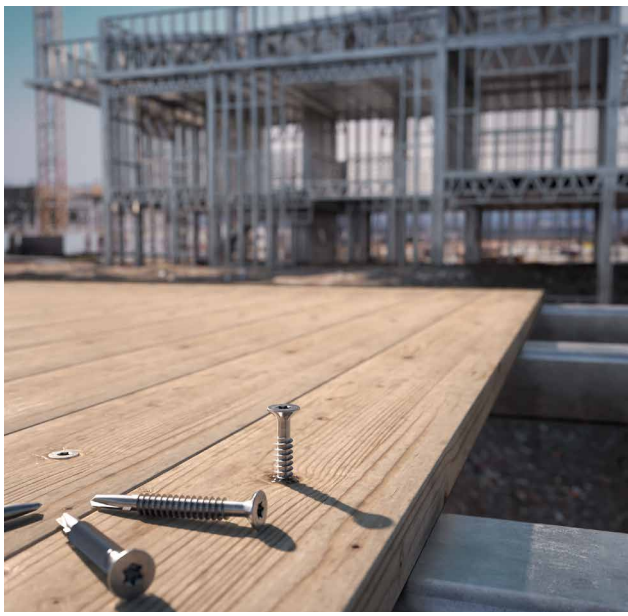
SBS

SELF-DRILLING TIMBER-TO-METAL SCREW

CE
EN 14592



CERTIFIED

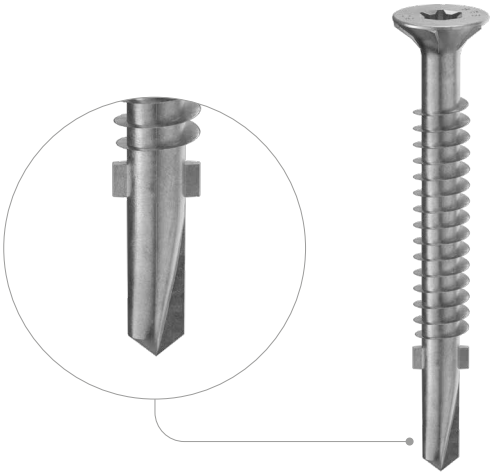
The SBS self-drilling screw is CE marked according to EN 14592. It is the ideal choice for professionals who demand quality, safety and reliable performance in structural timber-to-metal applications.

TIMBER-TO-METAL TIP

Special self-perforating tip with bleeder geometry for excellent drilling capacity both in aluminium (thickness: up to 8 mm) and steel (thickness: up to 6 mm).

CUTTING FINS

The fins protect the screw thread during timber pull-through. They guarantee maximum threading efficiency in metal and perfect adhesion between the thickness of the wood and the metal.



BIT INCLUDED

DIAMETER [mm]

3,5 — 4,2 — 6 — 8

LENGTH [mm]

25 — 32 — 100 — 240

SERVICE CLASS

SC1 SC2

ATMOSPHERIC CORROSIVITY

C1 C2

WOOD CORROSIVITY

T1 T2

MATERIAL

Zn ELECTRO PLATED — electrogalvanized carbon steel

FIELDS OF USE

Direct fastening, without pre-drilling hole, of timber elements to steel substructures:

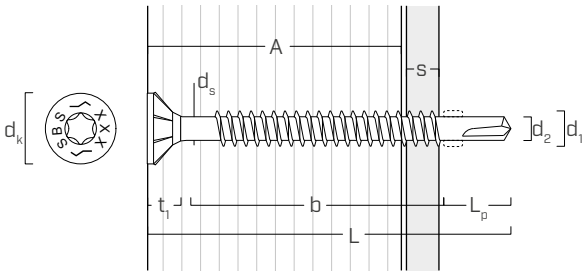
- in S235 steel with a maximum thickness of 6 mm
- in aluminium with a maximum thickness of 8,0 mm

CODES AND DIMENSIONS

d_1	CODE	L	b	A	s_S	s_A	pcs
[mm]		[mm]	[mm]	[mm]	[mm]	[mm]	
4,2 TX 20	SBS4232	32	18	17	1 ÷ 3	2 ÷ 4	500
	SBS4238	38	19	23	1 ÷ 3	2 ÷ 4	500
4,8 TX 25	SBS4838	38	23	22	2 ÷ 4	3 ÷ 5	200
	SBS4845	45	25	29	2 ÷ 4	3 ÷ 5	200
5,5 TX 30	SBS5545	45	29	28	3 ÷ 5	4 ÷ 6	200
	SBS5550	50	29	33	3 ÷ 5	4 ÷ 6	200
6,3 TX 30	SBS6360	60	35	39	4 ÷ 6	6 ÷ 8	100
	SBS6370	70	45	49	4 ÷ 6	6 ÷ 8	100
	SBS6385	85	55	64	4 ÷ 6	6 ÷ 8	100
	SBS63100	100	55	79	4 ÷ 6	6 ÷ 8	100

s_S thickness that can be drilled, steel plate S235/St37
s_A thickness that can be drilled, aluminium plate

GEOMETRY AND MECHANICAL CHARACTERISTICS



GEOMETRY

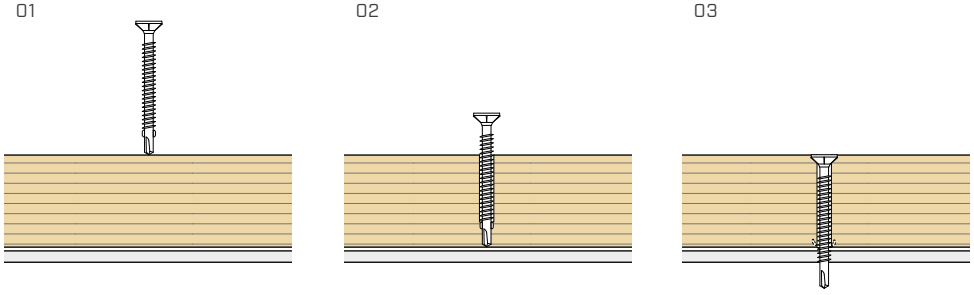
Nominal diameter	d_1	[mm]	4,2	4,8	5,5	6,3
Head diameter	d_K	[mm]	8,00	9,25	10,50	12,00
Thread diameter	d_2	[mm]	3,30	3,50	4,15	4,85
Shank diameter	d_S	[mm]	3,40	3,85	4,45	5,20
Head thickness	t_1	[mm]	3,50	4,20	4,80	5,30
Tip length	L_p	[mm]	10,0	10,5	11,5	15,0

CHARACTERISTIC MECHANICAL PARAMETERS

Nominal diameter	d_1	[mm]	4,2	4,8	5,5	6,3
Tensile strength	$f_{tens,k}$	[kN]	7,5	9,5	10,5	16,5
Yield moment	$M_{y,k}$	[Nm]	3,4	7,6	10,5	18,0
Withdrawal resistance parameter	$f_{ax,k}$	[N/mm²]	-	-	-	-
Associated density	ρ_a	[kg/m³]	-	-	-	-
Head-pull-through parameter	$f_{head,k}$	[N/mm²]	10,0	10,0	13,0	14,0
Associated density	ρ_a	[kg/m³]	350	350	350	350

INSTALLATION

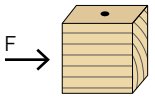
01 02 03

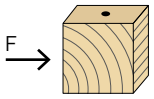


RECOMMENDATIONS FOR SCREWING:
steel: $v_S \approx 1000$ - 1500 rpm
aluminium: $v_A \approx 600$-1000 rpm

MINIMUM DISTANCES FOR SHEAR LOADS

screws inserted **WITHOUT pre-drilled hole** — $\rho_k \leq 420$ kg/m³



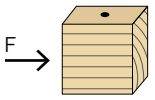


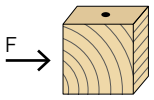
d_1	[mm]		4,2	4,8		5,5	6,3
a_1	[mm]	**10·d**	42	48	**12·d**	66	76
a_2	[mm]	**5·d**	21	24	**5·d**	28	32
$a_{3,t}$	[mm]	**15·d**	63	72	**15·d**	83	95
$a_{3,c}$	[mm]	**10·d**	42	48	**10·d**	55	63
$a_{4,t}$	[mm]	**5·d**	21	24	**5·d**	28	32
$a_{4,c}$	[mm]	**5·d**	21	24	**5·d**	28	32

d_1	[mm]		4,2	4,8		5,5	6,3
a_1	[mm]	**5·d**	21	24	**5·d**	28	32
a_2	[mm]	**5·d**	21	24	**5·d**	28	32
$a_{3,t}$	[mm]	**10·d**	42	48	**10·d**	55	63
$a_{3,c}$	[mm]	**10·d**	42	48	**10·d**	55	63
$a_{4,t}$	[mm]	**7·d**	29	34	**10·d**	55	63
$a_{4,c}$	[mm]	**5·d**	21	24	**5·d**	28	32

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

screws inserted **WITH pre-drilled hole**

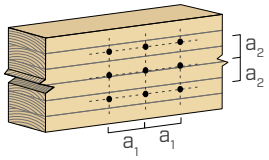




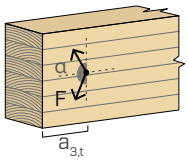
d_1	[mm]		4,2	4,8		5,5	6,3
a_1	[mm]	**5·d**	21	24	**5·d**	28	32
a_2	[mm]	**3·d**	13	14	**3·d**	17	19
$a_{3,t}$	[mm]	**12·d**	50	58	**12·d**	66	76
$a_{3,c}$	[mm]	**7·d**	29	34	**7·d**	39	44
$a_{4,t}$	[mm]	**3·d**	13	14	**3·d**	17	19
$a_{4,c}$	[mm]	**3·d**	13	14	**3·d**	17	19

d_1	[mm]		4,2	4,8		5,5	6,3
a_1	[mm]	**4·d**	17	19	**4·d**	22	25
a_2	[mm]	**4·d**	17	19	**4·d**	22	25
$a_{3,t}$	[mm]	**7·d**	29	34	**7·d**	39	44
$a_{3,c}$	[mm]	**7·d**	29	34	**7·d**	39	44
$a_{4,t}$	[mm]	**5·d**	21	24	**7·d**	39	44
$a_{4,c}$	[mm]	**3·d**	13	14	**3·d**	17	19

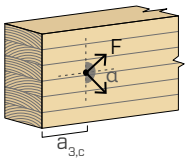
α = load-to-grain angle
d = d_1 = nominal screw diameter



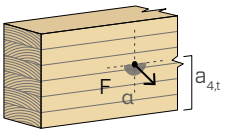
stressed end
-90° < α < 90°



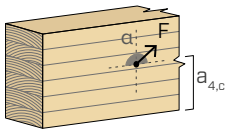
unloaded end
90° < α < 270°



stressed edge
0° < α < 180°



unload edge
180° < α < 360°

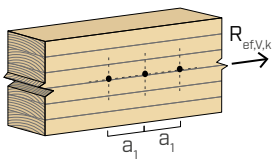


NOTES
- Minimum distances in accordance with EN 1995:2014.

EFFECTIVE NUMBER FOR SHEAR LOADS

The load-bearing capacity of a connection made with several screws, all of the same type and size, may be lower than the sum of the load-bearing capacities of the individual connection system.
For a row of n screws arranged parallel to the direction of the grain at a distance a_1, the characteristic effective load-bearing capacity is equal to:

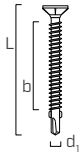
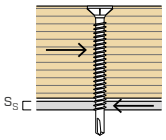
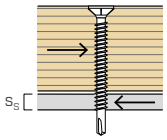
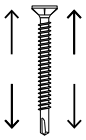
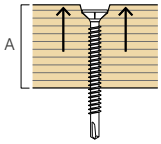
$$R_{ef,V,k} = n_{ef} \cdot R_{V,k}$$



The n_{ef} value is given in the table below as a function of n and a_1.

		a_1(*)										
		4·d	5·d	6·d	7·d	8·d	9·d	10·d	11·d	12·d	13·d	≥ 14·d
n	2	1,41	1,48	1,55	1,62	1,68	1,74	1,80	1,85	1,90	1,95	2,00
	3	1,73	1,86	2,01	2,16	2,28	2,41	2,54	2,65	2,76	2,88	3,00
	4	2,00	2,19	2,41	2,64	2,83	3,03	3,25	3,42	3,61	3,80	4,00
	5	2,24	2,49	2,77	3,09	3,34	3,62	3,93	4,17	4,43	4,71	5,00

(*)For intermediate a_1 values a linear interpolation is possible.

			SHEAR				TENSION		
geometry			timber-to-steel min plate		timber-to-steel max plate		steel tension	head pull-through	
									
d_1 [mm]	L [mm]	b [mm]	S_S [mm]	$R_{V,k}$ [kN]	S_S [mm]	$R_{V,k}$ [kN]	$R_{tens,k}$ [kN]	A_{min} [mm]	$R_{head,k}$ [kN]
4,2	32	18	1	0,62	3	0,64	7,50	-	-
	38	19		0,80		0,85			-
4,8	38	23	2	0,83	4	1,00	9,50	20	-
	45	25		1,05		1,20			0,92
5,5	45	29	3	1,12	5	1,36	10,50	20	1,55
	50	29		1,29		1,51			1,55
6,3	60	35	4	1,78	6	2,03	16,50	25	2,18
	70	45		2,16		2,38			2,18
	85	55		2,42		2,90			2,18
	100	55		2,43		3,00			2,18

ε = screw-to-grain angle

STRUCTURAL VALUES

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.
- Dimensioning and verification of timber elements and steel plates must be carried out separately.
- The screws must be positioned in accordance with the minimum distances.
- The head pull-through characteristic strength was calculated using timber elements.

NOTES | TIMBER

- The characteristic plate shear strengths are evaluated considering the case of thin plate ($S_S \leq 0,5\ d_1$) and intermediate plate ($0,5\ d_1 < S_S < d_1$).
- The characteristic shear strengths on a steel plate are calculated for the minimum drilling hole thickness $s_{s,min}$ (min plate) and maximum $s_{s,max}$ (max plate).
- For the calculation process a timber characteristic density ρ_k = 385 kg/m^3 has been considered.
- For the Ø4.2 and Ø4.8 screws, the characteristic pull-through strength of the head was calculated by taking the values from the experimental tests carried out at the HFB Engineering laboratory, Leipzig, Germany, as valid.