SBD

SELF-DRILLING DOWEL

BIT INCLUDED | MY PROJECT SOFTWARE | VIDEO | CE EN 14592

STEEL AND ALUMINUM

Special self-perforating timber-metal tip geometry that reduces the possibility of breakage. The concealed cylindrical head ensures an optimal visual appearance and meets fire-resistance requisites.

INCREASED DIAMETER

The diameter of 7,5 mm ensures a shear strength of over 15 % and enables the optimisation of the number of fasteners.

DOUBLE THREAD

The thread close to the tip (b_1) facilitates screwing. The longer under-head thread (b_2) allows quick and precise closing of the joint.

CHARACTERISTICS

FOCUS	self-drilling, timber-metal-timber
HEAD	cylindrical, countersunk
DIAMETER	7,5 mm
LENGTH	from 55 to 235 mm

VIDEO
Scan the QR Code and watch the video on our YouTube channel

MATERIAL

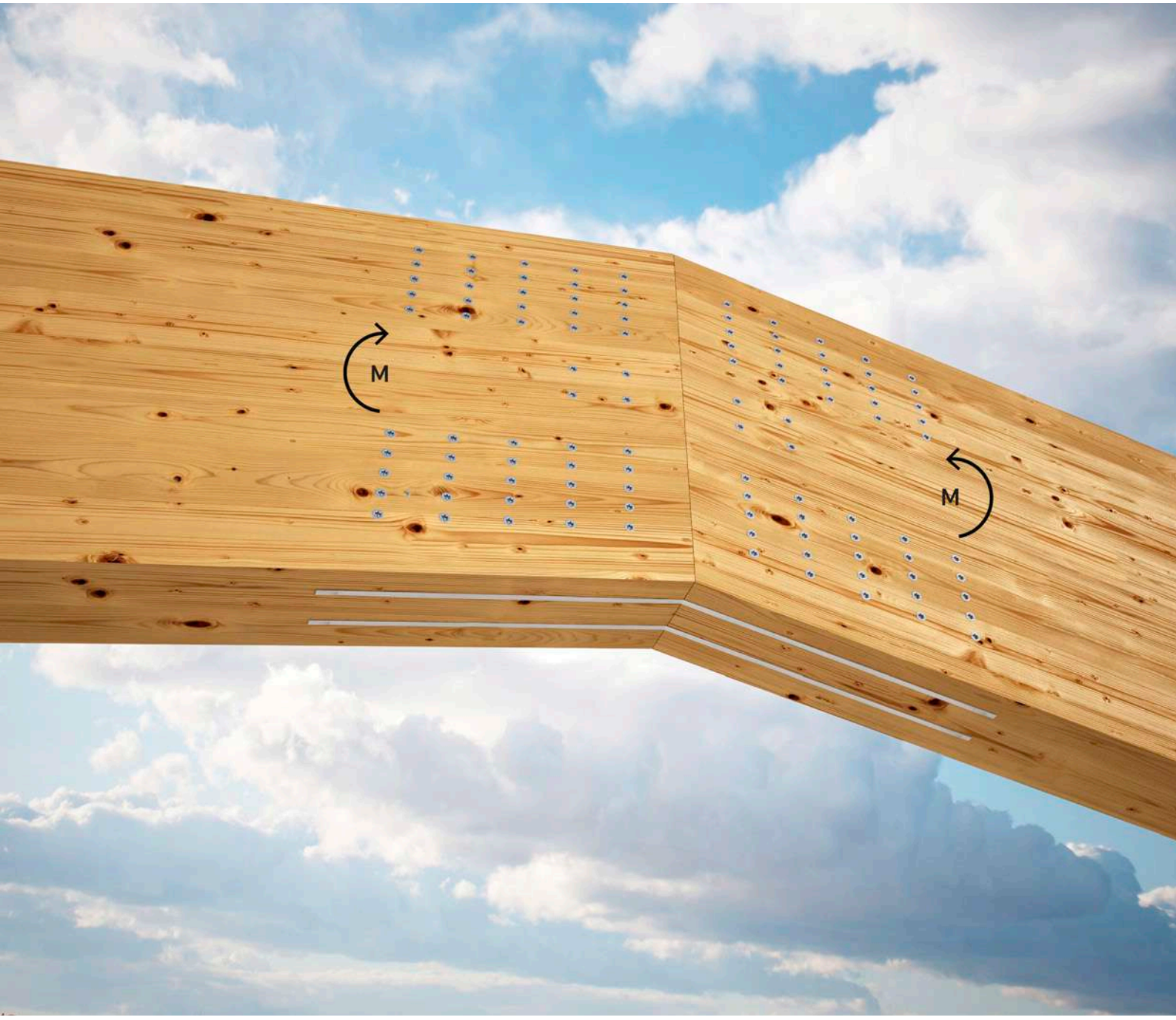
Bright zinc plated carbon steel.

FIELDS OF USE

Self-drilling system for concealed timber-to-steel and timber-to-aluminium joints. It can be used with screw guns running at 600-1500 rpm with:

- steel S235 ≤ 10,0 mm
- steel S275 ≤ 8,0 mm
- steel S355 ≤ 6,0 mm
- ALUMINI, ALUMIDI and ALUMAXI brackets

Service classes 1 and 2.



KNEE BEAM

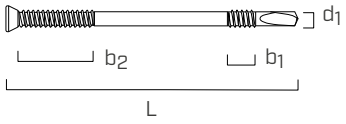
Ideal for joining head beams and making continuous beams, restoring shear and moment forces. The small dowel diameter guarantees joints that offer high stiffness.

MOMENT RESISTING JOINT

Also certified, tested and calculated for fastening standard Rothoblaas plates such as the TYP X post base.

CODES AND DIMENSIONS

d_1 [mm]	CODE	L [mm]	b_2 [mm]	b_1 [mm]	pcs
7,5 TX40	**SBD7555**	55	10	-	50
	SBD7575	75	10	15	50
	SBD7595	95	20	15	50
	SBD75115	115	20	15	50
	SBD75135	135	20	15	50
	SBD75155	155	20	15	50
	SBD75175	175	40	15	50
	SBD75195	195	40	15	50
	SBD75215	215	40	15	50
	SBD75235	235	40	15	50



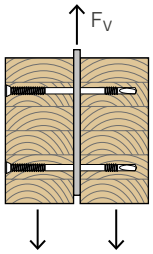
MATERIAL AND DURABILITY

SBD: bright zinc plated carbon steel
To be used in service classes 1 and 2 (EN 1995-1-1).

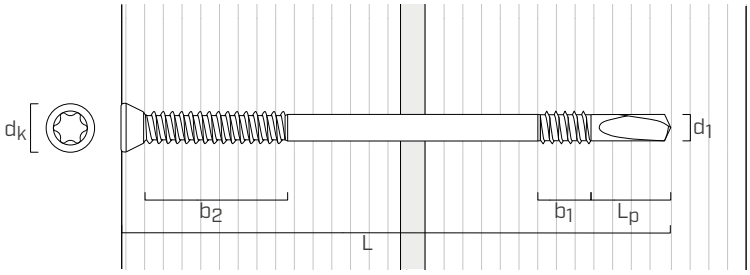
FIELD OF USE

- Timber-steel-timber joints

EXTERNAL LOADS



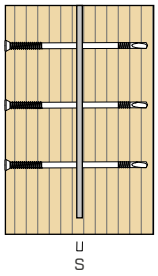
GEOMETRY AND MECHANICAL CHARACTERISTICS



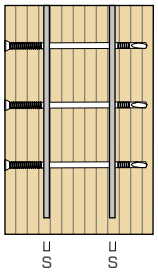
Nominal diameter	d_1	[mm]	7,5
Head diameter	d_k	[mm]	11,0
Tip length	L_p	[mm]	19,0
Effective length	L_{eff}	[mm]	L - 8,0
Characteristic yield moment	$M_{y,k}$	[Nmm]	42000

INSTALLATION

plate	s single plate [mm]	s double plate [mm]
S235 steel	10,0	8,0
S275 steel	8,0	6,0
S355 steel	6,0	5,0
ALUMINI	6,0	-
ALUMIDI	6,0	-
ALUMAXI	10,0	-



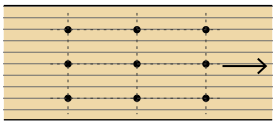
single plate



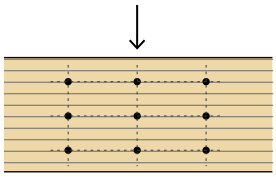
double plate

Timber-metal plate-timber shear joint
Recommended pressure: ≈ 40 kg
Recommended screwing: ≈ 1000 - 1500 rpm (steel plate)
≈ 600 - 1000 rpm (aluminium plate)

MINIMUM DISTANCES FOR CONNECTORS SUBJECTED TO SHEAR STRESS[1]

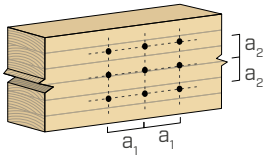


Load-to-grain angle α = 0°

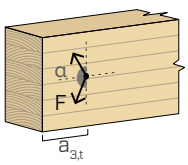


Load-to-grain angle α = 90°

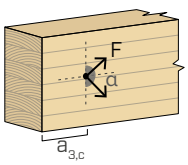
d_1	[mm]	7,5	7,5
a_1	[mm]	38	23
a_2	[mm]	23	23
$a_{3,t}$	[mm]	80	80
$a_{3,c}$	[mm]	40	40
$a_{4,t}$	[mm]	23	30
$a_{4,c}$	[mm]	23	23



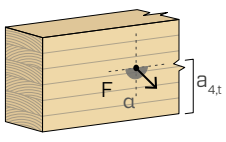
stressed end
-90° < α < 90°



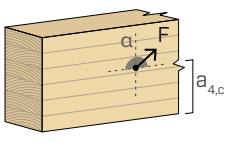
unloaded end
90° < α < 270°



stressed edge
0° < α < 180°



unload edge
180° < α < 360°



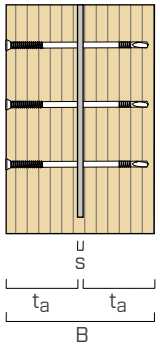
NOTES:

(1) The minimum distances are compliant with EN 1995-1-1.

TIMBER-TO-STEEL AND ALUMINIUM STATIC VALUES

SHEAR $R_{v,k}$ - 1 INTERNAL PLATE

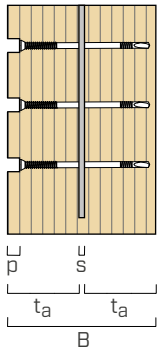
DOWEL HEAD INSERTION DEPTH 0 mm



FASTENING	SBD	[mm]	7,5x55	7,5x75	7,5x95	7,5x115	7,5x135	7,5x155	7,5x175	7,5x195	7,5x215	7,5x235
Beam width	**B**	[mm]	60	80	100	120	140	160	180	200	220	240
Head insertion depth	**p**	[mm]	0	0	0	0	0	0	0	0	0	0
Exterior wood	t_a	[mm]	27	37	47	57	67	77	87	97	107	117

$R_{v,k}$ [kN]	load-to-grain angle	**0°**	7,48	9,20	10,18	11,46	12,91	13,69	13,95	13,95	13,95	13,95
		30°	6,89	8,59	9,40	10,51	11,77	12,71	13,21	13,21	13,21	13,21
		45°	6,41	8,09	8,77	9,72	10,84	11,90	12,53	12,57	12,57	12,57
		60°	6,00	7,67	8,24	9,08	10,07	11,15	11,78	12,02	12,02	12,02
		90°	5,66	7,31	7,79	8,53	9,42	10,40	11,14	11,54	11,54	11,54

DOWEL HEAD INSERTION DEPTH 15 mm



FASTENING	SBD	[mm]	7,5x55	7,5x75	7,5x95	7,5x115	7,5x135	7,5x155	7,5x175	7,5x195	7,5x215	7,5x235
Beam width	**B**	[mm]	80	100	120	140	160	180	200	220	240	-
Head insertion depth	**p**	[mm]	15	15	15	15	15	15	15	15	15	-
Exterior wood	t_a	[mm]	37	47	57	67	77	87	97	107	117	-

$R_{v,k}$ [kN]	load-to-grain angle	**0°**	8,47	9,10	10,13	11,43	12,89	13,95	13,95	13,95	13,95	-
		30°	7,79	8,49	9,35	10,48	11,75	13,06	13,21	13,21	13,21	-
		45°	7,25	8,00	8,72	9,70	10,82	12,04	12,57	12,57	12,57	-
		60°	6,67	7,58	8,19	9,05	10,05	11,14	12,02	12,02	12,02	-
		90°	6,14	7,23	7,74	8,50	9,40	10,39	11,40	11,54	11,54	-

CORRECTIVE COEFFICIENT k_F FOR DIFFERENT DENSITIES ρ_k

Strength class	C24	GL22h	C30	GL24h	C40 / GL32c	GL28h	D24	D30
ρ_k [kg/m^3]	350	370	380	385	400	425	485	530
k_F	0,91	0,96	0,99	1,00	1,02	1,05	1,12	1,17

For different densities ρ_k the wood-side design strength is calculated as: $R'_{V,d} = R_{V,d} \cdot k_F$.

EFFECTIVE NUMBER OF DOWELS n_{ef} FOR $\alpha = 0°$

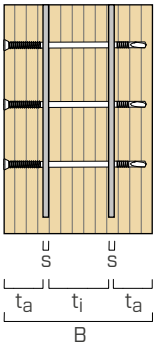
		a_1 [mm]								
	n. SBD	40	50	60	70	80	90	100	120	140
n_{ef}	2	1,49	1,58	1,65	1,72	1,78	1,83	1,88	1,97	2,00
	3	2,15	2,27	2,38	2,47	2,56	2,63	2,70	2,83	2,94
	4	2,79	2,95	3,08	3,21	3,31	3,41	3,50	3,67	3,81
	5	3,41	3,60	3,77	3,92	4,05	4,17	4,28	4,48	4,66
	6	4,01	4,24	4,44	4,62	4,77	4,92	5,05	5,28	5,49
	7	4,61	4,88	5,10	5,30	5,48	5,65	5,80	6,07	6,31

In the case of multiple dowels placed parallel to the fibres, the effective number must be taken into account: $R'_{V,d} = R_{V,d} \cdot n_{ef}$.

TIMBER-TO-STEEL AND ALUMINIUM STATIC VALUES

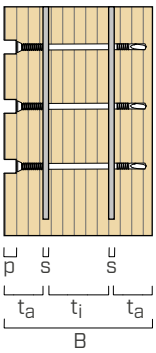
SHEAR $R_{v,k}$ - 2 INTERNAL PLATES

DOWEL HEAD INSERTION DEPTH 0 mm



FASTENING	SBD	[mm]	7,5x55	7,5x75	7,5x95	7,5x115	7,5x135	7,5x155	7,5x175	7,5x195	7,5x215	7,5x235
Beam width	**B**	[mm]	-	-	-	-	140	160	180	200	220	240
Head insertion depth	**p**	[mm]	-	-	-	-	0	0	0	0	0	0
Exterior wood	$\mathbf{t_a}$	[mm]	-	-	-	-	37	42	48	56	66	74
Interior wood	$\mathbf{t_i}$	[mm]	-	-	-	-	54	64	72	76	76	80
$\mathbf{R_{v,k}}$ [kN] load-to-grain angle	**0°**		-	-	-	-	21,03	23,07	24,25	25,28	26,71	27,41
	30°		-	-	-	-	19,19	21,17	22,71	23,60	24,85	25,72
	45°		-	-	-	-	17,69	19,62	21,08	22,19	23,30	24,25
	60°		-	-	-	-	16,45	18,32	19,62	20,75	21,73	22,84
	90°		-	-	-	-	15,40	17,09	18,40	19,40	20,28	21,48

DOWEL HEAD INSERTION DEPTH 10 mm



FASTENING	SBD	[mm]	7,5x55	7,5x75	7,5x95	7,5x115	7,5x135	7,5x155	7,5x175	7,5x195	7,5x215	7,5x235
Beam width	**B**	[mm]	-	-	-	140	160	180	200	220	240	-
Head insertion depth	**p**	[mm]	-	-	-	10	10	10	10	10	10	-
Exterior wood	$\mathbf{t_a}$	[mm]	-	-	-	37	42	48	56	66	74	-
Interior wood	$\mathbf{t_i}$	[mm]	-	-	-	54	64	72	76	76	80	-
$\mathbf{R_{v,k}}$ [kN] load-to-grain angle	**0°**		-	-	-	19,31	22,20	23,23	24,02	25,28	26,42	-
	30°		-	-	-	17,49	20,25	21,86	22,52	23,60	24,59	-
	45°		-	-	-	16,01	18,65	20,36	21,26	22,19	23,07	-
	60°		-	-	-	14,78	17,32	19,02	19,94	20,75	21,78	-
	90°		-	-	-	13,75	16,07	17,88	18,68	19,40	20,52	-

GENERAL PRINCIPLES:

- Characteristic values according to EN 1995-1-1.
- The design values are obtained from the 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.

- The values provided are calculated using 5 mm thick plates, a 6 mm thick milled cut in the timber and a single SBD dowel.
- For the calculation process a timber density ρ_k = 385 kg/m^3 has been considered.
- Sizing and verification of the wooden elements and metal plates must be done separately.