

Project:
Project no:
Author:



Project data

Project name
Project number
Author
Description
Date 04/10/2017
Design code EN

Material

Steel S 355
Concrete C25/30, C35/45

Project item Hellenic Cover Joint

Design

Name Hellenic Cover Joint
Description
Analysis Stress, strain/ loads in equilibrium

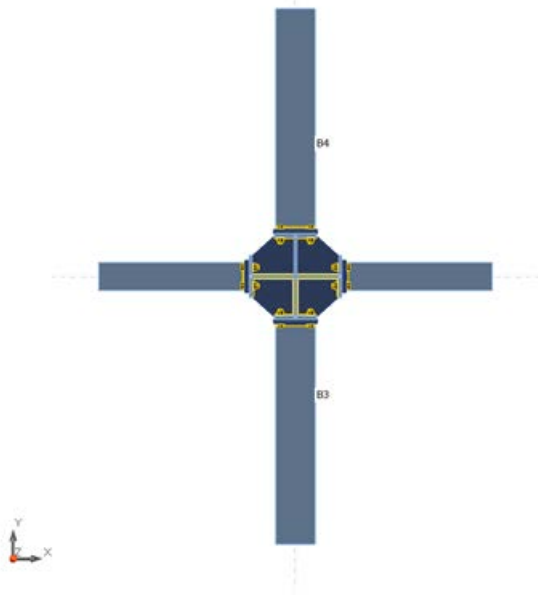
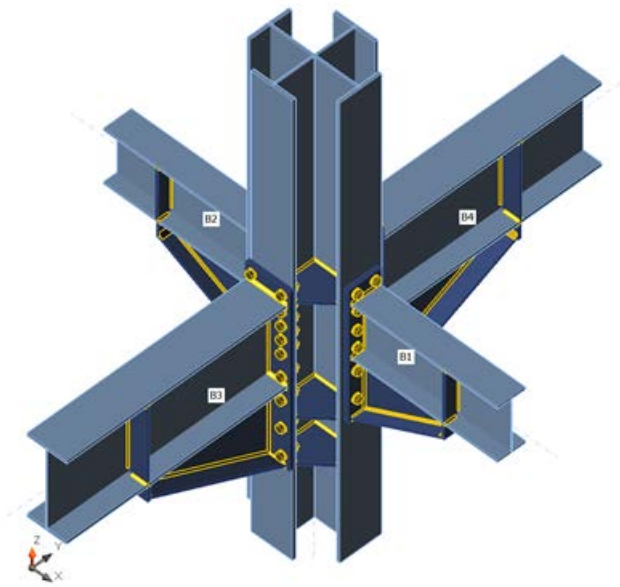
Beams and columns

Name	Cross-section	β - Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in	X [mm]
SL	7 - General	0.0	-90.0	0.0	0	0	0	Node	0
B1	8 - IPE240	0.0	0.0	0.0	0	0	0	Node	0
B2	8 - IPE240	180.0	0.0	0.0	0	0	0	Node	0
B3	9 - IPE360	-90.0	0.0	0.0	0	0	-60	Node	0
B4	9 - IPE360	90.0	0.0	0.0	0	0	-60	Node	0

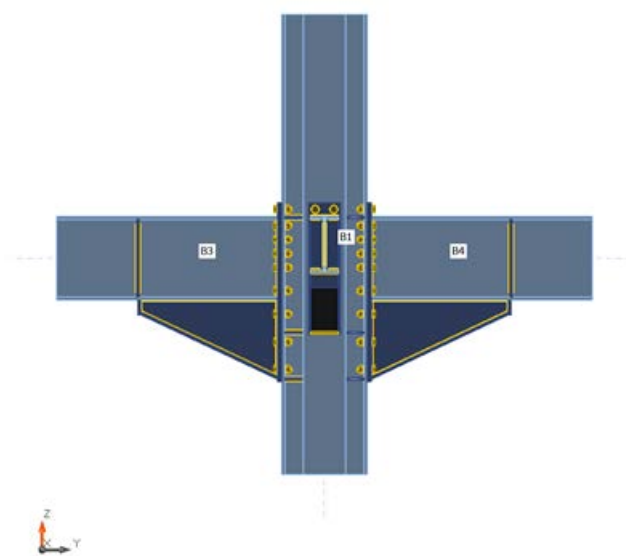
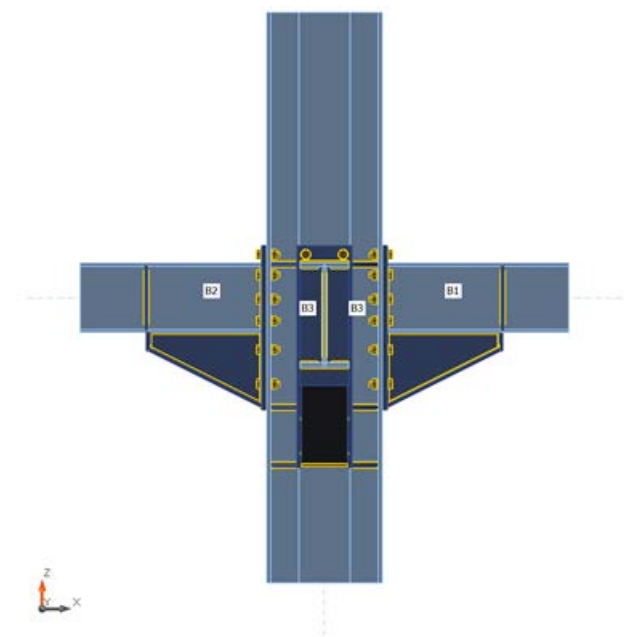
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Cross-sections

Name	Material
7 - General	S 355, S 355, S 355
8 - IPE240	S 355
8 - IPE240	S 355
9 - IPE360	S 355
9 - IPE360	S 355

Bolts

Name	Bolt assembly	Diameter [mm]	fu [MPa]	Gross area [mm ²]
M20 8.8	M20 8.8	20	800.0	314

Load effects (forces in equilibrium)

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Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
LE1	SL	0.0	0.0	0.0	0.0	0.0	0.0
	SL	1400.0	0.0	0.0	0.0	0.0	0.0
	B1	0.0	0.0	-300.0	0.0	240.0	0.0
	B2	0.0	0.0	-300.0	0.0	240.0	0.0
	B3	0.0	0.0	-400.0	0.0	350.0	0.0
	B4	0.0	0.0	-400.0	0.0	350.0	0.0

Check

Summary

Name	Value	Status
Analysis	100.0%	OK
Plates	0.6 < 5%	OK
Bolts	86.6 < 100%	OK
Welds	98.4 < 100%	OK
Buckling	Not calculated	

Plates

Name	Thickness [mm]	Loads	σ_{Ed} [MPa]	ϵ_{Pl} [1e-4]	Status
SL-bfl 1	13.5	LE1	355.2	11.5	OK
SL-tfl 1	13.5	LE1	355.2	11.5	OK
SL-w 1	8.6	LE1	257.4	0.0	OK
SL-tfl 2	13.5	LE1	355.1	6.3	OK
SL-w 2	8.6	LE1	126.0	0.0	OK
SL-tfl 3	13.5	LE1	355.1	6.3	OK
SL-w 3	8.6	LE1	128.8	0.0	OK
B1-bfl 1	9.8	LE1	355.0	2.3	OK
B1-tfl 1	9.8	LE1	345.1	6.3	OK
B1-w 1	6.2	LE1	356.2	56.8	OK
B2-bfl 1	9.8	LE1	355.0	2.3	OK
B2-tfl 1	9.8	LE1	345.2	6.3	OK
B2-w 1	6.2	LE1	356.2	56.8	OK
B3-bfl 1	12.7	LE1	176.4	0.0	OK
B3-tfl 1	12.7	LE1	255.0	0.3	OK
B3-w 1	8.0	LE1	274.7	0.0	OK
B4-bfl 1	12.7	LE1	176.4	0.0	OK
B4-tfl 1	12.7	LE1	253.6	0.2	OK
B4-w 1	8.0	LE1	274.7	0.0	OK
EP1	18.0	LE1	305.9	0.0	OK
WID1	10.0	LE1	353.0	6.3	OK
WID1	10.0	LE1	288.2	0.2	OK
STIFF1a	10.0	LE1	197.2	0.0	OK
STIFF1b	10.0	LE1	197.7	0.0	OK
EP2	18.0	LE1	306.3	0.0	OK
WID2	10.0	LE1	353.1	6.3	OK
WID2	10.0	LE1	288.2	0.2	OK
STIFF2a	10.0	LE1	197.8	0.0	OK
STIFF2b	10.0	LE1	197.4	0.0	OK
EP3	18.0	LE1	199.1	0.0	OK

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WID3	10.0	LE1	251.4	0.0	OK
WID3	10.0	LE1	201.9	0.0	OK
STIFF3a	10.0	LE1	75.1	0.0	OK
STIFF3b	10.0	LE1	75.1	0.0	OK
EP4	18.0	LE1	198.8	0.0	OK
WID4	10.0	LE1	252.5	0.0	OK
WID4	10.0	LE1	206.3	0.0	OK
STIFF4a	10.0	LE1	75.4	0.0	OK
STIFF4b	10.0	LE1	75.4	0.0	OK
SP1	10.0	LE1	270.3	1.2	OK
SP2	10.0	LE1	181.1	0.0	OK
SP3	10.0	LE1	166.6	0.0	OK
SP4	10.0	LE1	270.3	1.1	OK
SP5	10.0	LE1	180.5	0.0	OK
SP6	10.0	LE1	166.3	0.0	OK
SP7	10.0	LE1	252.9	0.0	OK
SP8	10.0	LE1	158.1	0.0	OK
SP9	10.0	LE1	168.1	0.0	OK
SP10	10.0	LE1	250.2	0.0	OK
SP11	10.0	LE1	158.2	0.0	OK
SP12	10.0	LE1	166.7	0.0	OK
SP13	10.0	LE1	355.4	18.1	OK
SP14	10.0	LE1	355.4	18.1	OK
SP15	10.0	LE1	288.2	0.0	OK
SP16	10.0	LE1	289.7	0.0	OK

Design data

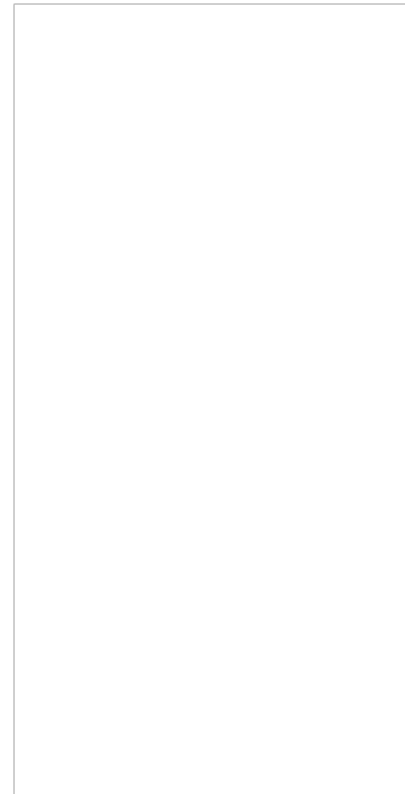
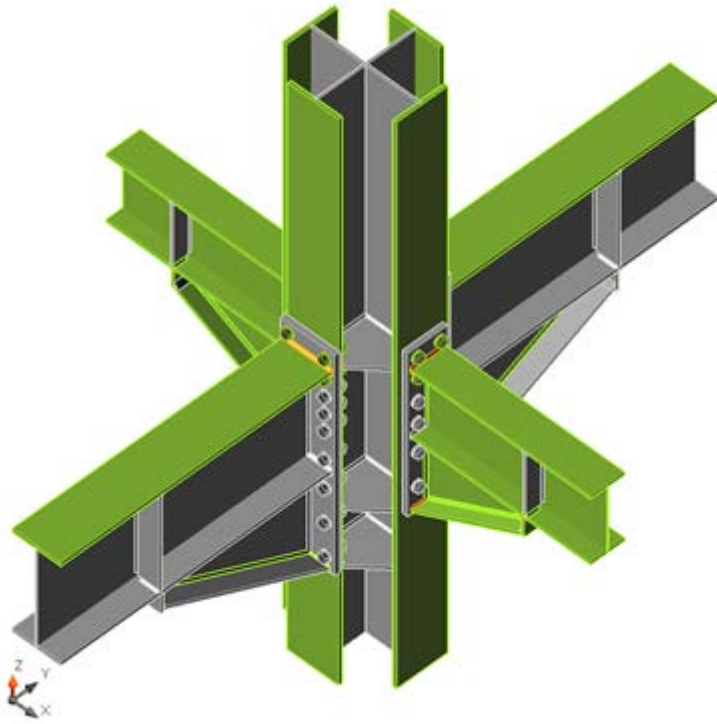
Material	f_y [MPa]	ϵ_{lim} [1e-4]
S 355	355.0	500.0

Symbol explanation

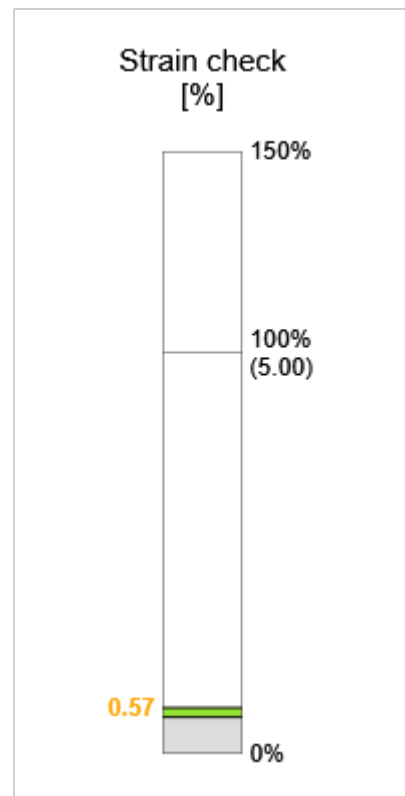
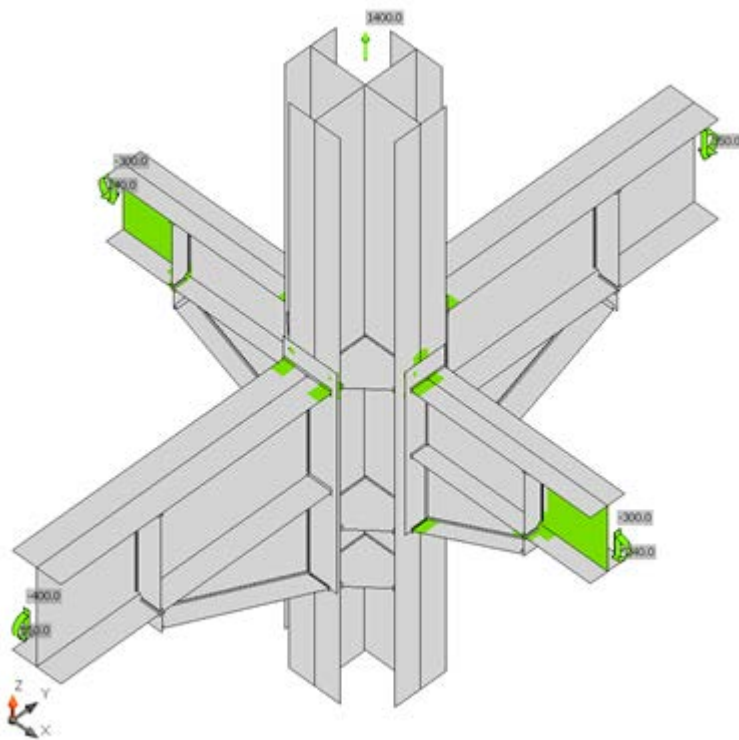
ϵ_{Pl} Strain

σ_{Ed} Eq. stress

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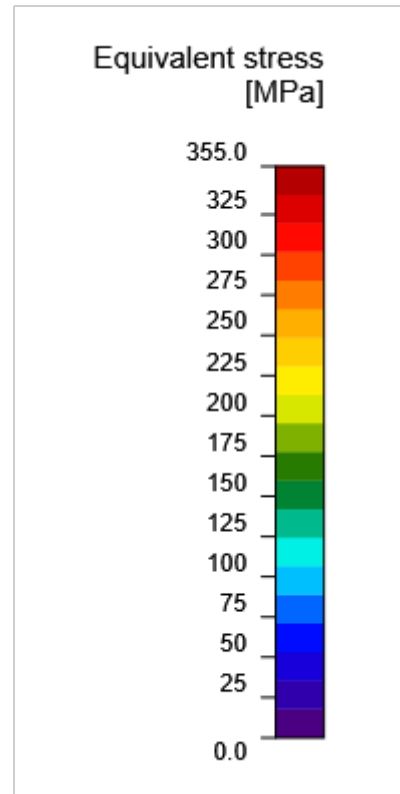
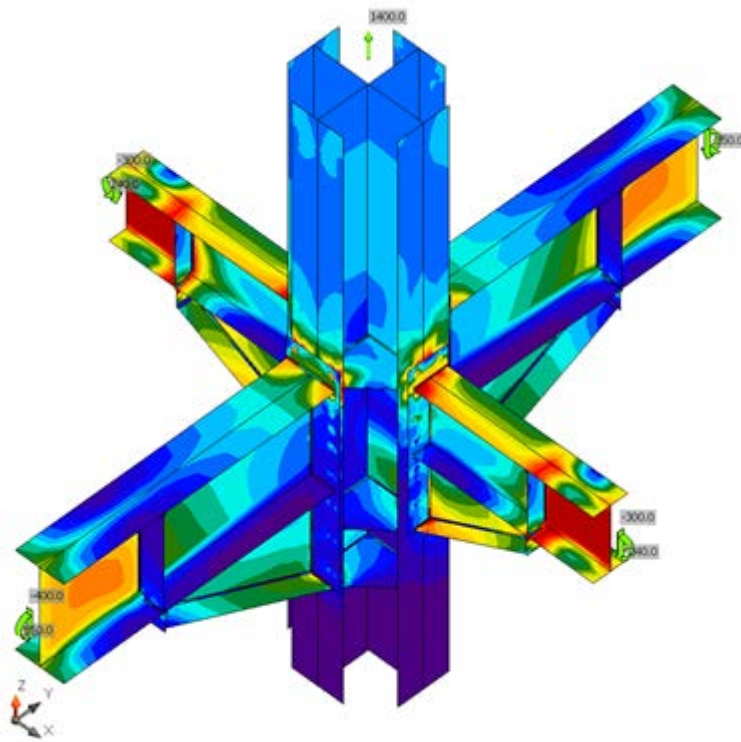


Overall check, LE1



Strain check, LE1

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Equivalent stress, LE1

Bolts

	Name	Loads	F _{t,Ed} [kN]	V [kN]	U _t [%]	F _{b,Rd} [kN]	U _{t,s} [%]	U _{t,ts} [%]	Status
	B1	LE1	90.5	31.1	64.2	139.2	33.1	78.9	OK
	B2	LE1	106.2	30.9	75.2	138.5	32.9	86.6	OK
	B3	LE1	97.8	22.1	69.3	264.6	23.5	73.1	OK
	B4	LE1	113.1	25.7	80.1	244.3	27.3	84.5	OK
	B5	LE1	52.1	20.5	36.9	234.5	21.8	48.1	OK
	B6	LE1	49.6	24.6	35.1	234.5	26.1	51.2	OK
	B7	LE1	25.1	21.0	17.8	264.6	22.3	35.0	OK
	B8	LE1	25.4	24.7	18.0	264.6	26.3	39.1	OK
	B9	LE1	1.9	22.4	1.4	264.6	23.8	24.8	OK
	B10	LE1	1.8	25.4	1.3	264.6	27.0	28.0	OK
	B11	LE1	5.1	24.7	3.6	264.6	26.2	28.8	OK
	B12	LE1	1.9	28.4	1.3	264.6	30.1	31.1	OK
	B13	LE1	106.2	30.9	75.2	138.5	32.9	86.6	OK
	B14	LE1	90.5	31.1	64.1	139.2	33.1	78.8	OK
	B15	LE1	113.1	25.7	80.1	244.3	27.3	84.5	OK
	B16	LE1	97.9	22.1	69.4	264.6	23.5	73.1	OK
	B17	LE1	49.6	24.6	35.1	234.5	26.1	51.2	OK
	B18	LE1	52.1	20.5	36.9	234.5	21.8	48.1	OK

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+14 +13 +16 +15 +18 +17 +20 +19 +22 +21 +24 +23	B19	LE1	25.3	24.7	18.0	264.6	26.3	39.1	OK
	B20	LE1	25.1	20.9	17.8	264.6	22.3	35.0	OK
	B21	LE1	2.1	25.4	1.5	264.6	27.0	28.1	OK
	B22	LE1	2.0	22.4	1.4	264.6	23.8	24.8	OK
	B23	LE1	1.9	28.3	1.3	264.6	30.1	31.1	OK
+26 +25 +28 +27 +30 +29 +32 +31 +34 +33 +36 +35 +38 +37 +40 +39 +42 +41	B24	LE1	5.1	24.7	3.6	264.6	26.2	28.8	OK
	B25	LE1	112.1	25.2	79.4	127.3	26.8	83.5	OK
	B26	LE1	112.1	25.2	79.4	127.3	26.8	83.5	OK
	B27	LE1	112.4	24.8	79.7	103.4	26.4	83.3	OK
	B28	LE1	112.4	24.8	79.7	103.4	26.4	83.3	OK
	B29	LE1	27.7	21.6	19.6	103.6	23.0	37.0	OK
	B30	LE1	27.7	21.6	19.6	103.6	23.0	37.0	OK
	B31	LE1	26.1	20.8	18.5	103.6	22.1	35.3	OK
	B32	LE1	26.1	20.8	18.5	103.6	22.1	35.3	OK
	B33	LE1	23.0	20.4	16.3	157.0	21.7	33.4	OK
	B34	LE1	23.0	20.4	16.3	157.0	21.7	33.4	OK
	B35	LE1	14.1	20.7	10.0	157.0	22.0	29.2	OK
	B36	LE1	14.1	20.7	10.0	157.0	22.0	29.2	OK
	B37	LE1	2.5	21.2	1.8	156.9	22.6	23.8	OK
	B38	LE1	2.5	21.2	1.8	156.9	22.6	23.8	OK
	B39	LE1	1.7	21.5	1.2	156.9	22.8	23.7	OK
	+44 +43 +46 +45 +48 +47 +50 +49 +52 +51 +54 +53 +56 +55 +58 +57 +60 +59	B40	LE1	1.9	21.4	1.4	156.8	22.8	23.8
B41		LE1	3.1	23.9	2.2	156.9	25.4	27.0	OK
B42		LE1	3.2	23.9	2.3	156.8	25.4	27.0	OK
B43		LE1	110.3	25.6	78.2	127.3	27.2	83.0	OK
B44		LE1	110.3	25.6	78.2	127.4	27.2	83.0	OK
B45		LE1	110.4	24.5	78.2	103.4	26.1	82.0	OK
B46		LE1	110.4	24.5	78.2	103.4	26.1	81.9	OK
B47		LE1	30.7	21.5	21.7	103.8	22.8	38.4	OK
B48		LE1	30.6	21.5	21.7	103.8	22.8	38.3	OK
B49		LE1	27.8	20.7	19.7	103.6	22.0	36.1	OK
B50		LE1	27.8	20.7	19.7	103.7	22.0	36.1	OK
B51		LE1	24.6	20.4	17.4	157.0	21.7	34.1	OK
B52	LE1	24.5	20.4	17.4	157.1	21.7	34.1	OK	
B53	LE1	15.5	20.7	11.0	157.0	22.0	29.8	OK	
B54	LE1	15.5	20.7	11.0	157.0	22.0	29.8	OK	
B55	LE1	3.2	21.2	2.3	156.9	22.6	24.2	OK	
B56	LE1	3.2	21.2	2.3	156.9	22.6	24.2	OK	
B57	LE1	1.8	21.5	1.3	156.9	22.8	23.8	OK	
B58	LE1	2.0	21.5	1.4	156.9	22.8	23.8	OK	
B59	LE1	3.3	24.0	2.4	156.8	25.5	27.2	OK	
B60	LE1	3.4	24.1	2.4	156.9	25.6	27.3	OK	

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Name	F _{t,Rd} [kN]	B _{p,Rd} [kN]	F _{v,Rd} [kN]
M20 8.8 - 1	141.1	314.2	94.1

Detailed result for B2

$$U_{tts} = \frac{F_{v,Ed}}{F_{v,Rd}} + \frac{F_{t,Ed}}{1.4F_{t,Rd}} = 86.6 \%$$

$$U_{tt} = \frac{F_{t,Ed}}{\min(F_{t,Rd}; B_{p,Rd})} = 75.2 \%$$

$$U_{ts} = \frac{V_{Ed}}{\min(F_{v,Rd}; F_{b,Rd})} = 32.9 \%$$

$$F_{t,Rd} = \frac{k_2 f_{ub} A_s}{\gamma_{M2}} = 141.1 \text{ kN}$$

where:

$$k_2 = 0.90 \quad \text{– Factor}$$

$$f_{ub} = 800.0 \text{ MPa} \quad \text{– Ultimate tensile strength of the bolt}$$

$$A_s = 245 \text{ mm}^2 \quad \text{– Tensile stress area of the bolt}$$

$$\gamma_{M2} = 1.25 \quad \text{– Safety factor}$$

$$B_{p,Rd} = \frac{0.6\pi d_m t_p f_u}{\gamma_{M2}} = 314.2 \text{ kN}$$

where:

$$d_m = 32 \text{ mm} \quad \text{– The mean of the across points and across flats dimensions of the bolt head or the nut, whichever is smaller}$$

$$t_p = 14 \text{ mm} \quad \text{– Thickness}$$

$$f_u = 490.0 \text{ MPa} \quad \text{– Ultimate strength}$$

$$\gamma_{M2} = 1.25 \quad \text{– Safety factor}$$

$$F_{v,Rd} = \frac{\beta_p \alpha_v f_{ub} A}{\gamma_{M2}} = 94.1 \text{ kN}$$

where:

$$\beta_p = 1.00 \quad \text{– Reducing factor}$$

$$\alpha_v = 0.60 \quad \text{– Reducing factor}$$

$$f_{ub} = 800.0 \text{ MPa} \quad \text{– Ultimate tensile strength of the bolt}$$

$$A = 245 \text{ mm}^2 \quad \text{– Tensile stress area of the bolt}$$

$$\gamma_{M2} = 1.25 \quad \text{– Safety factor}$$

$$F_{b,Rd} = \frac{k_1 \alpha_b f_u d t}{\gamma_{M2}} = 138.5 \text{ kN}$$

where:

$$k_1 = 2.14 \quad \text{– Factor for edge distance and bolt spacing perpendicular to the direction of load transfer - EN 1993-1-8 - Table 3.4}$$

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- $\alpha_b = 0.46$ – Factor
- $f_u = 490.0$ MPa – Ultimate strength
- $d = 20$ mm – Nominal diameter of the fastener
- $t = 18$ mm – Thickness
- $\gamma_{M2} = 1.25$ – Safety factor

Symbol explanation

- $F_{t,Rd}$ Bolt tension resistance EN 1993-1-8 tab. 3.4
- $F_{t,Ed}$ Tension force
- $B_{p,Rd}$ Punching shear resistance
- V Resultant of shear forces V_y, V_z in bolt
- $F_{v,Rd}$ Bolt shear resistance EN_1993-1-8 table 3.4
- $F_{b,Rd}$ Plate bearing resistance EN 1993-1-8 tab. 3.4
- U_t Utilization in tension
- U_s Utilization in shear
- U_{ts} Utilization in tension and shear EN 1993-1-8 table 3.4

Welds (Plastic redistribution)

Item	Edge	Throat th. [mm]	Length [mm]	Loads	$\sigma_{w,Ed}$ [MPa]	ϵ_{PI} [%]	σ_{\square} [MPa]	$T_{ }$ [MPa]	T_{\square} [MPa]	U_t [%]	U_t^c [%]	Status
EP1	B1-bfl 1	▲4.9▲	120	LE1	88.2	0.0	61.6	-19.2	31.0	20.3	12.0	OK
		▲4.9▲	120	LE1	44.5	0.0	-16.9	-23.7	1.8	10.2	8.2	OK
EP1	B1-tfl 1	▲4.9▲	120	LE1	428.5	0.9	214.6	-51.2	207.9	98.4	94.5	OK
		▲4.9▲	120	LE1	427.5	0.4	194.5	72.4	-207.5	98.2	86.2	OK
EP1	B1-w 1	▲3.1▲	230	LE1	267.4	0.0	111.3	50.0	131.2	61.4	31.1	OK
		▲3.1▲	230	LE1	283.5	0.0	123.4	79.6	-124.0	65.1	40.0	OK
EP1	WID1	▲5.0▲	250	LE1	397.6	0.0	-173.7	78.4	-191.0	91.3	46.5	OK
		▲5.0▲	250	LE1	264.3	0.0	-118.3	3.2	136.4	60.7	33.5	OK
B1-bfl 1	WID1	▲4.9▲	390	LE1	376.0	0.0	-77.9	197.0	79.4	86.3	44.0	OK
		▲4.9▲	390	LE1	318.0	0.0	-57.6	-171.5	-56.3	73.0	35.0	OK
WID1	WID1	▲5.0▲	434	LE1	387.1	0.0	49.2	-216.8	46.2	88.9	25.0	OK
		▲5.0▲	434	LE1	321.6	0.0	24.1	183.2	-27.1	73.8	19.4	OK
EP1	WID1	▲5.0▲	120	LE1	428.2	0.8	-162.9	0.4	-228.6	98.3	75.2	OK
		▲5.0▲	120	LE1	427.1	0.1	-269.0	-130.1	140.5	98.0	70.2	OK
B2-bfl 1	WID2	▲4.9▲	390	LE1	317.9	0.0	-57.6	171.5	56.4	73.0	35.0	OK
		▲4.9▲	390	LE1	376.2	0.0	-77.9	-197.1	-79.3	86.4	44.0	OK
B1-bfl 1	STIFF1a	▲4.9▲	42	LE1	159.5	0.0	-78.8	-3.6	-80.0	36.6	27.3	OK
		▲4.9▲	42	LE1	260.1	0.0	-131.0	-8.0	129.5	59.7	44.5	OK
B1-w 1	STIFF1a	▲3.1▲	190	LE1	124.0	0.0	-4.4	-65.4	-29.2	28.5	16.4	OK
		▲3.1▲	190	LE1	165.6	0.0	-46.3	89.3	21.4	38.0	20.8	OK
B1-tfl 1	STIFF1a	▲4.9▲	42	LE1	131.0	0.0	-61.8	42.1	-51.7	30.1	19.6	OK
		▲4.9▲	42	LE1	72.3	0.0	-5.3	-38.6	15.5	16.6	12.8	OK
B1-bfl 1	STIFF1b	▲4.9▲	42	LE1	267.7	0.0	-143.6	8.2	-130.2	61.5	46.6	OK
		▲4.9▲	42	LE1	176.7	0.0	-77.3	-16.0	90.4	40.6	29.1	OK
B1-w 1	STIFF1b	▲3.1▲	190	LE1	161.4	0.0	-47.4	-85.1	-26.4	37.1	17.7	OK
		▲3.1▲	190	LE1	136.1	0.0	-3.3	74.7	24.3	31.2	20.2	OK

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B1-tfl 1	STIFF1b	▲4.9▼	42	LE1	89.6	0.0	-2.4	50.5	-11.2	20.6	17.2	OK
		▲4.9▼	42	LE1	152.5	0.0	-68.2	-51.7	59.4	35.0	24.6	OK
EP2	B2-bfl 1	▲4.9▼	120	LE1	88.8	0.0	62.0	19.3	31.2	20.4	12.1	OK
		▲4.9▼	120	LE1	44.5	0.0	-17.1	23.7	1.7	10.2	8.2	OK
EP2	B2-tfl 1	▲4.9▼	120	LE1	428.4	0.9	214.9	51.0	207.8	98.4	94.5	OK
		▲4.9▼	120	LE1	427.5	0.4	194.8	-72.0	-207.6	98.1	86.2	OK
EP2	B2-w 1	▲3.1▼	230	LE1	283.2	0.0	122.1	-78.1	125.2	65.0	40.4	OK
		▲3.1▼	230	LE1	249.6	0.0	101.0	-58.0	-118.3	57.3	30.9	OK
EP2	WID2	▲5.0▼	250	LE1	264.0	0.0	-118.3	-3.6	-136.2	60.6	33.3	OK
		▲5.0▼	250	LE1	396.7	0.0	-173.5	-78.4	190.4	91.1	46.3	OK
WID2	WID2	▲5.0▼	434	LE1	323.1	0.0	23.4	-183.8	28.9	74.2	19.4	OK
		▲5.0▼	434	LE1	385.3	0.0	49.7	216.1	-44.3	88.5	25.0	OK
B3-bfl 1	WID3	▲5.0▼	590	LE1	200.4	0.0	-29.9	110.4	29.9	46.0	28.8	OK
		▲5.0▼	590	LE1	200.5	0.0	-29.9	-110.5	-29.9	46.0	28.8	OK
EP2	WID2	▲5.0▼	120	LE1	428.2	0.8	-162.9	-0.6	-228.6	98.3	75.2	OK
		▲5.0▼	120	LE1	427.1	0.1	-268.8	130.2	140.5	98.0	70.3	OK
WID3	WID3	▲5.0▼	650	LE1	276.8	0.0	34.7	-154.7	34.7	63.5	15.9	OK
		▲5.0▼	650	LE1	276.8	0.0	34.7	154.7	-34.7	63.6	15.9	OK
B2-bfl 1	STIFF2a	▲4.9▼	42	LE1	176.3	0.0	-76.9	16.0	-90.2	40.5	29.1	OK
		▲4.9▼	42	LE1	267.3	0.0	-143.5	-8.2	129.9	61.4	46.6	OK
B2-w 1	STIFF2a	▲3.1▼	190	LE1	136.1	0.0	-3.3	-74.7	-24.3	31.2	20.2	OK
		▲3.1▼	190	LE1	161.4	0.0	-47.4	85.1	26.3	37.1	17.7	OK
B2-tfl 1	STIFF2a	▲4.9▼	42	LE1	152.5	0.0	-68.2	51.6	-59.4	35.0	24.6	OK
		▲4.9▼	42	LE1	89.7	0.0	-2.4	-50.5	11.2	20.6	17.2	OK
B2-bfl 1	STIFF2b	▲4.9▼	42	LE1	260.1	0.0	-131.2	8.0	-129.4	59.7	44.6	OK
		▲4.9▼	42	LE1	159.6	0.0	-78.7	3.6	80.1	36.6	27.3	OK
B2-w 1	STIFF2b	▲3.1▼	190	LE1	165.7	0.0	-46.3	-89.3	-21.4	38.0	20.8	OK
		▲3.1▼	190	LE1	124.1	0.0	-4.4	65.4	29.2	28.5	16.4	OK
B2-tfl 1	STIFF2b	▲4.9▼	42	LE1	72.3	0.0	-5.4	38.7	-15.5	16.6	12.8	OK
		▲4.9▼	42	LE1	131.0	0.0	-61.8	-42.1	51.7	30.1	19.6	OK
EP3	B3-bfl 1	▲6.3▼	170	LE1	26.9	0.0	19.8	1.3	10.4	6.2	5.0	OK
		▲6.3▼	170	LE1	21.1	0.0	-12.1	-1.6	9.8	4.8	4.7	OK
EP3	B3-tfl 1	▲6.3▼	170	LE1	427.0	0.1	198.2	111.1	188.0	98.0	65.3	OK
		▲6.3▼	170	LE1	426.9	0.0	175.4	-121.3	-189.1	98.0	57.2	OK
EP3	B3-w 1	▲4.0▼	347	LE1	185.8	0.0	79.7	-54.3	80.2	42.6	23.4	OK
		▲4.0▼	347	LE1	186.3	0.0	80.8	54.5	-80.2	42.8	23.4	OK
EP3	WID3	▲5.0▼	330	LE1	172.3	0.0	-79.8	36.4	-80.3	39.6	29.0	OK
		▲5.0▼	330	LE1	172.3	0.0	-80.8	-36.1	80.1	39.6	29.0	OK
B4-bfl 1	WID4	▲5.0▼	590	LE1	201.4	0.0	-30.1	111.0	30.2	46.3	28.9	OK
		▲5.0▼	590	LE1	201.4	0.0	-30.1	-110.9	-30.2	46.2	28.9	OK
WID4	WID4	▲5.0▼	650	LE1	278.3	0.0	34.8	-155.6	34.8	63.9	16.2	OK
		▲5.0▼	650	LE1	278.3	0.0	34.8	155.6	-34.8	63.9	16.2	OK
EP3	WID3	▲5.0▼	160	LE1	352.9	0.0	-113.0	-0.4	-193.1	81.0	79.3	OK
		▲5.0▼	160	LE1	205.0	0.0	-120.1	-36.4	88.7	47.1	44.8	OK
SL-tfl 3	SP1	▲5.0▼	90	LE1	428.5	0.9	207.8	-38.3	212.9	98.4	63.5	OK
		▲5.0▼	90	LE1	428.7	1.1	216.2	30.5	-211.5	98.4	65.4	OK
B3-bfl 1	STIFF3a	▲5.0▼	63	LE1	78.9	0.0	-31.6	-3.9	-41.5	18.1	12.1	OK
		▲5.0▼	63	LE1	127.0	0.0	-70.9	1.0	60.8	29.2	21.0	OK
B3-w 1	STIFF3a	▲4.0▼	299	LE1	39.8	0.0	-2.1	-22.7	-3.6	9.1	6.9	OK
		▲4.0▼	299	LE1	43.4	0.0	5.4	23.9	-6.9	10.0	7.2	OK
B3-tfl 1	STIFF3a	▲5.0▼	63	LE1	45.1	0.0	-26.8	13.9	-15.6	10.4	7.1	OK
		▲5.0▼	63	LE1	27.1	0.0	11.6	-14.1	-0.3	6.2	5.0	OK

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B3-bfl 1	STIFF3b	▲5.0▼	63	LE1	127.0	0.0	-70.9	-1.0	-60.8	29.2	21.0	OK
		▲5.0▼	63	LE1	78.9	0.0	-31.6	3.9	41.5	18.1	12.1	OK
B3-w 1	STIFF3b	▲4.0▼	299	LE1	43.4	0.0	5.4	-23.9	6.9	10.0	7.2	OK
		▲4.0▼	299	LE1	39.8	0.0	-2.1	22.6	3.6	9.1	6.9	OK
B3-tfl 1	STIFF3b	▲5.0▼	63	LE1	27.1	0.0	11.6	14.1	0.3	6.2	5.0	OK
		▲5.0▼	63	LE1	45.1	0.0	-26.8	-13.9	15.6	10.3	7.1	OK
EP4	B4-bfl 1	▲6.3▼	170	LE1	28.5	0.0	20.9	1.5	11.1	6.5	5.2	OK
		▲6.3▼	170	LE1	21.6	0.0	-2.3	9.8	-7.5	5.0	4.9	OK
EP4	B4-tfl 1	▲6.3▼	170	LE1	427.0	0.1	199.1	-109.7	188.5	98.0	65.5	OK
		▲6.3▼	170	LE1	426.8	0.0	175.1	120.5	-189.7	98.0	57.1	OK
EP4	B4-w 1	▲4.0▼	347	LE1	177.8	0.0	77.0	-50.3	77.7	40.8	23.5	OK
		▲4.0▼	347	LE1	178.4	0.0	78.2	50.5	-77.6	41.0	23.5	OK
EP4	WID4	▲5.0▼	330	LE1	173.0	0.0	-79.8	37.3	-80.4	39.7	28.6	OK
		▲5.0▼	330	LE1	172.7	0.0	-80.7	-36.9	80.1	39.7	28.7	OK
SL-tfl 3	SP2	▲5.0▼	90	LE1	173.1	0.0	-73.6	57.4	-70.0	39.8	21.0	OK
		▲5.0▼	90	LE1	172.6	0.0	-70.3	-52.8	74.1	39.6	20.3	OK
SL-tfl 3	SP3	▲5.0▼	90	LE1	263.7	0.0	-144.3	32.1	-123.3	60.5	42.0	OK
		▲5.0▼	90	LE1	259.7	0.0	-108.0	-43.7	129.2	59.6	37.9	OK
EP4	WID4	▲5.0▼	160	LE1	361.7	0.0	-115.2	-1.0	-198.0	83.1	81.6	OK
		▲5.0▼	160	LE1	210.8	0.0	-123.5	-37.5	91.2	48.4	46.3	OK
SL-tfl 3	SP4	▲5.0▼	90	LE1	428.5	0.9	207.8	-38.1	-213.0	98.4	63.5	OK
		▲5.0▼	90	LE1	428.7	1.1	216.2	30.3	211.6	98.4	65.4	OK
B4-bfl 1	STIFF4a	▲5.0▼	63	LE1	79.5	0.0	-32.0	-3.9	-41.8	18.2	12.2	OK
		▲5.0▼	63	LE1	127.6	0.0	-71.1	1.1	61.1	29.3	21.1	OK
B4-w 1	STIFF4a	▲4.0▼	299	LE1	40.0	0.0	-2.1	-22.8	-3.5	9.2	6.9	OK
		▲4.0▼	299	LE1	43.6	0.0	5.4	24.0	-6.9	10.0	7.2	OK
B4-tfl 1	STIFF4a	▲5.0▼	63	LE1	45.2	0.0	-26.8	14.0	-15.6	10.4	7.1	OK
		▲5.0▼	63	LE1	27.1	0.0	11.6	-14.2	-0.3	6.2	5.0	OK
B4-bfl 1	STIFF4b	▲5.0▼	63	LE1	127.5	0.0	-71.1	-1.1	-61.1	29.3	21.1	OK
		▲5.0▼	63	LE1	79.5	0.0	-32.0	3.9	41.8	18.2	12.2	OK
B4-w 1	STIFF4b	▲4.0▼	299	LE1	43.6	0.0	5.4	-24.0	6.9	10.0	7.2	OK
		▲4.0▼	299	LE1	40.0	0.0	-2.1	22.8	3.5	9.2	6.9	OK
B4-tfl 1	STIFF4b	▲5.0▼	63	LE1	27.1	0.0	11.6	14.2	0.3	6.2	5.0	OK
		▲5.0▼	63	LE1	45.2	0.0	-26.9	-14.0	15.6	10.4	7.1	OK
SL-tfl 3	SP5	▲5.0▼	90	LE1	171.1	0.0	-72.8	55.9	69.7	39.3	20.9	OK
		▲5.0▼	90	LE1	171.1	0.0	-70.2	-52.2	-73.4	39.3	20.3	OK
SL-w 1	SP1	▲4.3▼	190	LE1	427.0	0.1	133.8	-191.1	135.3	98.0	39.4	OK
		▲4.3▼	190	LE1	427.0	0.1	134.0	192.9	-132.6	98.0	37.9	OK
SL-tfl 3	SP6	▲5.0▼	90	LE1	262.7	0.0	-143.5	32.8	122.7	60.3	41.9	OK
		▲5.0▼	90	LE1	258.4	0.0	-107.4	-43.9	-128.4	59.3	37.8	OK
SL-w 1	SP2	▲4.3▼	190	LE1	420.3	0.0	-117.4	201.1	-117.6	96.5	24.4	OK
		▲4.3▼	190	LE1	421.0	0.0	-119.5	-200.3	119.3	96.7	24.0	OK
SL-tfl 1	SP7	▲5.0▼	84	LE1	278.7	0.0	131.5	16.3	140.9	64.0	36.2	OK
		▲5.0▼	84	LE1	323.0	0.0	166.6	-30.7	-156.8	74.2	43.1	OK
SL-w 1	SP3	▲4.3▼	190	LE1	117.0	0.0	-56.1	17.4	-56.6	26.9	19.6	OK
		▲4.3▼	190	LE1	126.1	0.0	-61.6	-17.3	61.1	28.9	21.5	OK
SL-tfl 2	SP7	▲5.0▼	86	LE1	427.7	0.5	209.2	-7.3	215.2	98.2	70.0	OK
		▲5.0▼	86	LE1	427.9	0.6	217.2	-3.5	-212.8	98.2	73.2	OK
SL-w 1	SP4	▲4.3▼	190	LE1	427.0	0.1	133.8	-191.1	-135.2	98.0	39.4	OK
		▲4.3▼	190	LE1	427.0	0.1	134.0	192.9	132.5	98.0	37.9	OK
SL-w 1	SP7	▲4.3▼	182	LE1	177.8	0.0	85.5	33.6	83.5	40.8	29.1	OK
		▲4.3▼	182	LE1	150.8	0.0	19.6	68.2	-52.9	34.6	27.4	OK

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SL-w 1	SP5	▲4.3▼	190	LE1	420.1	0.0	-117.5	200.9	117.7	96.5	24.4	OK
		▲4.3▼	190	LE1	421.0	0.0	-119.7	-200.1	-119.4	96.7	24.0	OK
SL-tfl 1	SP8	▲5.0▼	84	LE1	213.3	0.0	-117.1	-10.2	-102.4	49.0	35.4	OK
		▲5.0▼	84	LE1	182.1	0.0	-78.3	19.0	93.0	41.8	30.0	OK
SL-w 1	SP6	▲4.3▼	190	LE1	116.8	0.0	-56.0	17.4	56.6	26.8	19.6	OK
		▲4.3▼	190	LE1	125.9	0.0	-61.5	-17.4	-61.0	28.9	21.5	OK
SL-tfl 2	SP8	▲5.0▼	86	LE1	81.8	0.0	-27.2	38.5	-22.4	18.8	13.5	OK
		▲5.0▼	86	LE1	78.0	0.0	-22.2	-33.5	27.2	17.9	13.2	OK
SL-w 1	SP8	▲4.3▼	182	LE1	172.4	0.0	-20.7	85.3	-49.9	39.6	15.4	OK
		▲4.3▼	182	LE1	156.8	0.0	-51.4	-82.6	22.2	36.0	14.9	OK
SL-tfl 1	SP9	▲5.0▼	84	LE1	25.8	0.0	-6.3	-13.7	-4.5	5.9	4.2	OK
		▲5.0▼	84	LE1	17.0	0.0	-5.1	6.4	6.9	3.9	2.5	OK
SL-w 2	SP7	▲4.3▼	166	LE1	162.3	0.0	78.4	-28.3	77.0	37.3	32.7	OK
		▲4.3▼	166	LE1	158.8	0.0	67.5	48.5	-67.3	36.5	30.9	OK
SL-tfl 2	SP9	▲5.0▼	86	LE1	256.0	0.0	-140.7	25.3	-120.9	58.8	42.4	OK
		▲5.0▼	86	LE1	241.3	0.0	-100.8	-36.4	121.2	55.4	35.3	OK
SL-w 1	SP9	▲4.3▼	182	LE1	114.5	0.0	-56.8	4.5	-57.2	26.3	17.8	OK
		▲4.3▼	182	LE1	118.1	0.0	-59.2	-5.7	58.7	27.1	18.3	OK
SL-bfl 1	SP10	▲5.0▼	84	LE1	278.4	0.0	131.3	16.3	-140.8	63.9	36.2	OK
		▲5.0▼	84	LE1	322.6	0.0	166.2	-30.6	156.7	74.1	43.0	OK
SL-w 2	SP8	▲4.3▼	166	LE1	116.0	0.0	-63.1	-1.4	-56.1	26.6	21.3	OK
		▲4.3▼	166	LE1	131.2	0.0	-59.8	9.4	66.8	30.1	22.2	OK
SL-tfl 2	SP10	▲5.0▼	86	LE1	427.7	0.5	209.0	-8.4	-215.3	98.2	69.9	OK
		▲5.0▼	86	LE1	427.9	0.6	217.4	-3.7	212.8	98.2	73.1	OK
SL-w 1	SP10	▲4.3▼	182	LE1	177.7	0.0	85.5	33.6	-83.4	40.8	29.1	OK
		▲4.3▼	182	LE1	150.9	0.0	19.5	68.4	52.8	34.6	27.4	OK
SL-bfl 1	SP11	▲5.0▼	84	LE1	213.5	0.0	-117.2	-10.4	102.5	49.0	35.4	OK
		▲5.0▼	84	LE1	182.5	0.0	-78.4	19.0	-93.2	41.9	30.0	OK
SL-w 2	SP9	▲4.3▼	166	LE1	89.1	0.0	-17.2	-29.3	-41.1	20.4	9.3	OK
		▲4.3▼	166	LE1	75.6	0.0	-12.8	-41.1	12.7	17.3	7.9	OK
SL-tfl 2	SP11	▲5.0▼	86	LE1	80.1	0.0	-27.4	36.9	22.9	18.4	13.6	OK
		▲5.0▼	86	LE1	77.2	0.0	-22.7	-32.7	-27.3	17.7	13.3	OK
SL-w 1	SP11	▲4.3▼	182	LE1	172.1	0.0	-20.7	85.2	49.8	39.5	15.4	OK
		▲4.3▼	182	LE1	156.7	0.0	-51.4	-82.5	-22.2	36.0	14.9	OK
SL-bfl 1	SP12	▲5.0▼	84	LE1	26.0	0.0	-6.3	-13.8	4.5	6.0	4.2	OK
		▲5.0▼	84	LE1	17.2	0.0	-5.1	6.5	-6.9	3.9	2.5	OK
SL-w 2	SP10	▲4.3▼	166	LE1	162.0	0.0	78.3	-28.3	-76.9	37.2	32.7	OK
		▲4.3▼	166	LE1	158.7	0.0	67.5	48.4	67.3	36.4	30.9	OK
SL-tfl 2	SP12	▲5.0▼	86	LE1	255.0	0.0	-140.1	24.5	120.6	58.6	42.3	OK
		▲5.0▼	86	LE1	241.1	0.0	-100.9	-36.2	-121.1	55.4	35.2	OK
SL-w 1	SP12	▲4.3▼	182	LE1	114.6	0.0	-56.9	4.7	57.3	26.3	17.8	OK
		▲4.3▼	182	LE1	118.3	0.0	-59.3	-5.9	-58.8	27.2	18.3	OK
SL-w 2	SP11	▲4.3▼	166	LE1	115.8	0.0	-63.0	-1.2	56.1	26.6	21.2	OK
		▲4.3▼	166	LE1	131.1	0.0	-59.8	9.1	-66.7	30.1	22.2	OK
SL-w 2	SP12	▲4.3▼	166	LE1	89.1	0.0	-17.2	-29.4	41.0	20.5	9.3	OK
		▲4.3▼	166	LE1	75.1	0.0	-12.8	-40.8	-12.7	17.2	7.9	OK
B1-bfl 1	SP13	▲4.9▼	120	LE1	426.8	0.0	-40.0	-27.5	-243.8	98.0	36.4	OK
		▲4.9▼	120	LE1	426.9	0.1	-322.9	1.9	161.3	98.0	67.8	OK
SP13	WID1	▲5.0▼	55	LE1	427.6	0.4	-106.0	213.4	-107.8	98.2	98.1	OK
		▲5.0▼	55	LE1	427.5	0.4	-122.6	-203.3	120.7	98.2	94.6	OK
SP13	WID1	▲10.0▼	120	LE1	81.9	0.0	-80.0	10.2	1.3	22.7	11.6	OK
B2-bfl 1	SP14	▲4.9▼	120	LE1	426.8	0.0	-40.1	27.6	-243.8	98.0	36.4	OK

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		▲4.9▲	120	LE1	426.9	0.1	-322.7	-1.8	161.4	98.0	67.8	OK
SP14	WID2	▲5.0▲	55	LE1	427.5	0.4	-122.5	203.5	-120.5	98.2	94.5	OK
		▲5.0▲	55	LE1	427.6	0.4	-106.2	-213.4	107.9	98.2	98.1	OK
SP14	WID2	▲10.0	120	LE1	82.9	0.0	-80.0	-12.6	1.3	22.7	11.7	OK
B3-bfl 1	SP15	▲5.0▲	170	LE1	306.1	0.0	-45.3	-5.2	-174.7	70.3	21.3	OK
		▲5.0▲	170	LE1	297.4	0.0	-232.5	29.3	103.0	68.3	34.4	OK
SP15	WID3	▲5.0▲	52	LE1	427.0	0.1	-69.7	233.0	-69.8	98.0	71.5	OK
		▲5.0▲	52	LE1	427.0	0.1	-69.6	-233.0	69.7	98.0	71.5	OK
SP15	WID3	▲10.0	160	LE1	77.2	0.0	-32.5	0.0	-40.4	17.7	9.9	OK
B4-bfl 1	SP16	▲5.0▲	170	LE1	307.0	0.0	-45.4	5.2	-175.2	70.5	21.4	OK
		▲5.0▲	170	LE1	299.0	0.0	-233.7	-29.4	103.6	68.6	34.6	OK
SP16	WID4	▲5.0▲	52	LE1	427.0	0.1	-69.5	233.1	-69.5	98.0	71.9	OK
		▲5.0▲	52	LE1	427.0	0.1	-69.5	-233.1	69.5	98.0	71.9	OK
SP16	WID4	▲10.0	160	LE1	77.8	0.0	-32.5	0.0	-40.8	17.9	10.0	OK

Design data

	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9σ [MPa]
S 355	0.90	435.6	352.8

Symbol explanation

- ϵ_{Pl} Strain
 $\sigma_{w,Ed}$ Equivalent stress
 $\sigma_{w,Rd}$ Equivalent stress resistance
 σ_{\perp} Perpendicular stress
 τ_{\parallel} Shear stress parallel to weld axis
 τ_{\perp} Shear stress perpendicular to weld axis
 0.9σ Perpendicular stress resistance - $0.9 \cdot f_u / \gamma_{M2}$
 β_w Correlation factor EN 1993-1-8 tab. 4.1
Ut Utilization
Utc Weld capacity utilization

Detailed result for SL-tfl 3 SP4

$$UT = \max\left(\frac{\sigma_{w,Ed}}{\sigma_{w,Rd}}; \frac{|\sigma_{\perp}|}{\sigma_{\perp,Rd}}\right) = 98.4 \%$$

$$\sigma_{w,Ed} = [\sigma_{\perp}^2 + 3(\tau_{\perp}^2 + \tau_{\parallel}^2)]^{0.5} = 428.7 \text{ MPa}$$

$$\sigma_{w,Rd} = f_u / (\beta_w \gamma_{M2}) = 435.6 \text{ MPa}$$

$$\sigma_{\perp,Rd} = 0.9 f_u / \gamma_{M2} = 352.8 \text{ MPa}$$

where:

$$f_u = 490.0 \text{ MPa} \quad - \text{ Ultimate strength}$$

$$\gamma_{M2} = 1.25 \quad - \text{ Safety factor}$$

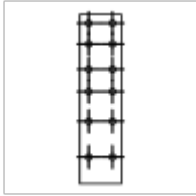
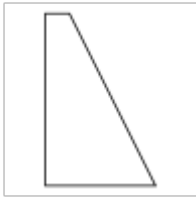
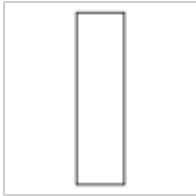
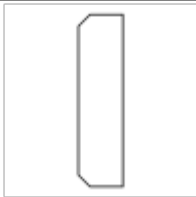
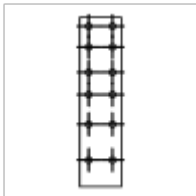
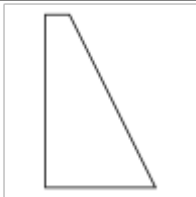
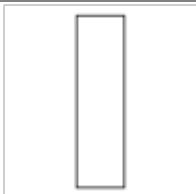
Project:
 Project no:
 Author:

Buckling

Buckling analysis was not calculated.

Bill of material

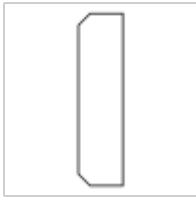
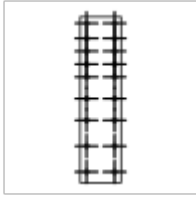
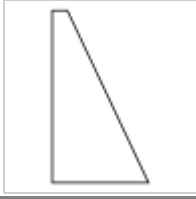
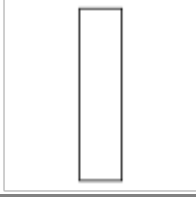
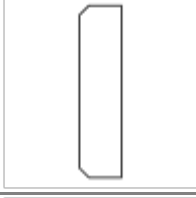
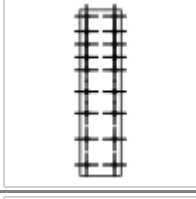
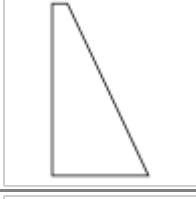
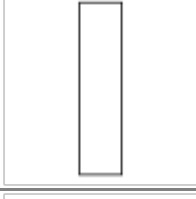
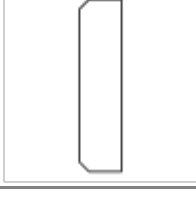
Manufacturing operations

Name	Plates [mm]	Shape	Nr.	Welds [mm]	Length [mm]	Bolts	Nr.
EP1	P18.0x140.0-570.0 (S 355)		1	Double fillet: a = 4.9 Double fillet: a = 3.1	240.0 230.2	M20 8.8	12
WID1	P10.0x250.0-390.0 (S 355)		1	Double fillet: a = 5.0 Double fillet: a = 4.9	803.5 390.0		
	P10.0x120.0-433.5 (S 355)		1				
STIFF1	P10.0x56.9-220.4 (S 355)		2	Double fillet: a = 4.9 Double fillet: a = 3.1	167.6 380.8		
EP2	P18.0x140.0-570.0 (S 355)		1	Double fillet: a = 4.9 Double fillet: a = 3.1	240.0 230.2	M20 8.8	12
WID2	P10.0x250.0-390.0 (S 355)		1	Double fillet: a = 5.0 Double fillet: a = 4.9	803.5 390.0		
	P10.0x120.0-433.5 (S 355)		1				

Project:

Project no:

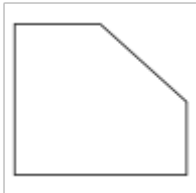
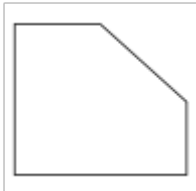
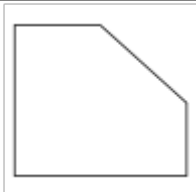
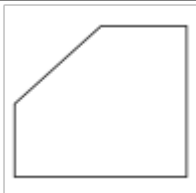
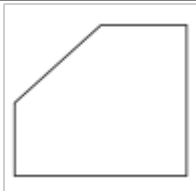
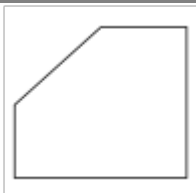
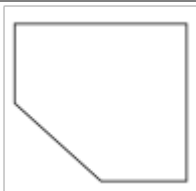
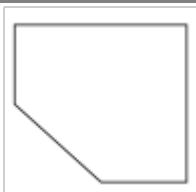
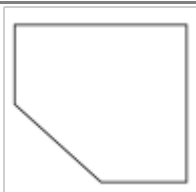
Author:

STIFF2	P10.0x56.9-220.4 (S 355)		2	Double fillet: a = 4.9 Double fillet: a = 3.1	167.6 380.8		
EP3	P18.0x190.0-770.0 (S 355)		1	Double fillet: a = 6.3 Double fillet: a = 4.0	340.0 347.3	M20 8.8	18
WID3	P10.0x330.0-590.0 (S 355)		1	Double fillet: a = 5.0	1729.9		
	P10.0x160.0-649.9 (S 355)		1				
STIFF3	P10.0x81.0-334.6 (S 355)		2	Double fillet: a = 5.0 Double fillet: a = 4.0	252.0 597.2		
EP4	P18.0x190.0-770.0 (S 355)		1	Double fillet: a = 6.3 Double fillet: a = 4.0	340.0 347.3	M20 8.8	18
WID4	P10.0x330.0-590.0 (S 355)		1	Double fillet: a = 5.0	1729.9		
	P10.0x160.0-649.9 (S 355)		1				
STIFF4	P10.0x81.0-334.6 (S 355)		2	Double fillet: a = 5.0 Double fillet: a = 4.0	252.0 597.2		

Project:

Project no:

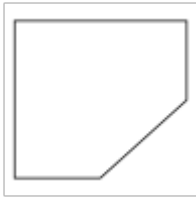
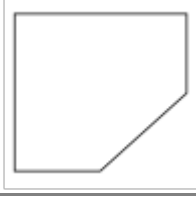
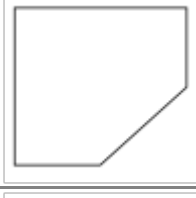
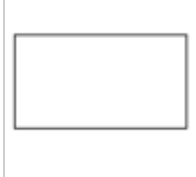


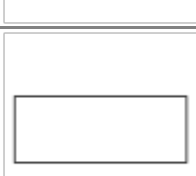
Author:

SP1	P10.0x190.0-166.5 (S 355)		1				
SP2	P10.0x190.0-166.5 (S 355)		1				
SP3	P10.0x190.0-166.5 (S 355)		1				
SP4	P10.0x190.0-166.5 (S 355)		1				
SP5	P10.0x190.0-166.5 (S 355)		1				
SP6	P10.0x190.0-166.5 (S 355)		1				
SP7	P10.0x182.2-166.5 (S 355)		1				
SP8	P10.0x182.2-166.5 (S 355)		1				
SP9	P10.0x182.2-166.5 (S 355)		1				

Project:

Project no:

Author:

SP10	P10.0x182.2-166.5 (S 355)		1				
SP11	P10.0x182.2-166.5 (S 355)		1				
SP12	P10.0x182.2-166.5 (S 355)		1				
SP13	P10.0x120.0-65.0 (S 355)		1				
SP14	P10.0x120.0-65.0 (S 355)		1				
SP15	P10.0x170.0-65.0 (S 355)		1				
SP16	P10.0x170.0-65.0 (S 355)		1				

Welds

Type	Material	Throat thickness [mm]	Leg size [mm]	Length [mm]
Double fillet	S 355	4.9	6.9	1835.2
Double fillet	S 355	3.1	4.4	1222.0
Double fillet	S 355	5.0	7.1	7681.9
Double fillet	S 355	6.3	9.0	680.0
Double fillet	S 355	4.0	5.7	1889.0
Double fillet	S 355	4.3	6.1	3232.1
Fillet	S 355	10.0	14.1	560.0

Project:

Project no:

Author:

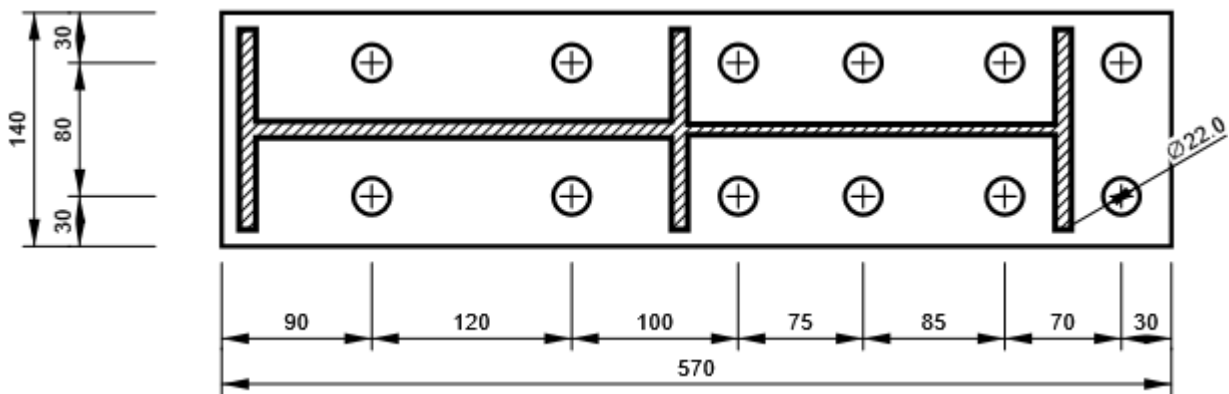
Bolts

Name	Grip length [mm]	Count
M20 8.8	31	48
M20 8.8	32	12

Drawing

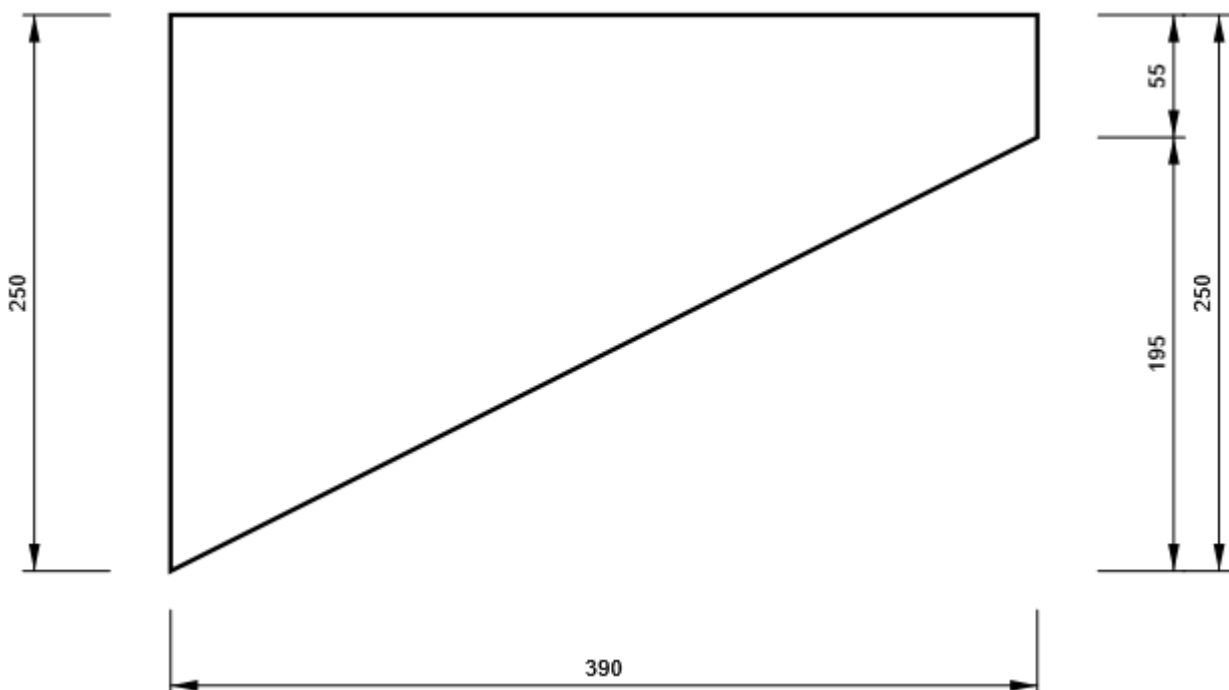
EP1

P18.0x570-140 (S 355)



WID1 - 1

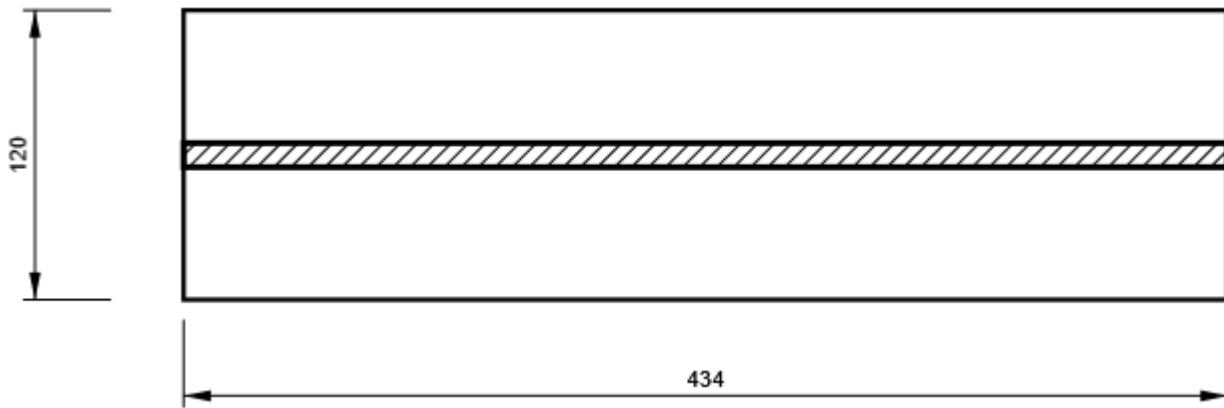
P10.0x390-250 (S 355)



WID1 - 2

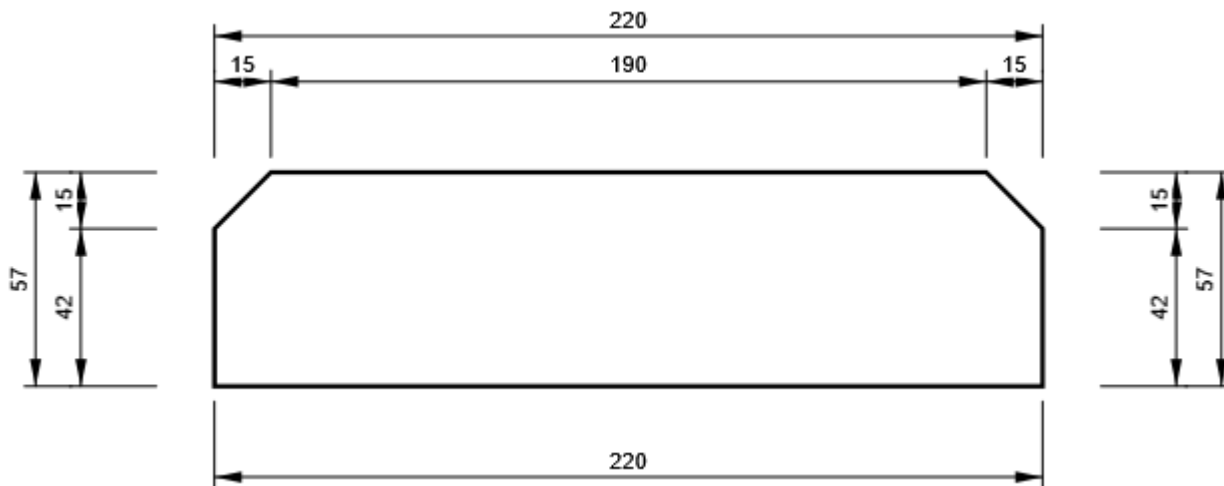
P10.0x434-120 (S 355)

Project:
Project no:
Author:



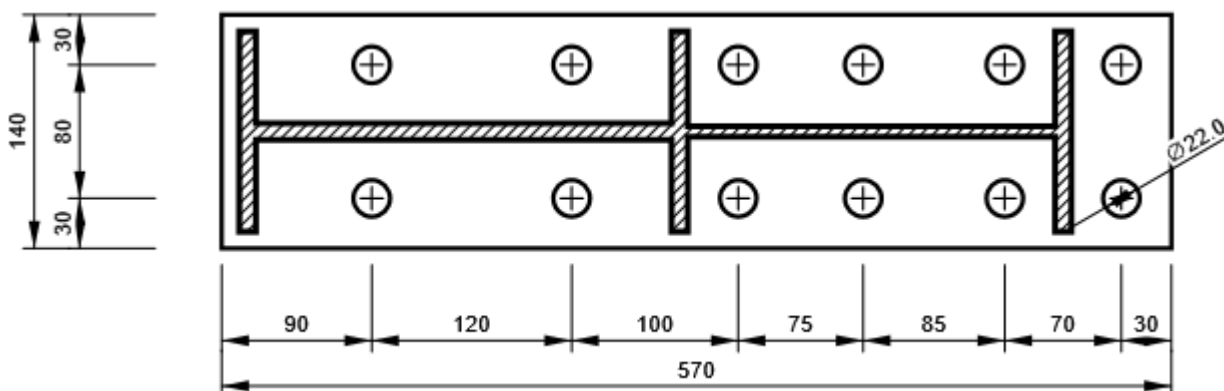
STIFF1

P10.0x220-57 (S 355)



EP2

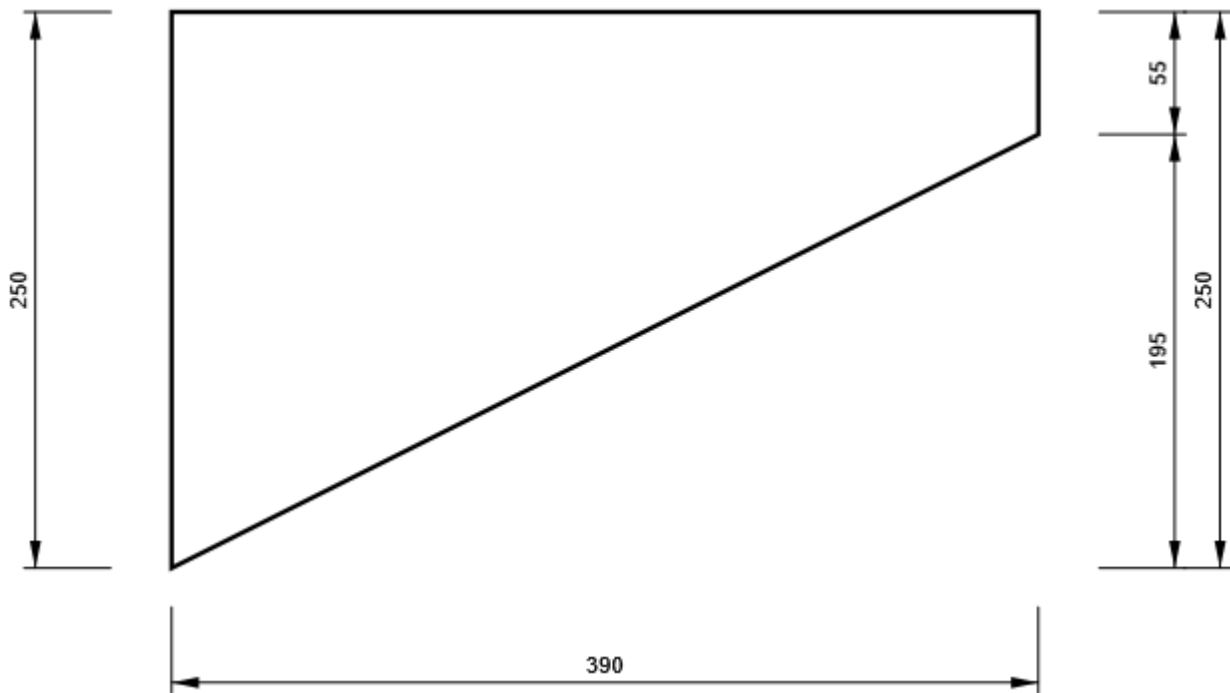
P18.0x570-140 (S 355)



WID2 - 1

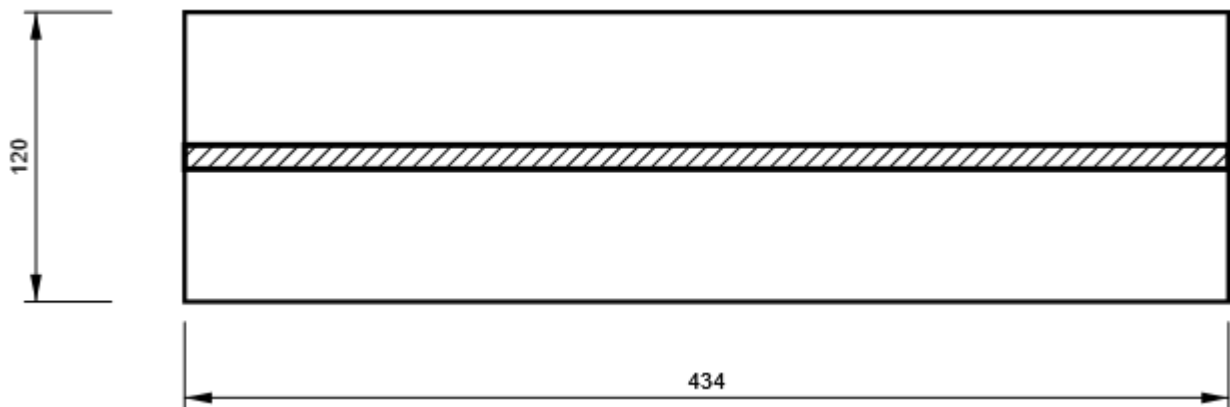
P10.0x390-250 (S 355)

Project:
Project no:
Author:



WID2 - 2

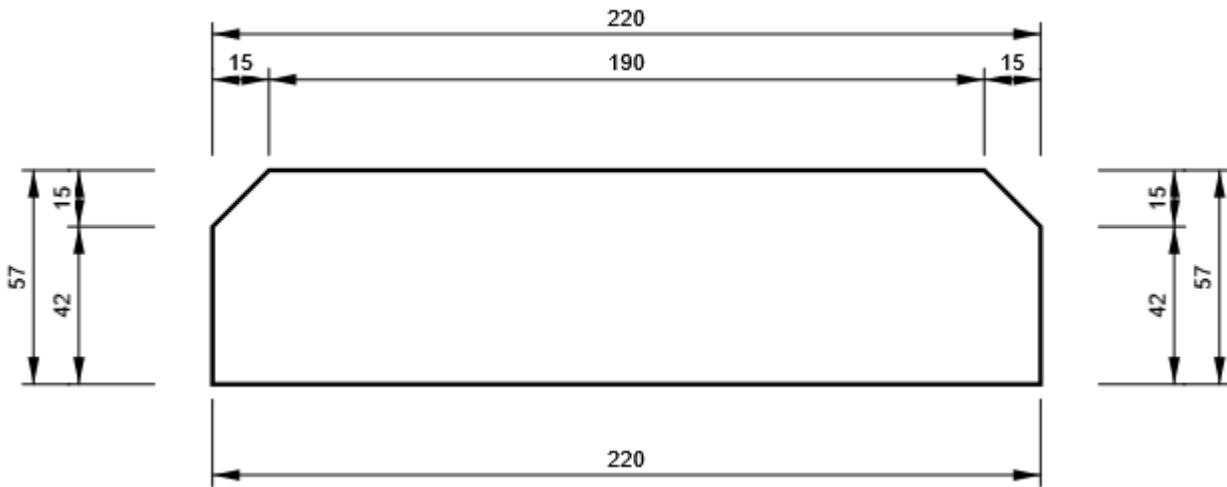
P10.0x434-120 (S 355)



STIFF2

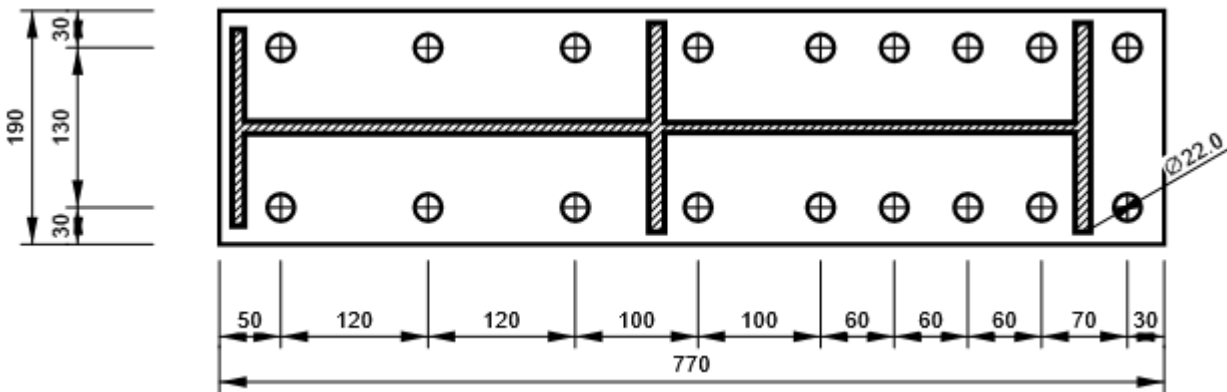
P10.0x220-57 (S 355)

Project:
Project no:
Author:



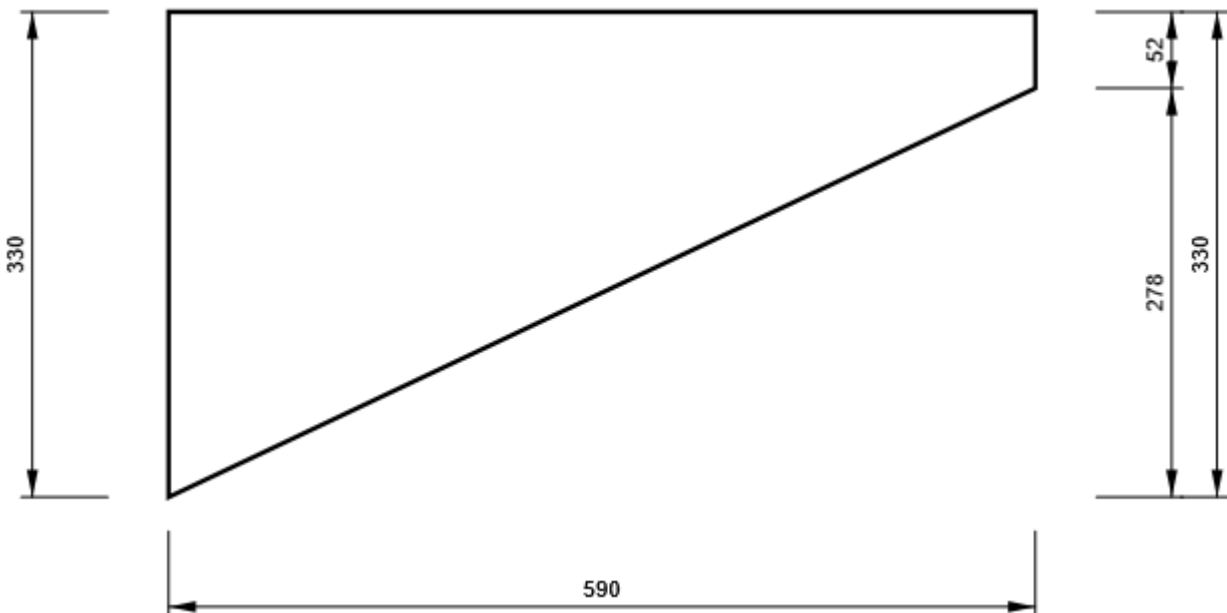
EP3

P18.0x770-190 (S 355)



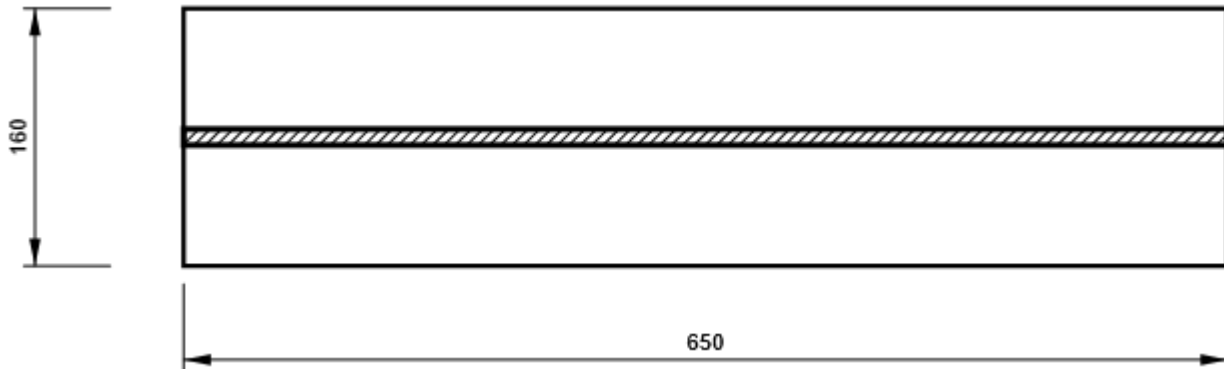
WID3 - 1

P10.0x590-330 (S 355)



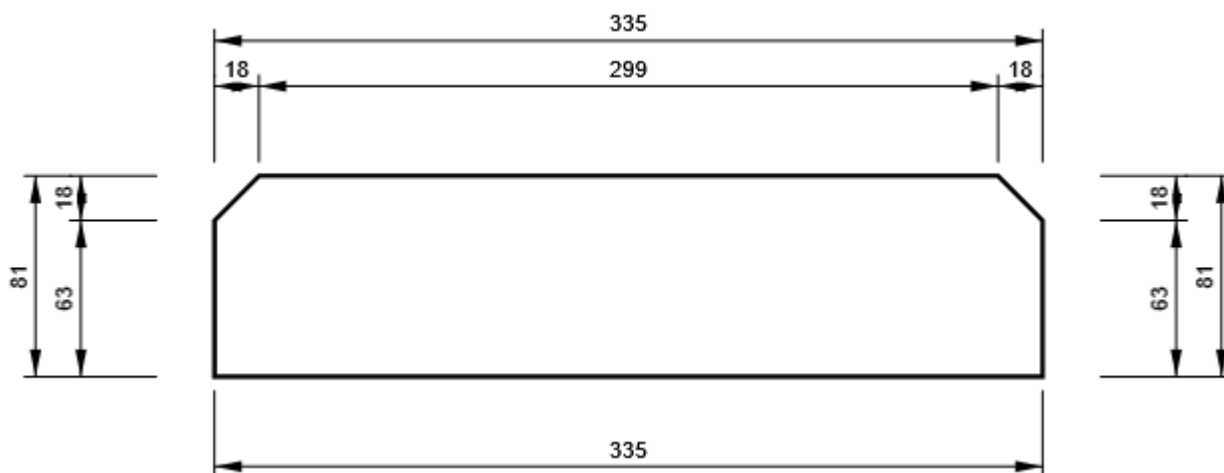
Project:
Project no:
Author:
WID3 - 2

P10.0x650-160 (S 355)



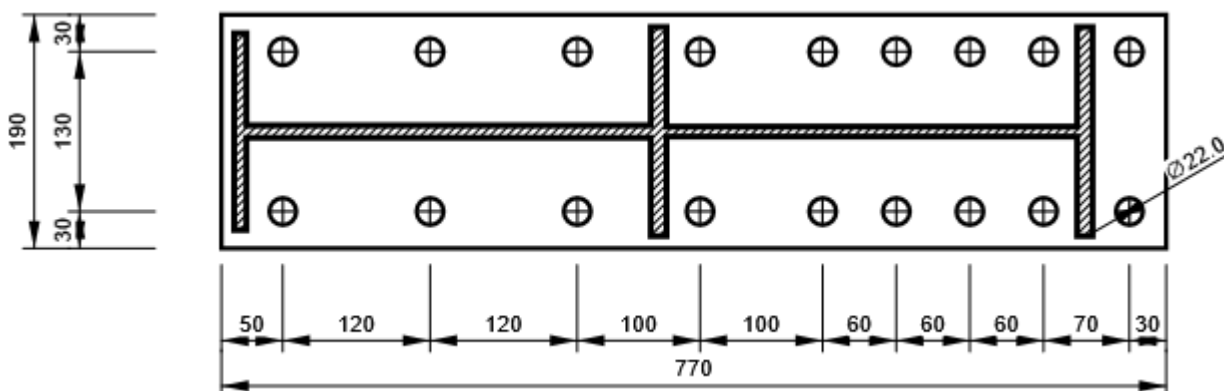
STIFF3

P10.0x335-81 (S 355)



EP4

P18.0x770-190 (S 355)



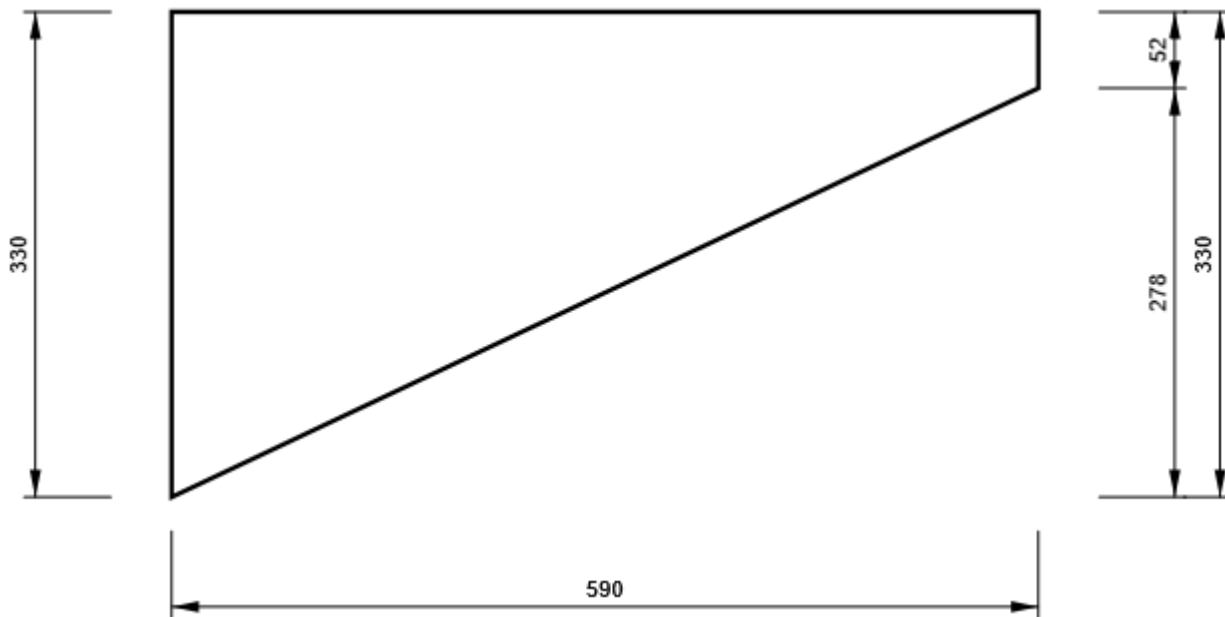
WID4 - 1

Project:

Project no:

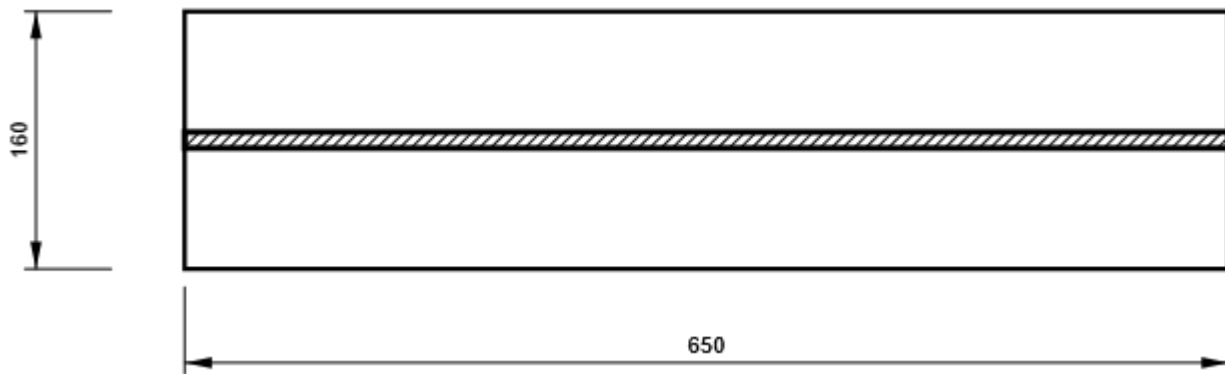
Author:

P10.0x590-330 (S 355)



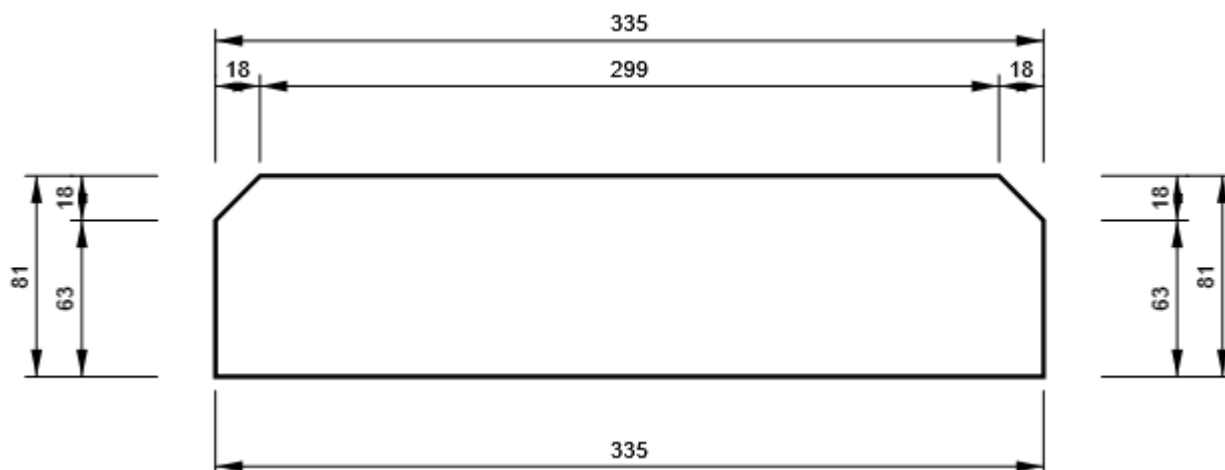
WID4 - 2

P10.0x650-160 (S 355)



STIFF4

P10.0x335-81 (S 355)



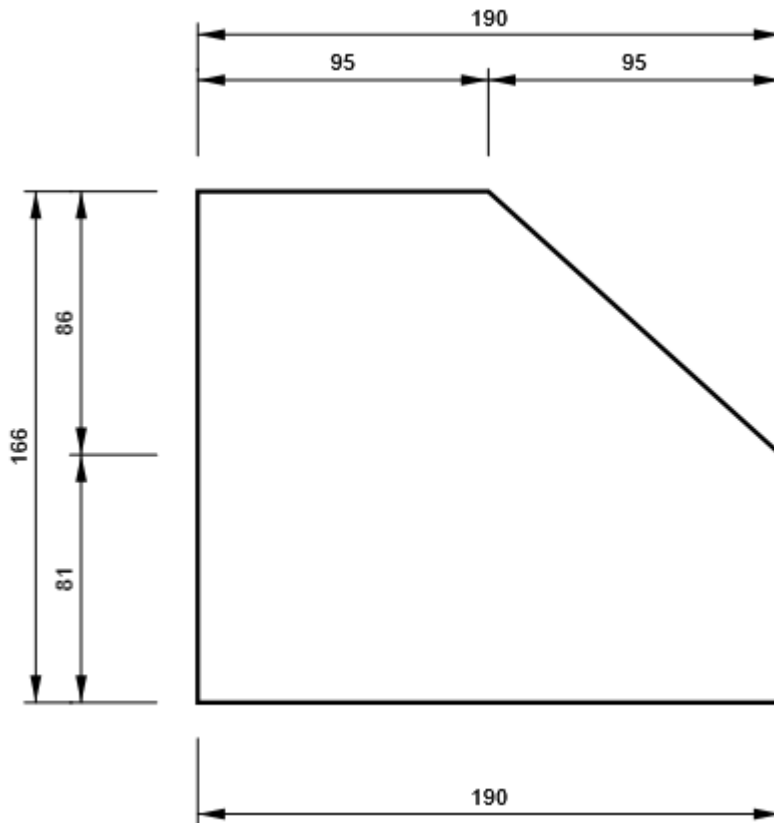
Project:

Project no:

Author:

SP1

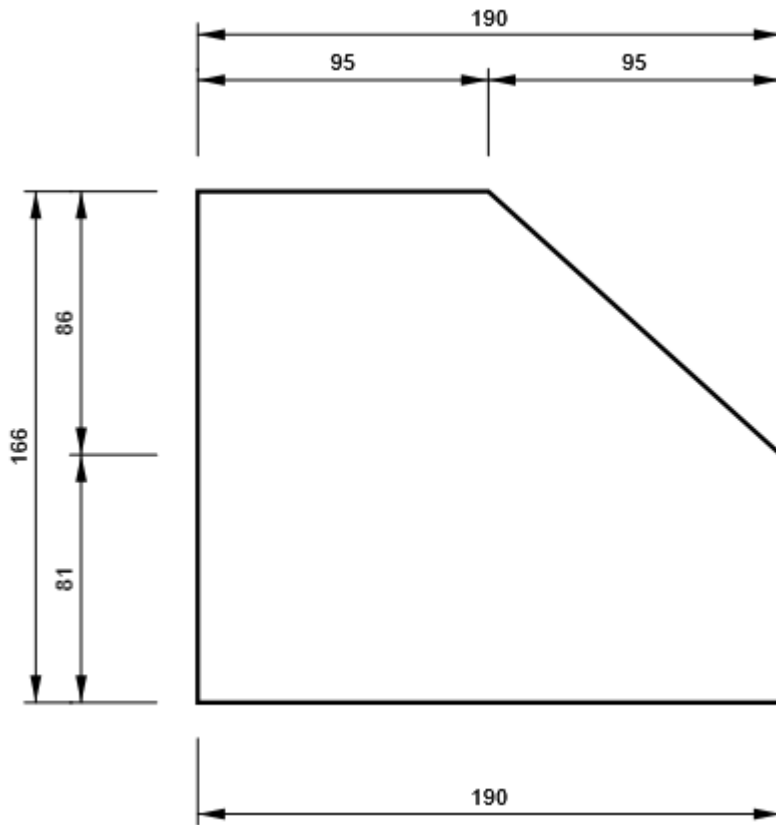
P10.0x166-190 (S 355)



SP2

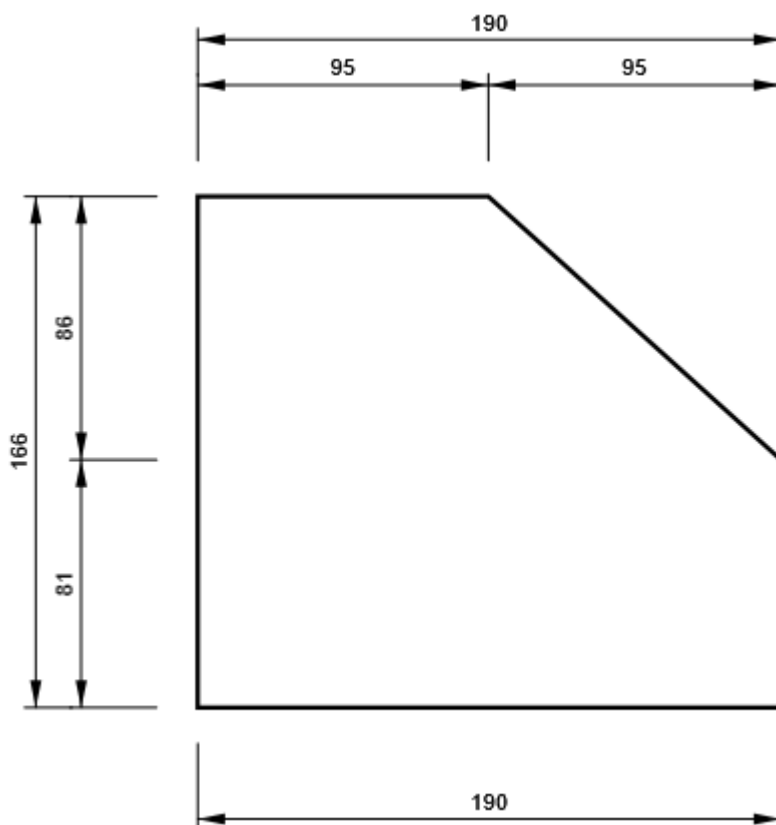
P10.0x166-190 (S 355)

Project:
Project no:
Author:



SP3

P10.0x166-190 (S 355)



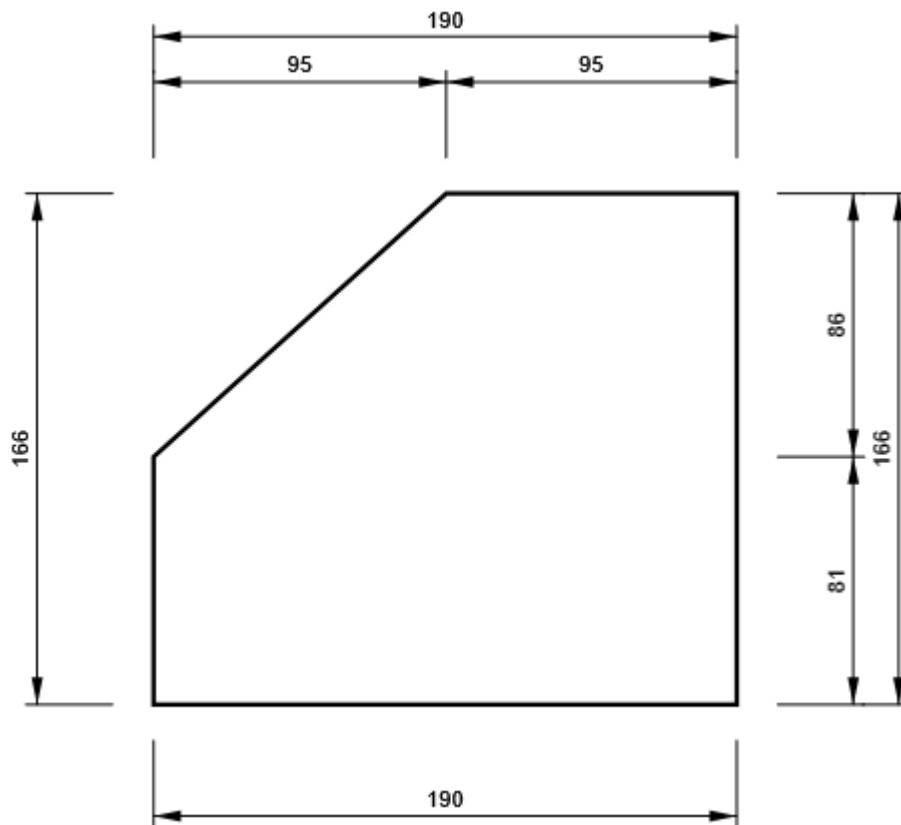
Project:

Project no:

Author:

SP4

P10.0x166-190 (S 355)



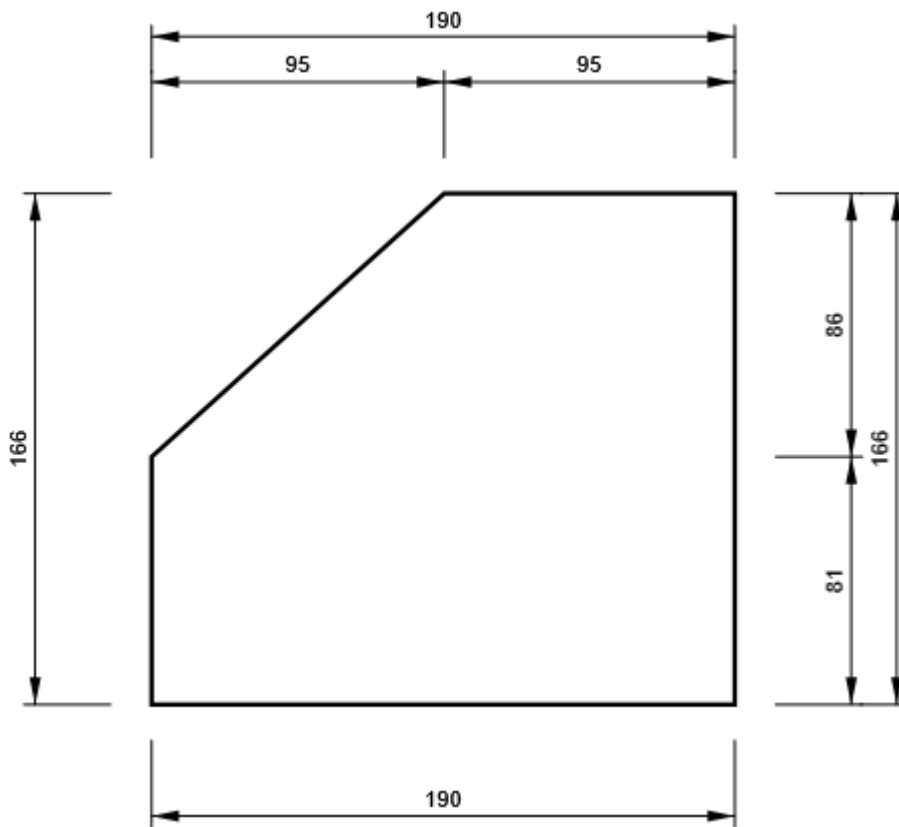
SP5

P10.0x166-190 (S 355)

Project:

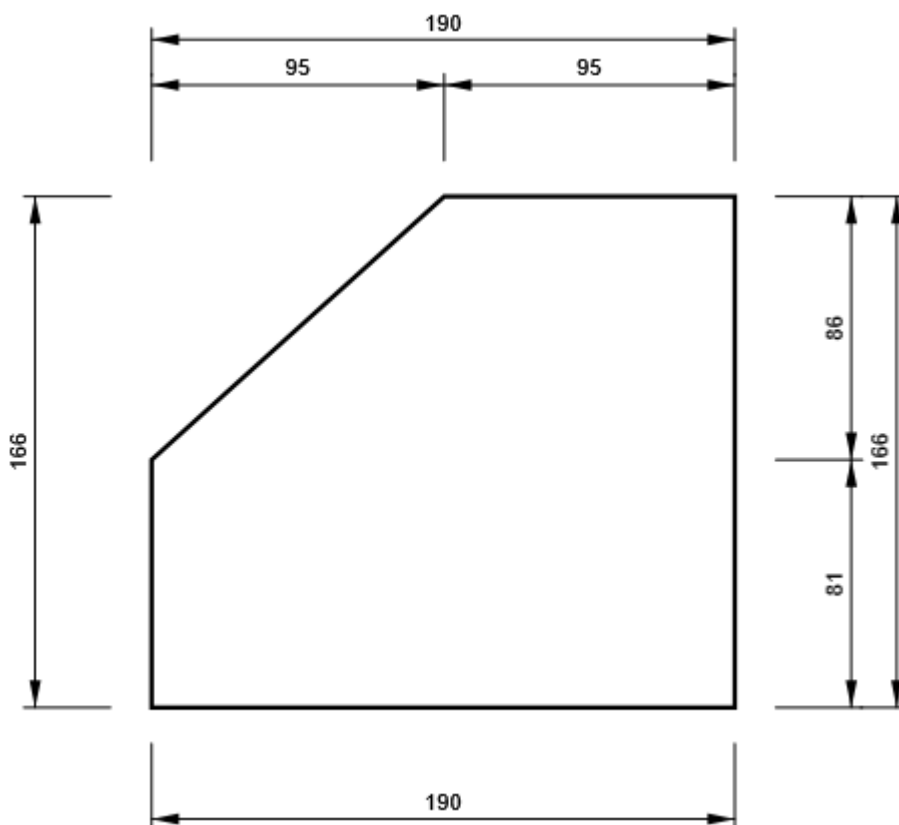
Project no:

Author:



SP6

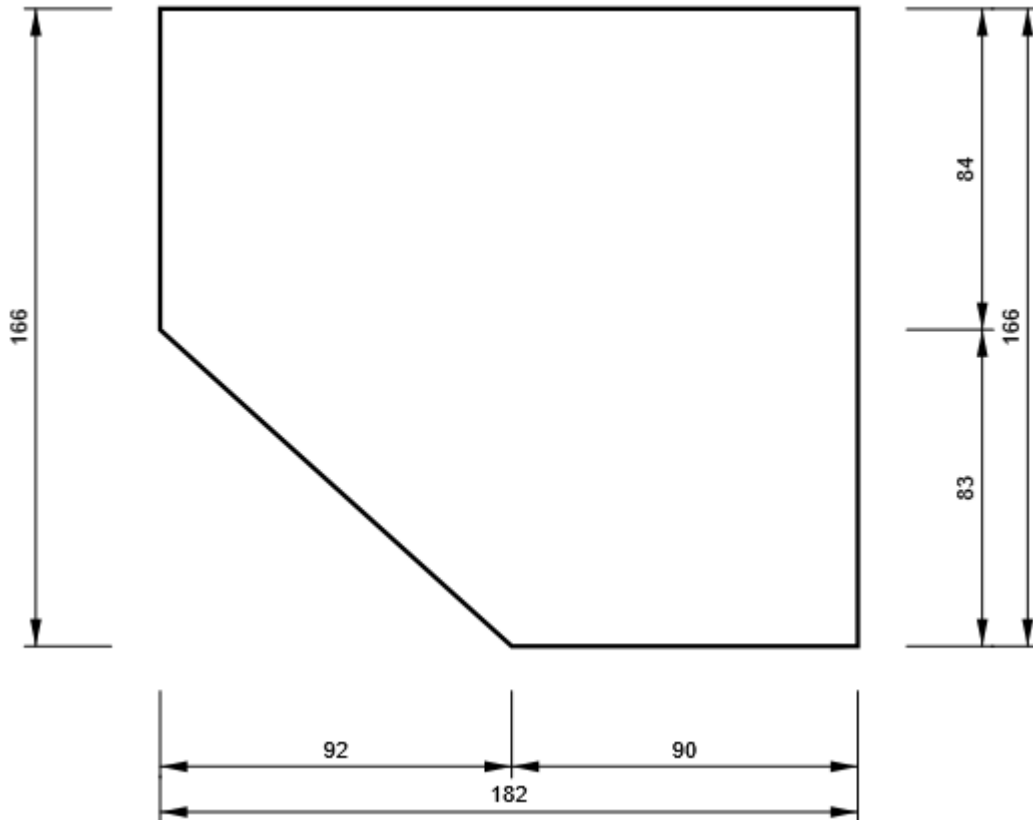
P10.0x166-190 (S 355)



Project:
Project no:
Author:

SP7

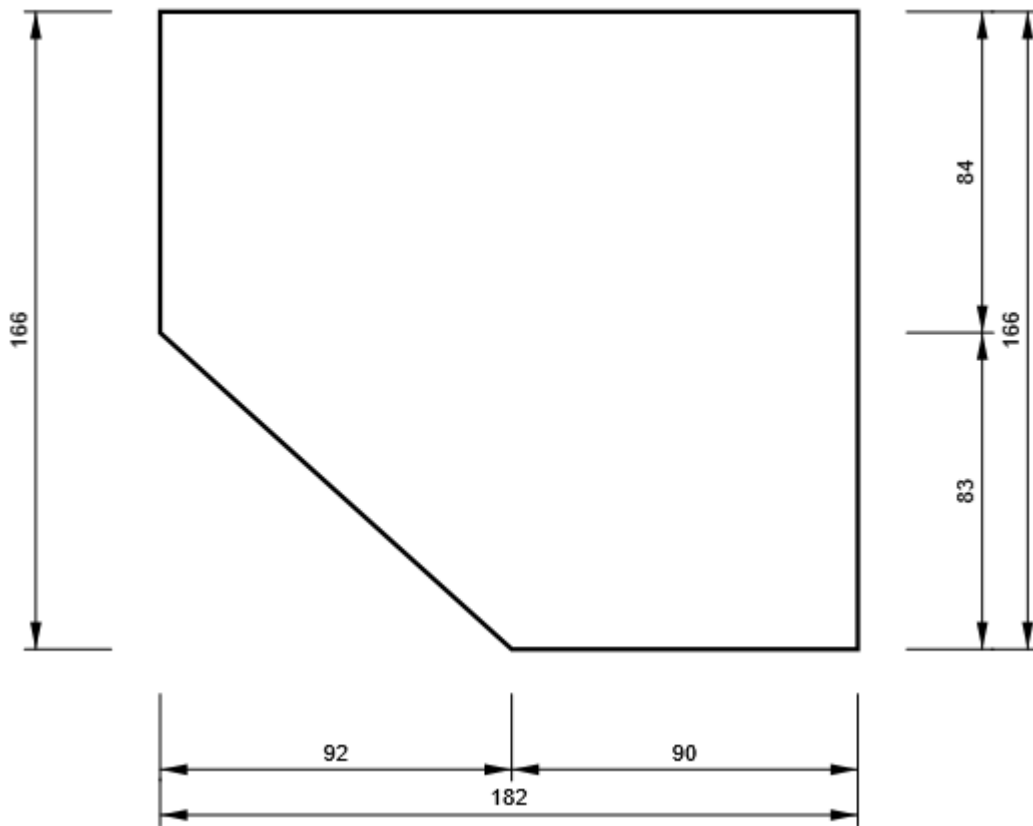
P10.0x166-182 (S 355)



SP8

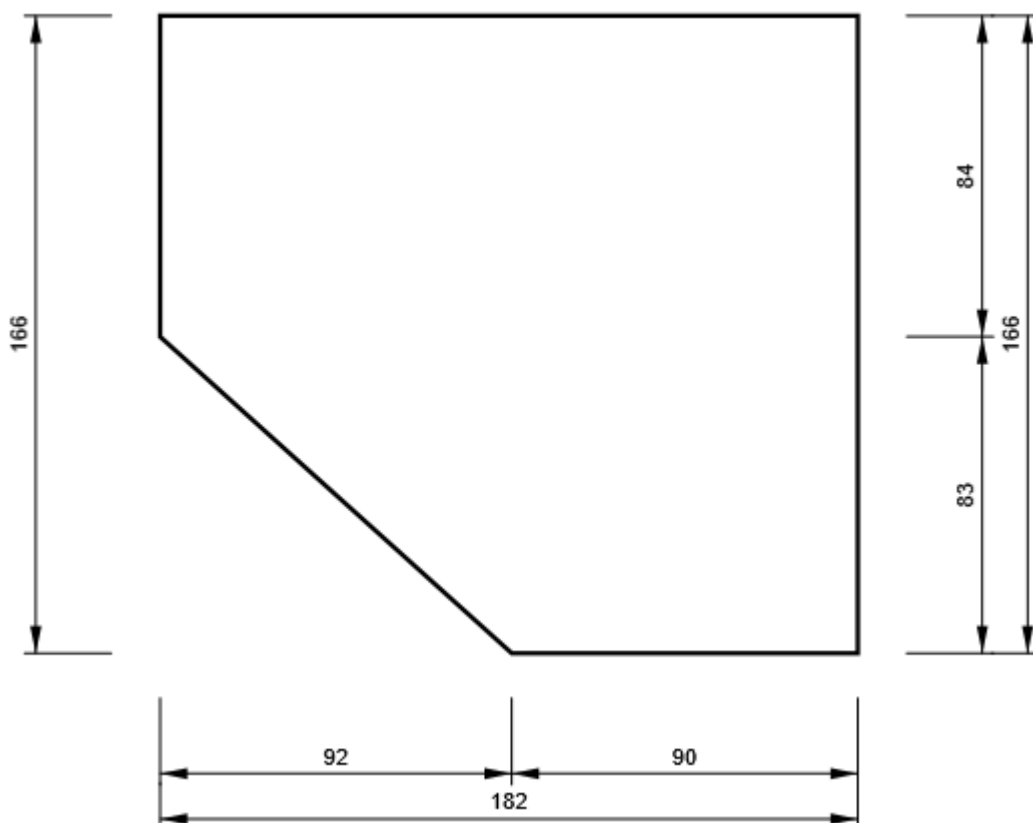
P10.0x166-182 (S 355)

Project:
Project no:
Author:



SP9

P10.0x166-182 (S 355)



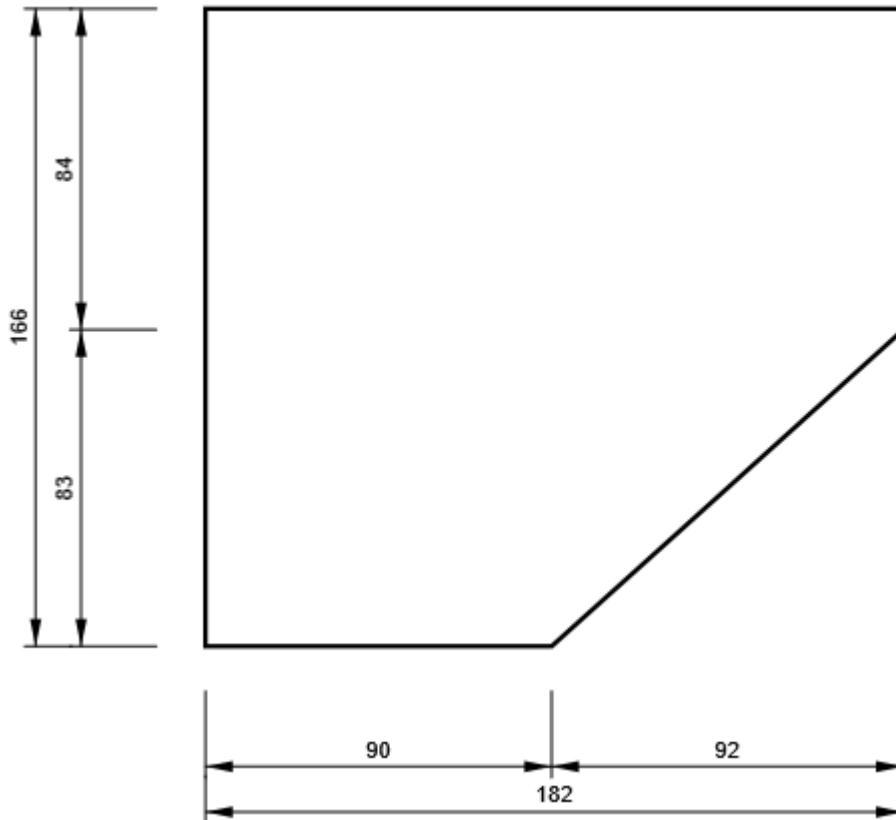
Project:

Project no:

Author:

SP10

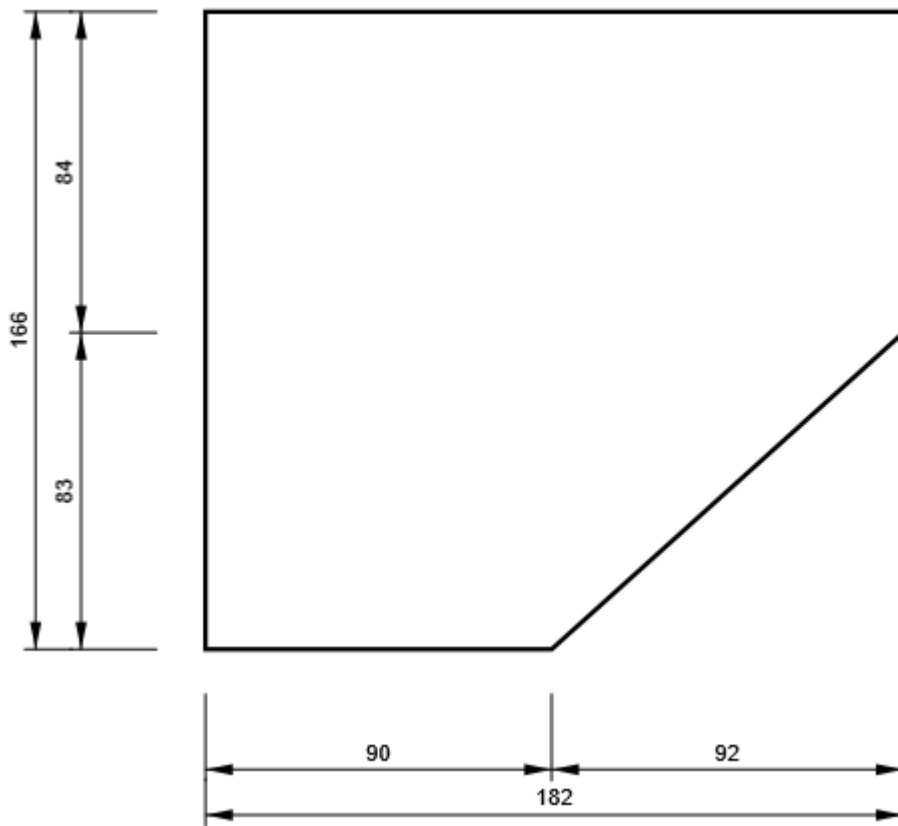
P10.0x166-182 (S 355)



SP11

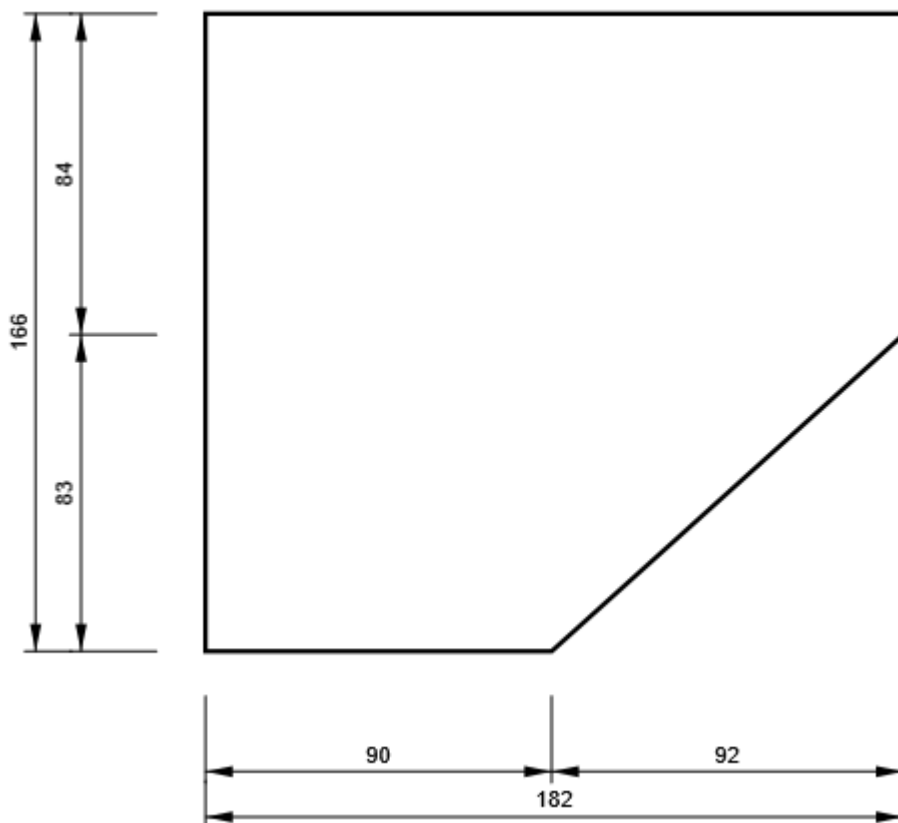
P10.0x166-182 (S 355)

Project:
Project no:
Author:



SP12

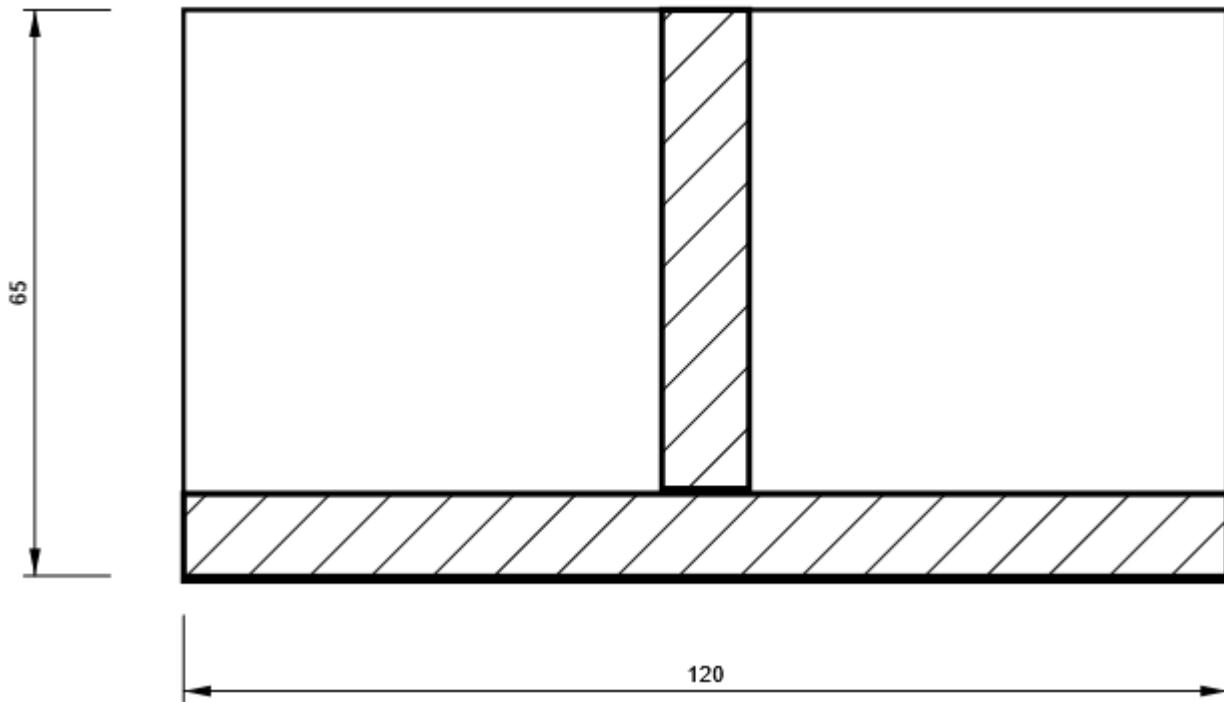
P10.0x166-182 (S 355)



Project:
Project no:
Author:

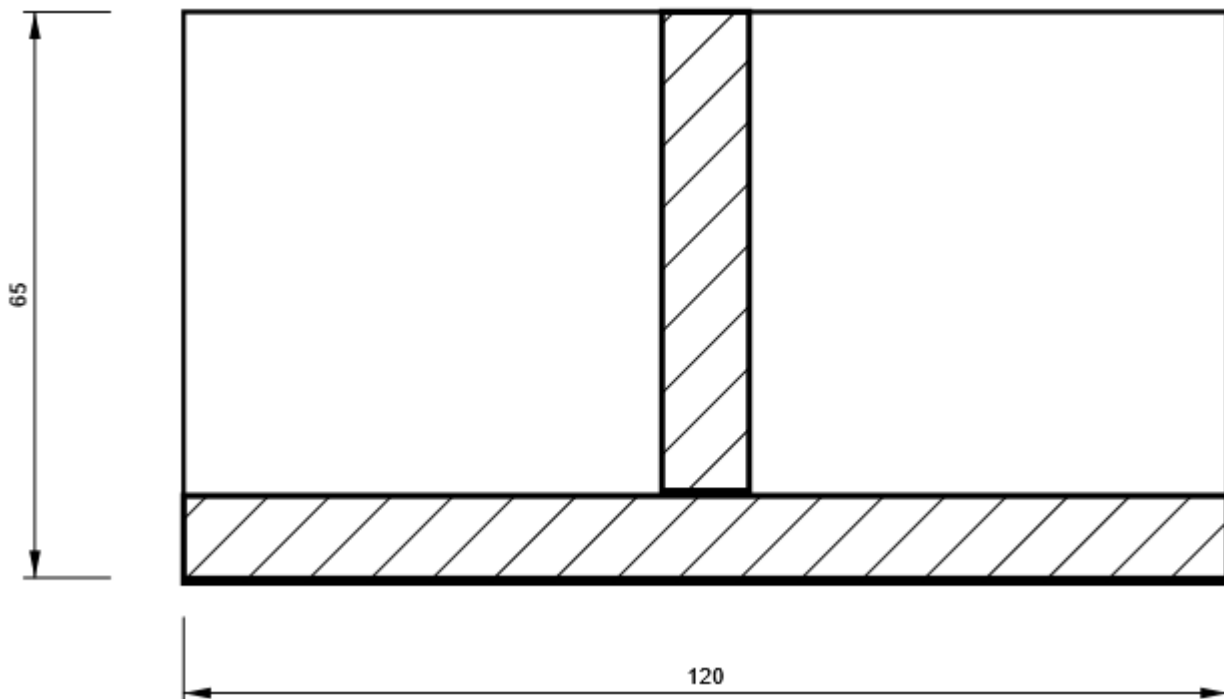
SP13

P10.0x65-120 (S 355)



SP14

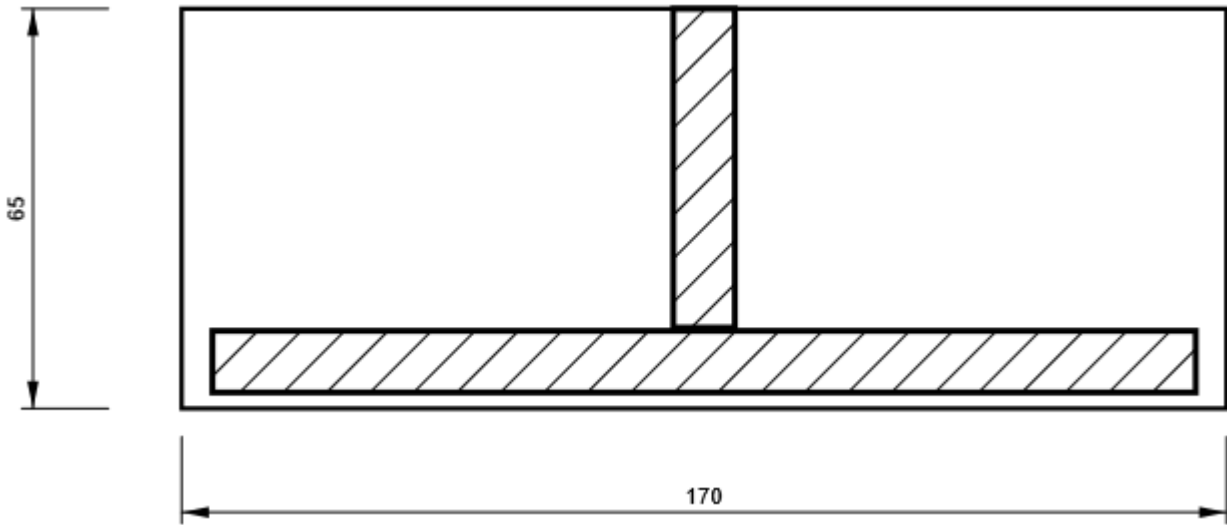
P10.0x65-120 (S 355)



SP15

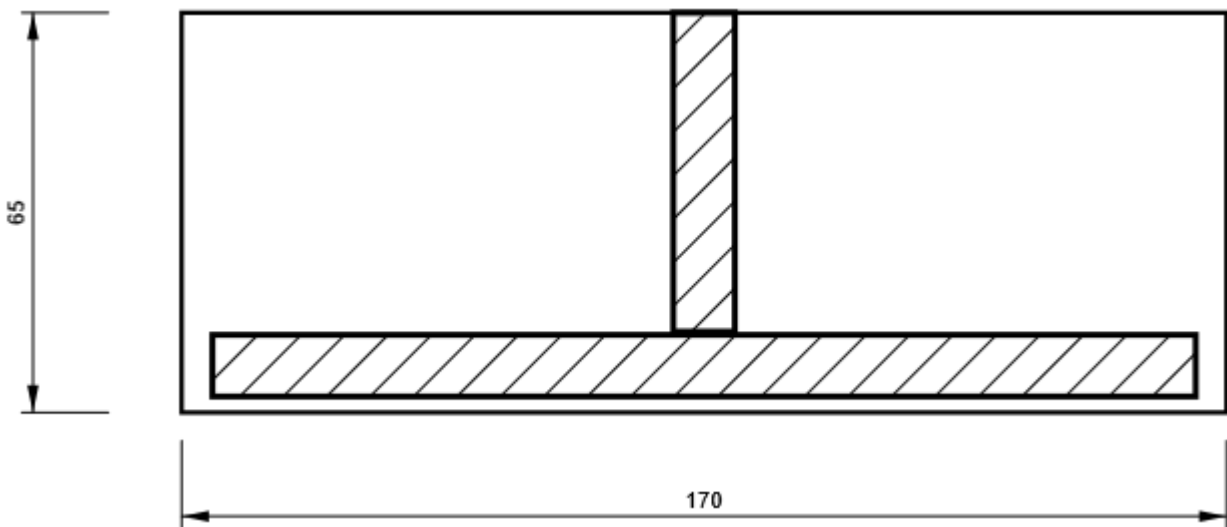
P10.0x65-170 (S 355)

Project:
Project no:
Author:

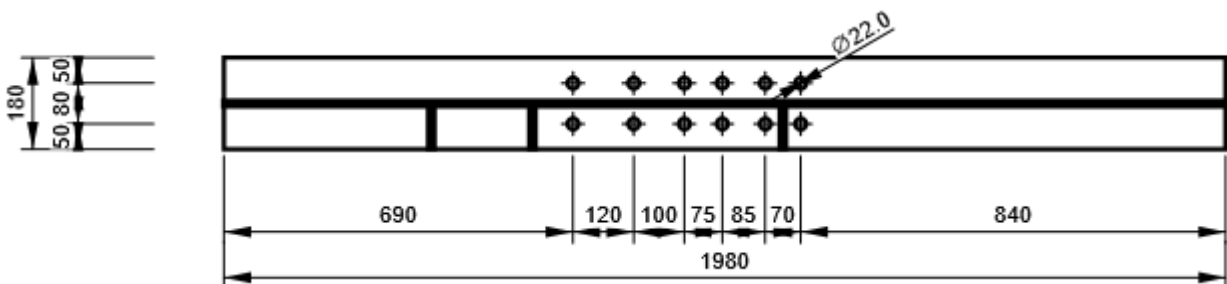


SP16

P10.0x65-170 (S 355)



SL, General - Bottom flange 1:

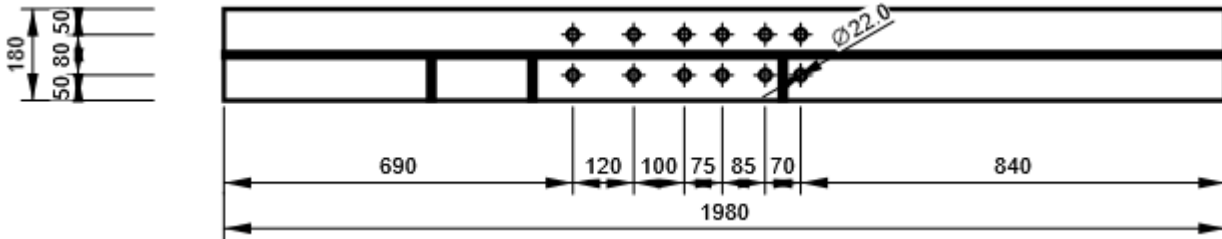


SL, General - Top flange 1:

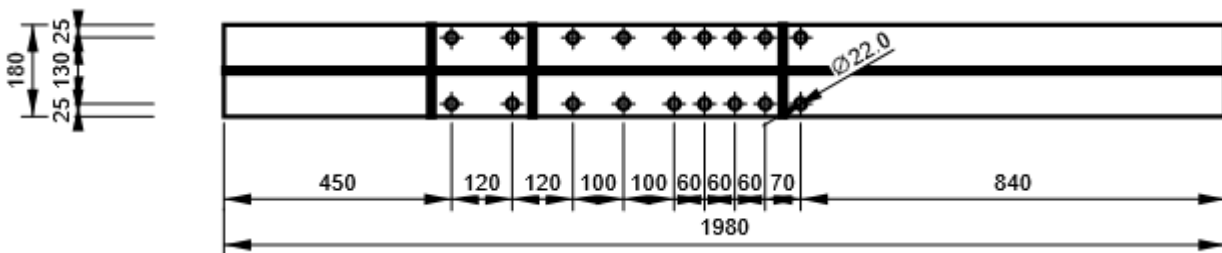
Project:

Project no:

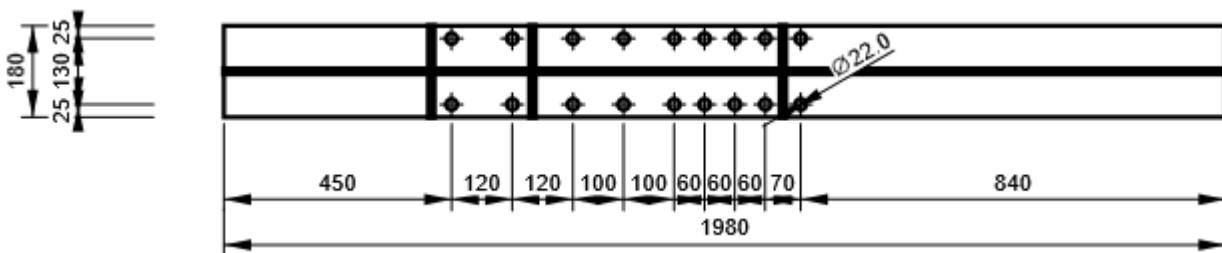
Author:



SL, General - Top flange 2:



SL, General - Top flange 3:



Code settings

Item	Value	Unit	Reference
γ_{M0}	1.00	-	EN 1993-1-1: 6.1
γ_{M1}	1.00	-	EN 1993-1-1: 6.1
γ_{M2}	1.25	-	EN 1993-1-1: 6.1
γ_{M3}	1.25	-	EN 1993-1-8: 2.2
γ_c	1.50	-	EN 1992-1-1: 2.4.2.4
γ_{Inst}	1.20	-	ETAG 001-C: 3.2.1
Joint coefficient β_j	0.67	-	EN 1993-1-8: 6.2.5
Effective area - influence of mesh size	0.10	-	
Friction coefficient - concrete	0.25	-	EN 1993-1-8
Friction coefficient in slip-resistance	0.30	-	EN 1993-1-8 tab 3.7
Limit plastic strain	0.05	-	EN 1993-1-5
Weld stress evaluation	Plastic redistribution		
Detailing	No		
Distance between bolts [d]	2.20	-	EN 1993-1-8: tab 3.3
Distance between bolts and edge [d]	1.20	-	EN 1993-1-8: tab 3.3
Concrete breakout resistance	No		ETAG 001-C
Use calculated α_b in bearing check.	Yes		EN 1993-1-8: tab 3.4