TEN TECH
DESIGN AND ENGINEERING OF LIGHTWEIGHT STRUCTURES

Content:	**Tentbook (according to EN 13782)**
Owner Tentbook:	**Organic Concept**
Tent system:	**20x15m Stretchtent**
Document code:	**21.03.00226.1**
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Tentsystem:	20x15m Stretchtent
Document code:	21.03.00226.1
Owner Tentbook / Manufacturer:	Organic Concept Molenveldstraat 18 B 26 30 AARTSELAAR België +322709 0 950
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Revisions

Version	Date	Revision	Paragraph
17.04.00297	24.04.2017	Document composed	
17.04.00297.2	27.06.2018	New version of 3-ply fabric	H.2.1, H.7.1, I
		Aluminium poles added	D, E, H.2.5, H.3, H.7, J
17.04.00297.3	26.03.2021	New certificates added	
21.03.00226.1	26.03.2021	Ascribed to Organic Concept	

A. Introduction

Organic Concept a Belgian company that rents and sells tent structures made out of a stretchable membrane, so called Stretch Tents or Bedouin tents. This enables a freedom of form as there is not a pre-described shape necessary. Depending on the location, the number of poles, length of the poles, placement of the poles, number and type of tie-downs can be varied. Resulting in a custom made cover at each new location.

This freedom of form is enabled by the stretch fabric, as the desired form is stretched in shape.
The drawback of this flexibility in shape is the difficulty to investigate all the different possibilities and to put them into a kind of order in a static analysis.

This report only shows the static analysis of a 20m x 15m tent. A variant with closed side walls is investigated and a variant with open side walls. These two variants are characteristic / leading shapes for this tent structure. The total size can also be achieved by connecting multiple fabric panels.

This document contains the data required for a tent book, according to EN 13782, for the 20x15m stretch tents of Organic Concept, including:

- Ownership data;
- Drawings of the different variants of the tent, including dimensions, indications of elements and required anchoring;
- Permitted live load;
- Maximum wind speeds (according to EN 1991-1-4:2005);
- Structural analysis (according to EN 13782:2015);
- Material certificates (strength properties and fire properties).

Utrecht, 26.03.2021,

ir. Ruud van Bommel

B. Contents

C. Codes and standards

- EN 1990 Eurocode, Basis of structural Design
- EN 1991 Eurocode 1, Part 1-4: General actions - wind actions.
- EN 1993 Eurocode 3, Design of steel structures
- EN 1995 Eurocode 5, Design of wooden structures
- EN 1999 Eurocode 9, Design of aluminum structures
- EN 13782 Temporary Structures – Tents - Safety
- EN 10204 Products of steel –inspections documents
- EN 12195-2 Belts
- ISO 1141 Synthetic fiber ropes Polyester
- ISO 1346 Synthetic fiber ropes Polypropylene
- ISO 1969 Synthetic fiber ropes Polyethylene

D. Summary

Owner:	Organic Concept Molenveldstraat 18 B 26 30 AARTSELAAR België +322709 0 950

General information:			
Main dimensions	Width: Length: Side height membrane: Max. heigth:	**20x15m** 15m 20m 3.0m 5.5m	
		Wood [Eucalyptus, D35]	**Aluminium [6063 T6]**
	<u>Floating configuration:</u> Center pole – 5.5m Center pole – 5.0m Entrance pole – 3.0m Corner pole – 2.5m <u>Closed configuration:</u> Center pole – 5.5m Center pole – 5.0m Center pole – 4.0m Entrance pole – 3.0m Corner poles – 2.5m Side wall poles – 2.5m	 Ø 120mm Ø 110mm Ø 85mm Ø 70mm Ø 120mm Ø 110mm Ø 85mm Ø 85mm Ø 70mm Ø 70mm	 Lower to 5m, Ø90x3/Ø76x5mm Ø90x3mm/Ø76x4mm Ø76x3mm Ø50x3mm Ø90x3mm/Ø76x4mm Ø90x3mm/Ø76x4mm Ø76x3mm Ø76x3mm Ø50x3mm Ø50x3mm
	Stormbelt: Guy ropes: Circumference rope: Connections elements at guy rope:	Belt: PES, Min. Breaking load: 5000 kg Rope: synthetic, Min. Breaking load: 5870 kg * OR Belt: PES, Min. Breaking load: 3000 kg Rope: synthetic, Min. Breaking load: 4500 kg * OR Belt: PES, Min. Breaking load: 2750 kg Min. breaking load: 3000 kg	

* The required breaking load (BL_{tot}) may be achieved by using multiple rope sections (n): $BL_{rope} = BL_{tot} / n$

Loads:	
User load:	max. additional load of 10 kg per column is allowed, if the load is applied centric.
Snow load:	0.1 kN/m² (equal to 4cm of snow) according to the French CTS.
Wind load:	The calculation is based on a wind pressure of p_w = 500 N/m², according to EN 13782 par. 7.4.2.2. This value corresponds to a peak value of the wind speed v = 31.1 m/s (±113 km/h) at 10m height. The wind pressure is recalculated to the corresponding wind speeds(1) for Europe (not country specific), shown in the table below. Storm belts are necessary from a certain reduced wind pressure, as stated in paragraph H.5.5.1. The corresponding wind speeds are stated on the drawings.

Wind speeds for default European terrain categories (not Country specific)

	Out of service (1)				
	Coast	Flattened, open area	Rural area	Village	City
10 min. average wind speed (2)	> 17.53 m/s > 63.11 km/h	> 18.39 m/s > 66.20 km/h	> 20.36 m/s > 73.30 km/h	> 24.99 m/s > 89.96 km/h	> 26.08 m/s > 93.89 km/h
Beaufort (3)	> 7 BFT	> 7 BFT	> 7 BFT	> 9 BFT	> 9 BFT
Peak wind speed (4)	> 113 km/h	> 113 km/h	> 113 km/h	> 113 km/h	> 113 km/h

(1) 'Out of service' means: above the given wind speed the structure is no longer guaranteed regarding strength and/or stability.

(2) 10min average wind speed at 10m height measured at the nearest weather stations.

(3) wind data in Beaufort (BFT) are indicative values.

(4) 3 second peak wind speed measured on site at 10m height.

Safety against sliding, overturning and uplifting:

Anchor forces:

Assumptions: angle of 45 degrees

The following design resistance of the anchor forces* is required :

"Floating" tent

	Full wind		Reduced wind Up to and until 7 BFT	
Guy ropes - short side	11.75	kN	7.73	kN
Guy ropes - long side	5.98	kN	4.18	kN
Guy ropes - corner	19.19	kN	13.52	kN
Guy ropes - valley	7.76	kN	12.70	kN
Storm belts	17.98	kN		

"Closed" tent

	Full wind		Reduced wind Up to and until 7 BFT	
Guy ropes	7.24	kN	11.60	kN
Ground point – front corner	14.53	kN	12.73	kN
Ground point – back corner	6.57	kN	4.25	kN
Ground point - short side	5.81	kN	6.72	kN
Ground points - long side	4.15	kN	3.31	kN
Storm belts - width direction	14.69	kN		
Storm belts - length direction	17.35	kN		

*See H.8.3 for Anchor tests according to BS-EN 13782

Required anchor stakes:

Based on dense, non-cohesive soil (e.g. sandy soils).

In case anchors **Ø35mm x 1200mm** (effective length) are being used:

"Floating" tent

	Full wind	Reduced wind Up to and until 7 BFT
Guy ropes - short side	2x	2x
Guy ropes - long side	1x	1x
Guy ropes – corner (2 guy ropes)	2x	1x
Guy ropes - valley	2x	2x
Storm belts	3x	-

"Closed" tent

	Full wind	Reduced wind Up to and until 7 BFT
Guy ropes	1x	2x
Ground point – front corner	2x	2x
Ground point – back corner	1x	1x
Ground point - short side	1x	1x
Ground points - long side	1x	1x
Storm belts - width direction	2x	-
Storm belts - length direction	3x	-

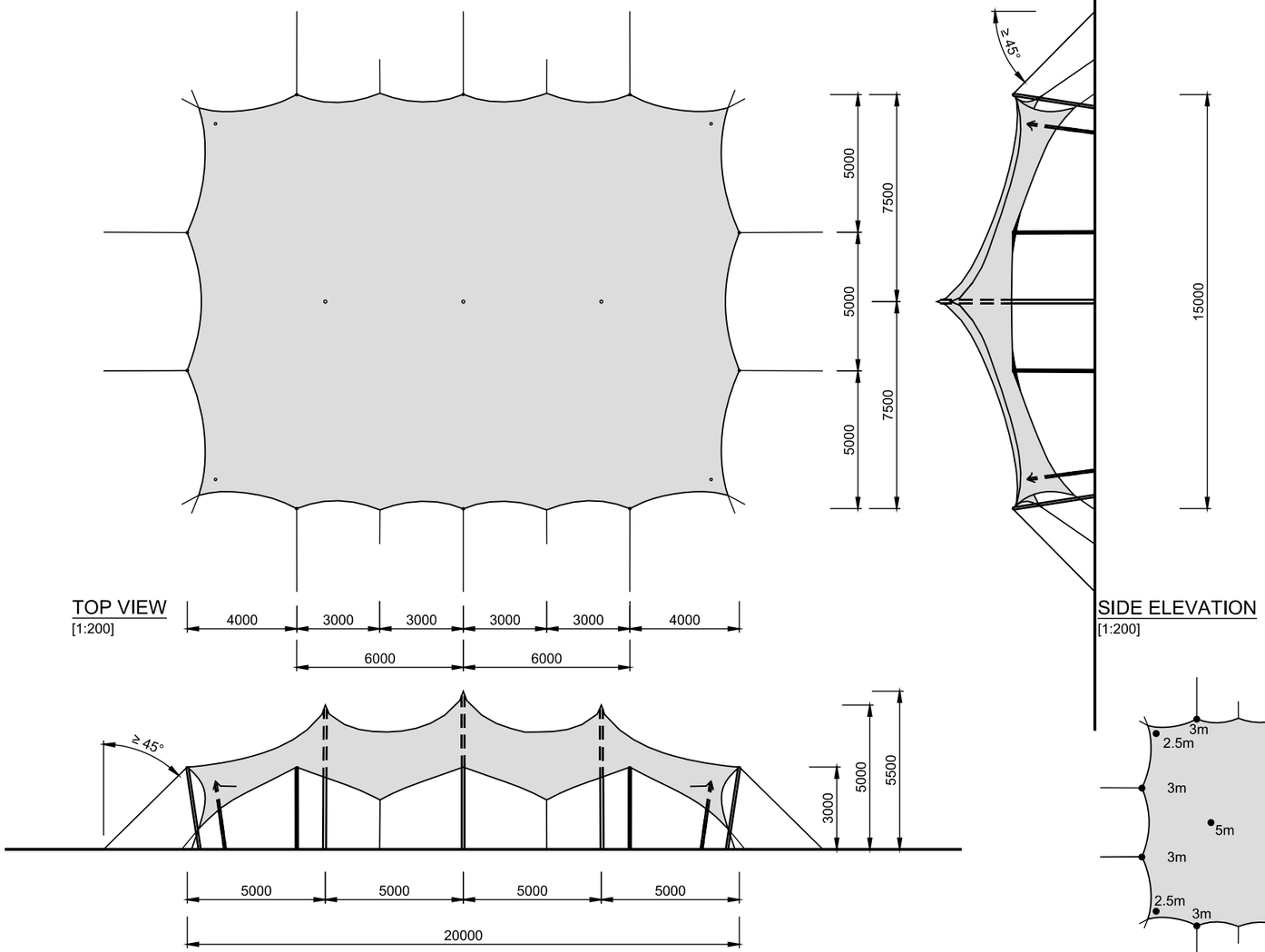
E. Drawings: main dimensions and anchoring

The following pages contain the drawings for:

Analysed sizes:

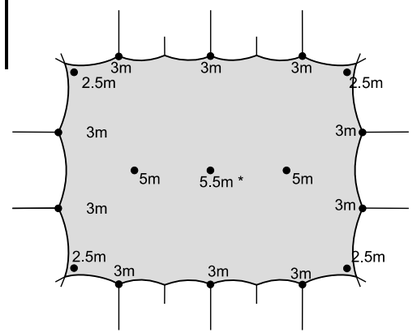
- 20x15m - floating
- 20x15m – closed

E.1. 20x15m – Floating



FRONT ELEVATION
[1:200]

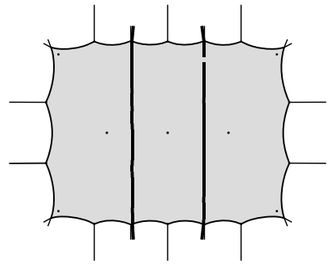
SIDE ELEVATION
[1:200]



* lower to 5.0m when aluminium poles are being used

POLE HEIGHT DIAGRAM
[1:400]

APPLICATION OF STORM BELTS



Evacuate:	Wind Pressure	Gust	City	Village	Rural	Flattened	Coast
Without storm belt	265 N/m²	> 82 km/h	> 7 Bft > 19.0m/s	> 7 Bft > 18.2 m/s	> 6 Bft > 14.8m/s	> 5 Bft > 13.4 m/s	> 5 Bft > 12.8 m/s
With storm belt	500 N/m²	> 113 km/h	> 9 Bft > 26.1m/s	> 9 Bft > 25.0 m/s	> 7 Bft > 20.4m/s	> 7 Bft > 18.4 m/s	> 7 Bft > 17.5 m/s

ANCHORS

Based on: dense, non-cohesive soil

In case anchors of Ø35 x 1200mm (effective length) are being used:

Guy ropes -short side	2x	per rope
Guy ropes - long side	1x	per rope
Guy ropes - corner (2x)	2x	per rope
Guy ropes - valley	2x	per rope
Storm belt	3x	per side

POLES

Center poles (5.5m*):
- Ø120 mm [Eucalyptus D35] or Ø90x3 / Ø76x5mm [6063 T6]

Center poles (5.0m):
- Ø110 mm [Eucalyptus D35] or Ø90x3 / Ø76x4mm [6063 T6]

Entrance poles (3m):
- Ø85 mm [Eucalyptus D35] or Ø76x3mm [6063 T6]

Corner poles - (2.5m):
- Ø70 mm [Eucalyptus D35] or Ø50x3mm [6063 T6]

BELTS / ROPES

Storm belt:	PES, BL 5000 daN = LC 1667 daN
Guy rope:	PES, BL 3000 daN = LC 1000 daN
	OR Synthetic rope, BL 5870 daN *
Circumference rope:	PES, BL 2750 daN = LC 917 daN
	OR Synthetic rope, BL 4500 daN *

* required breaking load (BLtot) may be achieved by using multiple rope sections (n): BLrope = BLtot / n

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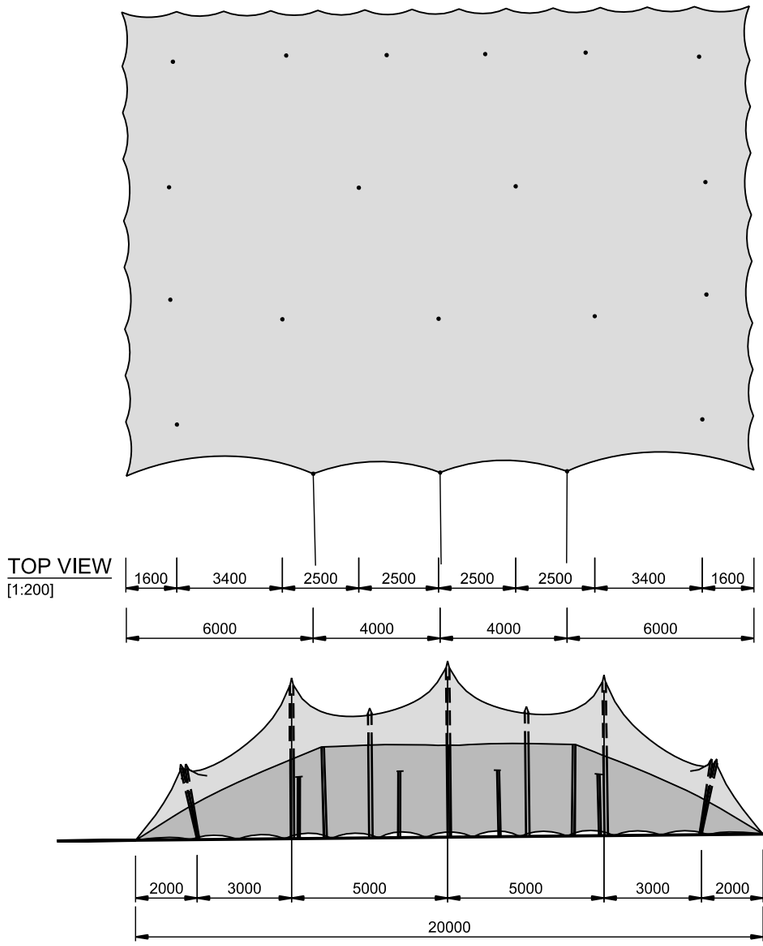
RVB	27.06.18	17.02.0170_15x20m - floating

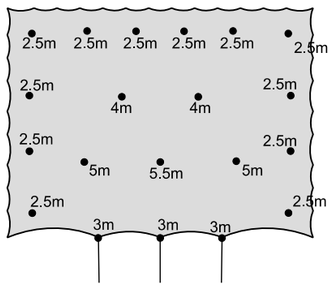
E.2. 20x15m – Closed



TOP VIEW
[1:200]

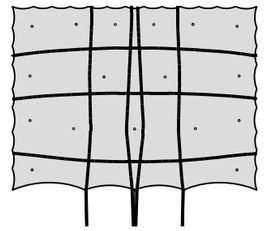
SIDE ELEVATION
[1:200]

FRONT ELEVATION
[1:200]



POLE HEIGHT DIAGRAM
[1:400]

APPLICATION OF STORM BELTS



Evacuate:	Wind Pressure	Gust	City	Village	Rural	Flattened	Coast
Without storm belt	265 N/m²	> 82 km/h	> 7 Bft > 19.0m/s	> 7 Bft > 18.2 m/s	> 6 Bft > 14.8m/s	> 5 Bft > 13.4 m/s	> 5 Bft > 12.8 m/s
With storm belt	500 N/m²	> 113 km/h	> 9 Bft > 26.1m/s	> 9 Bft > 25.0 m/s	> 7 Bft > 20.4m/s	> 7 Bft > 18.4 m/s	> 7 Bft > 17.5 m/s

ANCHORS

Based on: dense, non-cohesive soil

In case anchors of Ø35 x 1200mm (effective length) are being used:

Guy ropes	2x	per rope
Ground point - front corner	2x	per rope
Ground point - back corner	1x	per rope
Ground point - short side	1x	per rope
Ground point - long side	1x	per rope
Storm belt - width (4x)	2x	per side
Storm belt - length (3x)	3x	per side

POLES

Center poles (5.5m):
- Ø120 mm [Eucalyptus D35] or Ø90x3 / Ø76x4mm [6063 T6]

Center poles (5.0m):
- Ø110 mm [Eucalyptus D35] or Ø90x3 / Ø76x4mm [6063 T6]

Center poles (4m) / Entrance poles (3m):
- Ø85 mm [Eucalyptus D35] or Ø76x3mm [6063 T6]

Corner poles - (2.5m):
- Ø70 mm [Eucalyptus D35] or Ø50x3mm [6063 T6]

Side wall poles - (2.5m):
- Ø70 mm [Eucalyptus D35] or Ø50x3mm [6063 T6]

BELTS / ROPES

Storm belt:	PES, BL 5000 daN = LC 1667 daN
Guy rope:	PES, BL 3000 daN = LC 1000 daN
	OR Synthetic rope, BL 5870 daN *
Circumference rope:	PES, BL 2750 daN = LC 917 daN
	OR Synthetic rope, BL 4500 daN *

* required breaking load (BLtot) may be achieved by using multiple rope sections (n): BLrope = BLtot / n

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RVB	27.06.18	17.02.0170_15x20m - closed

F. Important terms and conditions

This document applies to the built structure if the following principles and conditions are met:

- The used materials, parts and sections (membrane, poles, ties, anchoring) are in accordance with this document.
- The dimensions of the built structure match the dimensions stated in this document.
- Parts (poles, ties, anchors) may not be removed.
- Obstacles should be placed at least 0.5m from the membrane (measured perpendicular to the fabric); The fabric needs a certain freedom to deform in all directions to prevent damages caused by collision with objects located closely to the fabric (see also NEN-EN 13782, article 8.7).
- Above the maximum allowable wind speeds (see summary, part wind load) the structure should be evacuated and access for the public must be denied.
- Only decorations, music- and light installations of less than 10 kg per pole, can be attached to the structure.
- A conventional load of 0.1 kN/m^2 is taken into account according to EN 13782, which corresponds with the required snowload (4cm) according to the French CTS.
- Anchoring is based on dense, non-cohesive soil. When soil differs, additional anchoring might be necessary or anchor tests need to be performed.

G. Allowable wind speeds

The maximum wind speed is converted into a basic wind speed for a coastal area, flattened/open area, rural area, village and city according to EN 1991-1-4. Terrain roughness is taken according to the recommended general values for the different terrain categories for Europe. (not country specific) Illustrations of these terrain categories are presented at page 18.

Storm belts are needed from a certain reduced wind pressure, as stated in paragraph H.5.5.1.

	Full wind load	**α = 0.53**	
Wind pressure p_w	500 N/m²	265 N/m²	At **5m** height
Corresponding peak wind pressure $p_{w,peak}$	605 N/m²	321 N/m²	At **10m** height

Peak wind speed at 10m height

Equation:

$$605 = {}^1/_2 \times \rho \times v^2 = {}^1/_2 \times 1.25 \times v^2 \rightarrow v = 31.1\ m/s \rightarrow \pm 113\ km/h$$

Eq. 4.10 NEN-EN 1991-1-4
Basic wind pressure

$$321 = {}^1/_2 \times \rho \times v^2 = {}^1/_2 \times 1.25 \times v^2 \rightarrow v = 22.7\ m/s \rightarrow \pm 82\ km/h$$

Eq. 4.10 NEN-EN 1991-1-4
Basic wind pressure

Wind speed coastal area at 10m height

$$K_r = 0.19 \times \left(\frac{z_0}{0.05}\right)^{0.07} = 0.19 \times \left(\frac{0.003}{0.05}\right)^{0.07} = 0.156$$

Eq. 4.5 NEN-EN 1991-1-4
Terrain factor for coastal area

$$C_r = K_r \times \ln\left(\frac{z}{z_0}\right) = 0.156 \times \ln\left(\frac{5.0}{0.003}\right) = 1.158$$

Eq. 4.4 NEN-EN 1991-1-4
Roughness factor at 4m height
Z = 5.0 > Z_{min} = 1

$$V_m = C_r \times V_b = 1.158 \times V_b$$

Eq. 4.3 NEN-EN 1991-1-4
Average wind speed at height

$$\sigma_v = K_r \times V_b = 0.156 \times V_b$$

Eq. 4.6 NEN-EN 1991-1-4
Standard deviation of turbulence

$$L_v = \frac{\sigma_v}{V_m} = \frac{0.156 \times V_b}{1.158 \times V_b} = 0.135$$

Eq. 4.7 NEN-EN 1991-1-4
Turbulence intensity

$$Q_p = (1 + 7 \times L_v) \times {}^1/_2 \times \rho \times {V_m}^2 = 1.628 \times {V_b}^2$$

Eq. 4.8 NEN-EN 1991-1-4
Extreme wind pressure

Equation:

$$500 = 1.628 \times {V_b}^2 \rightarrow solving\ gives \rightarrow V_b = 17.53\ m/s$$

Characteristic wind speed

$$265 = 1.628 \times {V_b}^2 \rightarrow solving\ gives \rightarrow V_b = 12.76\ m/s$$

Characteristic wind speed

Wind speed flattened, open area at 10m height

$$K_r = 0.19 \times \left(\frac{z_0}{0.05}\right)^{0.07} = 0.19 \times \left(\frac{0.01}{0.05}\right)^{0.07} = 0.170$$ **Eq. 4.5 NEN-EN 1991-1-4 Terrain factor for coastal area**

$$C_r = K_r \times \ln\left(\frac{z}{z_0}\right) = 0.170 \times \ln\left(\frac{5.0}{0.01}\right) = 1.055$$ **Eq. 4.4 NEN-EN 1991-1-4 Roughness factor at 3.5m height Z = 5.0 > Z_{min} = 1**

$$V_m = C_r \times V_b = 1.055 \times V_b$$ **Eq. 4.3 NEN-EN 1991-1-4 Average wind speed at height**

$$\sigma_v = K_r \times V_b = 0.170 \times V_b$$ **Eq. 4.6 NEN-EN 1991-1-4 Standard deviation of turbulence**

$$L_v = \frac{\sigma_v}{V_m} = \frac{0.170 \times V_b}{1.055 \times V_b} = 0.161$$ **Eq. 4.7 NEN-EN 1991-1-4 Turbulence intensity**

$$Q_p = (1 + 7 \times L_v) \times {}^1/_2 \times \rho \times {V_m}^2 = 1.479 \times {V_b}^2$$ **Eq. 4.8 NEN-EN 1991-1-4 Extreme wind pressure**

Equation:

$$500 = 1.479 \times {V_b}^2 \rightarrow solving\ gives \rightarrow V_b = 18.39\ m/s$$ **Characteristic wind speed**

$$265 = 1.479 \times {V_b}^2 \rightarrow solving\ gives \rightarrow V_b = 13..39\ m/s$$ **Characteristic wind speed**

Wind speed rural area at 10m height

$$K_r = 0.19 \times \left(\frac{z_0}{0.05}\right)^{0.07} = 0.19 \times \left(\frac{0.05}{0.05}\right)^{0.07} = 0.190$$ **Eq. 4.5 NEN-EN 1991-1-4 Terrain factor for unbuilt area**

$$C_r = K_r \times \ln\left(\frac{z}{z_0}\right) = 0.190 \times \ln\left(\frac{5.0}{0.05}\right) = 0.875$$ **Eq. 4.4 NEN-EN 1991-1-4 Roughness factor at 4m height Z = 5.0 > Z_{min} = 2**

$$V_m = C_r \times V_b = 0.875 \times V_b$$ **Eq. 4.3 NEN-EN 1991-1-4 Average wind speed at height**

$$\sigma_v = K_r \times V_b = 0.190 \times V_b$$ **Eq. 4.6 NEN-EN 1991-1-4 Standard deviation of turbulence**

$$L_v = \frac{\sigma_v}{V_m} = \frac{0.190 \times V_b}{0.875 \times V_b} = 0.217$$ **Eq. 4.7 NEN-EN 1991-1-4 Turbulence intensity**

$$Q_p = (1 + 7 \times L_v) \times {}^1/_2 \times \rho \times {V_m}^2 = 1.206 \times {V_b}^2$$ **Eq. 4.8 NEN-EN 1991-1-4 Extreme wind pressure**

Equation:

$$500 = 1.206 \times {V_b}^2 \rightarrow solving\ gives \rightarrow V_b = 20.36\ m/s$$ **Characteristic wind speed**

$$265 = 1.206 \times {V_b}^2 \rightarrow solving\ gives \rightarrow V_b = 14.82\ m/s$$ **Characteristic wind speed**

Wind speed village at 10m height

$$K_r = 0.19 \times \left(\frac{z_0}{0.05}\right)^{0.07} = 0.19 \times \left(\frac{0.3}{0.05}\right)^{0.07} = 0.215$$ **Eq. 4.5 NEN-EN 1991-1-4 Terrain factor for unbuilt area**

$$C_r = K_r \times \ln\left(\frac{z}{z_0}\right) = 0.215 \times \ln\left(\frac{5}{0.3}\right) = 0.606$$ **Eq. 4.4 NEN-EN 1991-1-4 Roughness factor at 7m height Z = Z_{min} = 5**

$$V_m = C_r \times V_b = 0.606 \times V_b$$ **Eq. 4.3 NEN-EN 1991-1-4 Average wind speed at height**

$$\sigma_v = K_r \times V_b = 0.215 \times V_b$$ **Eq. 4.6 NEN-EN 1991-1-4 Standard deviation of turbulence**

$$L_v = \frac{\sigma_v}{V_m} = \frac{0.215 \times V_b}{0.606 \times V_b} = 0.355$$ **Eq. 4.7 NEN-EN 1991-1-4 Turbulence intensity**

$$Q_p = (1 + 7 \times L_v) \times {}^1/_2 \times \rho \times {V_m}^2 = 0.801 \times {V_b}^2$$ **Eq. 4.8 NEN-EN 1991-1-4 Extreme wind pressure**

Equation:

$$500 = 0.801 \times {V_b}^2 \rightarrow solving\ gives \rightarrow V_b = 24.99\ m/s$$ **Characteristic wind speed**

$$265 = 0.801 \times {V_b}^2 \rightarrow solving\ gives \rightarrow V_b = 18.19\ m/s$$ **Characteristic wind speed**

Wind speed city at 10m height

$$K_r = 0.19 \times \left(\frac{z_0}{0.05}\right)^{0.07} = 0.19 \times \left(\frac{1}{0.05}\right)^{0.07} = 0.234$$ **Eq. 4.5 NEN-EN 1991-1-4 Terrain factor for unbuilt area**

$$C_r = K_r \times \ln\left(\frac{z}{z_0}\right) = 0.234 \times \ln\left(\frac{10}{1}\right) = 0.540$$ **Eq. 4.4 NEN-EN 1991-1-4 Roughness factor at 7m height Z = Z_{min} =10**

$$V_m = C_r \times V_b = 0.540 \times V_b$$ **Eq. 4.3 NEN-EN 1991-1-4 Average wind speed at height**

$$\sigma_v = K_r \times V_b = 0.234 \times V_b$$ **Eq. 4.6 NEN-EN 1991-1-4 Standard deviation of turbulence**

$$L_v = \frac{\sigma_v}{V_m} = \frac{0.234 \times V_b}{0.540 \times V_b} = 0.434$$ **Eq. 4.7 NEN-EN 1991-1-4 Turbulence intensity**

$$Q_p = (1 + 7 \times L_v) \times {}^1/_2 \times \rho \times {V_m}^2 = 0.735 \times {V_b}^2$$ **Eq. 4.8 NEN-EN 1991-1-4 Extreme wind pressure**

Equation:

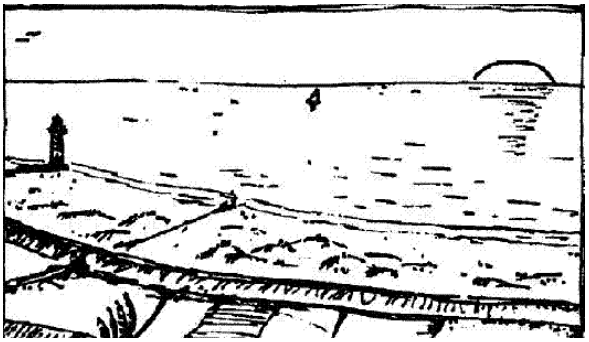
$$500 = 0.735 \times {V_b}^2 \rightarrow solving\ gives \rightarrow V_b = 26.08\ m/s$$ **Characteristic wind speed**

$$265 = 0.735 \times {V_b}^2 \rightarrow solving\ gives \rightarrow V_b = 18.99\ m/s$$ **Characteristic wind speed**

Terrain categories

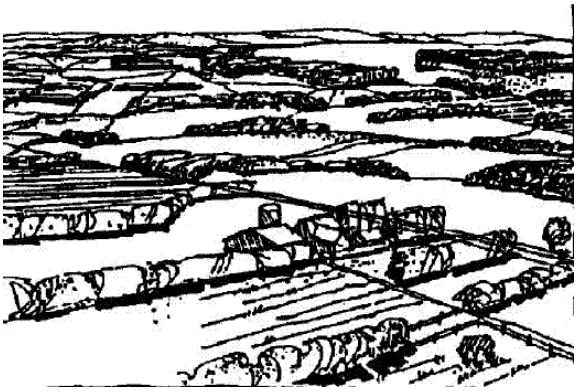
Default European terrain categories (not Country specific)

0: Coastal area:

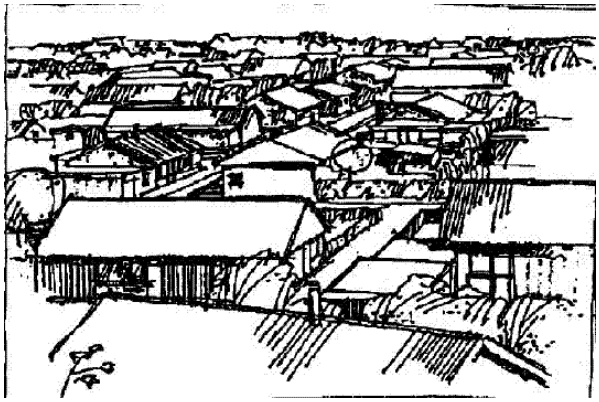


I: Flattened, open area:

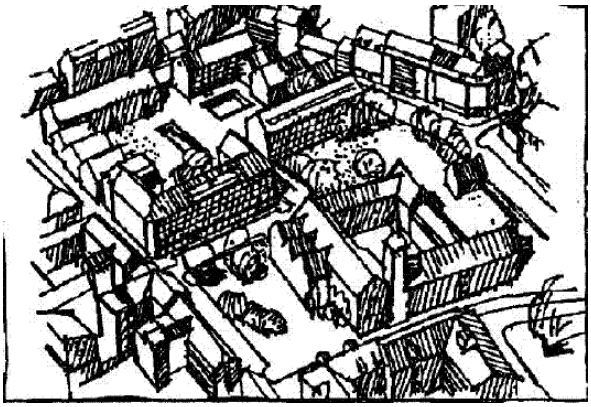
II: Rural area



III: Village



IV: City



H. Static Analysis

H.1. Project description

H.1.1 Description

The principle of a stretchtent is based on a rectangular piece of stretchable membrane with fixing possibilities along the boundary. The membrane is supported by poles, both at the edge and in the field. The side poles are stabilized by guy ropes. Besides, it is also possible to tie down the edge of the membrane directly to the ground. The poles do not require a fixed position which ensures a freedom of shape.

Tentech has performed a static analysis of the 20x15m stretch tent, for which two configurations have been considered in detail:

- The 20x15m 'floating model'
  Elevated from the ground by center poles and entrance poles. The corner poles are positioned slightly inward and the corners of the fabric are tied down to the ground with a short rope. On the long sides the fabric is tied to the ground with guy ropes at the entrance poles and guy ropes between the entrance poles to create more curvature.

- The 20x15m 'three sides closed' model
  Opened on one side with entrance poles. The other three membrane edges are directly connected to the ground each ≈ 1.5m. The 'walls' are created by placing side wall poles in the fabric, positioned ca. 2m from the edge. The rest of the membrane is supported by center poles.

Storm belts are only needed from a certain wind load. These conditions are specified in paragraph H.5.5.1.

The total size can be achieved by joining multiple membrane parts. The connection between two membrane parts can be verified on the assumption that the connection itself is stronger than a single membrane layer. Therefore, it is possible to construct a tent size that has been analyzed as one part also with multiple parts, as long as the arrangement stays the same.

H.1.2 Analyzed configurations

H.1.2.1 20x15m – Floating

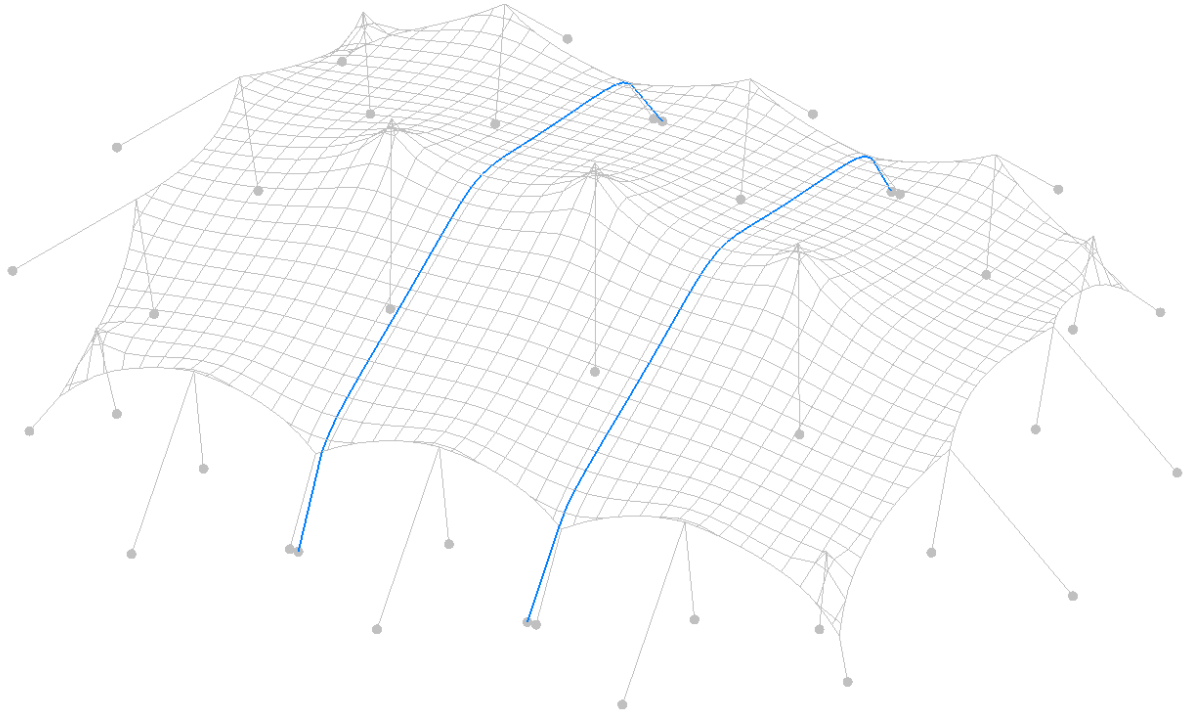


Figure 1. 20x15m floating

H.1.2.2 20x15m – three sides closed

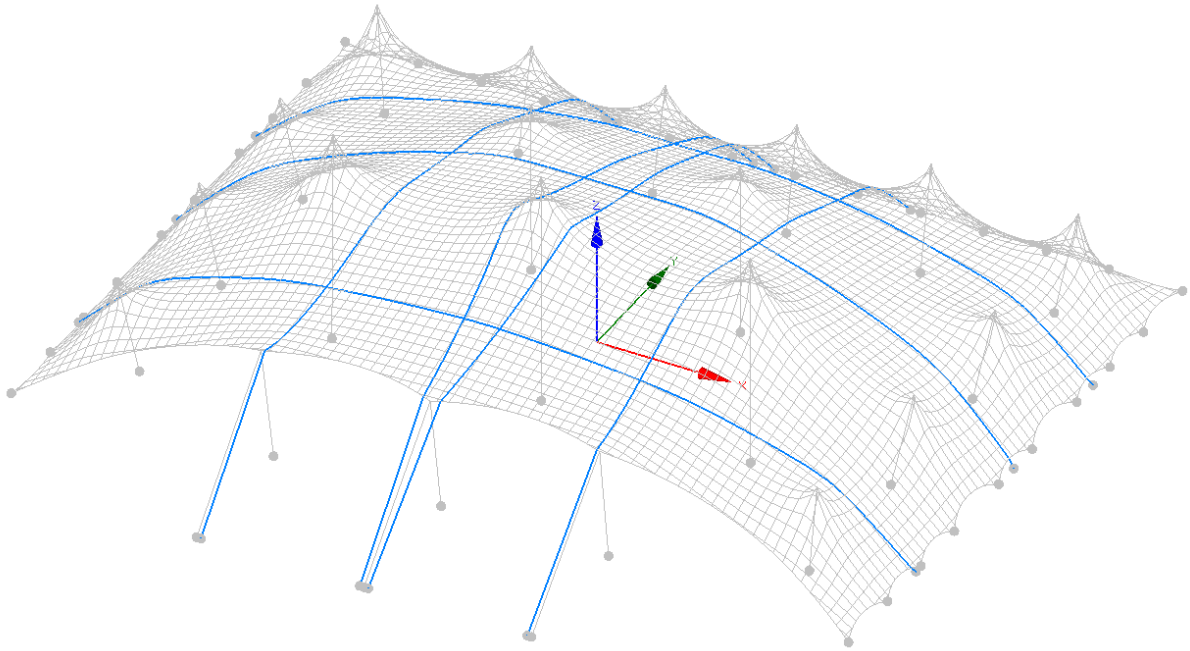


Figure 2. 20x15m closed

H.2. Materials

H.2.1 Fabric

Design tensile strength	f_d	f_{tk} / γ_m	art 8.6EN 13782
Characteristic tensile strength (warp)	$f_{tk, warp}$		
Characteristic tensile strength (weft)	$f_{tk, weft}$		
Material factor – global, permanent load	γ_m	2.5	tbl 4. EN13782
Material factor – global, short duration load	γ_m	2.0	tbl 4. EN13782

Table 1. Used symbols, codes and standard for fabric materials

Material	Type	Weight	$f_{rd;warp;perm}$	$f_{rd; weft;perm}$	$f_{rd; warp;short}$	$f_{rd: weft;short}$
Contour 3xl FR	-	≈ 500 gr/m^2	8.0 kN/m	5.6 kN/m	10.0 kN/m	7.0 kN/m
Contour X FR	-	≈ 750 gr/m^2	7.6 kN/m	6 kN/m	9.5 kN/m	7.5 kN/m

Table 2. Used fabrics

The calculations provided in this tentbook are based on the lowest tensile strength of the two fabrics.

H.2.2 Belts

Design resistance	F_{rd}	R_m / γ_{m1}	art 10.2. EN13782
Characteristic breaking strength	R_m	LC x γ_{m2}	art 10.2. EN13782
Lashing capacity	LC		Conform EN 12195-2
Material factor	γ_{m1}	2.0	art 10.2. EN13782
Material factor	γ_{m2}	3.0	EN1492-1

Table 3. Used symbols, codes and standard for belt materials

Material	LC	Rm	F_{rd}
Storm belt [PES] EN 12195-2	1667 daN 16.67 kN	5000 daN 50 kN	25 kN

Table 4. Used belts

H.2.3 **Ropes**

Design resistance	F_{rd}	R_m / γ_{m1}	art 10.2. EN13782
Characteristic tensile strength	R_m		art 10.2. EN13782
Material factor	$\gamma_{m1 < 12mm}$ $\gamma_{m1 > 12mm}$	4.0 3.3	art 10.3. EN13782 art 10.3. EN13782

Table 5. Used symbols, codes and standard for belt materials

Material	Cross section	Breaking strength	Rm	F_{rd}
14mm Polyester Braid rope	Ø 14 mm	≥ 3640 daN	36.4 kN	11.0 kN
7mm Polyester Braid rope	Ø 7 mm	≥ 910 daN	9.1 kN	2.3 kN

Table 6. Used ropes

H.2.4 **Wood, Eucalyptus D35**

Material	γ_{m1}	1.3	tbl. 2.3. EN 1995-1-1

Table 7. Used material factors

Material	Weight	$E_{0.05}$	F_{c0k}	F_{mk}
Wood, Eucalyptus D35 strength class	540 kg/m^3	8.7 kN/m^2	25 N/mm^2	35 N/mm^2

Table 8. Used wooden materials

H.2.5 **Aluminium, 6063 T6**

Material factor (strength)	γ_{m0}	1.1	tbl. 6.1. EN 1999-1-1
Material factor (stability)	γ_{m1}	1.1	tbl. 6.1. EN 1999-1-1
Material factor (tension to fracture / connections)	γ_{m2}	1.25	tbl. 2.1. EN 1999-1-1

Table 9. Used material factors

Material	Weight	E-modulus	F_y	F_u
EN-AW 6063 T6	2700 kg/m^3	70000 N/mm^2	160 N/mm^2	195 N/mm^2

Table 10. Used aluminum materials

H.3. Cross sections

Profile	Material	Ø mm	t mm	G kg/m	A mm^2	I_y mm^4	$W_{el;y}$ mm^3	$W_{pl;y}$ mm^3
Ø ≈ 120 mm *	Wood D35	120	n/a	6.11	11310	10178760	169646	
Ø ≈ 110 mm *	Wood D35	110	n/a	5.13	9503	7186884	130671	
Ø ≈ 85mm *	Wood D35	85	n/a	3.06	5675	2562392	60292	
Ø ≈ 70 mm *	Wood D35	70	n/a	2.08	3849	1178588	33674	
Ø ≈ 65 mm *	Wood D35	65	n/a	1.79	3318	876241	26961	
Ø90x3mm	6063 T6	90	3	2.21	820	776703	17260	22716
Ø76x5mm	6063 T6	76	5	3.01	1115	706242	18585	25247
Ø76x4mm	6063 T6	76	4	2.44	905	588106	15476	20757
Ø76x3mm	6063 T6	76	3	1.86	688	459074	12081	15996
Ø50x3mm	6063 T6	50	3	1.20	443	122812	4912	6636

Table 11. Used cross sections

* the average diameter, as a minimum required at the middle of the pole.

H.4. Calculation method

H.4.1 Modeling

The analysis of the structure is performed with the software package EASY FCS supplied by TECHNET GmbH, Berlin. This software is specially developed for structures with large deformability, such as membrane structures. The performed analysis is a full non-linear second order analysis.

The membrane structure is modeled in 3D. The membrane is modeled as a cable net structure and supported by poles. These center poles will be stabilized by the tensioned membrane. The side poles are stabilized and tied down by tension belts, which are attached to ground anchors. Alternatively, the membrane is directly tied to a ground anchor.

The membrane edges are reinforced. They consist of multiple layers of fabric about 10cm wide with additional patches where the lugs are placed, so point loads are introduced gradually into the fabric.

When required, stormbelts are placed in the valleys between the field poles.

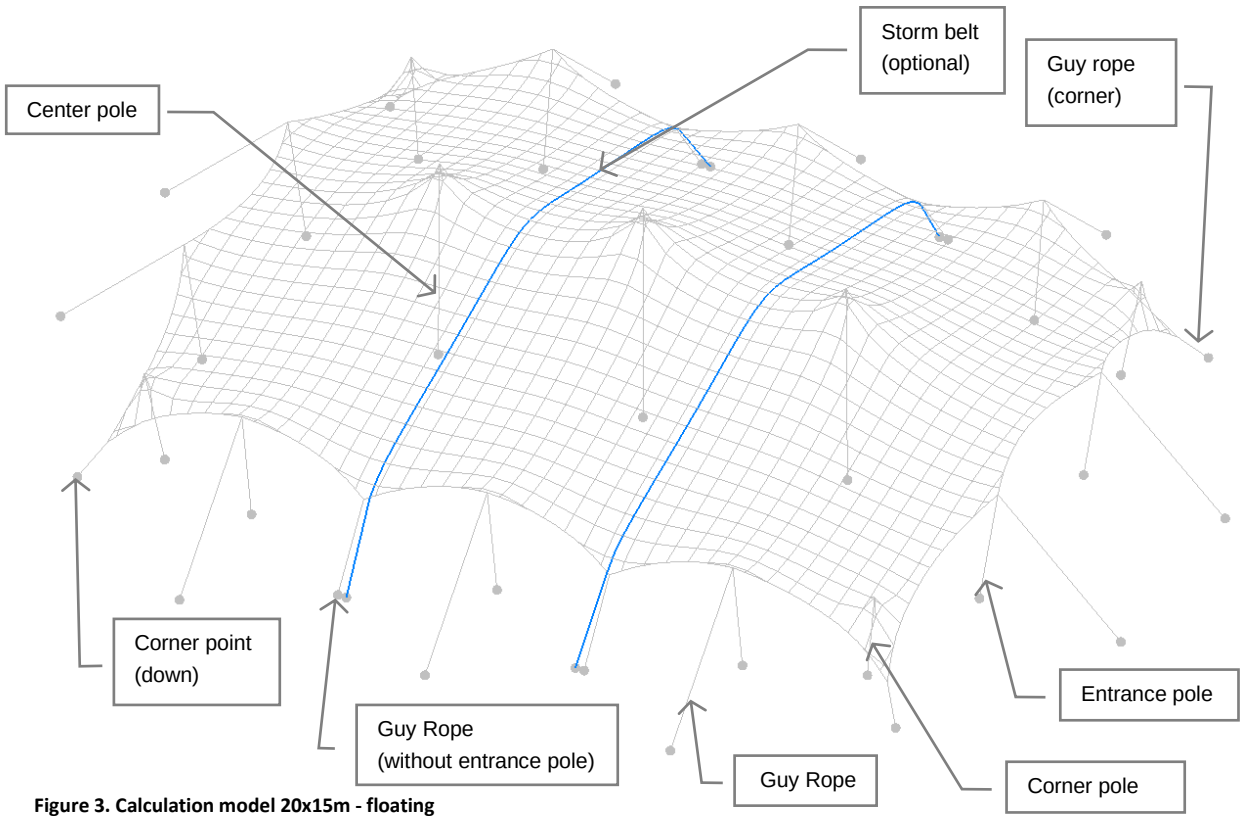


Figure 3. Calculation model 20x15m - floating

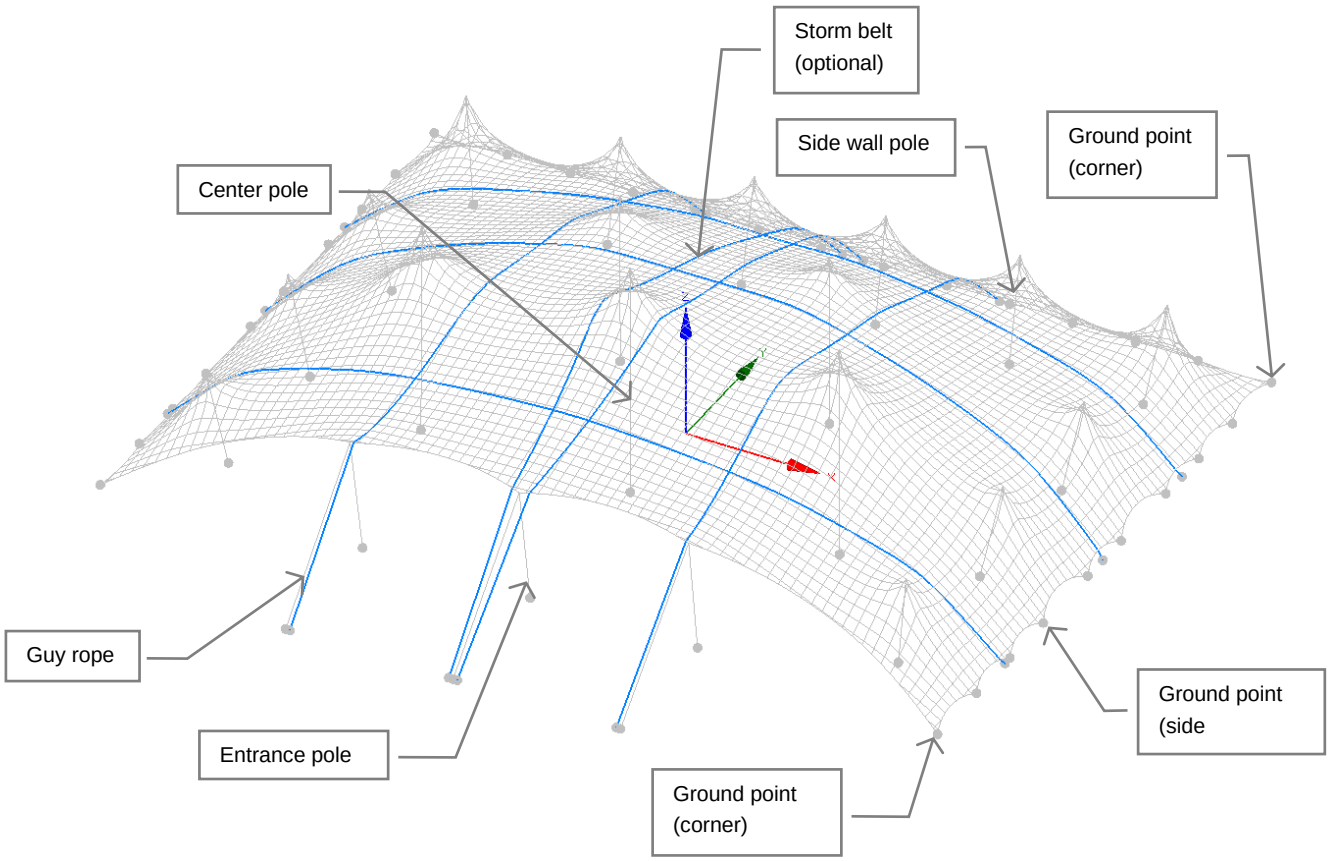


Figure 4. Calculation model 20x15m - closed

H.4.2 Structural behavior of membrane structures

Since the fabric is a highly deformable material, it is only possible to calculate stresses and deformations with a non-linear method. FEM-software EASY is used to perform these calculations. Because of the non-linearity of the calculations the partial safety factors are not applied beforehand, since the deformations will be greater due to these safety factors, resulting in lower stresses in the fabric. See figure below.

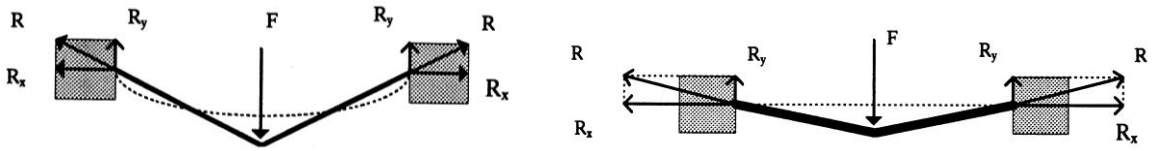


Figure 5. membrane behavior

As a membrane structure is a form-active structure, article 6.3 (4) b) of the EN-1990:2002 applies:

> *When the action effect increases less than the action, the partial factor γ_F should be applied to the action effect of the representative value of the action.*

This means that no load factors are applied on the load beforehand, but afterwards.

H.4.3 Load combinations

H.4.3.1 Fundamental - Ultimate limit state

For the purpose of determination of strength and check of elements and connections.

	One variable load	Multiple variable loads
Unfavorable permanent load	$1.35 \times G + 1.5 \times Q$	$1.35 \times G + \sum 1.35 \times Q_i$
Favorable permanent load	$1.0 \times G + 1.5 \times Q$	$1.0 \times G + \sum 1.35 \times Q_i$

Table 12. Load combinations according to NEN-EN 13782

This means the following load combinations will be checked/calculated:

1. 1.0 x Own weight + 1.5 x Wind load
2. 1.35 x Own weight + 1.5 x Conventional load

H.4.3.2 Safety against overturning, sliding and uplifting - Ultimate limit state

For the purpose of determination and check of needed contra weight and/or anchor pins

	One or multiple variable loads
Unfavorable permanent load	$1.1 \times G + 1.2 \times Q_{wind} + \sum 1.3 \times Q_i$
Favorable permanent load	$1.0 \times G + 1.2 \times Q_{wind} + \sum 1.3 \times Q_i$

Table 13. Load combinations according to NEN-EN 13782

This means the following load combinations will be checked/calculated:

A. 1.0 x Own weight + 1.2 x Wind load

H.5. Load cases

H.5.1 Own weight

The own weight of the fabric is 750 g/m^2 = 0.0075 kN/m^2 and is added as separate load case.

H.5.2 Pretension

The structure will be pretensioned with ropes. The pretension varies between 150-200 kg of pressure in a center pole.

H.5.3 Conventional / snow load

Conventional load according to EN 13782: The stability shall be checked with a conventional vertical load of 0,1 kN/m^2. This load shall not be combined with other load cases, except self-weight. This can be seen as a snow load of 0.1 kN/m^2 (4cm) according the French CTS.

H.5.4 User load

A user defined load (for light, sound and/or decoration purposes) is set on 10 kg per pole and is added after the analysis while performing checks.

H.5.5 Wind

H.5.5.1 Wind pressure

Wind load according to EN 13782, 7.4.2.2:
This leads to a peak velocity pressure **q_p (z_e) of 0.50 kN/m^2**.

In case of wind suction, storm belts are needed from a certain reduced wind pressure (pw,red):

Floating model – no stormbelts:	pw,red = α x p_w = 0.53 x 500 = **265 N/m^2**
Floating model – 2 stormbelts:	full wind load
Closed model – no stormbelts:	pw,red = α x p_w = 0.53 x 500 = **265 N/m^2**
Closed model – 7 stormbelts:	full wind load

H.5.5.2 **Wind shape values (Cp-factors)**

Two different wind situations are reviewed for the membrane:

1. The whole tent is subjected to wind suction (conform Cp values given in EN 13782)
2. The whole tent is subjected to wind pressure (conform Cp values given in EN 13782)

Wind suction - floating configuration

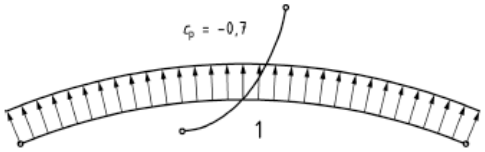


figure 6. C_p values for rectangle structures BS-EN 13782

P_w	$p_{w,rep}$
500 N/m²	-0.7 x 0.500 = **-0.350 kN/m²**
265 N/m²	-0.7 x 0.265 = **-0.186 kN/m²**

Wind suction – three sides closed configuration (closed)

Wind coefficients (c_p – values) for tent constructions according to EN 1991-1-4, for a free standing canopy with a blockage of ϕ = 1.0, Cp = 1.3

P_w	$p_{w,rep}$
500 N/m²	-1.3 x 0.500 = **-0.650 kN/m²**
265 N/m²	-1.3 x 0.265 = **-0.345 kN/m²**

Wind pressure

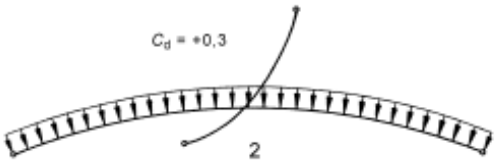


figure 7. C_p values for rectangle structures BS-EN 13782

P_w	$p_{w,rep}$
500 N/m²	0.3 x 0.500 = **0.150 kN/m²**
265 N/m²	0.3 x 0.265 = **0.080 kN/m²**

H.6. Calculation results

H.6.1 Listing of calculated load combinations

LC1 = Pretension
LC2 = Own weight
LC3 = Conventional load / Snow load
LC4 = Wind pressure
LC5 = Wind suction – floating – reduction 0.53
LC6 = Wind suction – floating – full wind load
LC7 = Wind suction – closed – reduction 0.53
LC8 = Wind suction – closed – full wind load

The following load combinations are taken into account:
partial safety factors are added after the static analysis (see H.4.2).

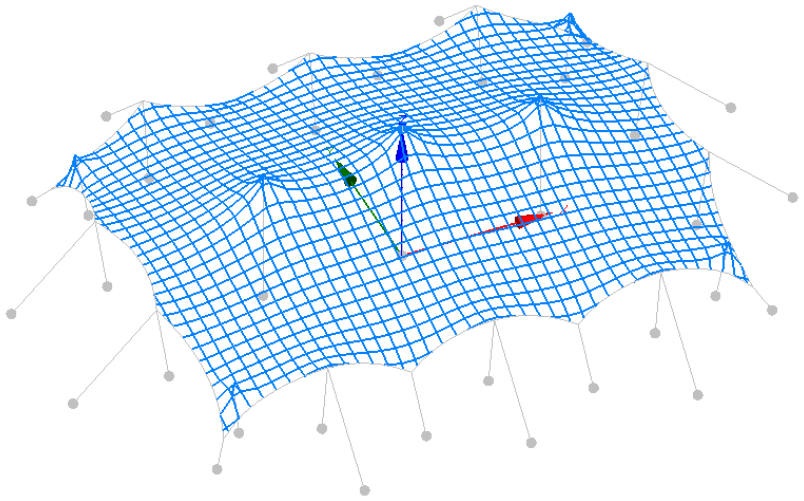
	LC 1	LC2	LC 3	LC 4	LC 5	LC6	LC7	LC8
CO 1	1 x	1 x						
CO 2	1 x	1 x	1 x					
CO 3	1 x	1 x		1 x				
CO 4	1 x	1 x			1 x			
CO 5	1 x	1 x				1 x		
CO 6	1 x	1 x					1x	
CO 7	1 x	1 x						1x

table 14. Combinations (CO)

Storm belts are only necessary above a certain wind speed. Only when required, storm belts are added to the calculation model. In H.6.2 Overview: Global results of static analysis, it is explicitly mentioned when a stormbelt is added.

H.6.2 Overview: Global results of static analysis

H.6.2.1 Membrane

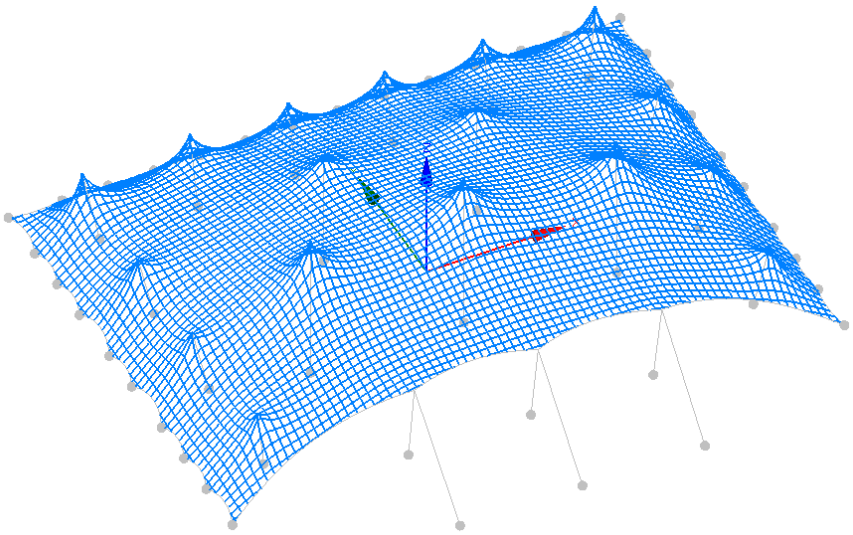


Floating model

Floating		Load combination	F_{rep}	Pag.
Warp		CO1. Own weight + pretension	0.59 kN/m	100
		CO2. Own weight + pretension + conventional / snow	2.64 kN/m	103
		CO3. Own weight + pretension + wind pressure	3.43 kN/m	106
		CO4. Own weight + pretension + wind suction – floating – reduction 0.53	3.00 kN/m	109
	Max	CO5. Own weight + pretension + wind suction – floating – full wind load *	3.66 kN/m	112
Weft		CO1. Own weight + pretension	0.53 kN/m	100
		CO2. Own weight + pretension + conventional / snow	3.46 kN/m	103
		CO3. Own weight + pretension + wind pressure	4.76 kN/m	106
	Max	CO4. Own weight + pretension + wind suction – floating – reduction 0.53	4.76 kN/m	109
		CO5. Own weight + pretension + wind suction – floating – full wind load *	4.18 kN/m	112

Table 15. Leading forces membrane – floating model

* 2 stormbelts required. See Figure 1. 20x15m floating and/or drawing 20x15m – Floating in chapter E.1



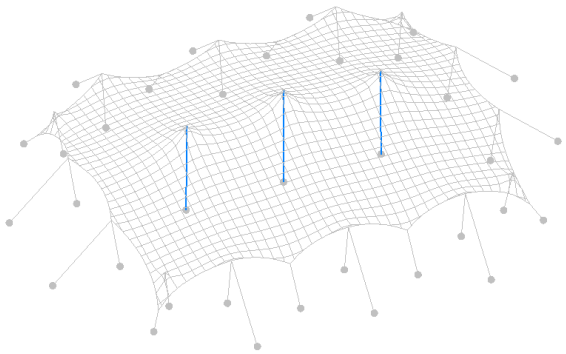
Closed model

Closed		Load combination	F_{rep}	Pag.
Warp		CO1. Own weight + pretension	1.45 kN/m	115
		CO2. Own weight + pretension + conventional / snow	3.57 kN/m	118
		CO3. Own weight + pretension + wind pressure	5.06 kN/m	121
		CO6. Own weight + pretension + wind suction – closed – reduction 0.53	6.33 kN/m	124
	Max	CO7. Own weight + pretension + wind suction – closed – full wind load *	6.33 kN/m	127
Weft		CO1. Own weight + pretension	1.16 kN/m	115
		CO2. Own weight + pretension + conventional / snow	3.59 kN/m	118
	Max	CO3. Own weight + pretension + wind pressure	4.67 kN/m	121
		CO6. Own weight + pretension + wind suction – closed – reduction 0.53	4.67 kN/m	124
		CO7. Own weight + pretension + wind suction – closed – full wind load *	4.21 kN/m	127

Table 16. Leading forces membrane – closed model

* 7 stormbelts required. See Figure 2. 20x15m closed and/or Drawing 20x15m – Closed in chapter E.2

H.6.2.2 **Center poles**

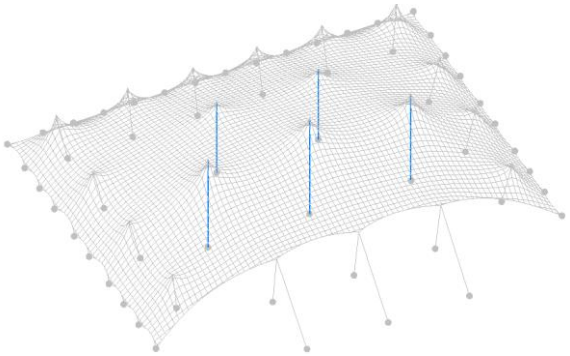


Floating model

Floating		Load combination	F_{rep}	Pag.
Center pole 5.5m		CO1. Own weight + pretension	-1.47 kN	102
		CO2. Own weight + pretension + conventional / snow	-8.11 kN	105
	Max	CO3. Own weight + pretension + wind pressure	-11.0 kN	108
		CO4. Own weight + pretension + wind suction – floating – reduction 0.53	-0.20 kN	111
		CO5. Own weight + pretension + wind suction – floating – full wind load *	-0.14 kN	114
Center pole 5.0m		CO1. Own weight + pretension	-1.30 kN	102
		CO2. Own weight + pretension + conventional / snow	-6.93 kN	105
	Max	CO3. Own weight + pretension + wind pressure	-9.50 kN	108
		CO4. Own weight + pretension + wind suction – floating – reduction 0.53	-0.13 kN	111
		CO5. Own weight + pretension + wind suction – floating – full wind load *	-0.02 kN	114

Table 17. Leading forces Center poles – floating model

* 2 stormbelts required. See Figure 1. 20x15m floating and/or drawing 20x15m – Floating in chapter E.1



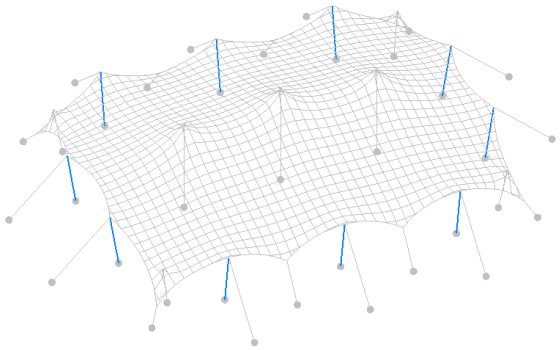
Closed model

Closed		Load combination	F_{rep}	Pag.
Center pole 5.5m		CO1. Own weight + pretension	-1.81 kN	117
		CO2. Own weight + pretension + conventional / snow	-5.69 kN	120
	Max	CO3. Own weight + pretension + wind pressure	-7.43 kN	123
		CO6. Own weight + pretension + wind suction – closed – reduction 0.53	-0.98 kN	126
		CO7. Own weight + pretension + wind suction – closed – full wind load *	-2.4 kN	129
Center pole 5.0m		CO1. Own weight + pretension	-2.01 kN	117
		CO2. Own weight + pretension + conventional / snow	-5.96 kN	120
	Max	CO3. Own weight + pretension + wind pressure	-8.35 kN	123
		CO6. Own weight + pretension + wind suction – closed – reduction 0.53	-1.23 kN	126
		CO7. Own weight + pretension + wind suction – closed – full wind load *	-1.44 kN	129
Center pole 4.0m		CO1. Own weight + pretension	-1.06 kN	117
		CO2. Own weight + pretension + conventional / snow	-3.75 kN	120
	Max	CO3. Own weight + pretension + wind pressure	-5.45 kN	123
		CO6. Own weight + pretension + wind suction – closed – reduction 0.53	-0.18 kN	126
		CO7. Own weight + pretension + wind suction – closed – full wind load *	-0.28 kN	129

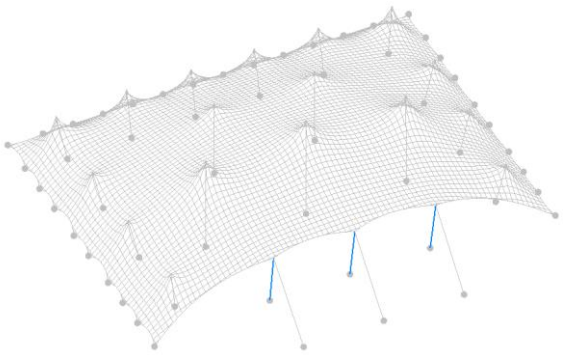
Table 18. Leading forces Center poles – closed mode

* 7 stormbelts required. See Figure 2. 20x15m closed and/or Drawing 20x15m – Closed in chapter E.2

H.6.2.3 **Entrance poles**



Floating model



Closed model

Floating		Load combination	F_{rep}	Pag.
Entrance poles 3.0m		CO1. Own weight + pretension	-1.91 kN	102
		CO2. Own weight + pretension + conventional / snow	-6.19 kN	105
	Max	CO3. Own weight + pretension + wind pressure	-8.81 kN	108
		CO4. Own weight + pretension + wind suction – floating – reduction 0.53	-5.19 kN	111
		CO5. Own weight + pretension + wind suction – floating – full wind load *	-7.00 kN	114

Table 19. Leading forces entrance poles – floating model

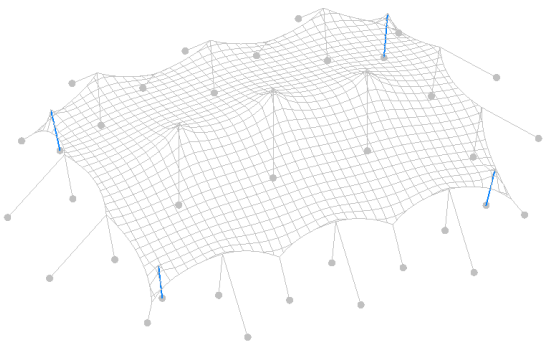
* 2 stormbelts required. See Figure 1. 20x15m floating and/or drawing 20x15m – Floating in chapter E.1

Closed		Load combination	F_{rep}	Pag.
Entrance poles 3.0m		CO1. Own weight + pretension	-2.61 kN	117
		CO2. Own weight + pretension + conventional / snow	-4.78 kN	120
		CO3. Own weight + pretension + wind pressure	-6.58 kN	123
		CO6. Own weight + pretension + wind suction – closed – reduction 0.53	-5.41 kN	126
	Max	CO7. Own weight + pretension + wind suction – closed – full wind load *	-9.79 kN	129

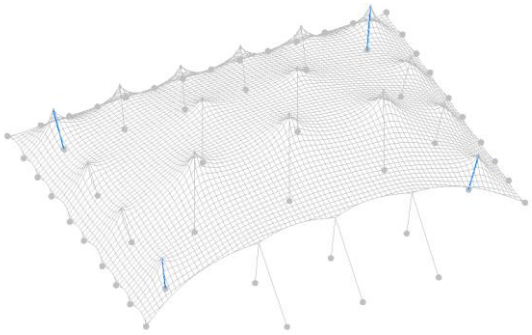
Table 20. Leading forces entrance poles – closed model

* 7 stormbelts required. See Figure 2. 20x15m closed and/or Drawing 20x15m – Closed in chapter E.2

H.6.2.4 **Corner poles**



Floating model



Closed model

Floating		Load combination	F_{rep}	Pag.
Corner poles 2.5m		CO1. Own weight + pretension	-0.94 kN	102
		CO2. Own weight + pretension + conventional / snow	-2.63 kN	105
	Max	CO3. Own weight + pretension + wind pressure	-3.90 kN	108
		CO4. Own weight + pretension + wind suction – floating – reduction 0.53	-0.96 kN	111
		CO5. Own weight + pretension + wind suction – floating – full wind load *	-0.95 kN	114

Table 21. Leading forces corner poles – floating model

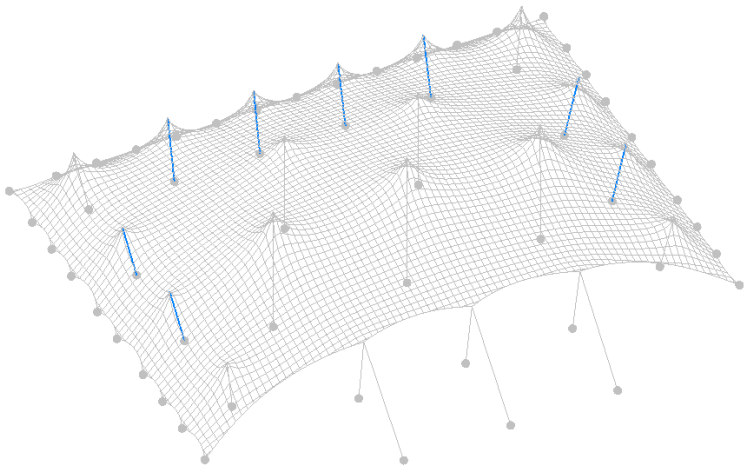
* 2 stormbelts required. See Figure 1. 20x15m floating and/or drawing 20x15m – Floating in chapter E.1

Closed		Load combination	F_{rep}	Pag.
Corner poles 2.5m		CO1. Own weight + pretension	-1.57 kN	117
		CO2. Own weight + pretension + conventional / snow	-3.40 kN	120
	Max	CO3. Own weight + pretension + wind pressure	-5.76 kN	123
		CO6. Own weight + pretension + wind suction – closed – reduction 0.53	-1.14 kN	126
		CO7. Own weight + pretension + wind suction – closed – full wind load *	-1.31 kN	129

Table 22. Leading forces corner poles – closed model

* 7 stormbelts required. See Figure 2. 20x15m closed and/or Drawing 20x15m – Closed in chapter E.2

H.6.2.5 **Side wall poles**



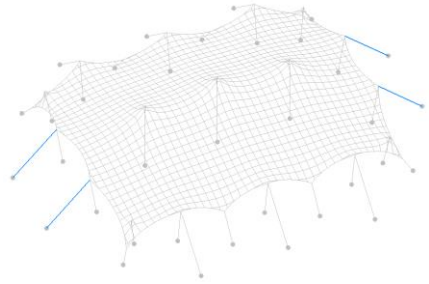
Closed model

Closed		Load combination	F_{rep}	Pag.
Side wall poles 2.5m		CO1. Own weight + pretension	-1.11 kN	117
		CO2. Own weight + pretension + conventional / snow	-3.16 kN	120
	Max	CO3. Own weight + pretension + wind pressure	-5.37 kN	123
		CO6. Own weight + pretension + wind suction – closed – reduction 0.53	-0.93 kN	126
		CO7. Own weight + pretension + wind suction – closed – full wind load *	-0.94 kN	129

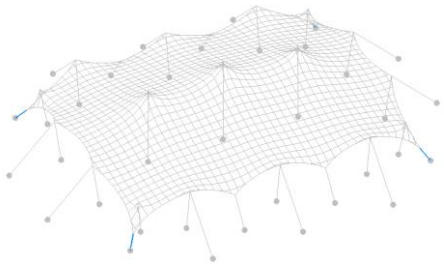
Table 23. Leading forces side wall poles – closed model

* 7 stormbelts required. See Figure 2. 20x15m closed and/or Drawing 20x15m – Closed in chapter E.2

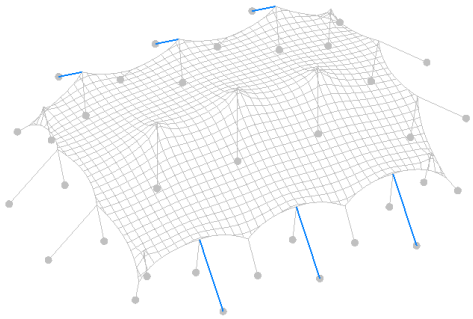
H.6.2.6 **Guy ropes**



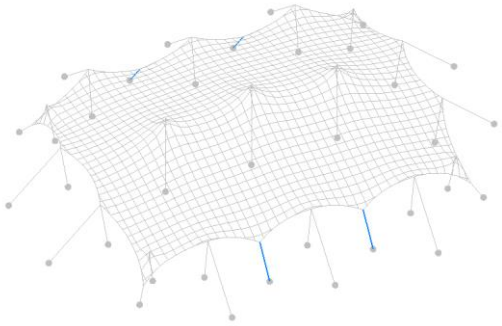
Floating model – guy ropes short side



Floating model – guy ropes corner



Floating model – guy ropes long side

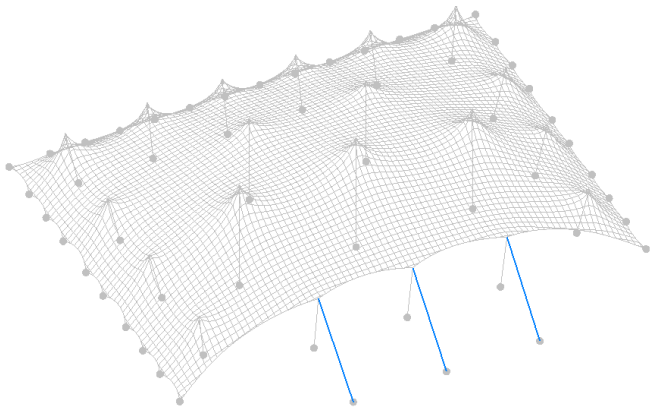


Floating model – guy ropes valley

Floating		Load combination	F_{rep}	Pag.
Guy ropes short side		CO1. Own weight + pretension	1.37 kN	101
		CO2. Own weight + pretension + conventional / snow	4.08 kN	104
		CO3. Own weight + pretension + wind pressure	5.91 kN	107
		CO4. Own weight + pretension + wind suction – floating – reduction 0.53	6.44 kN	111
	Max	CO5. Own weight + pretension + wind suction – floating – full wind load *	9.79 kN	113
Guy ropes long side		CO1. Own weight + pretension	1.09 kN	101
		CO2. Own weight + pretension + conventional / snow	4.28 kN	104
	Max	CO3. Own weight + pretension + wind pressure	6.43 kN	107
		CO4. Own weight + pretension + wind suction – floating – reduction 0.53	3.48 kN	111
		CO5. Own weight + pretension + wind suction – floating – full wind load *	4.98 kN	113
Guy ropes corner		CO1. Own weight + pretension	3.13 kN	101
		CO2. Own weight + pretension + conventional / snow	7.02 kN	104
		CO3. Own weight + pretension + wind pressure	9.82 kN	107
		CO4. Own weight + pretension + wind suction – floating – reduction 0.53	11.27 kN	111
	Max	CO5. Own weight + pretension + wind suction – floating – full wind load *	15.99 kN	113
Guy ropes valley		CO1. Own weight + pretension	1.35 kN	101
		CO2. Own weight + pretension + conventional / snow	2.52 kN	104
		CO3. Own weight + pretension + wind pressure	3.53 kN	107
	Max	CO4. Own weight + pretension + wind suction – floating – reduction 0.53	10.58 kN	111
		CO5. Own weight + pretension + wind suction – floating – full wind load *	6.47 kN	113

Table 24. Leading forces guy ropes – floating model

* 2 stormbelts required. See Figure 1. 20x15m floating and/or drawing 20x15m – Floating in chapter E.1



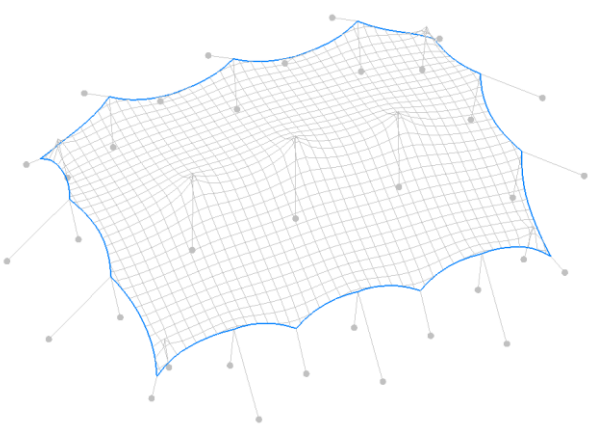
Closed model – guy ropes

Closed		Load combination	F_{rep}	Pag.
Guy ropes		CO1. Own weight + pretension	2.21 kN	116
		CO2. Own weight + pretension + conventional / snow	4.17 kN	119
		CO3. Own weight + pretension + wind pressure	5.80 kN	123
	Max	CO6. Own weight + pretension + wind suction – closed – reduction 0.53	9.66 kN	125
		CO7. Own weight + pretension + wind suction – closed – full wind load *	6.03 kN	128

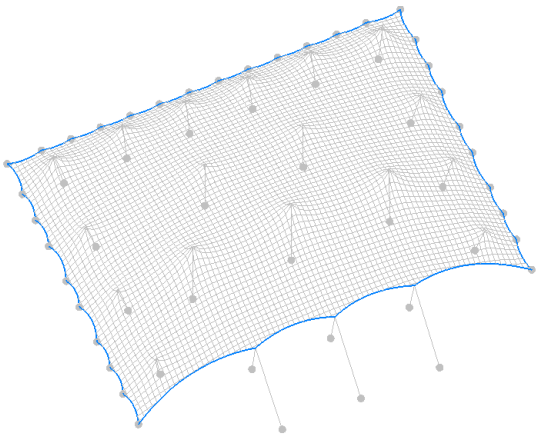
Table 25. Leading forces guy ropes – closed model

* 7 stormbelts required. See Figure 2. 20x15m closed and/or Drawing 20x15m – Closed in chapter E.2

H.6.2.7 **Circumference rope**



Floating model



Closed model

Floating		Load combination	F_{rep}	Pag.
Circumference rope		CO1. Own weight + pretension	1.84 kN	101
		CO2. Own weight + pretension + conventional / snow	4.24 kN	104
		CO3. Own weight + pretension + wind pressure	5.62 kN	107
		CO4. Own weight + pretension + wind suction – floating – reduction 0.53	6.42 kN	110
	Max	CO5. Own weight + pretension + wind suction – floating – full wind load *	9.12 kN	113

Table 26. Leading forces Circumference rope – floating model

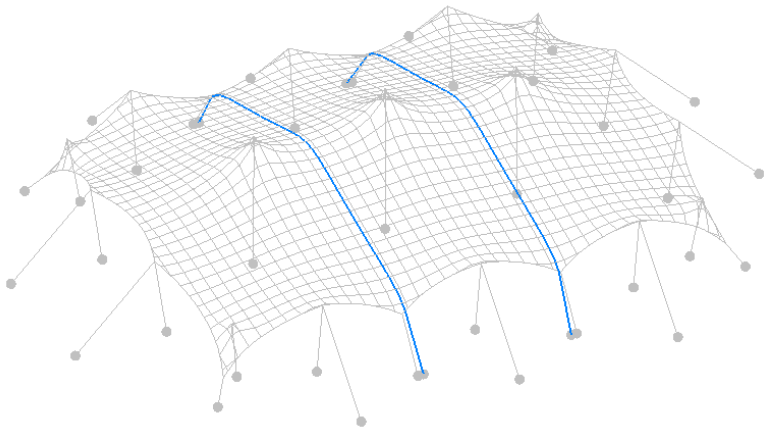
* 2 stormbelts required. See Figure 1. 20x15m floating and/or drawing 20x15m – Floating in chapter E.1

Closed		Load combination	F_{rep}	Pag.
Circumference rope		CO1. Own weight + pretension	3.34 kN	116
		CO2. Own weight + pretension + conventional / snow	4.43 kN	119
		CO3. Own weight + pretension + wind pressure	5.74 kN	122
		CO6. Own weight + pretension + wind suction – closed – reduction 0.53	7.43 kN	125
	Max	CO7. Own weight + pretension + wind suction – closed – full wind load *	8.27 kN	128

Table 27. Leading forces Circumference rope – closed model

* 7 stormbelts required. See Figure 2. 20x15m closed and/or Drawing 20x15m – Closed in chapter E.2

H.6.2.8 **Storm belts**

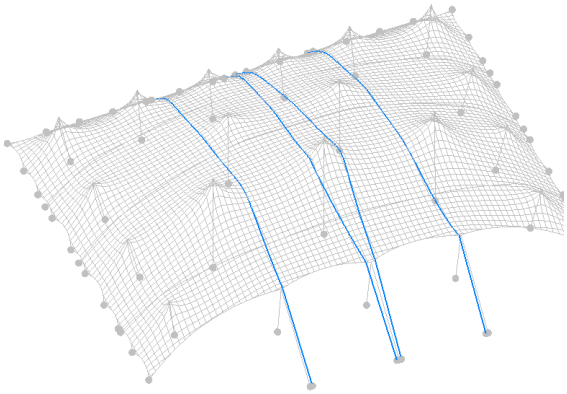


Floating model – 2 stormbelts

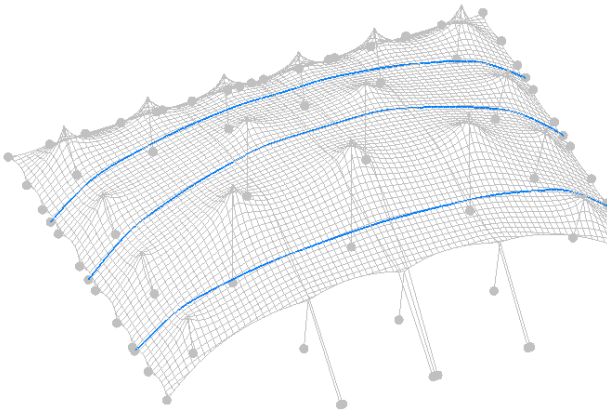
Floating		Load combination	F_{rep}	Pag.
Storm Belts		CO1. Own weight + pretension	No stormbelt	-
		CO2. Own weight + pretension + conventional / snow	No stormbelt	-
		CO3. Own weight + pretension + wind pressure	No stormbelt	-
		CO4. Own weight + pretension + wind suction – floating – reduction 0.53	No stormbelt	-
	Max	CO5. Own weight + pretension + wind suction – floating – full wind load *	14.98 kN	114

Table 28. Leading forces storm belts – floating model

* 2 stormbelts required. See Figure 1. 20x15m floating and/or drawing 20x15m – Floating in chapter E.1



Closed model – stormbelts width direction



Closed model – stormbelts length direction

Closed		Load combination	F_{rep}	Pag.
Storm Belts width		CO1. Own weight + pretension	No stormbelt	-
		CO2. Own weight + pretension + conventional / snow	No stormbelt	-
		CO3. Own weight + pretension + wind pressure	No stormbelt	-
		CO6. Own weight + pretension + wind suction – closed – reduction 0.53	No stormbelt	-
	Max	CO7. Own weight + pretension + wind suction – closed – full wind load *	12.24 kN	129
Storm Belts length		CO1. Own weight + pretension	No stormbelt	-
		CO2. Own weight + pretension + conventional / snow	No stormbelt	-
		CO3. Own weight + pretension + wind pressure	No stormbelt	-
		CO6. Own weight + pretension + wind suction – closed – reduction 0.53	No stormbelt	-
	Max	CO7. Own weight + pretension + wind suction – closed – full wind load *	14.46 kN	129

Table 29. Leading forces storm belts – closed model

* 7 stormbelts required. See Figure 2. 20x15m closed and/or Drawing 20x15m – Closed in chapter E.2

H.7. Check elements

H.7.1 Membrane

Load combination	Element	Representative stress	Design value stress	Pag.
CO7. Own weight + pretension + wind suction – closed – full wind load	Membrane Short term load warp direction	6.33 kN/m *	9.50 kN/m (γ = 1.5)	31
CO4. Own weight + pretension + wind suction – floating – reduction 0.53	Membrane Short term load weft direction	4.76 kN/m *	7.14 kN/m (γ = 1.5)	31

* As shown in Annex B, the stresses in the membrane exceed the representative limit of 6.58 kN/m for the warp direction and 4.76 kN/m for the weft direction only at local points where either the membrane is reinforced and consists out of multiple layers or the calculated stress is higher than in reality because of the cable net modeling.

Contour 3xl FR or Contour X FR is being used.

UC.1a	**S_{Ed} / S_{rd} < 1**	**9.50 / 9.5 = 1 = 1**	**OK**
UC.1b	**S_{Ed} / S_{rd} < 1**	**7.14 / 7.0 = 1.02 ≈ 1**	**ACCEPTABLE**

For capacity of membrane see H.2, page 22

H.7.2 **Center poles**

Load combinations	Element	Representative force	Design value force	Pag.
CO3. Own weight + pretension + wind pressure	Center pole 5.5m floating	-11.0 kN	-16.5 kN (γ = 1.5)	33
CO3. Own weight + pretension + wind pressure	Center pole 5.0m floating	-9.5 kN	-14.25 kN (γ = 1.5)	33
CO3. Own weight + pretension + wind pressure	Center pole 5.5m closed	-7.43 kN	-11.15 kN (γ = 1.5)	33
CO3. Own weight + pretension + wind pressure	Center pole 5.0m closed	-8.35 kN	-12.53 kN (γ = 1.5)	33
CO3. Own weight + pretension + wind pressure	Center pole 4.5m closed	-5.45 kN	-8.18 kN (γ = 1.5)	33

User load of max. 10 kg is applied, loaded centrically.

5.5m pole, floating Ned = -16.5 + (1.35 x -0.1) = -16.6 kN

5.0m pole, floating Ned = -14.25 + (1.35 x -0.1) = -14.4 kN

5.5m pole, closed Ned = -11.15 + (1.35 x -0.1) = -11.3 kN

5.0m pole, closed Ned = -12.53 + (1.35 x -0.1) = -12.7 kN

4.0m pole, closed Ned = -8.18 + (1.35 x -0.1) = -8.3 kN

H.7.2.1 **5.5m, floating - Wood, Eucalyptus D35**

Profile = Pole, Ø ≈ 120 mm
average diameter, as a minimum required at the middle of the pole

Length = max. 5.5m

Quality = D35

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.2a	**5.5m**	**σc,0,d / (fc,0,d x kcy) = 1.47 / (17.31 x 0.096 = 0.88 < 1**	**OK**

See Annex C.1 Center pole 5.5m, floating – wood, on page 130 for the elaborate check

H.7.2.2 **5.5m*, floating - Aluminium, 6063 T6**

Profile = Pole, Ø90x3 OR Ø76x5mm

Length = max. 5.0m *

Quality = 6063 T6

* Lower 5.5m center pole to 5.0m when using aluminium profiles.

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.2b	**5.0m* - Ø90x3**	**$(N_{ed} / \chi\ \omega\ N_{rd})^{0.8} = (16.6 / 0.150 * 1 * 119.27)^{0.8} = 0.94 < 1$**	**OK**

See Annex C.2 Center pole 5.0m*, floating – aluminium 90x3mm, on page 131 for the elaborate check

UC.2c	**5.0m* - Ø76x5**	**$(N_{ed} / \chi\ \omega\ N_{rd})^{0.8} = (16.6 / 0.102 * 1 * 162.22)^{0.8} = 1.00 < 1$**	**OK**

See Annex C.3 Center pole 5.0m*, floating – aluminium 76x5mm, on page 132 for the elaborate check

H.7.2.3 **5.0m, floating - Wood, Eucalyptus D35**

Profile = Pole, Ø ≈ 110 mm
average diameter, as a minimum required at the middle of the pole
Length = max. 5.0m
Quality = D35

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.3a	**5m**	**σc,0,d / (fc,0,d x kcy) = 1.52 / (17.31 x 0.0976) = 0.90 < 1**	**OK**

See Annex C.4 Center pole 5.0m, floating – wood, on page 133 for the elaborate check

H.7.2.4 **5.0m, floating – Aluminium, 6063 T6**

Profile = Pole, Ø90x3 OR Ø76x4mm
Length = max. 5.0m
Quality = 6063 T6

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.3b	**5m - Ø90x3**	**$(N_{ed} / \chi\ \omega\ N_{rd})^{0.8} = (14.4 / 0.150 * 1 * 119.27)^{0.8} = 0.84 < 1$**	**OK**

See Annex C.5 Center pole 5.0m, floating – aluminium 90x3mm, on page 134 for the elaborate check

UC.3c	**5m - Ø76x4**	**$(N_{ed} / \chi\ \omega\ N_{rd})^{0.8} = (14.4 / 0.105 * 1 * 131.60)^{0.8} = 1.04 = 1$**	**OK**

See Annex C.6 Center pole 5.0m, floating – aluminium 76x4mm, on page 135 for the elaborate check

H.7.2.5 **5.5m, closed - Wood, Eucalyptus D35**

Profile = Pole, Ø ≈ 110 mm
average diameter, as a minimum required at the middle of the pole
Length = max. 5.5m
Quality = D35

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.4a	**5.5m**	**σc,0,d / (fc,0,d x kcy) = 1.19 / (17.31 x 0.0812) = 0.85 < 1**	**OK**

See Annex C.7 Center pole 5.5m, closed – wood, on page 136 for the elaborate check

H.7.2.6 **5.5m, closed – Aluminium, 6063 T6**

Profile = Pole, Ø90x3 OR Ø76x4mm
Length = max. 5.5m
Quality = 6063 T6

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.4b	**5.5m - Ø90x3**	**$(N_{ed} / \chi \omega N_{rd})^{0.8} = (11.3 / 0.125 * 1 * 119.27)^{0.8} = 0.80 < 1$**	**OK**
		See Annex C.8 Center pole 5.5m, closed – aluminium 90x3mm, on page 137 for the elaborate check	
UC.4c	**5.5m - Ø76x4**	**$(N_{ed} / \chi \omega N_{rd})^{0.8} = (11.3 / 0.087 * 1 * 131.60)^{0.8} = 0.99 < 1$**	**OK**
		See Annex C.9 Center pole 5.5m, closed – aluminium 76x4mm, on page 138 for the elaborate check	

H.7.2.7 **5.0m, closed - Wood, Eucalyptus D35**

Profile = Pole, Ø ≈ 110 mm
average diameter, as a minimum required at the middle of the pole
Length = max. 5.0m
Quality = D35

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.5a	**5m**	**$\sigma c,0,d / (fc,0,d \times kcy) = 1.34 / (17.31 \times 0.0976) = 0.79 < 1$**	**OK**
		See Annex C.10 Center pole 5.0m, closed – wood, on page 139 for the elaborate check	

H.7.2.8 **5.0m, closed – Aluminium, 6063 T6**

Profile = Pole, Ø90x3 OR Ø76x4mm
Length = max. 5.0m
Quality = 6063 T6

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.5b	**5m - Ø90x3**	**$(N_{ed} / \chi \omega N_{rd})^{0.8} = (12.7 / 0.150 * 1 * 119.27)^{0.8} = 0.76 < 1$**	**OK**
		See Annex C.11 Center pole 5.0m, closed – Aluminium 90x3mm, on page 140 for the elaborate check	
UC.5c	**5m - Ø76x4**	**$(N_{ed} / \chi \omega N_{rd})^{0.8} = (12.7 / 0.105 * 1 * 131.60)^{0.8} = 0.94 < 1$**	**OK**
		See Annex C.12 Center pole 5.0m, closed – Aluminium 76x4mm, on page 141 for the elaborate check	

H.7.2.9 **4.0m, closed - Wood, Eucalyptus D35**

Profile	=	Pole, Ø90x3 OR Ø76x4mm
		average diameter, as a minimum required at the middle of the pole
Length	=	max. 4.0m
Quality	=	D35

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.6a	**4m**	**$\sigma_{c,0,d} / (f_{c,0,d} \times k_{cy}) = 1.46 / (17.31 \times 0.0913) = 0.93 < 1$**	**OK**

SeeAnnex C.13 Center pole 4.0m, closed – wood, on page 142 for the elaborate check

H.7.2.10 **4.0m, closed – Aluminium, 6063 T6**

Profile	=	Pole, Ø76x3mm
Length	=	max. 4.0m
Quality	=	6063 T6

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.6b	**4m**	**$(N_{ed} / \chi \omega N_{rd})^{0.8} = (8.3 / 0.164 * 1 * 100.07)^{0.8} = 0.58 < 1$**	**OK**

See Annex C.14 Center pole 4.0m, closed – Aluminium 76x4mm, on page 143 for the elaborate check

H.7.3 Entrance poles

Load combinations	Element	Representative force	Design value force	Pag.
CO3. Own weight + pretension + wind pressure	Entrance pole 3.0m floating	-8.81 kN	-13.2 kN (γ = 1.5)	33
CO7. Own weight + pretension + wind suction – closed – full wind load	Entrance pole 3.0m closed	-9.79 kN	-14.7 kN (γ = 1.5)	33

User load of max. 10 kg is applied, loaded centrically.

3m pole, floating Ned = -13.2 + (1.35 x -0.1) = -13.34 kN

3m pole, closed Ned = -14.70 + (1.35 x -0.1) = -14.84 kN

H.7.3.1 3m, floating - Wood, Eucalyptus D35

Profile = Pole, Ø ≈ 85 mm
average diameter, as a minimum required at the middle of the pole

Length = max. 3.0m

Quality = D35

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.7a	**3m**	**σc,0,d / (fc,0,d x kcy) = 2.35 / (17.31 x 0.1586) = 0.86 < 1**	**OK**

See Annex C.15 Entrance pole 3.0m, floating– wood, on page 144 for the elaborate check

H.7.3.2 3m, floating - Aluminium, 6063 T6

Profile = Pole, Ø76x3mm

Length = max. 3.0m

Quality = 6063 T6

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.7b	**3m**	**$(N_{ed} / \chi \omega N_{rd})^{0.8} = (13.34 / 0.279 * 1 * 100.07)^{0.8} = 0.55 < 1$**	**OK**

See Annex C.16 Entrance pole 3.0m, floating – Aluminium 76x3mm, on page 145 for the elaborate check

H.7.3.3 **3m, closed - Wood, Eucalyptus D35**

Profile	=	Pole, Ø ≈ 85 mm
		average diameter, as a minimum required at the middle of the pole
Length	=	max. 3.0m
Quality	=	D35

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.8a	**3m**	**$\sigma_{c,0,d} / (f_{c,0,d} \times k_{cy}) = 2.62 / (17.31 \times 0.1586) = 0.95 < 1$**	**OK**

See Annex C.17 Entrance pole 3.0m, closed– wood, on page 146 for the elaborate check

H.7.3.4 **3m, closed - Aluminium, 6063 T6**

Profile	=	Pole, Ø76x3mm
Length	=	max. 3.0m
Quality	=	6063 T6

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.8b	**3m**	**$(N_{ed} / \chi \omega N_{rd})^{0.8} = (14.84 / 0.279 * 1 * 100.07)^{0.8} = 0.60 < 1$**	**OK**

See Annex C.18 Entrance pole 3.0m, closed – Aluminium 76x3mm, on page 147 for the elaborate check

H.7.4 Corner poles

Load combinations	Element	Representative force	Design value force	Pag.
CO3. Own weight + pretension + wind pressure	Corner pole 2.5m floating	-3.90 kN	-5.85 kN (γ = 1.5)	33
CO3. Own weight + pretension + wind pressure	Corner pole 2.5m closed	-5.76 kN	-8.64 kN (γ = 1.5)	33

User load of max. 10 kg is applied, loaded centrically.

2.5m corner pole, floating Ned = -5.85 + (1.35 x -0.1) = -5.99 kN

2.5m corner pole, closed Ned = -8.64 + (1.35 x -0.1) = -8.78 kN

H.7.4.1 2.5m, floating - Wood, Eucalyptus D35

Profile = Pole, Ø ≈ 65 mm
average diameter, as a minimum required at the middle of the pole

Length = max. 2.5m

Quality = D35

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.9a	**2.5m**	**σc,0,d / (fc,0,d x kcy) = 1.81 / (17.31 x 0.1346) = 0.77 < 1**	**OK**

See Annex C.19 Corner pole 2.5m, floating – wood, on page 148 for the elaborate check

H.7.4.2 2.5m, floating - Aluminium, 6063 T6

Profile = Pole, Ø50x3mm

Length = max. 2.5m

Quality = 6063 T6

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.9b	**2.5m**	**$(N_{ed} / \chi \omega N_{rd})^{0.8} = (5.99 / 0.174 * 1 * 64.43)^{0.8} = 0.61 < 1$**	**OK**

See Annex C.20 Corner pole 2.5m, floating – Aluminium 50x3mm, on page 149 for the elaborate check

H.7.4.3 **2.5m, closed - Wood, Eucalyptus D35**

Profile	=	Pole, Ø ≈ 70 mm
		average diameter, as a minimum required at the middle of the pole
Length	=	max. 2.5m
Quality	=	D35

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.10a	**2.5m**	**$\sigma_{c,0,d} / (f_{c,0,d} \times k_{cy}) = 2.28 / (17.31 \times 0.1551) = 0.85 < 1$**	**OK**

See Annex C.21 Corner pole 2.5m, closed – wood, on page 150 for the elaborate check

H.7.4.4 **2.5m, closed - Aluminium, 6063 T6**

Profile	=	Pole, Ø50x3mm
Length	=	max. 2.5m
Quality	=	6063 T6

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.10b	**2.5m**	**$(N_{ed} / \chi \omega N_{rd})^{0.8} = (8.78 / 0.174 * 1 * 64.43)^{0.8} = 0.82 < 1$**	**OK**

See Annex C.22 Corner pole 2.5m, closed – Aluminium 50x3mm, on page 151 for the elaborate check

H.7.5 Side wall poles

Load combinations	Element	Representative force	Design value force	Pag.
CO3. Own weight + pretension + wind pressure	Side wall pole 2.5m closed	-5.37 kN	-8.06 kN (γ = 1.5)	33

User load of max. 10 kg is applied, loaded centrically.

2.5m side wall pole, closed Ned = -8.06 + (1.35 x -0.1) = -8.19 kN

H.7.5.1 2.5m, closed - Wood, Eucalyptus D35

Profile = Pole, Ø ≈ 70 mm
average diameter, as a minimum required at the middle of the pole
Length = max. 2.5m
Quality = D35

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.11a	**2m**	**σc,0,d / (fc,0,d x kcy) = 2.13 / (17.31 x 0.1551) = 0.79 < 1**	**OK**

See Annex C.23 Side wall pole 2.5m, closed – wood, on page 152 for the elaborate check

H.7.5.2 2.5m, closed - Aluminium, 6063 T6

Profile = Pole, Ø50x3mm
Length = max. 2.5m
Quality = 6063 T6

The poles are considered as hinged poles; the buckling length is equivalent to the pole length.

UC.11b	**2.5m**	**$(N_{ed} / \chi \omega N_{rd})^{0.8} = (8.19 / 0.174 * 1 * 64.43)^{0.8} = 0.78 < 1$**	**OK**

See Annex C.24 Side wall pole 2.5m, closed – Aluminium 50x3mm, on page 153 for the elaborate check

H.7.6 **Guy ropes**

Load combination	Element	Representative force	Design value force	Pag.
CO5. Own weight + pretension + wind suction – floating – full wind load	Guy ropes floating short side	9.79 kN	14.69 kN (γ = 1.5)	38
CO3. Own weight + pretension + wind pressure	Guy ropes floating long side	6.43 kN	9.65 kN (γ = 1.5)	38
CO5. Own weight + pretension + wind suction – floating – full wind load	Guy ropes floating Corner*	15.99 / 2 = 8.00 kN*	12.0 kN (γ = 1.5)	38
CO4. Own weight + pretension + wind suction – floating – reduction 0.53	Guy ropes floating valley	10.58 kN	15.87 kN (γ = 1.5)	38
CO6. Own weight + pretension + wind suction – closed – reduction 0.53	Guy ropes closed	9.66 kN	14.49 kN (γ = 1.5)	38

* In the calculation model only 1 guy rope is modelled at the corner. In practice, two individual guy ropes will be necessary / used.

It is possible to use either a rope or a belt.
The 7mm guy ropes have a minimum breaking strength of 910 kg → Frd,7mm = 2.3 kN.
The 14mm guy ropes have a minimum breaking strength of 3640 kg → Frd, 14mm = 11 kN
The ropes need to be tied back, creating multiple rope sections that together will take the load.

UC.12a	Guy ropes floating short side	7 sections	**F_d / F_{rd} < 1**	**14.69 / (7 x 2.3) = 0.91 < 1**	**OK**
		2 sections		**14.69 / (2 x 11) = 0.67 < 1**	**OK**
UC.12b	Guy ropes floating long side	4 sections	**F_d / F_{rd} < 1**	**9.65 / (4 x 2.3) = 1.05 ≈ 1**	**Acceptable**
		1 sections		**9.65 / (1 x 11) = 0.87 < 1**	**OK**
UC.12c	Guy ropes floating corner	5 sections	**F_d / F_{rd} < 1**	**12.0 / (5 x 2.3) = 1.04 ≈ 1**	**Acceptable**
		2 sections		**12.0 / (2 x 11) = 0.55 < 1**	**OK**
UC.12d	Guy ropes floating valley	7 sections	**F_d / F_{rd} < 1**	**15.87 / (7 x 2.3) = 0.99 < 1**	**OK**
		2 sections		**15.87 / (2 x 11) = 0.72 < 1**	**OK**
UC.12e	Guy ropes closed	7 sections	**F_d / F_{rd} < 1**	**14.49 / (7 x 2.3) = 0.90 < 1**	**OK**
		2 sections		**14.49 / (2 x 11) = 0.66 < 1**	**OK**

For capacity of ropes see 0, page 23

It is also possible to use alternative **ropes** with a higher breaking strength (BL_{rope}) and less rope sections (n), as long as **BL_{rope} x n ≥ 5870 kg.**

In case **PES belts** are used, a minimum breaking strengh of **3000 kg** is required.

H.7.7 **Circumference rope**

Load combination	Element	Representative force	Design value force	Pag.
CO5. Own weight + pretension + wind suction – floating – full wind load	Circumference rope Floating	9.12 kN	13.68 kN (γ = 1.5)	40
CO4. Own weight + pretension + wind suction – floating – reduction 0.53	Circumference rope Floating	6.42 kN	9.63 kN (γ = 1.5)	40
CO7. Own weight + pretension + wind suction – closed – full wind load	Circumference rope closed	8.27 kN	12.4 kN (γ = 1.5)	40
CO6. Own weight + pretension + wind suction – closed – reduction 0.53	Circumference rope closed	7.43 kN	11.15 kN (γ = 1.5)	40

It is possible to use either a rope or a belt.

UC.13a	Circumference rope	2 sections	**$F_{d,red}$ / F_{rd} < 1**	**13.68 / (2 x 11) = 0.62 < 1**	**OK**
UC.13b	Circumference rope	1 section	**F_{d} / F_{rd} < 1**	**9.63 / (1 x 11) = 0.88 < 1**	**OK**
UC.13a	Circumference rope	2 sections	**$F_{d,red}$ / F_{rd} < 1**	**12.4 / (2 x 11) = 0.56 < 1**	**OK**
UC.13b	Circumference rope	1 section	**F_{d} / F_{rd} < 1**	**11.15 / (1 x 11) = 1.01 ≈ 1**	**ACCEPTABLE**

For capacity of ropes see H.2.3, page 23

When the tent is built for wind load up to and until 7 BFt, a 14mm rope with 1 rope section satisfies.

If the tent is built for full wind load, a 14mm rope with 2 rope sections is required.
Otherwise, a PES belt, with a minimum breaking strength of **2750 kg** can be used.

It is also possible to use alternative ropes with a higher breaking strength (BL_{rope}) and less rope sections (n), as long as **BL_{rope} x n ≥ 4500 kg** (for ropes sections ≥ 14mm).

H.7.8 **Storm belts**

Load combination	Element	Representative force	Design value force	Pag.
CO5. Own weight + pretension + wind suction – floating – full wind load	Storm belt floating	14.98 kN	22.47 kN (γ = 1.5)	41

Belts are PES belts with a minimum breaking strength of **5000kg.**

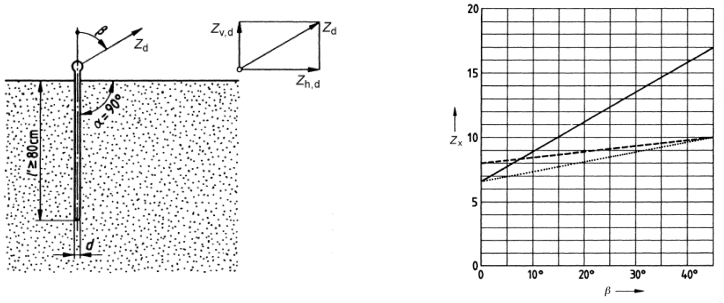
UC.14	Storm belt	**F_d / F_{rd} < 1**	**24.47 / 25 = 0.98 < 1.0**	**OK**

For capacity of belts see H.2.2, page 22

H.8. Safety against overturning, sliding and uplifting

The calculations in this chapter provides a guideline for dense cohesion less soil, in case no anchor tests have been performed. Anchor tests on location can show that a different amount of anchors or different size of anchors have sufficient capacity for the specific soil conditions. (see paragraph 0)

H.8.1 Anchor capacity



Angle of pull	Load bearing capacity N
$\beta = 0$	$Z_d = 6{,}5\ dl'$ for stiff cohesive and for dense cohesion less soils
$\beta = 0$	$Z_d = 8\ dl'$ for very stiff cohesive soils
$\beta \geq 45$	$Z_d = 10\ dl'$ for cohesive soils of at least medium to stiff consistency
$\beta \geq 45$	$Z_d = 17\ dl'$ for dense cohesion less soils
$0 < \beta < 45$	The load bearing capacity for the soil types shall be determined by interpolation

Z_d is the anchor service load (service load), in N;

$Z_{h,d}$ is the horizontal anchor service load, in N;

$Z_{v,d}$ is the vertical anchor service load, in N;

d is the anchor diameter, in cm;

l' is the depth of penetration in cm;

α is the angle of penetration;

ß is the angle of acting tensile force to the vertical

figure 8. Taken from from NEN-EN 13782: Figures 4 & 5, table 5

Anchors **of Ø35mm** are used, taking into account an **effective length of at least 1200 mm.**

If multiple anchors are placed at the same location, the anchors need to be at least 5x Ø apart to exploit the full capacity of the anchors.

Anchor capacity for anchors based in dense cohesion less soil (sandy soil)

		Ø35 x 1200 mm
Angle	β	≥ 45
Effective length anchor	l’	120 cm
Diameter anchor	d	3.5 cm
Anchor capacity*	Z_d	7.14 kN

*Calculated under the assumption the anchor is based in dense cohesion less soil.

H.8.2 **Required anchor pins**

H.8.2.1 **Floating**

H.8.2.1.1. Reduced wind pressure

Load combination	Element	Representative force	Design value force	Pag.
CO4: Wind suction – floating – reduction 0.53	Guy ropes short side	6.44 kN	7.73 kN (y=1.2)	111
CO4: Wind suction – floating – reduction 0.53	Guy ropes long side	3.48 kN	4.18 kN (y=1.2)	111
CO4: Wind suction – floating – reduction 0.53	Guy ropes corner	11.27 kN*	13.52 kN (y=1.2)	111
CO4: Wind suction – floating – reduction 0.53	Guy ropes valley	10.58 kN	12.70 kN (y=1.2)	111

Anchoring – dense cohesion less soil

Guy ropes - short side	**2x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 7.73 / (2 x 7.14) = 0.54 < 1**	**OK**
Guy ropes - long side	**1x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 4.18 / (1 x 7.14) = 0.59 < 1**	**OK**
Guy ropes – corner	**2x**	**Ø35 x 1200 mm***	**F_d / F_{rd} = 13.52 / (2 x 7.14) = 0.95 < 1**	**OK**
Guy ropes – valley	**2x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 12.70 / (2 x 7.14) = 0.89 < 1**	**OK**

*In the corners only 1 guy rope is modelled, however 2 will be applied in practice. Therefore, 2 guy ropes with 1 anchor each can be applied.

H.8.2.1.2. Full wind pressure

Load combination	Element	Representative force	Design value force	Pag.
CO5: Wind suction – floating – full wind load	Guy ropes short side	9.79 kN	11.75 kN (y=1.2)	113
CO5: Wind suction – floating – full wind load	Guy ropes long side	4.98 kN	5.98 kN (y=1.2)	113
CO5: Wind suction – floating – full wind load	Guy ropes corner	15.99 kN*	19.19 kN (y=1.2)	113
CO5: Wind suction – floating – full wind load	Guy ropes valley	6.47 kN	7.76 kN (y=1.2)	113
CO5: Wind suction – floating – full wind load	Storm belts	14.98 kN	17.98 kN (y=1.2)	114

Anchoring – dense cohesion less soil

Guy ropes – short side	**2x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 11.75 / (2 x 7.14) = 0.82 < 1**	**OK**
Guy ropes – long side	**1x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 5.98 / (1 x 7.14) = 0.84 < 1**	**OK**
Guy ropes – corner	**3x**	**Ø35 x 1200 mm***	**F_d / F_{rd} = 19.19 / (3 x 7.14) = 0.90 < 1**	**OK**
Guy ropes – valley	**2x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 7.76 / (2 x 7.14) = 0.54 < 1**	**OK**
Storm belts	**3x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 17.98 / (3 x 7.14) = 0.84 < 1**	**OK**

*In the corners only 1 guy rope is modelled, however 2 will be applied in practice. Therefore, 2 guy ropes with 2 anchors each can be applied.

H.8.2.2 **Closed**

H.8.2.2.1. Reduced wind pressure

Load combination	Element	Representative force	Design value force	Pag.
CO6: Wind suction – closed – reduction 0.53	Guy ropes	9.66 kN	11.60 kN (y=1.2)	125
CO6: Wind suction – closed – reduction 0.53	Ground point Corner front		12.73 kN (y=1.2)*	172
CO6: Wind suction – closed – reduction 0.53	Ground point Corner back		4.25 kN (y=1.2)*	173
CO6: Wind suction – closed – reduction 0.53	Ground points Short side		6.72 kN (y=1.2)*	176
CO6: Wind suction – closed – reduction 0.53	Ground points Long side		3.31 kN (y=1.2)*	178

Anchoring – dense cohesion less soil

Guy ropes	**2x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 11.60 / (2 x 7.14) = 0.81 < 1**	**OK**
Ground point Corner front	**2x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 12.73 / (2 x 7.14) = 0.89 < 1**	**OK**
Ground point Corner back	**1x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 4.25 / (1 x 7.14) = 0.60 < 1**	**OK**
Ground points Short side	**1x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 6.72 / (1 x 6.99) = 0.96 < 1**	**OK**
Ground points Long side	**1x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 3.31 / (1 x 6.56) = 0.50 < 1**	**OK**

* 0 shows the acting forces and the verification of the anchoring for the ground points and stormbelts

H.8.2.2.2. Full wind pressure

Load combination	Element	Representative force	Design value force	Pag.
CO7: Wind suction – closed – full wind load	Guy ropes	6.03 kN	7.24 kN (y=1.2)*	128
CO7: Wind suction – closed – full wind load	Ground point Corner front		14.53 kN (y=1.2)*	172
CO7: Wind suction – closed – full wind load	Ground point Corner back		6.57 kN (y=1.2)*	173
CO7: Wind suction – closed – full wind load	Ground points Short side		5.81 kN (y=1.2)*	174
CO7: Wind suction – closed – full wind load	Ground points Long side		4.15 kN (y=1.2)*	176
CO7: Wind suction – closed – full wind load	Storm belts Width direction		14.69 kN (y=1.2)*	178
CO7: Wind suction – closed – full wind load	Storm belts Length direction		17.35 kN (y=1.2)*	180

* 0 shows the acting forces and the verification of the anchoring for the ground points and stormbelts

Anchoring – dense cohesion less soil

Guy ropes	**1x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 7.24 / (1 x 7.14) = 1.01 ≈ 1**	**Acceptable**
Ground point Corner front	**2x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 14.53 / (2 x 7.14) = 1.02 ≈ 1**	**Acceptable**
Ground point Corner back	**1x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 6.57 / (1 x 7.14) = 0.92 < 1**	**OK**
Ground points Short side	**1x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 5.81 / (1 x 6.61) = 0.88 < 1**	**OK**
Ground points Long side	**1x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 4.15 / (1 x 6.33) = 0.66 < 1**	**OK**
Storm belts Width direction	**2x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 14.69 / (2 x 7.14) = 1.03 ≈ 1**	**Acceptable**
Storm belts Length direction	**3x**	**Ø35 x 1200 mm**	**F_d / F_{rd} = 17.35 / (3 x 7.01) = 0.82 < 1**	**OK**

H.8.3 **Anchor tests according to BS-EN 13782**

It is advised to perform anchor test on location when there is a reason to doubt the “pull-out force” of the anchors, which could be when ground conditions differ from dense, non-cohesive soil.

Anchor tests should be carried out according to the following procedure:
Three anchors spread throughout the terrain should be put perpendicular into the ground. The anchors should be pulled out with the aid of a spring balance in the direction of the force acting on the anchor. The lowest of the three measured values should be used.

A safety factor of v = 1.6 regarding ultimate limit load is to apply for the lowest test value in order to determine the load bearing capacity in subsequent calculation. The load bearing capacity determined in this manner shall not result in anchor movement which would result in stresses, deformations or instability inadmissible for the structure.
If the foundation conditions are comparable, test loadings carried out in another location may be adduced for substantiation purposes.

For example:
Force in belts: Frep = 16.2 kN
Fsd_{belt} = 1.2 x Frep = 1.2 x 16.2 = 19.4 kN

The partial safety factor γ = 1.6 is applied on the ultimate limit load:
$Z_{u,d,test}$ > 1.6 x Fsd = 1.6 x 19.4 =31.1 kN

If for example the anchor test point out there has a minimal anchor capacity of 16 kN (1600 kg), then 2 anchors are needed: 2x16 = 32 kN > $Z_{u,d,test}$

I. Material specifications

Membrane – Contour 3xl FR– Technical data

CONTOUR

CONTOUR 3X AND 3XL

DESCRIPTION	This is a three-ply laminated product that is designed for outdoor stretch tenting. This product exhibits very good stretch and recovery properties. The product is waterproofed by sandwiching a polyurethane membrane between two knitted fabrics. It is not intended to be a permanent structure, as lengthy exposure to UV and hydrolysis, will eventually compromise the membrane. By using a PU membrane instead of a PVC film, the elongation and recoverability is improved. However, the waterproofing performance of a PVC film is superior.
INTENDED USE	Outdoor Stretch Tenting, Bedouin tents
BENEFITS	Water/Oil Repellent / UV Resistant / Waterproof / Anti-Fungal

PROPERTY		UNITS	METHOD	3X	3XL	3XL FR
Composition		-	COA	Polyester/PU	Polyester/PU	Polyester/PU
Construction		-	Visual	Composite	Composite	Composite
Weight		gsm	Finlam	600 ±10%	440 ±10%	500 ±10%
Usable Width		cm	Finlam	170	170	150
Water Penetration		mm	SABS SM 99 (10 Min Hydrostatic Head)	> 2000	> 2000	> 2000
Tensile Strength	Machine Direction (Ave)	Newtons	BS 13934	> 1300	> 1000	> 1000
	Cross Direction (Ave)			> 1000	> 700	> 700
Average Peelbond	Machine Direction (Ave)	Newtons	SANS 1439	> 10	> 10	> 10
	Cross Direction (Ave)			> 10	> 10	> 10
Anti-Fungal		-	DIN 53931	Pass	Pass	Pass
Colour Fastness to Light		Blue Wool	ISO 105-B02	≥ 6	≥ 6	≥ 6
Oil Repellency		Rating	AATCC 118	≥ 4	≥ 4	≥ 4
Water Repellency		Rating	AATCC 22	≥ 80	≥ 80	≥ 80
Flammability Performance		-	BS 7837:1996;	-	-	Pass
		-	California Fire Marshall Title 19	-	-	Pass

This applies to the entire range of CONTOUR® fabrics. The fabric is guaranteed for a period of one year, during which it covers any abnormal deterioration of the waterproofing properties and delamination (when fabric is used for rental usage and not semi-permanent) as well as the general structural integrity of the fabric, given a normal exposure to weather and in the case that care and cleaning advices have been properly followed. The warranty includes the replacement of the fabric required to replace the product in question only, and does not include other expenses such as postage, transportation, sewing, labour and / or assembly. This warranty does not cover damages caused by accidents, mechanical action, rubbing, chemical aggressive agents, abuse and / or negligence. This warranty is applied from the date of the despatch from Finlam Technical, of the product and any claim must be accompanied with the installers receipt and relevant roll number stating that the fabric used was CONTOUR®. *Please see colour specification chart for colourfastness results, supplied by Finlam Technical (Pty) Ltd. Please also note that darker colours will fade quicker than lighter colours.

Please note that the information shared in this document is for general information only, and it is the responsibility of the customer to ensure that this product meets their specific requirements. The data in this document is for indication only and the product performance properties may vary. This document is not to be treated as a Certificate of Conformance. Finlam Technical will not entertain any damages claimed against them as a result of data expressed in this document.

CONTOUR 3XFR

DESCRIPTION	This is a three-ply laminated composite product that is designed for outdoor stretch tenting. This product exhibits very good stretch, recovery, UV and FR properties. The product is not intended to be a permanent structure, as lengthy exposure to the elements, will eventually compromise the membrane.
INTENDED USE	Outdoor FR Stretch Tenting, Bedouin tents
BENEFITS	Fire retardant (M2)/Water/Oil Repellent / UV Resistant / Waterproof / Anti-Fungal

PROPERTY		UNITS	METHOD	3X FR
Composition		-	COA	Polyester/PU
Construction		-	Visual	Composite
Weight		gsm	Finlam	820 ±10%
Usable Width		cm	Finlam	150
Tensile Strength	Machine Direction (Ave)	Newtons/5cm	BS 13934-1:1999	≥ 1000
	Cross Direction (Ave)			≥ 700
Average Peelbond	Machine Direction (Ave)	Newtons/5cm	SANS 1439	≥ 10
	Cross Direction (Ave)			≥ 10
Water Penetration		mm	SABS SM 99 (10 Min Hydrostatic Head)	≥ 1000
Water Repellency		Rating	AATCC 22	≥ 80
Oil Repellency		Rating	AATCC 118	≥ 4
Colour Fastness to Light		Rating	ISO 105-B02	≥ 6
Anti-Fungal		-	DIN EN 14119	Pass
Flammability Performance		-	BS 7837:1996;	Pass
		-	M2	Pass

This applies to the entire range of CONTOUR® fabrics. The fabric is guaranteed for a period of one year, during which it covers any abnormal deterioration of the waterproofing properties and delamination (when fabric is used for rental usage and not semi-permanent) as well as the general structural integrity of the fabric, given a normal exposure to weather and in the case that care and cleaning advice has been properly followed. The warranty includes the replacement of the fabric required to replace the product in question only, and does not include other expenses such as framework, postage, transportation, sewing, labour and / or assembly. This warranty does not cover damages caused by accidents, mechanical action, rubbing, chemical aggressive agents, abuse and / or negligence. This warranty is applied from the date of the despatch from Finlam Textiles, of the product and any claim must be accompanied with the installers receipt and relevant roll number stating that the fabric used was CONTOUR®. *Please see colour specification chart for colourfastness results, supplied by Finlam Textiles (Pty) Ltd. Please also note that darker colours will fade quicker than lighter colours.

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Membrane – Contour 3xl FR – Fire certificate

Institut Français du Textile et de l'Habillement

PROCES-VERBAL DE CLASSEMENT DE REACTION AU FEU D'UN MATERIAU PREVU A L'ARTICLE 5 DE L'ARRÊTE DU 21 NOVEMBRE 2002

Valable 5 ans à partir de la date de délivrance

PROCES-VERBAL N°19-00151 L

et 1 annexe de 5 pages

MATERIAU présenté par :	FINLAM TECHNICAL (PTY) LTD 19 MANCHESTER ROAD 3610 PINETOWN AFRIQUE DU SUD
MARQUE COMMERCIALE :	CONTOUR 3XL FR
DESCRIPTION SOMMAIRE :	Complexe fait de 2 tricots polyester contrecollés sur chaque face d'un film polyuréthanne avec une colle polyuréthanne sur une face et une pâte polyuréthanne pour l'autre face Masse surfacique mesurée : environ 600 g/m² Epaisseur nominale : 1.22 mm Coloris : marron
RAPPORT D'ESSAI :	N°19-00151 Ef1-V1 du 4 février 2019
NATURE DES ESSAIS :	Brûleur électrique Essai pour matériaux fusibles
CLASSEMENT :	**M 2**

DURABILITE du classement (Article 5 de l'annexe 2) : non limitée a priori

Compte tenu des critères résultant des essais décrits dans le rapport d'essai annexé.
Ce document atteste uniquement des caractéristiques de l'échantillon soumis aux essais et ne préjuge pas des caractéristiques de produits similaires. Il ne constitue donc pas une certification de produits au sens de l'article L.433-3 l'Ordonnance n°2016-301 du 14 mars 2016 relative au code de la consommation

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A Lyon, le 4 février 2019

guinamand

Sophie GUINAMAND
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SIRET 433 430 832 00108 – NAF 729Z – TVA : FR 39 433430832 – CENTRE TECHNIQUE INDUSTRIEL (LOI DU 22 JUILLET 1948 – ARRETE DU 14 AVRIL 2000)

Institut Français du Textile et de l'Habillement

This document is the translation of the French certificate n°19-00151 L on the February 4th, 2019 delivered by IFTH.

MATERIAL REACTION TO FIRE CLASSIFICATION
REPORT PREPARED IN COMPLIANCE WITH AMENDED 5 OF THE FRENCH HOME OFFICE REGULATION DATED NOVEMBER 21ST, 2002 (OFFICIAL GAZETTE DATED DECEMBER 31, 2002)

Valid five years from issue date

CERTIFICATE N°19-00151 L

And appendices of 5 pages

MATERIAL presented by: FINLAM TECHNICAL (PTY) LTD
19 MANCHESTER ROAD
3610 PINETOWN
AFRIQUE DU SUD

TRADE NAME: CONTOUR 3XL FR

BRIEF DESCRIPTION: Fabric made of two polyester knitted fabric laminated on a polyurethanne foil with fireproofed polyurethanne glue for one side and fireproofed polyurethane paste for other side
Measured surface weight: about 600 g/m²
Nominal thickness: 1.22 mm
Colours: brown

TEST REPORT: N°19-00151 $_{E1-V1}$ on the February 4th, 2019

TESTS: Electrical burner test
Dripping test

CLASSIFICATION: M 2

CLASSIFICATION DURATION (article 5 of appendix 2): unlimited unless otherwise specified

given the criteria resulting from the tests described in the enclosed test report.
The classification indicated does not mean that materials marketed comply with the test samples and must not be considered as a qualification certificate as defined by French law dated March 14, 2016.

N.B.: Only integral copies of this document may be made by photocopying the classification report and/or the classification report and enclosed test report.

Issued in Lyon, France, on the February 4th, 2019

guinamand

Sophie GUINAMAND
Engineer Tests and Trials

Jean-Marc ORAISON
In charge of Fire Regulation

Siège Social : 14 rue des Reculettes – 75013 PARIS ● Tél : +33 (0)1 44 08 19 00 ● Fax : +33 (0)1 44 08 19 39 ● www.ifth.org
SIRET 433 430 832 00108 – NAF 729Z – TVA : FR 39 433430832 – CENTRE TECHNIQUE INDUSTRIEL (LOI DU 22 JUILLET 1948 – ARRETE DU 14 AVRIL 2000)
ENRQ_11 v1 01/09

CALIFORNIA DEPARTMENT OF FORESTRY and FIRE PROTECTION
OFFICE OF THE STATE FIRE MARSHAL

REGISTERED FLAME RESISTANT PRODUCT

Product:
CONTOUR 3XL FR

Registration No.
F-33201

Product Marketed By:
FINLAM TECHNICAL
19-23 MANCHESTER ROAD
PINETOWN,3620, SOUTH AFRICA

This product meets the minimum requirements of flame resistance established by the California State Fire Marshal for products identified in Section 13115, California Health and Safety Code.

The scope of the approved use of this product is provided in the current edition of the **CALIFORNIA APPROVED LIST OF FLAME RETARDANT CHEMICALS AND FABRICS, GENERAL AND LIMITED APPLICATIONS CONCERNS** published by the California State Fire Marshal.

Deputy State Fire Marshal

Expire: 6/30/2020

FR-8

THOR

THOR GMBH
Landwehrstraße 1 · 67346 Speyer · GERMANY
Tel: +49 6232 636-0 · Fax: +49 6232 636-111
E-Mail: info@thor.com

TELEFAX

To:	**FINLAM**
Attn:	**Janice Roberts**
From:	**Mrs. Schneider-Müller**
Date:	**23.11.2020-bib**
E-Mail:	**jroberts@finlamtechnical.com**
Ref.:	**SSM 27462/20**
Pages:	**1**

Dear Janice,

The samples were tested. Enclosed please find the results.

NF-P92-503:	**Classification**
Art. 750 gsm Contour Endurance – Chino – Sample 1	M2
Art. 900 gsm Contour Endurance – Grey – Sample 2	M2
Art. 810 gsm Contour Endurance – Grey – Sample 3	M2

The results in this report are based on the present samples under lab conditions. The results cannot be transferred to other samples without further testing.

For further information, please do not hesitate to contact us again.

Kind regards,
Thor GmbH

i. V. Susanne Schneider-Müller
SSM/CM

THOR

Reference No.:	SSM 27462/20
Material:	Art. 810 gsm Contour Endurance – Grey
Subject:	Test results

Flammability Test acc. to NF-P92-503:
(Burning time in sec)

Sample	**3**					
Classification M						
20 sec.	0					
45 sec.	6,8					
1 min. 15 sec.	0					
1 min. 45 sec.	0					
2 min. 15 sec.	0					
2 min. 45 sec.	0					
3 min. 15 sec.	0					
3 min. 45 sec.	0					
4 min. 15 sec.	0					
4 min. 45 sec.	0					
Hole formation	Yes					
Dripping / not burning	Yes					
Dripping / burning parts	Yes					
Smoke development (visual)	Very strong					
Burning length (in cm)	12,5					
Burning width (in cm)	5,5					
Test acc. to NFP92-503	**M2**					
Test acc. to NFP92-504	**M2**					
Classification NFP92-507	**M2**					

The results in this report are based on the tests carried out with the present samples under laboratory conditions. The results are not transferrable to other samples without doing further tests.

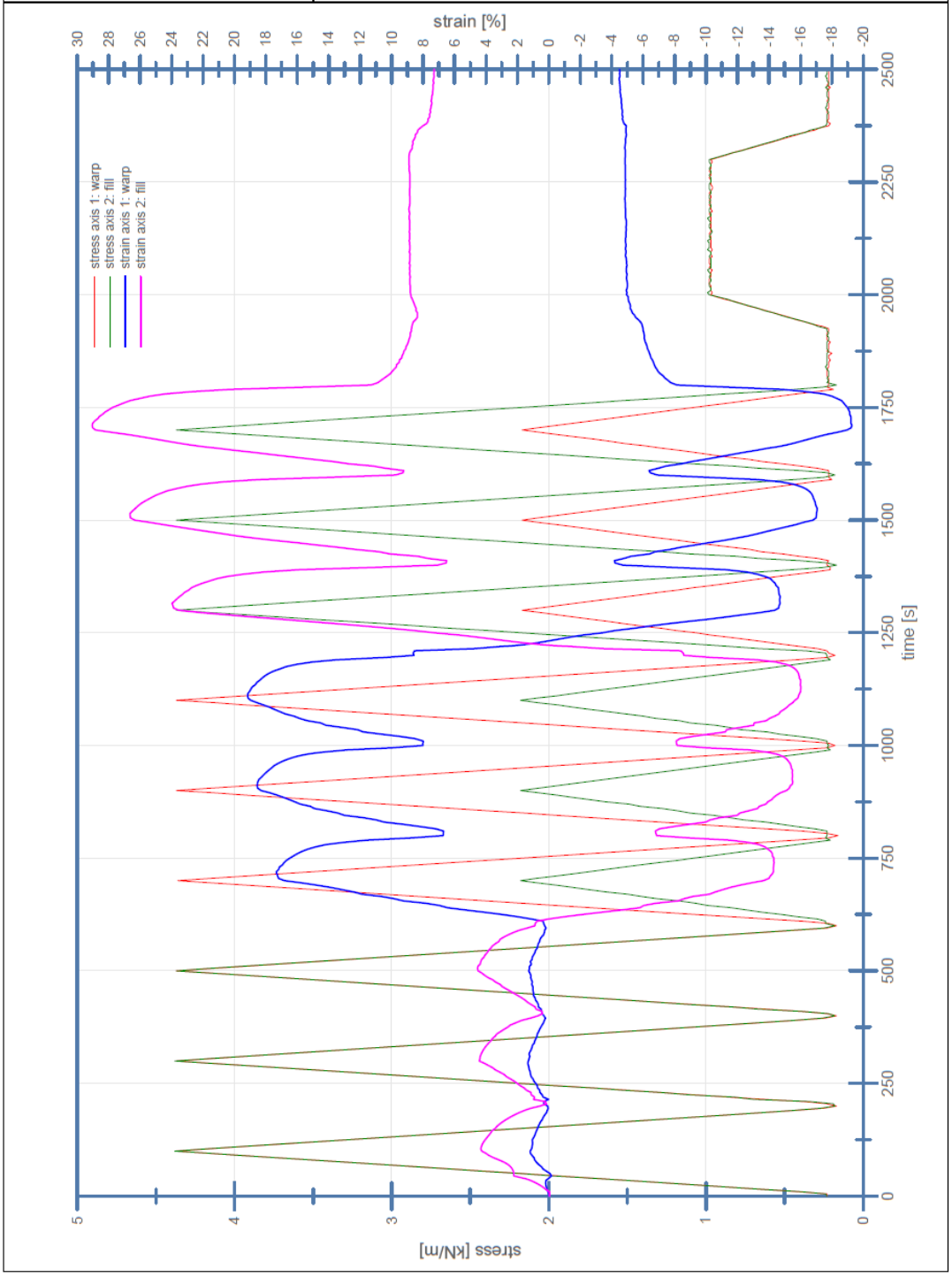
Membrane – Contour 3xl FR – Biaxial test

UNIVERSITÄT DUISBURG ESSEN
Open-Minded

Fakultät für Ingenieurwissenschaften - Abteilung Bauwissenschaften
Institut für Metall- und Leichtbau
Essener Labor für Leichte Flächentragwerke - ELLF
D-45141 Essen, Universitätsstr. 15, Tel.: +49 201 183-4223, Fax: -4276

Stress-strain-time diagram to biaxial tensile test

Test: DTS010618	Material: DTS 3ply fabric



Membrane – Contour X FR – Flex matte coated – Technical data

TEN TECH

DIMENSIONS
TENTS + STRUCTURES

Product Technical Data

***Product Reference**: Contour X FR,800gm/mt Stretch Fabric, Vinyl Prim for Semi-Permanent Outdoor Structures*

***Product Description**: Coated HT Polyester Knitted Fabric*

***Product Characteristics**: Coated high tenacity polyester - Waterproof, Fire Retarded and UV protected. The base knitted fabric is Teflon coated for water and dirt repellence*

***End Use**: Permanent and Semi permanent outdoor structures.*

Fabric Supplier ISO compliant - ISO 9001, ISO TS and ISO 14001

Technical Data and Product Dimensions:

	Value	Tolerances	Unit	Test Method
Width Fabric Weight Overall Mass	152 340 **770**	+/-2 0.95 **+/-5%**	cm g/m^2 **g/m^2**	BS 3424.5 **BS 3424.5**
Product Properties:				
	Value	**Tolerances**	**Unit**	**Test Method**
Color fastness for wet and dry rubbing	4 3	min min	grey scale grey scale	**BS 3424 p14method 16** **A BS 3424 p14 method 16 A**
Tensile WMD	950	min.	N/50mm	**BS 3424 P4**
AMD	750	min.	N/50mm	**BS 3424 P4**
Elongation under constant load WMD	25	min.	%	**10kg/10min.**
Elongation under constant load AMD	30	min.	%	**10kg/10min.**
Bursting resistance	20	min.	kg/sq.cm	**Mullen**
Fusion of PVC	Good	0	Disintegration	**BS 3424.83 P22**
Adhesion of Coating	80	min.	N/50mm	**BS 3424 P7**
Resistance to Flexions	ok	No Cracks	250000Cycles	**BS 3424 P9 Annex NA**
Loss of volatiles	2.5	max.	%	**BS 3424 P12 Method A**
Flame Resistance (British)	5	max.	sec	**BS 7837 (method BS 54382B)**
Electrical Burner Test M2 (French)	20	max	sec	**M2**
Flame Resistance test ISO 6940	20	max	sec	**ISO 6940**
Flame Resistance test ISO 6941	20	max	sec	**ISO 6941**
Coating Pell strength	25	min	N/50mm	**BS 3424:9B**
Water column	2m		No drops	**ASTM D 751**

TEN TECH

DIMENSIONS
TENTS + STRUCTURES

Contour X FR – Out Door Stretch PVC Coated Vinyl

- *Premium PVC coated stretch material designed for outdoor use*
- *High Frequency adhesion ("high weld properties")*
- *Field experience : waterproof in excess of 3 years & exposure 5 + years*
- *A premium coated product specifically designed for a durable, long lasting stretch tent product*
- *Fire resistant to British Standards 7837, French M2, CSFM, CPAI 18, ISO 6940, ISO 6941*
- *Water / dirt repellent: Teflon coated on the reverse base fabric*
- *Anti peel: strong adhesion between the PVC coat and base fabric*
- *Premium Elasticity: Stretch, strength, burst and stretch recovery of the pole pressure points*

Note:

Cleaning of the product should be with a mild soapy solution and rinsed thoroughly. The product should not be stored in a wet/damp state for extended periods of time.

The use of abrasive chemicals for cleaning purposes as well as cleaning agents containing solvents should be avoided.
The product is not recommended for use in temperatures below -10 degrees Celsius.

Longevity: When used for the designed purpose, the material should not show brittleness of film, delamination from the fabric or disintegration of the film for a period of 24 months from invoice date. Customers are required to ensure that the product is suitable for the end use application.

FCBA
INSTITUT TECHNOLOGIQUE

INSTITUT TECHNOLOGIQUE
FCBA
Fire Laboratory
10 rue Galilée - 77420 Champs-sur-Marne

Laboratory approved by the Ministry for the Interior
JO of February 10, 2007
OFFICIAL REPORT OF CLASSIFICATION OF FIRE PERFORMANCE
Of A MATERIAL ENVISAGED IN ARTICLE 5
DECREE OF November 21, 2002

N° CM - 16 - P - 076
et 2 annexes de 4 pages.

Valid 5 years as from mercredi 18 mai 2016

Material presents by : **SIOEN FABRICS SA**
Avenue Urbino 6
7700 MOUSCRON

Trade mark: **F5639**

Summary description

Kind of textile support textile polyester enduit de PVC/ polyster fabric with PVC coating
Composition support textile/ fabric 100% polyester (280 g/m²) + enduction/ coating PVC ignifugé (450 g/m²)
Mass per unit area 730 g/m²
Color tous coloris/ all colors

Nature of the test : Electrical burner test
Flame persistence flame
Dripping test

Classification : **M2**

Observations : /

Durability of the classification (Article 5 de l'annexe 2) Not limited

Usual term Walls hung covering, sheers, curtains,… **Cleaning conditions** Not washable with water and not cleanable

Taking into account the criteria resulting from the tests annexed described in the test report N° *367160335 et 367160687*

This official report attests only characteristics of the sample submitted for testing and does not prejudge similar characteristics of products. It thus does not constitute a certification of products within the meaning of the L.115-27 article of the code of the consumption and the law of June 3rd, 1994.
NOTE: The integral reproductions and by photocopy of this official report of classification are only authorized or the official report unit of classification and report of annexed test.

"Not legally acceptable for any use under the pretence of the article AM 18 (Decree of March 6th, 2006)"

Champs-sur-Marne, le lundi 28 novembre 2016

Technicienne d'essais du Laboratoire Feu

Clotilde ETIEMVRE

Responsable Technique du Laboratoire Feu du Pôle Ameublement

Clarence RAWAS

Only the french version remains valid

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Institut technologique FCBA : Forêt, Cellulose, Bois - construction, Ameublement

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TESTING LABORATORIES, INC.
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"We Test Per Your Request"
336 WEST FRONT STREET
P.O. BOX 4004
BURLINGTON, NORTH CAROLINA 27215
PHONE (336) 227-7710 • FAX (336) 227-1175
www.diversifiedtestinglabs.com

June 24, 2019

Ms. Karen Provost
SIOEN FABRICS S.A.
Avenue Urbino 6
B-7700 Mouscron
Belgium

Reference: Flammability Test Report
Lab Identification No. 36497
Invoice No. 67757

Dear Ms. Provost:

One (1) sample, identified as **RP5639/RP5678,** was received and tested in accordance with the California Administrative Code Title 19--Public Safety, Section 1237. Flame Resistance, Small Scale Test. The results are as follows:

Test Results

Specimen Number	After Flame (sec)		Char Length (in)	
	Length	Width	Length	Width
1	0.0	3.0	4.0	4.9
2	13.0	0.0	4.1	3.8
3	0.0	0.0	4.1	3.6
4	0.0	3.0	4.3	3.9
5	0.0	0.0	4.0	4.1
Avg.	2.6	1.2		

The sample submitted, in its original state, **meets** the minimum requirements of the above standard. The char length may not exceed 6.0 inches for any individual specimen and the average afterflame time may not exceed 4.0 seconds in the length or width directions.

If there are any questions or when we can be of further assistance, please let us know.

Sincerely,

Brian S. Dement

BSD/mr

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Reference: Flammability Test Report
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Invoice No. 67757

Dear Ms. Provost:

One (1) sample, identified as **RP5639/RP5678,** was received and tested in accordance with the California Administrative Code Title 19--Public Safety, Section 1237. Flame Resistance, Small Scale Test. **The sample was tested after 72 hours of leaching.** The results are as follows:

Test Results

Specimen Number	After Flame (sec)		Char Length (in)	
	Length	Width	Length	Width
1	5.0	0.0	3.7	4.2
2	0.0	0.0	3.6	3.4
3	7.0	4.0	5.6	2.7
4	0.0	0.0	4.0	3.3
5	0.0	0.0	4.1	4.0
Avg.	2.4	0.8		

The sample submitted, when tested after 72 hours of leaching, **meets** minimum requirements of the above standard. The char length may not exceed 6.0 inches for any individual specimen and the average afterflame time may not exceed 4.0 seconds in the length or width directions.

If there are any questions or when we can be of further assistance, please let us know.

Sincerely,

Brian S. Dement

BSD/mr

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June 24, 2019

Ms. Karen Provost
SIOEN FABRICS S.A.
Avenue Urbino 6
B-7700 Mouscron
Belgium

Reference: Flammability Test Report
Lab Identification No. 36497
Invoice No. 67757

Dear Ms. Provost:

One (1) sample, identified as **RP5639/RP5678,** was received and tested in accordance with the California Administrative Code Title 19--Public Safety, Section 1237. Flame Resistance, Small Scale Test. **The sample was tested after 100 hours of accelerated weathering.** The results are as follows:

Test Results

Specimen Number	After Flame (sec)		Char Length (in)	
	Length	Width	Length	Width
1	0.0	0.0	4.1	4.6
2	0.0	0.0	4.4	4.1
3	0.0	0.0	4.0	3.2
4	0.0	0.0	3.4	3.5
5	0.0	0.0	4.2	3.7
Avg.	0.0	0.0		

The sample submitted, when tested after 100 hours accelerated weathering, **meets** the minimum requirements of the above standard. The char length may not exceed 6.0 inches for any individual specimen and the average afterflame time may not exceed 4.0 seconds in the length or width directions.

If there are any questions or when we can be of further assistance, please let us know.

Sincerely,

Brian S. Dement

BSD/mr

DIVERSIFIED TESTING LABORATORIES, INC. SEAL 1975 NORTH CAROLINA

Exova Warringtonfire, Frankfurt
Industriepark Höchst, C369
Frankfurt am Main
D-65926
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E : EBH@exova.com
W: www.exova.com

Testing. Advising. Assuring.

Test report No. 2018-1124

for applying of a required "Verwendbarkeitsnachweis"
issued 26.02.2018

Applicant: SIOEN FABRICS SA
Avenue Urbino 6

B – 7700 Mouscron

Date of order: **25.01.2018**
Date of sampling: ***no official sampling of the specimen by a representative of Exova Warringtonfire, Frankfurt***
Date of arrival: **26.01.2018**
Date of test: **12.02.2018 + 14.02.2018**

Order

Testing of the flammability (building class B1) according to DIN 4102-1 (May 1998)

Description / designation of the test object

Product name: RP5639

Description of the relevant test procedure

DIN 4102 part 1 (Mai 1998)

This test report does not replace the required „Verwendbarkeitsnachweis". It is only used for issuing the "Verwendbarkeitsnachweis".

DAkkS Deutsche Akkreditierungsstelle D-PL-18534-01-00

1. Description of the test material

1.1 Details of the customer:

Product name: RP5639

Product description:

280 g/m² PES-Textile with 450 g/m² PVC coating
Thickness: approx. 0.90mm
Colour: taupe

Intended end use of product: Flexible stretch tents.

1.2 By Exova Warringtonfire, Frankfurt determined values:

Fabric pattern

Colour:	light grey
Thickness:	0,85 mm
Square weight:	750 g/m²

Testing after storing 14- days under climatic conditions (23°C / 50 % rel. humidity).

2/28/2018

2. Test results

2.1.1 Brandschachtprüfung according to DIN 4102-1

Sample A: Material tested in production direction
Sample B: Material tested crosswise to the production direction
Sample C: Material tested crosswise to the production direction
Sample D: Material tested crosswise to the production direction

Test results of the Brandschacht tests part 1						
line no.			Measurements test sample			
			A	B	C	D
1	no. test arrangement according to DIN 4102 part 15, table 1		1	1	1	1
2	flame height max. over lower sample edge	cm	70	90	90	90
	time [1]	min : s	0:18	0:22	0:18	0:21
3	ascertainments on the front side Flaming/glowing time [1]	min : s	0:03	0:03	0:03	0:08
4	melting / burning through time [1]	min : s	0:15	0:15	0:16	0:15
5	ascertainments on the back side Flaming/glowing time [1]	min : s	no	no	no	no
6	discolouring time [1]	min : s	no	no	no	no
7	burning droplets begin [1]	min : s	not occured	not occured	not occured	not occured
	extent					
8	occasional dropping of material					
9	constant dropping of material					
10	separating from burning sample parts begin [1]	min : s	no	no	no	no
11	occasional separating parts					
12	constant separating parts					
13	duration of burning on the sieve tray (max.)	min : s	not occured	not occured	not occured	not occured
14	influence on the burner flame by dropping of / separating material time [1]	min : s	yes	yes	yes	yes
15	earlier end of test end of the fire scenario on the sample [1]	min : s	no	no	no	no
16	time of a possible resulted test stop [1]	min : s				

[1] time from start of test

2/28/2018

Test results of the Brandschacht tests part 2						
line no.			Measurements test sample			
			A	B	C	
	flaming after end of test		--/--	--/--	--/--	--/--
17	duration		--/--	--/--	--/--	--/--
18	number of sample	min : s	--/--	--/--	--/--	--/--
19	front side of sample		--/--	--/--	--/--	--/--
20	backside of sample		--/--	--/--	--/--	--/--
21	flame length	cm	--/--	--/--	--/--	--/--
	glowing after end of test					
22	duration	min . s	not occured	not occured	not occured	not occured
23	number of sample		--/--	--/--	--/--	--/--
	place of occurrence		--/--	--/--	--/--	--/--
24	lower sample part		--/--	--/--	--/--	--/--
25	upper sample part		--/--	--/--	--/--	--/--
26	front side of sample		--/--	--/--	--/--	--/--
27	backside of sample		--/--	--/--	--/--	--/--
			--/--	--/--	--/--	--/--
	smoke density					
28	< 400 % x min		78	75	68	99
29	> 440 % x min		--/--	--/--	--/--	--/--
30	diagram in annex no.		1	2	3	4
	residual length					
31	single results	cm	39 / 38 47 / 49	42 / 45 44 / 42	45 / 46 44 / 43	42 / 47 44 / 40
32	average of the single results	cm	43	43	44	43
33	photo of the sample on page		5	5	5	5
	smoke temperature					
34	max. of the average results	°C	124	133	131	123
35	time [1]	min : s	0:20	0:25	0:22	0:26
36	diagram in annex no.		1	2	3	4

[1] time from start of test

Remarks: none

2/28/2018

2.1.2 Appearance of the specimen after the test:

Sample A


Sample B

Sample C

Sample D

2.2.1 Normal flammability test according to DIN 4102-1

Test with edge ignition without deposit
Flame application on: lower sample edge
Edge ignition

Length direction

Sample-no. / Time from start of test	1	2	3	4	5
Ignition point [s]	1	1	1	1	1
Reaching the measuring mark within 20 seconds	no	no	no	no	no
Self-extinguishing of the flame [s]	15	15	15	15	15
Max. flame height [mm]	70	70	60	70	70
Time [s]	10	10	10	10	10
End of afterflaming [s]	-	-	-	-	-
End of afterglowing [s]	-	-	-	-	-
Flames extinguished after [s]	-	-	-	-	-
Smoke development (visual impression) low / moderate / strong	strong smoke development				
Separating from burning material	no	no	no	no	no
Time [s]	-	-	-	-	-

Remarks: none

Test with edge ignition without deposit
Flame application on: lower sample edge
Edge ignition

Cross direction

Sample-no. / Time from start of test	1	2	3	4	5
Ignition point [s]	1	1	1	1	1
Reaching the measuring mark within 20 seconds	no	no	no	no	no
Self-extinguishing of the flame [s]	15	15	15	15	15
Max. flame height [mm]	70	70	60	60	60
Time [s]	10	10	10	10	10
End of afterflaming [s]	-	-	-	-	-
End of afterglowing [s]	-	-	-	-	-
Flames extinguished after [s]	-	-	-	-	-
Smoke development (visual impression) low / moderate / strong	strong smoke development				
Separating from burning material	no	no	no	no	no
Time [s]	-	-	-	-	-

Remarks: none

2/28/2018

2.2.2 Appearance of the sample after the small burner test:

2/28/2018

Assessment

The material described in chapter one fulfils the requirements of the building class B2 according to DIN 4102-1 (Mai 1998).
The determined test results show that the material also fulfils the requirements

of the building class B1

according to DIN 4102-1 (Mai 1998).

Special note

The fire test result is only valid for the material described in chapter one in the tested colour and square weight.
The test was carried out in free hanging configuration.
The distance to other plane material must be more or equal then 40 mm.

The material wasn't tested after an outside storage.

In combination with other materials (for example coatings, deposits) the burning behaviour could be influenced unfavourable so that the classification above is not valid any longer. According to DIN 4102-1 the burning behaviour in combination with other materials has to be tested separately.

This test report does not replace the required „Verwendbarkeitsnachweis". It is only used for issuing the "Verwendbarkeitsnachweis".

Frankfurt, the 26.02.2018

H. Anders
Tester in Charge

i. V.
Dipl.-Ing. T. Zachäus
Head of the business

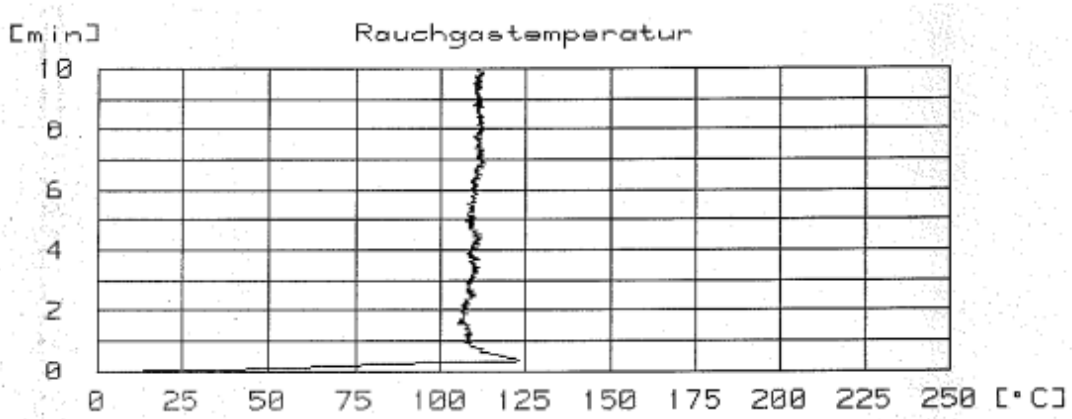
DAkkS
Deutsche Akkreditierungsstelle
D-PL-18354-01-00

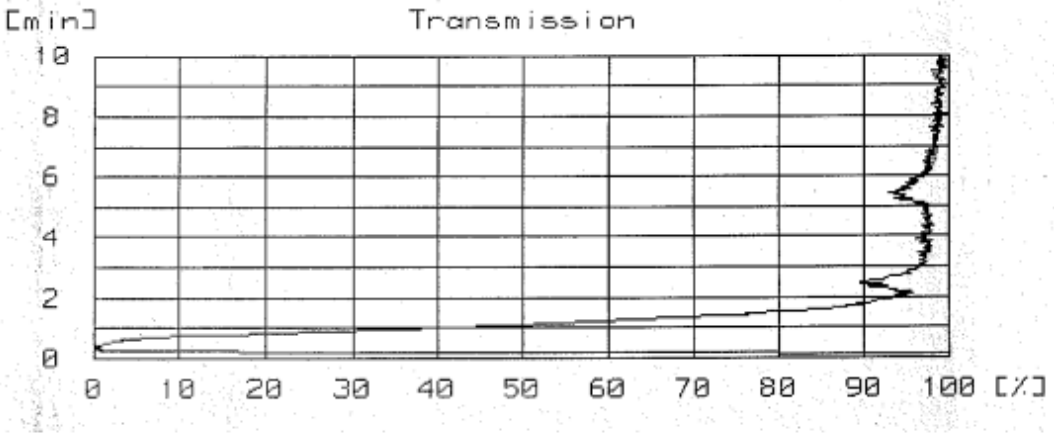
This Test report is valid until 11.02.2023.
The results of the tests relate only to the behaviour of the test specimen which is designated on the top.
Test reports are only allowed to be published or reproduced, not changed in form and tenor without permission of the Exova Warringtonfire, Frankfurt. The abridged account of a test report is only allowed with the agreement of the Exova Warringtonfire, Frankfurt.
This test report is a translation of the German version 2018-1124 (issued 26.02.2018). In case of doubt only the German version is valid
This test report contains 8 pages and 4 annexes.

2/28/2018

Annex 1 to the Test report No. 2018-1124 issued 26.02.2018

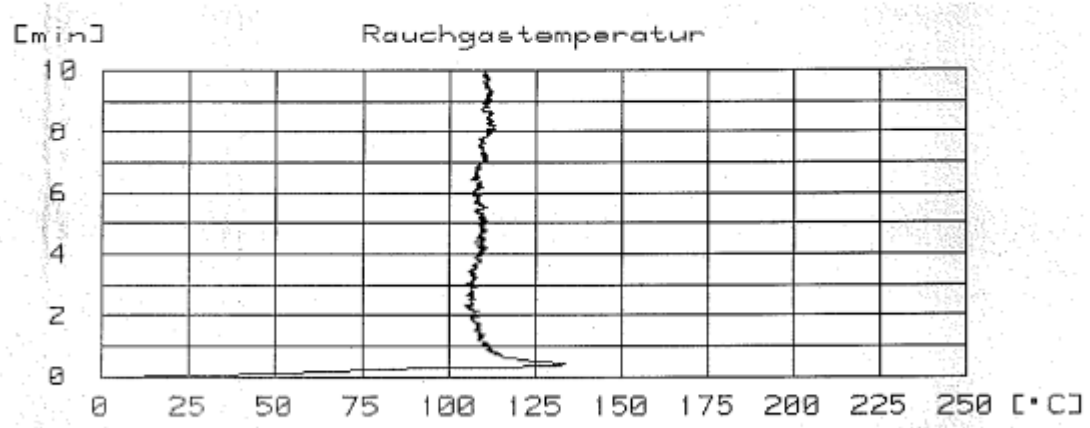
Sample A:

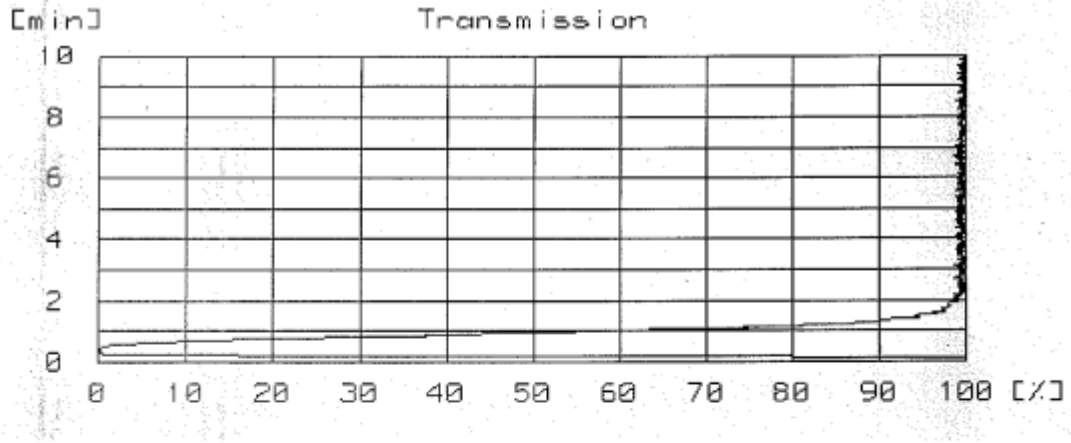




Annex 2 to the Test report No. 2018-1124 issued 26.02.2018

Sample B:

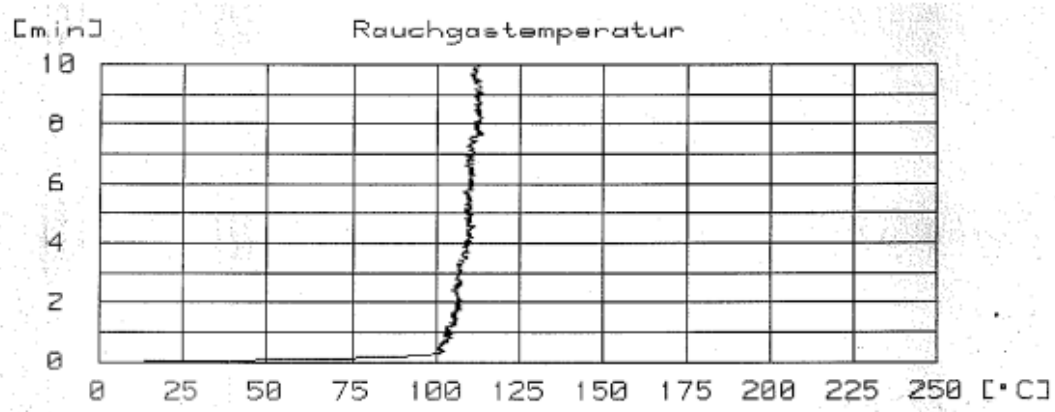


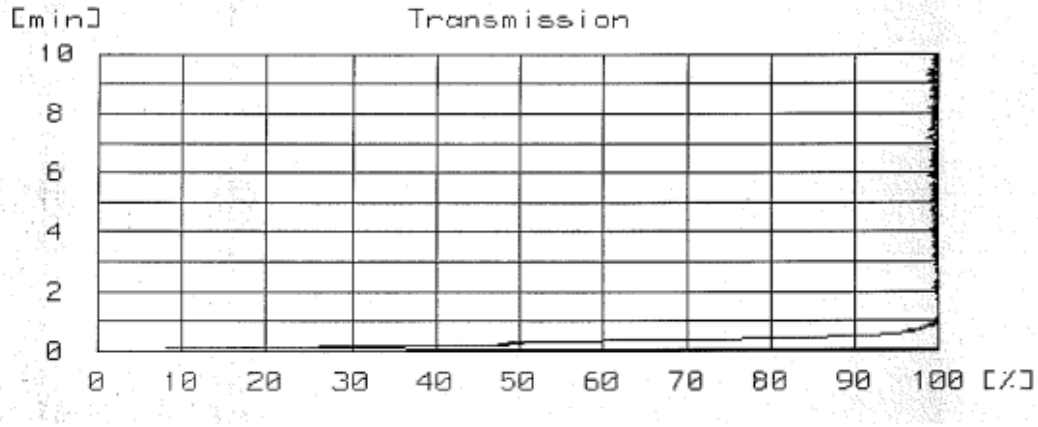


2/28/2018

Annex 2 to the Test report No. 2018-1124 issued 26.02.2018

Sample C:





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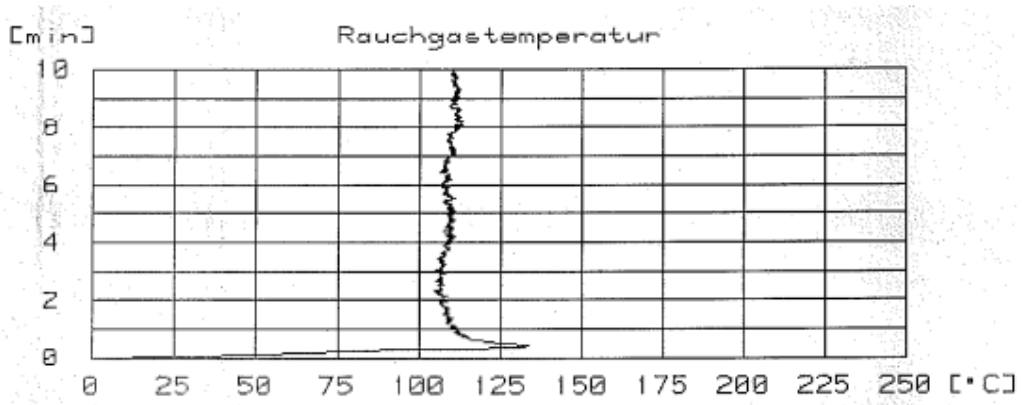
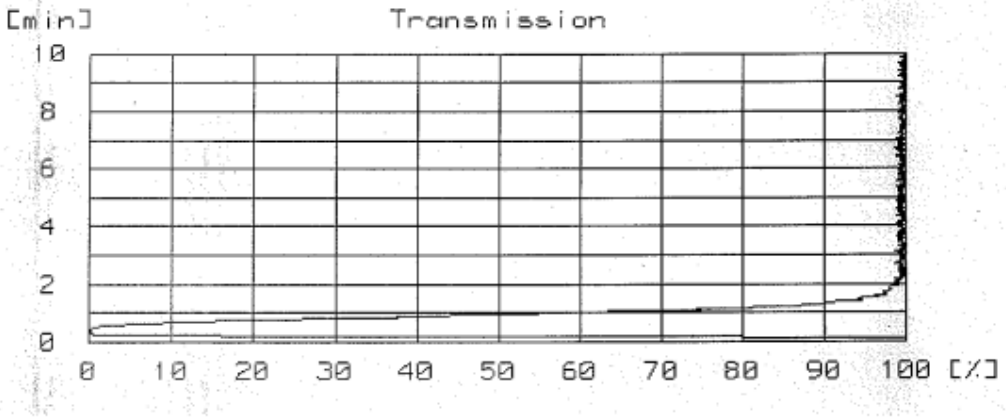
Annex 4 to the Test report No. 2018-1124 issued 26.02.2018

Sample D:





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UNIVERSITÄT DUISBURG ESSEN
Open-Minded

Fakultät für Ingenieurwissenschaften - Abteilung Bauwissenschaften
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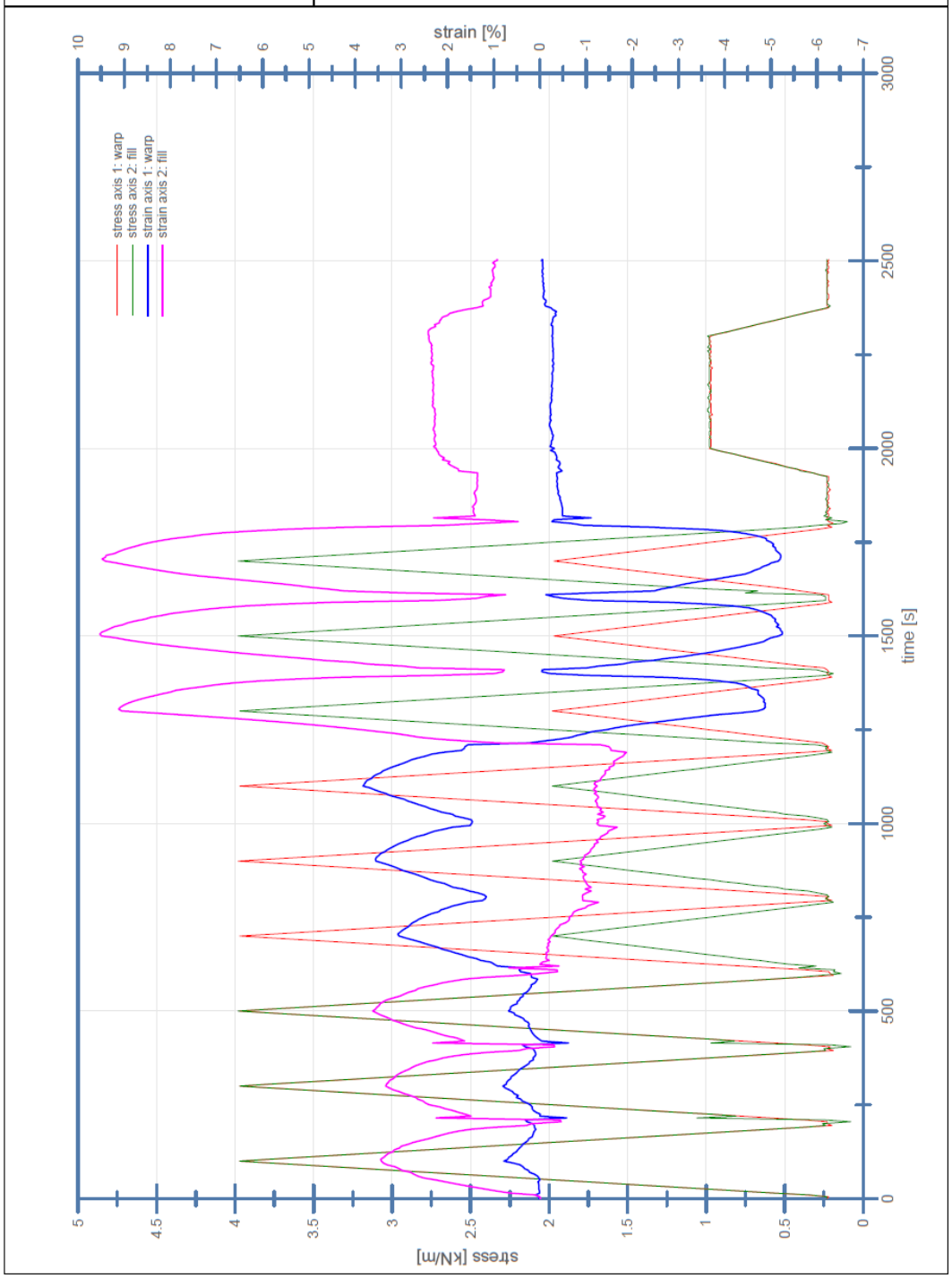
Essener Labor für Leichte Flächentragwerke - ELLF
D-45141 Essen, Universitätsstr. 15, Tel.: +49 201 183-4223, Fax: -4276

Stress-strain-time diagram to biaxial tensile test

Test: DTS2417	Material: Flex coated FR



Material certificate – Ropes 14mm and 7mm

DIMENSIONS
TENTS + STRUCTURES

Date: 17/08/2015

DESCRIPTION: Polyester Braid Rope

DIAMETER	14mm
COLOUR	Black
SHEETH COMPOSITION	High tenacity PET
CORE COMPOSITION	Twisted Polyamide
LINEAR DENSITY	130g/m
LOAD AT BREAK	3640kg

DIAMETER	7mm
COLOUR	Black
SHEETH COMPOSITION	High tenacity PET
CORE COMPOSITION	Twisted Polyamide
LINEAR DENSITY	32g/m
LOAD AT BREAK	910kg

J. Annexes

Annex A. Software input (load cases)

Annex A.1. 20x15m - floating

Annex A.1.1. Own weight + pretension

EXTERNAL LOADS (AUTOMATIC SELFWEIGHT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOADFACTOR	VOLUME/AREA(P.U)	SUM_X	SUM_Y	SUM_Z	VOLUME/AREA
STRUTS	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-1.0099	0.012865
CABLES	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-0.0727	0.000926
MEM-LINKS1000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.0973	292.624216
MEM-LINKS2000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.0972	292.592308

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOAD	FACTOR	SUM_X	SUM_Y	SUM_Z	LOADED AREA
SUM				0.0000	0.0000	0.0000	

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADMODES

	LOADMODE	SUM_X	SUM_Y	SUM_Z
SUM	AREA-LOADS	0.0000	0.0000	0.0000

EXTERNAL LOADS: SUM OF ALL EXTERNAL LOADS

SUM_X	SUM_Y	SUM_Z
0.0000	0.0000	-3.2771

Annex A.1.2. Own weight + pretension + conventional / snow

EXTERNAL LOADS (AUTOMATIC SELFWEIGHT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOADFACTOR	VOLUME/AREA(P.U)	SUM_X	SUM_Y	SUM_Z	VOLUME/AREA
STRUTS	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-1.0099	0.012865
CABLES	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-0.0727	0.000926
MEM-LINKS1000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.0973	292.624216
MEM-LINKS2000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.0972	292.592308

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOAD	FACTOR	SUM_X	SUM_Y	SUM_Z	LOADED AREA
1	SCHNEE	0.1000	1.00	0.0000	0.0000	-27.3639	273.64
SUM				0.0000	0.0000	-27.3639	

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADMODES

	LOADMODE	SUM_X	SUM_Y	SUM_Z
SUM	SCHNEE	0.0000	0.0000	-27.3639
SUM	AREA-LOADS	0.0000	0.0000	-27.3639

EXTERNAL LOADS: SUM OF ALL EXTERNAL LOADS

SUM_X	SUM_Y	SUM_Z
0.0000	0.0000	-30.6410

Annex A.1.3. Own weight + pretension + wind pressure

EXTERNAL LOADS (AUTOMATIC SELFWEIGHT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOADFACTOR	VOLUME/AREA(P.U)	SUM_X	SUM_Y	SUM_Z	VOLUME/AREA
STRUTS	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-1.0099	0.012865
CABLES	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-0.0727	0.000926
MEM-LINKS1000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.0973	292.624216
MEM-LINKS2000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.0972	292.592308

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOAD	FACTOR	SUM_X	SUM_Y	SUM_Z	LOADED AREA
1	WIND	-0.1500	1.00	0.0000	0.0000	-41.0458	292.80
SUM				0.0000	0.0000	-41.0458	

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADMODES

	LOADMODE	SUM_X	SUM_Y	SUM_Z
SUM	WIND	0.0000	0.0000	-41.0458
SUM	AREA-LOADS	0.0000	0.0000	-41.0458

EXTERNAL LOADS: SUM OF ALL EXTERNAL LOADS

SUM_X	SUM_Y	SUM_Z
0.0000	0.0000	-44.3230

Annex A.1.4. Own weight + pretension + wind suction – floating – reduction 0.53

EXTERNAL LOADS (AUTOMATIC SELFWEIGHT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOADFACTOR	VOLUME/AREA(P.U)	SUM_X	SUM_Y	SUM_Z	VOLUME/AREA
STRUTS	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-1.0099	0.012865
CABLES	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-0.0727	0.000926
MEM-LINKS1000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.0973	292.624216
MEM-LINKS2000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.0972	292.592308

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOAD	FACTOR	SUM_X	SUM_Y	SUM_Z	LOADED AREA
1	WIND	0.3500	0.53	0.0000	0.0000	50.7600	292.80
SUM				0.0000	0.0000	50.7600	

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADMODES

	LOADMODE	SUM_X	SUM_Y	SUM_Z
SUM	WIND	0.0000	0.0000	50.7600
SUM	AREA-LOADS	0.0000	0.0000	50.7600

EXTERNAL LOADS: SUM OF ALL EXTERNAL LOADS

SUM_X	SUM_Y	SUM_Z
0.0000	0.0000	47.4829

Annex A.1.5. Own weight + pretension + wind suction – floating – full wind load

EXTERNAL LOADS (AUTOMATIC SELFWEIGHT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOADFACTOR	VOLUME/AREA(P.U)	SUM_X	SUM_Y	SUM_Z	VOLUME/AREA
STRUTS	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-1.0099	0.012865
CABLES	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-0.0897	0.001142
MEM-LINKS1000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.0974	292.628759
MEM-LINKS2000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.0971	292.564733

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOAD	FACTOR	SUM_X	SUM_Y	SUM_Z	LOADED AREA
1	WIND	0.3500	1.00	0.0006	-0.0003	95.7406	292.75
SUM				0.0006	-0.0003	95.7406	

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADMODES

	LOADMODE	SUM_X	SUM_Y	SUM_Z
SUM	WIND	0.0006	-0.0003	95.7406
SUM	AREA-LOADS	0.0006	-0.0003	95.7406

EXTERNAL LOADS: SUM OF ALL EXTERNAL LOADS

SUM_X	SUM_Y	SUM_Z
0.0006	-0.0003	92.4466

Annex A.2. 20x15m - closed

Annex A.2.1. Own weight + pretension

EXTERNAL LOADS (AUTOMATIC SELFWEIGHT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOADFACTOR	VOLUME/AREA(P.U)	SUM_X	SUM_Y	SUM_Z	VOLUME/AREA
STRUTS	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-1.1430	0.014561
CABLES	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-0.0848	0.001081
MEM-LINKS1000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.2874	343.302092
MEM-LINKS2000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.2873	343.267288

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOAD	FACTOR	SUM_X	SUM_Y	SUM_Z	LOADED AREA
SUM				0.0000	0.0000	0.0000	

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADMODES

	LOADMODE	SUM_X	SUM_Y	SUM_Z
SUM	AREA-LOADS	0.0000	0.0000	0.0000

EXTERNAL LOADS: SUM OF ALL EXTERNAL LOADS

SUM_X	SUM_Y	SUM_Z
0.0000	0.0000	-3.8025

Annex A.2.2. Own weight + pretension + conventional / snow

EXTERNAL LOADS (AUTOMATIC SELFWEIGHT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOADFACTOR	VOLUME/AREA(P.U)	SUM_X	SUM_Y	SUM_Z	VOLUME/AREA
STRUTS	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-1.1430	0.014561
CABLES	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-0.0848	0.001081
MEM-LINKS1000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.2874	343.302092
MEM-LINKS2000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.2873	343.267288

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOAD	FACTOR	SUM_X	SUM_Y	SUM_Z	LOADED AREA
1	SCHNEE	0.1000	1.00	0.0000	0.0000	-28.7573	287.57
SUM				0.0000	0.0000	-28.7573	

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADMODES

	LOADMODE	SUM_X	SUM_Y	SUM_Z
SUM	SCHNEE	0.0000	0.0000	-28.7573
SUM	AREA-LOADS	0.0000	0.0000	-28.7573

EXTERNAL LOADS: SUM OF ALL EXTERNAL LOADS

SUM_X	SUM_Y	SUM_Z
0.0000	0.0000	-32.5599

Annex A.2.3. Own weight + pretension + wind pressure

EXTERNAL LOADS (AUTOMATIC SELFWEIGHT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOADFACTOR	VOLUME/AREA(P.U)	SUM_X	SUM_Y	SUM_Z	VOLUME/AREA
STRUTS	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-1.1430	0.014561
CABLES	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-0.0848	0.001081
MEM-LINKS1000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.2874	343.302092
MEM-LINKS2000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.2873	343.267288

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOAD	FACTOR	SUM_X	SUM_Y	SUM_Z	LOADED AREA
1	WIND	-0.1500	1.00	0.0000	-6.2523	-43.1360	344.27
SUM				0.0000	-6.2523	-43.1360	

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADMODES

	LOADMODE	SUM_X	SUM_Y	SUM_Z
SUM	WIND	0.0000	-6.2523	-43.1360
SUM	AREA-LOADS	0.0000	-6.2523	-43.1360

EXTERNAL LOADS: SUM OF ALL EXTERNAL LOADS

SUM_X	SUM_Y	SUM_Z
0.0000	-6.2523	-46.9385

Annex A.2.4. Own weight + pretension + wind suction – closed – reduction 0.53

EXTERNAL LOADS (AUTOMATIC SELFWEIGHT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOADFACTOR	VOLUME/AREA(P.U)	SUM_X	SUM_Y	SUM_Z	VOLUME/AREA
STRUTS	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-1.1430	0.014561
CABLES	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-0.0848	0.001081
MEM-LINKS1000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.2874	343.302092
MEM-LINKS2000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.2873	343.267288

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOAD	FACTOR	SUM_X	SUM_Y	SUM_Z	LOADED AREA
1	WIND	0.6500	0.53	-0.0001	14.3595	99.0691	344.27
SUM				-0.0001	14.3595	99.0691	

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADMODES

	LOADMODE	SUM_X	SUM_Y	SUM_Z
SUM	WIND	-0.0001	14.3595	99.0691
SUM	AREA-LOADS	-0.0001	14.3595	99.0691

EXTERNAL LOADS: SUM OF ALL EXTERNAL LOADS

SUM_X	SUM_Y	SUM_Z
-0.0001	14.3595	95.2665

Annex A.2.5. Own weight + pretension + wind suction – closed – full wind load

EXTERNAL LOADS (AUTOMATIC SELFWEIGHT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOADFACTOR	VOLUME/AREA(P.U)	SUM_X	SUM_Y	SUM_Z	VOLUME/AREA
STRUTS	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-1.1430	0.014561
CABLES	SELFWEIGHT	1.00	78.500000	0.0000	0.0000	-0.1468	0.001870
MEM-LINKS1000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.2873	343.287623
MEM-LINKS2000	SELFWEIGHT	1.00	0.003750	0.0000	0.0000	-1.2873	343.271683

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADGROUPS

LOADGROUP	LOADMODE	LOAD	FACTOR	SUM_X	SUM_Y	SUM_Z	LOADED AREA
1	WIND	0.6500	1.00	-0.0003	27.0704	186.8839	344.18
SUM				-0.0003	27.0704	186.8839	

EXTERNAL LOADS (AREA-DEPENDENT)
ORDERED BY LOADMODES

	LOADMODE	SUM_X	SUM_Y	SUM_Z
SUM	WIND	-0.0003	27.0704	186.8839
SUM	AREA-LOADS	-0.0003	27.0704	186.8839

EXTERNAL LOADS: SUM OF ALL EXTERNAL LOADS

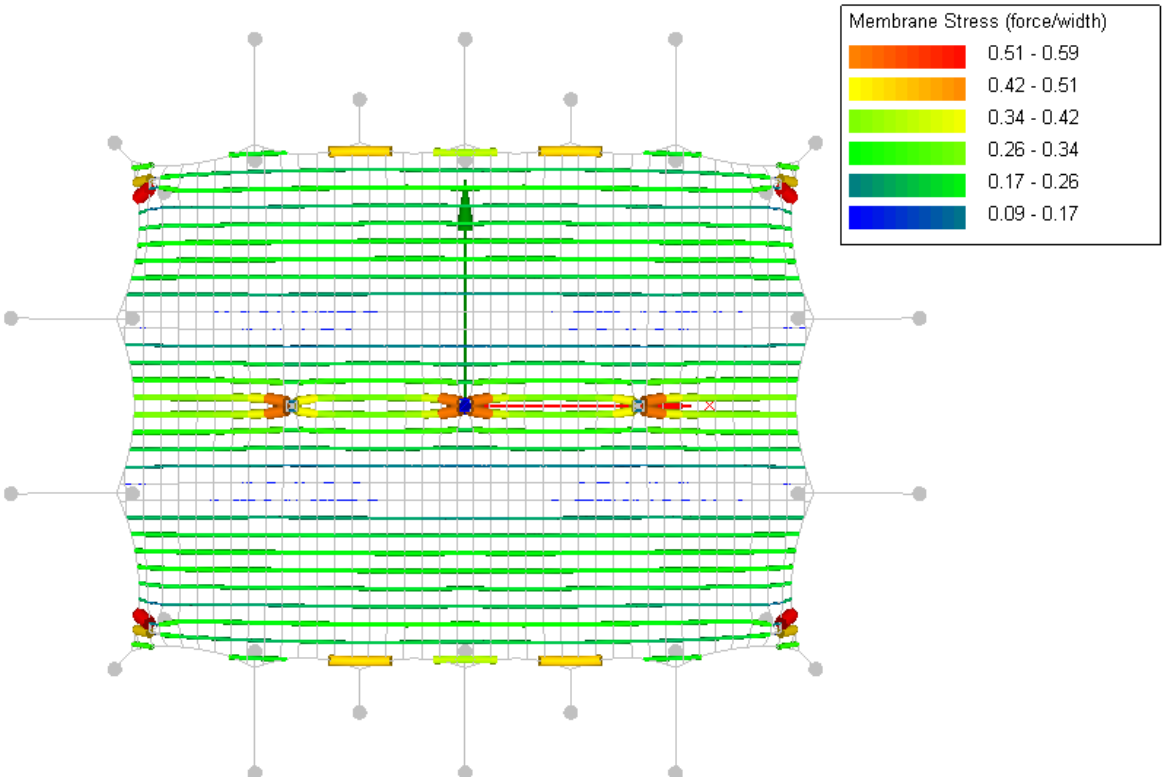
SUM_X	SUM_Y	SUM_Z
-0.0003	27.0704	183.0195

Annex B. Results per load combination

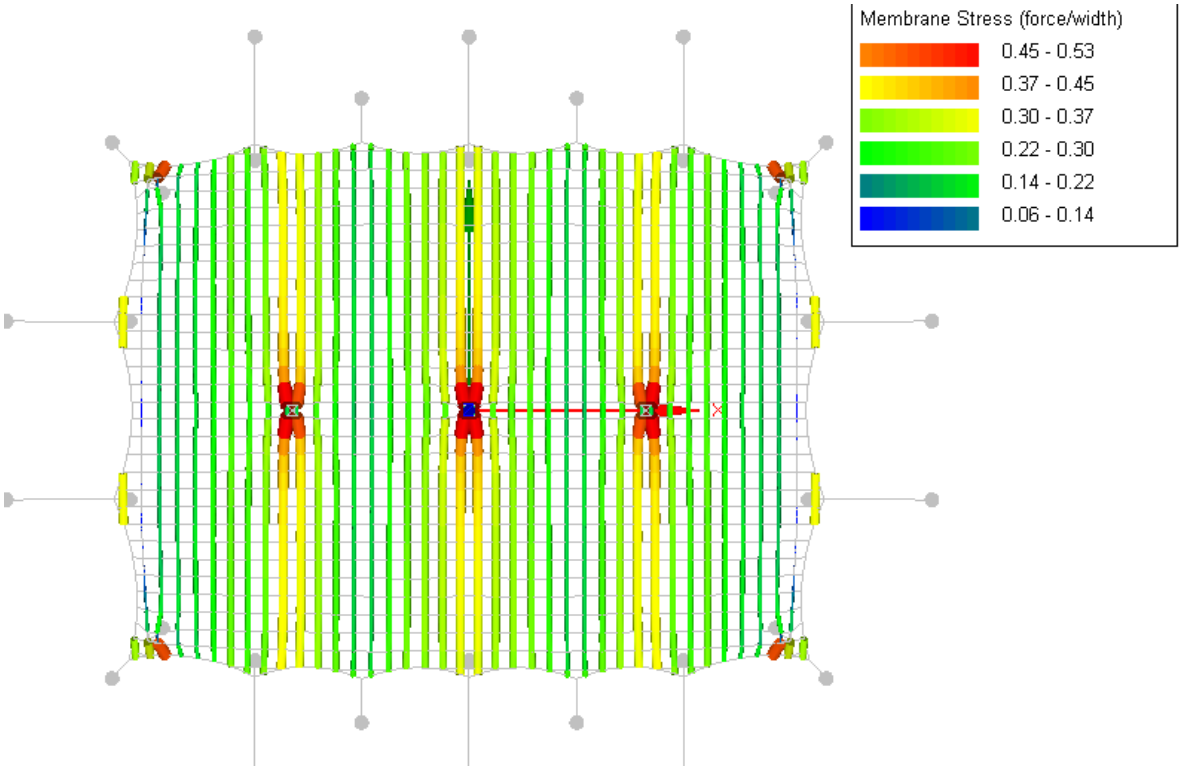
Annex B.1. 20x15m - floating

Annex B.1.1. CO1 Own weight + Pretension

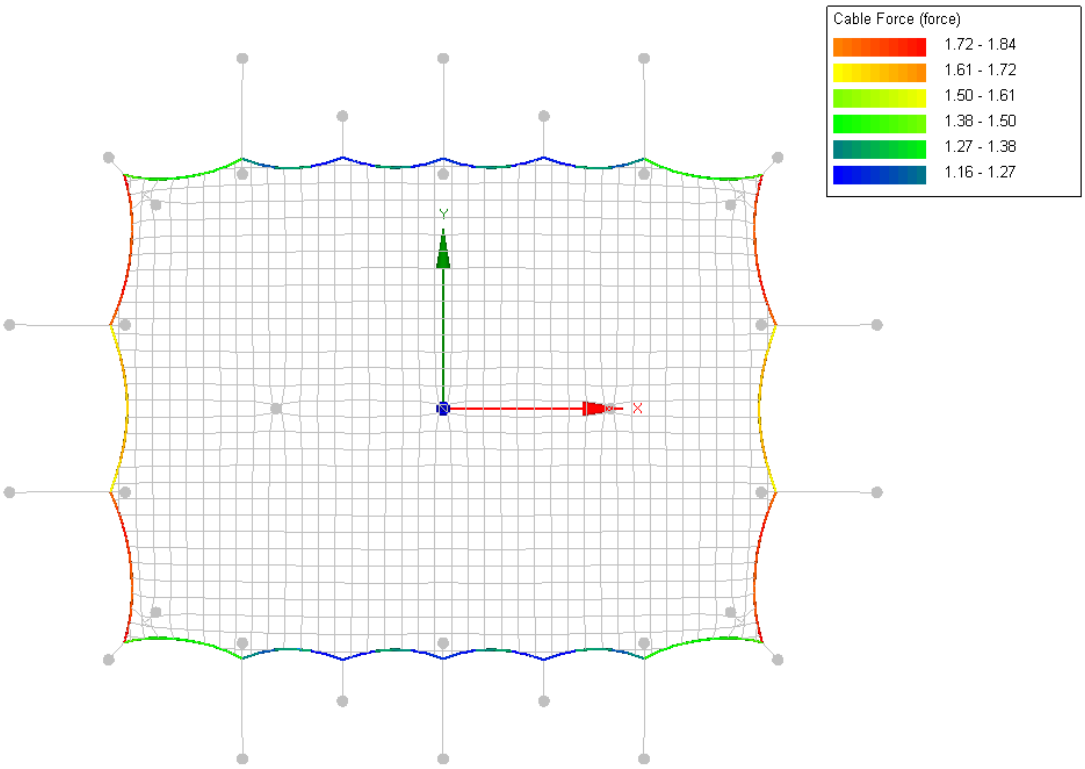
Annex B.1.1.1. Membrane stress (warp)



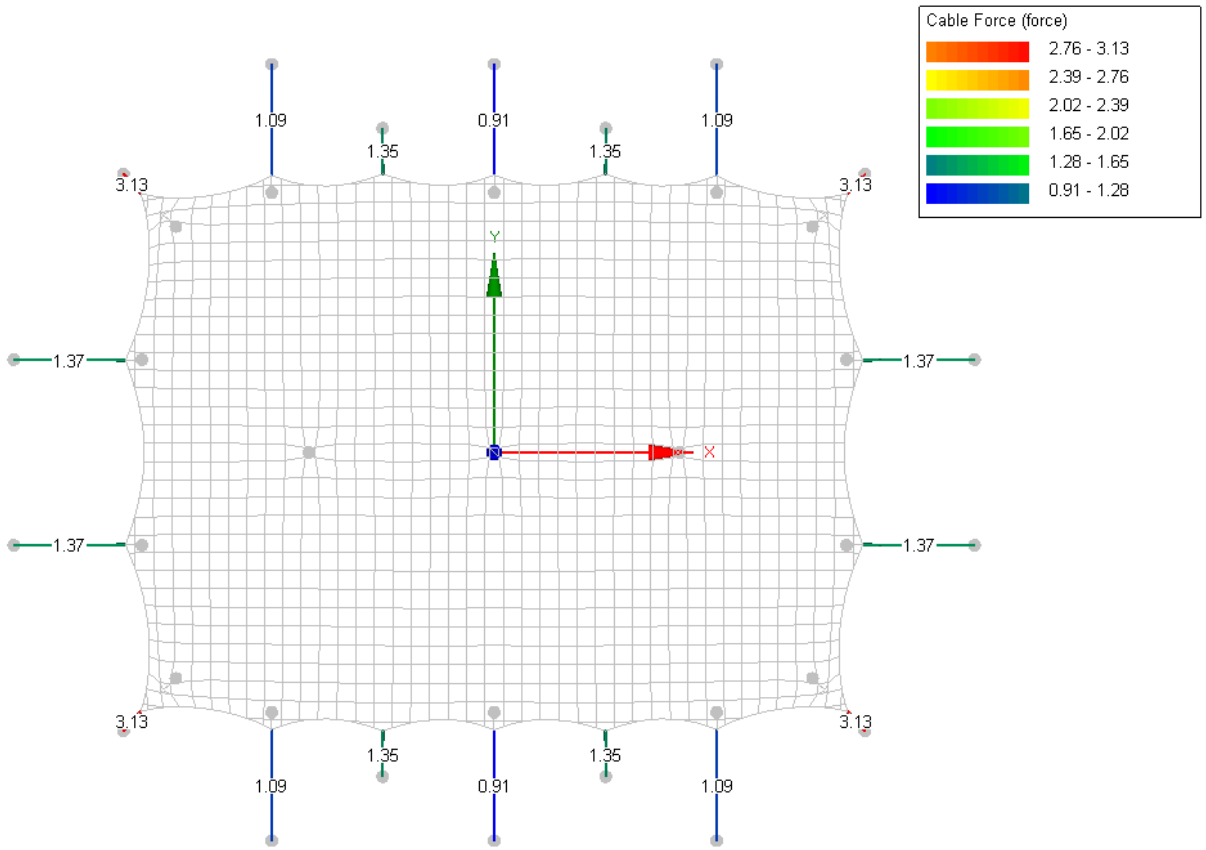
Annex B.1.1.2. Membrane stress (weft)



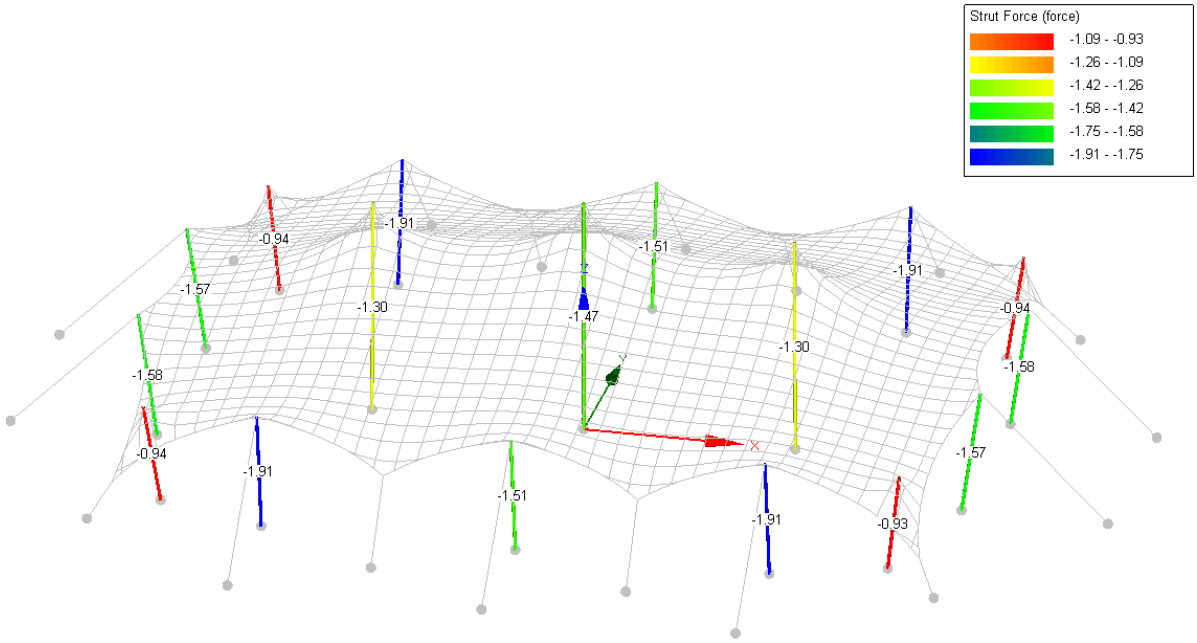
Annex B.1.1.3. Membrane edge



Annex B.1.1.4. Cable forces

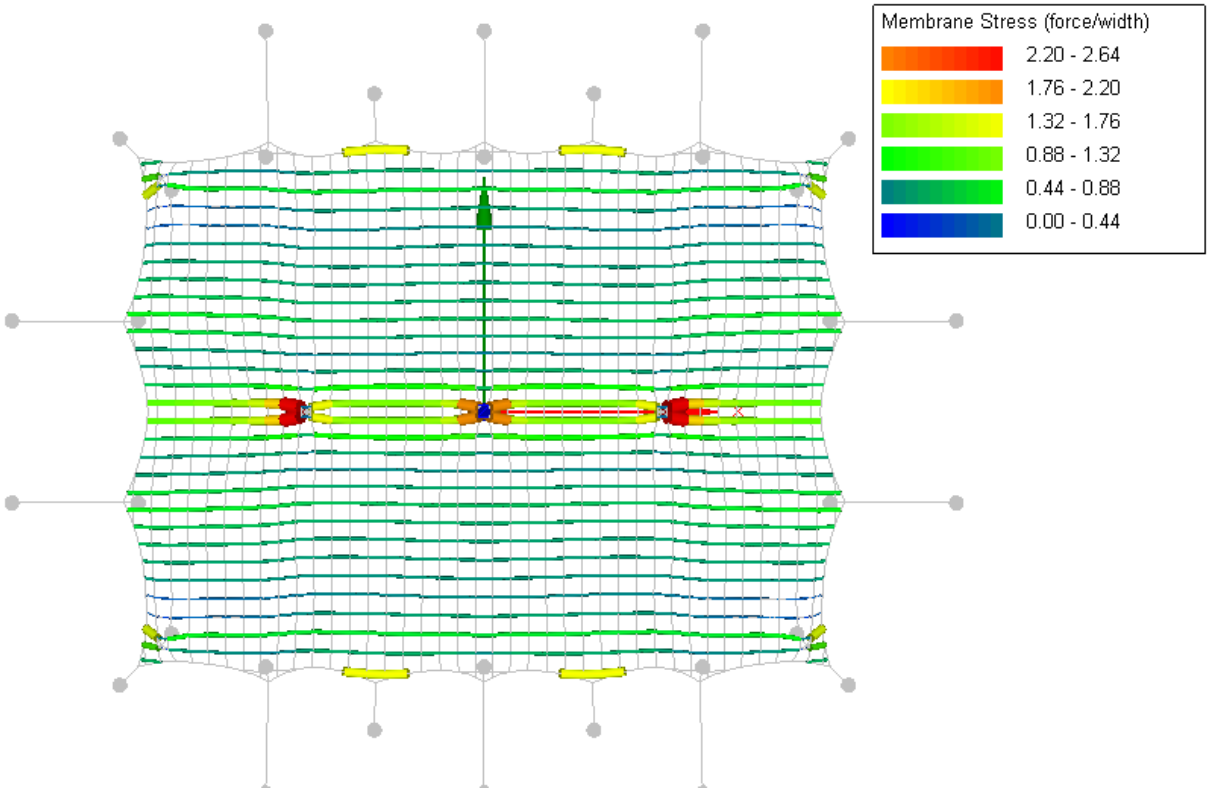


Annex B.1.1.5. Strut forces

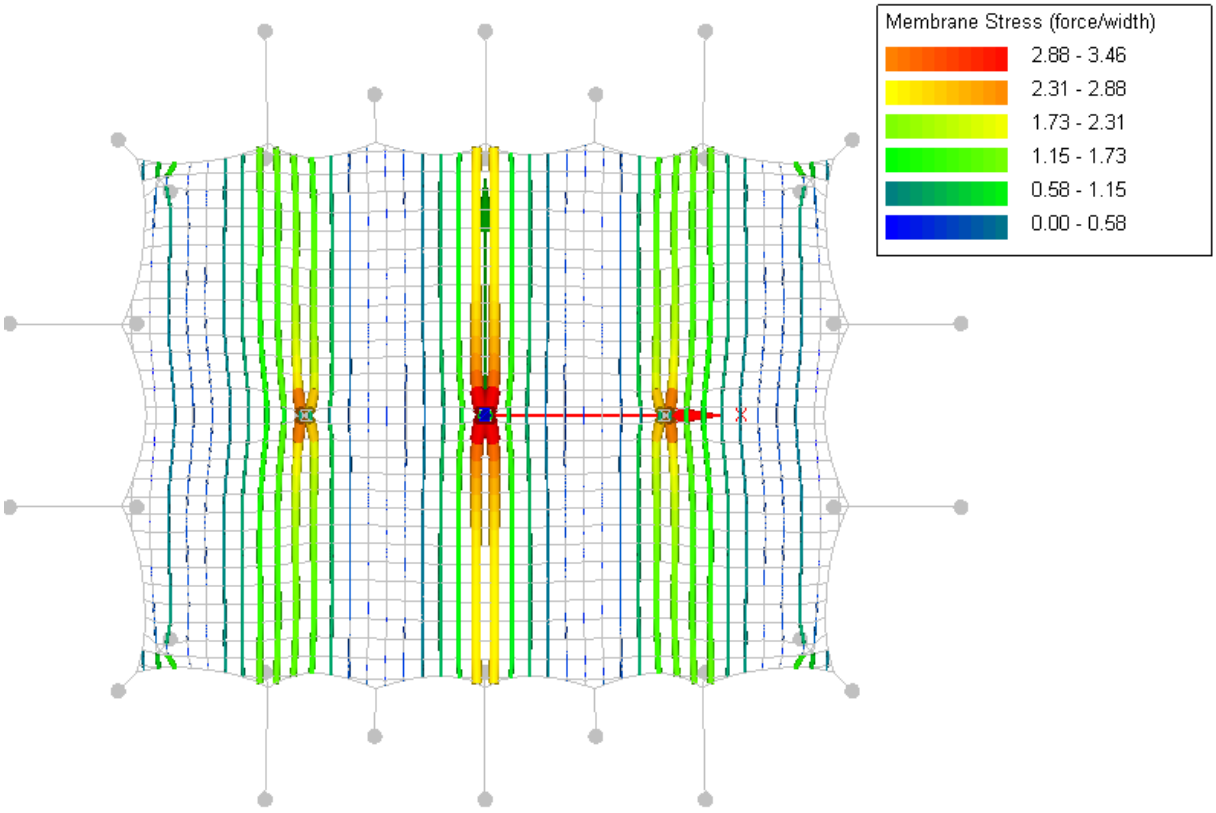


Annex B.1.2. CO2 Own weight + Pretension + Conventional / snow

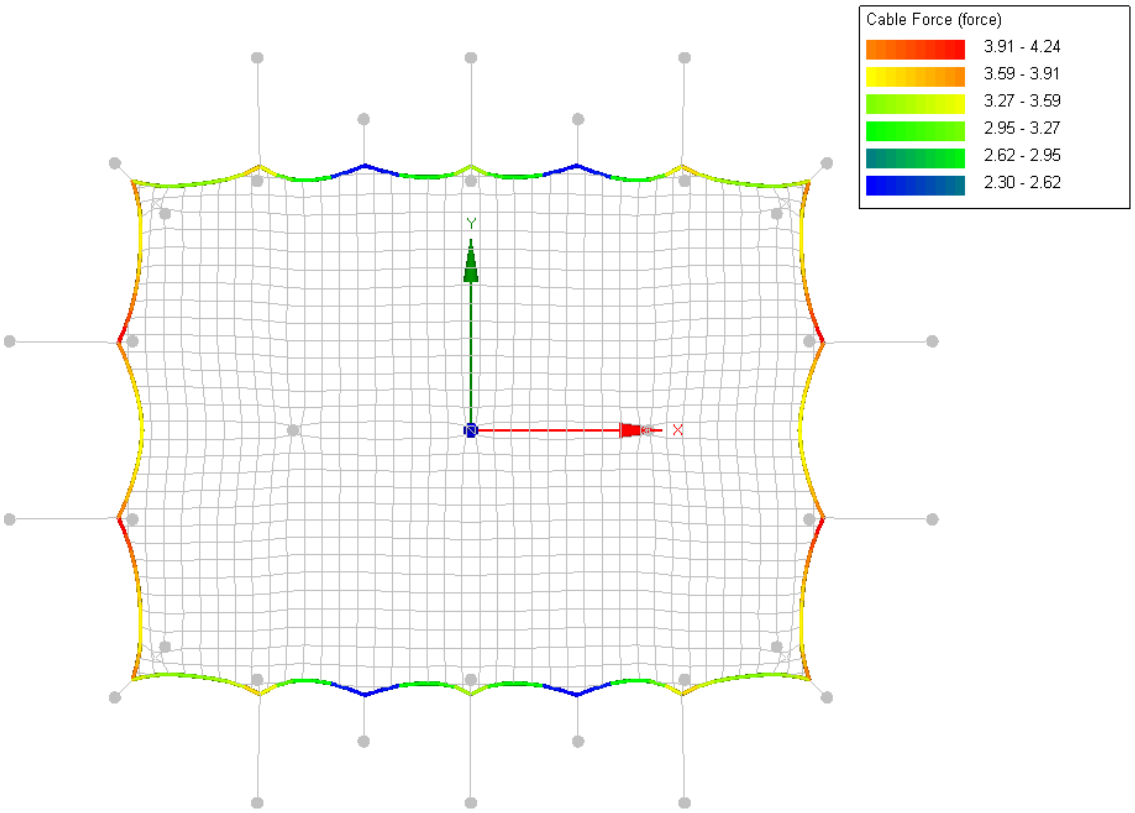
Annex B.1.2.1. Membrane stress (warp)



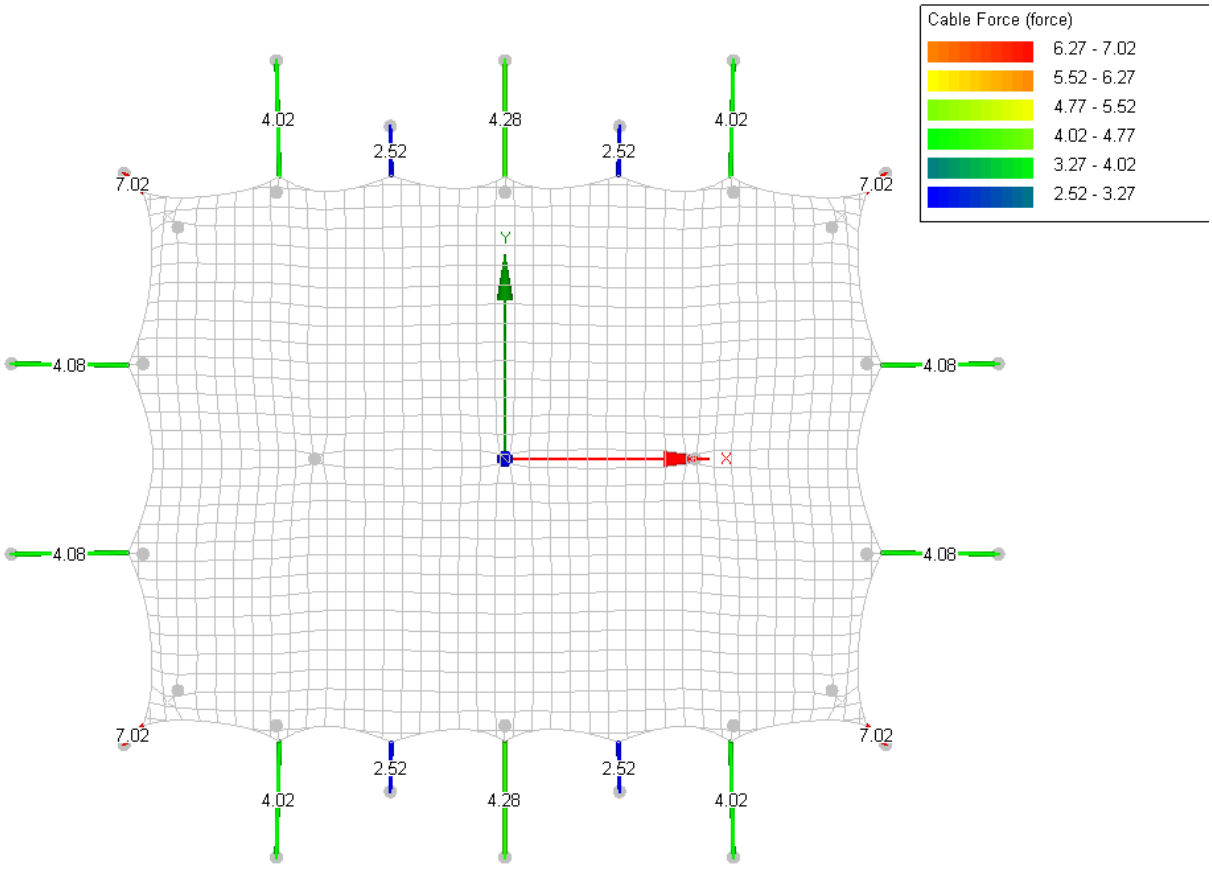
Annex B.1.2.2. Membrane stress (weft)



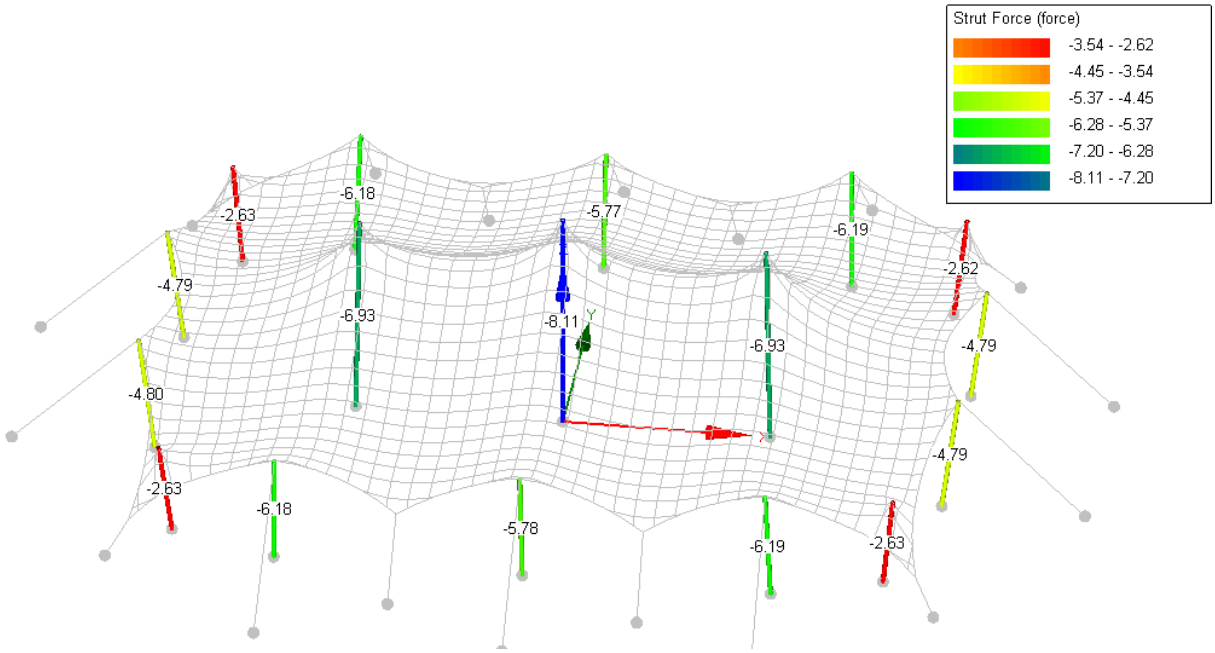
Annex B.1.2.3. Membrane edge



Annex B.1.2.4. Cable forces

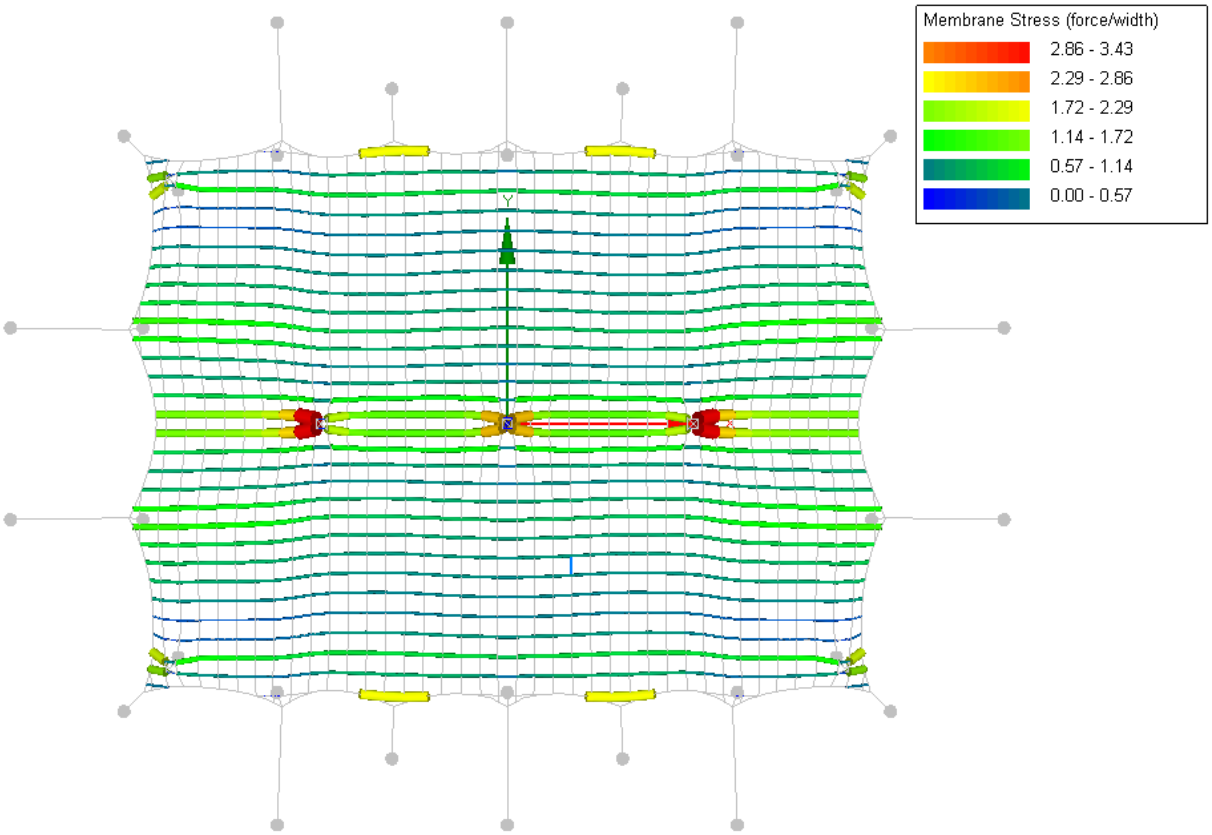


Annex B.1.2.5. Strut forces

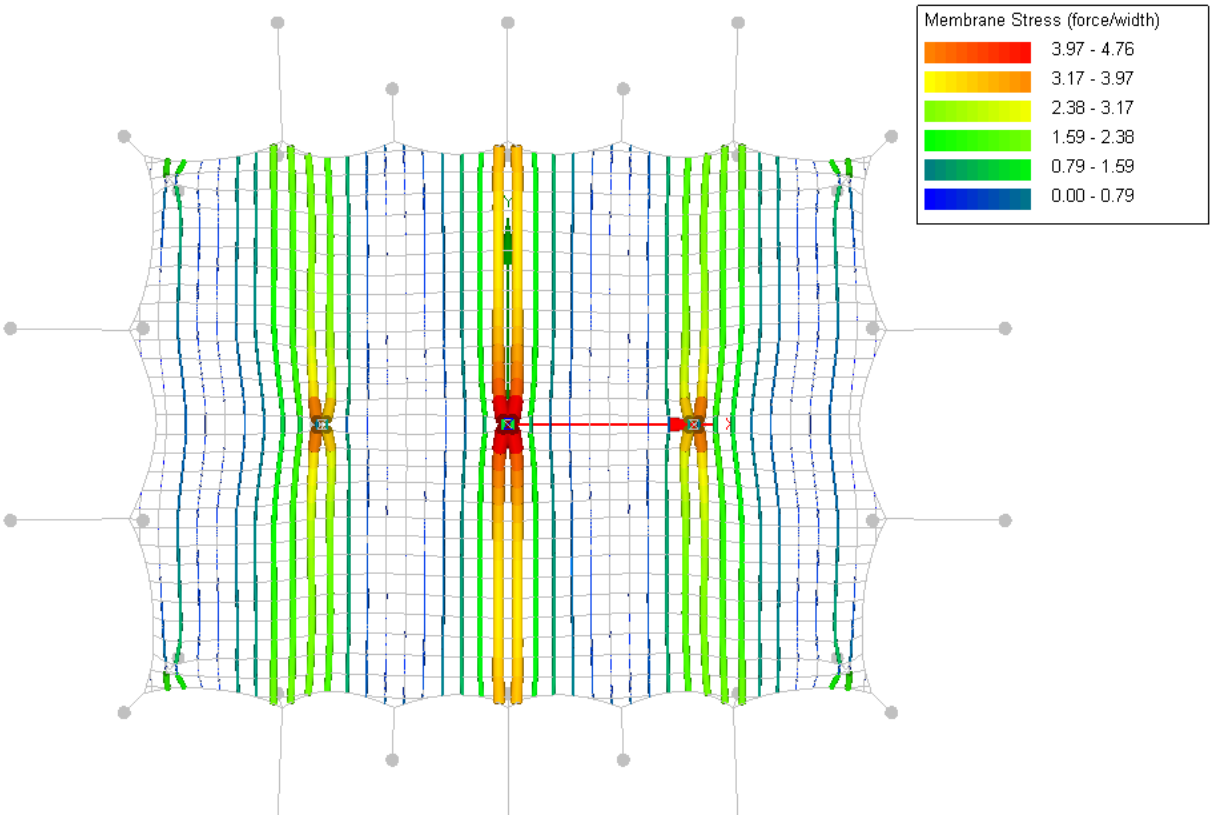


Annex B.1.3. CO3 Own weight + Pretension + Wind pressure

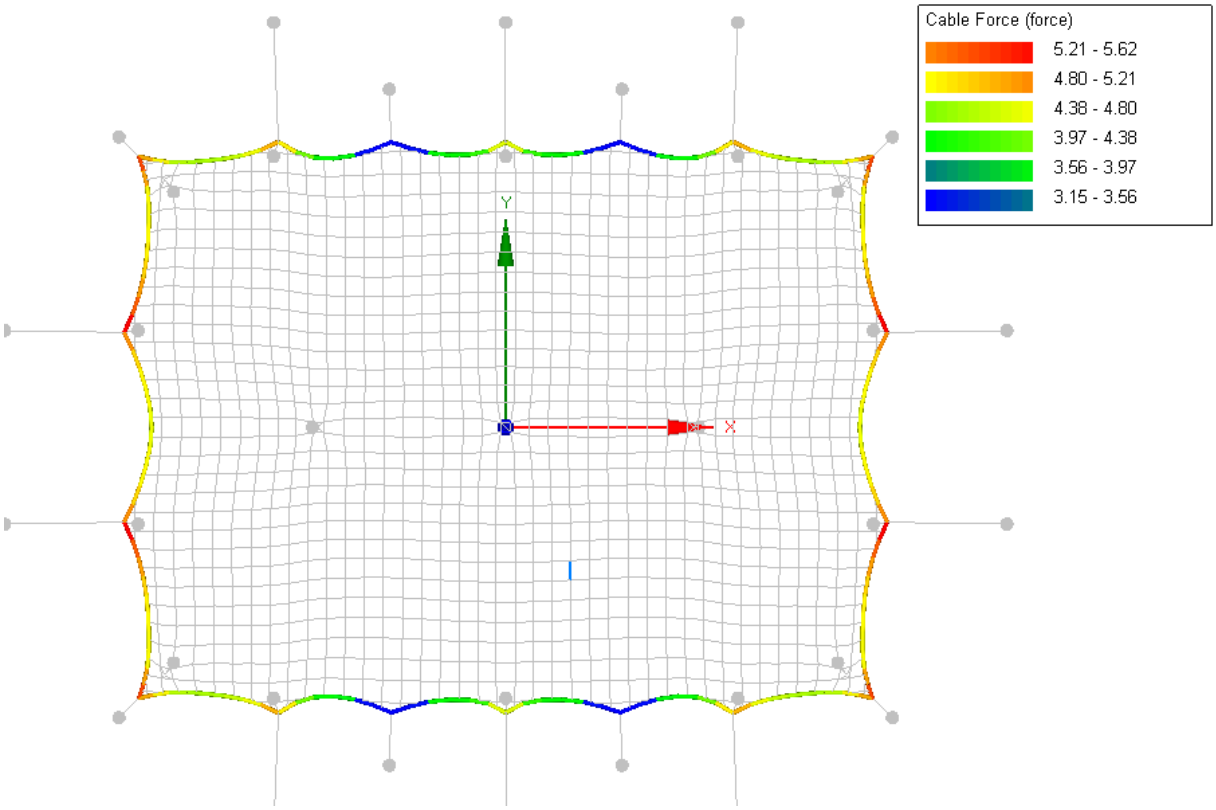
Annex B.1.3.1. Membrane stress (warp)



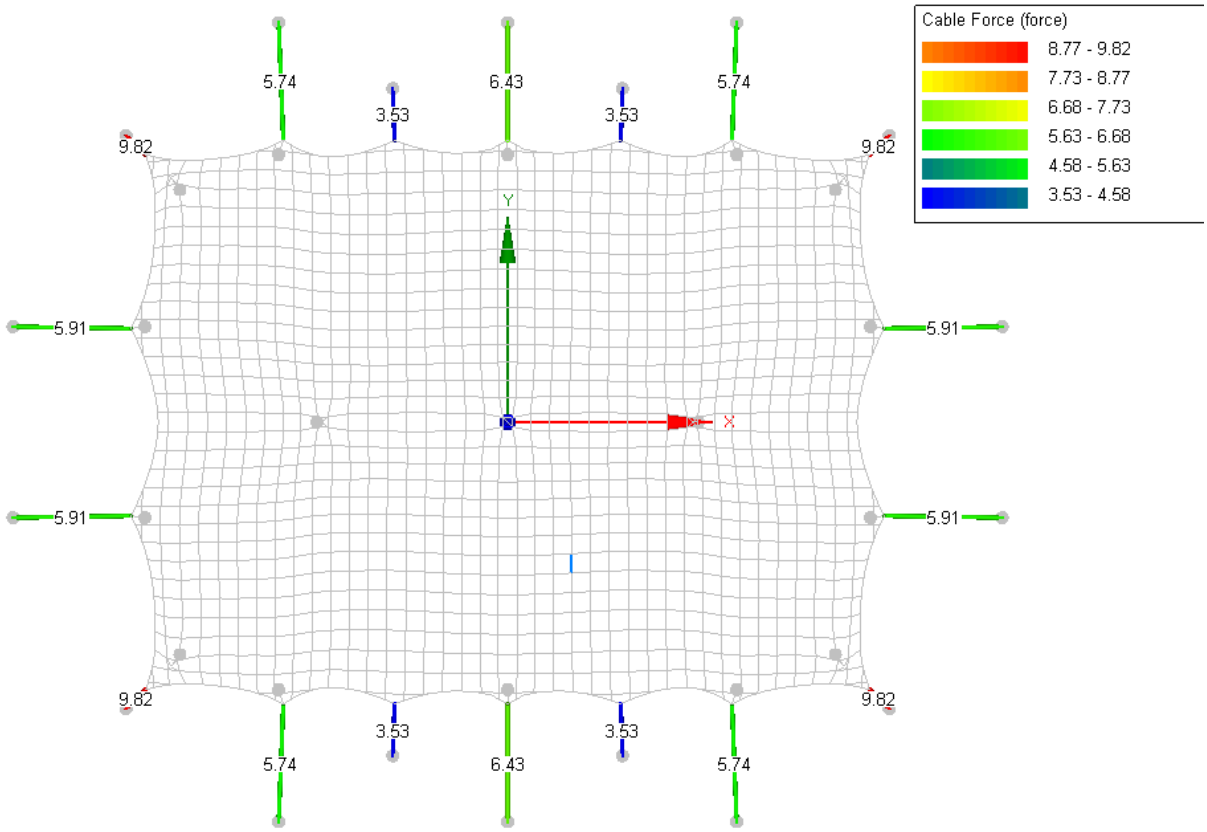
Annex B.1.3.2. Membrane stress (weft)



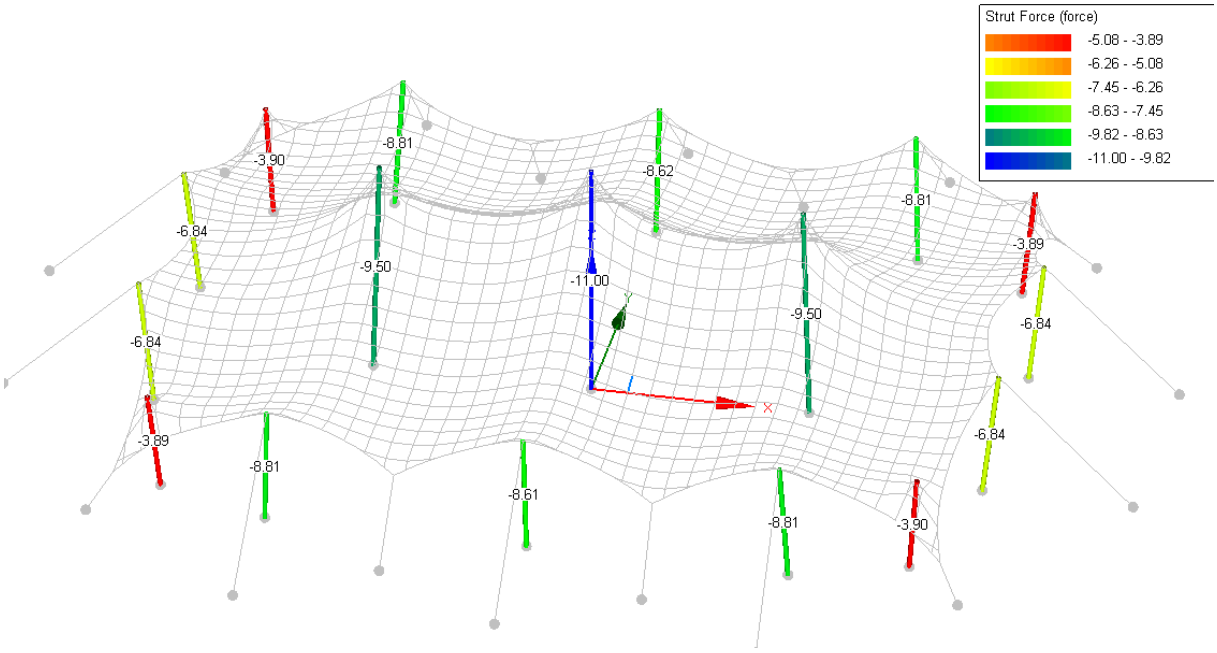
Annex B.1.3.3. Membrane edge



Annex B.1.3.4. Cable forces

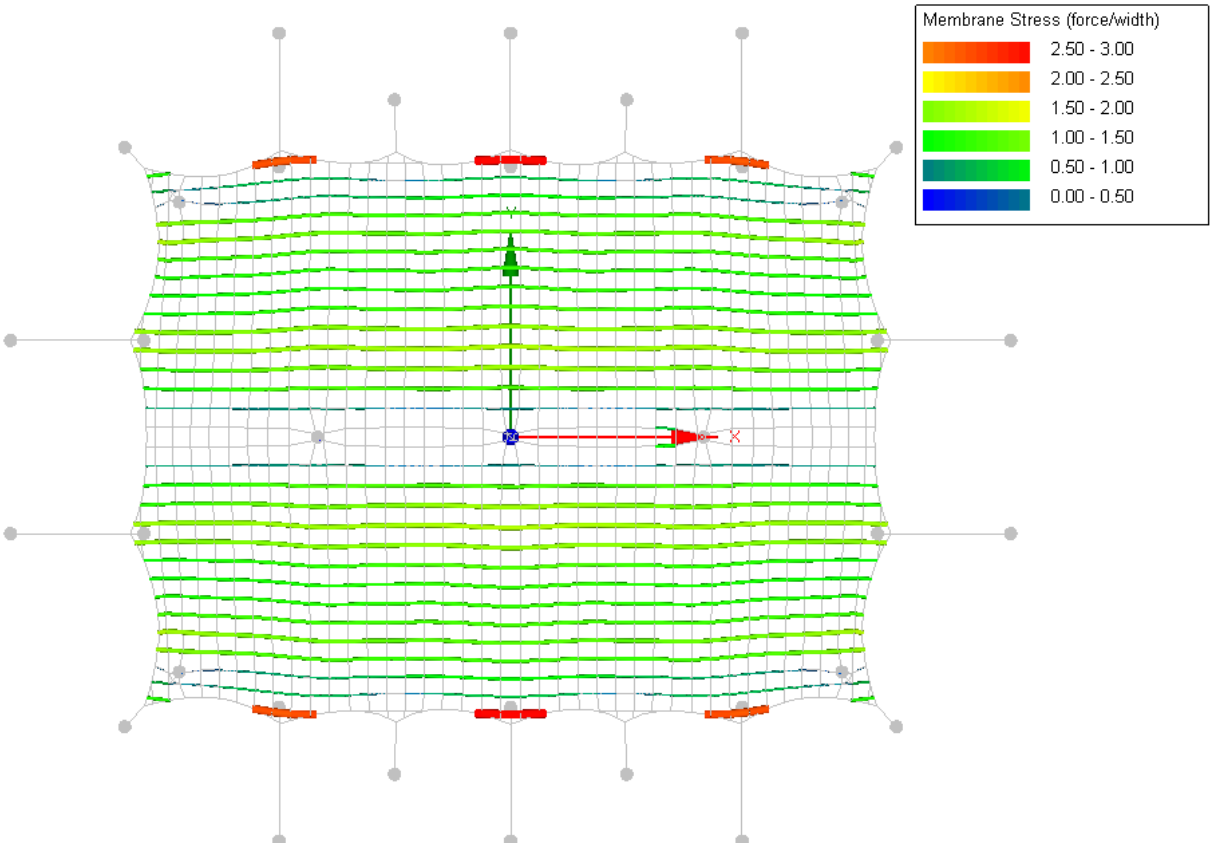


Annex B.1.3.5. Strut forces

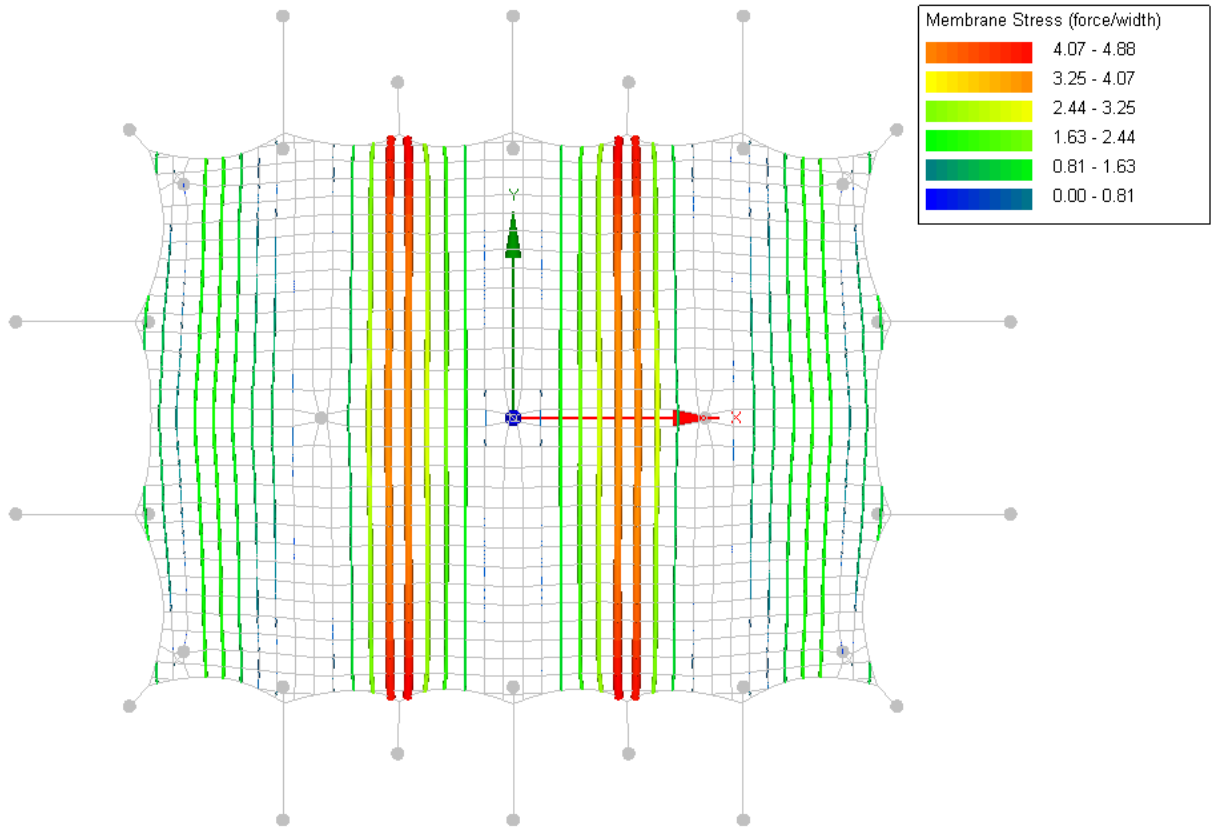


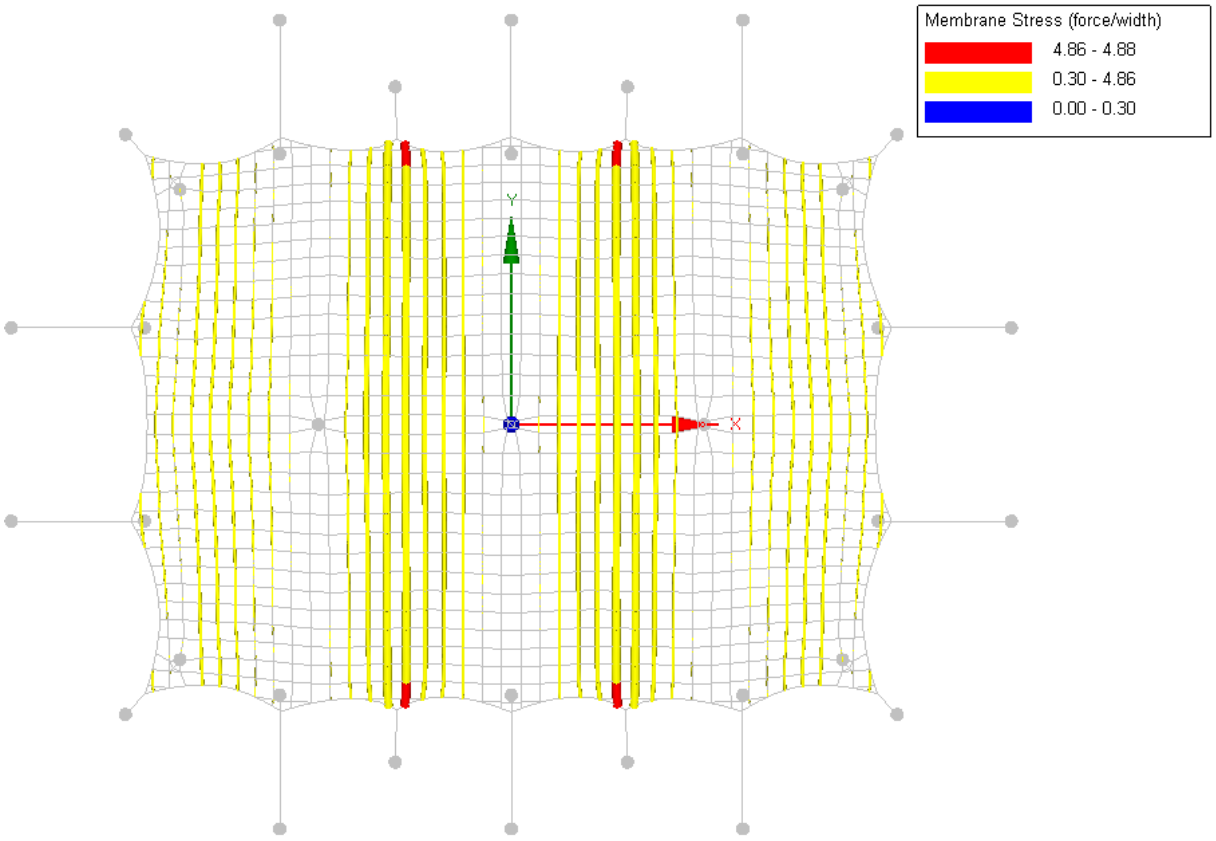
Annex B.1.4. CO4 Own weight + Pretension + Wind suction – floating – reduction 0.53

Annex B.1.4.1. Membrane stress (warp)



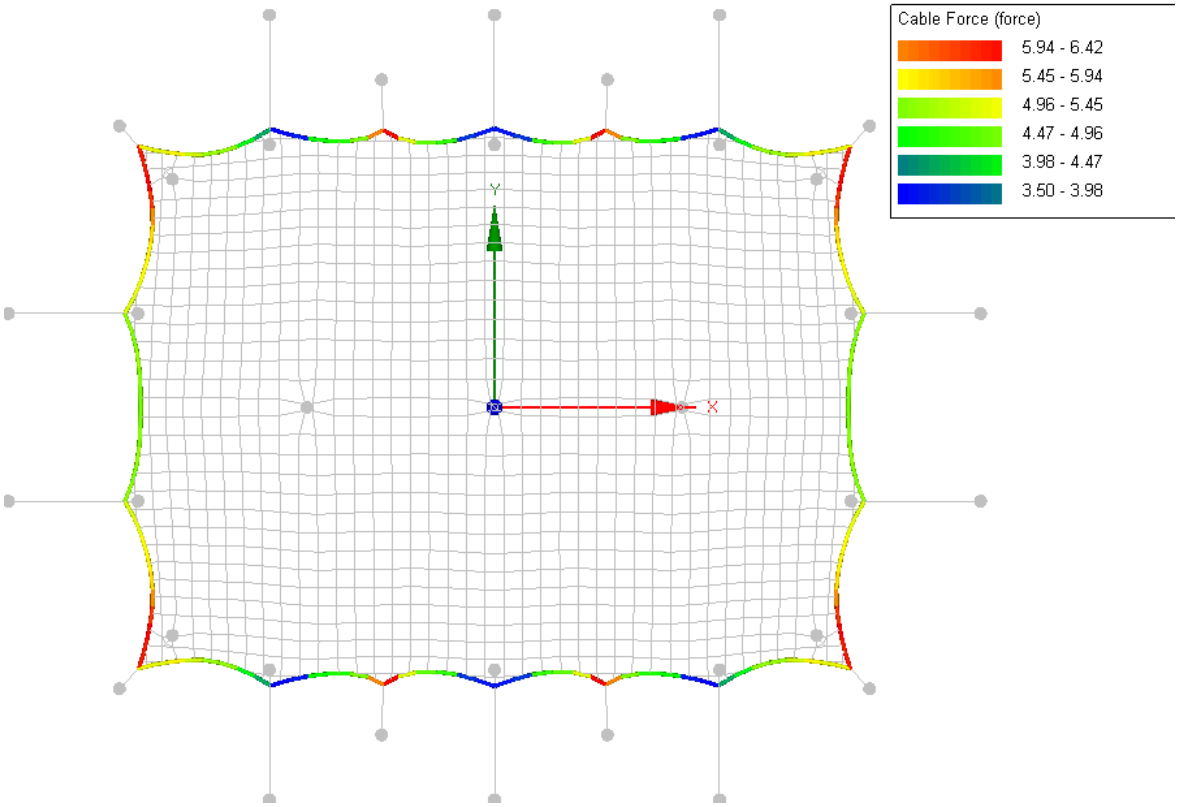
Annex B.1.4.2. Membrane stress (weft)



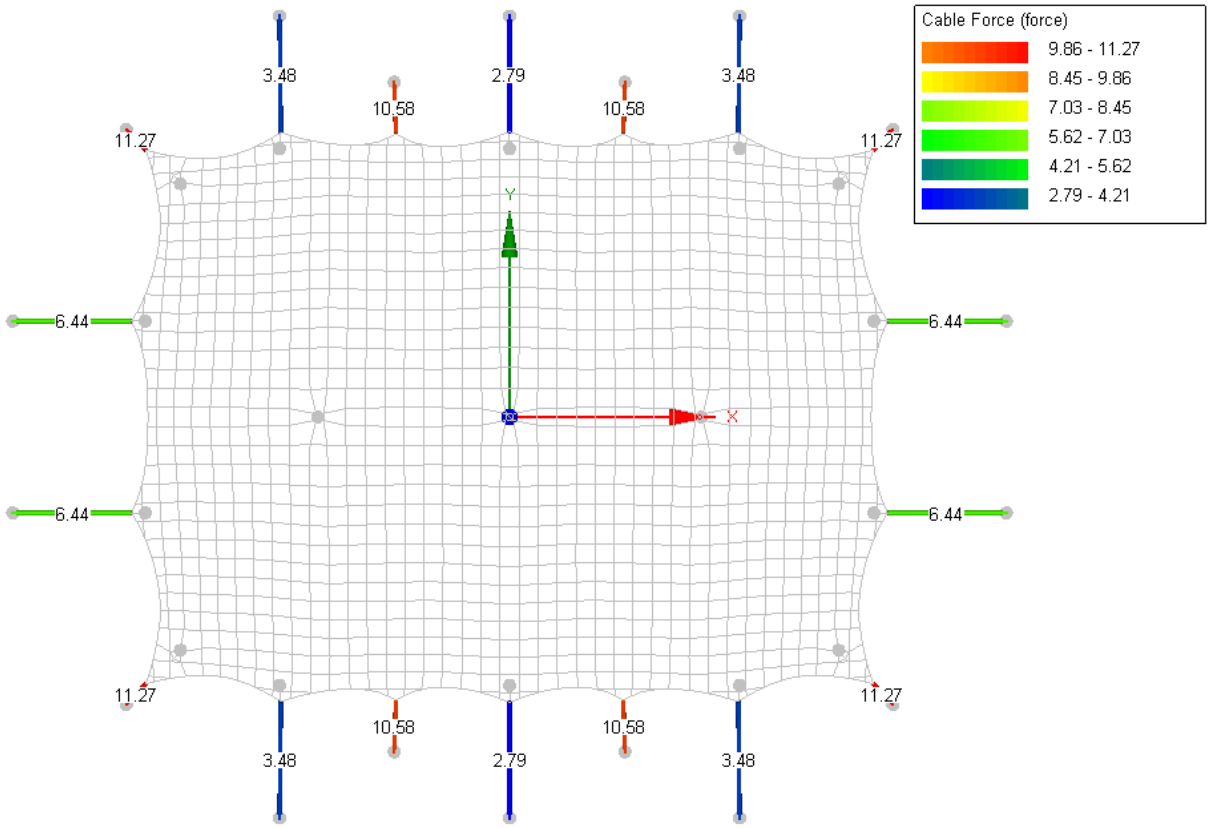


If the weft direction of the fabric runs along the width of the tent (vertical in the picture above), the capacity of the membrane is exceeded in the red colored links. However, these are local stresses near the edge, where multiple layers of fabric are present. Thefore, this is acceptable.

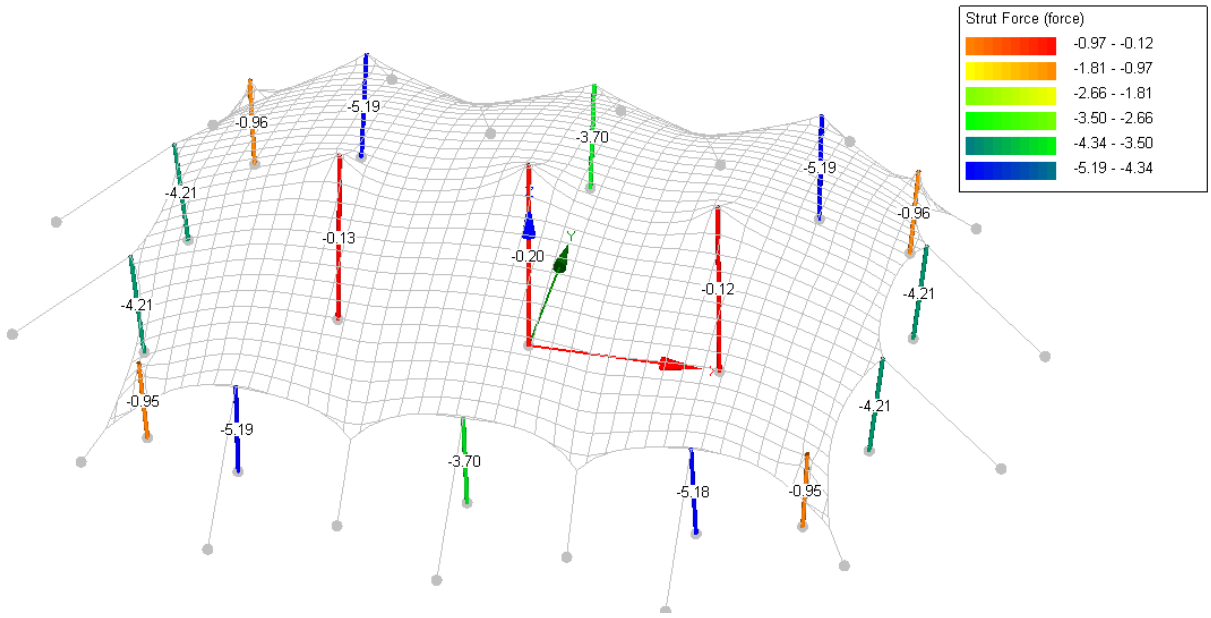
Annex B.1.4.3. Membrane edge



Annex B.1.4.4. Cable forces

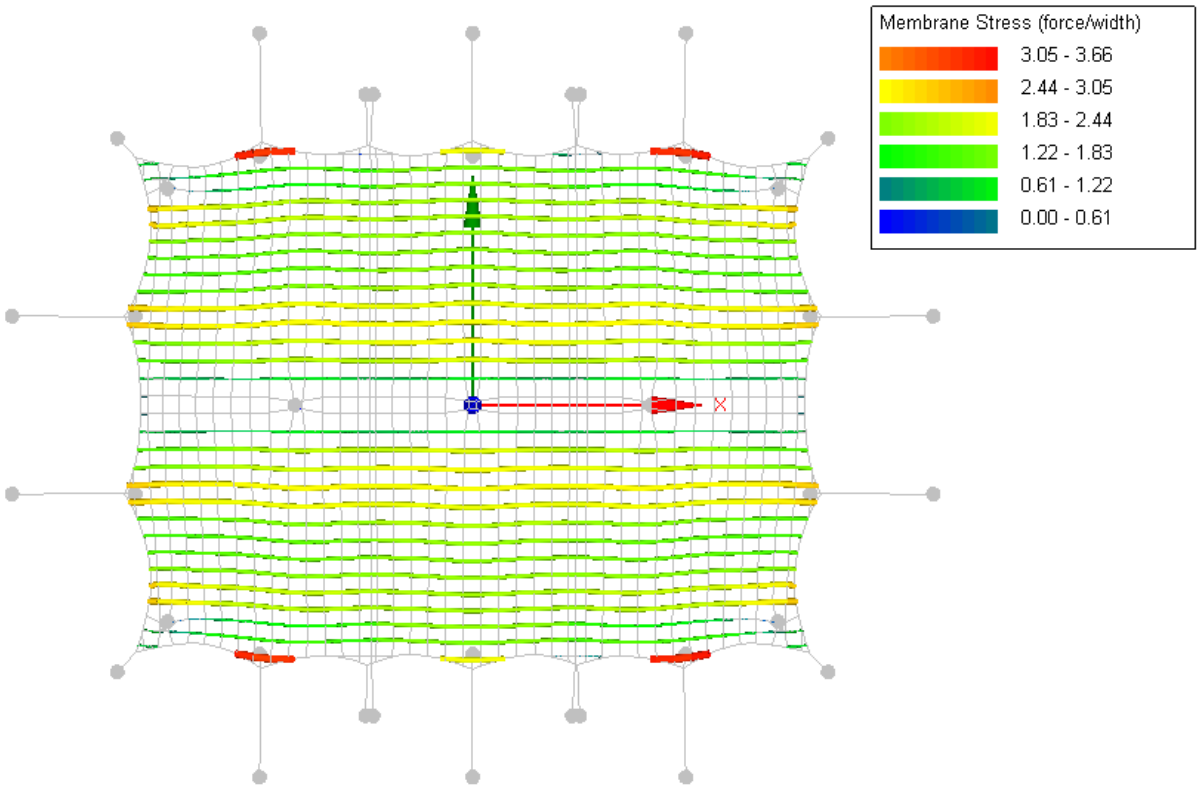


Annex B.1.4.5. Strut forces

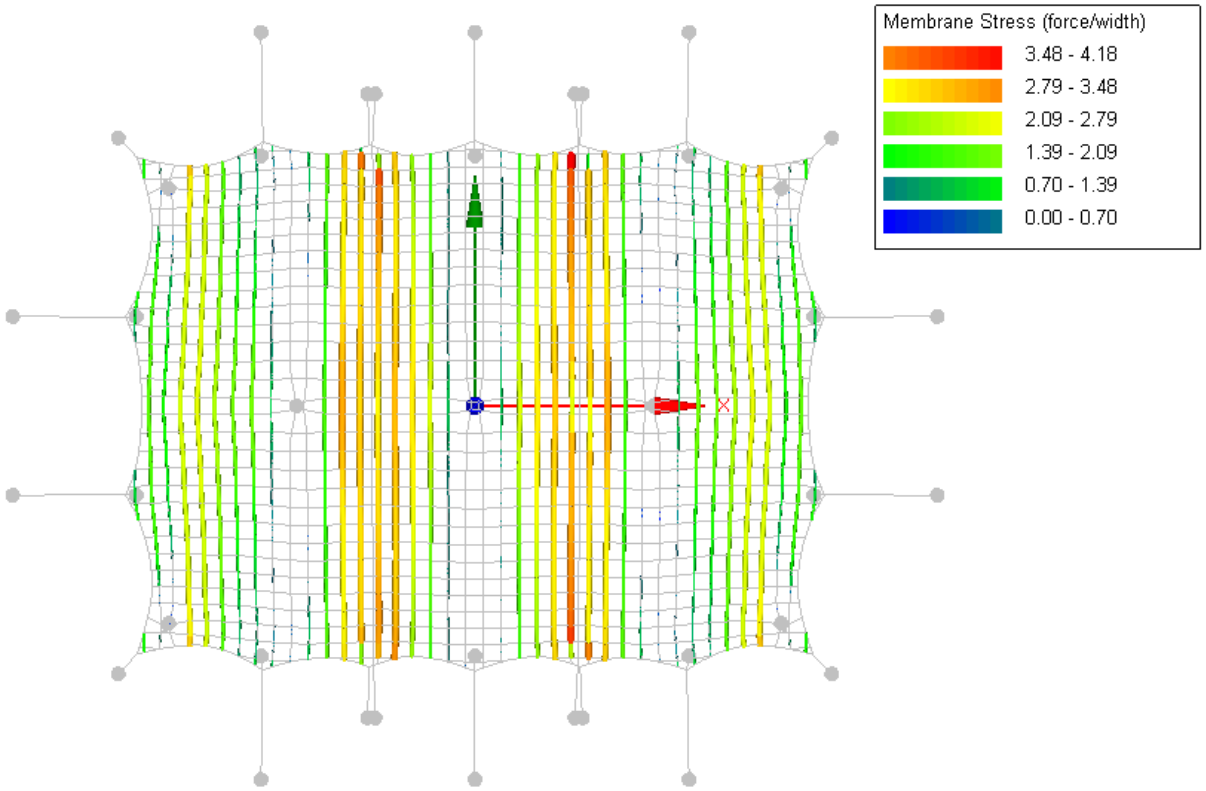


Annex B.1.5. CO5 Own weight + Pretension + Wind suction – floating – full wind load

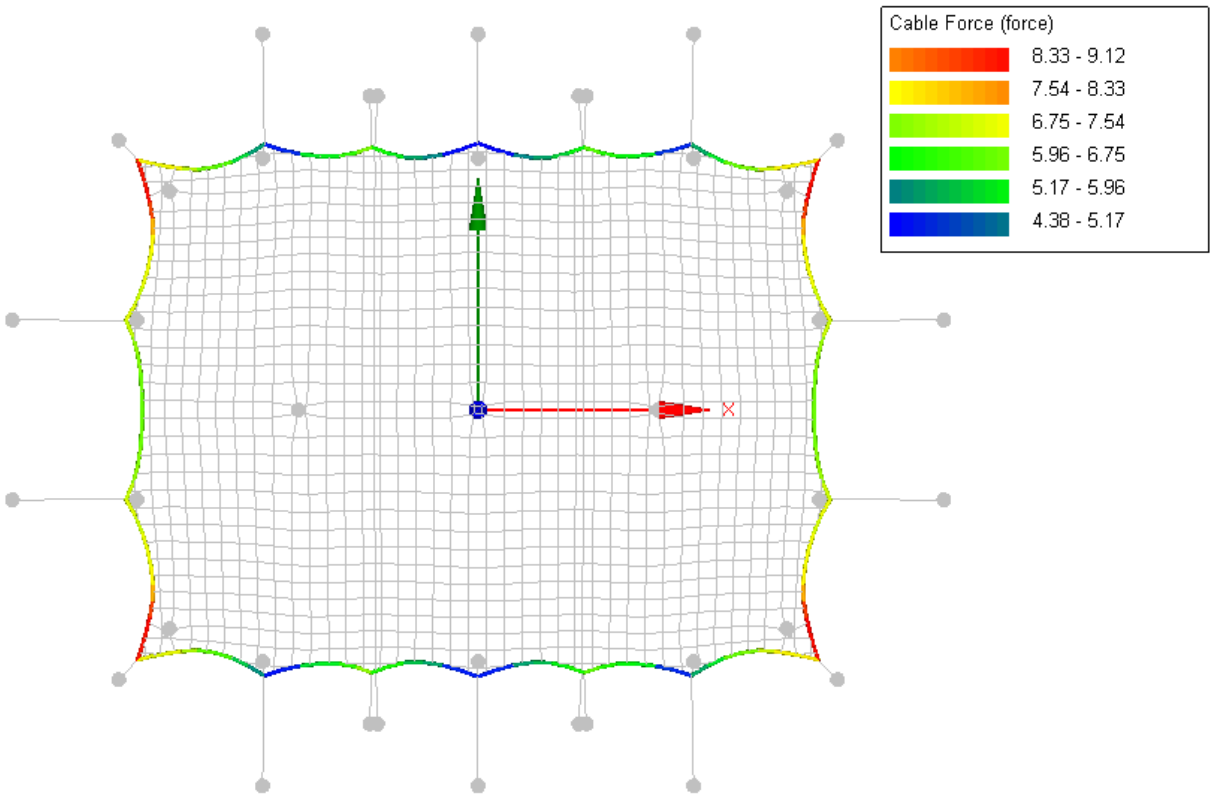
Annex B.1.5.1. Membrane stress (warp)



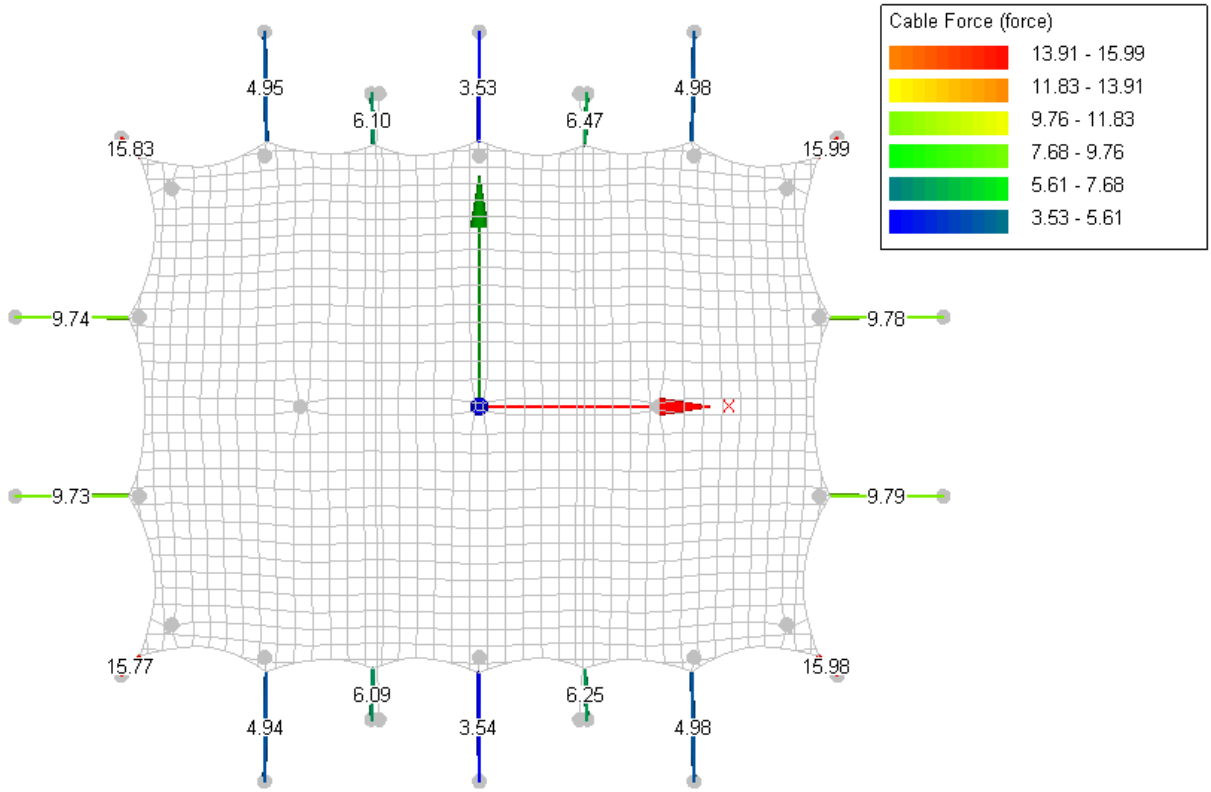
Annex B.1.5.2. Membrane stress (weft)



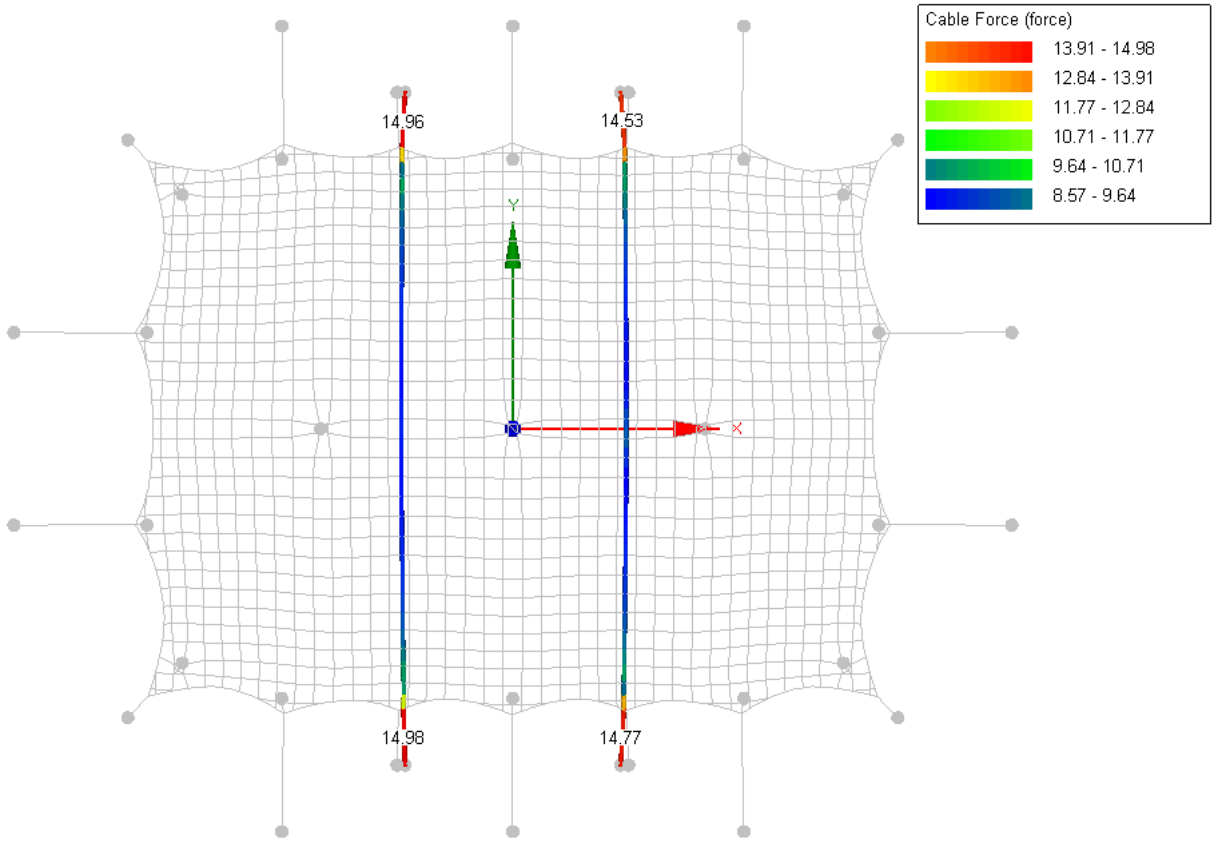
Annex B.1.5.3. Membrane edge



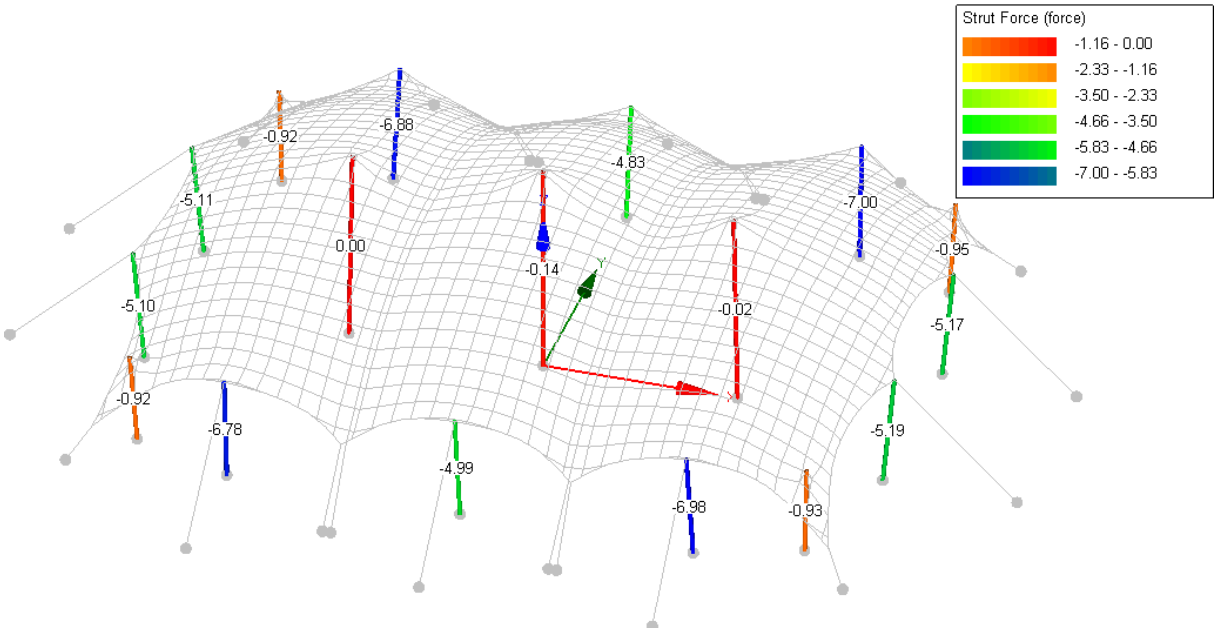
Annex B.1.5.4. Cable forces



Annex B.1.5.5. Storm belts



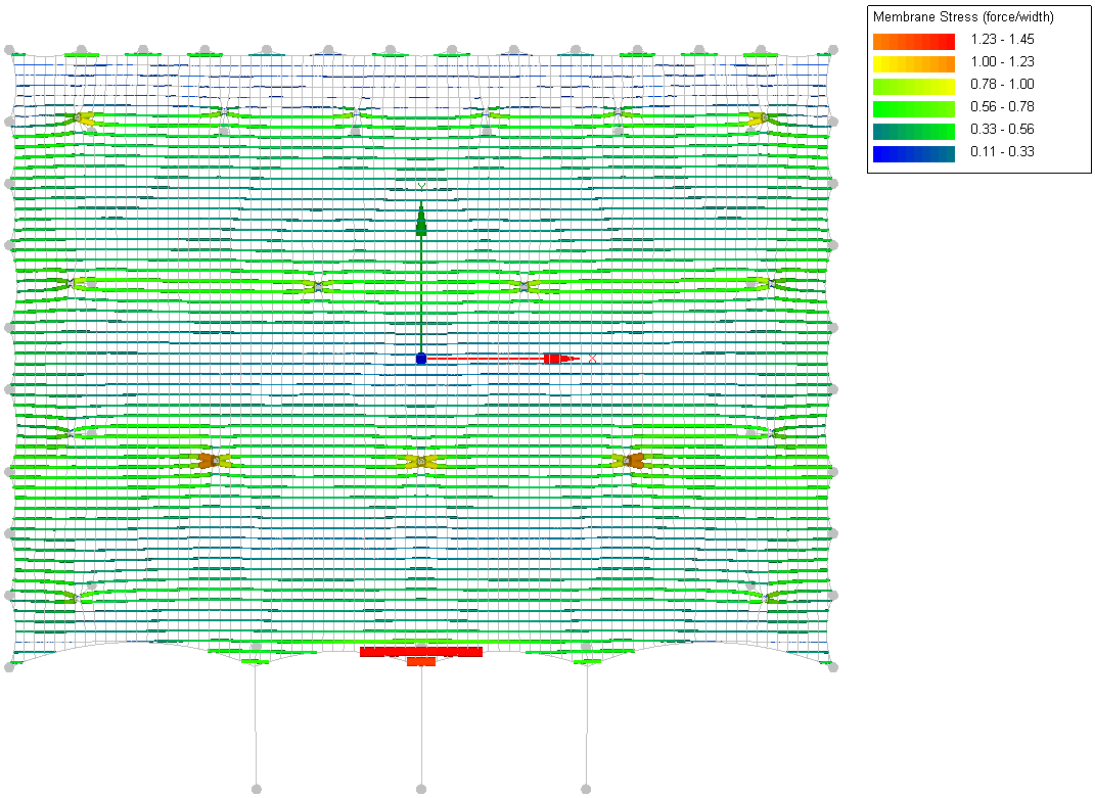
Annex B.1.5.6. Strut forces



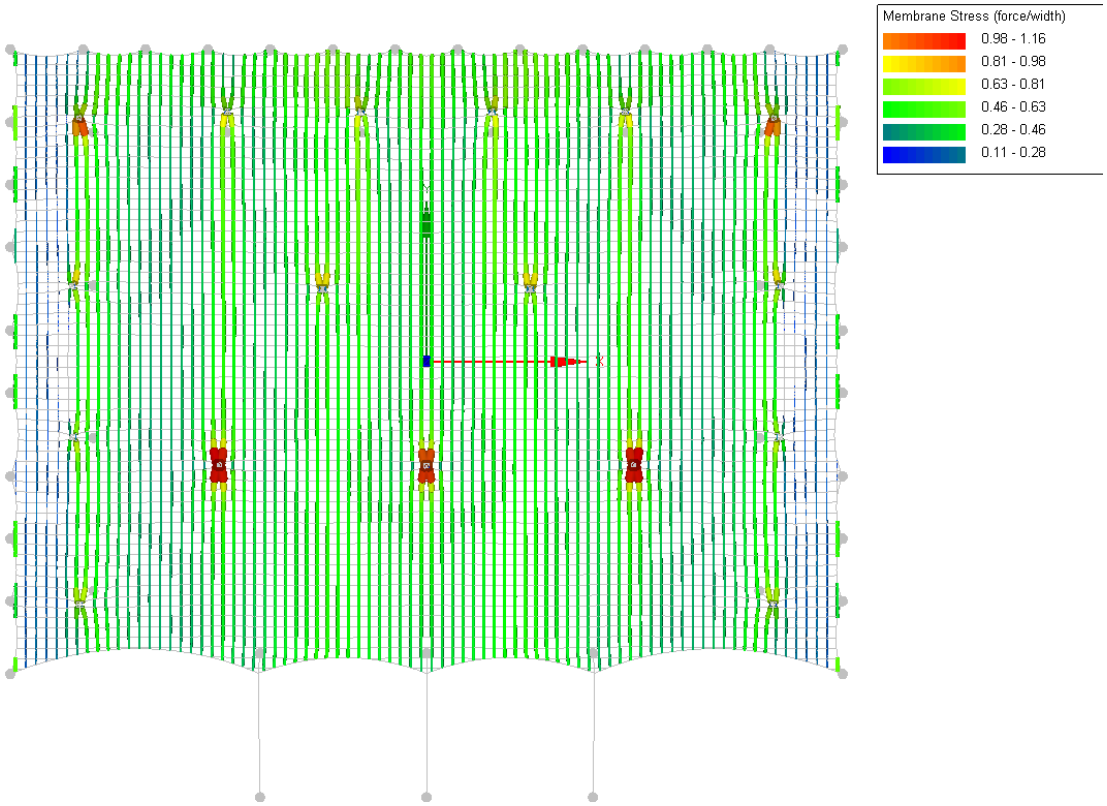
Annex B.2. 20x15m - closed

Annex B.2.1. CO1 Own weight + Pretension

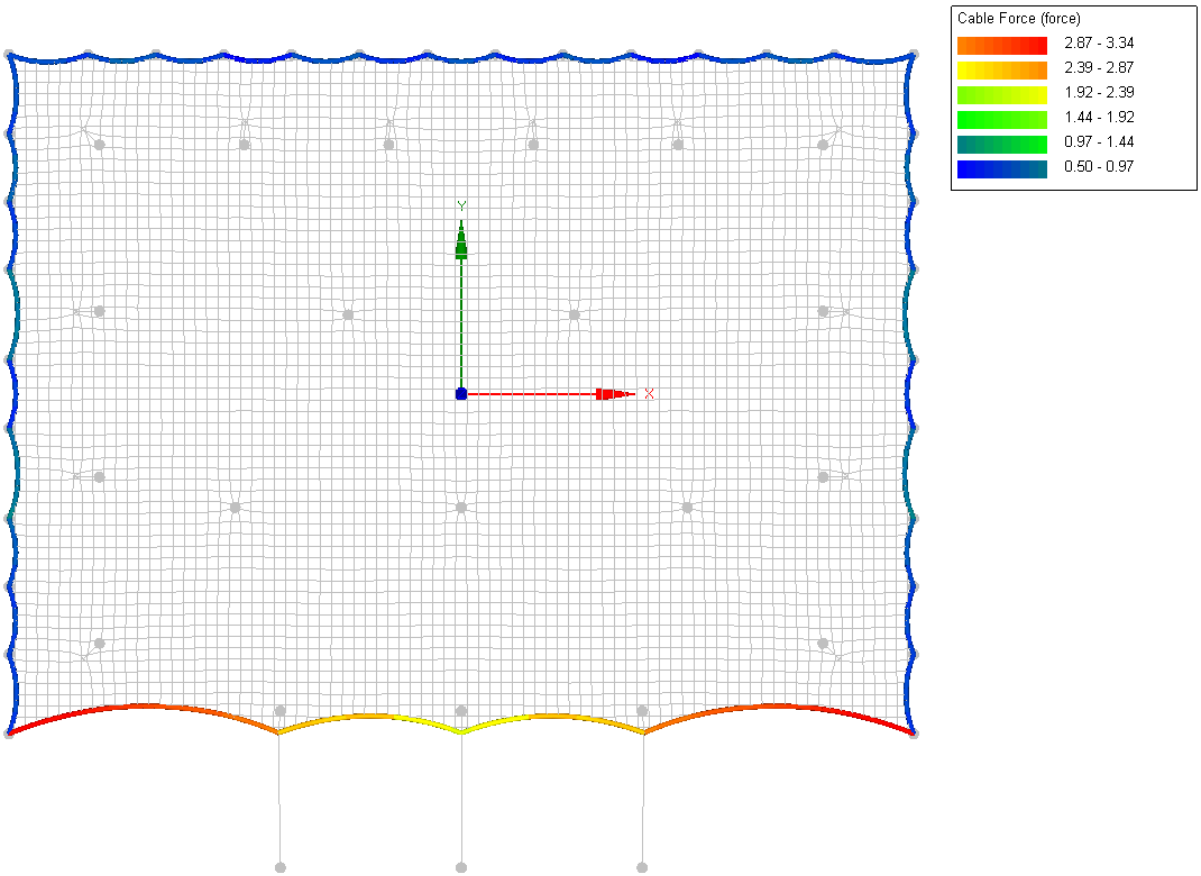
Annex B.2.1.1. Membrane stress (warp)



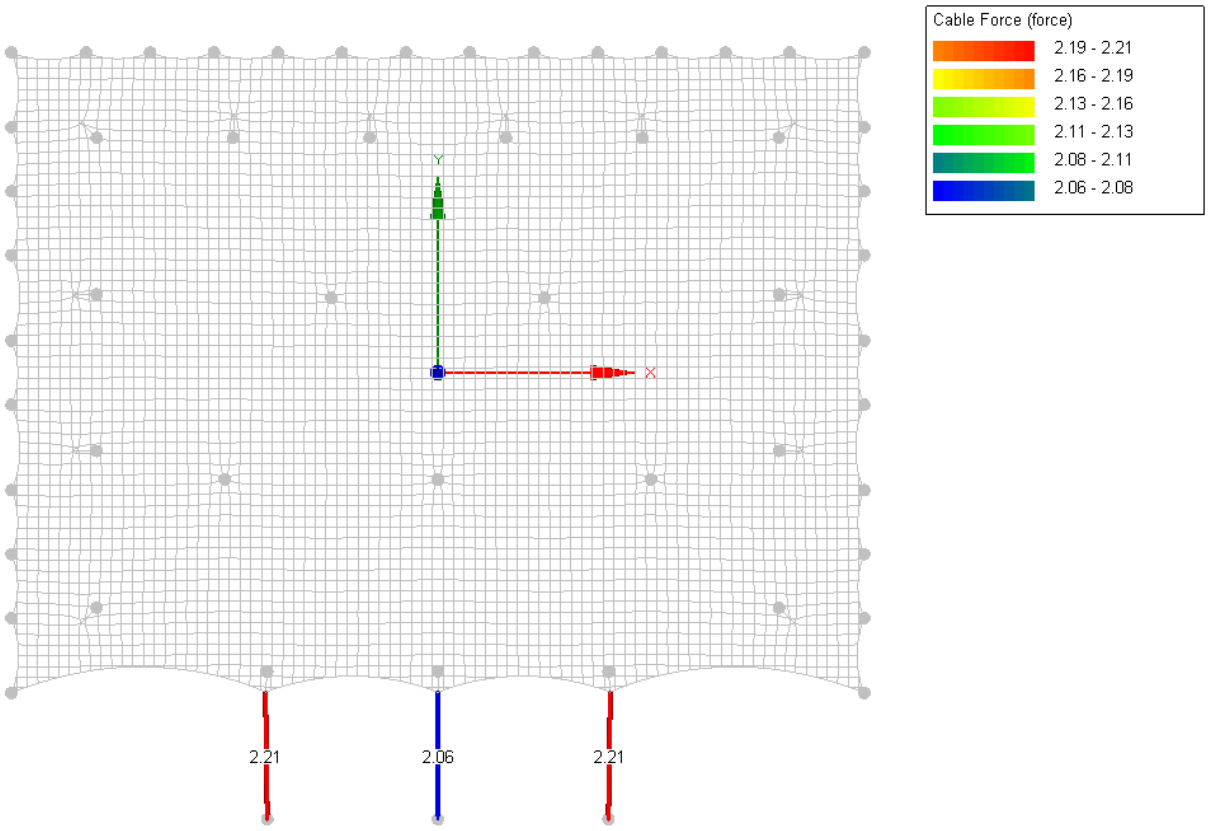
Annex B.2.1.2. Membrane stress (weft)



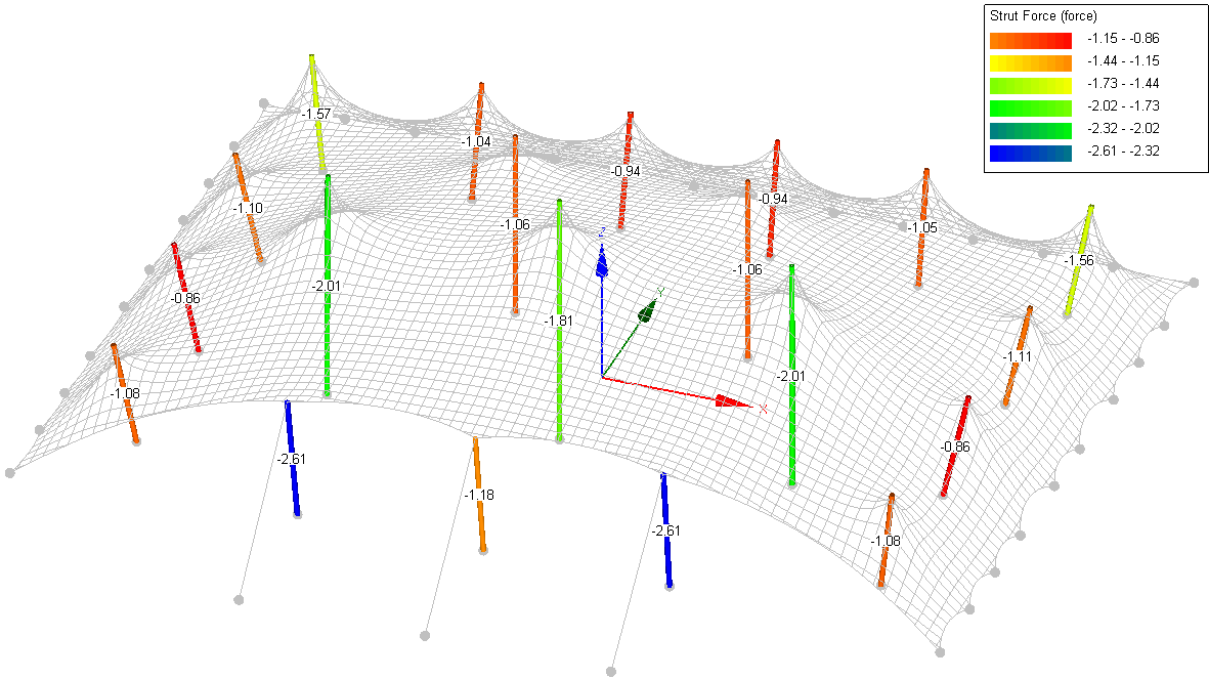
Annex B.2.1.3. Membrane edge



Annex B.2.1.4. Cable forces

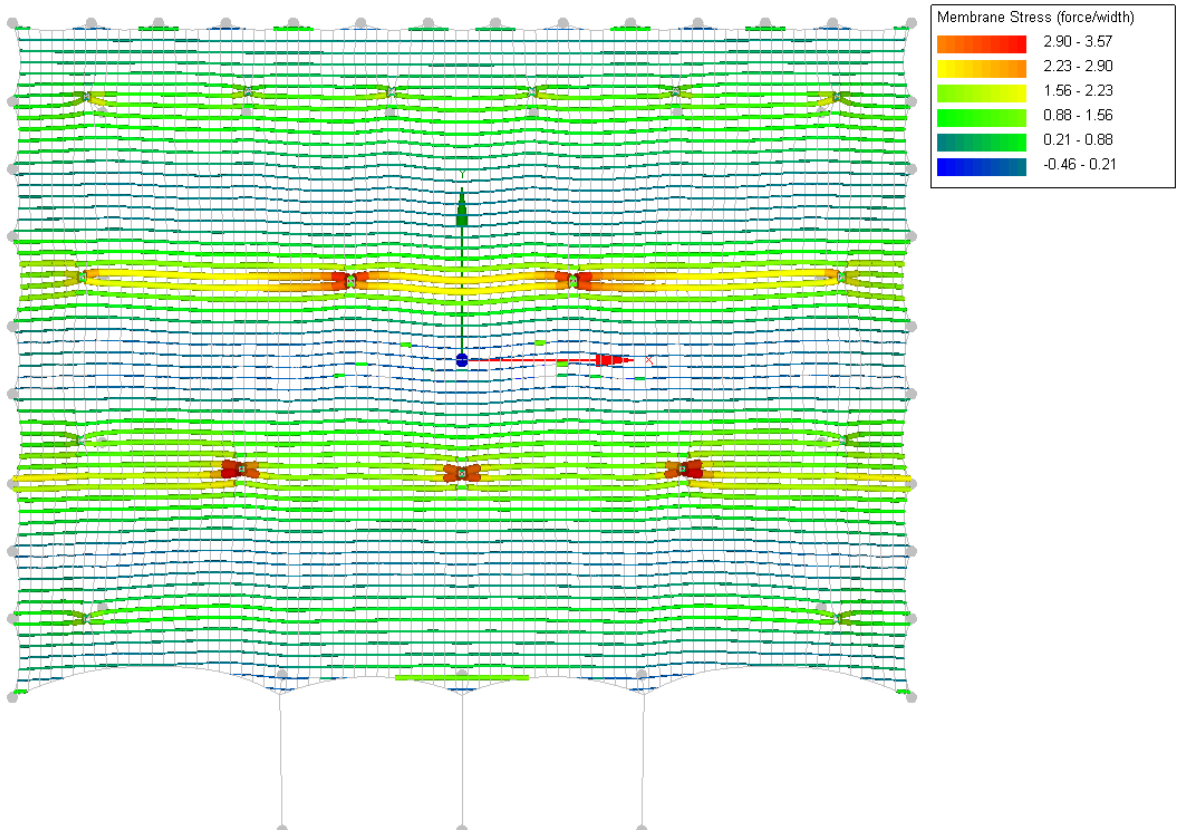


Annex B.2.1.5. Strut forces

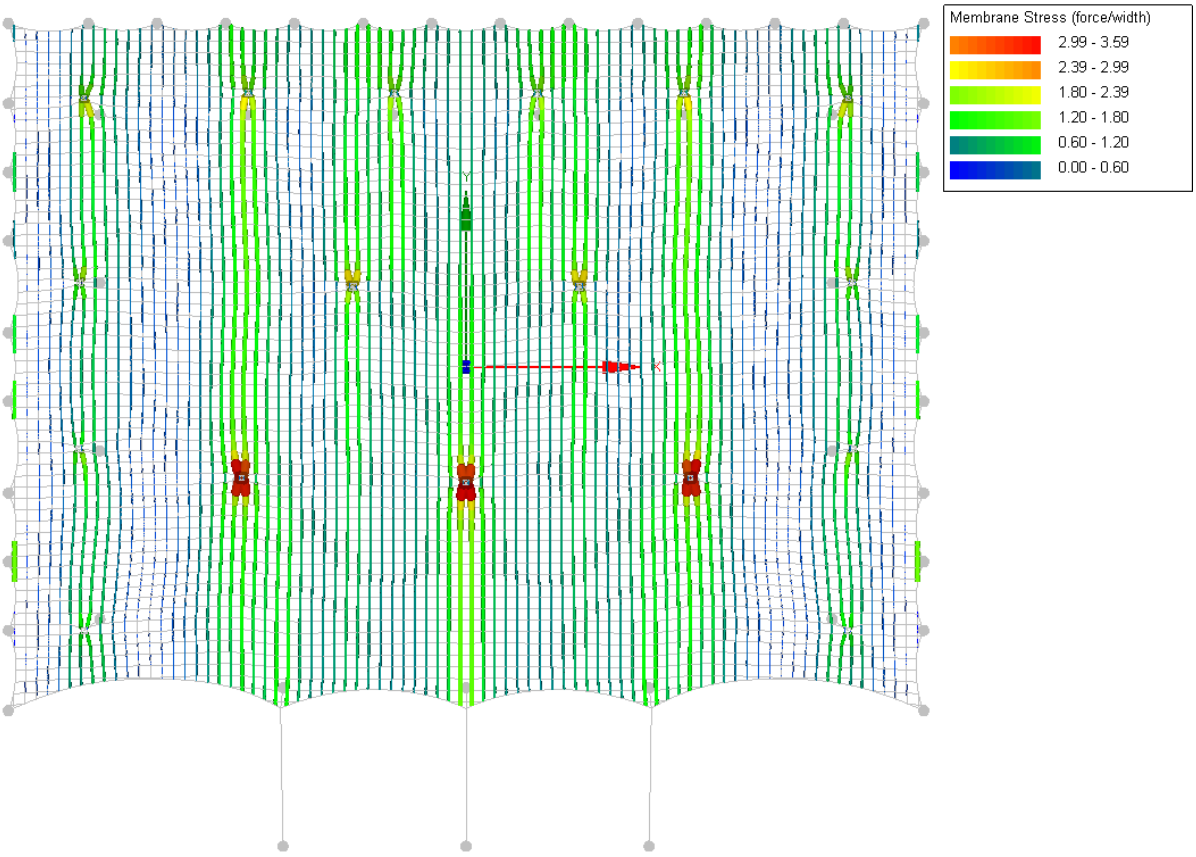


Annex B.2.2. CO2 Own weight + Pretension + Conventional / snow

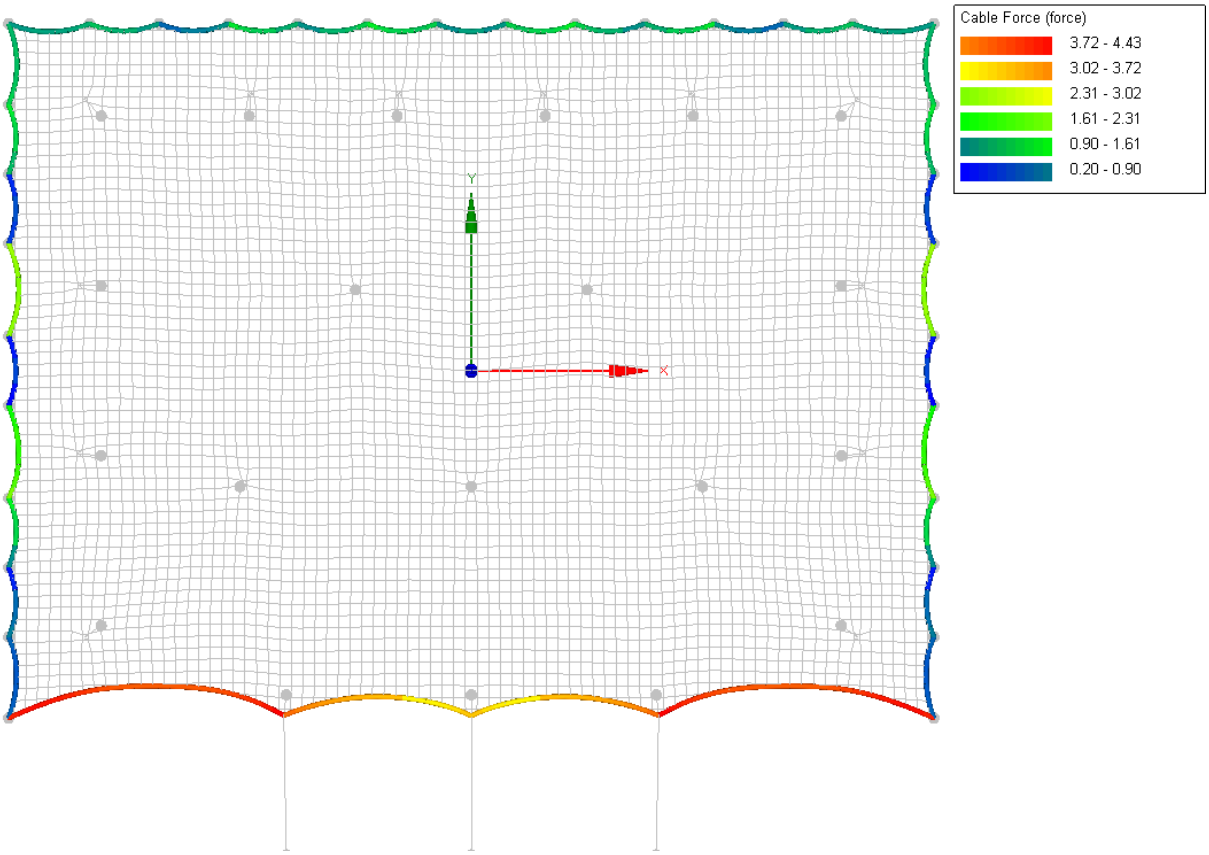
Annex B.2.2.1. Membrane stress (warp)



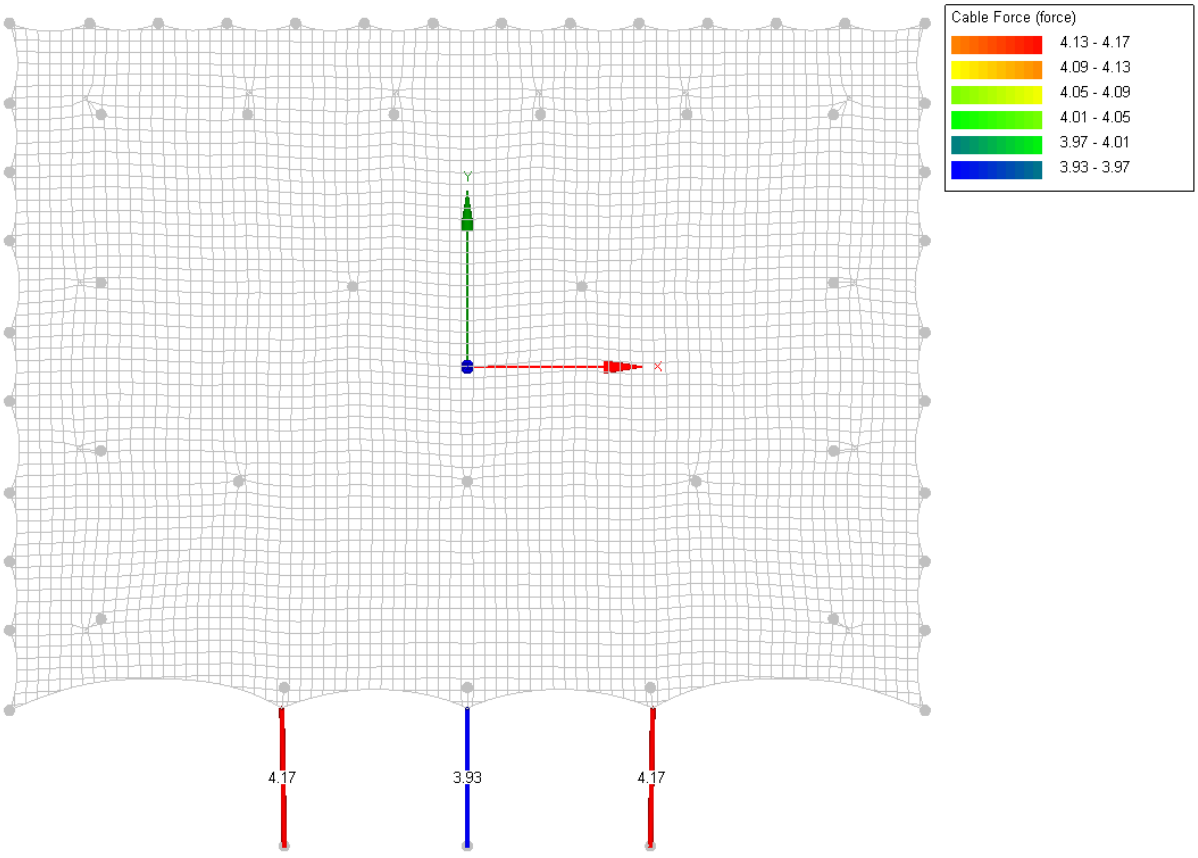
Annex B.2.2.2. Membrane stress (weft)



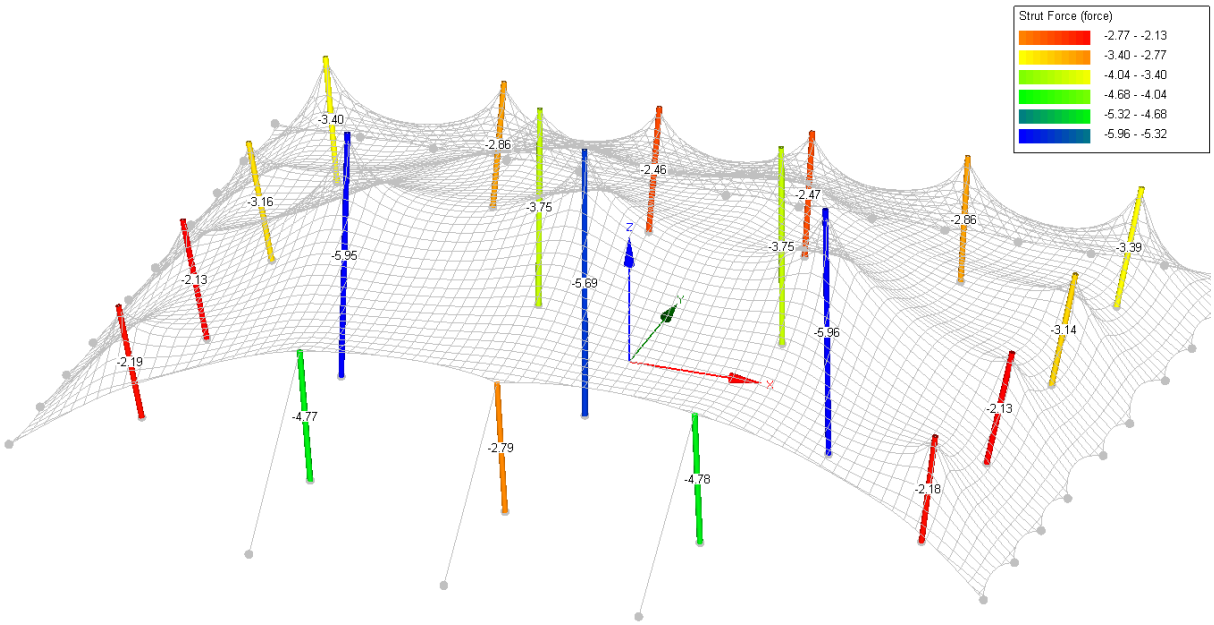
Annex B.2.2.3. Membrane edge



Annex B.2.2.4. Cable forces

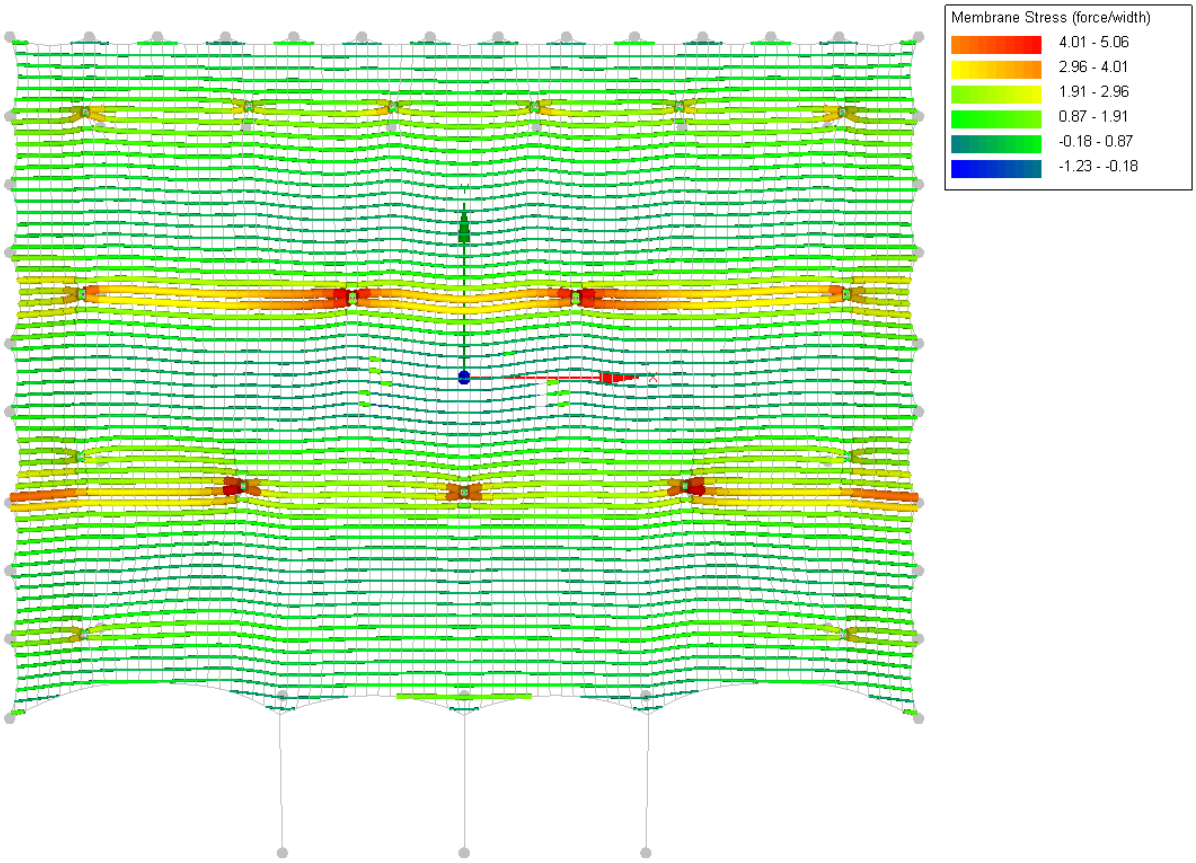


Annex B.2.2.5. Strut forces

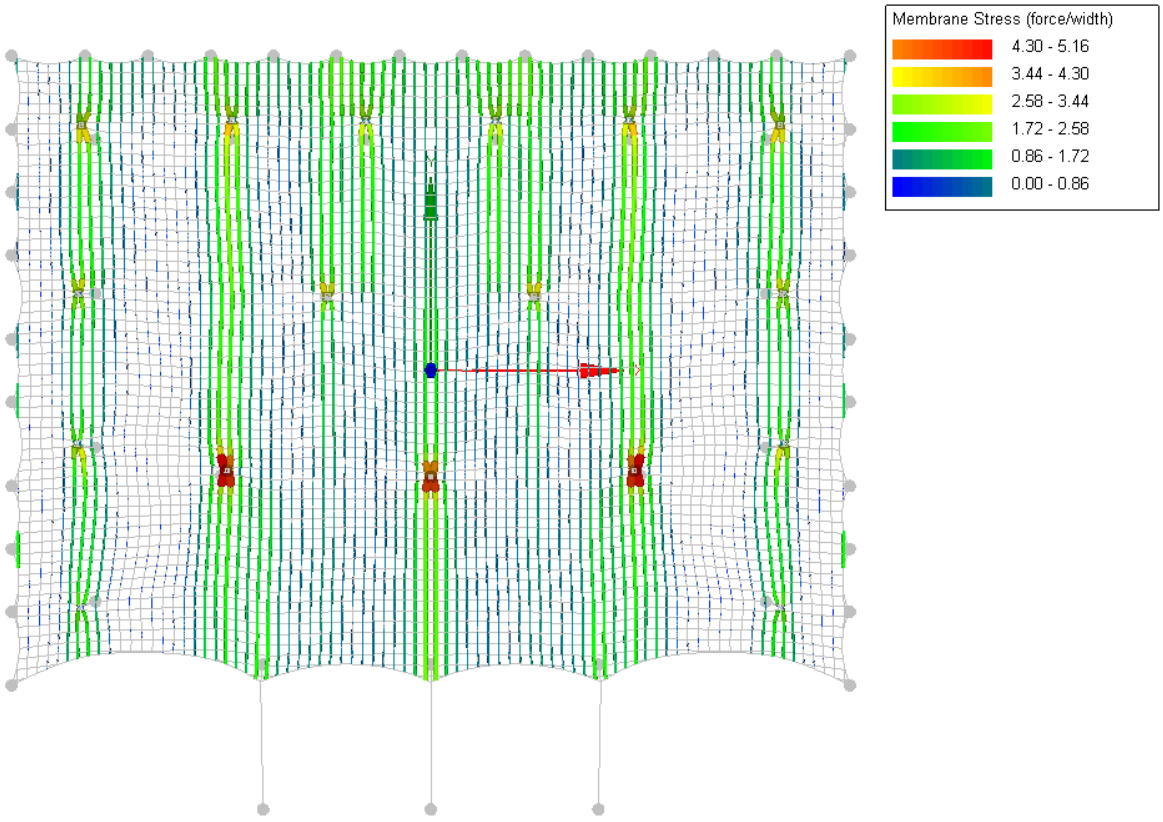


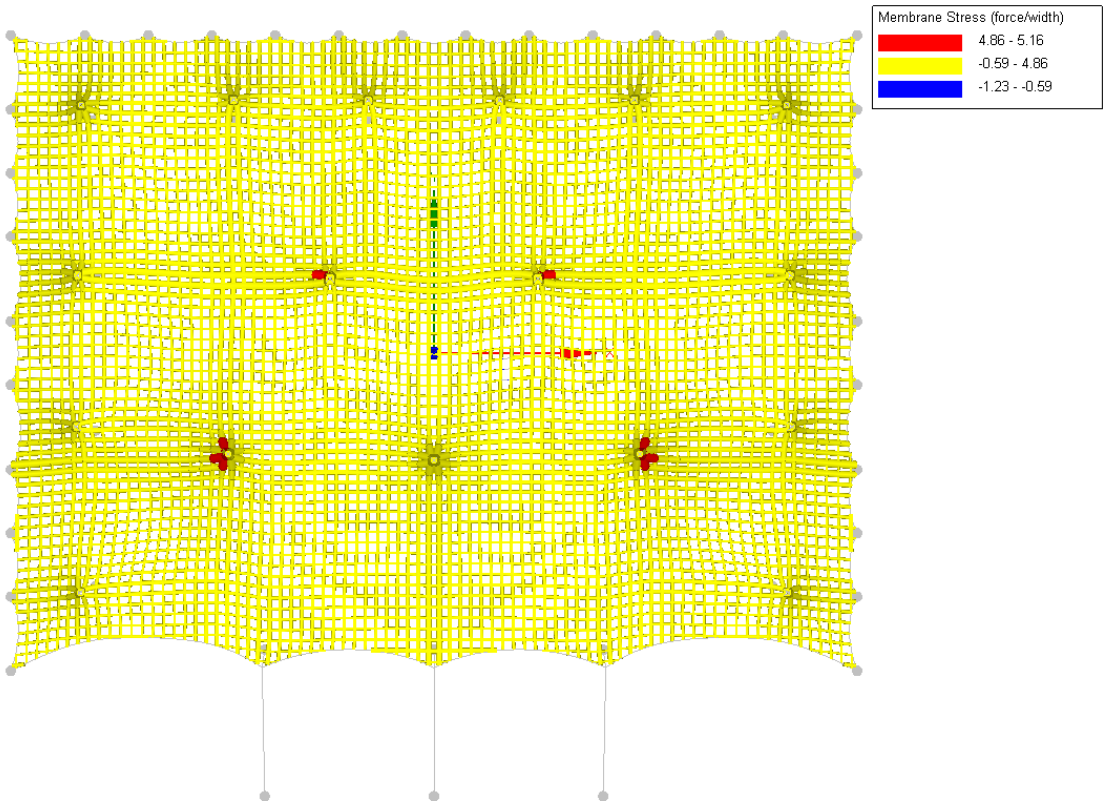
Annex B.2.3. CO3 Own weight + Pretension + Wind pressure

Annex B.2.3.1. Membrane stress (warp)



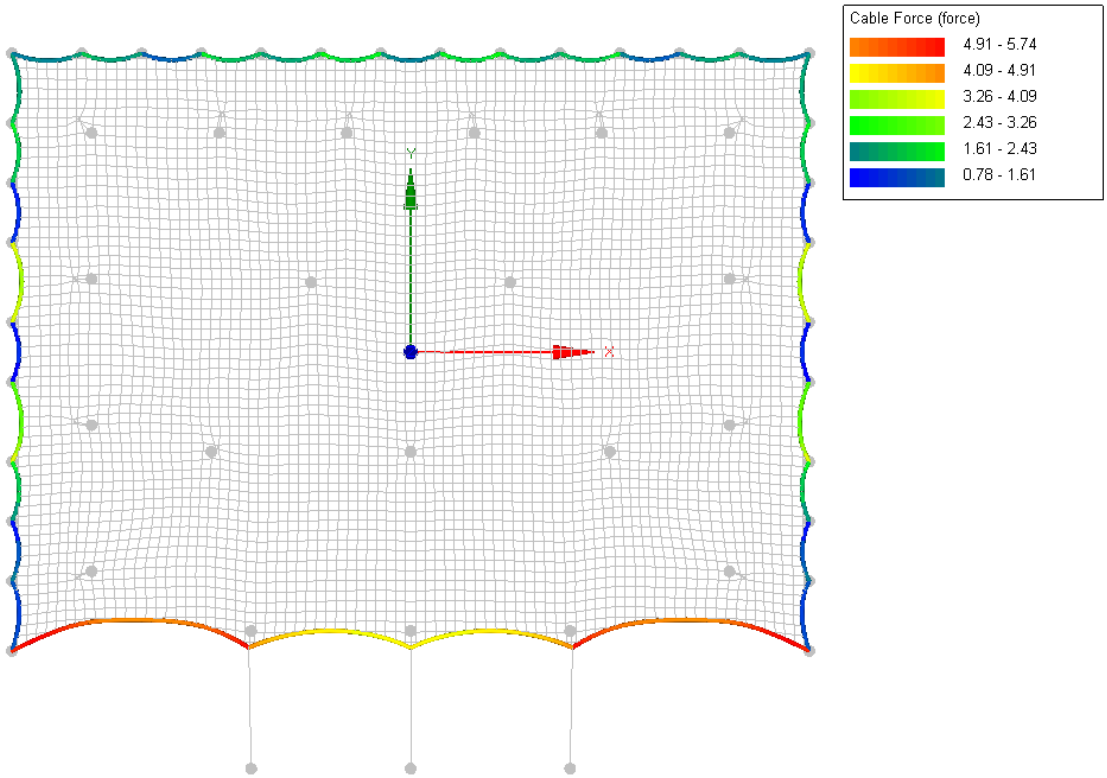
Annex B.2.3.2. Membrane stress (weft)



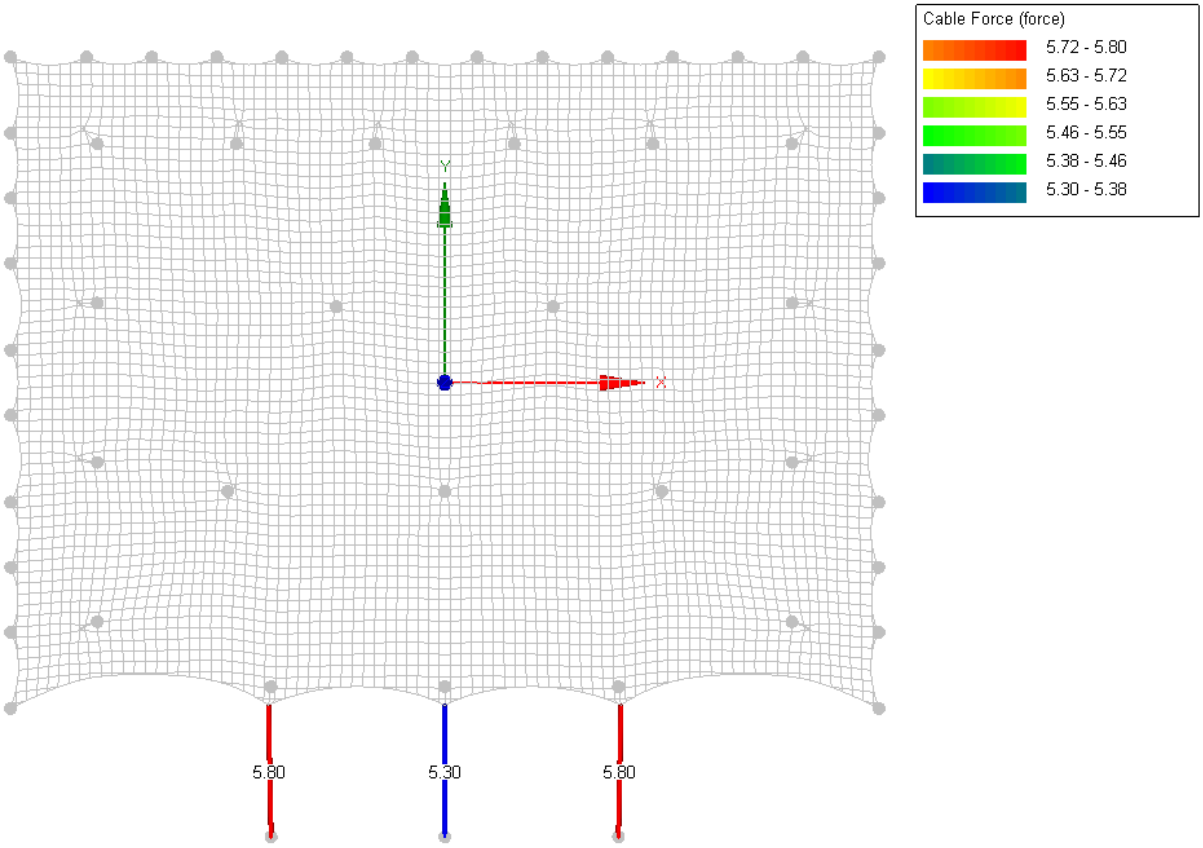


The capacity of the membrane is theoretically exceeded in the red colored links. However these are local stresses that occur due to the way the poletops are modelled. The stresses in these links may be averaged with the other poletop links to compensate for the modelling. With the averaged stresses the membrane will not burst.

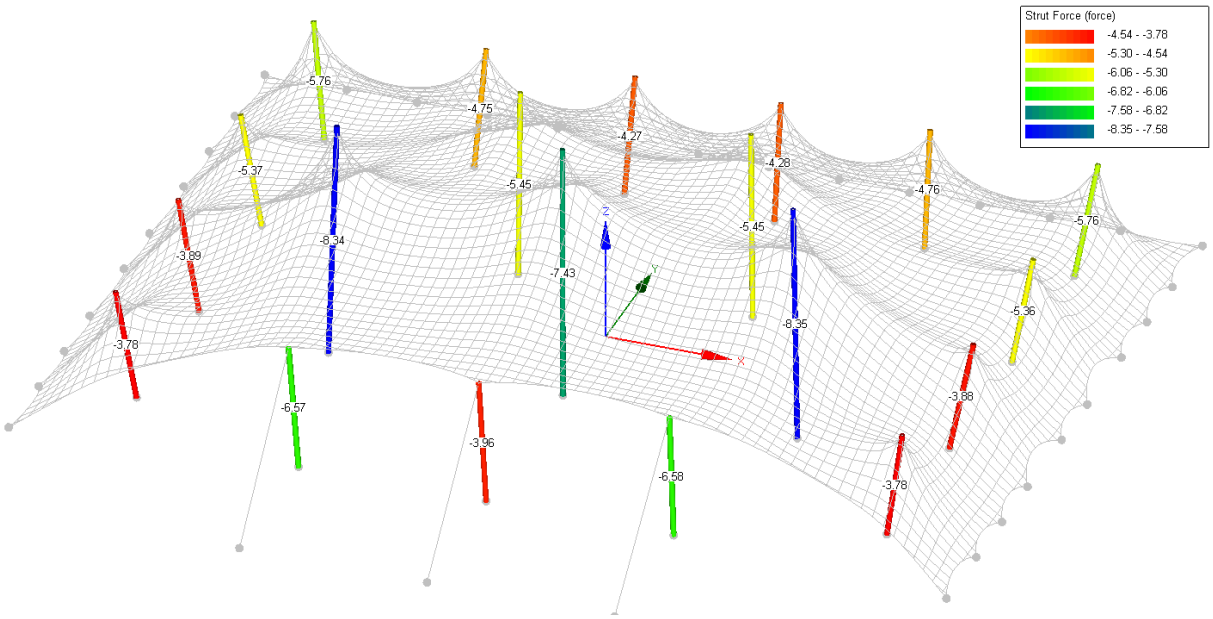
Annex B.2.3.3. Membrane edge



Annex B.2.3.4. Cable forces

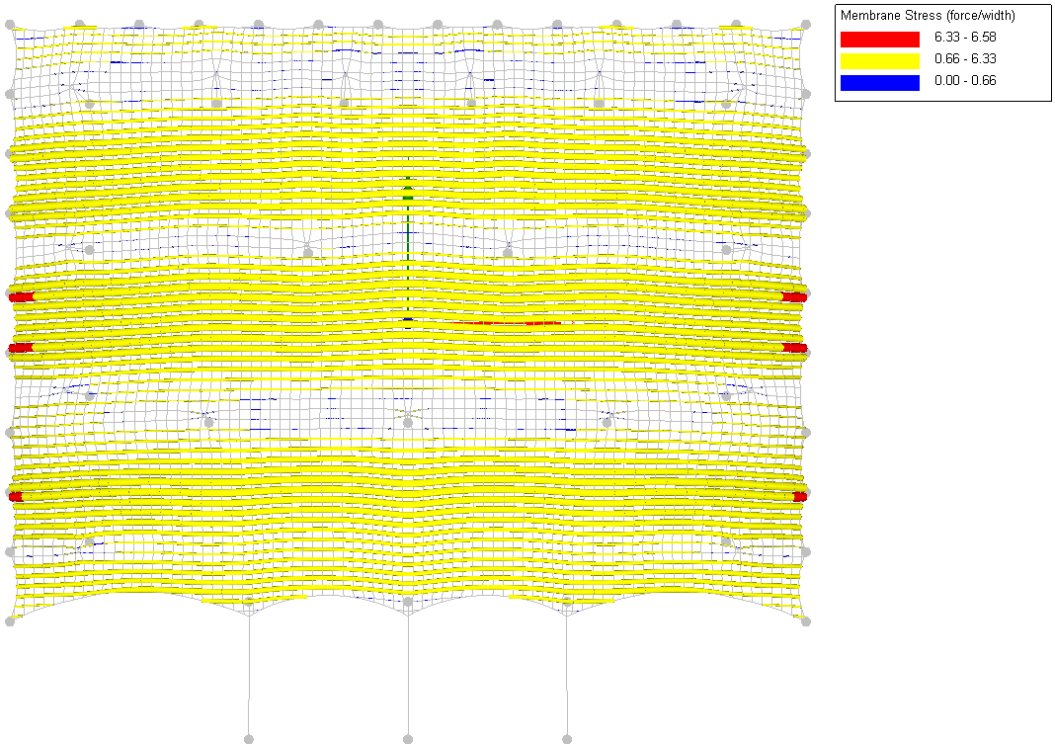


Annex B.2.3.5. Strut forces



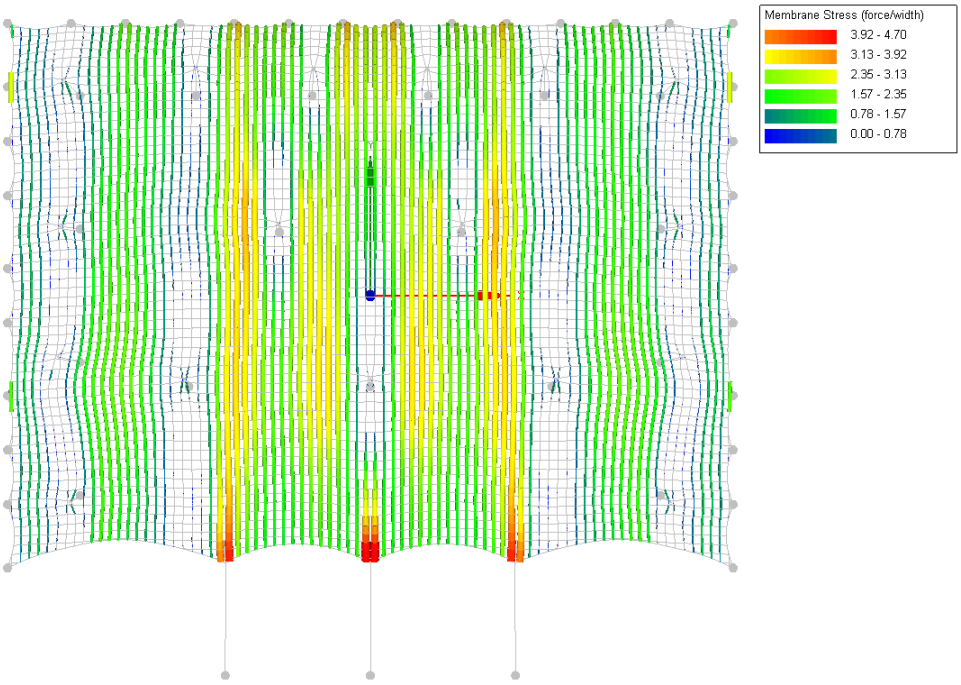
Annex B.2.4. CO6 Own weight + Pretension + Wind suction – closed – reduction 0.53

Annex B.2.4.1. Membrane stress (warp)



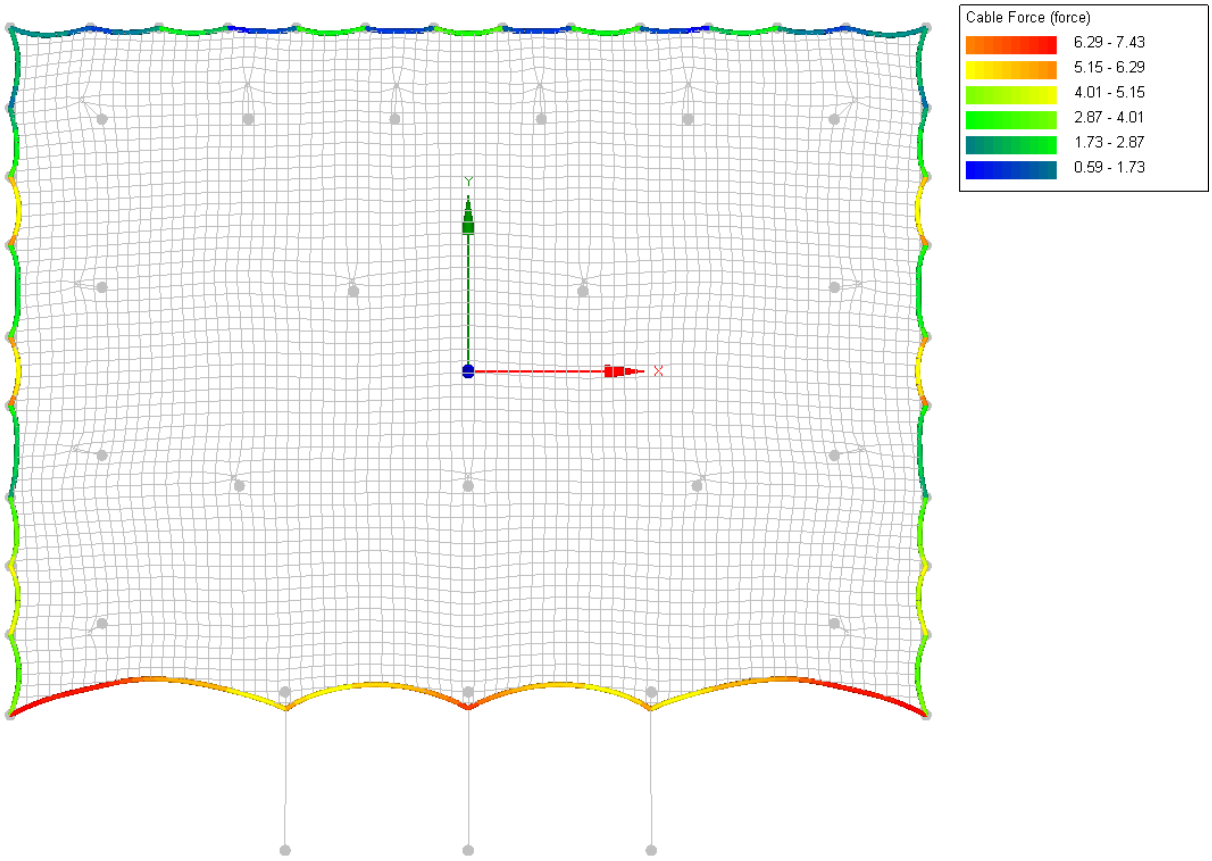
The warp and weft direction of the membrane must be fixed (warp direction along the length of the tent). The membrane stresses are exceeded in the red colored links. However, these are local stresses near the edge, where multiple layers of fabric are present. Therefore, this is acceptable.

Annex B.2.4.2. Membrane stress (weft)

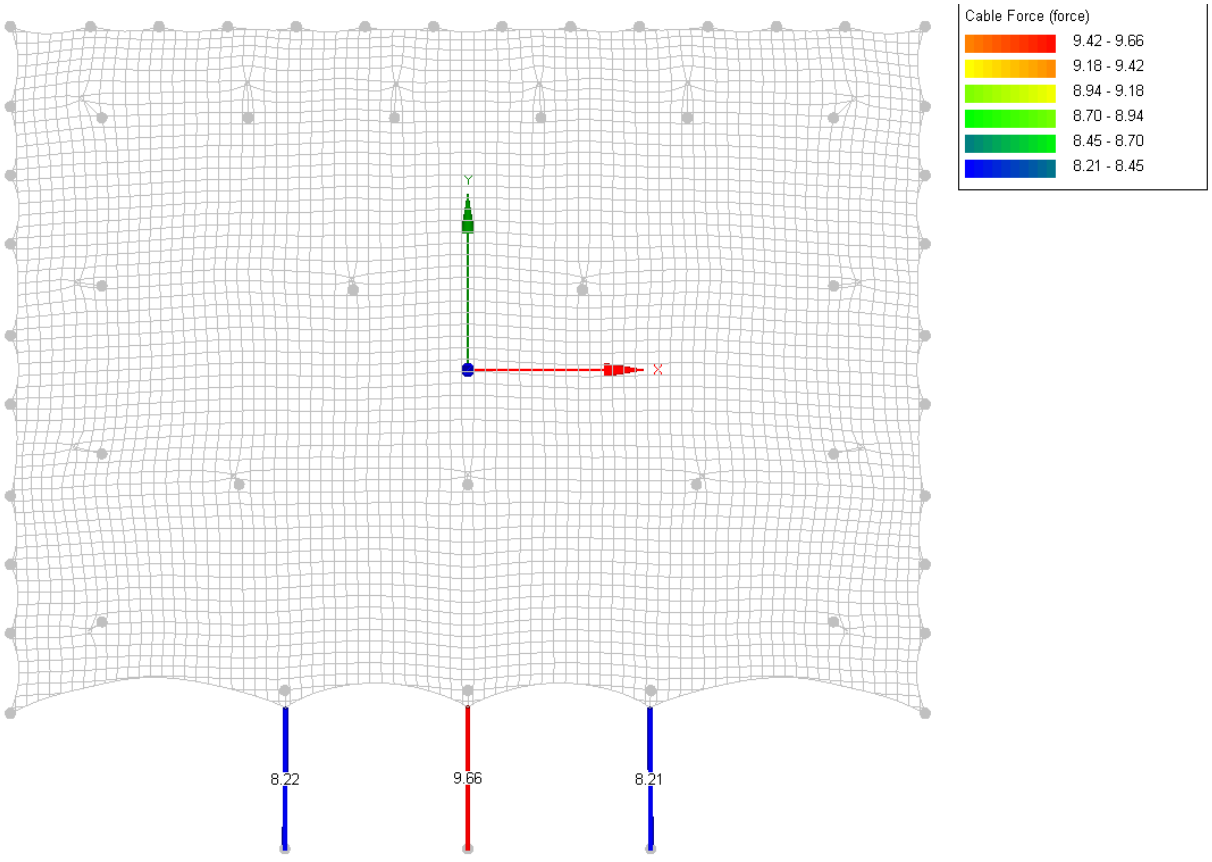


The membrane capacity in weft direction is locally exceeded near the edge. Because multiple layers of fabric are present here, this is acceptable.

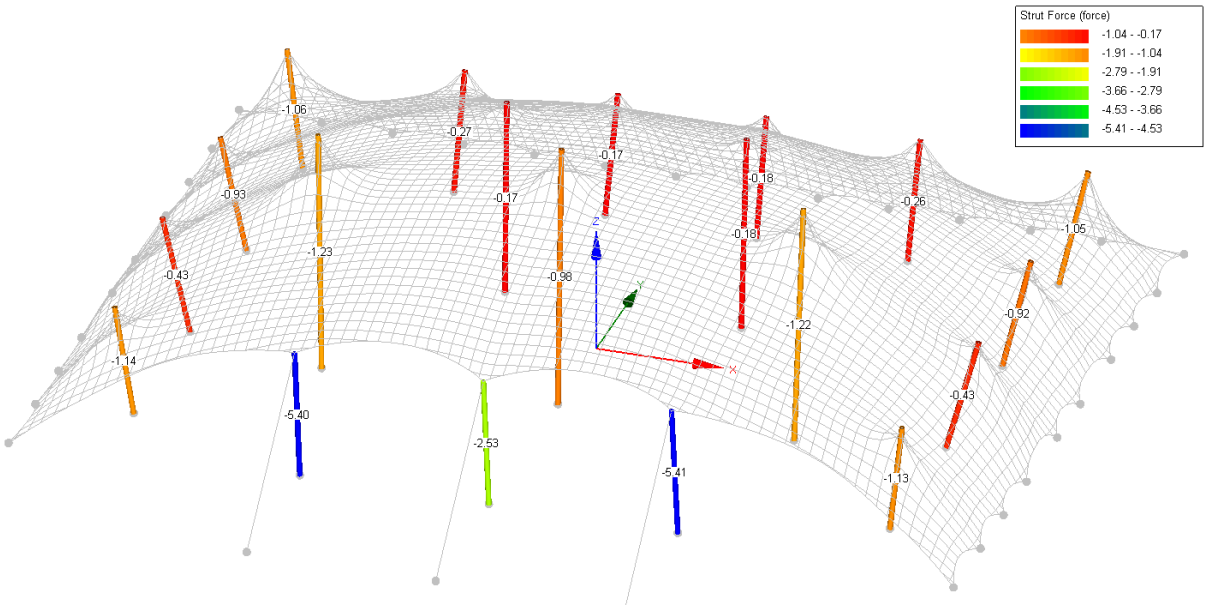
Annex B.2.4.3. Membrane edge



Annex B.2.4.4. Cable forces

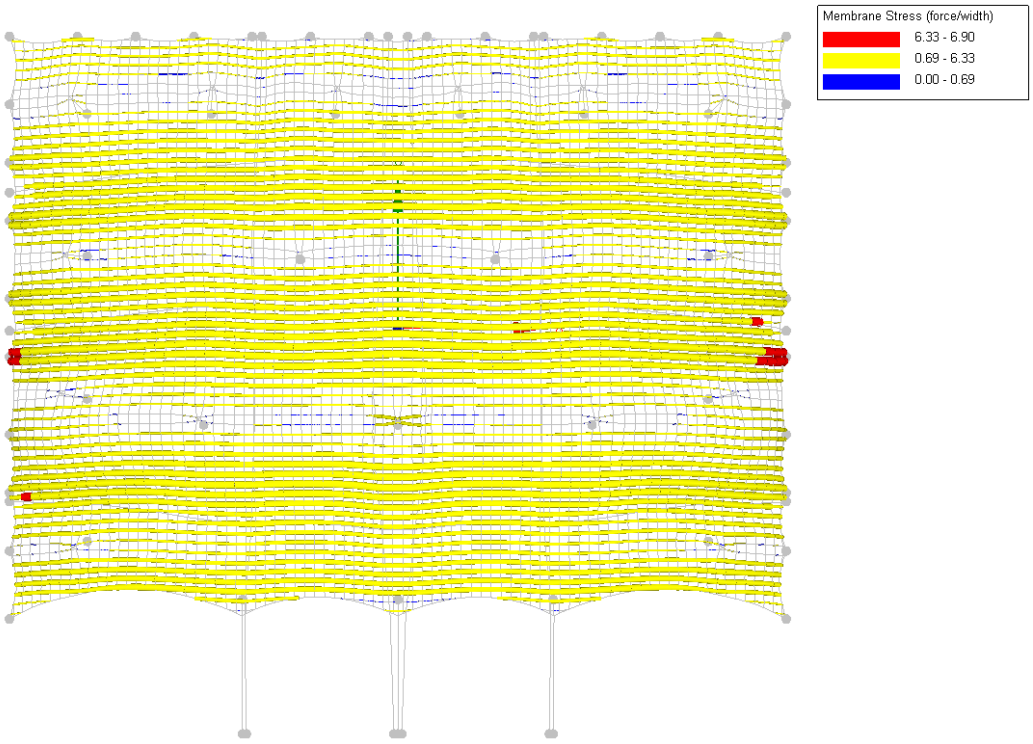


Annex B.2.4.5. Strut forces



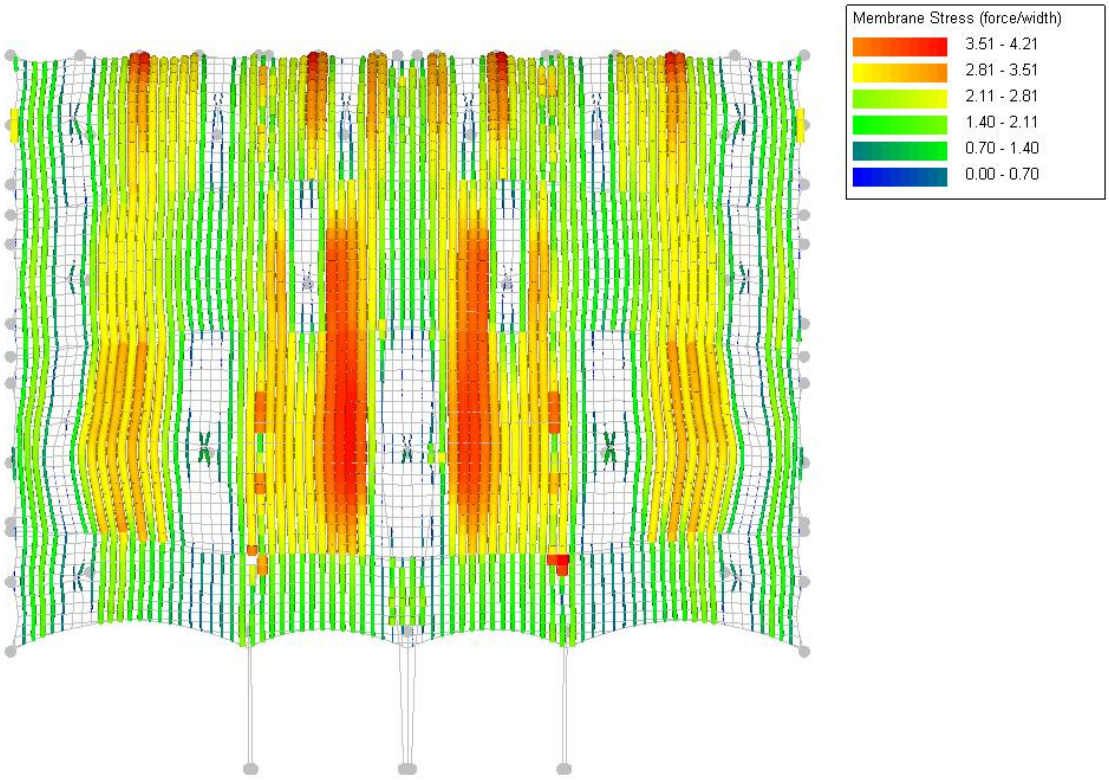
Annex B.2.5. CO7 Own weight + Pretension + Wind suction – closed – full wind load

Annex B.2.5.1. Membrane stress (warp)

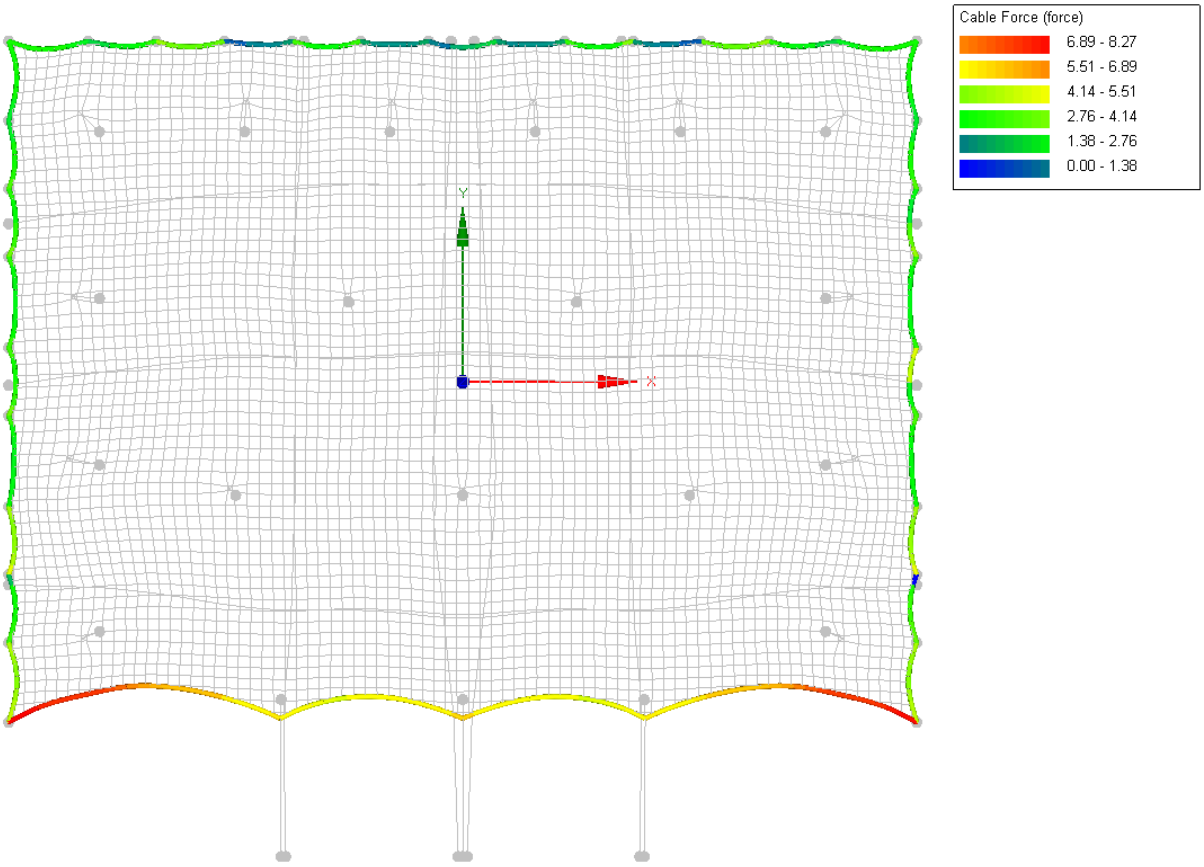


The warp and weft direction of the membrane must be fixed (warp direction along the length of the tent). The membrane stresses are exceeded in the red colored links. However, these are local stresses near the edge, where multiple layers of fabric are present. Therefore, this is acceptable.

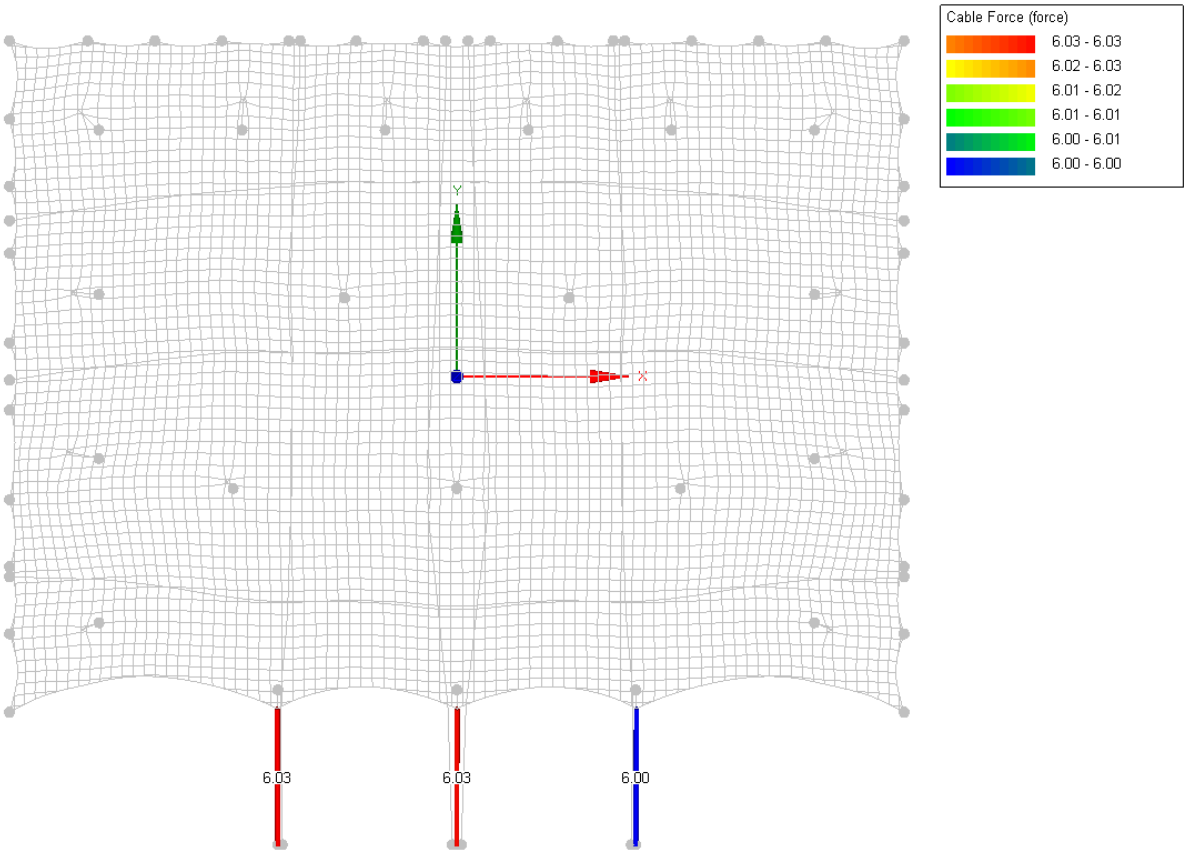
Annex B.2.5.2. Membrane stress (weft)



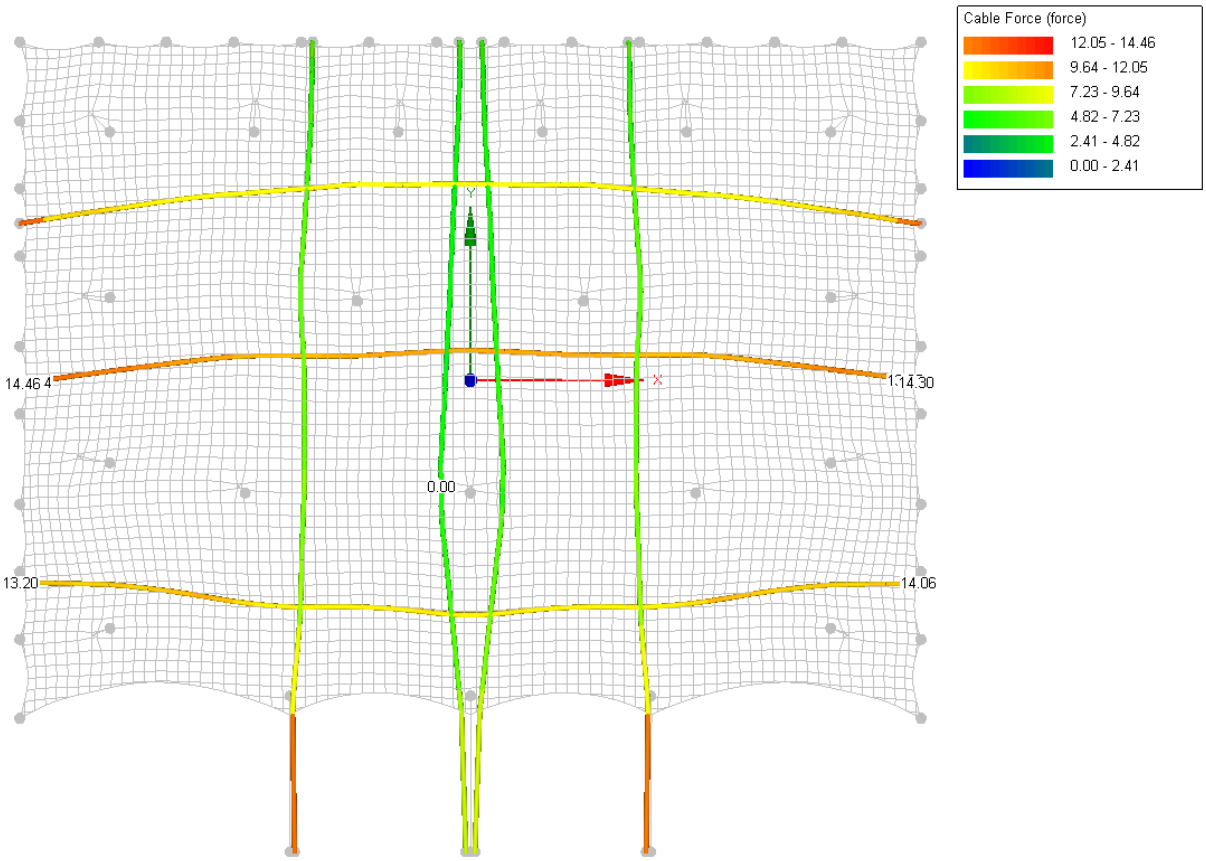
Annex B.2.5.3. Membrane edge



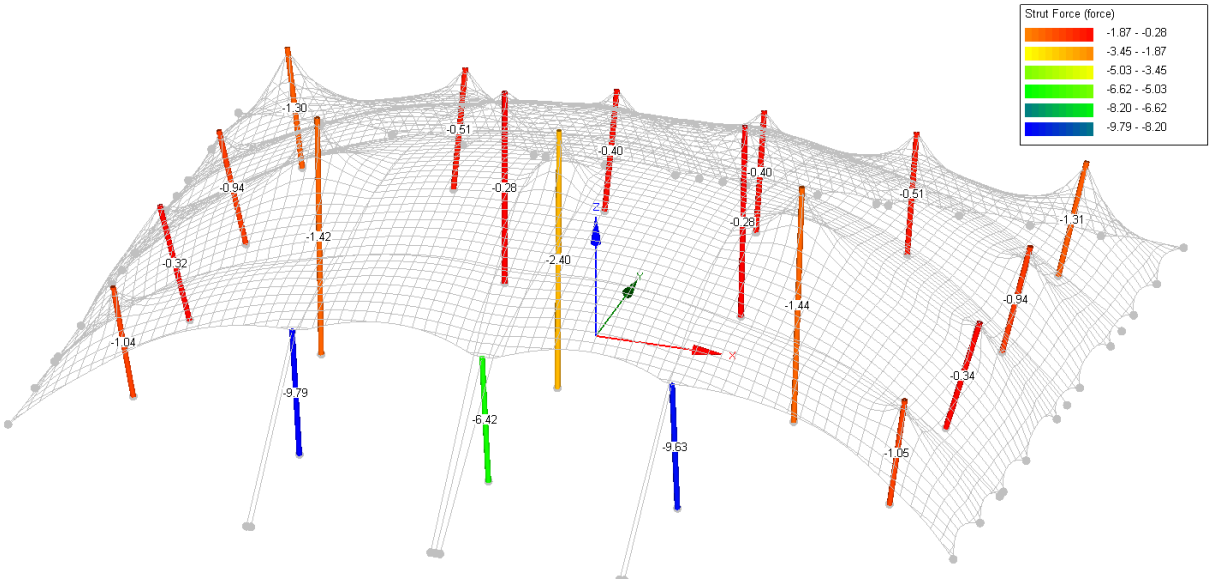
Annex B.2.5.4. Cable forces



Annex B.2.5.5. Storm belts



Annex B.2.5.6. Strut forces

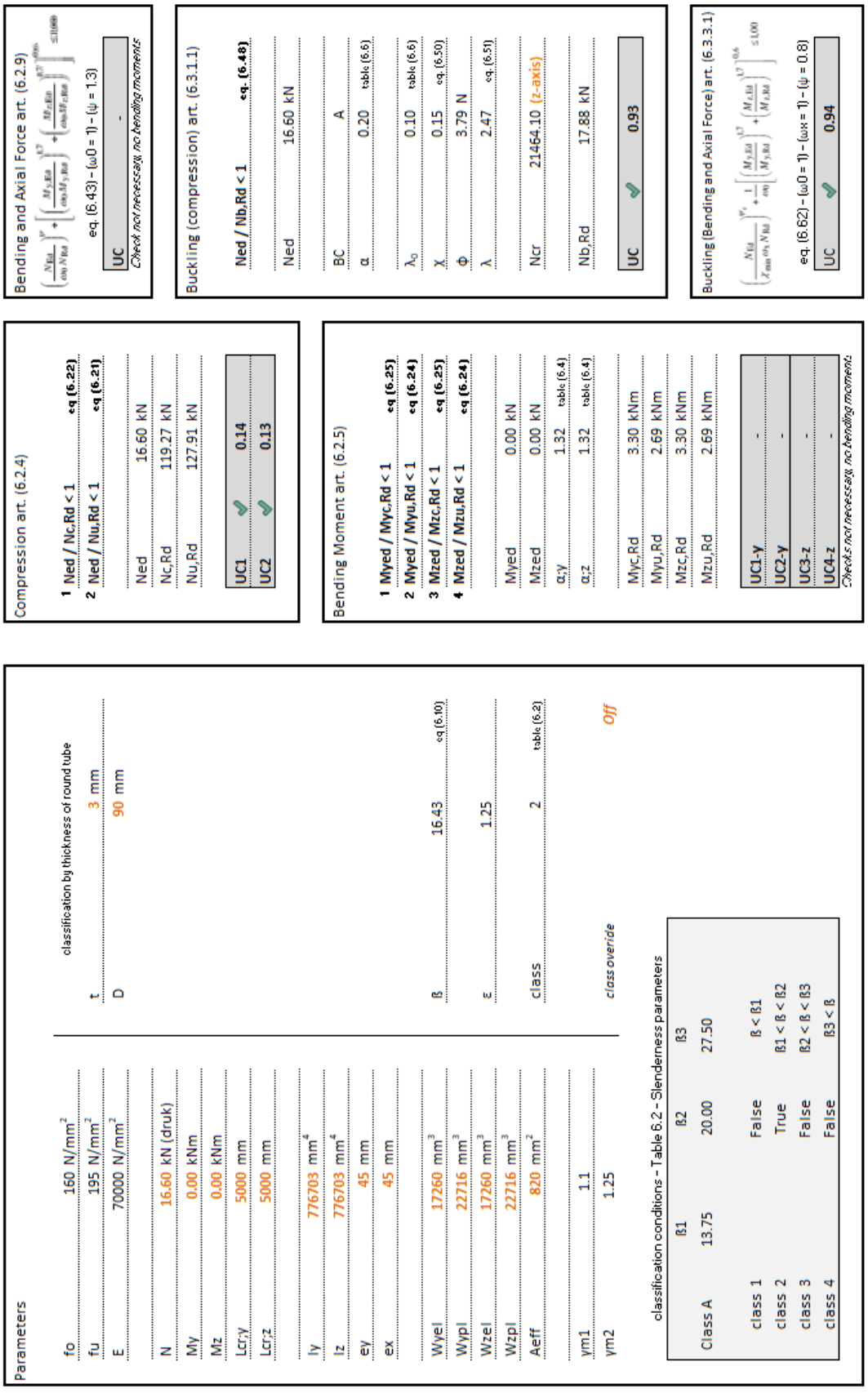


Annex C. Member checks

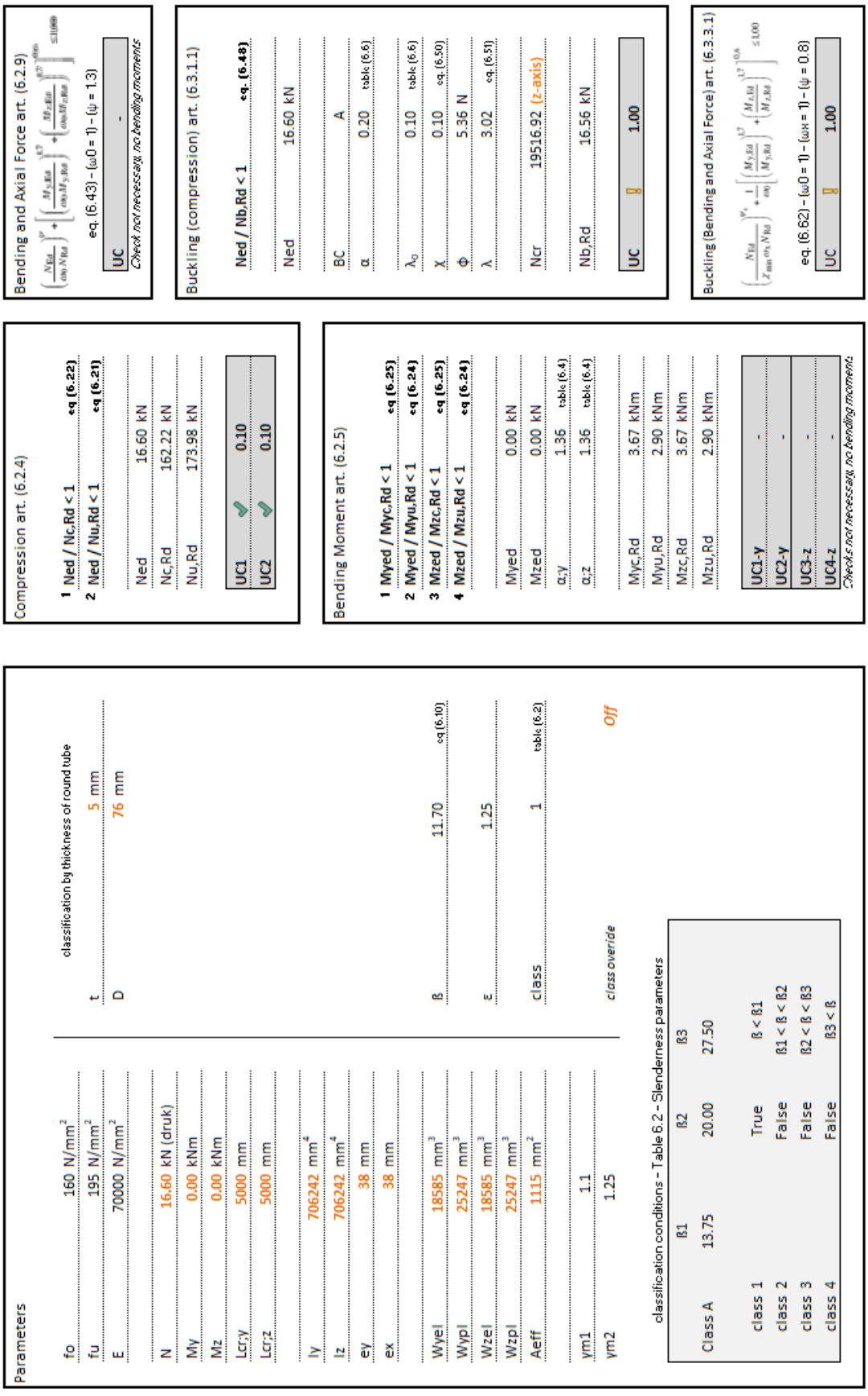
Annex C.1. Center pole 5.5m, floating – wood

Woodtype		Gum pole		
Strenght type		**D35**		
Material factor	γ_M	1.3		NEN-EN 1995-1-1:2005 table 2.3
Climate class		**2**		NEN-EN 1995-1-1:2005 article 2.3.1.3
Straightness factor	β_c	0.2		NEN-EN 1995-1-1:2005 equ. 6.29
Diameter	D	**120**	mm	
Length (buckling)	$l_{buc;y}$	**5.5**	m	
Effective area	A	11309.73355	mm^2	
Moment of innertia	I_y	10178760.2	mm^4	
Elastic modules	$W_{el;y}$	169646.0033	mm^3	
Charistic pressure strenght	f_{c0k}	25	N/mm^2	
Charistic bending strenght	f_{c0k}	35	N/mm^2	
Modules of elasticity	$E_{0.05}$	8.7	kN/m^2	
	i_y	30.0	mm	
Slenderness	λ_y	183.3		
Relative slenderness	λ_{rely}	3.13		NEN-EN 1995-1-1:2005 equ. 6.21
	k_y	5.68		NEN-EN 1995-1-1:2005 equ. 6.21
Buckling factor	k_{cy}	0.0960		NEN-EN 1995-1-1:2005 equ. 6.25
Strenght check				
Pressure force	F_d	**16.60**	kN	
Bending moment	M_d	**0.00**	kNm	
Pressure stress	σ_{c0d}	1.47	N/mm^2	
Bending stress	σ_{c0d}	0.00	N/mm^2	
Load duration		**short**		NEN-EN 1995-1-1:2005 table 2.1
Modificationfactor	k_{mod}	0.90		NEN-EN 1995-1-1:2005 table 3.1
Design pressure strenght	f_{c0d}	17.31	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Design bending strenght	f_{m0d}	24.23	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Strenght check		**0.88**		NEN-EN 1995-1-1:2005 equ. 6.23

Annex C.2. Center pole 5.0m*, floating – aluminium 90x3mm



Annex C.3. Center pole 5.0m*, floating – aluminium 76x5mm



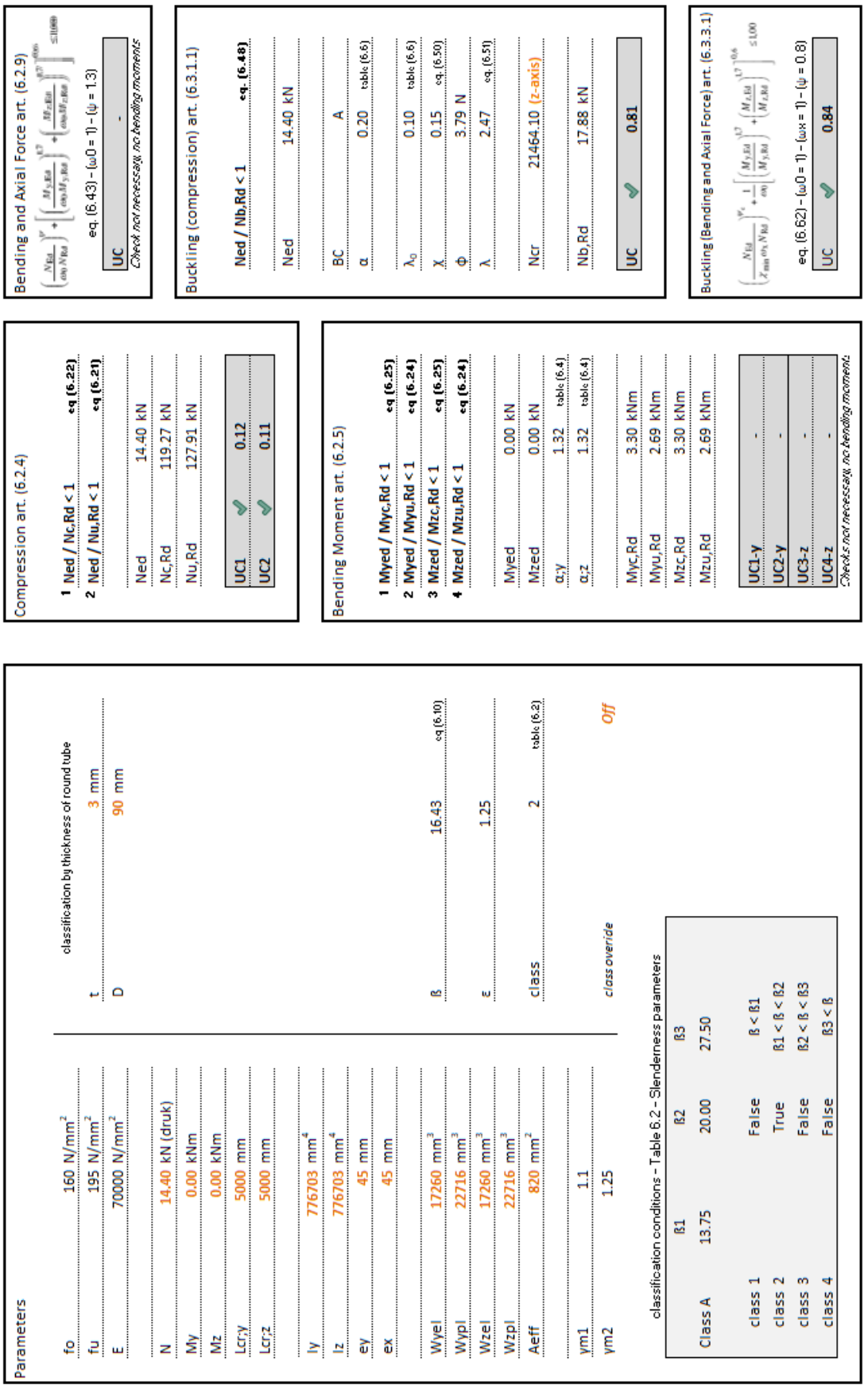
Annex C.4. Center pole 5.0m, floating – wood

Woodtype		Gum pole		
Strenght type		**D35**		
Material factor	γ_M	1.3		NEN-EN 1995-1-1:2005 table 2.3
Climate class		**2**		NEN-EN 1995-1-1:2005 article 2.3.1.3
Straightness factor	β_c	0.2		NEN-EN 1995-1-1:2005 equ. 6.29
Diameter	D	**110**	mm	
Length (buckling)	$l_{buc;y}$	**5**	m	
Effective area	A	9503.317777	mm^2	
Moment of innertia	I_y	7186884.069	mm^4	
Elastic modules	$W_{el;y}$	130670.6194	mm^3	
Charistic pressure strenght	f_{c0k}	25	N/mm^2	
Charistic bending strenght	f_{c0k}	35	N/mm^2	
Modules of elasticity	$E_{0.05}$	8.7	kN/m^2	
	i_y	27.5	mm	
Slenderness	λ_y	181.8		
Relative slenderness	λ_{rely}	3.10		NEN-EN 1995-1-1:2005 equ. 6.21
	k_y	5.59		NEN-EN 1995-1-1:2005 equ. 6.21
Buckling factor	k_{cy}	0.0976		NEN-EN 1995-1-1:2005 equ. 6.25

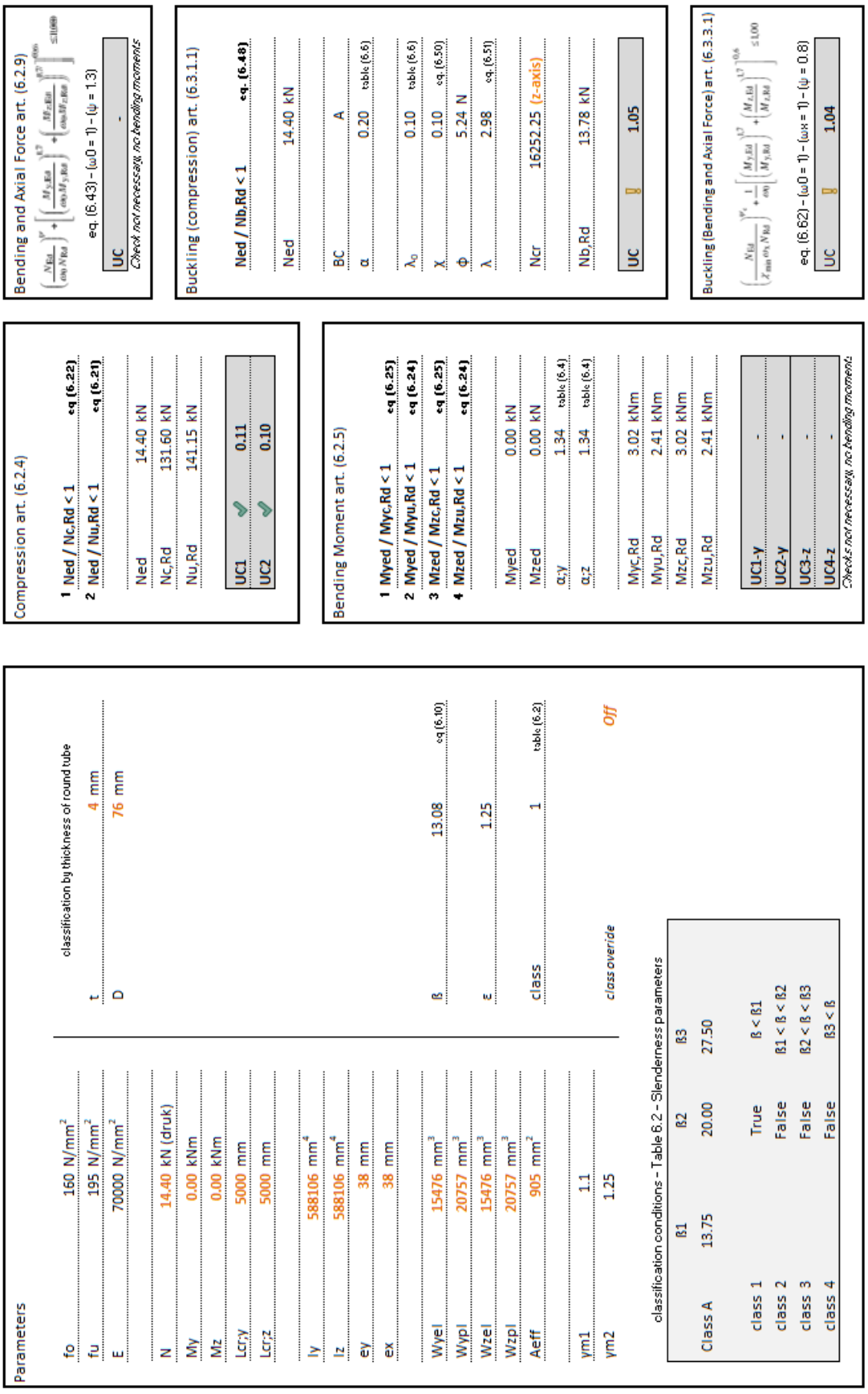
Strenght check

Pressure force	F_d	**14.40**	kN	
Bending moment	M_d	**0.00**	kNm	
Pressure stress	σ_{c0d}	1.52	N/mm^2	
Bending stress	σ_{c0d}	0.00	N/mm^2	
Load duration		**short**		NEN-EN 1995-1-1:2005 table 2.1
Modificationfactor	k_{mod}	0.90		NEN-EN 1995-1-1:2005 table 3.1
Design pressure strenght	f_{c0d}	17.31	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Design bending strenght	f_{m0d}	24.23	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Strenght check		**0.90**		NEN-EN 1995-1-1:2005 equ. 6.23

Annex C.5. Center pole 5.0m, floating – aluminium 90x3mm



Annex C.6. Center pole 5.0m, floating – aluminium 76x4mm



Annex C.7. Center pole 5.5m, closed – wood

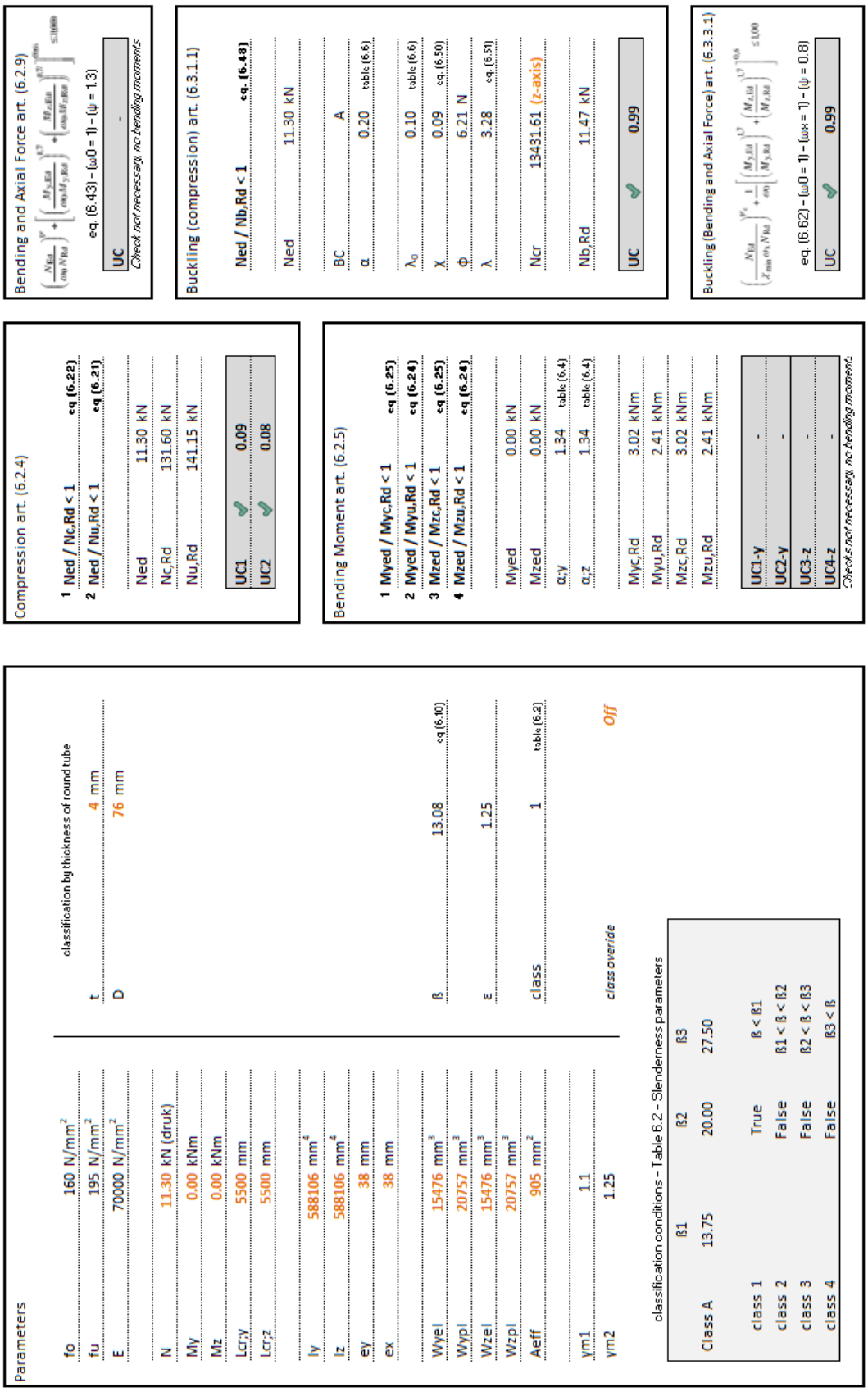
Woodtype		Gum pole		
Strenght type		**D35**		
Material factor	γ_M	1.3		NEN-EN 1995-1-1:2005 table 2.3
Climate class		**2**		NEN-EN 1995-1-1:2005 article 2.3.1.3
Straightness factor	β_c	0.2		NEN-EN 1995-1-1:2005 equ. 6.29
Diameter	D	**110**	mm	
Length (buckling)	$l_{buc;y}$	**5.5**	m	
Effective area	A	9503.317777	mm^2	
Moment of innertia	I_y	7186884.069	mm^4	
Elastic modules	$W_{el;y}$	130670.6194	mm^3	
Charistic pressure strenght	f_{c0k}	25	N/mm^2	
Charistic bending strenght	f_{c0k}	35	N/mm^2	
Modules of elasticity	$E_{0.05}$	8.7	kN/m^2	
	i_y	27.5	mm	
Slenderness	λ_y	200.0		
Relative slenderness	λ_{rely}	3.41		NEN-EN 1995-1-1:2005 equ. 6.21
	k_y	6.63		NEN-EN 1995-1-1:2005 equ. 6.21
Buckling factor	k_{cy}	0.08115		NEN-EN 1995-1-1:2005 equ. 6.25

Strenght check

Pressure force	F_d	**11.30**	kN	
Bending moment	M_d	**0.00**	kNm	
Pressure stress	σ_{c0d}	1.19	N/mm^2	
Bending stress	σ_{c0d}	0.00	N/mm^2	
Load duration		**short**		NEN-EN 1995-1-1:2005 table 2.1
Modificationfactor	k_{mod}	0.90		NEN-EN 1995-1-1:2005 table 3.1
Design pressure strenght	f_{c0d}	17.31	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Design bending strenght	f_{m0d}	24.23	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Strenght check		**0.85**		NEN-EN 1995-1-1:2005 equ. 6.23

Annex C.8. Center pole 5.5m, closed – aluminium 90x3mm

Annex C.9. Center pole 5.5m, closed – aluminium 76x4mm



Annex C.10. Center pole 5.0m, closed – wood

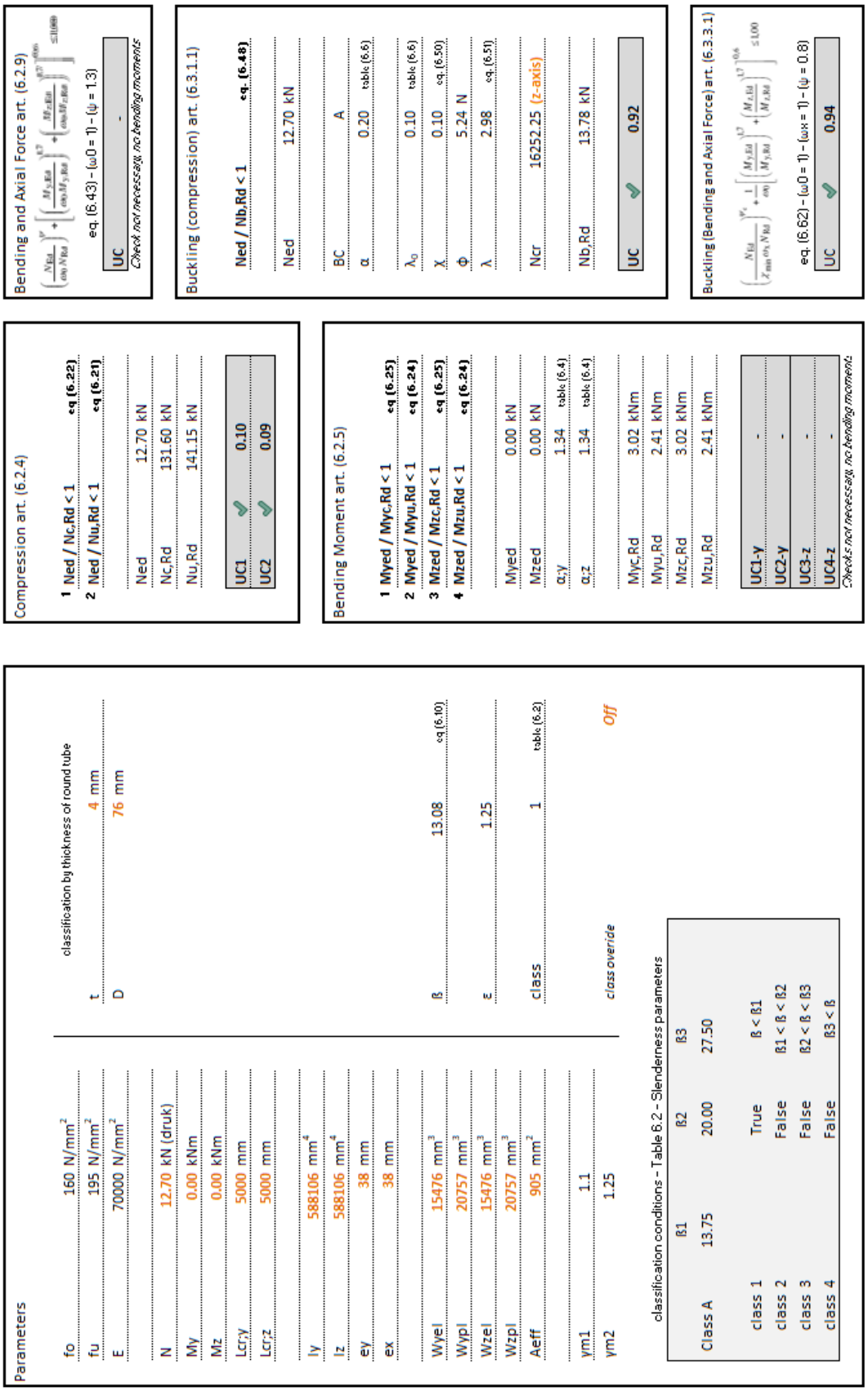
Woodtype		Gum pole		
Strenght type		**D35**		
Material factor	γ_M	1.3		NEN-EN 1995-1-1:2005 table 2.3
Climate class		**2**		NEN-EN 1995-1-1:2005 article 2.3.1.3
Straightness factor	β_c	0.2		NEN-EN 1995-1-1:2005 equ. 6.29
Diameter	D	**110**	mm	
Length (buckling)	$l_{buc;y}$	**5**	m	
Effective area	A	9503.317777	mm^2	
Moment of innertia	I_y	7186884.069	mm^4	
Elastic modules	$W_{el;y}$	130670.6194	mm^3	
Charistic pressure strenght	f_{c0k}	25	N/mm^2	
Charistic bending strenght	f_{c0k}	35	N/mm^2	
Modules of elasticity	$E_{0.05}$	8.7	kN/m^2	
	i_y	27.5	mm	
Slenderness	λ_y	181.8		
Relative slenderness	λ_{rely}	3.10		NEN-EN 1995-1-1:2005 equ. 6.21
	k_y	5.59		NEN-EN 1995-1-1:2005 equ. 6.21
Buckling factor	k_{cy}	0.09760		NEN-EN 1995-1-1:2005 equ. 6.25

Strenght check

Pressure force	F_d	**12.70**	kN	
Bending moment	M_d	**0.00**	kNm	
Pressure stress	σ_{c0d}	1.34	N/mm^2	
Bending stress	σ_{c0d}	0.00	N/mm^2	
Load duration		**short**		NEN-EN 1995-1-1:2005 table 2.1
Modificationfactor	k_{mod}	0.90		NEN-EN 1995-1-1:2005 table 3.1
Design pressure strenght	f_{c0d}	17.31	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Design bending strenght	f_{m0d}	24.23	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Strenght check		**0.79**		NEN-EN 1995-1-1:2005 equ. 6.23

Annex C.11. Center pole 5.0m, closed – Aluminium 90x3mm

Annex C.12. Center pole 5.0m, closed – Aluminium 76x4mm



Annex C.13. Center pole 4.0m, closed – wood

Woodtype		Gum pole		
Strenght type		**D35**		
Material factor	γ_M	1.3		NEN-EN 1995-1-1:2005 table 2.3
Climate class		**2**		NEN-EN 1995-1-1:2005 article 2.3.1.3
Straightness factor	β_c	0.2		NEN-EN 1995-1-1:2005 equ. 6.29
Diameter	D	**85**	mm	
Length (buckling)	$l_{buc;y}$	**4**	m	
Effective area	A	5674.501731	mm^2	
Moment of innertia	I_y	2562392.188	mm^4	
Elastic modules	$W_{el;y}$	60291.58089	mm^3	
Charistic pressure strenght	f_{c0k}	25	N/mm^2	
Charistic bending strenght	f_{c0k}	35	N/mm^2	
Modules of elasticity	$E_{0.05}$	8.7	kN/m^2	
	i_y	21.3	mm	
Slenderness	λ_y	188.2		
Relative slenderness	λ_{rely}	3.21		NEN-EN 1995-1-1:2005 equ. 6.21
	k_y	5.95		NEN-EN 1995-1-1:2005 equ. 6.21
Buckling factor	k_{cy}	0.0913		NEN-EN 1995-1-1:2005 equ. 6.25

Strenght check

Pressure force	F_d	**8.30**	kN	
Bending moment	M_d	**0.00**	kNm	
Pressure stress	σ_{c0d}	1.46	N/mm^2	
Bending stress	σ_{c0d}	0.00	N/mm^2	
Load duration		**short**		NEN-EN 1995-1-1:2005 table 2.1
Modificationfactor	k_{mod}	0.90		NEN-EN 1995-1-1:2005 table 3.1
Design pressure strenght	f_{c0d}	17.31	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Design bending strenght	f_{m0d}	24.23	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Strenght check		**0.93**		NEN-EN 1995-1-1:2005 equ. 6.23

Annex C.14. Center pole 4.0m, closed – Aluminium 76x4mm

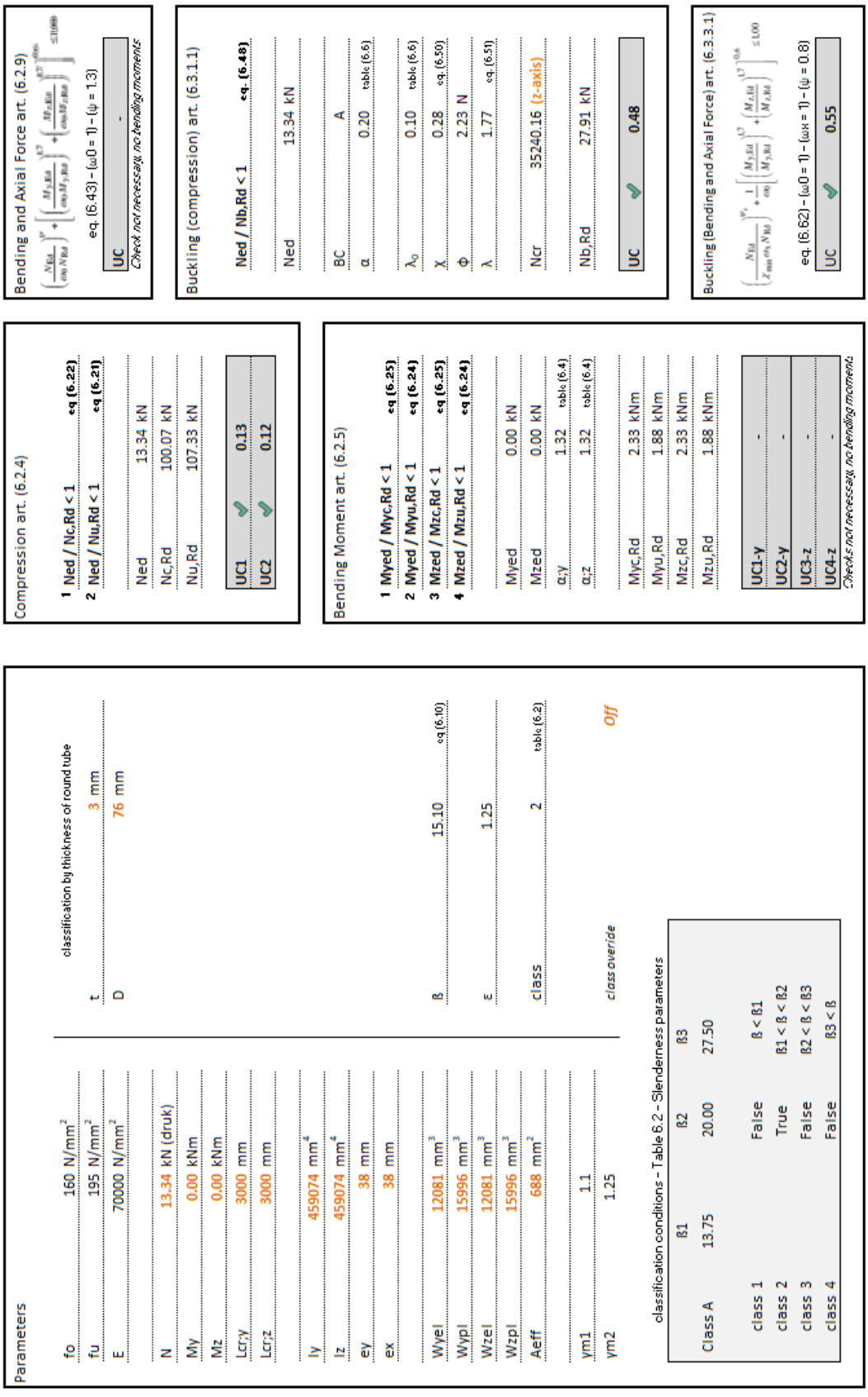
Annex C.15. Entrance pole 3.0m, floating– wood

Woodtype		Gum pole		
Strenght type		**D35**		
Material factor	γ_M	1.3		NEN-EN 1995-1-1:2005 table 2.3
Climate class		**2**		NEN-EN 1995-1-1:2005 article 2.3.1.3
Straightness factor	β_c	0.2		NEN-EN 1995-1-1:2005 equ. 6.29
Diameter	D	**85**	mm	
Length (buckling)	$l_{buc;y}$	**3**	m	
Effective area	A	5674.501731	mm^2	
Moment of innertia	I_y	2562392.188	mm^4	
Elastic modules	$W_{el;y}$	60291.58089	mm^3	
Charistic pressure strenght	f_{c0k}	25	N/mm^2	
Charistic bending strenght	f_{c0k}	35	N/mm^2	
Modules of elasticity	$E_{0.05}$	8.7	kN/m^2	
	i_y	21.3	mm	
Slenderness	λ_y	141.2		
Relative slenderness	λ_{rely}	2.41		NEN-EN 1995-1-1:2005 equ. 6.21
	k_y	3.61		NEN-EN 1995-1-1:2005 equ. 6.21
Buckling factor	k_{cy}	0.15862		NEN-EN 1995-1-1:2005 equ. 6.25

Strenght check

Pressure force	F_d	**13.34**	kN	
Bending moment	M_d	**0.00**	kNm	
Pressure stress	σ_{c0d}	2.35	N/mm^2	
Bending stress	σ_{c0d}	0.00	N/mm^2	
Load duration		**short**		NEN-EN 1995-1-1:2005 table 2.1
Modificationfactor	k_{mod}	0.90		NEN-EN 1995-1-1:2005 table 3.1
Design pressure strenght	f_{c0d}	17.31	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Design bending strenght	f_{m0d}	24.23	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Strenght check		**0.86**		NEN-EN 1995-1-1:2005 equ. 6.23

Annex C.16. Entrance pole 3.0m, floating – Aluminium 76x3mm



Annex C.17. Entrance pole 3.0m, closed– wood

Woodtype		Gum pole		
Strenght type		**D35**		
Material factor	γ_M	1.3		NEN-EN 1995-1-1:2005 table 2.3
Climate class		**2**		NEN-EN 1995-1-1:2005 article 2.3.1.3
Straightness factor	β_c	0.2		NEN-EN 1995-1-1:2005 equ. 6.29
Diameter	D	**85**	mm	
Length (buckling)	$l_{buc;y}$	**3**	m	
Effective area	A	5674.501731	mm^2	
Moment of innertia	I_y	2562392.188	mm^4	
Elastic modules	$W_{el;y}$	60291.58089	mm^3	
Charistic pressure strenght	f_{c0k}	25	N/mm^2	
Charistic bending strenght	f_{c0k}	35	N/mm^2	
Modules of elasticity	$E_{0.05}$	8.7	kN/m^2	
	i_y	21.3	mm	
Slenderness	λ_y	141.2		
Relative slenderness	λ_{rely}	2.41		NEN-EN 1995-1-1:2005 equ. 6.21
	k_y	3.61		NEN-EN 1995-1-1:2005 equ. 6.21
Buckling factor	k_{cy}	0.15862		NEN-EN 1995-1-1:2005 equ. 6.25

Strenght check

Pressure force	F_d	**14.84**	kN	
Bending moment	M_d	**0.00**	kNm	
Pressure stress	σ_{c0d}	2.62	N/mm^2	
Bending stress	σ_{c0d}	0.00	N/mm^2	
Load duration		**short**		NEN-EN 1995-1-1:2005 table 2.1
Modificationfactor	k_{mod}	0.90		NEN-EN 1995-1-1:2005 table 3.1
Design pressure strenght	f_{c0d}	17.31	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Design bending strenght	f_{m0d}	24.23	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Strenght check		**0.95**		NEN-EN 1995-1-1:2005 equ. 6.23

Annex C.18. Entrance pole 3.0m, closed – Aluminium 76x3mm

Annex C.19. Corner pole 2.5m, floating – wood

Woodtype		Gum pole		
Strenght type		**D35**		
Material factor	γ_M	1.3		NEN-EN 1995-1-1:2005 table 2.3
Climate class		**2**		NEN-EN 1995-1-1:2005 article 2.3.1.3
Straightness factor	β_c	0.2		NEN-EN 1995-1-1:2005 equ. 6.29
Diameter	D	**65**	mm	
Length (buckling)	$l_{buc;y}$	**2.5**	m	
Effective area	A	3318.30724	mm^2	
Moment of innertia	I_y	876240.5057	mm^4	
Elastic modules	$W_{el;y}$	26961.24633	mm^3	
Charistic pressure strenght	f_{c0k}	25	N/mm^2	
Charistic bending strenght	f_{c0k}	35	N/mm^2	
Modules of elasticity	$E_{0.05}$	8.7	kN/m^2	
	i_y	16.3	mm	
Slenderness	λ_y	153.8		
Relative slenderness	λ_{rely}	2.63		NEN-EN 1995-1-1:2005 equ. 6.21
	k_y	4.18		NEN-EN 1995-1-1:2005 equ. 6.21
Buckling factor	k_{cy}	0.1346		NEN-EN 1995-1-1:2005 equ. 6.25

Strenght check

Pressure force	F_d	**5.99**	kN	
Bending moment	M_d	**0.00**	kNm	
Pressure stress	σ_{c0d}	1.81	N/mm^2	
Bending stress	σ_{c0d}	0.00	N/mm^2	
Load duration		**short**		NEN-EN 1995-1-1:2005 table 2.1
Modificationfactor	k_{mod}	0.90		NEN-EN 1995-1-1:2005 table 3.1
Design pressure strenght	f_{c0d}	17.31	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Design bending strenght	f_{m0d}	24.23	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Strenght check		**0.77**		NEN-EN 1995-1-1:2005 equ. 6.23

Annex C.20. Corner pole 2.5m, floating – Aluminium 50x3mm

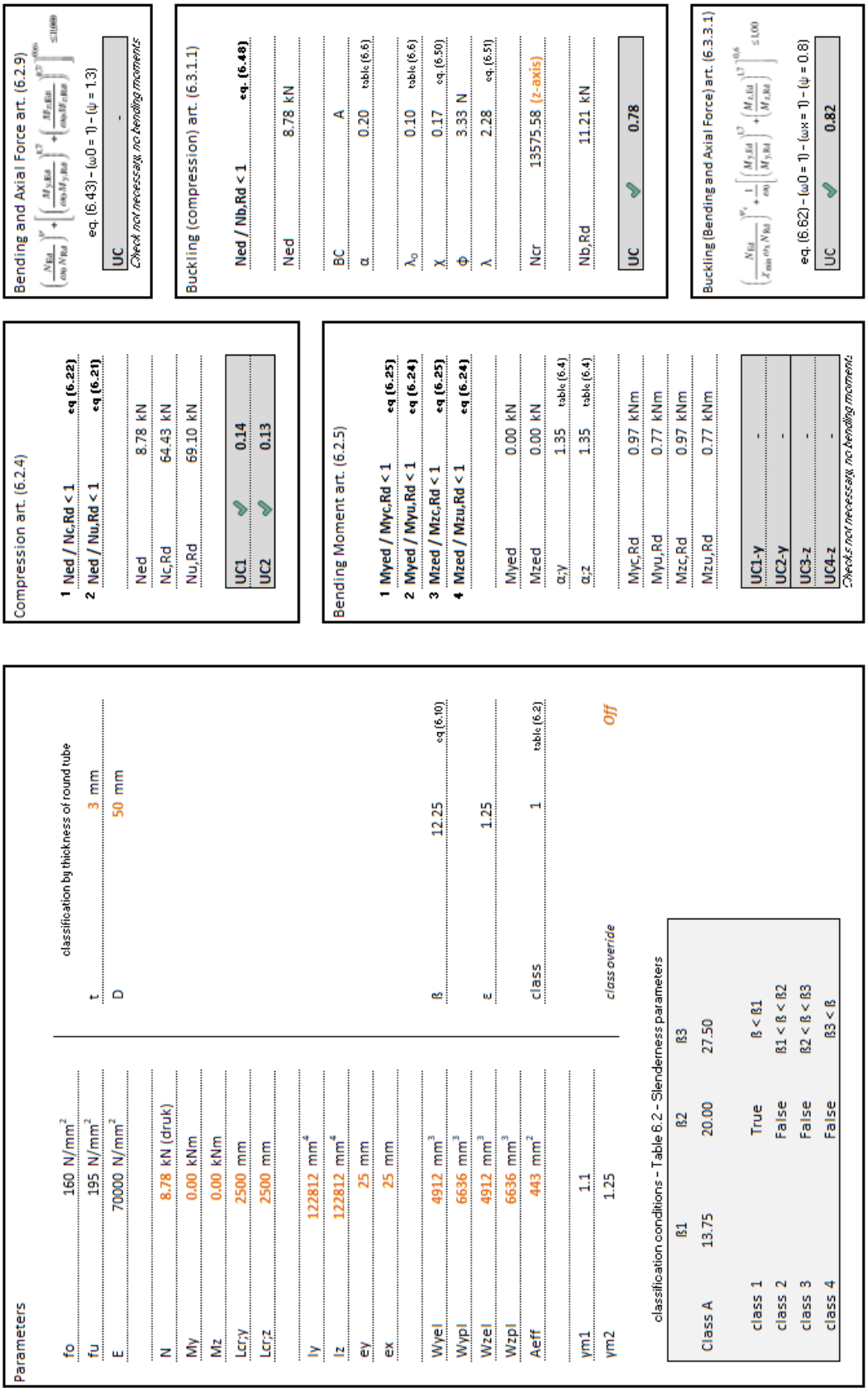
Annex C.21. Corner pole 2.5m, closed – wood

Woodtype		Gum pole		
Strenght type		**D35**		
Material factor	γ_M	1.3		NEN-EN 1995-1-1:2005 table 2.3
Climate class		**2**		NEN-EN 1995-1-1:2005 article 2.3.1.3
Straightness factor	β_c	0.2		NEN-EN 1995-1-1:2005 equ. 6.29
Diameter	D	**70**	mm	
Length (buckling)	$l_{buc;y}$	**2.5**	m	
Effective area	A	3848.451001	mm^2	
Moment of innertia	I_y	1178588.119	mm^4	
Elastic modules	$W_{el;y}$	33673.94626	mm^3	
Charistic pressure strenght	f_{c0k}	25	N/mm^2	
Charistic bending strenght	f_{c0k}	35	N/mm^2	
Modules of elasticity	$E_{0.05}$	8.7	kN/m^2	
	i_y	17.5	mm	
Slenderness	λ_y	142.9		
Relative slenderness	λ_{rely}	2.44		NEN-EN 1995-1-1:2005 equ. 6.21
	k_y	3.68		NEN-EN 1995-1-1:2005 equ. 6.21
Buckling factor	k_{cy}	0.15509		NEN-EN 1995-1-1:2005 equ. 6.25

Strenght check

Pressure force	F_d	**8.78**	kN	
Bending moment	M_d	**0.00**	kNm	
Pressure stress	σ_{c0d}	2.28	N/mm^2	
Bending stress	σ_{c0d}	0.00	N/mm^2	
Load duration		**short**		NEN-EN 1995-1-1:2005 table 2.1
Modificationfactor	k_{mod}	0.90		NEN-EN 1995-1-1:2005 table 3.1
Design pressure strenght	f_{c0d}	17.31	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Design bending strenght	f_{m0d}	24.23	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Strenght check		**0.85**		NEN-EN 1995-1-1:2005 equ. 6.23

Annex C.22. Corner pole 2.5m, closed – Aluminium 50x3mm



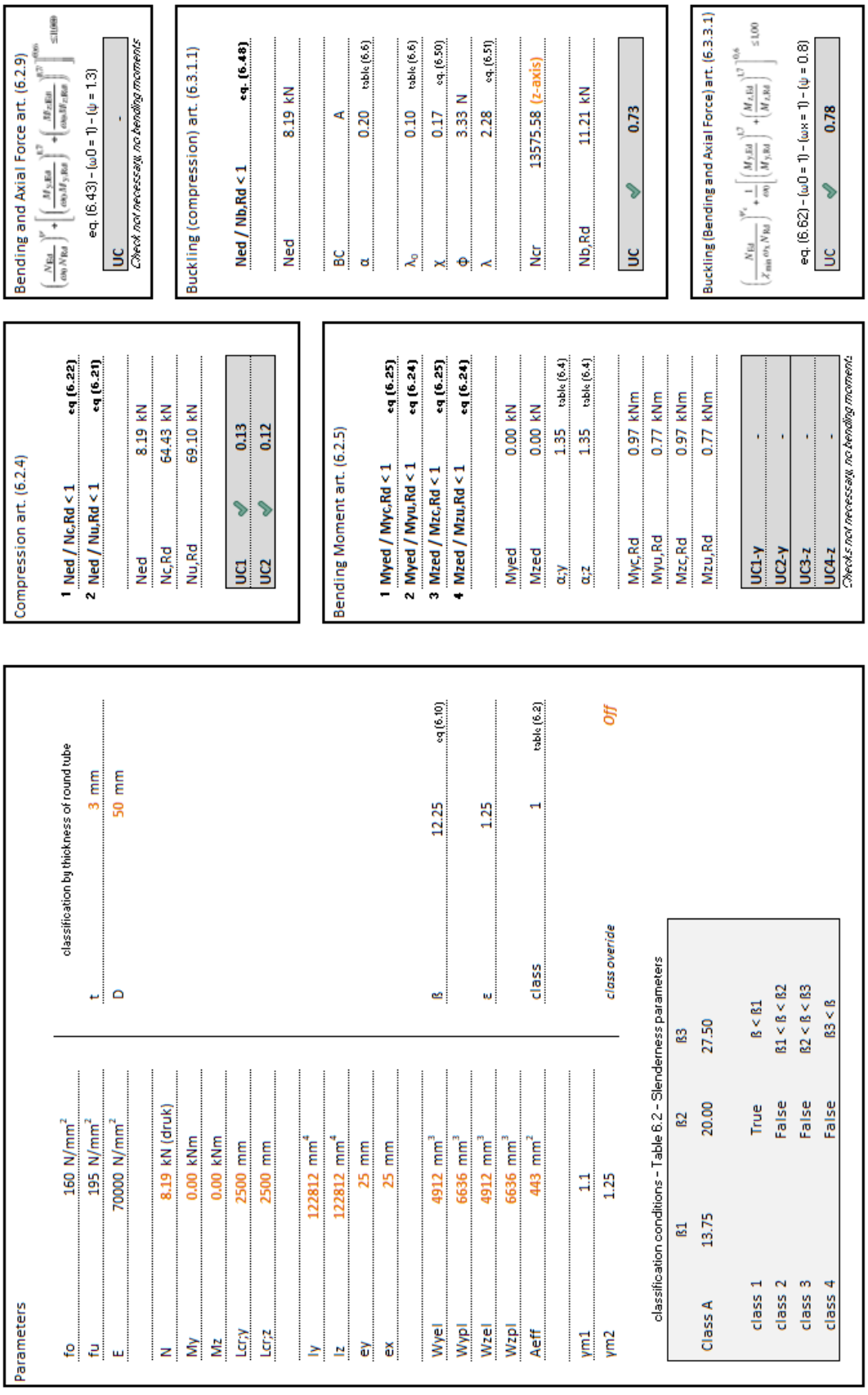
Annex C.23. Side wall pole 2.5m, closed – wood

Woodtype		Gum pole		
Strenght type		**D35**		
Material factor	γ_M	1.3		NEN-EN 1995-1-1:2005 table 2.3
Climate class		**2**		NEN-EN 1995-1-1:2005 article 2.3.1.3
Straightness factor	β_c	0.2		NEN-EN 1995-1-1:2005 equ. 6.29
Diameter	D	**70**	mm	
Length (buckling)	$l_{buc;y}$	**2.5**	m	
Effective area	A	3848.451001	mm^2	
Moment of innertia	I_y	1178588.119	mm^4	
Elastic modules	$W_{el;y}$	33673.94626	mm^3	
Charistic pressure strenght	f_{c0k}	25	N/mm^2	
Charistic bending strenght	f_{c0k}	35	N/mm^2	
Modules of elasticity	$E_{0.05}$	8.7	kN/m^2	
	i_y	17.5	mm	
Slenderness	λ_y	142.9		
Relative slenderness	λ_{rely}	2.44		NEN-EN 1995-1-1:2005 equ. 6.21
	k_y	3.68		NEN-EN 1995-1-1:2005 equ. 6.21
Buckling factor	k_{cy}	0.15509		NEN-EN 1995-1-1:2005 equ. 6.25

Strenght check

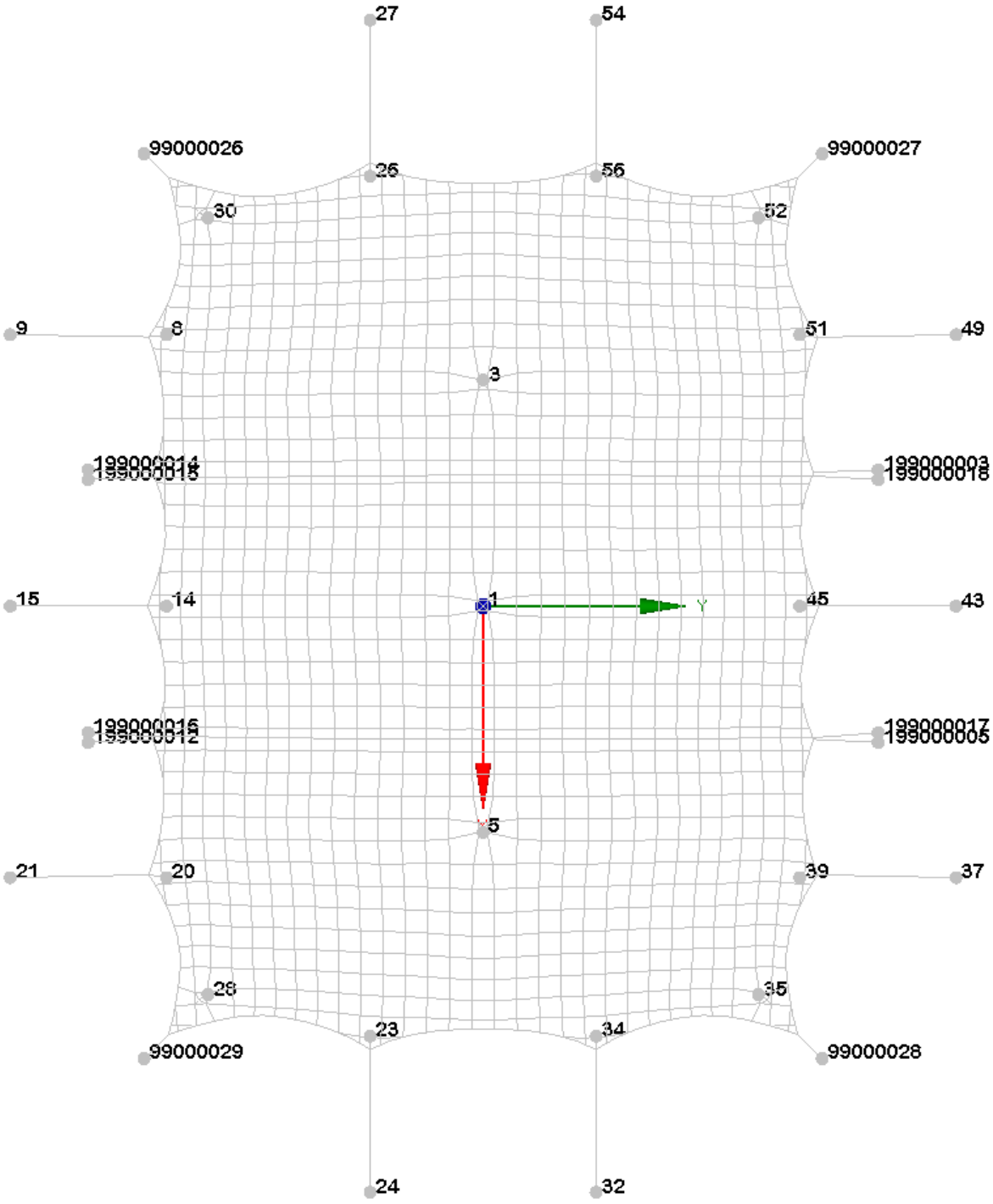
Pressure force	F_d	**8.19**	kN	
Bending moment	M_d	**0.00**	kNm	
Pressure stress	σ_{c0d}	2.13	N/mm^2	
Bending stress	σ_{c0d}	0.00	N/mm^2	
Load duration		**short**		NEN-EN 1995-1-1:2005 table 2.1
Modificationfactor	k_{mod}	0.90		NEN-EN 1995-1-1:2005 table 3.1
Design pressure strenght	f_{c0d}	17.31	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Design bending strenght	f_{m0d}	24.23	N/mm^2	NEN-EN 1995-1-1:2005 equ. 2.14
Strenght check		**0.79**		NEN-EN 1995-1-1:2005 equ. 6.23

Annex C.24. Side wall pole 2.5m, closed – Aluminium 50x3mm



Annex D. Software output (reaction forces)

Annex D.1. Point numbers 20x15 - floating



Annex D.2. Reaction forces 20x15m - floating

Annex D.2.1. CO1: Own weight + pretension

Att	Node	Koor X	Koor Y	Koor Z	Fx	Fy	Fz
Guy rope	9	-6.00	-10.46	0.00	0.00	-0.77	-0.77
Guy rope	15	0.00	-10.46	0.00	0.00	-0.65	-0.64
Guy rope	24	12.96	-2.50	0.00	0.97	-0.01	-0.96
Guy rope	27	-12.96	-2.50	0.00	-0.97	-0.01	-0.96
Guy rope	32	12.96	2.50	0.00	0.97	0.01	-0.96
Guy rope	37	6.00	10.46	0.00	0.00	0.77	-0.77
Guy rope	43	0.00	10.46	0.00	0.00	0.65	-0.64
Guy rope	49	-6.00	10.46	0.00	0.00	0.77	-0.77
Guy rope	54	-12.96	2.50	0.00	-0.97	0.01	-0.96
Guy rope	21	6.00	-10.46	0.00	0.00	-0.77	-0.77
Guy rope (corner)	99000026	-10.00	-7.50	0.00	-1.43	-1.60	-2.28
Guy rope (corner)	99000027	-10.00	7.50	0.00	-1.43	1.60	-2.28
Guy rope (corner)	99000028	10.00	7.50	0.00	1.43	1.60	-2.28
Guy rope (corner)	99000029	10.00	-7.50	0.00	1.43	-1.60	-2.28
Guy rope (valley)	199000003	-3.01	8.73	0.00	0.00	0.77	-1.11
Guy rope (valley)	199000005	3.01	8.73	0.00	0.00	0.77	-1.11
Guy rope (valley)	199000012	3.01	-8.73	0.00	0.00	-0.77	-1.11
Guy rope (valley)	199000014	-3.01	-8.73	0.00	0.00	-0.77	-1.11
Center pole 5.5m	1	0.00	0.00	0.00	0.00	0.00	1.52
Center pole 5.0m	3	-5.00	0.00	0.00	0.01	0.00	1.34
Center pole 5.0m	5	5.00	0.00	0.00	-0.01	0.00	1.34
Corner pole 2.5m	28	8.59	-6.09	0.00	0.13	-0.12	0.94
Corner pole 2.5m	30	-8.59	-6.09	0.00	-0.13	-0.12	0.94
Corner pole 2.5m	35	8.59	6.09	0.00	0.13	0.12	0.94
Corner pole 2.5m	52	-8.59	6.09	0.00	-0.13	0.12	0.94
Entrance pole 3.0m	8	-6.00	-7.00	0.00	0.00	-0.29	1.92
Entrance pole 3.0m	14	0.00	-7.00	0.00	0.00	-0.24	1.53
Entrance pole 3.0m	23	9.50	-2.50	0.00	0.23	0.01	1.59
Entrance pole 3.0m	26	-9.50	-2.50	0.00	-0.23	0.01	1.59
Entrance pole 3.0m	34	9.50	2.50	0.00	0.23	-0.01	1.59
Entrance pole 3.0m	39	6.00	7.00	0.00	0.00	0.29	1.92
Entrance pole 3.0m	45	0.00	7.00	0.00	0.00	0.24	1.53
Entrance pole 3.0m	51	-6.00	7.00	0.00	0.00	0.29	1.92
Entrance pole 3.0m	56	-9.50	2.50	0.00	-0.23	-0.01	1.59
Entrance pole 3.0m	20	6.00	-7.00	0.00	0.00	-0.29	1.92

Annex D.2.2. CO2: Own weight + pretension + conventional / snow

Att	Node	Koor X	Koor Y	Koor Z	Fx	Fy	Fz
Guy rope	9	-6.00	-10.46	0.00	-0.07	-2.88	-2.81
Guy rope	15	0.00	-10.46	0.00	0.00	-3.06	-2.98
Guy rope	24	12.96	-2.50	0.00	2.93	-0.04	-2.84
Guy rope	27	-12.96	-2.50	0.00	-2.93	-0.04	-2.84
Guy rope	32	12.96	2.50	0.00	2.93	0.04	-2.84
Guy rope	37	6.00	10.46	0.00	0.07	2.88	-2.81
Guy rope	43	0.00	10.46	0.00	0.00	3.06	-2.98
Guy rope	49	-6.00	10.46	0.00	-0.07	2.88	-2.81
Guy rope	54	-12.96	2.50	0.00	-2.93	0.04	-2.84
Guy rope	21	6.00	-10.46	0.00	0.07	-2.88	-2.81
Guy rope (corner)	99000026	-10.00	-7.50	0.00	-3.38	-3.43	-5.11
Guy rope (corner)	99000027	-10.00	7.50	0.00	-3.38	3.43	-5.11
Guy rope (corner)	99000028	10.00	7.50	0.00	3.38	3.43	-5.11
Guy rope (corner)	99000029	10.00	-7.50	0.00	3.38	-3.43	-5.11
Guy rope (valley)	199000003	-3.01	8.73	0.00	-0.03	1.51	-2.02
Guy rope (valley)	199000005	3.01	8.73	0.00	0.03	1.51	-2.02
Guy rope (valley)	199000012	3.01	-8.73	0.00	0.03	-1.51	-2.02
Guy rope (valley)	199000014	-3.01	-8.73	0.00	-0.03	-1.51	-2.02
Center pole 5.5m	1	0.00	0.00	0.00	0.00	0.00	8.16
Center pole 5.0m	3	-5.00	0.00	0.00	0.12	0.00	6.97
Center pole 5.0m	5	5.00	0.00	0.00	-0.12	0.00	6.97
Corner pole 2.5m	28	8.59	-6.09	0.00	0.29	-0.33	2.61
Corner pole 2.5m	30	-8.59	-6.09	0.00	-0.29	-0.33	2.61
Corner pole 2.5m	35	8.59	6.09	0.00	0.29	0.33	2.61
Corner pole 2.5m	52	-8.59	6.09	0.00	-0.29	0.33	2.61
Entrance pole 3.0m	8	-6.00	-7.00	0.00	0.16	-0.84	6.15
Entrance pole 3.0m	14	0.00	-7.00	0.00	0.00	-0.79	5.75
Entrance pole 3.0m	23	9.50	-2.50	0.00	0.64	0.07	4.78
Entrance pole 3.0m	26	-9.50	-2.50	0.00	-0.64	0.07	4.78
Entrance pole 3.0m	34	9.50	2.50	0.00	0.64	-0.07	4.78
Entrance pole 3.0m	39	6.00	7.00	0.00	-0.16	0.84	6.15
Entrance pole 3.0m	45	0.00	7.00	0.00	0.00	0.79	5.75
Entrance pole 3.0m	51	-6.00	7.00	0.00	0.16	0.84	6.15
Entrance pole 3.0m	56	-9.50	2.50	0.00	-0.64	-0.07	4.78
Entrance pole 3.0m	20	6.00	-7.00	0.00	-0.16	-0.84	6.15

Annex D.2.3. CO3: Own weight + pretension + wind pressure

Att	Node	Koor X	Koor Y	Koor Z	Fx	Fy	Fz
Guy rope	9	-6.00	-10.46	0.00	-0.16	-4.13	-3.99
Guy rope	15	0.00	-10.46	0.00	0.00	-4.63	-4.47
Guy rope	24	12.96	-2.50	0.00	4.26	-0.07	-4.10
Guy rope	27	-12.96	-2.50	0.00	-4.26	-0.07	-4.10
Guy rope	32	12.96	2.50	0.00	4.26	0.07	-4.10
Guy rope	37	6.00	10.46	0.00	0.16	4.13	-3.99
Guy rope	43	0.00	10.46	0.00	0.00	4.63	-4.47
Guy rope	49	-6.00	10.46	0.00	-0.16	4.13	-3.99
Guy rope	54	-12.96	2.50	0.00	-4.26	0.07	-4.10
Guy rope	21	6.00	-10.46	0.00	0.16	-4.13	-3.99
Guy rope (corner)	99000026	-10.00	-7.50	0.00	-4.86	-4.72	-7.11
Guy rope (corner)	99000027	-10.00	7.50	0.00	-4.86	4.71	-7.11
Guy rope (corner)	99000028	10.00	7.50	0.00	4.86	4.71	-7.11
Guy rope (corner)	99000029	10.00	-7.50	0.00	4.86	-4.71	-7.11
Guy rope (valley)	199000003	-3.01	8.73	0.00	-0.07	2.21	-2.75
Guy rope (valley)	199000005	3.01	8.73	0.00	0.08	2.21	-2.75
Guy rope (valley)	199000012	3.01	-8.73	0.00	0.07	-2.21	-2.75
Guy rope (valley)	199000014	-3.01	-8.73	0.00	-0.08	-2.21	-2.75
Center pole 5.5m	1	0.00	0.00	0.00	0.00	0.00	11.05
Center pole 5.0m	3	-5.00	0.00	0.00	0.26	0.00	9.55
Center pole 5.0m	5	5.00	0.00	0.00	-0.26	0.00	9.55
Corner pole 2.5m	28	8.59	-6.09	0.00	0.38	-0.49	3.87
Corner pole 2.5m	30	-8.59	-6.09	0.00	-0.38	-0.49	3.87
Corner pole 2.5m	35	8.59	6.09	0.00	0.38	0.49	3.87
Corner pole 2.5m	52	-8.59	6.09	0.00	-0.38	0.49	3.87
Entrance pole 3.0m	8	-6.00	-7.00	0.00	0.36	-1.11	8.76
Entrance pole 3.0m	14	0.00	-7.00	0.00	0.00	-1.07	8.58
Entrance pole 3.0m	23	9.50	-2.50	0.00	0.84	0.11	6.81
Entrance pole 3.0m	26	-9.50	-2.50	0.00	-0.84	0.11	6.81
Entrance pole 3.0m	34	9.50	2.50	0.00	0.84	-0.11	6.81
Entrance pole 3.0m	39	6.00	7.00	0.00	-0.36	1.11	8.76
Entrance pole 3.0m	45	0.00	7.00	0.00	0.00	1.07	8.58
Entrance pole 3.0m	51	-6.00	7.00	0.00	0.36	1.11	8.76
Entrance pole 3.0m	56	-9.50	2.50	0.00	-0.84	-0.11	6.81
Entrance pole 3.0m	20	6.00	-7.00	0.00	-0.36	-1.11	8.76

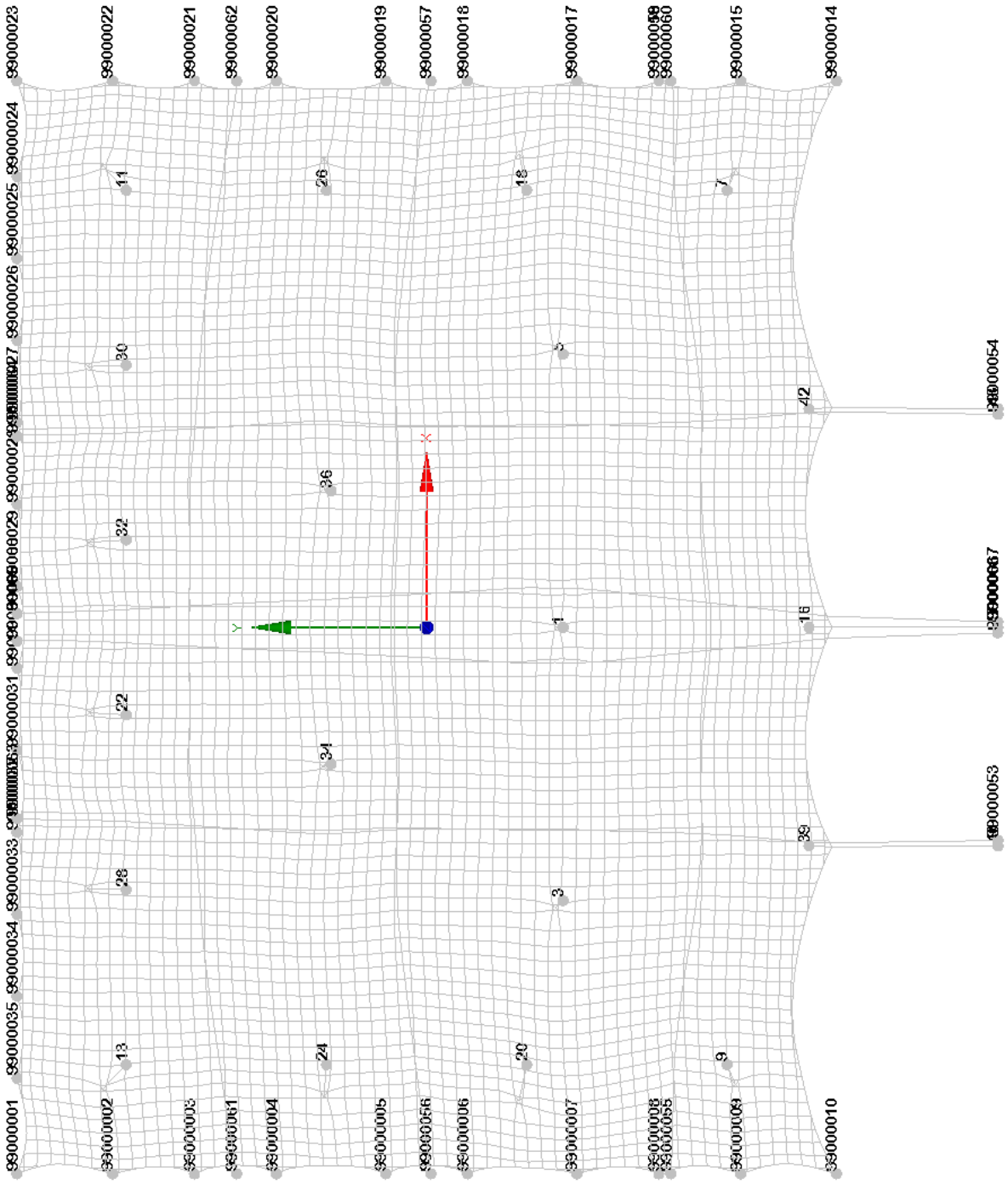
Annex D.2.4. CO4: Own weight + pretension + wind suction – floating – reduction 0.53

Att	Node	Koor X	Koor Y	Koor Z	Fx	Fy	Fz
Guy rope	9	-6.00	-10.46	0.00	-0.03	-2.49	-2.43
Guy rope	15	0.00	-10.46	0.00	0.00	-1.99	-1.96
Guy rope	24	12.96	-2.50	0.00	4.65	0.00	-4.46
Guy rope	27	-12.96	-2.50	0.00	-4.65	0.00	-4.46
Guy rope	32	12.96	2.50	0.00	4.65	0.00	-4.46
Guy rope	37	6.00	10.46	0.00	0.03	2.49	-2.43
Guy rope	43	0.00	10.46	0.00	0.00	1.99	-1.96
Guy rope	49	-6.00	10.46	0.00	-0.03	2.49	-2.43
Guy rope	54	-12.96	2.50	0.00	-4.65	0.00	-4.46
Guy rope	21	6.00	-10.46	0.00	0.03	-2.49	-2.43
Guy rope (corner)	99000026	-10.00	-7.50	0.00	-5.53	-5.81	-7.91
Guy rope (corner)	99000027	-10.00	7.50	0.00	-5.54	5.81	-7.91
Guy rope (corner)	99000028	10.00	7.50	0.00	5.53	5.81	-7.91
Guy rope (corner)	99000029	10.00	-7.50	0.00	5.53	-5.81	-7.91
Guy rope (valley)	199000003	-3.01	8.73	0.00	-0.22	6.39	-8.42
Guy rope (valley)	199000005	3.01	8.73	0.00	0.22	6.39	-8.42
Guy rope (valley)	199000012	3.01	-8.73	0.00	0.22	-6.39	-8.42
Guy rope (valley)	199000014	-3.01	-8.73	0.00	-0.22	-6.39	-8.42
Center pole 5.5m	1	0.00	0.00	0.00	0.00	0.00	0.25
Center pole 5.0m	3	-5.00	0.00	0.00	0.00	0.00	0.17
Center pole 5.0m	5	5.00	0.00	0.00	0.00	0.00	0.17
Corner pole 2.5m	28	8.59	-6.09	0.00	0.07	-0.08	0.97
Corner pole 2.5m	30	-8.59	-6.09	0.00	-0.07	-0.08	0.97
Corner pole 2.5m	35	8.59	6.09	0.00	0.07	0.08	0.97
Corner pole 2.5m	52	-8.59	6.09	0.00	-0.07	0.08	0.97
Entrance pole 3.0m	8	-6.00	-7.00	0.00	0.06	-0.72	5.16
Entrance pole 3.0m	14	0.00	-7.00	0.00	0.00	-0.54	3.70
Entrance pole 3.0m	23	9.50	-2.50	0.00	0.50	0.00	4.21
Entrance pole 3.0m	26	-9.50	-2.50	0.00	-0.50	0.00	4.21
Entrance pole 3.0m	34	9.50	2.50	0.00	0.50	0.00	4.21
Entrance pole 3.0m	39	6.00	7.00	0.00	-0.06	0.72	5.16
Entrance pole 3.0m	45	0.00	7.00	0.00	0.00	0.54	3.70
Entrance pole 3.0m	51	-6.00	7.00	0.00	0.06	0.72	5.16
Entrance pole 3.0m	56	-9.50	2.50	0.00	-0.50	0.00	4.21
Entrance pole 3.0m	20	6.00	-7.00	0.00	-0.06	-0.72	5.16

Annex D.2.5. CO5: Own weight + pretension + wind suction – floating – full wind load

Att	Node	Koor X	Koor Y	Koor Z	Fx	Fy	Fz
Storm belt	199000015	-2.80	-8.73	0.00	0.28	-9.68	-11.43
Storm belt	199000016	2.80	-8.73	0.00	-0.56	-9.54	-11.27
Storm belt	199000017	2.80	8.73	0.00	-0.71	9.40	-11.06
Storm belt	199000018	-2.80	8.73	0.00	0.52	9.67	-11.39
Guy rope	9	-6.00	-10.46	0.00	-0.05	-3.55	-3.44
Guy rope	15	0.00	-10.46	0.00	0.01	-2.53	-2.48
Guy rope	24	12.96	-2.50	0.00	7.12	-0.02	-6.73
Guy rope	27	-12.96	-2.50	0.00	-7.07	-0.02	-6.68
Guy rope	32	12.96	2.50	0.00	7.11	0.02	-6.71
Guy rope	37	6.00	10.46	0.00	0.07	3.57	-3.46
Guy rope	43	0.00	10.46	0.00	0.00	2.52	-2.47
Guy rope	49	-6.00	10.46	0.00	-0.06	3.55	-3.45
Guy rope	54	-12.96	2.50	0.00	-7.08	0.01	-6.69
Guy rope	21	6.00	-10.46	0.00	0.07	-3.57	-3.46
Guy rope (corner)	99000026	-10.00	-7.50	0.00	-7.71	-8.11	-11.11
Guy rope (corner)	99000027	-10.00	7.50	0.00	-7.79	8.10	-11.15
Guy rope (corner)	99000028	10.00	7.50	0.00	7.91	8.16	-11.24
Guy rope (corner)	99000029	10.00	-7.50	0.00	7.90	-8.17	-11.24
Guy rope (valley)	199000003	-3.01	8.73	0.00	-0.15	3.97	-4.63
Guy rope (valley)	199000005	3.01	8.73	0.00	0.19	4.20	-4.91
Guy rope (valley)	199000012	3.01	-8.73	0.00	0.18	-4.06	-4.75
Guy rope (valley)	199000014	-3.01	-8.73	0.00	-0.11	-3.96	-4.62
Center pole 5.5m	1	0.00	0.00	0.00	0.00	0.00	0.19
Center pole 5.0m	3	-5.00	0.00	0.00	0.00	0.00	0.04
Center pole 5.0m	5	5.00	0.00	0.00	0.00	0.00	0.06
Corner pole 2.5m	28	8.59	-6.09	0.00	0.04	-0.08	0.96
Corner pole 2.5m	30	-8.59	-6.09	0.00	-0.05	-0.07	0.94
Corner pole 2.5m	35	8.59	6.09	0.00	0.04	0.08	0.96
Corner pole 2.5m	52	-8.59	6.09	0.00	-0.05	0.07	0.95
Entrance pole 3.0m	8	-6.00	-7.00	0.00	0.11	-0.89	6.75
Entrance pole 3.0m	14	0.00	-7.00	0.00	-0.02	-0.70	4.97
Entrance pole 3.0m	23	9.50	-2.50	0.00	0.52	0.01	5.18
Entrance pole 3.0m	26	-9.50	-2.50	0.00	-0.51	0.02	5.10
Entrance pole 3.0m	34	9.50	2.50	0.00	0.52	-0.01	5.18
Entrance pole 3.0m	39	6.00	7.00	0.00	-0.14	0.91	6.95
Entrance pole 3.0m	45	0.00	7.00	0.00	-0.01	0.68	4.80
Entrance pole 3.0m	51	-6.00	7.00	0.00	0.13	0.90	6.85
Entrance pole 3.0m	56	-9.50	2.50	0.00	-0.51	-0.01	5.11
Entrance pole 3.0m	20	6.00	-7.00	0.00	-0.14	-0.91	6.94

Annex D.3. Point numbers 20x15m – closed



Annex D.4. Reaction forces 20x15m - closed

Annex D.4.1. CO1: Own weight + pretension

Att	Node	Koor X	Koor Y	Koor Z	Fx	Fy	Fz
Guy rope	17	0.00	-10.46	0.00	0.00	-1.46	-1.45
Guy rope	40	-4.00	-10.46	0.00	0.02	-1.57	-1.56
Guy rope	43	4.00	-10.46	0.00	-0.02	-1.57	-1.56
Center pole 5.5m	1	0.00	-2.50	0.00	0.00	0.00	1.86
Center pole 5.0m	3	-5.00	-2.50	0.00	0.00	0.01	2.06
Center pole 5.0m	5	5.00	-2.50	0.00	0.00	0.01	2.06
Center pole 4.0m	34	-2.50	1.75	0.00	0.00	0.00	1.10
Center pole 4.0m	36	2.50	1.75	0.00	0.00	0.00	1.10
Corner pole 2.5m	7	8.00	-5.50	0.00	0.16	-0.16	1.08
Corner pole 2.5m	9	-8.00	-5.50	0.00	-0.16	-0.16	1.09
Corner pole 2.5m	11	8.00	5.50	0.00	0.24	0.24	1.55
Corner pole 2.5m	13	-8.00	5.50	0.00	-0.24	0.24	1.55
Entrance pole 3.0m	16	0.00	-7.00	0.00	0.00	-0.19	1.20
Side wall pole 2.5m	18	8.00	-1.83	0.00	0.19	0.01	0.86
Side wall pole 2.5m	20	-8.00	-1.83	0.00	-0.19	0.01	0.86
Side wall pole 2.5m	22	-1.60	5.50	0.00	0.01	0.20	0.94
Side wall pole 2.5m	24	-8.00	1.83	0.00	-0.24	0.00	1.10
Side wall pole 2.5m	26	8.00	1.83	0.00	0.24	0.00	1.10
Side wall pole 2.5m	28	-4.80	5.50	0.00	0.01	0.23	1.05
Side wall pole 2.5m	30	4.80	5.50	0.00	-0.01	0.23	1.05
Side wall pole 2.5m	32	1.60	5.50	0.00	-0.01	0.20	0.94
Entrance pole 3.0m	39	-4.00	-7.00	0.00	-0.04	-0.42	2.60
Entrance pole 3.0m	42	4.00	-7.00	0.00	0.04	-0.42	2.61
Ground point (corner)	99000001	-10.00	7.50	0.00	-0.97	0.98	-0.17
Ground point	99000002	-10.00	5.75	0.00	-0.51	0.07	-0.38
Ground point	99000003	-10.00	4.25	0.00	-0.57	-0.13	-0.48
Ground point	99000004	-10.00	2.75	0.00	-0.63	0.14	-0.64
Ground point	99000005	-10.00	0.75	0.00	-0.57	-0.20	-0.63
Ground point	99000006	-10.00	-0.75	0.00	-0.56	0.19	-0.63
Ground point	99000007	-10.00	-2.75	0.00	-0.69	-0.07	-0.76
Ground point	99000008	-10.00	-4.25	0.00	-0.52	-0.04	-0.52
Ground point	99000009	-10.00	-5.75	0.00	-0.51	0.00	-0.49
Ground point (corner)	99000010	-10.00	-7.50	0.00	-2.91	-1.73	-1.86
Ground point (corner)	99000014	10.00	-7.50	0.00	2.91	-1.73	-1.86
Ground point	99000015	10.00	-5.75	0.00	0.51	0.00	-0.49
Ground point	99000016	10.00	-4.25	0.00	0.52	-0.04	-0.52
Ground point	99000017	10.00	-2.75	0.00	0.69	-0.07	-0.76
Ground point	99000018	10.00	-0.75	0.00	0.55	0.19	-0.63
Ground point	99000019	10.00	0.75	0.00	0.57	-0.20	-0.63
Ground point	99000020	10.00	2.75	0.00	0.63	0.13	-0.64
Ground point	99000021	10.00	4.25	0.00	0.57	-0.13	-0.48

Ground point	99000022	10.00	5.75	0.00	0.50	0.07	-0.38
Ground point (corner)	99000023	10.00	7.50	0.00	0.97	0.98	-0.17
Ground point	99000024	8.25	7.50	0.00	0.06	0.49	-0.38
Ground point	99000025	6.75	7.50	0.00	-0.08	0.55	-0.50
Ground point	99000026	5.25	7.50	0.00	-0.18	0.45	-0.48
Ground point	99000027	3.75	7.50	0.00	0.16	0.51	-0.55
Ground point	99000028	2.25	7.50	0.00	-0.12	0.58	-0.65
Ground point	99000029	0.75	7.50	0.00	0.10	0.50	-0.57
Ground point	99000030	-0.75	7.50	0.00	-0.10	0.50	-0.57
Ground point	99000031	-2.25	7.50	0.00	0.12	0.58	-0.65
Ground point	99000032	-3.75	7.50	0.00	-0.16	0.51	-0.55
Ground point	99000033	-5.25	7.50	0.00	0.18	0.45	-0.48
Ground point	99000034	-6.75	7.50	0.00	0.08	0.55	-0.50
Ground point	99000035	-8.25	7.50	0.00	-0.06	0.49	-0.38

Annex D.4.2. CO2: Own weight + pretension + conventional / snow

Att	Node	Koor X	Koor Y	Koor Z	Fx	Fy	Fz
Guy rope	17	0.00	-10.46	0.00	0.00	-2.80	-2.76
Guy rope	40	-4.00	-10.46	0.00	0.05	-2.97	-2.93
Guy rope	43	4.00	-10.46	0.00	-0.05	-2.97	-2.93
Center pole 5.5m	1	0.00	-2.50	0.00	0.00	-0.02	5.74
Center pole 5.0m	3	-5.00	-2.50	0.00	0.11	0.10	6.00
Center pole 5.0m	5	5.00	-2.50	0.00	-0.11	0.10	6.00
Center pole 4.0m	34	-2.50	1.75	0.00	0.02	0.02	3.80
Center pole 4.0m	36	2.50	1.75	0.00	-0.02	0.02	3.80
Corner pole 2.5m	7	8.00	-5.50	0.00	0.33	-0.24	2.17
Corner pole 2.5m	9	-8.00	-5.50	0.00	-0.33	-0.24	2.17
Corner pole 2.5m	11	8.00	5.50	0.00	0.51	0.53	3.33
Corner pole 2.5m	13	-8.00	5.50	0.00	-0.51	0.53	3.33
Entrance pole 3.0m	16	0.00	-7.00	0.00	0.00	-0.42	2.79
Side wall pole 2.5m	18	8.00	-1.83	0.00	0.44	0.04	2.10
Side wall pole 2.5m	20	-8.00	-1.83	0.00	-0.44	0.04	2.10
Side wall pole 2.5m	22	-1.60	5.50	0.00	0.03	0.51	2.43
Side wall pole 2.5m	24	-8.00	1.83	0.00	-0.61	0.02	3.12
Side wall pole 2.5m	26	8.00	1.83	0.00	0.61	0.02	3.11
Side wall pole 2.5m	28	-4.80	5.50	0.00	0.05	0.60	2.81
Side wall pole 2.5m	30	4.80	5.50	0.00	-0.05	0.60	2.81
Side wall pole 2.5m	32	1.60	5.50	0.00	-0.03	0.51	2.43
Entrance pole 3.0m	39	-4.00	-7.00	0.00	-0.08	-0.71	4.75
Entrance pole 3.0m	42	4.00	-7.00	0.00	0.08	-0.71	4.75
Ground point (corner)	99000001	-10.00	7.50	0.00	-1.31	1.41	-0.21
Ground point	99000002	-10.00	5.75	0.00	-1.03	0.09	-0.73
Ground point	99000003	-10.00	4.25	0.00	-0.57	-0.66	-0.42
Ground point	99000004	-10.00	2.75	0.00	-1.13	1.62	-1.16
Ground point	99000005	-10.00	0.75	0.00	-0.94	-1.75	-1.02
Ground point	99000006	-10.00	-0.75	0.00	-0.64	1.25	-0.69
Ground point	99000007	-10.00	-2.75	0.00	-1.73	-0.62	-1.73
Ground point	99000008	-10.00	-4.25	0.00	-0.41	-0.54	-0.33
Ground point	99000009	-10.00	-5.75	0.00	-0.68	-0.12	-0.59
Ground point (corner)	99000010	-10.00	-7.50	0.00	-3.67	-2.12	-2.32
Ground point (corner)	99000014	10.00	-7.50	0.00	3.67	-2.12	-2.32
Ground point	99000015	10.00	-5.75	0.00	0.68	-0.12	-0.59
Ground point	99000016	10.00	-4.25	0.00	0.41	-0.54	-0.33
Ground point	99000017	10.00	-2.75	0.00	1.73	-0.61	-1.73
Ground point	99000018	10.00	-0.75	0.00	0.64	1.24	-0.69
Ground point	99000019	10.00	0.75	0.00	0.93	-1.75	-1.02
Ground point	99000020	10.00	2.75	0.00	1.13	1.61	-1.16
Ground point	99000021	10.00	4.25	0.00	0.57	-0.66	-0.42
Ground point	99000022	10.00	5.75	0.00	1.02	0.09	-0.73
Ground point (corner)	99000023	10.00	7.50	0.00	1.31	1.40	-0.21

Ground point	99000024	8.25	7.50	0.00	0.07	0.88	-0.62
Ground point	99000025	6.75	7.50	0.00	-0.24	0.64	-0.52
Ground point	99000026	5.25	7.50	0.00	0.36	0.96	-1.01
Ground point	99000027	3.75	7.50	0.00	-0.13	0.76	-0.77
Ground point	99000028	2.25	7.50	0.00	0.13	1.11	-1.17
Ground point	99000029	0.75	7.50	0.00	-0.26	0.84	-0.89
Ground point	99000030	-0.75	7.50	0.00	0.26	0.83	-0.89
Ground point	99000031	-2.25	7.50	0.00	-0.13	1.11	-1.17
Ground point	99000032	-3.75	7.50	0.00	0.13	0.76	-0.77
Ground point	99000033	-5.25	7.50	0.00	-0.36	0.96	-1.01
Ground point	99000034	-6.75	7.50	0.00	0.24	0.64	-0.52
Ground point	99000035	-8.25	7.50	0.00	-0.07	0.88	-0.62

Annex D.4.3. CO3: Own weight + pretension + wind pressure

Att	Node	Koor X	Koor Y	Koor Z	Fx	Fy	Fz
Guy rope	17	0.00	-10.46	0.00	0.00	-3.78	-3.71
Guy rope	40	-4.00	-10.46	0.00	0.08	-4.15	-4.05
Guy rope	43	4.00	-10.46	0.00	-0.08	-4.15	-4.05
Center pole 5.5m	1	0.00	-2.50	0.00	0.00	-0.04	7.48
Center pole 5.0m	3	-5.00	-2.50	0.00	0.22	0.20	8.38
Center pole 5.0m	5	5.00	-2.50	0.00	-0.22	0.20	8.39
Center pole 4.0m	34	-2.50	1.75	0.00	0.05	0.02	5.49
Center pole 4.0m	36	2.50	1.75	0.00	-0.05	0.01	5.49
Corner pole 2.5m	7	8.00	-5.50	0.00	0.59	-0.25	3.74
Corner pole 2.5m	9	-8.00	-5.50	0.00	-0.59	-0.25	3.75
Corner pole 2.5m	11	8.00	5.50	0.00	0.85	0.88	5.65
Corner pole 2.5m	13	-8.00	5.50	0.00	-0.85	0.88	5.66
Entrance pole 3.0m	16	0.00	-7.00	0.00	0.00	-0.57	3.94
Side wall pole 2.5m	18	8.00	-1.83	0.00	0.75	0.14	3.83
Side wall pole 2.5m	20	-8.00	-1.83	0.00	-0.75	0.14	3.84
Side wall pole 2.5m	22	-1.60	5.50	0.00	0.08	0.86	4.21
Side wall pole 2.5m	24	-8.00	1.83	0.00	-0.97	0.01	5.29
Side wall pole 2.5m	26	8.00	1.83	0.00	0.97	0.01	5.29
Side wall pole 2.5m	28	-4.80	5.50	0.00	0.13	0.98	4.68
Side wall pole 2.5m	30	4.80	5.50	0.00	-0.13	0.98	4.68
Side wall pole 2.5m	32	1.60	5.50	0.00	-0.08	0.86	4.22
Entrance pole 3.0m	39	-4.00	-7.00	0.00	-0.13	-0.92	6.54
Entrance pole 3.0m	42	4.00	-7.00	0.00	0.13	-0.92	6.54
Ground point (corner)	99000001	-10.00	7.50	0.00	-2.07	2.19	-0.33
Ground point	99000002	-10.00	5.75	0.00	-1.90	0.20	-1.32
Ground point	99000003	-10.00	4.25	0.00	-1.21	-0.91	-0.81
Ground point	99000004	-10.00	2.75	0.00	-2.11	2.25	-1.95
Ground point	99000005	-10.00	0.75	0.00	-1.90	-2.45	-1.82
Ground point	99000006	-10.00	-0.75	0.00	-1.48	1.82	-1.38
Ground point	99000007	-10.00	-2.75	0.00	-3.17	-1.20	-2.89
Ground point	99000008	-10.00	-4.25	0.00	-1.03	-0.75	-0.71
Ground point	99000009	-10.00	-5.75	0.00	-1.41	-0.24	-1.15
Ground point (corner)	99000010	-10.00	-7.50	0.00	-4.80	-3.33	-3.08
Ground point (corner)	99000014	10.00	-7.50	0.00	4.80	-3.33	-3.07
Ground point	99000015	10.00	-5.75	0.00	1.41	-0.24	-1.15
Ground point	99000016	10.00	-4.25	0.00	1.03	-0.75	-0.71
Ground point	99000017	10.00	-2.75	0.00	3.17	-1.19	-2.89
Ground point	99000018	10.00	-0.75	0.00	1.48	1.82	-1.38
Ground point	99000019	10.00	0.75	0.00	1.90	-2.45	-1.82
Ground point	99000020	10.00	2.75	0.00	2.11	2.25	-1.95
Ground point	99000021	10.00	4.25	0.00	1.21	-0.91	-0.81
Ground point	99000022	10.00	5.75	0.00	1.89	0.20	-1.32
Ground point (corner)	99000023	10.00	7.50	0.00	2.07	2.19	-0.33

Ground point	99000024	8.25	7.50	0.00	0.18	1.67	-1.15
Ground point	99000025	6.75	7.50	0.00	-0.34	1.28	-0.95
Ground point	99000026	5.25	7.50	0.00	0.54	1.74	-1.67
Ground point	99000027	3.75	7.50	0.00	-0.15	1.54	-1.39
Ground point	99000028	2.25	7.50	0.00	0.22	2.04	-1.97
Ground point	99000029	0.75	7.50	0.00	-0.50	1.68	-1.60
Ground point	99000030	-0.75	7.50	0.00	0.50	1.68	-1.60
Ground point	99000031	-2.25	7.50	0.00	-0.22	2.04	-1.97
Ground point	99000032	-3.75	7.50	0.00	0.15	1.54	-1.39
Ground point	99000033	-5.25	7.50	0.00	-0.53	1.74	-1.67
Ground point	99000034	-6.75	7.50	0.00	0.34	1.28	-0.95
Ground point	99000035	-8.25	7.50	0.00	-0.18	1.67	-1.15

Annex D.4.4. CO6: Own weight + pretension + wind suction – closed – reduction 0.53

Att	Node	Koor X	Koor Y	Koor Z	Fx	Fy	Fz
Guy rope	17	0.00	-10.46	0.00	0.00	-6.96	-6.69
Guy rope	40	-4.00	-10.46	0.00	-0.02	-5.91	-5.71
Guy rope	43	4.00	-10.46	0.00	0.02	-5.91	-5.71
Center pole 5.5m	1	0.00	-2.50	0.00	0.00	0.04	1.03
Center pole 5.0m	3	-5.00	-2.50	0.00	-0.03	0.04	1.27
Center pole 5.0m	5	5.00	-2.50	0.00	0.03	0.04	1.27
Center pole 4.0m	34	-2.50	1.75	0.00	0.00	0.01	0.21
Center pole 4.0m	36	2.50	1.75	0.00	0.00	0.01	0.21
Corner pole 2.5m	7	8.00	-5.50	0.00	0.15	-0.10	1.14
Corner pole 2.5m	9	-8.00	-5.50	0.00	-0.15	-0.10	1.14
Corner pole 2.5m	11	8.00	5.50	0.00	0.20	0.19	1.04
Corner pole 2.5m	13	-8.00	5.50	0.00	-0.20	0.19	1.04
Entrance pole 3.0m	16	0.00	-7.00	0.00	0.00	-0.30	2.54
Side wall pole 2.5m	18	8.00	-1.83	0.00	0.11	0.03	0.43
Side wall pole 2.5m	20	-8.00	-1.83	0.00	-0.11	0.03	0.43
Side wall pole 2.5m	22	-1.60	5.50	0.00	0.00	0.05	0.19
Side wall pole 2.5m	24	-8.00	1.83	0.00	-0.21	0.03	0.92
Side wall pole 2.5m	26	8.00	1.83	0.00	0.21	0.03	0.92
Side wall pole 2.5m	28	-4.80	5.50	0.00	0.00	0.08	0.26
Side wall pole 2.5m	30	4.80	5.50	0.00	0.00	0.08	0.26
Side wall pole 2.5m	32	1.60	5.50	0.00	0.00	0.05	0.19
Entrance pole 3.0m	39	-4.00	-7.00	0.00	0.02	-0.68	5.39
Entrance pole 3.0m	42	4.00	-7.00	0.00	-0.02	-0.68	5.39
Ground point (corner)	99000001	-10.00	7.50	0.00	-2.36	2.53	-0.78
Ground point	99000002	-10.00	5.75	0.00	-0.86	0.45	-0.95
Ground point	99000003	-10.00	4.25	0.00	-4.48	2.06	-4.23
Ground point	99000004	-10.00	2.75	0.00	-4.52	-2.90	-4.77
Ground point	99000005	-10.00	0.75	0.00	-4.42	2.31	-5.37
Ground point	99000006	-10.00	-0.75	0.00	-4.19	-3.09	-5.49
Ground point	99000007	-10.00	-2.75	0.00	-1.50	1.36	-2.66
Ground point	99000008	-10.00	-4.25	0.00	-4.45	0.42	-5.57
Ground point	99000009	-10.00	-5.75	0.00	-2.74	-0.98	-3.28
Ground point (corner)	99000010	-10.00	-7.50	0.00	-6.80	-6.24	-5.22
Ground point (corner)	99000014	10.00	-7.50	0.00	6.81	-6.24	-5.22
Ground point	99000015	10.00	-5.75	0.00	2.74	-0.98	-3.27
Ground point	99000016	10.00	-4.25	0.00	4.46	0.42	-5.58
Ground point	99000017	10.00	-2.75	0.00	1.50	1.37	-2.65
Ground point	99000018	10.00	-0.75	0.00	4.19	-3.09	-5.49
Ground point	99000019	10.00	0.75	0.00	4.42	2.31	-5.37
Ground point	99000020	10.00	2.75	0.00	4.52	-2.90	-4.77
Ground point	99000021	10.00	4.25	0.00	4.48	2.06	-4.23
Ground point	99000022	10.00	5.75	0.00	0.86	0.46	-0.95
Ground point (corner)	99000023	10.00	7.50	0.00	2.35	2.52	-0.78

Ground point	99000024	8.25	7.50	0.00	-0.21	0.52	-0.71
Ground point	99000025	6.75	7.50	0.00	0.78	1.43	-2.35
Ground point	99000026	5.25	7.50	0.00	-1.44	0.69	-1.45
Ground point	99000027	3.75	7.50	0.00	1.48	1.47	-2.89
Ground point	99000028	2.25	7.50	0.00	-1.66	1.13	-2.44
Ground point	99000029	0.75	7.50	0.00	1.89	1.52	-3.07
Ground point	99000030	-0.75	7.50	0.00	-1.89	1.53	-3.07
Ground point	99000031	-2.25	7.50	0.00	1.66	1.13	-2.44
Ground point	99000032	-3.75	7.50	0.00	-1.47	1.47	-2.89
Ground point	99000033	-5.25	7.50	0.00	1.44	0.68	-1.45
Ground point	99000034	-6.75	7.50	0.00	-0.79	1.43	-2.35
Ground point	99000035	-8.25	7.50	0.00	0.23	0.52	-0.71

Annex D.4.5. CO7: Own weight + pretension + wind suction – closed – full wind load

Att	Node	Koor X	Koor Y	Koor Z	Fx	Fy	Fz
Storm belt	99000053	-3.90	-10.46	0.00	0.13	-8.82	-8.49
Storm belt	99000054	3.90	-10.46	0.00	-0.13	-8.70	-8.36
Storm belt	99000055	-10.00	-4.48	0.00	-8.97	1.12	-9.62
Storm belt	99000056	-10.00	-0.08	0.00	-9.90	-1.31	-10.45
Storm belt	99000057	10.00	-0.08	0.00	9.52	-3.87	-9.94
Storm belt	99000060	10.00	-4.48	0.00	9.34	3.36	-9.95
Storm belt	99000061	-10.00	3.48	0.00	-9.71	-1.21	-7.94
Storm belt	99000062	10.00	3.48	0.00	9.73	-0.22	-7.94
Storm belt	99000063	-3.50	7.50	0.00	0.47	3.70	-5.21
Storm belt	99000064	3.50	7.50	0.00	-1.09	3.48	-4.92
Storm belt	99000065	-0.25	7.50	0.00	-0.64	3.55	-4.85
Storm belt	99000066	0.25	7.50	0.00	-0.34	3.40	-4.65
Storm belt	99000067	0.10	-10.46	0.00	-0.22	-6.54	-6.14
Storm belt	99000068	-0.10	-10.46	0.00	0.20	-6.31	-5.94
Guy rope	17	0.00	-10.46	0.00	0.00	-4.31	-4.21
Guy rope	40	-4.00	-10.46	0.00	0.03	-4.31	-4.21
Guy rope	43	4.00	-10.46	0.00	-0.03	-4.29	-4.19
Center pole 5.5m	1	0.00	-2.50	0.00	0.00	0.05	2.45
Center pole 5.0m	3	-5.00	-2.50	0.00	-0.04	0.04	1.47
Center pole 5.0m	5	5.00	-2.50	0.00	0.04	0.04	1.49
Center pole 4.0m	34	-2.50	1.75	0.00	0.00	0.01	0.31
Center pole 4.0m	36	2.50	1.75	0.00	0.00	0.01	0.32
Corner pole 2.5m	7	8.00	-5.50	0.00	0.16	-0.07	1.05
Corner pole 2.5m	9	-8.00	-5.50	0.00	-0.16	-0.07	1.05
Corner pole 2.5m	11	8.00	5.50	0.00	0.24	0.23	1.29
Corner pole 2.5m	13	-8.00	5.50	0.00	-0.24	0.23	1.29
Entrance pole 3.0m	16	0.00	-7.00	0.00	0.01	-0.90	6.38
Side wall pole 2.5m	18	8.00	-1.83	0.00	0.09	0.02	0.34
Side wall pole 2.5m	20	-8.00	-1.83	0.00	-0.09	0.02	0.34
Side wall pole 2.5m	22	-1.60	5.50	0.00	0.01	0.11	0.41
Side wall pole 2.5m	24	-8.00	1.83	0.00	-0.22	0.02	0.93
Side wall pole 2.5m	26	8.00	1.83	0.00	0.22	0.02	0.94
Side wall pole 2.5m	28	-4.80	5.50	0.00	0.00	0.14	0.50
Side wall pole 2.5m	30	4.80	5.50	0.00	-0.01	0.14	0.51
Side wall pole 2.5m	32	1.60	5.50	0.00	-0.01	0.11	0.42
Entrance pole 3.0m	39	-4.00	-7.00	0.00	-0.06	-1.36	9.71
Entrance pole 3.0m	42	4.00	-7.00	0.00	0.07	-1.34	9.57
Ground point (corner)	99000001	-10.00	7.50	0.00	-3.77	3.73	-1.37
Ground point	99000002	-10.00	5.75	0.00	-1.09	0.00	-1.37
Ground point	99000003	-10.00	4.25	0.00	-3.03	-0.30	-3.27
Ground point	99000004	-10.00	2.75	0.00	-3.52	-0.72	-4.31
Ground point	99000005	-10.00	0.75	0.00	-3.00	0.09	-4.19
Ground point	99000006	-10.00	-0.75	0.00	-3.22	-0.65	-4.94

Ground point	99000007	-10.00	-2.75	0.00	-1.84	1.43	-4.03
Ground point	99000008	-10.00	-4.25	0.00	-2.78	-2.61	-3.79
Ground point	99000009	-10.00	-5.75	0.00	-2.28	0.99	-3.21
Ground point (corner)	99000010	-10.00	-7.50	0.00	-7.20	-7.41	-6.31
Ground point (corner)	99000014	10.00	-7.50	0.00	7.12	-7.36	-6.25
Ground point	99000015	10.00	-5.75	0.00	2.35	0.53	-3.26
Ground point	99000016	10.00	-4.25	0.00	2.37	-4.36	-3.42
Ground point	99000017	10.00	-2.75	0.00	1.87	1.37	-4.11
Ground point	99000018	10.00	-0.75	0.00	3.21	0.04	-5.04
Ground point	99000019	10.00	0.75	0.00	3.40	1.81	-4.56
Ground point	99000020	10.00	2.75	0.00	3.63	-1.11	-4.36
Ground point	99000021	10.00	4.25	0.00	2.94	-0.78	-3.23
Ground point	99000022	10.00	5.75	0.00	1.10	0.01	-1.38
Ground point (corner)	99000023	10.00	7.50	0.00	3.76	3.72	-1.36
Ground point	99000024	8.25	7.50	0.00	-0.31	1.03	-1.44
Ground point	99000025	6.75	7.50	0.00	0.97	2.51	-4.10
Ground point	99000026	5.25	7.50	0.00	-2.43	1.25	-2.62
Ground point	99000027	3.75	7.50	0.00	2.35	1.67	-2.77
Ground point	99000028	2.25	7.50	0.00	-1.31	1.58	-3.33
Ground point	99000029	0.75	7.50	0.00	0.56	1.32	-2.47
Ground point	99000030	-0.75	7.50	0.00	0.35	1.11	-2.24
Ground point	99000031	-2.25	7.50	0.00	1.31	1.57	-3.33
Ground point	99000032	-3.75	7.50	0.00	-1.69	1.50	-2.53
Ground point	99000033	-5.25	7.50	0.00	2.41	1.25	-2.63
Ground point	99000034	-6.75	7.50	0.00	-0.97	2.50	-4.09
Ground point	99000035	-8.25	7.50	0.00	0.33	1.03	-1.44

Annex E. Anchoring of ground points and stormbelts

Explanation of abbreviations:

Fx, Fy and Fz	Reaction forces for x-, y- and z-direction	
Fh,d	Force acting horizontally at the anchor	$1.2 \times \sqrt{(Fx^2 + Fy^2)}$
Fz,d	Force acting vertically at the anchor	1.2 x Fz
Fa	Total Force acting at the anchor	$\sqrt{(Fh,d^2 + Fz,d^2)}$
β	Angle of total force	$90 - \tan^{-1} (Fz,d / Fh,d)$
f	for 0 < β < 45	((f;45 – f;0) / 45) x β + f;0
n	amount of anchors needed at specific location	
Frd	Capacity of ‘n’ anchors	(f x n x Ø x L’ / 1000)
UC	unity check	Fa / Frd

For the calculations below, anchors Ø35 x 1200mm are used in dense cohesionless soil conditions.

Annex E.1. Verification of anchoring ground points 20x15m – closed

Annex E.1.1. Corner, front

CO1. Own weight + pretension

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000010	-2.91	-1.73	-1.86	4.06	-2.23	4.63	61.18	17	1	7.14	0.65	OK
99000014	2.91	-1.73	-1.86	4.06	-2.23	4.63	61.18	17	1	7.14	0.65	OK

CO2. Own weight + pretension + conventional / snow

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000010	-3.67	-2.12	-2.32	5.09	-2.79	5.80	61.30	17	1	7.14	0.81	OK
99000014	3.67	-2.12	-2.32	5.09	-2.79	5.80	61.30	17	1	7.14	0.81	OK

CO3. Own weight + pretension + wind pressure

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000010	-4.80	-3.33	-3.08	7.02	-3.69	7.93	62.25	17	2	14.28	0.56	OK
99000014	4.80	-3.33	-3.07	7.01	-3.69	7.93	62.26	17	2	14.28	0.56	OK

CO6. Own weight + pretension + wind suction – closed – reduction 0.53

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000010	-6.80	-6.24	-5.22	11.08	-6.26	12.73	60.53	17	2	14.28	0.89	OK
99000014	6.81	-6.24	-5.22	11.08	-6.26	12.73	60.52	17	2	14.28	0.89	OK

CO7. Own weight + pretension + wind suction – closed – full wind load

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000010	-7.20	-7.41	-6.31	12.40	-7.58	14.53	58.56	17	2	14.28	1.02	ACCEPTABEL
99000014	7.12	-7.36	-6.25	12.28	-7.50	14.39	58.57	17	2	14.28	1.01	ACCEPTABEL

Annex E.1.2. Corner, back

CO1. Own weight + pretension

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000001	-0.97	0.98	-0.17	1.65	-0.21	1.67	82.88	17	1	7.14	0.23	OK
99000023	0.97	0.98	-0.17	1.65	-0.21	1.66	82.87	17	1	7.14	0.23	OK

CO2. Own weight + pretension + conventional / snow

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000001	-1.31	1.41	-0.21	2.31	-0.25	2.32	83.76	17	1	7.14	0.33	OK
99000023	1.31	1.40	-0.21	2.30	-0.25	2.32	83.76	17	1	7.14	0.32	OK

CO3. Own weight + pretension + wind pressure

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000001	-2.07	2.19	-0.33	3.62	-0.40	3.64	83.69	17	1	7.14	0.51	OK
99000023	2.07	2.19	-0.33	3.61	-0.40	3.64	83.68	17	1	7.14	0.51	OK

CO6. Own weight + pretension + wind suction – closed – reduction 0.53

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000001	-2.36	2.53	-0.78	4.15	-0.94	4.25	77.21	17	1	7.14	0.60	OK
99000023	2.35	2.52	-0.78	4.14	-0.94	4.24	77.22	17	1	7.14	0.59	OK

CO7. Own weight + pretension + wind suction – closed – full wind load

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000001	-3.77	3.73	-1.37	6.37	-1.64	6.57	75.55	17	1	7.14	0.92	OK
99000023	3.76	3.72	-1.36	6.34	-1.63	6.55	75.56	17	1	7.14	0.92	OK

Annex E.1.3. Short side, left

CO1. Own weight + pretension

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000002	-0.51	0.07	-0.38	0.61	-0.46	0.76	53.37					
99000003	-0.57	-0.13	-0.48	0.70	-0.58	0.91	50.58					
99000004	-0.63	0.14	-0.64	0.77	-0.77	1.09	45.28					
99000005	-0.57	-0.20	-0.63	0.73	-0.76	1.05	43.84					
99000006	-0.56	0.19	-0.63	0.70	-0.75	1.03	43.11					
99000007	-0.69	-0.07	-0.76	0.83	-0.91	1.23	42.20					
99000008	-0.52	-0.04	-0.52	0.62	-0.62	0.88	45.09					
99000009	-0.51	0.00	-0.49	0.61	-0.59	0.85	46.05					
						0.98	46.19	17.00	1	7.14	0.14	OK

CO2. Own weight + pretension + conventional / snow

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000002	-1.03	0.09	-0.73	1.24	-0.88	1.52	54.54					
99000003	-0.57	-0.66	-0.42	1.04	-0.51	1.16	64.06					
99000004	-1.13	1.62	-1.16	2.37	-1.39	2.74	59.60					
99000005	-0.94	-1.75	-1.02	2.39	-1.22	2.68	62.82					
99000006	-0.64	1.25	-0.69	1.69	-0.83	1.88	63.72					
99000007	-1.73	-0.62	-1.73	2.20	-2.08	3.03	46.66					
99000008	-0.41	-0.54	-0.33	0.81	-0.40	0.90	63.80					
99000009	-0.68	-0.12	-0.59	0.83	-0.71	1.09	49.45					
						1.88	58.08	17.00	1	7.14	0.26	OK

CO3. Own weight + pretension + wind pressure

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000002	-1.90	0.20	-1.32	2.29	-1.59	2.79	55.25					
99000003	-1.21	-0.91	-0.81	1.82	-0.98	2.07	61.75					
99000004	-2.11	2.25	-1.95	3.71	-2.34	4.38	57.76					
99000005	-1.90	-2.45	-1.82	3.73	-2.18	4.32	59.63					
99000006	-1.48	1.82	-1.38	2.82	-1.66	3.27	59.50					
99000007	-3.17	-1.20	-2.89	4.06	-3.47	5.35	49.47					
99000008	-1.03	-0.75	-0.71	1.53	-0.85	1.75	60.94					
99000009	-1.41	-0.24	-1.15	1.72	-1.38	2.20	51.26					
						3.27	56.95	17.00	1	7.14	0.46	OK

CO6. Own weight + pretension + wind suction – closed – reduction 0.53

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000002	-0.86	0.45	-0.95	1.17	-1.14	1.63	45.70					
99000003	-4.48	2.06	-4.23	5.92	-5.08	7.80	49.36					
99000004	-4.52	-2.90	-4.77	6.44	-5.72	8.62	48.41					
99000005	-4.42	2.31	-5.37	5.99	-6.45	8.80	42.91					
99000006	-4.19	-3.09	-5.49	6.25	-6.59	9.08	43.49					
99000007	-1.50	1.36	-2.66	2.43	-3.19	4.01	37.35					
99000008	-4.45	0.42	-5.57	5.37	-6.69	8.58	38.73					
99000009	-2.74	-0.98	-3.28	3.49	-3.93	5.25	41.58					
						6.72	43.44	16.64	1	6.99	0.96	OK

CO7. Own weight + pretension + wind suction – closed – full wind load

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000002	-1.09	0.00	-1.37	1.31	-1.64	2.10	38.51					
99000003	-3.03	-0.30	-3.27	3.65	-3.92	5.36	43.00					
99000004	-3.52	-0.72	-4.31	4.31	-5.17	6.74	39.81					
99000005	-3.00	0.09	-4.19	3.60	-5.03	6.18	35.62					
99000006	-3.22	-0.65	-4.94	3.94	-5.92	7.12	33.66					
99000007	-1.84	1.43	-4.03	2.79	-4.84	5.59	30.00					
99000008	-2.78	-2.61	-3.79	4.57	-4.55	6.45	45.11					
99000009	-2.28	0.99	-3.21	2.99	-3.85	4.88	37.78					
						5.55	37.94	15.35	1	6.45	0.86	OK

Annex E.1.4. Short side, right

CO1. Own weight + pretension

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000015	0.51	0.00	-0.49	0.61	-0.59	0.85	46.08					
99000016	0.52	-0.04	-0.52	0.62	-0.62	0.88	45.13					
99000017	0.69	-0.07	-0.76	0.83	-0.91	1.23	42.22					
99000018	0.55	0.19	-0.63	0.70	-0.75	1.03	43.09					
99000019	0.57	-0.20	-0.63	0.73	-0.76	1.05	43.85					
99000020	0.63	0.13	-0.64	0.77	-0.77	1.09	45.30					
99000021	0.57	-0.13	-0.48	0.70	-0.58	0.91	50.60					
99000022	0.50	0.07	-0.38	0.61	-0.45	0.76	53.40					
						0.97	46.21	17.00	1	7.14	0.14	OK

CO2. Own weight + pretension + conventional / snow

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000015	0.68	-0.12	-0.59	0.83	-0.71	1.09	49.49					
99000016	0.41	-0.54	-0.33	0.81	-0.40	0.91	63.85					
99000017	1.73	-0.61	-1.73	2.20	-2.07	3.02	46.67					
99000018	0.64	1.24	-0.69	1.68	-0.83	1.87	63.70					
99000019	0.93	-1.75	-1.02	2.38	-1.22	2.68	62.82					
99000020	1.13	1.61	-1.16	2.36	-1.39	2.74	59.58					
99000021	0.57	-0.66	-0.42	1.04	-0.51	1.16	64.03					
99000022	1.02	0.09	-0.73	1.23	-0.88	1.51	54.57					
						1.87	58.09	17.00	1	7.14	0.26	OK

CO3. Own weight + pretension + wind pressure

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000015	1.41	-0.24	-1.15	1.72	-1.38	2.20	51.29					
99000016	1.03	-0.75	-0.71	1.53	-0.85	1.75	60.98					
99000017	3.17	-1.19	-2.89	4.06	-3.47	5.34	49.49					
99000018	1.48	1.82	-1.38	2.81	-1.66	3.27	59.48					
99000019	1.90	-2.45	-1.82	3.72	-2.18	4.31	59.63					
99000020	2.11	2.25	-1.95	3.70	-2.34	4.38	57.75					
99000021	1.21	-0.91	-0.81	1.81	-0.98	2.06	61.74					
99000022	1.89	0.20	-1.32	2.28	-1.58	2.77	55.29					
						3.26	56.96	17.00	1	7.14	0.46	OK

CO6. Own weight + pretension + wind suction – closed – reduction 0.53

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000015	2.74	-0.98	-3.27	3.49	-3.93	5.25	41.61					
99000016	4.46	0.42	-5.58	5.37	-6.69	8.58	38.75					
99000017	1.50	1.37	-2.65	2.43	-3.18	4.01	37.41					
99000018	4.19	-3.09	-5.49	6.25	-6.59	9.08	43.50					
99000019	4.42	2.31	-5.37	5.99	-6.44	8.80	42.91					
99000020	4.52	-2.90	-4.77	6.45	-5.72	8.62	48.43					
99000021	4.48	2.06	-4.23	5.92	-5.08	7.80	49.36					
99000022	0.86	0.46	-0.95	1.17	-1.14	1.63	45.80					
						6.72	43.47	16.64	1	6.99	0.96	OK

CO7. Own weight + pretension + wind suction – closed – full wind load

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000015	2.35	0.53	-3.26	2.89	-3.92	4.87	36.45					
99000016	2.37	-4.36	-3.42	5.96	-4.11	7.24	55.43					
99000017	1.87	1.37	-4.11	2.78	-4.93	5.66	29.40					
99000018	3.21	0.04	-5.04	3.86	-6.05	7.18	32.52					
99000019	3.40	1.81	-4.56	4.62	-5.47	7.16	40.18					
99000020	3.63	-1.11	-4.36	4.55	-5.23	6.93	41.07					
99000021	2.94	-0.78	-3.23	3.65	-3.87	5.32	43.28					
99000022	1.10	0.01	-1.38	1.32	-1.66	2.11	38.47					
						5.81	39.60	15.74	1	6.61	0.88	OK

Annex E.1.5. Long side

CO1. Own weight + pretension

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000024	0.06	0.49	-0.38	0.60	-0.45	0.75	52.93					
99000025	-0.08	0.55	-0.50	0.67	-0.60	0.90	48.07					
99000026	-0.18	0.45	-0.48	0.58	-0.58	0.82	45.18					
99000027	0.16	0.51	-0.55	0.64	-0.66	0.92	43.99					
99000028	-0.12	0.58	-0.65	0.71	-0.78	1.05	42.11					
99000029	0.10	0.50	-0.57	0.61	-0.69	0.92	41.71					
99000030	-0.10	0.50	-0.57	0.61	-0.69	0.92	41.73					
99000031	0.12	0.58	-0.65	0.71	-0.78	1.05	42.12					
99000032	-0.16	0.51	-0.55	0.64	-0.66	0.92	43.98					
99000033	0.18	0.45	-0.48	0.59	-0.58	0.82	45.17					
99000034	0.08	0.55	-0.50	0.67	-0.60	0.90	48.04					
99000035	-0.06	0.49	-0.38	0.60	-0.45	0.75	52.92					
						0.89	45.66	17.00	1	7.14	0.13	OK

CO2. Own weight + pretension + conventional / snow

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000024	0.07	0.88	-0.62	1.05	-0.74	1.29	54.85					
99000025	-0.24	0.64	-0.52	0.82	-0.63	1.03	52.61					
99000026	0.36	0.96	-1.01	1.23	-1.21	1.72	45.47					
99000027	-0.13	0.76	-0.77	0.93	-0.93	1.31	45.01					
99000028	0.13	1.11	-1.17	1.34	-1.41	1.94	43.55					
99000029	-0.26	0.84	-0.89	1.05	-1.07	1.50	44.46					
99000030	0.26	0.83	-0.89	1.05	-1.07	1.50	44.46					
99000031	-0.13	1.11	-1.17	1.34	-1.41	1.94	43.55					
99000032	0.13	0.76	-0.77	0.93	-0.93	1.31	45.01					
99000033	-0.36	0.96	-1.01	1.23	-1.21	1.72	45.46					
99000034	0.24	0.64	-0.52	0.82	-0.63	1.03	52.57					
99000035	-0.07	0.88	-0.62	1.05	-0.74	1.29	54.85					
						1.47	47.66	17.00	1	7.14	0.21	OK

CO3. Own weight + pretension + wind pressure

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC
99000024	0.18	1.67	-1.15	2.01	-1.38	2.44	55.61				
99000025	-0.34	1.28	-0.95	1.59	-1.14	1.96	54.35				
99000026	0.54	1.74	-1.67	2.19	-2.00	2.97	47.49				
99000027	-0.15	1.54	-1.39	1.86	-1.67	2.50	48.06				
99000028	0.22	2.04	-1.97	2.47	-2.36	3.42	46.21				
99000029	-0.50	1.68	-1.60	2.11	-1.93	2.85	47.58				
99000030	0.50	1.68	-1.60	2.10	-1.92	2.85	47.58				
99000031	-0.22	2.04	-1.97	2.47	-2.36	3.42	46.22				
99000032	0.15	1.54	-1.39	1.86	-1.67	2.50	48.05				
99000033	-0.53	1.74	-1.67	2.19	-2.01	2.97	47.49				

99000034	0.34	1.28	-0.95	1.59	-1.14	1.96	54.32					
99000035	-0.18	1.67	-1.15	2.01	-1.38	2.44	55.62					
						2.69	49.88	17.00	1	7.14	0.38	OK

CO6. Own weight + pretension + wind suction – closed – reduction 0.53

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000024	-0.21	0.52	-0.71	0.67	-0.85	1.09	38.30					
99000025	0.78	1.43	-2.35	1.96	-2.82	3.44	34.71					
99000026	-1.44	0.69	-1.45	1.91	-1.74	2.58	47.74					
99000027	1.48	1.47	-2.89	2.50	-3.47	4.28	35.76					
99000028	-1.66	1.13	-2.44	2.41	-2.93	3.79	39.44					
99000029	1.89	1.52	-3.07	2.91	-3.68	4.70	38.36					
99000030	-1.89	1.53	-3.07	2.91	-3.68	4.70	38.34					
99000031	1.66	1.13	-2.44	2.41	-2.92	3.79	39.44					
99000032	-1.47	1.47	-2.89	2.50	-3.47	4.28	35.73					
99000033	1.44	0.68	-1.45	1.91	-1.74	2.58	47.70					
99000034	-0.79	1.43	-2.35	1.96	-2.82	3.43	34.75					
99000035	0.23	0.52	-0.71	0.68	-0.85	1.09	38.57					
						3.31	39.07	15.62	1	6.56	0.50	OK

CO7. Own weight + pretension + wind suction – closed – full wind load

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000024	-0.31	1.03	-1.44	1.28	-1.73	2.15	36.64					
99000025	0.97	2.51	-4.10	3.23	-4.91	5.88	33.33					
99000026	-2.43	1.25	-2.62	3.27	-3.15	4.54	46.14					
99000027	2.35	1.67	-2.77	3.46	-3.32	4.79	46.15					
99000028	-1.31	1.58	-3.33	2.46	-4.00	4.69	31.60					
99000029	0.56	1.32	-2.47	1.72	-2.97	3.43	30.07					
99000030	0.35	1.11	-2.24	1.40	-2.69	3.03	27.50					
99000031	1.31	1.57	-3.33	2.45	-4.00	4.69	31.51					
99000032	-1.69	1.50	-2.53	2.71	-3.03	4.07	41.77					
99000033	2.41	1.25	-2.63	3.25	-3.16	4.53	45.89					
99000034	-0.97	2.50	-4.09	3.22	-4.90	5.87	33.29					
99000035	0.33	1.03	-1.44	1.30	-1.73	2.17	36.86					
						4.15	36.73	15.07	1	6.33	0.66	OK

Annex E.1.6. Storm belts

CO7. Own weight + pretension + wind suction – closed – full wind load

Node	Fx	Fy	Fz	Fh,d	Fz,d	Fa	β	f	n	Frd	UC	
99000053	0.13	-8.82	-8.49	10.59	-10.19	14.69	46.09	17.00	2	14.28	1.03	ACCEPTABEL
99000054	-0.13	-8.70	-8.36	10.44	-10.04	14.48	46.13	17.00	2	14.28	1.01	ACCEPTABEL
99000055	-8.97	1.12	-9.62	10.84	-11.55	15.84	43.21	16.58	3	20.89	0.76	OK
99000056	-9.90	-1.31	-10.45	11.99	-12.54	17.35	43.70	16.70	3	21.04	0.82	OK
99000057	9.52	-3.87	-9.94	12.33	-11.93	17.15	45.93	17.00	3	21.42	0.80	OK
99000060	9.34	3.36	-9.95	11.92	-11.94	16.87	44.93	16.98	3	21.40	0.79	OK
99000061	-9.71	-1.21	-7.94	11.75	-9.53	15.12	50.96	17.00	3	21.42	0.71	OK
99000062	9.73	-0.22	-7.94	11.68	-9.53	15.08	50.79	17.00	3	21.42	0.70	OK
99000063	0.47	3.70	-5.21	4.48	-6.25	7.69	35.60	14.81	2	12.44	0.62	OK
99000064	-1.09	3.48	-4.92	4.38	-5.91	7.36	36.55	15.03	2	12.62	0.58	OK
99000065	-0.64	3.55	-4.85	4.33	-5.82	7.26	36.64	15.05	2	12.64	0.57	OK
99000066	-0.34	3.40	-4.65	4.10	-5.57	6.92	36.34	14.98	2	12.58	0.55	OK
99000067	-0.22	-6.54	-6.14	7.85	-7.37	10.77	46.79	17.00	2	14.28	0.75	OK
99000068	0.20	-6.31	-5.94	7.57	-7.13	10.40	46.73	17.00	2	14.28	0.73	OK