

TBS EVO

FLANGE HEAD SCREW



C4 EVO COATING

20 µm multilayer coating with a surface treatment of epoxy resin and aluminium flakes. No rust after 1440 hours of salt spray exposure, as per ISO 9227. Can be used in service class 3 outdoor applications and under class C4 atmospheric corrosion conditions.

AGGRESSIVE WOODS

Ideal for applications with woods containing tannin or treated with impregnating agents and other chemical processes.

INTEGRATED WASHER

The flange head serves as washer and ensures high tensile strength. Ideal in the presence of wind or variations in timber dimensions.

STRUCTURAL APPLICATIONS

Approved for structural applications subject to stresses in any direction vs. the grain ($\alpha = 0^\circ - 90^\circ$). Asymmetric "umbrella" threading for better timber pull-through.



CHARACTERISTICS

FOCUS	corrosiveness class C4
HEAD	flange
DIAMETER	6,0 and 8,0 mm
LENGTH	from 60 to 400 mm



MATERIAL

Carbon steel, with a 20 µm coating, highly resistant to corrosion.

FIELDS OF USE

- timber based panels
 - solid timber and glulam
 - CLT, LVL
 - high density woods
 - aggressive woods (containing tannin)
 - chemically treated woods
- Service classes 1, 2 and 3.



OUTDOOR WALKWAYS

Ideal for the construction of outdoor structures such as walkways and arcades. Values also certified for screw insertion parallel to the grain. Ideal for fastening aggressive woods containing tannin.

SIP PANELS

Values also tested, certified and calculated for CLT and high density woods such as Microllam® LVL. Suitable for fastening SIP and sandwich panels.

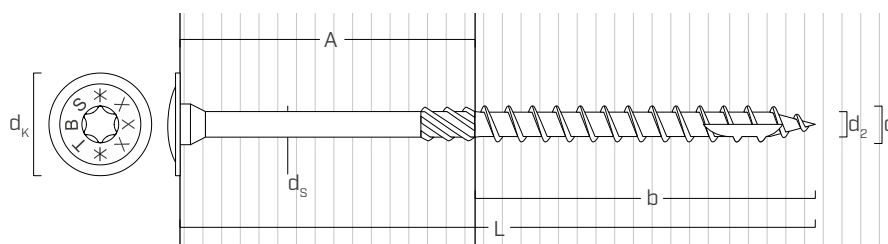


Fastening Wood Trusses outdoors.



Fastening of 3-layer, multi-ply beams with plasterboard coating. >

■ GEOMETRY AND MECHANICAL CHARACTERISTICS



Nominal diameter	d_1	[mm]	6	8
Head diameter	d_k	[mm]	15,50	19,00
Thread diameter	d_2	[mm]	3,95	5,40
Shank diameter	d_s	[mm]	4,30	5,80
Pre-drilling hole diameter ⁽¹⁾	d_v	[mm]	4,0	5,0
Characteristic yield moment	$M_{y,k}$	[Nm]	9,5	20,1
Characteristic withdrawal-resistance parameter ⁽²⁾	$f_{ax,k}$	[N/mm ²]	11,7	11,7
Associated density	ρ_a	[kg/m ³]	350	350
Characteristic head-pull-through parameter ⁽²⁾	$f_{head,k}$	[N/mm ²]	10,5	10,5
Associated density	ρ_a	[kg/m ³]	350	350
Characteristic tensile strength	$f_{tens,k}$	[kN]	11,3	20,1

⁽¹⁾ Pre-drilling valid for softwood.

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

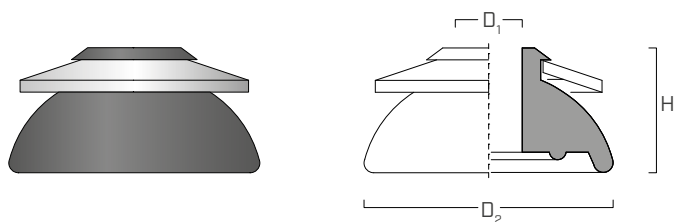
For applications with different materials or with high density please see ETA-11/0030.

CODES AND DIMENSIONS

d ₁ [mm]	CODE	L [mm]	b [mm]	A [mm]	pcs
6 TX 30	TBSEVO660	60	40	20	100
	TBSEVO680	80	50	30	100
	TBSEVO6100	100	60	40	100
	TBSEVO6120	120	75	45	100
	TBSEVO6140	140	75	65	100
	TBSEVO6160	160	75	85	100
	TBSEVO6180	180	75	105	100
	TBSEVO6200	200	75	125	100

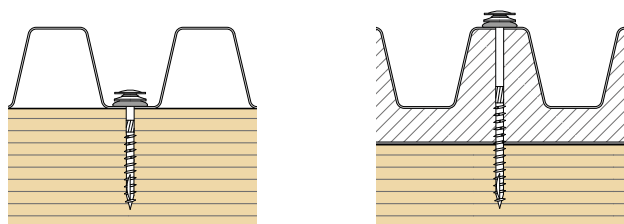
d ₁	CODE	L	b	A	pcs	
[mm]		[mm]	[mm]	[mm]		
8 TX 40	TBSEVO8100	100	52	48	50	
	TBSEVO8120	120	80	40	50	
	TBSEVO8140	140	80	60	50	
	TBSEVO8160	160	100	60	50	
	TBSEVO8180	180	100	80	50	
	TBSEVO8200	200	100	100	50	
	TBSEVO8220	220	100	120	50	
	TBSEVO8240	240	100	140	50	
	TBSEVO8280	NEW	280	100	180	50
	TBSEVO8320	NEW	320	100	220	50
	TBSEVO8360	NEW	360	100	260	50
	TBSEVO8400	NEW	400	100	300	50

WBAZ WASHER

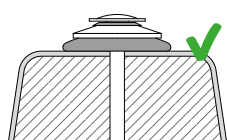


CODE	screw [mm]	D ₂ [mm]	H [mm]	D ₁ [mm]	pcs
WBAZ25A2	6,0 - 6,5	25	15	6,5	100

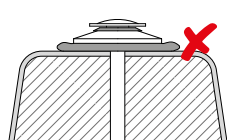
INSTALLATION



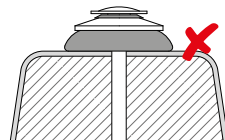
TBS EVO + WBAZ Ø x L	fastening package [mm]
6 x 60	min. 0 - max. 40
6 x 80	min. 10 - max. 60
6 x 100	min. 30 - max. 80
6 x 120	min. 50 - max. 100
6 x 140	min. 70 - max. 120
6 x 160	min. 90 - max. 140
6 x 180	min. 110 - max. 160
6 x 200	min. 130 - max. 180



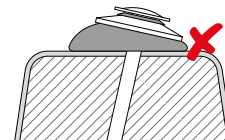
Correct tightening



Excessive tightening

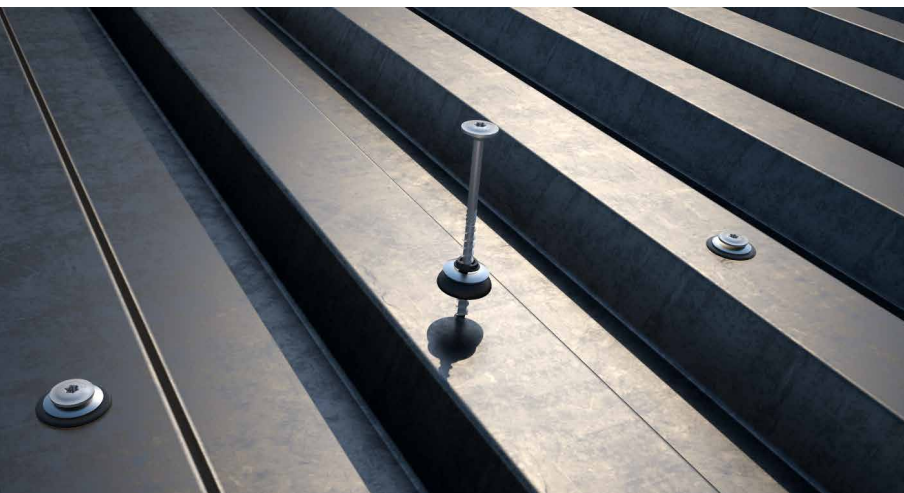


Insufficient
tightening



Tightening
off axis

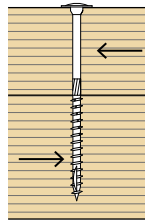
NOTE: The thickness of the washer after installation is approximately 8-9 mm.



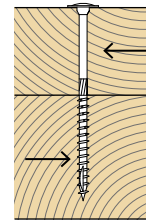
FASTENING METAL SHEET

Can be installed on sheets up to 0,7 mm thick without pre-drilling. TBS EVO Ø6 mm, ideal when used in combination with washer WBAZ. For outdoor use (Service class 3).

MINIMUM DISTANCES FOR SHEAR LOADS



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

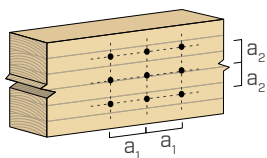


Load-to-grain angle $\alpha = 90^\circ$

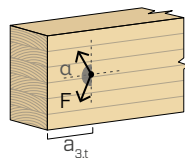
SCREWS INSERTED WITH PRE-DRILLING HOLE				SCREWS INSERTED WITH PRE-DRILLING HOLE			
d_1	[mm]	6	8	d_1	[mm]	6	8
a_1	[mm]	$5 \cdot d$	30	40	$4 \cdot d$	24	32
a_2	[mm]	$3 \cdot d$	18	24	$4 \cdot d$	24	32
$a_{3,t}$	[mm]	$12 \cdot d$	72	96	$7 \cdot d$	42	56
$a_{3,c}$	[mm]	$7 \cdot d$	42	56	$7 \cdot d$	42	56
$a_{4,t}$	[mm]	$3 \cdot d$	18	24	$7 \cdot d$	42	56
$a_{4,c}$	[mm]	$3 \cdot d$	18	24	$3 \cdot d$	18	24

SCREWS INSERTED WITHOUT PRE-DRILLING HOLE				SCREWS INSERTED WITHOUT PRE-DRILLING HOLE			
d_1	[mm]	6	8	d_1	[mm]	6	8
a_1	[mm]	$12 \cdot d$	72	96	$5 \cdot d$	30	40
a_2	[mm]	$5 \cdot d$	30	40	$5 \cdot d$	30	40
$a_{3,t}$	[mm]	$15 \cdot d$	90	120	$10 \cdot d$	60	80
$a_{3,c}$	[mm]	$10 \cdot d$	60	80	$10 \cdot d$	60	80
$a_{4,t}$	[mm]	$5 \cdot d$	30	40	$10 \cdot d$	60	80
$a_{4,c}$	[mm]	$5 \cdot d$	30	40	$5 \cdot d$	30	40

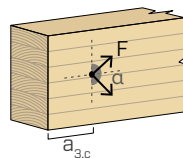
d = nominal screw diameter



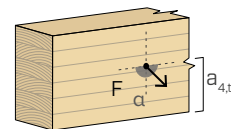
stressed end
 $-90^\circ < \alpha < 90^\circ$



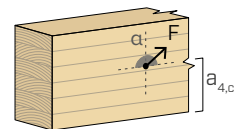
unloaded end
 $90^\circ < \alpha < 270^\circ$



stressed edge
 $0^\circ < \alpha < 180^\circ$



unload edge
 $180^\circ < \alpha < 360^\circ$



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.
- The minimum spacing for all steel-to-timber connections (a_1 , a_2) can be multiplied by a coefficient of 0,7.
- The minimum spacing for all panel-to-timber connections (a_1 , a_2) can be multiplied by a coefficient of 0,85.
- 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				timber-to-timber	panel-to-timber ⁽¹⁾	thread withdrawal ⁽²⁾	head pull-through
d ₁	L	b	A	R _{V,k}	R _{V,k}	R _{ax,k}	R _{head,k}
[mm]	[mm]	[mm]	[mm]	[kN]	[kN]	[kN]	[kN]
6	60	40	20	2,02	-	3,25	2,92
	80	50	30	2,31	-	4,06	2,92
	100	60	40	2,47	-	4,87	2,92
	120	75	45	2,47	-	6,09	2,92
	140	75	65	2,47	-	6,09	2,92
	160	75	85	2,47	-	6,09	2,92
	180	75	105	2,47	-	6,09	2,92
	200	75	125	2,47	-	6,09	2,92
8	100	52	48	3,90	-	5,63	4,39
	120	80	40	3,66	-	8,66	4,39
	140	80	60	3,90	-	8,66	4,39
	160	100	60	3,90	-	10,83	4,39
	180	100	80	3,90	-	10,83	4,39
	200	100	100	3,90	-	10,83	4,39
	220	100	120	3,90	-	10,83	4,39
	240	100	140	3,90	-	10,83	4,39
	280	100	180	3,90	-	10,83	4,39
	320	100	220	3,90	-	10,83	4,39
	360	100	260	3,90	-	10,83	4,39
	400	100	300	3,90	-	10,83	4,39

NOTES:

- (1) The characteristic shear strength are calculated considering an OSB panel or particle board with a S_{PAN} thickness.
- (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 $\rho_k = 420 \text{ kg/m}^3$ 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 configurations, the MyProject software is available (www.rothoblaas.com).