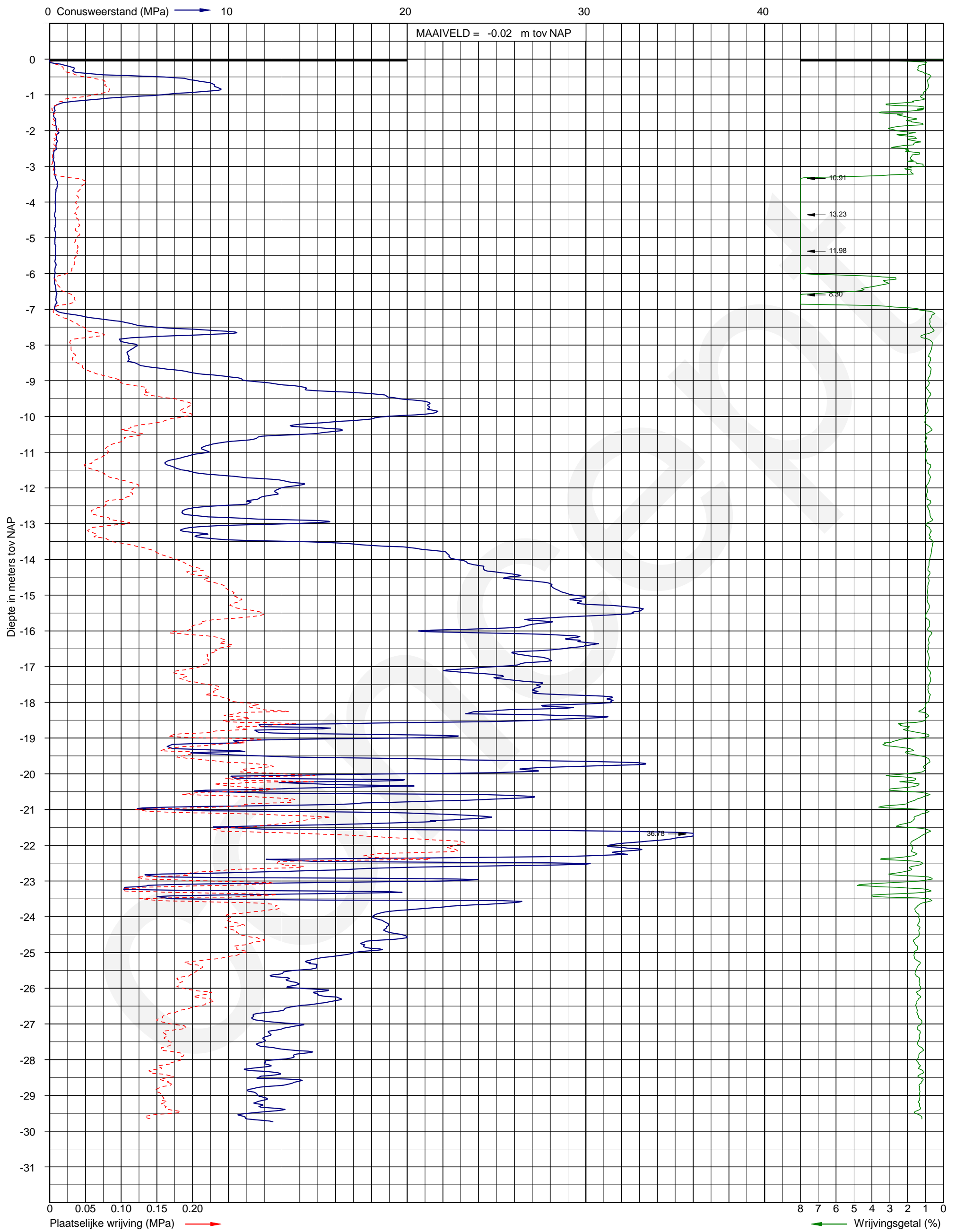
INPIJN-BLOKPOEL Ingenieursbureau

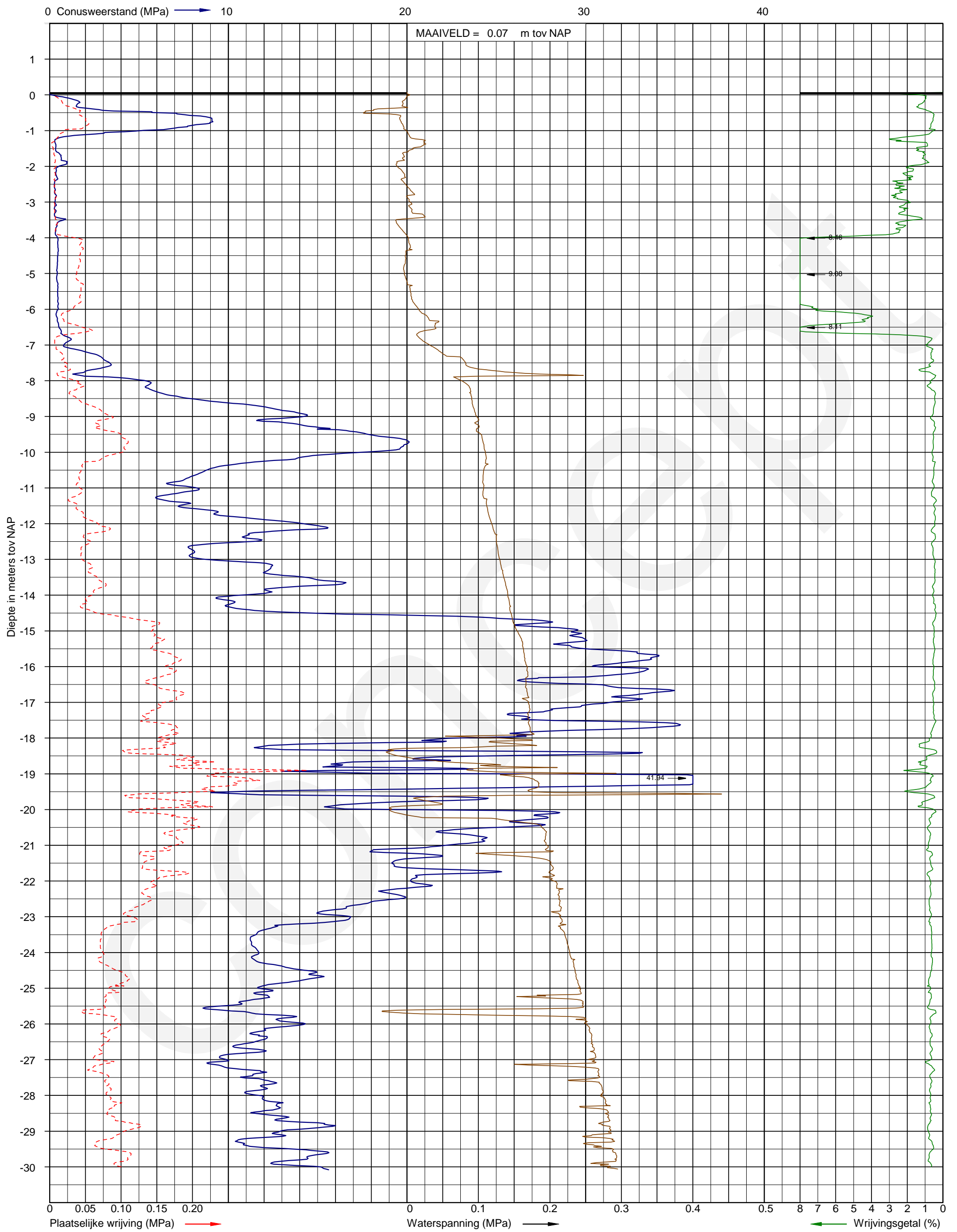
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opdracht: 02P001595-03

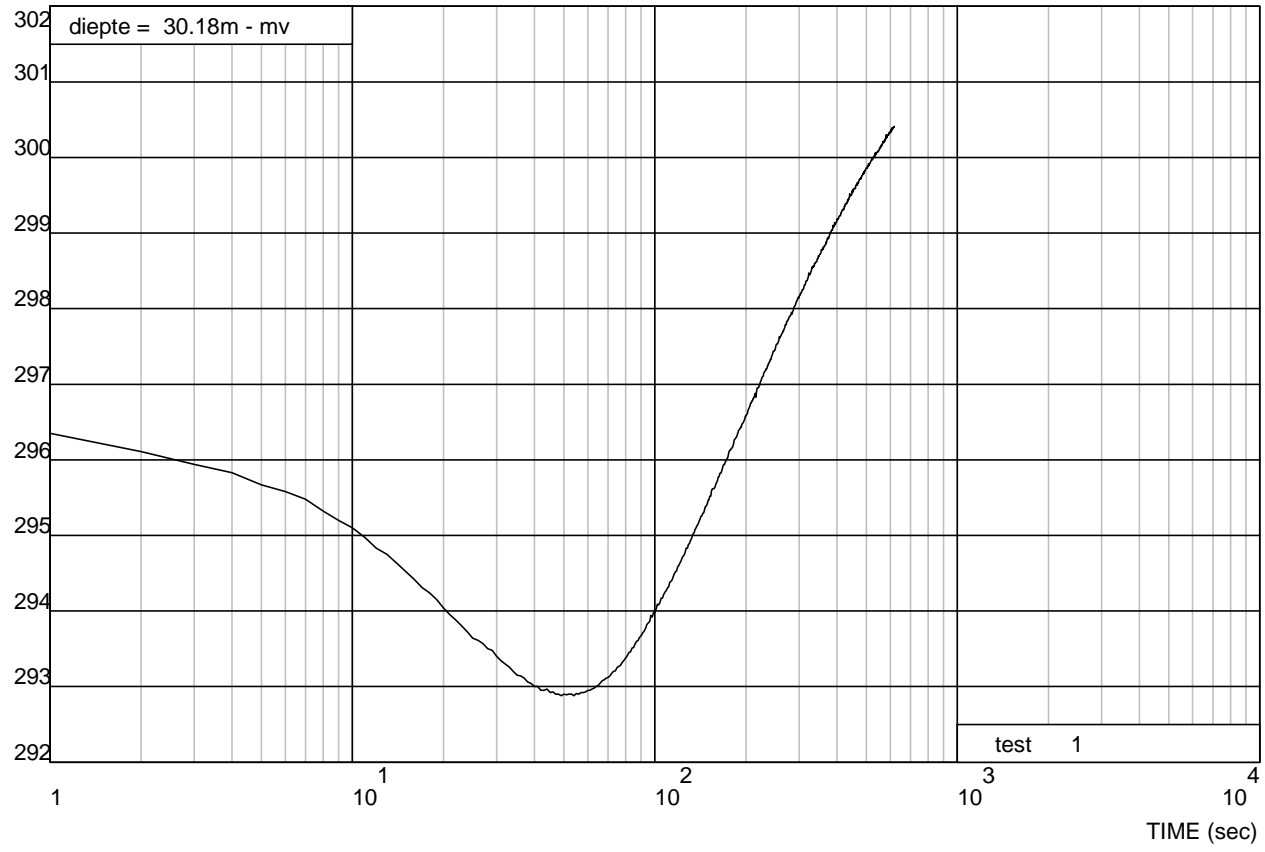








waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

uitv.: RHL-S22

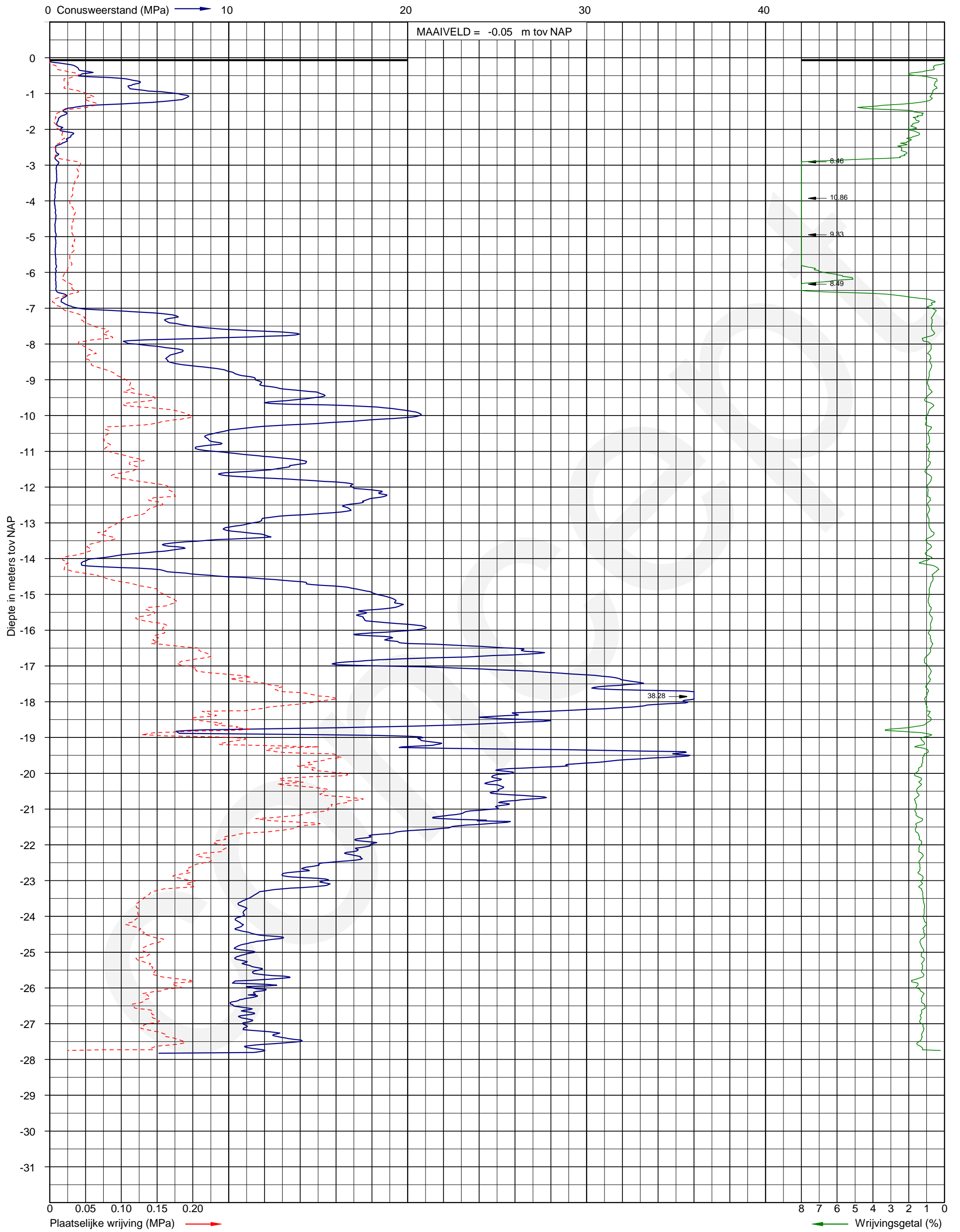
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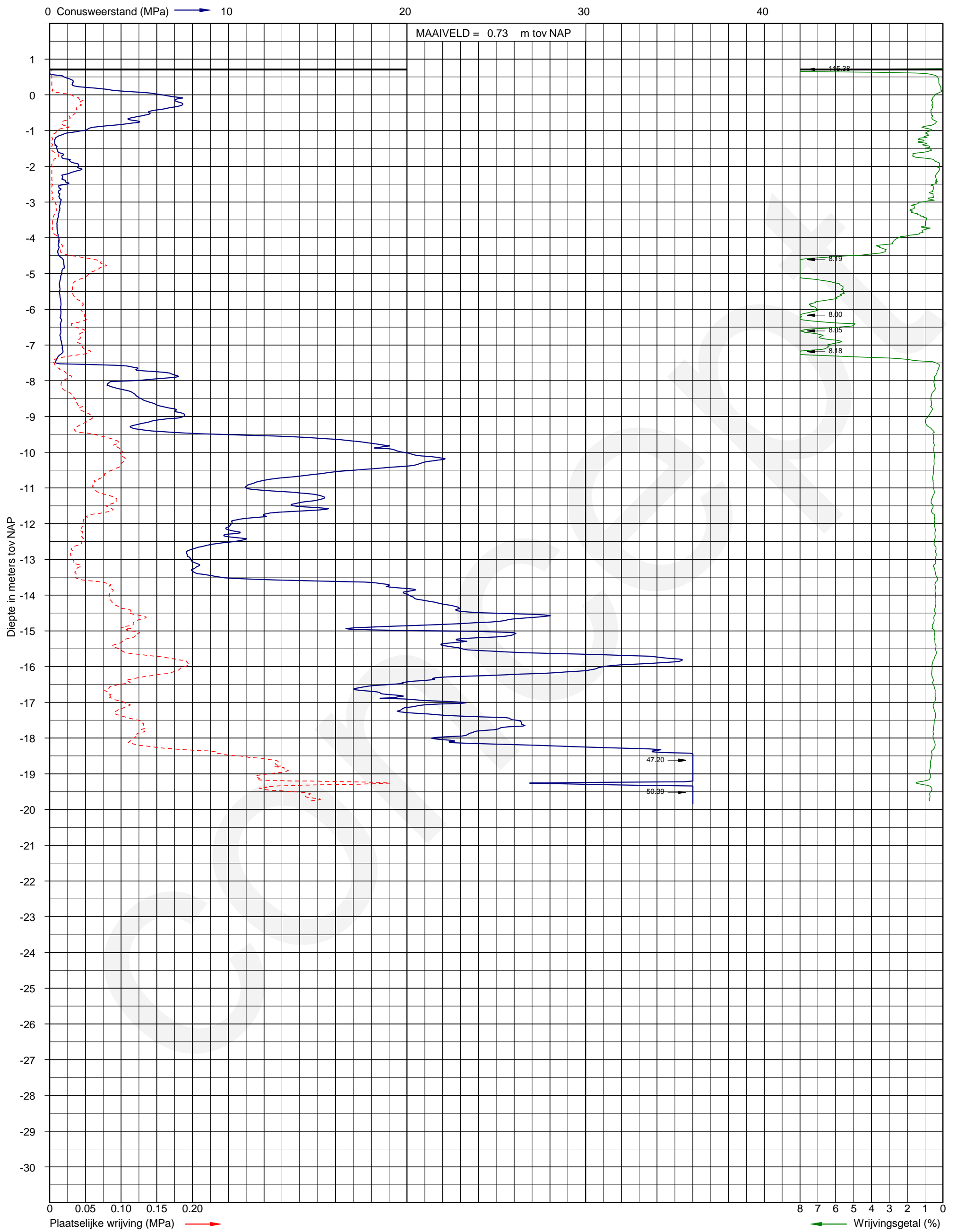
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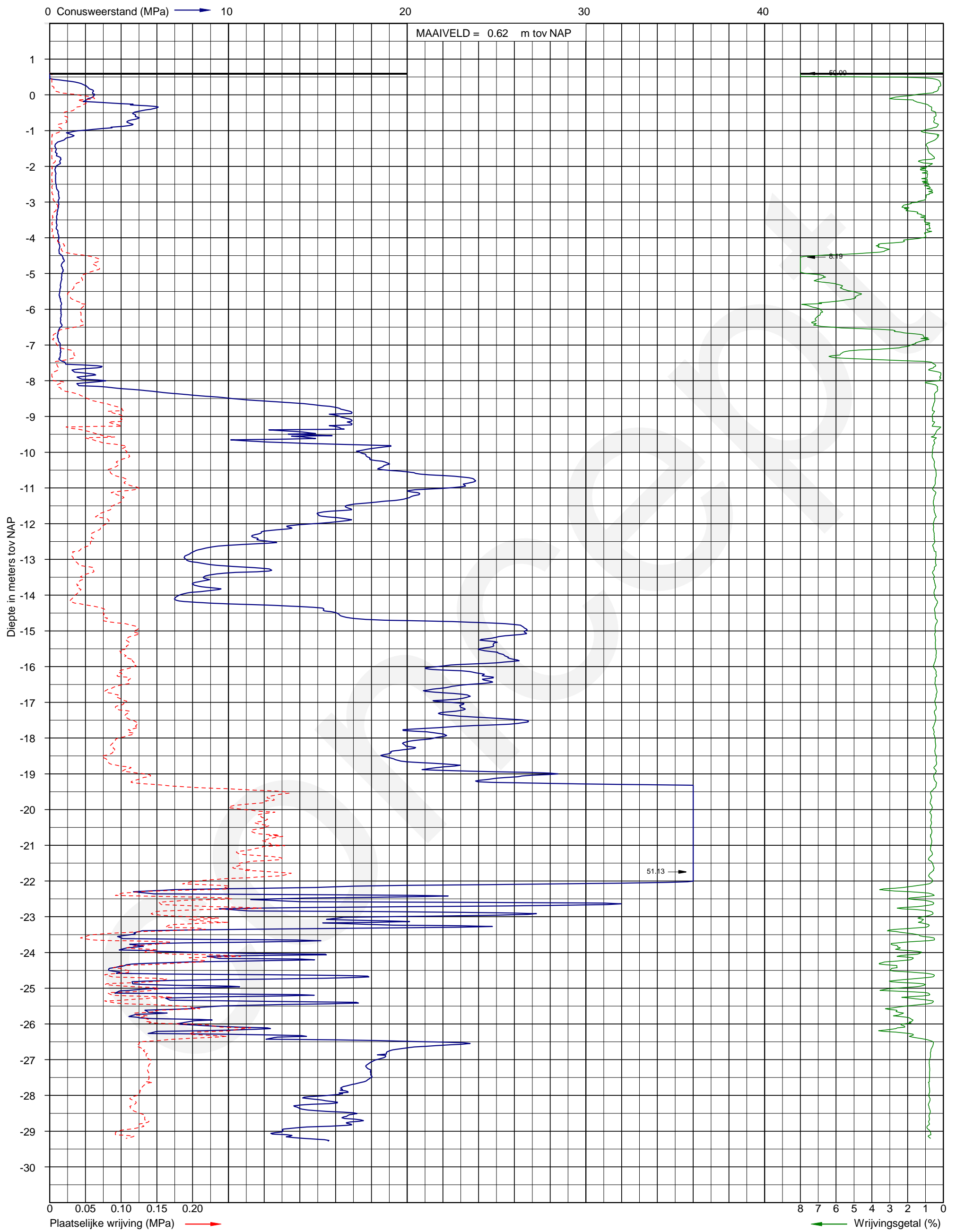
INPIJN-BLOKPOEL Ingenieursbureau

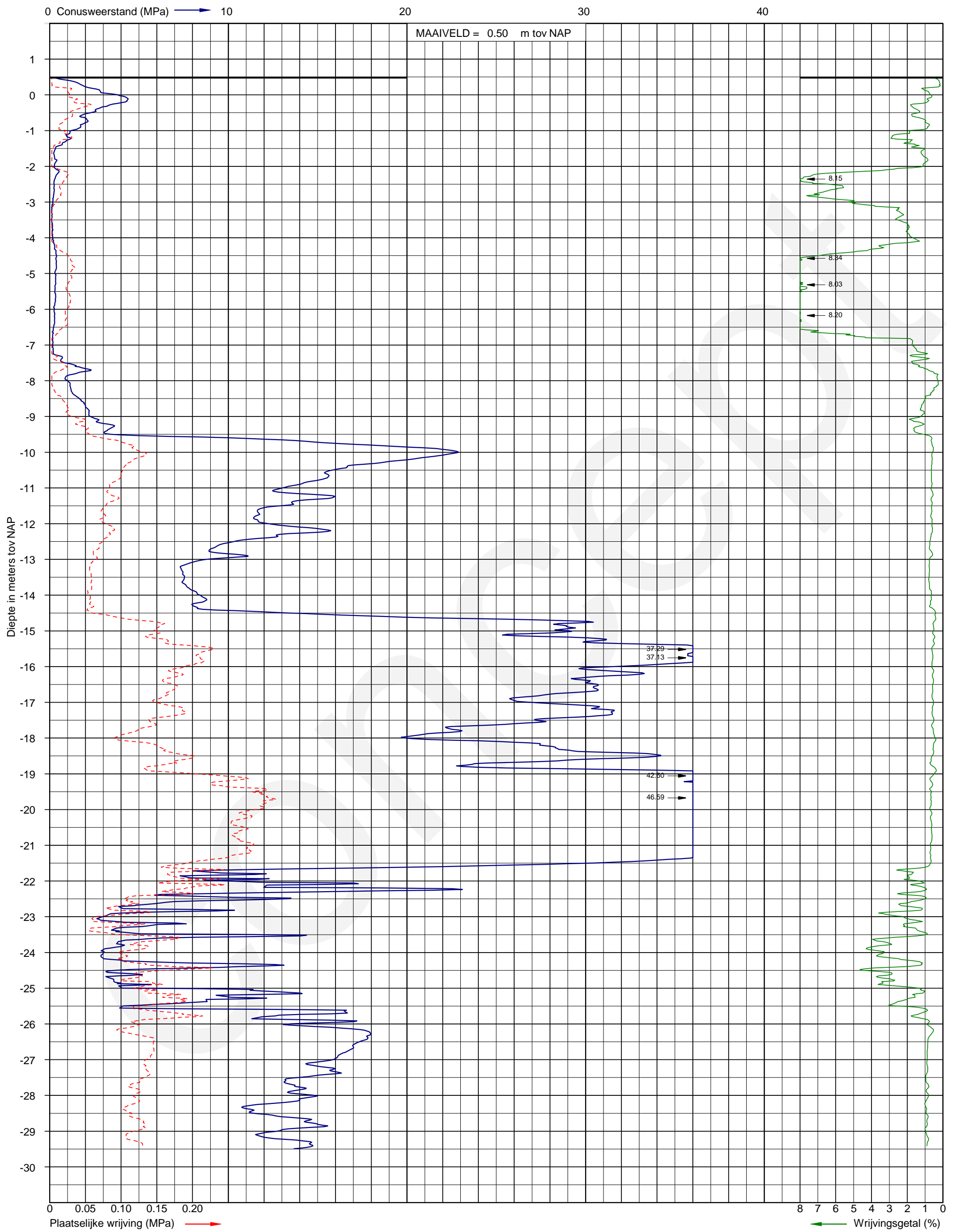
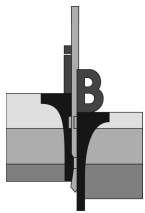
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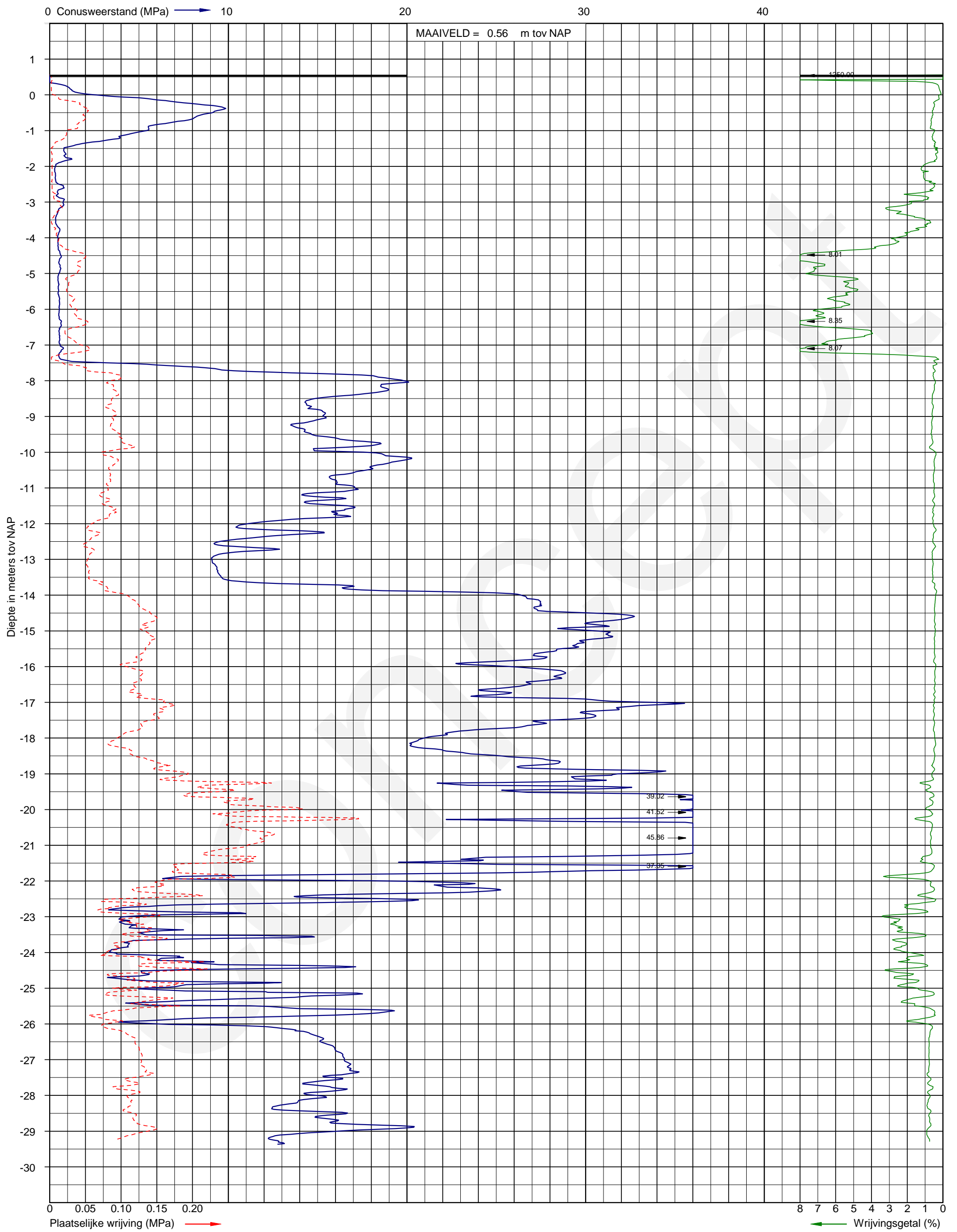
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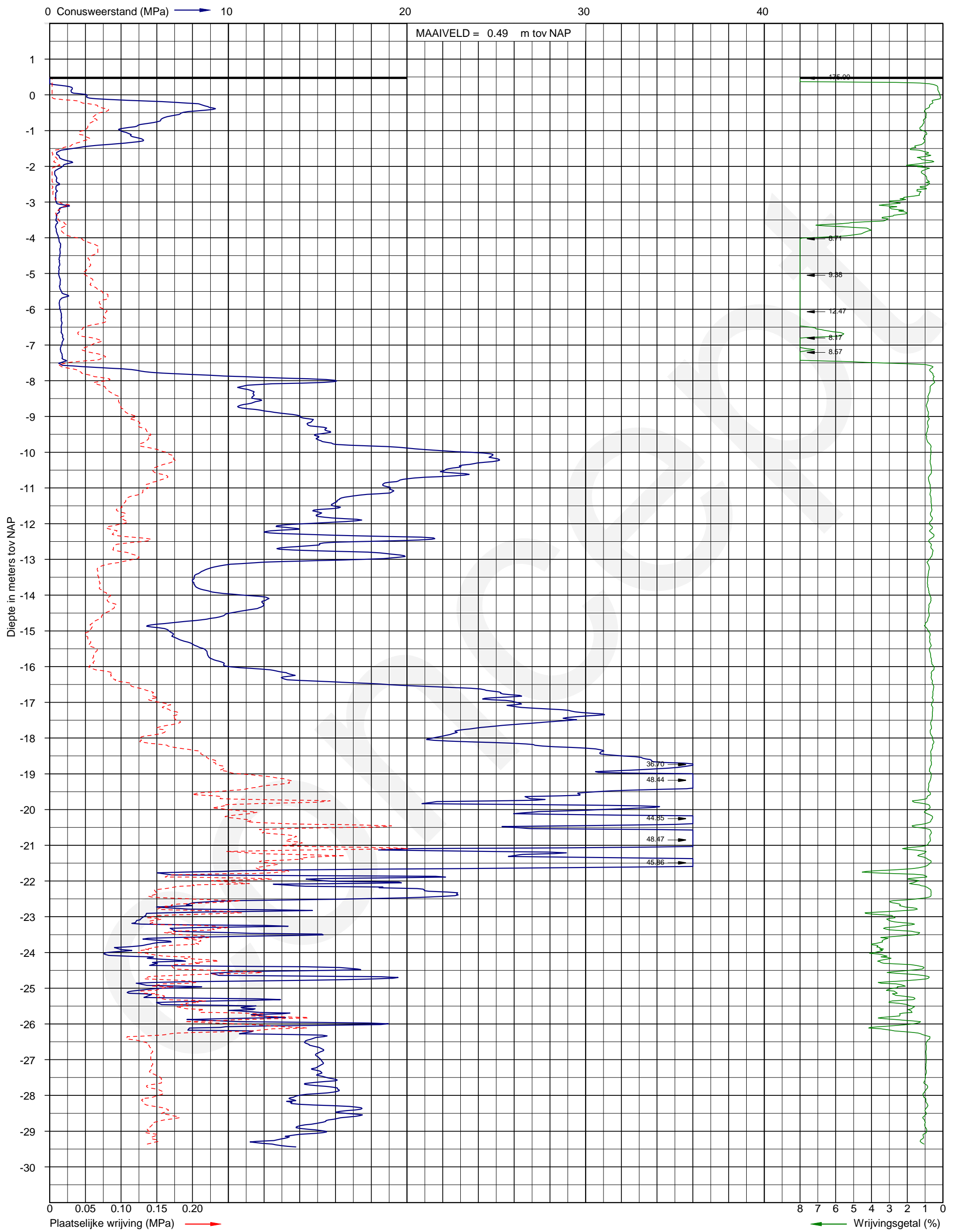


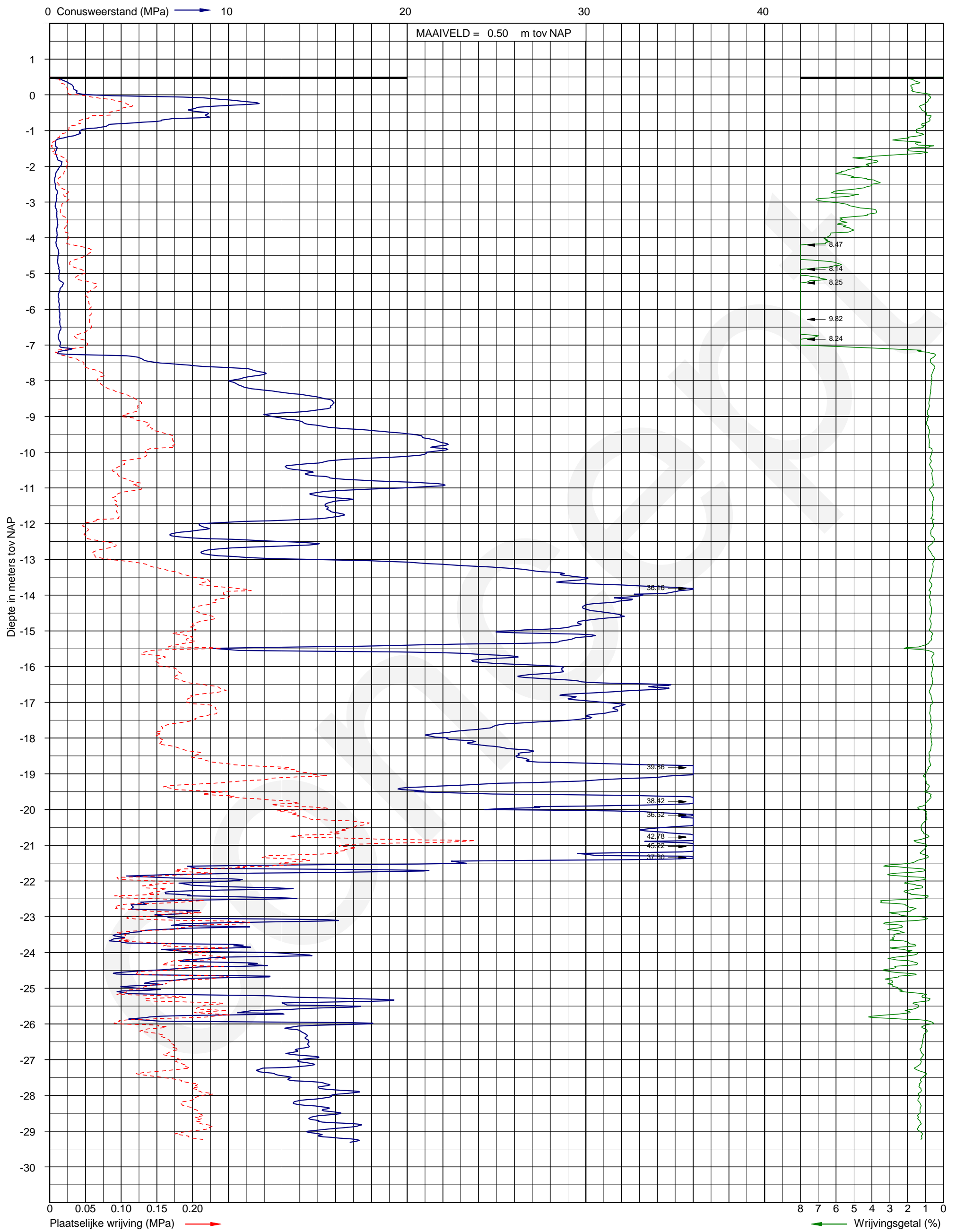


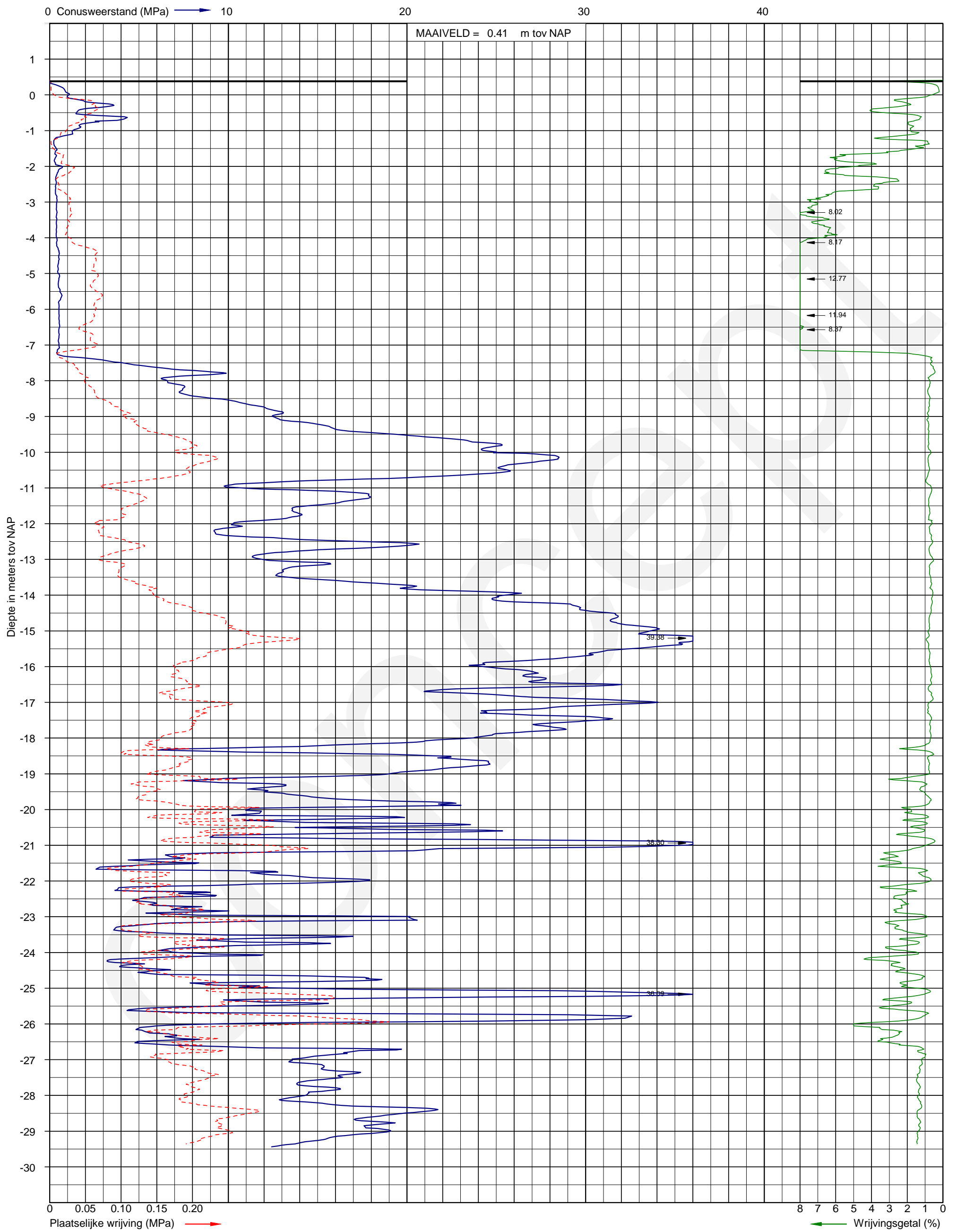


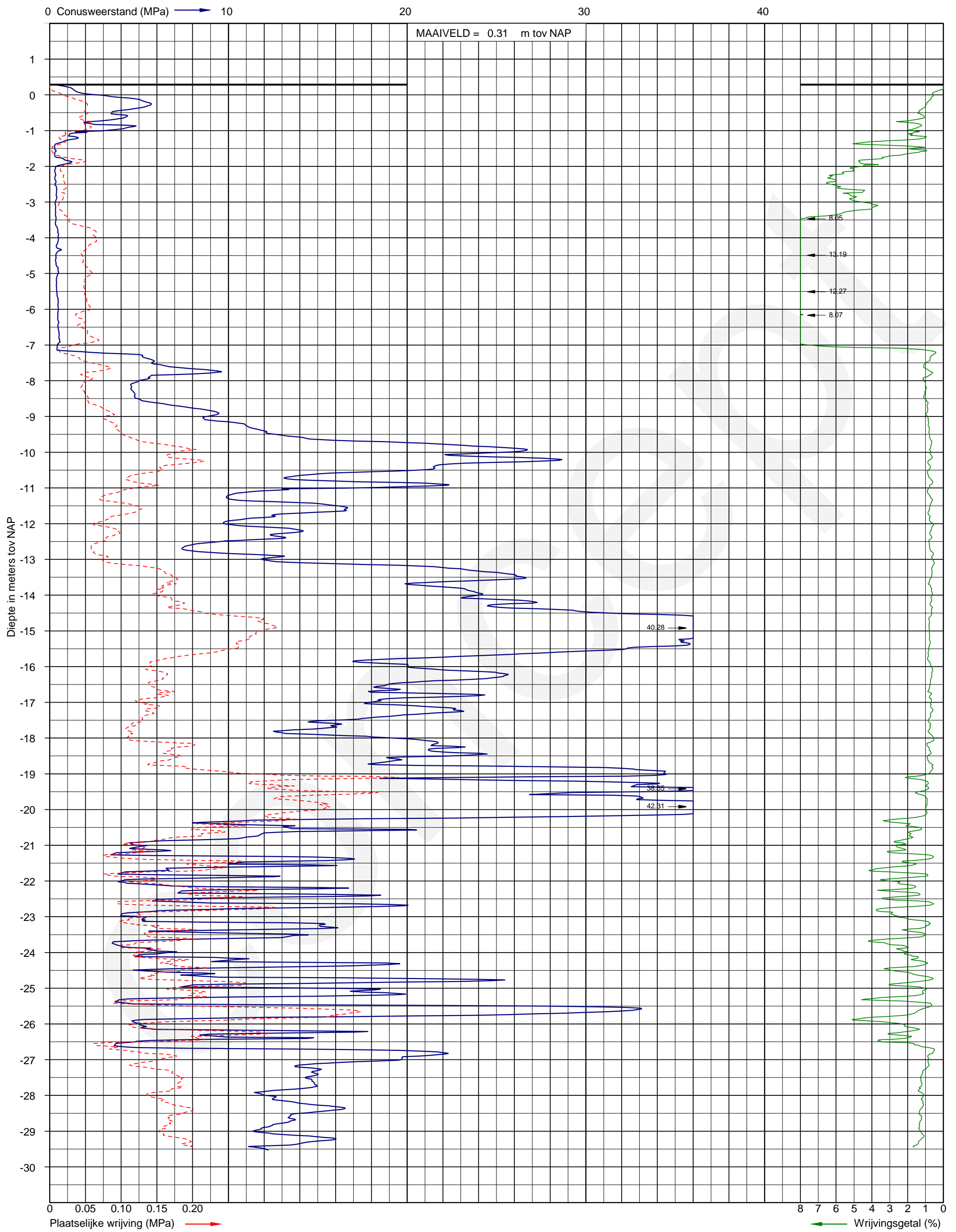


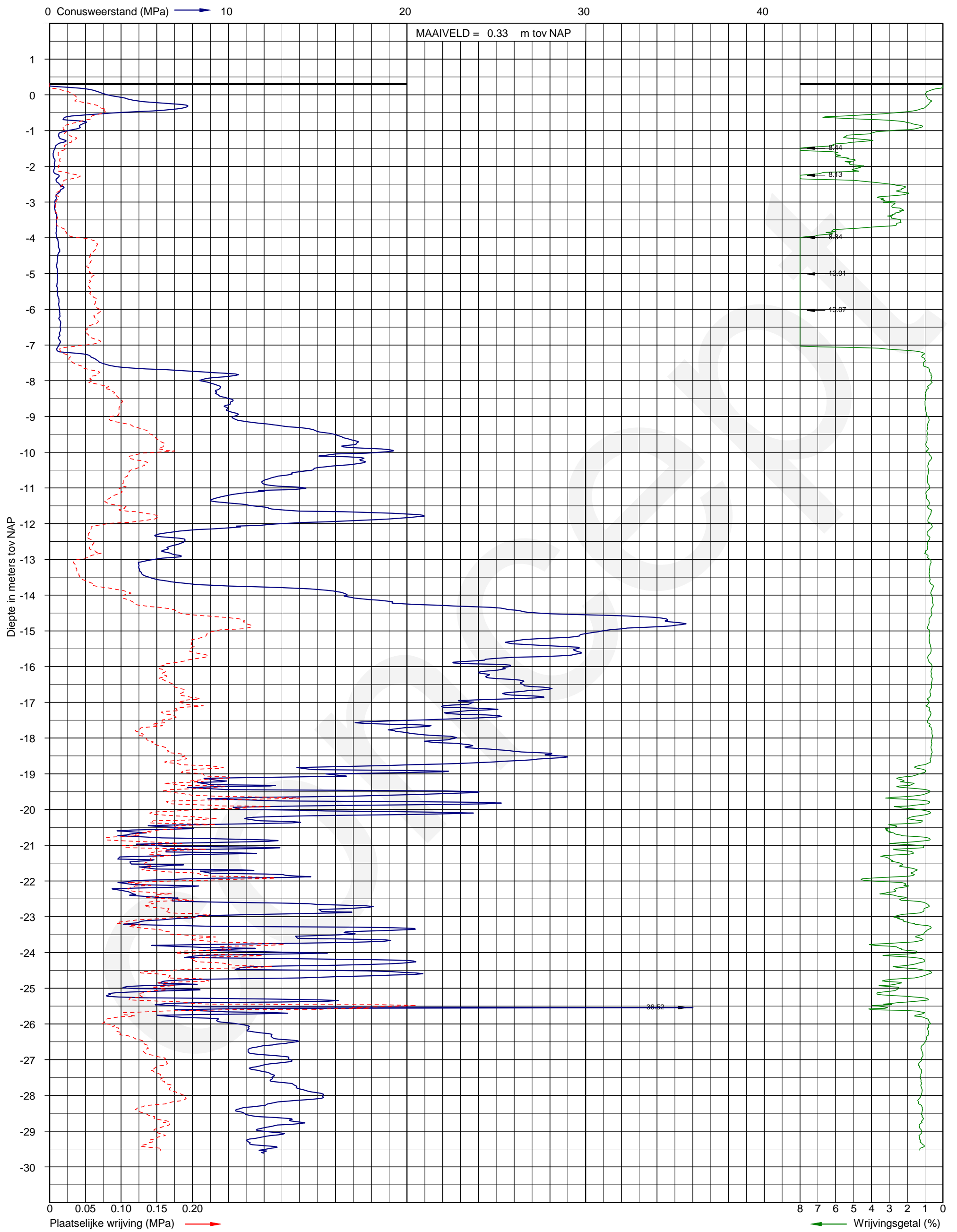


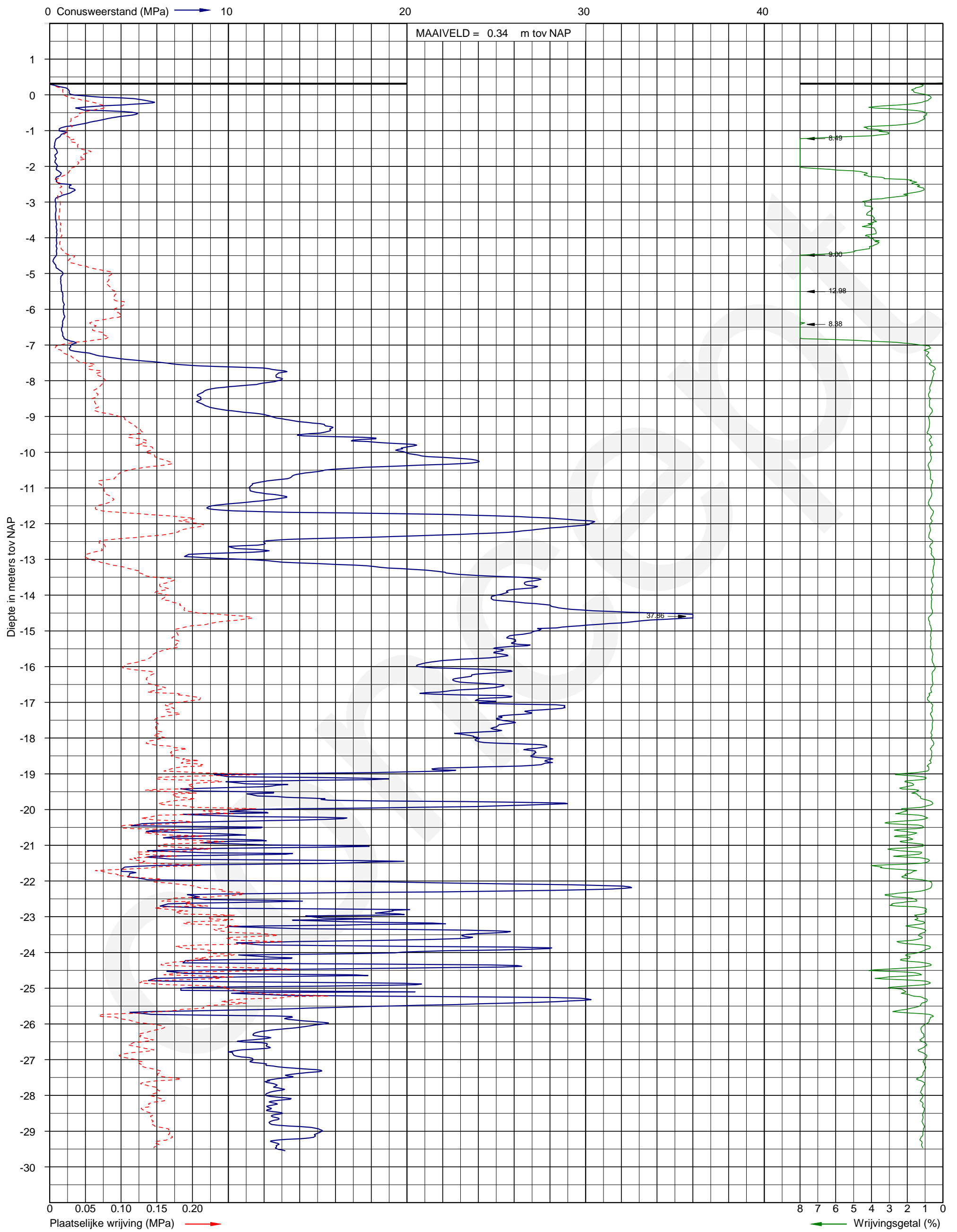


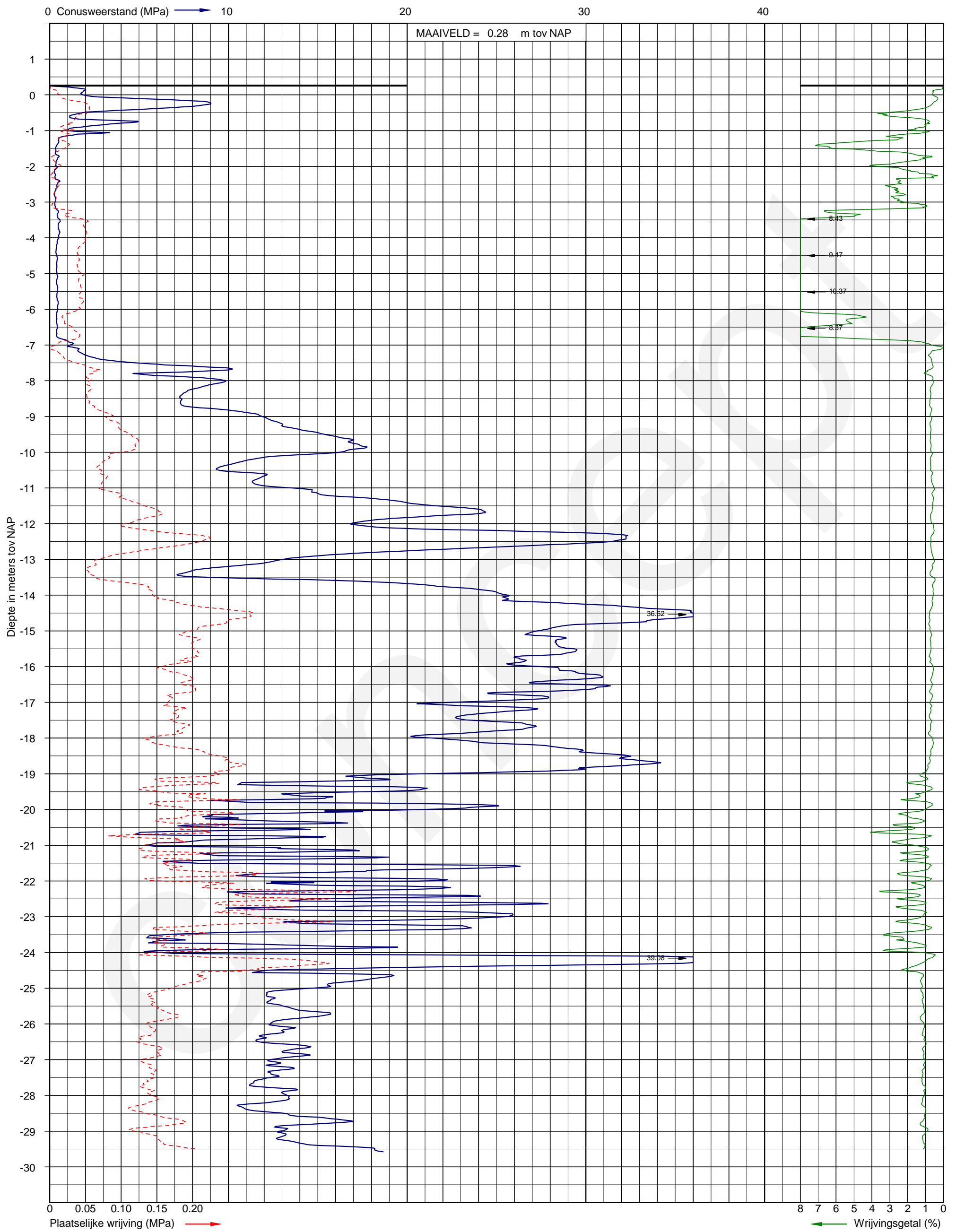


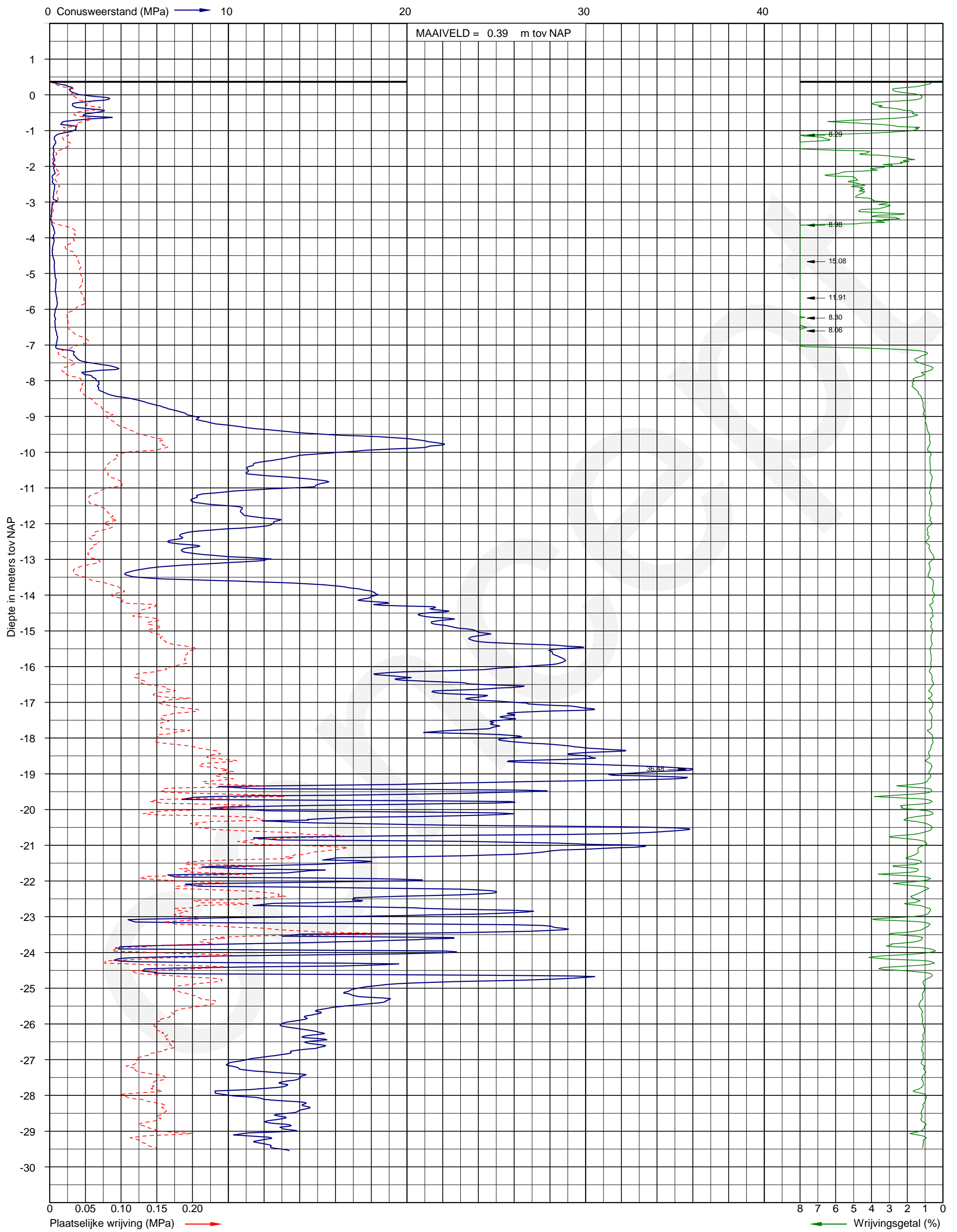


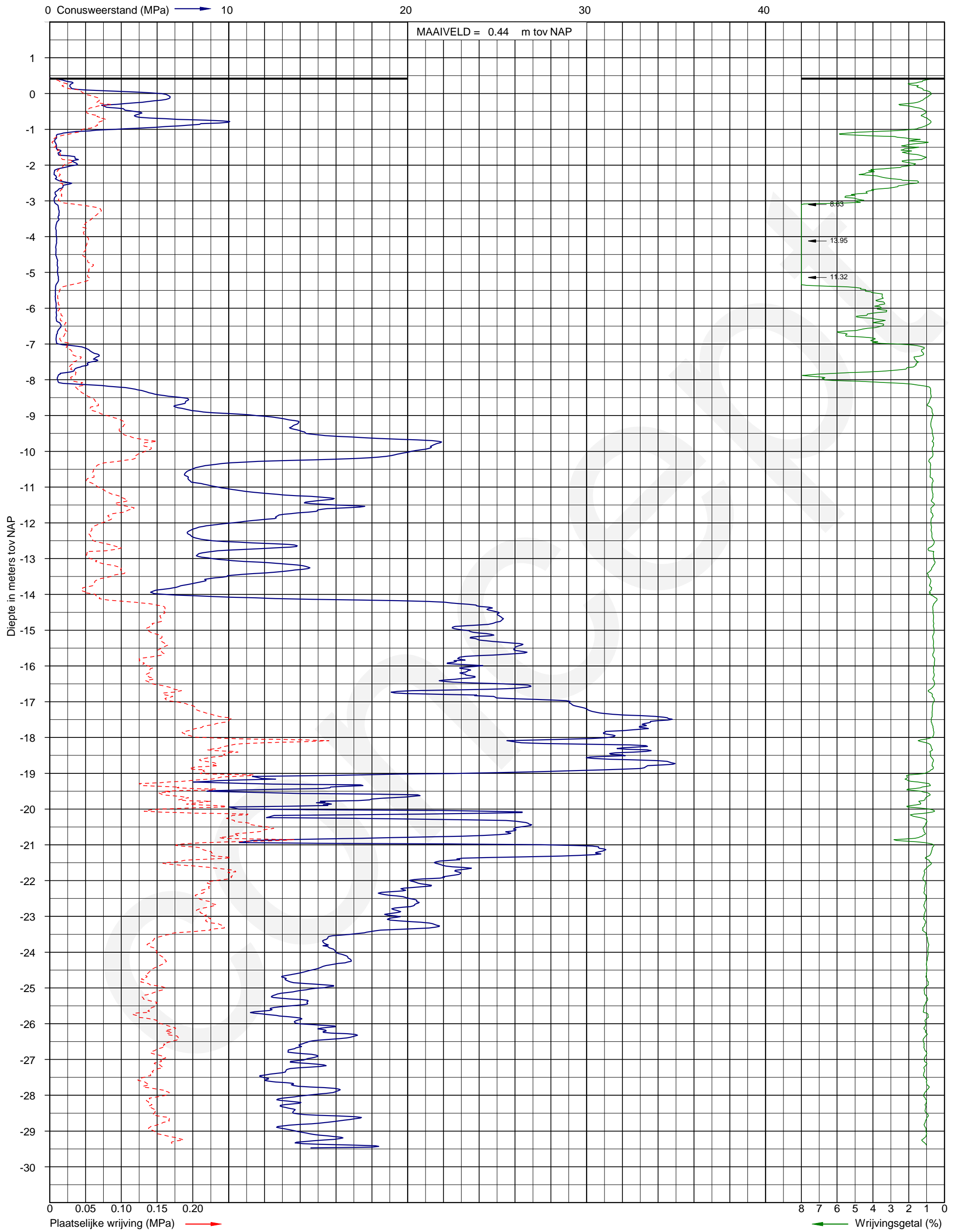


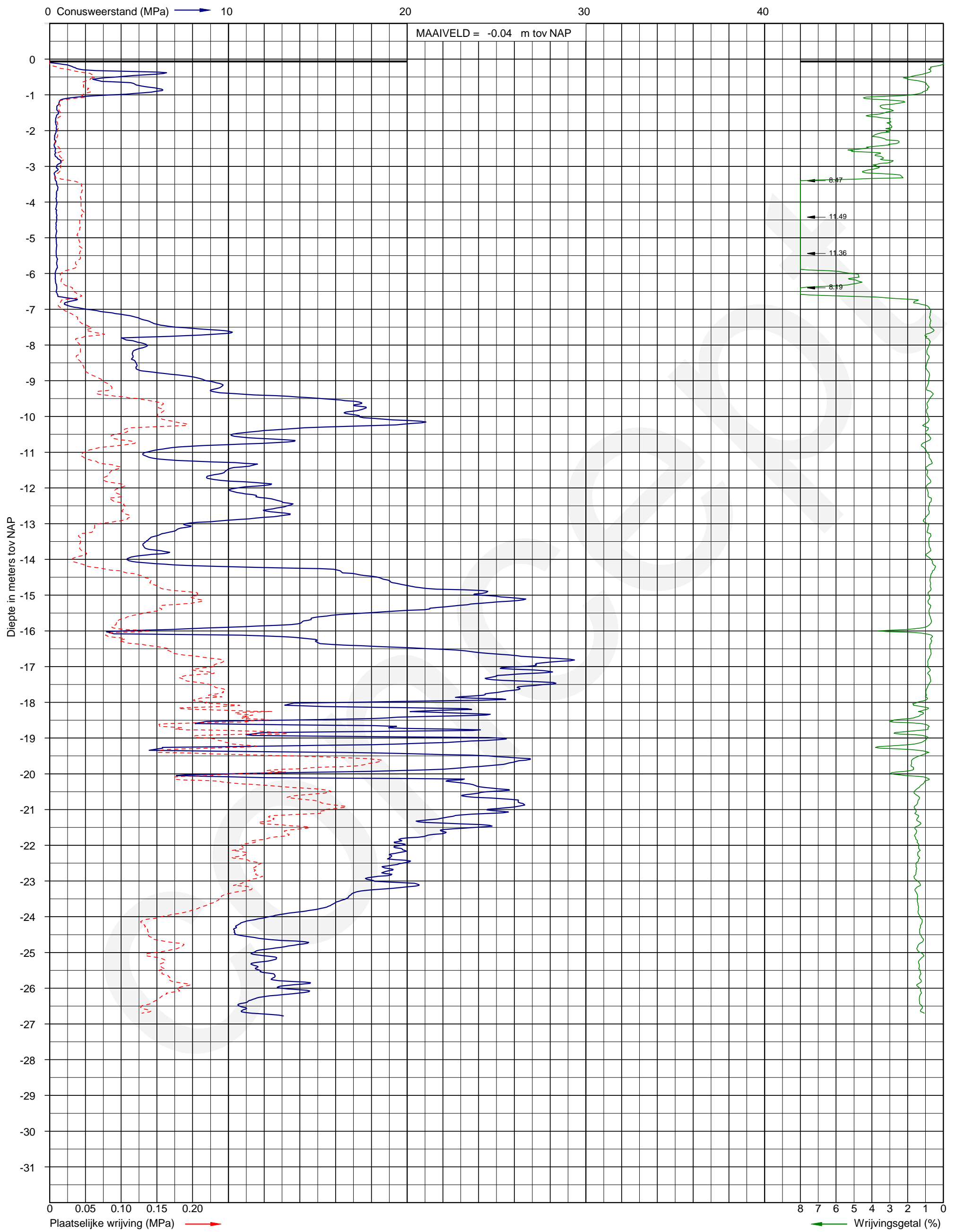
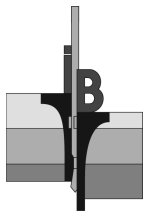


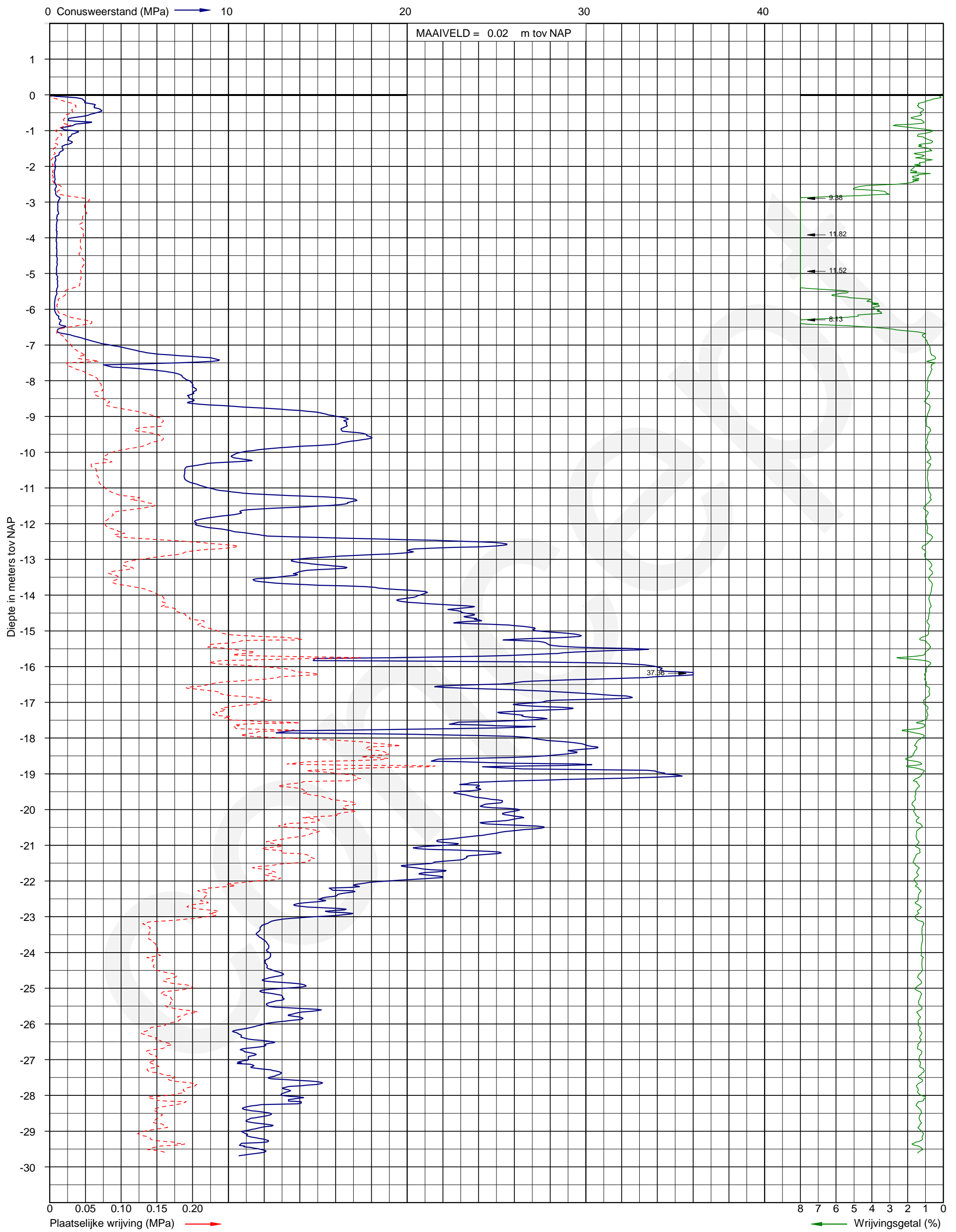


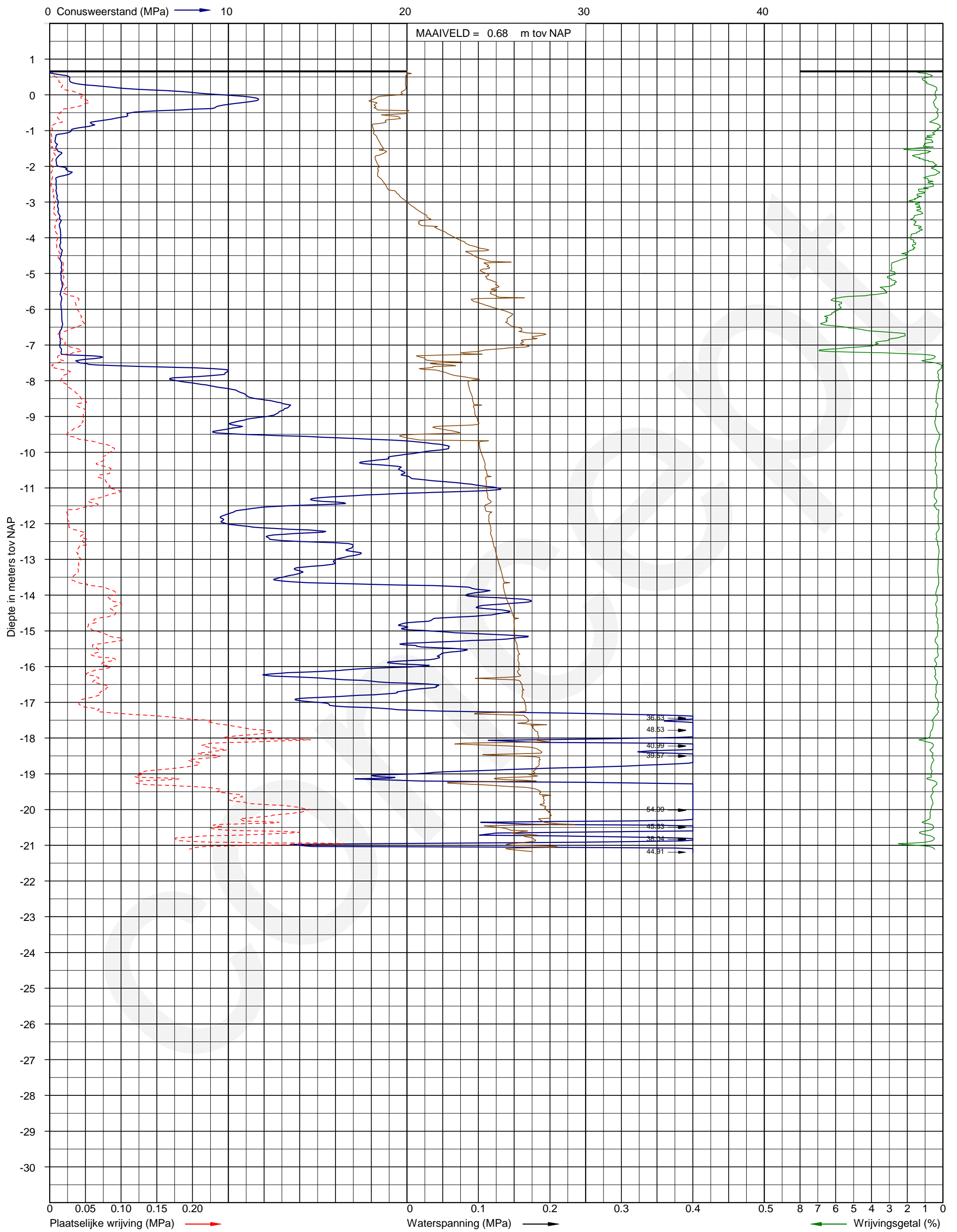




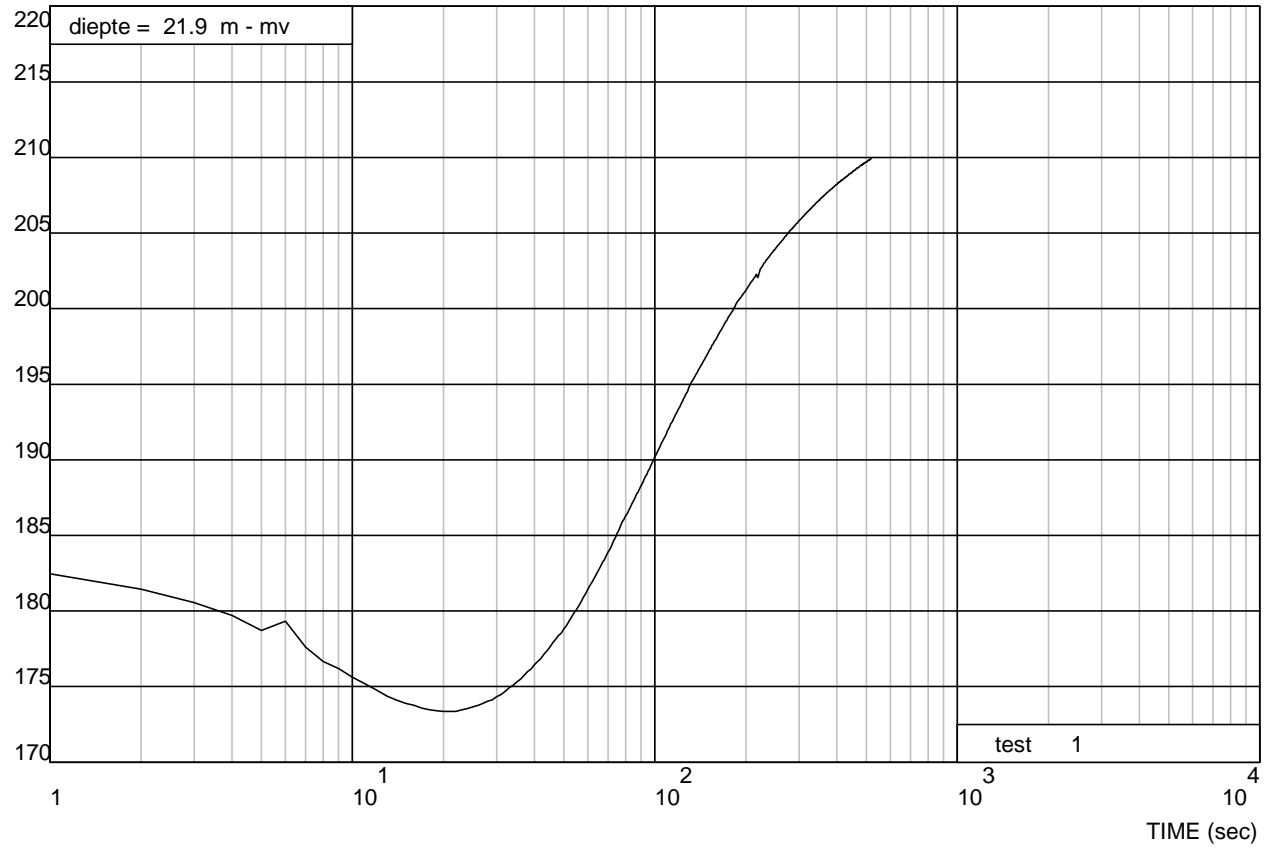








waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

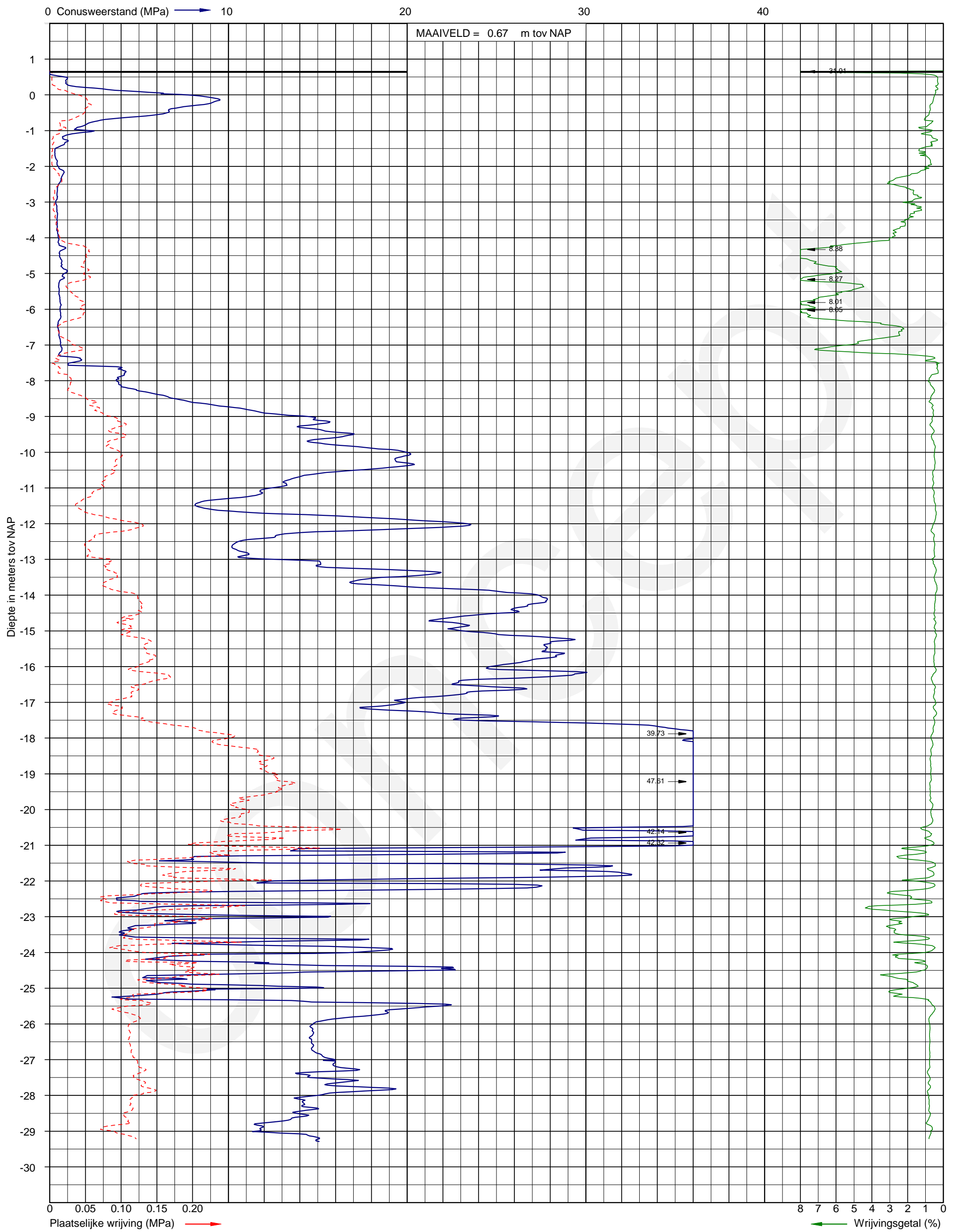
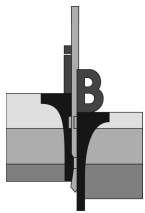
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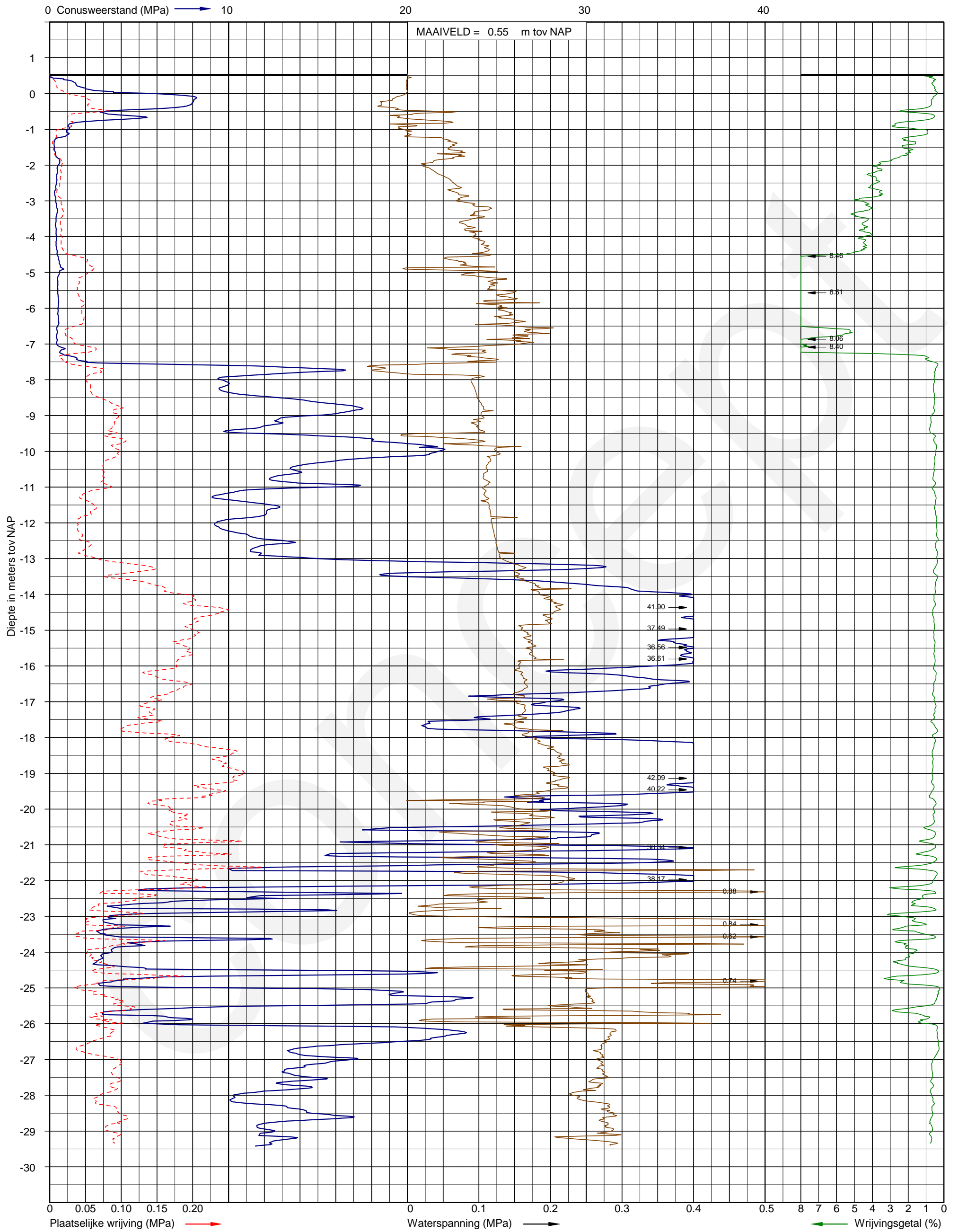
sondering: 51

INPIJN-BLOKPOEL Ingenieursbureau

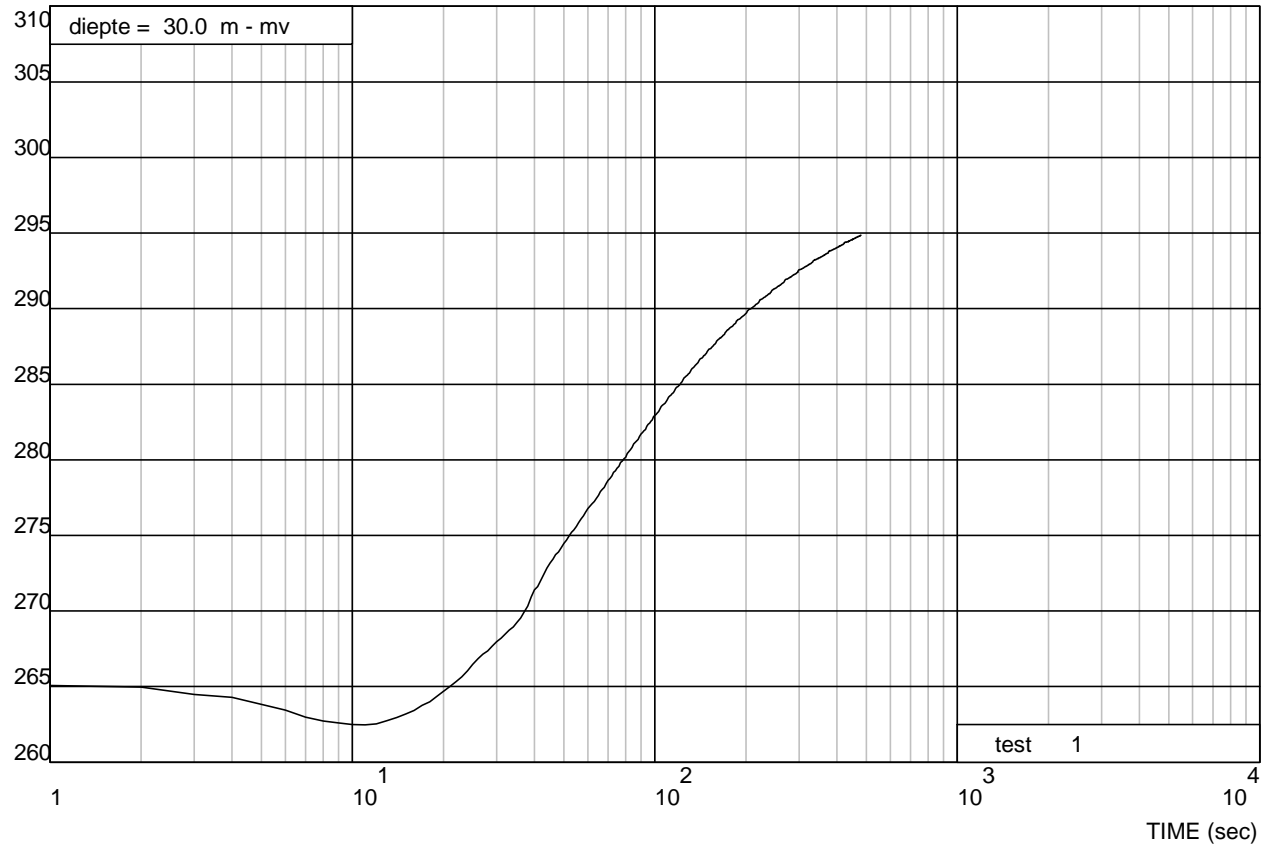
datum: 10-11-2014

opdracht: 02P001595-03





waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

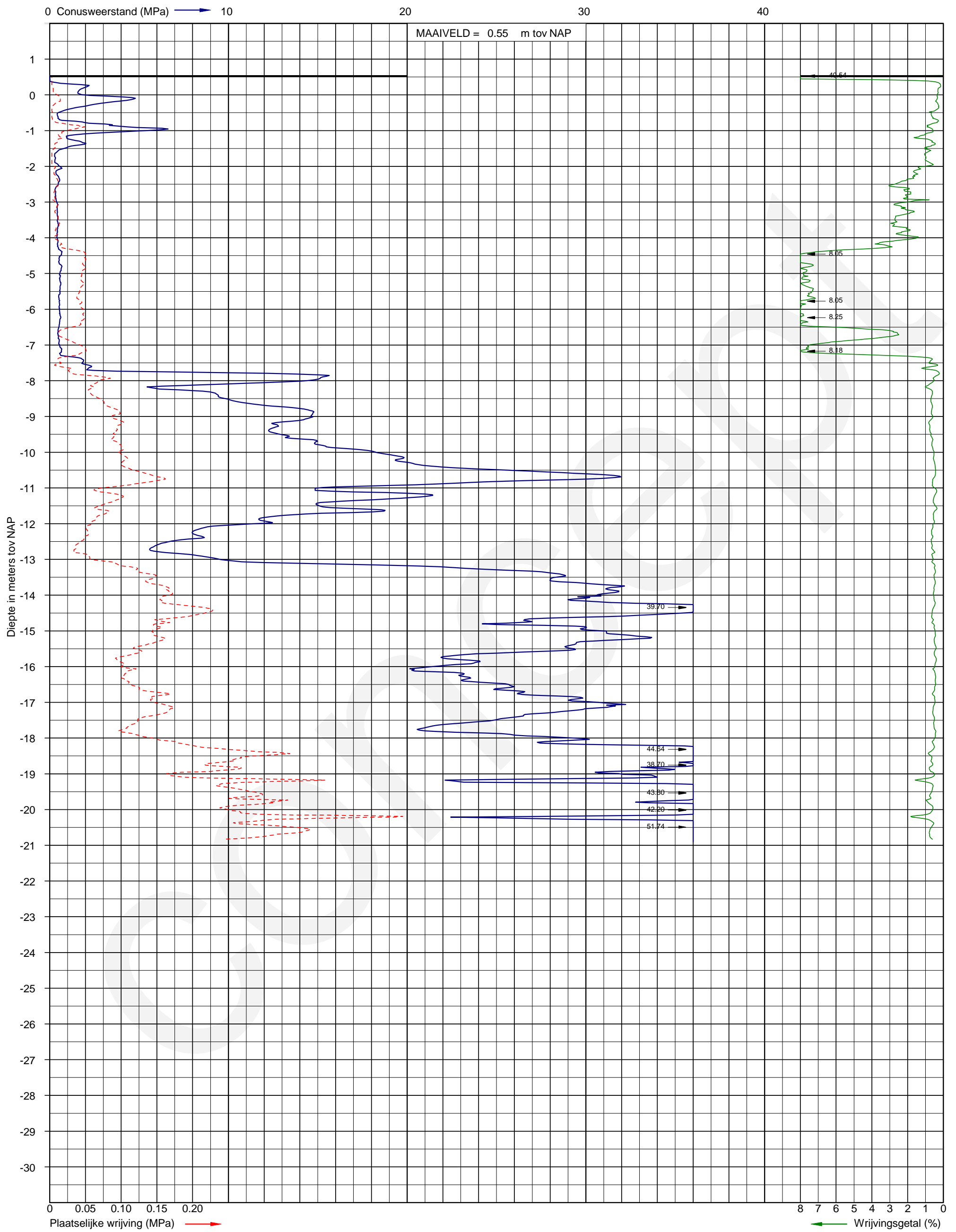
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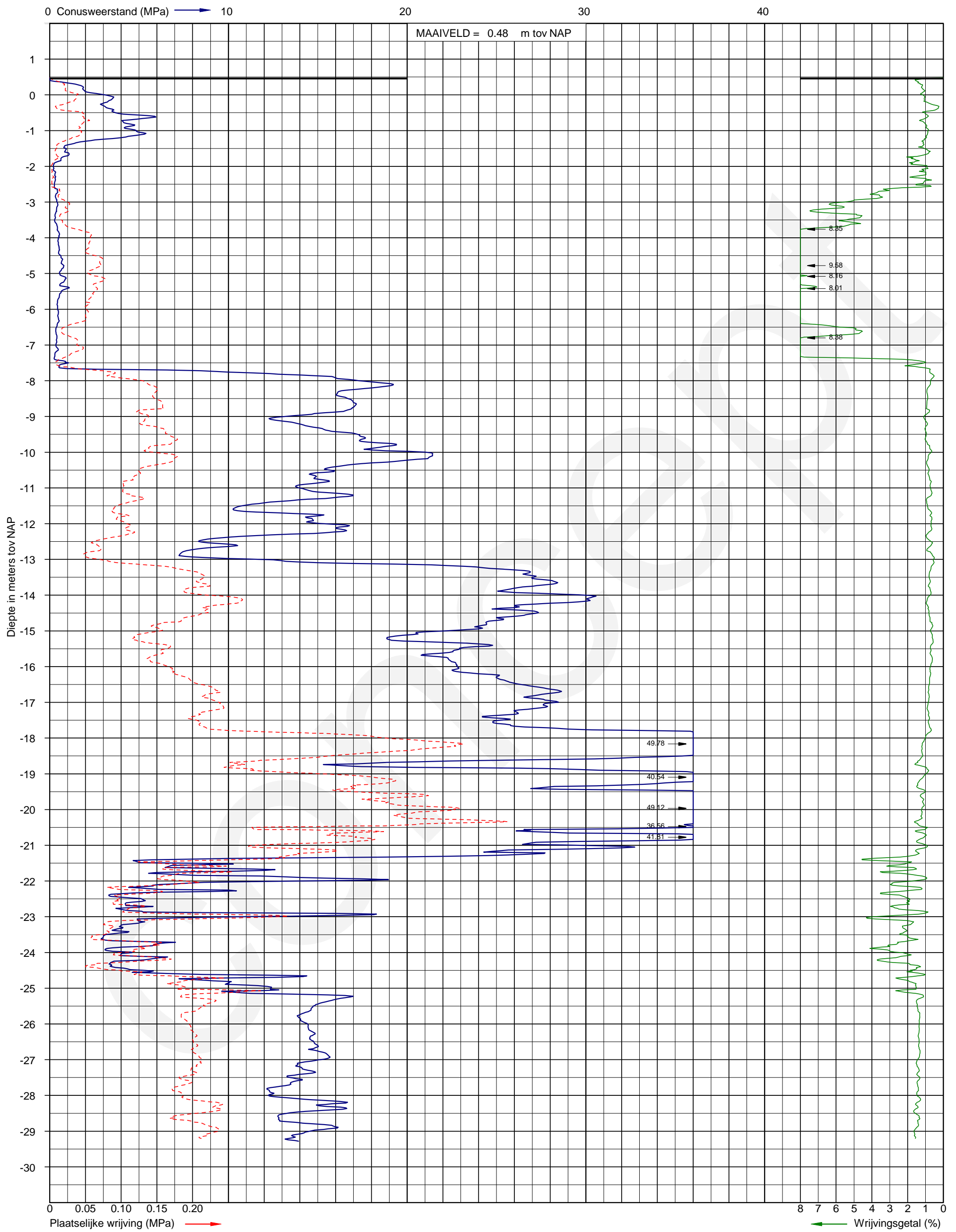
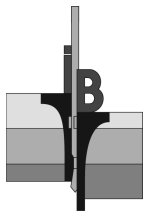
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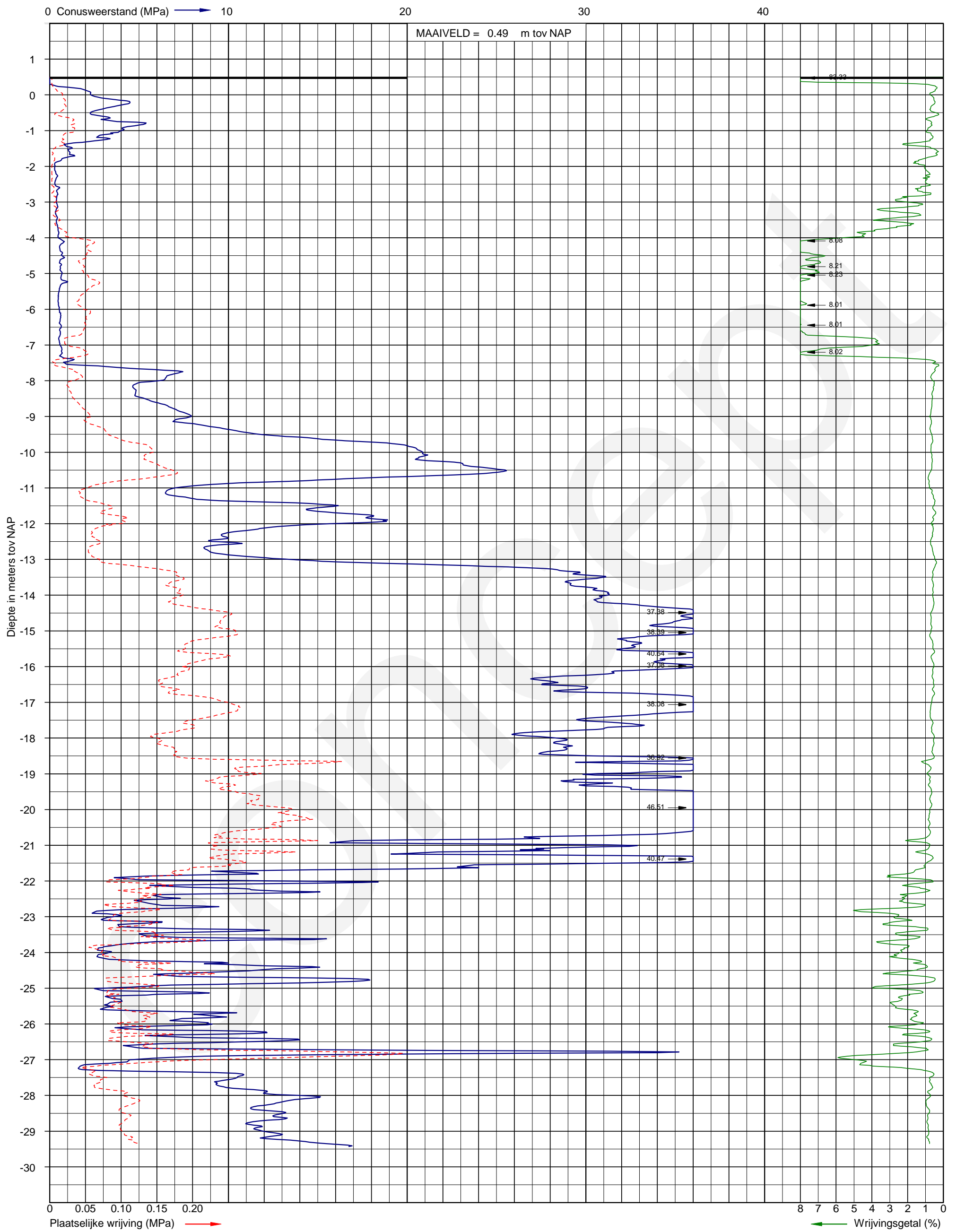
INPIJN-BLOKPOEL Ingenieursbureau

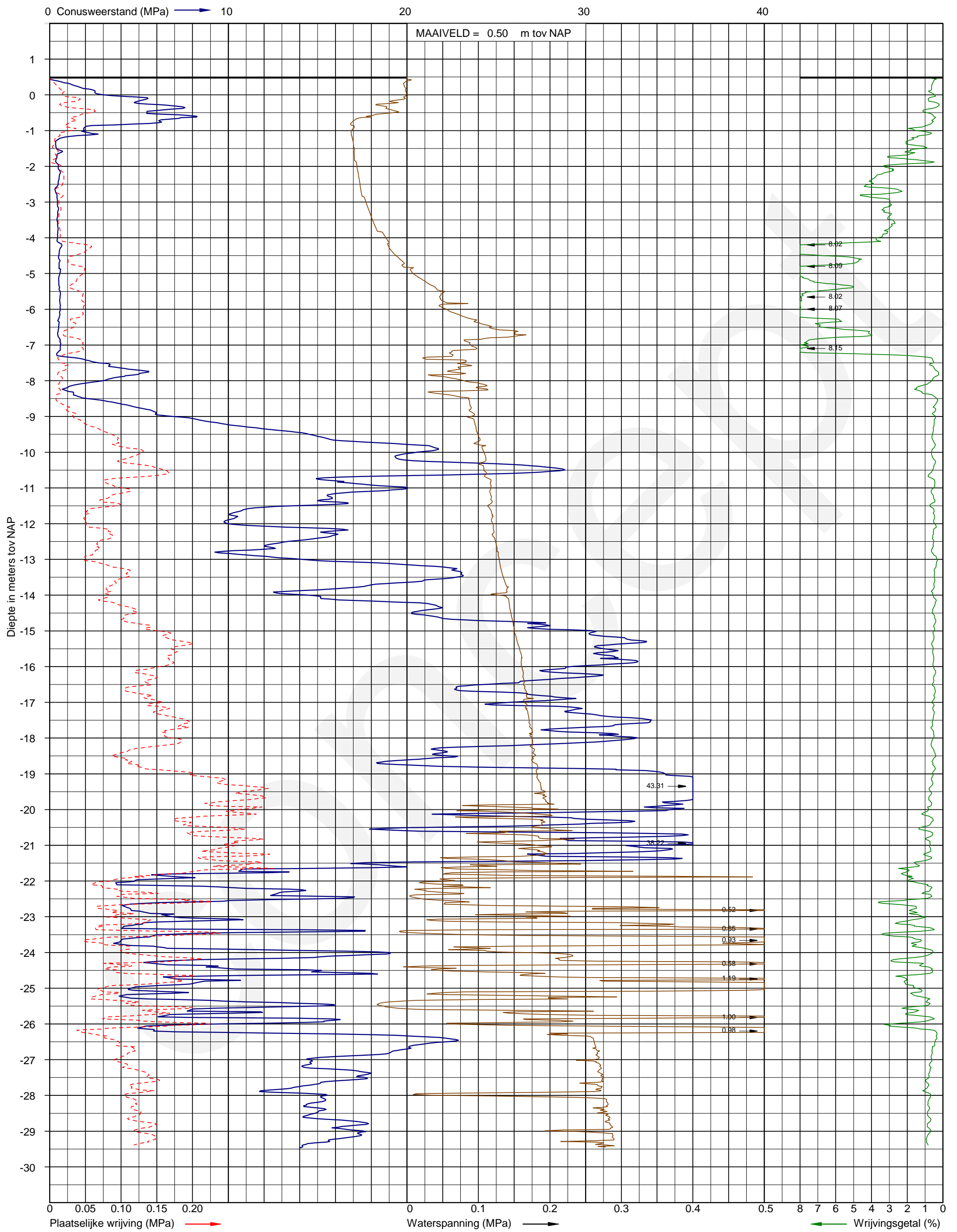
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opdracht: 02P001595-03

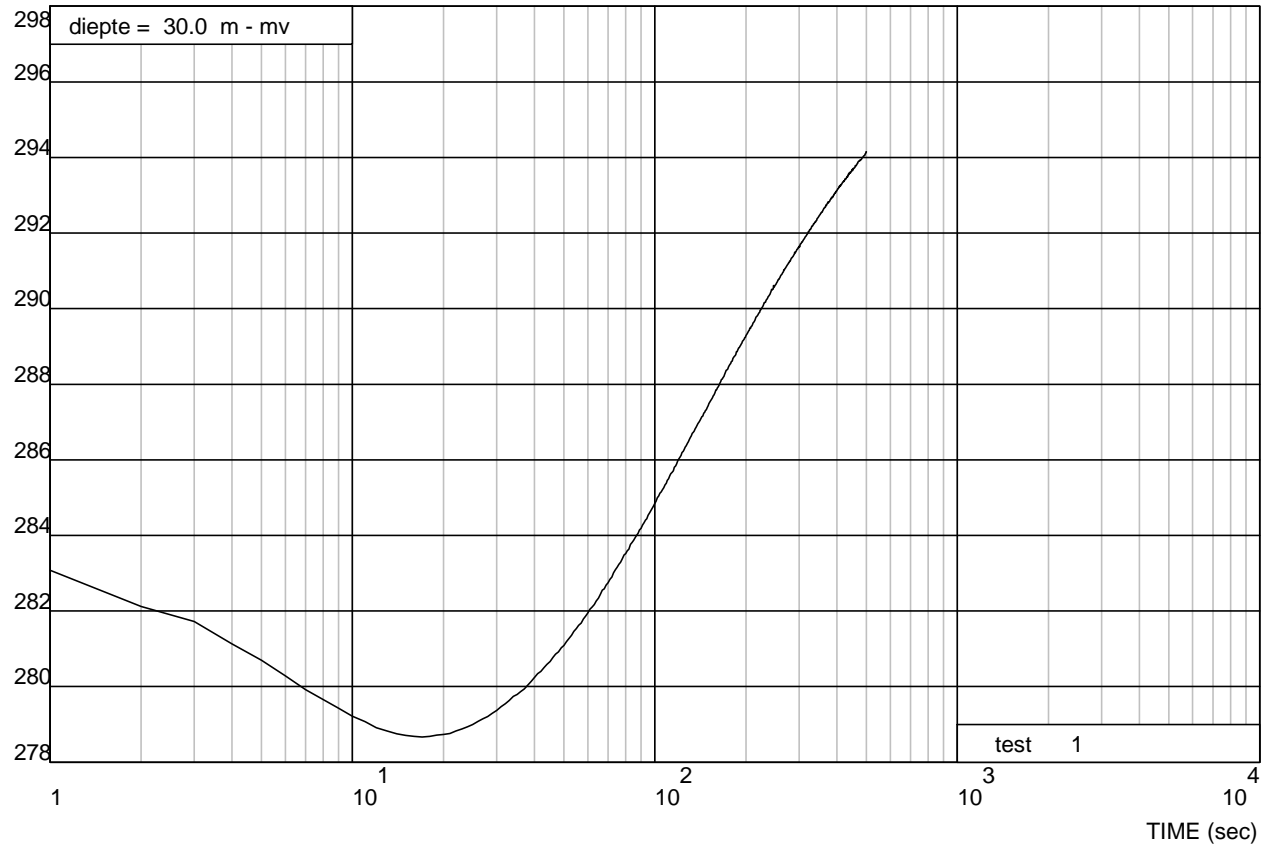








waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

uitv.: RHL-S22

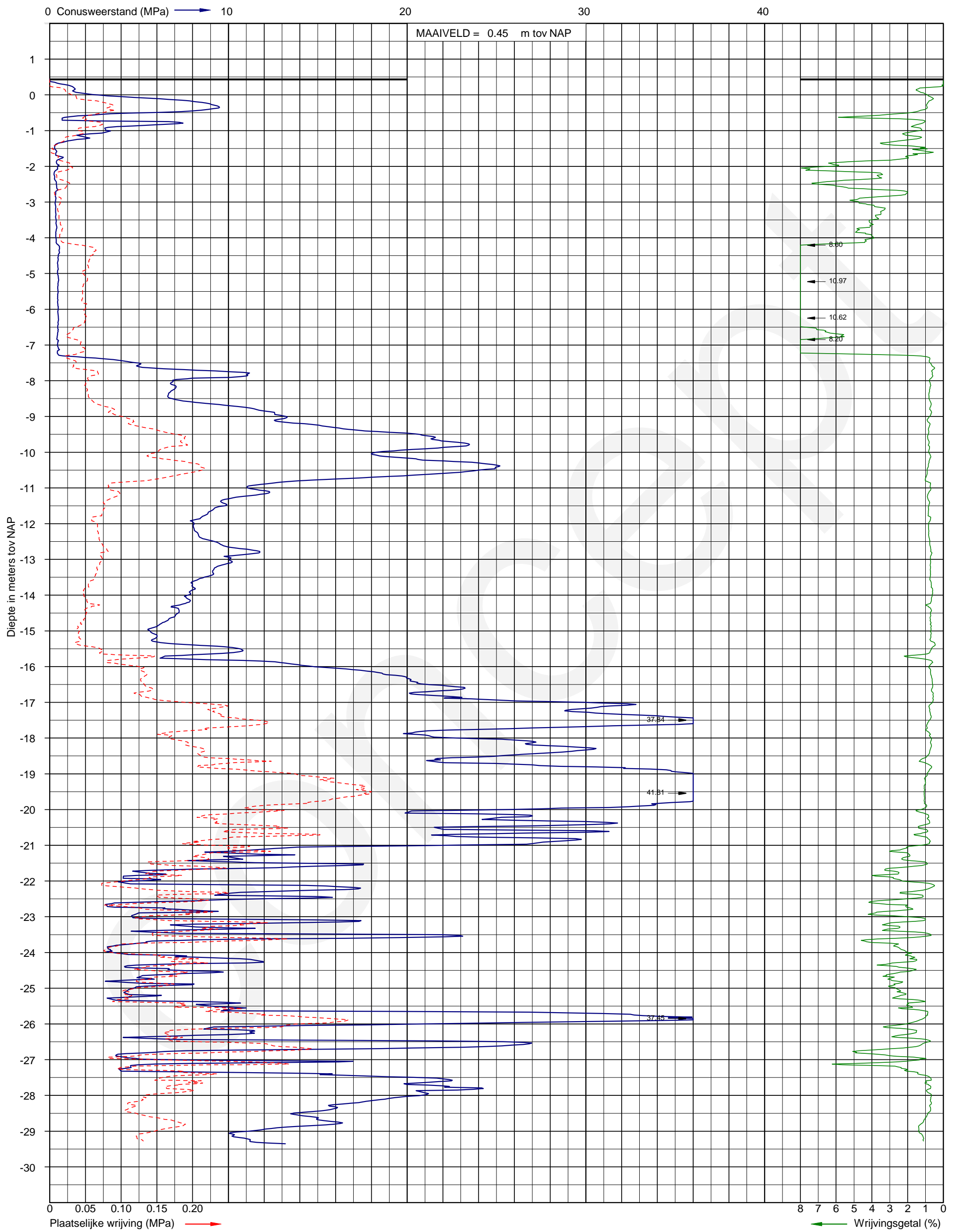
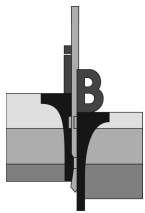
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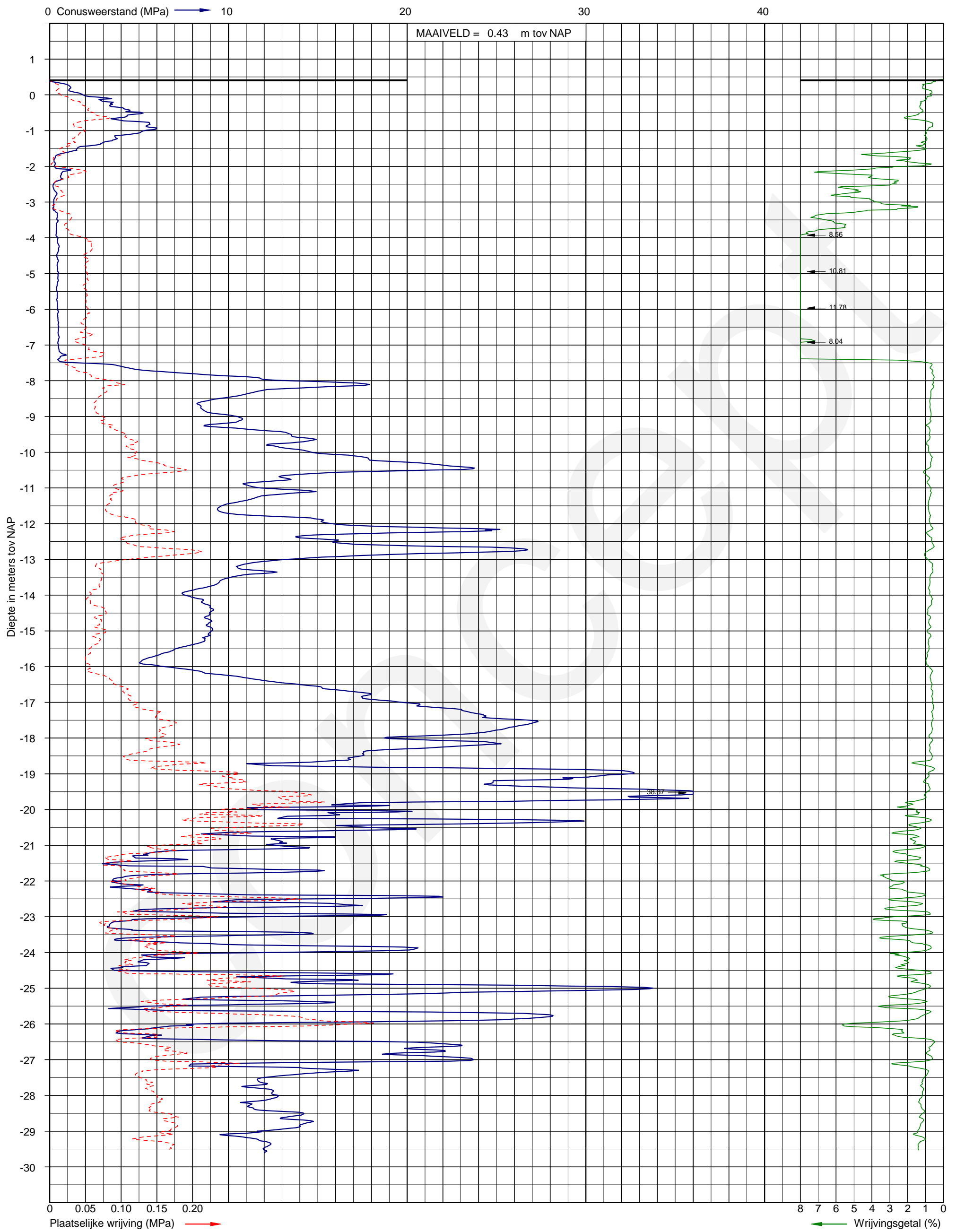
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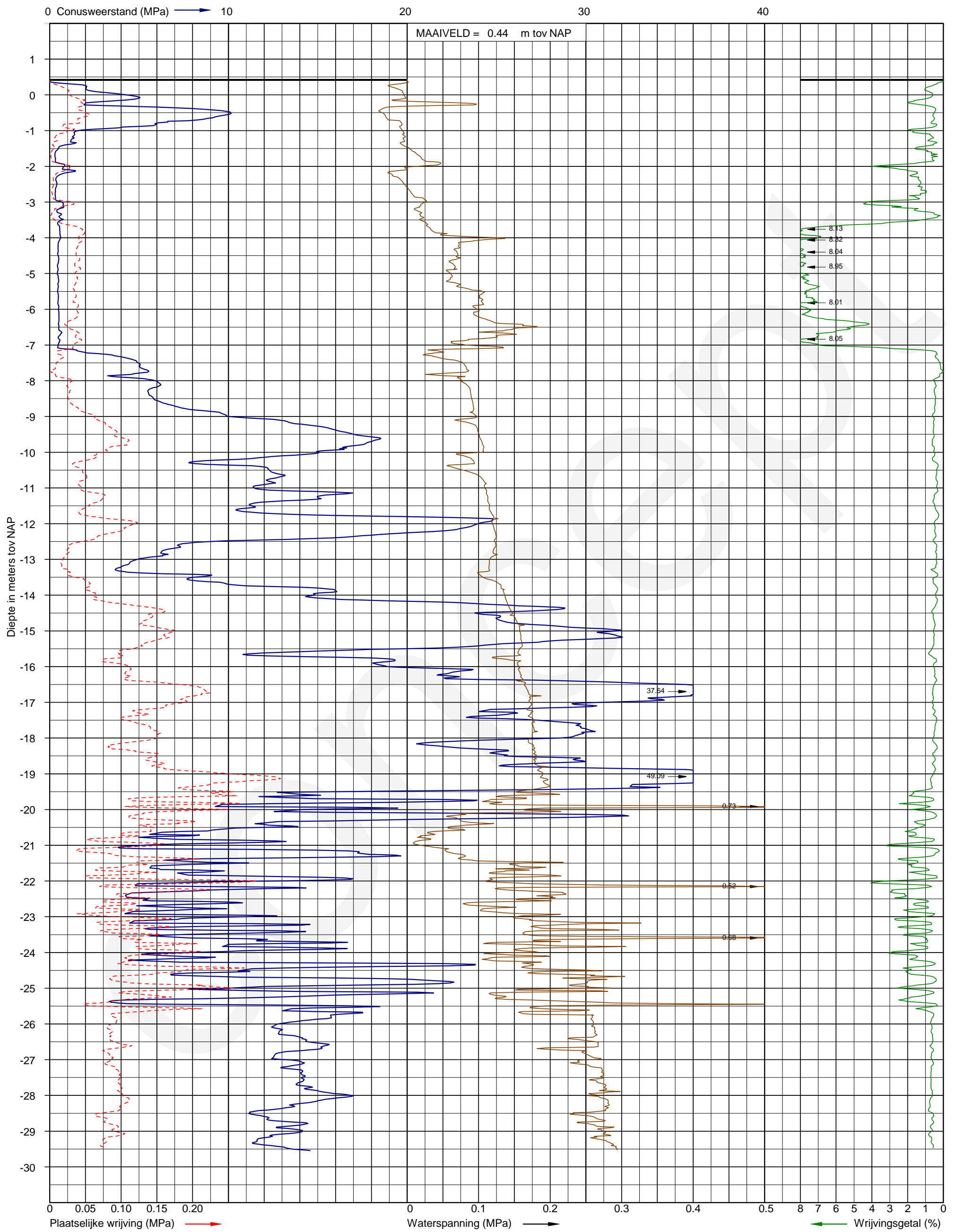
INPIJN-BLOKPOEL Ingenieursbureau

datum: 4-11-2014

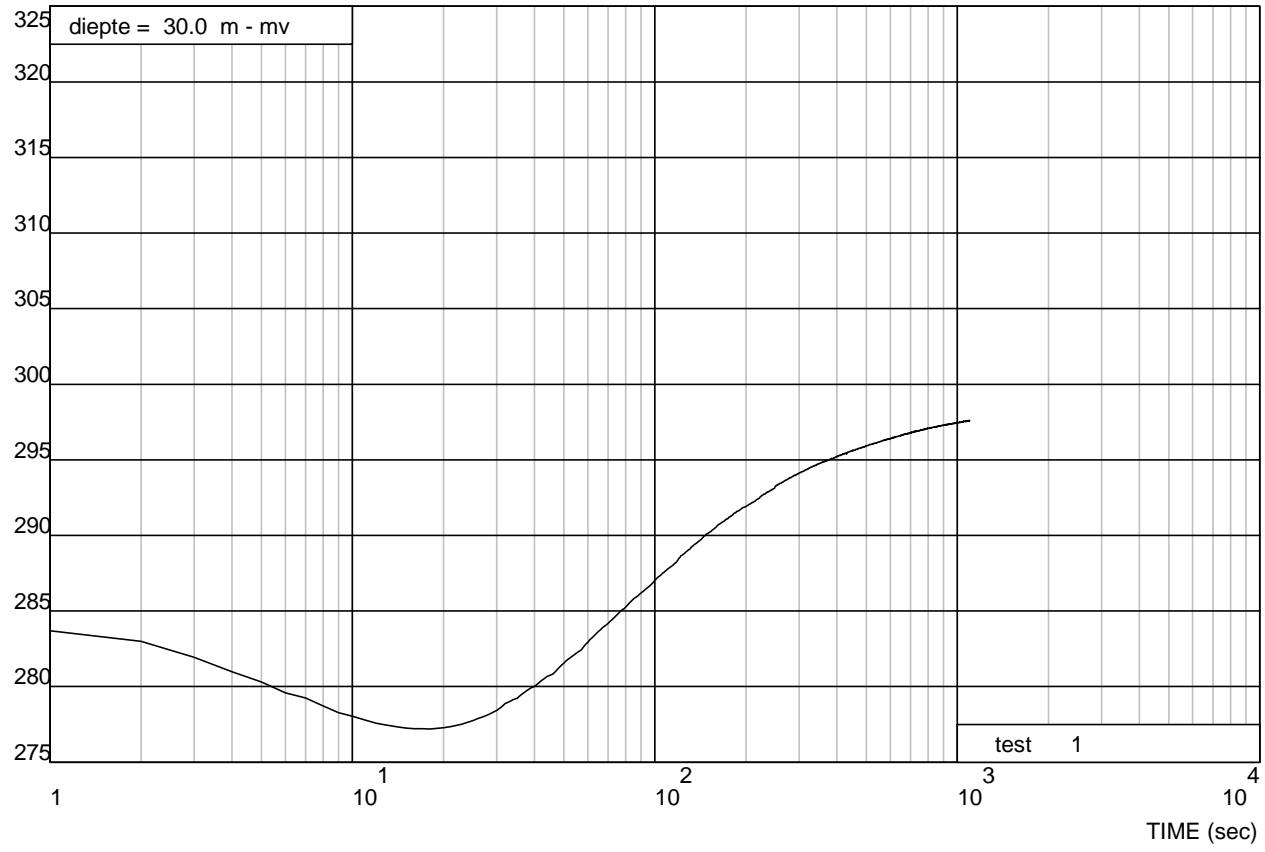
opdracht: 02P001595-03







waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

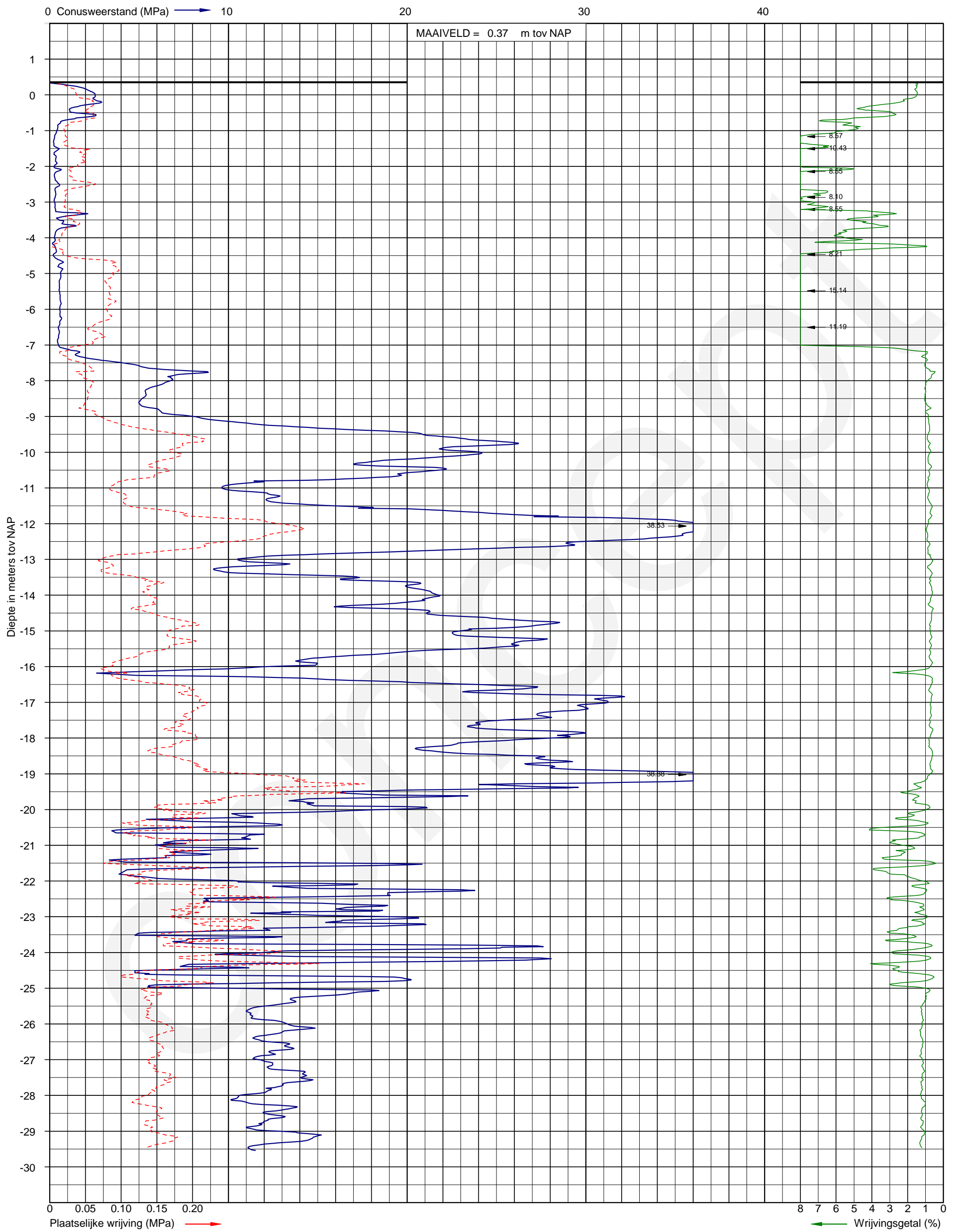
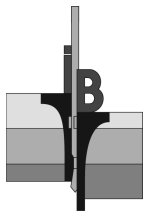
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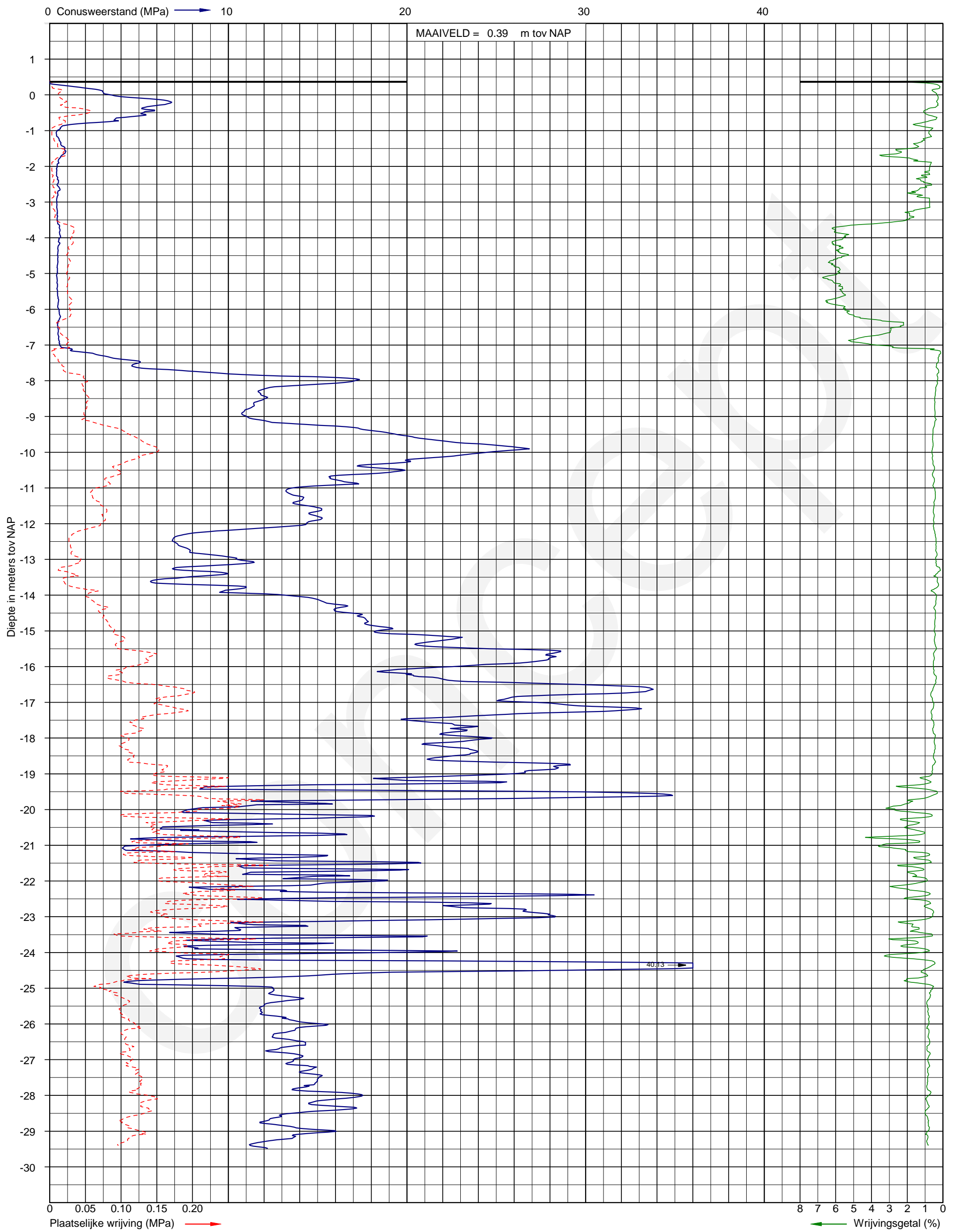
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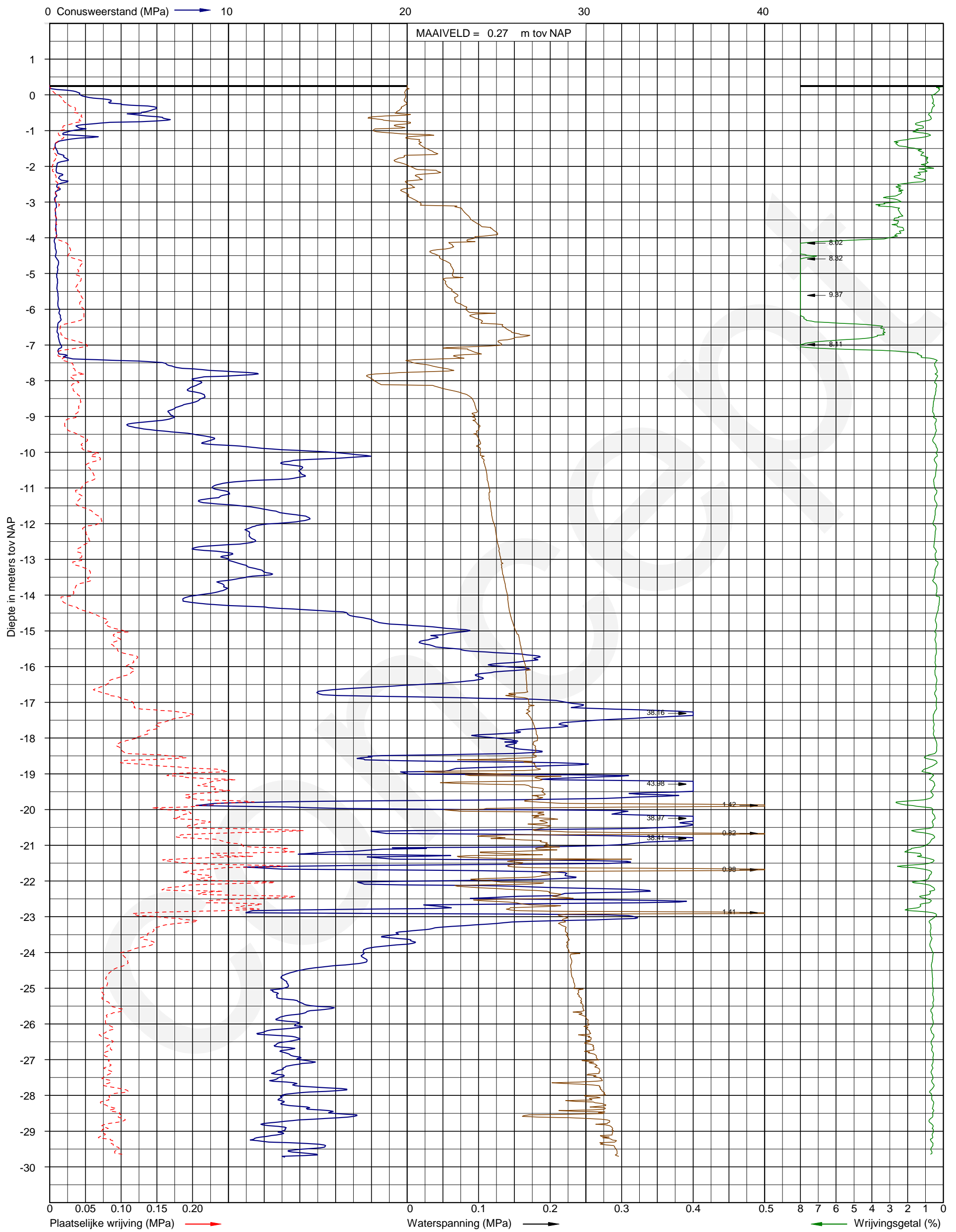
INPIJN-BLOKPOEL Ingenieursbureau

datum: 4-11-2014

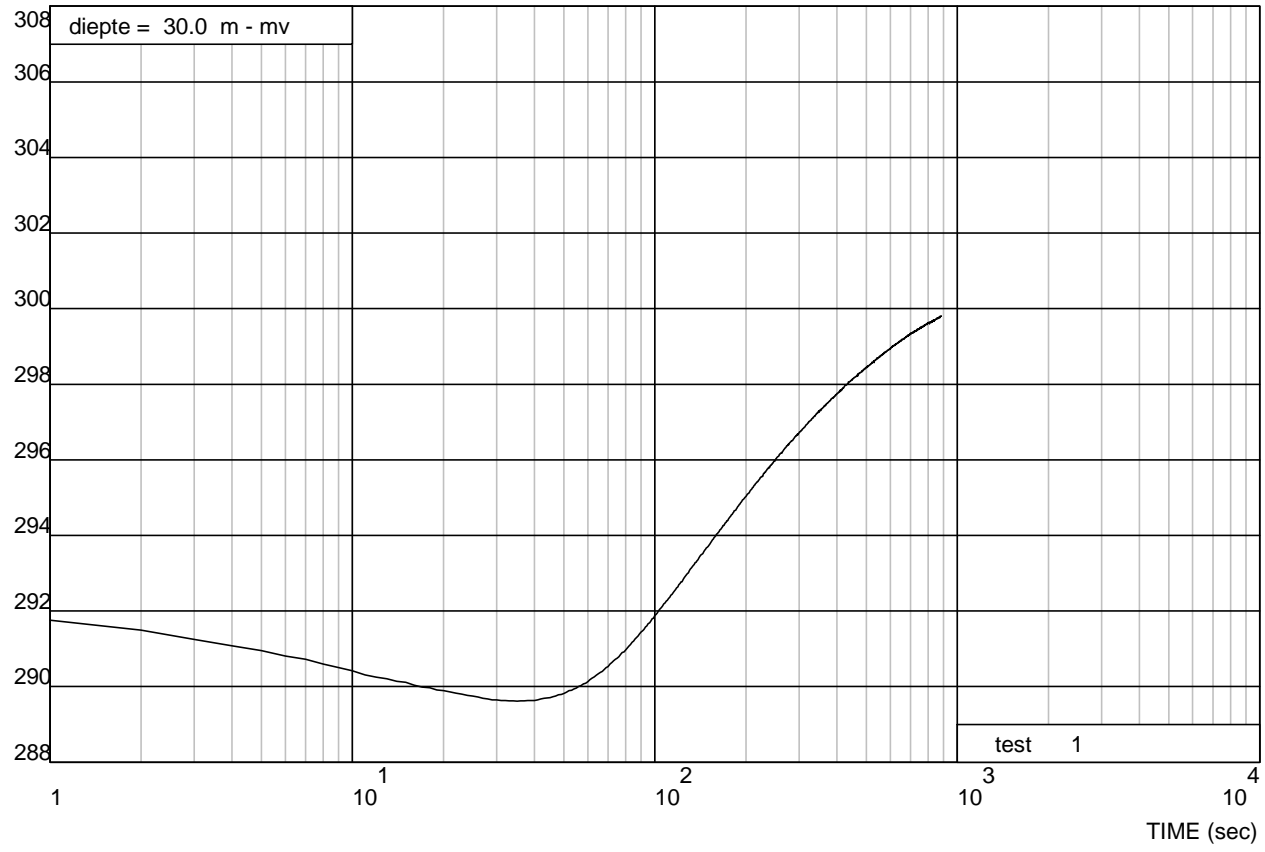
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waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

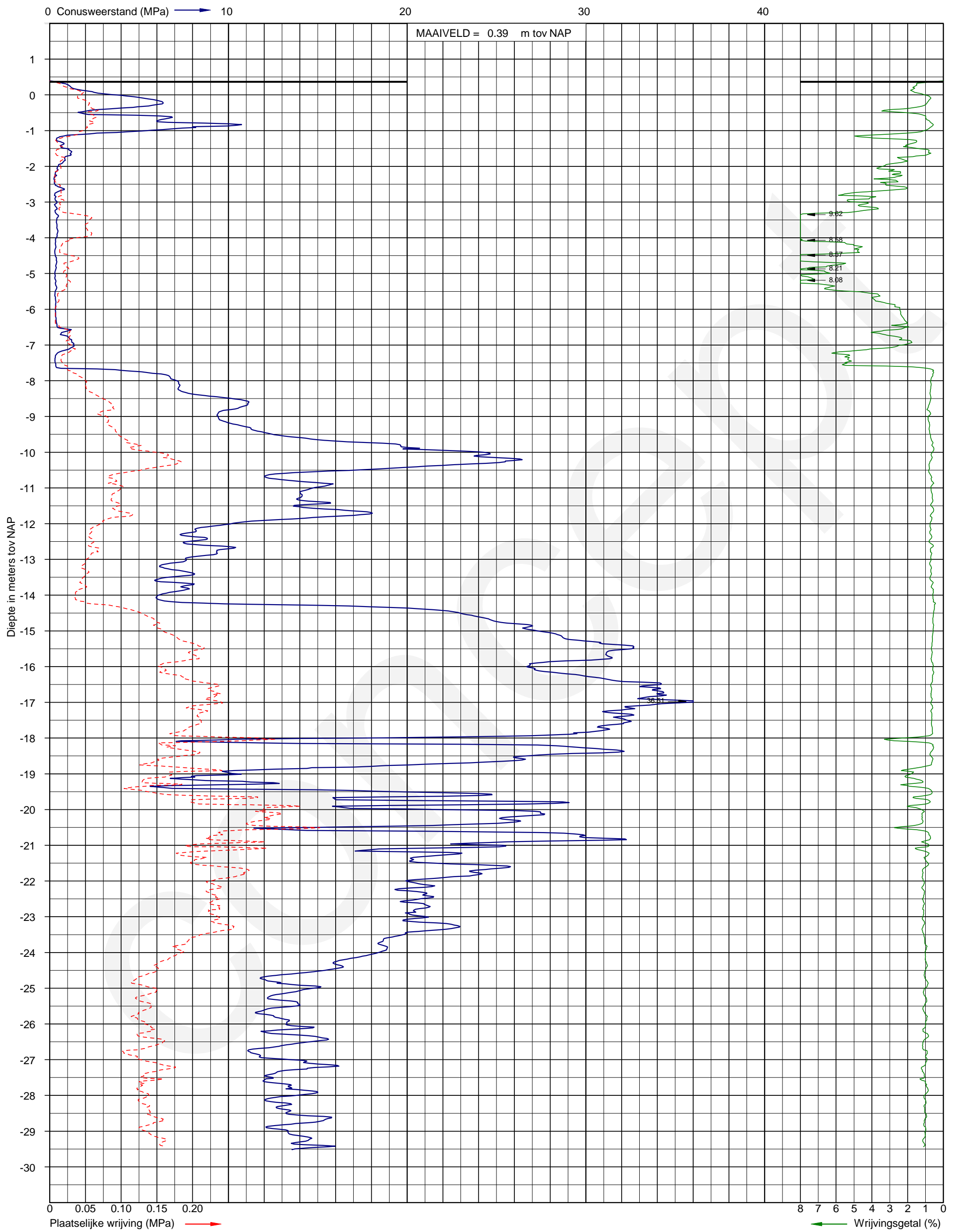
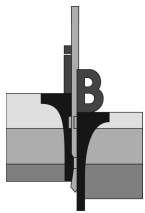
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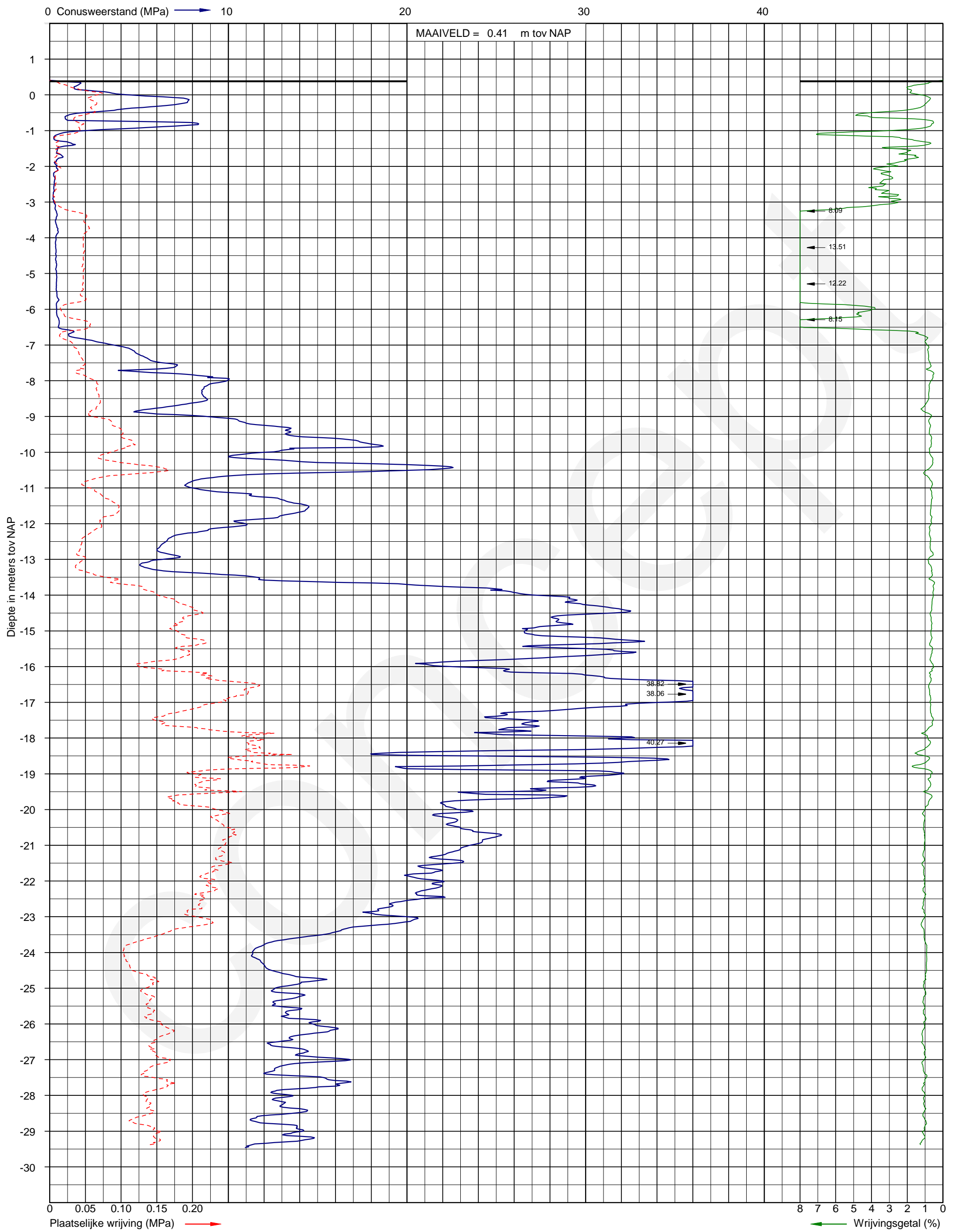
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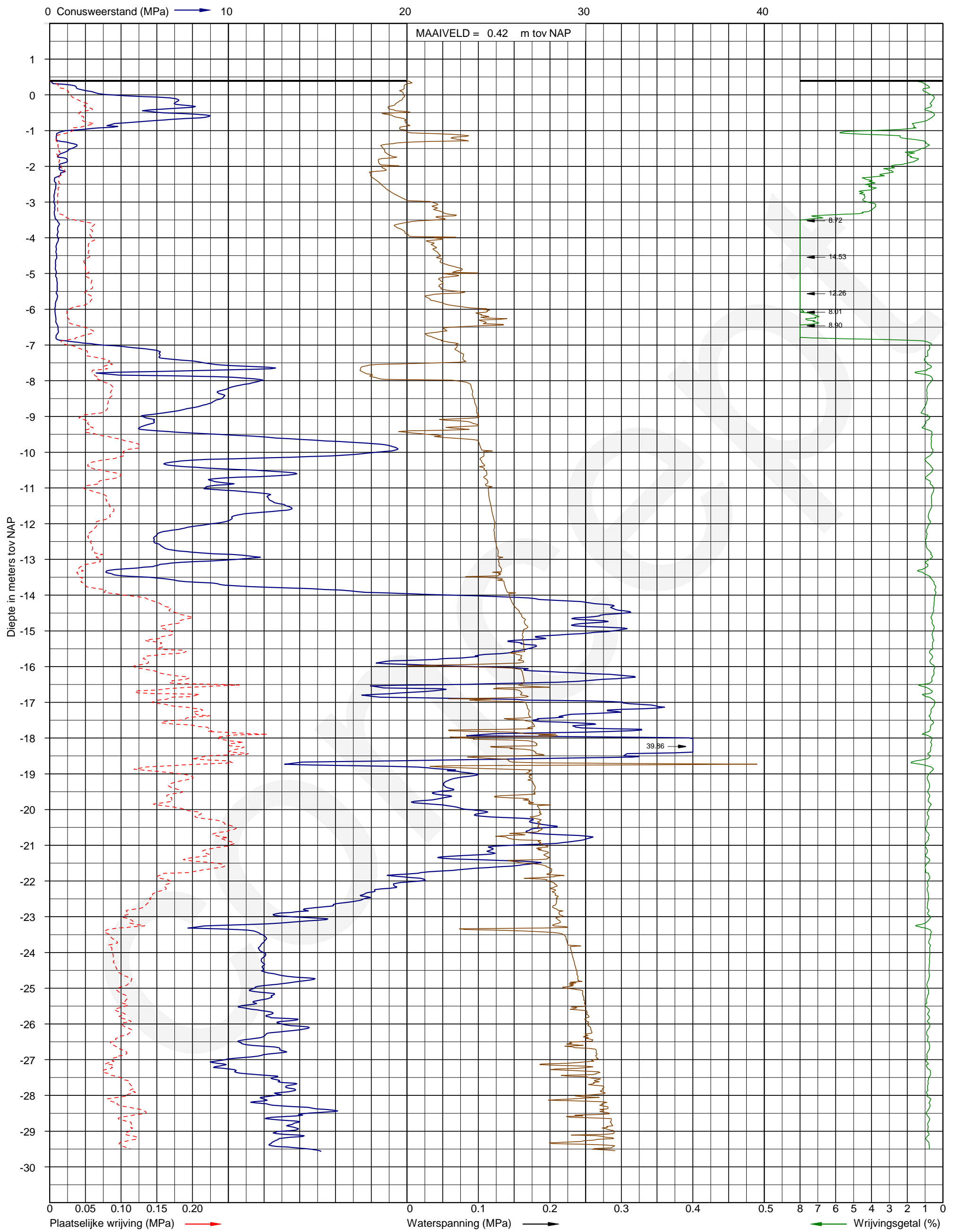
INPIJN-BLOKPOEL Ingenieursbureau

datum: 3-11-2014

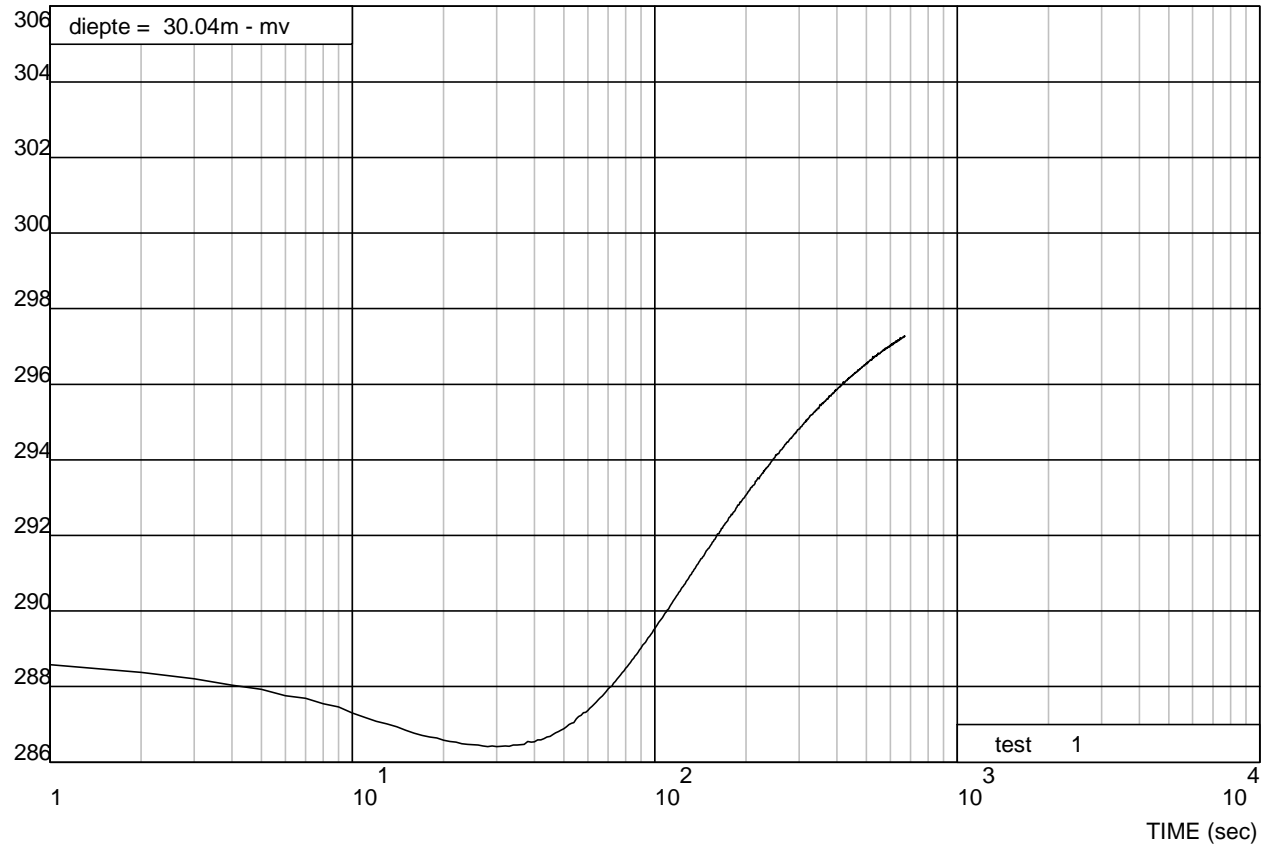
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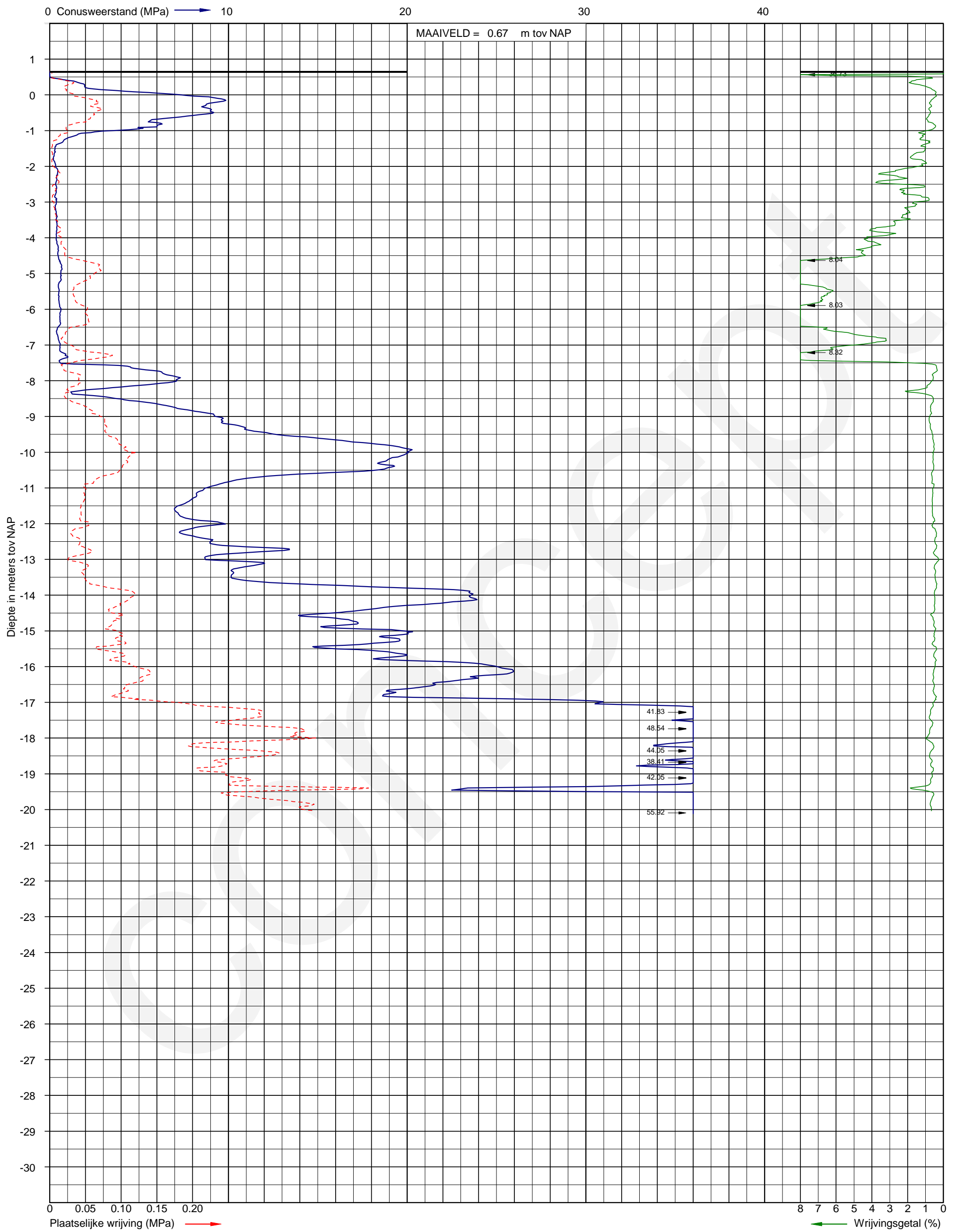
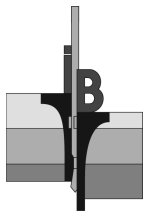


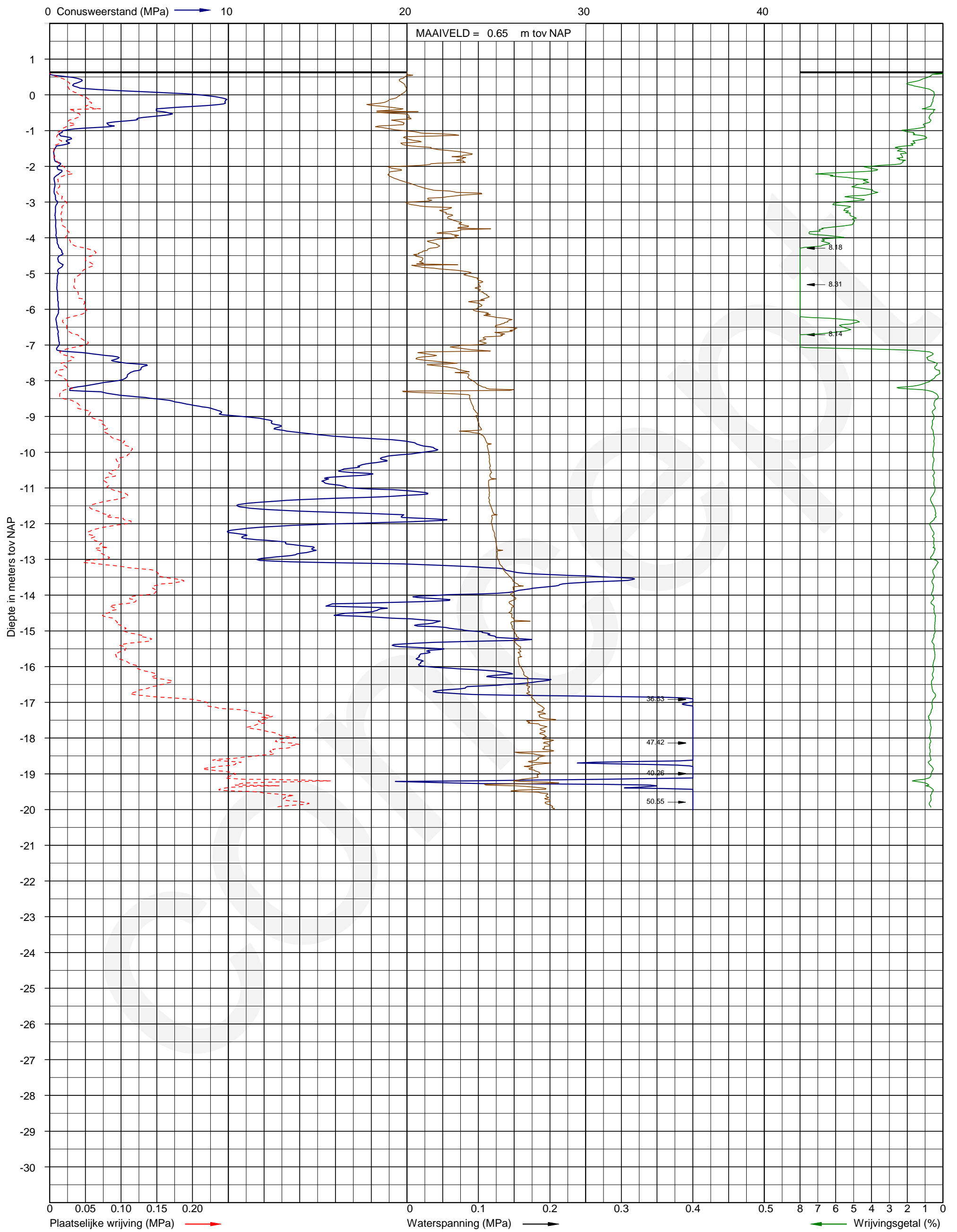


waterspanning (kPa)

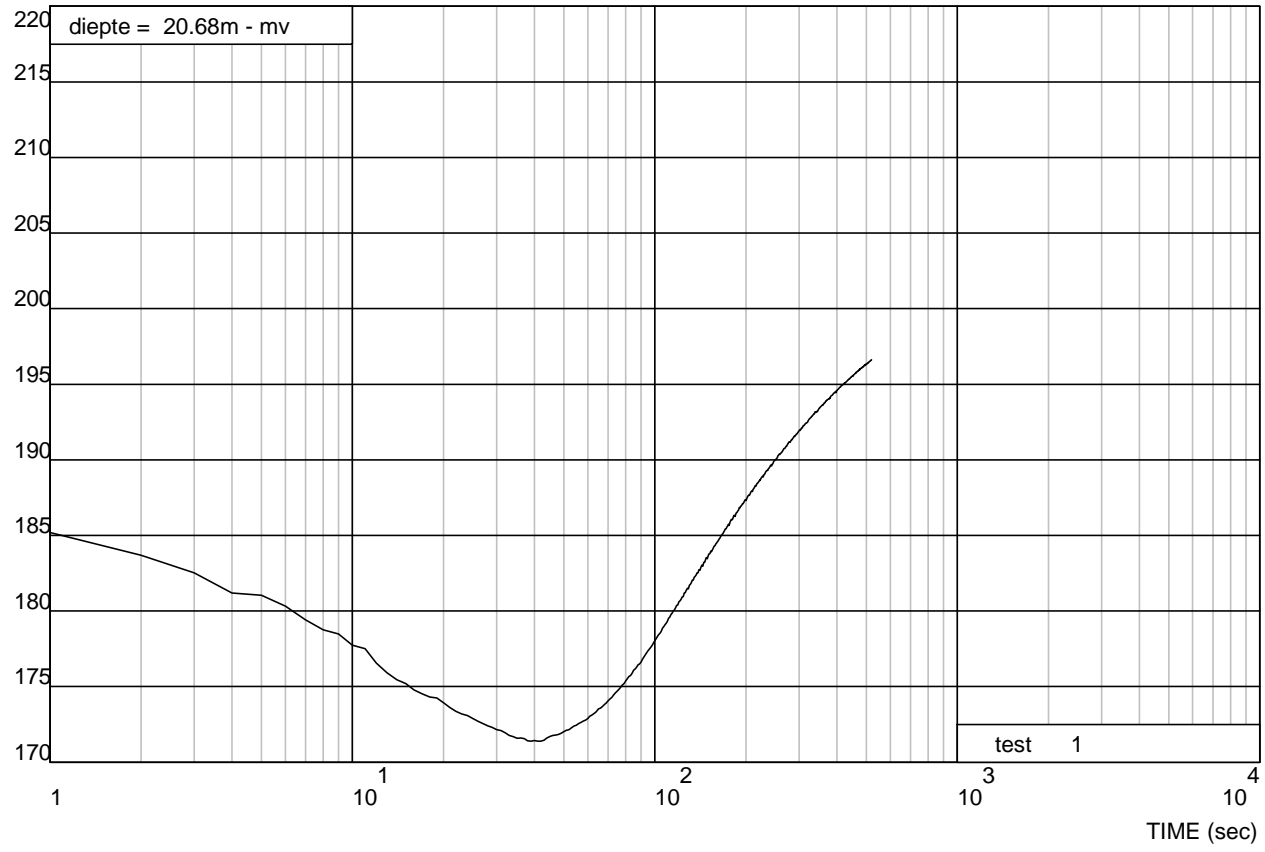


Grondonderzoek station te Rilland	dissipatietest	uitv.: RHL-S22	sondering: 66
		mat.:	
INPIJN-BLOKPOEL Ingenieursbureau	datum: 31-10-2014		opdracht: 02P001595-03





waterspanning (kPa)



Grondonderzoek station te Rilland

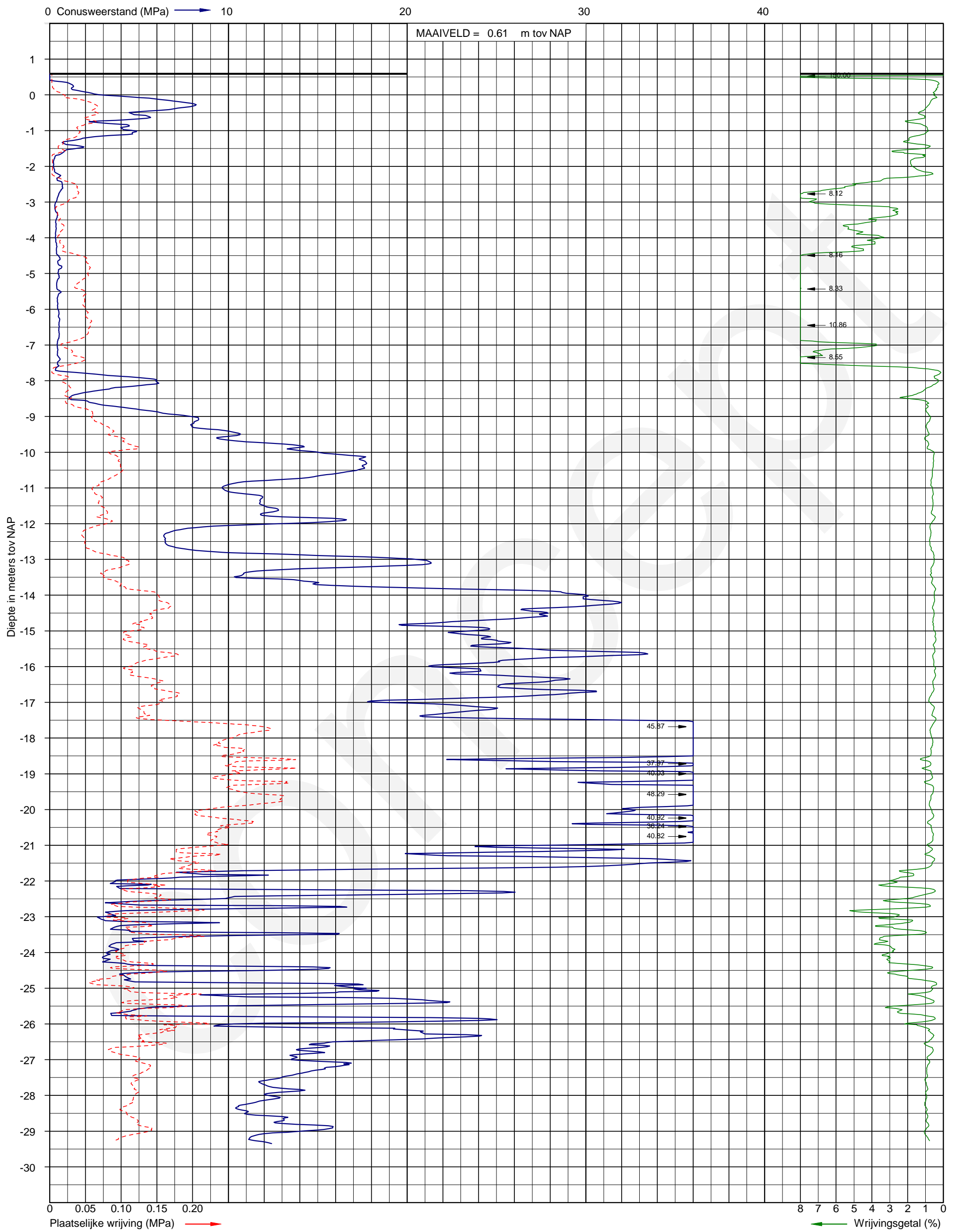
dissipatietest

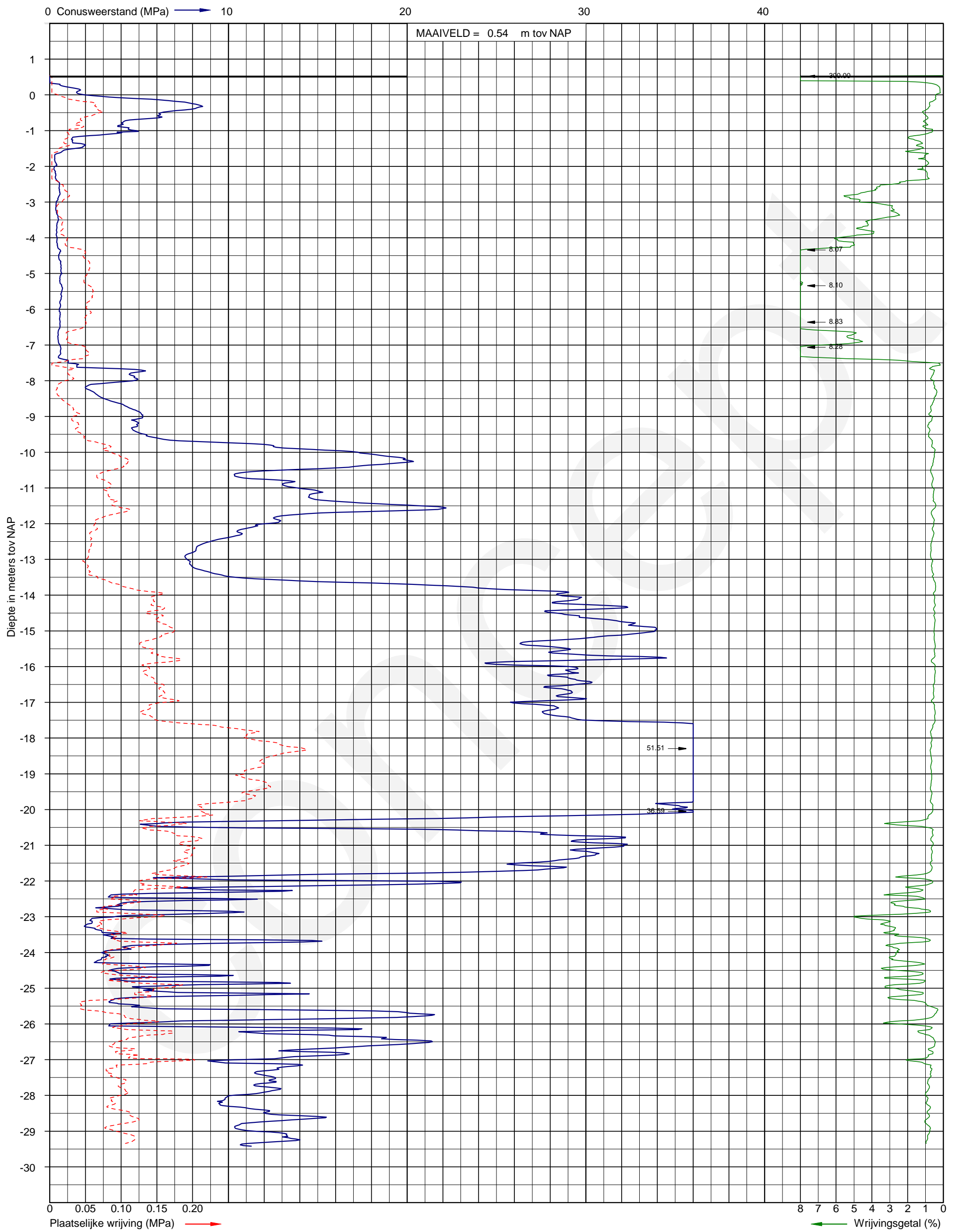
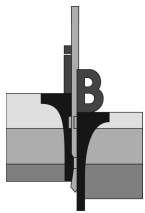
uitv.: RHL-S22
mat.: sondering: 68

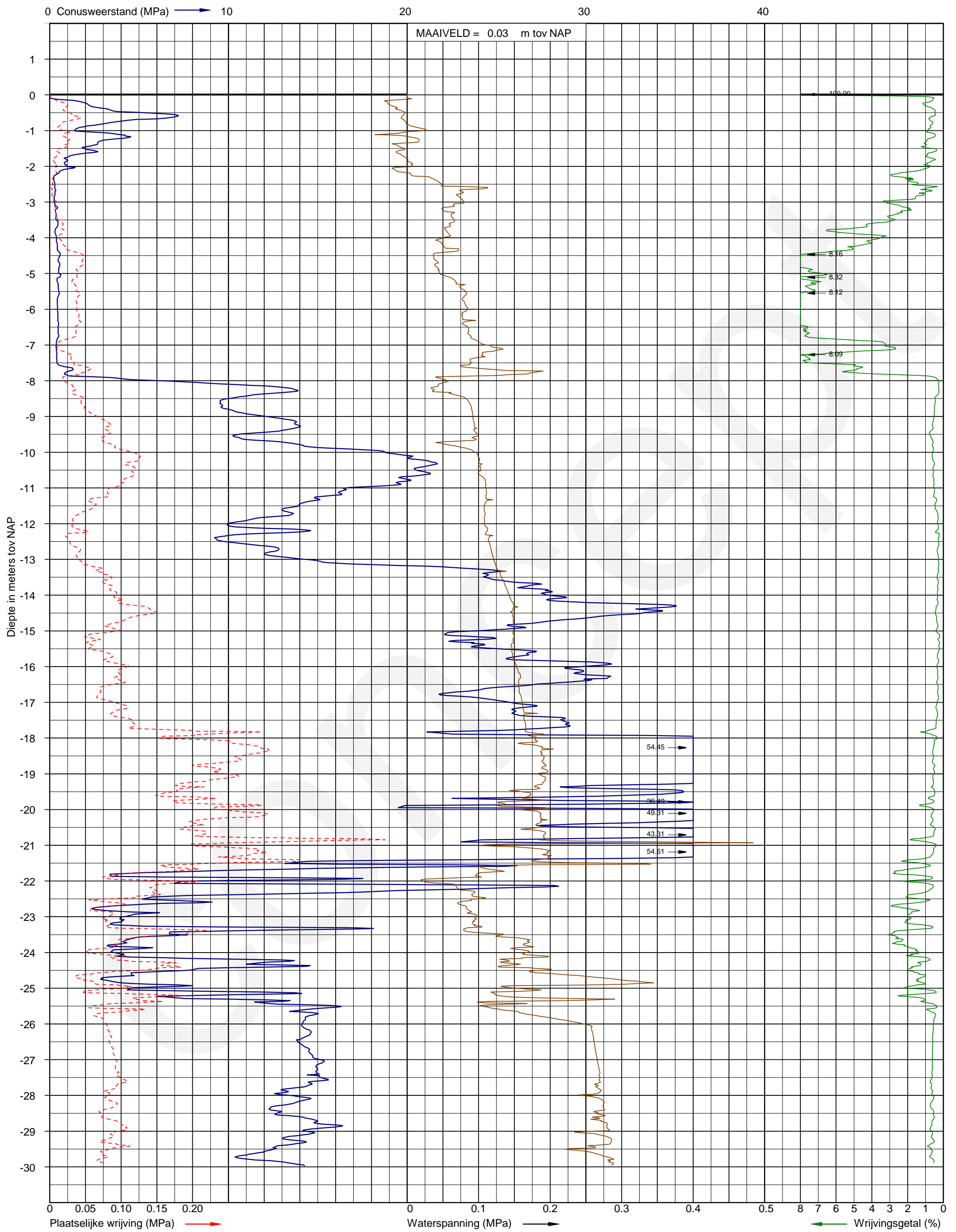
INPIJN-BLOKPOEL Ingenieursbureau

datum: 10-11-2014

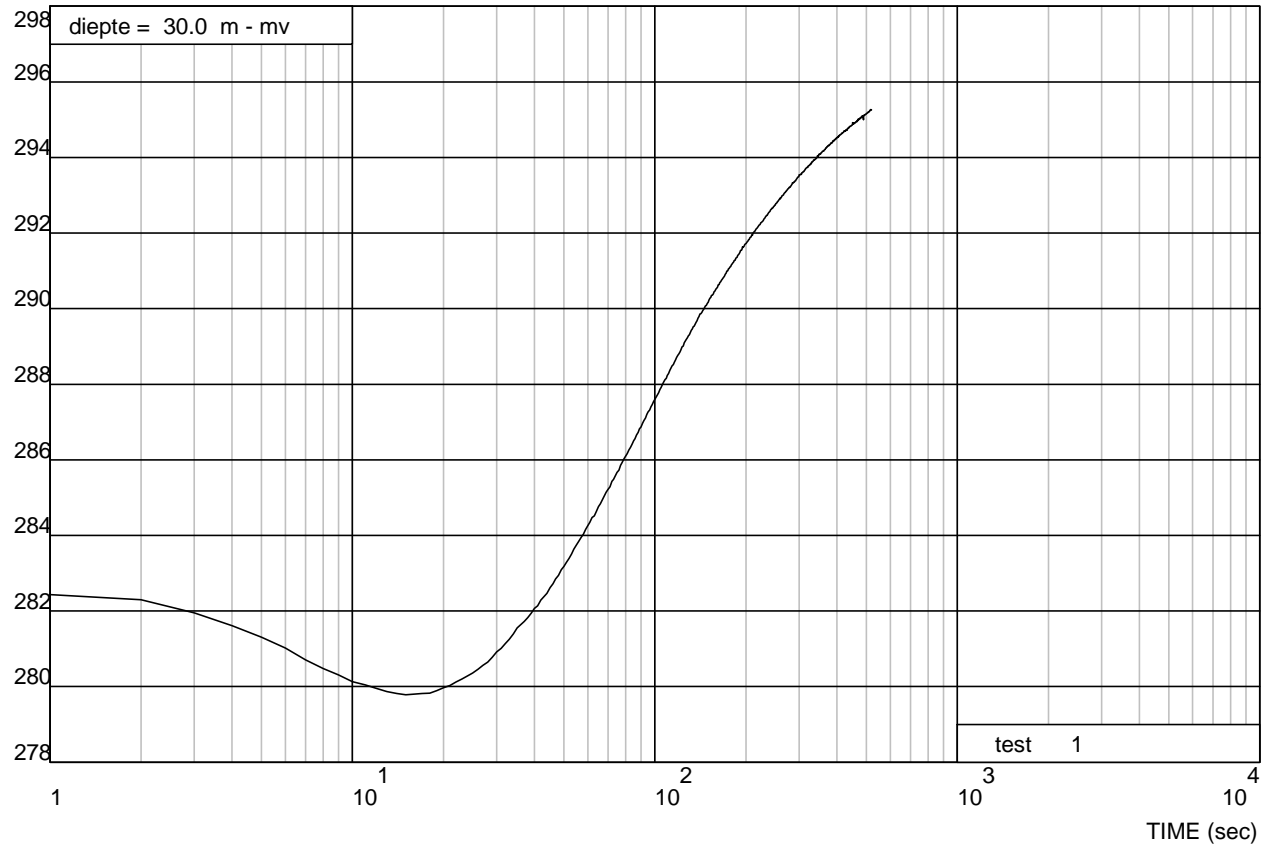
opdracht: 02P001595-03







waterspanning (kPa)



Grondonderzoek station te Rilland

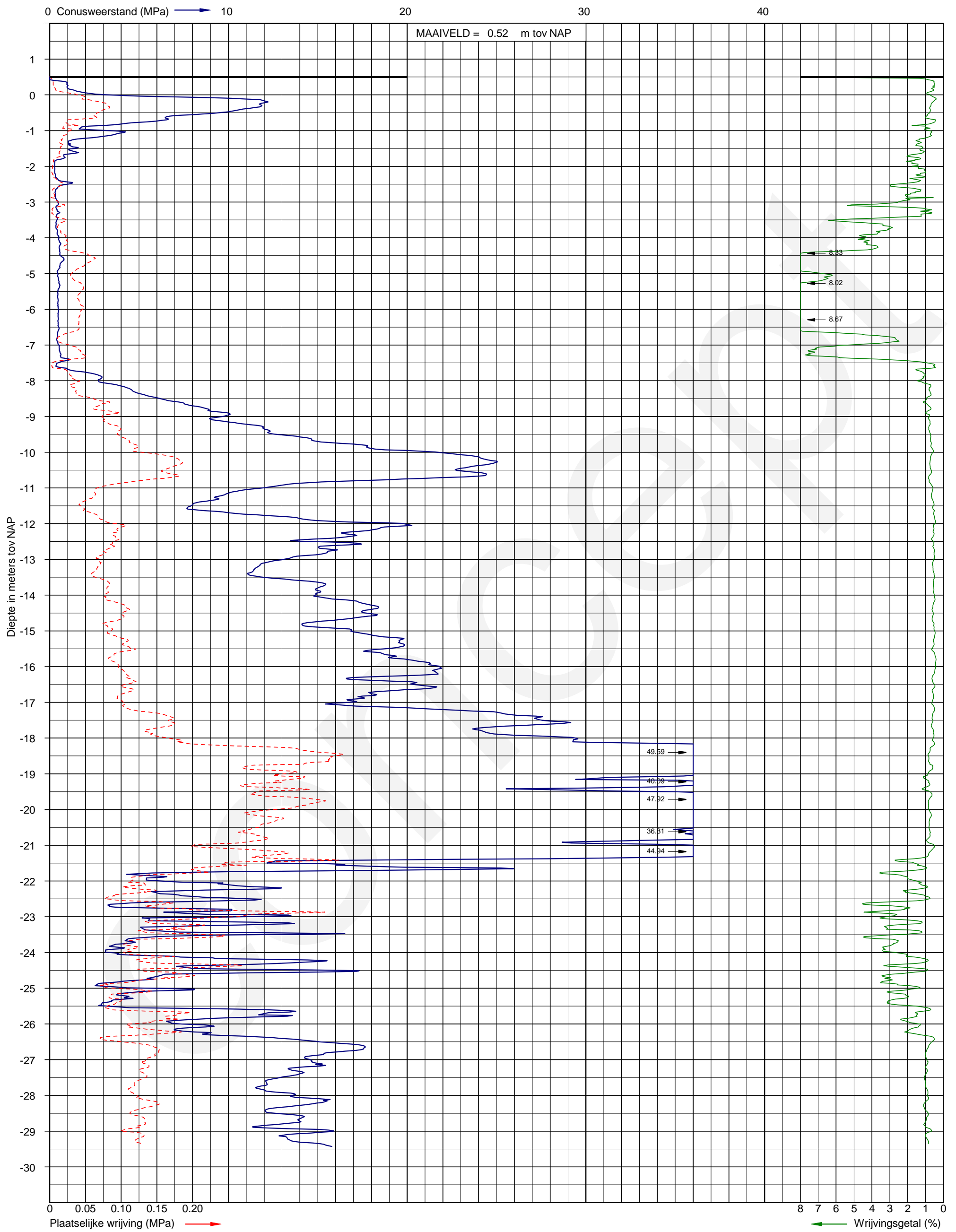
dissipatietest

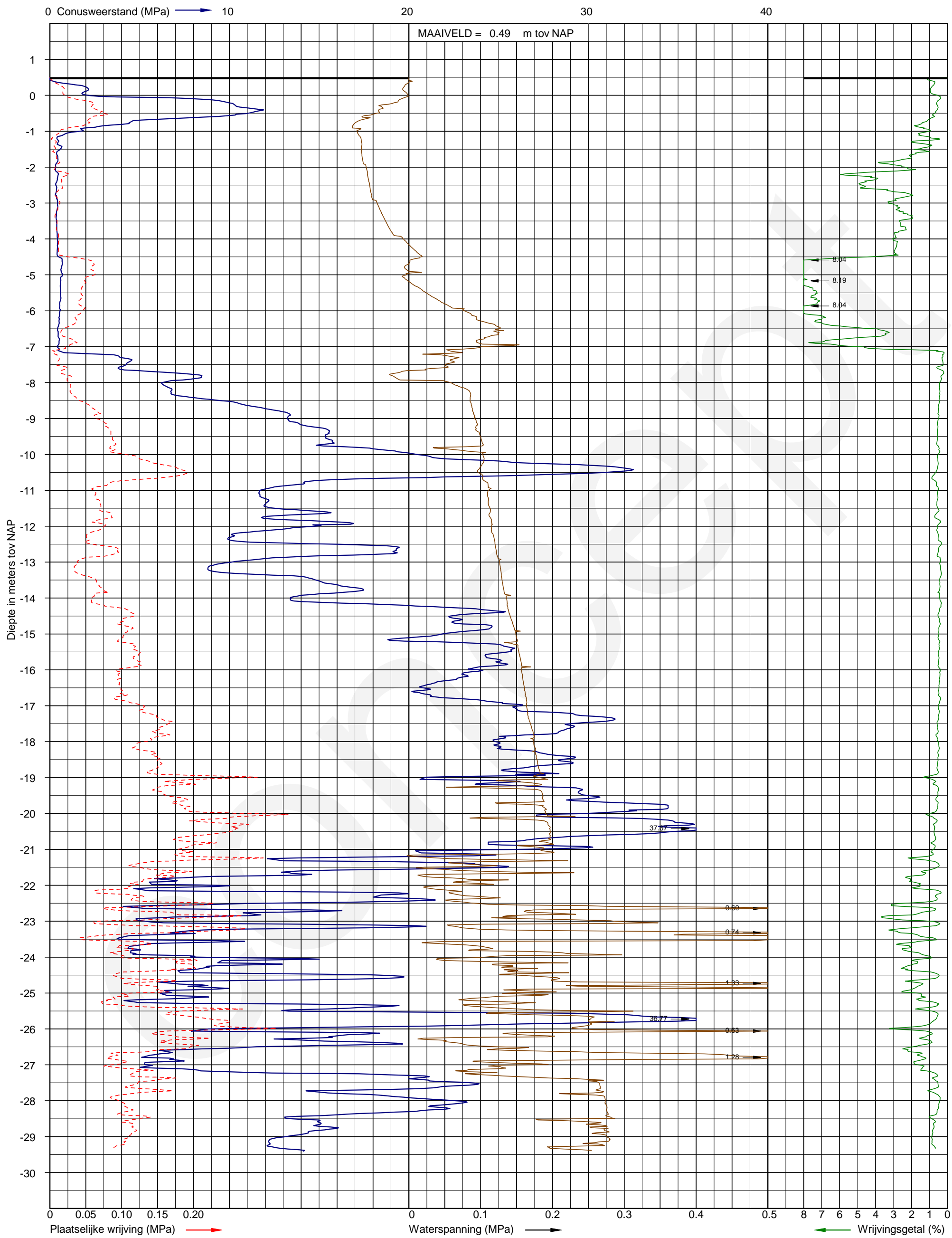
uitv.: RHL-S22
mat.: sondering: 71

INPIJN-BLOKPOEL Ingenieursbureau

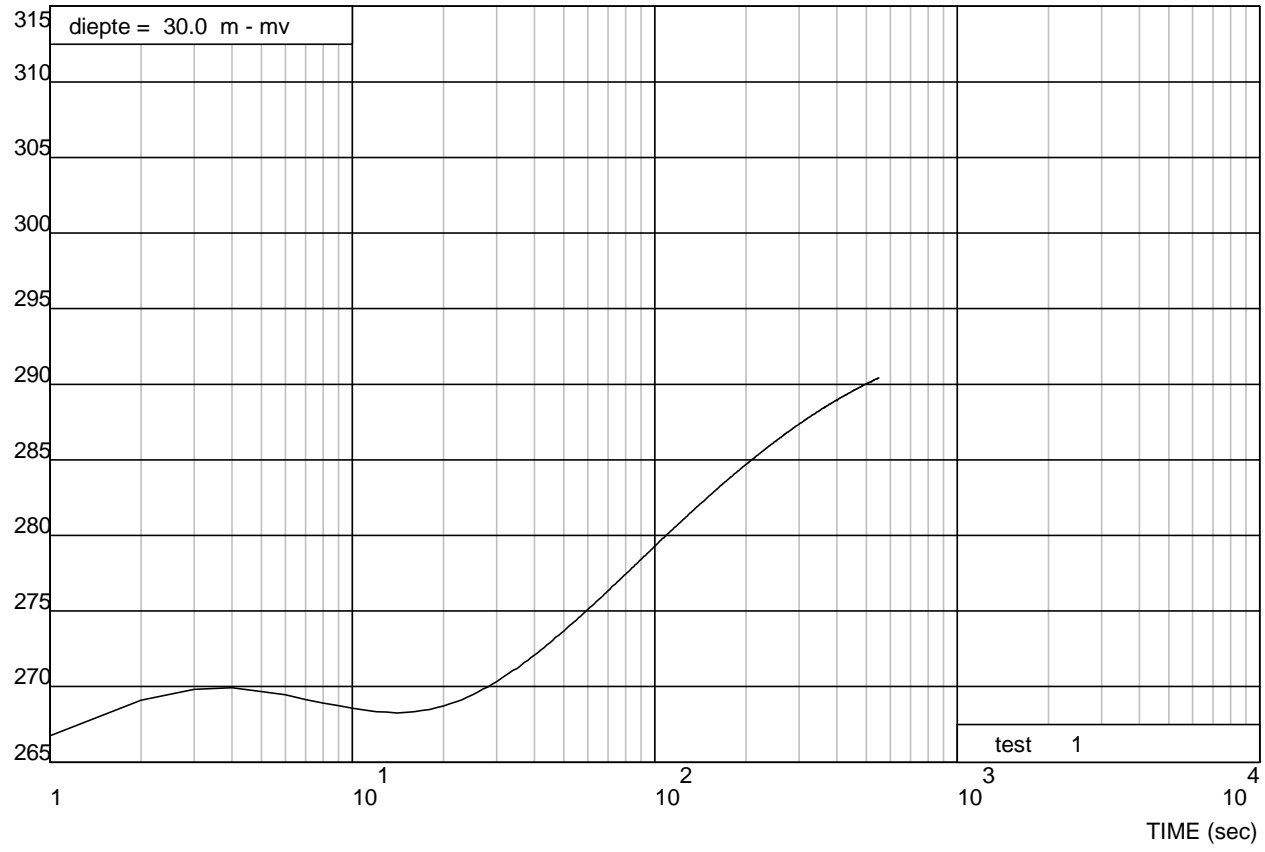
datum: 7-11-2014

opdracht: 02P001595-03





waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

uitv.: RHL-S22

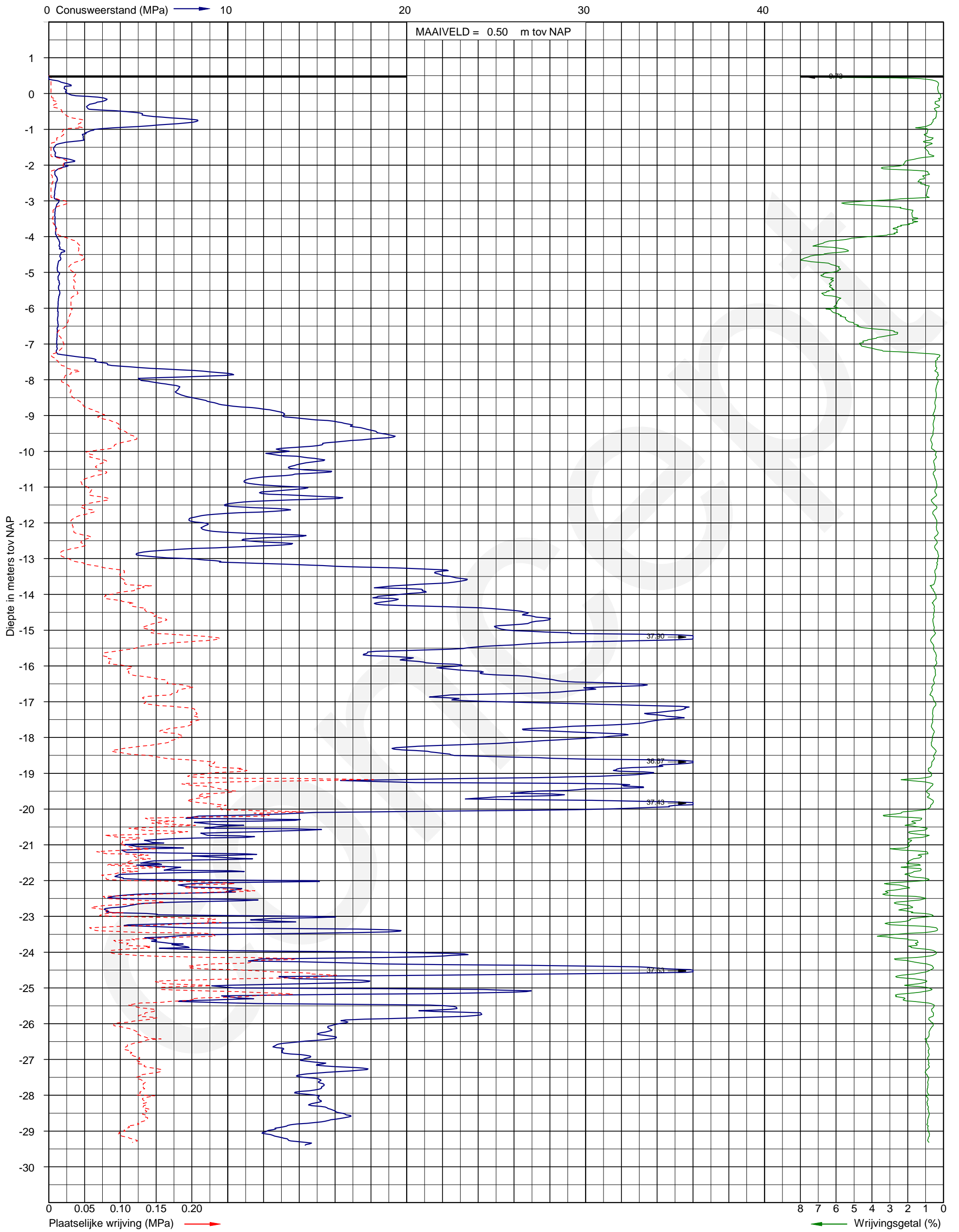
sondering: 74

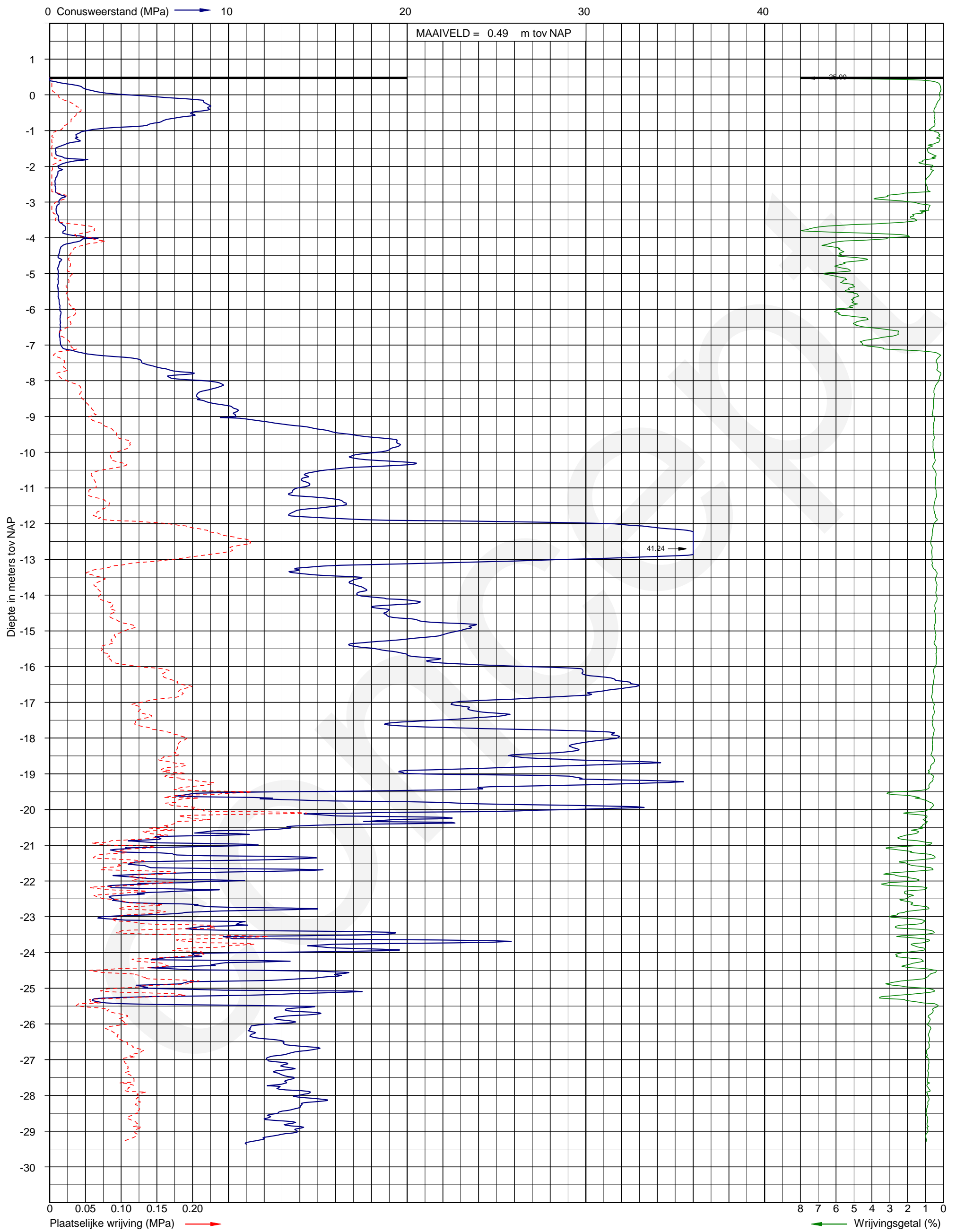
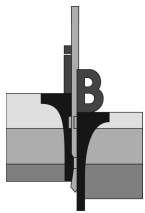
mat.:

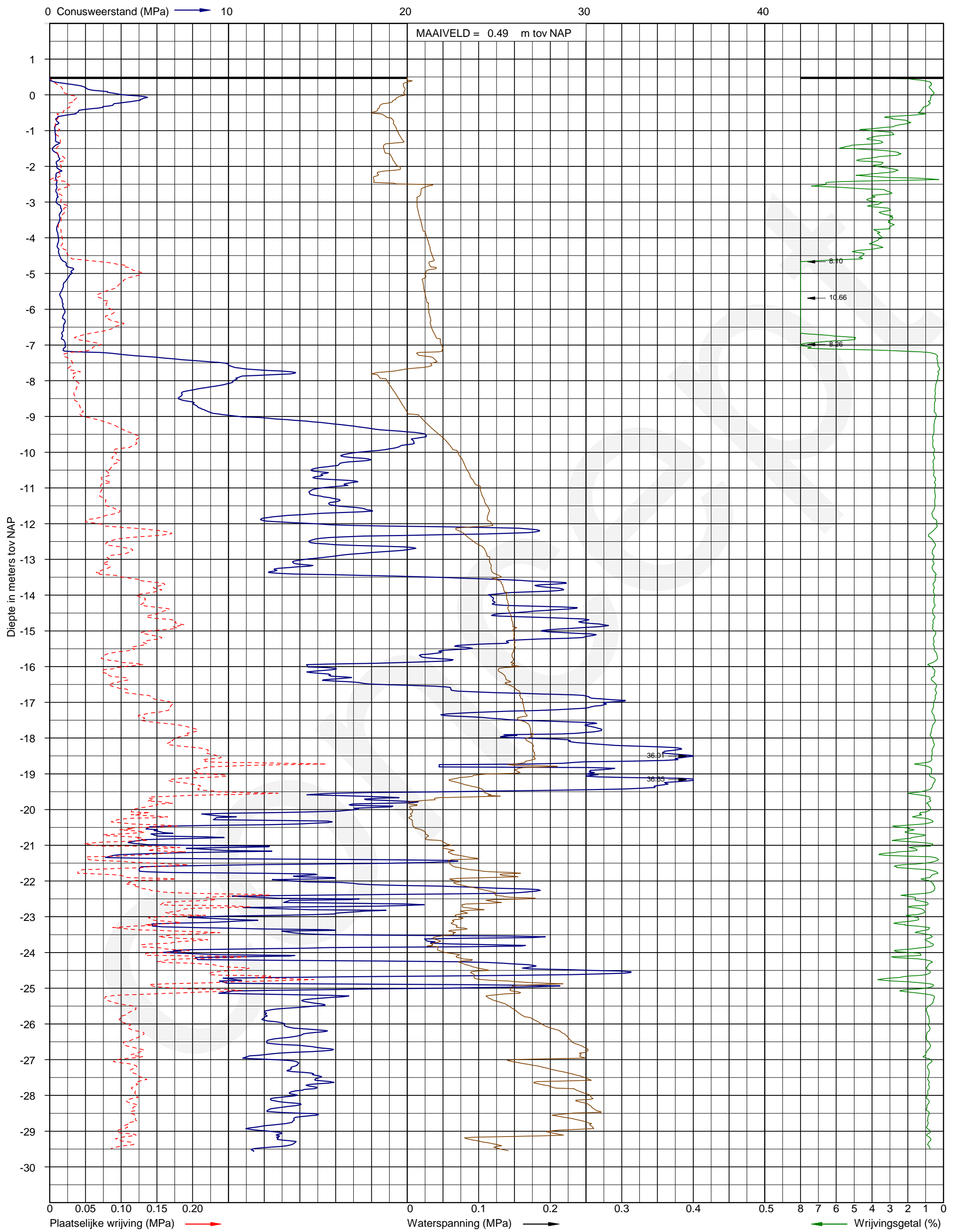
INPIJN-BLOKPOEL Ingenieursbureau

datum: 5-11-2014

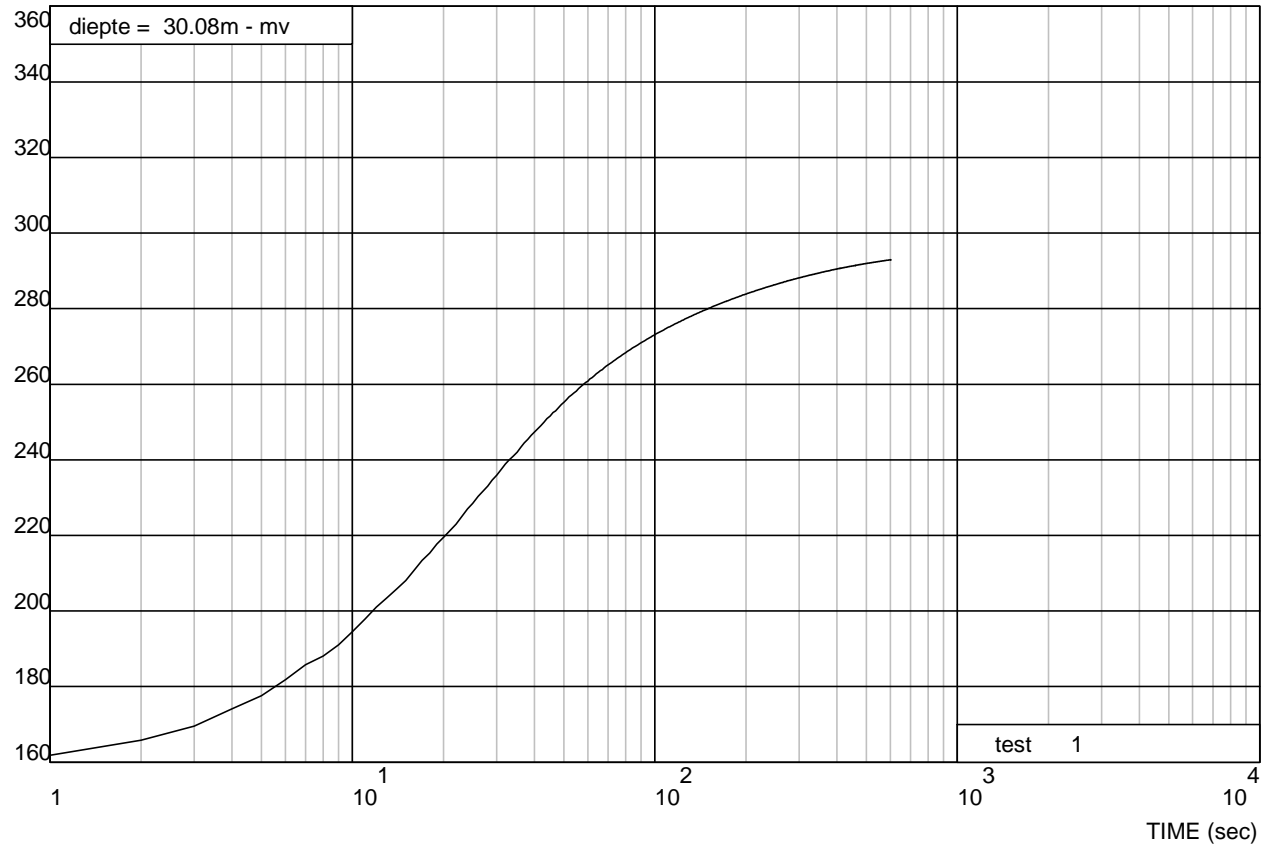
opdracht: 02P001595-03







waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

uitv.: RHL-S22

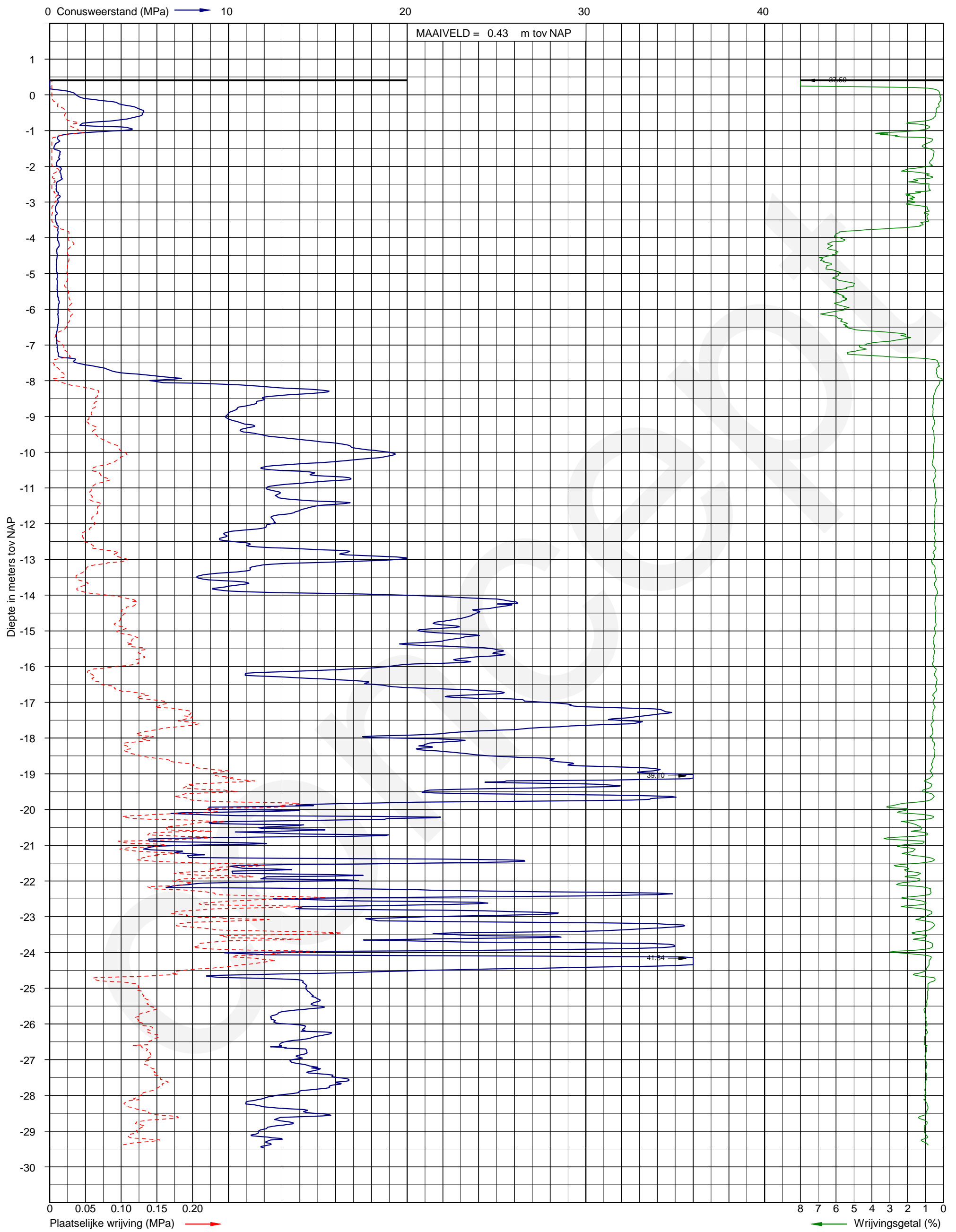
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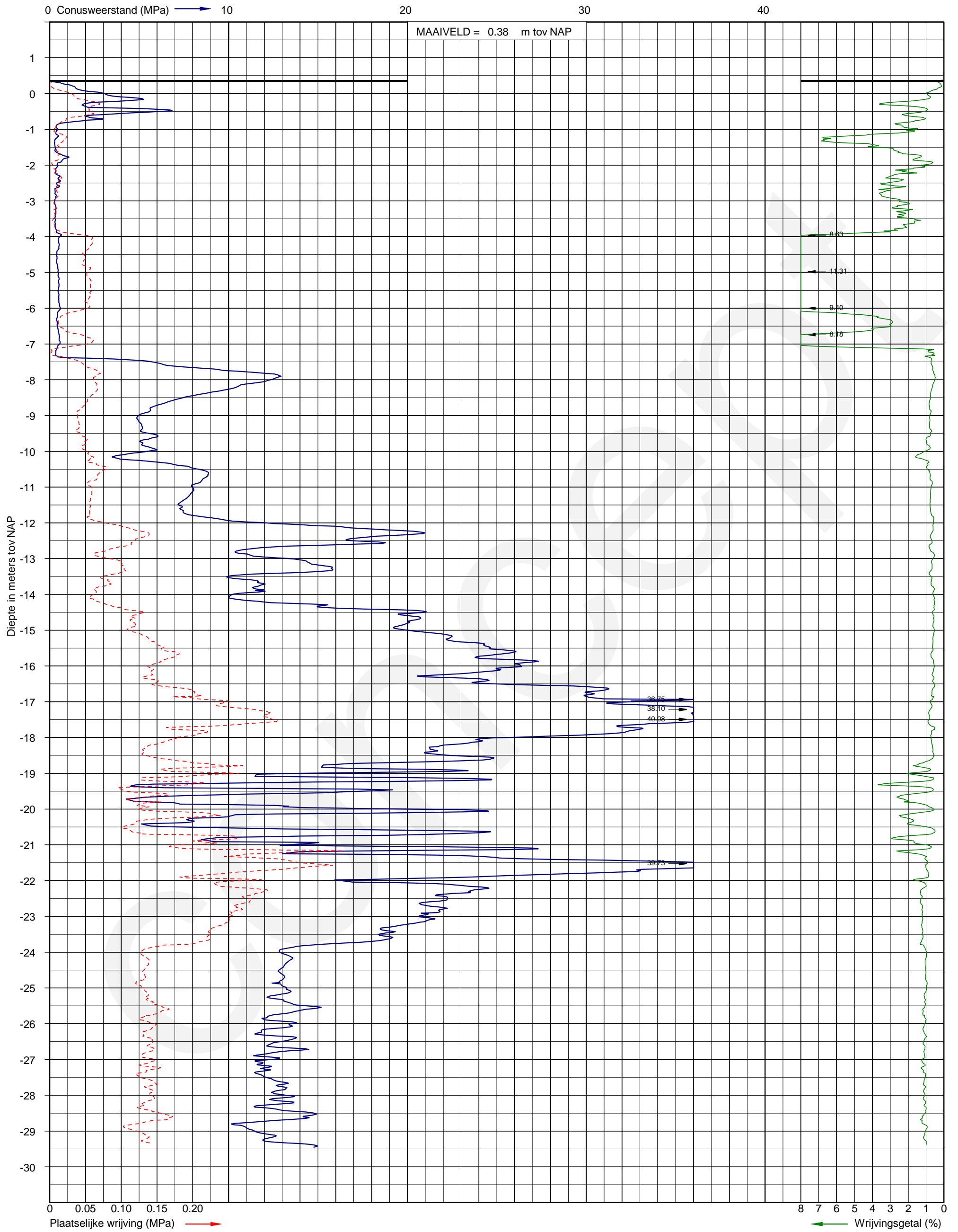
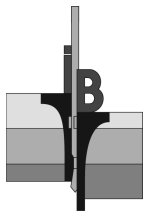
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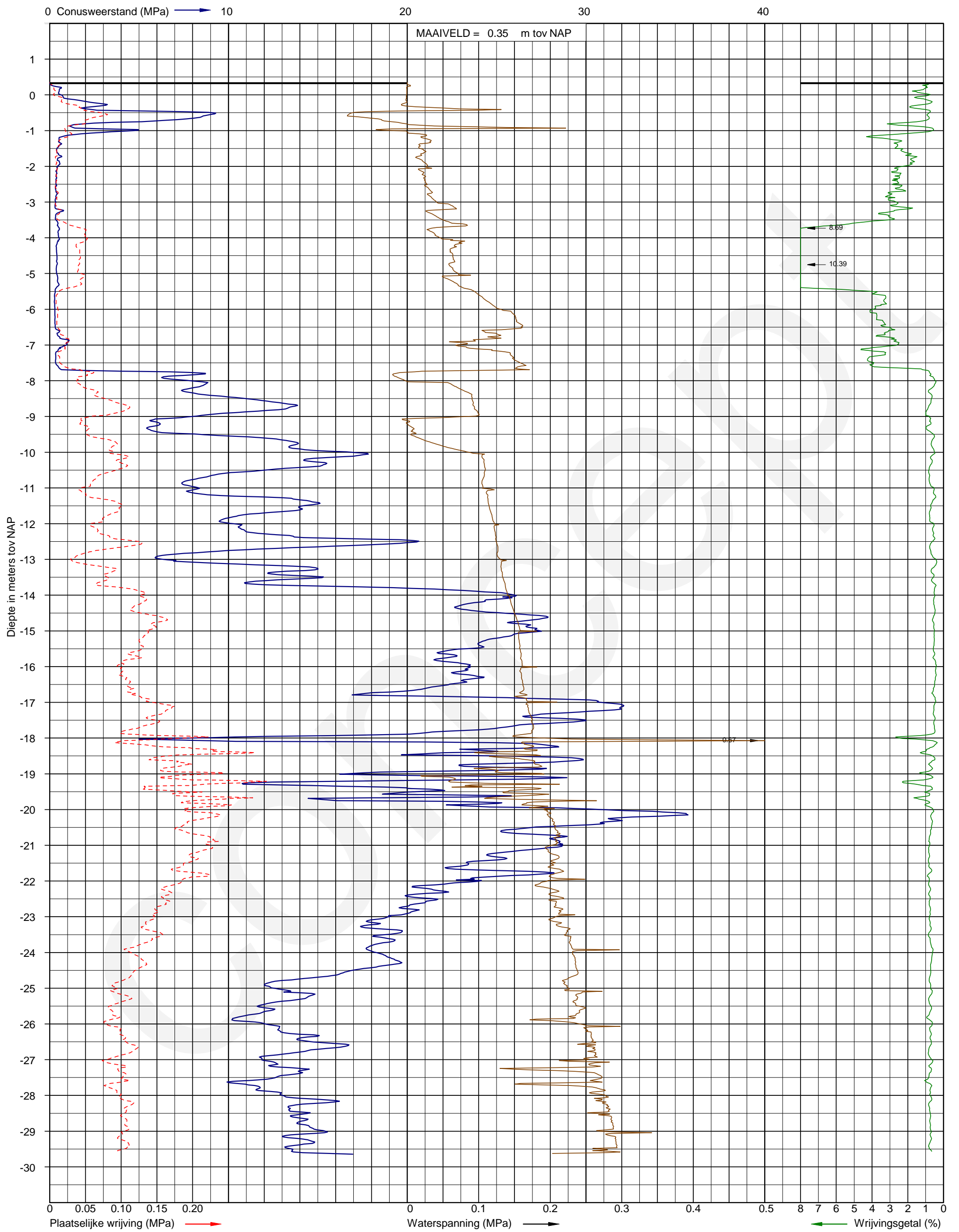
INPIJN-BLOKPOEL Ingenieursbureau

datum: 4-11-2014

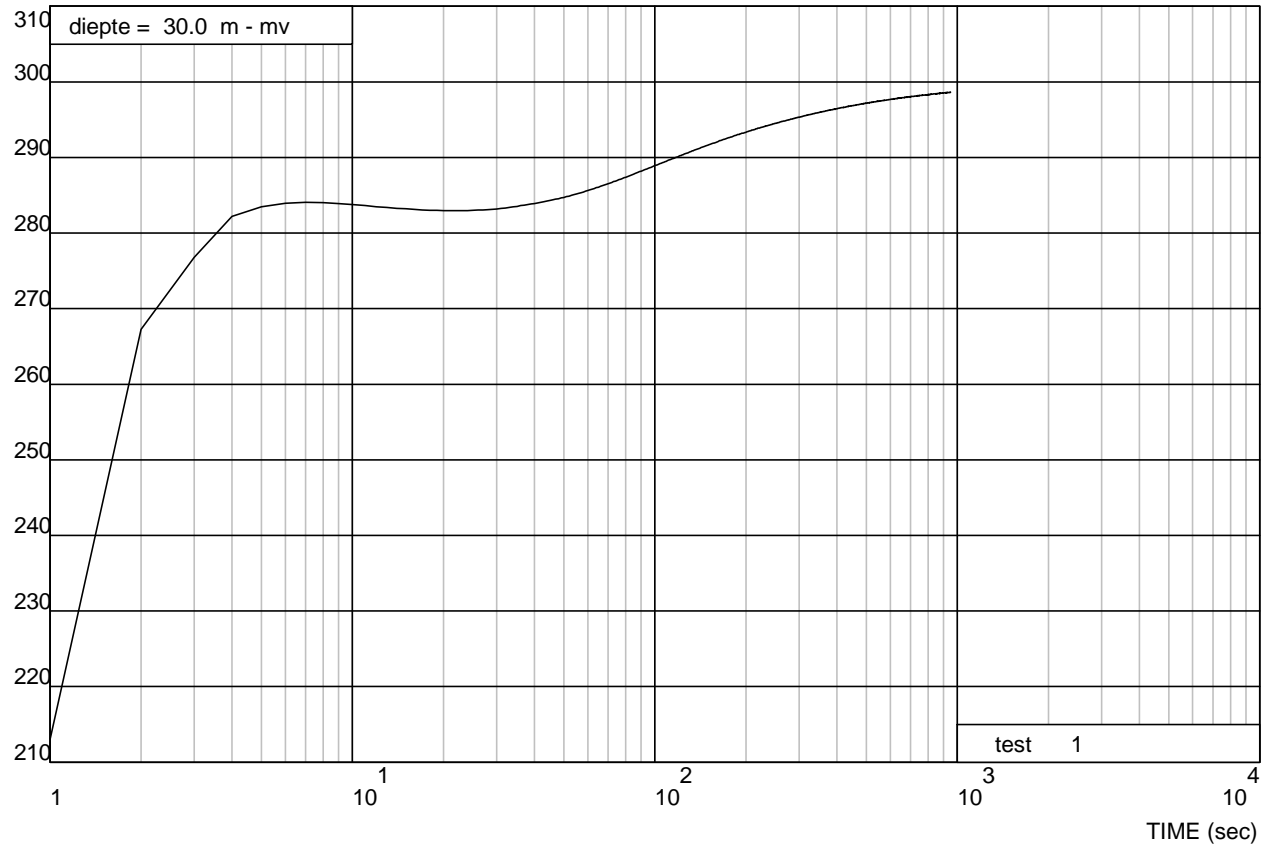
opdracht: 02P001595-03







waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

uitv.: RHL-S22

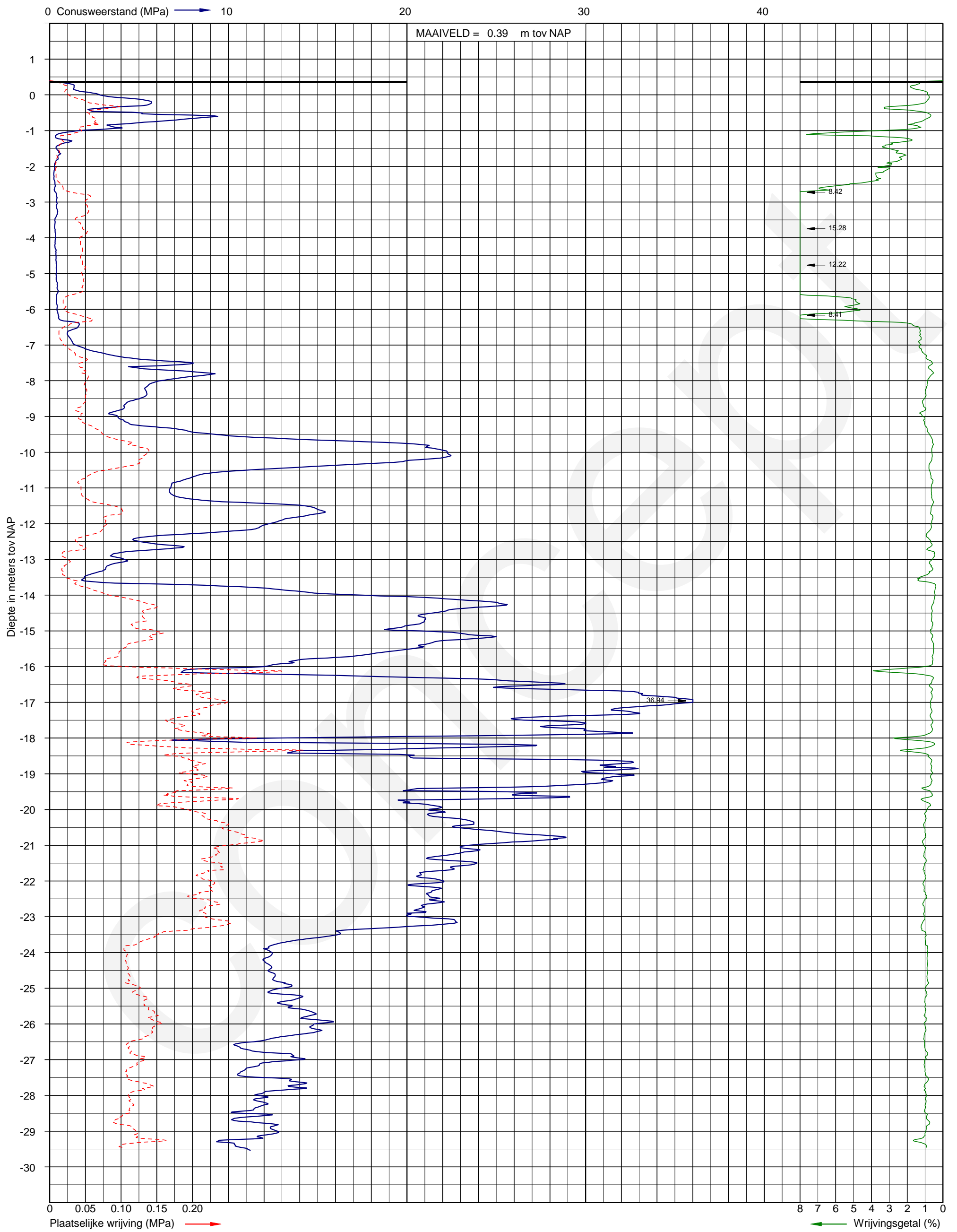
sondering: 80

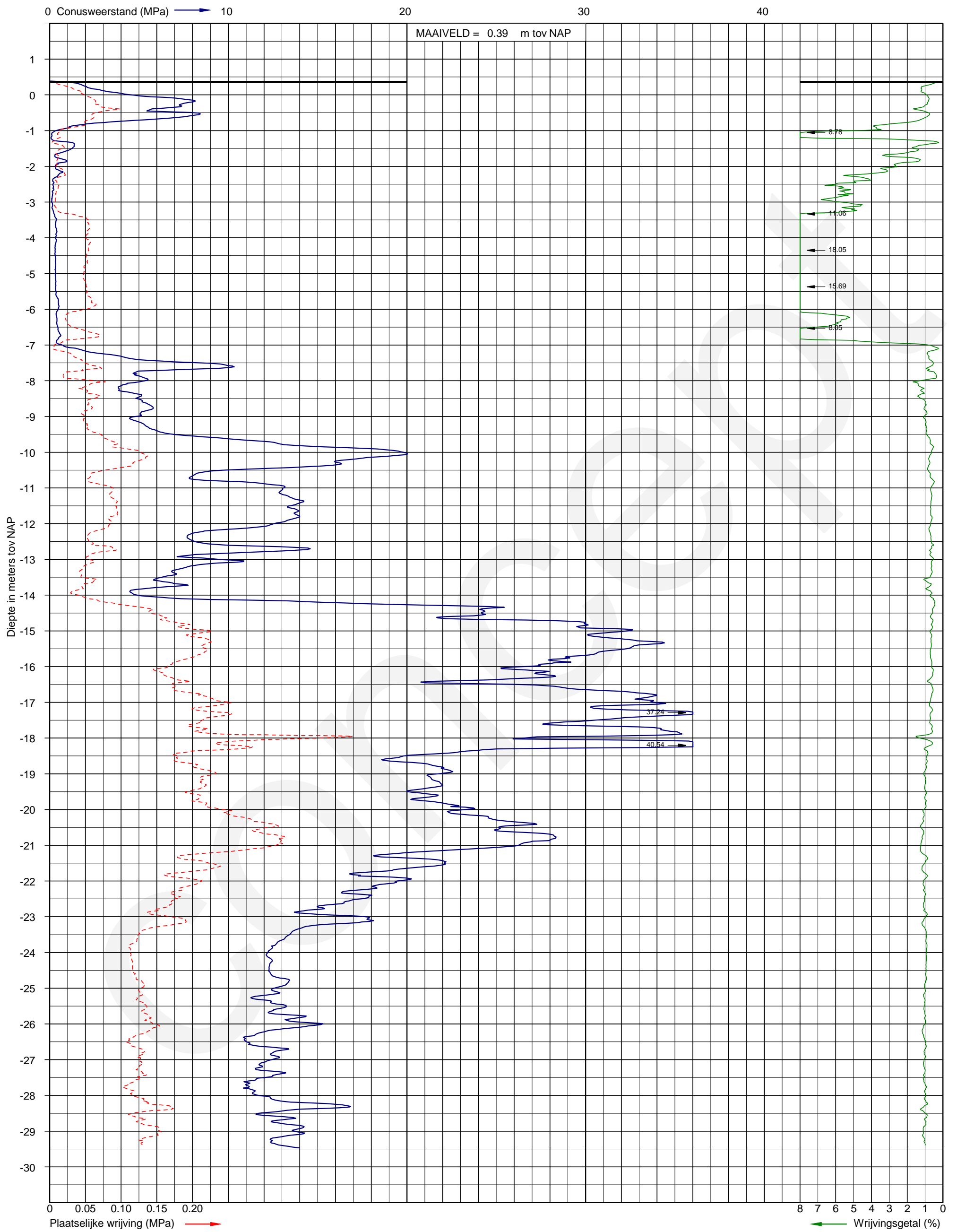
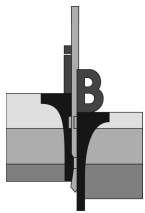
mat.:

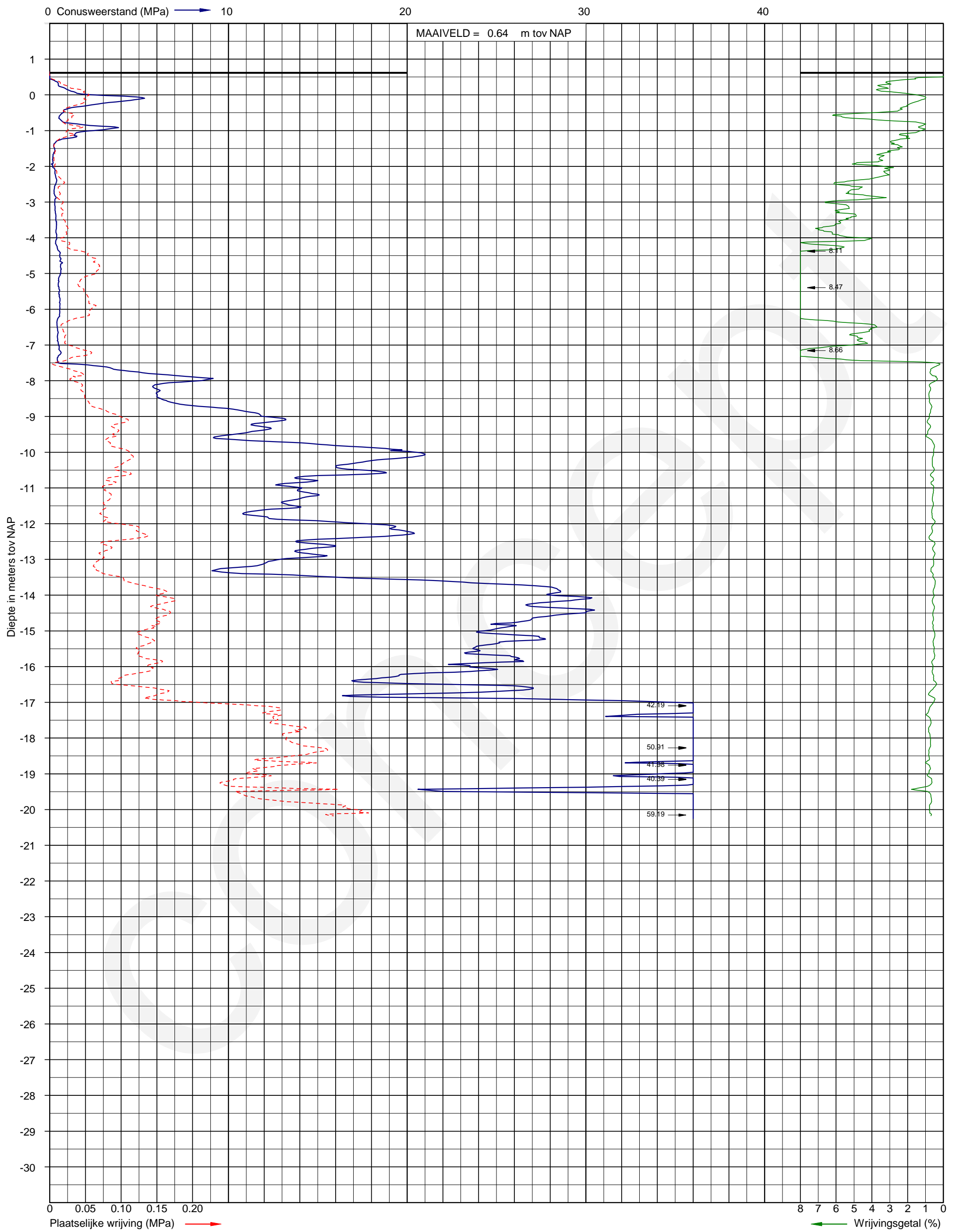
INPIJN-BLOKPOEL Ingenieursbureau

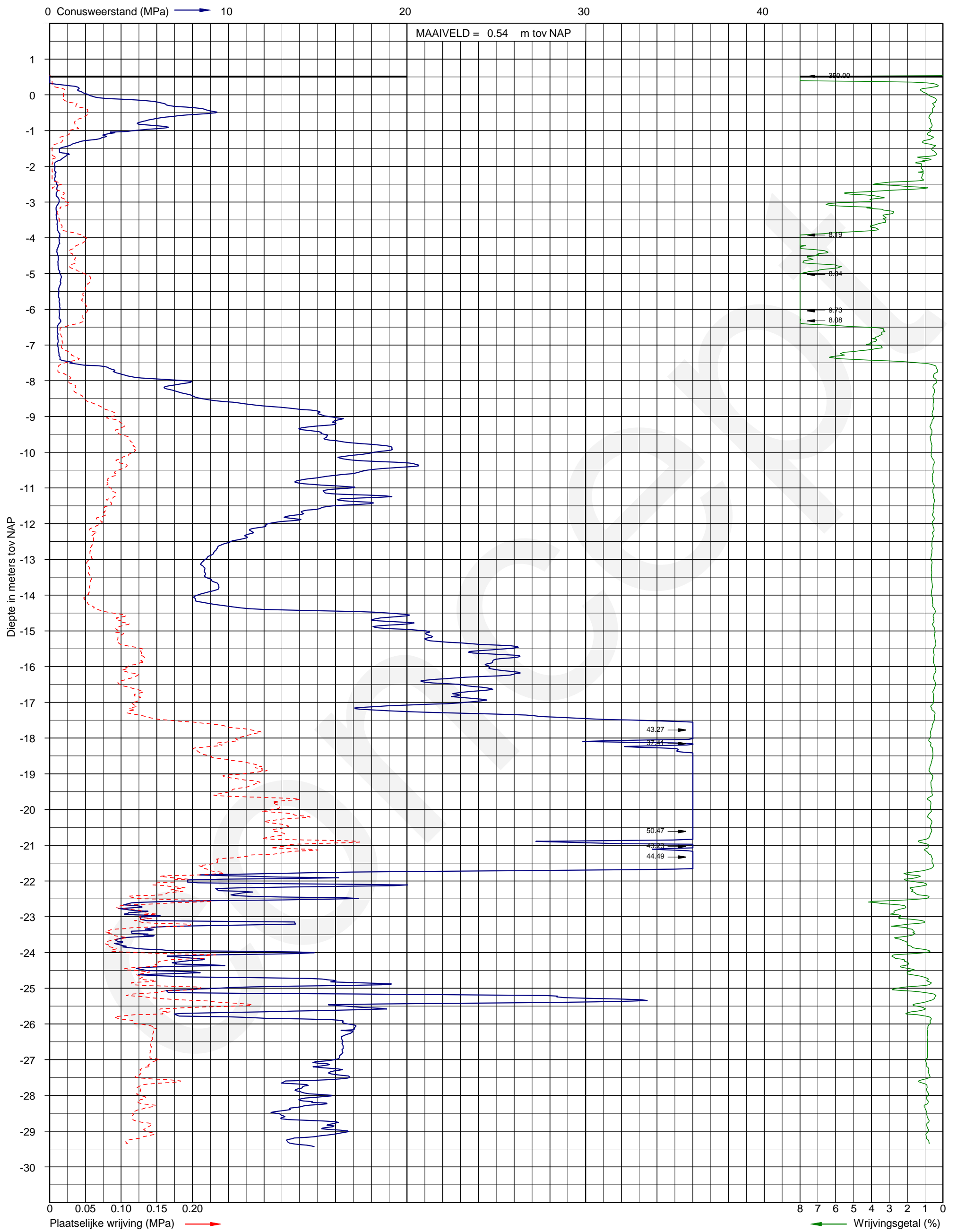
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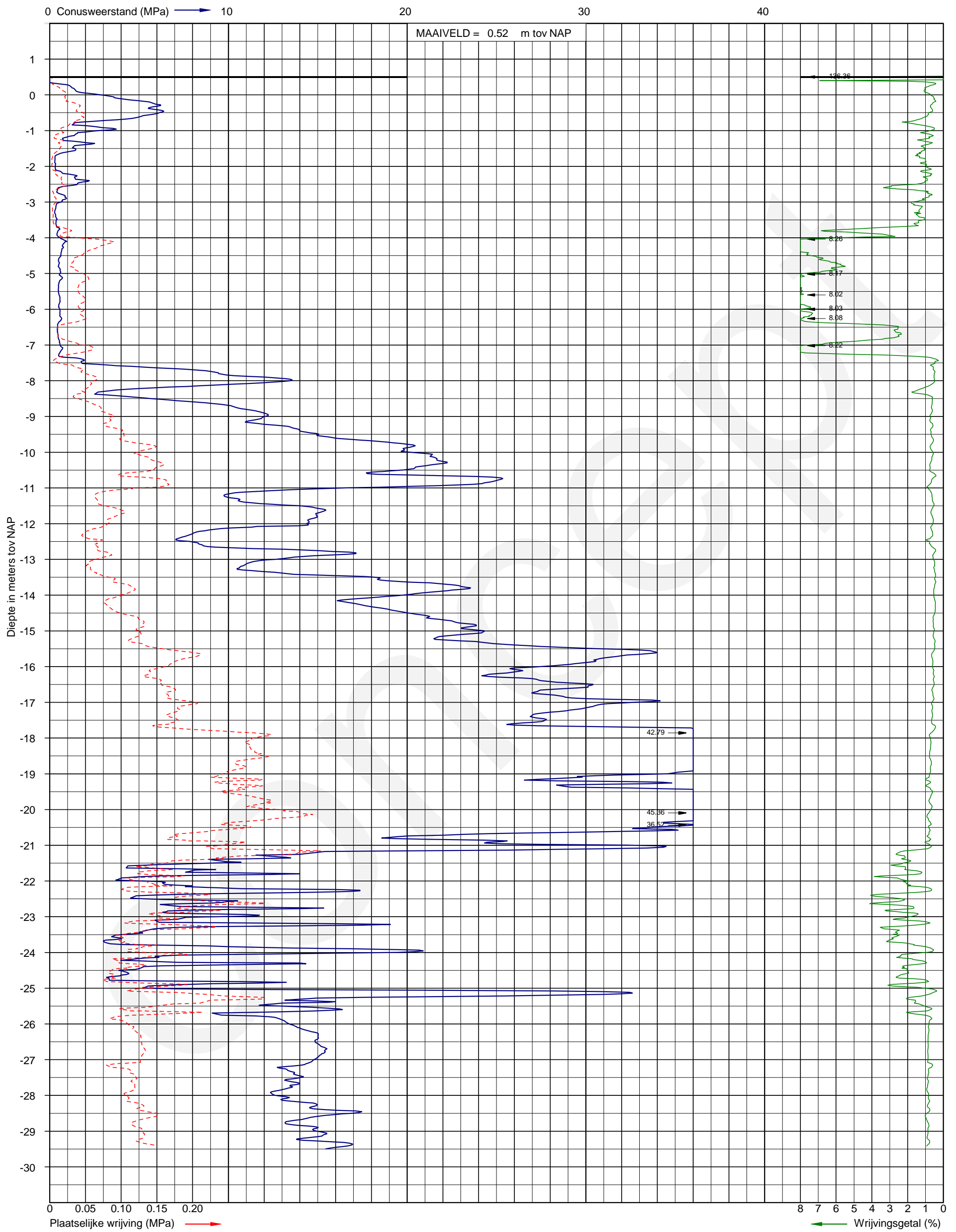
opdracht: 02P001595-03

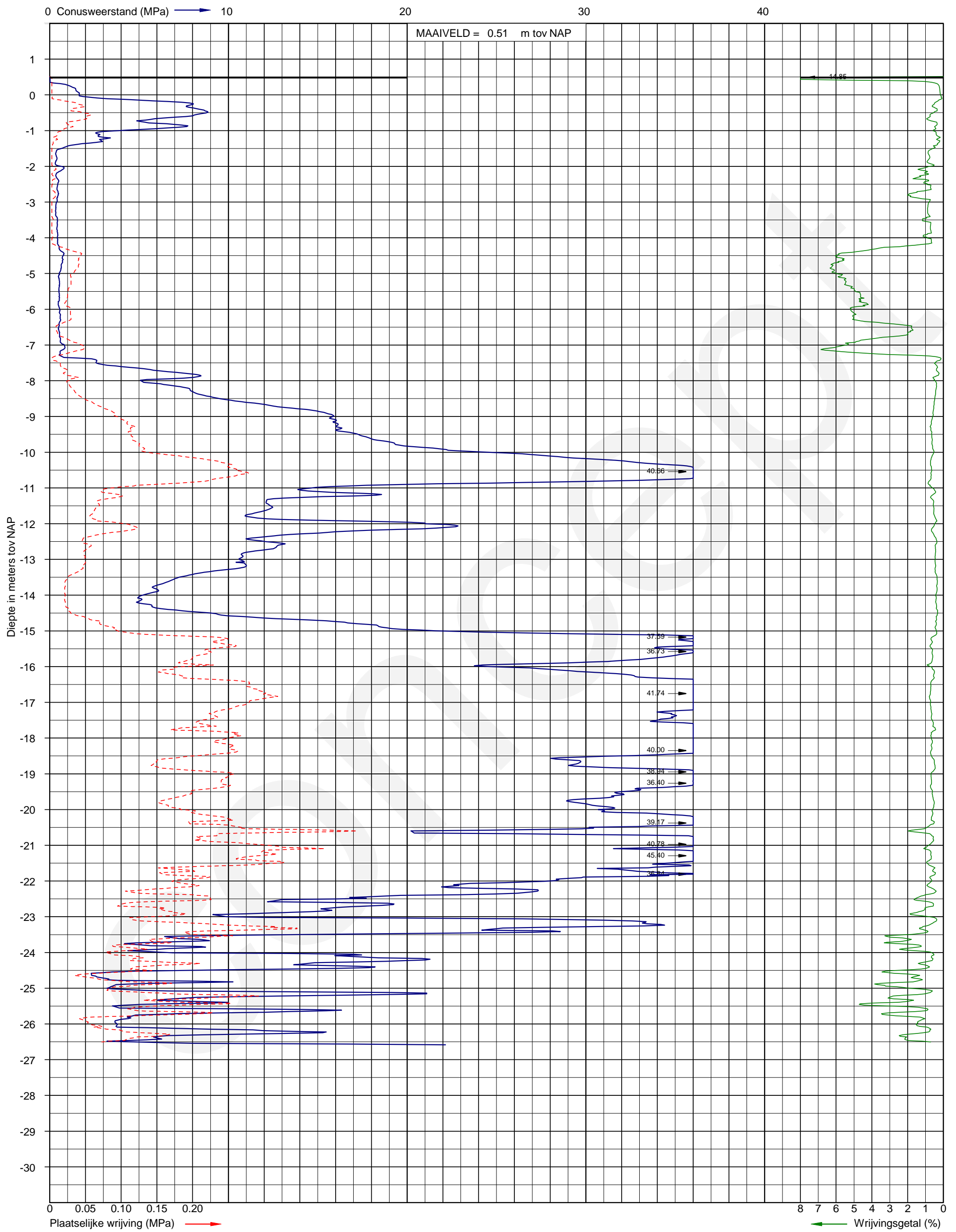
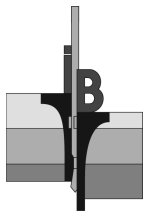


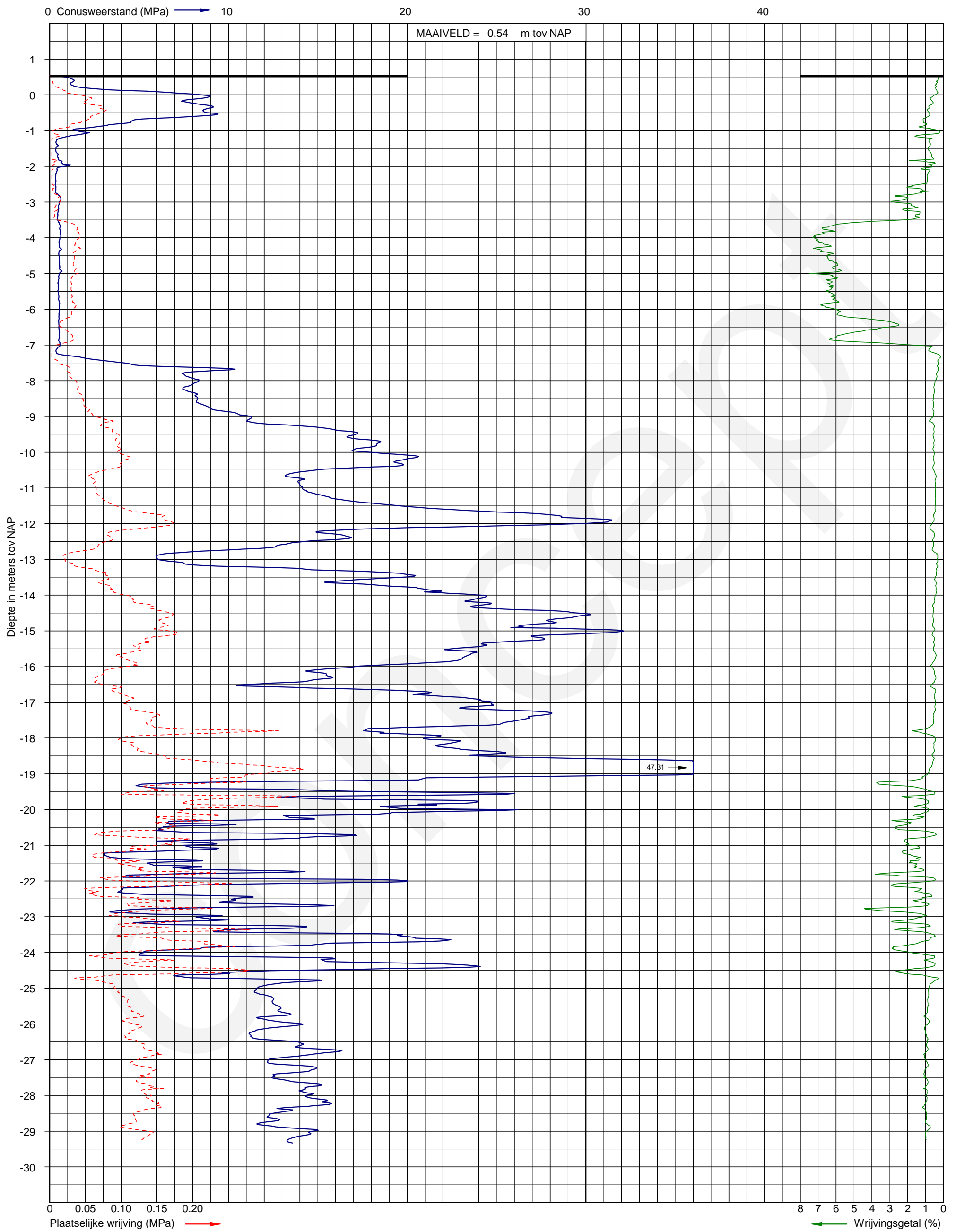


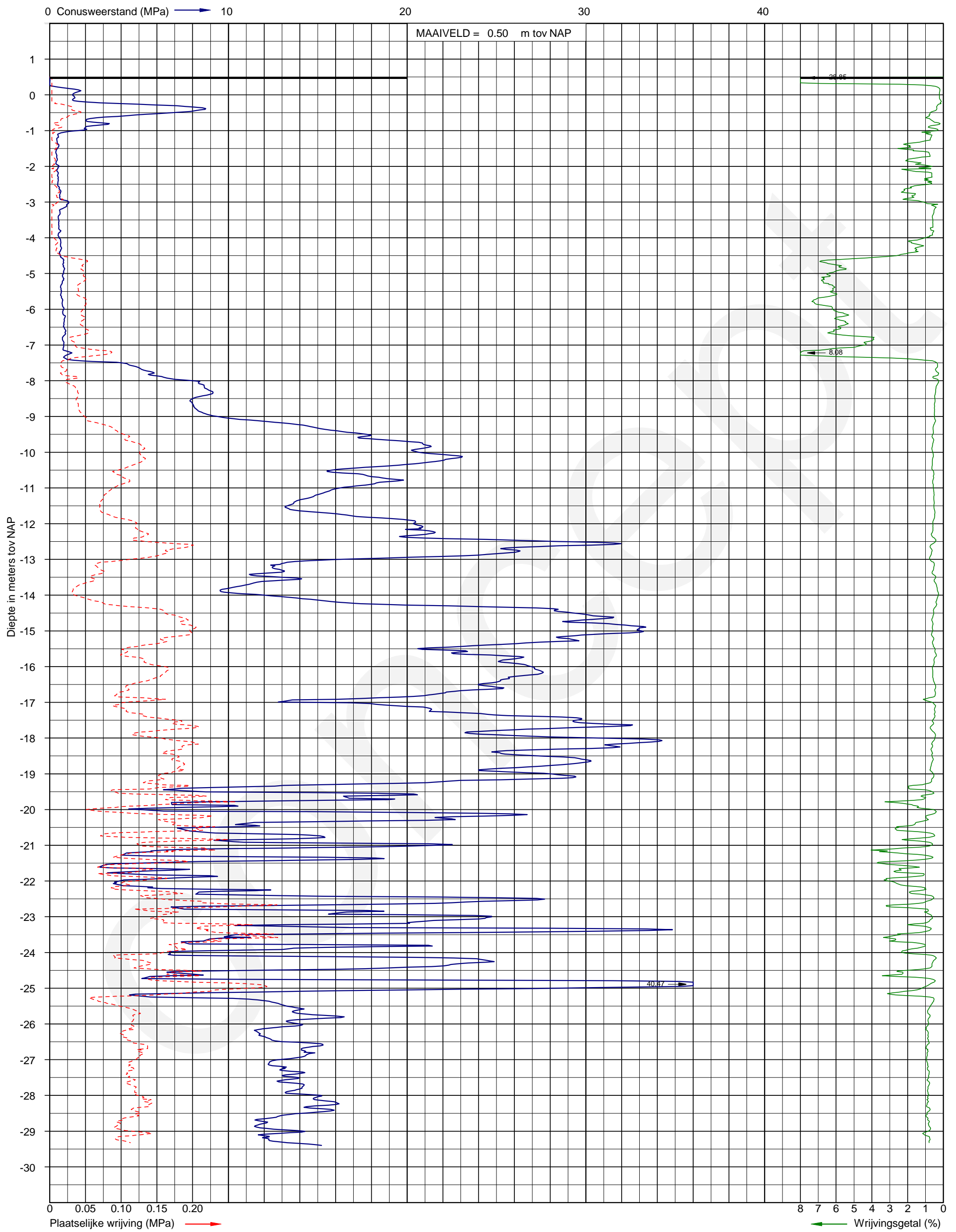


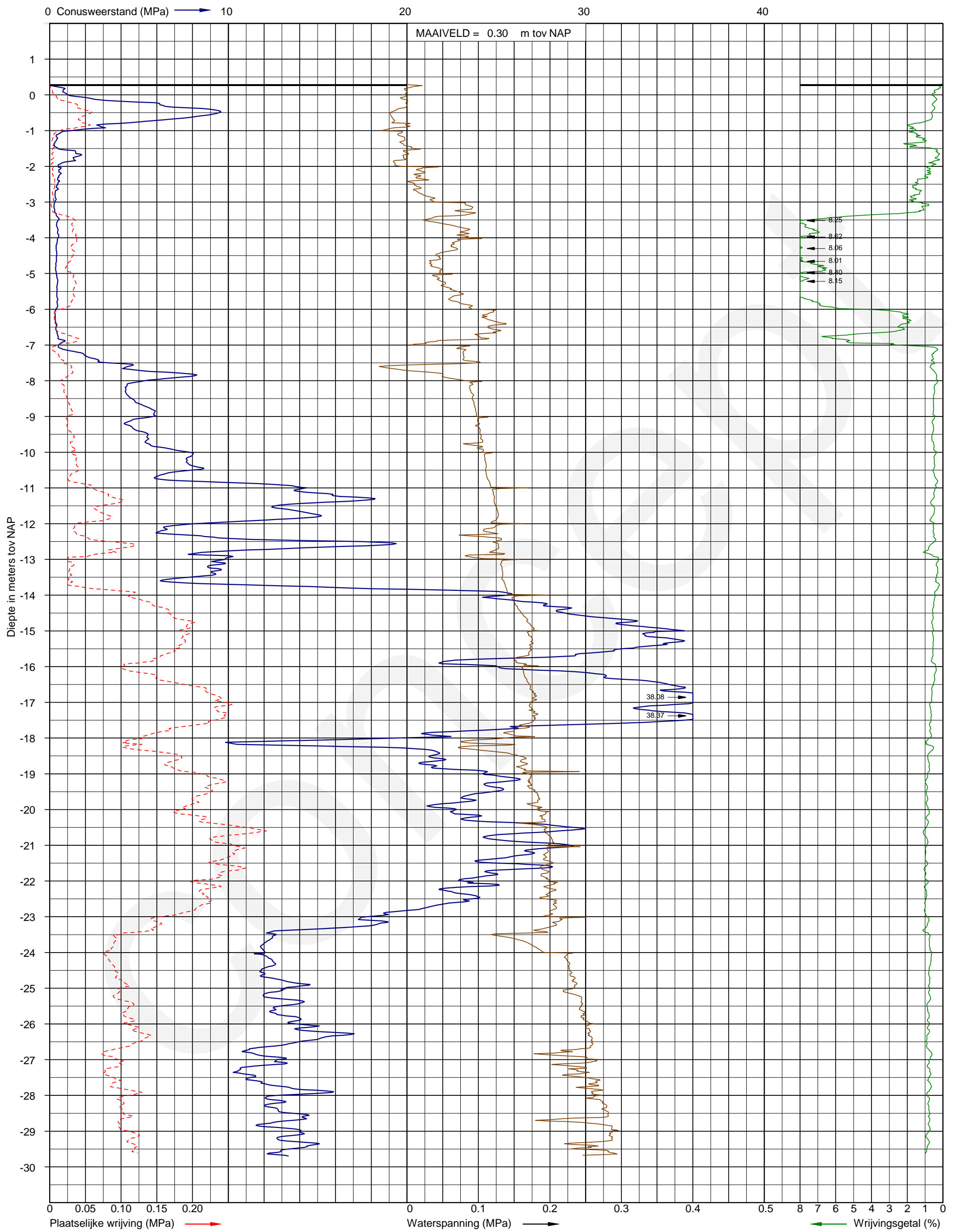


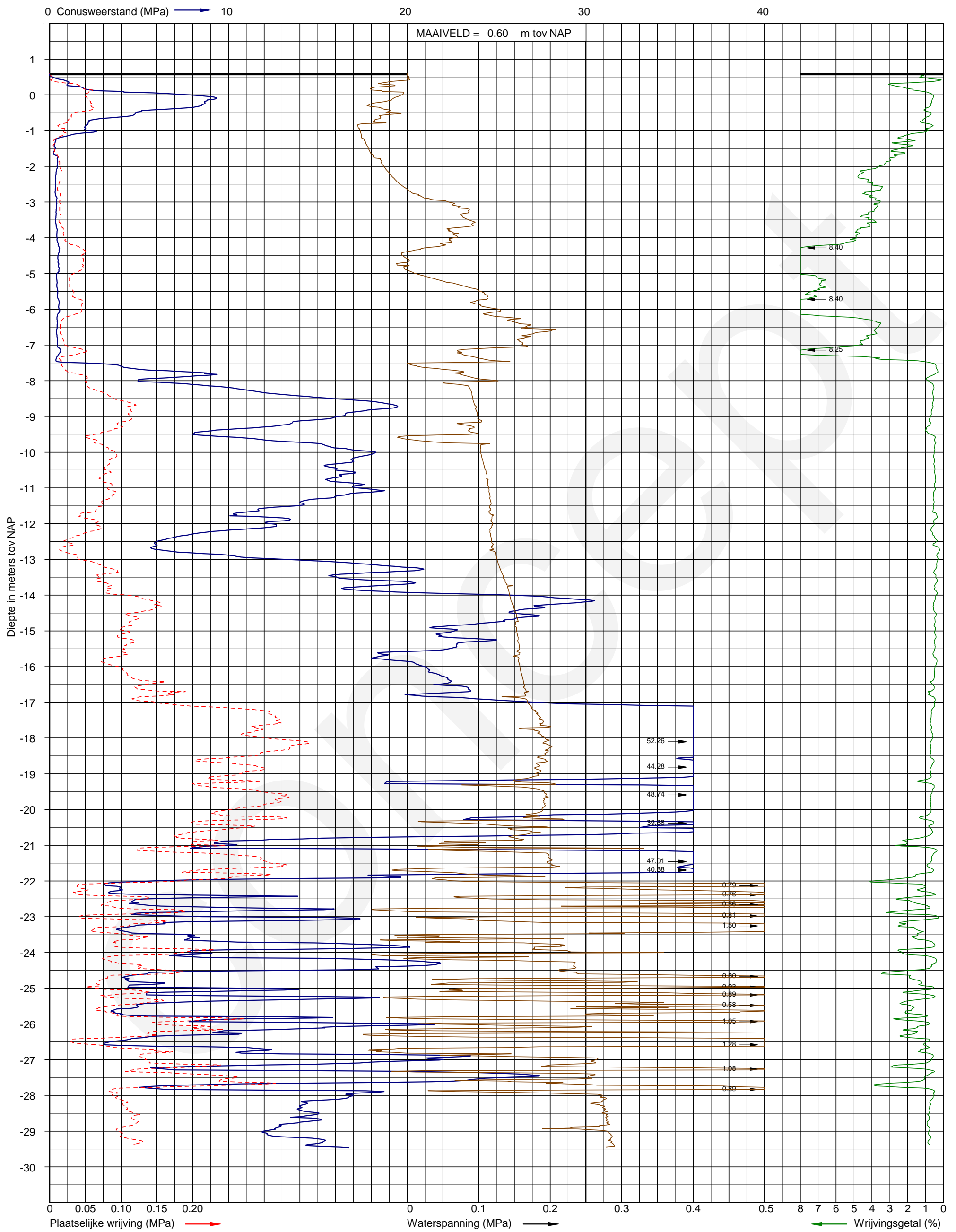




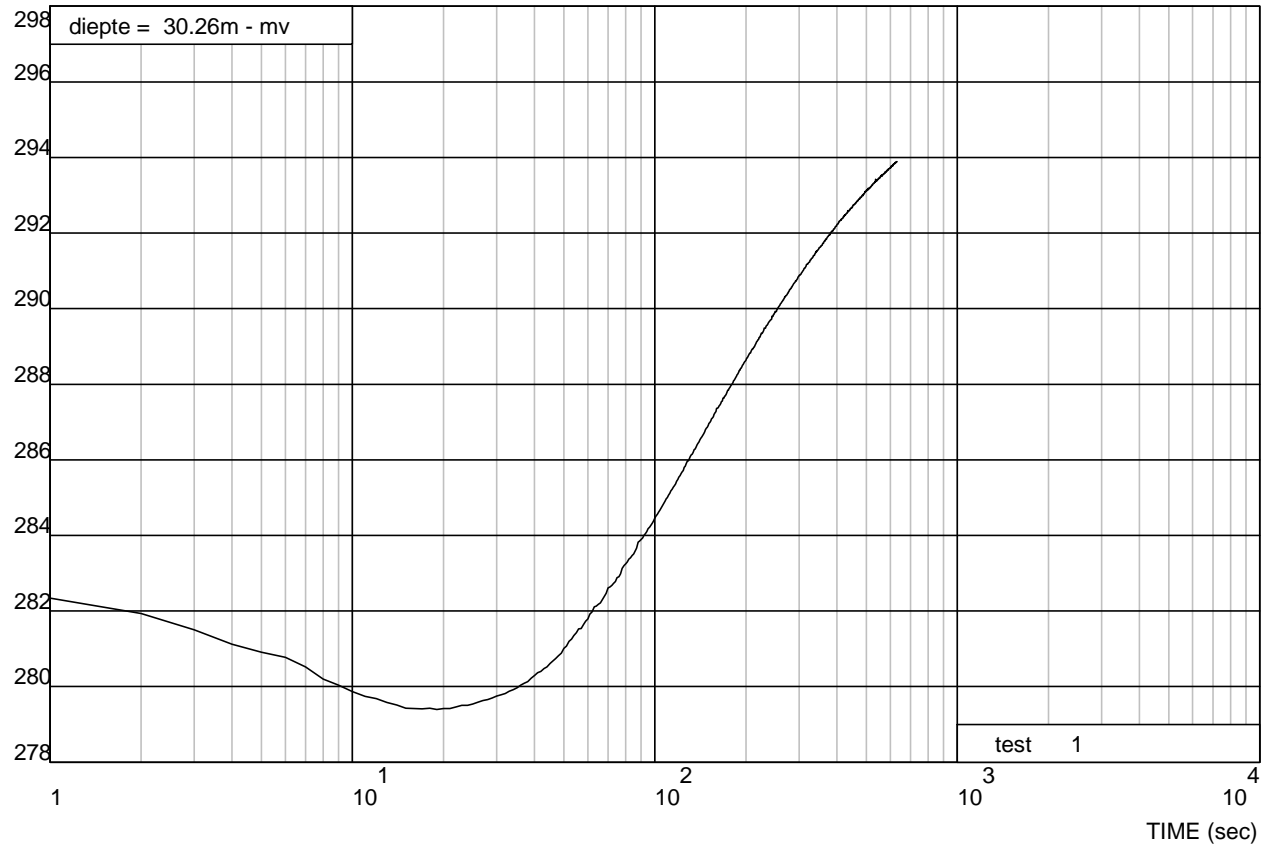








waterspanning (kPa)



Grondonderzoek station te Rilland

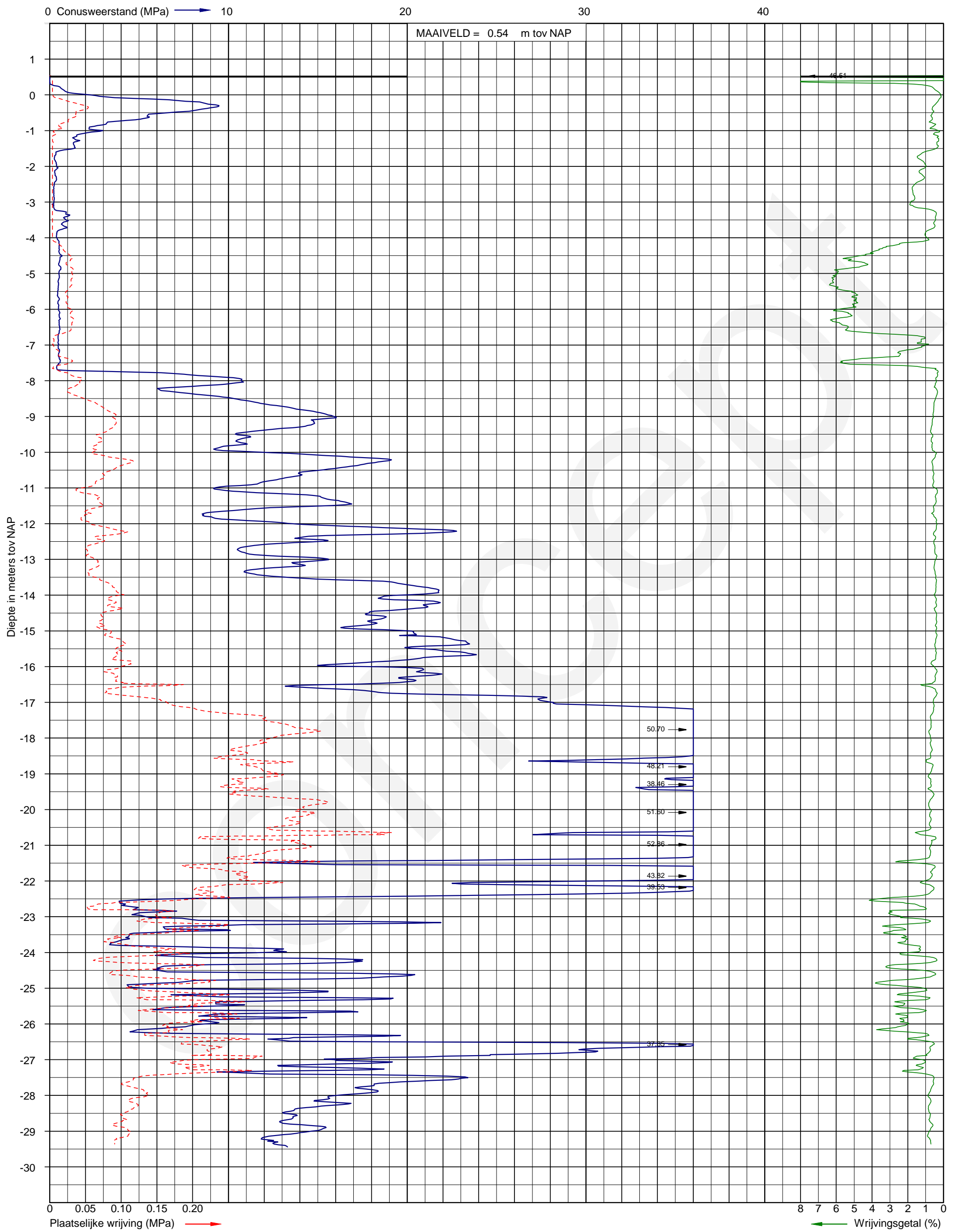
dissipatietest

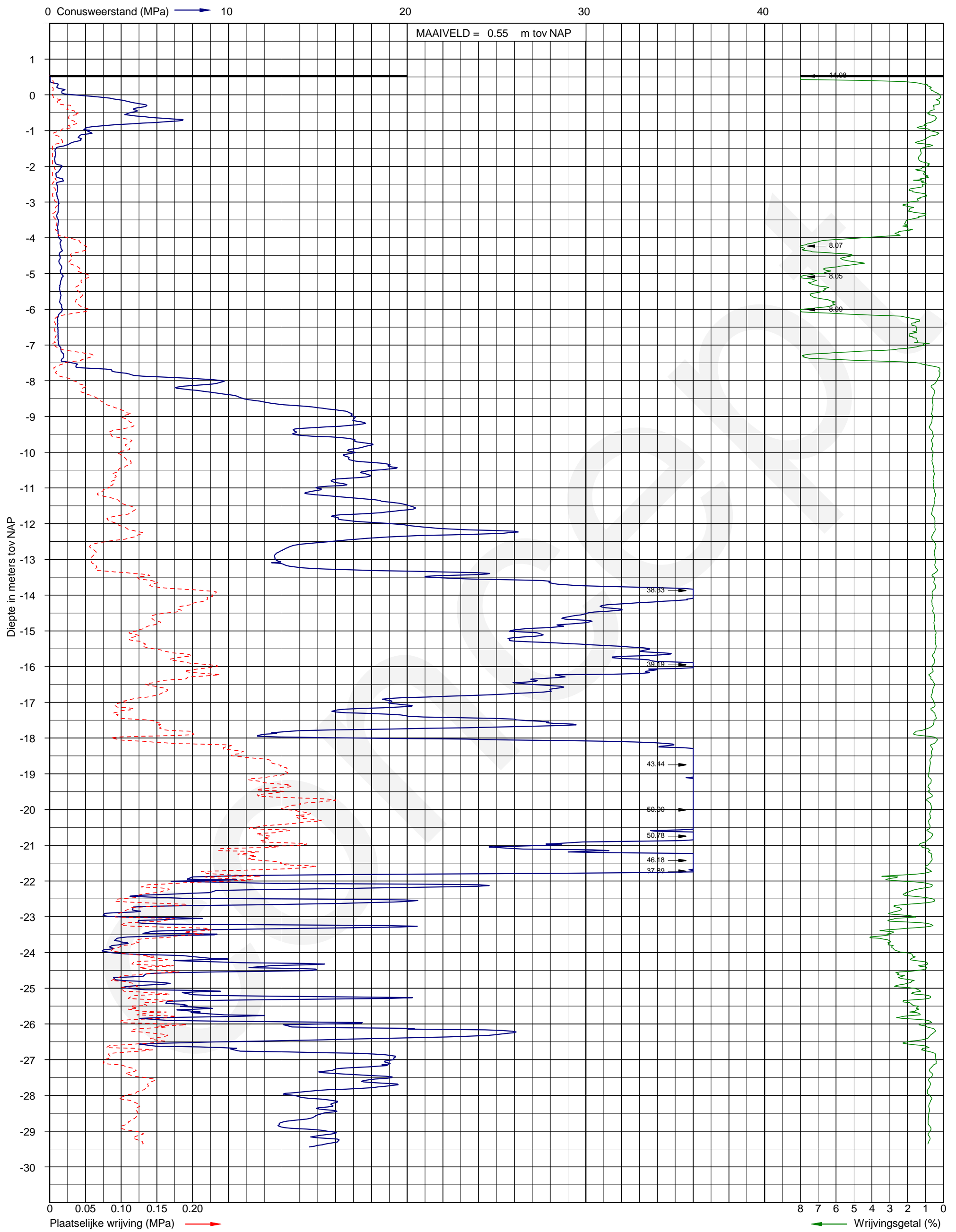
uitv.: RHL-S22
mat.: sondering: 91

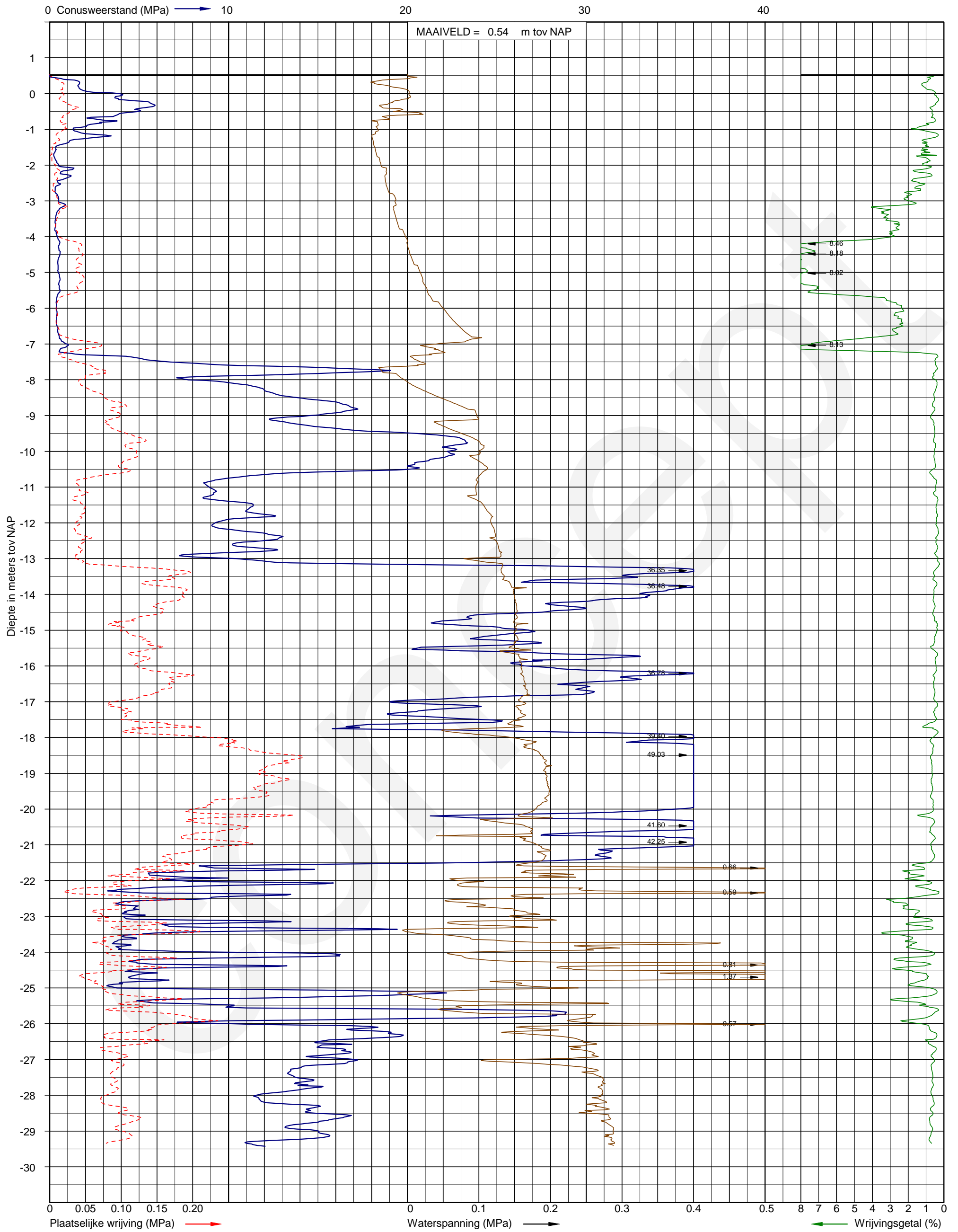
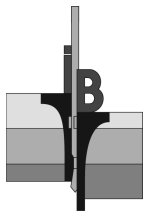
INPIJN-BLOKPOEL Ingenieursbureau

datum: 7-11-2014

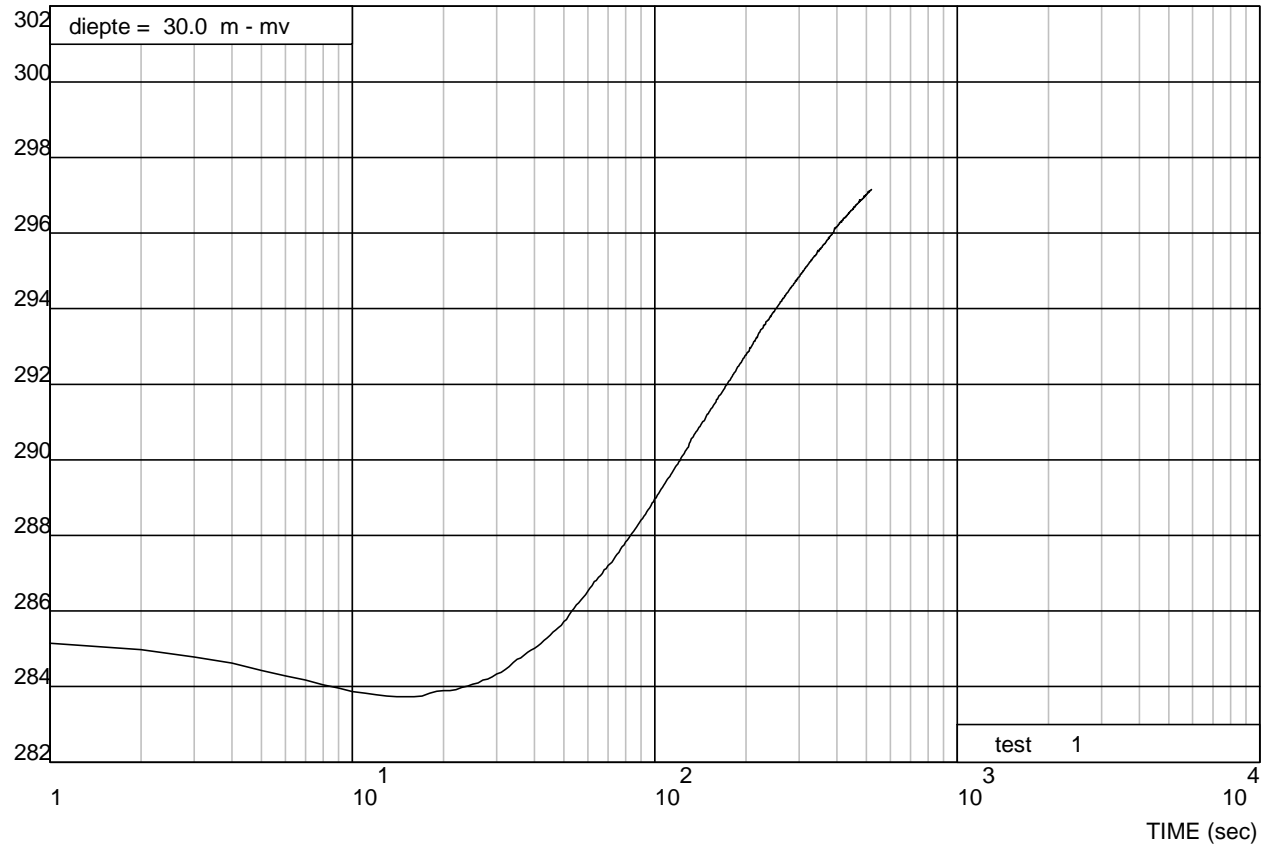
opdracht: 02P001595-03







waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

uitv.: RHL-S22

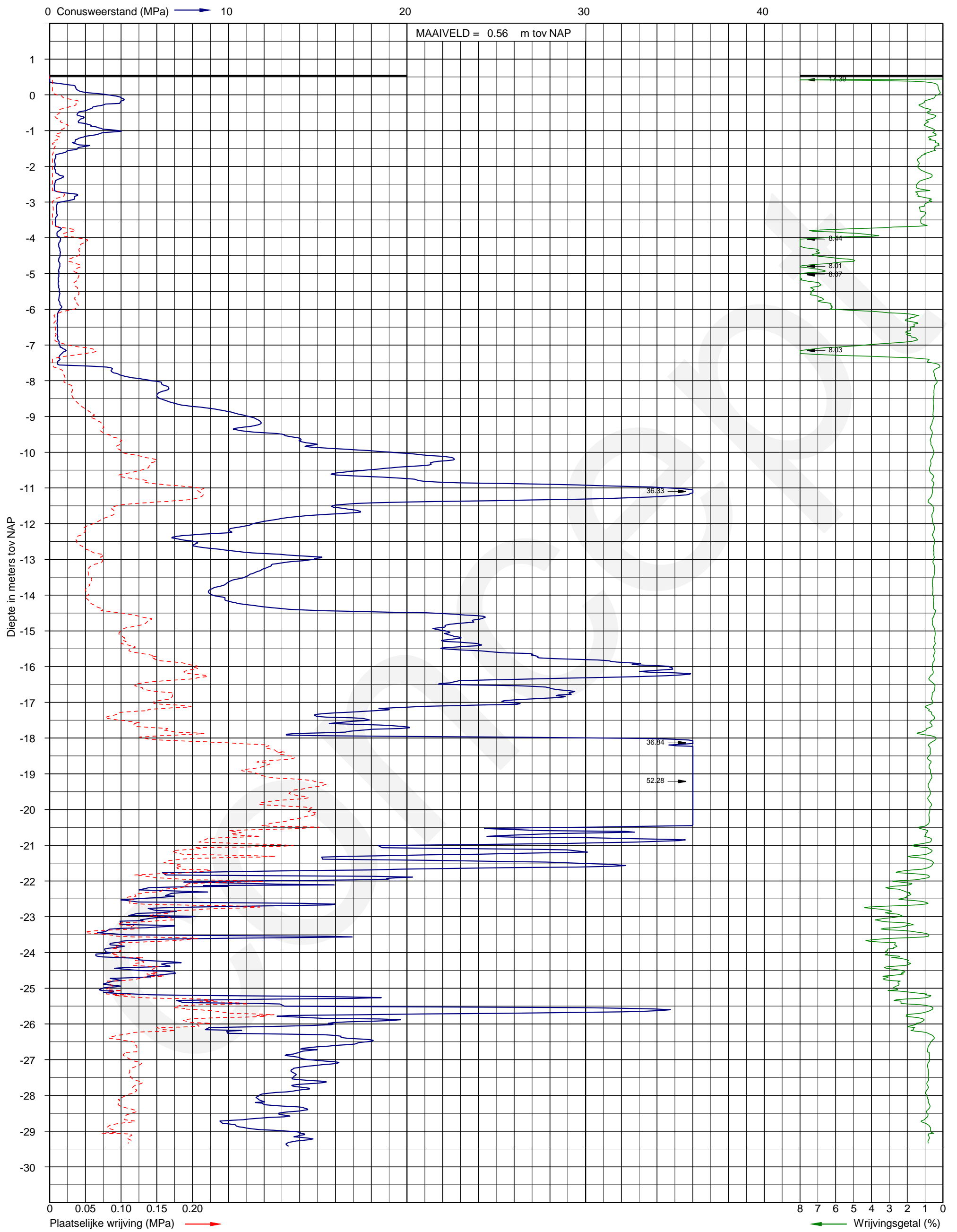
sondering: 94

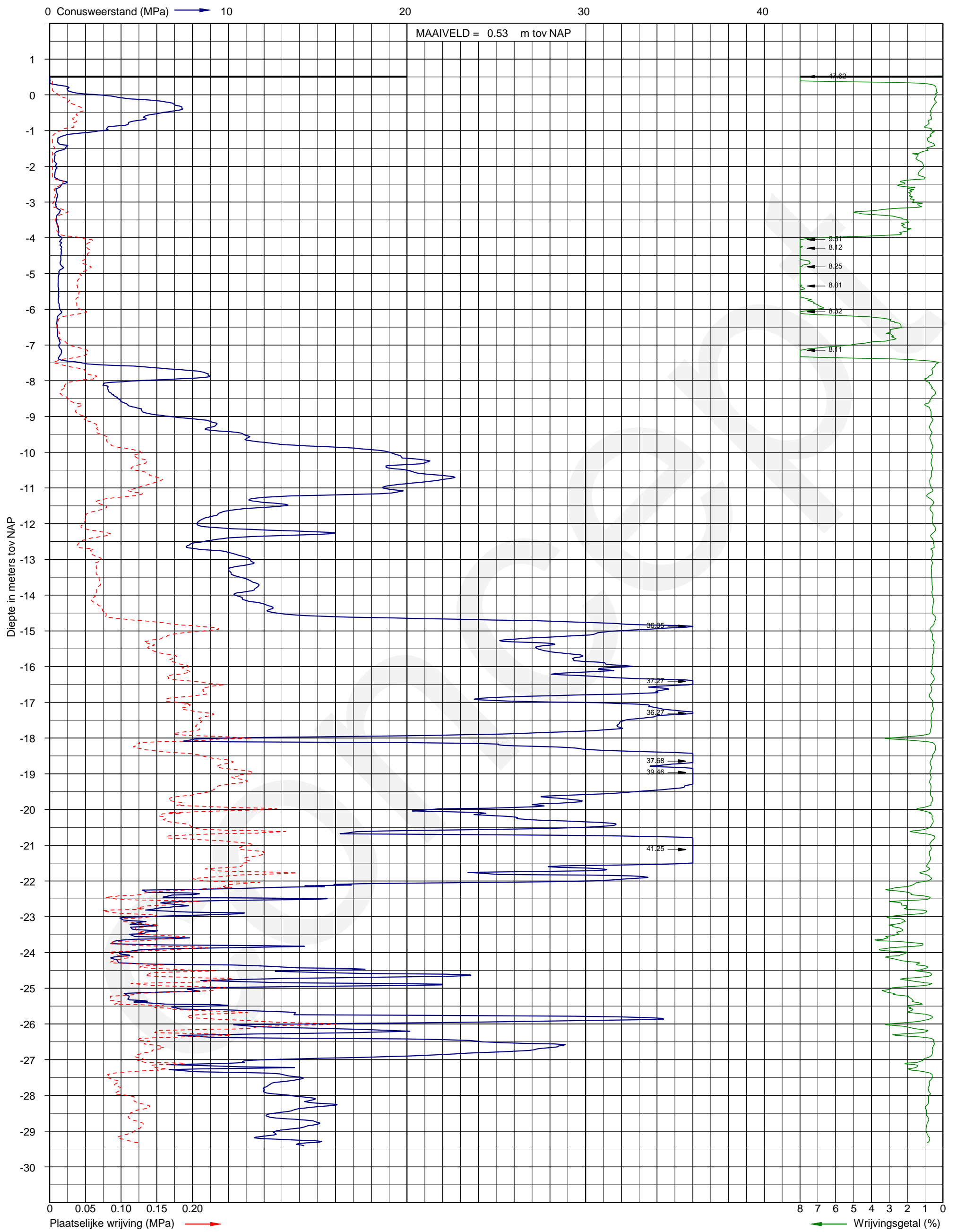
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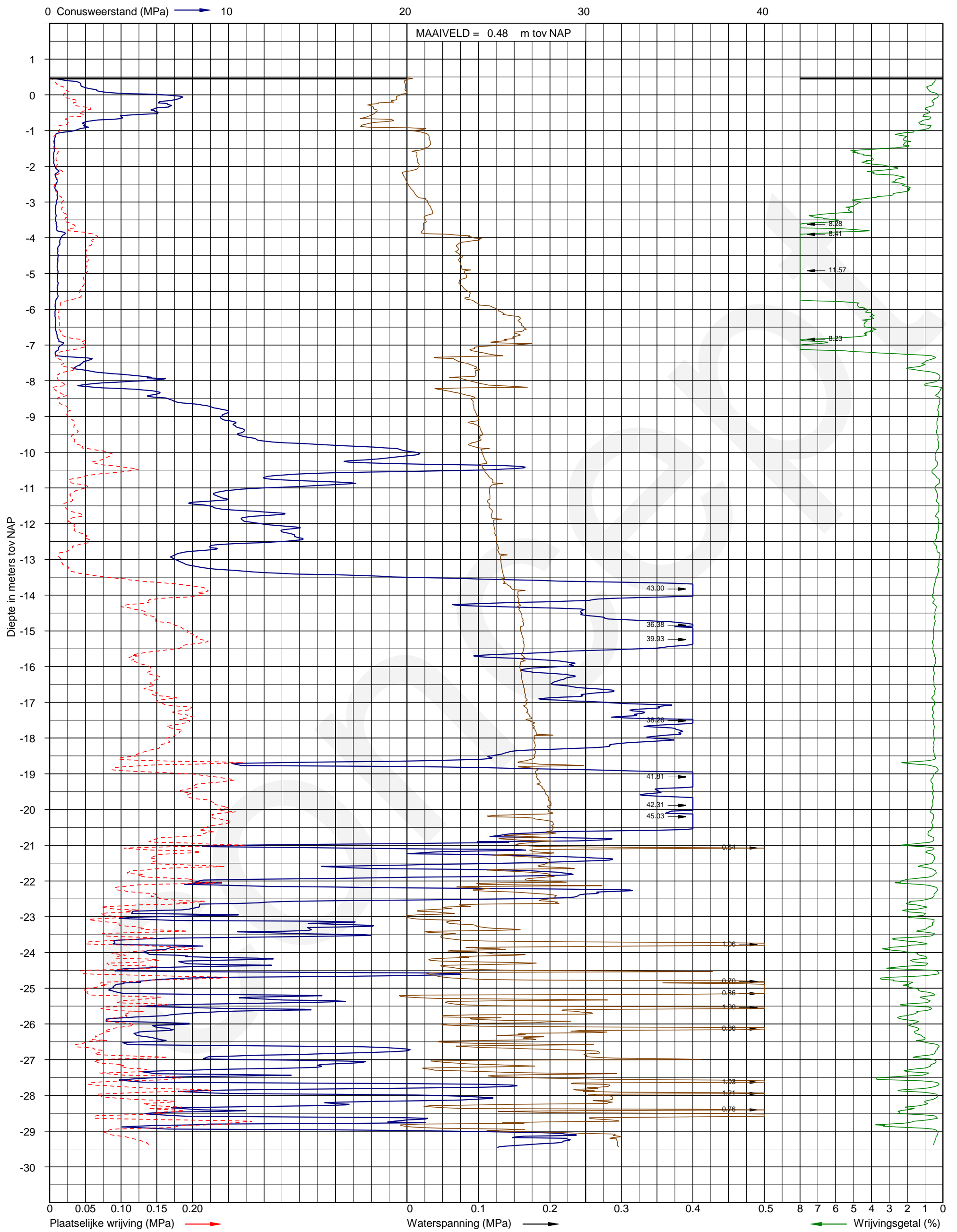
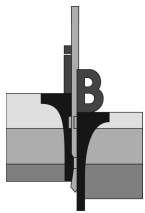
INPIJN-BLOKPOEL Ingenieursbureau

datum: 7-11-2014

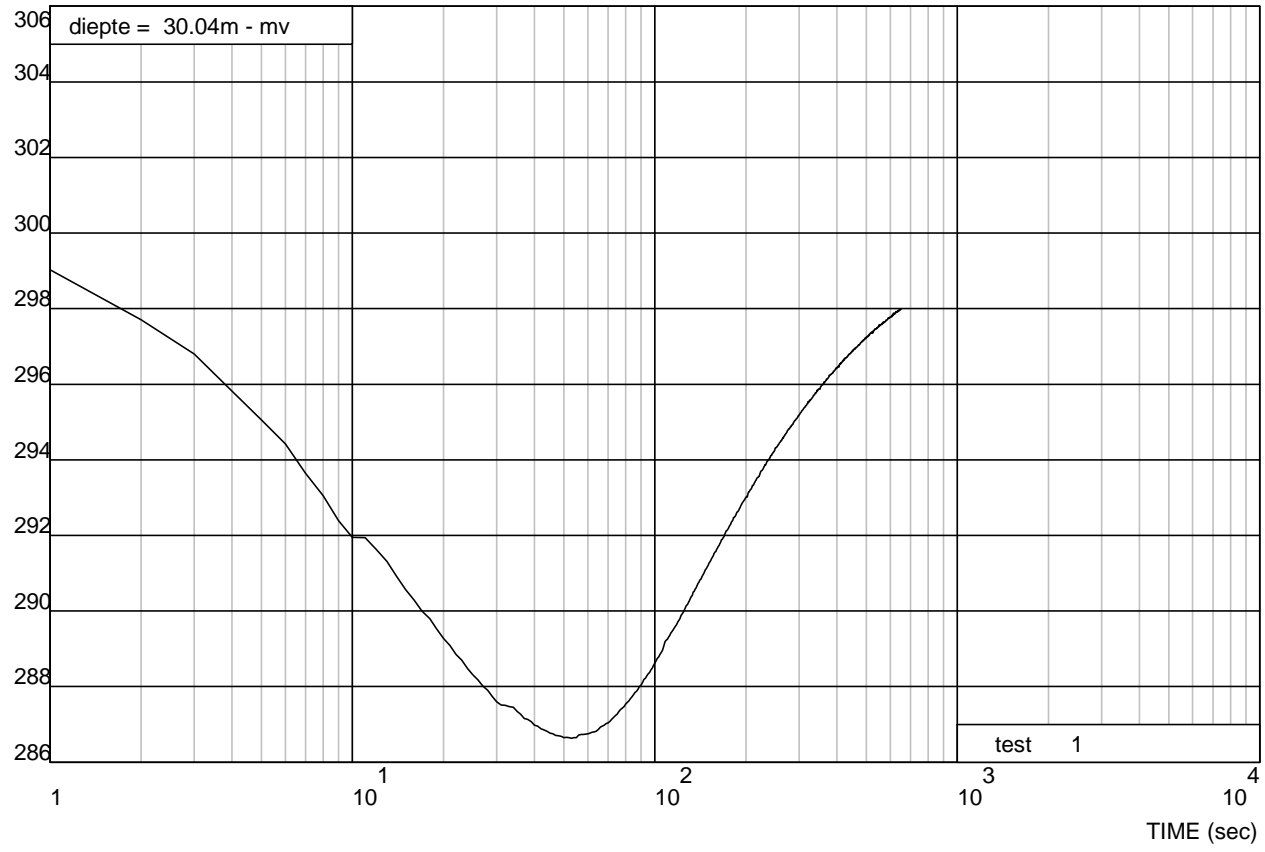
opdracht: 02P001595-03







waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

uitv.: RHL-S22

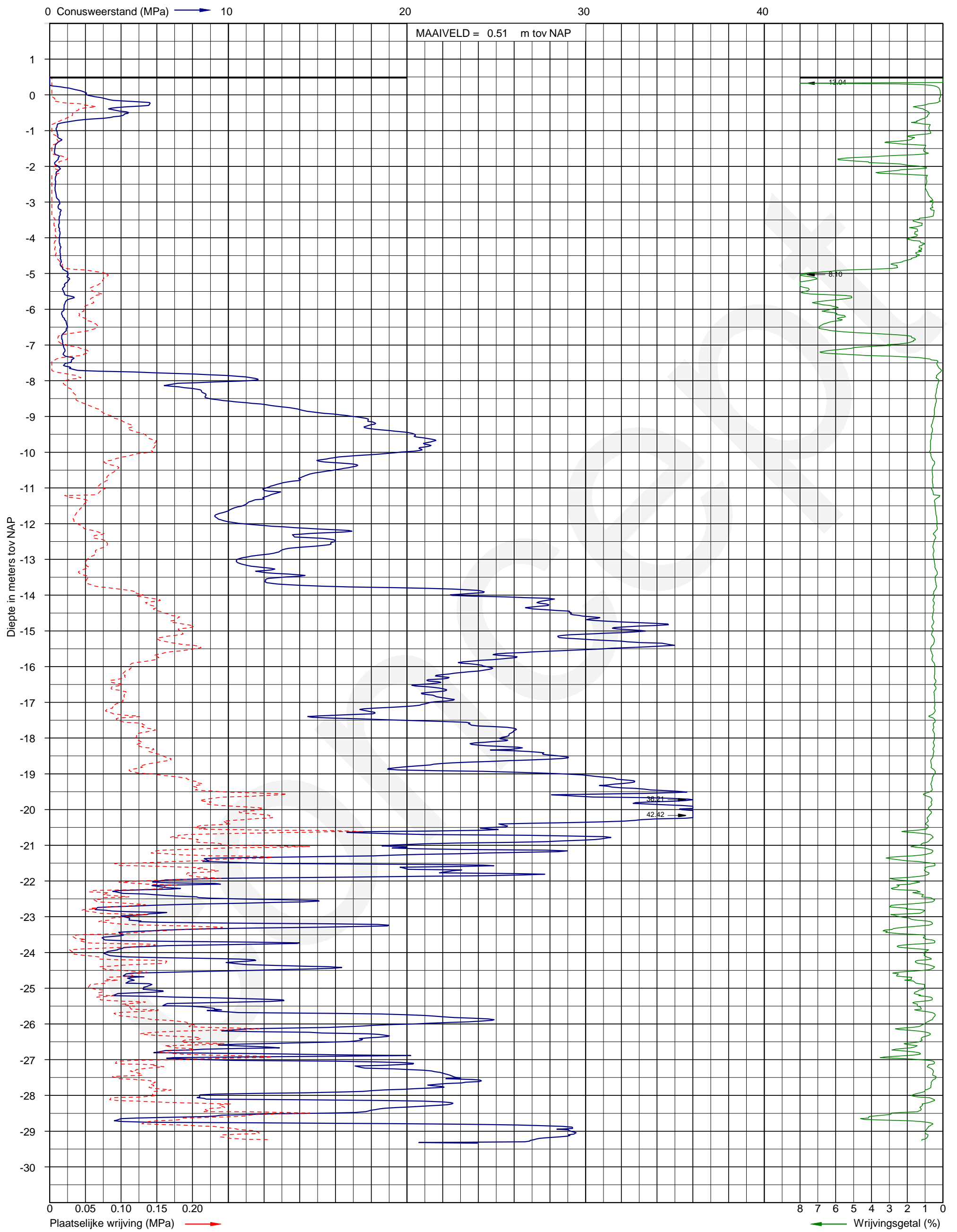
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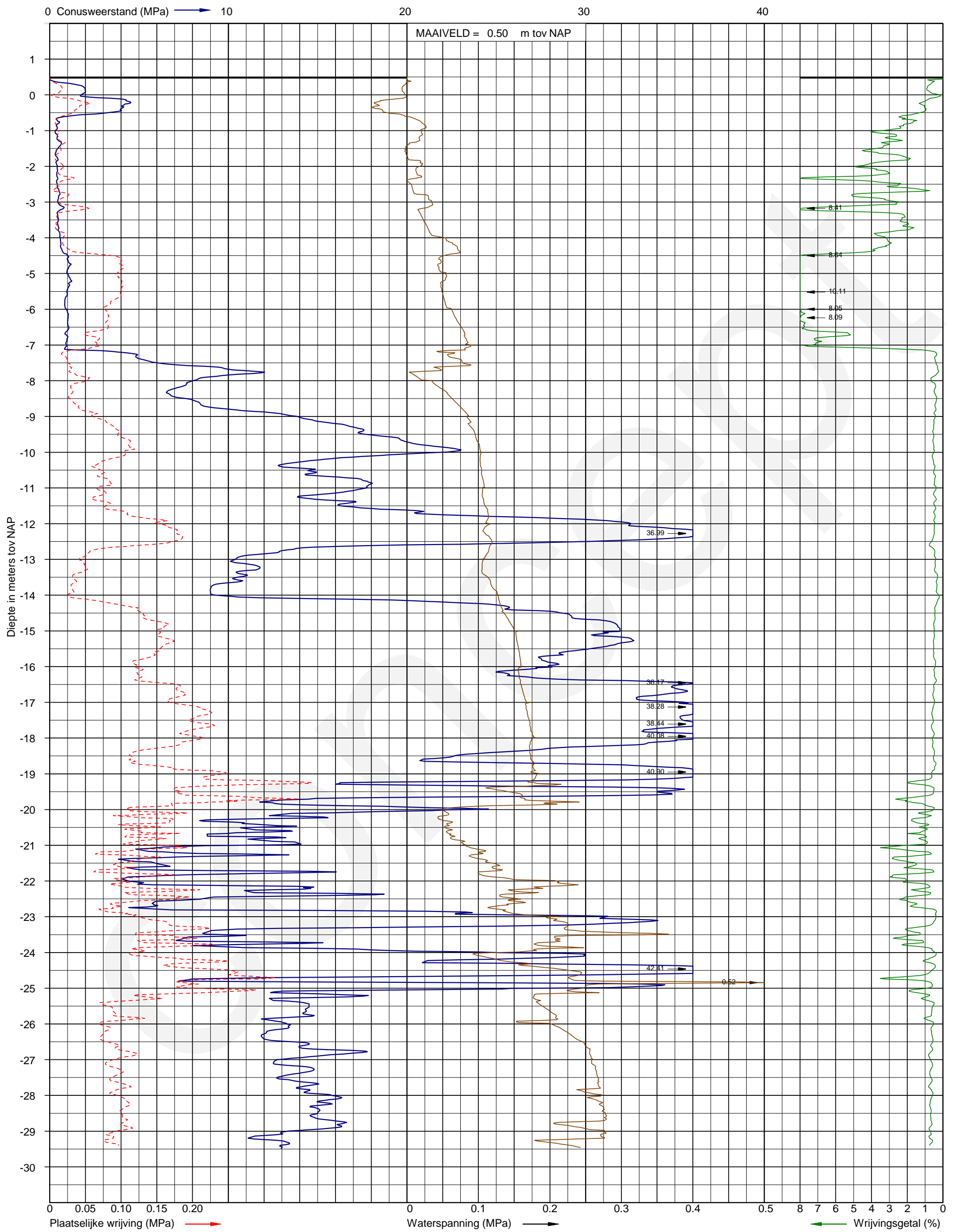
mat.:

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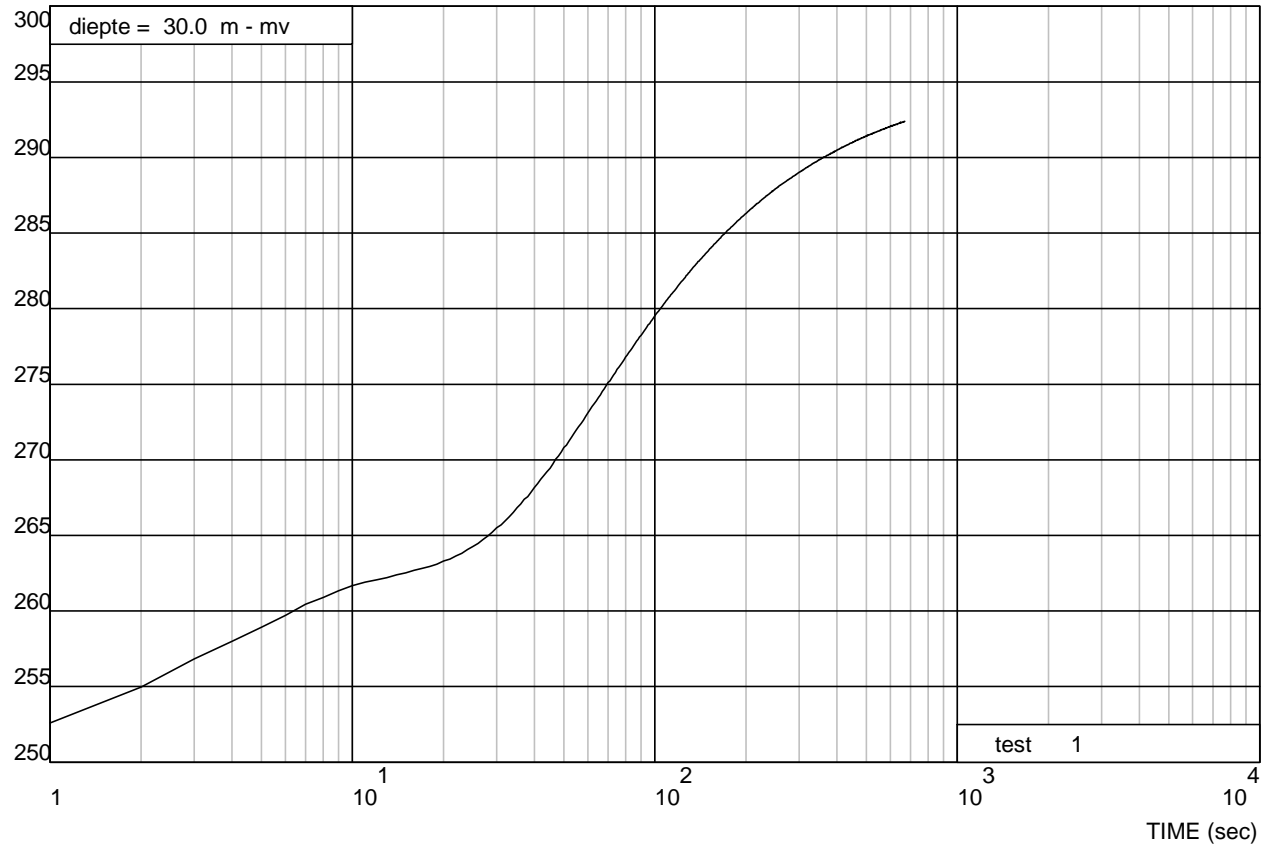
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opdracht: 02P001595-03





waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

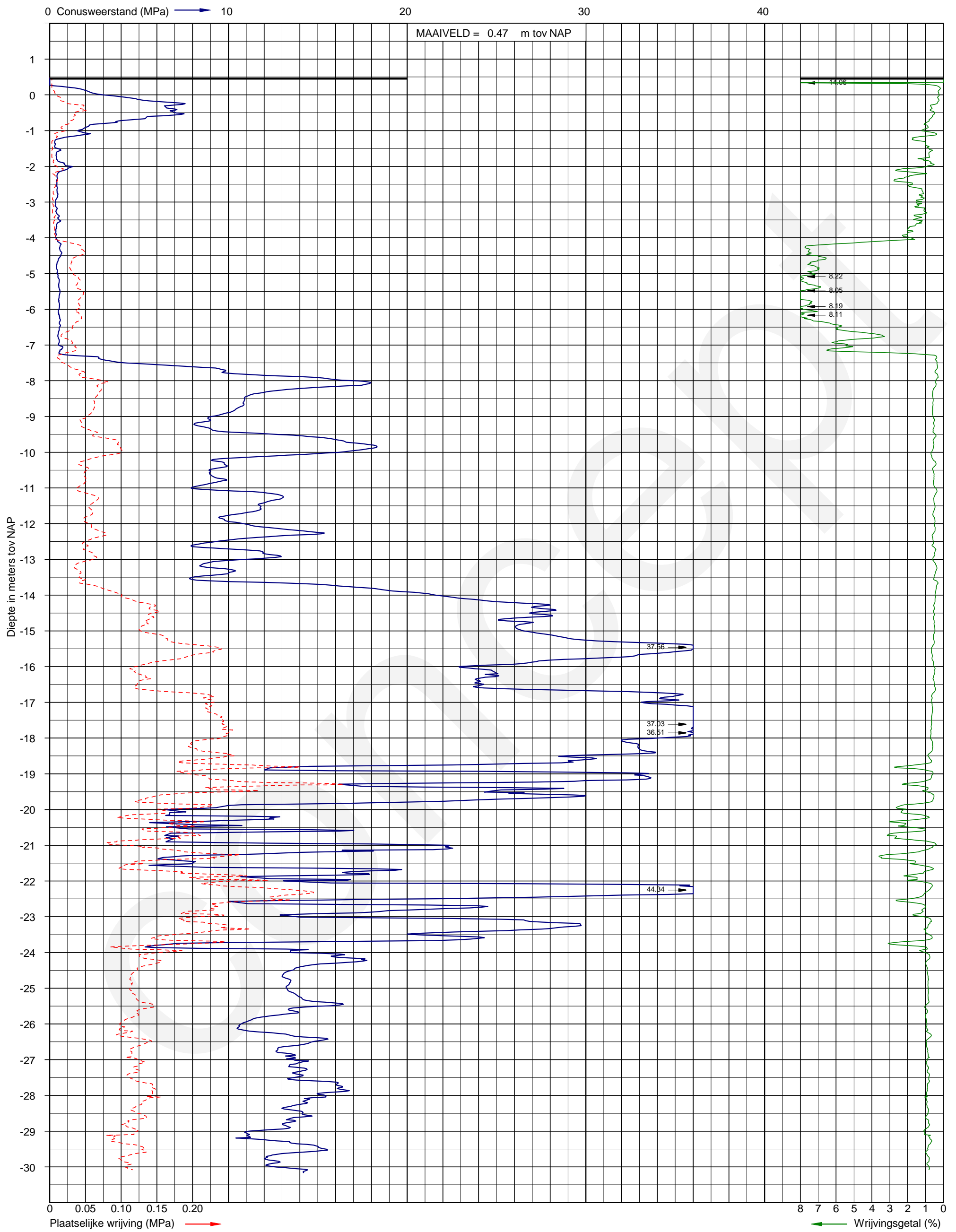
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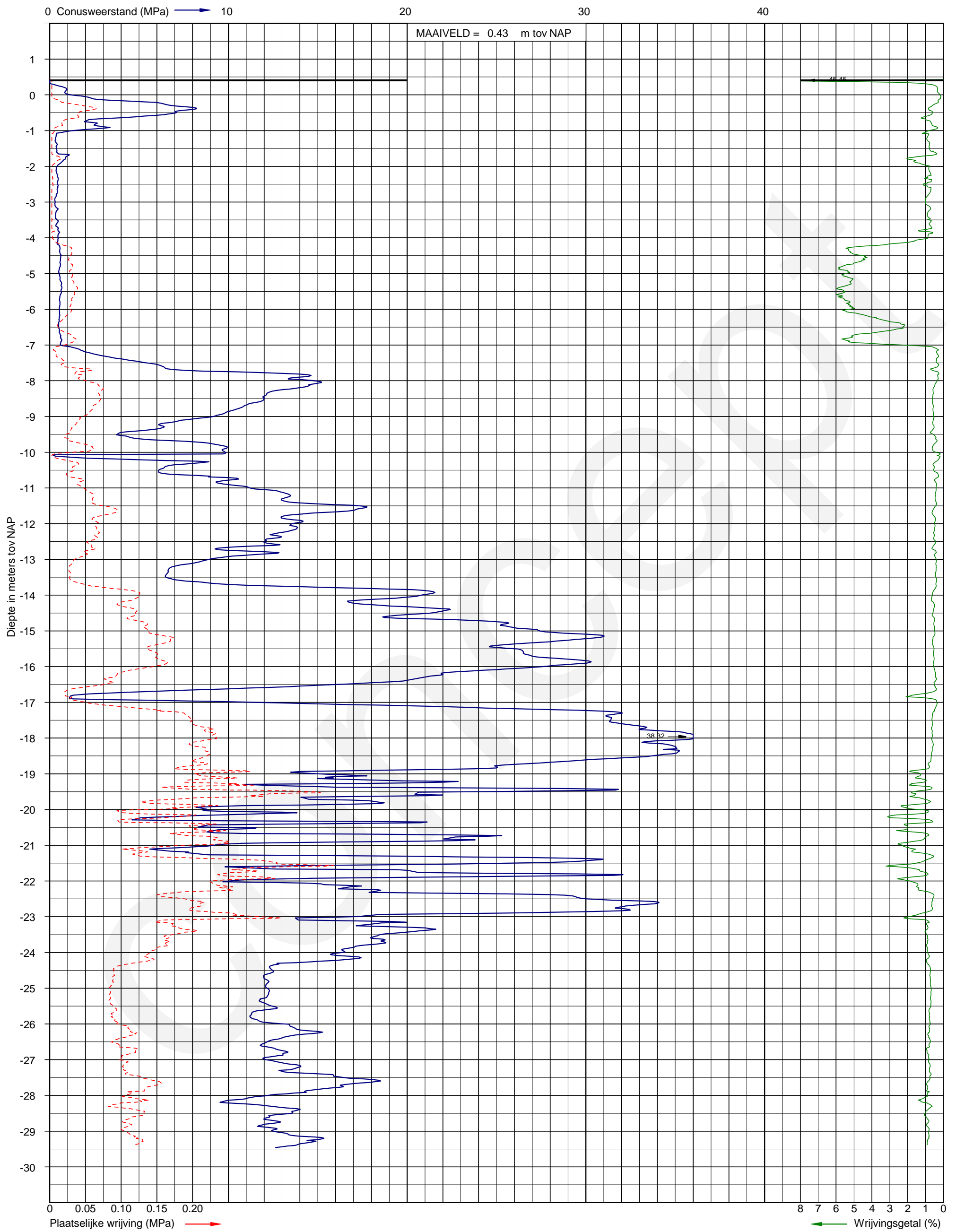
sondering: 99

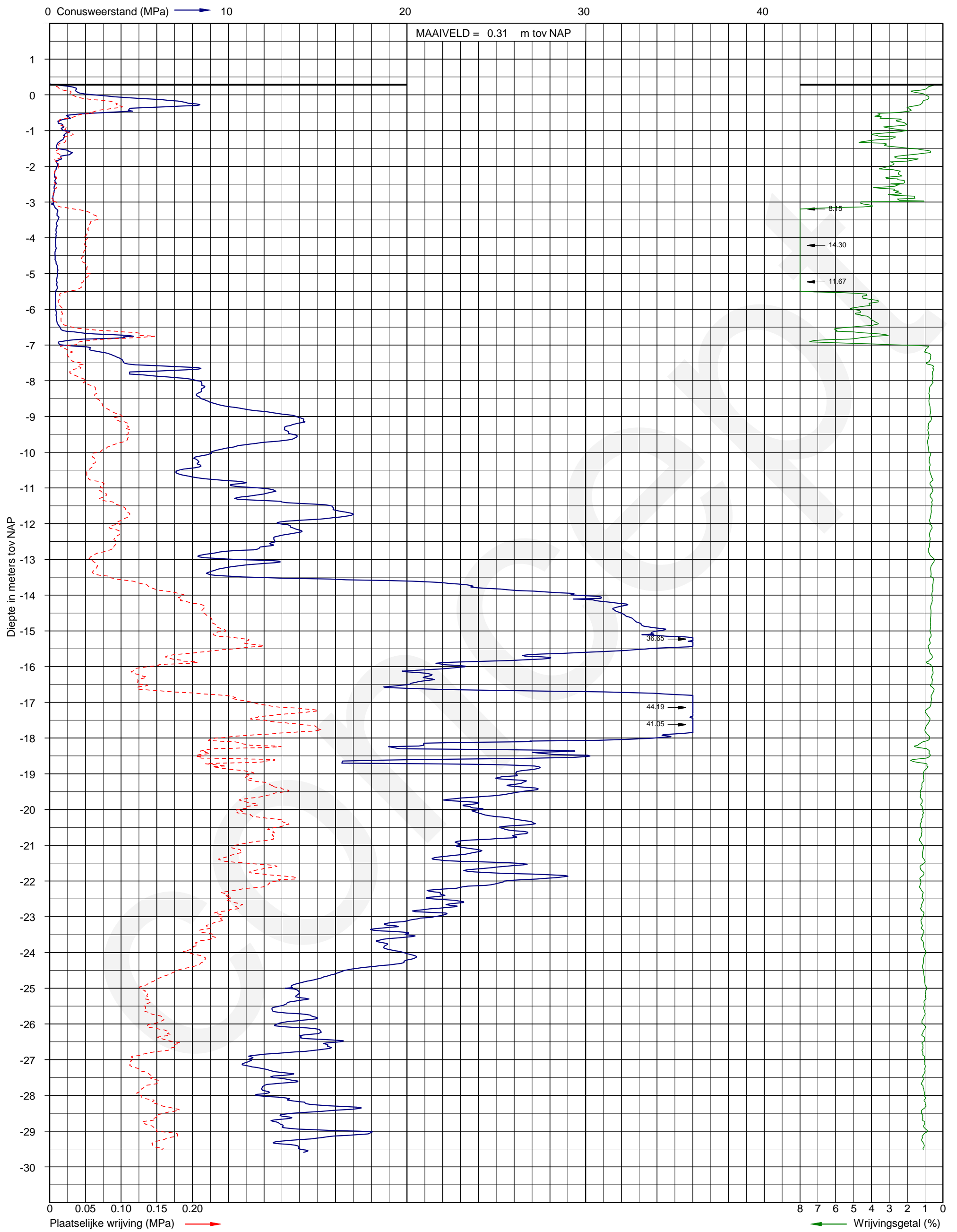
INPIJN-BLOKPOEL Ingenieursbureau

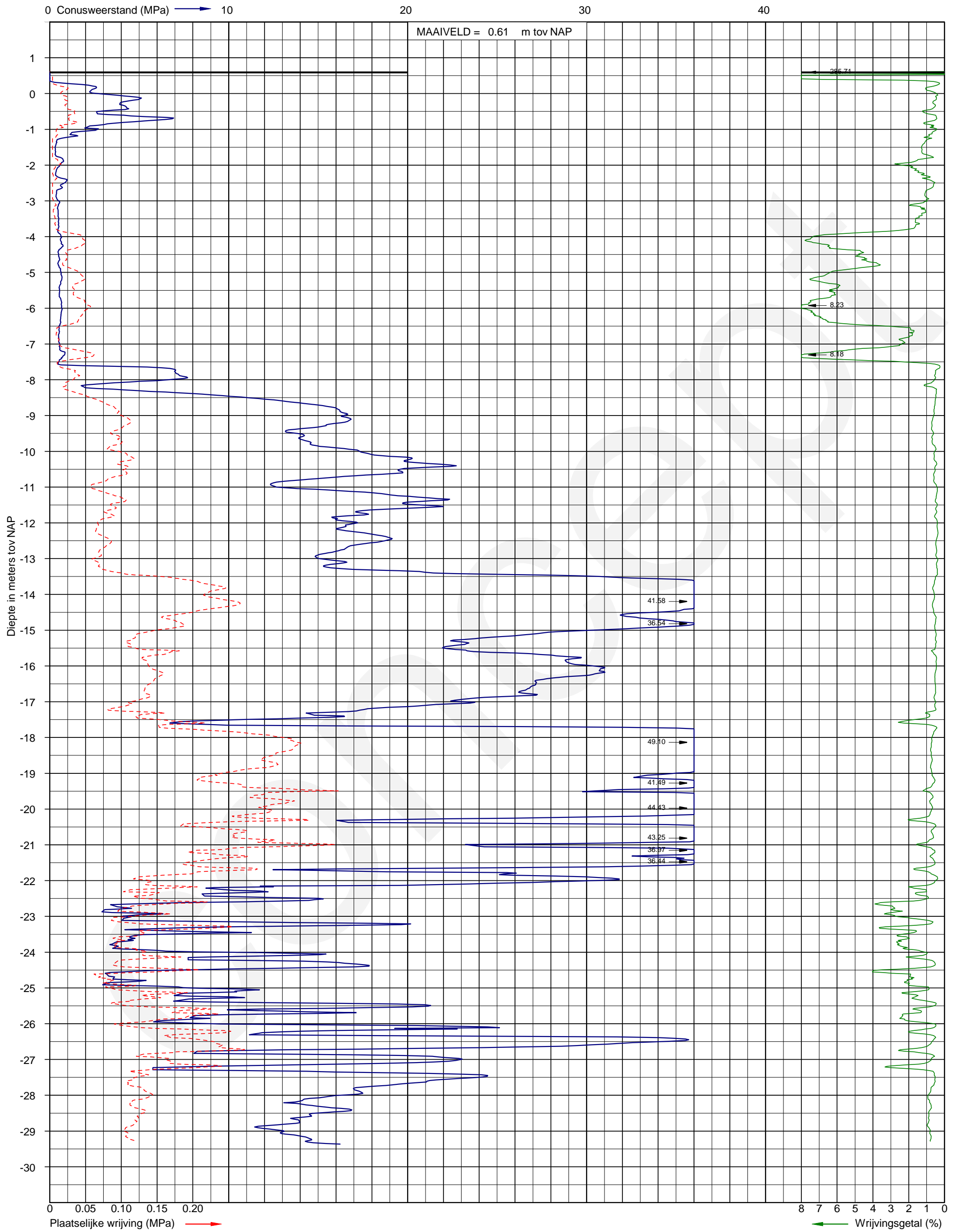
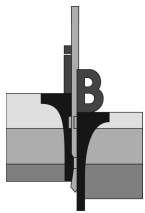
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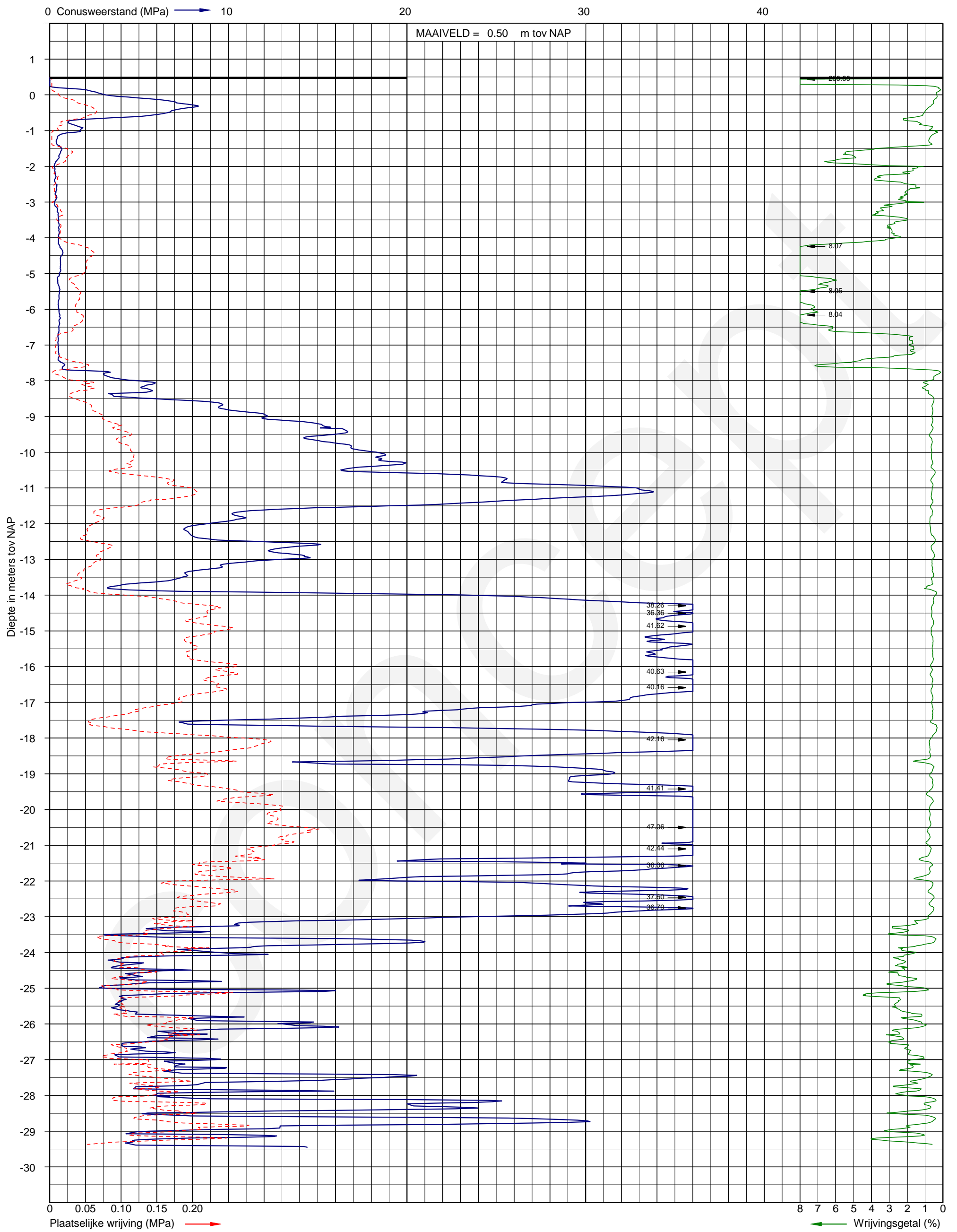
opdracht: 02P001595-03

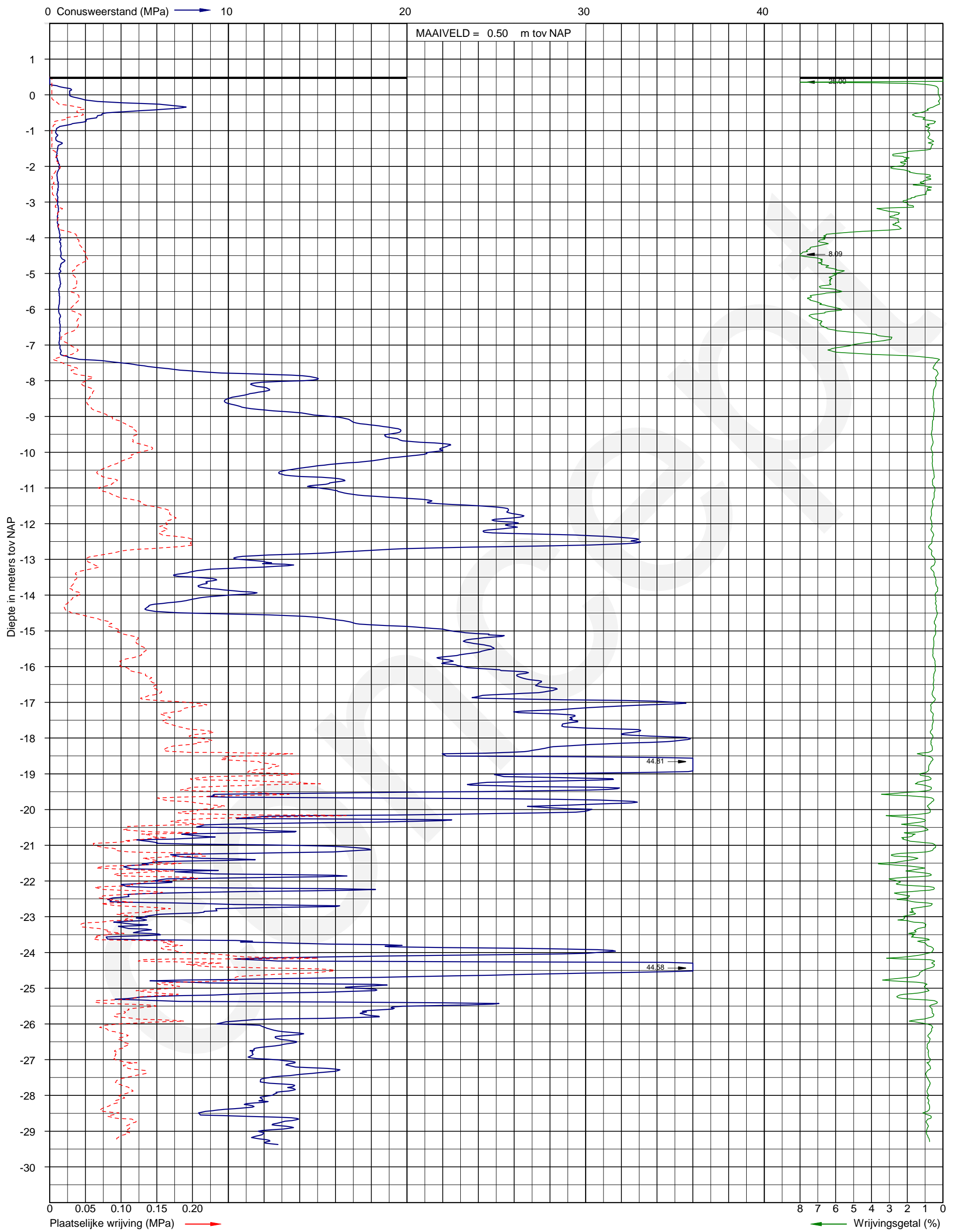


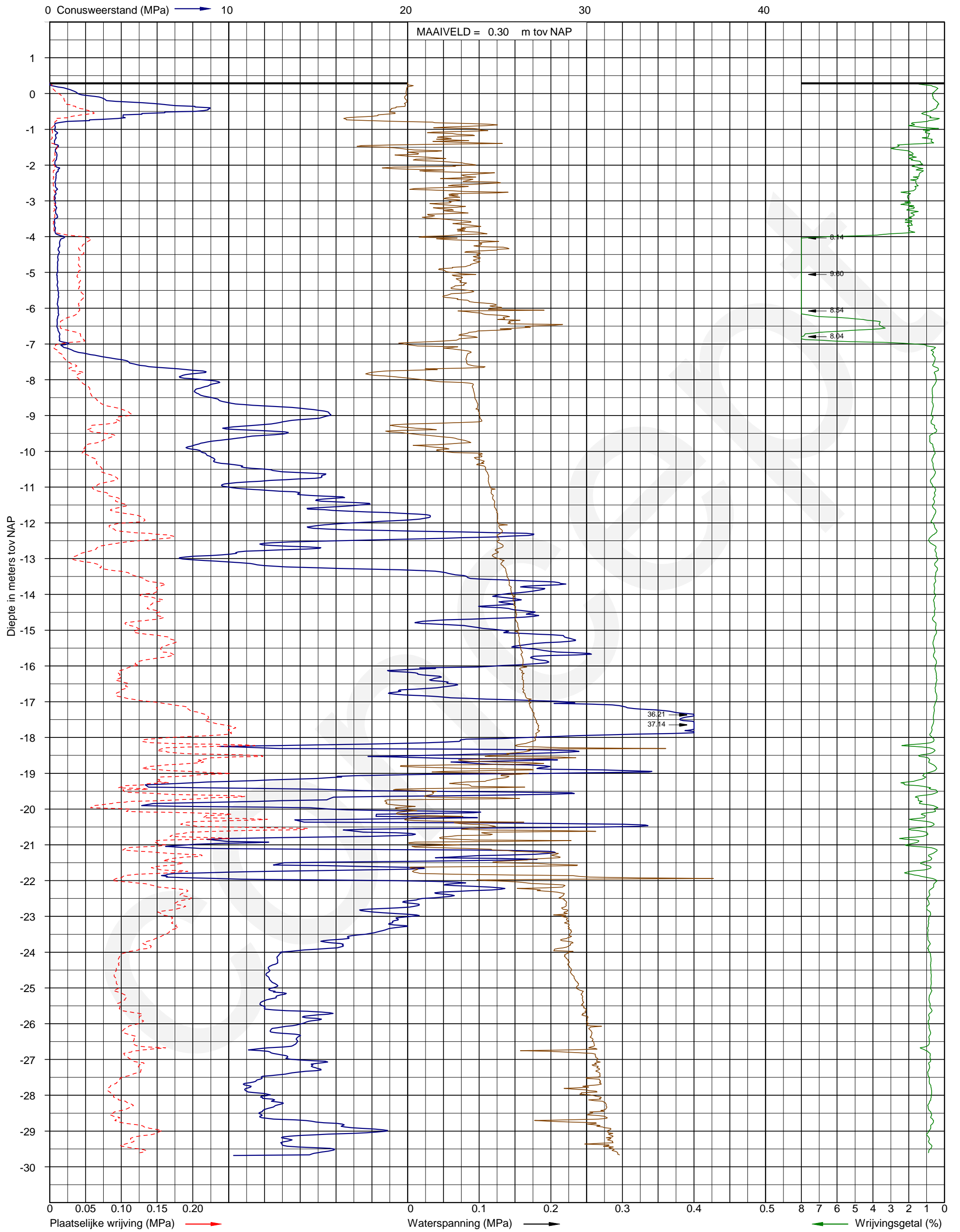




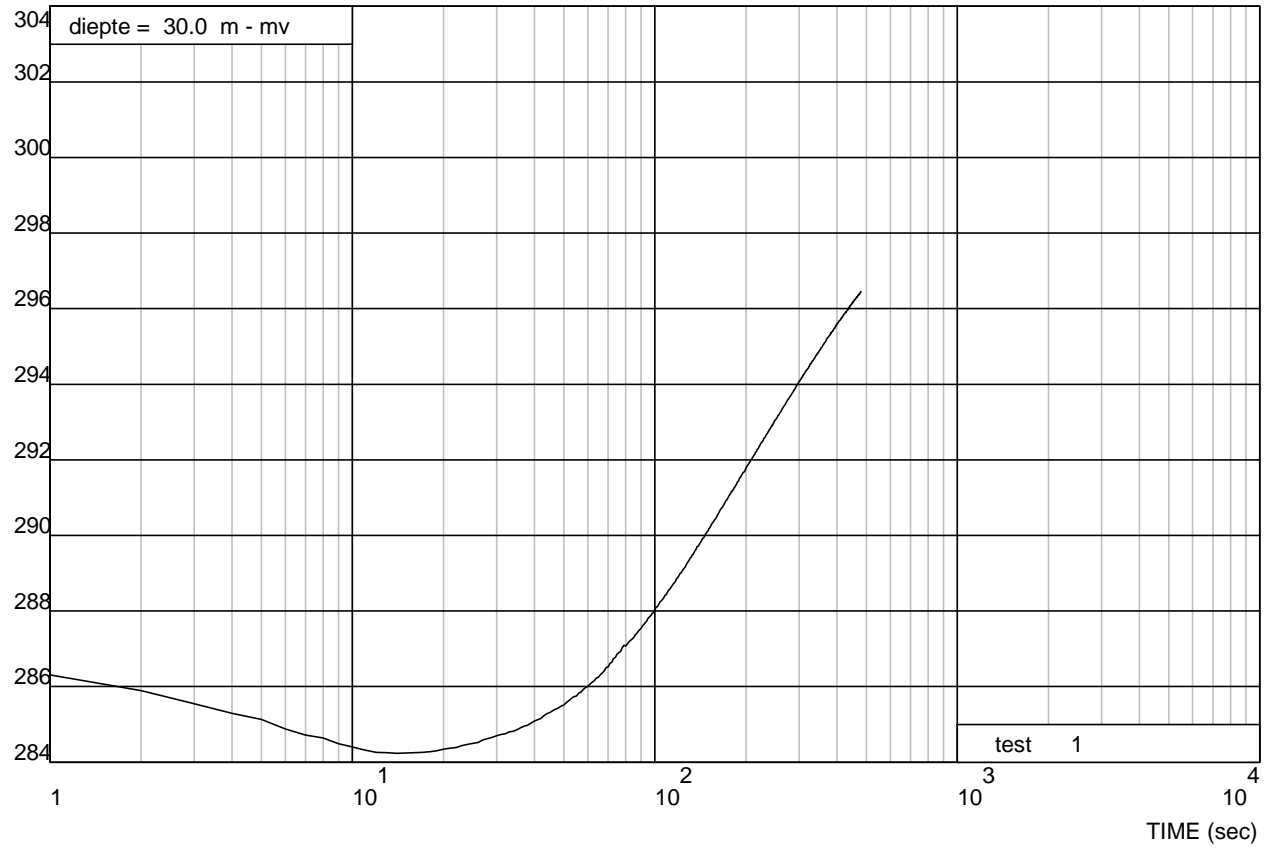








waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

uitv.: RHL-S22

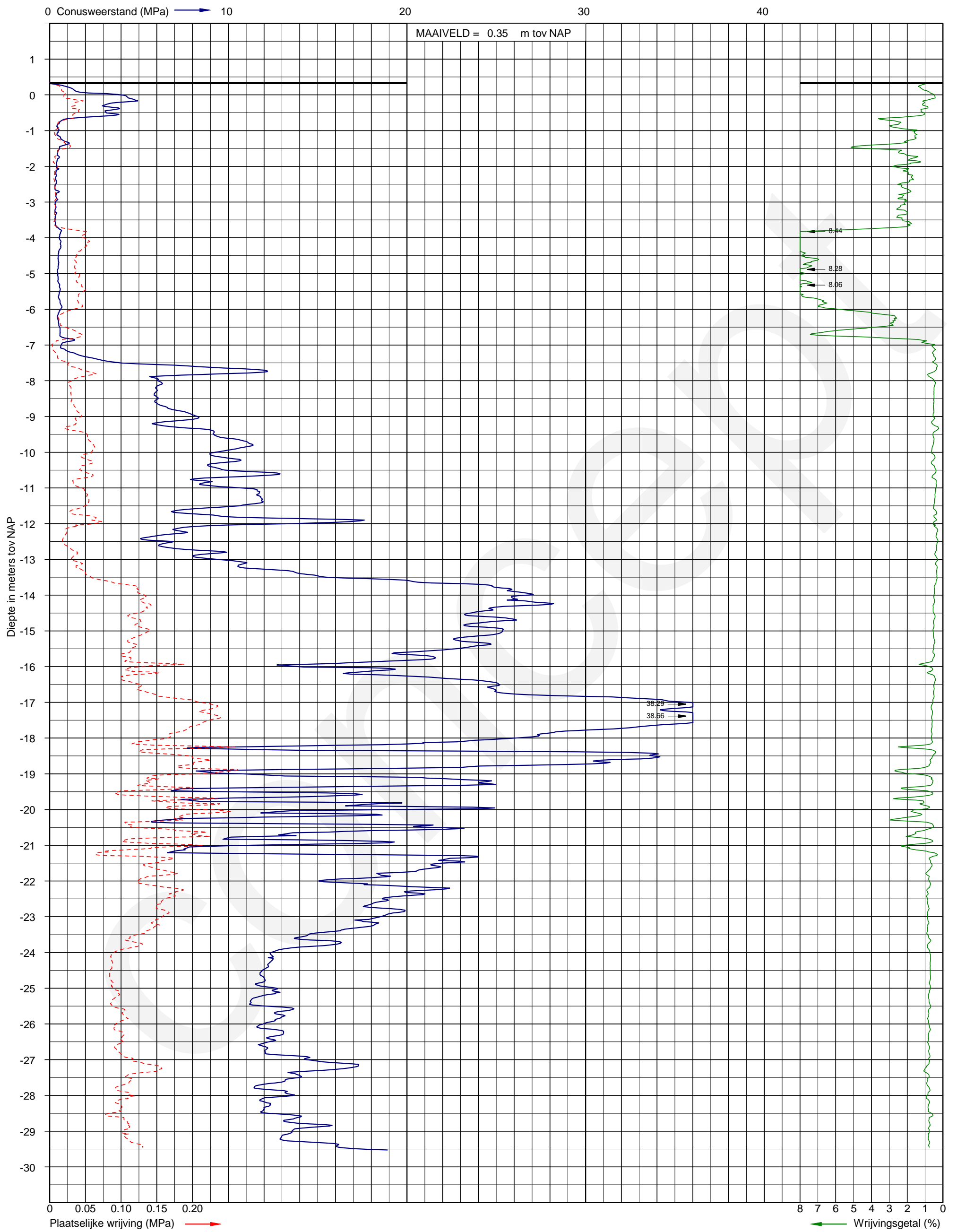
sondering: 106

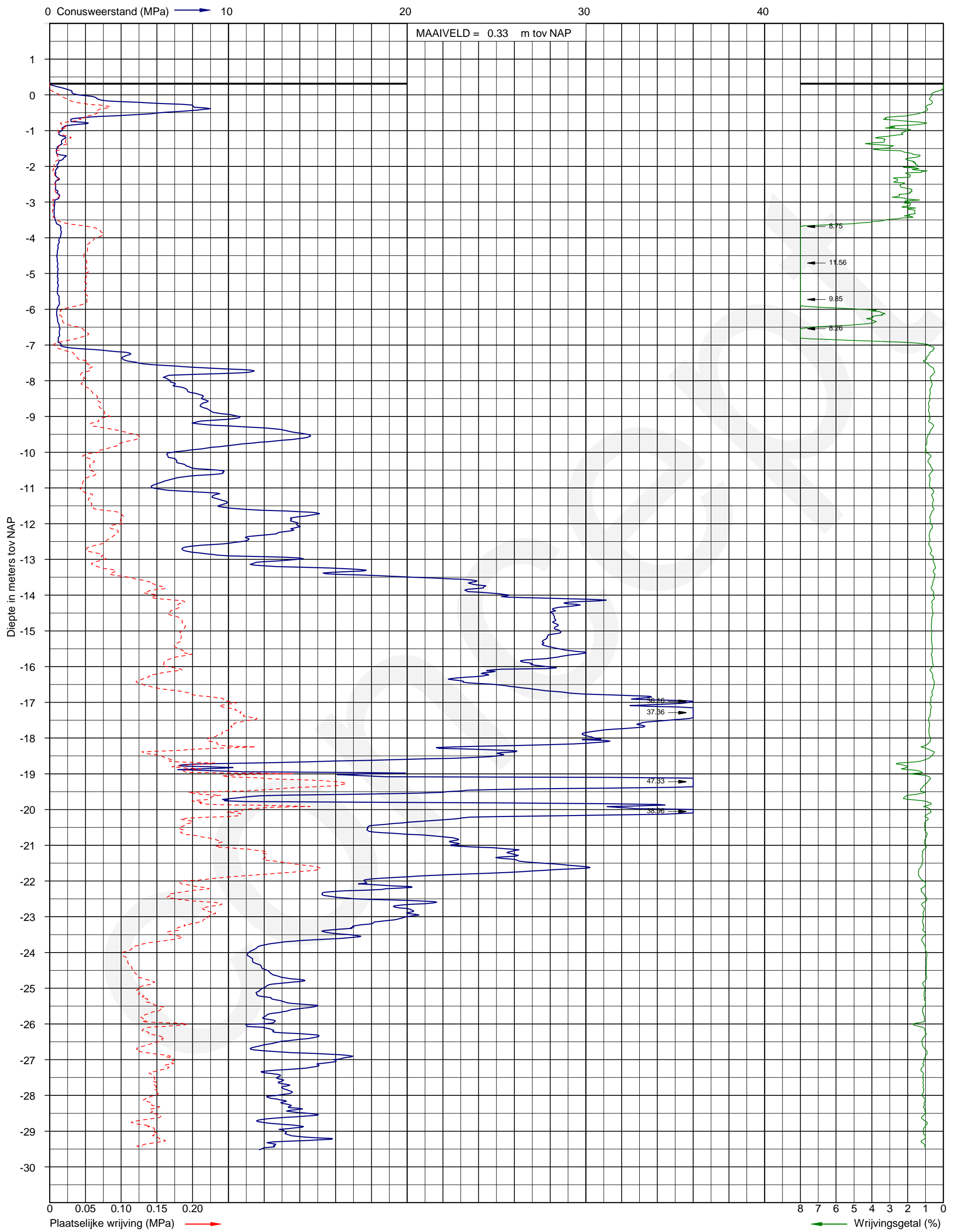
mat.:

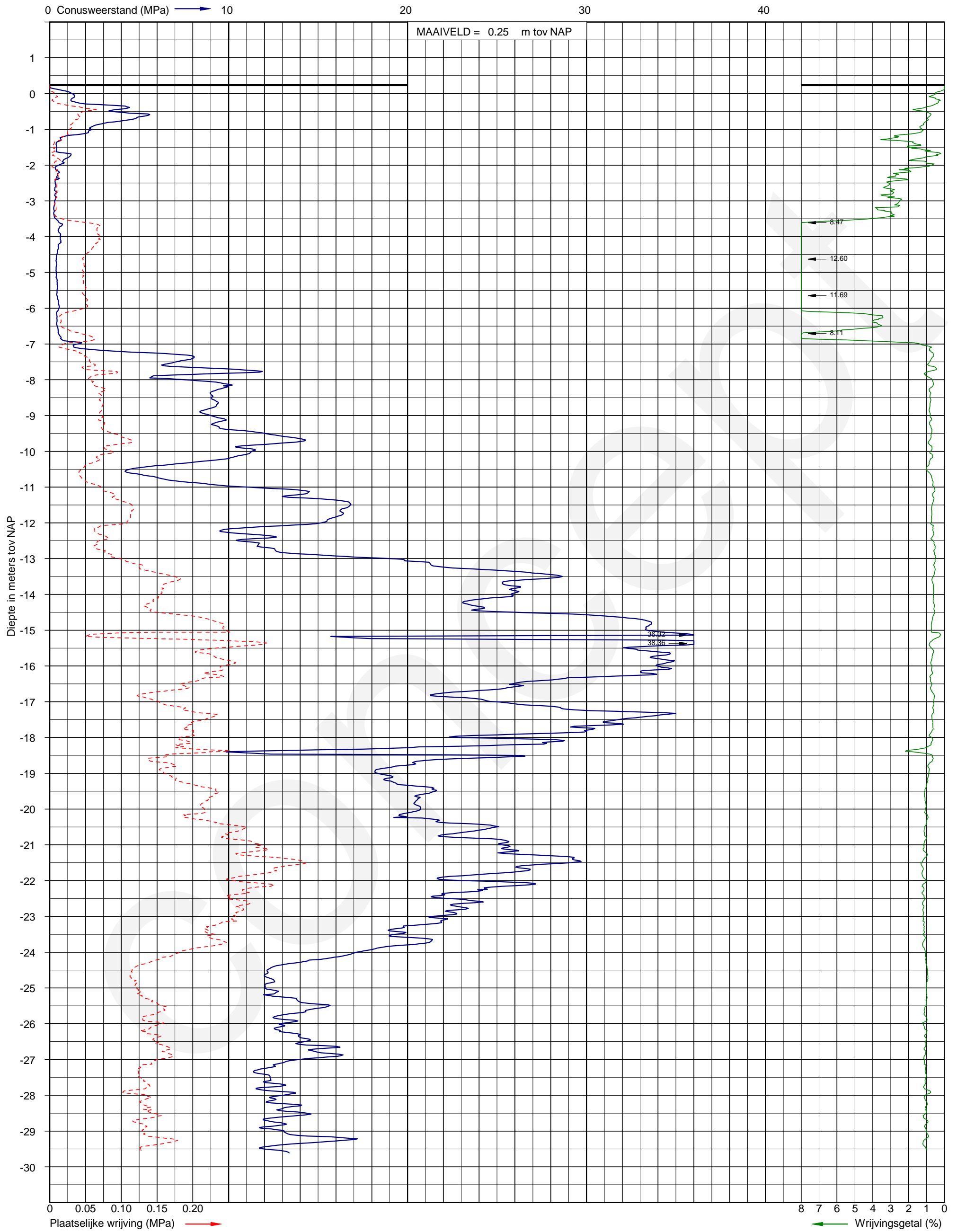
INPIJN-BLOKPOEL Ingenieursbureau

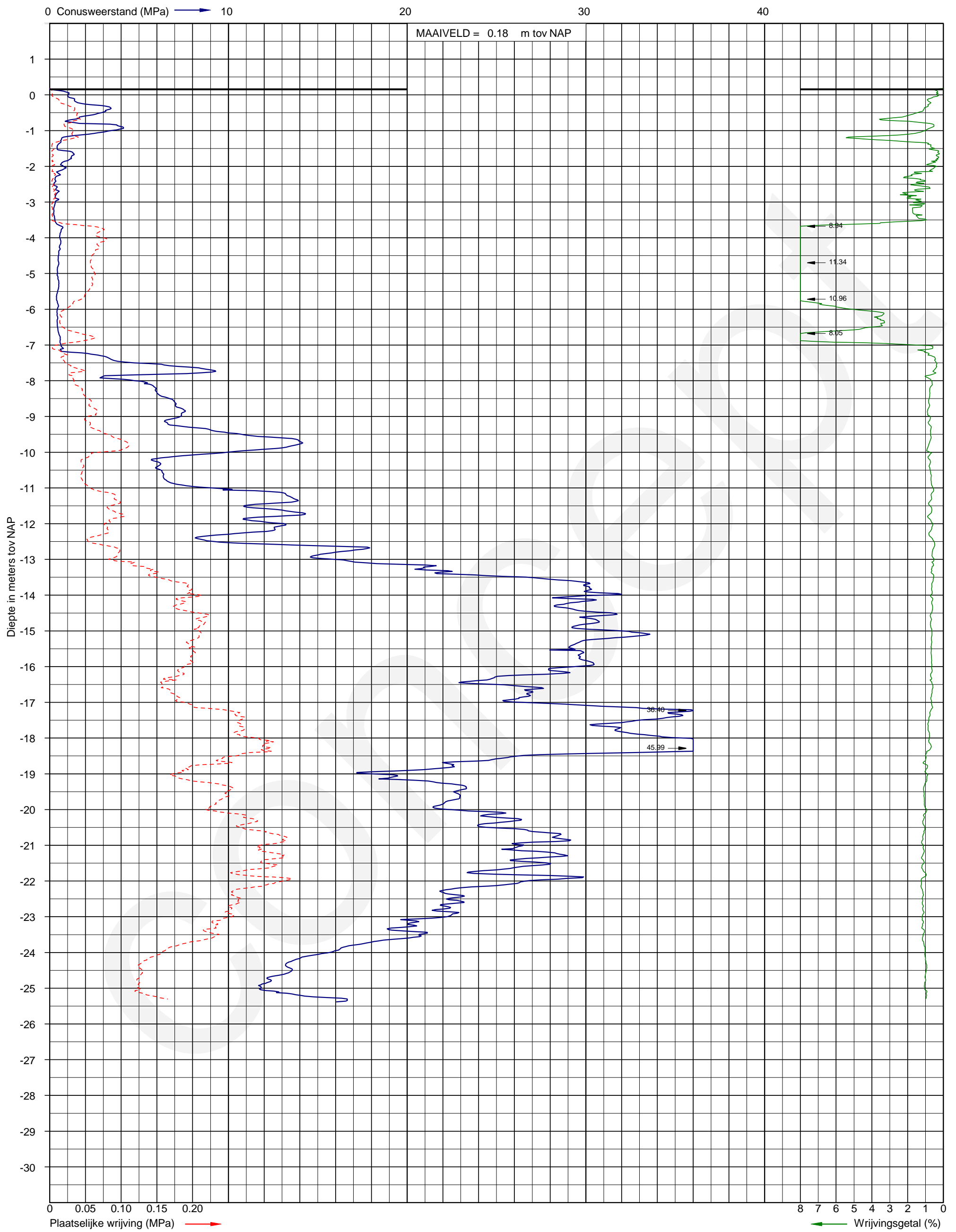
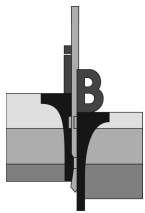
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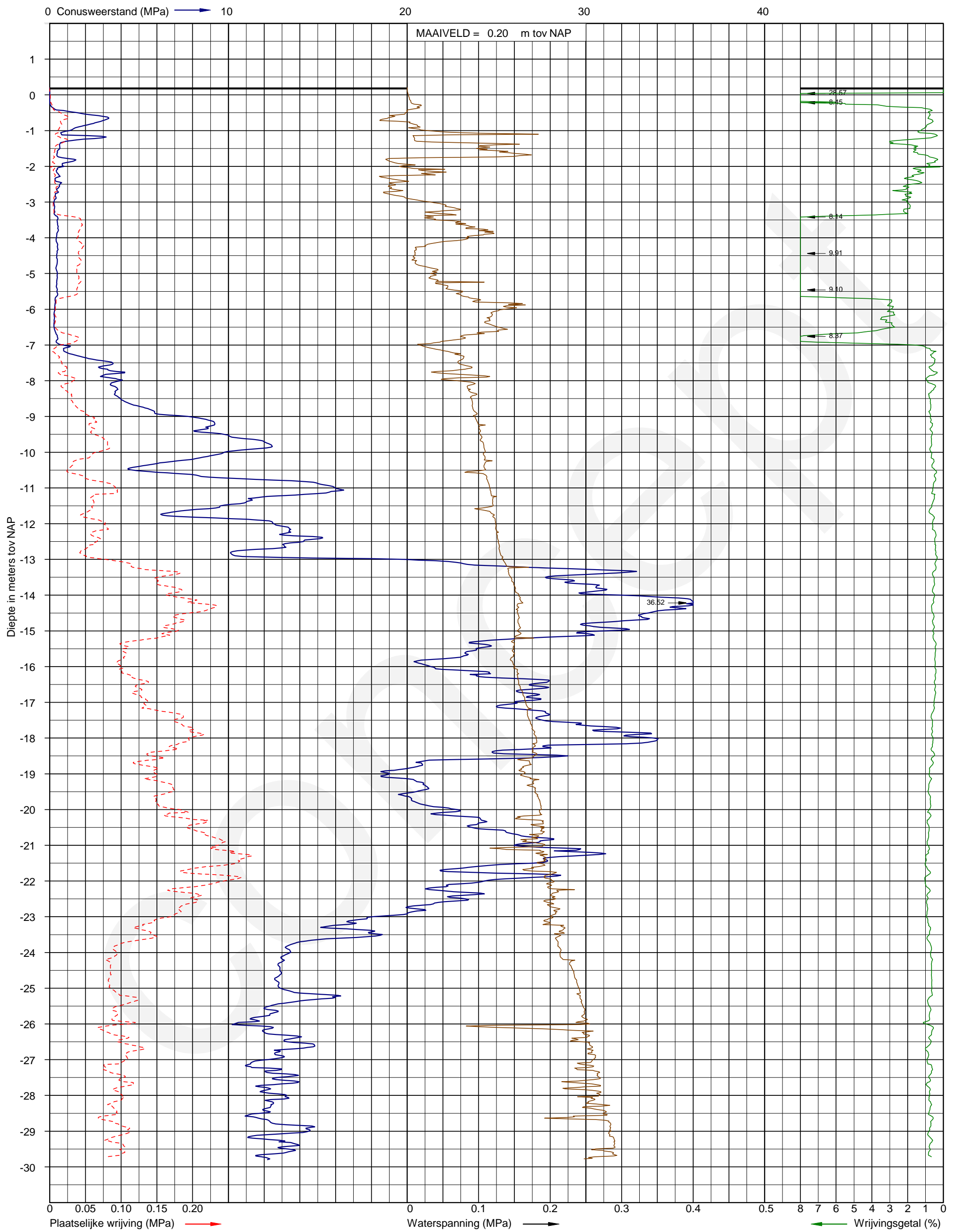
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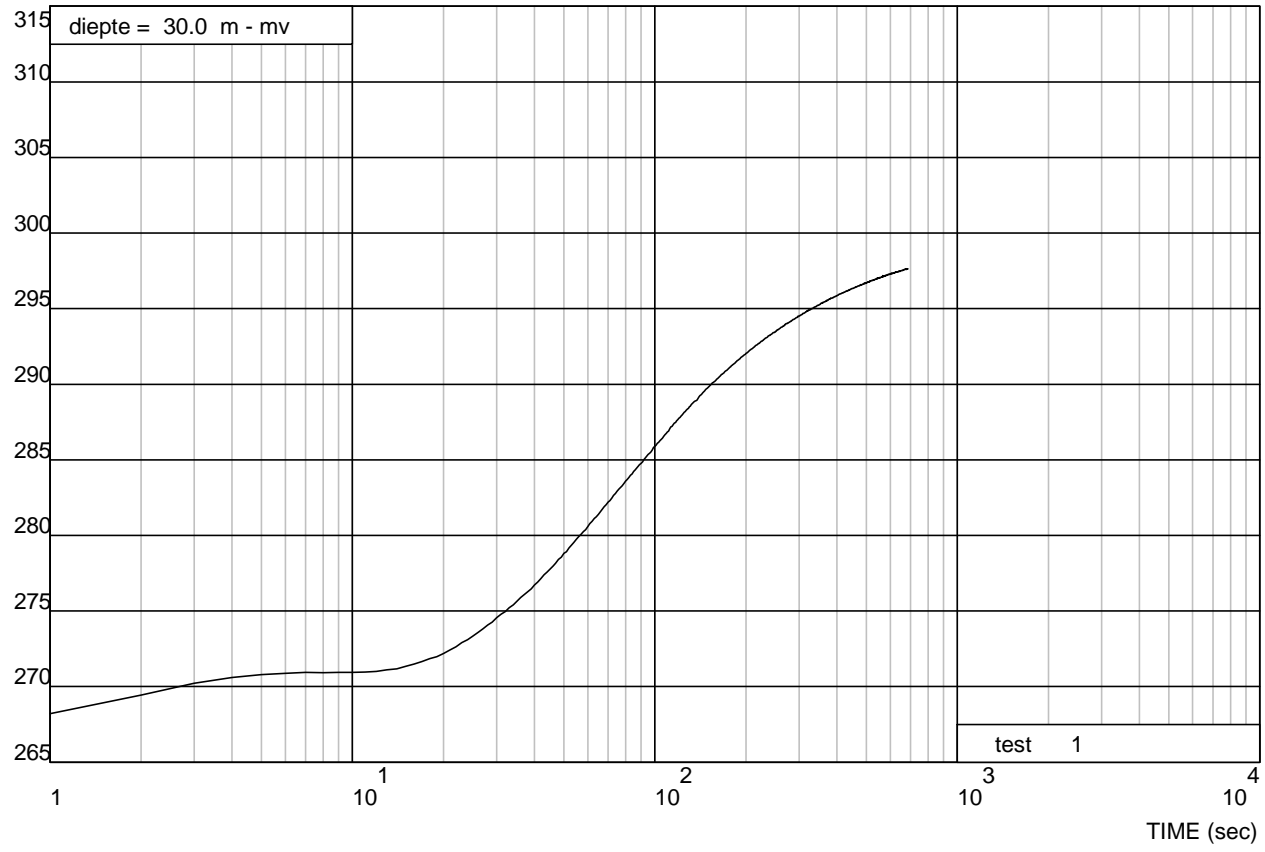








waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

uitv.: RHL-S22

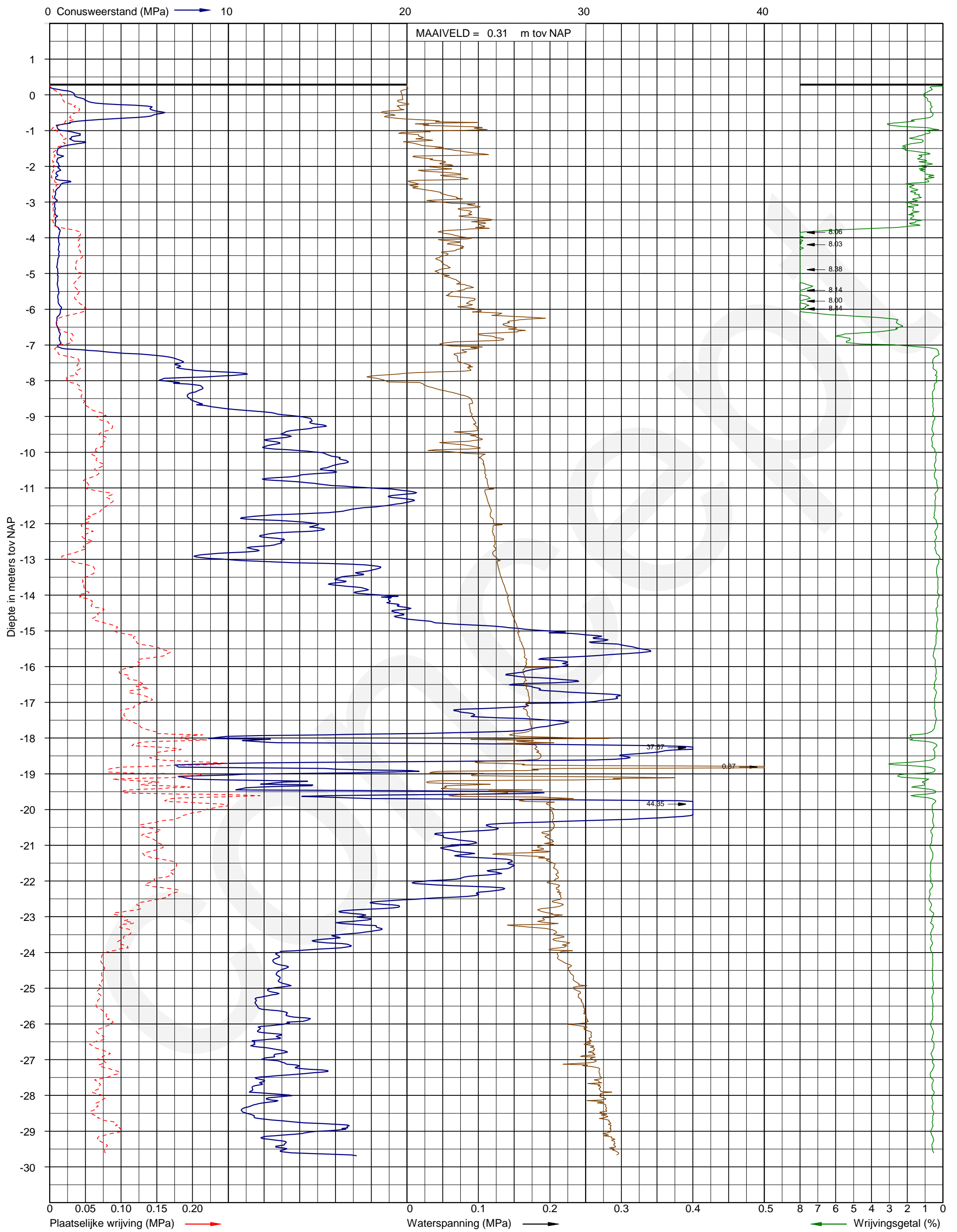
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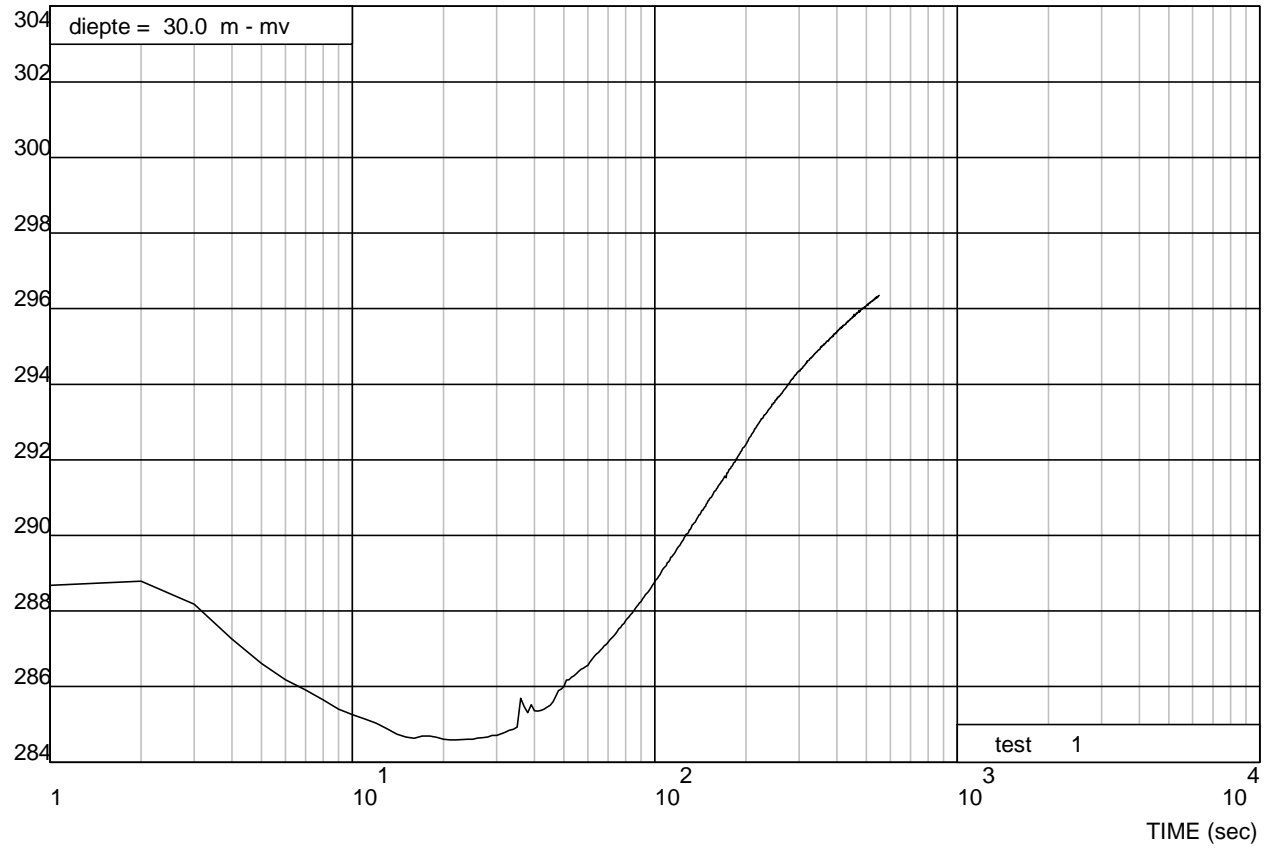
INPIJN-BLOKPOEL Ingenieursbureau

datum: 29-10-2014

opdracht: 02P001595-03



waterspanning (kPa)



Grondonderzoek station te Rilland

dissipatietest

uitv.: RHL-S22

sondering: 112

mat.:

INPIJN-BLOKPOEL Ingenieursbureau

datum: 4-11-2014

opdracht: 02P001595-03

