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Designated according to Article 29 of Regulation (EU) No 305/2011

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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

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 differnt 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 specifiactions 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 (η) [kNcm/rad]	See Annex 11-52
	Moment-rotation curve (Rotational stiffness) k (θ) [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

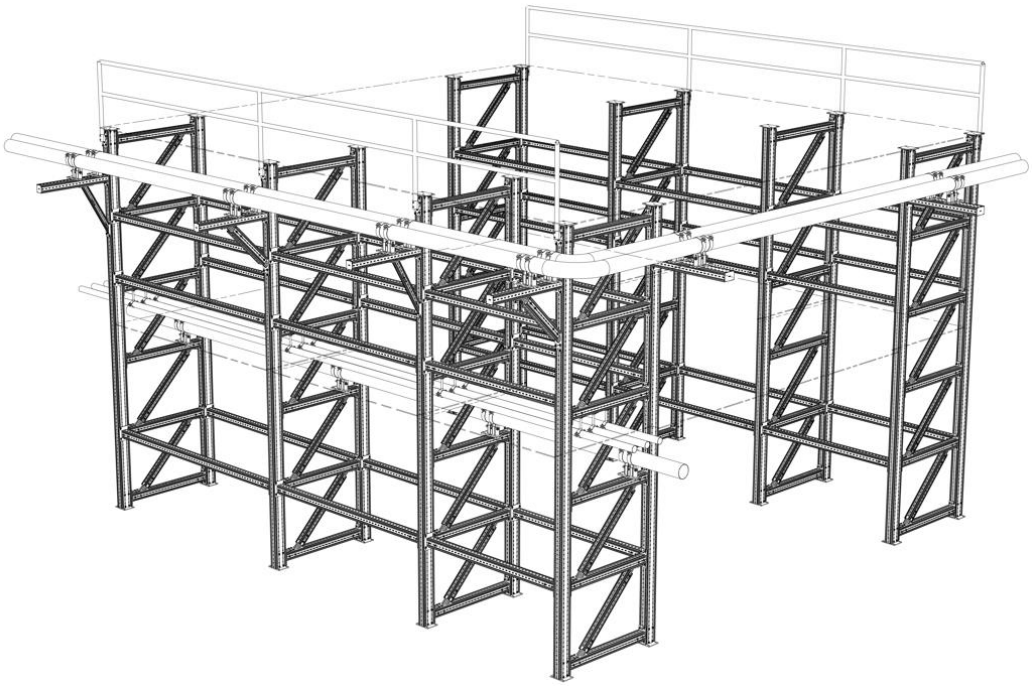
General Manager

LUXEMBOURG INSTITUTE FOR LUXIB BUILDING AND TECHNOLOGY

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 1: AK F 80/30	11
type 2: AK F 80/30-E	12
type 3: STA F 80/30-E	13
type 4: STA F 80-E	14
type 5: AK F 80	15
type 6: AK F 80-E	16
type 7: STA F 80	17
type 8: TKO F 80	18
type 9: WBD F 80 – 80/120	19
type 10: WBD F 80 – 121/160	20
type 11: WBD F 80 – 161/200	21
type 12: WBD F 80 – 201/310	22
type 13: WBD F 80 – T	23
type 14: AK F 100	24
type 15: AK F 100-E	25
type 16: STA F 100	26
type 17: TKO F 100	27
type 18: WBD F 100 - 80/120	28
type 19: WBD F 100 - 121/160	29
type 20: WBD F 100 - 161/200	30
type 21: WBD F 100 - 201/310	31

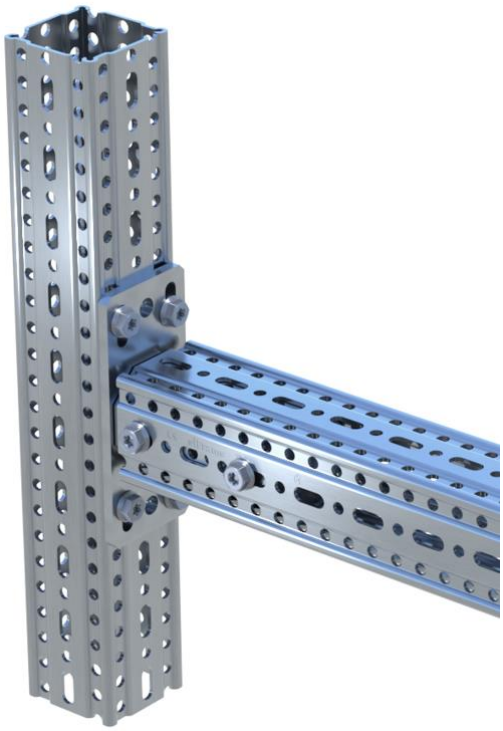
Type	**Annex**
type 22: WBD F 100 - T	32
type 23: WD F 100 140/140	33
type 24: TKO F 100/160	34
type 25: WBD F 100/160 - 121/160	35
type 26: STA F 100-E	36
type 27: STA F 80/30	37
type 28: STA F 80/30-Q	38
type 29: STA F 80-E 45°	39
type 30: STA F 100-80	40
type 31: STA F 100-80-E	41
type 32: STA F 100-80-E 45°	42
type 33: STA F 160-100-E	43
type 34: STA F 160-Q	44
type 35: WD F 80	45
type 36: WD F 80 single	46
type 37: AK F 80/30-Q	47
type 38: AK F 100-80	48
type 39: AK F 100-80-E	49
type 40: AK F 160-100-E	50
type 41: SKO F 80	51
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).

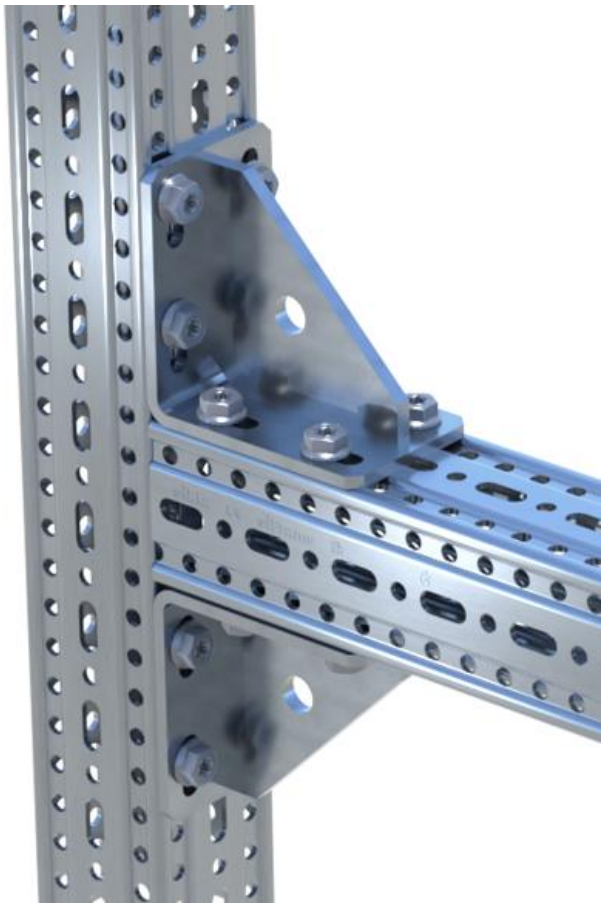
Component II is not part of the PRC and therefore, the connection between beam bracket and component II is not part of the assessment.

Steel components for PRS	**Annex 5**
Example of Type "WBD"	

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.

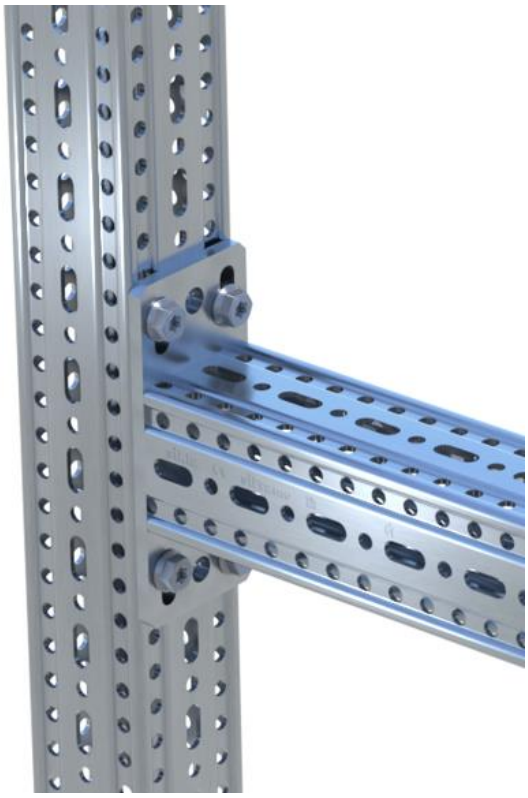
The corner brackets are fastened with in total 8 Self Forming Screws (FLS F) to component II (upright section).

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:

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

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%.

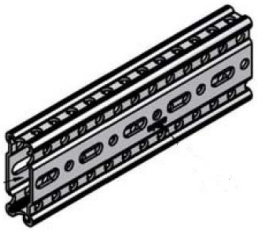
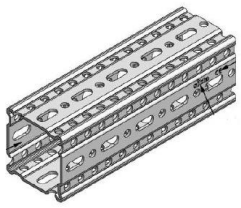
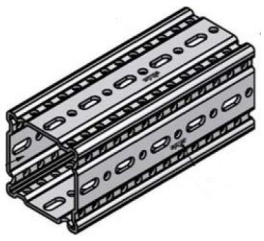
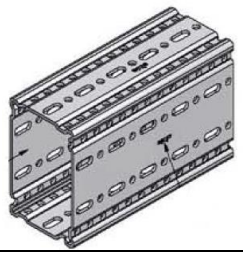
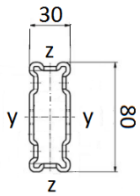
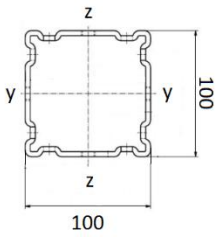
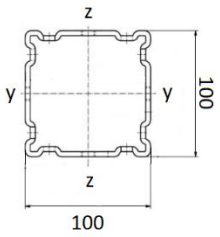
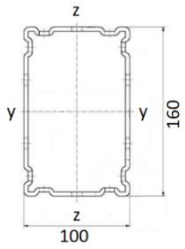
Installation conditions

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	**Annex 10**
Beam and upright characteristics	

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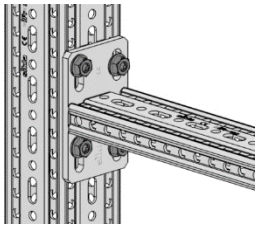
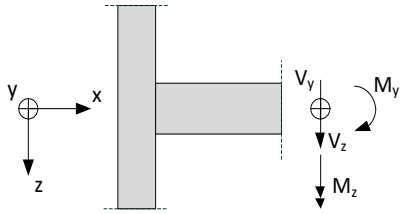
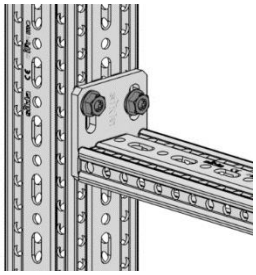
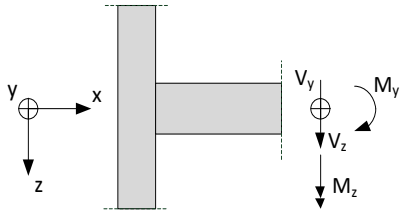
Beam end connector characteristics

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

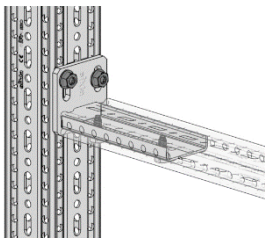
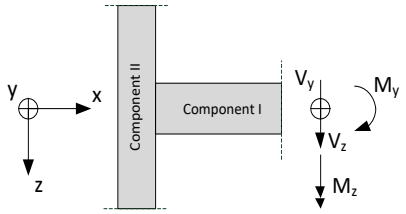
Beam end connector characteristics

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

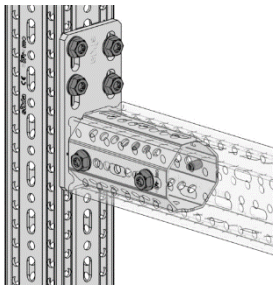
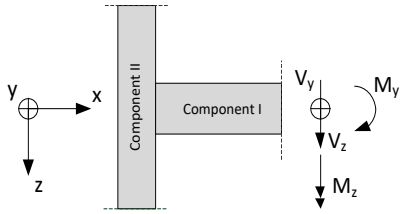
Steel components for PRS	**Annex 12**
Beam end connector type 2	

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.
		

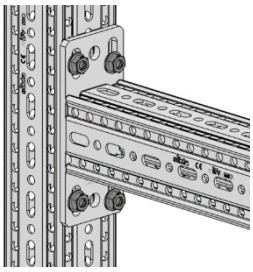
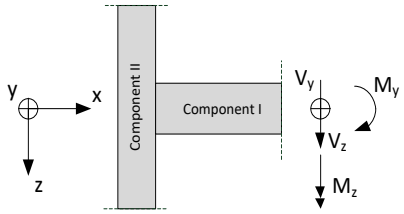
$M_{y,Rk}$ [kNm]	0.23 (positive direction only)
$C_{My,Rd}$ [kNm/rad]	5.00 (positive direction only)
$C_{My,Geb}$ [kNm/rad]	12.0 (positive direction only)
$C_{My,ini}$ [kNm/rad]	12.0 (positive direction only)
$M_{z,Rk}$ [kNm]	0.61
$C_{Mz,Rd}$ [kNm/rad]	10.0
$C_{Mz,Geb}$ [kNm/rad]	22.0
$C_{Mz,ini}$ [kNm/rad]	42.0
$V_{z,Rk}$ [kN]	7.51 (positive direction only)
$V_{y,Rk}$ [kN]	11.21

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.
		

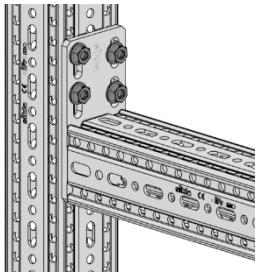
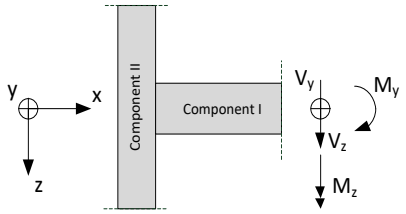
$M_{y,Rk}$ [kNm]	2.52 (positive direction only)
$C_{My,Rd}$ [kNm/rad]	42.0 (positive direction only)
$C_{My,Geb}$ [kNm/rad]	44.0 (positive direction only)
$C_{My,ini}$ [kNm/rad]	46.0 (positive direction only)
$M_{z,Rk}$ [kNm]	0.92
$C_{Mz,Rd}$ [kNm/rad]	17.0
$C_{Mz,Geb}$ [kNm/rad]	25.0
$C_{Mz,ini}$ [kNm/rad]	33.0
$V_{z,Rk}$ [kN]	39.65 (positive direction only)
$V_{y,Rk}$ [kN]	9.96

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

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

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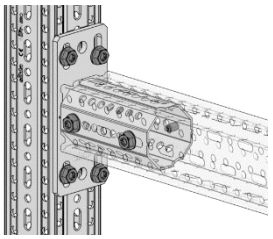
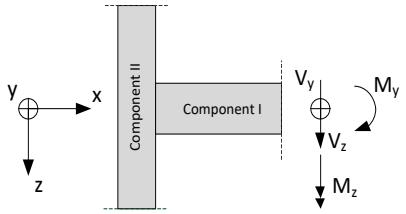
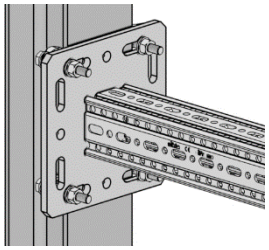
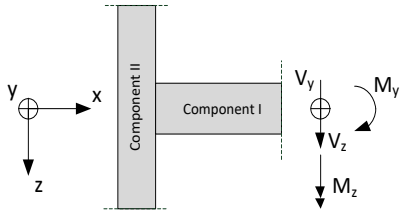
Beam end connector characteristics

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

Beam end connector characteristics

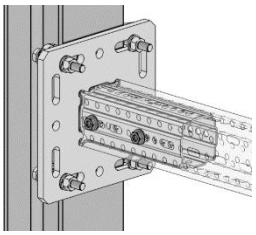
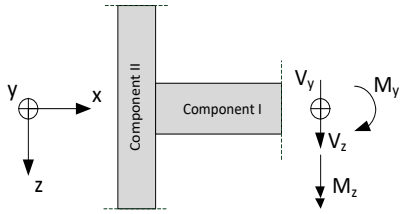
Beam end connector type 8: TKO F 80		
	Connector:	Beam Bracket TKO F 80
	Component I	Beam section TP F 80
	Component II	Steel beam
	description	Component I is welded to the beam bracket (connector). The beam bracket is fastened with 4 metric screws M12 8.8 to component II.
		

$M_{y,Rk}$ [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	**Annex 18**
Beam end connector type 8	

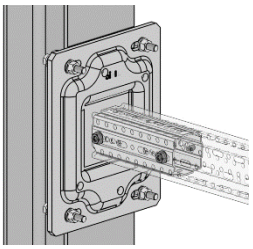
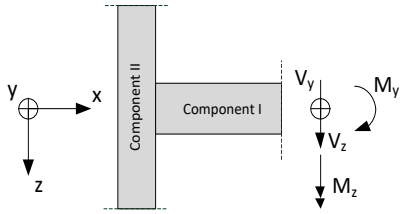
Beam end connector characteristics

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.

Beam end connector characteristics

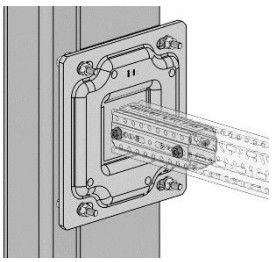
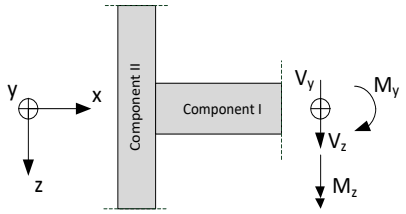
Beam end connector type 10: WBD F 80 – 121/160		
	Connector:	End Support WBD F 80 – 121/160
	Component I	Beam section TP F 80
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The 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

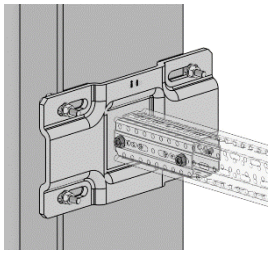
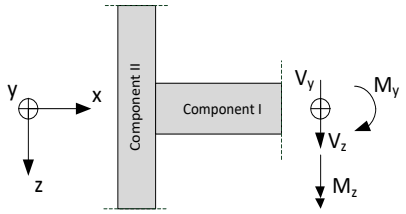
Beam end connector type 11: WBD F 80 – 161/200		
	Connector:	End Support WBD F 80 – 161/200
	Component I	Beam section TP F 80
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The 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

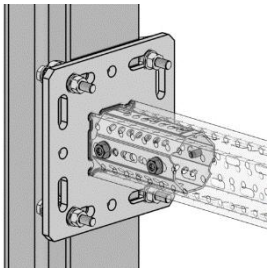
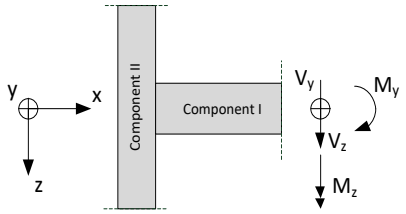
Beam end connector type 12: WBD F 80 – 201/310		
	Connector:	End Support WBD F 80 – 201/310
	Component I	Beam section TP F 80
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The 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

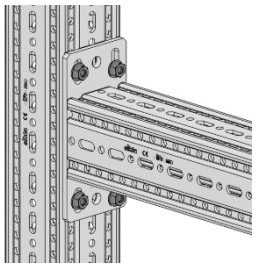
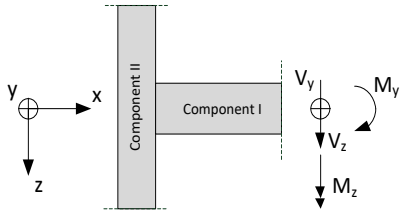
Beam end connector type 13: F 80 – T		
	Connector:	End support F 80 – T
	Component I	Beam section TP F 80
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end support is fastened 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.

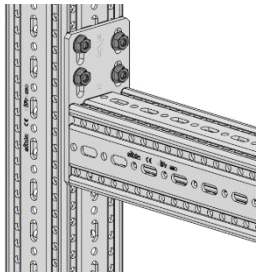
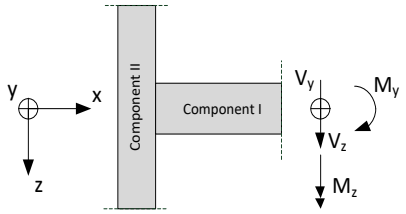
Steel components for PRS	**Annex 23**
Beam end connector type 13	

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

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

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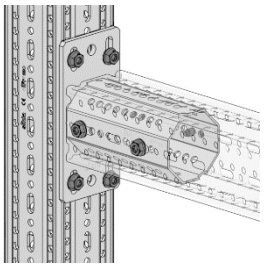
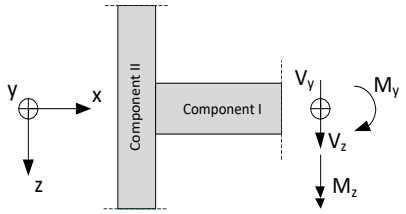
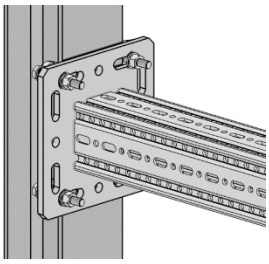
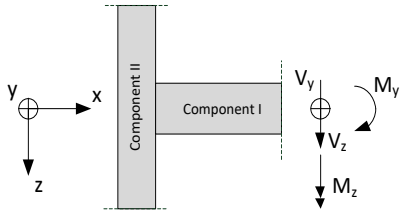
Beam end connector characteristics

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	**Annex 26**
Beam end connector type 16	

Beam end connector characteristics

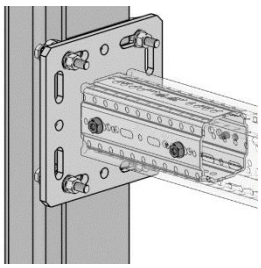
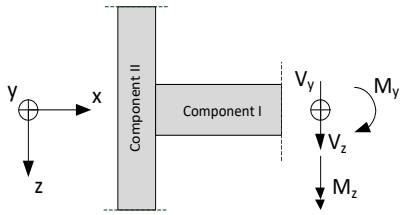
Beam end connector type 17: TKO F 100		
	Connector:	Beam Bracket TKO F 100
	Component I	Beam section TP F 100
	Component II	Steel beam
	description	Component I is welded to the beam bracket (connector). The beam bracket is fastened with 4 metric screws M12 8.8 to component II.
		

$M_{y,Rk}$ [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	**Annex 27**
Beam end connector type 17	

Beam end connector characteristics

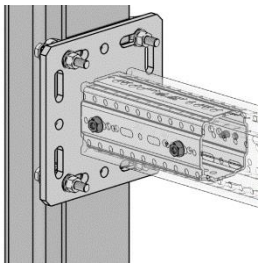
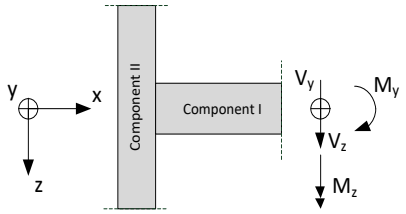
Beam end connector type 18: F 100 - 80/120		
	Connector:	End Support WBD F 100 - 80/120
	Component I	Beam section TP F 100
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end 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

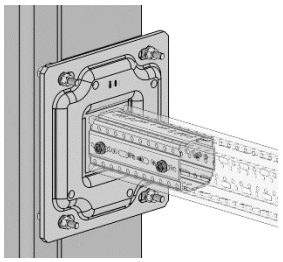
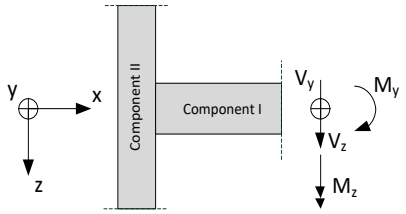
Beam end connector type 19: F 100 - 121/160		
	Connector:	End Support WBD F 100 - 121/160
	Component I	Beam section TP F 100
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end 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

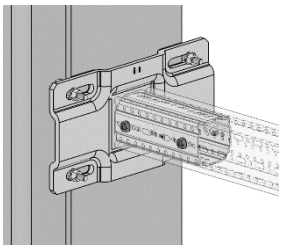
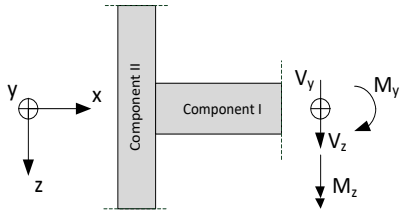
Beam end connector type 20: F 100 - 161/200		
	Connector:	End Support WBD F 100 - 161/200
	Component I	Beam section TP F 100
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end 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

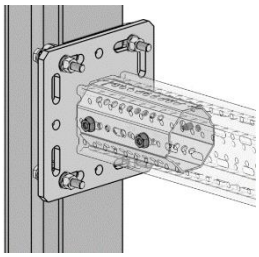
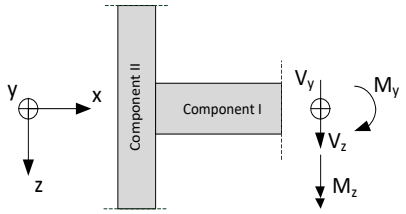
Beam end connector type 21: F 100 - 201/310		
	Connector:	End Support WBD F 100 - 201/310
	Component I	Beam section TP F 100
	Component II	Steel beam
	description	Component I is fastened with 4 Self Forming Screws (FLS F) to the connector (2 screws on two opposing sides, see image on the left). The end 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	

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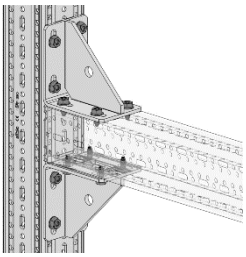
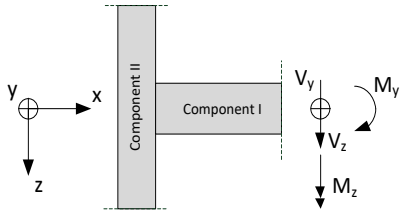
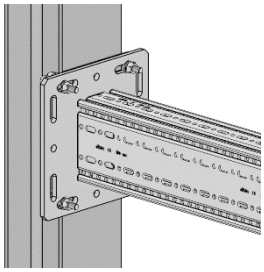
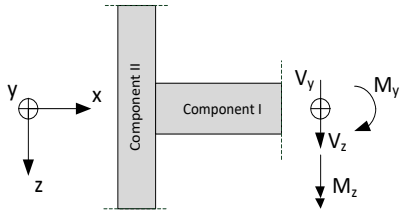
Beam end connector characteristics

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

Beam end connector characteristics

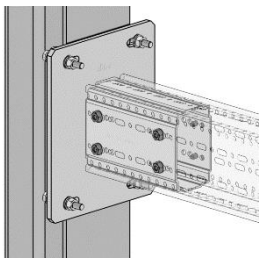
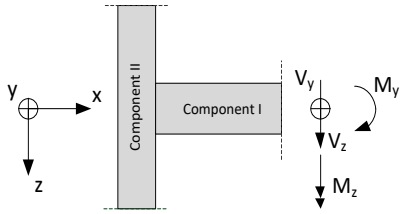
Beam end connector type 24: TKO F 100/160		
	Connector:	Beam Bracket TKO F 100/160
	Component I	Beam section TP F 100/160
	Component II	Steel beam
	description	Component I is welded to the beam bracket (connector). The beam bracket is fastened with 4 metric screws M12 8.8 to component II.
		

$M_{y,Rk}$ [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	**Annex 34**
Beam end connector type 24	

Beam end connector characteristics

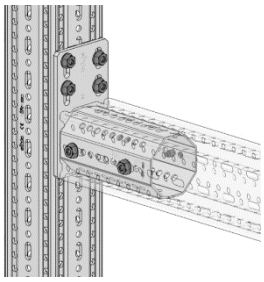
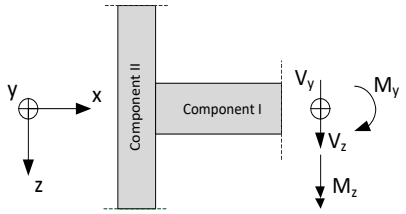
Beam end connector type 25: WBD F 100/160 - 121/160		
	Connector:	End Support WBD F 100/160 - 121/160
	Component I	Beam section TP F 100/160
	Component II	Steel beam
	description	Component I is fastened with 8 Self Forming Screws (FLS F) to the connector. (4 screws on two opposing sides, see image on 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.

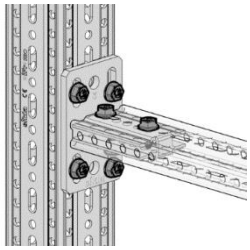
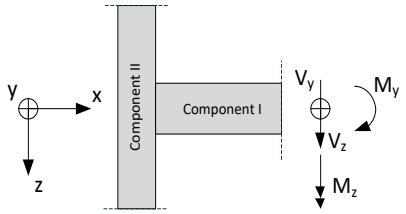
Steel components for PRS	**Annex 35**
Beam end connector type 25	

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.
		

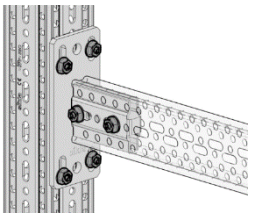
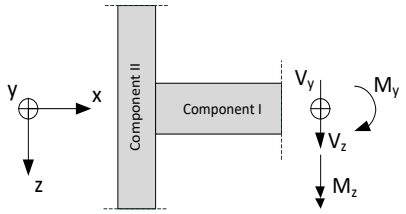
$M_{y,Rk}$ [kNm]	3.21 (positive direction only)
$C_{My,Rd}$ [kNm/rad]	81.0 (positive direction only)
$C_{My,Geb}$ [kNm/rad]	100.0 (positive direction only)
$C_{My,ini}$ [kNm/rad]	158.0 (positive direction only)
$M_{z,Rk}$ [kNm]	0.86
$C_{Mz,Rd}$ [kNm/rad]	42.0
$C_{Mz,Geb}$ [kNm/rad]	49.0
$C_{Mz,ini}$ [kNm/rad]	56.0
$V_{z,Rk}$ [kN]	41.82 (positive direction only)
$V_{y,Rk}$ [kN]	18.62

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.
		

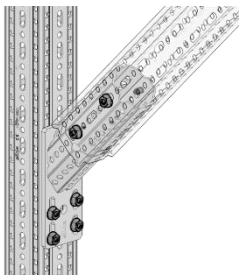
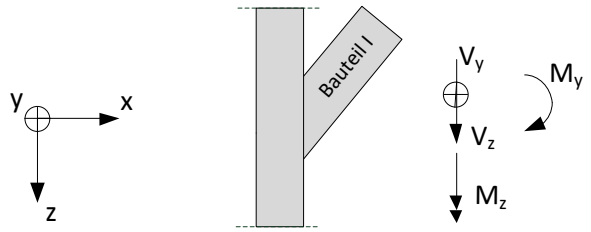
$M_{y,Rk}$ [kNm]	0.125
$C_{My,Rd}$ [kNm/rad]	13.0
$C_{My,Geb}$ [kNm/rad]	25.0
$C_{My,ini}$ [kNm/rad]	23.0
$M_{z,Rk}$ [kNm]	0.75
$C_{Mz,Rd}$ [kNm/rad]	51.0.
$C_{Mz,Geb}$ [kNm/rad]	104.0
$C_{Mz,ini}$ [kNm/rad]	188.0
$V_{z,Rk}$ [kN]	1.25
$V_{y,Rk}$ [kN]	4.76

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

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

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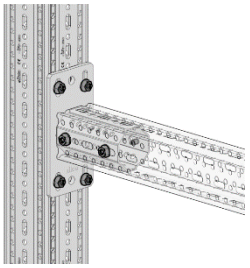
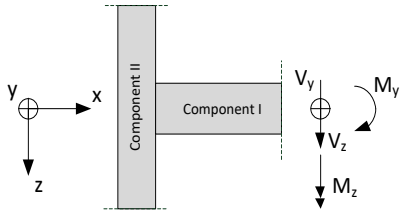
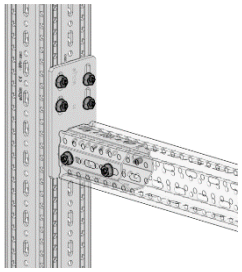
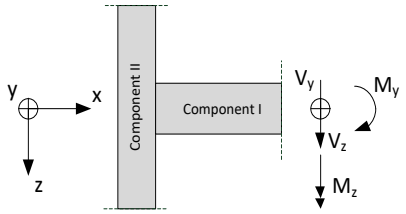
Beam end connector characteristics

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.
		

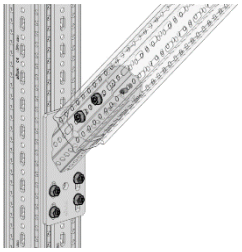
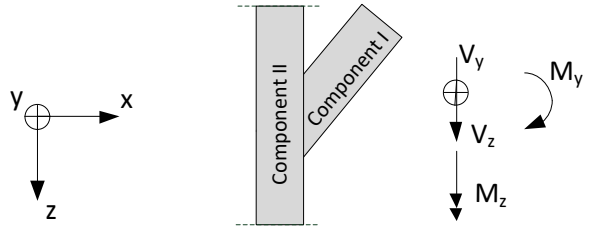
$M_{y,Rk}$ [kNm]	2.51
$C_{My,Rd}$ [kNm/rad]	53.0
$C_{My,Geb}$ [kNm/rad]	55.0
$C_{My,ini}$ [kNm/rad]	55.0
$M_{z,Rk}$ [kNm]	1.18
$C_{Mz,Rd}$ [kNm/rad]	21.0
$C_{Mz,Geb}$ [kNm/rad]	30.0
$C_{Mz,ini}$ [kNm/rad]	51.0
$V_{z,Rk}$ [kN]	27.39
$V_{y,Rk}$ [kN]	15.26

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

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

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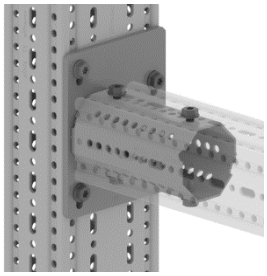
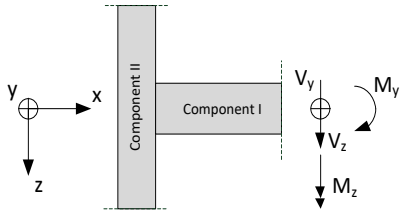
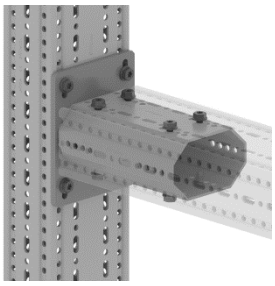
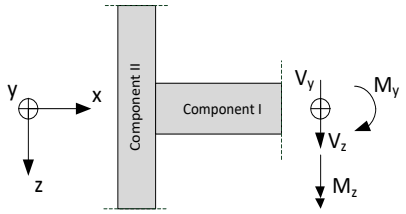
Beam end connector characteristics

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

LUXEMBOURG INSTITUTE FOR LUXIB BUILDING AND TECHNOLOGY

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

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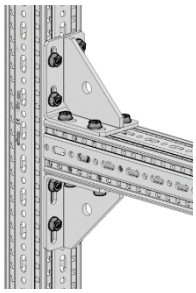
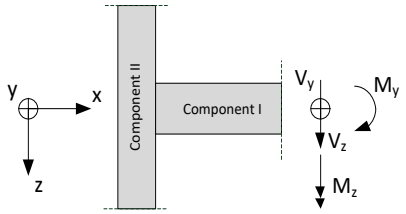
Beam end connector characteristics

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

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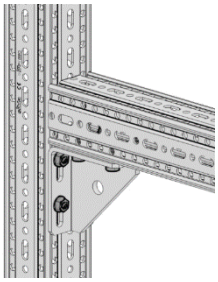
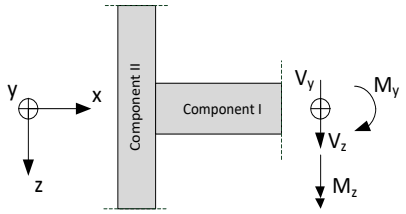
Beam end connector characteristics

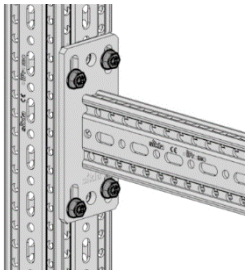
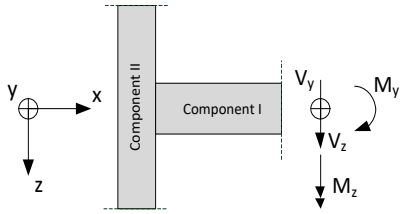
Beam end connector type 36: WD F 80 single		
	Connector:	1 x Corner Bracket WD 80
	Component I	Beam section TP F 80
	Component II	Beam section TP F 80
	description	Component I is fastened with in total 4 Self Forming Screws (FLS F) to both corner brackets. The corner brackets are fastened with in total 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	**Annex 46**
Beam end connector type 36	

LUXEMBOURG INSTITUTE FOR LUXIB BUILDING AND TECHNOLOGY

Beam end connector characteristics

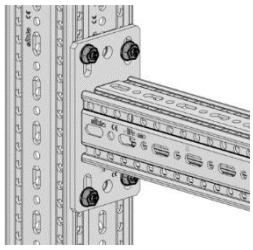
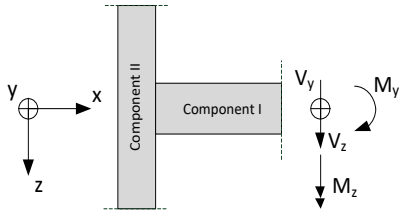
Beam end connector type 37: AK F 80/30-Q		
	Connector:	Cantilever Bracket AK F 80/30-Q
	Component I	Beam section TP F 80/30
	Component II	Beam section TP F 80
	description	Component I is welded to the face plate. The face plate is fastened with 4 Self Forming Screws (FLS F) to component II.
		

$M_{y,Rk}$ [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	**Annex 47**
Beam end connector type 37	

LUXEMBOURG INSTITUTE FOR LUXIB BUILDING AND TECHNOLOGY

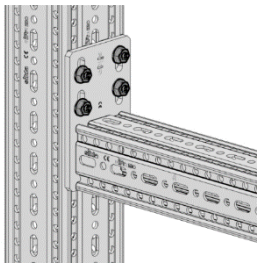
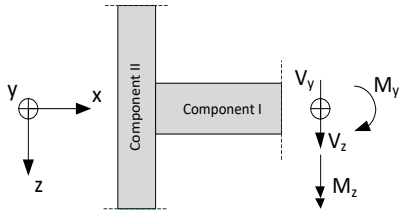
Beam end connector characteristics

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**

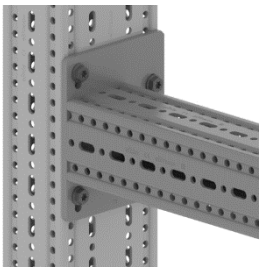
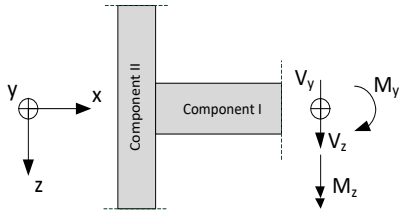
Beam end connector characteristics

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

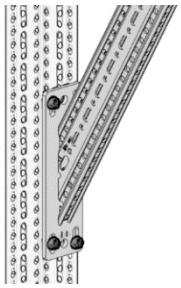
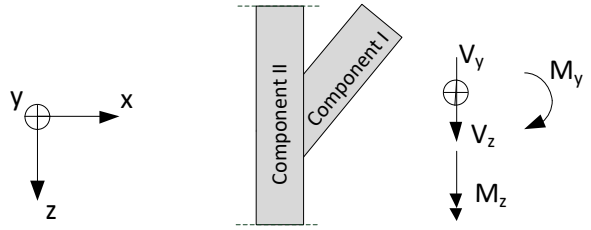
Steel components for PRS	**Annex 49**
Beam end connector type 39	

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

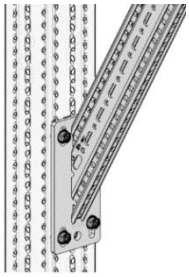
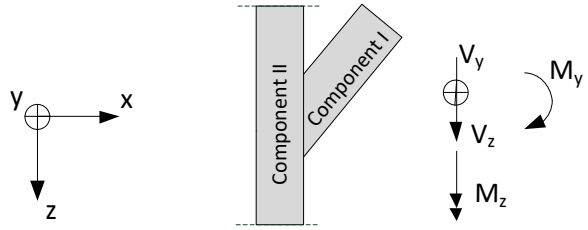
Beam end connector characteristics

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	**Annex 51**
Beam end connector type 41	

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	**Annex 52**
Beam end connector type 42	