



## European Technical Assessment

ETA-09/0301  
of 4 November 2025

English translation prepared by DIBt - Original version in German language

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Trade name of the construction product

Product family  
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment  
contains

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

This version replaces

Deutsches Institut für Bautechnik

BB-beam connectors

Three-dimensional nailing plates (BB-connector for wood  
to wood connections)

BB Stanz- und Umformtechnik GmbH  
Nordhäuser Straße 42  
06536 Berga  
DEUTSCHLAND

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Nordhäuser Straße 42  
06536 Berga  
DEUTSCHLAND

20 pages including 4 annexes which form an integral part  
of this assessment

EAD 130186-00-0603

ETA-09/0301 issued on 25 January 2019

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## Specific Part

### 1 Technical description of the product

BB-beam connectors are two-piece non-welded timber connectors. They are fastened to timber construction elements with screws in accordance with EN 14592<sup>1</sup> and used for connecting the timber construction elements with each other. They are installed as connections between wood-based members in accordance with Annex 2.

The connectors are made in different sizes of cold-formed galvanized steel sheet S250GD+Z275 in accordance with EN 10346<sup>2</sup>. Dimensions, hole positions, arrangement of fasteners and typical installations are shown in Annex 1 and in Annex 4. The beam connectors are made of steel sheets with tolerances in accordance with EN 10143<sup>3</sup>.

### 2 Specification of the intended use in accordance with the applicable European Assessment Document

The beam connectors are used for connecting the timber construction elements (header and joist or column and joist). The structural behaviour of the construction elements and the support conditions correspond to the indications given in Annex 3.

The beam connectors are used in timber structures subject to climate conditions corresponding to service classes 1 and 2 in accordance with EN 1995-1-1<sup>4</sup>.

The performances given in Section 3 are only valid if the BB-beam connectors are used in compliance with the specifications and conditions given in Annex 1 to 4.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the BB-beam connectors of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, 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

#### 3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Joint strength	See Annex 3
Joint stiffness	No performance assessed
Joint ductility	No performance assessed
Resistance to seismic actions	No performance assessed
Resistance to corrosion and deterioration	See Annex 2

#### 3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

<sup>1</sup> EN 14592:2008+A1:2012

Timber structures Dowel-type fasteners Requirements

<sup>2</sup> EN 10346:2015

Continuously hot-dip coated steel flat products for cold forming – Technical delivery conditions

<sup>3</sup> EN 10143:2006

Continuously hot-dip coated steel sheet and strip – Tolerances on dimensions and shape

<sup>4</sup> EN 1995-1-1+AC:2006+A1:2008+A2:2014

Eurocode 5: Design of timber structures; Part 1-1: General – Common rules and rules for buildings

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

In accordance with the European Assessment Document EAD 130186-00-0603 the applicable European legal act is: [97/638/EC (EU)].

The 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 Deutsches Institut für Bautechnik.

Issued in Berlin on 4 November 2025 by Deutsches Institut für Bautechnik

Anja Dewitt  
Head of Section

*beglaubigt:*  
Stützer

## Annex 1 Technical description of the product

### Fastener types and sizes

Screw diameter [mm]	Length [mm] Min – max	Type
5.0	80 - 120	Screws according to EN 14592 with a minimum thread length of 72 mm
<b>Values of strength</b>		
Characteristic value of yield moment $M_{y,k} \geq 5900 \text{ Nmm}$		
Characteristic value of withdrawal parameter $f_{ax,k} \geq 10 \text{ N/mm}^2$ in timber with a characteristic density $\rho_k = 350 \text{ kg/m}^3$		

### BB-beam connector 90x70

Two-piece connector consisting of a joist plate and suitable header plate of 3.0 mm thick, galvanized steel sheet S250GD+Z275 according to EN 10346 with a tolerance according to EN 10143

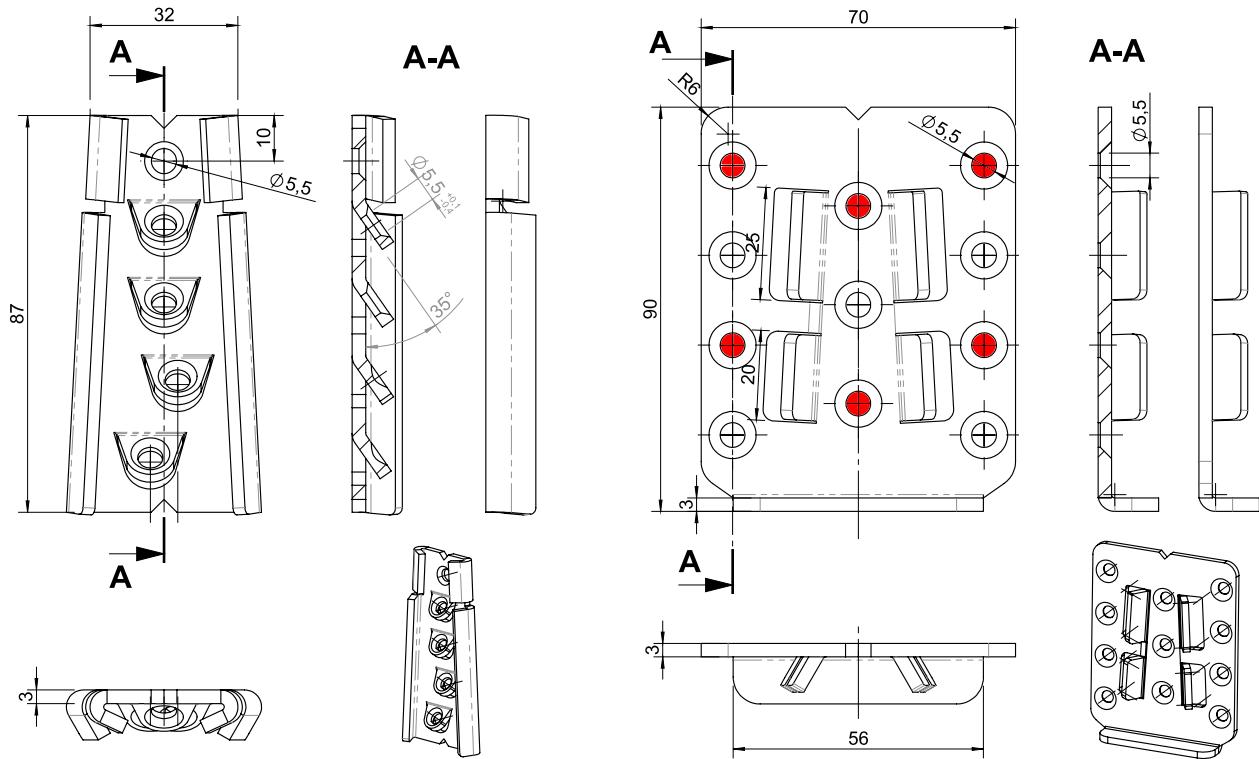


Figure A.1 Header plate of the Joist plate of the beam connector 90 mm x 70 mm

Figure A.2 beam connector 90 mm x 70 mm  
(● screws for column connection)

BB-beam connectors

BB-beam connector 90 mm x 70 mm x 3.0 mm

Annex 1.1

### BB-beam connector 125x70

Two-piece connector consisting of a joist plate and suitable header plate of 3.0 mm thick galvanized steel sheet S250GD+Z275 according to EN 10346 with a tolerance according to EN 10143

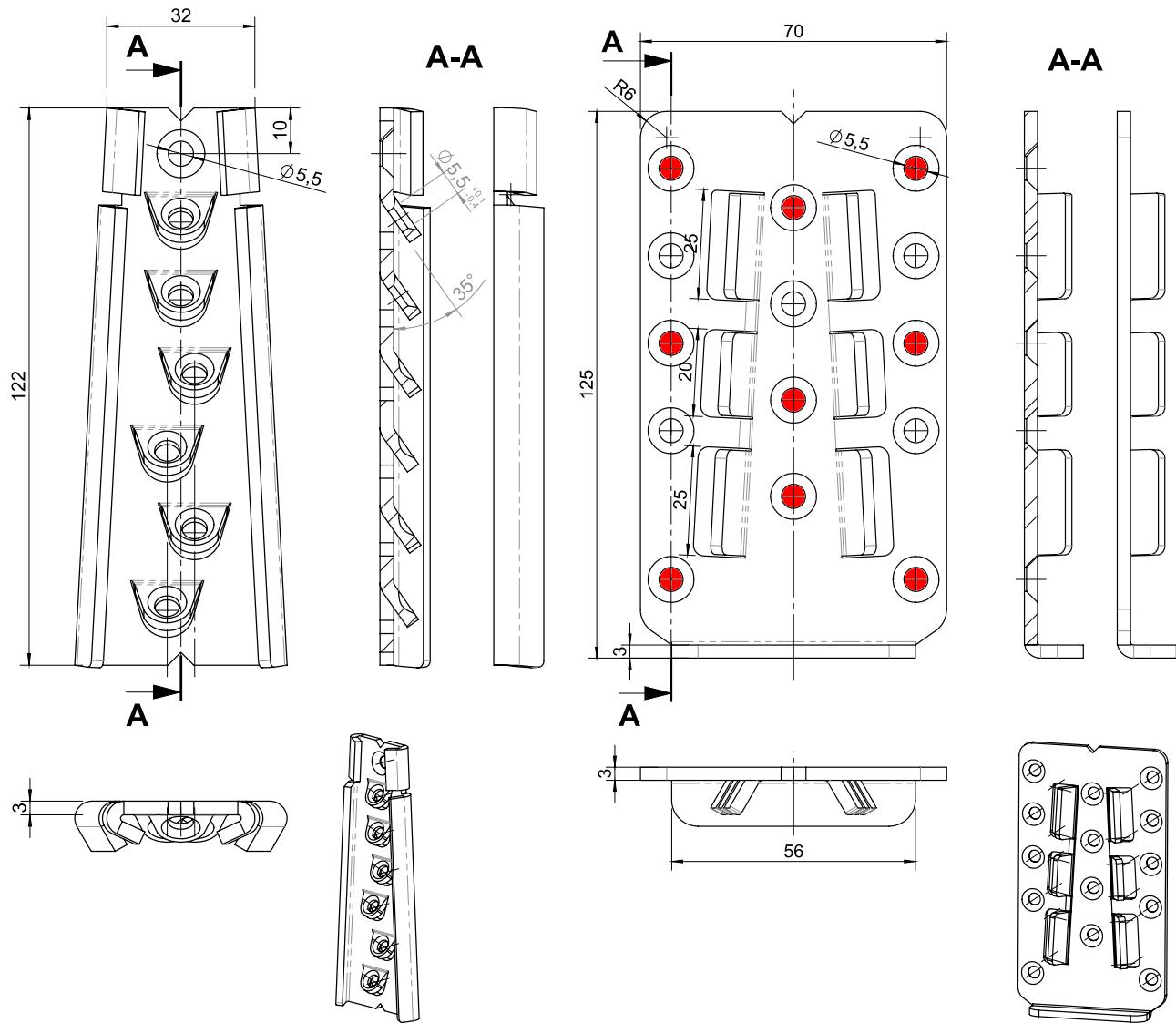


Figure A.3 Header plate of the Joist plate of  
the beam connector 125 mm x 70 mm

Figure A.4 beam connector 125 mm x 70 mm  
(red dots for column connection)

BB-beam connectors

BB-beam connector 125 mm x 70 mm x 3.0 mm

Annex 1.2

### BB-beam connector 150x70

Two-piece connector consisting of a joist plate and suitable header plate of 3.0 mm thick, galvanized steel sheet S250GD+Z275 according to EN 10346 with a tolerance according to EN 10143

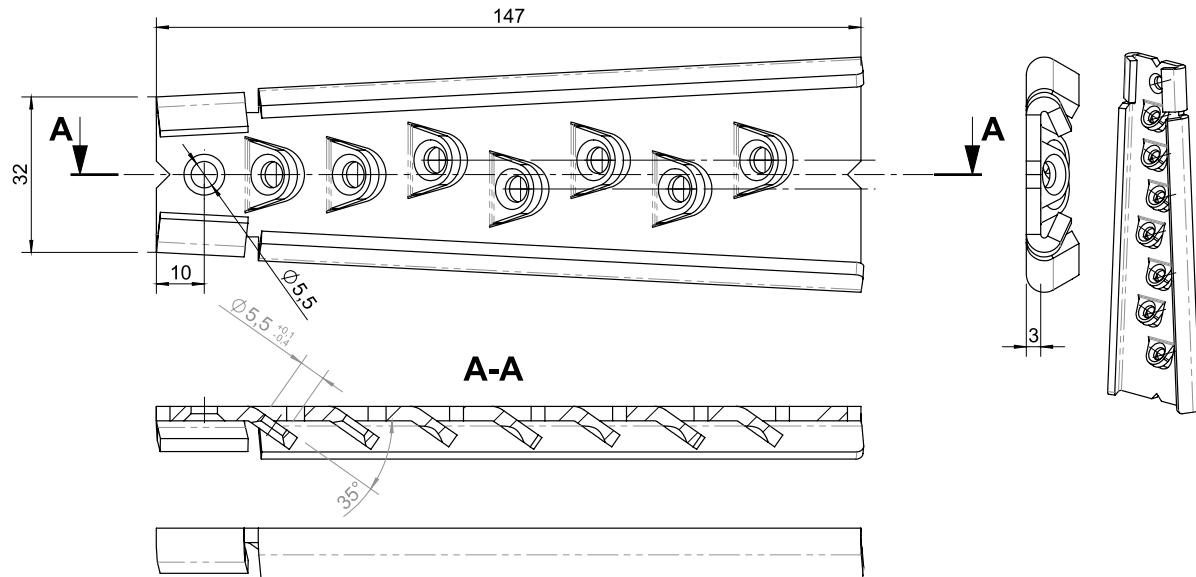


Figure A.5 Joist plate of the beam connector 150 mm x 70 mm

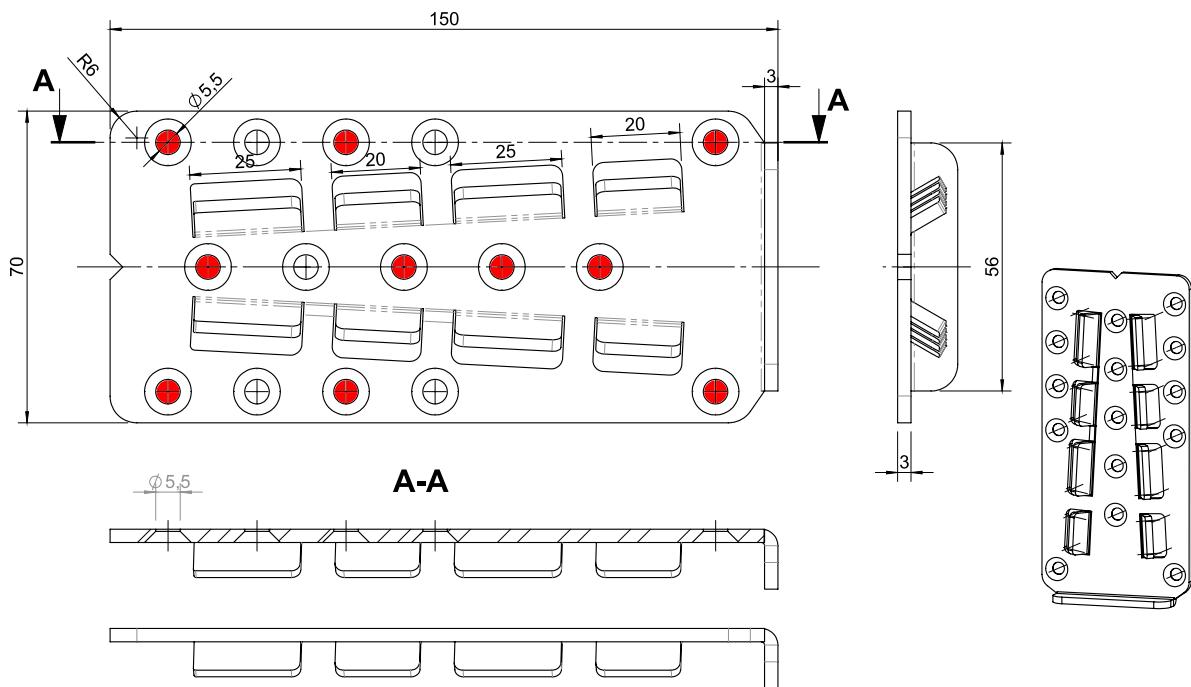


Figure A.6 Header plate of the beam connector 150 mm x 70 mm (● screws for column connection)

BB-beam connectors

BB-beam connector 150 mm x 70 mm x 3.0 mm

Annex 1.3

### BB-beam connector 190x70

Two-piece connector consisting of a joist plate and suitable header plate of 3.0 mm thick, galvanized steel sheet S250GD+Z275 according to EN 10346 with a tolerance according to EN 10143

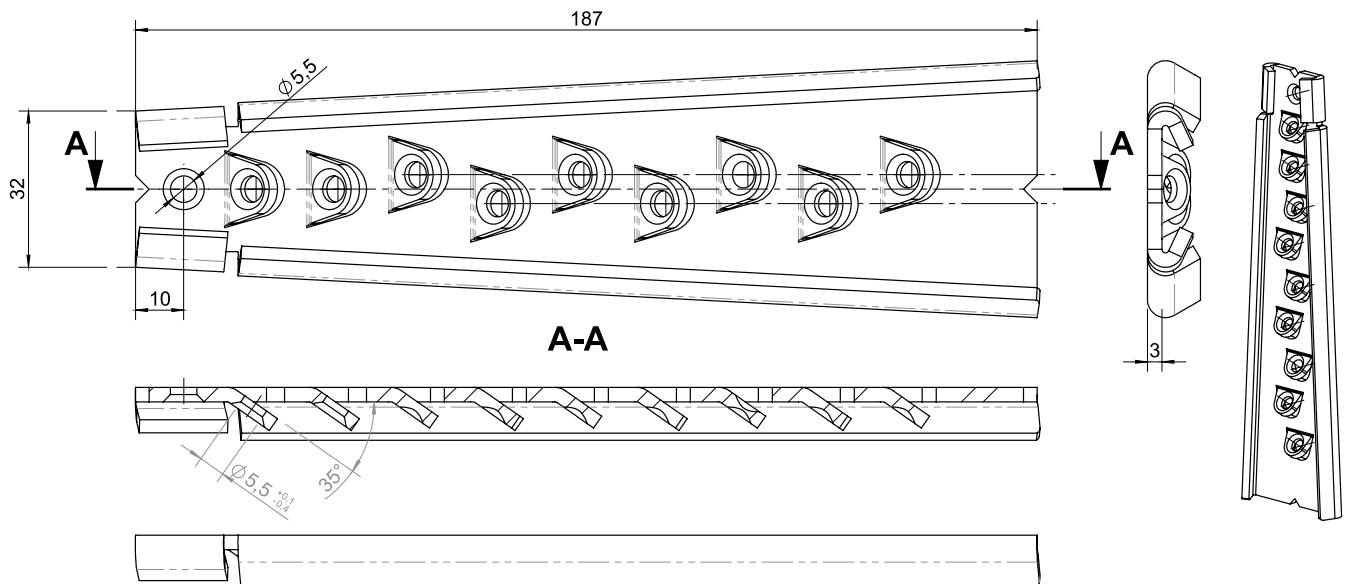


Figure A.7 Joist plate of the beam connector 190 mm x 70 mm

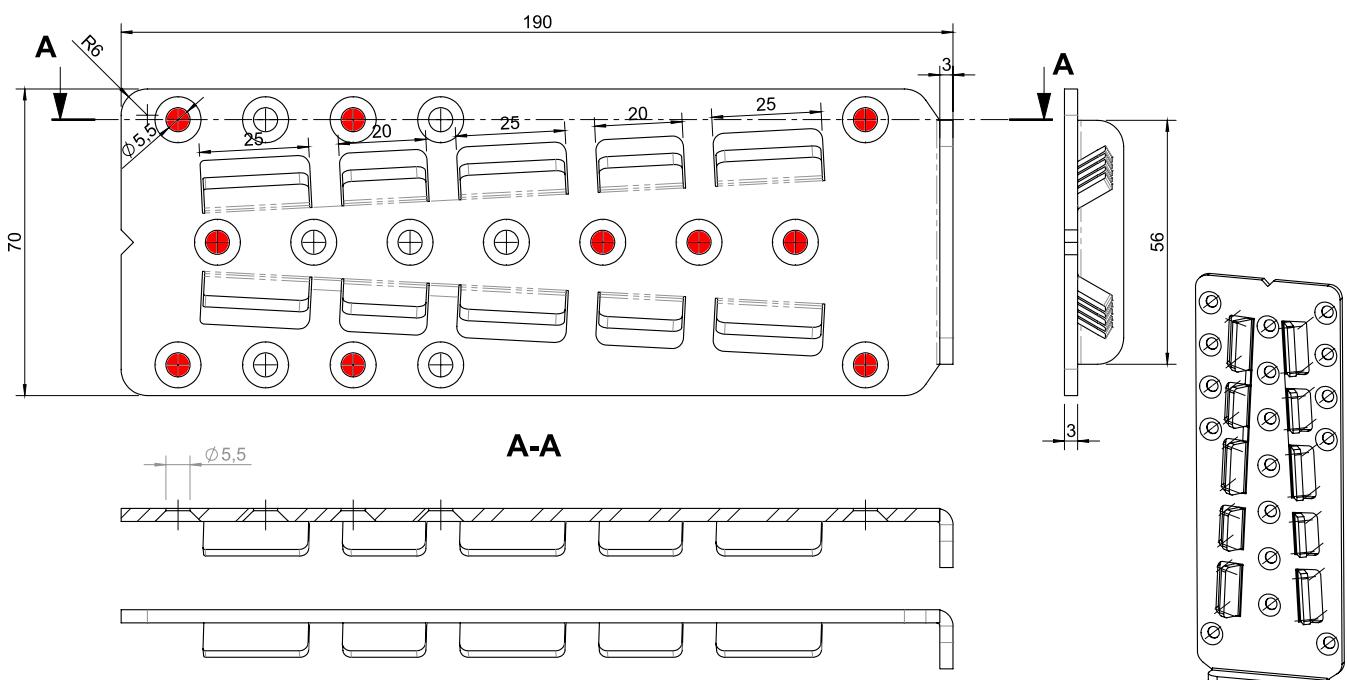


Figure A.8 Header plate of the beam connector 190 mm x 70 mm (● screws for column connection)

BB-beam connectors

BB-beam connector 190 mm x 70 mm x 3.0 mm

Annex 1.4

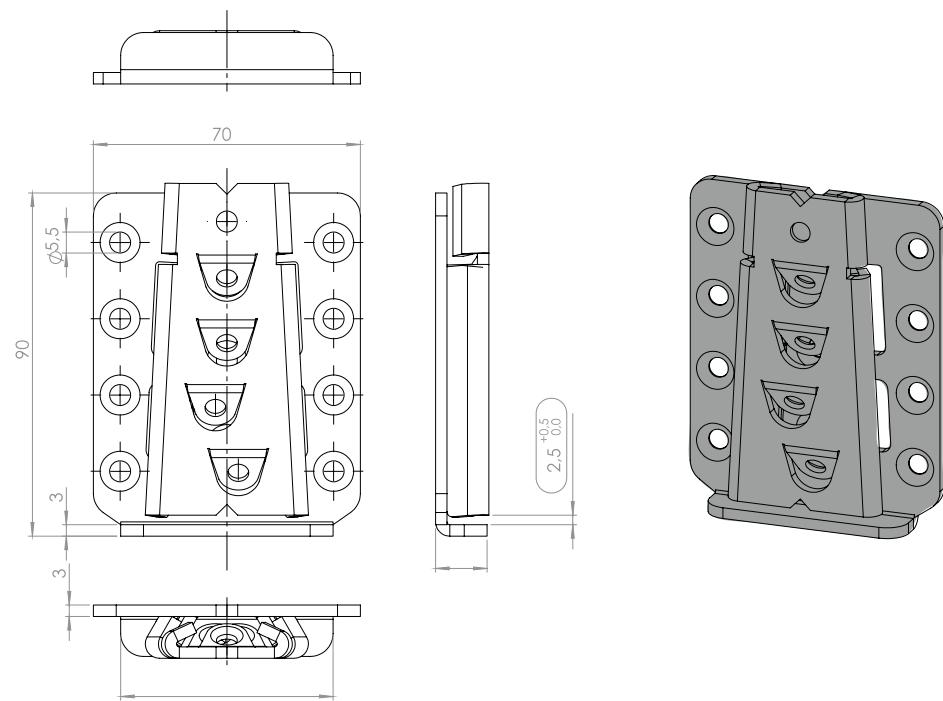


Figure A.9 Closed beam connector 90 mm x 70 mm x 3.0 mm

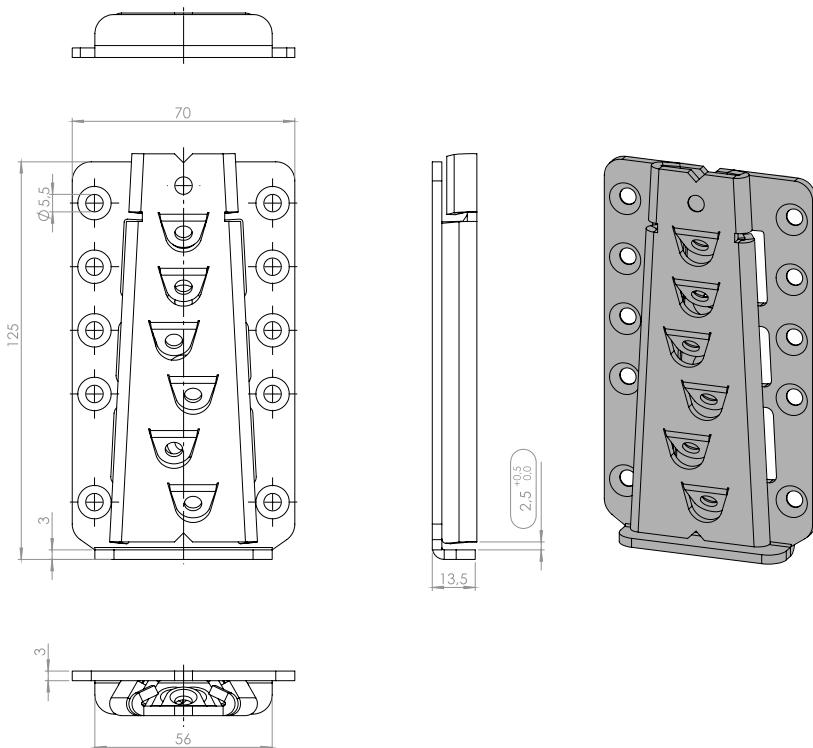
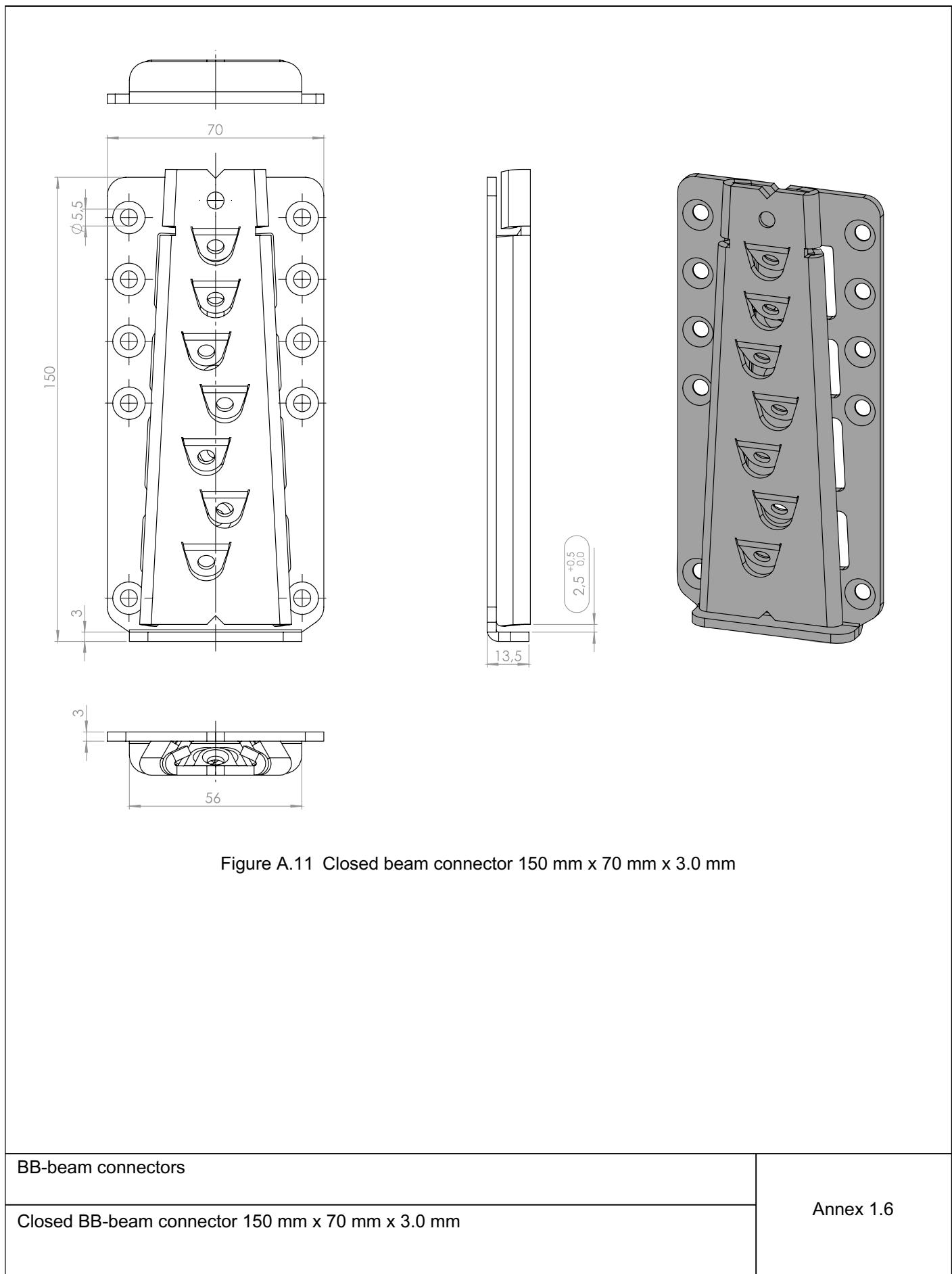


Figure A.10 Closed beam connector 125 mm x 70 mm x 3.0 mm

BB-beam connectors

BB-beam connectors 190 mm x 70 mm x 3.0 mm

Annex 1.4



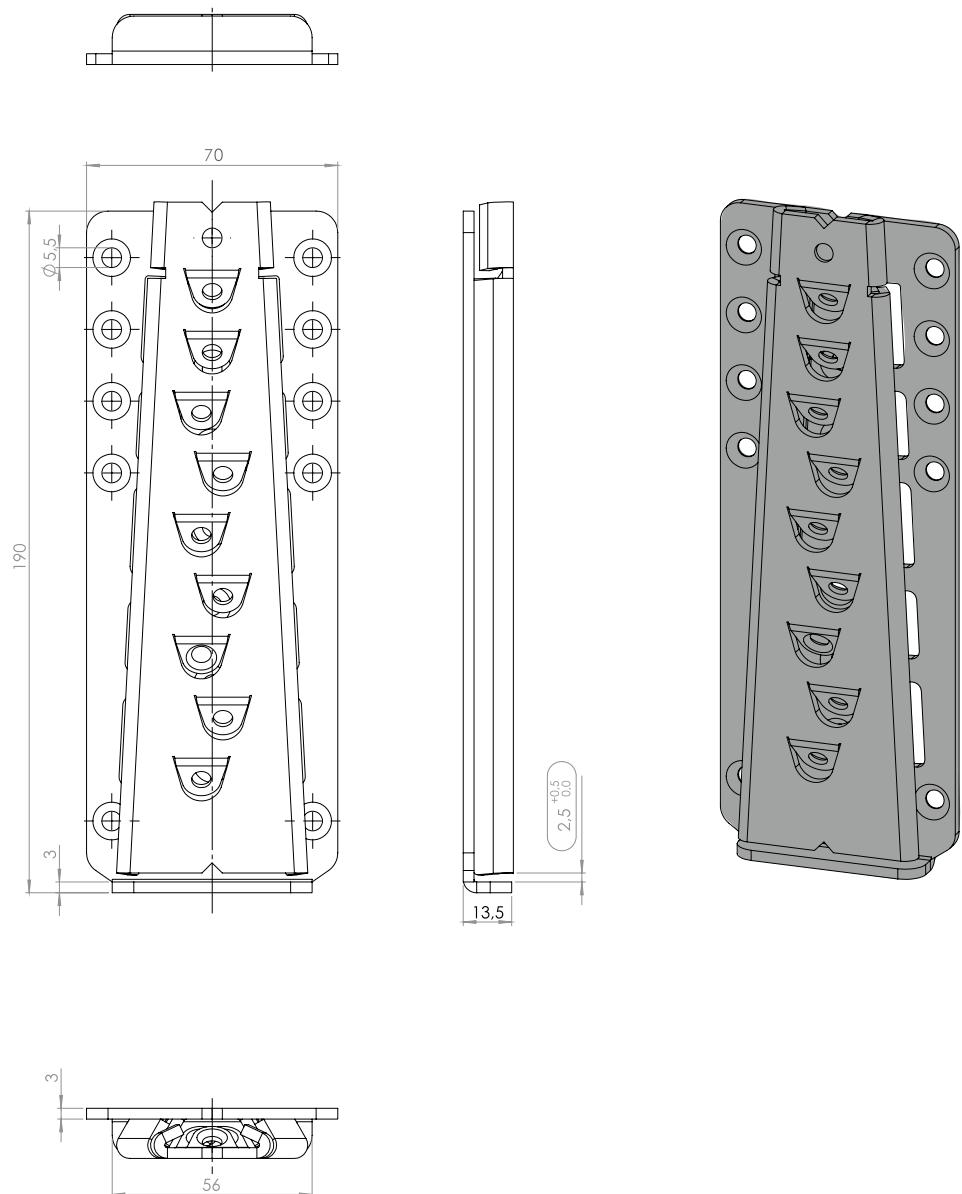


Figure A.12 Closed beam connector 190 mm x 70 mm x 3.0 mm

BB-beam connectors

Closed BB-beam connector 190 mm x 70 mm x 3.0 mm

Annex 1.7

## Annex 2 Specifications of intended use

### A.2.1 Loading

- Static and quasi-static loads (not relevant to fatigue)
- Only for connections on torsion-resistant headers and headers sufficiently secured against rotation

### A.2.2 Base material

The structural behaviour of the construction elements and the support conditions correspond to the indications given in Annex 3.

BB-beam connectors are installed as connections between the following wood-based members:

- Solid timber (softwood) of strength classes C14 – C40 according to EN 338<sup>1</sup> / EN 14081-1<sup>2</sup>,
- Glued laminated timber of at least strength class GL24c according to EN 14080<sup>3</sup>,
- Laminated veneer lumber LVL according to EN 14374<sup>4</sup> (only header or column), connection only perpendicular to the plane of the veneers,
- Plywood according to EN 636<sup>5</sup> and EN 13986<sup>6</sup> (only header),
- Oriented Strand Board (OSB) according to EN 300<sup>7</sup> and EN 13986 (only header),
- Glued solid timber according 14080,
- Solid wood panels according to EN 13353<sup>8</sup> and EN 13986.

### A.2.3 Use conditions (Environmental conditions)

#### A.2.3.1 Corrosion protection in service classes 1 and 2

BB-beam connectors are made of galvanized steel sheets of type S250GD + Z250 according to EN 10346<sup>9</sup>.

The screws used with the BB-beam connectors are of uncoated steel for service class 1 and 2 (in accordance with EN 1995-1-1<sup>10</sup>, Table 4.1 if there is no special corrosive condition).

<sup>1</sup> EN 338:2016

Timber structures - Strength classes

<sup>2</sup> EN 14081-1:2005+A1:2011

Timber structures - Strength graded structural timber with rectangular cross section - Part 1: General requirements

<sup>3</sup> EN 14080:2013

Timber structures - Glued laminated timber - Requirements

<sup>4</sup> EN 14374:2004

Timber structures - Structural laminated veneer lumber - Requirements

<sup>5</sup> EN 636:2012+A1:2015

Plywood - Specifications

<sup>6</sup> EN 13986:2004+A1:2015

Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking

<sup>7</sup> EN 300:2006

Oriented Strand Boards (OSB) – Definitions, classification and specifications

<sup>8</sup> EN 13353:2022

Solid wood panels (SWP) - Requirements

<sup>9</sup> EN 10346:2015

Continuously hot-dip coated steel flat products for cold forming – Technical delivery conditions

<sup>10</sup> EN 1995-1-1:2004+A1:2008+A2:2014

Eurocode 5: Design of timber structures – Part 1-1: General - Common rules and rules for buildings

BB-beam connectors

Specifications of intended use

Loading, base material, corrosion protection and wood preservative, installation

Annex 2.1

### A.2.3.2 Installation

The connection with BB-beam connectors is deemed fit for its intended use provided:

The connection of the connectors to the construction elements is carried out at the factory. The connectors and the timber elements connected with that are classified according to Annex 4.

The wood-based members are free from wane under the joist plate.

If the header carries a joist only on one side the eccentricity moment from

$$M_v = \frac{2 \cdot F_j}{B_H}$$

is considered at the strength verification of the header and its supports.

Where:  $F_j$  Reaction force from the joist

$B_H$  Width of header

The same applies when the header has connections on both sides but with forces which differ more than 20 %.

BB-beam connectors are fastened to joists and headers or columns by screws according to Table in Annex 1.

All holes on joists and headers are supplied with screws. The arrangement of the screws for the connection to columns is shown in Annexes 1.1 to 1.4.

Splitting of the header or joist caused by tensile forces perpendicular to the grain are considered in calculation.

BB-beam connectors are only used for connections on torsion-resistant headers and headers sufficiently secured against rotation.

The gap between the side grain of the header and the header plate of the connector as well as the gap between the joist plate and the header plate and the gap between the end grain of the joist and the joist plate are limited. Any of these gaps are maximum 1 mm. The joists and the connectors are installed strain-free, if suitable calculation is not carried out.

For BB-beam connectors the width of the header or column is at least equal to the screw length. In case of two-sided connections, the width of the header or columns are at least  $l+4d$ , where  $l$  is the length and  $d$  the diameter of the screws in the header or column. For the connectors the depth of the joist allows an edge distance of at least 10 mm between the screw tip and the adjacent joist surface.

The width of the joist allows an edge distance of at least 12.5 mm between the side surfaces of the joist and the adjacent connector edges. The adjacent connector edges and the depth of the joist allow an edge distance of at least 15 mm between the top and bottom surfaces of the joist and the adjacent connector edges.

The header or columns have a plane surface against the whole beam connector.

The requirements to the timber members being joined are taken into account.

BB-beam connectors

Annex 2.2

Specifications of intended use

Installation

## Annex 3 Specification of essential characteristics

### A.3.1 Forces acting in a connection with BB-beam Connectors

The forces acting in connection with the beam connectors are designated as  $F_x$ ,  $F_y$  and  $F_z$ , as given in Figure 3.1. The forces  $F_x$  and  $F_z$  act within the symmetry plane of the beam connector. The force  $F_y$  acts at a vertical distance  $e_j$  above the center of gravity of the screw connection at the joist. It is assumed that the line of action of the force is acting directly at the end of the joist.

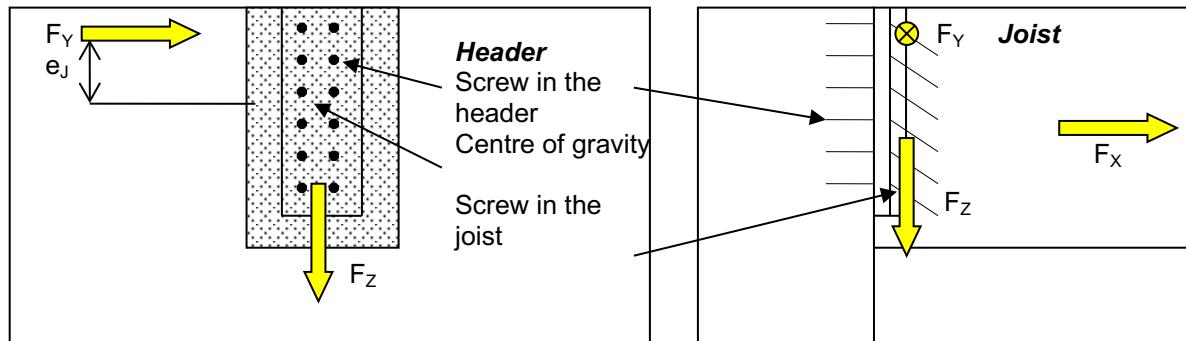


Figure 3.1: Acting forces in a connection with BB-beam connectors

In case of a one-sided connection of beam connectors, the eccentricity moment exposing the header on torsion or the column on bending is taken into account when verifying the header and its supports or the column. In case of two-sided connections, where the reaction forces  $F_N$  of opposing joists do not differ more than 20%, the eccentricity moment may be neglected.

### A.3.2 Design values of the load-carrying-capacities of BB-beam connector connections

The forces  $F_{x,Ed}$  and  $F_{z,Ed}$  act in the symmetry plane of the beam connector. The force  $F_{y,Ed}$  acts in a distance  $e_j$  of the centre of gravity of the joist connection. It is assumed that the forces  $F_{y,Ed}$  and  $F_{z,Ed}$  are acting right at the end of the joist.

The header is secured against rotation around its own axis. If the connection is carried out on one side of the header or the column only, the eccentricity moment or the bending moment is taken into account. This applies accordingly, if the reaction forces on both sides of the header differ by more than 20 %.

In case of connections to headers all holes of the header plate shall be provided with screws, in case of connections to columns only the marked holes.

The width of the header or columns is at least equal to the screw length, in case of two-sided connections the width is at least  $l + 4d$ , where  $l$  is the length and  $d$  the diameter of the screws in the header connection. The distance between the screw tip and the adjacent joist surface shall be at least 10 mm.

For the calculation of design values, the partial material factor and the modification factor for timber or wood-based members are used.

BB-beam connectors

Specification of essential characteristics

Design values of load-carrying-capacities

Annex 3.1

### A.3.2.1 Design values of the load caring capacities

Design values for the following force directions may be calculated according to equation B.1 to B.4:

**Force direction perpendicular to the connector plates:**

$$F_{X,Rd} = \min \left( \frac{A}{B_X \cdot k_p \cdot k_{mod}} \cdot \frac{\gamma_{M,S}}{\gamma_{M,T}} \right) \quad (B.1)$$

**Force direction lateral:**

$$F_{Y,Rd} = \frac{B_Y \cdot k_p \cdot k_{mod} \cdot k_e}{\gamma_{M,T}} \quad (B.2)$$

**Force direction downward:**

$$F_{Z,Rd} = \frac{B_Z \cdot k_p \cdot k_{mod}}{\gamma_{M,T}} \quad (B.3)$$

**Force direction upward:**

$$F_{Z,Rd} = 0 \quad (B.3a)$$

**Combined loading:**

$$\left( \frac{F_{X,Ed}}{F_{X,Rd}} \right)^2 + \left( \frac{F_{Y,Ed}}{F_{Y,Rd}} \right)^2 + \left( \frac{F_{Z,Ed}}{F_{Z,Rd}} \right)^2 \leq 1 \quad (B.4)$$

Where:

$A$ ,  $B_X$ ,  $B_Y$  and  $B_Z$  are constant parameters expressed in kN (see Table 3.1),

$\gamma_{M,S}$  Partial safety factor for steel in bending,

$\gamma_{M,T}$  Partial safety factor for timber or wood-based material,

$k_p$  Factor taking into account the characteristic density of joist or header/column,

$$k_p = \sqrt{\frac{\rho_k}{350}}$$

$\rho_k$  Lower characteristic density of joist or header/column in  $\text{kg}/\text{m}^3$ ;  $\rho_k \leq 460 \text{ kg}/\text{m}^3$ ,

$k_{mod}$  Modification factor to consider the load duration influence and the wood moisture,

$k_e$  Factor taking into account the eccentricity of the load  $F_{Y,Ed}$ ,

$$k_e = \frac{1}{1 + \frac{6 \cdot e_J}{l}}$$

$e_J$  Eccentricity of the force  $F_{Y,Ed}$  with regard to the centroid of the joist connection in mm (see Figure 3.1),

$l$  Connector length;  $90 \text{ mm} \leq l \leq 190 \text{ mm}$ .

BB-beam connectors

Specification of essential characteristics

Design values of load-carrying-capacities

Annex 3.2

**Table 3.1:** Constant parameters A, B<sub>X</sub>, B<sub>Y</sub> and B<sub>Z</sub>

Type	90x70	125x70	150x70	190x70
A [kN]	2.43	3.79	4.87	6.22
B <sub>X</sub> [kN]	3.79	5.46	6.27	7.86
B <sub>Y</sub> [kN]	5.15	7.73	9.02	11.6
B <sub>Z</sub> [kN]	8.78	12.6	14.5	18.2

### Splitting

If tensile stress perpendicular to the grain has to be proved, it can be carried out according to EN 1995-1-1, clause 8.1.4.

#### A.3.2.2 Design value of the load-carrying-capacity - Example

##### Beam connector Type 125x70

service class: 1/2

load-duration class permanent

- Force direction perpendicular to the connector plates:

$$F_{X,Rd} = \min \left\{ \frac{A}{\gamma_{M,S}}, \frac{B_X \cdot k_p \cdot k_{mod}}{\gamma_{M,T}} \right\} \quad (B1)$$

with:

A = 3.79 (see table 3.1)

$\gamma_{M,S} = 1.3$

$B_X = 5.46$  (see table 3.1)

$$k_p = \sqrt{\frac{\rho_k}{350}} = \sqrt{\frac{385}{350}} = 1.049$$

$k_{mod} = 0.6$  (service class: 1 / 2; load-duration class: permanent)

$\gamma_{M,T} = 1.3$

$$F_{X,Rd} = \min \left\{ \frac{\frac{3.79}{1.3} = 2.92 \text{ kN}}{5.46 \cdot 1.049 \cdot 0.6} = 2.64 \text{ kN} \right\}$$

design value **F<sub>X,RD</sub> = 2.64 kN**

BB-beam connectors

Specification of essential characteristics

Design values of load-carrying-capacities – Example of calculation

Annex 3.3

- Force direction lateral:

$$F_{Y,Rd} = \frac{B_Y \cdot k_\rho \cdot k_{mod}}{\gamma_{M,T}} \quad (B.2)$$

with:

$$B_Y = 7.73 \text{ kN} \text{ (see Table 3.1)}$$

$$k_\rho = \sqrt{\frac{\rho_k}{350}} = \sqrt{\frac{385}{350}} = 1.049$$

$$k_{mod} = 0.6 \text{ (service class: 1 / 2; load-duration class: permanent)}$$

$$k_e = \frac{1}{1 + \frac{6 \cdot e_J}{\ell}} = \frac{1}{1 + \frac{6 \cdot 60}{125}} = 0.258$$

$$e_J = 60 \text{ mm (assumed)}$$

$$\gamma_{M,T} = 1.3$$

$$F_{Y,Rd} = \frac{7.73 \cdot 1.049 \cdot 0.6 \cdot 0.258}{1.3} = 0.97 \text{ kN}$$

$$\text{design value} \quad \mathbf{F_{Y,RD} = 0.97 \text{ kN}}$$

- Force direction downward:

$$F_{Z,Rd} = \frac{B_Z \cdot k_\rho \cdot k_{mod}}{\gamma_{M,T}} \quad (B.3)$$

with:

$$B_Z = 12.6 \text{ (see table 3.1)}$$

$$k_\rho = \sqrt{\frac{\rho_k}{350}} = \sqrt{\frac{385}{350}} = 1.049$$

$$k_{mod} = 0.6 \text{ (service class: 1 / 2; load-duration class: permanent)}$$

$$\gamma_{M,T} = 1.3$$

$$F_{Z,Rd} = \frac{12.6 \cdot 1.049 \cdot 0.6}{1.3} = 6.1 \text{ kN}$$

$$\text{design value} \quad \mathbf{F_{Z,RD} = 6.1 \text{ kN}}$$

- Force direction upward:

$$\text{design value} \quad \mathbf{F_{Z,RD} = 0 \text{ kN}} \quad (B3a)$$

BB-beam connectors

Specification of essential characteristics

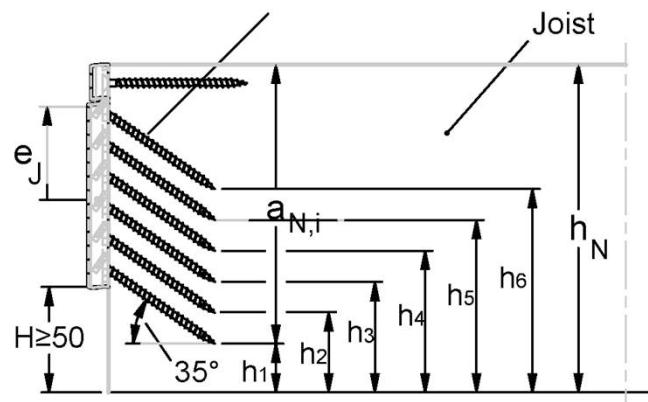
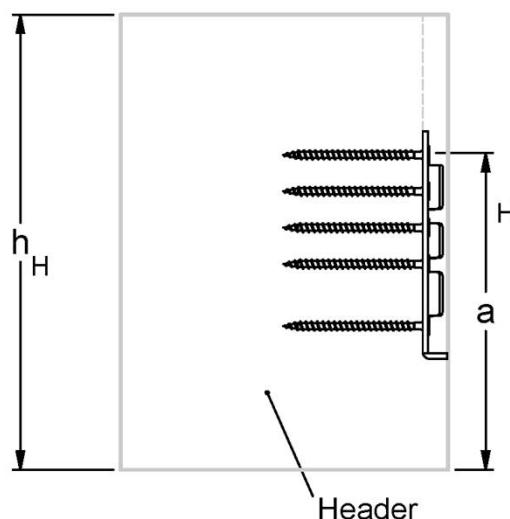
Design values of load-carrying-capacities – Example of calculation

Annex 3.4

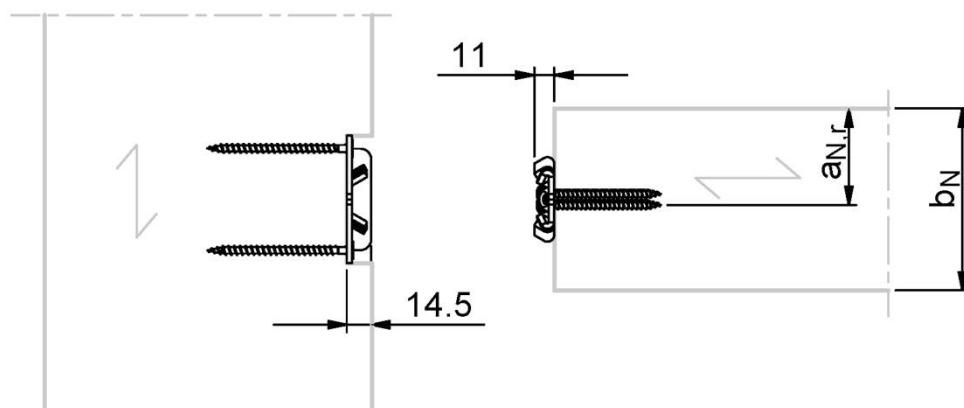
## BB-Balkenverbinder Installation of the connection

Screws 5.0 x 80 mm  
according to EN 14592 turned  
in with complete thread under  
35° to the grain of the joist.

Side view \*)



Top view \*)



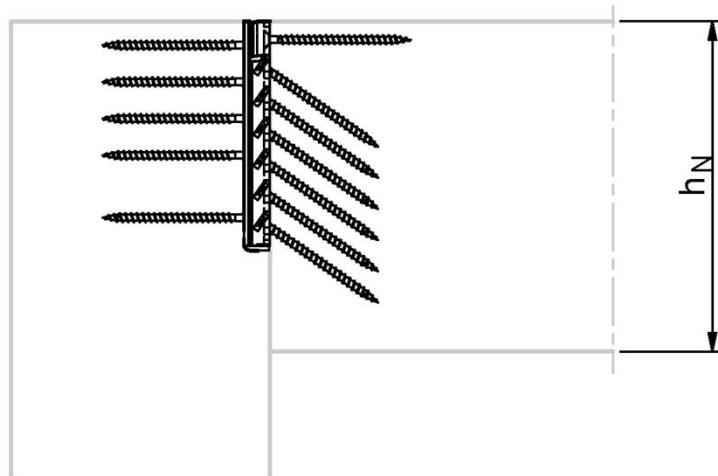
$e_J$ ... Eccentricity of the lateral force  $F_{y,Ed}$  with regard to the centroid of the joist connection.

**\*)** an installation is shown, where the connector has been recessed in the header. The connector may also be directly screwed to the header, without recessing it.

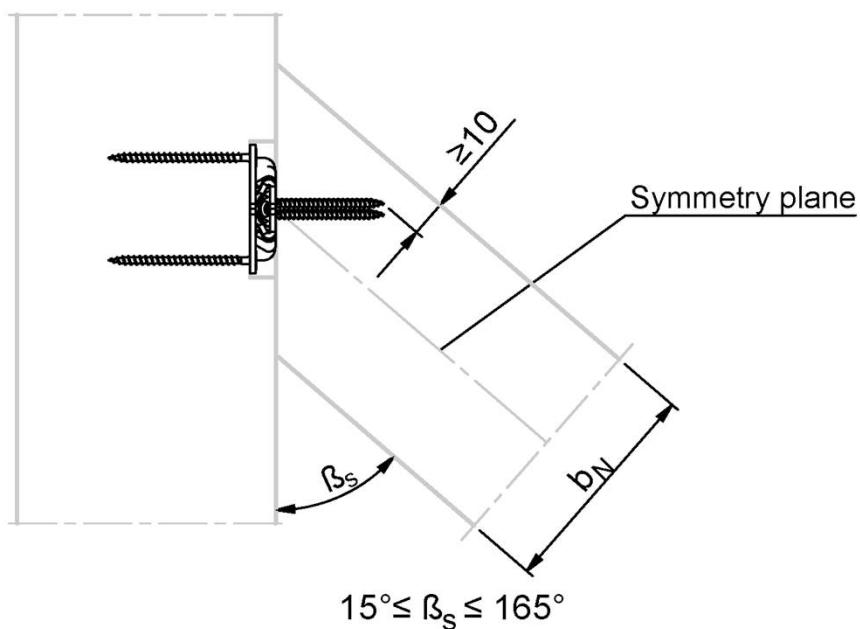
Dimensions in mm

BB-beam connectors	Annex 4.1
Typical installations	

Side view



Top view



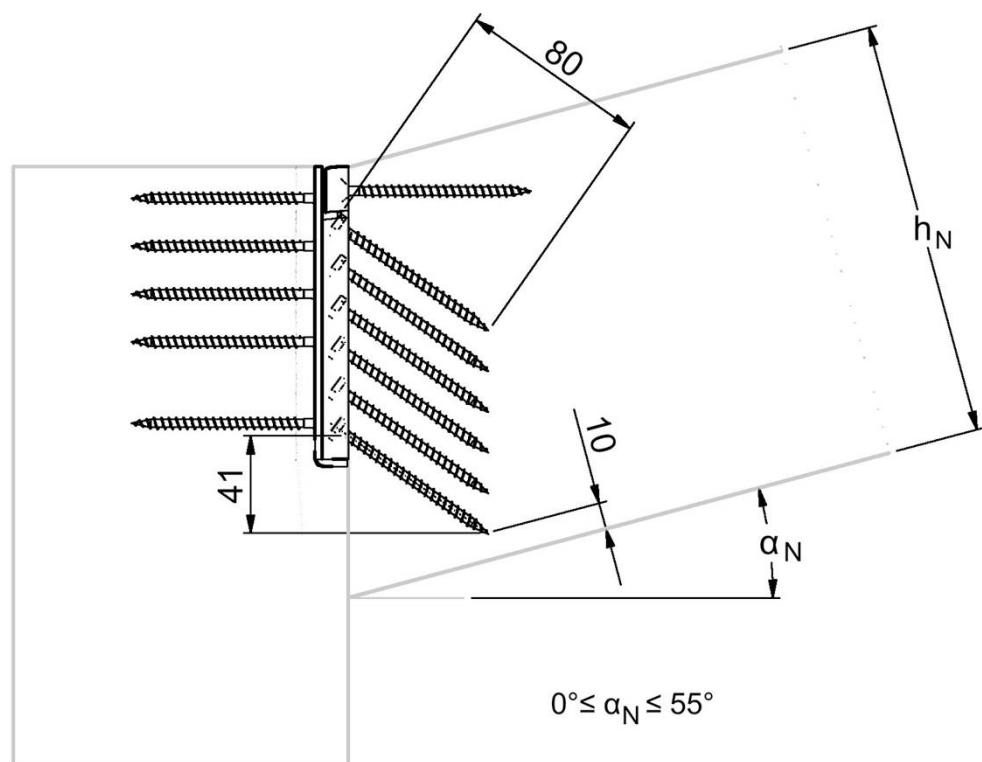
Dimensions in mm

BB-beam connectors

Typical installations

Annex 4.2

Side view



Dimensions in mm

BB-beam connectors

Typical installations

Annex 4.3