

HBS PLATE

PAN HEAD SCREW FOR PLATES



HBS P

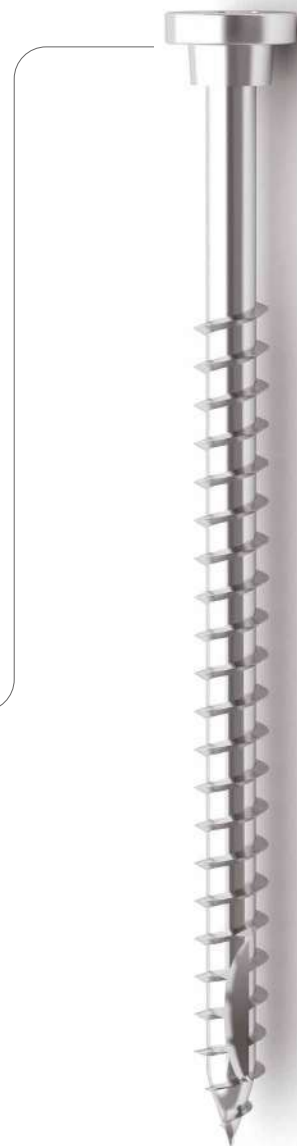
Designed for steel-to-timber joints: the head has a shoulder and the thickness is increased for completely safe, reliable fastening plates to the timber.

PLATE FASTENING

The under-head shoulder achieves an interlocking effect with the circular hole in the plate, thus guaranteeing excellent static performance.

LONGER THREAD

Increased thread length for excellent shear strength and tensile strength in steel-to-timber joints. Values higher than normal.



CHARACTERISTICS

FOCUS	steel-to-timber joints
HEAD	shoulder for plate
DIAMETER	from 8,0 to 12,0 mm
LENGTH	from 80 to 200 mm

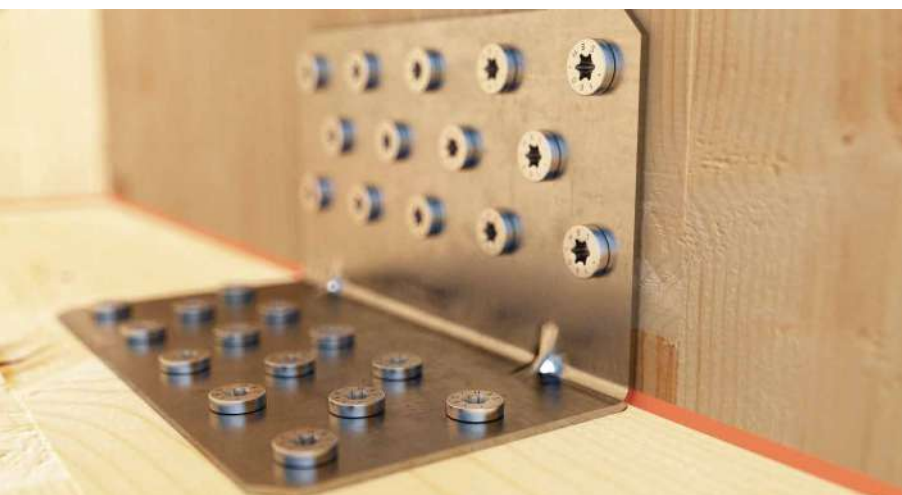
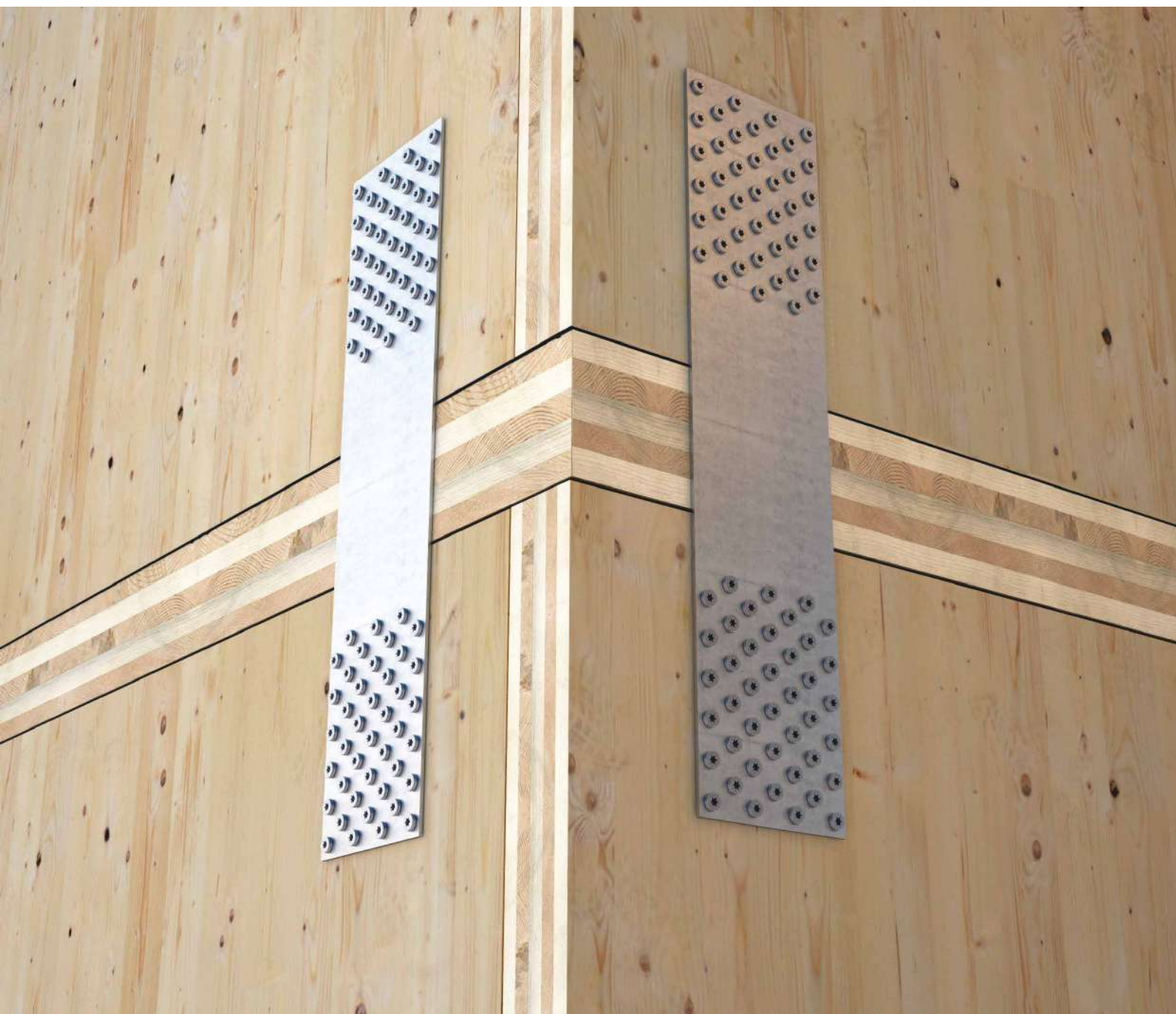


MATERIAL

Galvanized carbon steel.

FIELDS OF USE

- timber based panels
 - solid timber
 - glulam (Glued Laminated Timber)
 - CLT, LVL
 - high density woods
- Service classes 1 and 2.

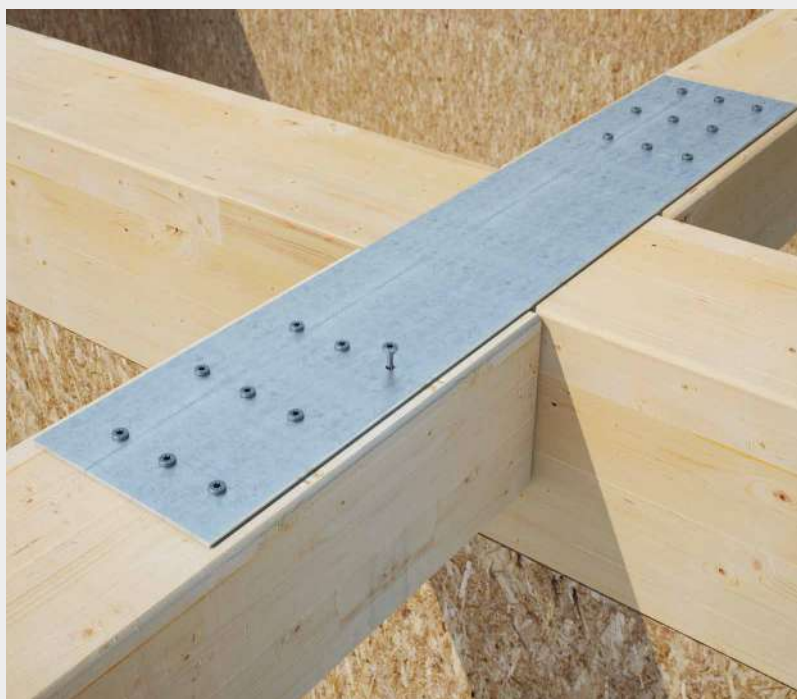


MULTISTOREY

Ideal for steel-to-timber joints with large customized plates, designed for multi-story timber buildings.

TITAN

Values also tested, certified and calculated for fastening standard Rothoblaas plates.

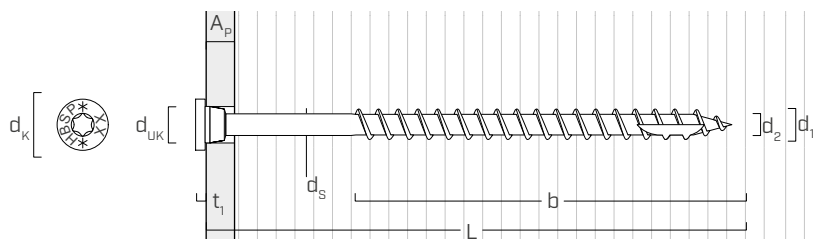


Steel-to-timber shear joint



Mixed steel-to-timber structural joint

GEOMETRY AND MECHANICAL CHARACTERISTICS



Nominal diameter	d_1	[mm]	8	10	12
Head diameter	d_K	[mm]	14,50	18,25	20,75
Tip diameter	d_2	[mm]	5,40	6,40	6,80
Shank diameter	d_S	[mm]	5,80	7,00	8,00
Head thickness	t_1	[mm]	3,40	4,35	5,00
Underhead diameter	d_{UK}	[mm]	10,00	12,00	14,00
Pre-drilling hole diameter ⁽¹⁾	d_V	[mm]	5,0	6,0	7,0
Recommended hole diameter on steel plate	$d_{v,steel}$	[mm]	11,0	13,0	15,0
Characteristic yield moment	$M_{y,k}$	[Nm]	20,1	35,8	48,0
Characteristic withdrawal-resistance parameter ⁽²⁾	$f_{ax,k}$	[N/mm ²]	11,7	11,7	11,7
Associated density	ρ_a	[kg/m ³]	350	350	350
Characteristic head-pull-through parameter ⁽²⁾	$f_{head,k}$	[N/mm ²]	10,5	10,5	10,5
Associated density	ρ_a	[kg/m ³]	350	350	350
Characteristic tensile strength	$f_{tens,k}$	[kN]	20,1	31,4	33,9

⁽¹⁾ Pre-drilling valid for softwood.

⁽²⁾ Valid for softwood - maximum density 440 kg/m³.

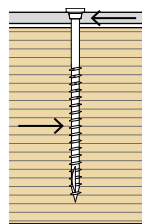
For applications with different materials or with high density please see ETA-11/0030.

CODES AND DIMENSIONS

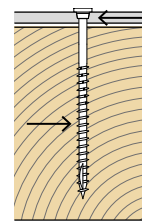
d ₁ [mm] [in]	CODE	L [mm] [in]	b [mm]	A _p [mm]	pcs
8 0.32 TX 40	HBSP880	80 3 1/8	55	1.0 ÷ 15.0	100
	HBSP8100	100 4	75	1.0 ÷ 15.0	100
	HBSP8120	120 4 3/4	95	1.0 ÷ 15.0	100
	HBSP8140	140 5 1/2	110	1.0 ÷ 20.0	100
	HBSP8160	160 6 1/4	130	1.0 ÷ 20.0	100
10 0.40 TX 40	HBSP10100	100 4	75	1.0 ÷ 15.0	50
	HBSP10120	120 4 3/4	95	1.0 ÷ 15.0	50
	HBSP10140	140 5 1/2	110	1.0 ÷ 20.0	50
	HBSP10160	160 6 1/4	130	1.0 ÷ 20.0	50
	HBSP10180	180 7 1/8	150	1.0 ÷ 20.0	50

d ₁ [mm] [in]	CODE	L [mm] [in]	b [mm]	A _p [mm]	pcs
12 0.48 TX 50	HBSP12120	120 4 3/4	90	1.0 ÷ 20.0	25
	HBSP12140	140 5 1/2	110	1.0 ÷ 20.0	25
	HBSP12160	160 6 1/4	120	1.0 ÷ 30.0	25
	HBSP12180	180 7 1/8	140	1.0 ÷ 30.0	25
	HBSP12200	200 8	160	1.0 ÷ 30.0	25

MINIMUM DISTANCES FOR SHEAR LOADS | STEEL-TO-TIMBER



Load-to-grain angle $\alpha = 0^\circ$

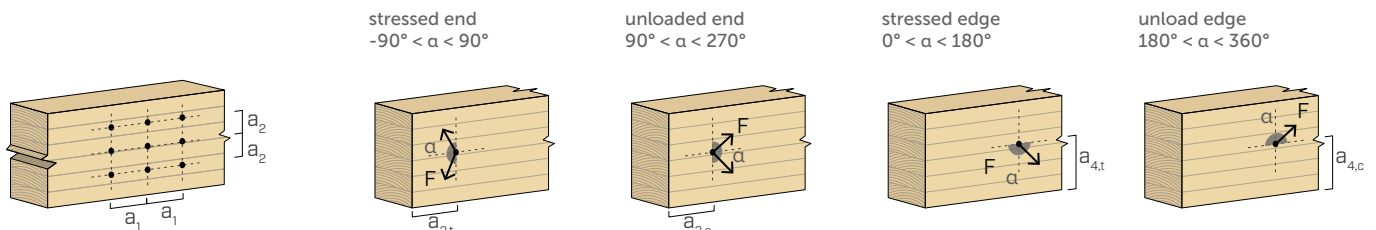


Load-to-grain angle $\alpha = 90^\circ$

SCREWS INSERTED WITH PRE-DRILLING HOLE					SCREWS INSERTED WITH PRE-DRILLING HOLE				
d ₁	[mm]	8	10	12	d ₁	[mm]	8	10	12
a ₁	[mm]	5 · d · 0,7	28	35	42	4 · d · 0,7	22	28	34
a ₂	[mm]	3 · d · 0,7	17	21	25	4 · d · 0,7	22	28	34
a _{3,t}	[mm]	12 · d	96	120	144	7 · d	56	70	84
a _{3,c}	[mm]	7 · d	56	70	84	7 · d	56	70	84
a _{4,t}	[mm]	3 · d	24	30	36	7 · d	56	70	84
a _{4,c}	[mm]	3 · d	24	30	36	3 · d	24	30	36

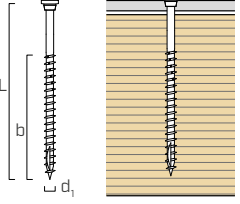
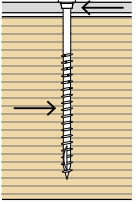
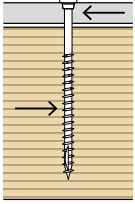
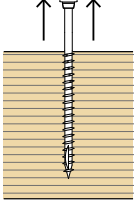
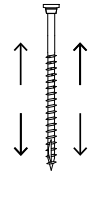
SCREWS INSERTED WITHOUT PRE-DRILLING HOLE					SCREWS INSERTED WITHOUT PRE-DRILLING HOLE				
d ₁	[mm]	8	10	12	d ₁	[mm]	8	10	12
a ₁	[mm]	12 · d · 0,7	67	84	101	5 · d · 0,7	28	35	42
a ₂	[mm]	5 · d · 0,7	28	35	42	5 · d · 0,7	28	35	42
a _{3,t}	[mm]	15 · d	120	150	180	10 · d	80	100	120
a _{3,c}	[mm]	10 · d	80	100	120	10 · d	80	100	120
a _{4,t}	[mm]	5 · d	40	50	60	10 · d	80	100	120
a _{4,c}	[mm]	5 · d	40	50	60	5 · d	40	50	60

d = nominal screw diameter



NOTES:

- The minimum distances are compliant with EN 1995:2014, according to ETA-11/0030, considering a timber characteristic density of $\rho_k \leq 420 \text{ kg/m}^3$ and calculation diameter of d = nominal screw diameter.
- In the case of joints with elements in Douglas fir (Pseudotsuga menziesii), the minimum spacing and distances parallel to the grain must be multiplied by a coefficient of 1.5.

			SHEAR		TENSION	
geometry			thin steel-to-timber plate ⁽¹⁾	thick steel-to-timber plate ⁽²⁾	thread withdrawal ⁽³⁾	steel tension
						
d ₁ [mm]	L [mm]	b [mm]	R _{V,k} [kN]	R _{V,k} [kN]	R _{ax,k} [kN]	R _{tens,k} [kN]
8	80	55	S _{PLATE} = 4,0 mm 4,07	S _{PLATE} = 8,0 mm 5,18	5,56	20,10
	100	75			7,58	
	120	95			9,60	
	140	110			11,11	
	160	130			13,13	
10	100	75	S _{PLATE} = 5,0 mm 6,01	S _{PLATE} = 10,0 mm 7,84	9,47	31,40
	120	95			12,00	
	140	110			13,89	
	160	130			16,42	
	180	150			18,94	
12	120	90	S _{PLATE} = 6,0 mm 8,19	S _{PLATE} = 12,0 mm 10,17	13,64	33,90
	140	110			16,67	
	160	120			18,18	
	180	140			21,21	
	200	160			24,24	

NOTES:

- (1) The shear resistance characteristics are calculated considering the case of a thin plate (S_{PLATE} ≤ 0,5 d₁).
- (2) The shear resistance characteristics are calculated considering the case of a thick plate (S_{PLATE} ≥ d₁).
- (3) The axial thread withdrawal resistance was calculated considering a 90° angle between the grain and the connector and for a fixing length of b.

In the case of steel-to-timber connections, generally the steel tensile strength is binding with respect to head separation or pull-through.

GENERAL PRINCIPLES:

- Characteristic values comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- Design values can be obtained from characteristic values as follows:

$$R_d = \frac{R_k \cdot k_{mod}}{\gamma_M}$$

The coefficients γ_M and k_{mod} should be taken according to the current regulations used for the calculation.

- The tensile design strength of the connector is the lower between the timber-side design strength (R_{ax,d}) and the steel-side design strength (R_{tens,d}).

$$R_{ax,d} = \min \left\{ \begin{array}{l} \frac{R_{ax,k} \cdot k_{mod}}{\gamma_M} \\ \frac{R_{tens,k}}{\gamma_{M2}} \end{array} \right.$$

- For the mechanical resistance values and the geometry of the screws, reference was made to ETA-11/0030.
- For the calculation process a timber characteristic density $\rho_k = 385 \text{ kg/m}^3$ has been considered.
- Values were calculated considering the threaded part as being completely inserted into the wood.
- Sizing and verification of the timber elements, panels and steel plates must be done separately.
- The characteristic shear resistances are calculated for screws inserted without pre-drilling hole. In the case of screws inserted with pre-drilling hole, greater resistance values can be obtained.
- For different calculation methods, the MyProject software is available free of charge (www.rotehoblaas.com).