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Authorised and notified according
to Article 29 of the Regulation (EU)
No 305/2011 of the European
Parliament and of the Council of 9
March 2011

MEMBER OF EOTA



European Technical Assessment ETA-20/0144 of 2020/10/05

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:

SPAX Concealed connectors
SXHCA, SXHCB, SXHC and SXHCC

Product family to which the above construction product belongs:

Three-dimensional nailing plate (Beam hanger for timber-to-timber connections or timber-to-steel or timber-to-concrete connections)

Manufacturer:

SPAX International GmbH & Co. KG
Kölner Strasse 71-77
DE-58256 Ennepetal
Tel. +49 23 33 799-0
Fax + 49 23 33 799-199
Internet www.spax.com

Manufacturing plant:

SPAX International production facilities

This European Technical Assessment contains:

25 pages including 3 annexes which form an integral part of the document

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

EAD 130186-00-0603 for Three-dimensional nailing plates

This version replaces:

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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product

SPAX Concealed connectors SXHCA, SXHCB, SXHC or SXHCC are two-piece, face-fixed connectors to be used in timber to timber connections or timber-to-steel or timber-to-concrete connections.

The SPAX Concealed connectors are made from steel grade S235 according to EN 10025-2:2004 or aluminium grade EN AW-2007 or EN AW-6082 T6 according to EN 755-2:2013-12. Dimensions, hole positions, steel grade or aluminium alloy and typical installations are shown in Annexes A and C.

2 Specification of the intended use in accordance with the applicable EAD

The concealed beam hangers are intended for use in making end-grain to side-grain connections in load bearing timber structures, as a connection between a wood based joist and a solid timber or wood based header or column as well as connections between a timber joist and a concrete structure or a steel member, where requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 and 4 of Regulation (EU) 305/2011 shall be fulfilled.

The SPAX Concealed connectors can be installed as connections between wood based members such as:

- Structural solid timber according to EN 14081,
- Glulam or glued solid timber according to EN 14080,
- LVL according to EN 14374,
- BauBuche GL70 according to ETA-14/0354,
- Cross laminated timber according to ETA.

However, the calculation methods are only allowed for a characteristic wood density of up to 700 kg/m^3 . Even though the wood based material may have a larger density, this must not be used in the formulas for the load-carrying capacities of the fasteners.

Annex B states the formulas for the characteristic load-carrying capacities of the connections with SPAX Concealed connectors. The design of the connections

shall be in accordance with Eurocode 5 or a similar national Timber Code.

The downward directed forces $F_{2,Ed}$ and the upward directed forces $F_{3,Ed}$ are assumed to act in the middle of the joist. The lateral force $F_{4,Ed}$ is assumed to act at a distance e from the centre of the SPAX Concealed connector. The force $F_{1,Ed}$ perpendicular to the connector plate is assumed to act in the centre of the SPAX Concealed connector.

It is assumed that the header beam is prevented from rotating. If the header beam only has installed a SPAX Concealed connector on one side the eccentricity moment $M_v = F_d \cdot (B_H / 2 + 14\text{mm})$ shall be considered. The same applies when the header has SPAX Concealed connector connections on both sides, but with vertical forces which differ more than 20%.

The SPAX Concealed connectors are intended for use for connections subject to static or quasi static loading.

The steel or aluminium connectors are for use in timber structures subject to the dry, internal conditions defined by the service classes 1 and 2 of EN 1995-1-1:2008, (Eurocode 5).

The scope of the hangers regarding resistance to corrosion shall be defined according to national provisions that apply at the installation site considering environmental conditions.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the connectors of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, 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

Characteristic	Assessment of characteristic
3.1 Mechanical resistance and stability*) (BWR1)	
Characteristic load-carrying capacity	See Annex B
Stiffness	No performance assessed
Ductility in cyclic testing	No performance assessed
3.2 Safety in case of fire (BWR2)	
Reaction to fire	The SPAX Concealed connectors are made from steel or aluminium classified as Euroclass A1 in accordance with EN 13501-1 and Commission Delegated Regulation 2016/364
3.7 Sustainable use of natural resources (BWR7)	No performance assessed
3.8 General aspects related to the performance of the product	The SPAX Concealed connectors have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service class 1 and 2
Identification	See Annex A

*) See additional information in section 3.9 – 3.11.

3.9 Mechanical resistance and stability

See annex B for characteristic load-carrying capacities of the SPAX Concealed connectors.

The characteristic capacities of the SPAX Concealed connectors are determined by calculation assisted by testing as described in the EOTA Guideline 015 clause 5.1.1. They should be used for designs in accordance with Eurocode 5 or a similar national Timber Code.

The design models allow the use of fasteners described in the table on page 17 in Annex A:

Threaded nails (ringed shank nails) and screws in accordance with EN 14592 or ETA-20/0527

In the formulas in Annex B the capacities for threaded nails and screws calculated from the formulas of Eurocode 5 are used assuming a thin steel plate for the joist plates and a thick steel plate for the header plates when calculating the lateral fastener load-carrying capacity.

The load bearing capacities of the SXHCA or SXHCB connectors have been determined based on the use of connector nails 4,0 x 40 mm in accordance with the German national approval for the nails.

The characteristic withdrawal capacity of the nails has to be determined by calculation in accordance with EN 1995-1-1: 2010, paragraph 8.3.2 (head pull-through is not relevant):

$$F_{ax,Rk} = f_{ax,k} \times d \times t_{pen}$$

Where:

$f_{ax,k}$	Characteristic value of the withdrawal parameter in N/mm ²
d	Nail diameter in mm
t_{pen}	Penetration depth of the profiled shank in mm

$$f_{ax,k} = 50 \times 10^{-6} \times \rho_k^2$$

Where:

ρ_k	Characteristic density of the timber in kg/m ³
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The shape of the nail directly under the head shall be in the form of a truncated cone with a diameter under the nail head which exceeds the hole diameter.

SPAX Connector nails according to ETA-20/0527 can be used instead.

No performance has been determined in relation to ductility of a joint under cyclic testing. The contribution to the performance of structures in seismic zones, therefore, has not been assessed.

No performance has been determined in relation to the joint's stiffness properties - to be used for the analysis of the serviceability limit state.

3.10 Aspects related to the performance of the product

2.7.1 Corrosion protection in service class 1 and 2.

In accordance with EAD 130186-00-0603 for Three-dimensional nailing plates the SPAX Concealed connectors are produced from steel grade S235 according to EN 10025-2:2004 or aluminium grade EN AW-2007 according to EN 755-2:2008.

3.11 General aspects related to the fitness for use of the product

SPAX Concealed connector connections

The performances given in this ETA are based on the following:

Header – support conditions

- The header beam shall be restrained against rotation and be free from wane under the SPAX Concealed connector.

If the header carries joists only on one side the eccentricity moment from the joists $M_{ec} = R_{joist} (b_{header}/2 + 14\text{mm})$ shall be considered at the strength verification of the header.

R_{joist}	Reaction force from the joists
b_{header}	Width of header

- For a header with joists from both sides but with different reaction forces a similar consideration applies.

Wood to wood connections

- SPAX Concealed connectors are fastened to wood or wood-based headers or columns by nails or screws and to wood-based joists by screws.
- There shall either be nails or screws in all holes for connections to headers or a partial nailing pattern for connections to headers or columns as prescribed in Annex B can be used.
- There shall either be screws in all holes for

connections to joists or a partial screw pattern can be used. The screws shall be placed symmetrically about the vertical symmetry line. There shall always be inclined screws in the 2 upper and 2 lower holes.

- The characteristic capacity of the connection with SPAX Concealed connectors is calculated according to the manufacturer's technical documentation, deposited at ETA-Danmark.
- The connection with SPAX Concealed connectors is designed in accordance with Eurocode 5 or an appropriate national code.
- The gap between the end of the joist and the surface, where contact stresses can occur during loading shall be limited. This means that for SPAX Concealed connectors the gap between the surfaces of the header or column and the header plate or the joist plate and the end of the joist shall be maximum 1 mm.
- The joist end grain surface and the surface of the header shall have a plane surface against the whole SPAX Concealed connector.
- The depth of the joist shall be so large that the top (bottom) of the joist is at least 10 mm above (below) the upper (lower) screw tip in the joist.
- Nails or screws to be used shall have a diameter and head shape, which fits the holes of the SPAX Concealed connectors.

Wood to concrete or steel

The above mentioned rules for wood to wood connections are applicable also for the connection between the joist made of timber and a header made of concrete or steel using the SPAX Concealed connectors with appropriate header plates.

- The SPAX Concealed connector joint is designed in accordance with Eurocodes 2, 3, 5 or 9 or an appropriate national code.
- The SPAX Concealed connector shall be in close contact with the concrete or steel over the whole face.
- The bolt or metal anchor shall have a diameter not less than the hole diameter minus 2 mm.
- There shall be bolts in all bolt holes.

4 Attestation and verification of constancy of performance (AVCP)

4.1 AVCP system

According to the decision 97/638/EC of the European Commission, as amended, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 2+.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2020-10-05 by



Thomas Bruun
Managing Director, ETA-Danmark

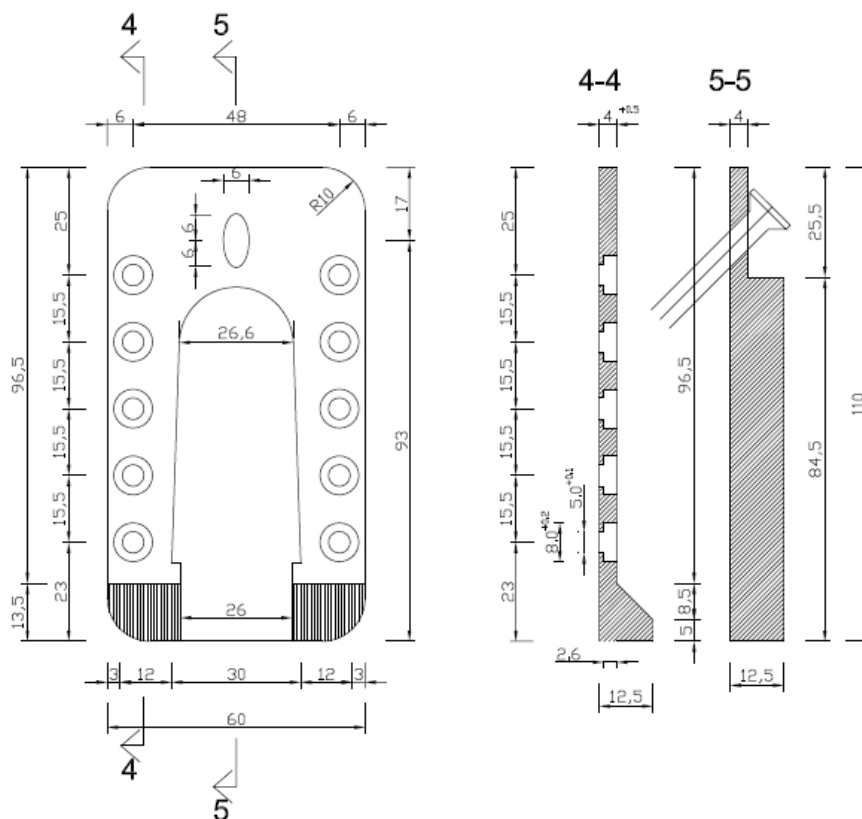
Annex A

Product details and definitions

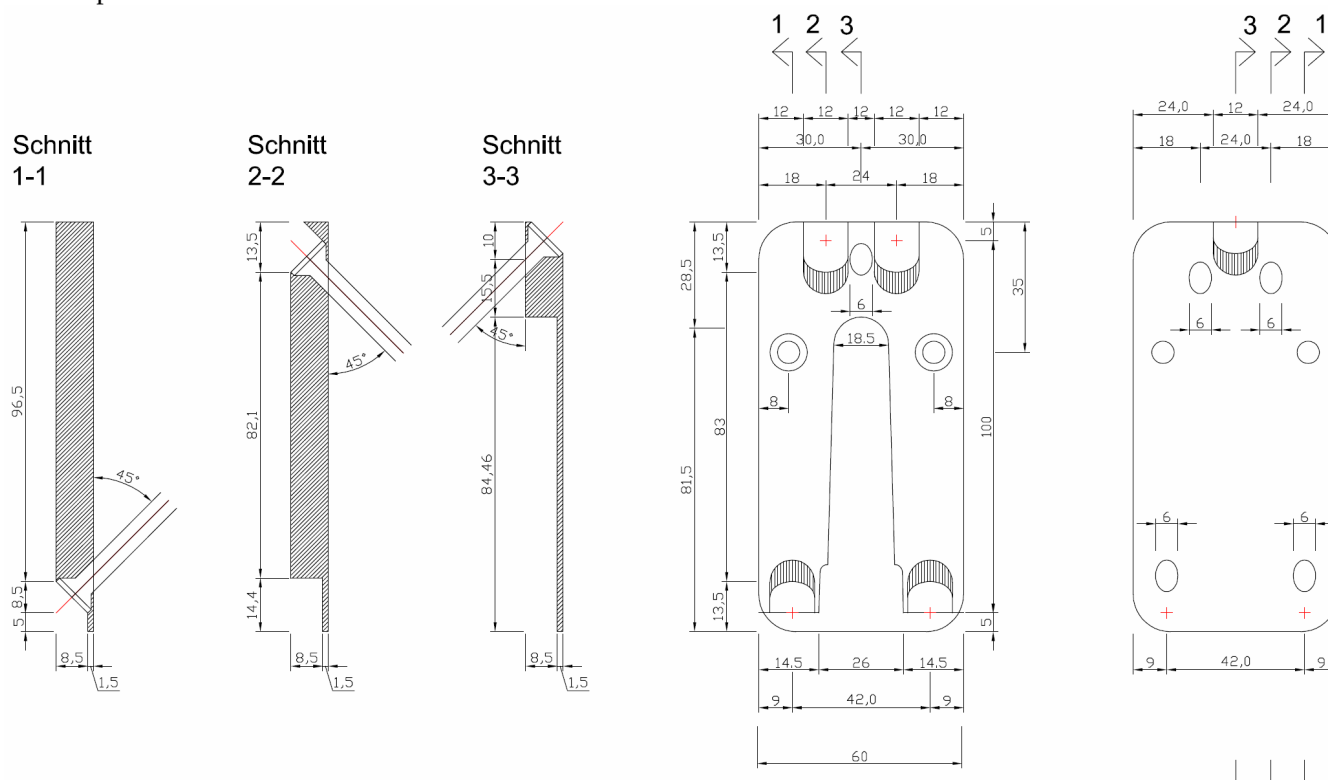
SPAX Concealed connector SXHCA

Face mount connector.

Steel grade S235 according to EN 10025-2:2004 or aluminium grade EN AW-2007 according to EN 755-2:2008.

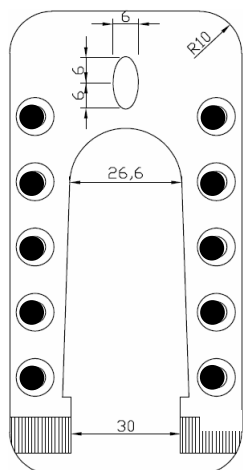


Header plate of SXHCA connector

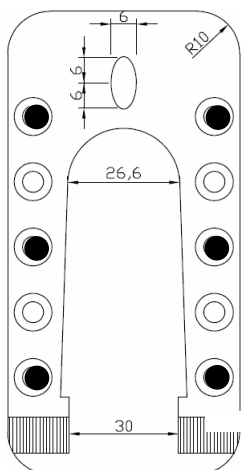


Joist plate of SXHCA connector

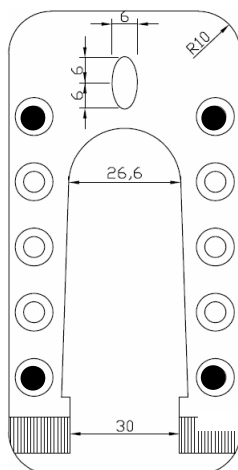




Full:
Connection to header



Partial – 6:
Connection to header or column



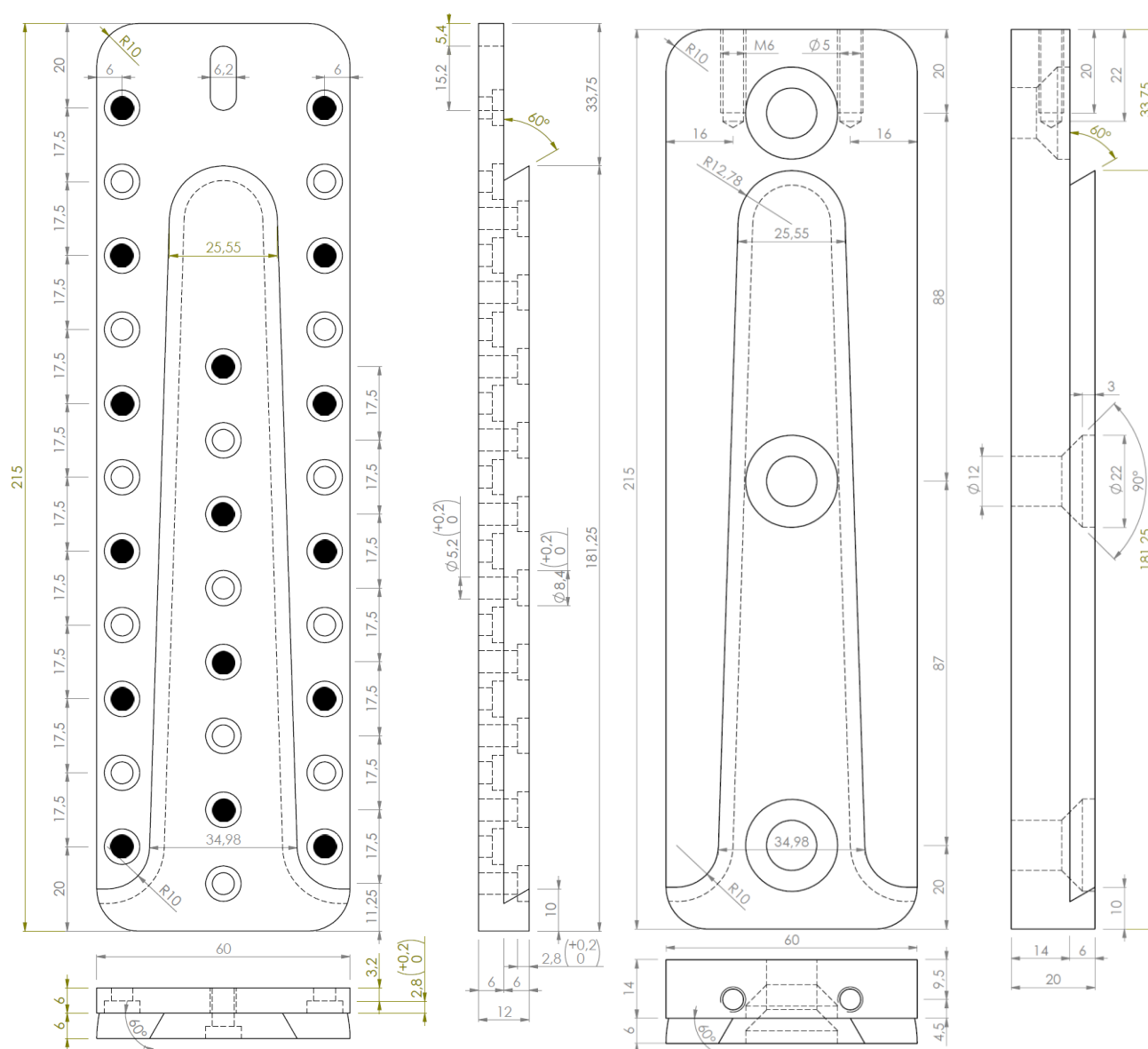
Partial – 4:
Connection to header or column

Nail or screw patterns for SXHCA or SXHCB connectors

SPAX Concealed connector SXHC215 or SXHCC215

Face mount connector.

Steel grade S235 according to EN 10025-2:2004 or aluminium grade EN AW-2007 or EN AW-6082 T6 according to EN 755-2:2013.



Header plate of SXHC215 Connector

• = Partial screw pattern

Header plate of SXHCC215 Connector

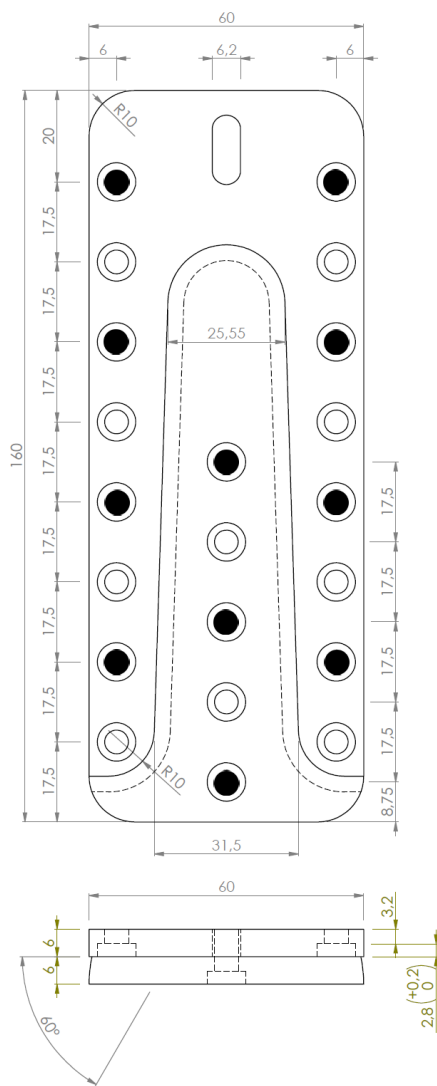
Timber to concrete or steel

- = Partial inclined screw pattern

SPAX Concealed connector SXHC160 or SXHCC160

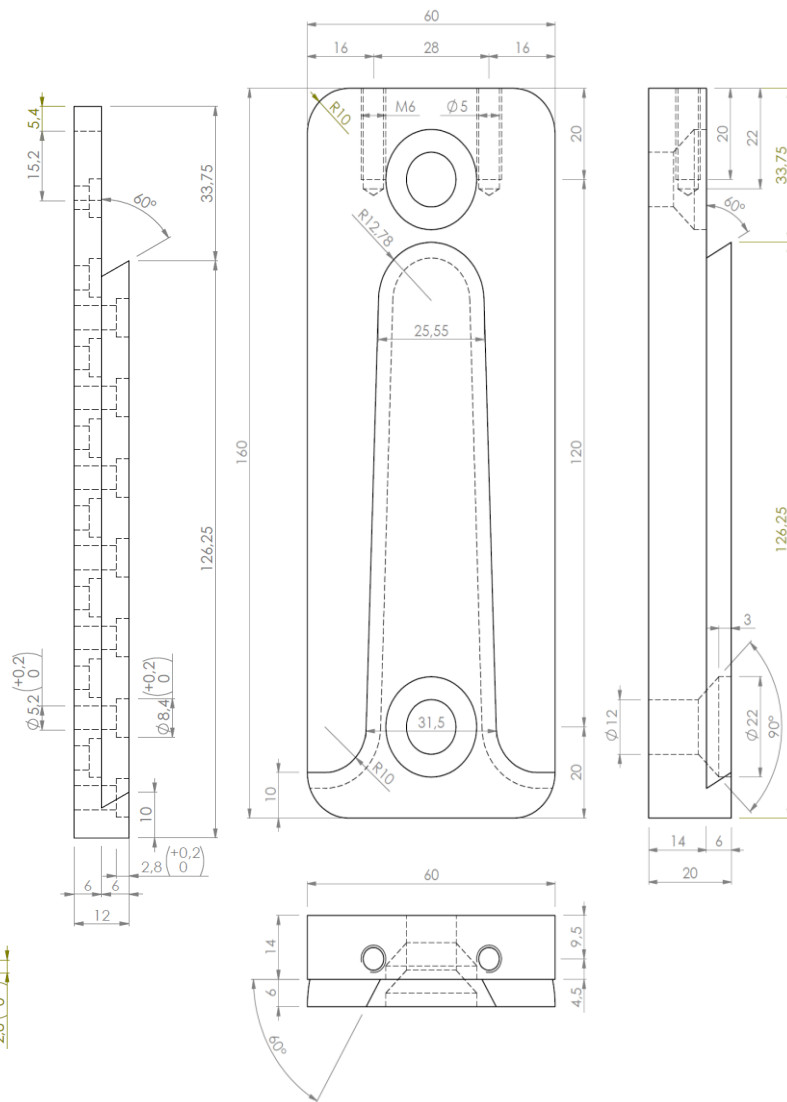
Face mount connector.

Steel grade S235 according to EN 10025-2:2004 or aluminium grade EN AW-2007 or EN AW-6082 T6 according to EN 755-2:2013.



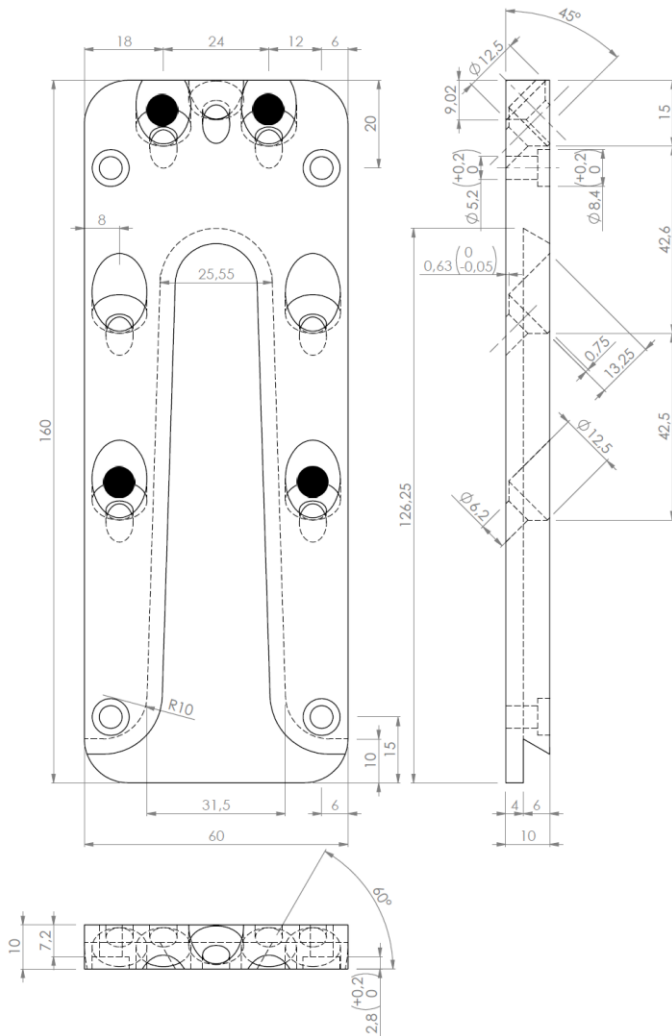
Header plate of SXHC160 Connector

• = Partial screw pattern



Header plate of SXHCC160 Connector

Timber to concrete or steel



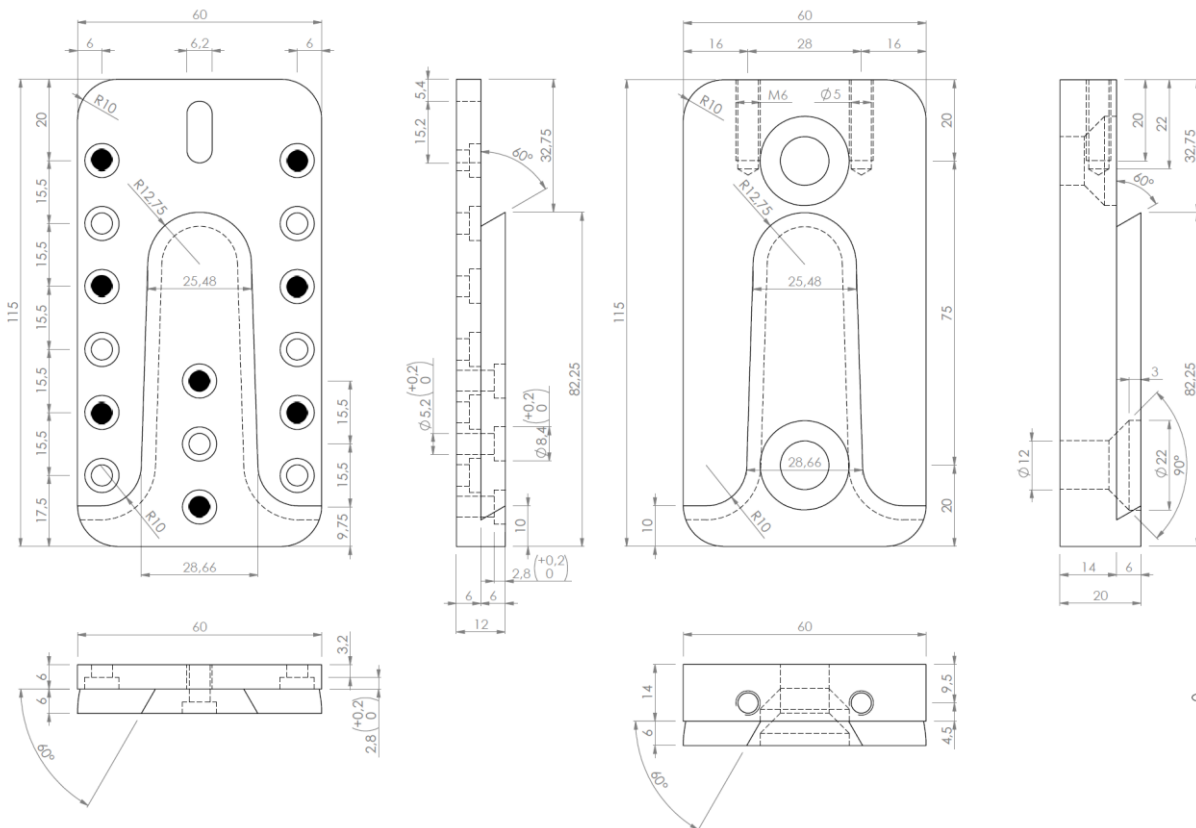
Joist plate of SXHC160 or SXHCC160 Connector

● = Partial inclined screw pattern

SPAX Concealed connector SXHC115 or SXHCC115

Face mount connector.

Steel grade S235 according to EN 10025-2:2004 or aluminium grade EN AW-2007 or EN AW-6082 T6 according to EN 755-2:2013.

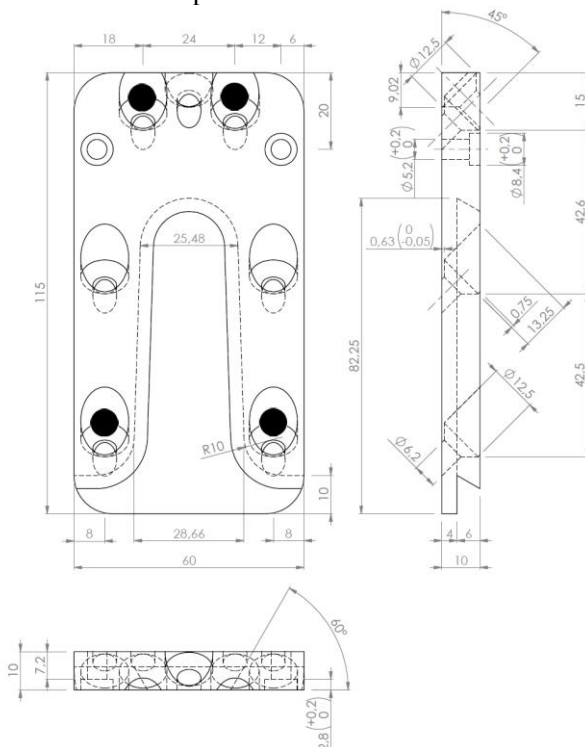


Header plate of SXHC115 Connector

• = Partial screw pattern

Header plate of SXHCC115 Connector

Timber to concrete or steel



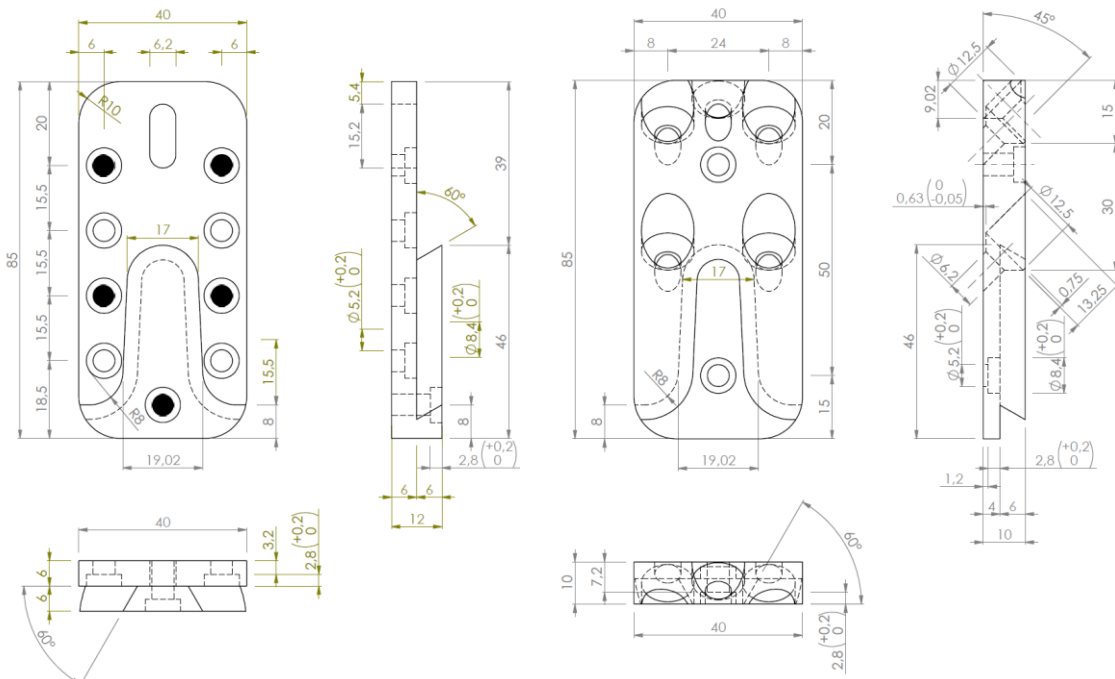
Joist plate of SXHC115 or SXHCC115 Connector

• = Partial inclined screw pattern

SPAX Concealed connector SXHC85

Face mount connector.

Steel grade S235 according to EN 10025-2:2004 or aluminium grade EN AW-2007 or EN AW-6082 T6 according to EN 755-2:2013.



Header plate of SXHC85 Connector

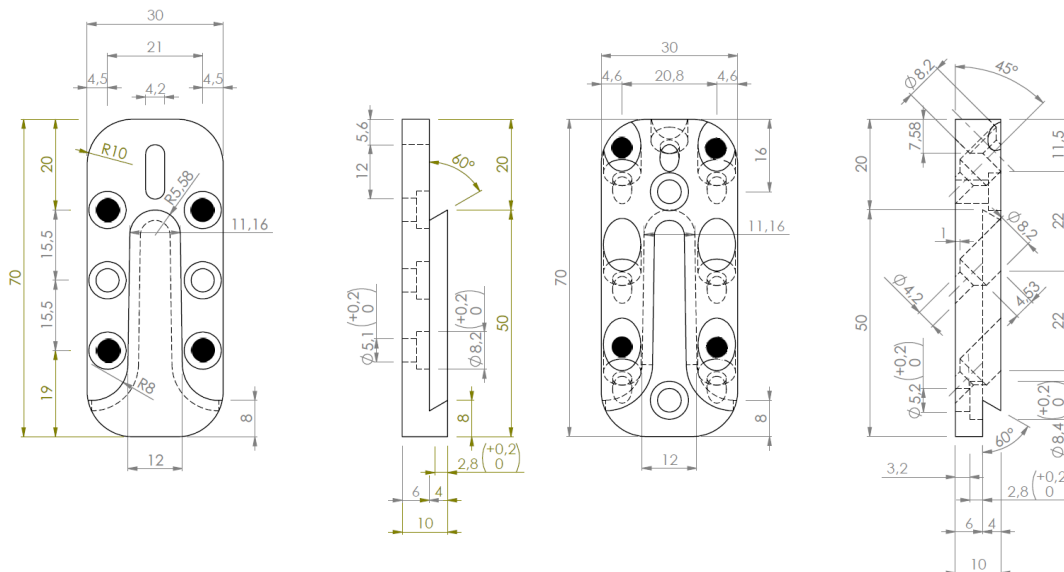
• = Partial screw pattern

Joist plate of SXHC85 Connector

SPAX Concealed connector SXHC70

Face mount connector.

Steel grade S235 according to EN 10025-2:2004 or aluminium grade EN AW-2007 or EN AW-6082 T6 according to EN 755-2:2013.



Header plate of SXHC70 Connector

• = Partial screw pattern

Joist plate of SXHC70 Connector

• = Partial inclined screw pattern

Fastener types and sizes

NAIL diameter	Length	Nail type
4.0	40 - 100	Ringed shank nails according to EN 14592 or SPAX Connector nails according to ETA-20/0527
In the formulas in Annex B the capacities for threaded nails calculated from the formulas of Eurocode 5 are used assuming a thick steel plate when calculating the lateral nail load-carrying-capacity. The load bearing capacities of the SPAX Concealed connectors have been determined based on the use of connector nails 4,0 x L mm in accordance with the German national approval for the nails. The characteristic withdrawal capacity of the nails has to be determined by calculation in accordance with EN 1995-1-1: 2004, paragraph 8.3.2 (head pull-through is not relevant): $F_{ax,Rk} = f_{1,k} \times d \times t_{pen}$ Where: $f_{1,k}$ Characteristic value of the withdrawal parameter in N/mm² d Nail diameter in mm t_{pen} Penetration depth of the profiled shank in mm Based on tests by Versuchsanstalt für Stahl, Holz und Steine, University of Karlsruhe, the characteristic value of the withdrawal resistance for the threaded nails used can be calculated as: $f_{1,k} = 50 \times 10^{-6} \times \rho_k^2$ Where: ρ_k Characteristic density of the timber in kg/m³ The shape of the nail directly under the head shall be in the form of a truncated cone with a diameter under the nail head which exceeds the hole diameter.		

Screw diameter	Length	Screw type
4.0	50 - 70	SPAX self-tapping screw according to ETA-12/0114
5.0	50 - 70	SPAX connector screw according to ETA-20/0527
6.0	100 - 200	SPAX self-tapping screw according to ETA-12/0114
In the formulas in Annex B the capacities for self-tapping screws calculated from the formulas of Eurocode 5 assuming a thin steel plate for the joist plates and a thick steel plate for the header plates are used when calculating the lateral load-carrying-capacity. The load bearing capacities of the SPAX Concealed connectors have been determined based on the use of 5 mm SPAX connector screws according to ETA-20/0527. The characteristic withdrawal capacity of these screws should be determined by calculation in accordance with EN 1995-1-1, paragraph 8.3.2 (head pull-through is not relevant) for angles α between screw axis and grain direction $0^\circ \leq \alpha \leq 90^\circ$: $F_{ax,\alpha,Rk} = k_{ax} \cdot 10,5 \cdot d \cdot \ell_{ef} \cdot \left(\frac{\rho_k}{350} \right)^{0,8}$ Where: k_{ax} Factor, taking into account the angle between screw axis and grain direction, $k_{ax} = 1,0$ for $45^\circ \leq \alpha < 90^\circ$ $k_{ax} = 0,3 + \frac{0,7 \cdot \alpha}{45^\circ}$ for $0^\circ \leq \alpha < 45^\circ$ d Screw diameter in mm; $d = 5$ mm ℓ_{ef} Penetration length of the threaded part according to EN 1995-1-1 in mm ρ_k Characteristic density of the timber in kg/m³		

LOCK SCREW diameter	Length	Fastener type
M6	20	Countersunk bolt with hexagon socket according to ISO 10642 minimum grade 8.8
M6	20	Recessed countersunk flat head screw according to ISO 7046-2 minimum grade 8.8

Annex B

Design values of load-carrying-capacities

The downward and the upward directed forces $F_{2,Ed}$ and $F_{3,Ed}$ are assumed to act in the middle of the joist. The lateral force $F_{4,Ed}$ is assumed to act at a distance e above or below the centre of the SPAX Concealed connector. The force $F_{1,Ed}$ perpendicular to the connector plate is assumed to act in the centre of the SPAX Concealed connector.

Two (SXHC70 to SXHC215 / SXHCC215) screw patterns for the header or joist plate or three (SXHCA or SXHCB) nail or screw patterns for the header plate are specified. A full pattern for connections to headers, where there are nails or screws in all the holes of the header and joist plate and partial patterns for connections to headers or columns, where the number of nails or screws in the header or column or joist are specified in Annex A. For loading down, an additional inclined header screw is required for SXHC70 to SXHC215 / SXHCC215.

The joist plates of SXHCA or SXHCB may contain two tensile screws and optionally two additional compressive screws. For loading up, an additional tensile screw is required for all types of SPAX Concealed connectors.

Force F_1 perpendicular to the connector plate:

(for SXHCA or SXHCB connectors, four screws $\varnothing$ 6 mm required in the joist)

$$F_{1,Rd} = \min(F_{1,alu,Rd} \cdot n_H \cdot F_{ax,H,Rd} \cdot n_{J,90,ef} \cdot F_{ax,J,Rd}) \quad (B.1.1)$$

Force F_2 downward in the direction of insertion:

- SXHCA or SXHCB connectors (at least two inclined screws required in the joist):

$$F_{2,Rd} = \min \left\{ \begin{array}{l} \frac{1,25 \cdot n_{J,45} \cdot F_{ax,\alpha,Rd}}{\sqrt{2}} \\ \frac{1}{\sqrt{\left(\frac{1}{n_H \cdot F_{v,H,Rd}} \right)^2 + \left(\frac{1}{k_{H,Z} \cdot F_{ax,H,Rd}} \right)^2}} \end{array} \right. \quad (B.1.2)$$

- SXHC70 to SXHC215 / SXHCC215 connectors (at least four inclined screws required in the joist, one inclined screw required in the header):

$$F_{2,Rd} = \min \left\{ \begin{array}{l} \frac{1,25 \cdot n_{J,45} \cdot F_{ax,\alpha,Rd}}{\sqrt{2}} \\ n_H \cdot F_{v,H,Rd} \end{array} \right. \quad (B.1.3)$$

Force F_3 upward against the direction of insertion (one inclined screw required in the header):

- SXHCA or SXHCB connectors (at least two screws $\varnothing$ 6 mm required in the joist):

$$F_{3,Rd} = \min \left\{ \begin{array}{l} \frac{1,25 \cdot F_{ax,\alpha,Rd}}{\sqrt{2}} \\ \frac{1}{\sqrt{\left(\frac{1}{n_H \cdot F_{v,H,Rd}} \right)^2 + \left(\frac{1}{k_{H,Z} \cdot F_{ax,H,Rd}} \right)^2}} \end{array} \right. \quad (B.1.4)$$

- SXHC70 to SXHC215 connectors in timber-to-timber connections:

$$F_{3,Rd} = \frac{1,25 \cdot F_{ax,\alpha,Rd}}{\sqrt{2}} \quad (B.1.5)$$

- SXHCC115 to SXHCC215 connectors in timber-to-concrete or timber-to-steel connections:

$$F_{3,Rd} = \frac{6 \text{ kN}}{\gamma_M} \quad (\text{B.1.6})$$

Force F_4 perpendicular to the direction of insertion:

- SXHCA or SXHCB connectors (four screws $\varnothing$ 6 mm required in the joist):

$$F_{4,Rd} = \min \left\{ \begin{array}{l} \frac{F_{v,J,Rd}}{\sqrt{\left(\frac{1}{4} + \frac{e}{e_{1,J}}\right)^2 + \left(\frac{e}{e_{2,J}}\right)^2}} \\ \frac{F_{v,H,Rd}}{\sqrt{\left(\frac{1}{n_H} + \frac{e}{e_{1,H}}\right)^2 + \left(\frac{e}{e_{2,H}}\right)^2 + \left(\frac{F_{v,H,Rd}}{k_{H,Y} \cdot F_{ax,H,Rd}}\right)^2}} \end{array} \right. \quad (\text{B.1.7})$$

- SXHC70 to SXHC215 / SXHCC215 Connectors (at least four inclined screws required in the joist):

$$F_{4,Rd} = \min \left\{ \begin{array}{l} \frac{F_{v,J,Rd}}{\sqrt{\left(\frac{1}{(n_{J,45} + n_{J,90,ef}) + \frac{e}{e_{1,J}}}\right)^2 + \left(\frac{e}{e_{2,J}}\right)^2}} \\ \frac{F_{v,H,Rd}}{\sqrt{\left(\frac{1}{n_H} + \frac{e}{e_{1,H}}\right)^2 + \left(\frac{e}{e_{2,H}}\right)^2}} \end{array} \right. \quad (\text{B.1.8})$$

Combined forces:

In case of combined forces shall the following inequality be fulfilled:

$$\left(\frac{F_{1,Ed}}{F_{1,Rd}} + \frac{F_{2/3,Ed}}{F_{2/3,Rd}} \right)^2 + \left(\frac{F_{4,Ed}}{F_{4,Rd}} \right)^2 \leq 1 \quad (\text{B.1.9})$$

where is:

n_H Number of nails or screws in the header or column connection with full or partial nail or screw pattern;

$n_{J,90,ef}$ Number of effective screws in the joist connection (see Table B.1);

$n_{J,45}$ Number of inclined screws in the joist connection (see Table B.1);

$F_{1,alu,Rd}$ Design value of the load-carrying-capacity of the connector plates ($F_{1,alu,Rk}$ see Table B.1);

$F_{ax,H,Rd}$ Design value of the axial load-carrying-capacity per nail or screw in the header;

$F_{ax,J,Rd}$ Design value of the axial load-carrying-capacity per screw in the joist;

for a screw $\varnothing$ 6 mm for SXHCA or SXHCB connectors,

for a screw $\varnothing$ 5 mm for SXHC70 to SXHC215 / SXHCC215 Connectors;

$F_{ax,\alpha,Rd}$ Design value of the axial load-carrying-capacity per inclined joist or header screw for load direction F_2 or F_3 ;

for a screw $\varnothing$ 6 mm for SXHCA or SXHCB and SXHC85 to SXHC215 / SXHCC215,

for a screw $\varnothing$ 4 mm for SXHC70;

$F_{v,J,Rd}$ Design value of the lateral load-carrying capacity per screw in the joist connection with an outer thin steel or aluminium plate,

for SXHCA or SXHCB:

$$F_{v,J,Rd} = 560 \cdot \sqrt{f_{h,J,d}} + F_{ax,J,Rd} / 4$$

for SXHC85 to SXHC215 / SXHCC215 for $d = 5$ mm:

$$F_{v,J,Rd} = 163 \cdot \sqrt{f_{h,J,d}} + F_{ax,J,Rd} / 4$$

for SXHC70 for $d = 4$ mm:

$$F_{v,J,Rd} = 118 \cdot \sqrt{f_{h,J,d}} + F_{ax,J,Rd} / 4$$

$f_{h,J,d}$	Design value of the embedding strength according to equation (8.15) of Eurocode 5
$F_{v,H,Rd}$	Design value of the lateral load-carrying capacity per nail or screw in the header connection with an outer thick steel or aluminium plate;
$k_{H,Y}$	Factor according to Table B.1;
$k_{H,Z}$	Factor according to Table B.1;
e	Distance of the lateral force above or below the centre of the SPAX Concealed connector;
e_1	SPAX Concealed connector dimension according to Table B.1;
e_2	SPAX Concealed connector dimension according to Table B.1;

Table B.1: SPAX Concealed connectors: Form factors k_H and dimensions e_1 and e_2

Nail or screw pattern	n_H	$n_{J,90,ef}$	$n_{J,45}$	$F_{1,alu,Rk}$ [kN]	$k_{H,Y}$	$k_{H,Z}$	$e_{1,H}$ [mm]	$e_{2,H}$ [mm]	$e_{1,J}$ [mm]	$e_{2,J}$ [mm]
SXHCA or SXHCB Full	10	2,8	2	4,0	15,7	23,0	341	440	189	360
SXHCA or SXHCB Partial – 6	6	2,8	2	4,0	9,4	14,7	235	304	189	360
SXHCA or SXHCB Partial – 4	4	2,8	2	4,0	6,3	11,0	198	256	189	360
SXHC70 Full	6	2	6	4,0	-	-	105	155	158	350
SXHC85 Full	9	2	4	4,0	-	-	175	356	110	252
SXHC115 Full	15	2	6	7,0	-	-	425	754	299	531
SXHC160 Full	21	4	6	12,0	-	-	650	1778	444	1204
SXHC215 Full	30	4	8	20,0	-	-	1089	4171	633	2441
SXHC70 Partial	4	2	4	4,0	-	-	90	134	149	330
SXHC85 Partial	5	2	4	4,0	-	-	110	223	110	252
SXHC115 Partial	8	2	4	7,0	-	-	235	418	271	480
SXHC160 Partial	11	4	4	12,0	-	-	358	979	426	1153
SXHC215 Partial	16	4	4	20,0	-	-	663	2416	586	2258

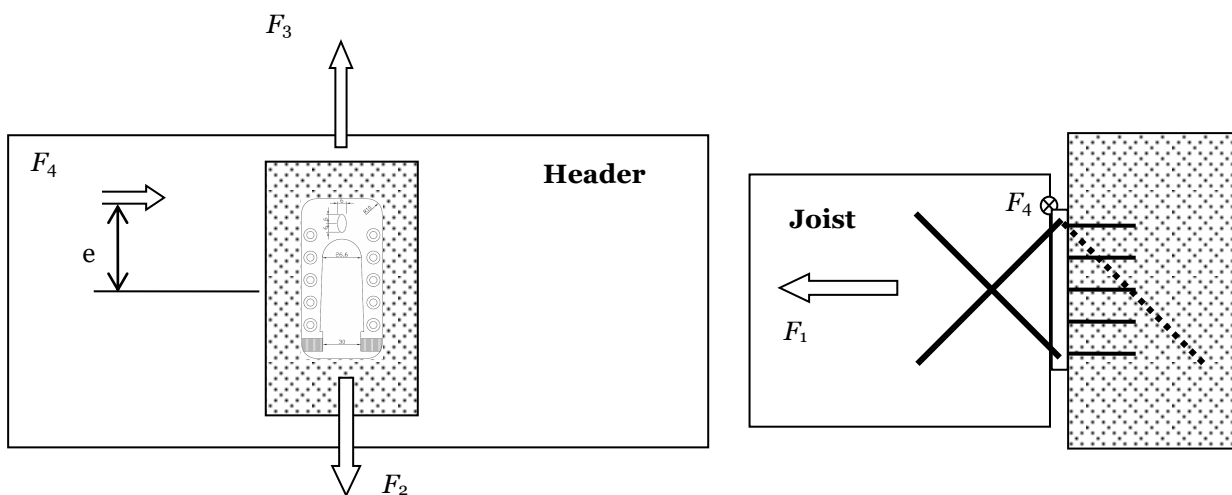
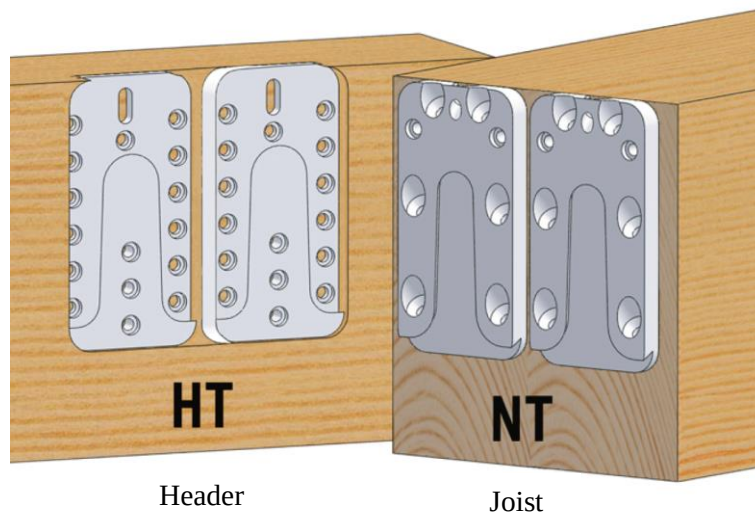


Figure B1: Definition of e

Annex C

Installation of SPAX Concealed connectors



**Connection with double SPAX Concealed connectors:
Minimum clearance between two connectors = 15 mm**

