



European Technical Assessment

**ETA-24/0471
of 21.08.2024**

General Part

Technical Assessment Body issuing the European Technical Assessment:
LUXEMBOURG INSTITUTE FOR BUILDING AND TECHNOLOGY

Trade name of the construction product

SIKLA SiFramo for PRS

Product family to which the construction product belongs

Steel components for pallet racking systems

Manufacturer

Sikla Holding GmbH
Ägydiplatz 3
A-4600 Thalheim bei Wels
Austria

Manufacturing plant(s)

Manufacturing plants of SIKLA

This European Technical Assessment contains

56 pages including 52 annexes which form an integral part of this assessment

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of

EAD 200059-00-0302
Steel components for pallet racking systems

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Specific parts

1. Technical description of the product

The construction products are corrosion-protected steel components from the siFramo system.

The system consists of upright sections, horizontal beams and, if necessary, stiffeners that are connected using the beam-end connectors. All beams, upright sections and stiffeners are made of S355MC according to EN 10149-2:2013 and are designed as hollow cross-sections. They are manufactured from thin-walled sheet metal elements by roll forming and then welded together to form a single hollow cross-section that is continuously perforated on all sides. An example of the product is shown in annex 1.

The types upright sections and beam-profiles are summarized in Annex 2.

There are four different types of beam end connectors (BEC) to fix the beams to the upright sections (AK, STA, WD and SKO). Additionally, there are three types of beam end connectors (BEC) to fix the beams to an existing steel structure (WBD and TKO).

The different types of BEC are described in annex 3-8.

A summary of the types beam end connectors (BEC) part of this ETA is shown in Annex 2.

The weld seams are manufactured in accordance with execution class EXC 2 - EN 1090-2:2018. The upright sections, beam sections and beam end connectors are hot-dip galvanized in accordance with EN ISO 1461:2022.

All connections shall correspond to the specifications given in the annexes. The material characteristics, dimensions and tolerances not indicated in annexes shall correspond to the specifications given in the technical documentation deposited with LUXIB.

The specifications for the self forming screw FLS F, used for the beam end connectors, are given in ETA-21/0936 of 14.08.2022.

For the beam end connectors (BEC) TKO and WBD, the connection between BEC and steel substructure, using metric screws M12 8.8 or M16 8.8 according to EN ISO 898 including nuts and washers, is not part of the assessment and has to be assessed additionally.

2. Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The components are intended to be used in accordance with EAD 200059-00-0302 Section 1.2.1 Furthermore the intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads). The threads formed by the screw FLS-F for the BEC are not intended for re-use.

According to EAD 200059-00-0302 a working life of the steel components for pallet racking systems of 10 years are taken into account.

The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3. Performance of the product and references to the methods used for its assessment

The performances are only valid if the components are used in compliance with the specifications and boundary conditions given in the Annexes to this ETA and are installed in accordance with the manufacturer's installation instructions.

Mechanical resistance and stability (BWR1)		
No.	Essential characteristic	Performance
1	Upright characteristics	
	Effective area of cross section A_{eff} [cm ²]	See Annex 10
	Effective section moduli W_{eff} [cm ³]	See Annex 10
	Reduction factor for lateral-torsional buckling χ_{LT} [-]	NPD
	Buckling curve $\chi(\bar{\lambda})$ [-]	NPD
2	Beam end connector (BEC) and connector lock characteristics	
	Bending strength M_{Rk} [kNcm]	See Annex 11-52
	Stiffness $k(\eta)$ [kNcm/rad]	See Annex 11-52
	Moment-rotation curve (Rotational stiffness) $k(\theta)$ [kNcm/rad]	NPD
	Looseness ϕ_i [rad]	NPD
	Shear strength V_{Rk} [kN]	See Annex 11-52
3	Floor connection characteristics	
	Ultimate moment of resistance for a range of axial loads N $M_{Rk}(N)$ [kNcm]	NPD
	Stiffness for a range of axial loads N $k(N)$ [kNcm/rad]	NPD

Mechanical resistance and stability (BWR1)		
No.	Essential characteristic	Performance
4	Upright frame characteristics	
	Transverse shear stiffness S [kN/rad]	NPD
	Range of transverse shear stiffness validity V_{max} [kN]	NPD
5	Beam characteristics	
	Effective section moduli W_{eff} [cm ³]	See Annex 10
	Stiffness for a range of axial loads N $k(N)$ [kNcm/rad]	NPD
6	Upright splices characteristics	
	Ultimate moment of resistance for a range of axial loads N $M_{Rk}(N)$ [kNcm]	NPD
	Stiffness for a range of axial loads N $k(N)$ [kNcm/rad]	NPD

The rotational stiffnesses k were determined conservatively. Therefore, the rotational stiffnesses of the connections might be higher than stated in the annexes.

4. Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

In accordance with EAD 200059-01-0302, the applicable European legal act is:

Commission Decision 1998/214/EC, amended by 2001/596/EC.

The AVCP-system to be applied is: **2+**

5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP-system are laid down in the control plan deposited with LUXIB.

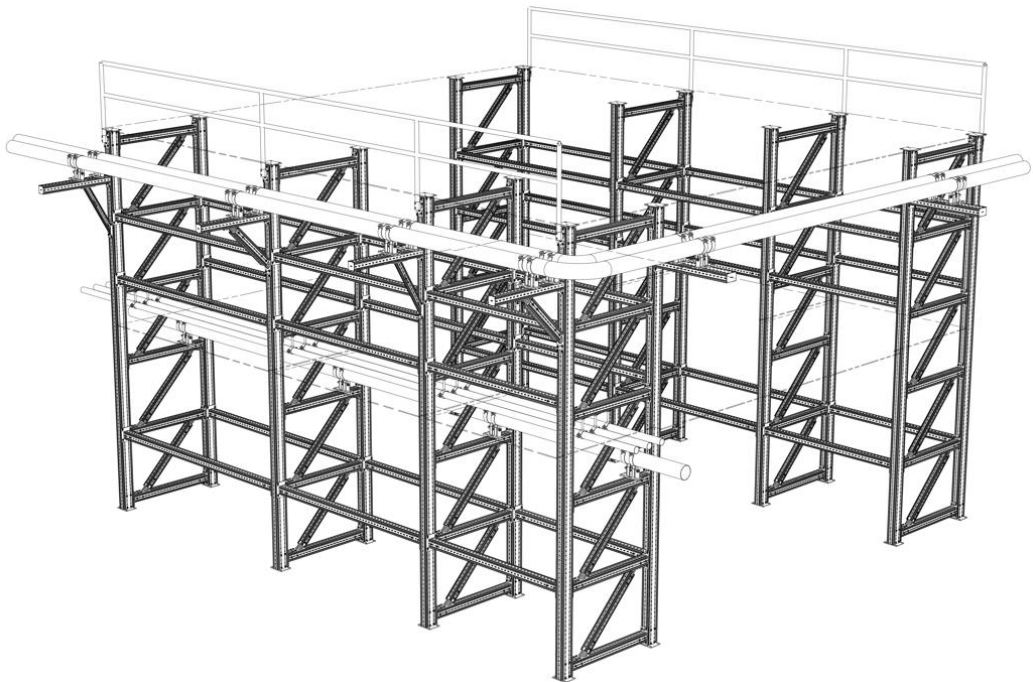
Issued in Luxembourg on 21.08.2024 by Luxembourg Institute for Building and Technology

Thierry Kohnen
General Manager

Description of the

The products are corrosion-protected steel components for pallet racking systems (PRS) of SIKLA Holding GmbH.

Figure 1: Example of a PRS



Terms and symbols used in this ETA

A_{eff}	Effective area of cross section
W_{eff}	Effective section moduli
M_{Rk}	Characteristic value of bending resistance
V_{Rk}	Characteristic value of shear resistance
$C_{M,Rd}$ [kNm/rad]	Rotational stiffness k at M_{Rd} . With $M_{Rd} = M_{Rk} / 1.25$
$C_{M,Geb}$ [kNm/rad]	Rotational stiffness k at $M_{Rk} / 1.5$
$C_{M,ini}$ [kNm/rad]	Initial Rotational stiffness k
γ_M	Recommended partial safety factor (see Annex 9).

Steel components for PRS	Annex 1
Description of the product Terms and symbols	

Table 1: Exam Summary of Beam and upright sections

Type	Annex
TP F 80/30	10
TP F 80	10
TP F 100	10
TP F 100/160	10

Table 2: Summary of Beam End connectors

Type	Annex	Type	Annex
type 1: AK F 80/30	11	type 22: WBD F 100 - T	32
type 2: AK F 80/30-E	12	type 23: WD F 100 140/140	33
type 3: STA F 80/30-E	13	type 24: TKO F 100/160	34
type 4: STA F 80-E	14	type 25: WBD F 100/160 - 121/160	35
type 5: AK F 80	15	type 26: STA F 100-E	36
type 6: AK F 80-E	16	type 27: STA F 80/30	37
type 7: STA F 80	17	type 28: STA F 80/30-Q	38
type 8: TKO F 80	18	type 29: STA F 80-E 45°	39
type 9: WBD F 80 – 80/120	19	type 30: STA F 100-80	40
type 10: WBD F 80 – 121/160	20	type 31: STA F 100-80-E	41
type 11: WBD F 80 – 161/200	21	type 32: STA F 100-80-E 45°	42
type 12: WBD F 80 – 201/310	22	type 33: STA F 160-100-E	43
type 13: WBD F 80 – T	23	type 34: STA F 160-Q	44
type 14: AK F 100	24	type 35: WD F 80	45
type 15: AK F 100-E	25	type 36: WD F 80 single	46
type 16: STA F 100	26	type 37: AK F 80/30-Q	47
type 17: TKO F 100	27	type 38: AK F 100-80	48
type 18: WBD F 100 - 80/120	28	type 39: AK F 100-80-E	49
type 19: WBD F 100 - 121/160	29	type 40: AK F 160-100-E	50
type 20: WBD F 100 - 161/200	30	type 41: SKO F 80	51
type 21: WBD F 100 - 201/310	31	type 42: SKO F 100	52

Steel components for PRS

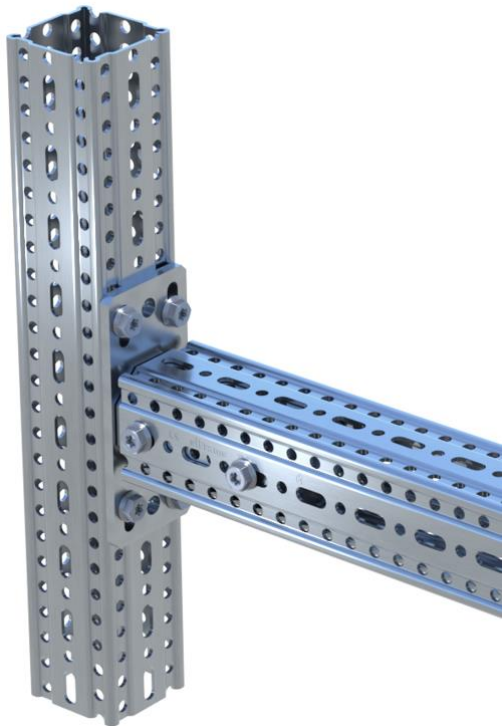
Summary of the components

Annex 2

Installation situation for beam end connectors (BEC)

The following figure shows a typical beam end connector.

Figure 2: Example of a BEC Type “STA”



Component I (beam) is fastened with 4 Self Forming Screws (FLS F) to the connector.
The connector is fastened with 4 Self Forming Screws (FLS F) to component II (upright section).

Steel components for PRS	Annex 3
Example of Type “STA”	

Installation situation for beam end connectors (BEC)

The following figure shows a typical beam end connector.

Figure 3: Example of a BEC Type “TKO”



Component I (beam) is welded to the beam bracket (connector). The beam bracket is fastened with 4 metric screws M12 8.8 according to EN ISO 898 including nuts and washers to component II (upright section).

Component II is not part of the PRC and therefore, the connection between beam bracket and component II is not part of the assessment.

Steel components for PRS	Annex 4
Example of Type “TKO”	

Installation situation for beam end connectors (BEC)

The following figure shows a typical beam end connector.

Figure 4: Example of a BEC Type “WBD”



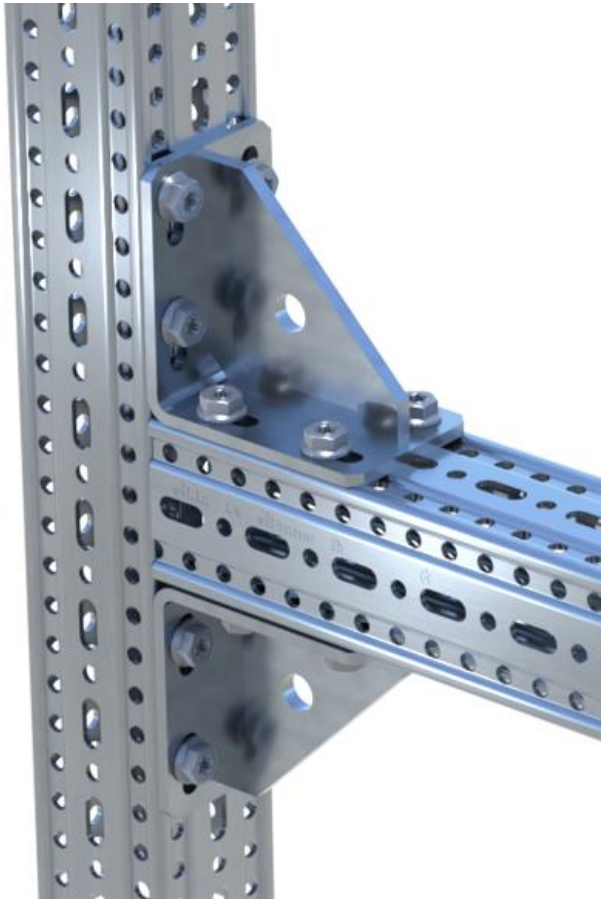
Component I (beam) is fastened with 4 Self Forming Screws (FLS F) to the connector.
The end support is fastened with 4 metric screws M12 8.8 according to EN ISO 898 including nuts and washers to component II (upright section).
Component II is not part of the PRC and therefore, the connection between beam bracket and component II is not part of the assessment.

Steel components for PRS	
Example of Type “WBD”	Annex 5

Installation situation for beam end connectors (BEC)

The following figure shows a typical beam end connector.

Figure 5: Example of a BEC Type “WD”



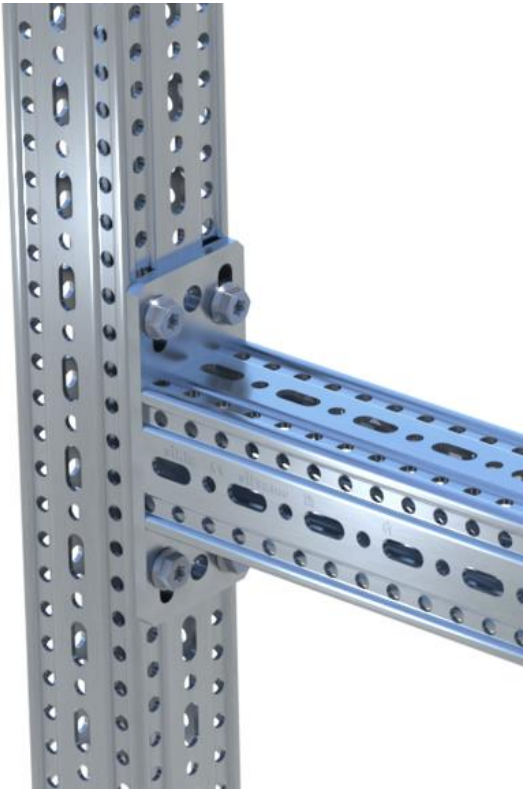
Component I (beam) is fastened with in total 8 Self Forming Screws (FLS F) to both corner brackets. The corner brackets are fastened with in total 8 Self Forming Screws (FLS F) to component II (upright section).

Steel components for PRS	Annex 6
Example of Type “WD”	

Installation situation for beam end connectors (BEC)

The following figure shows a typical beam end connector.

Figure 6: Example of a BEC Type “AK”



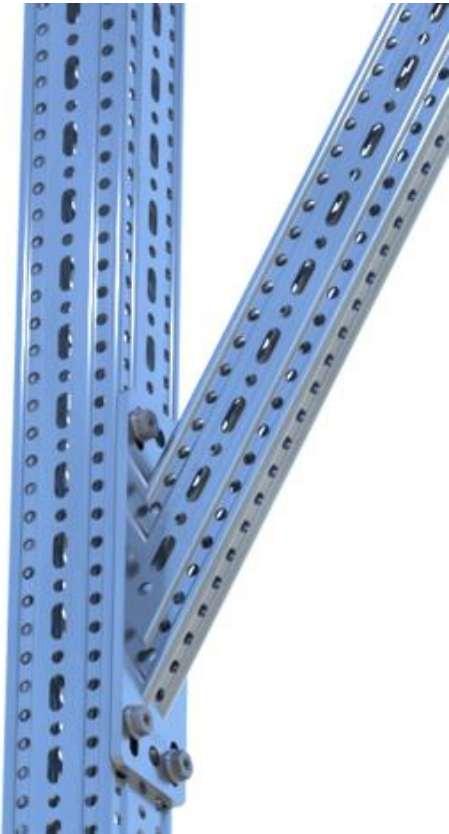
Component I (beam) is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II (upright section).

Steel components for PRS	Annex 7
Example of Type “AK”	

Installation situation for beam end connectors (BEC)

The following figure shows a typical beam end connector.

Figure 7: Example of a BEC Type “SKO”



Component I (beam) is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II (upright section).

Steel components for PRS	Annex 8
Example of Type “SKO”	

Recommendations for design

The design value of bending and shear resistance shall be determined as follows:

$$M_{y,Rd} = \frac{M_{y,Rk}}{\gamma_M} \quad M_{z,Rd} = \frac{M_{z,Rk}}{\gamma_M} \quad V_{y,Rd} = \frac{V_{y,Rk}}{\gamma_M} \quad V_{z,Rd} = \frac{V_{z,Rk}}{\gamma_M}$$

The characteristic values $M_{y,Rk}$, $M_{z,Rk}$, $V_{y,Rk}$ and $V_{z,Rk}$ are given in the Annexes.

The recommended partial safety factor is $\gamma_M = 1.25$, if no partial safety factor is given in national regulations or national Annexes to Eurocode 3.

For the beam end connectors (BEC) TKO and WBD, the connection between BEC and steel substructure is not part of the assessment and has to be assessed additionally.

The beam sections according to table 3 are not at risk for lateral torsional buckling.

The rotational stiffnesses were determined conservatively. Therefore, the rotational stiffnesses of the connections might be higher than stated in the annexes.

Compression and Torsional resistances of the beam sections are not part of this assessment.

If the degree of elastic tension utilisation of the beam section is more than 50% in the area of the BEC, the characteristic resistances of the BEC shall be reduced by 10%.

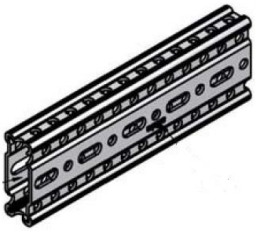
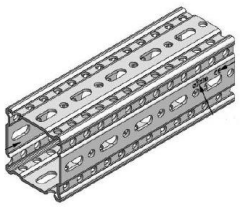
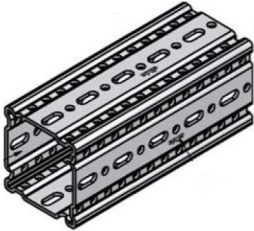
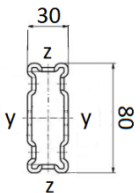
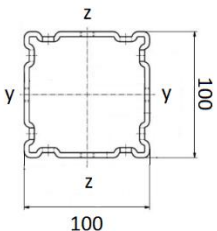
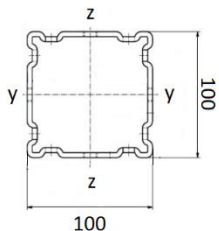
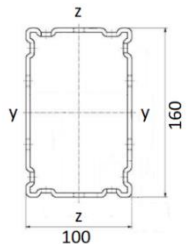
Installation conditions

The installation is carried out according to the manufacturer's instructions.

The self forming screws FLS F are used according to ETA-21/0936 of 14.08.2022.

Steel components for PRS	Annex 9
Recommendations for design	

Table 3: Beam and upright characteristics

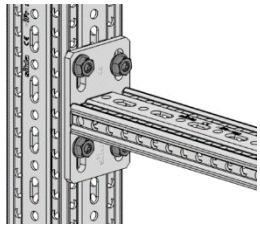
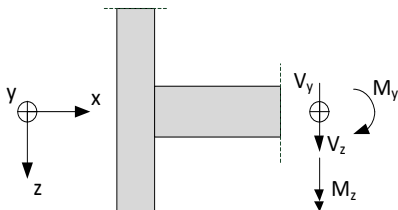
Beam and upright characteristics				
Picture				
Cross section [mm]				
Connector	TP F 80/30	TP F 80	TP F 100	TP F 100/160
A_{eff} [cm ²]	2.69	4.94	7.75	14.50
$W_{el,y,eff}$ [cm ³]	7.930	12.946	32.770	68.117
$W_{el,z,eff}$ [cm ³]	4.153	12.946	32.770	46.922

Steel components for PRS

Beam and upright characteristics

Annex 10

Beam end connector characteristics

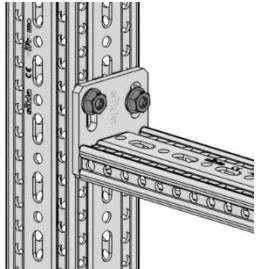
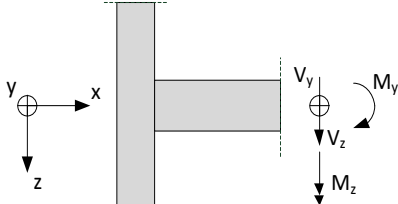
Beam end connector type 1: AK F 80/30		
	Connector:	Cantilever Bracket AK F 80/30
	Component I	Beam section TP F 80/30
	Component II	Beam section TP F 80
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]		1.69
$C_{My,Rd}$ [kNm/rad]		60.0
$C_{My,Geb}$ [kNm/rad]		111.0
$C_{My,ini}$ [kNm/rad]		222.0
$M_{z,Rk}$ [kNm]		1.04
$C_{Mz,Rd}$ [kNm/rad]		74.0
$C_{Mz,Geb}$ [kNm/rad]		97.0
$C_{Mz,ini}$ [kNm/rad]		124.0
$V_{z,Rk}$ [kN]		7.51
$V_{y,Rk}$ [kN]		11.52

Steel components for PRS

Beam end connector type 1

Annex 11

Beam end connector characteristics

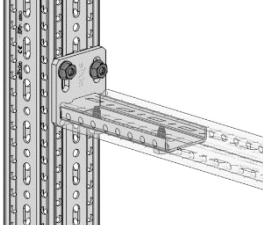
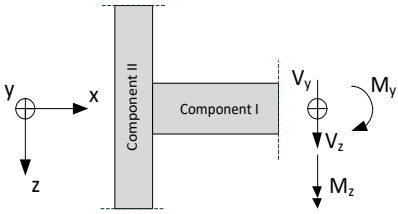
Beam end connector type 2: AK F 80/30-E		
	Connector:	End Support AK F 80/30-E
	Component I	Beam section TP F 80/30
	Component II	Beam section TP F 80
	description	Component I is welded to the face plate. The face plate is fastened with 2 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	0.23 (positive direction only)	
$C_{My,Rd}$ [kNm/rad]	5.00 (positive direction only)	
$C_{My,Geb}$ [kNm/rad]	12.0 (positive direction only)	
$C_{My,ini}$ [kNm/rad]	12.0 (positive direction only)	
$M_{z,Rk}$ [kNm]	0.61	
$C_{Mz,Rd}$ [kNm/rad]	10.0	
$C_{Mz,Geb}$ [kNm/rad]	22.0	
$C_{Mz,ini}$ [kNm/rad]	42.0	
$V_{z,Rk}$ [kN]	7.51 (positive direction only)	
$V_{y,Rk}$ [kN]	11.21	

Steel components for PRS

Beam end connector type 2

Annex 12

Beam end connector characteristics

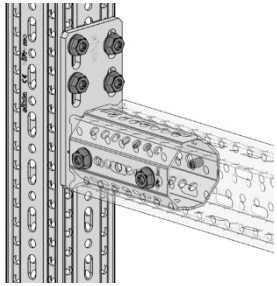
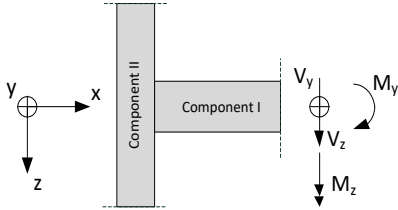
Beam end connector type 3: STA F 80/30-E		
	Connector:	End Support STA F 80/30
	Component I	Beam section TP F 80/30
	Component II	Beam section TP F 80
	description	Component I is fastened with 2 Self Forming Screws (FLS F) to the connector. Both screws need to be screwed into the adapter on the bottom side (alignment as seen in the image). The connector is fastened with 2 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	0.23 (positive direction only)	
$C_{My,Rd}$ [kNm/rad]	5.00 (positive direction only)	
$C_{My,Geb}$ [kNm/rad]	12.0 (positive direction only)	
$C_{My,ini}$ [kNm/rad]	12.0 (positive direction only)	
$M_{z,Rk}$ [kNm]	0.61	
$C_{Mz,Rd}$ [kNm/rad]	10.0	
$C_{Mz,Geb}$ [kNm/rad]	22.0	
$C_{Mz,ini}$ [kNm/rad]	42.0	
$V_{z,Rk}$ [kN]	7.51 (positive direction only)	
$V_{y,Rk}$ [kN]	11.21	

Steel components for PRS

Beam end connector type 3

Annex 13

Beam end connector characteristics

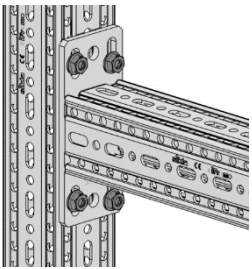
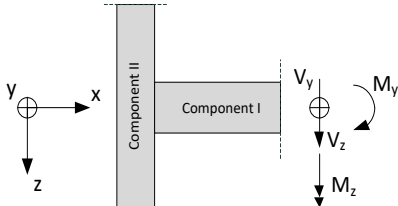
Beam end connector type 4: STA F 80-E		
	Connector:	End Support STA F 80-E
	Component I	Beam section TP F 80
	Component II	Beam section TP F 80
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	2.52 (positive direction only)	
$C_{My,Rd}$ [kNm/rad]	42.0 (positive direction only)	
$C_{My,Geb}$ [kNm/rad]	44.0 (positive direction only)	
$C_{My,ini}$ [kNm/rad]	46.0 (positive direction only)	
$M_{z,Rk}$ [kNm]	0.92	
$C_{Mz,Rd}$ [kNm/rad]	17.0	
$C_{Mz,Geb}$ [kNm/rad]	25.0	
$C_{Mz,ini}$ [kNm/rad]	33.0	
$V_{z,Rk}$ [kN]	39.65 (positive direction only)	
$V_{y,Rk}$ [kN]	9.96	

Steel components for PRS

Beam end connector type 4

Annex 14

Beam end connector characteristics

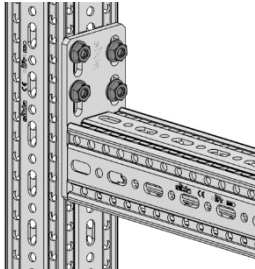
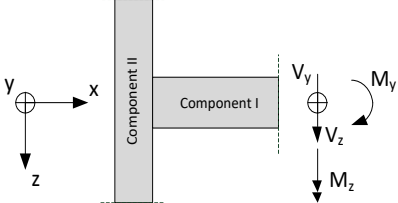
Beam end connector type 5: AK F 80		
	Connector:	Cantilever Bracket AK F 80
	Component I	Beam section TP F 80
	Component II	Beam section TP F 80
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]		2.61
$C_{My,Rd}$ [kNm/rad]		128.0
$C_{My,Geb}$ [kNm/rad]		195.0
$C_{My,ini}$ [kNm/rad]		246.0
$M_{z,Rk}$ [kNm]		1.21
$C_{Mz,Rd}$ [kNm/rad]		33.0
$C_{Mz,Geb}$ [kNm/rad]		52.0
$C_{Mz,ini}$ [kNm/rad]		64.0
$V_{z,Rk}$ [kN]		27.39
$V_{y,Rk}$ [kN]		15.26

Steel components for PRS

Beam end connector type 5

Annex 15

Beam end connector characteristics

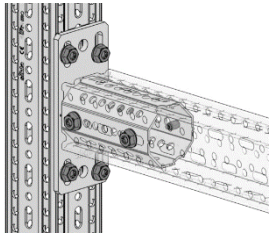
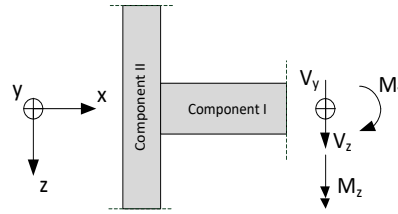
Beam end connector type 6: AK F 80-E		
	Connector:	Cantilever Bracket AK F 80-E
	Component I	Beam section TP F 80
	Component II	Beam section TP F 80
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	2.43 (positive direction only)	
$C_{My,Rd}$ [kNm/rad]	86.0 (positive direction only)	
$C_{My,Geb}$ [kNm/rad]	117.0 (positive direction only)	
$C_{My,ini}$ [kNm/rad]	143.0 (positive direction only)	
$M_{z,Rk}$ [kNm]	0.95	
$C_{Mz,Rd}$ [kNm/rad]	22.0	
$C_{Mz,Geb}$ [kNm/rad]	33.0	
$C_{Mz,ini}$ [kNm/rad]	40.0	
$V_{z,Rk}$ [kN]	33.99 (positive direction only)	
$V_{y,Rk}$ [kN]	9.96	

Steel components for PRS

Beam end connector type 6

Annex 16

Beam end connector characteristics

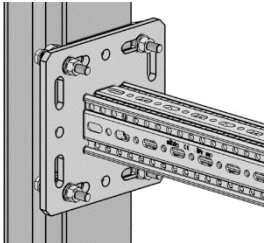
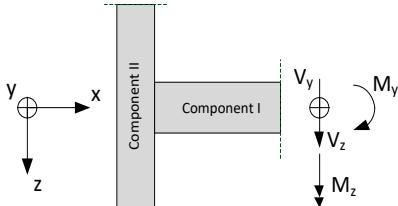
Beam end connector type 7: STA F 80		
	Connector:	End support STA F 80
	Component I	Beam section TP F 80
	Component II	Beam section TP F 80
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	2.51	
$C_{My,Rd}$ [kNm/rad]	53.0	
$C_{My,Geb}$ [kNm/rad]	55.0	
$C_{My,ini}$ [kNm/rad]	55.0	
$M_{z,Rk}$ [kNm]	1.18	
$C_{Mz,Rd}$ [kNm/rad]	21.0	
$C_{Mz,Geb}$ [kNm/rad]	30.0	
$C_{Mz,ini}$ [kNm/rad]	51.0	
$V_{z,Rk}$ [kN]	27.39	
$V_{y,Rk}$ [kN]	15.26	

Steel components for PRS

Beam end connector type 7

Annex 17

Beam end connector characteristics

Beam end connector type 8: TKO F 80		
	Connector:	Beam Bracket TKO F 80
	Component I	Beam section TP F 80
	Component II	Steel beam
	description	Component I is welded to the beam bracket (connector). The beam bracket is fastened with 4 metric screws M12 8.8 to component II.
		
$M_{y,Rk}$ [kNm]		6.51
$C_{My,Rd}$ [kNm/rad]		632.0
$C_{My,Geb}$ [kNm/rad]		720.0
$C_{My,ini}$ [kNm/rad]		958.0
$M_{z,Rk}$ [kNm]		6.51
$C_{Mz,Rd}$ [kNm/rad]		632.0
$C_{Mz,Geb}$ [kNm/rad]		720.0
$C_{Mz,ini}$ [kNm/rad]		958.0
$V_{z,Rk}$ [kN]		74.59
$V_{y,Rk}$ [kN]		74.59

Remark:

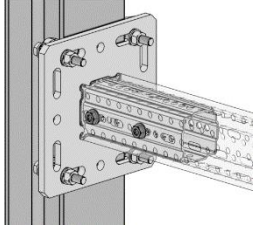
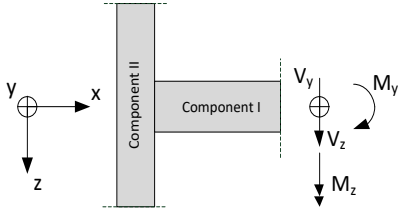
The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS

Beam end connector type 8

Annex 18

Beam end connector characteristics

Beam end connector type 9: WBD F 80 – 80/120		
	Connector:	End Support WBD F 80 – 80/120
	Component I	Beam section TP F 80
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end support is fastened with 4 metric screws M12 8.8 to component II.
		
$M_{y,Rk}$ [kNm]	6.00	
$C_{My,Rd}$ [kNm/rad]	118.0	
$C_{My,Geb}$ [kNm/rad]	138.0	
$C_{My,ini}$ [kNm/rad]	149.0	
$M_{z,Rk}$ [kNm]	6.00	
$C_{Mz,Rd}$ [kNm/rad]	118.0	
$C_{Mz,Geb}$ [kNm/rad]	138.0	
$C_{Mz,ini}$ [kNm/rad]	149.0	
$V_{z,Rk}$ [kN]	74.60	
$V_{y,Rk}$ [kN]	74.60	

Remark:

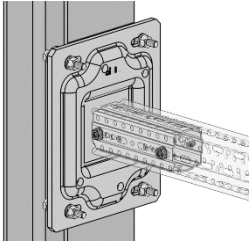
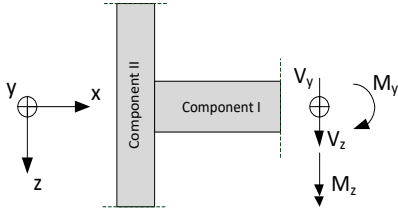
The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS

Beam end connector type 9

Annex 19

Beam end connector characteristics

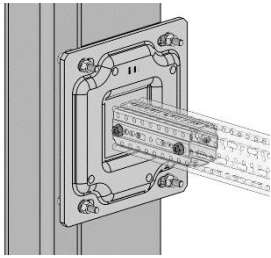
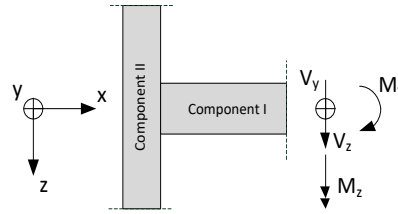
Beam end connector type 10: WBD F 80 – 121/160		
	Connector:	End Support WBD F 80 – 121/160
	Component I	Beam section TP F 80
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end support is fastened with 4 metric screws M12 8.8 to component II.
		
$M_{y,Rk}$ [kNm]	5.91	
$C_{My,Rd}$ [kNm/rad]	119.0	
$C_{My,Geb}$ [kNm/rad]	138.0	
$C_{My,ini}$ [kNm/rad]	146.0	
$M_{z,Rk}$ [kNm]	5.69	
$C_{Mz,Rd}$ [kNm/rad]	93.0	
$C_{Mz,Geb}$ [kNm/rad]	134.0	
$C_{Mz,ini}$ [kNm/rad]	145.0	
$V_{z,Rk}$ [kN]	83.28	
$V_{y,Rk}$ [kN]	83.67	

Remark:

The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS	Annex 20
Beam end connector type 10	

Beam end connector characteristics

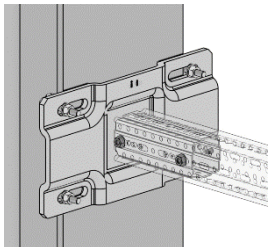
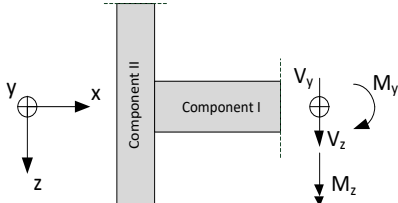
Beam end connector type 11: WBD F 80 – 161/200		
	Connector:	End Support WBD F 80 – 161/200
	Component I	Beam section TP F 80
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end support is fastened with 4 metric screws M16 8.8 to component II.
		
$M_{y,Rk}$ [kNm]	6.04	
$C_{My,Rd}$ [kNm/rad]	102.0	
$C_{My,Geb}$ [kNm/rad]	135.0	
$C_{My,ini}$ [kNm/rad]	133.0	
$M_{z,Rk}$ [kNm]	5.98	
$C_{Mz,Rd}$ [kNm/rad]	85.0	
$C_{Mz,Geb}$ [kNm/rad]	129.0	
$C_{Mz,ini}$ [kNm/rad]	140.0	
$V_{z,Rk}$ [kN]	103.43	
$V_{y,Rk}$ [kN]	99.23	

Remark:

The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS	Annex 21
Beam end connector type 11	

Beam end connector characteristics

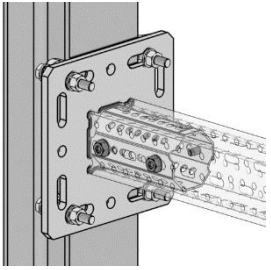
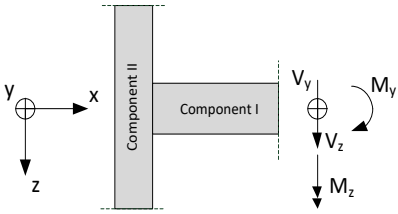
Beam end connector type 12: WBD F 80 – 201/310		
	Connector:	End Support WBD F 80 – 201/310
	Component I	Beam section TP F 80
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end support is fastened with 4 metric screws M16 8.8 to component II.
		
$M_{y,Rk}$ [kNm]	5.84	
$C_{My,Rd}$ [kNm/rad]	91.0	
$C_{My,Geb}$ [kNm/rad]	104.0	
$C_{My,ini}$ [kNm/rad]	104.0	
$M_{z,Rk}$ [kNm]	5.65	
$C_{Mz,Rd}$ [kNm/rad]	74.0	
$C_{Mz,Geb}$ [kNm/rad]	110.0	
$C_{Mz,ini}$ [kNm/rad]	96.0	
$V_{z,Rk}$ [kN]	67.83	
$V_{y,Rk}$ [kN]	91.78	

Remark:

The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS	Annex 22
Beam end connector type 12	

Beam end connector characteristics

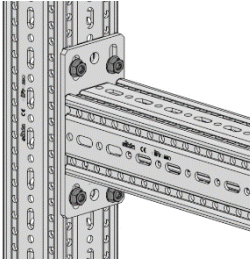
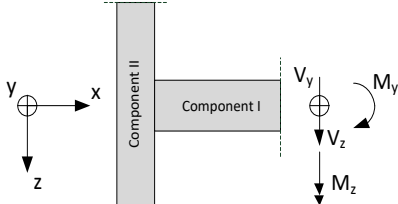
Beam end connector type 13: F 80 – T		
	Connector:	End support F 80 – T
	Component I	Beam section TP F 80
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end support is fastened with 4 metric screws M12 8.8 to component II.
		
$M_{y,Rk}$ [kNm]		4.00
$C_{My,Rd}$ [kNm/rad]		71.0
$C_{My,Geb}$ [kNm/rad]		85.0
$C_{My,ini}$ [kNm/rad]		85.0
$M_{z,Rk}$ [kNm]		4.00
$C_{Mz,Rd}$ [kNm/rad]		71.0
$C_{Mz,Geb}$ [kNm/rad]		85.0
$C_{Mz,ini}$ [kNm/rad]		85.0
$V_{z,Rk}$ [kN]		54.77
$V_{y,Rk}$ [kN]		54.77

Remark:

The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS	Annex 23
Beam end connector type 13	

Beam end connector characteristics

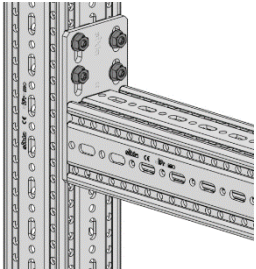
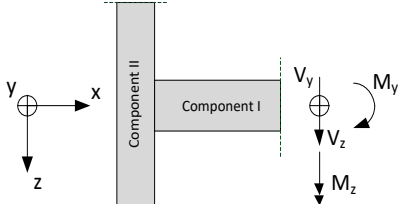
Beam end connector type 14: AK F 100		
	Connector:	Cantilever Bracket AK F 100
	Component I	Beam section TP F 100
	Component II	Beam section TP F 100
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]		3.59
$C_{My,Rd}$ [kNm/rad]		398.0
$C_{My,Geb}$ [kNm/rad]		508.0
$C_{My,ini}$ [kNm/rad]		588.0
$M_{z,Rk}$ [kNm]		2.58
$C_{Mz,Rd}$ [kNm/rad]		128.0
$C_{Mz,Geb}$ [kNm/rad]		179.0
$C_{Mz,ini}$ [kNm/rad]		315.0
$V_{z,Rk}$ [kN]		25.62
$V_{y,Rk}$ [kN]		29.53

Steel components for PRS

Beam end connector type 14

Annex 24

Beam end connector characteristics

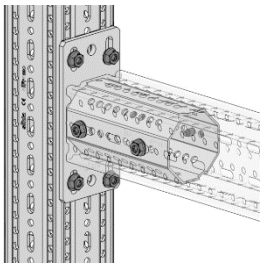
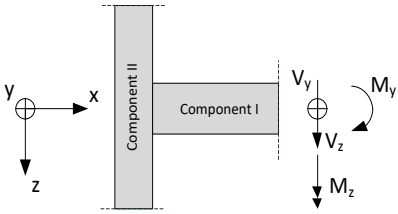
Beam end connector type 15: AK F 100-E		
	Connector:	Cantilever Bracket AK F 100-E
	Component I	Beam section TP F 100
	Component II	Beam section TP F 100
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	5.71 (positive direction only)	
$C_{My,Rd}$ [kNm/rad]	364.0 (positive direction only)	
$C_{My,Geb}$ [kNm/rad]	344.0 (positive direction only)	
$C_{My,ini}$ [kNm/rad]	1563.0 (positive direction only)	
$M_{z,Rk}$ [kNm]	2.23	
$C_{Mz,Rd}$ [kNm/rad]	113.0	
$C_{Mz,Geb}$ [kNm/rad]	151.0.	
$C_{Mz,ini}$ [kNm/rad]	168.0	
$V_{z,Rk}$ [kN]	41.82 (positive direction only)	
$V_{y,Rk}$ [kN]	18.62	

Steel components for PRS

Beam end connector type 15

Annex 25

Beam end connector characteristics

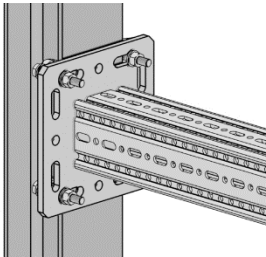
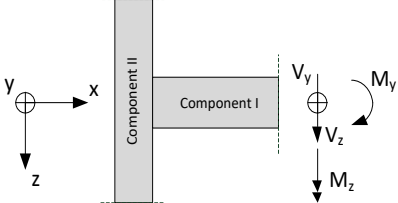
Beam end connector type 16: STA F 100		
	Connector:	End support STA F 100
	Component I	Beam section TP F 100
	Component II	Beam section TP F 100
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	3.44	
$C_{My,Rd}$ [kNm/rad]	96.0	
$C_{My,Geb}$ [kNm/rad]	113.0	
$C_{My,ini}$ [kNm/rad]	113.0	
$M_{z,Rk}$ [kNm]	1.99	
$C_{Mz,Rd}$ [kNm/rad]	79.0	
$C_{Mz,Geb}$ [kNm/rad]	96.0	
$C_{Mz,ini}$ [kNm/rad]	115.0	
$V_{z,Rk}$ [kN]	25.62	
$V_{y,Rk}$ [kN]	29.53	

Steel components for PRS

Beam end connector type 16

Annex 26

Beam end connector characteristics

Beam end connector type 17: TKO F 100		
	Connector:	Beam Bracket TKO F 100
	Component I	Beam section TP F 100
	Component II	Steel beam
	description	Component I is welded to the beam bracket (connector). The beam bracket is fastened with 4 metric screws M12 8.8 to component II.
		
$M_{y,Rk}$ [kNm]		12.90
$C_{My,Rd}$ [kNm/rad]		445.0
$C_{My,Geb}$ [kNm/rad]		1083.0
$C_{My,ini}$ [kNm/rad]		1648.0
$M_{z,Rk}$ [kNm]		12.90
$C_{Mz,Rd}$ [kNm/rad]		445.0
$C_{Mz,Geb}$ [kNm/rad]		1083.0
$C_{Mz,ini}$ [kNm/rad]		1648.0
$V_{z,Rk}$ [kN]		76.75
$V_{y,Rk}$ [kN]		76.75

Remark:

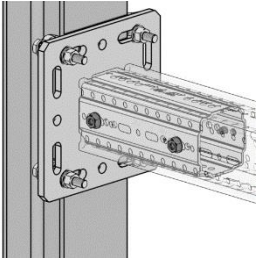
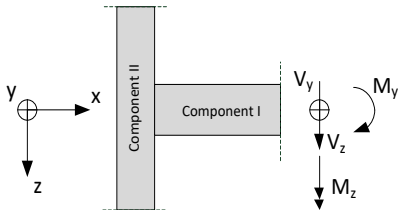
The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS

Beam end connector type 17

Annex 27

Beam end connector characteristics

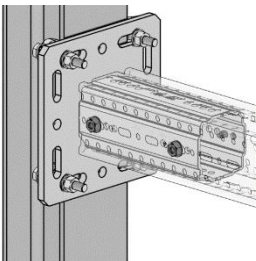
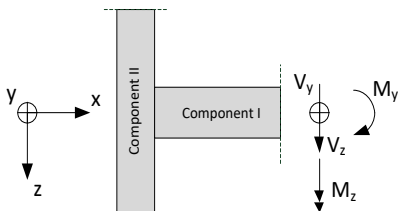
Beam end connector type 18: F 100 - 80/120		
	Connector:	End Support WBD F 100 - 80/120
	Component I	Beam section TP F 100
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end support is fastened with 4 metric screws M12 8.8 to component II.
		
$M_{y,Rk}$ [kNm]	9.86	
$C_{My,Rd}$ [kNm/rad]	256.0	
$C_{My,Geb}$ [kNm/rad]	291.0	
$C_{My,ini}$ [kNm/rad]	609.0	
$M_{z,Rk}$ [kNm]	9.86	
$C_{Mz,Rd}$ [kNm/rad]	256.0	
$C_{Mz,Geb}$ [kNm/rad]	291.0	
$C_{Mz,ini}$ [kNm/rad]	609.0	
$V_{z,Rk}$ [kN]	76.75	
$V_{y,Rk}$ [kN]	76.75	

Remark:

The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS	Annex 28
Beam end connector type 18	

Beam end connector characteristics

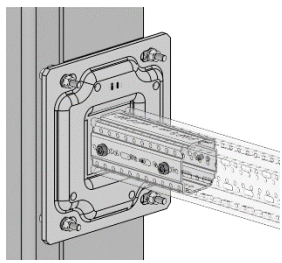
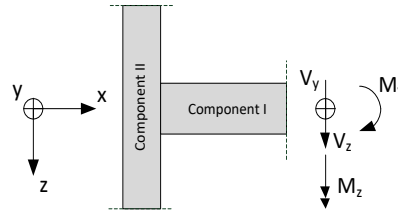
Beam end connector type 19: F 100 - 121/160		
	Connector:	End Support WBD F 100 - 121/160
	Component I	Beam section TP F 100
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end support is fastened with 4 metric screws M12 8.8 to component II.
		
$M_{y,Rk}$ [kNm]	8.34	
$C_{My,Rd}$ [kNm/rad]	232.0	
$C_{My,Geb}$ [kNm/rad]	242.0	
$C_{My,ini}$ [kNm/rad]	417.0	
$M_{z,Rk}$ [kNm]	7.79	
$C_{Mz,Rd}$ [kNm/rad]	176.0	
$C_{Mz,Geb}$ [kNm/rad]	190.0	
$C_{Mz,ini}$ [kNm/rad]	488.0	
$V_{z,Rk}$ [kN]	83.92	
$V_{y,Rk}$ [kN]	88.56	

Remark:

The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS	Annex 29
Beam end connector type 19	

Beam end connector characteristics

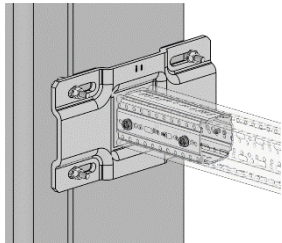
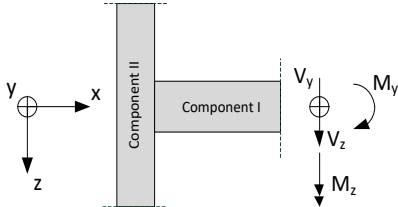
Beam end connector type 20: F 100 - 161/200		
	Connector:	End Support WBD F 100 - 161/200
	Component I	Beam section TP F 100
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end support is fastened with 4 metric screws M16 8.8 to component II.
		
$M_{y,Rk}$ [kNm]	7.64	
$C_{My,Rd}$ [kNm/rad]	211.0	
$C_{My,Geb}$ [kNm/rad]	211.0	
$C_{My,ini}$ [kNm/rad]	453.0	
$M_{z,Rk}$ [kNm]	7.89	
$C_{Mz,Rd}$ [kNm/rad]	180.0	
$C_{Mz,Geb}$ [kNm/rad]	200.0	
$C_{Mz,ini}$ [kNm/rad]	329.0	
$V_{z,Rk}$ [kN]	160.37	
$V_{y,Rk}$ [kN]	155.52	

Remark:

The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS	Annex 30
Beam end connector type 20	

Beam end connector characteristics

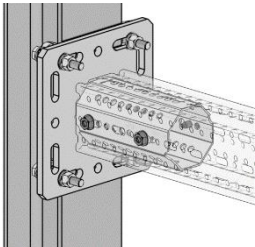
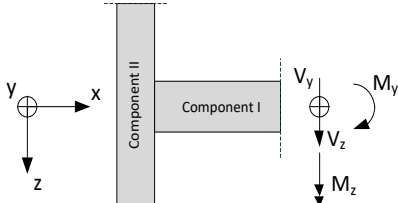
Beam end connector type 21: F 100 - 201/310		
	Connector:	End Support WBD F 100 - 201/310
	Component I	Beam section TP F 100
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end support is fastened with 4 metric screws M16 8.8 to component II.
		
$M_{y,Rk}$ [kNm]	5.16	
$C_{My,Rd}$ [kNm/rad]	132.0	
$C_{My,Geb}$ [kNm/rad]	121.0	
$C_{My,ini}$ [kNm/rad]	230.0	
$M_{z,Rk}$ [kNm]	6.81	
$C_{Mz,Rd}$ [kNm/rad]	119.0	
$C_{Mz,Geb}$ [kNm/rad]	175.0	
$C_{Mz,ini}$ [kNm/rad]	338.0	
$V_{z,Rk}$ [kN]	166.25	
$V_{y,Rk}$ [kN]	150.64	

Remark:

The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS	Annex 31
Beam end connector type 21	

Beam end connector characteristics

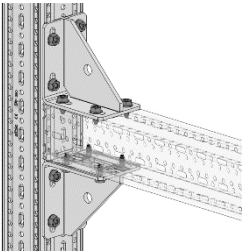
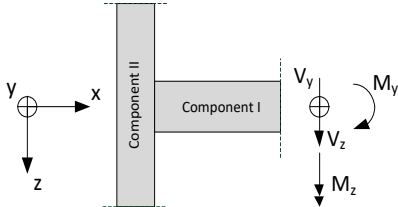
Beam end connector type 22: WBD F 100 - T		
	Connector:	End Support WBD F 100 - T
	Component I	Beam section TP F 100
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end support is fastened with 4 metric screws M12 8.8 to component II.
		
$M_{y,Rk}$ [kNm]	6.30	
$C_{My,Rd}$ [kNm/rad]	99.0	
$C_{My,Geb}$ [kNm/rad]	114.0	
$C_{My,ini}$ [kNm/rad]	256.0	
$M_{z,Rk}$ [kNm]	6.30	
$C_{Mz,Rd}$ [kNm/rad]	99.0	
$C_{Mz,Geb}$ [kNm/rad]	114.0	
$C_{Mz,ini}$ [kNm/rad]	256.0	
$V_{z,Rk}$ [kN]	49.13	
$V_{y,Rk}$ [kN]	49.13	

Remark:

The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS	Annex 32
Beam end connector type 22	

Beam end connector characteristics

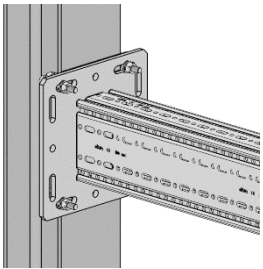
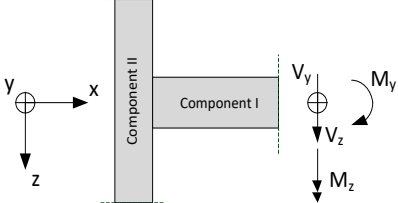
Beam end connector type 23: Corner Bracket WD F 100 140/140		
	Connector:	2 x Corner Bracket WD 100 140/140
	Component I	Beam section TP F 100
	Component II	Beam section TP F 100
	description	Component I is fastened with in total 8 Self Forming Screws (FLS F) to both corner brackets. The corner brackets are fastened with in total 8 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	7.56	
$C_{My,Rd}$ [kNm/rad]	339.0	
$C_{My,Geb}$ [kNm/rad]	489.0	
$C_{My,ini}$ [kNm/rad]	1282.0	
$M_{z,Rk}$ [kNm]	4.74	
$C_{Mz,Rd}$ [kNm/rad]	61.0	
$C_{Mz,Geb}$ [kNm/rad]	86.0	
$C_{Mz,ini}$ [kNm/rad]	201.0	
$V_{z,Rk}$ [kN]	74.46	
$V_{y,Rk}$ [kN]	33.41	

Steel components for PRS

Beam end connector type 23

Annex 33

Beam end connector characteristics

Beam end connector type 24: TKO F 100/160		
	Connector:	Beam Bracket TKO F 100/160
	Component I	Beam section TP F 100/160
	Component II	Steel beam
	description	Component I is welded to the beam bracket (connector). The beam bracket is fastened with 4 metric screws M12 8.8 to component II.
		
$M_{y,Rk}$ [kNm]		13.78
$C_{My,Rd}$ [kNm/rad]		1219.0
$C_{My,Geb}$ [kNm/rad]		1832.0
$C_{My,ini}$ [kNm/rad]		1727.0
$M_{z,Rk}$ [kNm]		11.43
$C_{Mz,Rd}$ [kNm/rad]		507.0
$C_{Mz,Geb}$ [kNm/rad]		798.0
$C_{Mz,ini}$ [kNm/rad]		1260.0
$V_{z,Rk}$ [kN]		101.78
$V_{y,Rk}$ [kN]		87.37

Remark:

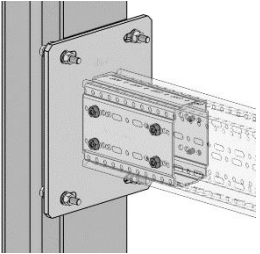
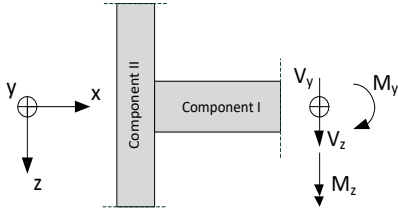
The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS

Beam end connector type 24

Annex 34

Beam end connector characteristics

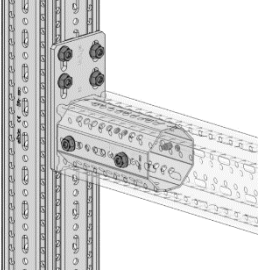
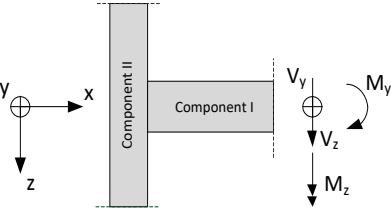
Beam end connector type 25: WBD F 100/160 - 121/160		
	Connector:	End Support WBD F 100/160 - 121/160
	Component I	Beam section TP F 100/160
	Component II	Steel beam
	description	Component I is fastened with 8 Self Forming Screws (FLS F) to the connector. (4 screws on two opposing sides, see image on the left). The end support is fastened with 4 metric screws M12 8.8 to component II.
		
$M_{y,Rk}$ [kNm]	13.03	
$C_{My,Rd}$ [kNm/rad]	288.0	
$C_{My,Geb}$ [kNm/rad]	434.0	
$C_{My,ini}$ [kNm/rad]	1251.0	
$M_{z,Rk}$ [kNm]	10.24	
$C_{Mz,Rd}$ [kNm/rad]	180.0	
$C_{Mz,Geb}$ [kNm/rad]	201.0	
$C_{Mz,ini}$ [kNm/rad]	686.0	
$V_{z,Rk}$ [kN]	101.78	
$V_{y,Rk}$ [kN]	87.37	

Remark:

The connection between beam end connector and steel beam (component II) using the metric screws is not part of the assessment.

Steel components for PRS	Annex 35
Beam end connector type 25	

Beam end connector characteristics

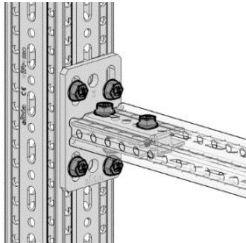
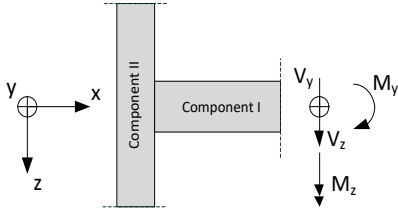
Beam end connector type 26: STA F 100-E		
	Connector:	End Support STA F 100-E
	Component I	Beam section TP F 100
	Component II	Beam section TP F 100
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	3.21 (positive direction only)	
$C_{My,Rd}$ [kNm/rad]	81.0 (positive direction only)	
$C_{My,Geb}$ [kNm/rad]	100.0 (positive direction only)	
$C_{My,ini}$ [kNm/rad]	158.0 (positive direction only)	
$M_{z,Rk}$ [kNm]	0.86	
$C_{Mz,Rd}$ [kNm/rad]	42.0	
$C_{Mz,Geb}$ [kNm/rad]	49.0	
$C_{Mz,ini}$ [kNm/rad]	56.0	
$V_{z,Rk}$ [kN]	41.82 (positive direction only)	
$V_{y,Rk}$ [kN]	18.62	

Steel components for PRS

Beam end connector type 26

Annex 36

Beam end connector characteristics

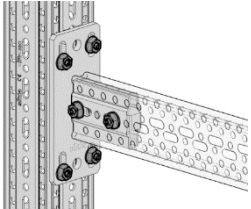
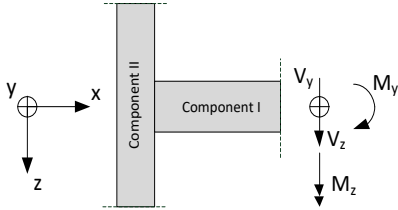
Beam end connector type 27: STA F 80/30		
	Connector:	End Support STA F 80/30
	Component I	Beam section TP F 80/30
	Component II	Beam section TP F 80
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	0.125	
$C_{My,Rd}$ [kNm/rad]	13.0	
$C_{My,Geb}$ [kNm/rad]	25.0	
$C_{My,ini}$ [kNm/rad]	23.0	
$M_{z,Rk}$ [kNm]	0.75	
$C_{Mz,Rd}$ [kNm/rad]	51.0.	
$C_{Mz,Geb}$ [kNm/rad]	104.0	
$C_{Mz,ini}$ [kNm/rad]	188.0	
$V_{z,Rk}$ [kN]	1.25	
$V_{y,Rk}$ [kN]	4.76	

Steel components for PRS

Beam end connector type 27

Annex 37

Beam end connector characteristics

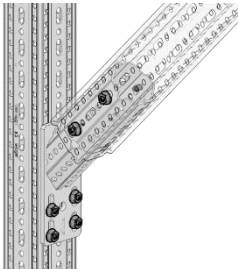
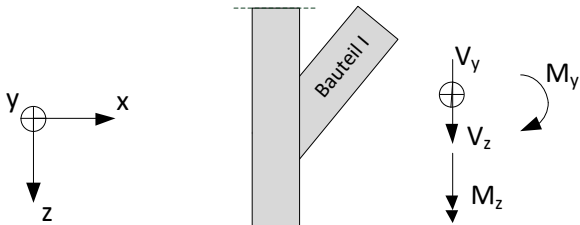
Beam end connector type 28: STA F 80/30-Q		
	Connector:	End Support STA F 80/30-Q
	Component I	Beam section TP F 80/30
	Component II	Beam section TP F 80
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	2.19	
$C_{My,Rd}$ [kNm/rad]	162.0	
$C_{My,Geb}$ [kNm/rad]	227.0	
$C_{My,ini}$ [kNm/rad]	252.0	
$M_{z,Rk}$ [kNm]	0.125	
$C_{Mz,Rd}$ [kNm/rad]	13.0	
$C_{Mz,Geb}$ [kNm/rad]	25.0	
$C_{Mz,ini}$ [kNm/rad]	23.0	
$V_{z,Rk}$ [kN]	4.76	
$V_{y,Rk}$ [kN]	1.25	

Steel components for PRS

Beam end connector type 28

Annex 38

Beam end connector characteristics -

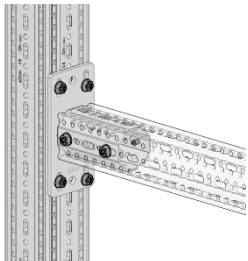
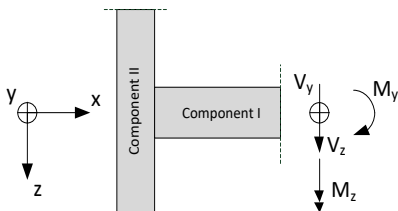
Beam end connector type 29: STA F 80-E 45°		
	Connector:	End Support STA F 80-E 45°
	Component I	Beam section TP F 80
	Component II	Beam section TP F 80
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	2.52 (negative direction only)	
$C_{My,Rd}$ [kNm/rad]	42.0 (negative direction only)	
$C_{My,Geb}$ [kNm/rad]	44.0 (negative direction only)	
$C_{My,ini}$ [kNm/rad]	46.0 (negative direction only)	
$M_{z,Rk}$ [kNm]	0.93	
$C_{Mz,Rd}$ [kNm/rad]	17.0	
$C_{Mz,Geb}$ [kNm/rad]	25.0	
$C_{Mz,ini}$ [kNm/rad]	33.0	
$V_{z,Rk}$ [kN]	7.51 (negative direction only)	
$V_{y,Rk}$ [kN]	11.21	

Steel components for PRS

Beam end connector type 29

Annex 39

Beam end connector characteristics

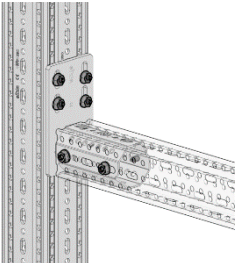
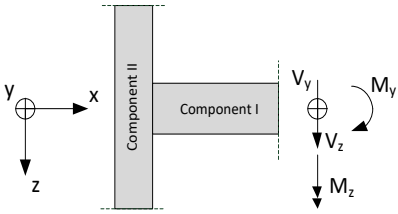
Beam end connector type 30: STA F 100-80		
	Connector:	End Support STA F 100-80
	Component I	Beam section TP F 80
	Component II	Beam section TP F 100
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	2.51	
$C_{My,Rd}$ [kNm/rad]	53.0	
$C_{My,Geb}$ [kNm/rad]	55.0	
$C_{My,ini}$ [kNm/rad]	55.0	
$M_{z,Rk}$ [kNm]	1.18	
$C_{Mz,Rd}$ [kNm/rad]	21.0	
$C_{Mz,Geb}$ [kNm/rad]	30.0	
$C_{Mz,ini}$ [kNm/rad]	51.0	
$V_{z,Rk}$ [kN]	27.39	
$V_{y,Rk}$ [kN]	15.26	

Steel components for PRS

Beam end connector type 30

Annex 40

Beam end connector characteristics

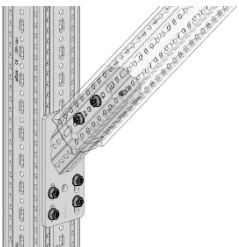
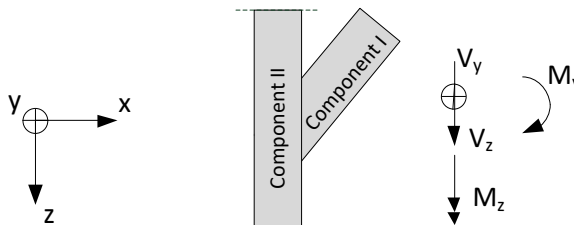
Beam end connector type 31: STA F 100-80-E		
	Connector:	End Support STA F 100-80-E
	Component I	Beam section TP F 80
	Component II	Beam section TP F 100
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	2.53 (positive direction only)	
$C_{My,Rd}$ [kNm/rad]	42.0 (positive direction only)	
$C_{My,Geb}$ [kNm/rad]	44.0 (positive direction only)	
$C_{My,ini}$ [kNm/rad]	46.0 (positive direction only)	
$M_{z,Rk}$ [kNm]	0.93	
$C_{Mz,Rd}$ [kNm/rad]	17.0	
$C_{Mz,Geb}$ [kNm/rad]	25.0	
$C_{Mz,ini}$ [kNm/rad]	33.0	
$V_{z,Rk}$ [kN]	39.65 (positive direction only)	
$V_{y,Rk}$ [kN]	9.96	

Steel components for PRS

Beam end connector type 31

Annex 41

Beam end connector characteristics

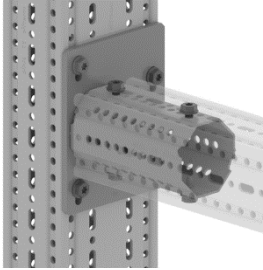
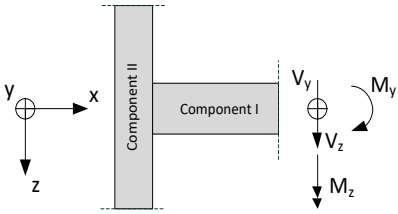
Beam end connector type 32: STA F 100-80-E 45°		
	Connector:	End Support STA F 100-80-E 45°
	Component I	Beam section TP F 100
	Component II	Beam section TP F 100
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	2.53 (negative direction only)	
$C_{My,Rd}$ [kNm/rad]	42.0 (negative direction only)	
$C_{My,Geb}$ [kNm/rad]	44.0 (negative direction only)	
$C_{My,ini}$ [kNm/rad]	46.0 (negative direction only)	
$M_{z,Rk}$ [kNm]	0.93	
$C_{Mz,Rd}$ [kNm/rad]	17.0	
$C_{Mz,Geb}$ [kNm/rad]	25.0	
$C_{Mz,ini}$ [kNm/rad]	33.0	
$V_{z,Rk}$ [kN]	41.82 (negative direction only)	
$V_{y,Rk}$ [kN]	18.62	

Steel components for PRS

Beam end connector type 32

Annex 42

Beam end connector characteristics

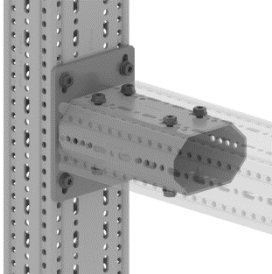
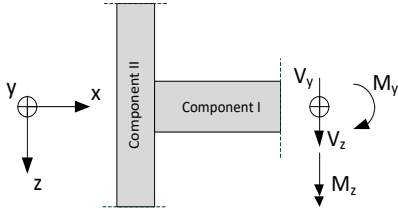
Beam end connector type 33: STA F 160-100-E		
	Connector:	End Support STA F 160-100-E
	Component I	Beam section TP F 100
	Component II	Beam section TP F 100/160
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	2.21	
$C_{My,Rd}$ [kNm/rad]	117.0	
$C_{My,Geb}$ [kNm/rad]	136.0	
$C_{My,ini}$ [kNm/rad]	216.0	
$M_{z,Rk}$ [kNm]	3.40	
$C_{Mz,Rd}$ [kNm/rad]	60.0	
$C_{Mz,Geb}$ [kNm/rad]	62.0	
$C_{Mz,ini}$ [kNm/rad]	128.0	
$V_{z,Rk}$ [kN]	11.40	
$V_{y,Rk}$ [kN]	11.61	

Steel components for PRS

Beam end connector type 33

Annex 43

Beam end connector characteristics

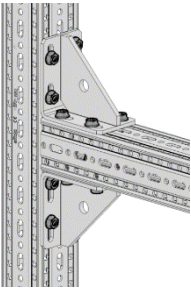
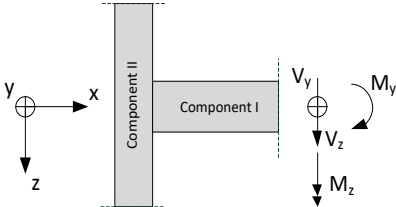
Beam end connector type 34: STA F 160-Q		
	Connector:	End Support STA F 160-Q
	Component I	Beam section TP F 100/160
	Component II	Beam section TP F 100/160
	description	Component I is fastened with 8 Self Forming Screws (FLS F) to the connector (4 screws on two opposing sides, see image on the left). The connector is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	4.21	
$C_{My,Rd}$ [kNm/rad]	154.0	
$C_{My,Geb}$ [kNm/rad]	200.0	
$C_{My,ini}$ [kNm/rad]	369.0	
$M_{z,Rk}$ [kNm]	2.89	
$C_{Mz,Rd}$ [kNm/rad]	159.0	
$C_{Mz,Geb}$ [kNm/rad]	199.0	
$C_{Mz,ini}$ [kNm/rad]	270.0	
$V_{z,Rk}$ [kN]	13.51	
$V_{y,Rk}$ [kN]	11.82	

Steel components for PRS

Beam end connector type 34

Annex 44

Beam end connector characteristics

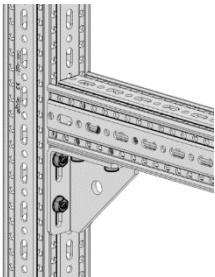
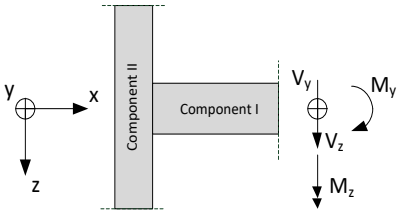
Beam end connector type 35: WD F 80		
	Connector:	2 x Corner Bracket WD 80
	Component I	Beam section TP F 80
	Component II	Beam section TP F 80
	description	Component I is fastened with in total 8 Self Forming Screws (FLS F) to both corner brackets. The corner brackets are fastened with in total 8 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]		4.97
$C_{My,Rd}$ [kNm/rad]		167
$C_{My,Geb}$ [kNm/rad]		356
$C_{My,ini}$ [kNm/rad]		863
$M_{z,Rk}$ [kNm]		2.01
$C_{Mz,Rd}$ [kNm/rad]		33
$C_{Mz,Geb}$ [kNm/rad]		65
$C_{Mz,ini}$ [kNm/rad]		112
$V_{z,Rk}$ [kN]		30.03
$V_{y,Rk}$ [kN]		9.02

Steel components for PRS

Beam end connector type 35

Annex 45

Beam end connector characteristics

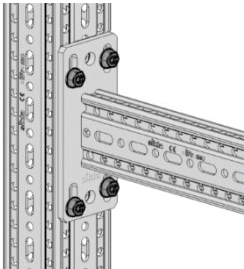
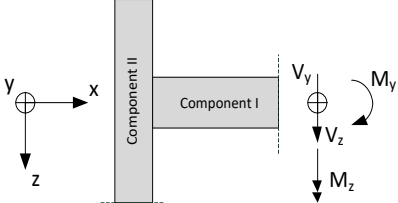
Beam end connector type 36: WD F 80 single		
	Connector:	1 x Corner Bracket WD 80
	Component I	Beam section TP F 80
	Component II	Beam section TP F 80
	description	Component I is fastened with in total 4 Self Forming Screws (FLS F) to both corner brackets. The corner brackets are fastened with in total 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]		1.74
$C_{My,Rd}$ [kNm/rad]		36
$C_{My,Geb}$ [kNm/rad]		61
$C_{My,ini}$ [kNm/rad]		115
$M_{z,Rk}$ [kNm]		1.06
$C_{Mz,Rd}$ [kNm/rad]		14
$C_{Mz,Geb}$ [kNm/rad]		25
$C_{Mz,ini}$ [kNm/rad]		40
$V_{z,Rk}$ [kN]		7.10
$V_{y,Rk}$ [kN]		3.71

Steel components for PRS

Beam end connector type 36

Annex 46

Beam end connector characteristics

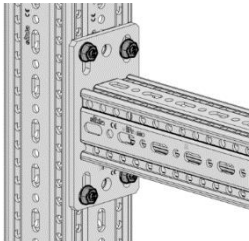
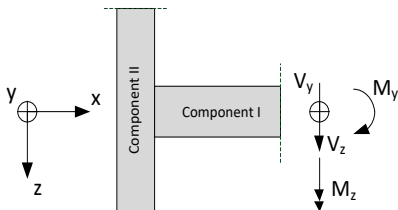
Beam end connector type 37: AK F 80/30-Q		
	Connector:	Cantilever Bracket AK F 80/30-Q
	Component I	Beam section TP F 80/30
	Component II	Beam section TP F 80
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]		2.06
$C_{My,Rd}$ [kNm/rad]		132
$C_{My,Geb}$ [kNm/rad]		190
$C_{My,ini}$ [kNm/rad]		282
$M_{z,Rk}$ [kNm]		0.125
$C_{Mz,Rd}$ [kNm/rad]		13
$C_{Mz,Geb}$ [kNm/rad]		25
$C_{Mz,ini}$ [kNm/rad]		23
$V_{z,Rk}$ [kN]		4.76
$V_{y,Rk}$ [kN]		1.25

Steel components for PRS

Beam end connector type 37

Annex 47

Beam end connector characteristics

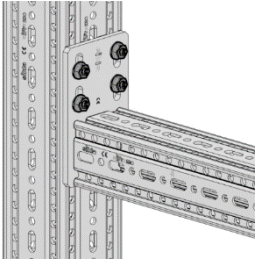
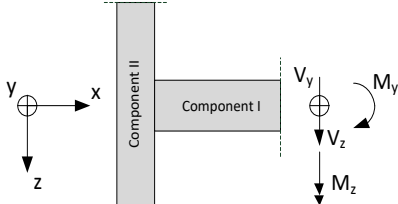
Beam end connector type 38: AK F 100-80		
	Connector:	Cantilever Bracket AK F 100-80
	Component I	Beam section TP F 80
	Component II	Beam section TP F 100
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]		2.61
$C_{My,Rd}$ [kNm/rad]		128.0
$C_{My,Geb}$ [kNm/rad]		195.0
$C_{My,ini}$ [kNm/rad]		246.0
$M_{z,Rk}$ [kNm]		1.21
$C_{Mz,Rd}$ [kNm/rad]		33.0
$C_{Mz,Geb}$ [kNm/rad]		52.0
$C_{Mz,ini}$ [kNm/rad]		64.0
$V_{z,Rk}$ [kN]		27.39
$V_{y,Rk}$ [kN]		15.26

Steel components for PRS

Beam end connector type 38

Annex 48

Beam end connector characteristics

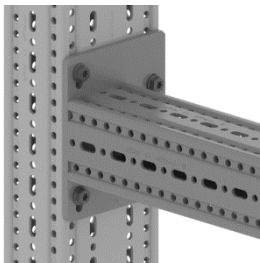
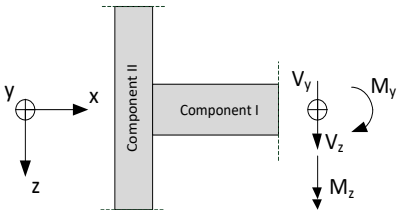
Beam end connector type 39: AK F 100-80-E		
	Connector:	Cantilever Bracket AK F 100-80-E
	Component I	Beam section TP F 80
	Component II	Beam section TP F 100
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	2.43 (positive direction only)	
$C_{My,Rd}$ [kNm/rad]	86.0 (positive direction only)	
$C_{My,Geb}$ [kNm/rad]	117.0 (positive direction only)	
$C_{My,ini}$ [kNm/rad]	143.0 (positive direction only)	
$M_{z,Rk}$ [kNm]	0.95	
$C_{Mz,Rd}$ [kNm/rad]	22.0	
$C_{Mz,Geb}$ [kNm/rad]	33.0	
$C_{Mz,ini}$ [kNm/rad]	40.0	
$V_{z,Rk}$ [kN]	33.99 (positive direction only)	
$V_{y,Rk}$ [kN]	9.96	

Steel components for PRS

Beam end connector type 39

Annex 49

Beam end connector characteristics

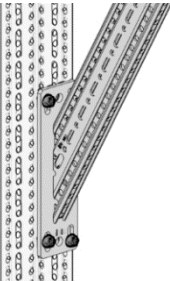
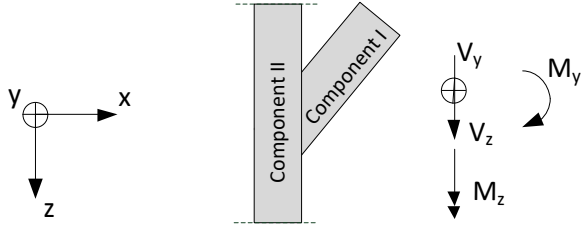
Beam end connector type 40: AK F 160-100-E		
	Connector:	Cantilever Bracket AK F 160-100-E
	Component I	Beam section TP F 100
	Component II	Beam section TP F 100/160
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]		2.21
$C_{My,Rd}$ [kNm/rad]		117.0
$C_{My,Geb}$ [kNm/rad]		136.0
$C_{My,ini}$ [kNm/rad]		216.0
$M_{z,Rk}$ [kNm]		3.40
$C_{Mz,Rd}$ [kNm/rad]		60.0
$C_{Mz,Geb}$ [kNm/rad]		62.0
$C_{Mz,ini}$ [kNm/rad]		128.0
$V_{z,Rk}$ [kN]		11.40
$V_{y,Rk}$ [kN]		11.61

Steel components for PRS

Beam end connector type 40

Annex 50

Beam end connector characteristics

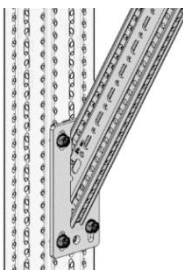
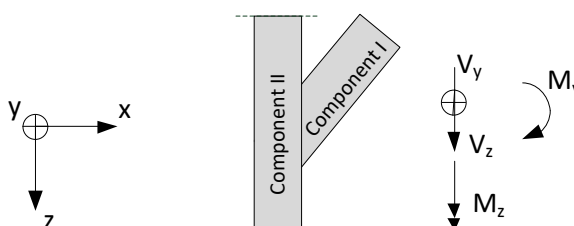
Beam end connector type 41: SKO F 80		
	Connector:	Cantilever Bracket SKO F 80
	Component I	Beam section TP F 80/30
	Component II	Beam section TP F 80
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]		2.06
$C_{My,Rd}$ [kNm/rad]		132
$C_{My,Geb}$ [kNm/rad]		190
$C_{My,ini}$ [kNm/rad]		282
$M_{z,Rk}$ [kNm]		0.125
$C_{Mz,Rd}$ [kNm/rad]		13
$C_{Mz,Geb}$ [kNm/rad]		25
$C_{Mz,ini}$ [kNm/rad]		23
$V_{z,Rk}$ [kN]		4.76
$V_{y,Rk}$ [kN]		1.25

Steel components for PRS

Beam end connector type 41

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Beam end connector characteristics

Beam end connector type 42: SKO F 100		
	Connector:	Cantilever Bracket SKO F 100
	Component I	Beam section TP F 80/30
	Component II	Beam section TP F 100
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		
$M_{y,Rk}$ [kNm]	2.06	
$C_{My,Rd}$ [kNm/rad]	132	
$C_{My,Geb}$ [kNm/rad]	190	
$C_{My,ini}$ [kNm/rad]	282	
$M_{z,Rk}$ [kNm]	0.125	
$C_{Mz,Rd}$ [kNm/rad]	13	
$C_{Mz,Geb}$ [kNm/rad]	25	
$C_{Mz,ini}$ [kNm/rad]	23	
$V_{z,Rk}$ [kN]	4.76	
$V_{y,Rk}$ [kN]	1.25	

Steel components for PRS

Beam end connector type 42

Annex 52