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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-21/0710 of 2025/11/13

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:

E.u.r.o.Tec T-Tec connector

Product family to which the
above construction product
belongs:

Three-dimensional nailing plate (face-fixed beam
hangers to be used in timber to timber, timber to steel
and timber to concrete connections)

Manufacturer:

E.u.r.o.Tec GmbH
Unter dem Hofe 5
D-58099 Hagen
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Fax +49 2331 / 6245 - 200
Internet www.e-u-r-o-tec.de

Manufacturing plant:

HSW 47

This European Technical
Assessment contains:

26 pages including 19 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:

The ETA with the same number issued on 2021-09-01

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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

E.u.r.o. Tec T-Tec connectors are one-piece, face-fixed connectors to be used in timber to timber or timber to concrete or steel connections.

The connectors are made from aluminium alloy EN AW-6005A T6 according to EN 573-3:2009. Dimensions, hole positions, aluminium alloy and typical installations are shown in Annexes A, B and C.

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

The connectors 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 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 of Regulation (EU) 305/2011 shall be fulfilled. Additionally, the connector could be applied to a connection between a joist and a column.

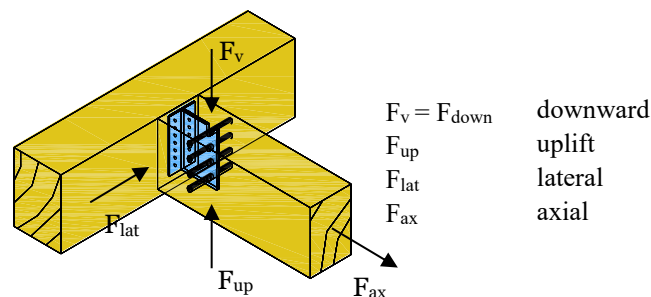
The connectors can be installed as connections between wood based members such as:

- Structural solid timber according to EN 14081,
- Glued solid timber according to EN 14080
- Glulam according to EN 14080,
- Cross-laminated timber according to ETA,
- Solid wood panels according to EN 13353 and EN 13986,
- LVL according to EN 14374 or ETA,
- FST according to ETA-14/0354,
- Plywood according to EN 636 or ETA,
- Engineered wood products with certified mechanical resistances for connections with dowel-type fasteners.

However, the calculation methods are only allowed for a characteristic wood density of up to 460 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 T-Tec connectors. The design of the connections shall be in accordance with Eurocode 5 or a similar national Timber Code.

It is assumed that the forces acting on the connector connection are F_{up} or F_{down} or F_{ax} perpendicular to the header axis and F_{lat} perpendicular to the connector axis. The forces F_{up} and F_{down} shall act in the symmetry plane of the connector. It is assumed that the forces F_{up} , F_{down} or F_{lat} are acting with an eccentricity e with regard to the side grain surface of the header or column.



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

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

The aluminium hangers are for use in timber structures subject to the dry, internal conditions defined by the service classes 1 and 2 of EN 1995-1-1:2004, (Eurocode 5).

The scope of the connectors regarding resistance to corrosion shall be defined according to national provisions that apply at the installation site considering environmental conditions and in conjunction with the admissible service conditions according to EN 1995-1-1 and the admissible corrosivity category as described and defined in EN ISO 12944-2.

Assumed working life

The assumed intended working life of the connectors for the intended use is 50 years, provided that they are subject to appropriate use and maintenance.

The information on the working life should not be regarded as a guarantee provided by the manufacturer or ETA Danmark. An “assumed intended working life” means that it is expected that, when this working life has elapsed, the real working life may be, in normal use conditions, considerably longer without major degradation affecting the essential requirements.

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)	
Joint Strength - Characteristic load-carrying capacity	See Annex B
Joint Stiffness	No performance assessed
Joint ductility	No performance assessed
Resistance to seismic actions	No performance assessed
Resistance to corrosion and deterioration	See section 3.6
3.2 Safety in case of fire (BWR2)	
Reaction to fire	The connectors are made from aluminium classified as Euroclass A1 in accordance with Commission Delegated Regulation 2016/364 and EN 13501-1 and EC decision 96/603/EC, amended by EC Decision 2000/605/EC
Resistance to fire	No performance assessed
3.3 General aspects related to the performance of the product	The 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 classes 1 and 2

*) See additional information in section 3.4 – 3.7.

3.4 Methods of verification

Safety principles and partial factors

The characteristic load-carrying capacities are based on the characteristic values of the fasteners and the aluminium plates. To obtain design values the capacities have to be divided by different partial factors for the material properties, in case of timber failure in addition multiplied with the coefficient k_{mod} .

According to EN 1990 (Eurocode – Basis of design) paragraph 6.3.5 the design value of load-carrying capacity may be determined by reducing the characteristic values of the load-carrying capacity with different partial factors.

Thus, the characteristic values of the load-carrying capacity are determined also for timber failure $F_{Rk,H}$ (obtaining the embedment strength of fasteners subjected to shear or the withdrawal capacity of the most loaded fastener, respectively) as well as for aluminium plate failure $F_{Rk,alu}$. The design value of the load-carrying capacity is the smaller value of both load-carrying capacities.

$$F_{Rd} = \min \left\{ \frac{k_{mod} \cdot F_{Rk,H}}{\gamma_{M,H}}; \frac{F_{Rk,alu}}{\gamma_{M,alu}} \right\}$$

Therefore, for timber failure the load duration class and the service class are included. The different partial factors γ_M for aluminium or timber, respectively, are also correctly taken into account.

3.5 Mechanical resistance and stability

See annex B for characteristic load-carrying capacities of the T-Tec connectors.

The characteristic capacities of the E.u.r.o.Tec connectors are determined by calculation assisted by tests as described in the EAD 130186-00-0603. 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 9 in Annex A:

- *Screws, bolts, dowels or self-drilling dowels in accordance with EN 14592 or according to ETA*
- *Self-tapping screws in accordance with ETA-11/0024*
- *Anchor nails in accordance to EN 14592 or ETA-22/0083*
- *Metal anchors in accordance with an ETA*

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

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.

3.6 Aspects related to the performance of the product

In accordance with EAD 130186-00-0603 the aluminium E.u.r.o.Tec connectors are produced from aluminium alloy EN AW 6005A T6 according to EN 1999-1-1.

3.7 General aspects related to the use of the product

E.u.r.o.Tec connectors are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.

The following provisions concerning product performance apply:

T-Tec connector joints

A connector joint is deemed fit for its intended use provided:

Header – support conditions

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

If the header carries joists only on one side the eccentricity moment from the joists $M_{ec} = R_{joist} (b_{header}/2 + 96\text{mm})$ 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

- Connectors are fastened to wood-based headers by screws or nails and to wood-based joists by dowels.
- The characteristic capacity of the connector joint is calculated according to the manufacturer's technical documentation, dated 2020-01-03, 2024-10-10 and 2025-06-23.

- The connector joint 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 connectors the gap between the surface of the header plate and the end of the joist shall be maximum 10 mm.
- The groove in the joist and the surface of the header shall have a plane surface against the whole connector.
- The depth of the joist shall be so large that the top (bottom) of the joist is at least $a_{4,t}$ above (below) the upper (lower) dowel in the joist. See figure 4 of Annex B.2.
- The depth of the header shall be so large that the top and bottom of the header is at least $a_{4,t}$ above or below the upper or lower screw in the header. See figures in annexes B and C.
- Screws and nails to be used shall have a diameter and head shape, which fits the holes of the connectors.

Wood to concrete or steel

The above mentioned rules for wood to wood connections are applicable also for the connection between the joist and the connector.

- The connector connection is designed in accordance with Eurocodes 2, 3, 5 or 9 or an appropriate national code.
- The connector shall be in close contact with the concrete or steel over the whole face. There shall be no intermediate layers in between.
- The gap between the end of the joist and the surface, where contact stresses can occur during loading shall be limited. This means that the gap between the end grain surface of the joist and that of the concrete or steel shall be maximum 20 mm.
- The bolt or metal anchor shall have a diameter not less than the hole diameter minus 2 mm.
- The bolts or metal anchors shall be placed symmetrically about the vertical symmetry line. There shall always be bolts in the 2 upper holes considering the minimum edge distance.
- The upper bolts shall have washers according to EN ISO 7094.

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

4.1 AVCP system

According to the decision 97/638/EC of the European Commission¹, 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 provided for 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 2025-11-13 by



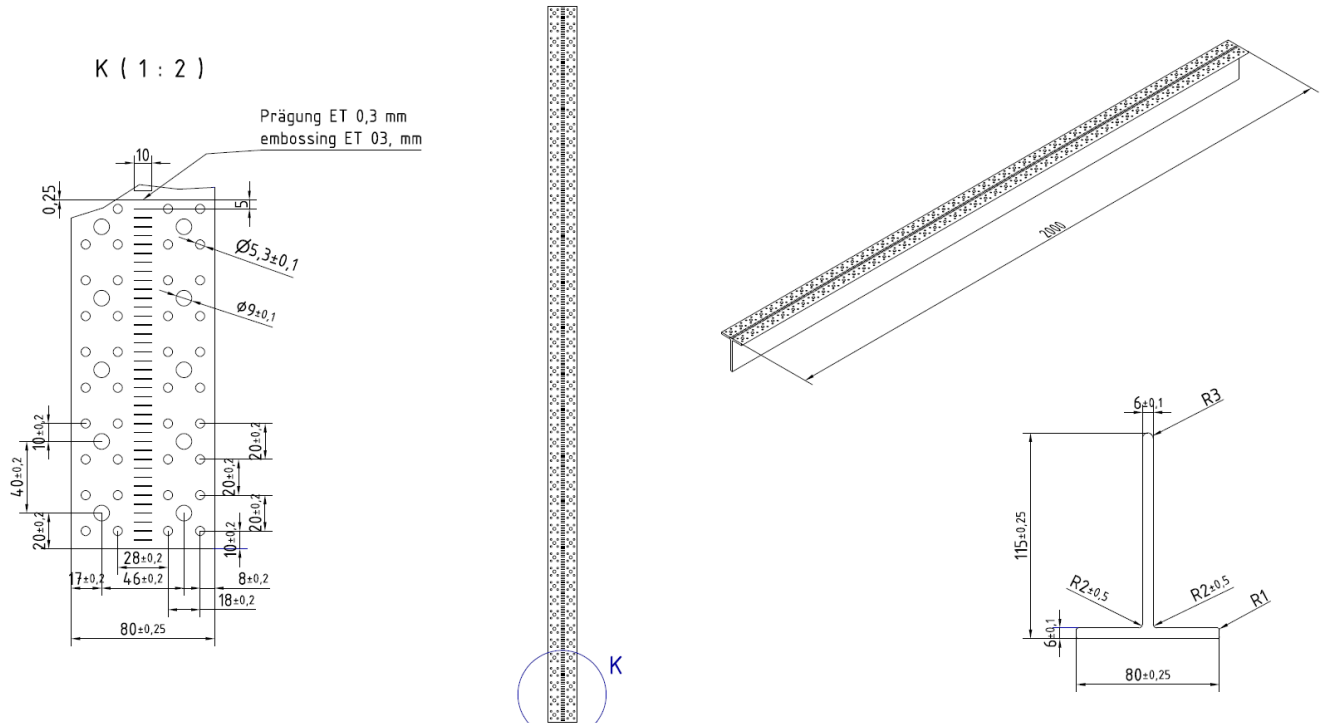
Thomas Bruun
Managing Director, ETA-Danmark

Annex A

Product details and definitions

T-Tec Connector

Face mount hanger with flanges without pre-punched holes for the joist connection. 6.0 mm thick aluminium alloy EN AW 6005A T6 according to EN 573-3:2009.



T-Tec Connector	Max. N° of screws		Max. N° of dowels	Effective N° of anchor holes	
	N°	d	N°	N°	d
100	20	5	3	2	9
120	24	5	3	4	9
140	28	5	4	4	9
160	32	5	5	4	9
180	36	5	6	4	9
200	40	5	7	6	9
220	44	5	8	6	9
240	48	5	9	6	9
260	52	5	10	6	9
280	56	5	10	8	9
300	60	5	11	8	9
320	64	5	12	8	9
340	68	5	13	8	9
360	72	5	14	10	9
380	76	5	15	10	9
400	80	5	16	10	9
420	84	5	16	10	9
440	88	5	17	12	9
460	92	5	18	12	9
480	96	5	19	12	9

The distance of the dowels of the joist connection from the header surface is 96 mm.

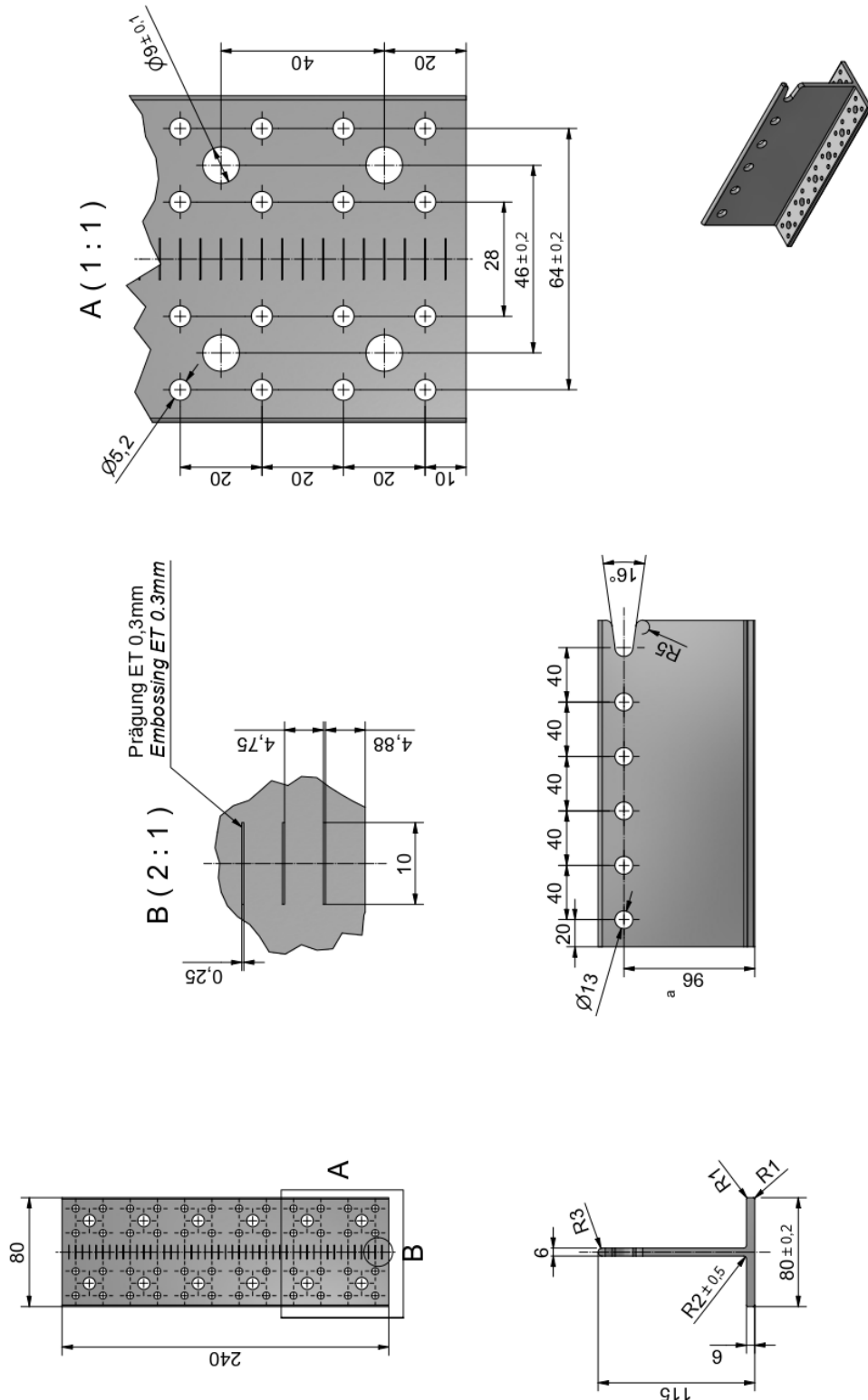
The T-Tec connectors are supplied in lengths of 2000 mm, which are cut to fit the lengths in the above table and to intermediate sizes within the range of 100 mm - 480 mm. For the load-carrying capacity of a T-Tec connector with intermediate size, refer to the next smaller tabulated size.

The given effective number of anchor holes is found by assuming the appropriate edge distance according EC9-1-1, 8.5.1 of $e_1 = 2 \cdot d_0$ at both edges. If this assumption is not fulfilled the upper row of anchor holes $\varnothing 9,0$ mm must not be used. The distance between concrete anchors was assumed as $s_1 = 80$ mm. If the ETA of the concrete anchors defines $s_{1,min} = 40$ mm a higher number of anchors could be applied.

Face mount hanger with flanges with pre-punched holes $\varnothing 13,0$ mm for joist connection with dowels $\varnothing 12,0$ mm according EC5-1-1. 6.0 mm thick aluminium alloy EN AW 6005A T6 according to EN 573-3:2009. These T-Tec connectors are produced with distinct lengths $\ell_{T-Tec} = \{120,160,200,240,280,320,360\}$ mm.

T-Tec Connector	Max. N° of dowels $\varnothing 12,0$ mm
120	3
160	4
200	5
240	6
280	7
320	8
360	9

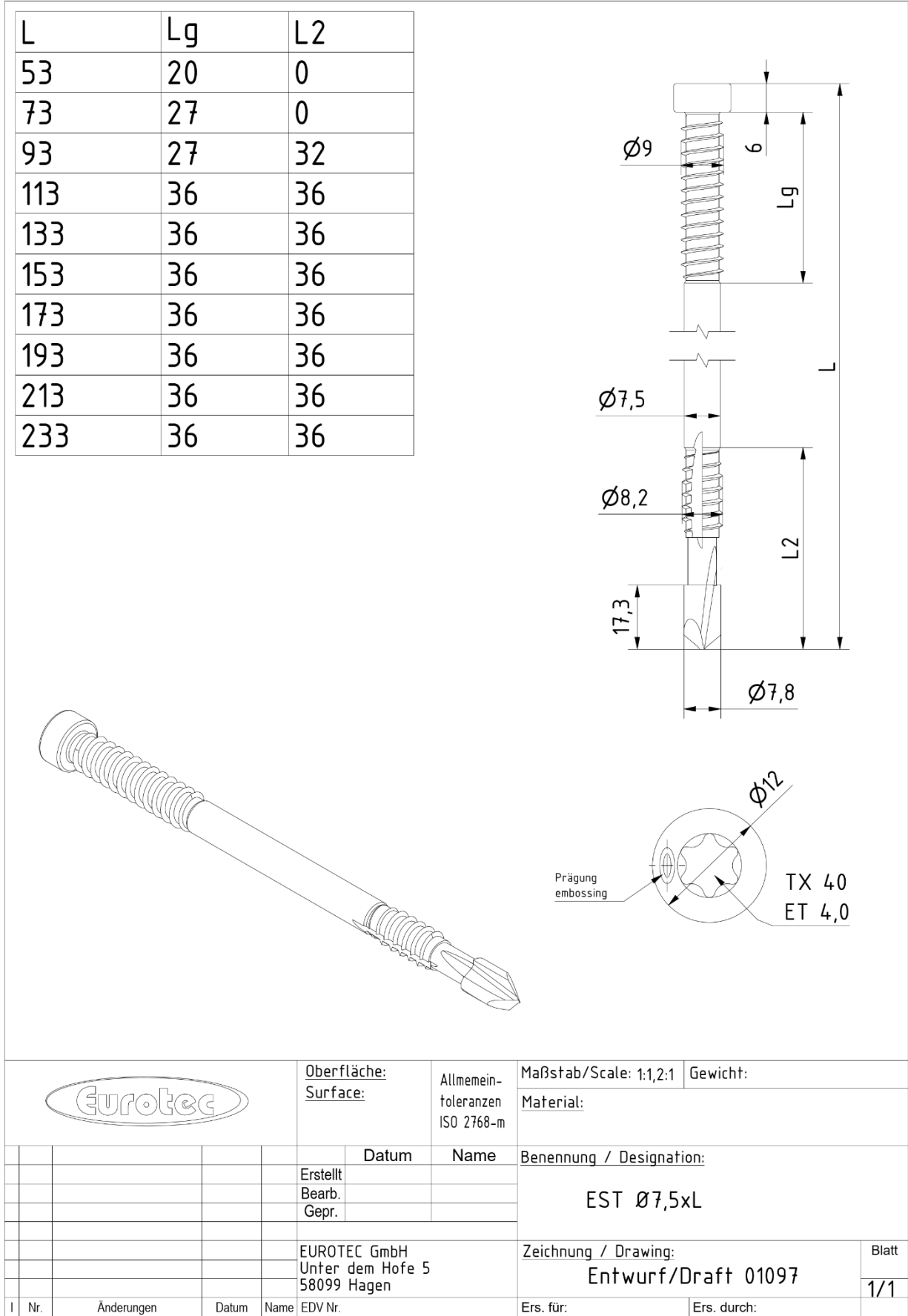
figure annexes 2:T-Tec 240 mm with pre-punched holes

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Fastener types and sizes

Connection to the joist, i.e. in the web of T-Tec		
BOLTS, METAL ANCHORS or DOWELS diameter	Corresponding hole diameter in aluminium plate	Fastener type
7.5	-	EST self-drilling dowels
12.0	13.0	Bolts or dowels according to EN 14592
Connection to the header or column, i.e. in the flange of T-Tec		
BOLTS, METAL ANCHORS or DOWELS diameter	Corresponding hole diameter in aluminium plate	Fastener type
< 9.0	9.0 for clearances between fastener and hole EN 1090-3 must be taken account of	Bolts or dowels according to EN 14592, metal anchors according to manufacturer's specification
Screw diameter; length		Screw type
5.0; 35 – 70 mm	5.0	Self-tapping screw according to EN 14592 or ETA-11/0024
The part of the screw directly under the head shall have a diameter which fits the hole diameter (see Annex A of ETA-11/0024).		
Nail diameter; length		Nail Type
4.0; 40 – 60 mm	5.0	Annular ringed shank nails according to EN 14592 or ETA-22/0083
The part of the ringed shank nail under the head shall be formed as a cone		

EST self-drilling dowels:



Diese Zeichnung und deren Inhalt ist geistiges Eigentum der Firma Eurotec GmbH und darf ohne unsere Zustimmung weder im Ganzen noch teilweise vervielfältigt oder an Dritte weitergeleitet werden.

figure annexes 3: EST self-drilling dowel

Annex B.1

Characteristic values of load-carrying-capacities

The downward and the upward directed forces are assumed to act in the joist axis.

Only a full screw pattern is specified in annex B.1, where there are screws or nails in all the holes of the header connection. In annex B.2 the mechanical models are presented, based on this and EC5-1-1 a general calculation of the load bearing capacity could be performed for different patterns. For header connections with bolts or metal anchors, there must always be at least bolts or metal anchors in the two uppermost holes for loading down or in the two lowermost holes for loading up.

B.1 T-Tec Connectors fastened with dowels and with screws, nails, bolts or metal anchors

Loading down or up:

$$F_{v,Rk} = F_{Z,Rk} = \min \left\{ \frac{n_J \cdot F_{v,J,Rk}}{\sqrt{\left(\frac{1}{n_{H,ef} \cdot F_{v,H,Rk}} \right)^2 + \left(\frac{1}{k_{H,Z} \cdot F_{ax,H,Rk}} \right)^2}} \right\} \quad (B.1)$$

n_J Number of dowels in the joist, see Table B.1

$n_{H,ef}$ Effective total number of fasteners in the header plate according to EC 5-1-1 for laterally loaded connectors. For joints with headers and therefore $\alpha = 90^\circ$ of the angle between load and grain direction $n_{H,ef}$ see Table B.1

$F_{v,J,Rk}$ Characteristic lateral load-carrying capacity of a dowel with two shear planes in the joist according EC5-1-1. If the embedding strength of the dowel in the aluminium web of T-Tec is minor to the load bearing capacity of the dowels in the timber, i.e. $F_{v,J,Rd} > F_{b,Rd,EC9-1-1}$, instead of $F_{v,J,Rk}$ in B.1 $F_{b,Rk,EC9-1-1}$ according EC9-1-1 must be applied for the load carrying capacity in the joist. For the EST selfdrilling dowels $F_{b,Rd,EST} = 15,0 \text{ kN}$ with $e_1 = 15,0 \text{ mm}$; $F_{b,Rd,\emptyset 12} = 18,4 \text{ kN}$ with $e_1 = 20,0 \text{ mm}$; here e_1 is the edge distance, see e.g. figure annexes 5 of annex B.2

$F_{v,H,Rk}$ Characteristic lateral load-carrying capacity of a fastener in single shear in the header assuming a thick plate

$F_{ax,H,Rk}$ Characteristic axial load-carrying capacity of a screw, nail, bolt or metal anchor in the header

$k_{H,Z}$ form factor, see Table B.1

The load-carrying capacity $F_{v,J,Rk}$ of the connection with EST self-drilling dowels may be calculated according to Eurocode 5 using the characteristic yield moment $M_{y,k} = 49 \text{ Nm}$ for $d = 7.5 \text{ mm}$.

Table B.1: E.u.r.o. Tec T-Tec connectors without pre-punched holes: Form factors $k_{H,Z}$ and effective number of dowels n_J and nails or screws $n_{H,ef}$ as maximum number of nails or screws

T-Tec Connector	n_J	$n_{H,ef}$	$k_{H,Z}$	$n_{H,ef}$	$k_{H,Z}$
		Timber-to-timber		Timber-to-concrete or steel	
100	3	20	6,25	2	1,67
120	3	24	9,17	4	2,17
140	4	28	12,6	4	2,78
160	5	32	16,7	4	3,45
180	6	36	21,3	4	4,17
200	7	40	26,4	6	4,95
220	8	44	32,1	6	5,83
240	9	48	38,3	6	6,78
260	10	52	45,1	6	7,78
280	10	56	52,5	8	8,85
300	11	60	60,4	8	10,00
320	12	64	68,9	8	11,22
340	13	68	77,9	8	12,5
360	14	72	87,5	10	13,85
380	15	76	97,6	10	15,28
400	16	80	108	10	16,78
420	16	84	120	10	18,33
440	17	88	132	12	19,96
460	18	92	144	12	21,67
480	19	96	156	12	23,44

The values in Table B.1 are based on the assumption that the depth of the joist and of the timber header fulfil the loaded and unloaded edge distance requirements of Eurocode 5. Consequently, all header screws are considered load-bearing.

For concrete headers, edge distances and spacing c_{min} ; s of bolts or anchors correspond to the applied ETA. The distance between the outermost anchor row and the edge of T-Tec was assumed as $e_1 = 20,0 \text{ mm}$ and the distance between anchors $s = 80,0 \text{ mm}$.

Loading perpendicular to the joist plate:

$$F_{lat,Rk} = F_{Y,Rk} = \min \left\{ \begin{array}{l} 42,9 \cdot H \\ k_n \cdot h \cdot b \cdot f_{v,k} \\ \sqrt{b} \cdot \left(1,5 + \frac{231}{b} \right) \end{array} \right. \quad (B.2)$$

Where

$F_{Y,Rk}$ Characteristic load-carrying capacity of a T-Tec connector for loads perpendicular to the joist plate in N;

H Depth of the connector in mm;

k_n Parameter according to Eurocode 5 equation (6.63);

b Joist width in mm;

h Joist depth in mm;

$f_{v,k}$ Characteristic joist shear strength [N/mm²]

Note: For joints with ringed shank nails with a reduced withdrawal capacity compared to screws an additional verification is demanded according to annex B.2

Note: For calculating design values, the partial factor for aluminium has to be applied to the first expression in equation (B.2), and k_{mod} and the partial factor for timber to the second expression in equation (B.2).

**Loading perpendicular to the header plate
(only if minimum end distance $a_{3,t} = 80$ mm for joist fasteners are met):**

$$F_{ax,Rk} = F_{X,Rk} = \min \begin{cases} 0,4 \cdot n_{H,ef} \cdot F_{ax,Rk} \\ n_J \cdot F_{v,Rk} \end{cases} \quad (B.3)$$

Where

$F_{ax,Rk}$ Characteristic load-carrying capacity of an axially loaded header fastener;

$n_{H,ef}$ Effective number of header fasteners, see Table B.1;

n_J Number of joist fasteners;

$F_{v,Rk}$ Characteristic load-carrying capacity of a dowel with two shear planes in the joist;

If $F_{X,Ed}$ or $F_{Y,Ed}$ or $F_{Z,Ed}$ load the connection simultaneously, the following interaction equation shall be fulfilled:

$$\left(\frac{F_{X,Ed}}{F_{X,Rd}} \right)^2 + \left(\frac{F_{Y,Ed}}{F_{Y,Rd}} \right)^2 + \left(\frac{F_{Z,Ed}}{F_{Z,Rd}} \right)^2 \leq 1,0 \quad (B.4)$$

Annex B.2

This annex provides general methods of verification especially for connections to columns made of timber or joints to headers of steel or reinforced concrete, where the values given in table B.1 are not applicable, due to the different pattern of connectors in the header.

Loading down or up:

The model for calculating the load bearing capacity of the connection to the joist assumes a uniform distribution of F_v or F_{up} at the connectors to the header and due to the moment of eccentricity $M_{ec} = F_v \cdot 96\text{mm}$ an axial tensile loading.

For loads acting perpendicular to the grain in the header $n_{ef} = n$ and therefore $F_{la} = \frac{F_v}{n_{ef}}$. For joints to timber columns, where the load acts parallel to the grain and with distance a_1 between the nails or screws $n_{ef} = n_{ef}^k$ according EC5-1-1

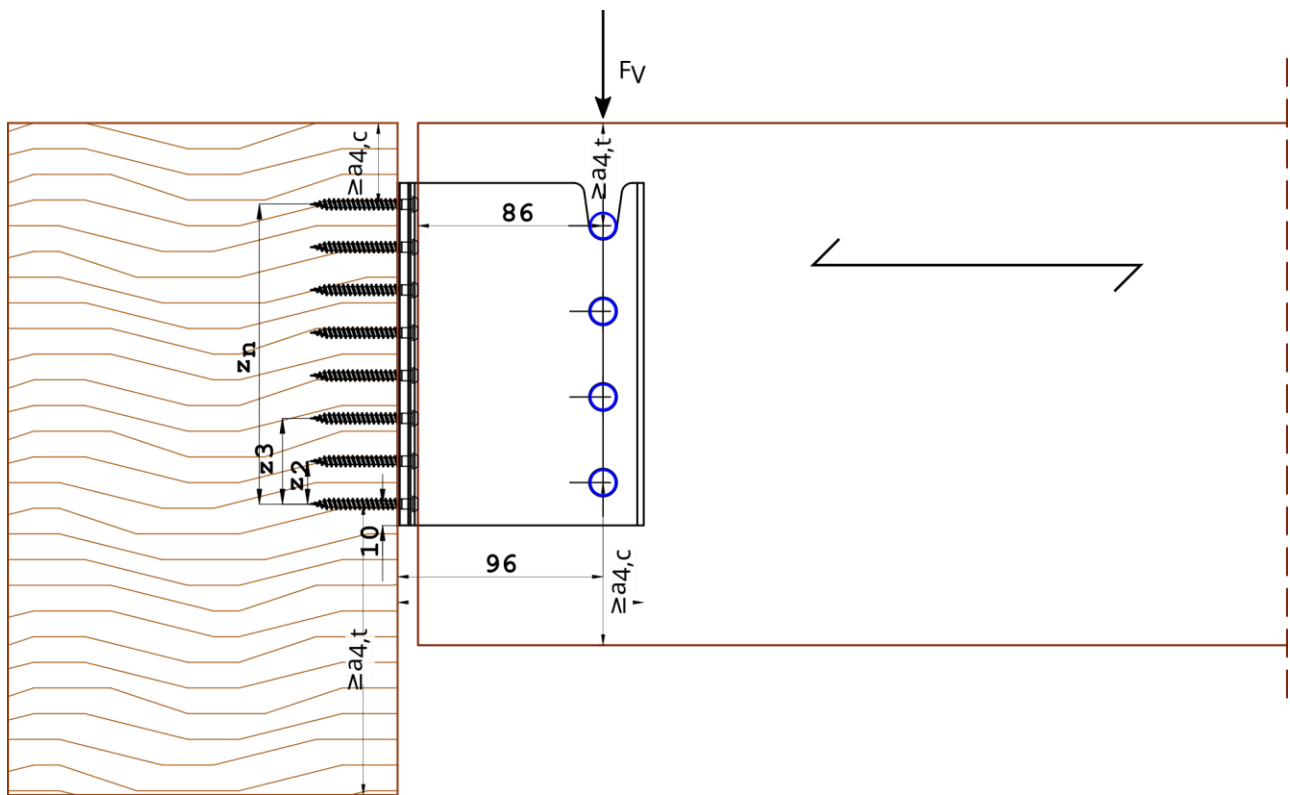


figure annexes 4: model for timber connections, here $z_1=0$ mm

The axial withdrawal force is calculated assuming a linear distribution. By using the polar moment $I_p = \sum_{i=1}^{i=n} z_i^2$ for the highest loaded connector with z_n the axial loading is $F_{ax} = \frac{M_{ec}}{I_p} \cdot z_n \rightarrow F_{ax} = \frac{F_v \cdot 96\text{mm}}{I_p} \cdot z_n$. The centre of rotation, i.e. $z = 0$ is assumed to be 10 mm above the loaded edge of the T-Tec profile.

As both loads F_{la} and F_{ax} depend linearly from F_v for anchor nails or self-tapping screws the verification for combined loading of connectors is $\left(\frac{F_{ax,Ed}}{F_{ax,Rd}}\right)^2 + \left(\frac{F_{la,Ed}}{F_{la,Rd}}\right)^2 \leq 1,0$.

For concrete headers there are a lot of different failure modes to be verified according EC2-4 and ETAs of concrete anchors or screws. Additionally, the verification for combined loading demands a quadratic interaction only for steel failure, EC2-4, 7.2.3 but different combinations for concrete failure modes.

For the verification of these connectors either F_v and $M_{ec} = F_v \cdot 96\text{mm}$ acting on the flange of T-Tec connector or F_v acting in a distance of 96 mm to the concrete's surface has to be applied in the models.

For calculating the axial loading of the anchors again a linear distribution might be assumed, here the edge of the T-Tec profile should be taken as the centre of rotation.

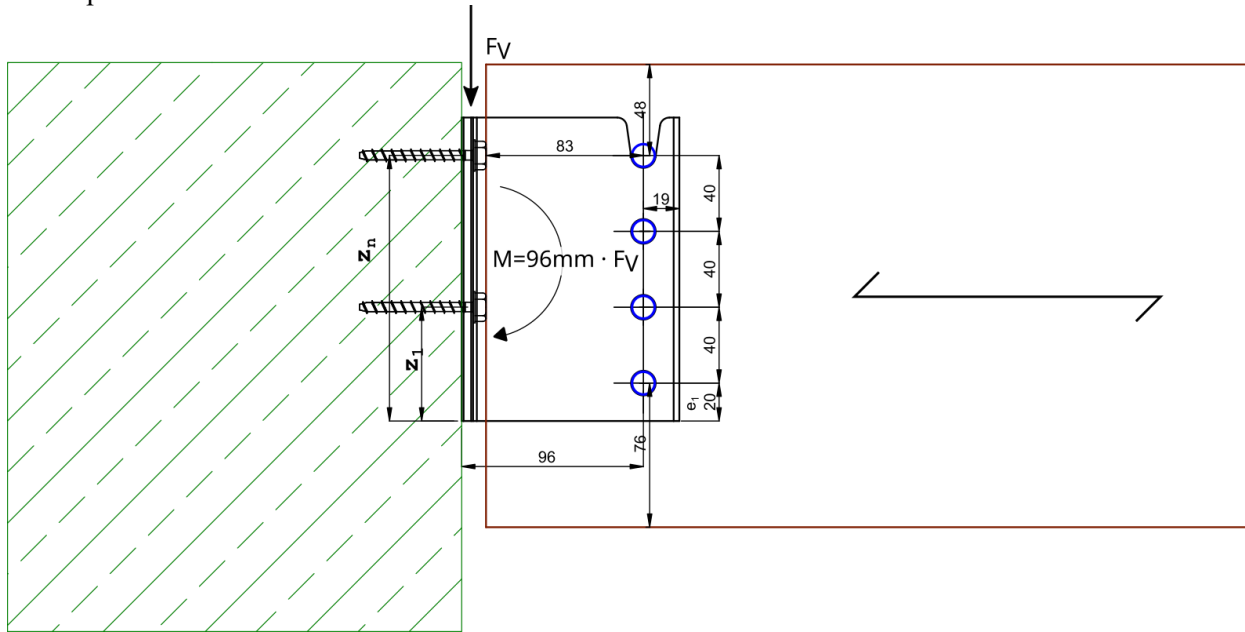


figure annexes 5: Model for T-Tec connection to concrete

Loading perpendicular to the joist plate:

For joints with ringed shank nails with a reduced withdrawal capacity compared to screws, an additional verification might be decisive.

The verification of combined loading of the nails is $\left(\frac{F_{ax,Ed}}{F_{ax,Rd}}\right)^2 + \left(\frac{F_{la,Ed}}{F_{la,Rd}}\right)^2 \leq 1,0$

Where:

$$F_{lat,Ed} = F_{lat}/n_{H,ef}$$

$$F_{ax,Ed} = \frac{F_{lat} \cdot 42,3mm}{l_{p,lat}} \cdot 64mm \text{ for the fastener with the greatest distance } z_3=64 \text{ mm from the center of rotation assumed in the outermost vertical row of connectors}$$

$$I_{p,lat} = \sum_{i=1}^{i=3} z_i^2$$

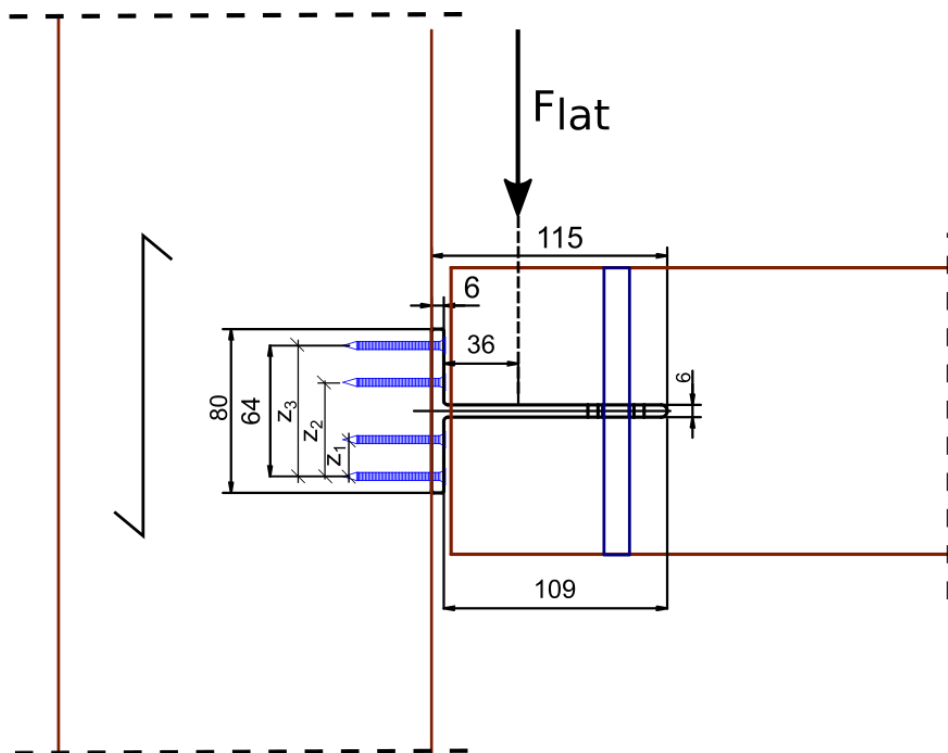
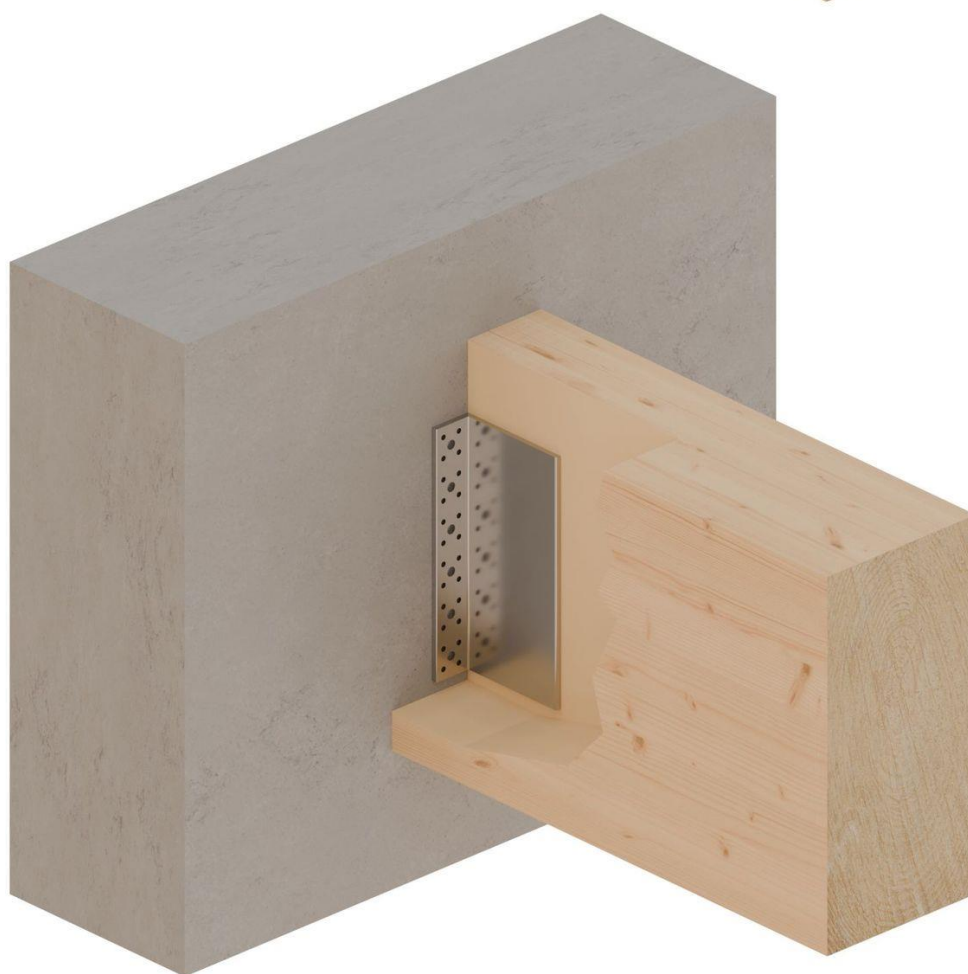
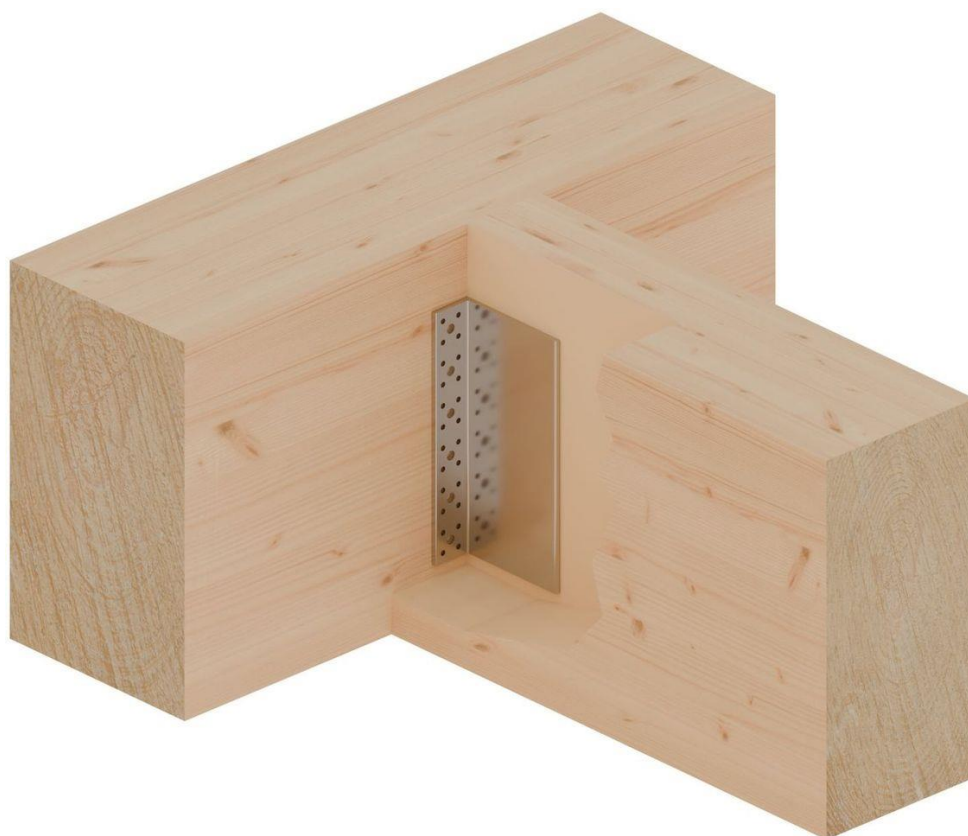


figure annexes 6: model for resulting forces in connection to header

Annex C
Installation of connectors

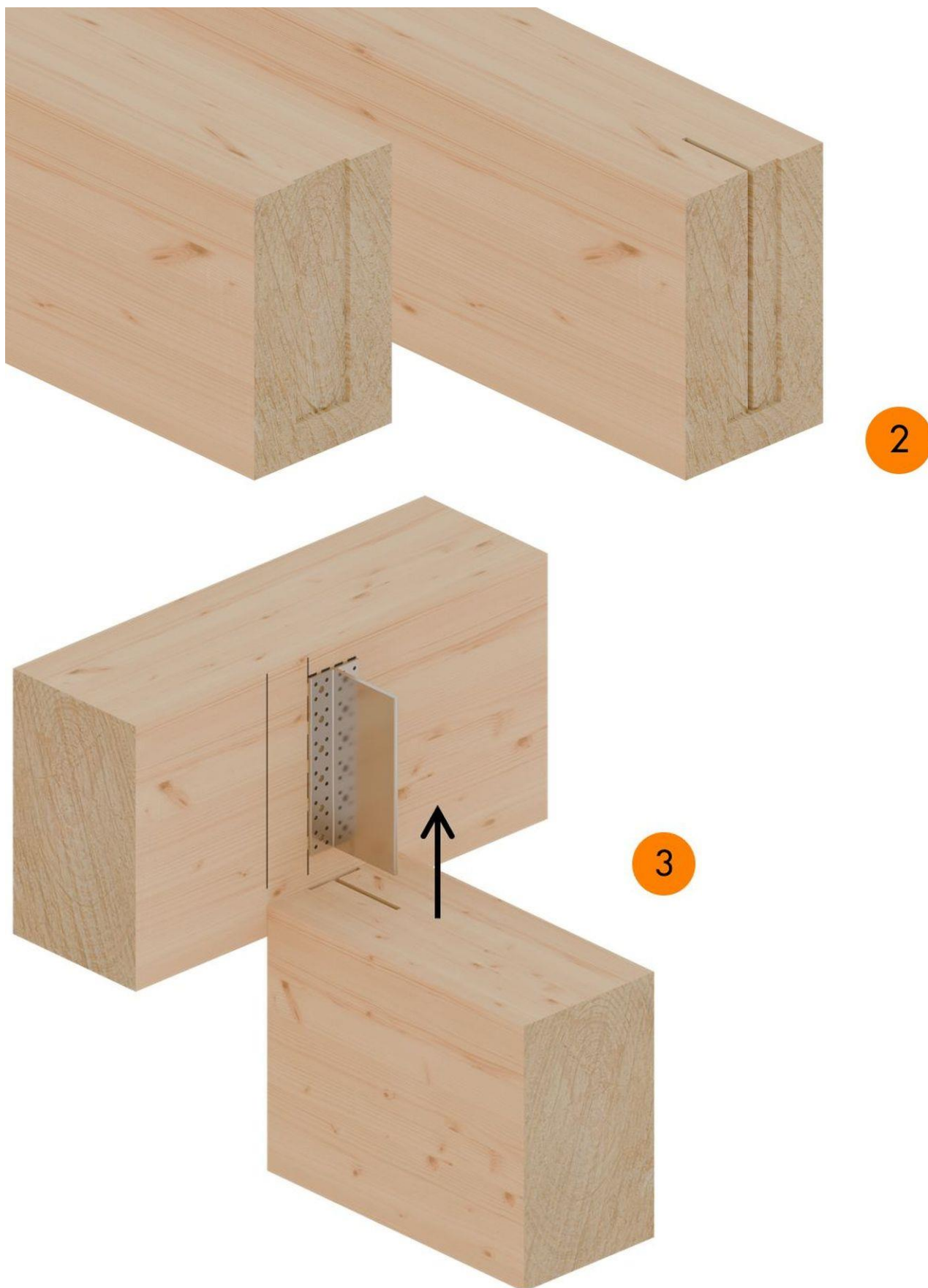




Installation order:



1



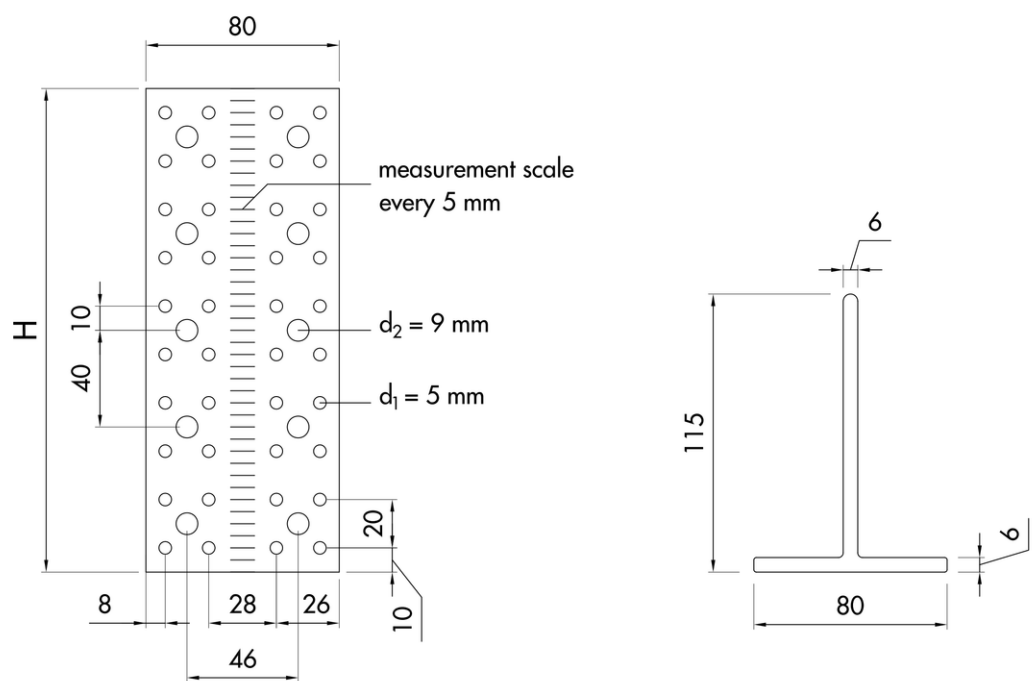


4

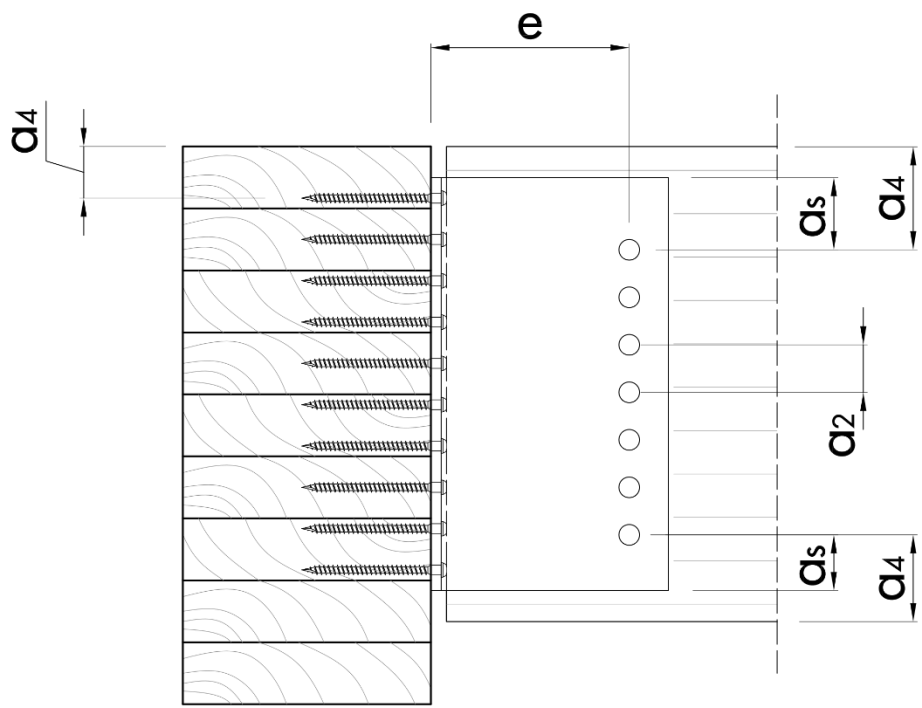


5

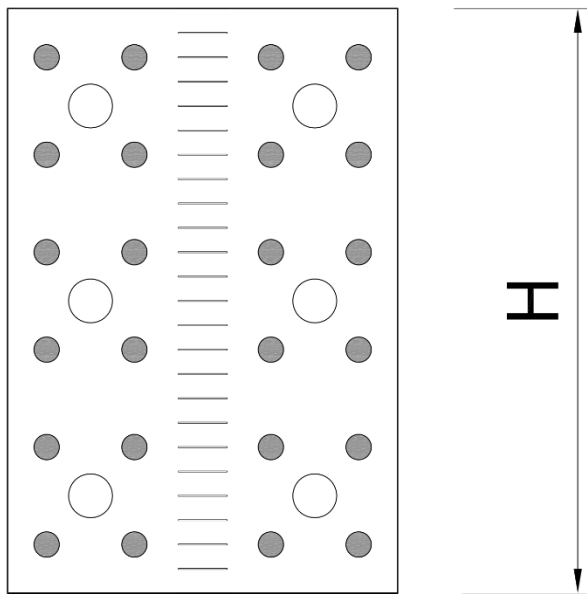
Geometry



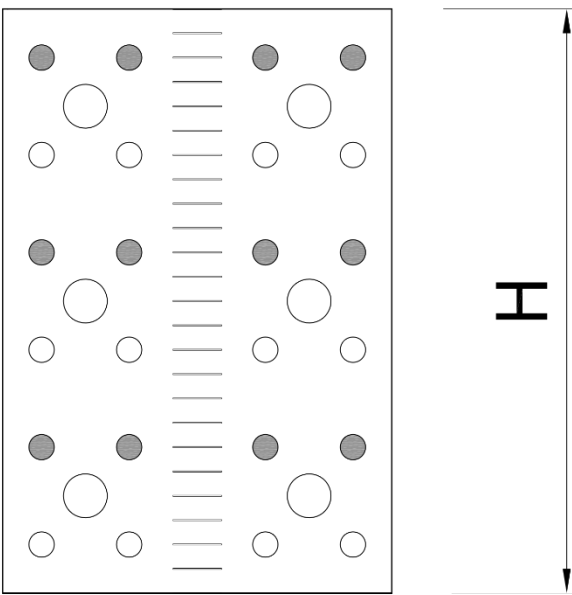
Header-joist connection



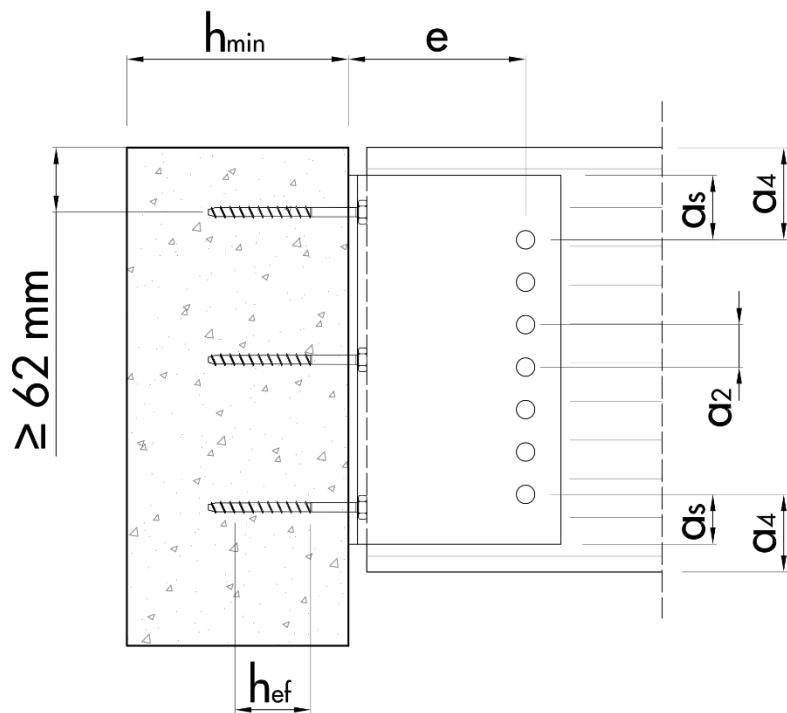
TOTAL FASTENING



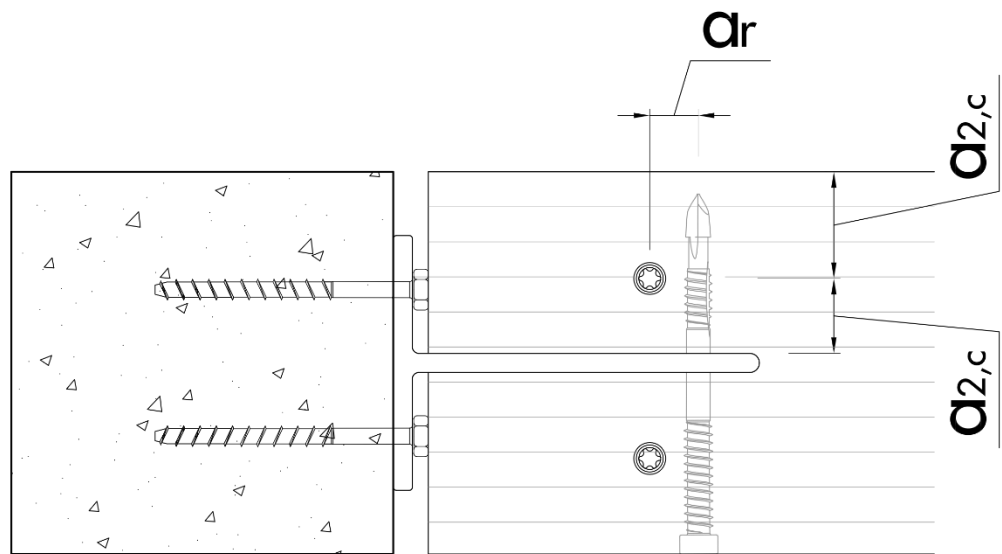
PARTIAL FASTENING



Timber-concrete connection



Top view



Partial fastening at concrete parts

