SYSTEM DESCRIPTION

General information

The extension of the longitudinal axis of the beam is oriented to the global X-axis.
Dead loads act in global X-direction.
Calculation is carried out taking into account warping torsion and the Wagner effect.
The deformations of the load spectra don't include the imperfections.

At non linear calculation iteration runs through maximal 50 steps per load spectrum.
Convergence criterion: The iteration is stopped if the result differences of two following steps do not exceed at no point the tolerances listed below.

criterion	tolerance	criterion	tolerance
displacements	0.00010 mm	int. forces	0.00010 kN
rotations	0.00010 ‰	int. moments	0.00010 kNm
twists	0.00010 ‰/m	warping bimom.	0.00010 kNm²

verification options

Results acc. to DIN EN 1993:2010, NA Germany
Limiting values of (c/t) are checked acc. to DIN EN 1993-1-1 table 5.2.
Moreover plastic cross-section verification acc. to DIN EN 1993-1-1 paragraph 6.2.1(6) is calculated.
The ultimate limit state is determined according to the extended partial section method.
For triple-sheet cross-sections, the partial section sizing method with rearrangement (KINDMANN) is used.
There is no limitation of limiting bending moments.

Regulations

DIN EN 1993-1-1, Eurocode 3: Bemessung und Konstruktion von Stahlbauten -
Teil 1-1: Allgemeine Bemessungsregeln und Regeln für den Hochbau;
Deutsche Fassung EN 1993-1-1:2005 + AC:2009, Ausgabe Dezember 2010
DIN EN 1993-1-1/A1, Ergänzungen zur DIN EN 1993-1-1, Ausgabe Juli 2014
DIN EN 1993-1-1/NA, Nationaler Anhang zur DIN EN 1993-1-1, Ausgabe Dezember 2018

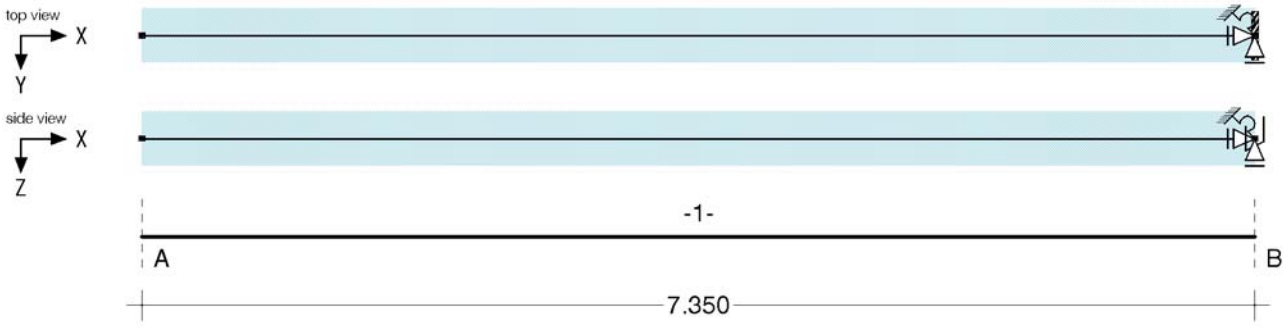
DIN EN 1993-1-1 verification parameters

NA Germany

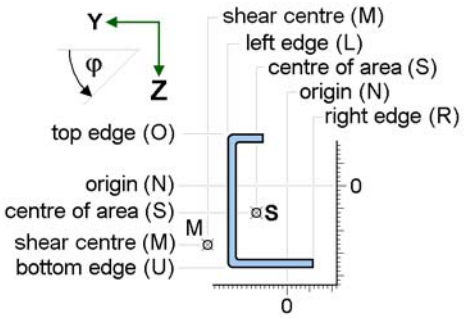
chapter	value	definition
6.1(1)	permanent/transient sit.	partial factors for structural steel
	γ_{M0} = 1.00	collapse of cross-sections
	γ_{M1} = 1.10	instability
	accidental situation	partial factors for structural steel
	γ_{M0} = 1.00	collapse of cross-sections
	γ_{M1} = 1.00	instability

System sketch

with point bearings of the section ends and position of the point/lines/hinged springs within the sections



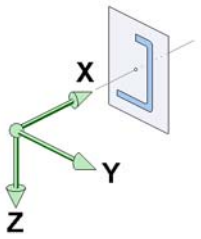
List of sections



The penetration point of the global X-axis through the plane of the cross-section is defined using the alongside shown horizontal and vertical alignment points.

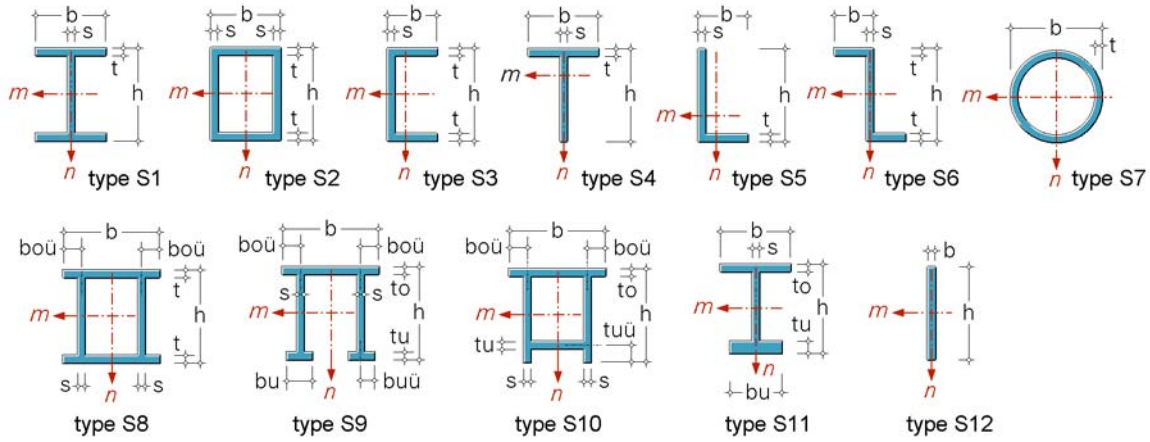
The alignment points are also used to describe the points of action of flexible point or line supports.

Following the alignment the cross-section is rotated through φ about the global X-axis.



sec.	from xa	to xe	l	Orientation at the beginning		Orientation at the end		φ
-	m	m	m	horizontal	vertical	horizontal	vertical	°
1	0.00	7.35	7.35	(S) + 0.00 cm	(S) + 0.00 cm	(S) + 0.00 cm	(S) + 0.00 cm	0.00

EXPLANATION SKETCH OF FOLLOWING CROSS-SECTIONS OF STEEL



Bars with parameterized special steel sections

At haunched beams, subscript A refers to the cross-section of the start node and subscript E to cross-section of the end node.

section	material	γM,E	type	h	b	t	s
-	-	-	-	cm	cm	cm	cm
1	S235	1.00	S1	36.00	36.00	2.00	1.20

section properties of bar sections

The position of the centre of gravity eY, eZ and the angle of rotation α of the principal axes η, ζ or the distance YSM, ZSM of the shear centre from the centroid of gravity is described with respect to the global XYZ system. All other cross-section values are given in the principal axis system

sec.	eY	eZ	α	YSM	ZSM	A	Iη	Iζ	IT	Iω	iM	rη	rζ	rω
-	cm	cm	°	cm	cm	cm2	cm4	cm4	cm4	cm6	cm	cm	cm	-
1	0.00	0.00	0.00	0.00	0.00	182.40	44941	15557	207.64	4494528	18.21	-0.00	0.00	0.00

Point supports at the ends of sections

The support is relocated from the X-axis with ΔY and ΔZ and distorted with the angle φ. Numeric values indicate spring constants. CPX, CPY and CPZ describe the bearings for the forces in the indexed direction. CMX, CMY and CMZ describe the moment restraint around the indexed axes. CMΩ is the warping restraint.

support	at x	CPX	CPY	CPZ	CMX	CMY	CMZ	CMω	ΔY	ΔZ	φ
-	m	kN/m	kN/m	kN/m	kNm/-	kNm/-	kNm/-	kN/m3	cm	cm	°
B	7.35	fix	fix	fix	fix	fix	fix	fix	0.00	0.00	0.00

Description of loading structure

On the left-hand side, the relationship between the actions effects, load case file and load cases are shown in a tree structure. The right-hand side shows the characteristics of the superposition to the associated objects on the left-hand. In terms of the superposition, a load case file is equivalent to an extreme rule of the defined objects therein and can be additive or alternatively superpositioned.

applied symbols: action effect load case file load case imperfection cases

Description of loading structure

On the left-hand side, the relationship between the actions effects, load case file and load cases are shown in a tree structure. The right-hand side shows the characteristics of the superposition to the associated objects on the left-hand. In terms of the superposition, a load case file is equivalent to an extreme rule of the defined objects therein and can be additive or alternatively superpositioned.

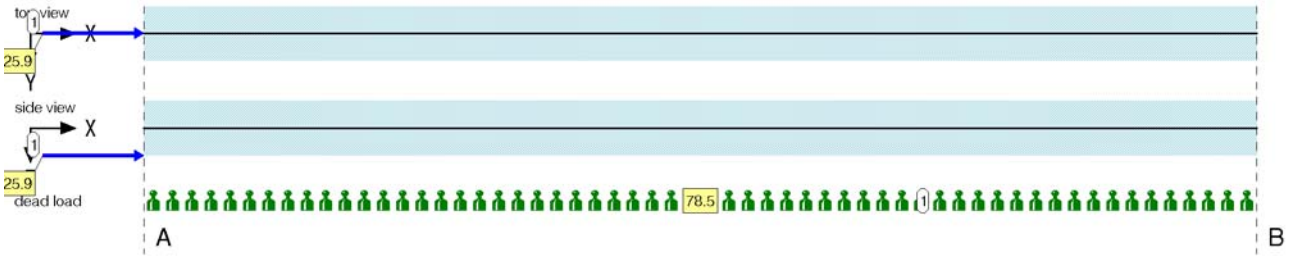
1: permanent loads	**permanent loads**
1: Eigenlasten	additive
2: snow loads	**transient snow loads**
2: snow load	alternative in group A
3: wind load	**transient wind load**
3: wind pressure	alternative in group B
4: Windzug	alternative in group B
5: Wind Giebelwände	alternative in group B
6: Wind Längswände	alternative in group B
imperfection cases	
1: Schiefstellung y	
2: Schiefstellung z	

GRAPHIC OF LOADS OF ACTION EFFECTS

The load images are displayed as projections with regard to the top view (X-Y plane) and the side view (X-Z plane).
Dead loads and torsion loads are drawn separately from the views in a separate line.
The load case numbers are indicated on the individual load inages.

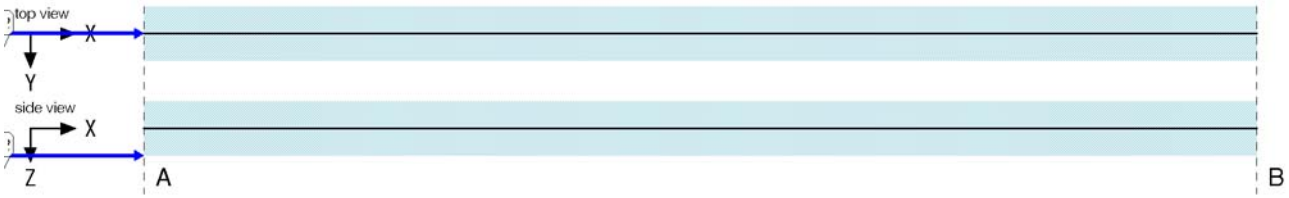
action effect 1: permanent loads

permanent, 1 load case (see numbers of load cases)
Dead loads act in global X-direction.



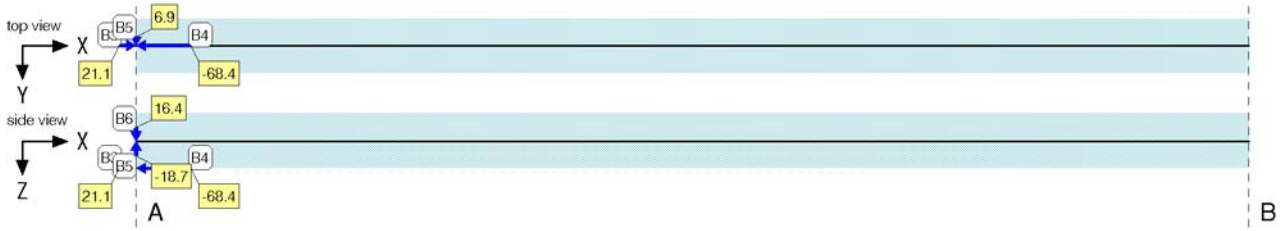
action effect 2: snow loads

transient, 1 load case (see numbers of load cases)



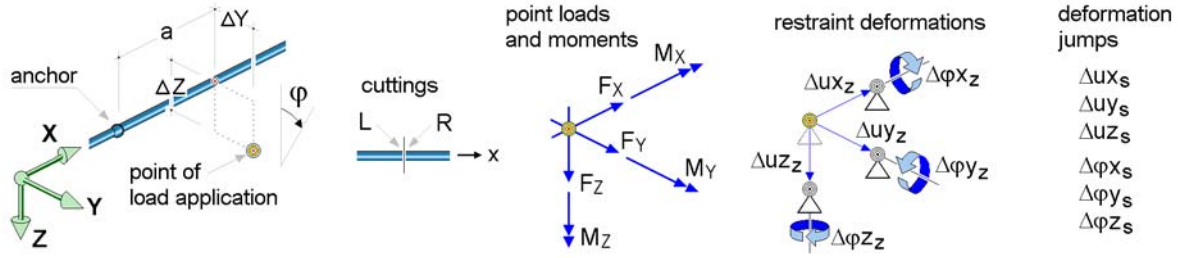
action effect 3: wind load

transient, 4 load cases (see numbers of load cases)



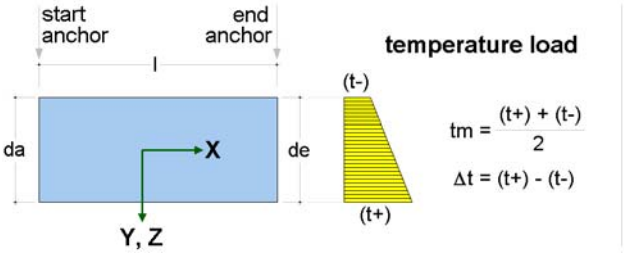
DESCRIPTION OF THE LOAD PICTURES

List of point loads



load case	anchor	a	ΔY	ΔZ	bank	load type, ordinates	φ
	-	m	cm	cm	-		°
1	A	0.000	0.000	18.000	L	FX = 125.900 kN MX = 0.000 kNm	0.00
2	A	0.000	0.000	18.000	L	FX = 166.900 kN MX = 0.000 kNm	0.00
3	A	0.000	0.000	18.000	L	FX = 21.100 kN MX = 0.000 kNm	0.00
3	A	0.000	0.000	0.000	L	FY = 6.900 kN MZ = 0.000 kNm	0.00
4	A	0.000	0.000	18.000	L	FX = -68.400 kN MX = 0.000 kNm	0.00
5	A	0.000	0.000	0.000	L	FZ = -18.700 kN MY = 0.000 kNm	0.00
5	A	0.000	0.000	0.000	L	FY = 6.900 kN MZ = 0.000 kNm	0.00
6	A	0.000	0.000	0.000	L	FZ = 16.400 kN MY = 0.000 kNm	0.00

List of dead loads and temperature loads

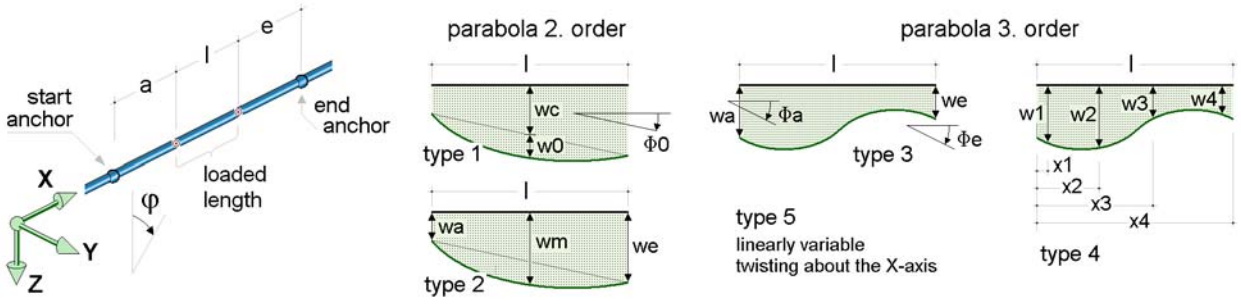


load types

EG dead load
TY temperature (variable in Y-direction)
TZ temperature (variable in Z-direction)

load case	start anchor	l	end anchor	type	γ	tm	Δt	da	de
-	-	m	-	-	kN/m³	K	K	cm	cm
1	A	7.350	B	EG	78.500	--	--	--	--

Explanation of the types of description for imperfections



Imperfections: type of description 1

imperf. case	start anchor	line sections a	l	e	end anchor	direc-tion	φ	wc	w0	Φ0
-	-	m	m	m	-	-	°	mm	mm	%
1	A	0.000	7.350	0.000	B	Y	0.00	1/626	0.000	1/-313
1	A	0.000	7.350	0.000	B	Z	0.00	1/626	0.000	1/-313

Meanings in the case of application of rules of superposition acc. to Eurocode:

Ψ_{dom}	combination coefficient of a	leading	traffic load action	(dominant action)
Ψ_{sub}	combination coefficient of a	non-leading	traffic load action	(accompanying action)
γ_{sup}	Partial safety factor for	unfavourable	load positions	
γ_{inf}	Partial safety factor for	favourable	load positions	

rules of superposition bridge construction and DIN 1055-100 behave like Eurocode.
In non-linear analysis, rules of extremization will not be considered

If verifications according to Eurocode are listed below, the following applies:
The national annex "Germany" is taken into account.

verification 1: EC3 design resistance (Th. I. Ord.)

EC 3 design resistance (Th. I. Ord.): design resistance acc. to DIN EN 1993

Verification options of verification 1:

☐ Safety as for stability

1: standard extreme rule

rules of extremization for verification 1,type: standard, rule of superposition: Eurocode

Action	Ψ_{dom}	Ψ_{sub}	γ_{sup}	γ_{inf}
1	1.00	1.00	1.35	1.00
2	1.00	0.50	1.50	0.00
3	1.00	0.60	1.50	0.00

verification 2: EC3 design resistance (th. II. o.)

EC 3 design resistance (th. II. o.): design resistance acc. to DIN EN 1993

1: standard load spectra

generation code for verification 2,type: standard, rule of superposition: Eurocode

Load spectra of generation code 1 of verification 2

Factorization of load cases. Negative numbers of load cases refer to imperfections

LS	1	2	3	4	5	6	-1	-2
1	1.00	1.50	-	-	-	-	1.00	-
2	1.35	1.50	-	-	-	-	1.00	-
3	1.00	1.50	0.90	-	-	-	1.00	-
4	1.35	1.50	0.90	-	-	-	1.00	-
5	1.00	1.50	-	0.90	-	-	1.00	-
6	1.35	1.50	-	0.90	-	-	1.00	-
7	1.00	1.50	-	-	0.90	-	1.00	-
8	1.35	1.50	-	-	0.90	-	1.00	-
9	1.00	1.50	-	-	-	0.90	1.00	-
10	1.35	1.50	-	-	-	0.90	1.00	-
11	1.00	1.50	-	-	-	-	-1.00	-
12	1.35	1.50	-	-	-	-	-1.00	-
13	1.00	1.50	0.90	-	-	-	-1.00	-
14	1.35	1.50	0.90	-	-	-	-1.00	-
15	1.00	1.50	-	0.90	-	-	-1.00	-
16	1.35	1.50	-	0.90	-	-	-1.00	-
17	1.00	1.50	-	-	0.90	-	-1.00	-
18	1.35	1.50	-	-	0.90	-	-1.00	-
19	1.00	1.50	-	-	-	0.90	-1.00	-
20	1.35	1.50	-	-	-	0.90	-1.00	-
21	1.00	1.50	-	-	-	-	-	1.00
22	1.35	1.50	-	-	-	-	-	1.00
23	1.00	1.50	0.90	-	-	-	-	1.00
24	1.35	1.50	0.90	-	-	-	-	1.00
25	1.00	1.50	-	0.90	-	-	-	1.00

LS	1	2	3	4	5	6	-1	-2
26	1.35	1.50	-	0.90	-	-	-	1.00
27	1.00	1.50	-	-	0.90	-	-	1.00
28	1.35	1.50	-	-	0.90	-	-	1.00
29	1.00	1.50	-	-	-	0.90	-	1.00
30	1.35	1.50	-	-	-	0.90	-	1.00
31	1.00	1.50	-	-	-	-	-	-1.00
32	1.35	1.50	-	-	-	-	-	-1.00
33	1.00	1.50	0.90	-	-	-	-	-1.00
34	1.35	1.50	0.90	-	-	-	-	-1.00
35	1.00	1.50	-	0.90	-	-	-	-1.00
36	1.35	1.50	-	0.90	-	-	-	-1.00
37	1.00	1.50	-	-	0.90	-	-	-1.00
38	1.35	1.50	-	-	0.90	-	-	-1.00
39	1.00	1.50	-	-	-	0.90	-	-1.00
40	1.35	1.50	-	-	-	0.90	-	-1.00
41	1.00	1.50	-	-	-	-	1.00	1.00
42	1.35	1.50	-	-	-	-	1.00	1.00
43	1.00	1.50	0.90	-	-	-	1.00	1.00
44	1.35	1.50	0.90	-	-	-	1.00	1.00
45	1.00	1.50	-	0.90	-	-	1.00	1.00
46	1.35	1.50	-	0.90	-	-	1.00	1.00
47	1.00	1.50	-	-	0.90	-	1.00	1.00
48	1.35	1.50	-	-	0.90	-	1.00	1.00
49	1.00	1.50	-	-	-	0.90	1.00	1.00
50	1.35	1.50	-	-	-	0.90	1.00	1.00

Load spectra of generation code 1 of verification 2

Factorization of load cases. Negative numbers of load cases refer to imperfections

LS	1	2	3	4	5	6	-1	-2
51	1.00	1.50	-	-	-	-	-1.00	1.00
52	1.35	1.50	-	-	-	-	-1.00	1.00
53	1.00	1.50	0.90	-	-	-	-1.00	1.00
54	1.35	1.50	0.90	-	-	-	-1.00	1.00
55	1.00	1.50	-	0.90	-	-	-1.00	1.00
56	1.35	1.50	-	0.90	-	-	-1.00	1.00
57	1.00	1.50	-	-	0.90	-	-1.00	1.00
58	1.35	1.50	-	-	0.90	-	-1.00	1.00
59	1.00	1.50	-	-	-	0.90	-1.00	1.00
60	1.35	1.50	-	-	-	0.90	-1.00	1.00
61	1.00	1.50	-	-	-	-	1.00	-1.00
62	1.35	1.50	-	-	-	-	1.00	-1.00
63	1.00	1.50	0.90	-	-	-	1.00	-1.00
64	1.35	1.50	0.90	-	-	-	1.00	-1.00
65	1.00	1.50	-	0.90	-	-	1.00	-1.00
66	1.35	1.50	-	0.90	-	-	1.00	-1.00
67	1.00	1.50	-	-	0.90	-	1.00	-1.00
68	1.35	1.50	-	-	0.90	-	1.00	-1.00
69	1.00	1.50	-	-	-	0.90	1.00	-1.00
70	1.35	1.50	-	-	-	0.90	1.00	-1.00
71	1.00	1.50	-	-	-	-	-1.00	-1.00
72	1.35	1.50	-	-	-	-	-1.00	-1.00
73	1.00	1.50	0.90	-	-	-	-1.00	-1.00
74	1.35	1.50	0.90	-	-	-	-1.00	-1.00
75	1.00	1.50	-	0.90	-	-	-1.00	-1.00
76	1.35	1.50	-	0.90	-	-	-1.00	-1.00
77	1.00	1.50	-	-	0.90	-	-1.00	-1.00
78	1.35	1.50	-	-	0.90	-	-1.00	-1.00
79	1.00	1.50	-	-	-	0.90	-1.00	-1.00
80	1.35	1.50	-	-	-	0.90	-1.00	-1.00
81	1.00	-	1.50	-	-	-	1.00	-
82	1.35	-	1.50	-	-	-	1.00	-
83	1.00	0.75	1.50	-	-	-	1.00	-
84	1.35	0.75	1.50	-	-	-	1.00	-
85	1.00	-	-	1.50	-	-	1.00	-
86	1.35	-	-	1.50	-	-	1.00	-
87	1.00	0.75	-	1.50	-	-	1.00	-
88	1.35	0.75	-	1.50	-	-	1.00	-
89	1.00	-	-	-	1.50	-	1.00	-
90	1.35	-	-	-	1.50	-	1.00	-
91	1.00	0.75	-	-	1.50	-	1.00	-
92	1.35	0.75	-	-	1.50	-	1.00	-
93	1.00	-	-	-	-	1.50	1.00	-
94	1.35	-	-	-	-	1.50	1.00	-
95	1.00	0.75	-	-	-	1.50	1.00	-
96	1.35	0.75	-	-	-	1.50	1.00	-
97	1.00	-	1.50	-	-	-	-1.00	-
98	1.35	-	1.50	-	-	-	-1.00	-
99	1.00	0.75	1.50	-	-	-	-1.00	-
100	1.35	0.75	1.50	-	-	-	-1.00	-
101	1.00	-	-	1.50	-	-	-1.00	-
102	1.35	-	-	1.50	-	-	-1.00	-
103	1.00	0.75	-	1.50	-	-	-1.00	-
104	1.35	0.75	-	1.50	-	-	-1.00	-
105	1.00	-	-	-	1.50	-	-1.00	-
106	1.35	-	-	-	1.50	-	-1.00	-
107	1.00	0.75	-	-	1.50	-	-1.00	-
108	1.35	0.75	-	-	1.50	-	-1.00	-
109	1.00	-	-	-	-	1.50	-1.00	-
110	1.35	-	-	-	-	1.50	-1.00	-
111	1.00	0.75	-	-	-	1.50	-1.00	-
112	1.35	0.75	-	-	-	1.50	-1.00	-
113	1.00	-	1.50	-	-	-	-	1.00
114	1.35	-	1.50	-	-	-	-	1.00
115	1.00	0.75	1.50	-	-	-	-	1.00
116	1.35	0.75	1.50	-	-	-	-	1.00
117	1.00	-	-	1.50	-	-	-	1.00
118	1.35	-	-	1.50	-	-	-	1.00
119	1.00	0.75	-	1.50	-	-	-	1.00
120	1.35	0.75	-	1.50	-	-	-	1.00

LS	1	2	3	4	5	6	-1	-2
121	1.00	-	-	-	1.50	-	-	1.00
122	1.35	-	-	-	1.50	-	-	1.00
123	1.00	0.75	-	-	1.50	-	-	1.00
124	1.35	0.75	-	-	1.50	-	-	1.00
125	1.00	-	-	-	-	1.50	-	1.00
126	1.35	-	-	-	-	1.50	-	1.00
127	1.00	0.75	-	-	-	1.50	-	1.00
128	1.35	0.75	-	-	-	1.50	-	1.00
129	1.00	-	1.50	-	-	-	-	-1.00
130	1.35	-	1.50	-	-	-	-	-1.00
131	1.00	0.75	1.50	-	-	-	-	-1.00
132	1.35	0.75	1.50	-	-	-	-	-1.00
133	1.00	-	-	1.50	-	-	-	-1.00
134	1.35	-	-	1.50	-	-	-	-1.00
135	1.00	0.75	-	1.50	-	-	-	-1.00
136	1.35	0.75	-	1.50	-	-	-	-1.00
137	1.00	-	-	-	1.50	-	-	-1.00
138	1.35	-	-	-	1.50	-	-	-1.00
139	1.00	0.75	-	-	1.50	-	-	-1.00
140	1.35	0.75	-	-	1.50	-	-	-1.00
141	1.00	-	-	-	-	1.50	-	-1.00
142	1.35	-	-	-	-	1.50	-	-1.00
143	1.00	0.75	-	-	-	1.50	-	-1.00
144	1.35	0.75	-	-	-	1.50	-	-1.00
145	1.00	-	1.50	-	-	-	1.00	1.00
146	1.35	-	1.50	-	-	-	1.00	1.00
147	1.00	0.75	1.50	-	-	-	1.00	1.00
148	1.35	0.75	1.50	-	-	-	1.00	1.00
149	1.00	-	-	1.50	-	-	1.00	1.00
150	1.35	-	-	1.50	-	-	1.00	1.00
151	1.00	0.75	-	1.50	-	-	1.00	1.00
152	1.35	0.75	-	1.50	-	-	1.00	1.00
153	1.00	-	-	-	1.50	-	1.00	1.00
154	1.35	-	-	-	1.50	-	1.00	1.00
155	1.00	0.75	-	-	1.50	-	1.00	1.00
156	1.35	0.75	-	-	1.50	-	1.00	1.00
157	1.00	-	-	-	-	1.50	1.00	1.00
158	1.35	-	-	-	-	1.50	1.00	1.00
159	1.00	0.75	-	-	-	1.50	1.00	1.00
160	1.35	0.75	-	-	-	1.50	1.00	1.00
161	1.00	-	1.50	-	-	-	-1.00	1.00
162	1.35	-	1.50	-	-	-	-1.00	1.00
163	1.00	0.75	1.50	-	-	-	-1.00	1.00
164	1.35	0.75	1.50	-	-	-	-1.00	1.00
165	1.00	-	-	1.50	-	-	-1.00	1.00
166	1.35	-	-	1.50	-	-	-1.00	1.00
167	1.00	0.75	-	1.50	-	-	-1.00	1.00
168	1.35	0.75	-	1.50	-	-	-1.00	1.00
169	1.00	-	-	-	1.50	-	-1.00	1.00
170	1.35	-	-	-	1.50	-	-1.00	1.00
171	1.00	0.75	-	-	1.50	-	-1.00	1.00
172	1.35	0.75	-	-	1.50	-	-1.00	1.00
173	1.00	-	-	-	-	1.50	-1.00	1.00
174	1.35	-	-	-	-	1.50	-1.00	1.00
175	1.00	0.75	-	-	-	1.50	-1.00	1.00
176	1.35	0.75	-	-	-	1.50	-1.00	1.00
177	1.00	-	1.50	-	-	-	1.00	-1.00
178	1.35	-	1.50	-	-	-	1.00	-1.00
179	1.00	0.75	1.50	-	-	-	1.00	-1.00
180	1.35	0.75	1.50	-	-	-	1.00	-1.00
181	1.00	-	-	1.50	-	-	1.00	-1.00
182	1.35	-	-	1.50	-	-	1.00	-1.00
183	1.00	0.75	-	1.50	-	-	1.00	-1.00
184	1.35	0.75	-	1.50	-	-	1.00	-1.00
185	1.00	-	-	-	1.50	-	1.00	-1.00
186	1.35	-	-	-	1.50	-	1.00	-1.00
187	1.00	0.75	-	-	1.50	-	1.00	-1.00
188	1.35	0.75	-	-	1.50	-	1.00	-1.00
189	1.00	-	-	-	-	1.50	1.00	-1.00
190	1.35	-	-	-	-	1.50	1.00	-1.00

Load spectra of generation code 1 of verification 2

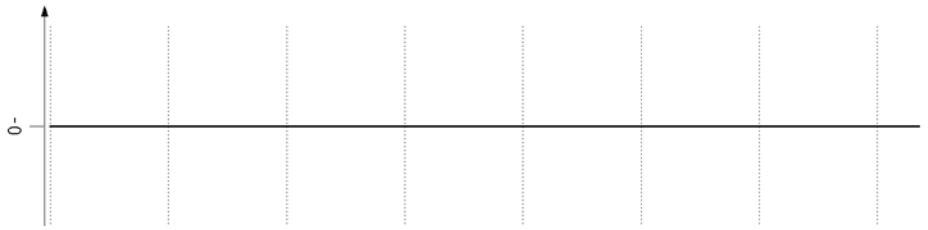
Factorization of load cases. Negative numbers of load cases refer to imperfections

LS	1	2	3	4	5	6	-1	-2
191	1.00	0.75	-	-	-	1.50	1.00	-1.00
192	1.35	0.75	-	-	-	1.50	1.00	-1.00
193	1.00	-	1.50	-	-	-	-1.00	-1.00
194	1.35	-	1.50	-	-	-	-1.00	-1.00
195	1.00	0.75	1.50	-	-	-	-1.00	-1.00
196	1.35	0.75	1.50	-	-	-	-1.00	-1.00
197	1.00	-	-	1.50	-	-	-1.00	-1.00
198	1.35	-	-	1.50	-	-	-1.00	-1.00
199	1.00	0.75	-	1.50	-	-	-1.00	-1.00

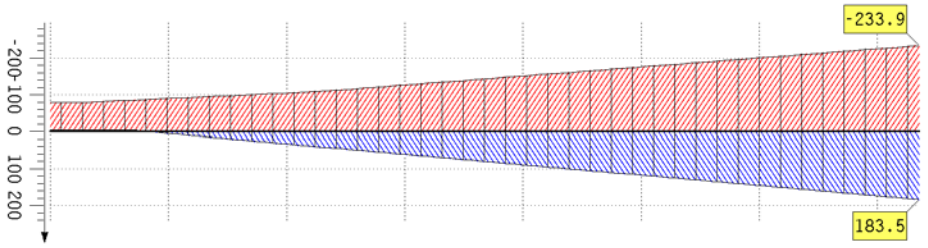
LS	1	2	3	4	5	6	-1	-2
200	1.35	0.75	-	1.50	-	-	-1.00	-1.00
201	1.00	-	-	-	1.50	-	-1.00	-1.00
202	1.35	-	-	-	1.50	-	-1.00	-1.00
203	1.00	0.75	-	-	1.50	-	-1.00	-1.00
204	1.35	0.75	-	-	1.50	-	-1.00	-1.00
205	1.00	-	-	-	-	1.50	-1.00	-1.00
206	1.35	-	-	-	-	1.50	-1.00	-1.00
207	1.00	0.75	-	-	-	1.50	-1.00	-1.00
208	1.35	0.75	-	-	-	1.50	-1.00	-1.00

SUMMARY VERIFICATION 1: EC3 DESIGN RESISTANCE (TH. I. ORD.)

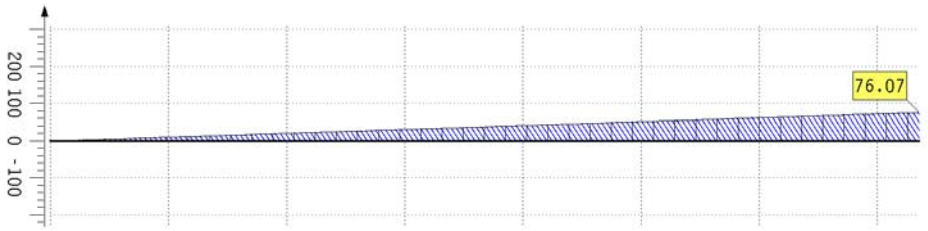
extremal internal forces and moments in system of principal axis



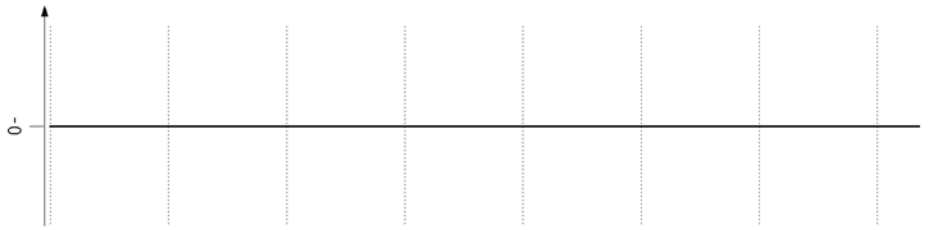
shear centre
torsional moment
T in kNm
min: 0.00
max: 0.00



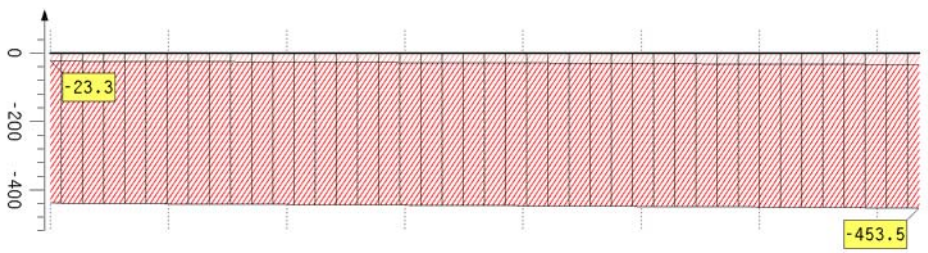
centroid
flexural moment
M_η in kNm
min: -233.94
max: 183.51



centroid
flexural moment
M_ζ in kNm
min: -0.00
max: 76.07

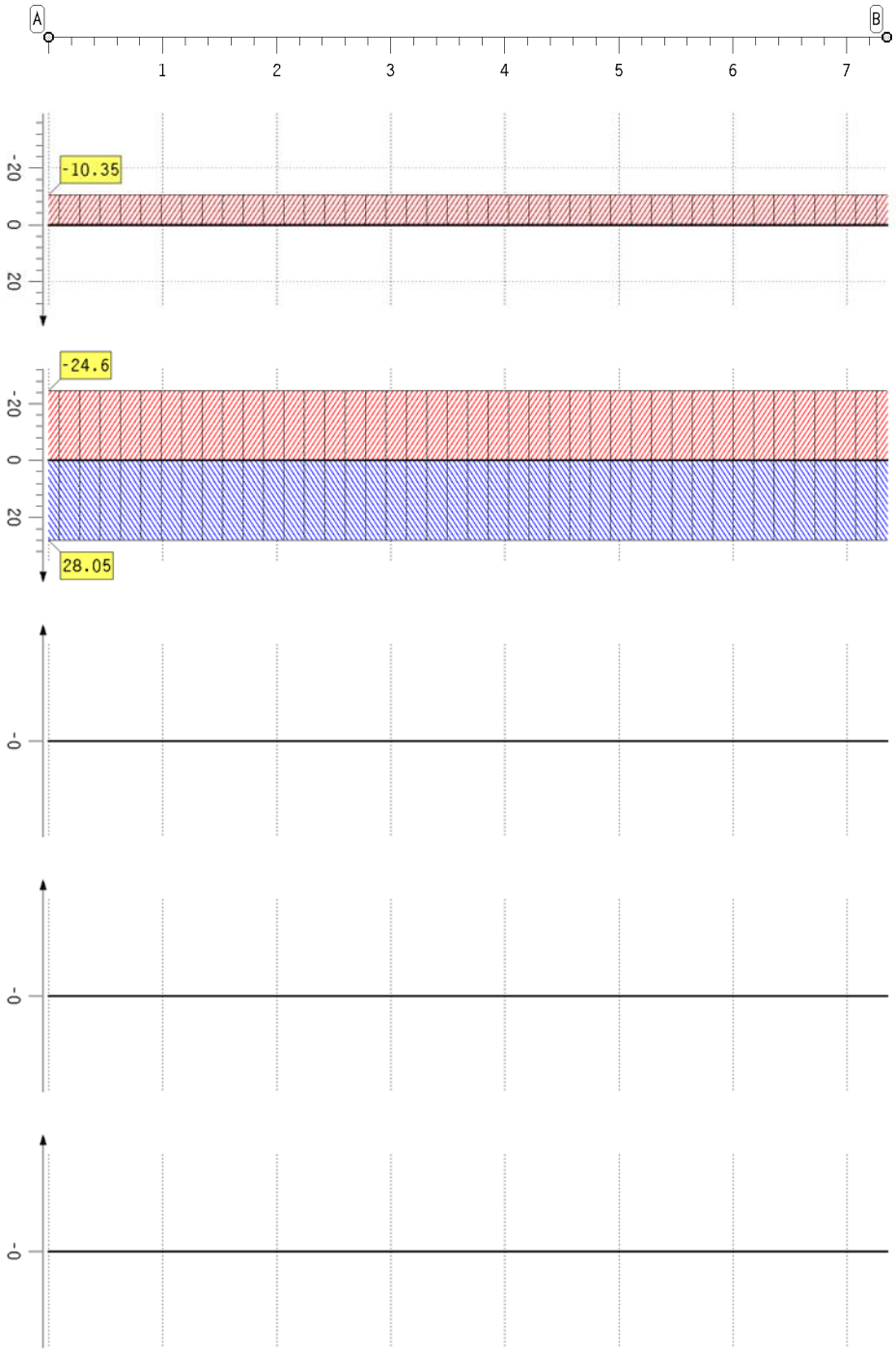


shear centre
warping bimoment
B in kNm^2
min: 0.00
max: 0.00



centroid
normal force
N in kN
min: -453.51
max: -23.30

extremal internal forces and moments in system of principal axis



shear centre
shear force
V_η in kN
min: -10.35
max: 0.00

shear centre
shear force
V_ζ in kN
min: -24.60
max: 28.05

St. Venant
torsional moment
T_t in kNm
min: 0.00
max: 0.00

torsional moment
from warping
T_w in kNm
min: 0.00
max: 0.00

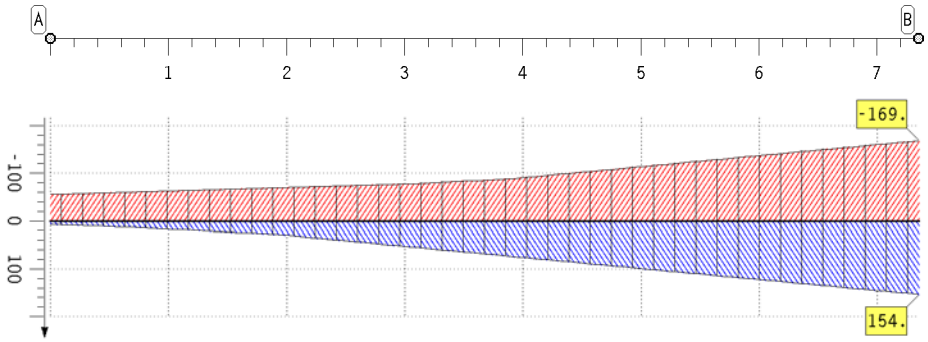
Wagner effect
torsional moment
T_σ in kNm
min: 0.00
max: 0.00

extremal internal forces and moments in system of principal axis

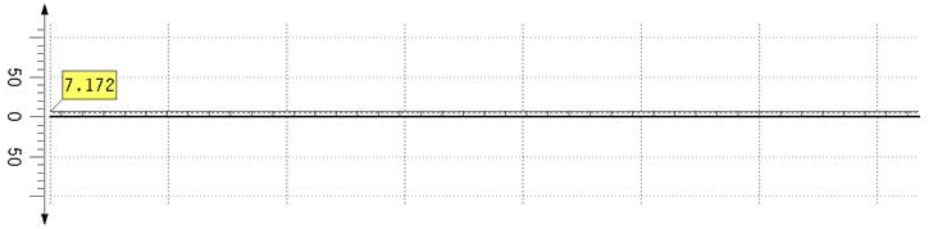
Shear forces V_η, V_ζ, torsional moments T, T_t, T_w, T_σ and warping bimoment B act in the shear centre.
Normal force N and flexural moments M_η, M_ζ refer to the centroid.

point	x	type	N	V_η	V_ζ	T	M_η	M_ζ	T_t	T_w	T_σ	K_σ	B
-	m		kN	kN	kN	kNm	kNm	kNm	kNm	kNm	kNm	kNm2	kNm2
A	0.000	min	-439.3	-10.35	-24.60	0.00	-79.1	-0.0	0.00	0.00	0.00	0.00	0.000
		max	-23.3	0.00	28.05	0.00	-4.2	0.0	0.00	0.00	0.00	0.00	0.000
B	7.350	min	-453.5	-10.35	-24.60	0.00	-233.9	0.0	0.00	0.00	0.00	0.00	0.000
		max	-33.8	0.00	28.05	0.00	183.5	76.1	0.00	0.00	0.00	0.00	0.000
minimum			**-453.5**	**-10.35**	**-24.60**	**0.00**	**-233.9**	**-0.0**	**0.00**	**0.00**	**0.00**	**0.00**	**0.000**
maximum			**-23.3**	**0.00**	**28.05**	**0.00**	**183.5**	**76.1**	**0.00**	**0.00**	**0.00**	**0.00**	**0.000**

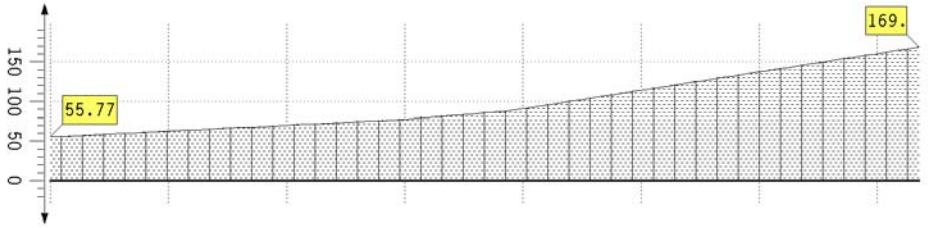
Results of steel design



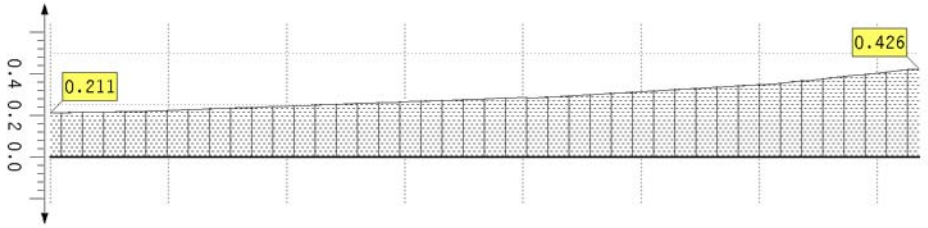
elastic
edge stresses
σ_x in MN/m²
min: -169.00
max: 154.04



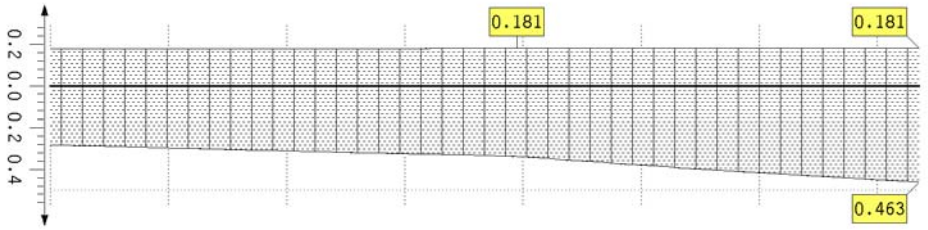
elastic
shear stress
τ in MN/m²
max: 7.17



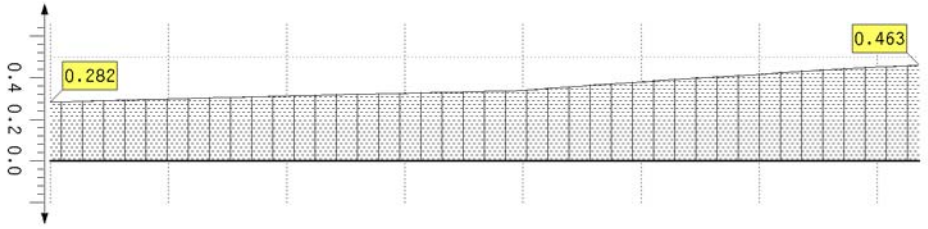
elastic
equivalent tensile stress
σ_v in MN/m²
max: 169.00



plastic
utilization $U_{\sigma,pl}$
of cross-section
max: 0.43



exist(c/t)/limit(c/t)
c/t 0-0 (two-s. hinged)
max: 0.18
c/t --0 (one-s. hinged)
max: 0.46



utilization
max: 0.46

Results of steel design

stresses are calculated elastically.

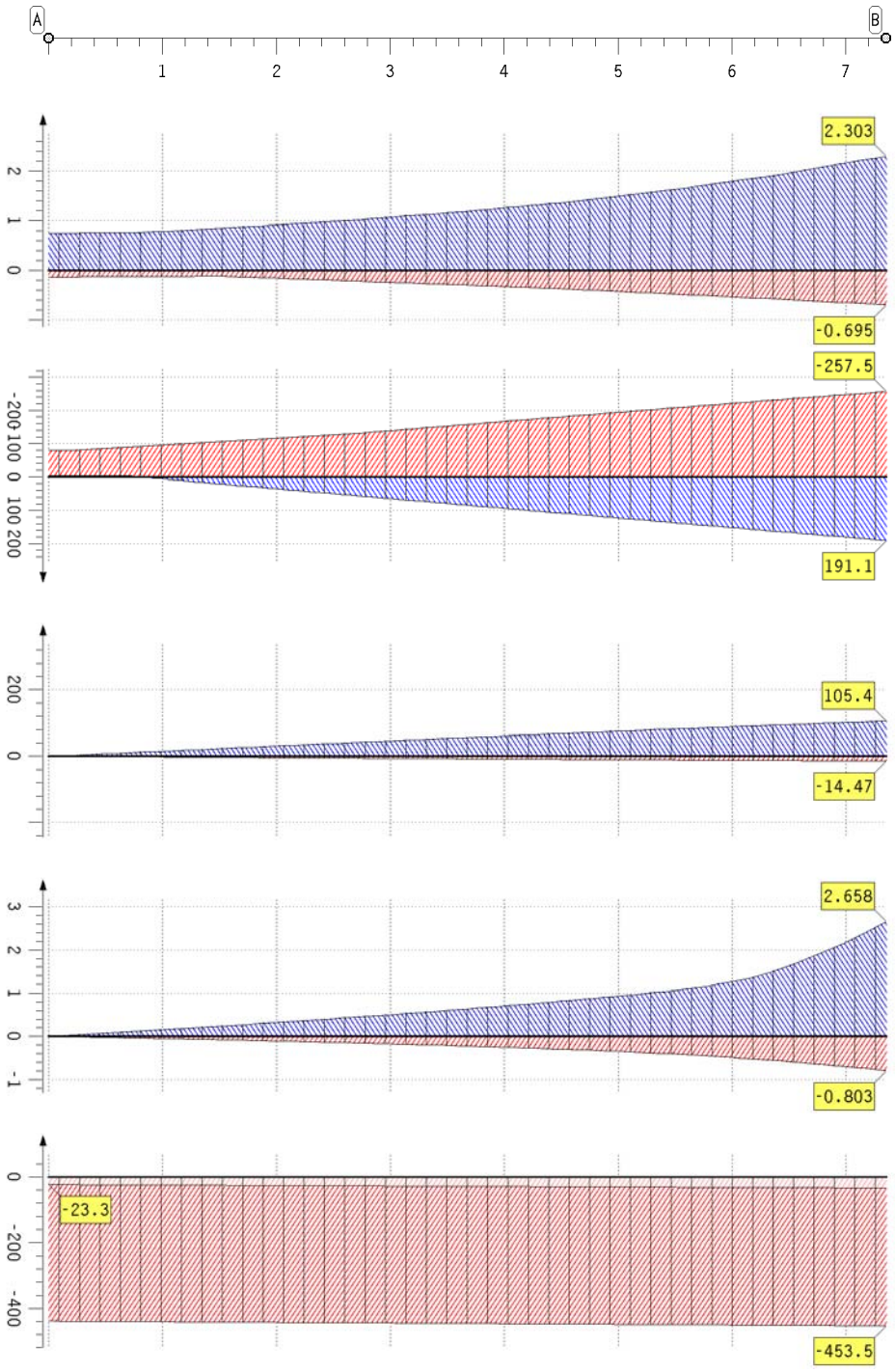
point	x	min σ_x	max σ_x	τ	σ_v	σ_{el}	$U_{\sigma,el}$	$U_{\sigma,pl}$	0-0	--0	U
-	m	MN/m²	MN/m²	MN/m²	MN/m²	MN/m²	-	-	-	-	-
A	0.000	-55.76	7.59	7.17	55.77	----	----	0.211	0.179	0.282	0.282
	3.859	-88.10	73.28	7.17	88.10	----	----	0.283	0.181	0.336	0.336
	6.156	-141.18	126.41	7.17	141.18	----	----	0.354	0.181	0.423	0.423
B	7.350	-169.00	154.04	7.17	169.00	----	----	0.426	0.181	0.463	0.463
minimum		**-169.00**	**7.59**	**7.17**	**55.77**	**0.00**	**0.000**	**0.211**	**0.179**	**0.282**	**0.282**
maximum		**-55.76**	**154.04**	**7.17**	**169.00**	**0.00**	**0.000**	**0.426**	**0.181**	**0.463**	**0.463**

Reactions in support points bzgl. der beam axis (γ_F-fach)

point	X	type	APx	APy	APz	AMx	AMy	AMz	ABx
-	m		kN	kN	kN	kNm	kNm	kNm	kNm²
A	0.000	min	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00
		max	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B	7.350	min	-453.51	-10.35	-24.60	0.00	-233.94	0.00	0.00
		max	-33.82	0.00	28.05	0.00	183.51	76.07	0.00

SUMMARY VERIFICATION 2: EC3 DESIGN RESISTANCE (TH. II. O.)

extremal internal forces and moments in system of principal axis



shear centre torsional moment T in kNm
min: -0.70
max: 2.30

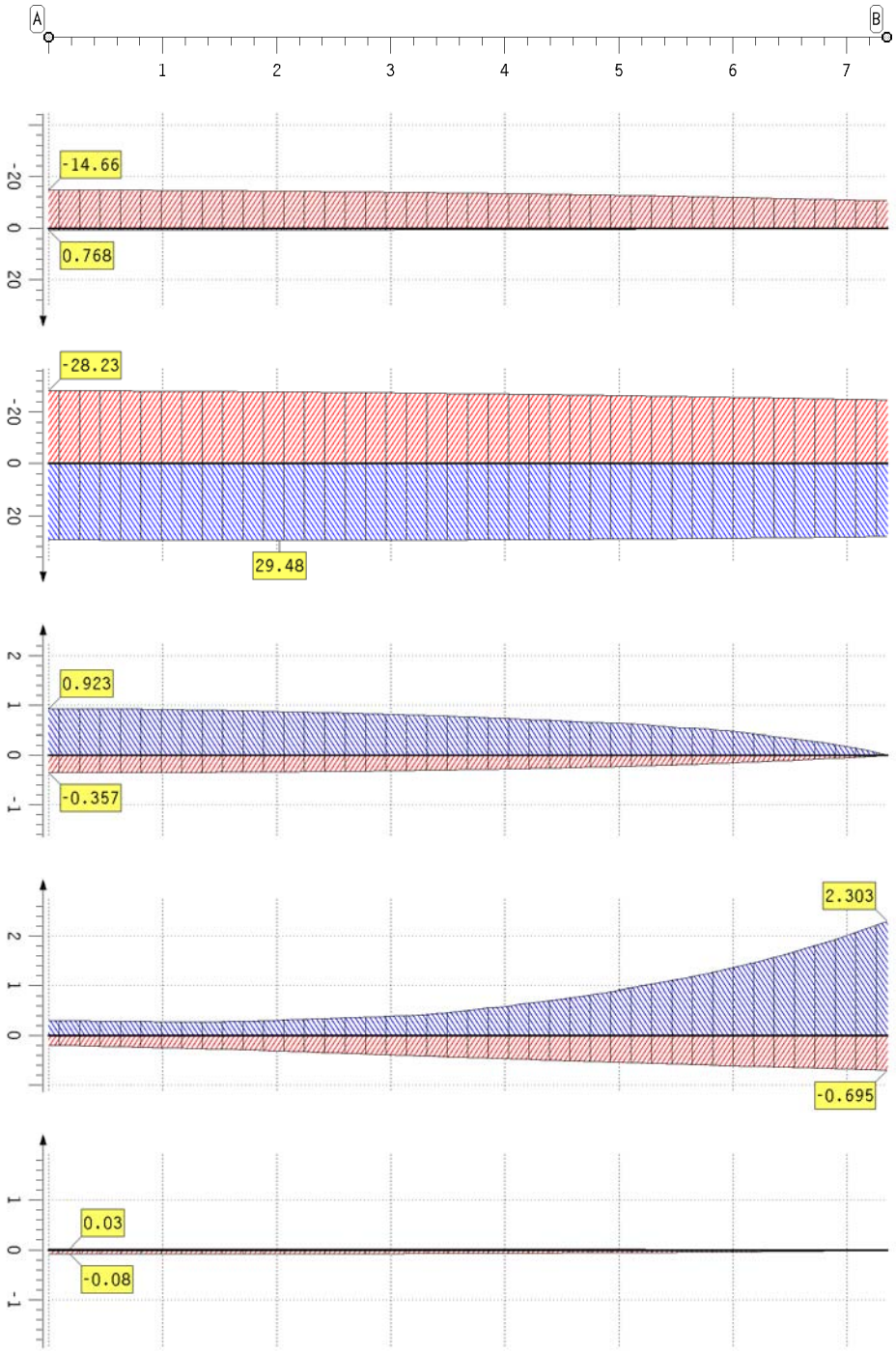
centroid flexural moment M_η in kNm
min: -257.50
max: 191.06

centroid flexural moment M_ζ in kNm
min: -14.47
max: 105.45

shear centre warping bimoment B in kNm²
min: -0.80
max: 2.66

centroid normal force N in kN
min: -453.51
max: -23.30

extremal internal forces and moments in system of principal axis



shear centre
shear force
V_η in kN
min: -14.66
max: 0.77

shear centre
shear force
V_ζ in kN
min: -28.23
max: 29.48

St. Venant
torsional moment
T_t in kNm
min: -0.36
max: 0.92

torsional moment
from warping
T_w in kNm
min: -0.70
max: 2.30

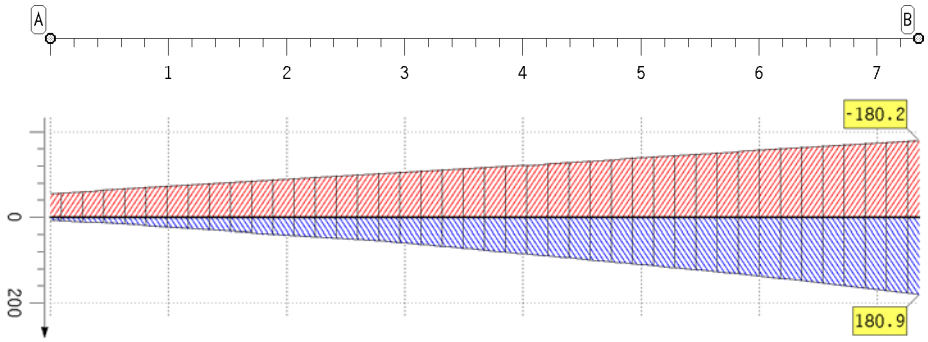
Wagner effect
torsional moment
T_σ in kNm
min: -0.08
max: 0.03

extremal internal forces and moments in system of principal axis

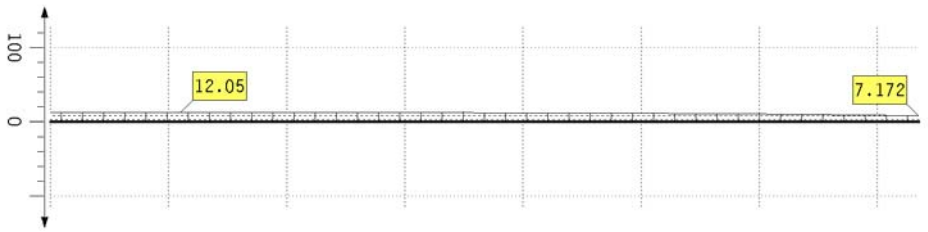
Shear forces V_η, V_ζ, torsional moments T, T_t, T_w, T_σ and warping bimoment B act in the shear centre.
Normal force N and flexural moments M_η, M_ζ refer to the centroid.

point	x	type	N	V_η	V_ζ	T	M_η	M_ζ	T_t	T_w	T_σ	K_σ	B
-	m		kN	kN	kN	kNm	kNm	kNm	kNm	kNm	kNm	kNm2	kNm2
A	0.000	min	-439.3	-14.66	-28.23	-0.13	-79.1	-0.0	-0.36	-0.19	-0.08	-14.57	-0.000
		max	-23.3	0.77	29.28	0.76	-4.2	0.0	0.92	0.30	0.03	-0.77	0.000
	0.092	min	-439.4	-14.65	-28.22	-0.13	-79.6	-0.2	-0.36	-0.19	-0.08	-14.58	-0.005
		max	-23.4	0.77	29.30	0.76	-4.2	1.5	0.92	0.30	0.03	-0.78	0.015
	0.184	min	-439.6	-14.64	-28.21	-0.13	-80.0	-0.4	-0.36	-0.20	-0.08	-14.58	-0.009
		max	-23.6	0.77	29.31	0.76	-4.2	2.9	0.92	0.30	0.03	-0.78	0.029
	1.837	min	-442.8	-14.23	-27.81	-0.14	-113.6	-4.1	-0.34	-0.30	-0.08	-14.69	-0.099
		max	-25.9	0.72	29.48	0.90	31.1	28.7	0.87	0.30	0.03	-0.86	0.300
	5.696	min	-450.3	-11.98	-25.87	-0.50	-214.1	-11.9	-0.18	-0.59	-0.04	-14.94	-0.447
		max	-31.5	0.29	28.81	1.70	143.5	85.0	0.52	1.21	0.02	-1.04	1.123
B	7.350	min	-453.5	-10.35	-24.60	-0.70	-257.5	-14.5	-0.00	-0.70	-0.00	-15.04	-0.803
		max	-33.8	0.00	28.05	2.30	191.1	105.4	0.00	2.30	0.00	-1.12	2.658
minimum			**-453.5**	**-14.66**	**-28.23**	**-0.70**	**-257.5**	**-14.5**	**-0.36**	**-0.70**	**-0.08**	**-15.04**	**-0.803**
maximum			**-23.3**	**0.77**	**29.48**	**2.30**	**191.1**	**105.4**	**0.92**	**2.30**	**0.03**	**-0.77**	**2.658**

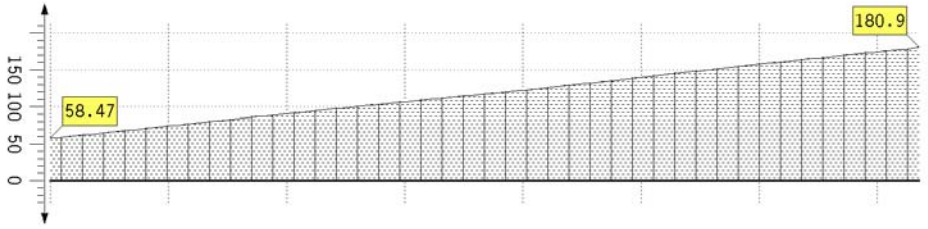
Results of steel design



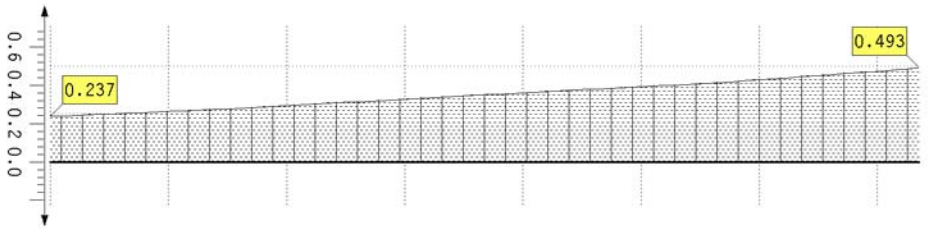
elastic
edge stresses
σ_x in MN/m²
min: -180.25
max: 180.94



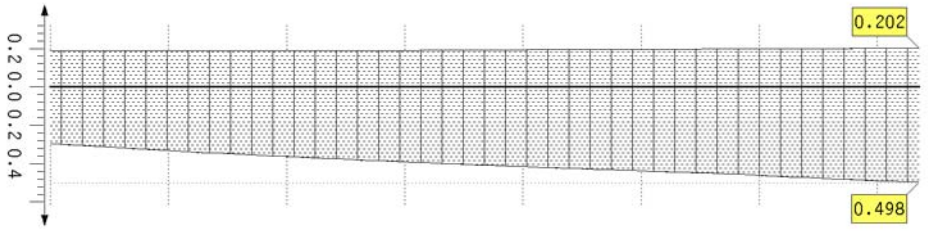
elastic
shear stress
τ in MN/m²
max: 12.05



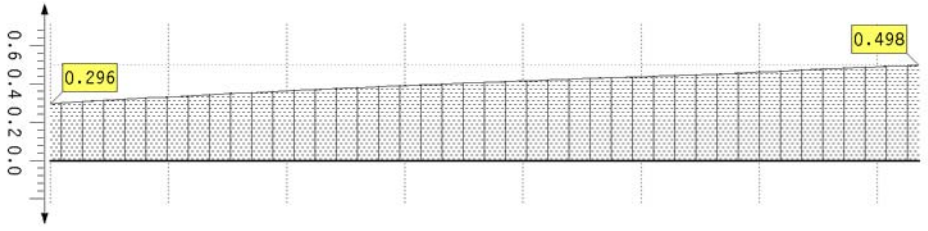
elastic
equivalent tensile stress
σ_v in MN/m²
max: 180.94



plastic
utilization $U_{\sigma,pl}$
of cross-section
max: 0.49



exist(c/t)/limit(c/t)
c/t 0-0 (two-s. hinged)
max: 0.20
c/t --0 (one-s. hinged)
max: 0.50



utilization
max: 0.50

Results of steel design

stresses are calculated elastically.

point	x	min σ_x	max σ_x	τ	σ_v	σ_{el}	$U_{\sigma,el}$	$U_{\sigma,pl}$	0-0	--0	U
-	m	MN/m²	MN/m²	MN/m²	MN/m²	MN/m²	-	-	-	-	-
A	0.000	-55.78	7.62	12.02	58.47	----	----	0.237	0.187	0.296	0.296
	1.102	-74.56	25.75	12.05	76.07	----	----	0.266	0.188	0.336	0.336
	2.664	-100.52	53.45	11.88	101.44	----	----	0.316	0.189	0.382	0.382
	4.134	-123.76	88.77	11.49	124.20	----	----	0.366	0.195	0.419	0.419
	5.053	-140.77	112.32	10.95	140.98	----	----	0.395	0.196	0.439	0.439
	6.156	-160.28	142.75	9.74	160.34	----	----	0.437	0.199	0.467	0.467
B	7.350	-180.25	180.94	7.17	180.94	----	----	0.493	0.202	0.498	0.498

Results of steel design

stresses are calculated elastically.

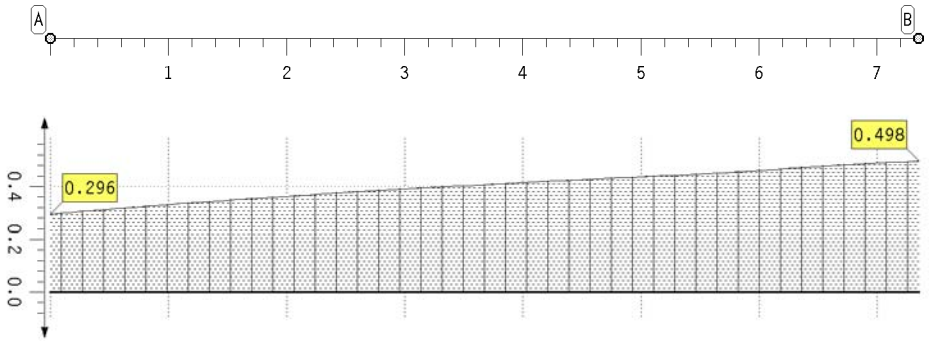
point	x	min σ_x	max σ_x	τ	σ_v	σ_{el}	$U_{\sigma,el}$	$U_{\sigma,pl}$	0-0	--0	U
-	m	MN/m²	MN/m²	MN/m²	MN/m²	MN/m²	-	-	-	-	-
minimum		-180.25	7.62	7.17	58.47	0.00	0.000	0.237	0.187	0.296	0.296
maximum		-55.78	180.94	12.05	180.94	0.00	0.000	0.493	0.202	0.498	0.498

Reactions in support points bzgl. der beam axis (γ_F-fach)

point	X	type	APx	APy	APz	AMx	AMy	AMz	ABx
-	m		kN	kN	kN	kNm	kNm	kNm	kNm²
A	0.000	min	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
		max	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B	7.350	min	-453.51	-10.35	-24.60	-0.70	-257.50	-14.47	-0.80
		max	-33.82	0.00	28.05	2.30	191.06	105.45	2.66

SUMMARY

Utilizations



utilization
max: 0.50

SECTION 1 AT X = 7.35 M

Description of cross-section

material (EN 1993): steel S235, t_{max} = 20 mm, $f_{y,k}$ = 235 MN/m²
cross-section type S1: I-cross-section
cross sectional geometry: h = 36.0 cm, s = 1.2 cm, b = 36.0 cm, t = 2.0 cm
section properties: A = 182.4 cm², I_m = 44940.8 cm⁴, I_n = 15556.6 cm⁴, I_{mn} = 0.0 cm⁴
section properties (torsion): I_T = 207.64 cm⁴, I_w = 4494528.00 cm⁶
3-sheet plate cross-section, reference point is web centre, angle of principal axis α = 0.00 °:
b_o = 36.00 cm, t_o = 2.00 cm, y_o = 0.00 cm, z_o = -17.00 cm
h_s = 32.00 cm, t_s = 1.20 cm
b_u = 36.00 cm, t_u = 2.00 cm, y_u = 0.00 cm, z_u = 17.00 cm
plastic form factors: $\alpha_{pl,\eta}$ = 1.101, $\alpha_{pl,\zeta}$ = 1.497

Results of load cases

Nr	u_x	u_y	u_z	φ_x	φ_y	φ_z	N	V_η	V_ζ	T	M_η	M_ζ	B	designation
	mm	mm	mm	‰	‰	‰	kN	kN	kN	kNm	kNm	kNm	kNm²	
action effect 1: permanent loads														
1	0.00	0.00	0.00	0.00	-0.00	0.00	-136.4	0.00	0.00	0.000	-22.66	0.00	0.000	Eigenlasten
action effect 2: snow loads														
2	0.00	0.00	0.00	0.00	-0.00	0.00	-166.9	0.00	0.00	0.000	-30.04	0.00	0.000	snow load
action effect 3: wind load														
3	0.00	0.00	0.00	0.00	-0.00	0.00	-21.1	-6.90	0.00	0.000	-3.80	50.71	0.000	Winddruck
4	0.00	0.00	0.00	0.00	-0.00	0.00	68.4	0.00	-0.00	0.000	12.31	0.00	0.000	Windzug
5	0.00	0.00	0.00	0.00	-0.00	0.00	0.0	-6.90	18.70	0.000	137.44	50.71	0.000	Wind Giebelwände
6	0.00	0.00	0.00	0.00	-0.00	0.00	0.0	0.00	-16.40	0.000	-120.54	0.00	0.000	Wind Längswände
imperfections														
1	0.00	0.00	0.00	0.00	3.19	-3.19	0.0	0.00	0.00	0.000	0.00	0.00	0.000	Schiefstellung y

verification 1: EC3 design resistance (Th. I. Ord.)

plastic cross-section verification: method of partial member forces with redistribution:
γ_M = 1.00, $f_{y,d}$ = 235.00 MN/m², $\tau_{R,d}$ = 135.68 MN/m²
no limitation of limiting bending moments.
plastic limiting member forces of cross-section parts in KN,m:
$V_{pl,o}$ = 976.9, $M_{pl,xp,o}$ = 9.50, $N_{pl,o}$ = 1692.0, $M_{pl,o}$ = 152.28, $I_{T,o}/I_T$ = 0.46, δ_o = 0.00
$V_{pl,s}$ = 521.0, $M_{pl,xp,s}$ = 3.07, $N_{pl,s}$ = 902.4, $M_{pl,s}$ = 72.19, $I_{T,s}/I_T$ = 0.09
$V_{pl,u}$ = 976.9, $M_{pl,xp,u}$ = 9.50, $N_{pl,u}$ = 1692.0, $M_{pl,u}$ = 152.28, $I_{T,u}/I_T$ = 0.46, δ_u = 0.00
limit values of (c/t)

Results of load spectra

Typ	N kN	V_η kN	V_ζ kN	T kNm	M_η kNm	M_ζ kNm	B kNm²	factorization
Extreme rule 1: standard extreme rule								
min N	-453.5	-6.21	0.00	0.000	-79.07	45.64	0.000	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3
max N	-33.8	0.00	0.00	0.000	-4.19	0.00	0.000	Lc1+1.5*Lc4
min Q_η	-168.1	-10.35	0.00	0.000	-28.36	76.07	0.000	Lc1+1.5*Lc3
max Q_η	-434.5	0.00	0.00	0.000	-75.66	0.00	0.000	1.35*Lc1+1.5*Lc2
min Q_ζ	-136.4	0.00	-24.60	0.000	-203.47	0.00	0.000	Lc1+1.5*Lc6
max Q_ζ	-309.3	-10.35	28.05	0.000	153.04	76.07	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5
min T	-136.4	0.00	0.00	0.000	-22.66	0.00	0.000	Lc1
max T	-453.5	-6.21	0.00	0.000	-79.07	45.64	0.000	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3
min M_η	-309.3	0.00	-24.60	0.000	-233.94	0.00	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6
max M_η	-136.4	-10.35	28.05	0.000	183.51	76.07	0.000	Lc1+1.5*Lc5
min M_ζ	-136.4	0.00	0.00	0.000	-22.66	0.00	0.000	Lc1
max M_ζ	-309.3	-10.35	28.05	0.000	153.04	76.07	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5
min B	-136.4	0.00	0.00	0.000	-22.66	0.00	0.000	Lc1
max B	-453.5	-6.21	0.00	0.000	-79.07	45.64	0.000	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3
min T_t	-136.4	0.00	0.00	0.000	-22.66	0.00	0.000	Lc1
max T_t	-453.5	-6.21	0.00	0.000	-79.07	45.64	0.000	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3
min T_w	-136.4	0.00	0.00	0.000	-22.66	0.00	0.000	Lc1
max T_w	-453.5	-6.21	0.00	0.000	-79.07	45.64	0.000	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3
min σ_1	-33.8	0.00	0.00	0.000	-4.19	0.00	0.000	Lc1+1.5*Lc4
max σ_1	-341.0	-10.35	0.00	0.000	-58.82	76.07	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3
min σ_2	-309.3	0.00	-24.60	0.000	-233.94	0.00	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6
max σ_2	-136.4	-10.35	28.05	0.000	183.51	76.07	0.000	Lc1+1.5*Lc5
min σ_3	-341.0	-10.35	0.00	0.000	-58.82	76.07	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3
max σ_3	-33.8	0.00	0.00	0.000	-4.19	0.00	0.000	Lc1+1.5*Lc4
min σ_4	-136.4	-10.35	28.05	0.000	183.51	76.07	0.000	Lc1+1.5*Lc5
max σ_4	-309.3	0.00	-24.60	0.000	-233.94	0.00	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6
min σ_5	-434.5	0.00	0.00	0.000	-75.66	0.00	0.000	1.35*Lc1+1.5*Lc2
max σ_5	-136.4	-10.35	28.05	0.000	183.51	76.07	0.000	Lc1+1.5*Lc5
min σ_6	-309.3	0.00	-24.60	0.000	-233.94	0.00	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6
max σ_6	-136.4	-10.35	28.05	0.000	183.51	76.07	0.000	Lc1+1.5*Lc5
min σ_7	-341.0	-10.35	0.00	0.000	-58.82	76.07	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3
max σ_7	-33.8	0.00	0.00	0.000	-4.19	0.00	0.000	Lc1+1.5*Lc4
min σ_8	-136.4	-10.35	28.05	0.000	183.51	76.07	0.000	Lc1+1.5*Lc5
max σ_8	-309.3	0.00	-24.60	0.000	-233.94	0.00	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6

Design calculation of load spectra

Extreme rule 1: min N
internal forces: N = -453.51 kN, V_η = -6.21 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -79.07 kNm, M_ζ = 45.64 kNm
normal stresses (elast.): σ_{max} = 59.62 MN/m², σ_{min} = -109.35 MN/m²
extr. stresses (elast.): σ = 109.35 MN/m², τ = 0.65 MN/m², σ_v = 109.35 MN/m²
partial member forces flange top: V_o = -3.11 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 22.82 kNm
partial member forces flange bottom: V_u = -3.11 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 22.82 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -453.51 kN, $M_{y,s}$ = -79.07 kNm
shear utilization: $U_{\tau,o}$ = 0.003, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.003
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.150, $U_{MS,u}$ = 0.150 ⇒ U_{MS} = 0.150
limiting normal forces flange top: -1560.06 kN ≤ N_o ≤ 1560.06 kN
limiting normal forces flange bottom: -1560.06 kN ≤ N_u ≤ 1560.06 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -4022.52 kN ≤ N ≤ 4022.52 kN ⇒ U_N = 0.113
utilization y-moment (centroid): -584.38 kNm ≤ $M_{y,s}$ ≤ 584.38 kNm ⇒ U_{My} = 0.135
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.285
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.478): c/t_{o-o} = 0.181, c/t_{--o} = 0.376
max. utilization: U = 0.376 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: max N
internal forces: N = -33.82 kN, V_η = 0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -4.19 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = -0.17 MN/m², σ_{min} = -3.53 MN/m²
extr. stresses (elast.): σ = 3.53 MN/m², τ = 0.00 MN/m², σ_v = 3.53 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm

partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -33.82 kN, $M_{y,s}$ = -4.19 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1692.00 kN ≤ N_o ≤ 1692.00 kN
limiting normal forces flange bottom: -1692.00 kN ≤ N_u ≤ 1692.00 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -4286.40 kN ≤ N ≤ 4286.40 kN ⇒ U_N = 0.008
utilization y-moment (centroid): -647.37 kNm ≤ $M_{y,s}$ ≤ 647.37 kNm ⇒ U_{My} = 0.006
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.014
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 8.264): c/t_{o-o} = 0.049, c/t_{--o} = 0.071
max. utilization: U = 0.071 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: min Q_η
internal forces: N = -168.07 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -28.36 kNm, M_ζ = 76.07 kNm
normal stresses (elast.): σ_{max} = 90.16 MN/m², σ_{min} = -108.59 MN/m²
extr. stresses (elast.): σ = 108.59 MN/m², τ = 1.08 MN/m², σ_v = 108.59 MN/m²
partial member forces flange top: V_o = -5.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.04 kNm
partial member forces flange bottom: V_u = -5.18 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 38.04 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -168.07 kN, $M_{y,s}$ = -28.36 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.005
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.250, $U_{MS,u}$ = 0.250 ⇒ U_{MS} = 0.250
limiting normal forces flange top: -1465.51 kN ≤ N_o ≤ 1465.51 kN
limiting normal forces flange bottom: -1465.51 kN ≤ N_u ≤ 1465.51 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -3833.42 kN ≤ N ≤ 3833.42 kN ⇒ U_N = 0.044
utilization y-moment (centroid): -567.96 kNm ≤ $M_{y,s}$ ≤ 567.96 kNm ⇒ U_{My} = 0.050
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.255
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.475): c/t_{o-o} = 0.110, c/t_{--o} = 0.358
max. utilization: U = 0.358 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: max Q_η
internal forces: N = -434.52 kN, V_η = 0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -75.66 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 6.48 MN/m², σ_{min} = -54.13 MN/m²
extr. stresses (elast.): σ = 54.13 MN/m², τ = 0.00 MN/m², σ_v = 54.13 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = -75.66 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1692.00 kN ≤ N_o ≤ 1692.00 kN
limiting normal forces flange bottom: -1692.00 kN ≤ N_u ≤ 1692.00 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -4286.40 kN ≤ N ≤ 4286.40 kN ⇒ U_N = 0.101
utilization y-moment (centroid): -630.73 kNm ≤ $M_{y,s}$ ≤ 630.73 kNm ⇒ U_{My} = 0.120
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.205
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.117): c/t_{o-o} = 0.178, c/t_{--o} = 0.278
max. utilization: U = 0.278 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: min Q_ζ
internal forces: N = -136.42 kN, V_η = 0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.000 kNm, M_η = -203.47 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 74.02 MN/m², σ_{min} = -88.98 MN/m²
extr. stresses (elast.): σ = 88.98 MN/m², τ = 6.29 MN/m², σ_v = 89.02 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = -203.47 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.047 ⇒ U_τ = 0.047
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1692.00 kN ≤ N_o ≤ 1692.00 kN
limiting normal forces flange bottom: -1692.00 kN ≤ N_u ≤ 1692.00 kN
limiting normal forces web: -901.39 kN ≤ N_s ≤ 901.39 kN
utilization normal force: -4285.39 kN ≤ N ≤ 4285.39 kN ⇒ U_N = 0.032
utilization y-moment (centroid): -645.74 kNm ≤ $M_{y,s}$ ≤ 645.74 kNm ⇒ U_{My} = 0.315
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.323

utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.668): c/t_{o-o} = 0.140, c/t_{--o} = 0.353
max. utilization: U = 0.353 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: max Q_ζ
internal forces: N = -309.35 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.000 kNm, M_η = 153.04 kNm, M_ζ = 76.07 kNm
normal stresses (elast.): σ_{max} = 132.36 MN/m², σ_{min} = -166.28 MN/m²
extr. stresses (elast.): σ = 166.28 MN/m², τ = 7.17 MN/m², σ_v = 166.28 MN/m²
partial member forces flange top: V_o = -5.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.04 kNm
partial member forces flange bottom: V_u = -5.18 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 38.04 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = 153.04 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.054 ⇒ U_τ = 0.054
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.250, $U_{MS,u}$ = 0.250 ⇒ U_{MS} = 0.250
limiting normal forces flange top: -1465.51 kN ≤ N_o ≤ 1465.51 kN
limiting normal forces flange bottom: -1465.51 kN ≤ N_u ≤ 1465.51 kN
limiting normal forces web: -901.09 kN ≤ N_s ≤ 901.09 kN
utilization normal force: -3832.11 kN ≤ N ≤ 3832.11 kN ⇒ U_N = 0.081
utilization y-moment (centroid): -561.86 kNm ≤ $M_{y,s}$ ≤ 561.86 kNm ⇒ U_{My} = 0.272
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.407
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.201): c/t_{o-o} = 0.162, c/t_{--o} = 0.460
max. utilization: U = 0.460 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: min T
internal forces: N = -136.42 kN, V_η = 0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -22.66 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 1.60 MN/m², σ_{min} = -16.56 MN/m²
extr. stresses (elast.): σ = 16.56 MN/m², τ = 0.00 MN/m², σ_v = 16.56 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = -22.66 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1692.00 kN ≤ N_o ≤ 1692.00 kN
limiting normal forces flange bottom: -1692.00 kN ≤ N_u ≤ 1692.00 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -4286.40 kN ≤ N ≤ 4286.40 kN ⇒ U_N = 0.032
utilization y-moment (centroid): -645.82 kNm ≤ $M_{y,s}$ ≤ 645.82 kNm ⇒ U_{My} = 0.035
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.063
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 3.826): c/t_{o-o} = 0.099, c/t_{--o} = 0.154
max. utilization: U = 0.154 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: max T
internal forces: N = -453.51 kN, V_η = -6.21 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -79.07 kNm, M_ζ = 45.64 kNm
normal stresses (elast.): σ_{max} = 59.62 MN/m², σ_{min} = -109.35 MN/m²
extr. stresses (elast.): σ = 109.35 MN/m², τ = 0.65 MN/m², σ_v = 109.35 MN/m²
partial member forces flange top: V_o = -3.11 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 22.82 kNm
partial member forces flange bottom: V_u = -3.11 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 22.82 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -453.51 kN, $M_{y,s}$ = -79.07 kNm
shear utilization: $U_{\tau,o}$ = 0.003, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.003
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.150, $U_{MS,u}$ = 0.150 ⇒ U_{MS} = 0.150
limiting normal forces flange top: -1560.06 kN ≤ N_o ≤ 1560.06 kN
limiting normal forces flange bottom: -1560.06 kN ≤ N_u ≤ 1560.06 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -4022.52 kN ≤ N ≤ 4022.52 kN ⇒ U_N = 0.113
utilization y-moment (centroid): -584.38 kNm ≤ $M_{y,s}$ ≤ 584.38 kNm ⇒ U_{My} = 0.135
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.285
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.478): c/t_{o-o} = 0.181, c/t_{--o} = 0.376
max. utilization: U = 0.376 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: min M_η
internal forces: N = -309.35 kN, V_η = 0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.000 kNm, M_η = -233.94 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 76.74 MN/m², σ_{min} = -110.66 MN/m²
extr. stresses (elast.): σ = 110.66 MN/m², τ = 6.29 MN/m², σ_v = 110.69 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = -233.94 kNm

shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.047 \Rightarrow U_\tau = 0.047$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1692.00\ kN \le N_o \le 1692.00\ kN$
limiting normal forces flange bottom: $-1692.00\ kN \le N_u \le 1692.00\ kN$
limiting normal forces web: $-901.39\ kN \le N_s \le 901.39\ kN$
utilization normal force: $-4285.39\ kN \le N \le 4285.39\ kN \Rightarrow U_N = 0.072$
utilization y-moment (centroid): $-638.90\ kNm \le M_{y,s} \le 638.90\ kNm \Rightarrow U_{My} = 0.366$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.396$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.493$): $c/t_{o-o} = 0.176$, $c/t_{--o} = 0.394$
max. utilization: $U = 0.396 \le 1 \Rightarrow$ **verification meets the requirements**

Extreme rule 1: max M_η
internal forces: $N = -136.42\ kN$, $V_\eta = -10.35\ kN$, $V_\zeta = 28.05\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = 183.51\ kNm$, $M_\zeta = 76.07\ kNm$
normal stresses (elast.): $\sigma_{max} = 154.04\ MN/m^2$, $\sigma_{min} = -169.00\ MN/m^2$
extr. stresses (elast.): $\sigma = 169.00\ MN/m^2$, $\tau = 7.17\ MN/m^2$, $\sigma_v = 169.00\ MN/m^2$
partial member forces flange top: $V_o = -5.18\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 38.04\ kNm$
partial member forces flange bottom: $V_u = -5.18\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 38.04\ kNm$
partial member forces web: $V_s = 28.05\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -136.42\ kN$, $M_{y,s} = 183.51\ kNm$
shear utilization: $U_{\tau,o} = 0.005$, $U_{\tau,u} = 0.005$, $U_{\tau,s} = 0.054 \Rightarrow U_\tau = 0.054$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.250$, $U_{MS,u} = 0.250 \Rightarrow U_{MS} = 0.250$
limiting normal forces flange top: $-1465.51\ kN \le N_o \le 1465.51\ kN$
limiting normal forces flange bottom: $-1465.51\ kN \le N_u \le 1465.51\ kN$
limiting normal forces web: $-901.09\ kN \le N_s \le 901.09\ kN$
utilization normal force: $-3832.11\ kN \le N \le 3832.11\ kN \Rightarrow U_N = 0.036$
utilization y-moment (centroid): $-568.71\ kNm \le M_{y,s} \le 568.71\ kNm \Rightarrow U_{My} = 0.323$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.426$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.194$): $c/t_{o-o} = 0.136$, $c/t_{--o} = 0.463$
max. utilization: $U = 0.463 \le 1 \Rightarrow$ **verification meets the requirements**

Extreme rule 1: min M_ζ
internal forces: $N = -136.42\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = 0.00\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -22.66\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = 1.60\ MN/m^2$, $\sigma_{min} = -16.56\ MN/m^2$
extr. stresses (elast.): $\sigma = 16.56\ MN/m^2$, $\tau = 0.00\ MN/m^2$, $\sigma_v = 16.56\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = 0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -136.42\ kN$, $M_{y,s} = -22.66\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1692.00\ kN \le N_o \le 1692.00\ kN$
limiting normal forces flange bottom: $-1692.00\ kN \le N_u \le 1692.00\ kN$
limiting normal forces web: $-902.40\ kN \le N_s \le 902.40\ kN$
utilization normal force: $-4286.40\ kN \le N \le 4286.40\ kN \Rightarrow U_N = 0.032$
utilization y-moment (centroid): $-645.82\ kNm \le M_{y,s} \le 645.82\ kNm \Rightarrow U_{My} = 0.035$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.063$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 3.826$): $c/t_{o-o} = 0.099$, $c/t_{--o} = 0.154$
max. utilization: $U = 0.154 \le 1 \Rightarrow$ **verification meets the requirements**

Extreme rule 1: max M_ζ
internal forces: $N = -309.35\ kN$, $V_\eta = -10.35\ kN$, $V_\zeta = 28.05\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = 153.04\ kNm$, $M_\zeta = 76.07\ kNm$
normal stresses (elast.): $\sigma_{max} = 132.36\ MN/m^2$, $\sigma_{min} = -166.28\ MN/m^2$
extr. stresses (elast.): $\sigma = 166.28\ MN/m^2$, $\tau = 7.17\ MN/m^2$, $\sigma_v = 166.28\ MN/m^2$
partial member forces flange top: $V_o = -5.18\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 38.04\ kNm$
partial member forces flange bottom: $V_u = -5.18\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 38.04\ kNm$
partial member forces web: $V_s = 28.05\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -309.35\ kN$, $M_{y,s} = 153.04\ kNm$
shear utilization: $U_{\tau,o} = 0.005$, $U_{\tau,u} = 0.005$, $U_{\tau,s} = 0.054 \Rightarrow U_\tau = 0.054$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.250$, $U_{MS,u} = 0.250 \Rightarrow U_{MS} = 0.250$
limiting normal forces flange top: $-1465.51\ kN \le N_o \le 1465.51\ kN$
limiting normal forces flange bottom: $-1465.51\ kN \le N_u \le 1465.51\ kN$
limiting normal forces web: $-901.09\ kN \le N_s \le 901.09\ kN$
utilization normal force: $-3832.11\ kN \le N \le 3832.11\ kN \Rightarrow U_N = 0.081$
utilization y-moment (centroid): $-561.86\ kNm \le M_{y,s} \le 561.86\ kNm \Rightarrow U_{My} = 0.272$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.407$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.201$): $c/t_{o-o} = 0.162$, $c/t_{--o} = 0.460$
max. utilization: $U = 0.460 \le 1 \Rightarrow$ **verification meets the requirements**

Design calculation of load spectra

Extreme rule 1: min B
internal forces: $N = -136.42$ kN, $V_\eta = 0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.000$ kNm, $M_\eta = -22.66$ kNm, $M_\zeta = 0.00$ kNm
normal stresses (elast.): $\sigma_{max} = 1.60$ MN/m², $\sigma_{min} = -16.56$ MN/m²
extr. stresses (elast.): $\sigma = 16.56$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 16.56$ MN/m²
partial member forces flange top: $V_o = 0.00$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 0.00$ kNm
partial member forces flange bottom: $V_u = -0.00$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 0.00$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -136.42$ kN, $M_{y,s} = -22.66$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: -1692.00 kN $\le N_o \le 1692.00$ kN
limiting normal forces flange bottom: -1692.00 kN $\le N_u \le 1692.00$ kN
limiting normal forces web: -902.40 kN $\le N_s \le 902.40$ kN
utilization normal force: -4286.40 kN $\le N \le 4286.40$ kN $\Rightarrow U_N = 0.032$
utilization y-moment (centroid): -645.82 kNm $\le M_{y,s} \le 645.82$ kNm $\Rightarrow U_{My} = 0.035$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.063$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 3.826$): $c/t_{o-o} = 0.099$, $c/t_{--o} = 0.154$
max. utilization: $U = 0.154 \le 1 \Rightarrow$ **verification meets the requirements**

Extreme rule 1: max B
internal forces: $N = -453.51$ kN, $V_\eta = -6.21$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.000$ kNm, $M_\eta = -79.07$ kNm, $M_\zeta = 45.64$ kNm
normal stresses (elast.): $\sigma_{max} = 59.62$ MN/m², $\sigma_{min} = -109.35$ MN/m²
extr. stresses (elast.): $\sigma = 109.35$ MN/m², $\tau = 0.65$ MN/m², $\sigma_v = 109.35$ MN/m²
partial member forces flange top: $V_o = -3.11$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 22.82$ kNm
partial member forces flange bottom: $V_u = -3.11$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 22.82$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -453.51$ kN, $M_{y,s} = -79.07$ kNm
shear utilization: $U_{\tau,o} = 0.003$, $U_{\tau,u} = 0.003$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.003$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.150$, $U_{MS,u} = 0.150 \Rightarrow U_{MS} = 0.150$
limiting normal forces flange top: -1560.06 kN $\le N_o \le 1560.06$ kN
limiting normal forces flange bottom: -1560.06 kN $\le N_u \le 1560.06$ kN
limiting normal forces web: -902.40 kN $\le N_s \le 902.40$ kN
utilization normal force: -4022.52 kN $\le N \le 4022.52$ kN $\Rightarrow U_N = 0.113$
utilization y-moment (centroid): -584.38 kNm $\le M_{y,s} \le 584.38$ kNm $\Rightarrow U_{My} = 0.135$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.285$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.478$): $c/t_{o-o} = 0.181$, $c/t_{--o} = 0.376$
max. utilization: $U = 0.376 \le 1 \Rightarrow$ **verification meets the requirements**

Extreme rule 1: min T_t
internal forces: $N = -136.42$ kN, $V_\eta = 0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.000$ kNm, $M_\eta = -22.66$ kNm, $M_\zeta = 0.00$ kNm
normal stresses (elast.): $\sigma_{max} = 1.60$ MN/m², $\sigma_{min} = -16.56$ MN/m²
extr. stresses (elast.): $\sigma = 16.56$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 16.56$ MN/m²
partial member forces flange top: $V_o = 0.00$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 0.00$ kNm
partial member forces flange bottom: $V_u = -0.00$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 0.00$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -136.42$ kN, $M_{y,s} = -22.66$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: -1692.00 kN $\le N_o \le 1692.00$ kN
limiting normal forces flange bottom: -1692.00 kN $\le N_u \le 1692.00$ kN
limiting normal forces web: -902.40 kN $\le N_s \le 902.40$ kN
utilization normal force: -4286.40 kN $\le N \le 4286.40$ kN $\Rightarrow U_N = 0.032$
utilization y-moment (centroid): -645.82 kNm $\le M_{y,s} \le 645.82$ kNm $\Rightarrow U_{My} = 0.035$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.063$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 3.826$): $c/t_{o-o} = 0.099$, $c/t_{--o} = 0.154$
max. utilization: $U = 0.154 \le 1 \Rightarrow$ **verification meets the requirements**

Extreme rule 1: max T_t
internal forces: $N = -453.51$ kN, $V_\eta = -6.21$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.000$ kNm, $M_\eta = -79.07$ kNm, $M_\zeta = 45.64$ kNm
normal stresses (elast.): $\sigma_{max} = 59.62$ MN/m², $\sigma_{min} = -109.35$ MN/m²
extr. stresses (elast.): $\sigma = 109.35$ MN/m², $\tau = 0.65$ MN/m², $\sigma_v = 109.35$ MN/m²
partial member forces flange top: $V_o = -3.11$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 22.82$ kNm
partial member forces flange bottom: $V_u = -3.11$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 22.82$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -453.51$ kN, $M_{y,s} = -79.07$ kNm
shear utilization: $U_{\tau,o} = 0.003$, $U_{\tau,u} = 0.003$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.003$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$

flange bending utilization M_{Sa}: $U_{MS,o} = 0.150$, $U_{MS,u} = 0.150 \Rightarrow U_{MS} = 0.150$
limiting normal forces flange top: $-1560.06\ kN \le N_o \le 1560.06\ kN$
limiting normal forces flange bottom: $-1560.06\ kN \le N_u \le 1560.06\ kN$
limiting normal forces web: $-902.40\ kN \le N_s \le 902.40\ kN$
utilization normal force: $-4022.52\ kN \le N \le 4022.52\ kN \Rightarrow U_N = 0.113$
utilization y-moment (centroid): $-584.38\ kNm \le M_{y,s} \le 584.38\ kNm \Rightarrow U_{My} = 0.135$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.285$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.478$): $c/t_{o-o} = 0.181$, $c/t_{--o} = 0.376$
max. utilization: $U = 0.376 \le 1 \Rightarrow$ **verification meets the requirements**

Extreme rule 1: min T_w
internal forces: $N = -136.42\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = 0.00\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -22.66\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = 1.60\ MN/m^2$, $\sigma_{min} = -16.56\ MN/m^2$
extr. stresses (elast.): $\sigma = 16.56\ MN/m^2$, $\tau = 0.00\ MN/m^2$, $\sigma_v = 16.56\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = 0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -136.42\ kN$, $M_{y,s} = -22.66\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1692.00\ kN \le N_o \le 1692.00\ kN$
limiting normal forces flange bottom: $-1692.00\ kN \le N_u \le 1692.00\ kN$
limiting normal forces web: $-902.40\ kN \le N_s \le 902.40\ kN$
utilization normal force: $-4286.40\ kN \le N \le 4286.40\ kN \Rightarrow U_N = 0.032$
utilization y-moment (centroid): $-645.82\ kNm \le M_{y,s} \le 645.82\ kNm \Rightarrow U_{My} = 0.035$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.063$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 3.826$): $c/t_{o-o} = 0.099$, $c/t_{--o} = 0.154$
max. utilization: $U = 0.154 \le 1 \Rightarrow$ **verification meets the requirements**

Extreme rule 1: max T_w
internal forces: $N = -453.51\ kN$, $V_\eta = -6.21\ kN$, $V_\zeta = 0.00\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -79.07\ kNm$, $M_\zeta = 45.64\ kNm$
normal stresses (elast.): $\sigma_{max} = 59.62\ MN/m^2$, $\sigma_{min} = -109.35\ MN/m^2$
extr. stresses (elast.): $\sigma = 109.35\ MN/m^2$, $\tau = 0.65\ MN/m^2$, $\sigma_v = 109.35\ MN/m^2$
partial member forces flange top: $V_o = -3.11\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 22.82\ kNm$
partial member forces flange bottom: $V_u = -3.11\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 22.82\ kNm$
partial member forces web: $V_s = 0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -453.51\ kN$, $M_{y,s} = -79.07\ kNm$
shear utilization: $U_{\tau,o} = 0.003$, $U_{\tau,u} = 0.003$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.003$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.150$, $U_{MS,u} = 0.150 \Rightarrow U_{MS} = 0.150$
limiting normal forces flange top: $-1560.06\ kN \le N_o \le 1560.06\ kN$
limiting normal forces flange bottom: $-1560.06\ kN \le N_u \le 1560.06\ kN$
limiting normal forces web: $-902.40\ kN \le N_s \le 902.40\ kN$
utilization normal force: $-4022.52\ kN \le N \le 4022.52\ kN \Rightarrow U_N = 0.113$
utilization y-moment (centroid): $-584.38\ kNm \le M_{y,s} \le 584.38\ kNm \Rightarrow U_{My} = 0.135$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.285$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.478$): $c/t_{o-o} = 0.181$, $c/t_{--o} = 0.376$
max. utilization: $U = 0.376 \le 1 \Rightarrow$ **verification meets the requirements**

Extreme rule 1: min σ_1
internal forces: $N = -33.82\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = 0.00\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -4.19\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = -0.17\ MN/m^2$, $\sigma_{min} = -3.53\ MN/m^2$
extr. stresses (elast.): $\sigma = 3.53\ MN/m^2$, $\tau = 0.00\ MN/m^2$, $\sigma_v = 3.53\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = 0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -33.82\ kN$, $M_{y,s} = -4.19\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1692.00\ kN \le N_o \le 1692.00\ kN$
limiting normal forces flange bottom: $-1692.00\ kN \le N_u \le 1692.00\ kN$
limiting normal forces web: $-902.40\ kN \le N_s \le 902.40\ kN$
utilization normal force: $-4286.40\ kN \le N \le 4286.40\ kN \Rightarrow U_N = 0.008$
utilization y-moment (centroid): $-647.37\ kNm \le M_{y,s} \le 647.37\ kNm \Rightarrow U_{My} = 0.006$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.014$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 8.264$): $c/t_{o-o} = 0.049$, $c/t_{--o} = 0.071$
max. utilization: $U = 0.071 \le 1 \Rightarrow$ **verification meets the requirements**

Extreme rule 1: max σ_1
internal forces: $N = -341.00\ kN$, $V_\eta = -10.35\ kN$, $V_\zeta = 0.00\ kN$

internal moments: T = 0.000 kNm, M_η = -58.82 kNm, M_ζ = 76.07 kNm
normal stresses (elast.): σ_{max} = 92.89 MN/m², σ_{min} = -130.28 MN/m²
extr. stresses (elast.): σ = 130.28 MN/m², τ = 1.08 MN/m², σ_v = 130.28 MN/m²
partial member forces flange top: V_o = -5.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.04 kNm
partial member forces flange bottom: V_u = -5.18 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 38.04 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -341.00 kN, $M_{y,s}$ = -58.82 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.005
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.250, $U_{MS,u}$ = 0.250 ⇒ U_{MS} = 0.250
limiting normal forces flange top: -1465.51 kN ≤ N_o ≤ 1465.51 kN
limiting normal forces flange bottom: -1465.51 kN ≤ N_u ≤ 1465.51 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -3833.42 kN ≤ N ≤ 3833.42 kN ⇒ U_N = 0.089
utilization y-moment (centroid): -560.16 kNm ≤ $M_{y,s}$ ≤ 560.16 kNm ⇒ U_{My} = 0.105
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.300
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.350): c/t_{o-o} = 0.157, c/t_{--o} = 0.400
max. utilization: U = 0.400 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: min σ_2
internal forces: N = -309.35 kN, V_η = 0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.000 kNm, M_η = -233.94 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 76.74 MN/m², σ_{min} = -110.66 MN/m²
extr. stresses (elast.): σ = 110.66 MN/m², τ = 6.29 MN/m², σ_v = 110.69 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = -233.94 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.047 ⇒ U_τ = 0.047
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1692.00 kN ≤ N_o ≤ 1692.00 kN
limiting normal forces flange bottom: -1692.00 kN ≤ N_u ≤ 1692.00 kN
limiting normal forces web: -901.39 kN ≤ N_s ≤ 901.39 kN
utilization normal force: -4285.39 kN ≤ N ≤ 4285.39 kN ⇒ U_N = 0.072
utilization y-moment (centroid): -638.90 kNm ≤ $M_{y,s}$ ≤ 638.90 kNm ⇒ U_{My} = 0.366
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.396
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.493): c/t_{o-o} = 0.176, c/t_{--o} = 0.394
max. utilization: U = 0.396 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: max σ_2
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.000 kNm, M_η = 183.51 kNm, M_ζ = 76.07 kNm
normal stresses (elast.): σ_{max} = 154.04 MN/m², σ_{min} = -169.00 MN/m²
extr. stresses (elast.): σ = 169.00 MN/m², τ = 7.17 MN/m², σ_v = 169.00 MN/m²
partial member forces flange top: V_o = -5.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.04 kNm
partial member forces flange bottom: V_u = -5.18 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 38.04 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 183.51 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.054 ⇒ U_τ = 0.054
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.250, $U_{MS,u}$ = 0.250 ⇒ U_{MS} = 0.250
limiting normal forces flange top: -1465.51 kN ≤ N_o ≤ 1465.51 kN
limiting normal forces flange bottom: -1465.51 kN ≤ N_u ≤ 1465.51 kN
limiting normal forces web: -901.09 kN ≤ N_s ≤ 901.09 kN
utilization normal force: -3832.11 kN ≤ N ≤ 3832.11 kN ⇒ U_N = 0.036
utilization y-moment (centroid): -568.71 kNm ≤ $M_{y,s}$ ≤ 568.71 kNm ⇒ U_{My} = 0.323
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.426
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.194): c/t_{o-o} = 0.136, c/t_{--o} = 0.463
max. utilization: U = 0.463 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: min σ_3
internal forces: N = -341.00 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -58.82 kNm, M_ζ = 76.07 kNm
normal stresses (elast.): σ_{max} = 92.89 MN/m², σ_{min} = -130.28 MN/m²
extr. stresses (elast.): σ = 130.28 MN/m², τ = 1.08 MN/m², σ_v = 130.28 MN/m²
partial member forces flange top: V_o = -5.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.04 kNm
partial member forces flange bottom: V_u = -5.18 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 38.04 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -341.00 kN, $M_{y,s}$ = -58.82 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.005
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.250, $U_{MS,u}$ = 0.250 ⇒ U_{MS} = 0.250
limiting normal forces flange top: -1465.51 kN ≤ N_o ≤ 1465.51 kN

limiting normal forces flange bottom: -1465.51 kN ≤ N_u ≤ 1465.51 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -3833.42 kN ≤ N ≤ 3833.42 kN ⇒ U_N = 0.089
utilization y-moment (centroid): -560.16 kNm ≤ $M_{y,s}$ ≤ 560.16 kNm ⇒ U_{My} = 0.105
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.300
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.350): c/t_{o-o} = 0.157, c/t_{--o} = 0.400
max. utilization: U = 0.400 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: max σ_3
internal forces: N = -33.82 kN, V_η = 0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -4.19 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = -0.17 MN/m², σ_{min} = -3.53 MN/m²
extr. stresses (elast.): σ = 3.53 MN/m², τ = 0.00 MN/m², σ_v = 3.53 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -33.82 kN, $M_{y,s}$ = -4.19 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1692.00 kN ≤ N_o ≤ 1692.00 kN
limiting normal forces flange bottom: -1692.00 kN ≤ N_u ≤ 1692.00 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -4286.40 kN ≤ N ≤ 4286.40 kN ⇒ U_N = 0.008
utilization y-moment (centroid): -647.37 kNm ≤ $M_{y,s}$ ≤ 647.37 kNm ⇒ U_{My} = 0.006
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.014
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 8.264): c/t_{o-o} = 0.049, c/t_{--o} = 0.071
max. utilization: U = 0.071 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: min σ_4
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.000 kNm, M_η = 183.51 kNm, M_ζ = 76.07 kNm
normal stresses (elast.): σ_{max} = 154.04 MN/m², σ_{min} = -169.00 MN/m²
extr. stresses (elast.): σ = 169.00 MN/m², τ = 7.17 MN/m², σ_v = 169.00 MN/m²
partial member forces flange top: V_o = -5.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.04 kNm
partial member forces flange bottom: V_u = -5.18 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 38.04 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 183.51 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.054 ⇒ U_τ = 0.054
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.250, $U_{MS,u}$ = 0.250 ⇒ U_{MS} = 0.250
limiting normal forces flange top: -1465.51 kN ≤ N_o ≤ 1465.51 kN
limiting normal forces flange bottom: -1465.51 kN ≤ N_u ≤ 1465.51 kN
limiting normal forces web: -901.09 kN ≤ N_s ≤ 901.09 kN
utilization normal force: -3832.11 kN ≤ N ≤ 3832.11 kN ⇒ U_N = 0.036
utilization y-moment (centroid): -568.71 kNm ≤ $M_{y,s}$ ≤ 568.71 kNm ⇒ U_{My} = 0.323
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.426
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.194): c/t_{o-o} = 0.136, c/t_{--o} = 0.463
max. utilization: U = 0.463 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: max σ_4
internal forces: N = -309.35 kN, V_η = 0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.000 kNm, M_η = -233.94 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 76.74 MN/m², σ_{min} = -110.66 MN/m²
extr. stresses (elast.): σ = 110.66 MN/m², τ = 6.29 MN/m², σ_v = 110.69 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = -233.94 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.047 ⇒ U_τ = 0.047
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1692.00 kN ≤ N_o ≤ 1692.00 kN
limiting normal forces flange bottom: -1692.00 kN ≤ N_u ≤ 1692.00 kN
limiting normal forces web: -901.39 kN ≤ N_s ≤ 901.39 kN
utilization normal force: -4285.39 kN ≤ N ≤ 4285.39 kN ⇒ U_N = 0.072
utilization y-moment (centroid): -638.90 kNm ≤ $M_{y,s}$ ≤ 638.90 kNm ⇒ U_{My} = 0.366
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.396
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.493): c/t_{o-o} = 0.176, c/t_{--o} = 0.394
max. utilization: U = 0.396 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: min σ_5
internal forces: N = -434.52 kN, V_η = 0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -75.66 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 6.48 MN/m², σ_{min} = -54.13 MN/m²

extr. stresses (elast.): σ = 54.13 MN/m², τ = 0.00 MN/m², σ_v = 54.13 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = -75.66 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1692.00 kN ≤ N_o ≤ 1692.00 kN
limiting normal forces flange bottom: -1692.00 kN ≤ N_u ≤ 1692.00 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -4286.40 kN ≤ N ≤ 4286.40 kN ⇒ U_N = 0.101
utilization y-moment (centroid): -630.73 kNm ≤ $M_{y,s}$ ≤ 630.73 kNm ⇒ U_{My} = 0.120
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.205
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.117): c/t_{o-o} = 0.178, c/t_{--o} = 0.278
max. utilization: U = 0.278 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: max σ_5
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.000 kNm, M_η = 183.51 kNm, M_ζ = 76.07 kNm
normal stresses (elast.): σ_{max} = 154.04 MN/m², σ_{min} = -169.00 MN/m²
extr. stresses (elast.): σ = 169.00 MN/m², τ = 7.17 MN/m², σ_v = 169.00 MN/m²
partial member forces flange top: V_o = -5.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.04 kNm
partial member forces flange bottom: V_u = -5.18 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 38.04 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 183.51 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.054 ⇒ U_τ = 0.054
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.250, $U_{MS,u}$ = 0.250 ⇒ U_{MS} = 0.250
limiting normal forces flange top: -1465.51 kN ≤ N_o ≤ 1465.51 kN
limiting normal forces flange bottom: -1465.51 kN ≤ N_u ≤ 1465.51 kN
limiting normal forces web: -901.09 kN ≤ N_s ≤ 901.09 kN
utilization normal force: -3832.11 kN ≤ N ≤ 3832.11 kN ⇒ U_N = 0.036
utilization y-moment (centroid): -568.71 kNm ≤ $M_{y,s}$ ≤ 568.71 kNm ⇒ U_{My} = 0.323
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.426
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.194): c/t_{o-o} = 0.136, c/t_{--o} = 0.463
max. utilization: U = 0.463 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: min σ_6
internal forces: N = -309.35 kN, V_η = 0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.000 kNm, M_η = -233.94 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 76.74 MN/m², σ_{min} = -110.66 MN/m²
extr. stresses (elast.): σ = 110.66 MN/m², τ = 6.29 MN/m², σ_v = 110.69 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = -233.94 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.047 ⇒ U_τ = 0.047
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1692.00 kN ≤ N_o ≤ 1692.00 kN
limiting normal forces flange bottom: -1692.00 kN ≤ N_u ≤ 1692.00 kN
limiting normal forces web: -901.39 kN ≤ N_s ≤ 901.39 kN
utilization normal force: -4285.39 kN ≤ N ≤ 4285.39 kN ⇒ U_N = 0.072
utilization y-moment (centroid): -638.90 kNm ≤ $M_{y,s}$ ≤ 638.90 kNm ⇒ U_{My} = 0.366
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.396
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.493): c/t_{o-o} = 0.176, c/t_{--o} = 0.394
max. utilization: U = 0.396 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: max σ_6
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.000 kNm, M_η = 183.51 kNm, M_ζ = 76.07 kNm
normal stresses (elast.): σ_{max} = 154.04 MN/m², σ_{min} = -169.00 MN/m²
extr. stresses (elast.): σ = 169.00 MN/m², τ = 7.17 MN/m², σ_v = 169.00 MN/m²
partial member forces flange top: V_o = -5.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.04 kNm
partial member forces flange bottom: V_u = -5.18 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 38.04 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 183.51 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.054 ⇒ U_τ = 0.054
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.250, $U_{MS,u}$ = 0.250 ⇒ U_{MS} = 0.250
limiting normal forces flange top: -1465.51 kN ≤ N_o ≤ 1465.51 kN
limiting normal forces flange bottom: -1465.51 kN ≤ N_u ≤ 1465.51 kN
limiting normal forces web: -901.09 kN ≤ N_s ≤ 901.09 kN

utilization normal force: -3832.11 kN ≤ N ≤ 3832.11 kN ⇒ U_N = 0.036
utilization y-moment (centroid): -568.71 kNm ≤ $M_{y,s}$ ≤ 568.71 kNm ⇒ U_{My} = 0.323
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.426
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.194): c/t_{o-o} = 0.136, c/t_{--o} = 0.463
max. utilization: U = 0.463 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: min σ_7
internal forces: N = -341.00 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -58.82 kNm, M_ζ = 76.07 kNm
normal stresses (elast.): σ_{max} = 92.89 MN/m², σ_{min} = -130.28 MN/m²
extr. stresses (elast.): σ = 130.28 MN/m², τ = 1.08 MN/m², σ_v = 130.28 MN/m²
partial member forces flange top: V_o = -5.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.04 kNm
partial member forces flange bottom: V_u = -5.18 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 38.04 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -341.00 kN, $M_{y,s}$ = -58.82 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.005
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.250, $U_{MS,u}$ = 0.250 ⇒ U_{MS} = 0.250
limiting normal forces flange top: -1465.51 kN ≤ N_o ≤ 1465.51 kN
limiting normal forces flange bottom: -1465.51 kN ≤ N_u ≤ 1465.51 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -3833.42 kN ≤ N ≤ 3833.42 kN ⇒ U_N = 0.089
utilization y-moment (centroid): -560.16 kNm ≤ $M_{y,s}$ ≤ 560.16 kNm ⇒ U_{My} = 0.105
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.300
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.350): c/t_{o-o} = 0.157, c/t_{--o} = 0.400
max. utilization: U = 0.400 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: max σ_7
internal forces: N = -33.82 kN, V_η = 0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -4.19 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = -0.17 MN/m², σ_{min} = -3.53 MN/m²
extr. stresses (elast.): σ = 3.53 MN/m², τ = 0.00 MN/m², σ_v = 3.53 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -33.82 kN, $M_{y,s}$ = -4.19 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1692.00 kN ≤ N_o ≤ 1692.00 kN
limiting normal forces flange bottom: -1692.00 kN ≤ N_u ≤ 1692.00 kN
limiting normal forces web: -902.40 kN ≤ N_s ≤ 902.40 kN
utilization normal force: -4286.40 kN ≤ N ≤ 4286.40 kN ⇒ U_N = 0.008
utilization y-moment (centroid): -647.37 kNm ≤ $M_{y,s}$ ≤ 647.37 kNm ⇒ U_{My} = 0.006
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.014
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 8.264): c/t_{o-o} = 0.049, c/t_{--o} = 0.071
max. utilization: U = 0.071 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: min σ_8
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.000 kNm, M_η = 183.51 kNm, M_ζ = 76.07 kNm
normal stresses (elast.): σ_{max} = 154.04 MN/m², σ_{min} = -169.00 MN/m²
extr. stresses (elast.): σ = 169.00 MN/m², τ = 7.17 MN/m², σ_v = 169.00 MN/m²
partial member forces flange top: V_o = -5.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.04 kNm
partial member forces flange bottom: V_u = -5.18 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 38.04 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 183.51 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.054 ⇒ U_τ = 0.054
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.250, $U_{MS,u}$ = 0.250 ⇒ U_{MS} = 0.250
limiting normal forces flange top: -1465.51 kN ≤ N_o ≤ 1465.51 kN
limiting normal forces flange bottom: -1465.51 kN ≤ N_u ≤ 1465.51 kN
limiting normal forces web: -901.09 kN ≤ N_s ≤ 901.09 kN
utilization normal force: -3832.11 kN ≤ N ≤ 3832.11 kN ⇒ U_N = 0.036
utilization y-moment (centroid): -568.71 kNm ≤ $M_{y,s}$ ≤ 568.71 kNm ⇒ U_{My} = 0.323
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.426
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.194): c/t_{o-o} = 0.136, c/t_{--o} = 0.463
max. utilization: U = 0.463 ≤ 1 ⇒ **verification meets the requirements**

Extreme rule 1: max σ_8
internal forces: N = -309.35 kN, V_η = 0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.000 kNm, M_η = -233.94 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 76.74 MN/m², σ_{min} = -110.66 MN/m²
extr. stresses (elast.): σ = 110.66 MN/m², τ = 6.29 MN/m², σ_v = 110.69 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm

partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = -233.94 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.047 ⇒ U_τ = 0.047
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1692.00 kN ≤ N_o ≤ 1692.00 kN
limiting normal forces flange bottom: -1692.00 kN ≤ N_u ≤ 1692.00 kN
limiting normal forces web: -901.39 kN ≤ N_s ≤ 901.39 kN
utilization normal force: -4285.39 kN ≤ N ≤ 4285.39 kN ⇒ U_N = 0.072
utilization y-moment (centroid): -638.90 kNm ≤ $M_{y,s}$ ≤ 638.90 kNm ⇒ U_{My} = 0.366
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.396
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.493): c/t_{o-o} = 0.176, c/t_{--o} = 0.394
max. utilization: U = 0.396 ≤ 1 ⇒ **verification meets the requirements**

summary:

σ_{max} = 154.04 MN/m²	Ex1[max M_η]:Lc1+1.5*Lc5
σ_{min} = -169.00 MN/m²	Ex1[max M_η]:Lc1+1.5*Lc5
τ = 7.17 MN/m²	Ex1[max Q_ζ]:1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5
σ_v = 169.00 MN/m²	Ex1[max M_η]:Lc1+1.5*Lc5
$U_{\sigma,pl}$ = 0.426	Ex1[max M_η]:Lc1+1.5*Lc5
$limit(c/t)_{o-o}$ = 0.181	Ex1[min N]:1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3
$limit(c/t)_{--o}$ = 0.463	Ex1[max M_η]:Lc1+1.5*Lc5
U = 0.463	Ex1[max M_η]:Lc1+1.5*Lc5

max. utilization: U = 0.463 ≤ 1 ⇒ **verification meets the requirements**

verification 2: EC3 design resistance (th. II. o.)

plastic cross-section verification: method of partial member forces with redistribution:
γ_M = 1.10, $f_{y,d}$ = 213.64 MN/m², $\tau_{R,d}$ = 123.34 MN/m²
no limitation of limiting bending moments.
plastic limiting member forces of cross-section parts in KN,m:
$V_{pl,o}$ = 888.1, $M_{pl,xp,o}$ = 8.63, $N_{pl,o}$ = 1538.2, $M_{pl,o}$ = 138.44, $I_{T,o}/I_T$ = 0.46, δ_o = 0.00
$V_{pl,s}$ = 473.6, $M_{pl,xp,s}$ = 2.79, $N_{pl,s}$ = 820.4, $M_{pl,s}$ = 65.63, $I_{T,s}/I_T$ = 0.09
$V_{pl,u}$ = 888.1, $M_{pl,xp,u}$ = 8.63, $N_{pl,u}$ = 1538.2, $M_{pl,u}$ = 138.44, $I_{T,u}/I_T$ = 0.46, δ_u = 0.00
limit values of (c/t)

Results of load spectra

Typ	N kN	V_η kN	V_ζ kN	T kNm	M_η kNm	M_ζ kNm	B kNm²	factorization
group of load spectra 1: standard load spectra								
1	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
2	-434.5	-0.00	0.00	0.008	-96.83	14.46	0.784	1.35*Lc1+1.5*Lc2+Ip1
3	-405.8	-6.21	0.00	0.314	-90.32	73.76	1.446	Lc1+1.5*Lc2+0.6*1.5*Lc3+Ip1
4	-453.5	-6.21	0.00	0.340	-101.81	78.68	1.684	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3+Ip1
5	-325.2	-0.00	0.00	0.003	-70.23	9.70	0.534	Lc1+1.5*Lc2+0.6*1.5*Lc4+Ip1
6	-373.0	-0.00	0.00	0.005	-81.17	11.59	0.632	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc4+Ip1
7	-386.8	-6.21	16.83	1.237	48.02	72.21	1.941	Lc1+1.5*Lc2+0.6*1.5*Lc5+Ip1
8	-434.5	-6.21	16.83	1.310	37.97	77.03	2.224	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc5+Ip1
9	-386.8	-0.00	-14.76	-0.441	-202.59	12.23	0.589	Lc1+1.5*Lc2+0.6*1.5*Lc6+Ip1
10	-434.5	-0.00	-14.76	-0.456	-215.07	14.35	0.683	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc6+Ip1
11	-386.8	0.00	-0.00	-0.001	-66.15	-12.31	-0.687	Lc1+1.5*Lc2+-1*Ip1
12	-434.5	0.00	-0.00	-0.002	-74.96	-14.47	-0.803	1.35*Lc1+1.5*Lc2+-1*Ip1
13	-405.8	-6.21	0.00	-0.018	-69.93	47.44	0.065	Lc1+1.5*Lc2+0.6*1.5*Lc3+-1*Ip1
14	-453.5	-6.21	0.00	-0.001	-78.84	47.87	0.081	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3+-1*Ip1
15	-325.2	0.00	-0.00	-0.000	-54.22	-9.70	-0.543	Lc1+1.5*Lc2+0.6*1.5*Lc4+-1*Ip1
16	-373.0	0.00	-0.00	-0.001	-62.69	-11.60	-0.645	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc4+-1*Ip1
17	-386.8	-6.21	16.83	-0.120	67.38	47.45	0.443	Lc1+1.5*Lc2+0.6*1.5*Lc5+-1*Ip1
18	-434.5	-6.21	16.83	-0.099	59.87	47.88	0.471	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc5+-1*Ip1
19	-386.8	-0.00	-14.76	0.446	-183.26	-12.23	-0.603	Lc1+1.5*Lc2+0.6*1.5*Lc6+-1*Ip1
20	-434.5	-0.00	-14.76	0.462	-193.21	-14.37	-0.701	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc6+-1*Ip1
21	-386.8	0.00	-0.00	0.000	-75.82	0.00	0.000	Lc1+1.5*Lc2
22	-434.5	0.00	-0.00	0.000	-85.90	0.00	0.000	1.35*Lc1+1.5*Lc2
23	-405.8	-6.21	-0.00	0.146	-80.12	60.61	0.764	Lc1+1.5*Lc2+0.6*1.5*Lc3
24	-453.5	-6.21	-0.00	0.166	-90.32	63.29	0.893	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3
25	-325.2	0.00	-0.00	0.000	-62.23	0.00	0.000	Lc1+1.5*Lc2+0.6*1.5*Lc4
26	-373.0	0.00	-0.00	0.000	-71.93	0.00	0.000	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc4
27	-386.8	-6.21	16.83	0.556	57.70	59.84	1.200	Lc1+1.5*Lc2+0.6*1.5*Lc5
28	-434.5	-6.21	16.83	0.602	48.92	62.47	1.358	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc5
29	-386.8	0.00	-14.76	0.000	-192.92	0.00	0.000	Lc1+1.5*Lc2+0.6*1.5*Lc6
30	-434.5	0.00	-14.76	0.000	-204.14	0.00	0.000	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc6
31	-386.8	0.00	-0.00	0.000	-75.82	0.00	0.000	Lc1+1.5*Lc2
32	-434.5	0.00	-0.00	0.000	-85.90	0.00	0.000	1.35*Lc1+1.5*Lc2
33	-405.8	-6.21	-0.00	0.146	-80.12	60.61	0.764	Lc1+1.5*Lc2+0.6*1.5*Lc3
34	-453.5	-6.21	-0.00	0.166	-90.32	63.29	0.893	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3
35	-325.2	0.00	-0.00	0.000	-62.23	0.00	0.000	Lc1+1.5*Lc2+0.6*1.5*Lc4
36	-373.0	0.00	-0.00	0.000	-71.93	0.00	0.000	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc4
37	-386.8	-6.21	16.83	0.556	57.70	59.84	1.200	Lc1+1.5*Lc2+0.6*1.5*Lc5
38	-434.5	-6.21	16.83	0.602	48.92	62.47	1.358	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc5
39	-386.8	0.00	-14.76	0.000	-192.92	0.00	0.000	Lc1+1.5*Lc2+0.6*1.5*Lc6

Results of load spectra

Typ	N kN	V_η kN	V_ζ kN	T kNm	M_η kNm	M_ζ kNm	B kNm2	factorization
40	-434.5	0.00	-14.76	0.000	-204.14	0.00	0.000	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc6
41	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
42	-434.5	-0.00	0.00	0.008	-96.83	14.46	0.784	1.35*Lc1+1.5*Lc2+Ip1
43	-405.8	-6.21	0.00	0.314	-90.32	73.76	1.446	Lc1+1.5*Lc2+0.6*1.5*Lc3+Ip1
44	-453.5	-6.21	0.00	0.340	-101.81	78.68	1.684	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3+Ip1
45	-325.2	-0.00	0.00	0.003	-70.23	9.70	0.534	Lc1+1.5*Lc2+0.6*1.5*Lc4+Ip1
46	-373.0	-0.00	0.00	0.005	-81.17	11.59	0.632	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc4+Ip1
47	-386.8	-6.21	16.83	1.237	48.02	72.21	1.941	Lc1+1.5*Lc2+0.6*1.5*Lc5+Ip1
48	-434.5	-6.21	16.83	1.310	37.97	77.03	2.224	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc5+Ip1
49	-386.8	-0.00	-14.76	-0.441	-202.59	12.23	0.589	Lc1+1.5*Lc2+0.6*1.5*Lc6+Ip1
50	-434.5	-0.00	-14.76	-0.456	-215.07	14.35	0.683	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc6+Ip1
51	-386.8	0.00	-0.00	-0.001	-66.15	-12.31	-0.687	Lc1+1.5*Lc2+-1*Ip1
52	-434.5	0.00	-0.00	-0.002	-74.96	-14.47	-0.803	1.35*Lc1+1.5*Lc2+-1*Ip1
53	-405.8	-6.21	0.00	-0.018	-69.93	47.44	0.065	Lc1+1.5*Lc2+0.6*1.5*Lc3+-1*Ip1
54	-453.5	-6.21	0.00	-0.001	-78.84	47.87	0.081	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3+-1*Ip1
55	-325.2	0.00	-0.00	-0.000	-54.22	-9.70	-0.543	Lc1+1.5*Lc2+0.6*1.5*Lc4+-1*Ip1
56	-373.0	0.00	-0.00	-0.001	-62.69	-11.60	-0.645	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc4+-1*Ip1
57	-386.8	-6.21	16.83	-0.120	67.38	47.45	0.443	Lc1+1.5*Lc2+0.6*1.5*Lc5+-1*Ip1
58	-434.5	-6.21	16.83	-0.099	59.87	47.88	0.471	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc5+-1*Ip1
59	-386.8	-0.00	-14.76	0.446	-183.26	-12.23	-0.603	Lc1+1.5*Lc2+0.6*1.5*Lc6+-1*Ip1
60	-434.5	-0.00	-14.76	0.462	-193.21	-14.37	-0.701	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc6+-1*Ip1
61	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
62	-434.5	-0.00	0.00	0.008	-96.83	14.46	0.784	1.35*Lc1+1.5*Lc2+Ip1
63	-405.8	-6.21	0.00	0.314	-90.32	73.76	1.446	Lc1+1.5*Lc2+0.6*1.5*Lc3+Ip1
64	-453.5	-6.21	0.00	0.340	-101.81	78.68	1.684	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3+Ip1
65	-325.2	-0.00	0.00	0.003	-70.23	9.70	0.534	Lc1+1.5*Lc2+0.6*1.5*Lc4+Ip1
66	-373.0	-0.00	0.00	0.005	-81.17	11.59	0.632	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc4+Ip1
67	-386.8	-6.21	16.83	1.237	48.02	72.21	1.941	Lc1+1.5*Lc2+0.6*1.5*Lc5+Ip1
68	-434.5	-6.21	16.83	1.310	37.97	77.03	2.224	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc5+Ip1
69	-386.8	-0.00	-14.76	-0.441	-202.59	12.23	0.589	Lc1+1.5*Lc2+0.6*1.5*Lc6+Ip1
70	-434.5	-0.00	-14.76	-0.456	-215.07	14.35	0.683	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc6+Ip1
71	-386.8	0.00	-0.00	-0.001	-66.15	-12.31	-0.687	Lc1+1.5*Lc2+-1*Ip1
72	-434.5	0.00	-0.00	-0.002	-74.96	-14.47	-0.803	1.35*Lc1+1.5*Lc2+-1*Ip1
73	-405.8	-6.21	0.00	-0.018	-69.93	47.44	0.065	Lc1+1.5*Lc2+0.6*1.5*Lc3+-1*Ip1
74	-453.5	-6.21	0.00	-0.001	-78.84	47.87	0.081	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3+-1*Ip1
75	-325.2	0.00	-0.00	-0.000	-54.22	-9.70	-0.543	Lc1+1.5*Lc2+0.6*1.5*Lc4+-1*Ip1
76	-373.0	0.00	-0.00	-0.001	-62.69	-11.60	-0.645	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc4+-1*Ip1
77	-386.8	-6.21	16.83	-0.120	67.38	47.45	0.443	Lc1+1.5*Lc2+0.6*1.5*Lc5+-1*Ip1
78	-434.5	-6.21	16.83	-0.099	59.87	47.88	0.471	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc5+-1*Ip1
79	-386.8	-0.00	-14.76	0.446	-183.26	-12.23	-0.603	Lc1+1.5*Lc2+0.6*1.5*Lc6+-1*Ip1
80	-434.5	-0.00	-14.76	0.462	-193.21	-14.37	-0.701	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc6+-1*Ip1
81	-168.1	-10.35	0.00	0.340	-33.67	88.17	0.627	Lc1+1.5*Lc3+Ip1
82	-215.8	-10.35	0.00	0.370	-43.65	92.22	0.830	1.35*Lc1+1.5*Lc3+Ip1
83	-293.2	-10.35	0.00	0.428	-62.54	100.26	1.244	Lc1+0.5*1.5*Lc2+1.5*Lc3+Ip1
84	-341.0	-10.35	0.00	0.462	-73.28	105.45	1.497	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3+Ip1
85	-33.8	-0.00	0.00	0.000	-4.90	0.68	0.032	Lc1+1.5*Lc4+Ip1
86	-81.6	-0.00	0.00	0.000	-14.15	1.84	0.096	1.35*Lc1+1.5*Lc4+Ip1
87	-159.0	-0.00	0.00	0.000	-31.65	4.03	0.222	Lc1+0.5*1.5*Lc2+1.5*Lc4+Ip1
88	-206.7	-0.00	0.00	0.001	-41.58	5.43	0.297	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc4+Ip1
89	-136.4	-10.35	28.05	1.908	184.74	85.67	1.516	Lc1+1.5*Lc5+Ip1
90	-184.2	-10.35	28.05	2.001	176.85	89.58	1.782	1.35*Lc1+1.5*Lc5+Ip1
91	-261.6	-10.35	28.05	2.186	161.77	97.33	2.323	Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
92	-309.3	-10.35	28.05	2.303	153.26	102.34	2.658	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
93	-136.4	-0.00	-24.60	-0.622	-212.11	3.37	0.152	Lc1+1.5*Lc6+Ip1
94	-184.2	-0.00	-24.60	-0.640	-223.59	4.71	0.211	1.35*Lc1+1.5*Lc6+Ip1
95	-261.6	-0.00	-24.60	-0.674	-245.17	7.29	0.328	Lc1+0.5*1.5*Lc2+1.5*Lc6+Ip1
96	-309.3	-0.00	-24.60	-0.695	-257.50	8.94	0.397	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6+Ip1
97	-168.1	-10.35	0.00	-0.163	-25.77	79.58	0.187	Lc1+1.5*Lc3+-1*Ip1
98	-215.8	-10.35	0.00	-0.140	-33.44	80.81	0.250	1.35*Lc1+1.5*Lc3+-1*Ip1
99	-293.2	-10.35	0.00	-0.095	-48.21	83.34	0.378	Lc1+0.5*1.5*Lc2+1.5*Lc3+-1*Ip1
100	-341.0	-10.35	0.00	-0.069	-56.51	84.99	0.459	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3+-1*Ip1
101	-33.8	0.00	-0.00	0.000	-3.55	-0.68	-0.032	Lc1+1.5*Lc4+-1*Ip1
102	-81.6	0.00	-0.00	0.000	-10.61	-1.84	-0.096	1.35*Lc1+1.5*Lc4+-1*Ip1
103	-159.0	0.00	-0.00	0.000	-24.21	-4.03	-0.224	Lc1+0.5*1.5*Lc2+1.5*Lc4+-1*Ip1
104	-206.7	0.00	-0.00	0.000	-31.84	-5.43	-0.300	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc4+-1*Ip1
105	-136.4	-10.35	28.05	-0.017	191.06	78.90	1.089	Lc1+1.5*Lc5+-1*Ip1
106	-184.2	-10.35	28.05	0.027	185.46	80.10	1.184	1.35*Lc1+1.5*Lc5+-1*Ip1
107	-261.6	-10.35	28.05	0.114	174.44	82.59	1.378	Lc1+0.5*1.5*Lc2+1.5*Lc5+-1*Ip1
108	-309.3	-10.35	28.05	0.167	168.34	84.21	1.500	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+-1*Ip1
109	-136.4	-0.00	-24.60	0.623	-205.80	-3.37	-0.153	Lc1+1.5*Lc6+-1*Ip1
110	-184.2	-0.00	-24.60	0.641	-215.00	-4.71	-0.213	1.35*Lc1+1.5*Lc6+-1*Ip1
111	-261.6	-0.00	-24.60	0.676	-232.53	-7.28	-0.333	Lc1+0.5*1.5*Lc2+1.5*Lc6+-1*Ip1
112	-309.3	-0.00	-24.60	0.698	-242.45	-8.94	-0.405	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6+-1*Ip1
113	-168.1	-10.35	-0.00	0.088	-29.72	83.87	0.408	Lc1+1.5*Lc3
114	-215.8	-10.35	-0.00	0.114	-38.55	86.52	0.542	1.35*Lc1+1.5*Lc3
115	-293.2	-10.35	-0.00	0.165	-55.37	91.80	0.815	Lc1+0.5*1.5*Lc2+1.5*Lc3
116	-341.0	-10.35	-0.00	0.195	-64.90	95.22	0.983	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3
117	-33.8	0.00	-0.00	0.000	-4.23	0.00	0.000	Lc1+1.5*Lc4
118	-81.6	0.00	-0.00	0.000	-12.38	0.00	0.000	1.35*Lc1+1.5*Lc4
119	-159.0	0.00	-0.00	0.000	-27.93	0.00	0.000	Lc1+0.5*1.5*Lc2+1.5*Lc4
120	-206.7	0.00	-0.00	0.000	-36.71	0.00	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc4
121	-136.4	-10.35	28.05	0.945	187.90	82.29	1.303	Lc1+1.5*Lc5
122	-184.2	-10.35	28.05	1.014	181.15	84.84	1.484	1.35*Lc1+1.5*Lc5
123	-261.6	-10.35	28.05	1.149	168.11	89.96	1.853	Lc1+0.5*1.5*Lc2+1.5*Lc5
124	-309.3	-10.35	28.05	1.234	160.80	93.28	2.084	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5
125	-136.4	0.00	-24.60	0.000	-208.95	0.00	0.000	Lc1+1.5*Lc6
126	-184.2	0.00	-24.60	0.000	-219.30	0.00	0.000	1.35*Lc1+1.5*Lc6
127	-261.6	0.00	-24.60	0.000	-238.85	0.00	0.000	Lc1+0.5*1.5*Lc2+1.5*Lc6
128	-309.3	0.00	-24.60	0.000	-249.97	0.00	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6
129	-168.1	-10.35	-0.00	0.088	-29.72	83.87	0.408	Lc1+1.5*Lc3

Results of load spectra

Typ	N kN	V_η kN	V_ζ kN	T kNm	M_η kNm	M_ζ kNm	B kNm2	factorization
130	-215.8	-10.35	-0.00	0.114	-38.55	86.52	0.542	1.35*Lc1+1.5*Lc3
131	-293.2	-10.35	-0.00	0.165	-55.37	91.80	0.815	Lc1+0.5*1.5*Lc2+1.5*Lc3
132	-341.0	-10.35	-0.00	0.195	-64.90	95.22	0.983	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3
133	-33.8	0.00	-0.00	0.000	-4.23	0.00	0.000	Lc1+1.5*Lc4
134	-81.6	0.00	-0.00	0.000	-12.38	0.00	0.000	1.35*Lc1+1.5*Lc4
135	-159.0	0.00	-0.00	0.000	-27.93	0.00	0.000	Lc1+0.5*1.5*Lc2+1.5*Lc4
136	-206.7	0.00	-0.00	0.000	-36.71	0.00	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc4
137	-136.4	-10.35	28.05	0.945	187.90	82.29	1.303	Lc1+1.5*Lc5
138	-184.2	-10.35	28.05	1.014	181.15	84.84	1.484	1.35*Lc1+1.5*Lc5
139	-261.6	-10.35	28.05	1.149	168.11	89.96	1.853	Lc1+0.5*1.5*Lc2+1.5*Lc5
140	-309.3	-10.35	28.05	1.234	160.80	93.28	2.084	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5
141	-136.4	0.00	-24.60	0.000	-208.95	0.00	0.000	Lc1+1.5*Lc6
142	-184.2	0.00	-24.60	0.000	-219.30	0.00	0.000	1.35*Lc1+1.5*Lc6
143	-261.6	0.00	-24.60	0.000	-238.85	0.00	0.000	Lc1+0.5*1.5*Lc2+1.5*Lc6
144	-309.3	0.00	-24.60	0.000	-249.97	0.00	0.000	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6
145	-168.1	-10.35	0.00	0.340	-33.67	88.17	0.627	Lc1+1.5*Lc3+Ip1
146	-215.8	-10.35	0.00	0.370	-43.65	92.22	0.830	1.35*Lc1+1.5*Lc3+Ip1
147	-293.2	-10.35	0.00	0.428	-62.54	100.26	1.244	Lc1+0.5*1.5*Lc2+1.5*Lc3+Ip1
148	-341.0	-10.35	0.00	0.462	-73.28	105.45	1.497	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3+Ip1
149	-33.8	-0.00	0.00	0.000	-4.90	0.68	0.032	Lc1+1.5*Lc4+Ip1
150	-81.6	-0.00	0.00	0.000	-14.15	1.84	0.096	1.35*Lc1+1.5*Lc4+Ip1
151	-159.0	-0.00	0.00	0.000	-31.65	4.03	0.222	Lc1+0.5*1.5*Lc2+1.5*Lc4+Ip1
152	-206.7	-0.00	0.00	0.001	-41.58	5.43	0.297	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc4+Ip1
153	-136.4	-10.35	28.05	1.908	184.74	85.67	1.516	Lc1+1.5*Lc5+Ip1
154	-184.2	-10.35	28.05	2.001	176.85	89.58	1.782	1.35*Lc1+1.5*Lc5+Ip1
155	-261.6	-10.35	28.05	2.186	161.77	97.33	2.323	Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
156	-309.3	-10.35	28.05	2.303	153.26	102.34	2.658	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
157	-136.4	-0.00	-24.60	-0.622	-212.11	3.37	0.152	Lc1+1.5*Lc6+Ip1
158	-184.2	-0.00	-24.60	-0.640	-223.59	4.71	0.211	1.35*Lc1+1.5*Lc6+Ip1
159	-261.6	-0.00	-24.60	-0.674	-245.17	7.29	0.328	Lc1+0.5*1.5*Lc2+1.5*Lc6+Ip1
160	-309.3	-0.00	-24.60	-0.695	-257.50	8.94	0.397	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6+Ip1
161	-168.1	-10.35	0.00	-0.163	-25.77	79.58	0.187	Lc1+1.5*Lc3+-1*Ip1
162	-215.8	-10.35	0.00	-0.140	-33.44	80.81	0.250	1.35*Lc1+1.5*Lc3+-1*Ip1
163	-293.2	-10.35	0.00	-0.095	-48.21	83.34	0.378	Lc1+0.5*1.5*Lc2+1.5*Lc3+-1*Ip1
164	-341.0	-10.35	0.00	-0.069	-56.51	84.99	0.459	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3+-1*Ip1
165	-33.8	0.00	-0.00	0.000	-3.55	-0.68	-0.032	Lc1+1.5*Lc4+-1*Ip1
166	-81.6	0.00	-0.00	0.000	-10.61	-1.84	-0.096	1.35*Lc1+1.5*Lc4+-1*Ip1
167	-159.0	0.00	-0.00	0.000	-24.21	-4.03	-0.224	Lc1+0.5*1.5*Lc2+1.5*Lc4+-1*Ip1
168	-206.7	0.00	-0.00	0.000	-31.84	-5.43	-0.300	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc4+-1*Ip1
169	-136.4	-10.35	28.05	-0.017	191.06	78.90	1.089	Lc1+1.5*Lc5+-1*Ip1
170	-184.2	-10.35	28.05	0.027	185.46	80.10	1.184	1.35*Lc1+1.5*Lc5+-1*Ip1
171	-261.6	-10.35	28.05	0.114	174.44	82.59	1.378	Lc1+0.5*1.5*Lc2+1.5*Lc5+-1*Ip1
172	-309.3	-10.35	28.05	0.167	168.34	84.21	1.500	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+-1*Ip1
173	-136.4	-0.00	-24.60	0.623	-205.80	-3.37	-0.153	Lc1+1.5*Lc6+-1*Ip1
174	-184.2	-0.00	-24.60	0.641	-215.00	-4.71	-0.213	1.35*Lc1+1.5*Lc6+-1*Ip1
175	-261.6	-0.00	-24.60	0.676	-232.53	-7.28	-0.333	Lc1+0.5*1.5*Lc2+1.5*Lc6+-1*Ip1
176	-309.3	-0.00	-24.60	0.698	-242.45	-8.94	-0.405	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6+-1*Ip1
177	-168.1	-10.35	0.00	0.340	-33.67	88.17	0.627	Lc1+1.5*Lc3+Ip1
178	-215.8	-10.35	0.00	0.370	-43.65	92.22	0.830	1.35*Lc1+1.5*Lc3+Ip1
179	-293.2	-10.35	0.00	0.428	-62.54	100.26	1.244	Lc1+0.5*1.5*Lc2+1.5*Lc3+Ip1
180	-341.0	-10.35	0.00	0.462	-73.28	105.45	1.497	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3+Ip1
181	-33.8	-0.00	0.00	0.000	-4.90	0.68	0.032	Lc1+1.5*Lc4+Ip1
182	-81.6	-0.00	0.00	0.000	-14.15	1.84	0.096	1.35*Lc1+1.5*Lc4+Ip1
183	-159.0	-0.00	0.00	0.000	-31.65	4.03	0.222	Lc1+0.5*1.5*Lc2+1.5*Lc4+Ip1
184	-206.7	-0.00	0.00	0.001	-41.58	5.43	0.297	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc4+Ip1
185	-136.4	-10.35	28.05	1.908	184.74	85.67	1.516	Lc1+1.5*Lc5+Ip1
186	-184.2	-10.35	28.05	2.001	176.85	89.58	1.782	1.35*Lc1+1.5*Lc5+Ip1
187	-261.6	-10.35	28.05	2.186	161.77	97.33	2.323	Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
188	-309.3	-10.35	28.05	2.303	153.26	102.34	2.658	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
189	-136.4	-0.00	-24.60	-0.622	-212.11	3.37	0.152	Lc1+1.5*Lc6+Ip1
190	-184.2	-0.00	-24.60	-0.640	-223.59	4.71	0.211	1.35*Lc1+1.5*Lc6+Ip1
191	-261.6	-0.00	-24.60	-0.674	-245.17	7.29	0.328	Lc1+0.5*1.5*Lc2+1.5*Lc6+Ip1
192	-309.3	-0.00	-24.60	-0.695	-257.50	8.94	0.397	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6+Ip1
193	-168.1	-10.35	0.00	-0.163	-25.77	79.58	0.187	Lc1+1.5*Lc3+-1*Ip1
194	-215.8	-10.35	0.00	-0.140	-33.44	80.81	0.250	1.35*Lc1+1.5*Lc3+-1*Ip1
195	-293.2	-10.35	0.00	-0.095	-48.21	83.34	0.378	Lc1+0.5*1.5*Lc2+1.5*Lc3+-1*Ip1
196	-341.0	-10.35	0.00	-0.069	-56.51	84.99	0.459	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3+-1*Ip1
197	-33.8	0.00	-0.00	0.000	-3.55	-0.68	-0.032	Lc1+1.5*Lc4+-1*Ip1
198	-81.6	0.00	-0.00	0.000	-10.61	-1.84	-0.096	1.35*Lc1+1.5*Lc4+-1*Ip1
199	-159.0	0.00	-0.00	0.000	-24.21	-4.03	-0.224	Lc1+0.5*1.5*Lc2+1.5*Lc4+-1*Ip1
200	-206.7	0.00	-0.00	0.000	-31.84	-5.43	-0.300	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc4+-1*Ip1
201	-136.4	-10.35	28.05	-0.017	191.06	78.90	1.089	Lc1+1.5*Lc5+-1*Ip1
202	-184.2	-10.35	28.05	0.027	185.46	80.10	1.184	1.35*Lc1+1.5*Lc5+-1*Ip1
203	-261.6	-10.35	28.05	0.114	174.44	82.59	1.378	Lc1+0.5*1.5*Lc2+1.5*Lc5+-1*Ip1
204	-309.3	-10.35	28.05	0.167	168.34	84.21	1.500	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+-1*Ip1
205	-136.4	-0.00	-24.60	0.623	-205.80	-3.37	-0.153	Lc1+1.5*Lc6+-1*Ip1
206	-184.2	-0.00	-24.60	0.641	-215.00	-4.71	-0.213	1.35*Lc1+1.5*Lc6+-1*Ip1
207	-261.6	-0.00	-24.60	0.676	-232.53	-7.28	-0.333	Lc1+0.5*1.5*Lc2+1.5*Lc6+-1*Ip1
208	-309.3	-0.00	-24.60	0.698	-242.45	-8.94	-0.405	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6+-1*Ip1
extreme rule of load case combinations								
min N	-453.5	-6.21	0.00	-0.001	-78.84	47.87	0.081	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc3+-1*Ip1
max N	-33.8	0.00	-0.00	0.000	-3.55	-0.68	-0.032	Lc1+1.5*Lc4+-1*Ip1
min Q_η	-341.0	-10.35	0.00	0.462	-73.28	105.45	1.497	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3+Ip1
max Q_η	-434.5	0.00	-0.00	-0.002	-74.96	-14.47	-0.803	1.35*Lc1+1.5*Lc2+-1*Ip1
min Q_ζ	-309.3	-0.00	-24.60	0.698	-242.45	-8.94	-0.405	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6+-1*Ip1
max Q_ζ	-309.3	-10.35	28.05	2.303	153.26	102.34	2.658	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
min T	-309.3	-0.00	-24.60	-0.695	-257.50	8.94	0.397	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6+Ip1
max T	-309.3	-10.35	28.05	2.303	153.26	102.34	2.658	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
min M_η	-309.3	-0.00	-24.60	-0.695	-257.50	8.94	0.397	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6+Ip1
max M_η	-136.4	-10.35	28.05	-0.017	191.06	78.90	1.089	Lc1+1.5*Lc5+-1*Ip1

Results of load spectra

Typ	N kN	V_η kN	V_ζ kN	T kNm	M_η kNm	M_ζ kNm	B kNm²	factorization
min M_ζ	-434.5	0.00	-0.00	-0.002	-74.96	-14.47	-0.803	1.35*Lc1+1.5*Lc2+-1*Ip1
max M_ζ	-341.0	-10.35	0.00	0.462	-73.28	105.45	1.497	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3+Ip1
min B	-434.5	0.00	-0.00	-0.002	-74.96	-14.47	-0.803	1.35*Lc1+1.5*Lc2+-1*Ip1
max B	-309.3	-10.35	28.05	2.303	153.26	102.34	2.658	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
min T_t	-434.5	0.00	-0.00	-0.002	-74.96	-14.47	-0.803	1.35*Lc1+1.5*Lc2+-1*Ip1
max T_t	-309.3	-10.35	28.05	2.303	153.26	102.34	2.658	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
min T_w	-309.3	-0.00	-24.60	-0.695	-257.50	8.94	0.397	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc6+Ip1
max T_w	-309.3	-10.35	28.05	2.303	153.26	102.34	2.658	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
min σ_1	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
max σ_1	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
min σ_2	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
max σ_2	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
min σ_3	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
max σ_3	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
min σ_4	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
max σ_4	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
min σ_5	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
max σ_5	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
min σ_6	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
max σ_6	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
min σ_7	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
max σ_7	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
min σ_8	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1
max σ_8	-386.8	-0.00	0.00	0.006	-85.48	12.30	0.673	Lc1+1.5*Lc2+Ip1

Design calculation of load spectra

Load spectrum 1, group of load spectra 1: standard load spectra
internal forces: $N = -386.77$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.006$ kNm, $M_\eta = -85.48$ kNm, $M_\zeta = 12.30$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.006$ kNm, $B = 0.673$ kNm²
normal stresses (elast.): $\sigma_{max} = 22.68$ MN/m², $\sigma_{min} = -74.26$ MN/m²
extr. stresses (elast.): $\sigma = 74.26$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 74.26$ MN/m²
partial member forces flange top: $V_o = 0.02$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 4.17$ kNm
partial member forces flange bottom: $V_u = -0.02$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 8.13$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -386.77$ kN, $M_{y,s} = -85.48$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.030$, $U_{MS,u} = 0.059 \Rightarrow U_{MS} = 0.059$
limiting normal forces flange top: -1514.84 kN $\le N_o \le 1514.84$ kN
limiting normal forces flange bottom: -1492.34 kN $\le N_u \le 1492.34$ kN
limiting normal forces web: -820.36 kN $\le N_s \le 820.36$ kN
utilization normal force: -3827.54 kN $\le N \le 3827.54$ kN $\Rightarrow U_N = 0.101$
utilization y-moment (centroid): -560.51 kNm $\le M_{y,s} \le 563.91$ kNm $\Rightarrow U_{My} = 0.155$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.253$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.718$): $c/t_{o-o} = 0.177$, $c/t_{--o} = 0.334$
max. utilization: $U = 0.334 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 2, group of load spectra 1: standard load spectra
internal forces: $N = -434.52$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.008$ kNm, $M_\eta = -96.83$ kNm, $M_\zeta = 14.46$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.008$ kNm, $B = 0.784$ kNm²
normal stresses (elast.): $\sigma_{max} = 26.35$ MN/m², $\sigma_{min} = -84.67$ MN/m²
extr. stresses (elast.): $\sigma = 84.67$ MN/m², $\tau = 0.01$ MN/m², $\sigma_v = 84.67$ MN/m²
partial member forces flange top: $V_o = 0.02$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 4.92$ kNm
partial member forces flange bottom: $V_u = -0.02$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 9.53$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -434.52$ kN, $M_{y,s} = -96.83$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.036$, $U_{MS,u} = 0.069 \Rightarrow U_{MS} = 0.069$
limiting normal forces flange top: -1510.59 kN $\le N_o \le 1510.59$ kN
limiting normal forces flange bottom: -1484.27 kN $\le N_u \le 1484.27$ kN
limiting normal forces web: -820.36 kN $\le N_s \le 820.36$ kN
utilization normal force: -3815.23 kN $\le N \le 3815.23$ kN $\Rightarrow U_N = 0.114$
utilization y-moment (centroid): -554.05 kNm $\le M_{y,s} \le 558.51$ kNm $\Rightarrow U_{My} = 0.178$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.287$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.609$): $c/t_{o-o} = 0.187$, $c/t_{--o} = 0.356$
max. utilization: $U = 0.356 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 3, group of load spectra 1: standard load spectra
internal forces: $N = -405.76$ kN, $V_\eta = -6.21$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.314$ kNm, $M_\eta = -90.32$ kNm, $M_\zeta = 73.76$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.314$ kNm, $B = 1.446$ kNm²
normal stresses (elast.): $\sigma_{max} = 89.43$ MN/m², $\sigma_{min} = -153.62$ MN/m²
extr. stresses (elast.): $\sigma = 153.62$ MN/m², $\tau = 0.84$ MN/m², $\sigma_v = 153.62$ MN/m²

partial member forces flange top: V_o = -2.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 32.63 kNm
partial member forces flange bottom: V_u = -4.03 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 41.13 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -405.76 kN, $M_{y,s}$ = -90.32 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.005
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.236, $U_{MS,u}$ = 0.297 ⇒ U_{MS} = 0.297
limiting normal forces flange top: -1344.76 kN ≤ N_o ≤ 1344.76 kN
limiting normal forces flange bottom: -1289.55 kN ≤ N_u ≤ 1289.55 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3454.68 kN ≤ N ≤ 3454.68 kN ⇒ U_N = 0.117
utilization y-moment (centroid): -492.74 kNm ≤ $M_{y,s}$ ≤ 501.48 kNm ⇒ U_{My} = 0.190
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.397
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.187): c/t_{o-o} = 0.181, c/t_{--o} = 0.459
max. utilization: U = 0.459 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 4, group of load spectra 1: standard load spectra
internal forces: N = -453.51 kN, V_η = -6.21 kN, V_ζ = 0.00 kN
internal moments: T = 0.340 kNm, M_η = -101.81 kNm, M_ζ = 78.68 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.340 kNm, B = 1.684 kNm²
normal stresses (elast.): σ_{max} = 95.49 MN/m², σ_{min} = -168.14 MN/m²
extr. stresses (elast.): σ = 168.14 MN/m², τ = 0.86 MN/m², σ_v = 168.14 MN/m²
partial member forces flange top: V_o = -2.10 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 34.39 kNm
partial member forces flange bottom: V_u = -4.11 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 44.29 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -453.51 kN, $M_{y,s}$ = -101.81 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.005
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.248, $U_{MS,u}$ = 0.320 ⇒ U_{MS} = 0.320
limiting normal forces flange top: -1333.52 kN ≤ N_o ≤ 1333.52 kN
limiting normal forces flange bottom: -1268.46 kN ≤ N_u ≤ 1268.46 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3422.35 kN ≤ N ≤ 3422.35 kN ⇒ U_N = 0.133
utilization y-moment (centroid): -481.74 kNm ≤ $M_{y,s}$ ≤ 493.25 kNm ⇒ U_{My} = 0.221
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.437
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.135): c/t_{o-o} = 0.192, c/t_{--o} = 0.481
max. utilization: U = 0.481 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 5, group of load spectra 1: standard load spectra
internal forces: N = -325.21 kN, V_η = -0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.003 kNm, M_η = -70.23 kNm, M_ζ = 9.70 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.003 kNm, B = 0.534 kNm²
normal stresses (elast.): σ_{max} = 17.89 MN/m², σ_{min} = -60.81 MN/m²
extr. stresses (elast.): σ = 60.81 MN/m², τ = 0.00 MN/m², σ_v = 60.81 MN/m²
partial member forces flange top: V_o = 0.01 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 3.28 kNm
partial member forces flange bottom: V_u = -0.01 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 6.42 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -325.21 kN, $M_{y,s}$ = -70.23 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.024, $U_{MS,u}$ = 0.046 ⇒ U_{MS} = 0.046
limiting normal forces flange top: -1519.86 kN ≤ N_o ≤ 1519.86 kN
limiting normal forces flange bottom: -1502.10 kN ≤ N_u ≤ 1502.10 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3842.32 kN ≤ N ≤ 3842.32 kN ⇒ U_N = 0.085
utilization y-moment (centroid): -567.89 kNm ≤ $M_{y,s}$ ≤ 570.14 kNm ⇒ U_{My} = 0.125
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.209
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.899): c/t_{o-o} = 0.162, c/t_{--o} = 0.302
max. utilization: U = 0.302 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 6, group of load spectra 1: standard load spectra
internal forces: N = -372.96 kN, V_η = -0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.005 kNm, M_η = -81.17 kNm, M_ζ = 11.59 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.005 kNm, B = 0.632 kNm²
normal stresses (elast.): σ_{max} = 21.17 MN/m², σ_{min} = -70.67 MN/m²
extr. stresses (elast.): σ = 70.67 MN/m², τ = 0.00 MN/m², σ_v = 70.67 MN/m²
partial member forces flange top: V_o = 0.02 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 3.93 kNm
partial member forces flange bottom: V_u = -0.02 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 7.66 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -372.96 kN, $M_{y,s}$ = -81.17 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.028, $U_{MS,u}$ = 0.055 ⇒ U_{MS} = 0.055
limiting normal forces flange top: -1516.17 kN ≤ N_o ≤ 1516.17 kN

limiting normal forces flange bottom: -1495.05 kN ≤ N_u ≤ 1495.05 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3831.58 kN ≤ N ≤ 3831.58 kN ⇒ U_N = 0.097
utilization y-moment (centroid): -562.39 kNm ≤ $M_{y,s}$ ≤ 565.46 kNm ⇒ U_{My} = 0.147
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.242
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.761): c/t_{o-o} = 0.174, c/t_{--o} = 0.326
max. utilization: U = 0.326 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 7, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = 1.237 kNm, M_η = 48.02 kNm, M_ζ = 72.21 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.237 kNm, B = 1.941 kNm²
normal stresses (elast.): σ_{max} = 94.80 MN/m², σ_{min} = -110.78 MN/m²
extr. stresses (elast.): σ = 110.78 MN/m², τ = 4.30 MN/m², σ_v = 110.78 MN/m²
partial member forces flange top: V_o = 0.53 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 30.40 kNm
partial member forces flange bottom: V_u = -6.74 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 41.81 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = 48.02 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.008, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.220, $U_{MS,u}$ = 0.302 ⇒ U_{MS} = 0.302
limiting normal forces flange top: -1358.86 kN ≤ N_o ≤ 1358.86 kN
limiting normal forces flange bottom: -1285.00 kN ≤ N_u ≤ 1285.00 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3463.71 kN ≤ N ≤ 3463.71 kN ⇒ U_N = 0.112
utilization y-moment (centroid): -494.34 kNm ≤ $M_{y,s}$ ≤ 505.49 kNm ⇒ U_{My} = 0.085
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.303
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.395): c/t_{o-o} = 0.175, c/t_{--o} = 0.389
max. utilization: U = 0.389 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 8, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = 1.310 kNm, M_η = 37.97 kNm, M_ζ = 77.03 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.310 kNm, B = 2.224 kNm²
normal stresses (elast.): σ_{max} = 95.66 MN/m², σ_{min} = -114.58 MN/m²
extr. stresses (elast.): σ = 114.58 MN/m², τ = 4.30 MN/m², σ_v = 114.58 MN/m²
partial member forces flange top: V_o = 0.75 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 31.97 kNm
partial member forces flange bottom: V_u = -6.96 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 45.06 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = 37.97 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.008, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.231, $U_{MS,u}$ = 0.325 ⇒ U_{MS} = 0.325
limiting normal forces flange top: -1348.91 kN ≤ N_o ≤ 1348.91 kN
limiting normal forces flange bottom: -1263.25 kN ≤ N_u ≤ 1263.25 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3432.01 kN ≤ N ≤ 3432.01 kN ⇒ U_N = 0.127
utilization y-moment (centroid): -483.25 kNm ≤ $M_{y,s}$ ≤ 497.78 kNm ⇒ U_{My} = 0.063
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.326
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.380): c/t_{o-o} = 0.187, c/t_{--o} = 0.393
max. utilization: U = 0.393 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 9, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = -0.00 kN, V_ζ = -14.76 kN
internal moments: T = -0.441 kNm, M_η = -202.59 kNm, M_ζ = 12.23 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.441 kNm, B = 0.589 kNm²
normal stresses (elast.): σ_{max} = 70.07 MN/m², σ_{min} = -120.50 MN/m²
extr. stresses (elast.): σ = 120.50 MN/m², τ = 3.77 MN/m², σ_v = 120.50 MN/m²
partial member forces flange top: V_o = -1.30 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 4.38 kNm
partial member forces flange bottom: V_u = 1.30 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 7.85 kNm
partial member forces web: V_s = -14.76 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = -202.59 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.001, $U_{\tau,s}$ = 0.031 ⇒ U_τ = 0.031
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.032, $U_{MS,u}$ = 0.057 ⇒ U_{MS} = 0.057
limiting normal forces flange top: -1513.66 kN ≤ N_o ≤ 1513.66 kN
limiting normal forces flange bottom: -1493.95 kN ≤ N_u ≤ 1493.95 kN
limiting normal forces web: -819.97 kN ≤ N_s ≤ 819.97 kN
utilization normal force: -3827.58 kN ≤ N ≤ 3827.58 kN ⇒ U_N = 0.101
utilization y-moment (centroid): -560.77 kNm ≤ $M_{y,s}$ ≤ 563.74 kNm ⇒ U_{My} = 0.363
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.429
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.357): c/t_{o-o} = 0.192, c/t_{--o} = 0.427
max. utilization: U = 0.429 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 10, group of load spectra 1: standard load spectra

internal forces: $N = -434.52$ kN, $V_\eta = -0.00$ kN, $V_\zeta = -14.76$ kN
internal moments: $T = -0.456$ kNm, $M_\eta = -215.07$ kNm, $M_\zeta = 14.35$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = -0.456$ kNm, $B = 0.683$ kNm²
normal stresses (elast.): $\sigma_{max} = 74.27$ MN/m², $\sigma_{min} = -131.22$ MN/m²
extr. stresses (elast.): $\sigma = 131.22$ MN/m², $\tau = 3.77$ MN/m², $\sigma_v = 131.22$ MN/m²
partial member forces flange top: $V_o = -1.34$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 5.17$ kNm
partial member forces flange bottom: $V_u = 1.34$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 9.19$ kNm
partial member forces web: $V_s = -14.76$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -434.52$ kN, $M_{y,s} = -215.07$ kNm
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.031$ ⇒ $U_\tau = 0.031$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.037$, $U_{MS,u} = 0.066$ ⇒ $U_{MS} = 0.066$
limiting normal forces flange top: -1509.21 kN ≤ N_o ≤ 1509.21 kN
limiting normal forces flange bottom: -1486.27 kN ≤ N_u ≤ 1486.27 kN
limiting normal forces web: -819.97 kN ≤ N_s ≤ 819.97 kN
utilization normal force: -3815.45 kN ≤ N ≤ 3815.45 kN ⇒ $U_N = 0.114$
utilization y-moment (centroid): -554.41 kNm ≤ $M_{y,s}$ ≤ 558.30 kNm ⇒ $U_{My} = 0.390$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.464$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.300$): $c/t_{o-o} = 0.202$, $c/t_{--o} = 0.445$
max. utilization: $U = 0.464$ ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 11, group of load spectra 1: standard load spectra
internal forces: $N = -386.77$ kN, $V_\eta = 0.00$ kN, $V_\zeta = -0.00$ kN
internal moments: $T = -0.001$ kNm, $M_\eta = -66.15$ kNm, $M_\zeta = -12.31$ kNm
warping torsion: $T_t = -0.000$ kNm, $T_w = -0.001$ kNm, $B = -0.687$ kNm²
normal stresses (elast.): $\sigma_{max} = 14.86$ MN/m², $\sigma_{min} = -66.62$ MN/m²
extr. stresses (elast.): $\sigma = 66.62$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 66.62$ MN/m²
partial member forces flange top: $V_o = -0.00$ kN, $M_{xp,o} = -0.00$ kNm, $M_{Sa,o} = -4.13$ kNm
partial member forces flange bottom: $V_u = 0.00$ kN, $M_{xp,u} = -0.00$ kNm, $M_{Sa,u} = -8.18$ kNm
partial member forces web: $V_s = -0.00$ kN, $M_{xp,s} = -0.00$ kNm
partial member forces main bending (centroid): $N = -386.77$ kN, $M_{y,s} = -66.15$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000$ ⇒ $U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.030$, $U_{MS,u} = 0.059$ ⇒ $U_{MS} = 0.059$
limiting normal forces flange top: -1515.04 kN ≤ N_o ≤ 1515.04 kN
limiting normal forces flange bottom: -1492.07 kN ≤ N_u ≤ 1492.07 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3827.47 kN ≤ N ≤ 3827.47 kN ⇒ $U_N = 0.101$
utilization y-moment (centroid): -560.46 kNm ≤ $M_{y,s}$ ≤ 563.93 kNm ⇒ $U_{My} = 0.121$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.224$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.811$): $c/t_{o-o} = 0.176$, $c/t_{--o} = 0.315$
max. utilization: $U = 0.315$ ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 12, group of load spectra 1: standard load spectra
internal forces: $N = -434.52$ kN, $V_\eta = 0.00$ kN, $V_\zeta = -0.00$ kN
internal moments: $T = -0.002$ kNm, $M_\eta = -74.96$ kNm, $M_\zeta = -14.47$ kNm
warping torsion: $T_t = -0.000$ kNm, $T_w = -0.002$ kNm, $B = -0.803$ kNm²
normal stresses (elast.): $\sigma_{max} = 17.48$ MN/m², $\sigma_{min} = -76.06$ MN/m²
extr. stresses (elast.): $\sigma = 76.06$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 76.06$ MN/m²
partial member forces flange top: $V_o = -0.01$ kN, $M_{xp,o} = -0.00$ kNm, $M_{Sa,o} = -4.87$ kNm
partial member forces flange bottom: $V_u = 0.01$ kN, $M_{xp,u} = -0.00$ kNm, $M_{Sa,u} = -9.60$ kNm
partial member forces web: $V_s = -0.00$ kN, $M_{xp,s} = -0.00$ kNm
partial member forces main bending (centroid): $N = -434.52$ kN, $M_{y,s} = -74.96$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000$ ⇒ $U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.035$, $U_{MS,u} = 0.069$ ⇒ $U_{MS} = 0.069$
limiting normal forces flange top: -1510.86 kN ≤ N_o ≤ 1510.86 kN
limiting normal forces flange bottom: -1483.90 kN ≤ N_u ≤ 1483.90 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3815.12 kN ≤ N ≤ 3815.12 kN ⇒ $U_N = 0.114$
utilization y-moment (centroid): -553.97 kNm ≤ $M_{y,s}$ ≤ 558.54 kNm ⇒ $U_{My} = 0.139$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.254$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.695$): $c/t_{o-o} = 0.186$, $c/t_{--o} = 0.337$
max. utilization: $U = 0.337$ ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 13, group of load spectra 1: standard load spectra
internal forces: $N = -405.76$ kN, $V_\eta = -6.21$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = -0.018$ kNm, $M_\eta = -69.93$ kNm, $M_\zeta = 47.44$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = -0.018$ kNm, $B = 0.065$ kNm²
normal stresses (elast.): $\sigma_{max} = 60.21$ MN/m², $\sigma_{min} = -105.59$ MN/m²
extr. stresses (elast.): $\sigma = 105.59$ MN/m², $\tau = 0.66$ MN/m², $\sigma_v = 105.59$ MN/m²
partial member forces flange top: $V_o = -3.16$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 23.53$ kNm
partial member forces flange bottom: $V_u = -3.05$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 23.91$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm

partial member forces main bending (centroid): N = -405.76 kN, $M_{y,s}$ = -69.93 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.004
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.170, $U_{MS,u}$ = 0.173 ⇒ U_{MS} = 0.173
limiting normal forces flange top: -1401.37 kN ≤ N_o ≤ 1401.37 kN
limiting normal forces flange bottom: -1399.02 kN ≤ N_u ≤ 1399.02 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3620.76 kN ≤ N ≤ 3620.76 kN ⇒ U_N = 0.112
utilization y-moment (centroid): -525.45 kNm ≤ $M_{y,s}$ ≤ 525.83 kNm ⇒ U_{My} = 0.133
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.293
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.433): c/t_{o-o} = 0.180, c/t_{--o} = 0.386
max. utilization: U = 0.386 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 14, group of load spectra 1: standard load spectra
internal forces: N = -453.51 kN, V_η = -6.21 kN, V_ζ = 0.00 kN
internal moments: T = -0.001 kNm, M_η = -78.84 kNm, M_ζ = 47.87 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.001 kNm, B = 0.081 kNm²
normal stresses (elast.): σ_{max} = 61.56 MN/m², σ_{min} = -112.38 MN/m²
extr. stresses (elast.): σ = 112.38 MN/m², τ = 0.65 MN/m², σ_v = 112.38 MN/m²
partial member forces flange top: V_o = -3.11 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 23.70 kNm
partial member forces flange bottom: V_u = -3.10 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 24.17 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -453.51 kN, $M_{y,s}$ = -78.84 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.004
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.171, $U_{MS,u}$ = 0.175 ⇒ U_{MS} = 0.175
limiting normal forces flange top: -1400.34 kN ≤ N_o ≤ 1400.34 kN
limiting normal forces flange bottom: -1397.44 kN ≤ N_u ≤ 1397.44 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3618.15 kN ≤ N ≤ 3618.15 kN ⇒ U_N = 0.125
utilization y-moment (centroid): -520.94 kNm ≤ $M_{y,s}$ ≤ 521.45 kNm ⇒ U_{My} = 0.152
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.318
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.390): c/t_{o-o} = 0.190, c/t_{--o} = 0.399
max. utilization: U = 0.399 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 15, group of load spectra 1: standard load spectra
internal forces: N = -325.21 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = -0.000 kNm, M_η = -54.22 kNm, M_ζ = -9.70 kNm
warping torsion: T_t = -0.000 kNm, T_w = -0.000 kNm, B = -0.543 kNm²
normal stresses (elast.): σ_{max} = 11.42 MN/m², σ_{min} = -54.47 MN/m²
extr. stresses (elast.): σ = 54.47 MN/m², τ = 0.00 MN/m², σ_v = 54.47 MN/m²
partial member forces flange top: V_o = -0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -3.25 kNm
partial member forces flange bottom: V_u = 0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -6.45 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -325.21 kN, $M_{y,s}$ = -54.22 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.024, $U_{MS,u}$ = 0.047 ⇒ U_{MS} = 0.047
limiting normal forces flange top: -1519.99 kN ≤ N_o ≤ 1519.99 kN
limiting normal forces flange bottom: -1501.93 kN ≤ N_u ≤ 1501.93 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3842.29 kN ≤ N ≤ 3842.29 kN ⇒ U_N = 0.085
utilization y-moment (centroid): -567.87 kNm ≤ $M_{y,s}$ ≤ 570.16 kNm ⇒ U_{My} = 0.097
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.185
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.003): c/t_{o-o} = 0.161, c/t_{--o} = 0.285
max. utilization: U = 0.285 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 16, group of load spectra 1: standard load spectra
internal forces: N = -372.96 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = -0.001 kNm, M_η = -62.69 kNm, M_ζ = -11.60 kNm
warping torsion: T_t = -0.000 kNm, T_w = -0.001 kNm, B = -0.645 kNm²
normal stresses (elast.): σ_{max} = 13.69 MN/m², σ_{min} = -63.37 MN/m²
extr. stresses (elast.): σ = 63.37 MN/m², τ = 0.00 MN/m², σ_v = 63.37 MN/m²
partial member forces flange top: V_o = -0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -3.90 kNm
partial member forces flange bottom: V_u = 0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -7.70 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -372.96 kN, $M_{y,s}$ = -62.69 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.028, $U_{MS,u}$ = 0.056 ⇒ U_{MS} = 0.056
limiting normal forces flange top: -1516.35 kN ≤ N_o ≤ 1516.35 kN
limiting normal forces flange bottom: -1494.81 kN ≤ N_u ≤ 1494.81 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3831.52 kN ≤ N ≤ 3831.52 kN ⇒ U_N = 0.097

utilization y-moment (centroid): -562.35 kNm ≤ $M_{y,s}$ ≤ 565.48 kNm ⇒ U_{My} = 0.114
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.214
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.857): c/t_{o-o} = 0.172, c/t_{--o} = 0.308
max. utilization: U = 0.308 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 17, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = -0.120 kNm, M_η = 67.38 kNm, M_ζ = 47.45 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.120 kNm, B = 0.443 kNm²
normal stresses (elast.): σ_{max} = 63.70 MN/m², σ_{min} = -100.07 MN/m²
extr. stresses (elast.): σ = 100.07 MN/m², τ = 4.30 MN/m², σ_v = 100.07 MN/m²
partial member forces flange top: V_o = -3.46 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 22.42 kNm
partial member forces flange bottom: V_u = -2.75 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 25.03 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = 67.38 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.162, $U_{MS,u}$ = 0.181 ⇒ U_{MS} = 0.181
limiting normal forces flange top: -1408.12 kN ≤ N_o ≤ 1408.12 kN
limiting normal forces flange bottom: -1392.21 kN ≤ N_u ≤ 1392.21 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3620.18 kN ≤ N ≤ 3620.18 kN ⇒ U_N = 0.107
utilization y-moment (centroid): -525.82 kNm ≤ $M_{y,s}$ ≤ 528.22 kNm ⇒ U_{My} = 0.126
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.279
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.472): c/t_{o-o} = 0.176, c/t_{--o} = 0.376
max. utilization: U = 0.376 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 18, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = -0.099 kNm, M_η = 59.87 kNm, M_ζ = 47.88 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.099 kNm, B = 0.471 kNm²
normal stresses (elast.): σ_{max} = 58.76 MN/m², σ_{min} = -100.00 MN/m²
extr. stresses (elast.): σ = 100.00 MN/m², τ = 4.30 MN/m², σ_v = 100.00 MN/m²
partial member forces flange top: V_o = -3.40 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 22.56 kNm
partial member forces flange bottom: V_u = -2.81 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 25.33 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = 59.87 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.163, $U_{MS,u}$ = 0.183 ⇒ U_{MS} = 0.183
limiting normal forces flange top: -1407.29 kN ≤ N_o ≤ 1407.29 kN
limiting normal forces flange bottom: -1390.37 kN ≤ N_u ≤ 1390.37 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3617.50 kN ≤ N ≤ 3617.50 kN ⇒ U_N = 0.120
utilization y-moment (centroid): -521.30 kNm ≤ $M_{y,s}$ ≤ 524.17 kNm ⇒ U_{My} = 0.112
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.280
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.471): c/t_{o-o} = 0.186, c/t_{--o} = 0.376
max. utilization: U = 0.376 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 19, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = -0.00 kN, V_ζ = -14.76 kN
internal moments: T = 0.446 kNm, M_η = -183.26 kNm, M_ζ = -12.23 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.446 kNm, B = -0.603 kNm²
normal stresses (elast.): σ_{max} = 62.25 MN/m², σ_{min} = -112.86 MN/m²
extr. stresses (elast.): σ = 112.86 MN/m², τ = 3.77 MN/m², σ_v = 112.86 MN/m²
partial member forces flange top: V_o = 1.31 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -4.34 kNm
partial member forces flange bottom: V_u = -1.31 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -7.89 kNm
partial member forces web: V_s = -14.76 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = -183.26 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.001, $U_{\tau,s}$ = 0.031 ⇒ U_τ = 0.031
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.031, $U_{MS,u}$ = 0.057 ⇒ U_{MS} = 0.057
limiting normal forces flange top: -1513.86 kN ≤ N_o ≤ 1513.86 kN
limiting normal forces flange bottom: -1493.71 kN ≤ N_u ≤ 1493.71 kN
limiting normal forces web: -819.97 kN ≤ N_s ≤ 819.97 kN
utilization normal force: -3827.53 kN ≤ N ≤ 3827.53 kN ⇒ U_N = 0.101
utilization y-moment (centroid): -560.73 kNm ≤ $M_{y,s}$ ≤ 563.77 kNm ⇒ U_{My} = 0.329
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.400
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.401): c/t_{o-o} = 0.189, c/t_{--o} = 0.413
max. utilization: U = 0.413 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 20, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = -0.00 kN, V_ζ = -14.76 kN
internal moments: T = 0.462 kNm, M_η = -193.21 kNm, M_ζ = -14.37 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.462 kNm, B = -0.701 kNm²

normal stresses (elast.): σ_{max} = 65.41 MN/m², σ_{min} = -122.61 MN/m²
extr. stresses (elast.): σ = 122.61 MN/m², τ = 3.77 MN/m², σ_v = 122.61 MN/m²
partial member forces flange top: V_o = 1.36 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -5.12 kNm
partial member forces flange bottom: V_u = -1.36 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -9.25 kNm
partial member forces web: V_s = -14.76 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = -193.21 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.031 ⇒ U_τ = 0.031
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.037, $U_{MS,u}$ = 0.067 ⇒ U_{MS} = 0.067
limiting normal forces flange top: -1509.47 kN ≤ N_o ≤ 1509.47 kN
limiting normal forces flange bottom: -1485.93 kN ≤ N_u ≤ 1485.93 kN
limiting normal forces web: -819.97 kN ≤ N_s ≤ 819.97 kN
utilization normal force: -3815.36 kN ≤ N ≤ 3815.36 kN ⇒ U_N = 0.114
utilization y-moment (centroid): -554.34 kNm ≤ $M_{y,s}$ ≤ 558.34 kNm ⇒ U_{My} = 0.351
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.432
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.344): c/t_{o-o} = 0.199, c/t_{--o} = 0.430
max. utilization: U = 0.432 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 21, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -75.82 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 9.16 MN/m², σ_{min} = -51.57 MN/m²
extr. stresses (elast.): σ = 51.57 MN/m², τ = 0.00 MN/m², σ_v = 51.57 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = -75.82 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3896.73 kN ≤ N ≤ 3896.73 kN ⇒ U_N = 0.099
utilization y-moment (centroid): -574.02 kNm ≤ $M_{y,s}$ ≤ 574.02 kNm ⇒ U_{My} = 0.132
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.214
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.069): c/t_{o-o} = 0.176, c/t_{--o} = 0.284
max. utilization: U = 0.284 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 22, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -85.90 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 10.58 MN/m², σ_{min} = -58.23 MN/m²
extr. stresses (elast.): σ = 58.23 MN/m², τ = 0.00 MN/m², σ_v = 58.23 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = -85.90 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3896.73 kN ≤ N ≤ 3896.73 kN ⇒ U_N = 0.112
utilization y-moment (centroid): -570.20 kNm ≤ $M_{y,s}$ ≤ 570.20 kNm ⇒ U_{My} = 0.151
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.241
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.948): c/t_{o-o} = 0.187, c/t_{--o} = 0.302
max. utilization: U = 0.302 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 23, group of load spectra 1: standard load spectra
internal forces: N = -405.76 kN, V_η = -6.21 kN, V_ζ = -0.00 kN
internal moments: T = 0.146 kNm, M_η = -80.12 kNm, M_ζ = 60.61 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.146 kNm, B = 0.764 kNm²
normal stresses (elast.): σ_{max} = 74.77 MN/m², σ_{min} = -129.67 MN/m²
extr. stresses (elast.): σ = 129.67 MN/m², τ = 0.74 MN/m², σ_v = 129.67 MN/m²
partial member forces flange top: V_o = -2.68 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 28.06 kNm
partial member forces flange bottom: V_u = -3.53 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 32.55 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -405.76 kN, $M_{y,s}$ = -80.12 kNm
shear utilization: $U_{\tau,o}$ = 0.003, $U_{\tau,u}$ = 0.004, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.004
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.203, $U_{MS,u}$ = 0.235 ⇒ U_{MS} = 0.235
limiting normal forces flange top: -1373.48 kN ≤ N_o ≤ 1373.48 kN

limiting normal forces flange bottom: $-1345.23\ kN \le N_u \le 1345.23\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3539.07\ kN \le N \le 3539.07\ kN \Rightarrow U_N = 0.115$
utilization y-moment (centroid): $-509.44\ kNm \le M_{y,s} \le 513.91\ kNm \Rightarrow U_{My} = 0.161$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.344$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.292$): $c/t_{o-o} = 0.180$, $c/t_{--o} = 0.424$
max. utilization: $U = 0.424 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 24, group of load spectra 1: standard load spectra
internal forces: $N = -453.51\ kN$, $V_\eta = -6.21\ kN$, $V_\zeta = -0.00\ kN$
internal moments: $T = 0.166\ kNm$, $M_\eta = -90.32\ kNm$, $M_\zeta = 63.29\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = 0.166\ kNm$, $B = 0.893\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 78.46\ MN/m^2$, $\sigma_{min} = -140.34\ MN/m^2$
extr. stresses (elast.): $\sigma = 140.34\ MN/m^2$, $\tau = 0.75\ MN/m^2$, $\sigma_v = 140.34\ MN/m^2$
partial member forces flange top: $V_o = -2.62\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 29.02\ kNm$
partial member forces flange bottom: $V_u = -3.59\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 34.27\ kNm$
partial member forces web: $V_s = -0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -453.51\ kN$, $M_{y,s} = -90.32\ kNm$
shear utilization: $U_{\tau,o} = 0.003$, $U_{\tau,u} = 0.004$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.004$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.210$, $U_{MS,u} = 0.248 \Rightarrow U_{MS} = 0.248$
limiting normal forces flange top: $-1367.50\ kN \le N_o \le 1367.50\ kN$
limiting normal forces flange bottom: $-1334.27\ kN \le N_u \le 1334.27\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3522.14\ kN \le N \le 3522.14\ kN \Rightarrow U_N = 0.129$
utilization y-moment (centroid): $-501.83\ kNm \le M_{y,s} \le 507.70\ kNm \Rightarrow U_{My} = 0.185$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.376$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.243$): $c/t_{o-o} = 0.191$, $c/t_{--o} = 0.442$
max. utilization: $U = 0.442 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 25, group of load spectra 1: standard load spectra
internal forces: $N = -325.21\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = -0.00\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -62.23\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = 7.09\ MN/m^2$, $\sigma_{min} = -42.75\ MN/m^2$
extr. stresses (elast.): $\sigma = 42.75\ MN/m^2$, $\tau = 0.00\ MN/m^2$, $\sigma_v = 42.75\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = -0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -325.21\ kN$, $M_{y,s} = -62.23\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1538.18\ kN \le N_o \le 1538.18\ kN$
limiting normal forces flange bottom: $-1538.18\ kN \le N_u \le 1538.18\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3896.73\ kN \le N \le 3896.73\ kN \Rightarrow U_N = 0.083$
utilization y-moment (centroid): $-578.30\ kNm \le M_{y,s} \le 578.30\ kNm \Rightarrow U_{My} = 0.108$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.178$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 2.273$): $c/t_{o-o} = 0.161$, $c/t_{--o} = 0.259$
max. utilization: $U = 0.259 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 26, group of load spectra 1: standard load spectra
internal forces: $N = -372.96\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = -0.00\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -71.93\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = 8.36\ MN/m^2$, $\sigma_{min} = -49.26\ MN/m^2$
extr. stresses (elast.): $\sigma = 49.26\ MN/m^2$, $\tau = 0.00\ MN/m^2$, $\sigma_v = 49.26\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = -0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -372.96\ kN$, $M_{y,s} = -71.93\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1538.18\ kN \le N_o \le 1538.18\ kN$
limiting normal forces flange bottom: $-1538.18\ kN \le N_u \le 1538.18\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3896.73\ kN \le N \le 3896.73\ kN \Rightarrow U_N = 0.096$
utilization y-moment (centroid): $-575.05\ kNm \le M_{y,s} \le 575.05\ kNm \Rightarrow U_{My} = 0.125$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.205$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 2.117$): $c/t_{o-o} = 0.173$, $c/t_{--o} = 0.278$
max. utilization: $U = 0.278 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 27, group of load spectra 1: standard load spectra
internal forces: $N = -386.77\ kN$, $V_\eta = -6.21\ kN$, $V_\zeta = 16.83\ kN$
internal moments: $T = 0.556\ kNm$, $M_\eta = 57.70\ kNm$, $M_\zeta = 59.84\ kNm$

warping torsion: T_t = 0.000 kNm, T_w = 0.556 kNm, B = 1.200 kNm²
normal stresses (elast.): σ_{max} = 79.31 MN/m², σ_{min} = -105.38 MN/m²
extr. stresses (elast.): σ = 105.38 MN/m², τ = 4.30 MN/m², σ_v = 105.38 MN/m²
partial member forces flange top: V_o = -1.47 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 26.39 kNm
partial member forces flange bottom: V_u = -4.74 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 33.45 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = 57.70 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.191, $U_{MS,u}$ = 0.242 ⇒ U_{MS} = 0.242
limiting normal forces flange top: -1383.83 kN ≤ N_o ≤ 1383.83 kN
limiting normal forces flange bottom: -1339.51 kN ≤ N_u ≤ 1339.51 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3543.18 kN ≤ N ≤ 3543.18 kN ⇒ U_N = 0.109
utilization y-moment (centroid): -510.42 kNm ≤ $M_{y,s}$ ≤ 517.11 kNm ⇒ U_{My} = 0.106
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.283
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.433): c/t_{o-o} = 0.175, c/t_{--o} = 0.383
max. utilization: U = 0.383 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 28, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = 0.602 kNm, M_η = 48.92 kNm, M_ζ = 62.47 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.602 kNm, B = 1.358 kNm²
normal stresses (elast.): σ_{max} = 77.30 MN/m², σ_{min} = -106.45 MN/m²
extr. stresses (elast.): σ = 106.45 MN/m², τ = 4.30 MN/m², σ_v = 106.45 MN/m²
partial member forces flange top: V_o = -1.33 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 27.24 kNm
partial member forces flange bottom: V_u = -4.88 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 35.23 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = 48.92 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.197, $U_{MS,u}$ = 0.254 ⇒ U_{MS} = 0.254
limiting normal forces flange top: -1378.56 kN ≤ N_o ≤ 1378.56 kN
limiting normal forces flange bottom: -1328.10 kN ≤ N_u ≤ 1328.10 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3526.51 kN ≤ N ≤ 3526.51 kN ⇒ U_N = 0.123
utilization y-moment (centroid): -502.77 kNm ≤ $M_{y,s}$ ≤ 511.33 kNm ⇒ U_{My} = 0.088
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.286
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.424): c/t_{o-o} = 0.186, c/t_{--o} = 0.384
max. utilization: U = 0.384 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 29, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = 0.00 kN, V_ζ = -14.76 kN
internal moments: T = 0.000 kNm, M_η = -192.92 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 56.07 MN/m², σ_{min} = -98.48 MN/m²
extr. stresses (elast.): σ = 98.48 MN/m², τ = 3.77 MN/m², σ_v = 98.49 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -14.76 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = -192.92 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.031 ⇒ U_τ = 0.031
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -819.97 kN ≤ N_s ≤ 819.97 kN
utilization normal force: -3896.33 kN ≤ N ≤ 3896.33 kN ⇒ U_N = 0.099
utilization y-moment (centroid): -573.98 kNm ≤ $M_{y,s}$ ≤ 573.98 kNm ⇒ U_{My} = 0.336
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.391
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.506): c/t_{o-o} = 0.191, c/t_{--o} = 0.391
max. utilization: U = 0.391 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 30, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = 0.00 kN, V_ζ = -14.76 kN
internal moments: T = 0.000 kNm, M_η = -204.14 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 57.94 MN/m², σ_{min} = -105.59 MN/m²
extr. stresses (elast.): σ = 105.59 MN/m², τ = 3.77 MN/m², σ_v = 105.60 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -14.76 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = -204.14 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.031 ⇒ U_τ = 0.031
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000

limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -819.97 kN ≤ N_s ≤ 819.97 kN
utilization normal force: -3896.33 kN ≤ N ≤ 3896.33 kN ⇒ U_N = 0.112
utilization y-moment (centroid): -570.16 kNm ≤ $M_{y,s}$ ≤ 570.16 kNm ⇒ U_{My} = 0.358
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.421
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.454): c/t_{o-o} = 0.200, c/t_{--o} = 0.405
max. utilization: U = 0.421 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 31, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -75.82 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 9.16 MN/m², σ_{min} = -51.57 MN/m²
extr. stresses (elast.): σ = 51.57 MN/m², τ = 0.00 MN/m², σ_v = 51.57 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = -75.82 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3896.73 kN ≤ N ≤ 3896.73 kN ⇒ U_N = 0.099
utilization y-moment (centroid): -574.02 kNm ≤ $M_{y,s}$ ≤ 574.02 kNm ⇒ U_{My} = 0.132
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.214
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 2.069): c/t_{o-o} = 0.176, c/t_{--o} = 0.284
max. utilization: U = 0.284 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 32, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -85.90 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 10.58 MN/m², σ_{min} = -58.23 MN/m²
extr. stresses (elast.): σ = 58.23 MN/m², τ = 0.00 MN/m², σ_v = 58.23 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = -85.90 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3896.73 kN ≤ N ≤ 3896.73 kN ⇒ U_N = 0.112
utilization y-moment (centroid): -570.20 kNm ≤ $M_{y,s}$ ≤ 570.20 kNm ⇒ U_{My} = 0.151
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.241
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.948): c/t_{o-o} = 0.187, c/t_{--o} = 0.302
max. utilization: U = 0.302 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 33, group of load spectra 1: standard load spectra
internal forces: N = -405.76 kN, V_η = -6.21 kN, V_ζ = -0.00 kN
internal moments: T = 0.146 kNm, M_η = -80.12 kNm, M_ζ = 60.61 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.146 kNm, B = 0.764 kNm²
normal stresses (elast.): σ_{max} = 74.77 MN/m², σ_{min} = -129.67 MN/m²
extr. stresses (elast.): σ = 129.67 MN/m², τ = 0.74 MN/m², σ_v = 129.67 MN/m²
partial member forces flange top: V_o = -2.68 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 28.06 kNm
partial member forces flange bottom: V_u = -3.53 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 32.55 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -405.76 kN, $M_{y,s}$ = -80.12 kNm
shear utilization: $U_{\tau,o}$ = 0.003, $U_{\tau,u}$ = 0.004, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.004
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.203, $U_{MS,u}$ = 0.235 ⇒ U_{MS} = 0.235
limiting normal forces flange top: -1373.48 kN ≤ N_o ≤ 1373.48 kN
limiting normal forces flange bottom: -1345.23 kN ≤ N_u ≤ 1345.23 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3539.07 kN ≤ N ≤ 3539.07 kN ⇒ U_N = 0.115
utilization y-moment (centroid): -509.44 kNm ≤ $M_{y,s}$ ≤ 513.91 kNm ⇒ U_{My} = 0.161
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.344
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.292): c/t_{o-o} = 0.180, c/t_{--o} = 0.424
max. utilization: U = 0.424 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 34, group of load spectra 1: standard load spectra
internal forces: N = -453.51 kN, V_η = -6.21 kN, V_ζ = -0.00 kN

internal moments: T = 0.166 kNm, M_η = -90.32 kNm, M_ζ = 63.29 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.166 kNm, B = 0.893 kNm²
normal stresses (elast.): σ_{max} = 78.46 MN/m², σ_{min} = -140.34 MN/m²
extr. stresses (elast.): σ = 140.34 MN/m², τ = 0.75 MN/m², σ_v = 140.34 MN/m²
partial member forces flange top: V_o = -2.62 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 29.02 kNm
partial member forces flange bottom: V_u = -3.59 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 34.27 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -453.51 kN, $M_{y,s}$ = -90.32 kNm
shear utilization: $U_{\tau,o}$ = 0.003, $U_{\tau,u}$ = 0.004, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.004
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.210, $U_{MS,u}$ = 0.248 ⇒ U_{MS} = 0.248
limiting normal forces flange top: -1367.50 kN ≤ N_o ≤ 1367.50 kN
limiting normal forces flange bottom: -1334.27 kN ≤ N_u ≤ 1334.27 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3522.14 kN ≤ N ≤ 3522.14 kN ⇒ U_N = 0.129
utilization y-moment (centroid): -501.83 kNm ≤ $M_{y,s}$ ≤ 507.70 kNm ⇒ U_{My} = 0.185
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.376
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.243): c/t_{o-o} = 0.191, c/t_{--o} = 0.442
max. utilization: U = 0.442 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 35, group of load spectra 1: standard load spectra
internal forces: N = -325.21 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -62.23 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 7.09 MN/m², σ_{min} = -42.75 MN/m²
extr. stresses (elast.): σ = 42.75 MN/m², τ = 0.00 MN/m², σ_v = 42.75 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -325.21 kN, $M_{y,s}$ = -62.23 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3896.73 kN ≤ N ≤ 3896.73 kN ⇒ U_N = 0.083
utilization y-moment (centroid): -578.30 kNm ≤ $M_{y,s}$ ≤ 578.30 kNm ⇒ U_{My} = 0.108
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.178
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.273): c/t_{o-o} = 0.161, c/t_{--o} = 0.259
max. utilization: U = 0.259 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 36, group of load spectra 1: standard load spectra
internal forces: N = -372.96 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -71.93 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 8.36 MN/m², σ_{min} = -49.26 MN/m²
extr. stresses (elast.): σ = 49.26 MN/m², τ = 0.00 MN/m², σ_v = 49.26 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -372.96 kN, $M_{y,s}$ = -71.93 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3896.73 kN ≤ N ≤ 3896.73 kN ⇒ U_N = 0.096
utilization y-moment (centroid): -575.05 kNm ≤ $M_{y,s}$ ≤ 575.05 kNm ⇒ U_{My} = 0.125
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.205
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.117): c/t_{o-o} = 0.173, c/t_{--o} = 0.278
max. utilization: U = 0.278 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 37, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = 0.556 kNm, M_η = 57.70 kNm, M_ζ = 59.84 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.556 kNm, B = 1.200 kNm²
normal stresses (elast.): σ_{max} = 79.31 MN/m², σ_{min} = -105.38 MN/m²
extr. stresses (elast.): σ = 105.38 MN/m², τ = 4.30 MN/m², σ_v = 105.38 MN/m²
partial member forces flange top: V_o = -1.47 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 26.39 kNm
partial member forces flange bottom: V_u = -4.74 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 33.45 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = 57.70 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999

flange bending utilization M_{Sa}: $U_{MS,o} = 0.191$, $U_{MS,u} = 0.242 \Rightarrow U_{MS} = 0.242$
limiting normal forces flange top: $-1383.83\ kN \le N_o \le 1383.83\ kN$
limiting normal forces flange bottom: $-1339.51\ kN \le N_u \le 1339.51\ kN$
limiting normal forces web: $-819.85\ kN \le N_s \le 819.85\ kN$
utilization normal force: $-3543.18\ kN \le N \le 3543.18\ kN \Rightarrow U_N = 0.109$
utilization y-moment (centroid): $-510.42\ kNm \le M_{y,s} \le 517.11\ kNm \Rightarrow U_{My} = 0.106$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.283$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.433$): $c/t_{o-o} = 0.175$, $c/t_{--o} = 0.383$
max. utilization: $U = 0.383 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 38, group of load spectra 1: standard load spectra
internal forces: $N = -434.52\ kN$, $V_\eta = -6.21\ kN$, $V_\zeta = 16.83\ kN$
internal moments: $T = 0.602\ kNm$, $M_\eta = 48.92\ kNm$, $M_\zeta = 62.47\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = 0.602\ kNm$, $B = 1.358\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 77.30\ MN/m^2$, $\sigma_{min} = -106.45\ MN/m^2$
extr. stresses (elast.): $\sigma = 106.45\ MN/m^2$, $\tau = 4.30\ MN/m^2$, $\sigma_v = 106.45\ MN/m^2$
partial member forces flange top: $V_o = -1.33\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 27.24\ kNm$
partial member forces flange bottom: $V_u = -4.88\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 35.23\ kNm$
partial member forces web: $V_s = 16.83\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -434.52\ kN$, $M_{y,s} = 48.92\ kNm$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.005$, $U_{\tau,s} = 0.036 \Rightarrow U_\tau = 0.036$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.197$, $U_{MS,u} = 0.254 \Rightarrow U_{MS} = 0.254$
limiting normal forces flange top: $-1378.56\ kN \le N_o \le 1378.56\ kN$
limiting normal forces flange bottom: $-1328.10\ kN \le N_u \le 1328.10\ kN$
limiting normal forces web: $-819.85\ kN \le N_s \le 819.85\ kN$
utilization normal force: $-3526.51\ kN \le N \le 3526.51\ kN \Rightarrow U_N = 0.123$
utilization y-moment (centroid): $-502.77\ kNm \le M_{y,s} \le 511.33\ kNm \Rightarrow U_{My} = 0.088$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.286$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.424$): $c/t_{o-o} = 0.186$, $c/t_{--o} = 0.384$
max. utilization: $U = 0.384 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 39, group of load spectra 1: standard load spectra
internal forces: $N = -386.77\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = -14.76\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -192.92\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = 56.07\ MN/m^2$, $\sigma_{min} = -98.48\ MN/m^2$
extr. stresses (elast.): $\sigma = 98.48\ MN/m^2$, $\tau = 3.77\ MN/m^2$, $\sigma_v = 98.49\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = -14.76\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -386.77\ kN$, $M_{y,s} = -192.92\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.031 \Rightarrow U_\tau = 0.031$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1538.18\ kN \le N_o \le 1538.18\ kN$
limiting normal forces flange bottom: $-1538.18\ kN \le N_u \le 1538.18\ kN$
limiting normal forces web: $-819.97\ kN \le N_s \le 819.97\ kN$
utilization normal force: $-3896.33\ kN \le N \le 3896.33\ kN \Rightarrow U_N = 0.099$
utilization y-moment (centroid): $-573.98\ kNm \le M_{y,s} \le 573.98\ kNm \Rightarrow U_{My} = 0.336$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.391$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.506$): $c/t_{o-o} = 0.191$, $c/t_{--o} = 0.391$
max. utilization: $U = 0.391 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 40, group of load spectra 1: standard load spectra
internal forces: $N = -434.52\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = -14.76\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -204.14\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = 57.94\ MN/m^2$, $\sigma_{min} = -105.59\ MN/m^2$
extr. stresses (elast.): $\sigma = 105.59\ MN/m^2$, $\tau = 3.77\ MN/m^2$, $\sigma_v = 105.60\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = -14.76\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -434.52\ kN$, $M_{y,s} = -204.14\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.031 \Rightarrow U_\tau = 0.031$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1538.18\ kN \le N_o \le 1538.18\ kN$
limiting normal forces flange bottom: $-1538.18\ kN \le N_u \le 1538.18\ kN$
limiting normal forces web: $-819.97\ kN \le N_s \le 819.97\ kN$
utilization normal force: $-3896.33\ kN \le N \le 3896.33\ kN \Rightarrow U_N = 0.112$
utilization y-moment (centroid): $-570.16\ kNm \le M_{y,s} \le 570.16\ kNm \Rightarrow U_{My} = 0.358$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.421$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.454$): $c/t_{o-o} = 0.200$, $c/t_{--o} = 0.405$
max. utilization: $U = 0.421 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 41, group of load spectra 1: standard load spectra

internal forces: $N = -386.77$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.006$ kNm, $M_\eta = -85.48$ kNm, $M_\zeta = 12.30$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.006$ kNm, $B = 0.673$ kNm²
normal stresses (elast.): $\sigma_{max} = 22.68$ MN/m², $\sigma_{min} = -74.26$ MN/m²
extr. stresses (elast.): $\sigma = 74.26$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 74.26$ MN/m²
partial member forces flange top: $V_o = 0.02$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 4.17$ kNm
partial member forces flange bottom: $V_u = -0.02$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 8.13$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -386.77$ kN, $M_{y,s} = -85.48$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000$ ⇒ $U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.030$, $U_{MS,u} = 0.059$ ⇒ $U_{MS} = 0.059$
limiting normal forces flange top: -1514.84 kN ≤ N_o ≤ 1514.84 kN
limiting normal forces flange bottom: -1492.34 kN ≤ N_u ≤ 1492.34 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3827.54 kN ≤ N ≤ 3827.54 kN ⇒ $U_N = 0.101$
utilization y-moment (centroid): -560.51 kNm ≤ $M_{y,s}$ ≤ 563.91 kNm ⇒ $U_{My} = 0.155$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.253$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.718$): $c/t_{o-o} = 0.177$, $c/t_{--o} = 0.334$
max. utilization: $U = 0.334 \le 1$ ⇒ **verification meets the requirements**

Load spectrum 42, group of load spectra 1: standard load spectra
internal forces: $N = -434.52$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.008$ kNm, $M_\eta = -96.83$ kNm, $M_\zeta = 14.46$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.008$ kNm, $B = 0.784$ kNm²
normal stresses (elast.): $\sigma_{max} = 26.35$ MN/m², $\sigma_{min} = -84.67$ MN/m²
extr. stresses (elast.): $\sigma = 84.67$ MN/m², $\tau = 0.01$ MN/m², $\sigma_v = 84.67$ MN/m²
partial member forces flange top: $V_o = 0.02$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 4.92$ kNm
partial member forces flange bottom: $V_u = -0.02$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 9.53$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -434.52$ kN, $M_{y,s} = -96.83$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000$ ⇒ $U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.036$, $U_{MS,u} = 0.069$ ⇒ $U_{MS} = 0.069$
limiting normal forces flange top: -1510.59 kN ≤ N_o ≤ 1510.59 kN
limiting normal forces flange bottom: -1484.27 kN ≤ N_u ≤ 1484.27 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3815.23 kN ≤ N ≤ 3815.23 kN ⇒ $U_N = 0.114$
utilization y-moment (centroid): -554.05 kNm ≤ $M_{y,s}$ ≤ 558.51 kNm ⇒ $U_{My} = 0.178$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.287$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.609$): $c/t_{o-o} = 0.187$, $c/t_{--o} = 0.356$
max. utilization: $U = 0.356 \le 1$ ⇒ **verification meets the requirements**

Load spectrum 43, group of load spectra 1: standard load spectra
internal forces: $N = -405.76$ kN, $V_\eta = -6.21$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.314$ kNm, $M_\eta = -90.32$ kNm, $M_\zeta = 73.76$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.314$ kNm, $B = 1.446$ kNm²
normal stresses (elast.): $\sigma_{max} = 89.43$ MN/m², $\sigma_{min} = -153.62$ MN/m²
extr. stresses (elast.): $\sigma = 153.62$ MN/m², $\tau = 0.84$ MN/m², $\sigma_v = 153.62$ MN/m²
partial member forces flange top: $V_o = -2.18$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 32.63$ kNm
partial member forces flange bottom: $V_u = -4.03$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 41.13$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -405.76$ kN, $M_{y,s} = -90.32$ kNm
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.005$, $U_{\tau,s} = 0.000$ ⇒ $U_\tau = 0.005$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.236$, $U_{MS,u} = 0.297$ ⇒ $U_{MS} = 0.297$
limiting normal forces flange top: -1344.76 kN ≤ N_o ≤ 1344.76 kN
limiting normal forces flange bottom: -1289.55 kN ≤ N_u ≤ 1289.55 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3454.68 kN ≤ N ≤ 3454.68 kN ⇒ $U_N = 0.117$
utilization y-moment (centroid): -492.74 kNm ≤ $M_{y,s}$ ≤ 501.48 kNm ⇒ $U_{My} = 0.190$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.397$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.187$): $c/t_{o-o} = 0.181$, $c/t_{--o} = 0.459$
max. utilization: $U = 0.459 \le 1$ ⇒ **verification meets the requirements**

Load spectrum 44, group of load spectra 1: standard load spectra
internal forces: $N = -453.51$ kN, $V_\eta = -6.21$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.340$ kNm, $M_\eta = -101.81$ kNm, $M_\zeta = 78.68$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.340$ kNm, $B = 1.684$ kNm²
normal stresses (elast.): $\sigma_{max} = 95.49$ MN/m², $\sigma_{min} = -168.14$ MN/m²
extr. stresses (elast.): $\sigma = 168.14$ MN/m², $\tau = 0.86$ MN/m², $\sigma_v = 168.14$ MN/m²
partial member forces flange top: $V_o = -2.10$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 34.39$ kNm
partial member forces flange bottom: $V_u = -4.11$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 44.29$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm

partial member forces main bending (centroid): N = -453.51 kN, $M_{y,s}$ = -101.81 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.005
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.248, $U_{MS,u}$ = 0.320 ⇒ U_{MS} = 0.320
limiting normal forces flange top: -1333.52 kN ≤ N_o ≤ 1333.52 kN
limiting normal forces flange bottom: -1268.46 kN ≤ N_u ≤ 1268.46 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3422.35 kN ≤ N ≤ 3422.35 kN ⇒ U_N = 0.133
utilization y-moment (centroid): -481.74 kNm ≤ $M_{y,s}$ ≤ 493.25 kNm ⇒ U_{My} = 0.221
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.437
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.135): c/t_{o-o} = 0.192, c/t_{--o} = 0.481
max. utilization: U = 0.481 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 45, group of load spectra 1: standard load spectra
internal forces: N = -325.21 kN, V_η = -0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.003 kNm, M_η = -70.23 kNm, M_ζ = 9.70 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.003 kNm, B = 0.534 kNm²
normal stresses (elast.): σ_{max} = 17.89 MN/m², σ_{min} = -60.81 MN/m²
extr. stresses (elast.): σ = 60.81 MN/m², τ = 0.00 MN/m², σ_v = 60.81 MN/m²
partial member forces flange top: V_o = 0.01 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 3.28 kNm
partial member forces flange bottom: V_u = -0.01 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 6.42 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -325.21 kN, $M_{y,s}$ = -70.23 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.024, $U_{MS,u}$ = 0.046 ⇒ U_{MS} = 0.046
limiting normal forces flange top: -1519.86 kN ≤ N_o ≤ 1519.86 kN
limiting normal forces flange bottom: -1502.10 kN ≤ N_u ≤ 1502.10 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3842.32 kN ≤ N ≤ 3842.32 kN ⇒ U_N = 0.085
utilization y-moment (centroid): -567.89 kNm ≤ $M_{y,s}$ ≤ 570.14 kNm ⇒ U_{My} = 0.125
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.209
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.899): c/t_{o-o} = 0.162, c/t_{--o} = 0.302
max. utilization: U = 0.302 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 46, group of load spectra 1: standard load spectra
internal forces: N = -372.96 kN, V_η = -0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.005 kNm, M_η = -81.17 kNm, M_ζ = 11.59 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.005 kNm, B = 0.632 kNm²
normal stresses (elast.): σ_{max} = 21.17 MN/m², σ_{min} = -70.67 MN/m²
extr. stresses (elast.): σ = 70.67 MN/m², τ = 0.00 MN/m², σ_v = 70.67 MN/m²
partial member forces flange top: V_o = 0.02 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 3.93 kNm
partial member forces flange bottom: V_u = -0.02 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 7.66 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -372.96 kN, $M_{y,s}$ = -81.17 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.028, $U_{MS,u}$ = 0.055 ⇒ U_{MS} = 0.055
limiting normal forces flange top: -1516.17 kN ≤ N_o ≤ 1516.17 kN
limiting normal forces flange bottom: -1495.05 kN ≤ N_u ≤ 1495.05 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3831.58 kN ≤ N ≤ 3831.58 kN ⇒ U_N = 0.097
utilization y-moment (centroid): -562.39 kNm ≤ $M_{y,s}$ ≤ 565.46 kNm ⇒ U_{My} = 0.147
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.242
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.761): c/t_{o-o} = 0.174, c/t_{--o} = 0.326
max. utilization: U = 0.326 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 47, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = 1.237 kNm, M_η = 48.02 kNm, M_ζ = 72.21 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.237 kNm, B = 1.941 kNm²
normal stresses (elast.): σ_{max} = 94.80 MN/m², σ_{min} = -110.78 MN/m²
extr. stresses (elast.): σ = 110.78 MN/m², τ = 4.30 MN/m², σ_v = 110.78 MN/m²
partial member forces flange top: V_o = 0.53 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 30.40 kNm
partial member forces flange bottom: V_u = -6.74 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 41.81 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = 48.02 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.008, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.220, $U_{MS,u}$ = 0.302 ⇒ U_{MS} = 0.302
limiting normal forces flange top: -1358.86 kN ≤ N_o ≤ 1358.86 kN
limiting normal forces flange bottom: -1285.00 kN ≤ N_u ≤ 1285.00 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3463.71 kN ≤ N ≤ 3463.71 kN ⇒ U_N = 0.112

utilization y-moment (centroid): -494.34 kNm ≤ $M_{y,s}$ ≤ 505.49 kNm ⇒ U_{My} = 0.085
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.303
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.395): c/t_{o-o} = 0.175, c/t_{--o} = 0.389
max. utilization: U = 0.389 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 48, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = 1.310 kNm, M_η = 37.97 kNm, M_ζ = 77.03 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.310 kNm, B = 2.224 kNm²
normal stresses (elast.): σ_{max} = 95.66 MN/m², σ_{min} = -114.58 MN/m²
extr. stresses (elast.): σ = 114.58 MN/m², τ = 4.30 MN/m², σ_v = 114.58 MN/m²
partial member forces flange top: V_o = 0.75 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 31.97 kNm
partial member forces flange bottom: V_u = -6.96 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 45.06 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = 37.97 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.008, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.231, $U_{MS,u}$ = 0.325 ⇒ U_{MS} = 0.325
limiting normal forces flange top: -1348.91 kN ≤ N_o ≤ 1348.91 kN
limiting normal forces flange bottom: -1263.25 kN ≤ N_u ≤ 1263.25 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3432.01 kN ≤ N ≤ 3432.01 kN ⇒ U_N = 0.127
utilization y-moment (centroid): -483.25 kNm ≤ $M_{y,s}$ ≤ 497.78 kNm ⇒ U_{My} = 0.063
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.326
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.380): c/t_{o-o} = 0.187, c/t_{--o} = 0.393
max. utilization: U = 0.393 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 49, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = -0.00 kN, V_ζ = -14.76 kN
internal moments: T = -0.441 kNm, M_η = -202.59 kNm, M_ζ = 12.23 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.441 kNm, B = 0.589 kNm²
normal stresses (elast.): σ_{max} = 70.07 MN/m², σ_{min} = -120.50 MN/m²
extr. stresses (elast.): σ = 120.50 MN/m², τ = 3.77 MN/m², σ_v = 120.50 MN/m²
partial member forces flange top: V_o = -1.30 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 4.38 kNm
partial member forces flange bottom: V_u = 1.30 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 7.85 kNm
partial member forces web: V_s = -14.76 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = -202.59 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.001, $U_{\tau,s}$ = 0.031 ⇒ U_τ = 0.031
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.032, $U_{MS,u}$ = 0.057 ⇒ U_{MS} = 0.057
limiting normal forces flange top: -1513.66 kN ≤ N_o ≤ 1513.66 kN
limiting normal forces flange bottom: -1493.95 kN ≤ N_u ≤ 1493.95 kN
limiting normal forces web: -819.97 kN ≤ N_s ≤ 819.97 kN
utilization normal force: -3827.58 kN ≤ N ≤ 3827.58 kN ⇒ U_N = 0.101
utilization y-moment (centroid): -560.77 kNm ≤ $M_{y,s}$ ≤ 563.74 kNm ⇒ U_{My} = 0.363
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.429
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.357): c/t_{o-o} = 0.192, c/t_{--o} = 0.427
max. utilization: U = 0.429 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 50, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = -0.00 kN, V_ζ = -14.76 kN
internal moments: T = -0.456 kNm, M_η = -215.07 kNm, M_ζ = 14.35 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.456 kNm, B = 0.683 kNm²
normal stresses (elast.): σ_{max} = 74.27 MN/m², σ_{min} = -131.22 MN/m²
extr. stresses (elast.): σ = 131.22 MN/m², τ = 3.77 MN/m², σ_v = 131.22 MN/m²
partial member forces flange top: V_o = -1.34 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 5.17 kNm
partial member forces flange bottom: V_u = 1.34 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 9.19 kNm
partial member forces web: V_s = -14.76 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = -215.07 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.031 ⇒ U_τ = 0.031
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.037, $U_{MS,u}$ = 0.066 ⇒ U_{MS} = 0.066
limiting normal forces flange top: -1509.21 kN ≤ N_o ≤ 1509.21 kN
limiting normal forces flange bottom: -1486.27 kN ≤ N_u ≤ 1486.27 kN
limiting normal forces web: -819.97 kN ≤ N_s ≤ 819.97 kN
utilization normal force: -3815.45 kN ≤ N ≤ 3815.45 kN ⇒ U_N = 0.114
utilization y-moment (centroid): -554.41 kNm ≤ $M_{y,s}$ ≤ 558.30 kNm ⇒ U_{My} = 0.390
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.464
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.300): c/t_{o-o} = 0.202, c/t_{--o} = 0.445
max. utilization: U = 0.464 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 51, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = -0.001 kNm, M_η = -66.15 kNm, M_ζ = -12.31 kNm
warping torsion: T_t = -0.000 kNm, T_w = -0.001 kNm, B = -0.687 kNm²

normal stresses (elast.): σ_{max} = 14.86 MN/m², σ_{min} = -66.62 MN/m²
extr. stresses (elast.): σ = 66.62 MN/m², τ = 0.00 MN/m², σ_v = 66.62 MN/m²
partial member forces flange top: V_o = -0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -4.13 kNm
partial member forces flange bottom: V_u = 0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -8.18 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = -66.15 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.030, $U_{MS,u}$ = 0.059 ⇒ U_{MS} = 0.059
limiting normal forces flange top: -1515.04 kN ≤ N_o ≤ 1515.04 kN
limiting normal forces flange bottom: -1492.07 kN ≤ N_u ≤ 1492.07 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3827.47 kN ≤ N ≤ 3827.47 kN ⇒ U_N = 0.101
utilization y-moment (centroid): -560.46 kNm ≤ $M_{y,s}$ ≤ 563.93 kNm ⇒ U_{My} = 0.121
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.224
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.811): c/t_{o-o} = 0.176, c/t_{--o} = 0.315
max. utilization: U = 0.315 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 52, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = -0.002 kNm, M_η = -74.96 kNm, M_ζ = -14.47 kNm
warping torsion: T_t = -0.000 kNm, T_w = -0.002 kNm, B = -0.803 kNm²
normal stresses (elast.): σ_{max} = 17.48 MN/m², σ_{min} = -76.06 MN/m²
extr. stresses (elast.): σ = 76.06 MN/m², τ = 0.00 MN/m², σ_v = 76.06 MN/m²
partial member forces flange top: V_o = -0.01 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -4.87 kNm
partial member forces flange bottom: V_u = 0.01 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -9.60 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = -74.96 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.035, $U_{MS,u}$ = 0.069 ⇒ U_{MS} = 0.069
limiting normal forces flange top: -1510.86 kN ≤ N_o ≤ 1510.86 kN
limiting normal forces flange bottom: -1483.90 kN ≤ N_u ≤ 1483.90 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3815.12 kN ≤ N ≤ 3815.12 kN ⇒ U_N = 0.114
utilization y-moment (centroid): -553.97 kNm ≤ $M_{y,s}$ ≤ 558.54 kNm ⇒ U_{My} = 0.139
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.254
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.695): c/t_{o-o} = 0.186, c/t_{--o} = 0.337
max. utilization: U = 0.337 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 53, group of load spectra 1: standard load spectra
internal forces: N = -405.76 kN, V_η = -6.21 kN, V_ζ = 0.00 kN
internal moments: T = -0.018 kNm, M_η = -69.93 kNm, M_ζ = 47.44 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.018 kNm, B = 0.065 kNm²
normal stresses (elast.): σ_{max} = 60.21 MN/m², σ_{min} = -105.59 MN/m²
extr. stresses (elast.): σ = 105.59 MN/m², τ = 0.66 MN/m², σ_v = 105.59 MN/m²
partial member forces flange top: V_o = -3.16 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 23.53 kNm
partial member forces flange bottom: V_u = -3.05 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 23.91 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -405.76 kN, $M_{y,s}$ = -69.93 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.004
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.170, $U_{MS,u}$ = 0.173 ⇒ U_{MS} = 0.173
limiting normal forces flange top: -1401.37 kN ≤ N_o ≤ 1401.37 kN
limiting normal forces flange bottom: -1399.02 kN ≤ N_u ≤ 1399.02 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3620.76 kN ≤ N ≤ 3620.76 kN ⇒ U_N = 0.112
utilization y-moment (centroid): -525.45 kNm ≤ $M_{y,s}$ ≤ 525.83 kNm ⇒ U_{My} = 0.133
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.293
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.433): c/t_{o-o} = 0.180, c/t_{--o} = 0.386
max. utilization: U = 0.386 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 54, group of load spectra 1: standard load spectra
internal forces: N = -453.51 kN, V_η = -6.21 kN, V_ζ = 0.00 kN
internal moments: T = -0.001 kNm, M_η = -78.84 kNm, M_ζ = 47.87 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.001 kNm, B = 0.081 kNm²
normal stresses (elast.): σ_{max} = 61.56 MN/m², σ_{min} = -112.38 MN/m²
extr. stresses (elast.): σ = 112.38 MN/m², τ = 0.65 MN/m², σ_v = 112.38 MN/m²
partial member forces flange top: V_o = -3.11 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 23.70 kNm
partial member forces flange bottom: V_u = -3.10 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 24.17 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -453.51 kN, $M_{y,s}$ = -78.84 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.004
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000

flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.171, $U_{MS,u}$ = 0.175 ⇒ U_{MS} = 0.175
limiting normal forces flange top: -1400.34 kN ≤ N_o ≤ 1400.34 kN
limiting normal forces flange bottom: -1397.44 kN ≤ N_u ≤ 1397.44 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3618.15 kN ≤ N ≤ 3618.15 kN ⇒ U_N = 0.125
utilization y-moment (centroid): -520.94 kNm ≤ $M_{y,s}$ ≤ 521.45 kNm ⇒ U_{My} = 0.152
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.318
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.390): c/t_{o-o} = 0.190, c/t_{--o} = 0.399
max. utilization: U = 0.399 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 55, group of load spectra 1: standard load spectra
internal forces: N = -325.21 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = -0.000 kNm, M_η = -54.22 kNm, M_ζ = -9.70 kNm
warping torsion: T_t = -0.000 kNm, T_w = -0.000 kNm, B = -0.543 kNm²
normal stresses (elast.): σ_{max} = 11.42 MN/m², σ_{min} = -54.47 MN/m²
extr. stresses (elast.): σ = 54.47 MN/m², τ = 0.00 MN/m², σ_v = 54.47 MN/m²
partial member forces flange top: V_o = -0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -3.25 kNm
partial member forces flange bottom: V_u = 0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -6.45 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -325.21 kN, $M_{y,s}$ = -54.22 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.024, $U_{MS,u}$ = 0.047 ⇒ U_{MS} = 0.047
limiting normal forces flange top: -1519.99 kN ≤ N_o ≤ 1519.99 kN
limiting normal forces flange bottom: -1501.93 kN ≤ N_u ≤ 1501.93 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3842.29 kN ≤ N ≤ 3842.29 kN ⇒ U_N = 0.085
utilization y-moment (centroid): -567.87 kNm ≤ $M_{y,s}$ ≤ 570.16 kNm ⇒ U_{My} = 0.097
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.185
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.003): c/t_{o-o} = 0.161, c/t_{--o} = 0.285
max. utilization: U = 0.285 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 56, group of load spectra 1: standard load spectra
internal forces: N = -372.96 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = -0.001 kNm, M_η = -62.69 kNm, M_ζ = -11.60 kNm
warping torsion: T_t = -0.000 kNm, T_w = -0.001 kNm, B = -0.645 kNm²
normal stresses (elast.): σ_{max} = 13.69 MN/m², σ_{min} = -63.37 MN/m²
extr. stresses (elast.): σ = 63.37 MN/m², τ = 0.00 MN/m², σ_v = 63.37 MN/m²
partial member forces flange top: V_o = -0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -3.90 kNm
partial member forces flange bottom: V_u = 0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -7.70 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -372.96 kN, $M_{y,s}$ = -62.69 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.028, $U_{MS,u}$ = 0.056 ⇒ U_{MS} = 0.056
limiting normal forces flange top: -1516.35 kN ≤ N_o ≤ 1516.35 kN
limiting normal forces flange bottom: -1494.81 kN ≤ N_u ≤ 1494.81 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3831.52 kN ≤ N ≤ 3831.52 kN ⇒ U_N = 0.097
utilization y-moment (centroid): -562.35 kNm ≤ $M_{y,s}$ ≤ 565.48 kNm ⇒ U_{My} = 0.114
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.214
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.857): c/t_{o-o} = 0.172, c/t_{--o} = 0.308
max. utilization: U = 0.308 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 57, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = -0.120 kNm, M_η = 67.38 kNm, M_ζ = 47.45 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.120 kNm, B = 0.443 kNm²
normal stresses (elast.): σ_{max} = 63.70 MN/m², σ_{min} = -100.07 MN/m²
extr. stresses (elast.): σ = 100.07 MN/m², τ = 4.30 MN/m², σ_v = 100.07 MN/m²
partial member forces flange top: V_o = -3.46 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 22.42 kNm
partial member forces flange bottom: V_u = -2.75 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 25.03 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = 67.38 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.162, $U_{MS,u}$ = 0.181 ⇒ U_{MS} = 0.181
limiting normal forces flange top: -1408.12 kN ≤ N_o ≤ 1408.12 kN
limiting normal forces flange bottom: -1392.21 kN ≤ N_u ≤ 1392.21 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3620.18 kN ≤ N ≤ 3620.18 kN ⇒ U_N = 0.107
utilization y-moment (centroid): -525.82 kNm ≤ $M_{y,s}$ ≤ 528.22 kNm ⇒ U_{My} = 0.126
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.279
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.472): c/t_{o-o} = 0.176, c/t_{--o} = 0.376

max. utilization: $U = 0.376 \leq 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 58, group of load spectra 1: standard load spectra
internal forces: $N = -434.52$ kN, $V_\eta = -6.21$ kN, $V_\zeta = 16.83$ kN
internal moments: $T = -0.099$ kNm, $M_\eta = 59.87$ kNm, $M_\zeta = 47.88$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = -0.099$ kNm, $B = 0.471$ kNm²
normal stresses (elast.): $\sigma_{max} = 58.76$ MN/m², $\sigma_{min} = -100.00$ MN/m²
extr. stresses (elast.): $\sigma = 100.00$ MN/m², $\tau = 4.30$ MN/m², $\sigma_v = 100.00$ MN/m²
partial member forces flange top: $V_o = -3.40$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 22.56$ kNm
partial member forces flange bottom: $V_u = -2.81$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 25.33$ kNm
partial member forces web: $V_s = 16.83$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -434.52$ kN, $M_{y,s} = 59.87$ kNm
shear utilization: $U_{\tau,o} = 0.004$, $U_{\tau,u} = 0.003$, $U_{\tau,s} = 0.036 \Rightarrow U_\tau = 0.036$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.163$, $U_{MS,u} = 0.183 \Rightarrow U_{MS} = 0.183$
limiting normal forces flange top: -1407.29 kN $\leq N_o \leq 1407.29$ kN
limiting normal forces flange bottom: -1390.37 kN $\leq N_u \leq 1390.37$ kN
limiting normal forces web: -819.85 kN $\leq N_s \leq 819.85$ kN
utilization normal force: -3617.50 kN $\leq N \leq 3617.50$ kN $\Rightarrow U_N = 0.120$
utilization y-moment (centroid): -521.30 kNm $\leq M_{y,s} \leq 524.17$ kNm $\Rightarrow U_{My} = 0.112$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.280$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.471$): $c/t_{o-o} = 0.186$, $c/t_{--o} = 0.376$
max. utilization: $U = 0.376 \leq 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 59, group of load spectra 1: standard load spectra
internal forces: $N = -386.77$ kN, $V_\eta = -0.00$ kN, $V_\zeta = -14.76$ kN
internal moments: $T = 0.446$ kNm, $M_\eta = -183.26$ kNm, $M_\zeta = -12.23$ kNm
warping torsion: $T_t = -0.000$ kNm, $T_w = 0.446$ kNm, $B = -0.603$ kNm²
normal stresses (elast.): $\sigma_{max} = 62.25$ MN/m², $\sigma_{min} = -112.86$ MN/m²
extr. stresses (elast.): $\sigma = 112.86$ MN/m², $\tau = 3.77$ MN/m², $\sigma_v = 112.86$ MN/m²
partial member forces flange top: $V_o = 1.31$ kN, $M_{xp,o} = -0.00$ kNm, $M_{Sa,o} = -4.34$ kNm
partial member forces flange bottom: $V_u = -1.31$ kN, $M_{xp,u} = -0.00$ kNm, $M_{Sa,u} = -7.89$ kNm
partial member forces web: $V_s = -14.76$ kN, $M_{xp,s} = -0.00$ kNm
partial member forces main bending (centroid): $N = -386.77$ kN, $M_{y,s} = -183.26$ kNm
shear utilization: $U_{\tau,o} = 0.001$, $U_{\tau,u} = 0.001$, $U_{\tau,s} = 0.031 \Rightarrow U_\tau = 0.031$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.031$, $U_{MS,u} = 0.057 \Rightarrow U_{MS} = 0.057$
limiting normal forces flange top: -1513.86 kN $\leq N_o \leq 1513.86$ kN
limiting normal forces flange bottom: -1493.71 kN $\leq N_u \leq 1493.71$ kN
limiting normal forces web: -819.97 kN $\leq N_s \leq 819.97$ kN
utilization normal force: -3827.53 kN $\leq N \leq 3827.53$ kN $\Rightarrow U_N = 0.101$
utilization y-moment (centroid): -560.73 kNm $\leq M_{y,s} \leq 563.77$ kNm $\Rightarrow U_{My} = 0.329$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.400$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.401$): $c/t_{o-o} = 0.189$, $c/t_{--o} = 0.413$
max. utilization: $U = 0.413 \leq 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 60, group of load spectra 1: standard load spectra
internal forces: $N = -434.52$ kN, $V_\eta = -0.00$ kN, $V_\zeta = -14.76$ kN
internal moments: $T = 0.462$ kNm, $M_\eta = -193.21$ kNm, $M_\zeta = -14.37$ kNm
warping torsion: $T_t = -0.000$ kNm, $T_w = 0.462$ kNm, $B = -0.701$ kNm²
normal stresses (elast.): $\sigma_{max} = 65.41$ MN/m², $\sigma_{min} = -122.61$ MN/m²
extr. stresses (elast.): $\sigma = 122.61$ MN/m², $\tau = 3.77$ MN/m², $\sigma_v = 122.61$ MN/m²
partial member forces flange top: $V_o = 1.36$ kN, $M_{xp,o} = -0.00$ kNm, $M_{Sa,o} = -5.12$ kNm
partial member forces flange bottom: $V_u = -1.36$ kN, $M_{xp,u} = -0.00$ kNm, $M_{Sa,u} = -9.25$ kNm
partial member forces web: $V_s = -14.76$ kN, $M_{xp,s} = -0.00$ kNm
partial member forces main bending (centroid): $N = -434.52$ kN, $M_{y,s} = -193.21$ kNm
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.031 \Rightarrow U_\tau = 0.031$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.037$, $U_{MS,u} = 0.067 \Rightarrow U_{MS} = 0.067$
limiting normal forces flange top: -1509.47 kN $\leq N_o \leq 1509.47$ kN
limiting normal forces flange bottom: -1485.93 kN $\leq N_u \leq 1485.93$ kN
limiting normal forces web: -819.97 kN $\leq N_s \leq 819.97$ kN
utilization normal force: -3815.36 kN $\leq N \leq 3815.36$ kN $\Rightarrow U_N = 0.114$
utilization y-moment (centroid): -554.34 kNm $\leq M_{y,s} \leq 558.34$ kNm $\Rightarrow U_{My} = 0.351$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.432$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.344$): $c/t_{o-o} = 0.199$, $c/t_{--o} = 0.430$
max. utilization: $U = 0.432 \leq 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 61, group of load spectra 1: standard load spectra
internal forces: $N = -386.77$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.006$ kNm, $M_\eta = -85.48$ kNm, $M_\zeta = 12.30$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.006$ kNm, $B = 0.673$ kNm²
normal stresses (elast.): $\sigma_{max} = 22.68$ MN/m², $\sigma_{min} = -74.26$ MN/m²
extr. stresses (elast.): $\sigma = 74.26$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 74.26$ MN/m²
partial member forces flange top: $V_o = 0.02$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 4.17$ kNm

partial member forces flange bottom: V_u = -0.02 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 8.13 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = -85.48 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.030, $U_{MS,u}$ = 0.059 ⇒ U_{MS} = 0.059
limiting normal forces flange top: -1514.84 kN ≤ N_o ≤ 1514.84 kN
limiting normal forces flange bottom: -1492.34 kN ≤ N_u ≤ 1492.34 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3827.54 kN ≤ N ≤ 3827.54 kN ⇒ U_N = 0.101
utilization y-moment (centroid): -560.51 kNm ≤ $M_{y,s}$ ≤ 563.91 kNm ⇒ U_{My} = 0.155
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.253
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.718): c/t_{o-o} = 0.177, c/t_{--o} = 0.334
max. utilization: U = 0.334 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 62, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = -0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.008 kNm, M_η = -96.83 kNm, M_ζ = 14.46 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.008 kNm, B = 0.784 kNm²
normal stresses (elast.): σ_{max} = 26.35 MN/m², σ_{min} = -84.67 MN/m²
extr. stresses (elast.): σ = 84.67 MN/m², τ = 0.01 MN/m², σ_v = 84.67 MN/m²
partial member forces flange top: V_o = 0.02 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 4.92 kNm
partial member forces flange bottom: V_u = -0.02 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 9.53 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = -96.83 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.036, $U_{MS,u}$ = 0.069 ⇒ U_{MS} = 0.069
limiting normal forces flange top: -1510.59 kN ≤ N_o ≤ 1510.59 kN
limiting normal forces flange bottom: -1484.27 kN ≤ N_u ≤ 1484.27 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3815.23 kN ≤ N ≤ 3815.23 kN ⇒ U_N = 0.114
utilization y-moment (centroid): -554.05 kNm ≤ $M_{y,s}$ ≤ 558.51 kNm ⇒ U_{My} = 0.178
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.287
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.609): c/t_{o-o} = 0.187, c/t_{--o} = 0.356
max. utilization: U = 0.356 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 63, group of load spectra 1: standard load spectra
internal forces: N = -405.76 kN, V_η = -6.21 kN, V_ζ = 0.00 kN
internal moments: T = 0.314 kNm, M_η = -90.32 kNm, M_ζ = 73.76 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.314 kNm, B = 1.446 kNm²
normal stresses (elast.): σ_{max} = 89.43 MN/m², σ_{min} = -153.62 MN/m²
extr. stresses (elast.): σ = 153.62 MN/m², τ = 0.84 MN/m², σ_v = 153.62 MN/m²
partial member forces flange top: V_o = -2.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 32.63 kNm
partial member forces flange bottom: V_u = -4.03 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 41.13 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -405.76 kN, $M_{y,s}$ = -90.32 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.005
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.236, $U_{MS,u}$ = 0.297 ⇒ U_{MS} = 0.297
limiting normal forces flange top: -1344.76 kN ≤ N_o ≤ 1344.76 kN
limiting normal forces flange bottom: -1289.55 kN ≤ N_u ≤ 1289.55 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3454.68 kN ≤ N ≤ 3454.68 kN ⇒ U_N = 0.117
utilization y-moment (centroid): -492.74 kNm ≤ $M_{y,s}$ ≤ 501.48 kNm ⇒ U_{My} = 0.190
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.397
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.187): c/t_{o-o} = 0.181, c/t_{--o} = 0.459
max. utilization: U = 0.459 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 64, group of load spectra 1: standard load spectra
internal forces: N = -453.51 kN, V_η = -6.21 kN, V_ζ = 0.00 kN
internal moments: T = 0.340 kNm, M_η = -101.81 kNm, M_ζ = 78.68 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.340 kNm, B = 1.684 kNm²
normal stresses (elast.): σ_{max} = 95.49 MN/m², σ_{min} = -168.14 MN/m²
extr. stresses (elast.): σ = 168.14 MN/m², τ = 0.86 MN/m², σ_v = 168.14 MN/m²
partial member forces flange top: V_o = -2.10 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 34.39 kNm
partial member forces flange bottom: V_u = -4.11 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 44.29 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -453.51 kN, $M_{y,s}$ = -101.81 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.005
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.248, $U_{MS,u}$ = 0.320 ⇒ U_{MS} = 0.320
limiting normal forces flange top: -1333.52 kN ≤ N_o ≤ 1333.52 kN
limiting normal forces flange bottom: -1268.46 kN ≤ N_u ≤ 1268.46 kN

limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3422.35 kN ≤ N ≤ 3422.35 kN ⇒ U_N = 0.133
utilization y-moment (centroid): -481.74 kNm ≤ $M_{y,s}$ ≤ 493.25 kNm ⇒ U_{My} = 0.221
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.437
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.135): c/t_{o-o} = 0.192, c/t_{--o} = 0.481
max. utilization: U = 0.481 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 65, group of load spectra 1: standard load spectra
internal forces: N = -325.21 kN, V_η = -0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.003 kNm, M_η = -70.23 kNm, M_ζ = 9.70 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.003 kNm, B = 0.534 kNm²
normal stresses (elast.): σ_{max} = 17.89 MN/m², σ_{min} = -60.81 MN/m²
extr. stresses (elast.): σ = 60.81 MN/m², τ = 0.00 MN/m², σ_v = 60.81 MN/m²
partial member forces flange top: V_o = 0.01 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 3.28 kNm
partial member forces flange bottom: V_u = -0.01 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 6.42 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -325.21 kN, $M_{y,s}$ = -70.23 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.024, $U_{MS,u}$ = 0.046 ⇒ U_{MS} = 0.046
limiting normal forces flange top: -1519.86 kN ≤ N_o ≤ 1519.86 kN
limiting normal forces flange bottom: -1502.10 kN ≤ N_u ≤ 1502.10 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3842.32 kN ≤ N ≤ 3842.32 kN ⇒ U_N = 0.085
utilization y-moment (centroid): -567.89 kNm ≤ $M_{y,s}$ ≤ 570.14 kNm ⇒ U_{My} = 0.125
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.209
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.899): c/t_{o-o} = 0.162, c/t_{--o} = 0.302
max. utilization: U = 0.302 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 66, group of load spectra 1: standard load spectra
internal forces: N = -372.96 kN, V_η = -0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.005 kNm, M_η = -81.17 kNm, M_ζ = 11.59 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.005 kNm, B = 0.632 kNm²
normal stresses (elast.): σ_{max} = 21.17 MN/m², σ_{min} = -70.67 MN/m²
extr. stresses (elast.): σ = 70.67 MN/m², τ = 0.00 MN/m², σ_v = 70.67 MN/m²
partial member forces flange top: V_o = 0.02 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 3.93 kNm
partial member forces flange bottom: V_u = -0.02 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 7.66 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -372.96 kN, $M_{y,s}$ = -81.17 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.028, $U_{MS,u}$ = 0.055 ⇒ U_{MS} = 0.055
limiting normal forces flange top: -1516.17 kN ≤ N_o ≤ 1516.17 kN
limiting normal forces flange bottom: -1495.05 kN ≤ N_u ≤ 1495.05 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3831.58 kN ≤ N ≤ 3831.58 kN ⇒ U_N = 0.097
utilization y-moment (centroid): -562.39 kNm ≤ $M_{y,s}$ ≤ 565.46 kNm ⇒ U_{My} = 0.147
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.242
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.761): c/t_{o-o} = 0.174, c/t_{--o} = 0.326
max. utilization: U = 0.326 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 67, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = 1.237 kNm, M_η = 48.02 kNm, M_ζ = 72.21 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.237 kNm, B = 1.941 kNm²
normal stresses (elast.): σ_{max} = 94.80 MN/m², σ_{min} = -110.78 MN/m²
extr. stresses (elast.): σ = 110.78 MN/m², τ = 4.30 MN/m², σ_v = 110.78 MN/m²
partial member forces flange top: V_o = 0.53 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 30.40 kNm
partial member forces flange bottom: V_u = -6.74 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 41.81 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = 48.02 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.008, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.220, $U_{MS,u}$ = 0.302 ⇒ U_{MS} = 0.302
limiting normal forces flange top: -1358.86 kN ≤ N_o ≤ 1358.86 kN
limiting normal forces flange bottom: -1285.00 kN ≤ N_u ≤ 1285.00 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3463.71 kN ≤ N ≤ 3463.71 kN ⇒ U_N = 0.112
utilization y-moment (centroid): -494.34 kNm ≤ $M_{y,s}$ ≤ 505.49 kNm ⇒ U_{My} = 0.085
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.303
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.395): c/t_{o-o} = 0.175, c/t_{--o} = 0.389
max. utilization: U = 0.389 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 68, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = -6.21 kN, V_ζ = 16.83 kN

internal moments: $T = 1.310$ kNm, $M_\eta = 37.97$ kNm, $M_\zeta = 77.03$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 1.310$ kNm, $B = 2.224$ kNm²
normal stresses (elast.): $\sigma_{max} = 95.66$ MN/m², $\sigma_{min} = -114.58$ MN/m²
extr. stresses (elast.): $\sigma = 114.58$ MN/m², $\tau = 4.30$ MN/m², $\sigma_v = 114.58$ MN/m²
partial member forces flange top: $V_o = 0.75$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 31.97$ kNm
partial member forces flange bottom: $V_u = -6.96$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 45.06$ kNm
partial member forces web: $V_s = 16.83$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -434.52$ kN, $M_{y,s} = 37.97$ kNm
shear utilization: $U_{\tau,o} = 0.001$, $U_{\tau,u} = 0.008$, $U_{\tau,s} = 0.036 \Rightarrow U_\tau = 0.036$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.231$, $U_{MS,u} = 0.325 \Rightarrow U_{MS} = 0.325$
limiting normal forces flange top: -1348.91 kN $\le N_o \le 1348.91$ kN
limiting normal forces flange bottom: -1263.25 kN $\le N_u \le 1263.25$ kN
limiting normal forces web: -819.85 kN $\le N_s \le 819.85$ kN
utilization normal force: -3432.01 kN $\le N \le 3432.01$ kN $\Rightarrow U_N = 0.127$
utilization y-moment (centroid): -483.25 kNm $\le M_{y,s} \le 497.78$ kNm $\Rightarrow U_{My} = 0.063$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.326$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.380$): $c/t_{o-o} = 0.187$, $c/t_{--o} = 0.393$
max. utilization: $U = 0.393 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 69, group of load spectra 1: standard load spectra
internal forces: $N = -386.77$ kN, $V_\eta = -0.00$ kN, $V_\zeta = -14.76$ kN
internal moments: $T = -0.441$ kNm, $M_\eta = -202.59$ kNm, $M_\zeta = 12.23$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = -0.441$ kNm, $B = 0.589$ kNm²
normal stresses (elast.): $\sigma_{max} = 70.07$ MN/m², $\sigma_{min} = -120.50$ MN/m²
extr. stresses (elast.): $\sigma = 120.50$ MN/m², $\tau = 3.77$ MN/m², $\sigma_v = 120.50$ MN/m²
partial member forces flange top: $V_o = -1.30$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 4.38$ kNm
partial member forces flange bottom: $V_u = 1.30$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 7.85$ kNm
partial member forces web: $V_s = -14.76$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -386.77$ kN, $M_{y,s} = -202.59$ kNm
shear utilization: $U_{\tau,o} = 0.001$, $U_{\tau,u} = 0.001$, $U_{\tau,s} = 0.031 \Rightarrow U_\tau = 0.031$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.032$, $U_{MS,u} = 0.057 \Rightarrow U_{MS} = 0.057$
limiting normal forces flange top: -1513.66 kN $\le N_o \le 1513.66$ kN
limiting normal forces flange bottom: -1493.95 kN $\le N_u \le 1493.95$ kN
limiting normal forces web: -819.97 kN $\le N_s \le 819.97$ kN
utilization normal force: -3827.58 kN $\le N \le 3827.58$ kN $\Rightarrow U_N = 0.101$
utilization y-moment (centroid): -560.77 kNm $\le M_{y,s} \le 563.74$ kNm $\Rightarrow U_{My} = 0.363$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.429$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.357$): $c/t_{o-o} = 0.192$, $c/t_{--o} = 0.427$
max. utilization: $U = 0.429 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 70, group of load spectra 1: standard load spectra
internal forces: $N = -434.52$ kN, $V_\eta = -0.00$ kN, $V_\zeta = -14.76$ kN
internal moments: $T = -0.456$ kNm, $M_\eta = -215.07$ kNm, $M_\zeta = 14.35$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = -0.456$ kNm, $B = 0.683$ kNm²
normal stresses (elast.): $\sigma_{max} = 74.27$ MN/m², $\sigma_{min} = -131.22$ MN/m²
extr. stresses (elast.): $\sigma = 131.22$ MN/m², $\tau = 3.77$ MN/m², $\sigma_v = 131.22$ MN/m²
partial member forces flange top: $V_o = -1.34$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 5.17$ kNm
partial member forces flange bottom: $V_u = 1.34$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 9.19$ kNm
partial member forces web: $V_s = -14.76$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -434.52$ kN, $M_{y,s} = -215.07$ kNm
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.031 \Rightarrow U_\tau = 0.031$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.037$, $U_{MS,u} = 0.066 \Rightarrow U_{MS} = 0.066$
limiting normal forces flange top: -1509.21 kN $\le N_o \le 1509.21$ kN
limiting normal forces flange bottom: -1486.27 kN $\le N_u \le 1486.27$ kN
limiting normal forces web: -819.97 kN $\le N_s \le 819.97$ kN
utilization normal force: -3815.45 kN $\le N \le 3815.45$ kN $\Rightarrow U_N = 0.114$
utilization y-moment (centroid): -554.41 kNm $\le M_{y,s} \le 558.30$ kNm $\Rightarrow U_{My} = 0.390$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.464$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.300$): $c/t_{o-o} = 0.202$, $c/t_{--o} = 0.445$
max. utilization: $U = 0.464 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 71, group of load spectra 1: standard load spectra
internal forces: $N = -386.77$ kN, $V_\eta = 0.00$ kN, $V_\zeta = -0.00$ kN
internal moments: $T = -0.001$ kNm, $M_\eta = -66.15$ kNm, $M_\zeta = -12.31$ kNm
warping torsion: $T_t = -0.000$ kNm, $T_w = -0.001$ kNm, $B = -0.687$ kNm²
normal stresses (elast.): $\sigma_{max} = 14.86$ MN/m², $\sigma_{min} = -66.62$ MN/m²
extr. stresses (elast.): $\sigma = 66.62$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 66.62$ MN/m²
partial member forces flange top: $V_o = -0.00$ kN, $M_{xp,o} = -0.00$ kNm, $M_{Sa,o} = -4.13$ kNm
partial member forces flange bottom: $V_u = 0.00$ kN, $M_{xp,u} = -0.00$ kNm, $M_{Sa,u} = -8.18$ kNm
partial member forces web: $V_s = -0.00$ kN, $M_{xp,s} = -0.00$ kNm
partial member forces main bending (centroid): $N = -386.77$ kN, $M_{y,s} = -66.15$ kNm

shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.030, $U_{MS,u}$ = 0.059 ⇒ U_{MS} = 0.059
limiting normal forces flange top: -1515.04 kN ≤ N_o ≤ 1515.04 kN
limiting normal forces flange bottom: -1492.07 kN ≤ N_u ≤ 1492.07 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3827.47 kN ≤ N ≤ 3827.47 kN ⇒ U_N = 0.101
utilization y-moment (centroid): -560.46 kNm ≤ $M_{y,s}$ ≤ 563.93 kNm ⇒ U_{My} = 0.121
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.224
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.811): c/t_{o-o} = 0.176, c/t_{--o} = 0.315
max. utilization: U = 0.315 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 72, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = -0.002 kNm, M_η = -74.96 kNm, M_ζ = -14.47 kNm
warping torsion: T_t = -0.000 kNm, T_w = -0.002 kNm, B = -0.803 kNm²
normal stresses (elast.): σ_{max} = 17.48 MN/m², σ_{min} = -76.06 MN/m²
extr. stresses (elast.): σ = 76.06 MN/m², τ = 0.00 MN/m², σ_v = 76.06 MN/m²
partial member forces flange top: V_o = -0.01 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -4.87 kNm
partial member forces flange bottom: V_u = 0.01 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -9.60 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = -74.96 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.035, $U_{MS,u}$ = 0.069 ⇒ U_{MS} = 0.069
limiting normal forces flange top: -1510.86 kN ≤ N_o ≤ 1510.86 kN
limiting normal forces flange bottom: -1483.90 kN ≤ N_u ≤ 1483.90 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3815.12 kN ≤ N ≤ 3815.12 kN ⇒ U_N = 0.114
utilization y-moment (centroid): -553.97 kNm ≤ $M_{y,s}$ ≤ 558.54 kNm ⇒ U_{My} = 0.139
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.254
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.695): c/t_{o-o} = 0.186, c/t_{--o} = 0.337
max. utilization: U = 0.337 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 73, group of load spectra 1: standard load spectra
internal forces: N = -405.76 kN, V_η = -6.21 kN, V_ζ = 0.00 kN
internal moments: T = -0.018 kNm, M_η = -69.93 kNm, M_ζ = 47.44 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.018 kNm, B = 0.065 kNm²
normal stresses (elast.): σ_{max} = 60.21 MN/m², σ_{min} = -105.59 MN/m²
extr. stresses (elast.): σ = 105.59 MN/m², τ = 0.66 MN/m², σ_v = 105.59 MN/m²
partial member forces flange top: V_o = -3.16 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 23.53 kNm
partial member forces flange bottom: V_u = -3.05 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 23.91 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -405.76 kN, $M_{y,s}$ = -69.93 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.004
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.170, $U_{MS,u}$ = 0.173 ⇒ U_{MS} = 0.173
limiting normal forces flange top: -1401.37 kN ≤ N_o ≤ 1401.37 kN
limiting normal forces flange bottom: -1399.02 kN ≤ N_u ≤ 1399.02 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3620.76 kN ≤ N ≤ 3620.76 kN ⇒ U_N = 0.112
utilization y-moment (centroid): -525.45 kNm ≤ $M_{y,s}$ ≤ 525.83 kNm ⇒ U_{My} = 0.133
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.293
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.433): c/t_{o-o} = 0.180, c/t_{--o} = 0.386
max. utilization: U = 0.386 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 74, group of load spectra 1: standard load spectra
internal forces: N = -453.51 kN, V_η = -6.21 kN, V_ζ = 0.00 kN
internal moments: T = -0.001 kNm, M_η = -78.84 kNm, M_ζ = 47.87 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.001 kNm, B = 0.081 kNm²
normal stresses (elast.): σ_{max} = 61.56 MN/m², σ_{min} = -112.38 MN/m²
extr. stresses (elast.): σ = 112.38 MN/m², τ = 0.65 MN/m², σ_v = 112.38 MN/m²
partial member forces flange top: V_o = -3.11 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 23.70 kNm
partial member forces flange bottom: V_u = -3.10 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 24.17 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -453.51 kN, $M_{y,s}$ = -78.84 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.004
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.171, $U_{MS,u}$ = 0.175 ⇒ U_{MS} = 0.175
limiting normal forces flange top: -1400.34 kN ≤ N_o ≤ 1400.34 kN
limiting normal forces flange bottom: -1397.44 kN ≤ N_u ≤ 1397.44 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3618.15 kN ≤ N ≤ 3618.15 kN ⇒ U_N = 0.125
utilization y-moment (centroid): -520.94 kNm ≤ $M_{y,s}$ ≤ 521.45 kNm ⇒ U_{My} = 0.152

utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.318
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.390): c/t_{o-o} = 0.190, c/t_{--o} = 0.399
max. utilization: U = 0.399 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 75, group of load spectra 1: standard load spectra
internal forces: N = -325.21 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = -0.000 kNm, M_η = -54.22 kNm, M_ζ = -9.70 kNm
warping torsion: T_t = -0.000 kNm, T_w = -0.000 kNm, B = -0.543 kNm²
normal stresses (elast.): σ_{max} = 11.42 MN/m², σ_{min} = -54.47 MN/m²
extr. stresses (elast.): σ = 54.47 MN/m², τ = 0.00 MN/m², σ_v = 54.47 MN/m²
partial member forces flange top: V_o = -0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -3.25 kNm
partial member forces flange bottom: V_u = 0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -6.45 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -325.21 kN, $M_{y,s}$ = -54.22 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.024, $U_{MS,u}$ = 0.047 ⇒ U_{MS} = 0.047
limiting normal forces flange top: -1519.99 kN ≤ N_o ≤ 1519.99 kN
limiting normal forces flange bottom: -1501.93 kN ≤ N_u ≤ 1501.93 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3842.29 kN ≤ N ≤ 3842.29 kN ⇒ U_N = 0.085
utilization y-moment (centroid): -567.87 kNm ≤ $M_{y,s}$ ≤ 570.16 kNm ⇒ U_{My} = 0.097
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.185
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 2.003): c/t_{o-o} = 0.161, c/t_{--o} = 0.285
max. utilization: U = 0.285 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 76, group of load spectra 1: standard load spectra
internal forces: N = -372.96 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = -0.001 kNm, M_η = -62.69 kNm, M_ζ = -11.60 kNm
warping torsion: T_t = -0.000 kNm, T_w = -0.001 kNm, B = -0.645 kNm²
normal stresses (elast.): σ_{max} = 13.69 MN/m², σ_{min} = -63.37 MN/m²
extr. stresses (elast.): σ = 63.37 MN/m², τ = 0.00 MN/m², σ_v = 63.37 MN/m²
partial member forces flange top: V_o = -0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -3.90 kNm
partial member forces flange bottom: V_u = 0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -7.70 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -372.96 kN, $M_{y,s}$ = -62.69 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.028, $U_{MS,u}$ = 0.056 ⇒ U_{MS} = 0.056
limiting normal forces flange top: -1516.35 kN ≤ N_o ≤ 1516.35 kN
limiting normal forces flange bottom: -1494.81 kN ≤ N_u ≤ 1494.81 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3831.52 kN ≤ N ≤ 3831.52 kN ⇒ U_N = 0.097
utilization y-moment (centroid): -562.35 kNm ≤ $M_{y,s}$ ≤ 565.48 kNm ⇒ U_{My} = 0.114
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.214
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.857): c/t_{o-o} = 0.172, c/t_{--o} = 0.308
max. utilization: U = 0.308 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 77, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = -0.120 kNm, M_η = 67.38 kNm, M_ζ = 47.45 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.120 kNm, B = 0.443 kNm²
normal stresses (elast.): σ_{max} = 63.70 MN/m², σ_{min} = -100.07 MN/m²
extr. stresses (elast.): σ = 100.07 MN/m², τ = 4.30 MN/m², σ_v = 100.07 MN/m²
partial member forces flange top: V_o = -3.46 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 22.42 kNm
partial member forces flange bottom: V_u = -2.75 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 25.03 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = 67.38 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.162, $U_{MS,u}$ = 0.181 ⇒ U_{MS} = 0.181
limiting normal forces flange top: -1408.12 kN ≤ N_o ≤ 1408.12 kN
limiting normal forces flange bottom: -1392.21 kN ≤ N_u ≤ 1392.21 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3620.18 kN ≤ N ≤ 3620.18 kN ⇒ U_N = 0.107
utilization y-moment (centroid): -525.82 kNm ≤ $M_{y,s}$ ≤ 528.22 kNm ⇒ U_{My} = 0.126
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.279
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.472): c/t_{o-o} = 0.176, c/t_{--o} = 0.376
max. utilization: U = 0.376 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 78, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = -6.21 kN, V_ζ = 16.83 kN
internal moments: T = -0.099 kNm, M_η = 59.87 kNm, M_ζ = 47.88 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.099 kNm, B = 0.471 kNm²
normal stresses (elast.): σ_{max} = 58.76 MN/m², σ_{min} = -100.00 MN/m²

extr. stresses (elast.): σ = 100.00 MN/m², τ = 4.30 MN/m², σ_v = 100.00 MN/m²
partial member forces flange top: V_o = -3.40 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 22.56 kNm
partial member forces flange bottom: V_u = -2.81 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 25.33 kNm
partial member forces web: V_s = 16.83 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = 59.87 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.003, $U_{\tau,s}$ = 0.036 ⇒ U_τ = 0.036
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.163, $U_{MS,u}$ = 0.183 ⇒ U_{MS} = 0.183
limiting normal forces flange top: -1407.29 kN ≤ N_o ≤ 1407.29 kN
limiting normal forces flange bottom: -1390.37 kN ≤ N_u ≤ 1390.37 kN
limiting normal forces web: -819.85 kN ≤ N_s ≤ 819.85 kN
utilization normal force: -3617.50 kN ≤ N ≤ 3617.50 kN ⇒ U_N = 0.120
utilization y-moment (centroid): -521.30 kNm ≤ $M_{y,s}$ ≤ 524.17 kNm ⇒ U_{My} = 0.112
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.280
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.471): c/t_{o-o} = 0.186, c/t_{--o} = 0.376
max. utilization: U = 0.376 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 79, group of load spectra 1: standard load spectra
internal forces: N = -386.77 kN, V_η = -0.00 kN, V_ζ = -14.76 kN
internal moments: T = 0.446 kNm, M_η = -183.26 kNm, M_ζ = -12.23 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.446 kNm, B = -0.603 kNm²
normal stresses (elast.): σ_{max} = 62.25 MN/m², σ_{min} = -112.86 MN/m²
extr. stresses (elast.): σ = 112.86 MN/m², τ = 3.77 MN/m², σ_v = 112.86 MN/m²
partial member forces flange top: V_o = 1.31 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -4.34 kNm
partial member forces flange bottom: V_u = -1.31 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -7.89 kNm
partial member forces web: V_s = -14.76 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -386.77 kN, $M_{y,s}$ = -183.26 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.001, $U_{\tau,s}$ = 0.031 ⇒ U_τ = 0.031
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.031, $U_{MS,u}$ = 0.057 ⇒ U_{MS} = 0.057
limiting normal forces flange top: -1513.86 kN ≤ N_o ≤ 1513.86 kN
limiting normal forces flange bottom: -1493.71 kN ≤ N_u ≤ 1493.71 kN
limiting normal forces web: -819.97 kN ≤ N_s ≤ 819.97 kN
utilization normal force: -3827.53 kN ≤ N ≤ 3827.53 kN ⇒ U_N = 0.101
utilization y-moment (centroid): -560.73 kNm ≤ $M_{y,s}$ ≤ 563.77 kNm ⇒ U_{My} = 0.329
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.400
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.401): c/t_{o-o} = 0.189, c/t_{--o} = 0.413
max. utilization: U = 0.413 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 80, group of load spectra 1: standard load spectra
internal forces: N = -434.52 kN, V_η = -0.00 kN, V_ζ = -14.76 kN
internal moments: T = 0.462 kNm, M_η = -193.21 kNm, M_ζ = -14.37 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.462 kNm, B = -0.701 kNm²
normal stresses (elast.): σ_{max} = 65.41 MN/m², σ_{min} = -122.61 MN/m²
extr. stresses (elast.): σ = 122.61 MN/m², τ = 3.77 MN/m², σ_v = 122.61 MN/m²
partial member forces flange top: V_o = 1.36 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -5.12 kNm
partial member forces flange bottom: V_u = -1.36 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -9.25 kNm
partial member forces web: V_s = -14.76 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -434.52 kN, $M_{y,s}$ = -193.21 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.031 ⇒ U_τ = 0.031
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.037, $U_{MS,u}$ = 0.067 ⇒ U_{MS} = 0.067
limiting normal forces flange top: -1509.47 kN ≤ N_o ≤ 1509.47 kN
limiting normal forces flange bottom: -1485.93 kN ≤ N_u ≤ 1485.93 kN
limiting normal forces web: -819.97 kN ≤ N_s ≤ 819.97 kN
utilization normal force: -3815.36 kN ≤ N ≤ 3815.36 kN ⇒ U_N = 0.114
utilization y-moment (centroid): -554.34 kNm ≤ $M_{y,s}$ ≤ 558.34 kNm ⇒ U_{My} = 0.351
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.432
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.344): c/t_{o-o} = 0.199, c/t_{--o} = 0.430
max. utilization: U = 0.432 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 81, group of load spectra 1: standard load spectra
internal forces: N = -168.07 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = 0.340 kNm, M_η = -33.67 kNm, M_ζ = 88.17 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.340 kNm, B = 0.627 kNm²
normal stresses (elast.): σ_{max} = 102.02 MN/m², σ_{min} = -128.98 MN/m²
extr. stresses (elast.): σ = 128.98 MN/m², τ = 1.29 MN/m², σ_v = 128.98 MN/m²
partial member forces flange top: V_o = -4.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 42.24 kNm
partial member forces flange bottom: V_u = -6.17 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 45.93 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -168.07 kN, $M_{y,s}$ = -33.67 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.007, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.007
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.305, $U_{MS,u}$ = 0.332 ⇒ U_{MS} = 0.332

limiting normal forces flange top: $-1282.20\ kN \le N_o \le 1282.20\ kN$
limiting normal forces flange bottom: $-1257.36\ kN \le N_u \le 1257.36\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3359.93\ kN \le N \le 3359.93\ kN \Rightarrow U_N = 0.050$
utilization y-moment (centroid): $-493.73\ kNm \le M_{y,s} \le 495.35\ kNm \Rightarrow U_{My} = 0.070$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.335$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.291$): $c/t_{o-o} = 0.116$, $c/t_{--o} = 0.408$
max. utilization: $U = 0.408 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 82, group of load spectra 1: standard load spectra
internal forces: $N = -215.82\ kN$, $V_\eta = -10.35\ kN$, $V_\zeta = 0.00\ kN$
internal moments: $T = 0.370\ kNm$, $M_\eta = -43.65\ kNm$, $M_\zeta = 92.22\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = 0.370\ kNm$, $B = 0.830\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 106.71\ MN/m^2$, $\sigma_{min} = -141.68\ MN/m^2$
extr. stresses (elast.): $\sigma = 141.68\ MN/m^2$, $\tau = 1.30\ MN/m^2$, $\sigma_v = 141.68\ MN/m^2$
partial member forces flange top: $V_o = -4.09\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 43.67\ kNm$
partial member forces flange bottom: $V_u = -6.26\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 48.55\ kNm$
partial member forces web: $V_s = 0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -215.82\ kN$, $M_{y,s} = -43.65\ kNm$
shear utilization: $U_{\tau,o} = 0.005$, $U_{\tau,u} = 0.007$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.007$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.315$, $U_{MS,u} = 0.351 \Rightarrow U_{MS} = 0.351$
limiting normal forces flange top: $-1272.64\ kN \le N_o \le 1272.64\ kN$
limiting normal forces flange bottom: $-1239.38\ kN \le N_u \le 1239.38\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3332.38\ kN \le N \le 3332.38\ kN \Rightarrow U_N = 0.065$
utilization y-moment (centroid): $-486.62\ kNm \le M_{y,s} \le 489.42\ kNm \Rightarrow U_{My} = 0.092$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.360$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.232$): $c/t_{o-o} = 0.132$, $c/t_{--o} = 0.430$
max. utilization: $U = 0.430 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 83, group of load spectra 1: standard load spectra
internal forces: $N = -293.25\ kN$, $V_\eta = -10.35\ kN$, $V_\zeta = 0.00\ kN$
internal moments: $T = 0.428\ kNm$, $M_\eta = -62.54\ kNm$, $M_\zeta = 100.26\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = 0.428\ kNm$, $B = 1.244\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 116.50\ MN/m^2$, $\sigma_{min} = -165.60\ MN/m^2$
extr. stresses (elast.): $\sigma = 165.60\ MN/m^2$, $\tau = 1.34\ MN/m^2$, $\sigma_v = 165.60\ MN/m^2$
partial member forces flange top: $V_o = -3.92\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 46.47\ kNm$
partial member forces flange bottom: $V_u = -6.43\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 53.79\ kNm$
partial member forces web: $V_s = 0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -293.25\ kN$, $M_{y,s} = -62.54\ kNm$
shear utilization: $U_{\tau,o} = 0.004$, $U_{\tau,u} = 0.007$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.007$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.336$, $U_{MS,u} = 0.389 \Rightarrow U_{MS} = 0.389$
limiting normal forces flange top: $-1253.71\ kN \le N_o \le 1253.71\ kN$
limiting normal forces flange bottom: $-1202.76\ kN \le N_u \le 1202.76\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3276.83\ kN \le N \le 3276.83\ kN \Rightarrow U_N = 0.089$
utilization y-moment (centroid): $-471.68\ kNm \le M_{y,s} \le 477.50\ kNm \Rightarrow U_{My} = 0.138$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.415$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.141$): $c/t_{o-o} = 0.154$, $c/t_{--o} = 0.467$
max. utilization: $U = 0.467 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 84, group of load spectra 1: standard load spectra
internal forces: $N = -341.00\ kN$, $V_\eta = -10.35\ kN$, $V_\zeta = 0.00\ kN$
internal moments: $T = 0.462\ kNm$, $M_\eta = -73.28\ kNm$, $M_\zeta = 105.45\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = 0.462\ kNm$, $B = 1.497\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 122.47\ MN/m^2$, $\sigma_{min} = -180.25\ MN/m^2$
extr. stresses (elast.): $\sigma = 180.25\ MN/m^2$, $\tau = 1.36\ MN/m^2$, $\sigma_v = 180.25\ MN/m^2$
partial member forces flange top: $V_o = -3.82\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 48.32\ kNm$
partial member forces flange bottom: $V_u = -6.53\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 57.13\ kNm$
partial member forces web: $V_s = 0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -341.00\ kN$, $M_{y,s} = -73.28\ kNm$
shear utilization: $U_{\tau,o} = 0.004$, $U_{\tau,u} = 0.007$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.007$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.349$, $U_{MS,u} = 0.413 \Rightarrow U_{MS} = 0.413$
limiting normal forces flange top: $-1241.03\ kN \le N_o \le 1241.03\ kN$
limiting normal forces flange bottom: $-1178.79\ kN \le N_u \le 1178.79\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3240.19\ kN \le N \le 3240.19\ kN \Rightarrow U_N = 0.105$
utilization y-moment (centroid): $-461.14\ kNm \le M_{y,s} \le 469.42\ kNm \Rightarrow U_{My} = 0.166$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.451$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.094$): $c/t_{o-o} = 0.166$, $c/t_{--o} = 0.489$
max. utilization: $U = 0.489 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 85, group of load spectra 1: standard load spectra
internal forces: $N = -33.82$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.000$ kNm, $M_\eta = -4.90$ kNm, $M_\zeta = 0.68$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.000$ kNm, $B = 0.032$ kNm²
normal stresses (elast.): $\sigma_{max} = 0.68$ MN/m², $\sigma_{min} = -4.83$ MN/m²
extr. stresses (elast.): $\sigma = 4.83$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 4.83$ MN/m²
partial member forces flange top: $V_o = 0.00$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 0.25$ kNm
partial member forces flange bottom: $V_u = -0.00$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 0.44$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -33.82$ kN, $M_{y,s} = -4.90$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000$ $\Rightarrow$ $U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.002$, $U_{MS,u} = 0.003$ $\Rightarrow$ $U_{MS} = 0.003$
limiting normal forces flange top: -1536.81 kN $\le N_o \le 1536.81$ kN
limiting normal forces flange bottom: -1535.76 kN $\le N_u \le 1535.76$ kN
limiting normal forces web: -820.36 kN $\le N_s \le 820.36$ kN
utilization normal force: -3892.93 kN $\le N \le 3892.93$ kN $\Rightarrow$ $U_N = 0.009$
utilization y-moment (centroid): -587.85 kNm $\le M_{y,s} \le 587.86$ kNm $\Rightarrow$ $U_{My} = 0.008$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.017$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 6.730$): $c/t_{o-o} = 0.052$, $c/t_{--o} = 0.086$
max. utilization: $U = 0.086 \le 1$ $\Rightarrow$ **verification meets the requirements**

Load spectrum 86, group of load spectra 1: standard load spectra
internal forces: $N = -81.57$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.000$ kNm, $M_\eta = -14.15$ kNm, $M_\zeta = 1.84$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.000$ kNm, $B = 0.096$ kNm²
normal stresses (elast.): $\sigma_{max} = 2.67$ MN/m², $\sigma_{min} = -12.92$ MN/m²
extr. stresses (elast.): $\sigma = 12.92$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 12.92$ MN/m²
partial member forces flange top: $V_o = 0.00$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 0.64$ kNm
partial member forces flange bottom: $V_u = -0.00$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 1.20$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -81.57$ kN, $M_{y,s} = -14.15$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000$ $\Rightarrow$ $U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.005$, $U_{MS,u} = 0.009$ $\Rightarrow$ $U_{MS} = 0.009$
limiting normal forces flange top: -1534.64 kN $\le N_o \le 1534.64$ kN
limiting normal forces flange bottom: -1531.51 kN $\le N_u \le 1531.51$ kN
limiting normal forces web: -820.36 kN $\le N_s \le 820.36$ kN
utilization normal force: -3886.51 kN $\le N \le 3886.51$ kN $\Rightarrow$ $U_N = 0.021$
utilization y-moment (centroid): -586.17 kNm $\le M_{y,s} \le 586.27$ kNm $\Rightarrow$ $U_{My} = 0.024$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.046$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 4.118$): $c/t_{o-o} = 0.081$, $c/t_{--o} = 0.140$
max. utilization: $U = 0.140 \le 1$ $\Rightarrow$ **verification meets the requirements**

Load spectrum 87, group of load spectra 1: standard load spectra
internal forces: $N = -159.00$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.000$ kNm, $M_\eta = -31.65$ kNm, $M_\zeta = 4.03$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.000$ kNm, $B = 0.222$ kNm²
normal stresses (elast.): $\sigma_{max} = 7.11$ MN/m², $\sigma_{min} = -27.57$ MN/m²
extr. stresses (elast.): $\sigma = 27.57$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 27.57$ MN/m²
partial member forces flange top: $V_o = 0.00$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 1.36$ kNm
partial member forces flange bottom: $V_u = -0.00$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 2.67$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -159.00$ kN, $M_{y,s} = -31.65$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000$ $\Rightarrow$ $U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.010$, $U_{MS,u} = 0.019$ $\Rightarrow$ $U_{MS} = 0.019$
limiting normal forces flange top: -1530.60 kN $\le N_o \le 1530.60$ kN
limiting normal forces flange bottom: -1523.29 kN $\le N_u \le 1523.29$ kN
limiting normal forces web: -820.36 kN $\le N_s \le 820.36$ kN
utilization normal force: -3874.25 kN $\le N \le 3874.25$ kN $\Rightarrow$ $U_N = 0.041$
utilization y-moment (centroid): -582.09 kNm $\le M_{y,s} \le 582.55$ kNm $\Rightarrow$ $U_{My} = 0.055$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.097$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 2.820$): $c/t_{o-o} = 0.113$, $c/t_{--o} = 0.204$
max. utilization: $U = 0.204 \le 1$ $\Rightarrow$ **verification meets the requirements**

Load spectrum 88, group of load spectra 1: standard load spectra
internal forces: $N = -206.75$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.001$ kNm, $M_\eta = -41.58$ kNm, $M_\zeta = 5.43$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.001$ kNm, $B = 0.297$ kNm²
normal stresses (elast.): $\sigma_{max} = 9.57$ MN/m², $\sigma_{min} = -36.29$ MN/m²
extr. stresses (elast.): $\sigma = 36.29$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 36.29$ MN/m²
partial member forces flange top: $V_o = 0.00$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 1.84$ kNm
partial member forces flange bottom: $V_u = -0.00$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 3.59$ kNm

partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -206.75 kN, $M_{y,s}$ = -41.58 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.013, $U_{MS,u}$ = 0.026 ⇒ U_{MS} = 0.026
limiting normal forces flange top: -1527.93 kN ≤ N_o ≤ 1527.93 kN
limiting normal forces flange bottom: -1518.12 kN ≤ N_u ≤ 1518.12 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3866.42 kN ≤ N ≤ 3866.42 kN ⇒ U_N = 0.053
utilization y-moment (centroid): -578.88 kNm ≤ $M_{y,s}$ ≤ 579.68 kNm ⇒ U_{My} = 0.072
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.127
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.458): c/t_{o-o} = 0.129, c/t_{--o} = 0.234
max. utilization: U = 0.234 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 89, group of load spectra 1: standard load spectra
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 1.908 kNm, M_η = 184.74 kNm, M_ζ = 85.67 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.908 kNm, B = 1.516 kNm²
normal stresses (elast.): σ_{max} = 175.96 MN/m², σ_{min} = -170.28 MN/m²
extr. stresses (elast.): σ = 175.96 MN/m², τ = 7.17 MN/m², σ_v = 175.96 MN/m²
partial member forces flange top: V_o = 0.44 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.38 kNm
partial member forces flange bottom: V_u = -10.79 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 47.30 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 184.74 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.012, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.277, $U_{MS,u}$ = 0.342 ⇒ U_{MS} = 0.342
limiting normal forces flange top: -1307.72 kN ≤ N_o ≤ 1307.72 kN
limiting normal forces flange bottom: -1247.95 kN ≤ N_u ≤ 1247.95 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3374.59 kN ≤ N ≤ 3374.59 kN ⇒ U_N = 0.040
utilization y-moment (centroid): -496.22 kNm ≤ $M_{y,s}$ ≤ 499.40 kNm ⇒ U_{My} = 0.368
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.488
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.134): c/t_{o-o} = 0.143, c/t_{--o} = 0.487
max. utilization: U = 0.488 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 90, group of load spectra 1: standard load spectra
internal forces: N = -184.17 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 2.001 kNm, M_η = 176.85 kNm, M_ζ = 89.58 kNm
warping torsion: T_t = 0.000 kNm, T_w = 2.001 kNm, B = 1.782 kNm²
normal stresses (elast.): σ_{max} = 176.52 MN/m², σ_{min} = -172.45 MN/m²
extr. stresses (elast.): σ = 176.52 MN/m², τ = 7.17 MN/m², σ_v = 176.52 MN/m²
partial member forces flange top: V_o = 0.71 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 39.55 kNm
partial member forces flange bottom: V_u = -11.06 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 50.03 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -184.17 kN, $M_{y,s}$ = 176.85 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.012, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.286, $U_{MS,u}$ = 0.361 ⇒ U_{MS} = 0.361
limiting normal forces flange top: -1300.03 kN ≤ N_o ≤ 1300.03 kN
limiting normal forces flange bottom: -1229.07 kN ≤ N_u ≤ 1229.07 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3348.03 kN ≤ N ≤ 3348.03 kN ⇒ U_N = 0.055
utilization y-moment (centroid): -489.10 kNm ≤ $M_{y,s}$ ≤ 494.21 kNm ⇒ U_{My} = 0.355
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.488
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.126): c/t_{o-o} = 0.150, c/t_{--o} = 0.490
max. utilization: U = 0.490 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 91, group of load spectra 1: standard load spectra
internal forces: N = -261.60 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 2.186 kNm, M_η = 161.77 kNm, M_ζ = 97.33 kNm
warping torsion: T_t = 0.000 kNm, T_w = 2.186 kNm, B = 2.323 kNm²
normal stresses (elast.): σ_{max} = 178.88 MN/m², σ_{min} = -175.94 MN/m²
extr. stresses (elast.): σ = 178.88 MN/m², τ = 7.17 MN/m², σ_v = 178.88 MN/m²
partial member forces flange top: V_o = 1.26 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 41.83 kNm
partial member forces flange bottom: V_u = -11.60 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 55.49 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -261.60 kN, $M_{y,s}$ = 161.77 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.013, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.302, $U_{MS,u}$ = 0.401 ⇒ U_{MS} = 0.401
limiting normal forces flange top: -1284.93 kN ≤ N_o ≤ 1284.93 kN
limiting normal forces flange bottom: -1190.48 kN ≤ N_u ≤ 1190.48 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN

utilization normal force: -3294.33 kN ≤ N ≤ 3294.33 kN ⇒ U_N = 0.079
utilization y-moment (centroid): -473.95 kNm ≤ $M_{y,s}$ ≤ 483.60 kNm ⇒ U_{My} = 0.328
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.488
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.113): c/t_{o-o} = 0.162, c/t_{--o} = 0.494
max. utilization: U = 0.494 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 92, group of load spectra 1: standard load spectra
internal forces: N = -309.35 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 2.303 kNm, M_η = 153.26 kNm, M_ζ = 102.34 kNm
warping torsion: T_t = 0.000 kNm, T_w = 2.303 kNm, B = 2.658 kNm²
normal stresses (elast.): σ_{max} = 180.94 MN/m², σ_{min} = -178.66 MN/m²
extr. stresses (elast.): σ = 180.94 MN/m², τ = 7.17 MN/m², σ_v = 180.94 MN/m²
partial member forces flange top: V_o = 1.60 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 43.35 kNm
partial member forces flange bottom: V_u = -11.95 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 58.99 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = 153.26 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.013, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.313, $U_{MS,u}$ = 0.426 ⇒ U_{MS} = 0.426
limiting normal forces flange top: -1274.79 kN ≤ N_o ≤ 1274.79 kN
limiting normal forces flange bottom: -1165.12 kN ≤ N_u ≤ 1165.12 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3258.83 kN ≤ N ≤ 3258.83 kN ⇒ U_N = 0.095
utilization y-moment (centroid): -463.15 kNm ≤ $M_{y,s}$ ≤ 476.40 kNm ⇒ U_{My} = 0.312
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.493
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.104): c/t_{o-o} = 0.170, c/t_{--o} = 0.498
max. utilization: U = 0.498 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 93, group of load spectra 1: standard load spectra
internal forces: N = -136.42 kN, V_η = -0.00 kN, V_ζ = -24.60 kN
internal moments: T = -0.622 kNm, M_η = -212.11 kNm, M_ζ = 3.37 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.622 kNm, B = 0.152 kNm²
normal stresses (elast.): σ_{max} = 80.34 MN/m², σ_{min} = -97.37 MN/m²
extr. stresses (elast.): σ = 97.37 MN/m², τ = 6.29 MN/m², σ_v = 97.37 MN/m²
partial member forces flange top: V_o = -1.83 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 1.24 kNm
partial member forces flange bottom: V_u = 1.83 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 2.13 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = -212.11 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.009, $U_{MS,u}$ = 0.015 ⇒ U_{MS} = 0.015
limiting normal forces flange top: -1531.29 kN ≤ N_o ≤ 1531.29 kN
limiting normal forces flange bottom: -1526.28 kN ≤ N_u ≤ 1526.28 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3876.82 kN ≤ N ≤ 3876.82 kN ⇒ U_N = 0.035
utilization y-moment (centroid): -583.37 kNm ≤ $M_{y,s}$ ≤ 583.64 kNm ⇒ U_{My} = 0.364
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.376
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.518): c/t_{o-o} = 0.149, c/t_{--o} = 0.386
max. utilization: U = 0.386 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 94, group of load spectra 1: standard load spectra
internal forces: N = -184.17 kN, V_η = -0.00 kN, V_ζ = -24.60 kN
internal moments: T = -0.640 kNm, M_η = -223.59 kNm, M_ζ = 4.71 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.640 kNm, B = 0.211 kNm²
normal stresses (elast.): σ_{max} = 83.47 MN/m², σ_{min} = -106.54 MN/m²
extr. stresses (elast.): σ = 106.54 MN/m², τ = 6.29 MN/m², σ_v = 106.54 MN/m²
partial member forces flange top: V_o = -1.88 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 1.73 kNm
partial member forces flange bottom: V_u = 1.88 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 2.98 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -184.17 kN, $M_{y,s}$ = -223.59 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.013, $U_{MS,u}$ = 0.021 ⇒ U_{MS} = 0.021
limiting normal forces flange top: -1528.51 kN ≤ N_o ≤ 1528.51 kN
limiting normal forces flange bottom: -1521.55 kN ≤ N_u ≤ 1521.55 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3869.32 kN ≤ N ≤ 3869.32 kN ⇒ U_N = 0.048
utilization y-moment (centroid): -580.48 kNm ≤ $M_{y,s}$ ≤ 580.99 kNm ⇒ U_{My} = 0.385
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.404
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.450): c/t_{o-o} = 0.160, c/t_{--o} = 0.403
max. utilization: U = 0.404 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 95, group of load spectra 1: standard load spectra
internal forces: N = -261.60 kN, V_η = -0.00 kN, V_ζ = -24.60 kN
internal moments: T = -0.674 kNm, M_η = -245.17 kNm, M_ζ = 7.29 kNm

warping torsion: T_t = 0.000 kNm, T_w = -0.674 kNm, B = 0.328 kNm²
normal stresses (elast.): σ_{max} = 90.05 MN/m², σ_{min} = -123.21 MN/m²
extr. stresses (elast.): σ = 123.21 MN/m², τ = 6.29 MN/m², σ_v = 123.21 MN/m²
partial member forces flange top: V_o = -1.98 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 2.68 kNm
partial member forces flange bottom: V_u = 1.98 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 4.61 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -261.60 kN, $M_{y,s}$ = -245.17 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.019, $U_{MS,u}$ = 0.033 ⇒ U_{MS} = 0.033
limiting normal forces flange top: -1523.23 kN ≤ N_o ≤ 1523.23 kN
limiting normal forces flange bottom: -1512.35 kN ≤ N_u ≤ 1512.35 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3854.84 kN ≤ N ≤ 3854.84 kN ⇒ U_N = 0.068
utilization y-moment (centroid): -574.34 kNm ≤ $M_{y,s}$ ≤ 575.45 kNm ⇒ U_{My} = 0.427
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.457
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.347): c/t_{o-o} = 0.178, c/t_{--o} = 0.433
max. utilization: U = 0.457 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 96, group of load spectra 1: standard load spectra
internal forces: N = -309.35 kN, V_η = -0.00 kN, V_ζ = -24.60 kN
internal moments: T = -0.695 kNm, M_η = -257.50 kNm, M_ζ = 8.94 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.695 kNm, B = 0.397 kNm²
normal stresses (elast.): σ_{max} = 93.81 MN/m², σ_{min} = -133.14 MN/m²
extr. stresses (elast.): σ = 133.14 MN/m², τ = 6.29 MN/m², σ_v = 133.14 MN/m²
partial member forces flange top: V_o = -2.05 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 3.30 kNm
partial member forces flange bottom: V_u = 2.04 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 5.64 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = -257.50 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.024, $U_{MS,u}$ = 0.041 ⇒ U_{MS} = 0.041
limiting normal forces flange top: -1519.74 kN ≤ N_o ≤ 1519.74 kN
limiting normal forces flange bottom: -1506.53 kN ≤ N_u ≤ 1506.53 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3845.53 kN ≤ N ≤ 3845.53 kN ⇒ U_N = 0.080
utilization y-moment (centroid): -569.85 kNm ≤ $M_{y,s}$ ≤ 571.44 kNm ⇒ U_{My} = 0.453
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.490
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.295): c/t_{o-o} = 0.188, c/t_{--o} = 0.450
max. utilization: U = 0.490 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 97, group of load spectra 1: standard load spectra
internal forces: N = -168.07 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = -0.163 kNm, M_η = -25.77 kNm, M_ζ = 79.58 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.163 kNm, B = 0.187 kNm²
normal stresses (elast.): σ_{max} = 91.91 MN/m², σ_{min} = -112.89 MN/m²
extr. stresses (elast.): σ = 112.89 MN/m², τ = 1.18 MN/m², σ_v = 112.89 MN/m²
partial member forces flange top: V_o = -5.66 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 39.24 kNm
partial member forces flange bottom: V_u = -4.69 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 40.34 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -168.07 kN, $M_{y,s}$ = -25.77 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.283, $U_{MS,u}$ = 0.291 ⇒ U_{MS} = 0.291
limiting normal forces flange top: -1302.03 kN ≤ N_o ≤ 1302.03 kN
limiting normal forces flange bottom: -1294.79 kN ≤ N_u ≤ 1294.79 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3417.19 kN ≤ N ≤ 3417.19 kN ⇒ U_N = 0.049
utilization y-moment (centroid): -504.09 kNm ≤ $M_{y,s}$ ≤ 504.57 kNm ⇒ U_{My} = 0.052
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.294
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.379): c/t_{o-o} = 0.116, c/t_{--o} = 0.382
max. utilization: U = 0.382 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 98, group of load spectra 1: standard load spectra
internal forces: N = -215.82 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = -0.140 kNm, M_η = -33.44 kNm, M_ζ = 80.81 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.140 kNm, B = 0.250 kNm²
normal stresses (elast.): σ_{max} = 93.36 MN/m², σ_{min} = -120.42 MN/m²
extr. stresses (elast.): σ = 120.42 MN/m², τ = 1.16 MN/m², σ_v = 120.42 MN/m²
partial member forces flange top: V_o = -5.59 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 39.67 kNm
partial member forces flange bottom: V_u = -4.76 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 41.14 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -215.82 kN, $M_{y,s}$ = -33.44 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006

yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.287$, $U_{MS,u} = 0.297 \Rightarrow U_{MS} = 0.297$
limiting normal forces flange top: $-1299.21 \text{ kN} \le N_o \le 1299.21 \text{ kN}$
limiting normal forces flange bottom: $-1289.53 \text{ kN} \le N_u \le 1289.53 \text{ kN}$
limiting normal forces web: $-820.36 \text{ kN} \le N_s \le 820.36 \text{ kN}$
utilization normal force: $-3409.10 \text{ kN} \le N \le 3409.10 \text{ kN} \Rightarrow U_N = 0.063$
utilization y-moment (centroid): $-500.76 \text{ kNm} \le M_{y,s} \le 501.57 \text{ kNm} \Rightarrow U_{My} = 0.068$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.306$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.336$): $c/t_{o-o} = 0.131$, $c/t_{--o} = 0.397$
max. utilization: $U = 0.397 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 99, group of load spectra 1: standard load spectra
internal forces: $N = -293.25 \text{ kN}$, $V_\eta = -10.35 \text{ kN}$, $V_\zeta = 0.00 \text{ kN}$
internal moments: $T = -0.095 \text{ kNm}$, $M_\eta = -48.21 \text{ kNm}$, $M_\zeta = 83.34 \text{ kNm}$
warping torsion: $T_t = 0.000 \text{ kNm}$, $T_w = -0.095 \text{ kNm}$, $B = 0.378 \text{ kNm}^2$
normal stresses (elast.): $\sigma_{max} = 97.09 \text{ MN/m}^2$, $\sigma_{min} = -134.40 \text{ MN/m}^2$
extr. stresses (elast.): $\sigma = 134.40 \text{ MN/m}^2$, $\tau = 1.14 \text{ MN/m}^2$, $\sigma_v = 134.40 \text{ MN/m}^2$
partial member forces flange top: $V_o = -5.45 \text{ kN}$, $M_{xp,o} = 0.00 \text{ kNm}$, $M_{Sa,o} = 40.56 \text{ kNm}$
partial member forces flange bottom: $V_u = -4.90 \text{ kN}$, $M_{xp,u} = 0.00 \text{ kNm}$, $M_{Sa,u} = 42.78 \text{ kNm}$
partial member forces web: $V_s = 0.00 \text{ kN}$, $M_{xp,s} = 0.00 \text{ kNm}$
partial member forces main bending (centroid): $N = -293.25 \text{ kN}$, $M_{y,s} = -48.21 \text{ kNm}$
shear utilization: $U_{\tau,o} = 0.006$, $U_{\tau,u} = 0.006$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.006$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.293$, $U_{MS,u} = 0.309 \Rightarrow U_{MS} = 0.309$
limiting normal forces flange top: $-1293.35 \text{ kN} \le N_o \le 1293.35 \text{ kN}$
limiting normal forces flange bottom: $-1278.56 \text{ kN} \le N_u \le 1278.56 \text{ kN}$
limiting normal forces web: $-820.36 \text{ kN} \le N_s \le 820.36 \text{ kN}$
utilization normal force: $-3392.27 \text{ kN} \le N \le 3392.27 \text{ kN} \Rightarrow U_N = 0.086$
utilization y-moment (centroid): $-493.60 \text{ kNm} \le M_{y,s} \le 495.29 \text{ kNm} \Rightarrow U_{My} = 0.099$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.337$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.266$): $c/t_{o-o} = 0.153$, $c/t_{--o} = 0.422$
max. utilization: $U = 0.422 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 100, group of load spectra 1: standard load spectra
internal forces: $N = -341.00 \text{ kN}$, $V_\eta = -10.35 \text{ kN}$, $V_\zeta = 0.00 \text{ kN}$
internal moments: $T = -0.069 \text{ kNm}$, $M_\eta = -56.51 \text{ kNm}$, $M_\zeta = 84.99 \text{ kNm}$
warping torsion: $T_t = 0.000 \text{ kNm}$, $T_w = -0.069 \text{ kNm}$, $B = 0.459 \text{ kNm}^2$
normal stresses (elast.): $\sigma_{max} = 99.16 \text{ MN/m}^2$, $\sigma_{min} = -142.80 \text{ MN/m}^2$
extr. stresses (elast.): $\sigma = 142.80 \text{ MN/m}^2$, $\tau = 1.12 \text{ MN/m}^2$, $\sigma_v = 142.80 \text{ MN/m}^2$
partial member forces flange top: $V_o = -5.38 \text{ kN}$, $M_{xp,o} = 0.00 \text{ kNm}$, $M_{Sa,o} = 41.15 \text{ kNm}$
partial member forces flange bottom: $V_u = -4.97 \text{ kN}$, $M_{xp,u} = 0.00 \text{ kNm}$, $M_{Sa,u} = 43.85 \text{ kNm}$
partial member forces web: $V_s = 0.00 \text{ kN}$, $M_{xp,s} = 0.00 \text{ kNm}$
partial member forces main bending (centroid): $N = -341.00 \text{ kN}$, $M_{y,s} = -56.51 \text{ kNm}$
shear utilization: $U_{\tau,o} = 0.006$, $U_{\tau,u} = 0.006$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.006$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.297$, $U_{MS,u} = 0.317 \Rightarrow U_{MS} = 0.317$
limiting normal forces flange top: $-1289.46 \text{ kN} \le N_o \le 1289.46 \text{ kN}$
limiting normal forces flange bottom: $-1271.44 \text{ kN} \le N_u \le 1271.44 \text{ kN}$
limiting normal forces web: $-820.36 \text{ kN} \le N_s \le 820.36 \text{ kN}$
utilization normal force: $-3381.27 \text{ kN} \le N \le 3381.27 \text{ kN} \Rightarrow U_N = 0.101$
utilization y-moment (centroid): $-488.41 \text{ kNm} \le M_{y,s} \le 490.81 \text{ kNm} \Rightarrow U_{My} = 0.118$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.359$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.229$): $c/t_{o-o} = 0.165$, $c/t_{--o} = 0.437$
max. utilization: $U = 0.437 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 101, group of load spectra 1: standard load spectra
internal forces: $N = -33.82 \text{ kN}$, $V_\eta = 0.00 \text{ kN}$, $V_\zeta = -0.00 \text{ kN}$
internal moments: $T = 0.000 \text{ kNm}$, $M_\eta = -3.55 \text{ kNm}$, $M_\zeta = -0.68 \text{ kNm}$
warping torsion: $T_t = -0.000 \text{ kNm}$, $T_w = 0.000 \text{ kNm}$, $B = -0.032 \text{ kNm}^2$
normal stresses (elast.): $\sigma_{max} = 0.14 \text{ MN/m}^2$, $\sigma_{min} = -4.29 \text{ MN/m}^2$
extr. stresses (elast.): $\sigma = 4.29 \text{ MN/m}^2$, $\tau = 0.00 \text{ MN/m}^2$, $\sigma_v = 4.29 \text{ MN/m}^2$
partial member forces flange top: $V_o = 0.00 \text{ kN}$, $M_{xp,o} = -0.00 \text{ kNm}$, $M_{Sa,o} = -0.25 \text{ kNm}$
partial member forces flange bottom: $V_u = -0.00 \text{ kN}$, $M_{xp,u} = -0.00 \text{ kNm}$, $M_{Sa,u} = -0.44 \text{ kNm}$
partial member forces web: $V_s = -0.00 \text{ kN}$, $M_{xp,s} = -0.00 \text{ kNm}$
partial member forces main bending (centroid): $N = -33.82 \text{ kN}$, $M_{y,s} = -3.55 \text{ kNm}$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.002$, $U_{MS,u} = 0.003 \Rightarrow U_{MS} = 0.003$
limiting normal forces flange top: $-1536.81 \text{ kN} \le N_o \le 1536.81 \text{ kN}$
limiting normal forces flange bottom: $-1535.76 \text{ kN} \le N_u \le 1535.76 \text{ kN}$
limiting normal forces web: $-820.36 \text{ kN} \le N_s \le 820.36 \text{ kN}$
utilization normal force: $-3892.94 \text{ kN} \le N \le 3892.94 \text{ kN} \Rightarrow U_N = 0.009$
utilization y-moment (centroid): $-587.85 \text{ kNm} \le M_{y,s} \le 587.86 \text{ kNm} \Rightarrow U_{My} = 0.006$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.015$

utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 7.127): c/t_{o-o} = 0.052, c/t_{--o} = 0.081
max. utilization: U = 0.081 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 102, group of load spectra 1: standard load spectra
internal forces: N = -81.57 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -10.61 kNm, M_ζ = -1.84 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.000 kNm, B = -0.096 kNm²
normal stresses (elast.): σ_{max} = 1.25 MN/m², σ_{min} = -11.50 MN/m²
extr. stresses (elast.): σ = 11.50 MN/m², τ = 0.00 MN/m², σ_v = 11.50 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -0.64 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -1.20 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -81.57 kN, $M_{y,s}$ = -10.61 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.005, $U_{MS,u}$ = 0.009 ⇒ U_{MS} = 0.009
limiting normal forces flange top: -1534.65 kN ≤ N_o ≤ 1534.65 kN
limiting normal forces flange bottom: -1531.50 kN ≤ N_u ≤ 1531.50 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3886.51 kN ≤ N ≤ 3886.51 kN ⇒ U_N = 0.021
utilization y-moment (centroid): -586.17 kNm ≤ $M_{y,s}$ ≤ 586.27 kNm ⇒ U_{My} = 0.018
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.041
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 4.355): c/t_{o-o} = 0.081, c/t_{--o} = 0.132
max. utilization: U = 0.132 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 103, group of load spectra 1: standard load spectra
internal forces: N = -159.00 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -24.21 kNm, M_ζ = -4.03 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.000 kNm, B = -0.224 kNm²
normal stresses (elast.): σ_{max} = 4.12 MN/m², σ_{min} = -24.60 MN/m²
extr. stresses (elast.): σ = 24.60 MN/m², τ = 0.00 MN/m², σ_v = 24.60 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -1.36 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -2.67 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -159.00 kN, $M_{y,s}$ = -24.21 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.010, $U_{MS,u}$ = 0.019 ⇒ U_{MS} = 0.019
limiting normal forces flange top: -1530.63 kN ≤ N_o ≤ 1530.63 kN
limiting normal forces flange bottom: -1523.26 kN ≤ N_u ≤ 1523.26 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3874.25 kN ≤ N ≤ 3874.25 kN ⇒ U_N = 0.041
utilization y-moment (centroid): -582.09 kNm ≤ $M_{y,s}$ ≤ 582.55 kNm ⇒ U_{My} = 0.042
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.086
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.980): c/t_{o-o} = 0.112, c/t_{--o} = 0.192
max. utilization: U = 0.192 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 104, group of load spectra 1: standard load spectra
internal forces: N = -206.75 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -31.84 kNm, M_ζ = -5.43 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.000 kNm, B = -0.300 kNm²
normal stresses (elast.): σ_{max} = 5.65 MN/m², σ_{min} = -32.41 MN/m²
extr. stresses (elast.): σ = 32.41 MN/m², τ = 0.00 MN/m², σ_v = 32.41 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -1.83 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -3.60 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -206.75 kN, $M_{y,s}$ = -31.84 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.013, $U_{MS,u}$ = 0.026 ⇒ U_{MS} = 0.026
limiting normal forces flange top: -1527.98 kN ≤ N_o ≤ 1527.98 kN
limiting normal forces flange bottom: -1518.07 kN ≤ N_u ≤ 1518.07 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3866.41 kN ≤ N ≤ 3866.41 kN ⇒ U_N = 0.053
utilization y-moment (centroid): -578.88 kNm ≤ $M_{y,s}$ ≤ 579.68 kNm ⇒ U_{My} = 0.056
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.112
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.596): c/t_{o-o} = 0.128, c/t_{--o} = 0.221
max. utilization: U = 0.221 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 105, group of load spectra 1: standard load spectra
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = -0.017 kNm, M_η = 191.06 kNm, M_ζ = 78.90 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.017 kNm, B = 1.089 kNm²
normal stresses (elast.): σ_{max} = 167.75 MN/m², σ_{min} = -167.88 MN/m²
extr. stresses (elast.): σ = 167.88 MN/m², τ = 7.17 MN/m², σ_v = 167.88 MN/m²

partial member forces flange top: V_o = -5.22 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 36.25 kNm
partial member forces flange bottom: V_u = -5.13 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 42.65 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 191.06 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.262, $U_{MS,u}$ = 0.308 ⇒ U_{MS} = 0.308
limiting normal forces flange top: -1321.54 kN ≤ N_o ≤ 1321.54 kN
limiting normal forces flange bottom: -1279.44 kN ≤ N_u ≤ 1279.44 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3419.90 kN ≤ N ≤ 3419.90 kN ⇒ U_N = 0.040
utilization y-moment (centroid): -504.57 kNm ≤ $M_{y,s}$ ≤ 506.81 kNm ⇒ U_{My} = 0.376
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.483
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.143): c/t_{o-o} = 0.144, c/t_{--o} = 0.485
max. utilization: U = 0.485 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 106, group of load spectra 1: standard load spectra
internal forces: N = -184.17 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.027 kNm, M_η = 185.46 kNm, M_ζ = 80.10 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.027 kNm, B = 1.184 kNm²
normal stresses (elast.): σ_{max} = 164.92 MN/m², σ_{min} = -168.99 MN/m²
extr. stresses (elast.): σ = 168.99 MN/m², τ = 7.17 MN/m², σ_v = 168.99 MN/m²
partial member forces flange top: V_o = -5.10 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 36.57 kNm
partial member forces flange bottom: V_u = -5.25 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 43.53 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -184.17 kN, $M_{y,s}$ = 185.46 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.264, $U_{MS,u}$ = 0.314 ⇒ U_{MS} = 0.314
limiting normal forces flange top: -1319.47 kN ≤ N_o ≤ 1319.47 kN
limiting normal forces flange bottom: -1273.56 kN ≤ N_u ≤ 1273.56 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3411.95 kN ≤ N ≤ 3411.95 kN ⇒ U_N = 0.054
utilization y-moment (centroid): -501.16 kNm ≤ $M_{y,s}$ ≤ 504.46 kNm ⇒ U_{My} = 0.366
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.480
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.138): c/t_{o-o} = 0.152, c/t_{--o} = 0.487
max. utilization: U = 0.487 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 107, group of load spectra 1: standard load spectra
internal forces: N = -261.60 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.114 kNm, M_η = 174.44 kNm, M_ζ = 82.59 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.114 kNm, B = 1.378 kNm²
normal stresses (elast.): σ_{max} = 160.46 MN/m², σ_{min} = -170.39 MN/m²
extr. stresses (elast.): σ = 170.39 MN/m², τ = 7.17 MN/m², σ_v = 170.39 MN/m²
partial member forces flange top: V_o = -4.84 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 37.24 kNm
partial member forces flange bottom: V_u = -5.51 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 45.35 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -261.60 kN, $M_{y,s}$ = 174.44 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.269, $U_{MS,u}$ = 0.328 ⇒ U_{MS} = 0.328
limiting normal forces flange top: -1315.09 kN ≤ N_o ≤ 1315.09 kN
limiting normal forces flange bottom: -1261.32 kN ≤ N_u ≤ 1261.32 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3395.34 kN ≤ N ≤ 3395.34 kN ⇒ U_N = 0.077
utilization y-moment (centroid): -493.79 kNm ≤ $M_{y,s}$ ≤ 499.29 kNm ⇒ U_{My} = 0.346
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.475
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.133): c/t_{o-o} = 0.165, c/t_{--o} = 0.489
max. utilization: U = 0.489 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 108, group of load spectra 1: standard load spectra
internal forces: N = -309.35 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.167 kNm, M_η = 168.34 kNm, M_ζ = 84.21 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.167 kNm, B = 1.500 kNm²
normal stresses (elast.): σ_{max} = 158.11 MN/m², σ_{min} = -171.61 MN/m²
extr. stresses (elast.): σ = 171.61 MN/m², τ = 7.17 MN/m², σ_v = 171.61 MN/m²
partial member forces flange top: V_o = -4.68 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 37.69 kNm
partial member forces flange bottom: V_u = -5.67 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 46.52 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = 168.34 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.272, $U_{MS,u}$ = 0.336 ⇒ U_{MS} = 0.336
limiting normal forces flange top: -1312.16 kN ≤ N_o ≤ 1312.16 kN

limiting normal forces flange bottom: $-1253.37\ kN \le N_u \le 1253.37\ kN$
limiting normal forces web: $-818.92\ kN \le N_s \le 818.92\ kN$
utilization normal force: $-3384.45\ kN \le N \le 3384.45\ kN \Rightarrow U_N = 0.091$
utilization y-moment (centroid): $-488.41\ kNm \le M_{y,s} \le 495.52\ kNm \Rightarrow U_{My} = 0.335$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.475$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.128$): $c/t_{o-o} = 0.173$, $c/t_{--o} = 0.491$
max. utilization: $U = 0.491 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 109, group of load spectra 1: standard load spectra
internal forces: $N = -136.42\ kN$, $V_\eta = -0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = 0.623\ kNm$, $M_\eta = -205.80\ kNm$, $M_\zeta = -3.37\ kNm$
warping torsion: $T_t = -0.000\ kNm$, $T_w = 0.623\ kNm$, $B = -0.153\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 77.80\ MN/m^2$, $\sigma_{min} = -94.85\ MN/m^2$
extr. stresses (elast.): $\sigma = 94.85\ MN/m^2$, $\tau = 6.29\ MN/m^2$, $\sigma_v = 94.85\ MN/m^2$
partial member forces flange top: $V_o = 1.83\ kN$, $M_{xp,o} = -0.00\ kNm$, $M_{Sa,o} = -1.23\ kNm$
partial member forces flange bottom: $V_u = -1.83\ kN$, $M_{xp,u} = -0.00\ kNm$, $M_{Sa,u} = -2.14\ kNm$
partial member forces web: $V_s = -24.60\ kN$, $M_{xp,s} = -0.00\ kNm$
partial member forces main bending (centroid): $N = -136.42\ kN$, $M_{y,s} = -205.80\ kNm$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.009$, $U_{MS,u} = 0.015 \Rightarrow U_{MS} = 0.015$
limiting normal forces flange top: $-1531.31\ kN \le N_o \le 1531.31\ kN$
limiting normal forces flange bottom: $-1526.27\ kN \le N_u \le 1526.27\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3876.84\ kN \le N \le 3876.84\ kN \Rightarrow U_N = 0.035$
utilization y-moment (centroid): $-583.38\ kNm \le M_{y,s} \le 583.64\ kNm \Rightarrow U_{My} = 0.353$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.366$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.538$): $c/t_{o-o} = 0.148$, $c/t_{--o} = 0.381$
max. utilization: $U = 0.381 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 110, group of load spectra 1: standard load spectra
internal forces: $N = -184.17\ kN$, $V_\eta = -0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = 0.641\ kNm$, $M_\eta = -215.00\ kNm$, $M_\zeta = -4.71\ kNm$
warping torsion: $T_t = -0.000\ kNm$, $T_w = 0.641\ kNm$, $B = -0.213\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 80.01\ MN/m^2$, $\sigma_{min} = -103.11\ MN/m^2$
extr. stresses (elast.): $\sigma = 103.11\ MN/m^2$, $\tau = 6.29\ MN/m^2$, $\sigma_v = 103.11\ MN/m^2$
partial member forces flange top: $V_o = 1.88\ kN$, $M_{xp,o} = -0.00\ kNm$, $M_{Sa,o} = -1.73\ kNm$
partial member forces flange bottom: $V_u = -1.88\ kN$, $M_{xp,u} = -0.00\ kNm$, $M_{Sa,u} = -2.98\ kNm$
partial member forces web: $V_s = -24.60\ kN$, $M_{xp,s} = -0.00\ kNm$
partial member forces main bending (centroid): $N = -184.17\ kN$, $M_{y,s} = -215.00\ kNm$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.012$, $U_{MS,u} = 0.022 \Rightarrow U_{MS} = 0.022$
limiting normal forces flange top: $-1528.56\ kN \le N_o \le 1528.56\ kN$
limiting normal forces flange bottom: $-1521.53\ kN \le N_u \le 1521.53\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3869.34\ kN \le N \le 3869.34\ kN \Rightarrow U_N = 0.048$
utilization y-moment (centroid): $-580.49\ kNm \le M_{y,s} \le 580.99\ kNm \Rightarrow U_{My} = 0.371$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.390$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.474$): $c/t_{o-o} = 0.159$, $c/t_{--o} = 0.397$
max. utilization: $U = 0.397 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 111, group of load spectra 1: standard load spectra
internal forces: $N = -261.60\ kN$, $V_\eta = -0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = 0.676\ kNm$, $M_\eta = -232.53\ kNm$, $M_\zeta = -7.28\ kNm$
warping torsion: $T_t = -0.000\ kNm$, $T_w = 0.676\ kNm$, $B = -0.333\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 84.95\ MN/m^2$, $\sigma_{min} = -118.17\ MN/m^2$
extr. stresses (elast.): $\sigma = 118.17\ MN/m^2$, $\tau = 6.29\ MN/m^2$, $\sigma_v = 118.17\ MN/m^2$
partial member forces flange top: $V_o = 1.99\ kN$, $M_{xp,o} = -0.00\ kNm$, $M_{Sa,o} = -2.66\ kNm$
partial member forces flange bottom: $V_u = -1.99\ kN$, $M_{xp,u} = -0.00\ kNm$, $M_{Sa,u} = -4.62\ kNm$
partial member forces web: $V_s = -24.60\ kN$, $M_{xp,s} = -0.00\ kNm$
partial member forces main bending (centroid): $N = -261.60\ kN$, $M_{y,s} = -232.53\ kNm$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.019$, $U_{MS,u} = 0.033 \Rightarrow U_{MS} = 0.033$
limiting normal forces flange top: $-1523.32\ kN \le N_o \le 1523.32\ kN$
limiting normal forces flange bottom: $-1512.28\ kN \le N_u \le 1512.28\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3854.85\ kN \le N \le 3854.85\ kN \Rightarrow U_N = 0.068$
utilization y-moment (centroid): $-574.33\ kNm \le M_{y,s} \le 575.46\ kNm \Rightarrow U_{My} = 0.405$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.437$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.375$): $c/t_{o-o} = 0.176$, $c/t_{--o} = 0.424$
max. utilization: $U = 0.437 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 112, group of load spectra 1: standard load spectra

internal forces: $N = -309.35$ kN, $V_\eta = -0.00$ kN, $V_\zeta = -24.60$ kN
internal moments: $T = 0.698$ kNm, $M_\eta = -242.45$ kNm, $M_\zeta = -8.94$ kNm
warping torsion: $T_t = -0.000$ kNm, $T_w = 0.698$ kNm, $B = -0.405$ kNm²
normal stresses (elast.): $\sigma_{max} = 87.73$ MN/m², $\sigma_{min} = -127.16$ MN/m²
extr. stresses (elast.): $\sigma = 127.16$ MN/m², $\tau = 6.29$ MN/m², $\sigma_v = 127.16$ MN/m²
partial member forces flange top: $V_o = 2.05$ kN, $M_{xp,o} = -0.00$ kNm, $M_{Sa,o} = -3.28$ kNm
partial member forces flange bottom: $V_u = -2.05$ kN, $M_{xp,u} = -0.00$ kNm, $M_{Sa,u} = -5.66$ kNm
partial member forces web: $V_s = -24.60$ kN, $M_{xp,s} = -0.00$ kNm
partial member forces main bending (centroid): $N = -309.35$ kN, $M_{y,s} = -242.45$ kNm
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052$ ⇒ $U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.024$, $U_{MS,u} = 0.041$ ⇒ $U_{MS} = 0.041$
limiting normal forces flange top: -1519.85 kN ≤ N_o ≤ 1519.85 kN
limiting normal forces flange bottom: -1506.42 kN ≤ N_u ≤ 1506.42 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3845.53 kN ≤ N ≤ 3845.53 kN ⇒ $U_N = 0.080$
utilization y-moment (centroid): -569.83 kNm ≤ $M_{y,s}$ ≤ 571.46 kNm ⇒ $U_{My} = 0.426$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.466$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.325): $c/t_{o-o} = 0.186$, $c/t_{--o} = 0.440$
max. utilization: $U = 0.466$ ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 113, group of load spectra 1: standard load spectra
internal forces: $N = -168.07$ kN, $V_\eta = -10.35$ kN, $V_\zeta = -0.00$ kN
internal moments: $T = 0.088$ kNm, $M_\eta = -29.72$ kNm, $M_\zeta = 83.87$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.088$ kNm, $B = 0.408$ kNm²
normal stresses (elast.): $\sigma_{max} = 96.96$ MN/m², $\sigma_{min} = -120.94$ MN/m²
extr. stresses (elast.): $\sigma = 120.94$ MN/m², $\tau = 1.13$ MN/m², $\sigma_v = 120.94$ MN/m²
partial member forces flange top: $V_o = -4.92$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 40.74$ kNm
partial member forces flange bottom: $V_u = -5.43$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 43.14$ kNm
partial member forces web: $V_s = -0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -168.07$ kN, $M_{y,s} = -29.72$ kNm
shear utilization: $U_{\tau,o} = 0.006$, $U_{\tau,u} = 0.006$, $U_{\tau,s} = 0.000$ ⇒ $U_\tau = 0.006$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.294$, $U_{MS,u} = 0.312$ ⇒ $U_{MS} = 0.312$
limiting normal forces flange top: -1292.17 kN ≤ N_o ≤ 1292.17 kN
limiting normal forces flange bottom: -1276.20 kN ≤ N_u ≤ 1276.20 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3388.73 kN ≤ N ≤ 3388.73 kN ⇒ $U_N = 0.050$
utilization y-moment (centroid): -498.95 kNm ≤ $M_{y,s}$ ≤ 499.99 kNm ⇒ $U_{My} = 0.061$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.314$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.333): $c/t_{o-o} = 0.116$, $c/t_{--o} = 0.395$
max. utilization: $U = 0.395$ ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 114, group of load spectra 1: standard load spectra
internal forces: $N = -215.82$ kN, $V_\eta = -10.35$ kN, $V_\zeta = -0.00$ kN
internal moments: $T = 0.114$ kNm, $M_\eta = -38.55$ kNm, $M_\zeta = 86.52$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.114$ kNm, $B = 0.542$ kNm²
normal stresses (elast.): $\sigma_{max} = 100.02$ MN/m², $\sigma_{min} = -131.06$ MN/m²
extr. stresses (elast.): $\sigma = 131.06$ MN/m², $\tau = 1.15$ MN/m², $\sigma_v = 131.06$ MN/m²
partial member forces flange top: $V_o = -4.84$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 41.67$ kNm
partial member forces flange bottom: $V_u = -5.51$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 44.85$ kNm
partial member forces web: $V_s = -0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -215.82$ kN, $M_{y,s} = -38.55$ kNm
shear utilization: $U_{\tau,o} = 0.005$, $U_{\tau,u} = 0.006$, $U_{\tau,s} = 0.000$ ⇒ $U_\tau = 0.006$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.301$, $U_{MS,u} = 0.324$ ⇒ $U_{MS} = 0.324$
limiting normal forces flange top: -1286.02 kN ≤ N_o ≤ 1286.02 kN
limiting normal forces flange bottom: -1264.67 kN ≤ N_u ≤ 1264.67 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3371.05 kN ≤ N ≤ 3371.05 kN ⇒ $U_N = 0.064$
utilization y-moment (centroid): -493.76 kNm ≤ $M_{y,s}$ ≤ 495.56 kNm ⇒ $U_{My} = 0.080$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.333$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.281): $c/t_{o-o} = 0.131$, $c/t_{--o} = 0.414$
max. utilization: $U = 0.414$ ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 115, group of load spectra 1: standard load spectra
internal forces: $N = -293.25$ kN, $V_\eta = -10.35$ kN, $V_\zeta = -0.00$ kN
internal moments: $T = 0.165$ kNm, $M_\eta = -55.37$ kNm, $M_\zeta = 91.80$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.165$ kNm, $B = 0.815$ kNm²
normal stresses (elast.): $\sigma_{max} = 106.78$ MN/m², $\sigma_{min} = -150.02$ MN/m²
extr. stresses (elast.): $\sigma = 150.02$ MN/m², $\tau = 1.18$ MN/m², $\sigma_v = 150.02$ MN/m²
partial member forces flange top: $V_o = -4.69$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 43.50$ kNm
partial member forces flange bottom: $V_u = -5.66$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 48.30$ kNm
partial member forces web: $V_s = -0.00$ kN, $M_{xp,s} = 0.00$ kNm

partial member forces main bending (centroid): N = -293.25 kN, $M_{y,s}$ = -55.37 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.314, $U_{MS,u}$ = 0.349 ⇒ U_{MS} = 0.349
limiting normal forces flange top: -1273.74 kN ≤ N_o ≤ 1273.74 kN
limiting normal forces flange bottom: -1241.16 kN ≤ N_u ≤ 1241.16 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3335.27 kN ≤ N ≤ 3335.27 kN ⇒ U_N = 0.088
utilization y-moment (centroid): -482.81 kNm ≤ $M_{y,s}$ ≤ 486.54 kNm ⇒ U_{My} = 0.118
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.376
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.198): c/t_{o-o} = 0.153, c/t_{--o} = 0.446
max. utilization: U = 0.446 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 116, group of load spectra 1: standard load spectra
internal forces: N = -341.00 kN, V_η = -10.35 kN, V_ζ = -0.00 kN
internal moments: T = 0.195 kNm, M_η = -64.90 kNm, M_ζ = 95.22 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.195 kNm, B = 0.983 kNm²
normal stresses (elast.): σ_{max} = 110.78 MN/m², σ_{min} = -161.56 MN/m²
extr. stresses (elast.): σ = 161.56 MN/m², τ = 1.20 MN/m², σ_v = 161.56 MN/m²
partial member forces flange top: V_o = -4.60 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 44.72 kNm
partial member forces flange bottom: V_u = -5.75 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 50.50 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -341.00 kN, $M_{y,s}$ = -64.90 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.323, $U_{MS,u}$ = 0.365 ⇒ U_{MS} = 0.365
limiting normal forces flange top: -1265.56 kN ≤ N_o ≤ 1265.56 kN
limiting normal forces flange bottom: -1225.88 kN ≤ N_u ≤ 1225.88 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3311.80 kN ≤ N ≤ 3311.80 kN ⇒ U_N = 0.103
utilization y-moment (centroid): -475.04 kNm ≤ $M_{y,s}$ ≤ 480.32 kNm ⇒ U_{My} = 0.141
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.405
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.155): c/t_{o-o} = 0.165, c/t_{--o} = 0.464
max. utilization: U = 0.464 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 117, group of load spectra 1: standard load spectra
internal forces: N = -33.82 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -4.23 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = -0.16 MN/m², σ_{min} = -3.55 MN/m²
extr. stresses (elast.): σ = 3.55 MN/m², τ = 0.00 MN/m², σ_v = 3.55 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -33.82 kN, $M_{y,s}$ = -4.23 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3896.73 kN ≤ N ≤ 3896.73 kN ⇒ U_N = 0.009
utilization y-moment (centroid): -588.50 kNm ≤ $M_{y,s}$ ≤ 588.50 kNm ⇒ U_{My} = 0.007
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.015
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 7.866): c/t_{o-o} = 0.052, c/t_{--o} = 0.075
max. utilization: U = 0.075 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 118, group of load spectra 1: standard load spectra
internal forces: N = -81.57 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -12.38 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 0.49 MN/m², σ_{min} = -9.43 MN/m²
extr. stresses (elast.): σ = 9.43 MN/m², τ = 0.00 MN/m², σ_v = 9.43 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -81.57 kN, $M_{y,s}$ = -12.38 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3896.73 kN ≤ N ≤ 3896.73 kN ⇒ U_N = 0.021
utilization y-moment (centroid): -587.96 kNm ≤ $M_{y,s}$ ≤ 587.96 kNm ⇒ U_{My} = 0.021
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.040

utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 4.831): c/t_{o-o} = 0.081, c/t_{--o} = 0.122
max. utilization: U = 0.122 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 119, group of load spectra 1: standard load spectra
internal forces: N = -159.00 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -27.93 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 2.47 MN/m², σ_{min} = -19.90 MN/m²
extr. stresses (elast.): σ = 19.90 MN/m², τ = 0.00 MN/m², σ_v = 19.90 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -159.00 kN, $M_{y,s}$ = -27.93 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3896.73 kN ≤ N ≤ 3896.73 kN ⇒ U_N = 0.041
utilization y-moment (centroid): -586.15 kNm ≤ $M_{y,s}$ ≤ 586.15 kNm ⇒ U_{My} = 0.048
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.083
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 3.329): c/t_{o-o} = 0.113, c/t_{--o} = 0.177
max. utilization: U = 0.177 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 120, group of load spectra 1: standard load spectra
internal forces: N = -206.75 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -36.71 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 3.37 MN/m², σ_{min} = -26.04 MN/m²
extr. stresses (elast.): σ = 26.04 MN/m², τ = 0.00 MN/m², σ_v = 26.04 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -206.75 kN, $M_{y,s}$ = -36.71 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3896.73 kN ≤ N ≤ 3896.73 kN ⇒ U_N = 0.053
utilization y-moment (centroid): -584.44 kNm ≤ $M_{y,s}$ ≤ 584.44 kNm ⇒ U_{My} = 0.063
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.109
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.910): c/t_{o-o} = 0.128, c/t_{--o} = 0.202
max. utilization: U = 0.202 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 121, group of load spectra 1: standard load spectra
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.945 kNm, M_η = 187.90 kNm, M_ζ = 82.29 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.945 kNm, B = 1.303 kNm²
normal stresses (elast.): σ_{max} = 171.87 MN/m², σ_{min} = -169.08 MN/m²
extr. stresses (elast.): σ = 171.87 MN/m², τ = 7.17 MN/m², σ_v = 171.87 MN/m²
partial member forces flange top: V_o = -2.40 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 37.31 kNm
partial member forces flange bottom: V_u = -7.95 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 44.98 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 187.90 kNm
shear utilization: $U_{\tau,o}$ = 0.003, $U_{\tau,u}$ = 0.009, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.270, $U_{MS,u}$ = 0.325 ⇒ U_{MS} = 0.325
limiting normal forces flange top: -1314.65 kN ≤ N_o ≤ 1314.65 kN
limiting normal forces flange bottom: -1263.78 kN ≤ N_u ≤ 1263.78 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3397.36 kN ≤ N ≤ 3397.36 kN ⇒ U_N = 0.040
utilization y-moment (centroid): -500.42 kNm ≤ $M_{y,s}$ ≤ 503.13 kNm ⇒ U_{My} = 0.372
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.486
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.138): c/t_{o-o} = 0.143, c/t_{--o} = 0.486
max. utilization: U = 0.486 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 122, group of load spectra 1: standard load spectra
internal forces: N = -184.17 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 1.014 kNm, M_η = 181.15 kNm, M_ζ = 84.84 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.014 kNm, B = 1.484 kNm²
normal stresses (elast.): σ_{max} = 170.73 MN/m², σ_{min} = -170.72 MN/m²
extr. stresses (elast.): σ = 170.73 MN/m², τ = 7.17 MN/m², σ_v = 170.73 MN/m²
partial member forces flange top: V_o = -2.19 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.06 kNm
partial member forces flange bottom: V_u = -8.16 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 46.79 kNm

partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -184.17 kN, $M_{y,s}$ = 181.15 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.009, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.275, $U_{MS,u}$ = 0.338 ⇒ U_{MS} = 0.338
limiting normal forces flange top: -1309.81 kN ≤ N_o ≤ 1309.81 kN
limiting normal forces flange bottom: -1251.49 kN ≤ N_u ≤ 1251.49 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3380.22 kN ≤ N ≤ 3380.22 kN ⇒ U_N = 0.054
utilization y-moment (centroid): -495.19 kNm ≤ $M_{y,s}$ ≤ 499.39 kNm ⇒ U_{My} = 0.360
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.483
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.132): c/t_{o-o} = 0.151, c/t_{--o} = 0.488
max. utilization: U = 0.488 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 123, group of load spectra 1: standard load spectra
internal forces: N = -261.60 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 1.149 kNm, M_η = 168.11 kNm, M_ζ = 89.96 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.149 kNm, B = 1.853 kNm²
normal stresses (elast.): σ_{max} = 169.70 MN/m², σ_{min} = -173.15 MN/m²
extr. stresses (elast.): σ = 173.15 MN/m², τ = 7.17 MN/m², σ_v = 173.15 MN/m²
partial member forces flange top: V_o = -1.79 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 39.53 kNm
partial member forces flange bottom: V_u = -8.56 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 50.43 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -261.60 kN, $M_{y,s}$ = 168.11 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.010, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.286, $U_{MS,u}$ = 0.364 ⇒ U_{MS} = 0.364
limiting normal forces flange top: -1300.15 kN ≤ N_o ≤ 1300.15 kN
limiting normal forces flange bottom: -1226.34 kN ≤ N_u ≤ 1226.34 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3345.42 kN ≤ N ≤ 3345.42 kN ⇒ U_N = 0.078
utilization y-moment (centroid): -484.03 kNm ≤ $M_{y,s}$ ≤ 491.57 kNm ⇒ U_{My} = 0.337
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.481
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.123): c/t_{o-o} = 0.164, c/t_{--o} = 0.492
max. utilization: U = 0.492 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 124, group of load spectra 1: standard load spectra
internal forces: N = -309.35 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 1.234 kNm, M_η = 160.80 kNm, M_ζ = 93.28 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.234 kNm, B = 2.084 kNm²
normal stresses (elast.): σ_{max} = 169.56 MN/m², σ_{min} = -175.11 MN/m²
extr. stresses (elast.): σ = 175.11 MN/m², τ = 7.17 MN/m², σ_v = 175.11 MN/m²
partial member forces flange top: V_o = -1.55 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 40.51 kNm
partial member forces flange bottom: V_u = -8.80 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 52.77 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = 160.80 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.010, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.293, $U_{MS,u}$ = 0.381 ⇒ U_{MS} = 0.381
limiting normal forces flange top: -1293.68 kN ≤ N_o ≤ 1293.68 kN
limiting normal forces flange bottom: -1209.95 kN ≤ N_u ≤ 1209.95 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3322.55 kN ≤ N ≤ 3322.55 kN ⇒ U_N = 0.093
utilization y-moment (centroid): -476.04 kNm ≤ $M_{y,s}$ ≤ 486.16 kNm ⇒ U_{My} = 0.324
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.482
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.116): c/t_{o-o} = 0.171, c/t_{--o} = 0.494
max. utilization: U = 0.494 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 125, group of load spectra 1: standard load spectra
internal forces: N = -136.42 kN, V_η = 0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.000 kNm, M_η = -208.95 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 76.21 MN/m², σ_{min} = -91.17 MN/m²
extr. stresses (elast.): σ = 91.17 MN/m², τ = 6.29 MN/m², σ_v = 91.22 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = -208.95 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3895.62 kN ≤ N ≤ 3895.62 kN ⇒ U_N = 0.035

utilization y-moment (centroid): -586.70 kNm ≤ $M_{y,s}$ ≤ 586.70 kNm ⇒ U_{My} = 0.356
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.365
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.571): c/t_{o-o} = 0.148, c/t_{--o} = 0.374
max. utilization: U = 0.374 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 126, group of load spectra 1: standard load spectra
internal forces: N = -184.17 kN, V_η = 0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.000 kNm, M_η = -219.30 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 77.74 MN/m², σ_{min} = -97.93 MN/m²
extr. stresses (elast.): σ = 97.93 MN/m², τ = 6.29 MN/m², σ_v = 97.97 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -184.17 kN, $M_{y,s}$ = -219.30 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3895.62 kN ≤ N ≤ 3895.62 kN ⇒ U_N = 0.047
utilization y-moment (centroid): -585.21 kNm ≤ $M_{y,s}$ ≤ 585.21 kNm ⇒ U_{My} = 0.375
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.389
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.515): c/t_{o-o} = 0.160, c/t_{--o} = 0.388
max. utilization: U = 0.389 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 127, group of load spectra 1: standard load spectra
internal forces: N = -261.60 kN, V_η = 0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.000 kNm, M_η = -238.85 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 81.32 MN/m², σ_{min} = -110.01 MN/m²
extr. stresses (elast.): σ = 110.01 MN/m², τ = 6.29 MN/m², σ_v = 110.05 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -261.60 kN, $M_{y,s}$ = -238.85 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3895.62 kN ≤ N ≤ 3895.62 kN ⇒ U_N = 0.067
utilization y-moment (centroid): -581.84 kNm ≤ $M_{y,s}$ ≤ 581.84 kNm ⇒ U_{My} = 0.411
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.434
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.428): c/t_{o-o} = 0.177, c/t_{--o} = 0.412
max. utilization: U = 0.434 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 128, group of load spectra 1: standard load spectra
internal forces: N = -309.35 kN, V_η = 0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.000 kNm, M_η = -249.97 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 83.16 MN/m², σ_{min} = -117.08 MN/m²
extr. stresses (elast.): σ = 117.08 MN/m², τ = 6.29 MN/m², σ_v = 117.12 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = -249.97 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3895.62 kN ≤ N ≤ 3895.62 kN ⇒ U_N = 0.079
utilization y-moment (centroid): -579.18 kNm ≤ $M_{y,s}$ ≤ 579.18 kNm ⇒ U_{My} = 0.432
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.461
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.384): c/t_{o-o} = 0.187, c/t_{--o} = 0.425
max. utilization: U = 0.461 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 129, group of load spectra 1: standard load spectra
internal forces: N = -168.07 kN, V_η = -10.35 kN, V_ζ = -0.00 kN
internal moments: T = 0.088 kNm, M_η = -29.72 kNm, M_ζ = 83.87 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.088 kNm, B = 0.408 kNm²
normal stresses (elast.): σ_{max} = 96.96 MN/m², σ_{min} = -120.94 MN/m²
extr. stresses (elast.): σ = 120.94 MN/m², τ = 1.13 MN/m², σ_v = 120.94 MN/m²
partial member forces flange top: V_o = -4.92 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 40.74 kNm

partial member forces flange bottom: V_u = -5.43 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 43.14 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -168.07 kN, $M_{y,s}$ = -29.72 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.294, $U_{MS,u}$ = 0.312 ⇒ U_{MS} = 0.312
limiting normal forces flange top: -1292.17 kN ≤ N_o ≤ 1292.17 kN
limiting normal forces flange bottom: -1276.20 kN ≤ N_u ≤ 1276.20 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3388.73 kN ≤ N ≤ 3388.73 kN ⇒ U_N = 0.050
utilization y-moment (centroid): -498.95 kNm ≤ $M_{y,s}$ ≤ 499.99 kNm ⇒ U_{My} = 0.061
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.314
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.333): c/t_{o-o} = 0.116, c/t_{--o} = 0.395
max. utilization: U = 0.395 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 130, group of load spectra 1: standard load spectra
internal forces: N = -215.82 kN, V_η = -10.35 kN, V_ζ = -0.00 kN
internal moments: T = 0.114 kNm, M_η = -38.55 kNm, M_ζ = 86.52 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.114 kNm, B = 0.542 kNm²
normal stresses (elast.): σ_{max} = 100.02 MN/m², σ_{min} = -131.06 MN/m²
extr. stresses (elast.): σ = 131.06 MN/m², τ = 1.15 MN/m², σ_v = 131.06 MN/m²
partial member forces flange top: V_o = -4.84 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 41.67 kNm
partial member forces flange bottom: V_u = -5.51 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 44.85 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -215.82 kN, $M_{y,s}$ = -38.55 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.301, $U_{MS,u}$ = 0.324 ⇒ U_{MS} = 0.324
limiting normal forces flange top: -1286.02 kN ≤ N_o ≤ 1286.02 kN
limiting normal forces flange bottom: -1264.67 kN ≤ N_u ≤ 1264.67 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3371.05 kN ≤ N ≤ 3371.05 kN ⇒ U_N = 0.064
utilization y-moment (centroid): -493.76 kNm ≤ $M_{y,s}$ ≤ 495.56 kNm ⇒ U_{My} = 0.080
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.333
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.281): c/t_{o-o} = 0.131, c/t_{--o} = 0.414
max. utilization: U = 0.414 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 131, group of load spectra 1: standard load spectra
internal forces: N = -293.25 kN, V_η = -10.35 kN, V_ζ = -0.00 kN
internal moments: T = 0.165 kNm, M_η = -55.37 kNm, M_ζ = 91.80 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.165 kNm, B = 0.815 kNm²
normal stresses (elast.): σ_{max} = 106.78 MN/m², σ_{min} = -150.02 MN/m²
extr. stresses (elast.): σ = 150.02 MN/m², τ = 1.18 MN/m², σ_v = 150.02 MN/m²
partial member forces flange top: V_o = -4.69 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 43.50 kNm
partial member forces flange bottom: V_u = -5.66 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 48.30 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -293.25 kN, $M_{y,s}$ = -55.37 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.314, $U_{MS,u}$ = 0.349 ⇒ U_{MS} = 0.349
limiting normal forces flange top: -1273.74 kN ≤ N_o ≤ 1273.74 kN
limiting normal forces flange bottom: -1241.16 kN ≤ N_u ≤ 1241.16 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3335.27 kN ≤ N ≤ 3335.27 kN ⇒ U_N = 0.088
utilization y-moment (centroid): -482.81 kNm ≤ $M_{y,s}$ ≤ 486.54 kNm ⇒ U_{My} = 0.118
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.376
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.198): c/t_{o-o} = 0.153, c/t_{--o} = 0.446
max. utilization: U = 0.446 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 132, group of load spectra 1: standard load spectra
internal forces: N = -341.00 kN, V_η = -10.35 kN, V_ζ = -0.00 kN
internal moments: T = 0.195 kNm, M_η = -64.90 kNm, M_ζ = 95.22 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.195 kNm, B = 0.983 kNm²
normal stresses (elast.): σ_{max} = 110.78 MN/m², σ_{min} = -161.56 MN/m²
extr. stresses (elast.): σ = 161.56 MN/m², τ = 1.20 MN/m², σ_v = 161.56 MN/m²
partial member forces flange top: V_o = -4.60 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 44.72 kNm
partial member forces flange bottom: V_u = -5.75 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 50.50 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -341.00 kN, $M_{y,s}$ = -64.90 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.323, $U_{MS,u}$ = 0.365 ⇒ U_{MS} = 0.365
limiting normal forces flange top: -1265.56 kN ≤ N_o ≤ 1265.56 kN
limiting normal forces flange bottom: -1225.88 kN ≤ N_u ≤ 1225.88 kN

limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3311.80\ kN \le N \le 3311.80\ kN \Rightarrow U_N = 0.103$
utilization y-moment (centroid): $-475.04\ kNm \le M_{y,s} \le 480.32\ kNm \Rightarrow U_{My} = 0.141$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.405$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.155$): $c/t_{o-o} = 0.165$, $c/t_{--o} = 0.464$
max. utilization: $U = 0.464 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 133, group of load spectra 1: standard load spectra
internal forces: $N = -33.82\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = -0.00\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -4.23\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = -0.16\ MN/m^2$, $\sigma_{min} = -3.55\ MN/m^2$
extr. stresses (elast.): $\sigma = 3.55\ MN/m^2$, $\tau = 0.00\ MN/m^2$, $\sigma_v = 3.55\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = -0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -33.82\ kN$, $M_{y,s} = -4.23\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1538.18\ kN \le N_o \le 1538.18\ kN$
limiting normal forces flange bottom: $-1538.18\ kN \le N_u \le 1538.18\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3896.73\ kN \le N \le 3896.73\ kN \Rightarrow U_N = 0.009$
utilization y-moment (centroid): $-588.50\ kNm \le M_{y,s} \le 588.50\ kNm \Rightarrow U_{My} = 0.007$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.015$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 7.866$): $c/t_{o-o} = 0.052$, $c/t_{--o} = 0.075$
max. utilization: $U = 0.075 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 134, group of load spectra 1: standard load spectra
internal forces: $N = -81.57\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = -0.00\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -12.38\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = 0.49\ MN/m^2$, $\sigma_{min} = -9.43\ MN/m^2$
extr. stresses (elast.): $\sigma = 9.43\ MN/m^2$, $\tau = 0.00\ MN/m^2$, $\sigma_v = 9.43\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = -0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -81.57\ kN$, $M_{y,s} = -12.38\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1538.18\ kN \le N_o \le 1538.18\ kN$
limiting normal forces flange bottom: $-1538.18\ kN \le N_u \le 1538.18\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3896.73\ kN \le N \le 3896.73\ kN \Rightarrow U_N = 0.021$
utilization y-moment (centroid): $-587.96\ kNm \le M_{y,s} \le 587.96\ kNm \Rightarrow U_{My} = 0.021$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.040$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 4.831$): $c/t_{o-o} = 0.081$, $c/t_{--o} = 0.122$
max. utilization: $U = 0.122 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 135, group of load spectra 1: standard load spectra
internal forces: $N = -159.00\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = -0.00\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -27.93\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = 2.47\ MN/m^2$, $\sigma_{min} = -19.90\ MN/m^2$
extr. stresses (elast.): $\sigma = 19.90\ MN/m^2$, $\tau = 0.00\ MN/m^2$, $\sigma_v = 19.90\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = -0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -159.00\ kN$, $M_{y,s} = -27.93\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1538.18\ kN \le N_o \le 1538.18\ kN$
limiting normal forces flange bottom: $-1538.18\ kN \le N_u \le 1538.18\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3896.73\ kN \le N \le 3896.73\ kN \Rightarrow U_N = 0.041$
utilization y-moment (centroid): $-586.15\ kNm \le M_{y,s} \le 586.15\ kNm \Rightarrow U_{My} = 0.048$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.083$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 3.329$): $c/t_{o-o} = 0.113$, $c/t_{--o} = 0.177$
max. utilization: $U = 0.177 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 136, group of load spectra 1: standard load spectra
internal forces: $N = -206.75\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = -0.00\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -36.71\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = 3.37\ MN/m^2$, $\sigma_{min} = -26.04\ MN/m^2$
extr. stresses (elast.): $\sigma = 26.04\ MN/m^2$, $\tau = 0.00\ MN/m^2$, $\sigma_v = 26.04\ MN/m^2$

partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -206.75 kN, $M_{y,s}$ = -36.71 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3896.73 kN ≤ N ≤ 3896.73 kN ⇒ U_N = 0.053
utilization y-moment (centroid): -584.44 kNm ≤ $M_{y,s}$ ≤ 584.44 kNm ⇒ U_{My} = 0.063
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.109
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.910): c/t_{o-o} = 0.128, c/t_{--o} = 0.202
max. utilization: U = 0.202 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 137, group of load spectra 1: standard load spectra
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.945 kNm, M_η = 187.90 kNm, M_ζ = 82.29 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.945 kNm, B = 1.303 kNm²
normal stresses (elast.): σ_{max} = 171.87 MN/m², σ_{min} = -169.08 MN/m²
extr. stresses (elast.): σ = 171.87 MN/m², τ = 7.17 MN/m², σ_v = 171.87 MN/m²
partial member forces flange top: V_o = -2.40 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 37.31 kNm
partial member forces flange bottom: V_u = -7.95 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 44.98 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 187.90 kNm
shear utilization: $U_{\tau,o}$ = 0.003, $U_{\tau,u}$ = 0.009, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.270, $U_{MS,u}$ = 0.325 ⇒ U_{MS} = 0.325
limiting normal forces flange top: -1314.65 kN ≤ N_o ≤ 1314.65 kN
limiting normal forces flange bottom: -1263.78 kN ≤ N_u ≤ 1263.78 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3397.36 kN ≤ N ≤ 3397.36 kN ⇒ U_N = 0.040
utilization y-moment (centroid): -500.42 kNm ≤ $M_{y,s}$ ≤ 503.13 kNm ⇒ U_{My} = 0.372
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.486
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.138): c/t_{o-o} = 0.143, c/t_{--o} = 0.486
max. utilization: U = 0.486 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 138, group of load spectra 1: standard load spectra
internal forces: N = -184.17 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 1.014 kNm, M_η = 181.15 kNm, M_ζ = 84.84 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.014 kNm, B = 1.484 kNm²
normal stresses (elast.): σ_{max} = 170.73 MN/m², σ_{min} = -170.72 MN/m²
extr. stresses (elast.): σ = 170.73 MN/m², τ = 7.17 MN/m², σ_v = 170.73 MN/m²
partial member forces flange top: V_o = -2.19 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.06 kNm
partial member forces flange bottom: V_u = -8.16 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 46.79 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -184.17 kN, $M_{y,s}$ = 181.15 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.009, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.275, $U_{MS,u}$ = 0.338 ⇒ U_{MS} = 0.338
limiting normal forces flange top: -1309.81 kN ≤ N_o ≤ 1309.81 kN
limiting normal forces flange bottom: -1251.49 kN ≤ N_u ≤ 1251.49 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3380.22 kN ≤ N ≤ 3380.22 kN ⇒ U_N = 0.054
utilization y-moment (centroid): -495.19 kNm ≤ $M_{y,s}$ ≤ 499.39 kNm ⇒ U_{My} = 0.360
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.483
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.132): c/t_{o-o} = 0.151, c/t_{--o} = 0.488
max. utilization: U = 0.488 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 139, group of load spectra 1: standard load spectra
internal forces: N = -261.60 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 1.149 kNm, M_η = 168.11 kNm, M_ζ = 89.96 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.149 kNm, B = 1.853 kNm²
normal stresses (elast.): σ_{max} = 169.70 MN/m², σ_{min} = -173.15 MN/m²
extr. stresses (elast.): σ = 173.15 MN/m², τ = 7.17 MN/m², σ_v = 173.15 MN/m²
partial member forces flange top: V_o = -1.79 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 39.53 kNm
partial member forces flange bottom: V_u = -8.56 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 50.43 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -261.60 kN, $M_{y,s}$ = 168.11 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.010, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.286, $U_{MS,u}$ = 0.364 ⇒ U_{MS} = 0.364
limiting normal forces flange top: -1300.15 kN ≤ N_o ≤ 1300.15 kN

limiting normal forces flange bottom: $-1226.34\ kN \le N_u \le 1226.34\ kN$
limiting normal forces web: $-818.92\ kN \le N_s \le 818.92\ kN$
utilization normal force: $-3345.42\ kN \le N \le 3345.42\ kN \Rightarrow U_N = 0.078$
utilization y-moment (centroid): $-484.03\ kNm \le M_{y,s} \le 491.57\ kNm \Rightarrow U_{My} = 0.337$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.481$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.123$): $c/t_{o-o} = 0.164$, $c/t_{--o} = 0.492$
max. utilization: $U = 0.492 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 140, group of load spectra 1: standard load spectra
internal forces: $N = -309.35\ kN$, $V_\eta = -10.35\ kN$, $V_\zeta = 28.05\ kN$
internal moments: $T = 1.234\ kNm$, $M_\eta = 160.80\ kNm$, $M_\zeta = 93.28\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = 1.234\ kNm$, $B = 2.084\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 169.56\ MN/m^2$, $\sigma_{min} = -175.11\ MN/m^2$
extr. stresses (elast.): $\sigma = 175.11\ MN/m^2$, $\tau = 7.17\ MN/m^2$, $\sigma_v = 175.11\ MN/m^2$
partial member forces flange top: $V_o = -1.55\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 40.51\ kNm$
partial member forces flange bottom: $V_u = -8.80\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 52.77\ kNm$
partial member forces web: $V_s = 28.05\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -309.35\ kN$, $M_{y,s} = 160.80\ kNm$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.010$, $U_{\tau,s} = 0.059 \Rightarrow U_\tau = 0.059$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.998$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.293$, $U_{MS,u} = 0.381 \Rightarrow U_{MS} = 0.381$
limiting normal forces flange top: $-1293.68\ kN \le N_o \le 1293.68\ kN$
limiting normal forces flange bottom: $-1209.95\ kN \le N_u \le 1209.95\ kN$
limiting normal forces web: $-818.92\ kN \le N_s \le 818.92\ kN$
utilization normal force: $-3322.55\ kN \le N \le 3322.55\ kN \Rightarrow U_N = 0.093$
utilization y-moment (centroid): $-476.04\ kNm \le M_{y,s} \le 486.16\ kNm \Rightarrow U_{My} = 0.324$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.482$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.116$): $c/t_{o-o} = 0.171$, $c/t_{--o} = 0.494$
max. utilization: $U = 0.494 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 141, group of load spectra 1: standard load spectra
internal forces: $N = -136.42\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -208.95\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = 76.21\ MN/m^2$, $\sigma_{min} = -91.17\ MN/m^2$
extr. stresses (elast.): $\sigma = 91.17\ MN/m^2$, $\tau = 6.29\ MN/m^2$, $\sigma_v = 91.22\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = -24.60\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -136.42\ kN$, $M_{y,s} = -208.95\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1538.18\ kN \le N_o \le 1538.18\ kN$
limiting normal forces flange bottom: $-1538.18\ kN \le N_u \le 1538.18\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3895.62\ kN \le N \le 3895.62\ kN \Rightarrow U_N = 0.035$
utilization y-moment (centroid): $-586.70\ kNm \le M_{y,s} \le 586.70\ kNm \Rightarrow U_{My} = 0.356$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.365$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.571$): $c/t_{o-o} = 0.148$, $c/t_{--o} = 0.374$
max. utilization: $U = 0.374 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 142, group of load spectra 1: standard load spectra
internal forces: $N = -184.17\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -219.30\ kNm$, $M_\zeta = 0.00\ kNm$
normal stresses (elast.): $\sigma_{max} = 77.74\ MN/m^2$, $\sigma_{min} = -97.93\ MN/m^2$
extr. stresses (elast.): $\sigma = 97.93\ MN/m^2$, $\tau = 6.29\ MN/m^2$, $\sigma_v = 97.97\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.00\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.00\ kNm$
partial member forces web: $V_s = -24.60\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -184.17\ kN$, $M_{y,s} = -219.30\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.000$, $U_{MS,u} = 0.000 \Rightarrow U_{MS} = 0.000$
limiting normal forces flange top: $-1538.18\ kN \le N_o \le 1538.18\ kN$
limiting normal forces flange bottom: $-1538.18\ kN \le N_u \le 1538.18\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3895.62\ kN \le N \le 3895.62\ kN \Rightarrow U_N = 0.047$
utilization y-moment (centroid): $-585.21\ kNm \le M_{y,s} \le 585.21\ kNm \Rightarrow U_{My} = 0.375$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.389$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.515$): $c/t_{o-o} = 0.160$, $c/t_{--o} = 0.388$
max. utilization: $U = 0.389 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 143, group of load spectra 1: standard load spectra
internal forces: $N = -261.60\ kN$, $V_\eta = 0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -238.85\ kNm$, $M_\zeta = 0.00\ kNm$

normal stresses (elast.): σ_{max} = 81.32 MN/m², σ_{min} = -110.01 MN/m²
extr. stresses (elast.): σ = 110.01 MN/m², τ = 6.29 MN/m², σ_v = 110.05 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -261.60 kN, $M_{y,s}$ = -238.85 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3895.62 kN ≤ N ≤ 3895.62 kN ⇒ U_N = 0.067
utilization y-moment (centroid): -581.84 kNm ≤ $M_{y,s}$ ≤ 581.84 kNm ⇒ U_{My} = 0.411
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.434
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.428): c/t_{o-o} = 0.177, c/t_{--o} = 0.412
max. utilization: U = 0.434 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 144, group of load spectra 1: standard load spectra
internal forces: N = -309.35 kN, V_η = 0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.000 kNm, M_η = -249.97 kNm, M_ζ = 0.00 kNm
normal stresses (elast.): σ_{max} = 83.16 MN/m², σ_{min} = -117.08 MN/m²
extr. stresses (elast.): σ = 117.08 MN/m², τ = 6.29 MN/m², σ_v = 117.12 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.00 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.00 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = -249.97 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.000, $U_{MS,u}$ = 0.000 ⇒ U_{MS} = 0.000
limiting normal forces flange top: -1538.18 kN ≤ N_o ≤ 1538.18 kN
limiting normal forces flange bottom: -1538.18 kN ≤ N_u ≤ 1538.18 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3895.62 kN ≤ N ≤ 3895.62 kN ⇒ U_N = 0.079
utilization y-moment (centroid): -579.18 kNm ≤ $M_{y,s}$ ≤ 579.18 kNm ⇒ U_{My} = 0.432
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.461
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.384): c/t_{o-o} = 0.187, c/t_{--o} = 0.425
max. utilization: U = 0.461 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 145, group of load spectra 1: standard load spectra
internal forces: N = -168.07 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = 0.340 kNm, M_η = -33.67 kNm, M_ζ = 88.17 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.340 kNm, B = 0.627 kNm²
normal stresses (elast.): σ_{max} = 102.02 MN/m², σ_{min} = -128.98 MN/m²
extr. stresses (elast.): σ = 128.98 MN/m², τ = 1.29 MN/m², σ_v = 128.98 MN/m²
partial member forces flange top: V_o = -4.18 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 42.24 kNm
partial member forces flange bottom: V_u = -6.17 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 45.93 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -168.07 kN, $M_{y,s}$ = -33.67 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.007, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.007
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.305, $U_{MS,u}$ = 0.332 ⇒ U_{MS} = 0.332
limiting normal forces flange top: -1282.20 kN ≤ N_o ≤ 1282.20 kN
limiting normal forces flange bottom: -1257.36 kN ≤ N_u ≤ 1257.36 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3359.93 kN ≤ N ≤ 3359.93 kN ⇒ U_N = 0.050
utilization y-moment (centroid): -493.73 kNm ≤ $M_{y,s}$ ≤ 495.35 kNm ⇒ U_{My} = 0.070
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.335
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.291): c/t_{o-o} = 0.116, c/t_{--o} = 0.408
max. utilization: U = 0.408 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 146, group of load spectra 1: standard load spectra
internal forces: N = -215.82 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = 0.370 kNm, M_η = -43.65 kNm, M_ζ = 92.22 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.370 kNm, B = 0.830 kNm²
normal stresses (elast.): σ_{max} = 106.71 MN/m², σ_{min} = -141.68 MN/m²
extr. stresses (elast.): σ = 141.68 MN/m², τ = 1.30 MN/m², σ_v = 141.68 MN/m²
partial member forces flange top: V_o = -4.09 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 43.67 kNm
partial member forces flange bottom: V_u = -6.26 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 48.55 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -215.82 kN, $M_{y,s}$ = -43.65 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.007, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.007
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.315, $U_{MS,u}$ = 0.351 ⇒ U_{MS} = 0.351

limiting normal forces flange top: $-1272.64\ kN \le N_o \le 1272.64\ kN$
limiting normal forces flange bottom: $-1239.38\ kN \le N_u \le 1239.38\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3332.38\ kN \le N \le 3332.38\ kN \Rightarrow U_N = 0.065$
utilization y-moment (centroid): $-486.62\ kNm \le M_{y,s} \le 489.42\ kNm \Rightarrow U_{My} = 0.092$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.360$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.232$): $c/t_{o-o} = 0.132$, $c/t_{--o} = 0.430$
max. utilization: $U = 0.430 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 147, group of load spectra 1: standard load spectra
internal forces: $N = -293.25\ kN$, $V_\eta = -10.35\ kN$, $V_\zeta = 0.00\ kN$
internal moments: $T = 0.428\ kNm$, $M_\eta = -62.54\ kNm$, $M_\zeta = 100.26\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = 0.428\ kNm$, $B = 1.244\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 116.50\ MN/m^2$, $\sigma_{min} = -165.60\ MN/m^2$
extr. stresses (elast.): $\sigma = 165.60\ MN/m^2$, $\tau = 1.34\ MN/m^2$, $\sigma_v = 165.60\ MN/m^2$
partial member forces flange top: $V_o = -3.92\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 46.47\ kNm$
partial member forces flange bottom: $V_u = -6.43\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 53.79\ kNm$
partial member forces web: $V_s = 0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -293.25\ kN$, $M_{y,s} = -62.54\ kNm$
shear utilization: $U_{\tau,o} = 0.004$, $U_{\tau,u} = 0.007$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.007$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.336$, $U_{MS,u} = 0.389 \Rightarrow U_{MS} = 0.389$
limiting normal forces flange top: $-1253.71\ kN \le N_o \le 1253.71\ kN$
limiting normal forces flange bottom: $-1202.76\ kN \le N_u \le 1202.76\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3276.83\ kN \le N \le 3276.83\ kN \Rightarrow U_N = 0.089$
utilization y-moment (centroid): $-471.68\ kNm \le M_{y,s} \le 477.50\ kNm \Rightarrow U_{My} = 0.138$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.415$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.141$): $c/t_{o-o} = 0.154$, $c/t_{--o} = 0.467$
max. utilization: $U = 0.467 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 148, group of load spectra 1: standard load spectra
internal forces: $N = -341.00\ kN$, $V_\eta = -10.35\ kN$, $V_\zeta = 0.00\ kN$
internal moments: $T = 0.462\ kNm$, $M_\eta = -73.28\ kNm$, $M_\zeta = 105.45\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = 0.462\ kNm$, $B = 1.497\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 122.47\ MN/m^2$, $\sigma_{min} = -180.25\ MN/m^2$
extr. stresses (elast.): $\sigma = 180.25\ MN/m^2$, $\tau = 1.36\ MN/m^2$, $\sigma_v = 180.25\ MN/m^2$
partial member forces flange top: $V_o = -3.82\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 48.32\ kNm$
partial member forces flange bottom: $V_u = -6.53\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 57.13\ kNm$
partial member forces web: $V_s = 0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -341.00\ kN$, $M_{y,s} = -73.28\ kNm$
shear utilization: $U_{\tau,o} = 0.004$, $U_{\tau,u} = 0.007$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.007$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.349$, $U_{MS,u} = 0.413 \Rightarrow U_{MS} = 0.413$
limiting normal forces flange top: $-1241.03\ kN \le N_o \le 1241.03\ kN$
limiting normal forces flange bottom: $-1178.79\ kN \le N_u \le 1178.79\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3240.19\ kN \le N \le 3240.19\ kN \Rightarrow U_N = 0.105$
utilization y-moment (centroid): $-461.14\ kNm \le M_{y,s} \le 469.42\ kNm \Rightarrow U_{My} = 0.166$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.451$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.094$): $c/t_{o-o} = 0.166$, $c/t_{--o} = 0.489$
max. utilization: $U = 0.489 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 149, group of load spectra 1: standard load spectra
internal forces: $N = -33.82\ kN$, $V_\eta = -0.00\ kN$, $V_\zeta = 0.00\ kN$
internal moments: $T = 0.000\ kNm$, $M_\eta = -4.90\ kNm$, $M_\zeta = 0.68\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = 0.000\ kNm$, $B = 0.032\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 0.68\ MN/m^2$, $\sigma_{min} = -4.83\ MN/m^2$
extr. stresses (elast.): $\sigma = 4.83\ MN/m^2$, $\tau = 0.00\ MN/m^2$, $\sigma_v = 4.83\ MN/m^2$
partial member forces flange top: $V_o = 0.00\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 0.25\ kNm$
partial member forces flange bottom: $V_u = -0.00\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 0.44\ kNm$
partial member forces web: $V_s = 0.00\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -33.82\ kN$, $M_{y,s} = -4.90\ kNm$
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.002$, $U_{MS,u} = 0.003 \Rightarrow U_{MS} = 0.003$
limiting normal forces flange top: $-1536.81\ kN \le N_o \le 1536.81\ kN$
limiting normal forces flange bottom: $-1535.76\ kN \le N_u \le 1535.76\ kN$
limiting normal forces web: $-820.36\ kN \le N_s \le 820.36\ kN$
utilization normal force: $-3892.93\ kN \le N \le 3892.93\ kN \Rightarrow U_N = 0.009$
utilization y-moment (centroid): $-587.85\ kNm \le M_{y,s} \le 587.86\ kNm \Rightarrow U_{My} = 0.008$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.017$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 6.730$): $c/t_{o-o} = 0.052$, $c/t_{--o} = 0.086$
max. utilization: $U = 0.086 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 150, group of load spectra 1: standard load spectra
internal forces: $N = -81.57$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.000$ kNm, $M_\eta = -14.15$ kNm, $M_\zeta = 1.84$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.000$ kNm, $B = 0.096$ kNm²
normal stresses (elast.): $\sigma_{max} = 2.67$ MN/m², $\sigma_{min} = -12.92$ MN/m²
extr. stresses (elast.): $\sigma = 12.92$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 12.92$ MN/m²
partial member forces flange top: $V_o = 0.00$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 0.64$ kNm
partial member forces flange bottom: $V_u = -0.00$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 1.20$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -81.57$ kN, $M_{y,s} = -14.15$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.005$, $U_{MS,u} = 0.009 \Rightarrow U_{MS} = 0.009$
limiting normal forces flange top: -1534.64 kN $\le N_o \le 1534.64$ kN
limiting normal forces flange bottom: -1531.51 kN $\le N_u \le 1531.51$ kN
limiting normal forces web: -820.36 kN $\le N_s \le 820.36$ kN
utilization normal force: -3886.51 kN $\le N \le 3886.51$ kN $\Rightarrow U_N = 0.021$
utilization y-moment (centroid): -586.17 kNm $\le M_{y,s} \le 586.27$ kNm $\Rightarrow U_{My} = 0.024$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.046$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 4.118$): $c/t_{o-o} = 0.081$, $c/t_{--o} = 0.140$
max. utilization: $U = 0.140 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 151, group of load spectra 1: standard load spectra
internal forces: $N = -159.00$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.000$ kNm, $M_\eta = -31.65$ kNm, $M_\zeta = 4.03$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.000$ kNm, $B = 0.222$ kNm²
normal stresses (elast.): $\sigma_{max} = 7.11$ MN/m², $\sigma_{min} = -27.57$ MN/m²
extr. stresses (elast.): $\sigma = 27.57$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 27.57$ MN/m²
partial member forces flange top: $V_o = 0.00$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 1.36$ kNm
partial member forces flange bottom: $V_u = -0.00$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 2.67$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -159.00$ kN, $M_{y,s} = -31.65$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.010$, $U_{MS,u} = 0.019 \Rightarrow U_{MS} = 0.019$
limiting normal forces flange top: -1530.60 kN $\le N_o \le 1530.60$ kN
limiting normal forces flange bottom: -1523.29 kN $\le N_u \le 1523.29$ kN
limiting normal forces web: -820.36 kN $\le N_s \le 820.36$ kN
utilization normal force: -3874.25 kN $\le N \le 3874.25$ kN $\Rightarrow U_N = 0.041$
utilization y-moment (centroid): -582.09 kNm $\le M_{y,s} \le 582.55$ kNm $\Rightarrow U_{My} = 0.055$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.097$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 2.820$): $c/t_{o-o} = 0.113$, $c/t_{--o} = 0.204$
max. utilization: $U = 0.204 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 152, group of load spectra 1: standard load spectra
internal forces: $N = -206.75$ kN, $V_\eta = -0.00$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.001$ kNm, $M_\eta = -41.58$ kNm, $M_\zeta = 5.43$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.001$ kNm, $B = 0.297$ kNm²
normal stresses (elast.): $\sigma_{max} = 9.57$ MN/m², $\sigma_{min} = -36.29$ MN/m²
extr. stresses (elast.): $\sigma = 36.29$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 36.29$ MN/m²
partial member forces flange top: $V_o = 0.00$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 1.84$ kNm
partial member forces flange bottom: $V_u = -0.00$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 3.59$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -206.75$ kN, $M_{y,s} = -41.58$ kNm
shear utilization: $U_{\tau,o} = 0.000$, $U_{\tau,u} = 0.000$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.000$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.013$, $U_{MS,u} = 0.026 \Rightarrow U_{MS} = 0.026$
limiting normal forces flange top: -1527.93 kN $\le N_o \le 1527.93$ kN
limiting normal forces flange bottom: -1518.12 kN $\le N_u \le 1518.12$ kN
limiting normal forces web: -820.36 kN $\le N_s \le 820.36$ kN
utilization normal force: -3866.42 kN $\le N \le 3866.42$ kN $\Rightarrow U_N = 0.053$
utilization y-moment (centroid): -578.88 kNm $\le M_{y,s} \le 579.68$ kNm $\Rightarrow U_{My} = 0.072$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.127$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 2.458$): $c/t_{o-o} = 0.129$, $c/t_{--o} = 0.234$
max. utilization: $U = 0.234 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 153, group of load spectra 1: standard load spectra
internal forces: $N = -136.42$ kN, $V_\eta = -10.35$ kN, $V_\zeta = 28.05$ kN
internal moments: $T = 1.908$ kNm, $M_\eta = 184.74$ kNm, $M_\zeta = 85.67$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 1.908$ kNm, $B = 1.516$ kNm²
normal stresses (elast.): $\sigma_{max} = 175.96$ MN/m², $\sigma_{min} = -170.28$ MN/m²
extr. stresses (elast.): $\sigma = 175.96$ MN/m², $\tau = 7.17$ MN/m², $\sigma_v = 175.96$ MN/m²
partial member forces flange top: $V_o = 0.44$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 38.38$ kNm
partial member forces flange bottom: $V_u = -10.79$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 47.30$ kNm

partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 184.74 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.012, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.277, $U_{MS,u}$ = 0.342 ⇒ U_{MS} = 0.342
limiting normal forces flange top: -1307.72 kN ≤ N_o ≤ 1307.72 kN
limiting normal forces flange bottom: -1247.95 kN ≤ N_u ≤ 1247.95 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3374.59 kN ≤ N ≤ 3374.59 kN ⇒ U_N = 0.040
utilization y-moment (centroid): -496.22 kNm ≤ $M_{y,s}$ ≤ 499.40 kNm ⇒ U_{My} = 0.368
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.488
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.134): c/t_{o-o} = 0.143, c/t_{--o} = 0.487
max. utilization: U = 0.488 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 154, group of load spectra 1: standard load spectra
internal forces: N = -184.17 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 2.001 kNm, M_η = 176.85 kNm, M_ζ = 89.58 kNm
warping torsion: T_t = 0.000 kNm, T_w = 2.001 kNm, B = 1.782 kNm²
normal stresses (elast.): σ_{max} = 176.52 MN/m², σ_{min} = -172.45 MN/m²
extr. stresses (elast.): σ = 176.52 MN/m², τ = 7.17 MN/m², σ_v = 176.52 MN/m²
partial member forces flange top: V_o = 0.71 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 39.55 kNm
partial member forces flange bottom: V_u = -11.06 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 50.03 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -184.17 kN, $M_{y,s}$ = 176.85 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.012, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.286, $U_{MS,u}$ = 0.361 ⇒ U_{MS} = 0.361
limiting normal forces flange top: -1300.03 kN ≤ N_o ≤ 1300.03 kN
limiting normal forces flange bottom: -1229.07 kN ≤ N_u ≤ 1229.07 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3348.03 kN ≤ N ≤ 3348.03 kN ⇒ U_N = 0.055
utilization y-moment (centroid): -489.10 kNm ≤ $M_{y,s}$ ≤ 494.21 kNm ⇒ U_{My} = 0.355
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.488
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.126): c/t_{o-o} = 0.150, c/t_{--o} = 0.490
max. utilization: U = 0.490 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 155, group of load spectra 1: standard load spectra
internal forces: N = -261.60 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 2.186 kNm, M_η = 161.77 kNm, M_ζ = 97.33 kNm
warping torsion: T_t = 0.000 kNm, T_w = 2.186 kNm, B = 2.323 kNm²
normal stresses (elast.): σ_{max} = 178.88 MN/m², σ_{min} = -175.94 MN/m²
extr. stresses (elast.): σ = 178.88 MN/m², τ = 7.17 MN/m², σ_v = 178.88 MN/m²
partial member forces flange top: V_o = 1.26 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 41.83 kNm
partial member forces flange bottom: V_u = -11.60 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 55.49 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -261.60 kN, $M_{y,s}$ = 161.77 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.013, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.302, $U_{MS,u}$ = 0.401 ⇒ U_{MS} = 0.401
limiting normal forces flange top: -1284.93 kN ≤ N_o ≤ 1284.93 kN
limiting normal forces flange bottom: -1190.48 kN ≤ N_u ≤ 1190.48 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3294.33 kN ≤ N ≤ 3294.33 kN ⇒ U_N = 0.079
utilization y-moment (centroid): -473.95 kNm ≤ $M_{y,s}$ ≤ 483.60 kNm ⇒ U_{My} = 0.328
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.488
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.113): c/t_{o-o} = 0.162, c/t_{--o} = 0.494
max. utilization: U = 0.494 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 156, group of load spectra 1: standard load spectra
internal forces: N = -309.35 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 2.303 kNm, M_η = 153.26 kNm, M_ζ = 102.34 kNm
warping torsion: T_t = 0.000 kNm, T_w = 2.303 kNm, B = 2.658 kNm²
normal stresses (elast.): σ_{max} = 180.94 MN/m², σ_{min} = -178.66 MN/m²
extr. stresses (elast.): σ = 180.94 MN/m², τ = 7.17 MN/m², σ_v = 180.94 MN/m²
partial member forces flange top: V_o = 1.60 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 43.35 kNm
partial member forces flange bottom: V_u = -11.95 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 58.99 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = 153.26 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.013, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.313, $U_{MS,u}$ = 0.426 ⇒ U_{MS} = 0.426
limiting normal forces flange top: -1274.79 kN ≤ N_o ≤ 1274.79 kN
limiting normal forces flange bottom: -1165.12 kN ≤ N_u ≤ 1165.12 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN

utilization normal force: $-3258.83\ kN \le N \le 3258.83\ kN \Rightarrow U_N = 0.095$
utilization y-moment (centroid): $-463.15\ kNm \le M_{y,s} \le 476.40\ kNm \Rightarrow U_{My} = 0.312$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.493$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.104$): $c/t_{o-o} = 0.170$, $c/t_{--o} = 0.498$
max. utilization: $U = 0.498 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 157, group of load spectra 1: standard load spectra
internal forces: $N = -136.42\ kN$, $V_\eta = -0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = -0.622\ kNm$, $M_\eta = -212.11\ kNm$, $M_\zeta = 3.37\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = -0.622\ kNm$, $B = 0.152\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 80.34\ MN/m^2$, $\sigma_{min} = -97.37\ MN/m^2$
extr. stresses (elast.): $\sigma = 97.37\ MN/m^2$, $\tau = 6.29\ MN/m^2$, $\sigma_v = 97.37\ MN/m^2$
partial member forces flange top: $V_o = -1.83\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 1.24\ kNm$
partial member forces flange bottom: $V_u = 1.83\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 2.13\ kNm$
partial member forces web: $V_s = -24.60\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -136.42\ kN$, $M_{y,s} = -212.11\ kNm$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.009$, $U_{MS,u} = 0.015 \Rightarrow U_{MS} = 0.015$
limiting normal forces flange top: $-1531.29\ kN \le N_o \le 1531.29\ kN$
limiting normal forces flange bottom: $-1526.28\ kN \le N_u \le 1526.28\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3876.82\ kN \le N \le 3876.82\ kN \Rightarrow U_N = 0.035$
utilization y-moment (centroid): $-583.37\ kNm \le M_{y,s} \le 583.64\ kNm \Rightarrow U_{My} = 0.364$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.376$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.518$): $c/t_{o-o} = 0.149$, $c/t_{--o} = 0.386$
max. utilization: $U = 0.386 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 158, group of load spectra 1: standard load spectra
internal forces: $N = -184.17\ kN$, $V_\eta = -0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = -0.640\ kNm$, $M_\eta = -223.59\ kNm$, $M_\zeta = 4.71\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = -0.640\ kNm$, $B = 0.211\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 83.47\ MN/m^2$, $\sigma_{min} = -106.54\ MN/m^2$
extr. stresses (elast.): $\sigma = 106.54\ MN/m^2$, $\tau = 6.29\ MN/m^2$, $\sigma_v = 106.54\ MN/m^2$
partial member forces flange top: $V_o = -1.88\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 1.73\ kNm$
partial member forces flange bottom: $V_u = 1.88\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 2.98\ kNm$
partial member forces web: $V_s = -24.60\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -184.17\ kN$, $M_{y,s} = -223.59\ kNm$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.013$, $U_{MS,u} = 0.021 \Rightarrow U_{MS} = 0.021$
limiting normal forces flange top: $-1528.51\ kN \le N_o \le 1528.51\ kN$
limiting normal forces flange bottom: $-1521.55\ kN \le N_u \le 1521.55\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3869.32\ kN \le N \le 3869.32\ kN \Rightarrow U_N = 0.048$
utilization y-moment (centroid): $-580.48\ kNm \le M_{y,s} \le 580.99\ kNm \Rightarrow U_{My} = 0.385$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.404$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.450$): $c/t_{o-o} = 0.160$, $c/t_{--o} = 0.403$
max. utilization: $U = 0.404 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 159, group of load spectra 1: standard load spectra
internal forces: $N = -261.60\ kN$, $V_\eta = -0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = -0.674\ kNm$, $M_\eta = -245.17\ kNm$, $M_\zeta = 7.29\ kNm$
warping torsion: $T_t = 0.000\ kNm$, $T_w = -0.674\ kNm$, $B = 0.328\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 90.05\ MN/m^2$, $\sigma_{min} = -123.21\ MN/m^2$
extr. stresses (elast.): $\sigma = 123.21\ MN/m^2$, $\tau = 6.29\ MN/m^2$, $\sigma_v = 123.21\ MN/m^2$
partial member forces flange top: $V_o = -1.98\ kN$, $M_{xp,o} = 0.00\ kNm$, $M_{Sa,o} = 2.68\ kNm$
partial member forces flange bottom: $V_u = 1.98\ kN$, $M_{xp,u} = 0.00\ kNm$, $M_{Sa,u} = 4.61\ kNm$
partial member forces web: $V_s = -24.60\ kN$, $M_{xp,s} = 0.00\ kNm$
partial member forces main bending (centroid): $N = -261.60\ kN$, $M_{y,s} = -245.17\ kNm$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.019$, $U_{MS,u} = 0.033 \Rightarrow U_{MS} = 0.033$
limiting normal forces flange top: $-1523.23\ kN \le N_o \le 1523.23\ kN$
limiting normal forces flange bottom: $-1512.35\ kN \le N_u \le 1512.35\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3854.84\ kN \le N \le 3854.84\ kN \Rightarrow U_N = 0.068$
utilization y-moment (centroid): $-574.34\ kNm \le M_{y,s} \le 575.45\ kNm \Rightarrow U_{My} = 0.427$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.457$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.347$): $c/t_{o-o} = 0.178$, $c/t_{--o} = 0.433$
max. utilization: $U = 0.457 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 160, group of load spectra 1: standard load spectra
internal forces: $N = -309.35\ kN$, $V_\eta = -0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = -0.695\ kNm$, $M_\eta = -257.50\ kNm$, $M_\zeta = 8.94\ kNm$

warping torsion: T_t = 0.000 kNm, T_w = -0.695 kNm, B = 0.397 kNm²
normal stresses (elast.): σ_{max} = 93.81 MN/m², σ_{min} = -133.14 MN/m²
extr. stresses (elast.): σ = 133.14 MN/m², τ = 6.29 MN/m², σ_v = 133.14 MN/m²
partial member forces flange top: V_o = -2.05 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 3.30 kNm
partial member forces flange bottom: V_u = 2.04 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 5.64 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = -257.50 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.024, $U_{MS,u}$ = 0.041 ⇒ U_{MS} = 0.041
limiting normal forces flange top: -1519.74 kN ≤ N_o ≤ 1519.74 kN
limiting normal forces flange bottom: -1506.53 kN ≤ N_u ≤ 1506.53 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3845.53 kN ≤ N ≤ 3845.53 kN ⇒ U_N = 0.080
utilization y-moment (centroid): -569.85 kNm ≤ $M_{y,s}$ ≤ 571.44 kNm ⇒ U_{My} = 0.453
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.490
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.295): c/t_{o-o} = 0.188, c/t_{--o} = 0.450
max. utilization: U = 0.490 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 161, group of load spectra 1: standard load spectra
internal forces: N = -168.07 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = -0.163 kNm, M_η = -25.77 kNm, M_ζ = 79.58 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.163 kNm, B = 0.187 kNm²
normal stresses (elast.): σ_{max} = 91.91 MN/m², σ_{min} = -112.89 MN/m²
extr. stresses (elast.): σ = 112.89 MN/m², τ = 1.18 MN/m², σ_v = 112.89 MN/m²
partial member forces flange top: V_o = -5.66 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 39.24 kNm
partial member forces flange bottom: V_u = -4.69 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 40.34 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -168.07 kN, $M_{y,s}$ = -25.77 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.283, $U_{MS,u}$ = 0.291 ⇒ U_{MS} = 0.291
limiting normal forces flange top: -1302.03 kN ≤ N_o ≤ 1302.03 kN
limiting normal forces flange bottom: -1294.79 kN ≤ N_u ≤ 1294.79 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3417.19 kN ≤ N ≤ 3417.19 kN ⇒ U_N = 0.049
utilization y-moment (centroid): -504.09 kNm ≤ $M_{y,s}$ ≤ 504.57 kNm ⇒ U_{My} = 0.052
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.294
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.379): c/t_{o-o} = 0.116, c/t_{--o} = 0.382
max. utilization: U = 0.382 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 162, group of load spectra 1: standard load spectra
internal forces: N = -215.82 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = -0.140 kNm, M_η = -33.44 kNm, M_ζ = 80.81 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.140 kNm, B = 0.250 kNm²
normal stresses (elast.): σ_{max} = 93.36 MN/m², σ_{min} = -120.42 MN/m²
extr. stresses (elast.): σ = 120.42 MN/m², τ = 1.16 MN/m², σ_v = 120.42 MN/m²
partial member forces flange top: V_o = -5.59 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 39.67 kNm
partial member forces flange bottom: V_u = -4.76 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 41.14 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -215.82 kN, $M_{y,s}$ = -33.44 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.005, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.287, $U_{MS,u}$ = 0.297 ⇒ U_{MS} = 0.297
limiting normal forces flange top: -1299.21 kN ≤ N_o ≤ 1299.21 kN
limiting normal forces flange bottom: -1289.53 kN ≤ N_u ≤ 1289.53 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3409.10 kN ≤ N ≤ 3409.10 kN ⇒ U_N = 0.063
utilization y-moment (centroid): -500.76 kNm ≤ $M_{y,s}$ ≤ 501.57 kNm ⇒ U_{My} = 0.068
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.306
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.336): c/t_{o-o} = 0.131, c/t_{--o} = 0.397
max. utilization: U = 0.397 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 163, group of load spectra 1: standard load spectra
internal forces: N = -293.25 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = -0.095 kNm, M_η = -48.21 kNm, M_ζ = 83.34 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.095 kNm, B = 0.378 kNm²
normal stresses (elast.): σ_{max} = 97.09 MN/m², σ_{min} = -134.40 MN/m²
extr. stresses (elast.): σ = 134.40 MN/m², τ = 1.14 MN/m², σ_v = 134.40 MN/m²
partial member forces flange top: V_o = -5.45 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 40.56 kNm
partial member forces flange bottom: V_u = -4.90 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 42.78 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -293.25 kN, $M_{y,s}$ = -48.21 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006

yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.293, $U_{MS,u}$ = 0.309 ⇒ U_{MS} = 0.309
limiting normal forces flange top: -1293.35 kN ≤ N_o ≤ 1293.35 kN
limiting normal forces flange bottom: -1278.56 kN ≤ N_u ≤ 1278.56 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3392.27 kN ≤ N ≤ 3392.27 kN ⇒ U_N = 0.086
utilization y-moment (centroid): -493.60 kNm ≤ $M_{y,s}$ ≤ 495.29 kNm ⇒ U_{My} = 0.099
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.337
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.266): c/t_{o-o} = 0.153, c/t_{--o} = 0.422
max. utilization: U = 0.422 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 164, group of load spectra 1: standard load spectra
internal forces: N = -341.00 kN, V_η = -10.35 kN, V_ζ = 0.00 kN
internal moments: T = -0.069 kNm, M_η = -56.51 kNm, M_ζ = 84.99 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.069 kNm, B = 0.459 kNm²
normal stresses (elast.): σ_{max} = 99.16 MN/m², σ_{min} = -142.80 MN/m²
extr. stresses (elast.): σ = 142.80 MN/m², τ = 1.12 MN/m², σ_v = 142.80 MN/m²
partial member forces flange top: V_o = -5.38 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 41.15 kNm
partial member forces flange bottom: V_u = -4.97 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 43.85 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -341.00 kN, $M_{y,s}$ = -56.51 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.006
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.297, $U_{MS,u}$ = 0.317 ⇒ U_{MS} = 0.317
limiting normal forces flange top: -1289.46 kN ≤ N_o ≤ 1289.46 kN
limiting normal forces flange bottom: -1271.44 kN ≤ N_u ≤ 1271.44 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3381.27 kN ≤ N ≤ 3381.27 kN ⇒ U_N = 0.101
utilization y-moment (centroid): -488.41 kNm ≤ $M_{y,s}$ ≤ 490.81 kNm ⇒ U_{My} = 0.118
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.359
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.229): c/t_{o-o} = 0.165, c/t_{--o} = 0.437
max. utilization: U = 0.437 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 165, group of load spectra 1: standard load spectra
internal forces: N = -33.82 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -3.55 kNm, M_ζ = -0.68 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.000 kNm, B = -0.032 kNm²
normal stresses (elast.): σ_{max} = 0.14 MN/m², σ_{min} = -4.29 MN/m²
extr. stresses (elast.): σ = 4.29 MN/m², τ = 0.00 MN/m², σ_v = 4.29 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -0.25 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -0.44 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -33.82 kN, $M_{y,s}$ = -3.55 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.002, $U_{MS,u}$ = 0.003 ⇒ U_{MS} = 0.003
limiting normal forces flange top: -1536.81 kN ≤ N_o ≤ 1536.81 kN
limiting normal forces flange bottom: -1535.76 kN ≤ N_u ≤ 1535.76 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3892.94 kN ≤ N ≤ 3892.94 kN ⇒ U_N = 0.009
utilization y-moment (centroid): -587.85 kNm ≤ $M_{y,s}$ ≤ 587.86 kNm ⇒ U_{My} = 0.006
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.015
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 7.127): c/t_{o-o} = 0.052, c/t_{--o} = 0.081
max. utilization: U = 0.081 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 166, group of load spectra 1: standard load spectra
internal forces: N = -81.57 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -10.61 kNm, M_ζ = -1.84 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.000 kNm, B = -0.096 kNm²
normal stresses (elast.): σ_{max} = 1.25 MN/m², σ_{min} = -11.50 MN/m²
extr. stresses (elast.): σ = 11.50 MN/m², τ = 0.00 MN/m², σ_v = 11.50 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -0.64 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -1.20 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -81.57 kN, $M_{y,s}$ = -10.61 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.005, $U_{MS,u}$ = 0.009 ⇒ U_{MS} = 0.009
limiting normal forces flange top: -1534.65 kN ≤ N_o ≤ 1534.65 kN
limiting normal forces flange bottom: -1531.50 kN ≤ N_u ≤ 1531.50 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3886.51 kN ≤ N ≤ 3886.51 kN ⇒ U_N = 0.021
utilization y-moment (centroid): -586.17 kNm ≤ $M_{y,s}$ ≤ 586.27 kNm ⇒ U_{My} = 0.018
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.041

utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 4.355): c/t_{o-o} = 0.081, c/t_{--o} = 0.132
max. utilization: U = 0.132 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 167, group of load spectra 1: standard load spectra
internal forces: N = -159.00 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -24.21 kNm, M_ζ = -4.03 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.000 kNm, B = -0.224 kNm²
normal stresses (elast.): σ_{max} = 4.12 MN/m², σ_{min} = -24.60 MN/m²
extr. stresses (elast.): σ = 24.60 MN/m², τ = 0.00 MN/m², σ_v = 24.60 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -1.36 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -2.67 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -159.00 kN, $M_{y,s}$ = -24.21 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.010, $U_{MS,u}$ = 0.019 ⇒ U_{MS} = 0.019
limiting normal forces flange top: -1530.63 kN ≤ N_o ≤ 1530.63 kN
limiting normal forces flange bottom: -1523.26 kN ≤ N_u ≤ 1523.26 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3874.25 kN ≤ N ≤ 3874.25 kN ⇒ U_N = 0.041
utilization y-moment (centroid): -582.09 kNm ≤ $M_{y,s}$ ≤ 582.55 kNm ⇒ U_{My} = 0.042
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.086
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.980): c/t_{o-o} = 0.112, c/t_{--o} = 0.192
max. utilization: U = 0.192 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 168, group of load spectra 1: standard load spectra
internal forces: N = -206.75 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -31.84 kNm, M_ζ = -5.43 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.000 kNm, B = -0.300 kNm²
normal stresses (elast.): σ_{max} = 5.65 MN/m², σ_{min} = -32.41 MN/m²
extr. stresses (elast.): σ = 32.41 MN/m², τ = 0.00 MN/m², σ_v = 32.41 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -1.83 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -3.60 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -206.75 kN, $M_{y,s}$ = -31.84 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.013, $U_{MS,u}$ = 0.026 ⇒ U_{MS} = 0.026
limiting normal forces flange top: -1527.98 kN ≤ N_o ≤ 1527.98 kN
limiting normal forces flange bottom: -1518.07 kN ≤ N_u ≤ 1518.07 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3866.41 kN ≤ N ≤ 3866.41 kN ⇒ U_N = 0.053
utilization y-moment (centroid): -578.88 kNm ≤ $M_{y,s}$ ≤ 579.68 kNm ⇒ U_{My} = 0.056
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.112
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.596): c/t_{o-o} = 0.128, c/t_{--o} = 0.221
max. utilization: U = 0.221 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 169, group of load spectra 1: standard load spectra
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = -0.017 kNm, M_η = 191.06 kNm, M_ζ = 78.90 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.017 kNm, B = 1.089 kNm²
normal stresses (elast.): σ_{max} = 167.75 MN/m², σ_{min} = -167.88 MN/m²
extr. stresses (elast.): σ = 167.88 MN/m², τ = 7.17 MN/m², σ_v = 167.88 MN/m²
partial member forces flange top: V_o = -5.22 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 36.25 kNm
partial member forces flange bottom: V_u = -5.13 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 42.65 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 191.06 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.262, $U_{MS,u}$ = 0.308 ⇒ U_{MS} = 0.308
limiting normal forces flange top: -1321.54 kN ≤ N_o ≤ 1321.54 kN
limiting normal forces flange bottom: -1279.44 kN ≤ N_u ≤ 1279.44 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3419.90 kN ≤ N ≤ 3419.90 kN ⇒ U_N = 0.040
utilization y-moment (centroid): -504.57 kNm ≤ $M_{y,s}$ ≤ 506.81 kNm ⇒ U_{My} = 0.376
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.483
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.143): c/t_{o-o} = 0.144, c/t_{--o} = 0.485
max. utilization: U = 0.485 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 170, group of load spectra 1: standard load spectra
internal forces: N = -184.17 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.027 kNm, M_η = 185.46 kNm, M_ζ = 80.10 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.027 kNm, B = 1.184 kNm²
normal stresses (elast.): σ_{max} = 164.92 MN/m², σ_{min} = -168.99 MN/m²
extr. stresses (elast.): σ = 168.99 MN/m², τ = 7.17 MN/m², σ_v = 168.99 MN/m²

partial member forces flange top: V_o = -5.10 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 36.57 kNm
partial member forces flange bottom: V_u = -5.25 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 43.53 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -184.17 kN, $M_{y,s}$ = 185.46 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.264, $U_{MS,u}$ = 0.314 ⇒ U_{MS} = 0.314
limiting normal forces flange top: -1319.47 kN ≤ N_o ≤ 1319.47 kN
limiting normal forces flange bottom: -1273.56 kN ≤ N_u ≤ 1273.56 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3411.95 kN ≤ N ≤ 3411.95 kN ⇒ U_N = 0.054
utilization y-moment (centroid): -501.16 kNm ≤ $M_{y,s}$ ≤ 504.46 kNm ⇒ U_{My} = 0.366
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.480
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.138): c/t_{o-o} = 0.152, c/t_{--o} = 0.487
max. utilization: U = 0.487 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 171, group of load spectra 1: standard load spectra
internal forces: N = -261.60 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.114 kNm, M_η = 174.44 kNm, M_ζ = 82.59 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.114 kNm, B = 1.378 kNm²
normal stresses (elast.): σ_{max} = 160.46 MN/m², σ_{min} = -170.39 MN/m²
extr. stresses (elast.): σ = 170.39 MN/m², τ = 7.17 MN/m², σ_v = 170.39 MN/m²
partial member forces flange top: V_o = -4.84 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 37.24 kNm
partial member forces flange bottom: V_u = -5.51 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 45.35 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -261.60 kN, $M_{y,s}$ = 174.44 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.269, $U_{MS,u}$ = 0.328 ⇒ U_{MS} = 0.328
limiting normal forces flange top: -1315.09 kN ≤ N_o ≤ 1315.09 kN
limiting normal forces flange bottom: -1261.32 kN ≤ N_u ≤ 1261.32 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3395.34 kN ≤ N ≤ 3395.34 kN ⇒ U_N = 0.077
utilization y-moment (centroid): -493.79 kNm ≤ $M_{y,s}$ ≤ 499.29 kNm ⇒ U_{My} = 0.346
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.475
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.133): c/t_{o-o} = 0.165, c/t_{--o} = 0.489
max. utilization: U = 0.489 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 172, group of load spectra 1: standard load spectra
internal forces: N = -309.35 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.167 kNm, M_η = 168.34 kNm, M_ζ = 84.21 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.167 kNm, B = 1.500 kNm²
normal stresses (elast.): σ_{max} = 158.11 MN/m², σ_{min} = -171.61 MN/m²
extr. stresses (elast.): σ = 171.61 MN/m², τ = 7.17 MN/m², σ_v = 171.61 MN/m²
partial member forces flange top: V_o = -4.68 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 37.69 kNm
partial member forces flange bottom: V_u = -5.67 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 46.52 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = 168.34 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.272, $U_{MS,u}$ = 0.336 ⇒ U_{MS} = 0.336
limiting normal forces flange top: -1312.16 kN ≤ N_o ≤ 1312.16 kN
limiting normal forces flange bottom: -1253.37 kN ≤ N_u ≤ 1253.37 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3384.45 kN ≤ N ≤ 3384.45 kN ⇒ U_N = 0.091
utilization y-moment (centroid): -488.41 kNm ≤ $M_{y,s}$ ≤ 495.52 kNm ⇒ U_{My} = 0.335
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.475
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.128): c/t_{o-o} = 0.173, c/t_{--o} = 0.491
max. utilization: U = 0.491 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 173, group of load spectra 1: standard load spectra
internal forces: N = -136.42 kN, V_η = -0.00 kN, V_ζ = -24.60 kN
internal moments: T = 0.623 kNm, M_η = -205.80 kNm, M_ζ = -3.37 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.623 kNm, B = -0.153 kNm²
normal stresses (elast.): σ_{max} = 77.80 MN/m², σ_{min} = -94.85 MN/m²
extr. stresses (elast.): σ = 94.85 MN/m², τ = 6.29 MN/m², σ_v = 94.85 MN/m²
partial member forces flange top: V_o = 1.83 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -1.23 kNm
partial member forces flange bottom: V_u = -1.83 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -2.14 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = -205.80 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.009, $U_{MS,u}$ = 0.015 ⇒ U_{MS} = 0.015
limiting normal forces flange top: -1531.31 kN ≤ N_o ≤ 1531.31 kN

limiting normal forces flange bottom: $-1526.27\ kN \le N_u \le 1526.27\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3876.84\ kN \le N \le 3876.84\ kN \Rightarrow U_N = 0.035$
utilization y-moment (centroid): $-583.38\ kNm \le M_{y,s} \le 583.64\ kNm \Rightarrow U_{My} = 0.353$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.366$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.538$): $c/t_{o-o} = 0.148$, $c/t_{--o} = 0.381$
max. utilization: $U = 0.381 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 174, group of load spectra 1: standard load spectra
internal forces: $N = -184.17\ kN$, $V_\eta = -0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = 0.641\ kNm$, $M_\eta = -215.00\ kNm$, $M_\zeta = -4.71\ kNm$
warping torsion: $T_t = -0.000\ kNm$, $T_w = 0.641\ kNm$, $B = -0.213\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 80.01\ MN/m^2$, $\sigma_{min} = -103.11\ MN/m^2$
extr. stresses (elast.): $\sigma = 103.11\ MN/m^2$, $\tau = 6.29\ MN/m^2$, $\sigma_v = 103.11\ MN/m^2$
partial member forces flange top: $V_o = 1.88\ kN$, $M_{xp,o} = -0.00\ kNm$, $M_{Sa,o} = -1.73\ kNm$
partial member forces flange bottom: $V_u = -1.88\ kN$, $M_{xp,u} = -0.00\ kNm$, $M_{Sa,u} = -2.98\ kNm$
partial member forces web: $V_s = -24.60\ kN$, $M_{xp,s} = -0.00\ kNm$
partial member forces main bending (centroid): $N = -184.17\ kN$, $M_{y,s} = -215.00\ kNm$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.012$, $U_{MS,u} = 0.022 \Rightarrow U_{MS} = 0.022$
limiting normal forces flange top: $-1528.56\ kN \le N_o \le 1528.56\ kN$
limiting normal forces flange bottom: $-1521.53\ kN \le N_u \le 1521.53\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3869.34\ kN \le N \le 3869.34\ kN \Rightarrow U_N = 0.048$
utilization y-moment (centroid): $-580.49\ kNm \le M_{y,s} \le 580.99\ kNm \Rightarrow U_{My} = 0.371$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.390$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.474$): $c/t_{o-o} = 0.159$, $c/t_{--o} = 0.397$
max. utilization: $U = 0.397 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 175, group of load spectra 1: standard load spectra
internal forces: $N = -261.60\ kN$, $V_\eta = -0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = 0.676\ kNm$, $M_\eta = -232.53\ kNm$, $M_\zeta = -7.28\ kNm$
warping torsion: $T_t = -0.000\ kNm$, $T_w = 0.676\ kNm$, $B = -0.333\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 84.95\ MN/m^2$, $\sigma_{min} = -118.17\ MN/m^2$
extr. stresses (elast.): $\sigma = 118.17\ MN/m^2$, $\tau = 6.29\ MN/m^2$, $\sigma_v = 118.17\ MN/m^2$
partial member forces flange top: $V_o = 1.99\ kN$, $M_{xp,o} = -0.00\ kNm$, $M_{Sa,o} = -2.66\ kNm$
partial member forces flange bottom: $V_u = -1.99\ kN$, $M_{xp,u} = -0.00\ kNm$, $M_{Sa,u} = -4.62\ kNm$
partial member forces web: $V_s = -24.60\ kN$, $M_{xp,s} = -0.00\ kNm$
partial member forces main bending (centroid): $N = -261.60\ kN$, $M_{y,s} = -232.53\ kNm$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.019$, $U_{MS,u} = 0.033 \Rightarrow U_{MS} = 0.033$
limiting normal forces flange top: $-1523.32\ kN \le N_o \le 1523.32\ kN$
limiting normal forces flange bottom: $-1512.28\ kN \le N_u \le 1512.28\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3854.85\ kN \le N \le 3854.85\ kN \Rightarrow U_N = 0.068$
utilization y-moment (centroid): $-574.33\ kNm \le M_{y,s} \le 575.46\ kNm \Rightarrow U_{My} = 0.405$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.437$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.375$): $c/t_{o-o} = 0.176$, $c/t_{--o} = 0.424$
max. utilization: $U = 0.437 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 176, group of load spectra 1: standard load spectra
internal forces: $N = -309.35\ kN$, $V_\eta = -0.00\ kN$, $V_\zeta = -24.60\ kN$
internal moments: $T = 0.698\ kNm$, $M_\eta = -242.45\ kNm$, $M_\zeta = -8.94\ kNm$
warping torsion: $T_t = -0.000\ kNm$, $T_w = 0.698\ kNm$, $B = -0.405\ kNm^2$
normal stresses (elast.): $\sigma_{max} = 87.73\ MN/m^2$, $\sigma_{min} = -127.16\ MN/m^2$
extr. stresses (elast.): $\sigma = 127.16\ MN/m^2$, $\tau = 6.29\ MN/m^2$, $\sigma_v = 127.16\ MN/m^2$
partial member forces flange top: $V_o = 2.05\ kN$, $M_{xp,o} = -0.00\ kNm$, $M_{Sa,o} = -3.28\ kNm$
partial member forces flange bottom: $V_u = -2.05\ kN$, $M_{xp,u} = -0.00\ kNm$, $M_{Sa,u} = -5.66\ kNm$
partial member forces web: $V_s = -24.60\ kN$, $M_{xp,s} = -0.00\ kNm$
partial member forces main bending (centroid): $N = -309.35\ kN$, $M_{y,s} = -242.45\ kNm$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.024$, $U_{MS,u} = 0.041 \Rightarrow U_{MS} = 0.041$
limiting normal forces flange top: $-1519.85\ kN \le N_o \le 1519.85\ kN$
limiting normal forces flange bottom: $-1506.42\ kN \le N_u \le 1506.42\ kN$
limiting normal forces web: $-819.26\ kN \le N_s \le 819.26\ kN$
utilization normal force: $-3845.53\ kN \le N \le 3845.53\ kN \Rightarrow U_N = 0.080$
utilization y-moment (centroid): $-569.83\ kNm \le M_{y,s} \le 571.46\ kNm \Rightarrow U_{My} = 0.426$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.466$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.325$): $c/t_{o-o} = 0.186$, $c/t_{--o} = 0.440$
max. utilization: $U = 0.466 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 177, group of load spectra 1: standard load spectra

internal forces: $N = -168.07$ kN, $V_\eta = -10.35$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.340$ kNm, $M_\eta = -33.67$ kNm, $M_\zeta = 88.17$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.340$ kNm, $B = 0.627$ kNm²
normal stresses (elast.): $\sigma_{max} = 102.02$ MN/m², $\sigma_{min} = -128.98$ MN/m²
extr. stresses (elast.): $\sigma = 128.98$ MN/m², $\tau = 1.29$ MN/m², $\sigma_v = 128.98$ MN/m²
partial member forces flange top: $V_o = -4.18$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 42.24$ kNm
partial member forces flange bottom: $V_u = -6.17$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 45.93$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -168.07$ kN, $M_{y,s} = -33.67$ kNm
shear utilization: $U_{\tau,o} = 0.005$, $U_{\tau,u} = 0.007$, $U_{\tau,s} = 0.000$ $\Rightarrow$ $U_\tau = 0.007$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.305$, $U_{MS,u} = 0.332$ $\Rightarrow$ $U_{MS} = 0.332$
limiting normal forces flange top: -1282.20 kN $\le N_o \le 1282.20$ kN
limiting normal forces flange bottom: -1257.36 kN $\le N_u \le 1257.36$ kN
limiting normal forces web: -820.36 kN $\le N_s \le 820.36$ kN
utilization normal force: -3359.93 kN $\le N \le 3359.93$ kN $\Rightarrow$ $U_N = 0.050$
utilization y-moment (centroid): -493.73 kNm $\le M_{y,s} \le 495.35$ kNm $\Rightarrow$ $U_{My} = 0.070$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.335$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.291$): $c/t_{o-o} = 0.116$, $c/t_{--o} = 0.408$
max. utilization: $U = 0.408 \le 1$ $\Rightarrow$ **verification meets the requirements**

Load spectrum 178, group of load spectra 1: standard load spectra
internal forces: $N = -215.82$ kN, $V_\eta = -10.35$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.370$ kNm, $M_\eta = -43.65$ kNm, $M_\zeta = 92.22$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.370$ kNm, $B = 0.830$ kNm²
normal stresses (elast.): $\sigma_{max} = 106.71$ MN/m², $\sigma_{min} = -141.68$ MN/m²
extr. stresses (elast.): $\sigma = 141.68$ MN/m², $\tau = 1.30$ MN/m², $\sigma_v = 141.68$ MN/m²
partial member forces flange top: $V_o = -4.09$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 43.67$ kNm
partial member forces flange bottom: $V_u = -6.26$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 48.55$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -215.82$ kN, $M_{y,s} = -43.65$ kNm
shear utilization: $U_{\tau,o} = 0.005$, $U_{\tau,u} = 0.007$, $U_{\tau,s} = 0.000$ $\Rightarrow$ $U_\tau = 0.007$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.315$, $U_{MS,u} = 0.351$ $\Rightarrow$ $U_{MS} = 0.351$
limiting normal forces flange top: -1272.64 kN $\le N_o \le 1272.64$ kN
limiting normal forces flange bottom: -1239.38 kN $\le N_u \le 1239.38$ kN
limiting normal forces web: -820.36 kN $\le N_s \le 820.36$ kN
utilization normal force: -3332.38 kN $\le N \le 3332.38$ kN $\Rightarrow$ $U_N = 0.065$
utilization y-moment (centroid): -486.62 kNm $\le M_{y,s} \le 489.42$ kNm $\Rightarrow$ $U_{My} = 0.092$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.360$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.232$): $c/t_{o-o} = 0.132$, $c/t_{--o} = 0.430$
max. utilization: $U = 0.430 \le 1$ $\Rightarrow$ **verification meets the requirements**

Load spectrum 179, group of load spectra 1: standard load spectra
internal forces: $N = -293.25$ kN, $V_\eta = -10.35$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.428$ kNm, $M_\eta = -62.54$ kNm, $M_\zeta = 100.26$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.428$ kNm, $B = 1.244$ kNm²
normal stresses (elast.): $\sigma_{max} = 116.50$ MN/m², $\sigma_{min} = -165.60$ MN/m²
extr. stresses (elast.): $\sigma = 165.60$ MN/m², $\tau = 1.34$ MN/m², $\sigma_v = 165.60$ MN/m²
partial member forces flange top: $V_o = -3.92$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 46.47$ kNm
partial member forces flange bottom: $V_u = -6.43$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 53.79$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -293.25$ kN, $M_{y,s} = -62.54$ kNm
shear utilization: $U_{\tau,o} = 0.004$, $U_{\tau,u} = 0.007$, $U_{\tau,s} = 0.000$ $\Rightarrow$ $U_\tau = 0.007$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.336$, $U_{MS,u} = 0.389$ $\Rightarrow$ $U_{MS} = 0.389$
limiting normal forces flange top: -1253.71 kN $\le N_o \le 1253.71$ kN
limiting normal forces flange bottom: -1202.76 kN $\le N_u \le 1202.76$ kN
limiting normal forces web: -820.36 kN $\le N_s \le 820.36$ kN
utilization normal force: -3276.83 kN $\le N \le 3276.83$ kN $\Rightarrow$ $U_N = 0.089$
utilization y-moment (centroid): -471.68 kNm $\le M_{y,s} \le 477.50$ kNm $\Rightarrow$ $U_{My} = 0.138$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.415$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.141$): $c/t_{o-o} = 0.154$, $c/t_{--o} = 0.467$
max. utilization: $U = 0.467 \le 1$ $\Rightarrow$ **verification meets the requirements**

Load spectrum 180, group of load spectra 1: standard load spectra
internal forces: $N = -341.00$ kN, $V_\eta = -10.35$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = 0.462$ kNm, $M_\eta = -73.28$ kNm, $M_\zeta = 105.45$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.462$ kNm, $B = 1.497$ kNm²
normal stresses (elast.): $\sigma_{max} = 122.47$ MN/m², $\sigma_{min} = -180.25$ MN/m²
extr. stresses (elast.): $\sigma = 180.25$ MN/m², $\tau = 1.36$ MN/m², $\sigma_v = 180.25$ MN/m²
partial member forces flange top: $V_o = -3.82$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 48.32$ kNm
partial member forces flange bottom: $V_u = -6.53$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 57.13$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm

partial member forces main bending (centroid): N = -341.00 kN, $M_{y,s}$ = -73.28 kNm
shear utilization: $U_{\tau,o}$ = 0.004, $U_{\tau,u}$ = 0.007, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.007
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.349, $U_{MS,u}$ = 0.413 ⇒ U_{MS} = 0.413
limiting normal forces flange top: -1241.03 kN ≤ N_o ≤ 1241.03 kN
limiting normal forces flange bottom: -1178.79 kN ≤ N_u ≤ 1178.79 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3240.19 kN ≤ N ≤ 3240.19 kN ⇒ U_N = 0.105
utilization y-moment (centroid): -461.14 kNm ≤ $M_{y,s}$ ≤ 469.42 kNm ⇒ U_{My} = 0.166
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.451
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 1.094): c/t_{o-o} = 0.166, c/t_{--o} = 0.489
max. utilization: U = 0.489 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 181, group of load spectra 1: standard load spectra
internal forces: N = -33.82 kN, V_η = -0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -4.90 kNm, M_ζ = 0.68 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.000 kNm, B = 0.032 kNm²
normal stresses (elast.): σ_{max} = 0.68 MN/m², σ_{min} = -4.83 MN/m²
extr. stresses (elast.): σ = 4.83 MN/m², τ = 0.00 MN/m², σ_v = 4.83 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.25 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 0.44 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -33.82 kN, $M_{y,s}$ = -4.90 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.002, $U_{MS,u}$ = 0.003 ⇒ U_{MS} = 0.003
limiting normal forces flange top: -1536.81 kN ≤ N_o ≤ 1536.81 kN
limiting normal forces flange bottom: -1535.76 kN ≤ N_u ≤ 1535.76 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3892.93 kN ≤ N ≤ 3892.93 kN ⇒ U_N = 0.009
utilization y-moment (centroid): -587.85 kNm ≤ $M_{y,s}$ ≤ 587.86 kNm ⇒ U_{My} = 0.008
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.017
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 6.730): c/t_{o-o} = 0.052, c/t_{--o} = 0.086
max. utilization: U = 0.086 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 182, group of load spectra 1: standard load spectra
internal forces: N = -81.57 kN, V_η = -0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -14.15 kNm, M_ζ = 1.84 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.000 kNm, B = 0.096 kNm²
normal stresses (elast.): σ_{max} = 2.67 MN/m², σ_{min} = -12.92 MN/m²
extr. stresses (elast.): σ = 12.92 MN/m², τ = 0.00 MN/m², σ_v = 12.92 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 0.64 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 1.20 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -81.57 kN, $M_{y,s}$ = -14.15 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.005, $U_{MS,u}$ = 0.009 ⇒ U_{MS} = 0.009
limiting normal forces flange top: -1534.64 kN ≤ N_o ≤ 1534.64 kN
limiting normal forces flange bottom: -1531.51 kN ≤ N_u ≤ 1531.51 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3886.51 kN ≤ N ≤ 3886.51 kN ⇒ U_N = 0.021
utilization y-moment (centroid): -586.17 kNm ≤ $M_{y,s}$ ≤ 586.27 kNm ⇒ U_{My} = 0.024
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.046
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, ε = 4.118): c/t_{o-o} = 0.081, c/t_{--o} = 0.140
max. utilization: U = 0.140 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 183, group of load spectra 1: standard load spectra
internal forces: N = -159.00 kN, V_η = -0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.000 kNm, M_η = -31.65 kNm, M_ζ = 4.03 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.000 kNm, B = 0.222 kNm²
normal stresses (elast.): σ_{max} = 7.11 MN/m², σ_{min} = -27.57 MN/m²
extr. stresses (elast.): σ = 27.57 MN/m², τ = 0.00 MN/m², σ_v = 27.57 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 1.36 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 2.67 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -159.00 kN, $M_{y,s}$ = -31.65 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.010, $U_{MS,u}$ = 0.019 ⇒ U_{MS} = 0.019
limiting normal forces flange top: -1530.60 kN ≤ N_o ≤ 1530.60 kN
limiting normal forces flange bottom: -1523.29 kN ≤ N_u ≤ 1523.29 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3874.25 kN ≤ N ≤ 3874.25 kN ⇒ U_N = 0.041

utilization y-moment (centroid): -582.09 kNm ≤ $M_{y,s}$ ≤ 582.55 kNm ⇒ U_{My} = 0.055
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.097
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.820): c/t_{o-o} = 0.113, c/t_{--o} = 0.204
max. utilization: U = 0.204 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 184, group of load spectra 1: standard load spectra
internal forces: N = -206.75 kN, V_η = -0.00 kN, V_ζ = 0.00 kN
internal moments: T = 0.001 kNm, M_η = -41.58 kNm, M_ζ = 5.43 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.001 kNm, B = 0.297 kNm²
normal stresses (elast.): σ_{max} = 9.57 MN/m², σ_{min} = -36.29 MN/m²
extr. stresses (elast.): σ = 36.29 MN/m², τ = 0.00 MN/m², σ_v = 36.29 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 1.84 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 3.59 kNm
partial member forces web: V_s = 0.00 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -206.75 kN, $M_{y,s}$ = -41.58 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.013, $U_{MS,u}$ = 0.026 ⇒ U_{MS} = 0.026
limiting normal forces flange top: -1527.93 kN ≤ N_o ≤ 1527.93 kN
limiting normal forces flange bottom: -1518.12 kN ≤ N_u ≤ 1518.12 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3866.42 kN ≤ N ≤ 3866.42 kN ⇒ U_N = 0.053
utilization y-moment (centroid): -578.88 kNm ≤ $M_{y,s}$ ≤ 579.68 kNm ⇒ U_{My} = 0.072
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.127
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.458): c/t_{o-o} = 0.129, c/t_{--o} = 0.234
max. utilization: U = 0.234 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 185, group of load spectra 1: standard load spectra
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 1.908 kNm, M_η = 184.74 kNm, M_ζ = 85.67 kNm
warping torsion: T_t = 0.000 kNm, T_w = 1.908 kNm, B = 1.516 kNm²
normal stresses (elast.): σ_{max} = 175.96 MN/m², σ_{min} = -170.28 MN/m²
extr. stresses (elast.): σ = 175.96 MN/m², τ = 7.17 MN/m², σ_v = 175.96 MN/m²
partial member forces flange top: V_o = 0.44 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 38.38 kNm
partial member forces flange bottom: V_u = -10.79 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 47.30 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 184.74 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.012, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.277, $U_{MS,u}$ = 0.342 ⇒ U_{MS} = 0.342
limiting normal forces flange top: -1307.72 kN ≤ N_o ≤ 1307.72 kN
limiting normal forces flange bottom: -1247.95 kN ≤ N_u ≤ 1247.95 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3374.59 kN ≤ N ≤ 3374.59 kN ⇒ U_N = 0.040
utilization y-moment (centroid): -496.22 kNm ≤ $M_{y,s}$ ≤ 499.40 kNm ⇒ U_{My} = 0.368
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.488
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.134): c/t_{o-o} = 0.143, c/t_{--o} = 0.487
max. utilization: U = 0.488 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 186, group of load spectra 1: standard load spectra
internal forces: N = -184.17 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 2.001 kNm, M_η = 176.85 kNm, M_ζ = 89.58 kNm
warping torsion: T_t = 0.000 kNm, T_w = 2.001 kNm, B = 1.782 kNm²
normal stresses (elast.): σ_{max} = 176.52 MN/m², σ_{min} = -172.45 MN/m²
extr. stresses (elast.): σ = 176.52 MN/m², τ = 7.17 MN/m², σ_v = 176.52 MN/m²
partial member forces flange top: V_o = 0.71 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 39.55 kNm
partial member forces flange bottom: V_u = -11.06 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 50.03 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -184.17 kN, $M_{y,s}$ = 176.85 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.012, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.286, $U_{MS,u}$ = 0.361 ⇒ U_{MS} = 0.361
limiting normal forces flange top: -1300.03 kN ≤ N_o ≤ 1300.03 kN
limiting normal forces flange bottom: -1229.07 kN ≤ N_u ≤ 1229.07 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3348.03 kN ≤ N ≤ 3348.03 kN ⇒ U_N = 0.055
utilization y-moment (centroid): -489.10 kNm ≤ $M_{y,s}$ ≤ 494.21 kNm ⇒ U_{My} = 0.355
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.488
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.126): c/t_{o-o} = 0.150, c/t_{--o} = 0.490
max. utilization: U = 0.490 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 187, group of load spectra 1: standard load spectra
internal forces: N = -261.60 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 2.186 kNm, M_η = 161.77 kNm, M_ζ = 97.33 kNm
warping torsion: T_t = 0.000 kNm, T_w = 2.186 kNm, B = 2.323 kNm²

normal stresses (elast.): σ_{max} = 178.88 MN/m², σ_{min} = -175.94 MN/m²
extr. stresses (elast.): σ = 178.88 MN/m², τ = 7.17 MN/m², σ_v = 178.88 MN/m²
partial member forces flange top: V_o = 1.26 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 41.83 kNm
partial member forces flange bottom: V_u = -11.60 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 55.49 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -261.60 kN, $M_{y,s}$ = 161.77 kNm
shear utilization: $U_{\tau,o}$ = 0.001, $U_{\tau,u}$ = 0.013, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.302, $U_{MS,u}$ = 0.401 ⇒ U_{MS} = 0.401
limiting normal forces flange top: -1284.93 kN ≤ N_o ≤ 1284.93 kN
limiting normal forces flange bottom: -1190.48 kN ≤ N_u ≤ 1190.48 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3294.33 kN ≤ N ≤ 3294.33 kN ⇒ U_N = 0.079
utilization y-moment (centroid): -473.95 kNm ≤ $M_{y,s}$ ≤ 483.60 kNm ⇒ U_{My} = 0.328
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.488
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.113): c/t_{o-o} = 0.162, c/t_{--o} = 0.494
max. utilization: U = 0.494 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 188, group of load spectra 1: standard load spectra
internal forces: N = -309.35 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 2.303 kNm, M_η = 153.26 kNm, M_ζ = 102.34 kNm
warping torsion: T_t = 0.000 kNm, T_w = 2.303 kNm, B = 2.658 kNm²
normal stresses (elast.): σ_{max} = 180.94 MN/m², σ_{min} = -178.66 MN/m²
extr. stresses (elast.): σ = 180.94 MN/m², τ = 7.17 MN/m², σ_v = 180.94 MN/m²
partial member forces flange top: V_o = 1.60 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 43.35 kNm
partial member forces flange bottom: V_u = -11.95 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 58.99 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = 153.26 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.013, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.313, $U_{MS,u}$ = 0.426 ⇒ U_{MS} = 0.426
limiting normal forces flange top: -1274.79 kN ≤ N_o ≤ 1274.79 kN
limiting normal forces flange bottom: -1165.12 kN ≤ N_u ≤ 1165.12 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3258.83 kN ≤ N ≤ 3258.83 kN ⇒ U_N = 0.095
utilization y-moment (centroid): -463.15 kNm ≤ $M_{y,s}$ ≤ 476.40 kNm ⇒ U_{My} = 0.312
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.493
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.104): c/t_{o-o} = 0.170, c/t_{--o} = 0.498
max. utilization: U = 0.498 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 189, group of load spectra 1: standard load spectra
internal forces: N = -136.42 kN, V_η = -0.00 kN, V_ζ = -24.60 kN
internal moments: T = -0.622 kNm, M_η = -212.11 kNm, M_ζ = 3.37 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.622 kNm, B = 0.152 kNm²
normal stresses (elast.): σ_{max} = 80.34 MN/m², σ_{min} = -97.37 MN/m²
extr. stresses (elast.): σ = 97.37 MN/m², τ = 6.29 MN/m², σ_v = 97.37 MN/m²
partial member forces flange top: V_o = -1.83 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 1.24 kNm
partial member forces flange bottom: V_u = 1.83 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 2.13 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = -212.11 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.009, $U_{MS,u}$ = 0.015 ⇒ U_{MS} = 0.015
limiting normal forces flange top: -1531.29 kN ≤ N_o ≤ 1531.29 kN
limiting normal forces flange bottom: -1526.28 kN ≤ N_u ≤ 1526.28 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3876.82 kN ≤ N ≤ 3876.82 kN ⇒ U_N = 0.035
utilization y-moment (centroid): -583.37 kNm ≤ $M_{y,s}$ ≤ 583.64 kNm ⇒ U_{My} = 0.364
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.376
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.518): c/t_{o-o} = 0.149, c/t_{--o} = 0.386
max. utilization: U = 0.386 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 190, group of load spectra 1: standard load spectra
internal forces: N = -184.17 kN, V_η = -0.00 kN, V_ζ = -24.60 kN
internal moments: T = -0.640 kNm, M_η = -223.59 kNm, M_ζ = 4.71 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.640 kNm, B = 0.211 kNm²
normal stresses (elast.): σ_{max} = 83.47 MN/m², σ_{min} = -106.54 MN/m²
extr. stresses (elast.): σ = 106.54 MN/m², τ = 6.29 MN/m², σ_v = 106.54 MN/m²
partial member forces flange top: V_o = -1.88 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 1.73 kNm
partial member forces flange bottom: V_u = 1.88 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 2.98 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -184.17 kN, $M_{y,s}$ = -223.59 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.052 ⇒ U_τ = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999

flange bending utilization M_{Sa}: $U_{MS,o} = 0.013$, $U_{MS,u} = 0.021 \Rightarrow U_{MS} = 0.021$
limiting normal forces flange top: $-1528.51 \text{ kN} \le N_o \le 1528.51 \text{ kN}$
limiting normal forces flange bottom: $-1521.55 \text{ kN} \le N_u \le 1521.55 \text{ kN}$
limiting normal forces web: $-819.26 \text{ kN} \le N_s \le 819.26 \text{ kN}$
utilization normal force: $-3869.32 \text{ kN} \le N \le 3869.32 \text{ kN} \Rightarrow U_N = 0.048$
utilization y-moment (centroid): $-580.48 \text{ kNm} \le M_{y,s} \le 580.99 \text{ kNm} \Rightarrow U_{My} = 0.385$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.404$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.450$): $c/t_{o-o} = 0.160$, $c/t_{--o} = 0.403$
max. utilization: $U = 0.404 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 191, group of load spectra 1: standard load spectra
internal forces: $N = -261.60 \text{ kN}$, $V_\eta = -0.00 \text{ kN}$, $V_\zeta = -24.60 \text{ kN}$
internal moments: $T = -0.674 \text{ kNm}$, $M_\eta = -245.17 \text{ kNm}$, $M_\zeta = 7.29 \text{ kNm}$
warping torsion: $T_t = 0.000 \text{ kNm}$, $T_w = -0.674 \text{ kNm}$, $B = 0.328 \text{ kNm}^2$
normal stresses (elast.): $\sigma_{max} = 90.05 \text{ MN/m}^2$, $\sigma_{min} = -123.21 \text{ MN/m}^2$
extr. stresses (elast.): $\sigma = 123.21 \text{ MN/m}^2$, $\tau = 6.29 \text{ MN/m}^2$, $\sigma_v = 123.21 \text{ MN/m}^2$
partial member forces flange top: $V_o = -1.98 \text{ kN}$, $M_{xp,o} = 0.00 \text{ kNm}$, $M_{Sa,o} = 2.68 \text{ kNm}$
partial member forces flange bottom: $V_u = 1.98 \text{ kN}$, $M_{xp,u} = 0.00 \text{ kNm}$, $M_{Sa,u} = 4.61 \text{ kNm}$
partial member forces web: $V_s = -24.60 \text{ kN}$, $M_{xp,s} = 0.00 \text{ kNm}$
partial member forces main bending (centroid): $N = -261.60 \text{ kN}$, $M_{y,s} = -245.17 \text{ kNm}$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.019$, $U_{MS,u} = 0.033 \Rightarrow U_{MS} = 0.033$
limiting normal forces flange top: $-1523.23 \text{ kN} \le N_o \le 1523.23 \text{ kN}$
limiting normal forces flange bottom: $-1512.35 \text{ kN} \le N_u \le 1512.35 \text{ kN}$
limiting normal forces web: $-819.26 \text{ kN} \le N_s \le 819.26 \text{ kN}$
utilization normal force: $-3854.84 \text{ kN} \le N \le 3854.84 \text{ kN} \Rightarrow U_N = 0.068$
utilization y-moment (centroid): $-574.34 \text{ kNm} \le M_{y,s} \le 575.45 \text{ kNm} \Rightarrow U_{My} = 0.427$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.457$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.347$): $c/t_{o-o} = 0.178$, $c/t_{--o} = 0.433$
max. utilization: $U = 0.457 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 192, group of load spectra 1: standard load spectra
internal forces: $N = -309.35 \text{ kN}$, $V_\eta = -0.00 \text{ kN}$, $V_\zeta = -24.60 \text{ kN}$
internal moments: $T = -0.695 \text{ kNm}$, $M_\eta = -257.50 \text{ kNm}$, $M_\zeta = 8.94 \text{ kNm}$
warping torsion: $T_t = 0.000 \text{ kNm}$, $T_w = -0.695 \text{ kNm}$, $B = 0.397 \text{ kNm}^2$
normal stresses (elast.): $\sigma_{max} = 93.81 \text{ MN/m}^2$, $\sigma_{min} = -133.14 \text{ MN/m}^2$
extr. stresses (elast.): $\sigma = 133.14 \text{ MN/m}^2$, $\tau = 6.29 \text{ MN/m}^2$, $\sigma_v = 133.14 \text{ MN/m}^2$
partial member forces flange top: $V_o = -2.05 \text{ kN}$, $M_{xp,o} = 0.00 \text{ kNm}$, $M_{Sa,o} = 3.30 \text{ kNm}$
partial member forces flange bottom: $V_u = 2.04 \text{ kN}$, $M_{xp,u} = 0.00 \text{ kNm}$, $M_{Sa,u} = 5.64 \text{ kNm}$
partial member forces web: $V_s = -24.60 \text{ kN}$, $M_{xp,s} = 0.00 \text{ kNm}$
partial member forces main bending (centroid): $N = -309.35 \text{ kN}$, $M_{y,s} = -257.50 \text{ kNm}$
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052 \Rightarrow U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.024$, $U_{MS,u} = 0.041 \Rightarrow U_{MS} = 0.041$
limiting normal forces flange top: $-1519.74 \text{ kN} \le N_o \le 1519.74 \text{ kN}$
limiting normal forces flange bottom: $-1506.53 \text{ kN} \le N_u \le 1506.53 \text{ kN}$
limiting normal forces web: $-819.26 \text{ kN} \le N_s \le 819.26 \text{ kN}$
utilization normal force: $-3845.53 \text{ kN} \le N \le 3845.53 \text{ kN} \Rightarrow U_N = 0.080$
utilization y-moment (centroid): $-569.85 \text{ kNm} \le M_{y,s} \le 571.44 \text{ kNm} \Rightarrow U_{My} = 0.453$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.490$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.295$): $c/t_{o-o} = 0.188$, $c/t_{--o} = 0.450$
max. utilization: $U = 0.490 \le 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 193, group of load spectra 1: standard load spectra
internal forces: $N = -168.07 \text{ kN}$, $V_\eta = -10.35 \text{ kN}$, $V_\zeta = 0.00 \text{ kN}$
internal moments: $T = -0.163 \text{ kNm}$, $M_\eta = -25.77 \text{ kNm}$, $M_\zeta = 79.58 \text{ kNm}$
warping torsion: $T_t = 0.000 \text{ kNm}$, $T_w = -0.163 \text{ kNm}$, $B = 0.187 \text{ kNm}^2$
normal stresses (elast.): $\sigma_{max} = 91.91 \text{ MN/m}^2$, $\sigma_{min} = -112.89 \text{ MN/m}^2$
extr. stresses (elast.): $\sigma = 112.89 \text{ MN/m}^2$, $\tau = 1.18 \text{ MN/m}^2$, $\sigma_v = 112.89 \text{ MN/m}^2$
partial member forces flange top: $V_o = -5.66 \text{ kN}$, $M_{xp,o} = 0.00 \text{ kNm}$, $M_{Sa,o} = 39.24 \text{ kNm}$
partial member forces flange bottom: $V_u = -4.69 \text{ kN}$, $M_{xp,u} = 0.00 \text{ kNm}$, $M_{Sa,u} = 40.34 \text{ kNm}$
partial member forces web: $V_s = 0.00 \text{ kN}$, $M_{xp,s} = 0.00 \text{ kNm}$
partial member forces main bending (centroid): $N = -168.07 \text{ kN}$, $M_{y,s} = -25.77 \text{ kNm}$
shear utilization: $U_{\tau,o} = 0.006$, $U_{\tau,u} = 0.005$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.006$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.283$, $U_{MS,u} = 0.291 \Rightarrow U_{MS} = 0.291$
limiting normal forces flange top: $-1302.03 \text{ kN} \le N_o \le 1302.03 \text{ kN}$
limiting normal forces flange bottom: $-1294.79 \text{ kN} \le N_u \le 1294.79 \text{ kN}$
limiting normal forces web: $-820.36 \text{ kN} \le N_s \le 820.36 \text{ kN}$
utilization normal force: $-3417.19 \text{ kN} \le N \le 3417.19 \text{ kN} \Rightarrow U_N = 0.049$
utilization y-moment (centroid): $-504.09 \text{ kNm} \le M_{y,s} \le 504.57 \text{ kNm} \Rightarrow U_{My} = 0.052$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.294$
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, $\varepsilon = 1.379$): $c/t_{o-o} = 0.116$, $c/t_{--o} = 0.382$

max. utilization: $U = 0.382 \leq 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 194, group of load spectra 1: standard load spectra
internal forces: $N = -215.82$ kN, $V_\eta = -10.35$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = -0.140$ kNm, $M_\eta = -33.44$ kNm, $M_\zeta = 80.81$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = -0.140$ kNm, $B = 0.250$ kNm²
normal stresses (elast.): $\sigma_{max} = 93.36$ MN/m², $\sigma_{min} = -120.42$ MN/m²
extr. stresses (elast.): $\sigma = 120.42$ MN/m², $\tau = 1.16$ MN/m², $\sigma_v = 120.42$ MN/m²
partial member forces flange top: $V_o = -5.59$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 39.67$ kNm
partial member forces flange bottom: $V_u = -4.76$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 41.14$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -215.82$ kN, $M_{y,s} = -33.44$ kNm
shear utilization: $U_{\tau,o} = 0.006$, $U_{\tau,u} = 0.005$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.006$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.287$, $U_{MS,u} = 0.297 \Rightarrow U_{MS} = 0.297$
limiting normal forces flange top: -1299.21 kN $\leq N_o \leq 1299.21$ kN
limiting normal forces flange bottom: -1289.53 kN $\leq N_u \leq 1289.53$ kN
limiting normal forces web: -820.36 kN $\leq N_s \leq 820.36$ kN
utilization normal force: -3409.10 kN $\leq N \leq 3409.10$ kN $\Rightarrow U_N = 0.063$
utilization y-moment (centroid): -500.76 kNm $\leq M_{y,s} \leq 501.57$ kNm $\Rightarrow U_{My} = 0.068$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.306$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.336$): $c/t_{o-o} = 0.131$, $c/t_{--o} = 0.397$
max. utilization: $U = 0.397 \leq 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 195, group of load spectra 1: standard load spectra
internal forces: $N = -293.25$ kN, $V_\eta = -10.35$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = -0.095$ kNm, $M_\eta = -48.21$ kNm, $M_\zeta = 83.34$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = -0.095$ kNm, $B = 0.378$ kNm²
normal stresses (elast.): $\sigma_{max} = 97.09$ MN/m², $\sigma_{min} = -134.40$ MN/m²
extr. stresses (elast.): $\sigma = 134.40$ MN/m², $\tau = 1.14$ MN/m², $\sigma_v = 134.40$ MN/m²
partial member forces flange top: $V_o = -5.45$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 40.56$ kNm
partial member forces flange bottom: $V_u = -4.90$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 42.78$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -293.25$ kN, $M_{y,s} = -48.21$ kNm
shear utilization: $U_{\tau,o} = 0.006$, $U_{\tau,u} = 0.006$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.006$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.293$, $U_{MS,u} = 0.309 \Rightarrow U_{MS} = 0.309$
limiting normal forces flange top: -1293.35 kN $\leq N_o \leq 1293.35$ kN
limiting normal forces flange bottom: -1278.56 kN $\leq N_u \leq 1278.56$ kN
limiting normal forces web: -820.36 kN $\leq N_s \leq 820.36$ kN
utilization normal force: -3392.27 kN $\leq N \leq 3392.27$ kN $\Rightarrow U_N = 0.086$
utilization y-moment (centroid): -493.60 kNm $\leq M_{y,s} \leq 495.29$ kNm $\Rightarrow U_{My} = 0.099$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.337$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.266$): $c/t_{o-o} = 0.153$, $c/t_{--o} = 0.422$
max. utilization: $U = 0.422 \leq 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 196, group of load spectra 1: standard load spectra
internal forces: $N = -341.00$ kN, $V_\eta = -10.35$ kN, $V_\zeta = 0.00$ kN
internal moments: $T = -0.069$ kNm, $M_\eta = -56.51$ kNm, $M_\zeta = 84.99$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = -0.069$ kNm, $B = 0.459$ kNm²
normal stresses (elast.): $\sigma_{max} = 99.16$ MN/m², $\sigma_{min} = -142.80$ MN/m²
extr. stresses (elast.): $\sigma = 142.80$ MN/m², $\tau = 1.12$ MN/m², $\sigma_v = 142.80$ MN/m²
partial member forces flange top: $V_o = -5.38$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 41.15$ kNm
partial member forces flange bottom: $V_u = -4.97$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 43.85$ kNm
partial member forces web: $V_s = 0.00$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -341.00$ kN, $M_{y,s} = -56.51$ kNm
shear utilization: $U_{\tau,o} = 0.006$, $U_{\tau,u} = 0.006$, $U_{\tau,s} = 0.000 \Rightarrow U_\tau = 0.006$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 1.000$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.297$, $U_{MS,u} = 0.317 \Rightarrow U_{MS} = 0.317$
limiting normal forces flange top: -1289.46 kN $\leq N_o \leq 1289.46$ kN
limiting normal forces flange bottom: -1271.44 kN $\leq N_u \leq 1271.44$ kN
limiting normal forces web: -820.36 kN $\leq N_s \leq 820.36$ kN
utilization normal force: -3381.27 kN $\leq N \leq 3381.27$ kN $\Rightarrow U_N = 0.101$
utilization y-moment (centroid): -488.41 kNm $\leq M_{y,s} \leq 490.81$ kNm $\Rightarrow U_{My} = 0.118$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.359$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.229$): $c/t_{o-o} = 0.165$, $c/t_{--o} = 0.437$
max. utilization: $U = 0.437 \leq 1 \Rightarrow$ **verification meets the requirements**

Load spectrum 197, group of load spectra 1: standard load spectra
internal forces: $N = -33.82$ kN, $V_\eta = 0.00$ kN, $V_\zeta = -0.00$ kN
internal moments: $T = 0.000$ kNm, $M_\eta = -3.55$ kNm, $M_\zeta = -0.68$ kNm
warping torsion: $T_t = -0.000$ kNm, $T_w = 0.000$ kNm, $B = -0.032$ kNm²
normal stresses (elast.): $\sigma_{max} = 0.14$ MN/m², $\sigma_{min} = -4.29$ MN/m²
extr. stresses (elast.): $\sigma = 4.29$ MN/m², $\tau = 0.00$ MN/m², $\sigma_v = 4.29$ MN/m²
partial member forces flange top: $V_o = 0.00$ kN, $M_{xp,o} = -0.00$ kNm, $M_{Sa,o} = -0.25$ kNm

partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -0.44 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -33.82 kN, $M_{y,s}$ = -3.55 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.002, $U_{MS,u}$ = 0.003 ⇒ U_{MS} = 0.003
limiting normal forces flange top: -1536.81 kN ≤ N_o ≤ 1536.81 kN
limiting normal forces flange bottom: -1535.76 kN ≤ N_u ≤ 1535.76 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3892.94 kN ≤ N ≤ 3892.94 kN ⇒ U_N = 0.009
utilization y-moment (centroid): -587.85 kNm ≤ $M_{y,s}$ ≤ 587.86 kNm ⇒ U_{My} = 0.006
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.015
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 7.127): c/t_{o-o} = 0.052, c/t_{--o} = 0.081
max. utilization: U = 0.081 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 198, group of load spectra 1: standard load spectra
internal forces: N = -81.57 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -10.61 kNm, M_ζ = -1.84 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.000 kNm, B = -0.096 kNm²
normal stresses (elast.): σ_{max} = 1.25 MN/m², σ_{min} = -11.50 MN/m²
extr. stresses (elast.): σ = 11.50 MN/m², τ = 0.00 MN/m², σ_v = 11.50 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -0.64 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -1.20 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -81.57 kN, $M_{y,s}$ = -10.61 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.005, $U_{MS,u}$ = 0.009 ⇒ U_{MS} = 0.009
limiting normal forces flange top: -1534.65 kN ≤ N_o ≤ 1534.65 kN
limiting normal forces flange bottom: -1531.50 kN ≤ N_u ≤ 1531.50 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3886.51 kN ≤ N ≤ 3886.51 kN ⇒ U_N = 0.021
utilization y-moment (centroid): -586.17 kNm ≤ $M_{y,s}$ ≤ 586.27 kNm ⇒ U_{My} = 0.018
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.041
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 4.355): c/t_{o-o} = 0.081, c/t_{--o} = 0.132
max. utilization: U = 0.132 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 199, group of load spectra 1: standard load spectra
internal forces: N = -159.00 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -24.21 kNm, M_ζ = -4.03 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.000 kNm, B = -0.224 kNm²
normal stresses (elast.): σ_{max} = 4.12 MN/m², σ_{min} = -24.60 MN/m²
extr. stresses (elast.): σ = 24.60 MN/m², τ = 0.00 MN/m², σ_v = 24.60 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -1.36 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -2.67 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -159.00 kN, $M_{y,s}$ = -24.21 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.010, $U_{MS,u}$ = 0.019 ⇒ U_{MS} = 0.019
limiting normal forces flange top: -1530.63 kN ≤ N_o ≤ 1530.63 kN
limiting normal forces flange bottom: -1523.26 kN ≤ N_u ≤ 1523.26 kN
limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3874.25 kN ≤ N ≤ 3874.25 kN ⇒ U_N = 0.041
utilization y-moment (centroid): -582.09 kNm ≤ $M_{y,s}$ ≤ 582.55 kNm ⇒ U_{My} = 0.042
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.086
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.980): c/t_{o-o} = 0.112, c/t_{--o} = 0.192
max. utilization: U = 0.192 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 200, group of load spectra 1: standard load spectra
internal forces: N = -206.75 kN, V_η = 0.00 kN, V_ζ = -0.00 kN
internal moments: T = 0.000 kNm, M_η = -31.84 kNm, M_ζ = -5.43 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.000 kNm, B = -0.300 kNm²
normal stresses (elast.): σ_{max} = 5.65 MN/m², σ_{min} = -32.41 MN/m²
extr. stresses (elast.): σ = 32.41 MN/m², τ = 0.00 MN/m², σ_v = 32.41 MN/m²
partial member forces flange top: V_o = 0.00 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -1.83 kNm
partial member forces flange bottom: V_u = -0.00 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -3.60 kNm
partial member forces web: V_s = -0.00 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -206.75 kN, $M_{y,s}$ = -31.84 kNm
shear utilization: $U_{\tau,o}$ = 0.000, $U_{\tau,u}$ = 0.000, $U_{\tau,s}$ = 0.000 ⇒ U_τ = 0.000
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 1.000
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.013, $U_{MS,u}$ = 0.026 ⇒ U_{MS} = 0.026
limiting normal forces flange top: -1527.98 kN ≤ N_o ≤ 1527.98 kN
limiting normal forces flange bottom: -1518.07 kN ≤ N_u ≤ 1518.07 kN

limiting normal forces web: -820.36 kN ≤ N_s ≤ 820.36 kN
utilization normal force: -3866.41 kN ≤ N ≤ 3866.41 kN ⇒ U_N = 0.053
utilization y-moment (centroid): -578.88 kNm ≤ $M_{y,s}$ ≤ 579.68 kNm ⇒ U_{My} = 0.056
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.112
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 2.596): c/t_{o-o} = 0.128, c/t_{--o} = 0.221
max. utilization: U = 0.221 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 201, group of load spectra 1: standard load spectra
internal forces: N = -136.42 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = -0.017 kNm, M_η = 191.06 kNm, M_ζ = 78.90 kNm
warping torsion: T_t = 0.000 kNm, T_w = -0.017 kNm, B = 1.089 kNm²
normal stresses (elast.): σ_{max} = 167.75 MN/m², σ_{min} = -167.88 MN/m²
extr. stresses (elast.): σ = 167.88 MN/m², τ = 7.17 MN/m², σ_v = 167.88 MN/m²
partial member forces flange top: V_o = -5.22 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 36.25 kNm
partial member forces flange bottom: V_u = -5.13 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 42.65 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -136.42 kN, $M_{y,s}$ = 191.06 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.262, $U_{MS,u}$ = 0.308 ⇒ U_{MS} = 0.308
limiting normal forces flange top: -1321.54 kN ≤ N_o ≤ 1321.54 kN
limiting normal forces flange bottom: -1279.44 kN ≤ N_u ≤ 1279.44 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3419.90 kN ≤ N ≤ 3419.90 kN ⇒ U_N = 0.040
utilization y-moment (centroid): -504.57 kNm ≤ $M_{y,s}$ ≤ 506.81 kNm ⇒ U_{My} = 0.376
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.483
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.143): c/t_{o-o} = 0.144, c/t_{--o} = 0.485
max. utilization: U = 0.485 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 202, group of load spectra 1: standard load spectra
internal forces: N = -184.17 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.027 kNm, M_η = 185.46 kNm, M_ζ = 80.10 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.027 kNm, B = 1.184 kNm²
normal stresses (elast.): σ_{max} = 164.92 MN/m², σ_{min} = -168.99 MN/m²
extr. stresses (elast.): σ = 168.99 MN/m², τ = 7.17 MN/m², σ_v = 168.99 MN/m²
partial member forces flange top: V_o = -5.10 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 36.57 kNm
partial member forces flange bottom: V_u = -5.25 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 43.53 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -184.17 kN, $M_{y,s}$ = 185.46 kNm
shear utilization: $U_{\tau,o}$ = 0.006, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.264, $U_{MS,u}$ = 0.314 ⇒ U_{MS} = 0.314
limiting normal forces flange top: -1319.47 kN ≤ N_o ≤ 1319.47 kN
limiting normal forces flange bottom: -1273.56 kN ≤ N_u ≤ 1273.56 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3411.95 kN ≤ N ≤ 3411.95 kN ⇒ U_N = 0.054
utilization y-moment (centroid): -501.16 kNm ≤ $M_{y,s}$ ≤ 504.46 kNm ⇒ U_{My} = 0.366
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.480
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.138): c/t_{o-o} = 0.152, c/t_{--o} = 0.487
max. utilization: U = 0.487 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 203, group of load spectra 1: standard load spectra
internal forces: N = -261.60 kN, V_η = -10.35 kN, V_ζ = 28.05 kN
internal moments: T = 0.114 kNm, M_η = 174.44 kNm, M_ζ = 82.59 kNm
warping torsion: T_t = 0.000 kNm, T_w = 0.114 kNm, B = 1.378 kNm²
normal stresses (elast.): σ_{max} = 160.46 MN/m², σ_{min} = -170.39 MN/m²
extr. stresses (elast.): σ = 170.39 MN/m², τ = 7.17 MN/m², σ_v = 170.39 MN/m²
partial member forces flange top: V_o = -4.84 kN, $M_{xp,o}$ = 0.00 kNm, $M_{Sa,o}$ = 37.24 kNm
partial member forces flange bottom: V_u = -5.51 kN, $M_{xp,u}$ = 0.00 kNm, $M_{Sa,u}$ = 45.35 kNm
partial member forces web: V_s = 28.05 kN, $M_{xp,s}$ = 0.00 kNm
partial member forces main bending (centroid): N = -261.60 kN, $M_{y,s}$ = 174.44 kNm
shear utilization: $U_{\tau,o}$ = 0.005, $U_{\tau,u}$ = 0.006, $U_{\tau,s}$ = 0.059 ⇒ U_τ = 0.059
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.998
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.269, $U_{MS,u}$ = 0.328 ⇒ U_{MS} = 0.328
limiting normal forces flange top: -1315.09 kN ≤ N_o ≤ 1315.09 kN
limiting normal forces flange bottom: -1261.32 kN ≤ N_u ≤ 1261.32 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3395.34 kN ≤ N ≤ 3395.34 kN ⇒ U_N = 0.077
utilization y-moment (centroid): -493.79 kNm ≤ $M_{y,s}$ ≤ 499.29 kNm ⇒ U_{My} = 0.346
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.475
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.133): c/t_{o-o} = 0.165, c/t_{--o} = 0.489
max. utilization: U = 0.489 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 204, group of load spectra 1: standard load spectra
internal forces: N = -309.35 kN, V_η = -10.35 kN, V_ζ = 28.05 kN

internal moments: $T = 0.167$ kNm, $M_\eta = 168.34$ kNm, $M_\zeta = 84.21$ kNm
warping torsion: $T_t = 0.000$ kNm, $T_w = 0.167$ kNm, $B = 1.500$ kNm²
normal stresses (elast.): $\sigma_{max} = 158.11$ MN/m², $\sigma_{min} = -171.61$ MN/m²
extr. stresses (elast.): $\sigma = 171.61$ MN/m², $\tau = 7.17$ MN/m², $\sigma_v = 171.61$ MN/m²
partial member forces flange top: $V_o = -4.68$ kN, $M_{xp,o} = 0.00$ kNm, $M_{Sa,o} = 37.69$ kNm
partial member forces flange bottom: $V_u = -5.67$ kN, $M_{xp,u} = 0.00$ kNm, $M_{Sa,u} = 46.52$ kNm
partial member forces web: $V_s = 28.05$ kN, $M_{xp,s} = 0.00$ kNm
partial member forces main bending (centroid): $N = -309.35$ kN, $M_{y,s} = 168.34$ kNm
shear utilization: $U_{\tau,o} = 0.005$, $U_{\tau,u} = 0.006$, $U_{\tau,s} = 0.059$ ⇒ $U_\tau = 0.059$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.998$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.272$, $U_{MS,u} = 0.336$ ⇒ $U_{MS} = 0.336$
limiting normal forces flange top: -1312.16 kN ≤ N_o ≤ 1312.16 kN
limiting normal forces flange bottom: -1253.37 kN ≤ N_u ≤ 1253.37 kN
limiting normal forces web: -818.92 kN ≤ N_s ≤ 818.92 kN
utilization normal force: -3384.45 kN ≤ N ≤ 3384.45 kN ⇒ $U_N = 0.091$
utilization y-moment (centroid): -488.41 kNm ≤ $M_{y,s}$ ≤ 495.52 kNm ⇒ $U_{My} = 0.335$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.475$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.128$): $c/t_{o-o} = 0.173$, $c/t_{--o} = 0.491$
max. utilization: $U = 0.491$ ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 205, group of load spectra 1: standard load spectra
internal forces: $N = -136.42$ kN, $V_\eta = -0.00$ kN, $V_\zeta = -24.60$ kN
internal moments: $T = 0.623$ kNm, $M_\eta = -205.80$ kNm, $M_\zeta = -3.37$ kNm
warping torsion: $T_t = -0.000$ kNm, $T_w = 0.623$ kNm, $B = -0.153$ kNm²
normal stresses (elast.): $\sigma_{max} = 77.80$ MN/m², $\sigma_{min} = -94.85$ MN/m²
extr. stresses (elast.): $\sigma = 94.85$ MN/m², $\tau = 6.29$ MN/m², $\sigma_v = 94.85$ MN/m²
partial member forces flange top: $V_o = 1.83$ kN, $M_{xp,o} = -0.00$ kNm, $M_{Sa,o} = -1.23$ kNm
partial member forces flange bottom: $V_u = -1.83$ kN, $M_{xp,u} = -0.00$ kNm, $M_{Sa,u} = -2.14$ kNm
partial member forces web: $V_s = -24.60$ kN, $M_{xp,s} = -0.00$ kNm
partial member forces main bending (centroid): $N = -136.42$ kN, $M_{y,s} = -205.80$ kNm
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052$ ⇒ $U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.009$, $U_{MS,u} = 0.015$ ⇒ $U_{MS} = 0.015$
limiting normal forces flange top: -1531.31 kN ≤ N_o ≤ 1531.31 kN
limiting normal forces flange bottom: -1526.27 kN ≤ N_u ≤ 1526.27 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3876.84 kN ≤ N ≤ 3876.84 kN ⇒ $U_N = 0.035$
utilization y-moment (centroid): -583.38 kNm ≤ $M_{y,s}$ ≤ 583.64 kNm ⇒ $U_{My} = 0.353$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.366$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.538$): $c/t_{o-o} = 0.148$, $c/t_{--o} = 0.381$
max. utilization: $U = 0.381$ ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 206, group of load spectra 1: standard load spectra
internal forces: $N = -184.17$ kN, $V_\eta = -0.00$ kN, $V_\zeta = -24.60$ kN
internal moments: $T = 0.641$ kNm, $M_\eta = -215.00$ kNm, $M_\zeta = -4.71$ kNm
warping torsion: $T_t = -0.000$ kNm, $T_w = 0.641$ kNm, $B = -0.213$ kNm²
normal stresses (elast.): $\sigma_{max} = 80.01$ MN/m², $\sigma_{min} = -103.11$ MN/m²
extr. stresses (elast.): $\sigma = 103.11$ MN/m², $\tau = 6.29$ MN/m², $\sigma_v = 103.11$ MN/m²
partial member forces flange top: $V_o = 1.88$ kN, $M_{xp,o} = -0.00$ kNm, $M_{Sa,o} = -1.73$ kNm
partial member forces flange bottom: $V_u = -1.88$ kN, $M_{xp,u} = -0.00$ kNm, $M_{Sa,u} = -2.98$ kNm
partial member forces web: $V_s = -24.60$ kN, $M_{xp,s} = -0.00$ kNm
partial member forces main bending (centroid): $N = -184.17$ kN, $M_{y,s} = -215.00$ kNm
shear utilization: $U_{\tau,o} = 0.002$, $U_{\tau,u} = 0.002$, $U_{\tau,s} = 0.052$ ⇒ $U_\tau = 0.052$
yield strengths reduction factors: $\eta_{y,\tau,o} = 1.000$, $\eta_{y,\tau,u} = 1.000$, $\eta_{y,\tau,s} = 0.999$
flange bending utilization M_{Sa}: $U_{MS,o} = 0.012$, $U_{MS,u} = 0.022$ ⇒ $U_{MS} = 0.022$
limiting normal forces flange top: -1528.56 kN ≤ N_o ≤ 1528.56 kN
limiting normal forces flange bottom: -1521.53 kN ≤ N_u ≤ 1521.53 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3869.34 kN ≤ N ≤ 3869.34 kN ⇒ $U_N = 0.048$
utilization y-moment (centroid): -580.49 kNm ≤ $M_{y,s}$ ≤ 580.99 kNm ⇒ $U_{My} = 0.371$
utilization from load increase of partial member forces: $U_{\sigma,pl} = 0.390$
utilization c/t (EN 1993-1-1, Tab. 5.2, c13, $\varepsilon = 1.474$): $c/t_{o-o} = 0.159$, $c/t_{--o} = 0.397$
max. utilization: $U = 0.397$ ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 207, group of load spectra 1: standard load spectra
internal forces: $N = -261.60$ kN, $V_\eta = -0.00$ kN, $V_\zeta = -24.60$ kN
internal moments: $T = 0.676$ kNm, $M_\eta = -232.53$ kNm, $M_\zeta = -7.28$ kNm
warping torsion: $T_t = -0.000$ kNm, $T_w = 0.676$ kNm, $B = -0.333$ kNm²
normal stresses (elast.): $\sigma_{max} = 84.95$ MN/m², $\sigma_{min} = -118.17$ MN/m²
extr. stresses (elast.): $\sigma = 118.17$ MN/m², $\tau = 6.29$ MN/m², $\sigma_v = 118.17$ MN/m²
partial member forces flange top: $V_o = 1.99$ kN, $M_{xp,o} = -0.00$ kNm, $M_{Sa,o} = -2.66$ kNm
partial member forces flange bottom: $V_u = -1.99$ kN, $M_{xp,u} = -0.00$ kNm, $M_{Sa,u} = -4.62$ kNm
partial member forces web: $V_s = -24.60$ kN, $M_{xp,s} = -0.00$ kNm
partial member forces main bending (centroid): $N = -261.60$ kN, $M_{y,s} = -232.53$ kNm

shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.052 ⇒ U_{τ} = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.019, $U_{MS,u}$ = 0.033 ⇒ U_{MS} = 0.033
limiting normal forces flange top: -1523.32 kN ≤ N_o ≤ 1523.32 kN
limiting normal forces flange bottom: -1512.28 kN ≤ N_u ≤ 1512.28 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3854.85 kN ≤ N ≤ 3854.85 kN ⇒ U_N = 0.068
utilization y-moment (centroid): -574.33 kNm ≤ $M_{y,s}$ ≤ 575.46 kNm ⇒ U_{My} = 0.405
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.437
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.375): c/t_{o-o} = 0.176, c/t_{--o} = 0.424
max. utilization: U = 0.437 ≤ 1 ⇒ **verification meets the requirements**

Load spectrum 208, group of load spectra 1: standard load spectra
internal forces: N = -309.35 kN, V_{η} = -0.00 kN, V_{ζ} = -24.60 kN
internal moments: T = 0.698 kNm, M_{η} = -242.45 kNm, M_{ζ} = -8.94 kNm
warping torsion: T_t = -0.000 kNm, T_w = 0.698 kNm, B = -0.405 kNm²
normal stresses (elast.): σ_{max} = 87.73 MN/m², σ_{min} = -127.16 MN/m²
extr. stresses (elast.): σ = 127.16 MN/m², τ = 6.29 MN/m², σ_v = 127.16 MN/m²
partial member forces flange top: V_o = 2.05 kN, $M_{xp,o}$ = -0.00 kNm, $M_{Sa,o}$ = -3.28 kNm
partial member forces flange bottom: V_u = -2.05 kN, $M_{xp,u}$ = -0.00 kNm, $M_{Sa,u}$ = -5.66 kNm
partial member forces web: V_s = -24.60 kN, $M_{xp,s}$ = -0.00 kNm
partial member forces main bending (centroid): N = -309.35 kN, $M_{y,s}$ = -242.45 kNm
shear utilization: $U_{\tau,o}$ = 0.002, $U_{\tau,u}$ = 0.002, $U_{\tau,s}$ = 0.052 ⇒ U_{τ} = 0.052
yield strengths reduction factors: $\eta_{y,\tau,o}$ = 1.000, $\eta_{y,\tau,u}$ = 1.000, $\eta_{y,\tau,s}$ = 0.999
flange bending utilization M_{Sa}: $U_{MS,o}$ = 0.024, $U_{MS,u}$ = 0.041 ⇒ U_{MS} = 0.041
limiting normal forces flange top: -1519.85 kN ≤ N_o ≤ 1519.85 kN
limiting normal forces flange bottom: -1506.42 kN ≤ N_u ≤ 1506.42 kN
limiting normal forces web: -819.26 kN ≤ N_s ≤ 819.26 kN
utilization normal force: -3845.53 kN ≤ N ≤ 3845.53 kN ⇒ U_N = 0.080
utilization y-moment (centroid): -569.83 kNm ≤ $M_{y,s}$ ≤ 571.46 kNm ⇒ U_{My} = 0.426
utilization from load increase of partial member forces: $U_{\sigma,pl}$ = 0.466
utilization c/t (EN 1993-1-1, Tab. 5.2, cl3, ε = 1.325): c/t_{o-o} = 0.186, c/t_{--o} = 0.440
max. utilization: U = 0.466 ≤ 1 ⇒ **verification meets the requirements**

summary:

σ_{max} = 180.94 MN/m²	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
σ_{min} = -180.25 MN/m²	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc3+Ip1
τ = 7.17 MN/m²	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
σ_v = 180.94 MN/m²	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
$U_{\sigma,pl}$ = 0.493	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
$limit(c/t)_{o-o}$ = 0.202	1.35*Lc1+1.5*Lc2+0.6*1.5*Lc6+Ip1
$limit(c/t)_{--o}$ = 0.498	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
U = 0.498	1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1

max. utilization: U = 0.498 ≤ 1 ⇒ **verification meets the requirements**

Summary of all verifications

load combination utilization: Nw2:1.35*Lc1+0.5*1.5*Lc2+1.5*Lc5+Ip1
max. utilization: U = 0.498 ≤ 1 ⇒ **verification meets the requirements**