HBS PLATE

PAN HEAD SCREW FOR PLATES

BIT INCLUDED | MY PROJECT SOFTWARE | CE ETA 11/0030

HBS P

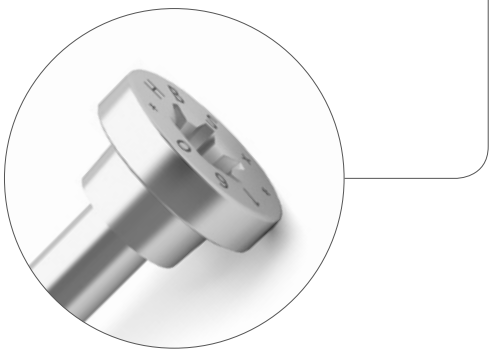
Designed for steel-to-timber joints: the head has a shoulder and the thickness is increased for completely safe, reliable fastening plates to the timber.

PLATE FASTENING

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

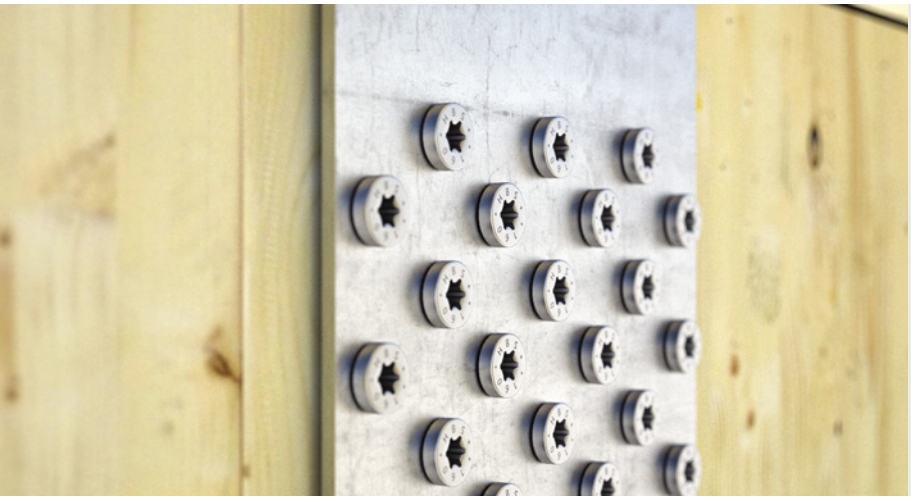
LONGER THREAD

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 mm to 12,0 mm
LENGTH	from 80 mm to 200 mm



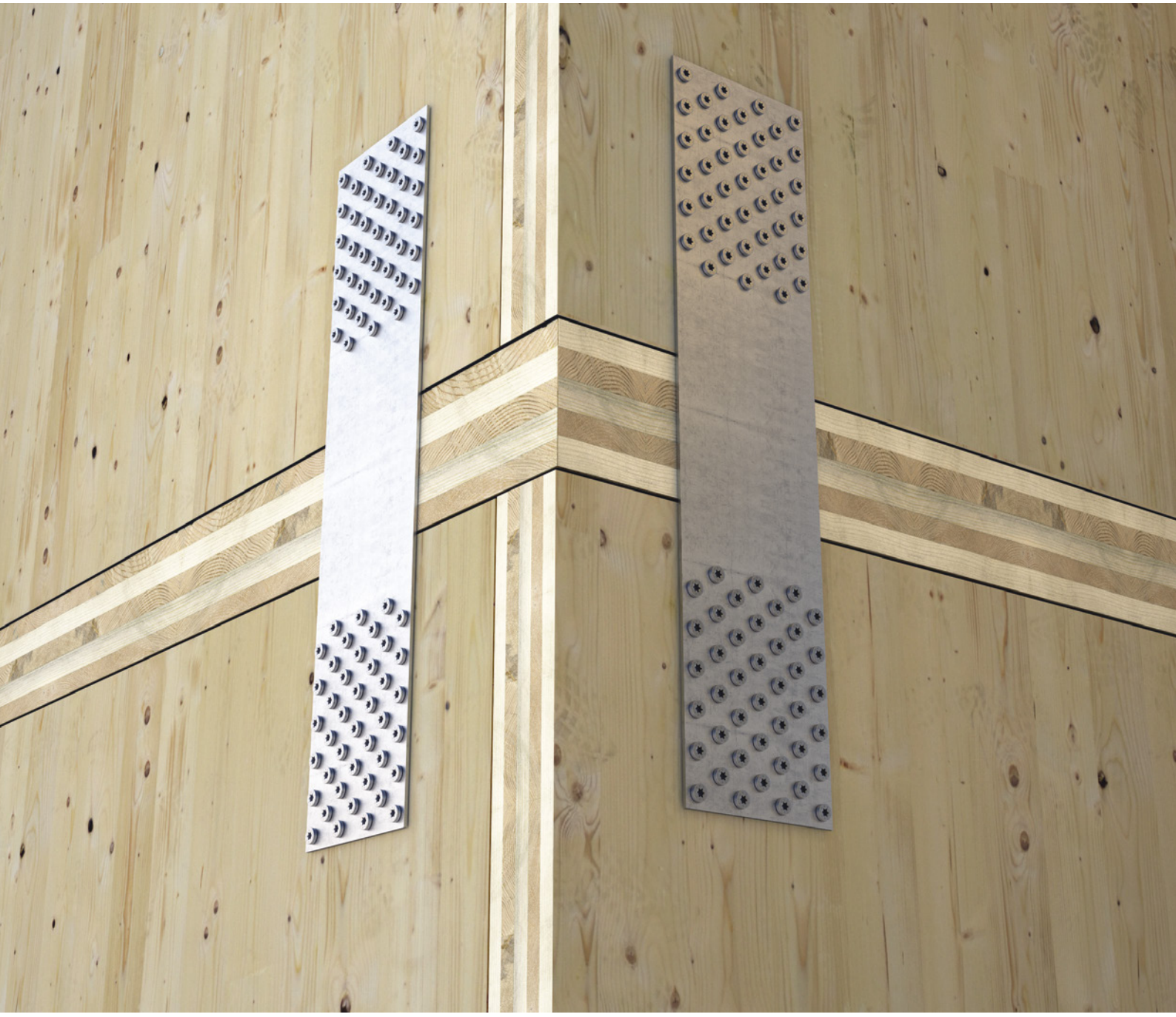
MATERIAL

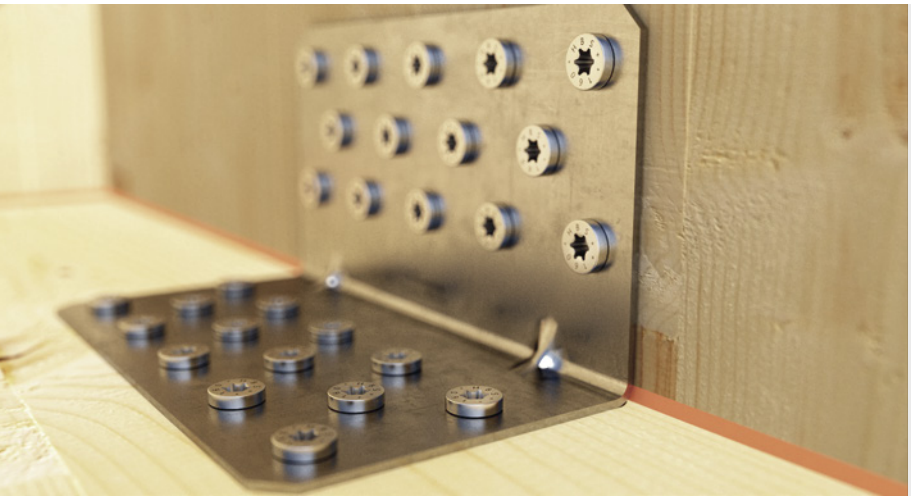
Galvanized carbon steel.

FIELDS OF USE

- wood 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 wooden buildings.

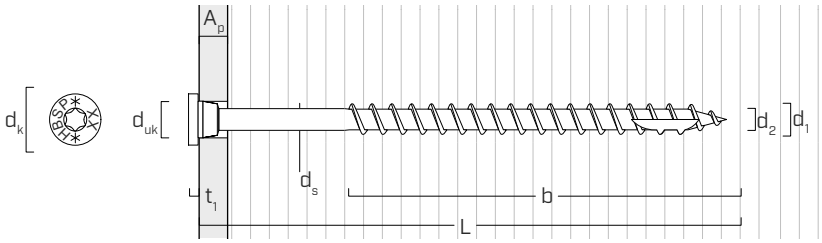
TITAN

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



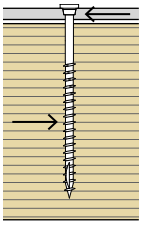
Nominal diameter	d_1	[mm]	8	10	12
Head diameter	d_k	[mm]	14,50	18,25	20,75
Tip diameter	d_2	[mm]	5,40	6,40	6,80
Shank diameter	d_s	[mm]	5,80	7,00	8,00
Head thickness	t_1	[mm]	3,40	4,35	5,00
Underhead diameter	d_{uk}	[mm]	10,00	12,00	14,00
Pre-drilling hole diameter	d_v	[mm]	5,0	6,0	6,5
Characteristic yield moment	$M_{y,k}$	[Nmm]	9493,7	20057,5	35829,6
Characteristic withdrawal-resistance parameter	$f_{ax,k}$	[N/mm²]	11,7	11,7	11,7
Characteristic head-pull-through parameter	$f_{head,k}$	[N/mm²]	10,5	10,5	10,5
Characteristic tensile strength	$f_{tens,k}$	[kN]	11,3	20,1	31,4

CODES AND DIMENSIONS

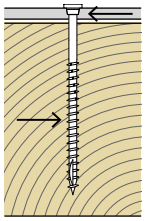
d_1 [mm]	CODE	L [mm]	b [mm]	A_p [mm]	pcs
8 TX 40	HBSP880	80	55	1,0 ÷ 15,0	100
	HBSP8100	100	75	1,0 ÷ 15,0	100
	HBSP8120	120	95	1,0 ÷ 15,0	100
	HBSP8140	140	110	1,0 ÷ 20,0	100
	HBSP8160	160	130	1,0 ÷ 20,0	100
10 TX 40	HBSP10100	100	75	1,0 ÷ 15,0	50
	HBSP10120	120	95	1,0 ÷ 15,0	50
	HBSP10140	140	110	1,0 ÷ 20,0	50
	HBSP10160	160	130	1,0 ÷ 20,0	50
	HBSP10180	180	150	1,0 ÷ 20,0	50

d_1 [mm]	CODE	L [mm]	b [mm]	A_p [mm]	pcs
12 TX 50	HBSP12120	120	90	1,0 ÷ 20,0	25
	HBSP12140	140	110	1,0 ÷ 20,0	25
	HBSP12160	160	120	1,0 ÷ 30,0	25
	HBSP12180	180	140	1,0 ÷ 30,0	25
	HBSP12200	200	160	1,0 ÷ 30,0	25

MINIMUM DISTANCES FOR SHEAR LOADS



Load-to-grain angle α = 0°

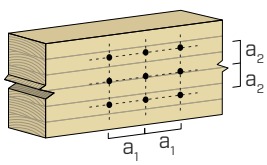


Load-to-grain angle α = 90°

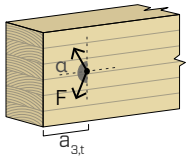
		SCREWS INSERTED WITH PRE-DRILLING HOLES				SCREWS INSERTED WITH PRE-DRILLING HOLES			
			8	10	12		8	10	12
a_1	[mm]	**5·d · 0,7**	28	35	42	**4·d · 0,7**	22	28	34
a_2	[mm]	**3·d · 0,7**	17	21	25	**4·d · 0,7**	22	28	34
$a_{3,t}$	[mm]	**12·d**	96	120	144	**7·d**	56	70	84
$a_{3,c}$	[mm]	**7·d**	56	70	84	**7·d**	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			
			8	10	12		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

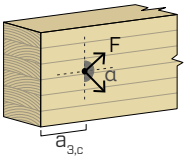
d = nominal screw diameter



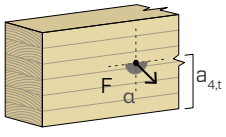
stressed end
-90° < α < 90°



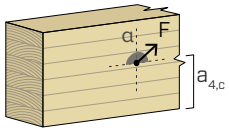
unloaded end
90° < α < 270°



stressed edge
0° < α < 180°



unload edge
180° < α < 360°

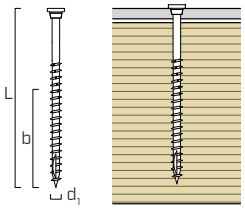
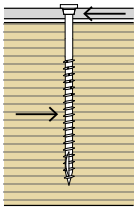
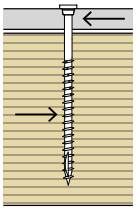
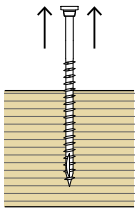
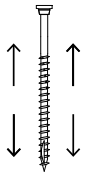


NOTES:

- The minimum distances are compliant with EN 1995:2014, according to ETA-11/0030, considering a wood characteristic density of $\rho_k \leq 420$ kg/m³ 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.

STATIC VALUES

CHARACTERISTIC VALUES
EN 1995:2014

geometry			SHEAR				TENSION [3]	
			thin steel-timber plate [1]		thick steel-timber plate [2]		thread withdrawal[4]	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	4,07	$S_{PLATE} \leq 4$ mm	5,18	$S_{PLATE} \geq 8$ mm	5,56	20,10
	100	75	4,57		5,68		7,58	
	120	95	5,08		6,19		9,60	
	140	110	5,36		6,57		11,11	
	160	130	5,36		7,07		13,13	
10	100	75	6,01	$S_{PLATE} \leq 5$ mm	7,84	$S_{PLATE} \geq 10$ mm	9,47	31,40
	120	95	6,87		8,48		12,00	
	140	110	7,34		8,95		13,89	
	160	130	7,74		9,58		16,42	
	180	150	7,74		10,21		18,94	
12	120	90	8,18	$S_{PLATE} \leq 6$ mm	10,16	$S_{PLATE} \geq 12$ mm	13,64	33,90
	140	110	8,94		10,92		16,67	
	160	120	9,32		11,30		18,18	
	180	140	9,55		12,06		21,21	
	200	160	9,55		12,81		24,24	

NOTES:

[1] The shear resistance characteristics are calculated considering the case of a thin plate ($S_{PLATE} \leq 0,5\, d_1$).

[2] The shear resistance characteristics are calculated considering the case of a thick plate ($S_{PLATE} \geq d_1$).

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

$$R_{ax,d} = min \begin{cases} \dfrac{R_{ax,k} \cdot k_{mod}}{\gamma_m} \\ \dfrac{R_{tens,k}}{\gamma_{m2}} \end{cases}$$

[4] 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-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.

- For the mechanical strength values and the geometry of the screws, reference was made to ETA-11/0030.
- For the calculation process a timber characteristic density ρ_k = 385 kg/m³ has been considered.
- Values were calculated considering the threaded part as being completely inserted into the wood.
- Sizing and verification of the wooden elements, panels and steel plates must be done separately.
- The shear characteristic resistances are calculated for screws inserted without pre-drilling holes. In the case of screws inserted with pre-drilling holes, greater resistance values can be obtained.
- For different calculation configurations, the MyProject software is available (www.rothoblaas.com).