LBS

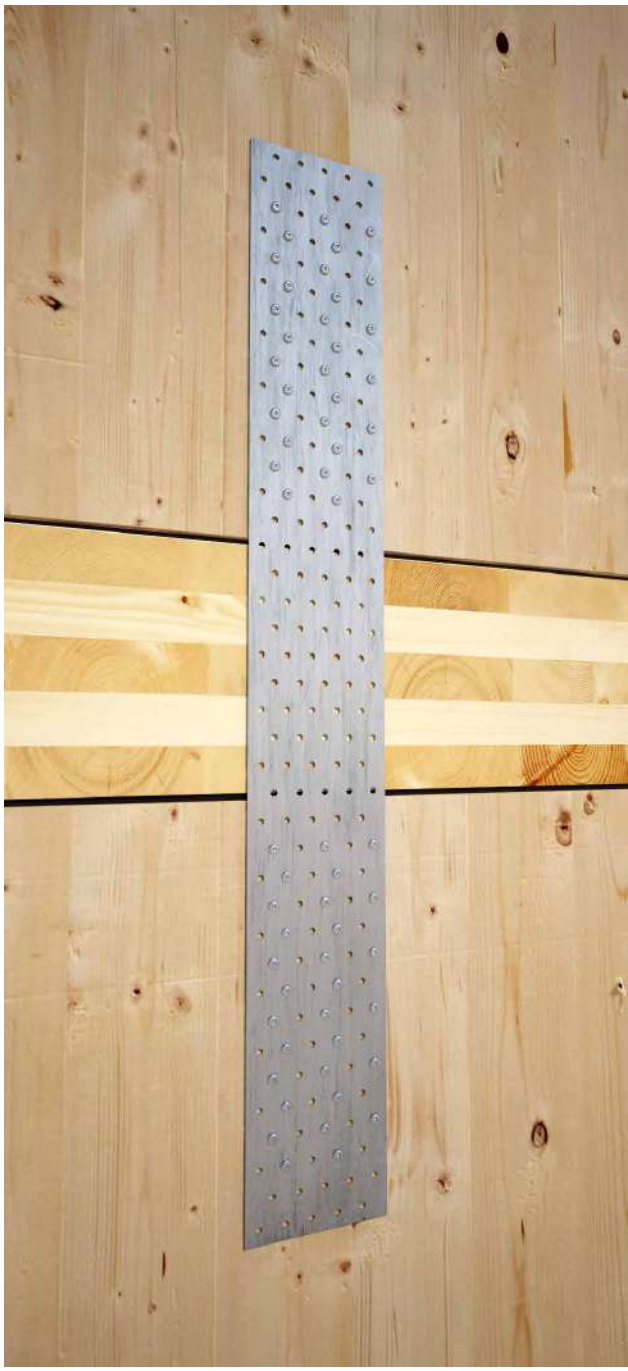
ROUND HEAD SCREW FOR PLATES

AC233
ESR-4645

BIT INCLUDED

SOFTWARE

ETA-11/0030



SCREW FOR PERFORATED PLATES

Cylindrical shoulder designed for fastening metal elements. Achieves an interlocking effect with the hole in the plate, thus guaranteeing excellent static performance.

STATICS

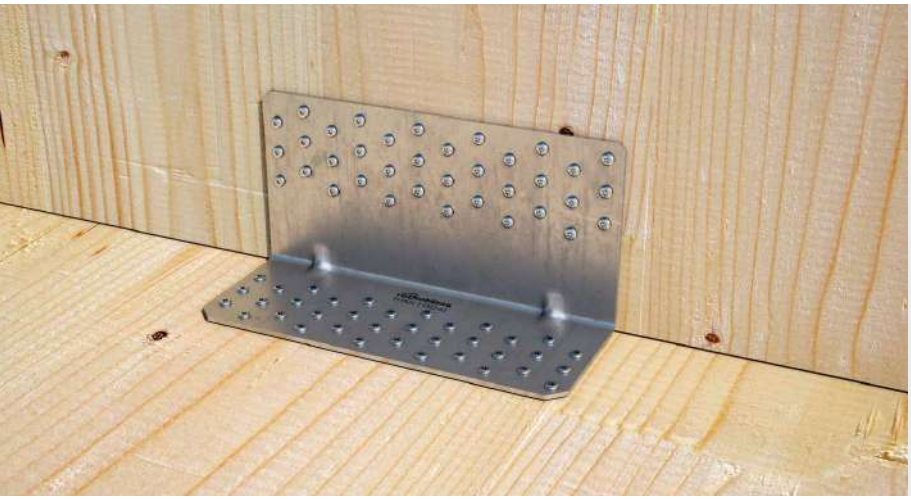
Can be calculated according to Eurocode 5 under thick plate timber-to-steel connections, even with thin metal elements.
Excellent shear strength values.

DUCTILITY

The bending angle is 20° greater than standard, certified according to ETA-11/0030. Cyclical SEISMIC-REV tests according to EN 12512.

CHARACTERISTICS

FOCUS	screw for perforated plates
HEAD	round with cylindrical underhead
DIAMETER	5,0 | 7,0 mm
LENGTH	from 25 to 100 mm



MATERIAL

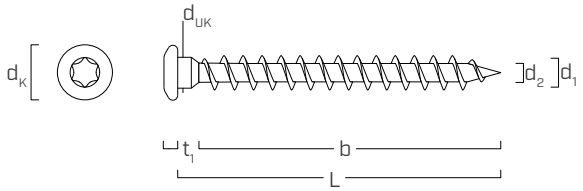
Galvanized carbon steel.

FIELDS OF USE

- timber based panels
- solid timber
- glulam (Glued Laminated Timber)
- CLT, LVL
- high density woods

Service classes 1 and 2.

GEOMETRY AND MECHANICAL CHARACTERISTICS



Nominal diameter	**d_1**	**[mm]**	**5**	**7**
Head diameter	d_K	[mm]	7,80	11,00
Tip diameter	d_2	[mm]	3,00	4,40
Underhead diameter	d_{UK}	[mm]	4,90	7,00
Head thickness	t_1	[mm]	2,40	3,50
Pre-drilling hole diameter(1)	d_V	[mm]	3,0	4,0
Characteristic yield moment	$M_{y,k}$	[Nm]	5,4	14,2
Characteristic withdrawal-resistance parameter(2)	$f_{ax,k}$	[N/mm²]	11,7	11,7
Associated density	ρ_a	[kg/m³]	350	350
Characteristic head-pull-through parameter(2)	$f_{head,k}$	[N/mm²]	10,5	10,5
Associated density	ρ_a	[kg/m³]	350	350
Characteristic tensile strength	$f_{tens,k}$	[kN]	7,9	15,4

(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

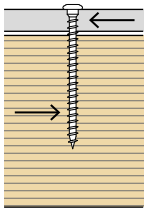
d_1 [mm] *[in]*	CODE	L [mm]	L *[in]*	b [mm]	pcs
5 *0.20* TX 20	**LBS525**	25	*1*	21	500
	LBS540	40	*1 9/16*	36	500
	LBS550	50	*1 15/16*	46	200
	LBS560	60	*2 3/8*	56	200
	LBS570	70	*2 3/4*	66	200

d_1 [mm] *[in]*	CODE	L [mm]	L *[in]*	b [mm]	pcs
7 *0.28* TX 30	**LBS760**	60	*2 3/8*	55	100
	LBS780	80	*3 1/8*	75	100
	LBS7100	100	*4*	95	100

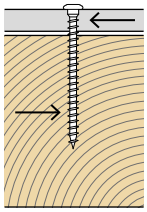
ALUMAXI

Values also tested, certified and calculated for fastening standard Rothoblaas plates. The 7 mm diameter version is ideal for joining the ALUMAXI concealed beam hanger.

MINIMUM DISTANCES FOR SHEAR LOADS | STEEL-TO-TIMBER



Load-to-grain angle α = 0°

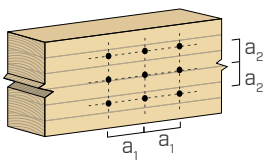


Load-to-grain angle α = 90°

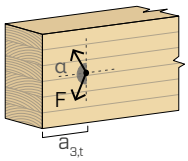
		SCREWS INSERTED WITH PRE-DRILLING HOLE			SCREWS INSERTED WITH PRE-DRILLING HOLE		
d_1	[mm]		5	7		5	7
a_1	[mm]	**5·d · 0,7**	18	25	**4·d · 0,7**	14	20
a_2	[mm]	**3·d · 0,7**	11	15	**4·d · 0,7**	14	20
$a_{3,t}$	[mm]	**12·d**	60	84	**7·d**	35	49
$a_{3,c}$	[mm]	**7·d**	35	49	**7·d**	35	49
$a_{4,t}$	[mm]	**3·d**	15	21	**7·d**	35	49
$a_{4,c}$	[mm]	**3·d**	15	21	**3·d**	15	21

		SCREWS INSERTED WITHOUT PRE-DRILLING HOLE			SCREWS INSERTED WITHOUT PRE-DRILLING HOLE		
d_1	[mm]		5	7		5	7
a_1	[mm]	**12·d · 0,7**	42	59	**5·d · 0,7**	18	25
a_2	[mm]	**5·d · 0,7**	18	25	**5·d · 0,7**	18	25
$a_{3,t}$	[mm]	**15·d**	75	105	**10·d**	50	70
$a_{3,c}$	[mm]	**10·d**	50	70	**10·d**	50	70
$a_{4,t}$	[mm]	**5·d**	25	35	**10·d**	50	70
$a_{4,c}$	[mm]	**5·d**	25	35	**5·d**	25	35

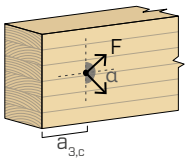
d = nominal screw diameter



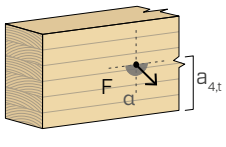
stressed end
-90° < α < 90°



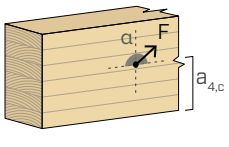
unloaded end
90° < α < 270°



stressed edge
0° < α < 180°



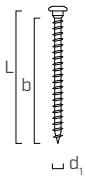
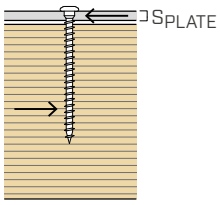
unload edge
180° < α < 360°

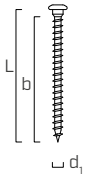
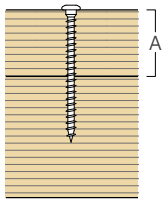
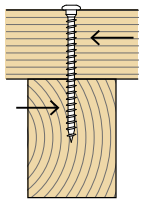
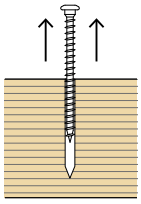


NOTES:

- The minimum distances are compliant with EN 1995:2014, according to ETA, considering a timber characteristic density of $\rho_k \leq 420$ kg/m^3 and calculation diameter of d = nominal screw diameter.
- In the case of timber-to-timber joints, the minimum spacing (a_1, a_2) can be multiplied by a coefficient of 1,5.

STATIC VALUES

geometry			SHEAR steel-to-timber[1]											
														
d_1 [mm]	L [mm]	b [mm]	$R_{V,k}$ [kN]											
5	25	21	S_{PLATE} = 1,5 mm	1,59	S_{PLATE} = 2,0 mm	1,58	S_{PLATE} = 2,5 mm	1,56	S_{PLATE} = 3,0 mm	-	S_{PLATE} = 4,0 mm	-	S_{PLATE} = 5,0 mm	-	S_{PLATE} = 6,0 mm	-
	40	36		2,24		2,24		2,24		2,24		2,23		-		-
	50	46		2,39		2,39		2,39		2,39		2,39		2,38		2,36
	60	56		2,55		2,55		2,55		2,55		2,55		2,54		2,52
	70	66		2,71		2,71		2,71		2,71		2,71		2,69		2,68
7	60	55	S_{PLATE} = 2,0 mm	2,86	S_{PLATE} = 3,0 mm	2,81	S_{PLATE} = 4,0 mm	2,98	S_{PLATE} = 5,0 mm	3,37	S_{PLATE} = 6,0 mm	3,79	S_{PLATE} = 7,0 mm	4,21	S_{PLATE} = 8,0 mm	4,18
	80	75		3,81		3,80		3,88		4,13		4,38		4,66		4,63
	100	95		4,25		4,25		4,38		4,63		4,87		5,10		5,08

geometry			SHEAR timber-to-timber			TENSION thread withdrawal[2]
						
d_1 [mm]	L [mm]	b [mm]	A [mm]	$R_{V,k}$ [kN]		$R_{ax,k}$ [kN]
5	25	21	-	-		1,33
	40	36	15	1,01		2,27
	50	46	20	1,11		2,90
	60	56	25	1,24		3,54
	70	66	30	1,35		4,17
7	60	55	25	1,91		4,86
	80	75	35	2,25		6,63
	100	95	45	2,49		8,40

NOTES:

(1) The characteristic shear-strength value for LBS Ø5 nails has been evaluated assuming a plate thickness = S_{PLATE}, always considering the case of thick plate according to ETA-11/0030 ($S_{PLATE} \geq 1,5$ mm).

The characteristic shear-strength value for LBS Ø7 screws has been evaluated assuming a plate thickness = S_{PLATE} , and considering the thin ($S_{PLATE} \leq 0,5\ d_1$), intermediate ($0,5\ d_1 < S_{PLATE} < d_1$) or thick ($S_{PLATE} \geq d_1$) plate case scenario.

(2) The axial thread withdrawal resistance was calculated considering a 90° angle between the grain and the connector and for a fixing length of b.

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 resistance 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/m^3 has been considered.
- Dimensioning and verification of timber elements and steel plates must be carried out 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.