

FULLY THREADED COUNTERSUNK SCREW

3 THORNS TIP

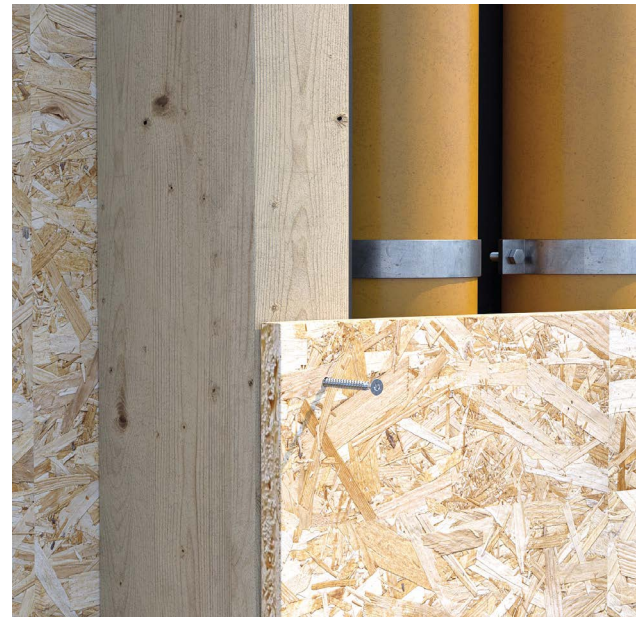
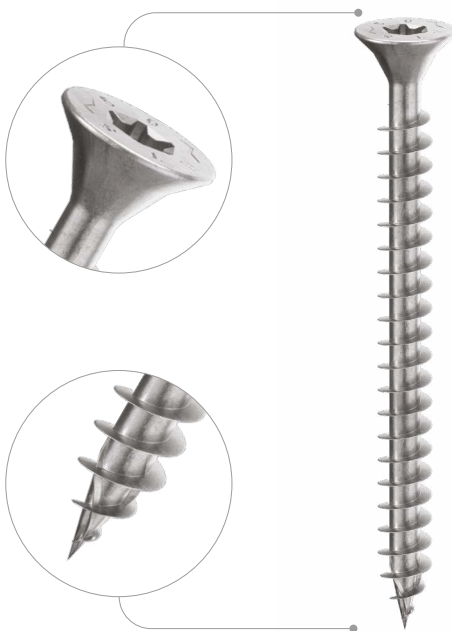
Thanks to the 3 THORNS tip, the screw can be installed without pre-drilling hole on even very thin joinery and furniture wood, such as melamine-faced panels, plated panels or MDF.

FINE THREAD

A fine thread is ideal for utmost screwing precision, even on MDF panels. The cavity for the Torx bit ensures stability and security.

LONG THREAD

The thread is 80% the length of the screw and the smooth part under head guarantees maximum coupling efficiency with fibreboard panels.



BIT INCLUDED

DIAMETER [mm]

3 **3** **5** 12

LENGTH [mm]

12 **12** **80** 1000

SERVICE CLASS

SC1 **SC2**

ATMOSPHERIC CORROSIVITY

C1 **C2**

WOOD CORROSIVITY

T1 **T2**

MATERIAL

Zn
ELECTRO
PLATED

electrogalvanized carbon steel



FIELDS OF USE

- timber based panels
- fibreboard, MDF, HDF and LDF
- plated and melamine faced panels
- solid timber
- glulam (Glued Laminated Timber)
- CLT and LVL

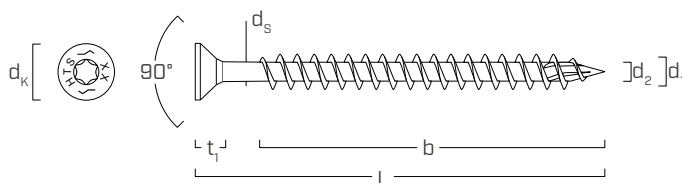
CODES AND DIMENSIONS

d_1 [mm]	CODE	L [mm]	b [mm]	pcs
3 TX 10	HTS312(*)	12	6	500
	HTS316(*)	16	10	500
	HTS320	20	14	1000
	HTS325	25	19	1000
	HTS330	30	24	1000
3,5 TX 15	HTS3516(*)	16	10	1000
	HTS3520(*)	20	14	1000
	HTS3525	25	19	1000
	HTS3530	30	24	500
	HTS3535	35	27	500
	HTS3540	40	32	500
	HTS3550	50	42	400
4 TX 20	HTS420(*)	20	14	1000
	HTS425	25	19	1000
	HTS430	30	24	500
	HTS435	35	27	500

d_1 [mm]	CODE	L [mm]	b [mm]	pcs
4 TX 20	HTS440	40	32	500
	HTS445	45	37	400
	HTS450	50	42	400
4,5 TX 20	HTS4530	30	24	500
	HTS4535	35	27	500
	HTS4540	40	32	400
	HTS4545	45	37	400
5 TX 25	HTS4550	50	42	200
	HTS530	30	24	500
	HTS535	35	27	400
	HTS540	40	32	200
	HTS545	45	37	200
	HTS550	50	42	200
	HTS560	60	50	200
	HTS570	70	60	100
	HTS580	80	70	100

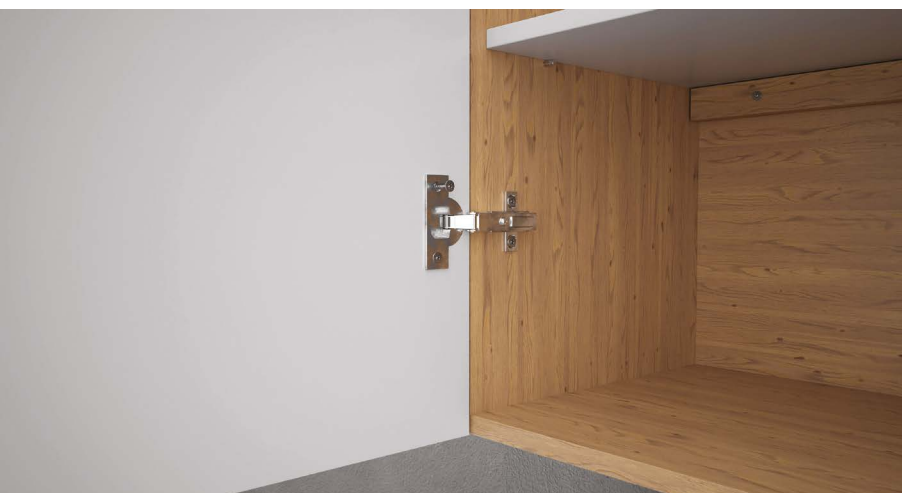
(*) Not holding CE marking.

GEOMETRY AND MECHANICAL CHARACTERISTICS



Nominal diameter	d_1	[mm]	3	3,5	4	4,5	5
Head diameter	d_k	[mm]	6,00	7,00	8,00	8,80	9,70
Thread diameter	d_2	[mm]	2,00	2,20	2,50	2,80	3,20
Shank diameter	d_s	[mm]	2,20	2,45	2,75	3,20	3,65
Head thickness	t_1	[mm]	2,20	2,40	2,70	2,80	2,80
Pre-drilling hole diameter ⁽¹⁾	d_v	[mm]	2,0	2,0	2,5	2,5	3,0
Characteristic tensile strength	$f_{tens,k}$	[kN]	4,2	4,5	5,5	7,8	11,0
Characteristic yield moment	$M_{y,k}$	[Nm]	2,2	2,7	3,7	5,8	8,8
Characteristic withdrawal-resistance parameter	$f_{ax,k}$	[N/mm ²]	18,5	17,9	17,1	17,0	15,5
Associated density	ρ_a	[kg/m ³]	350	350	350	350	350
Characteristic head-pull-through parameter	$f_{head,k}$	[N/mm ²]	26,0	25,1	24,1	23,1	22,5
Associated density	ρ_a	[kg/m ³]	350	350	350	350	350

⁽¹⁾ For high density materials, pre-drilled holes are recommended based on the wood specie.

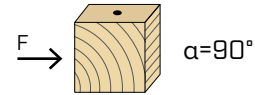
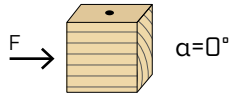


HINGES AND FURNITURE

The total thread and countersunk head geometry are ideal for fastening metal hinges when building furniture. Ideal for use with single bit (included in the package), easily exchanged in the driver bit holder. The new self-perforating tip increases the initial grip capacity of the screw.

MINIMUM DISTANCES FOR SHEAR LOADS

screws inserted **WITHOUT** pre-drilled hole $\rho_k \leq 420 \text{ kg/m}^3$

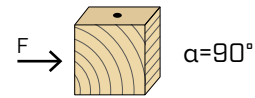
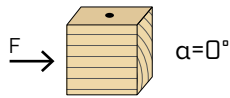


d_1 [mm]		3	3,5	4	4,5	5
a_1 [mm]	10·d	30	35	40	45	12·d 60
a_2 [mm]	5·d	15	18	20	23	5·d 25
$a_{3,t}$ [mm]	15·d	45	53	60	68	15·d 75
$a_{3,c}$ [mm]	10·d	30	35	40	45	10·d 50
$a_{4,t}$ [mm]	5·d	15	18	20	23	5·d 25
$a_{4,c}$ [mm]	5·d	15	18	20	23	5·d 25

α = load-to-grain angle
 $d = d_1$ = nominal screw diameter

d_1 [mm]		3	3,5	4	4,5	5
a_1 [mm]	5·d	15	18	20	23	5·d 25
a_2 [mm]	5·d	15	18	20	23	5·d 25
$a_{3,t}$ [mm]	10·d	30	35	40	45	10·d 50
$a_{3,c}$ [mm]	10·d	30	35	40	45	10·d 50
$a_{4,t}$ [mm]	7·d	21	25	28	32	10·d 50
$a_{4,c}$ [mm]	5·d	15	18	20	23	5·d 25

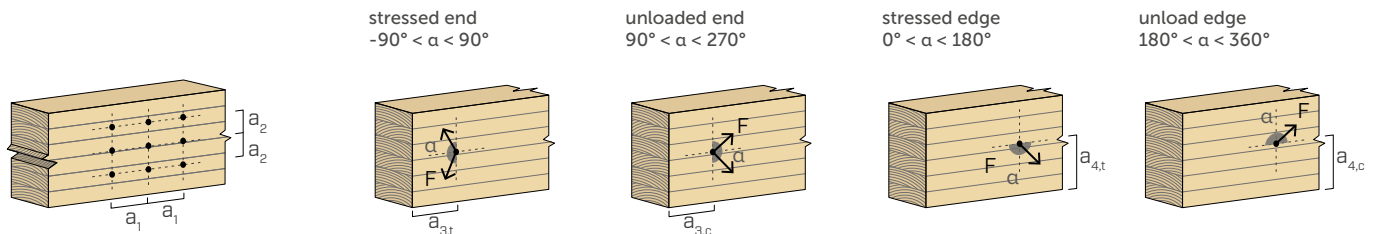
screws inserted **WITH** pre-drilled hole



d_1 [mm]		3	3,5	4	4,5	5
a_1 [mm]	5·d	15	18	20	23	5·d 25
a_2 [mm]	3·d	9	11	12	14	3·d 15
$a_{3,t}$ [mm]	12·d	36	42	48	54	12·d 60
$a_{3,c}$ [mm]	7·d	21	25	28	32	7·d 35
$a_{4,t}$ [mm]	3·d	9	11	12	14	3·d 15
$a_{4,c}$ [mm]	3·d	9	11	12	14	3·d 15

α = load-to-grain angle
 $d = d_1$ = nominal screw diameter

d_1 [mm]		3	3,5	4	4,5	5
a_1 [mm]	4·d	12	14	16	18	4·d 20
a_2 [mm]	4·d	12	14	16	18	4·d 20
$a_{3,t}$ [mm]	7·d	21	25	28	32	7·d 35
$a_{3,c}$ [mm]	7·d	21	25	28	32	7·d 35
$a_{4,t}$ [mm]	5·d	15	18	20	23	7·d 35
$a_{4,c}$ [mm]	3·d	9	11	12	14	3·d 15



MINIMUM DISTANCES

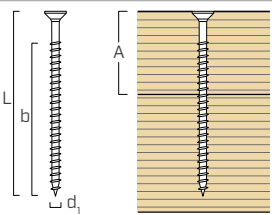
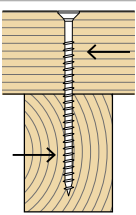
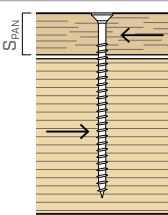
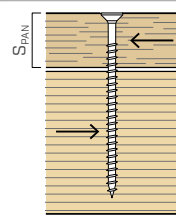
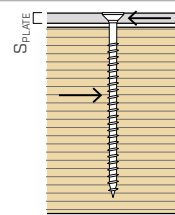
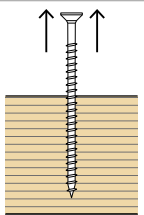
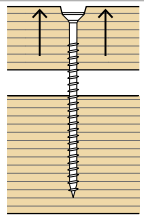
NOTES

- Minimum distances in accordance with EN 1995:2014.
- 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.

STRUCTURAL VALUES

NOTES

- The characteristic timber-to-timber shear strengths were evaluated by considering an angle ϵ of 90° between the grains of the second element and the connector.
- The characteristic panel-timber and steel-timber shear strengths were evaluated by considering an ϵ angle of 90° between the grains of the timber element and the connector.
- The shear strength characteristics on the plate are calculated considering the case of a thin plate ($S_{\text{PLATE}} = 0.5 d_1$).
- The characteristic thread withdrawal strength was evaluated by considering a 90° angle ϵ between the fibers of the timber element and the connector.
- For the calculation process a timber characteristic density $\rho_k = 385 \text{ kg/m}^3$ has been considered. For different values of ρ_k , the strength values in the table (timber-to-timber shear, steel-to-timber shear and tensile) can be converted by means of the coefficient k_{dens} (see page 42).
- The values in the table are independent of the load-to-grain angle.
- For a row of n screws arranged parallel to the direction of the grain at a distance a_1 , the characteristic effective shear bearing capacity $R_{\text{ef},V,k}$ can be calculated by means of the effective number n_{ef} (see page 34).

				SHEAR						TENSION		
geometry				timber-to-timber	panel-to-timber		panel-to-timber		steel-to-timber thin plate		thread withdrawal	head pull-through
												
d ₁	L	b	A	R _{V,k}	S _{PAN}	R _{V,k}	S _{PAN}	R _{V,k}	S _{PLATE}	R _{V,k}	R _{ax,k}	R _{head,k}
[mm]	[mm]	[mm]	[mm]	[kN]	[mm]	[kN]	[mm]	[kN]	[mm]	[kN]	[kN]	[kN]
3	12	6	-	-	9	-	12	-	1,5	0,23	0,36	1,01
	16	10	-	-		-		-		0,32	0,60	1,01
	20	14	-	-		-		-		0,41	0,84	1,01
	25	19	7	0,38		-		-		0,52	1,14	1,01
	30	24	12	0,60		0,76		0,72		0,62	1,44	1,01
3,5	16	10	-	-	9	-	12	-	1,75	0,33	0,68	1,33
	20	14	-	-		-		-		0,43	0,95	1,33
	25	19	-	-		-		-		0,55	1,28	1,33
	30	24	9	0,53		0,83		-		0,66	1,62	1,33
	35	27	14	0,77		0,92		0,94		0,78	1,83	1,33
	40	32	19	0,82		0,92		0,99		0,90	2,16	1,33
4	50	42	29	0,91	0,92	0,99	1,13	2,84	1,33			
	20	14	-	-	9	-	12	-	2	0,46	1,03	1,66
	25	19	-	-		-		-		0,59	1,40	1,66
	30	24	6	0,38		-		-		0,72	1,77	1,66
	35	27	11	0,71		0,99		-		0,85	1,99	1,66
	40	32	16	0,97		0,99		1,17		0,97	2,36	1,66
	45	37	21	1,02		0,99		1,17		1,10	2,73	1,66
50	42	26	1,08	0,99		1,17		1,23		3,10	1,66	
4,5	30	24	3	0,21	12	-	15	-	2,25	0,77	1,98	1,93
	35	27	8	0,56		-		-		0,91	2,23	1,93
	40	32	13	0,90		1,31		-		1,05	2,64	1,93
	45	37	18	1,15		1,40		1,42		1,19	3,05	1,93
	50	42	23	1,21		1,40		1,46		1,33	3,47	1,93
5	30	24	-	-	12	-	15	-	2,5	0,84	2,01	2,28
	35	27	5	0,38		-		-		0,99	2,26	2,28
	40	32	10	0,76		-		-		1,14	2,68	2,28
	45	37	15	1,14		1,46		1,51		1,30	3,09	2,28
	50	42	20	1,39		1,46		1,70		1,45	3,51	2,28
	60	50	30	1,52		1,46		1,74		1,75	4,18	2,28
	70	60	40	1,71		1,46		1,74		2,06	5,02	2,28
	80	70	50	1,71		1,46		1,74		2,36	5,85	2,28

GENERAL PRINCIPLES

- Characteristic values according to EN 1995:2014.
- 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.

- Mechanical strength values and screw geometry comply with CE marking according to EN 14592.
- Sizing and verification of the timber elements, panels and metal 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.

- The screws must be positioned in accordance with the minimum distances.
- The characteristic panel-timber shear strengths are calculated considering an OSB3 or OSB4 panel, as per EN 300, or a particle board panel, as per EN 312, with thickness S_{PAN} .
- The thread withdrawal characteristic strength has been evaluated considering a fixing length equal to b .
- The head pull-through characteristic strength was calculated using timber elements.
In the case of steel-to-timber connections, generally the steel tensile strength is binding with respect to head separation or pull-through.