SBD

SELF-DRILLING DOWEL

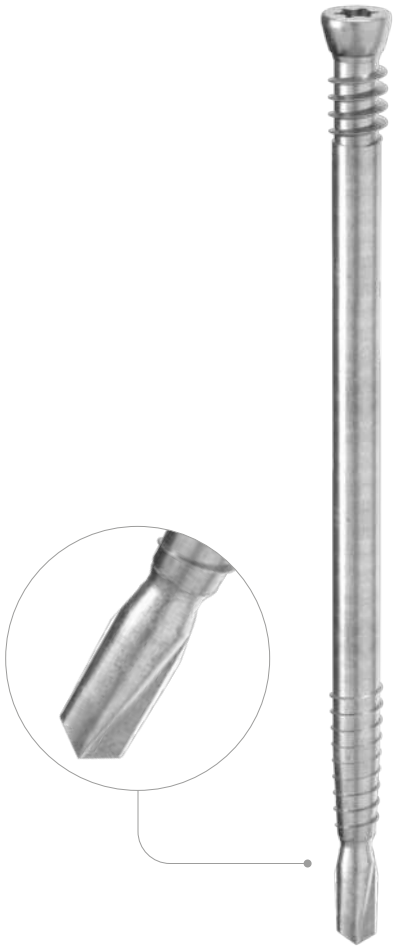
CE
EN 14592

TAPERED TIP
The new tapered self-perforating tip minimises insertion times in timber-to-metal connection systems and guarantees applications in hard-to-reach positions (reduced application force).

GREATER STRENGTH
Higher shear strengths than the previous version.
The 7.5 mm diameter ensures higher shear strengths than other solutions on the market and enables 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.

CYLINDRICAL HEAD
It allows the dowel to penetrate beyond the surface of the timber substrate. It ensures an optimal appearance and meets fire-strength requisites.



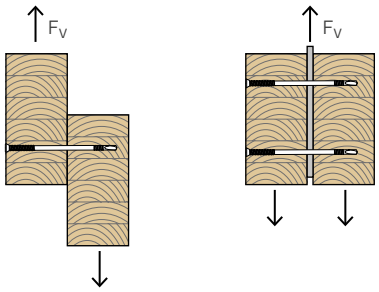
CANADIAN DESIGN VALUES
USA, EU and more design values available online.

VIDEO

BIT INCLUDED

DIAMETER [mm]	7,5 **(7,5)** 20
LENGTH [mm]	55 **(235)** 1000
SERVICE CONDITION	DRY
ATMOSPHERIC CORROSIVITY	C1 C2
WOOD CORROSIVITY	T1 T2
MATERIAL	Zn ELECTRO PLATED electrogalvanized carbon steel

EXTERNAL LOADS



FIELDS OF USE

Self-drilling system for concealed timber-to. steel joints.
It can be used with screw guns running at 600-2100 rpm, minimum applied force 25 kg, with:

- steel S235 ≤ 10.0 mm
- steel S275 ≤ 10.0 mm
- steel S355 ≤ 10.0 mm
- ALUMINI, ALUMIDI and ALUMAXI brackets

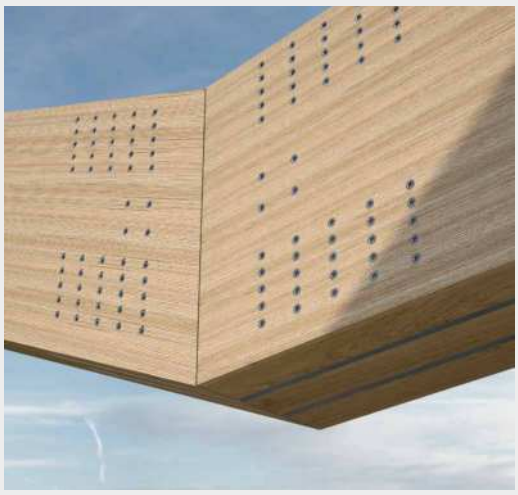
MOMENT RESTORING

It restores shear and moment forces in concealed centreline joints of large beams.

EXCEPTIONAL SPEED

The only dowel that drills a 5 mm thick S355 plate in 20 seconds (horizontal application with an applied force of 25 kg).
No self-drilling dowel exceeds the application speed of the SBD with its new tip.

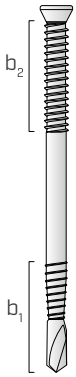
Fastening of Rothoblaas pillar-holder with internal knife plate F70.



Rigid "knee" joint with double internal plate (LVL).

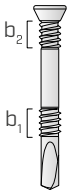
CODES AND DIMENSIONS

SBD L ≥ 95 mm



d_1 [mm] *[in]*	CODE	L [mm]	*L [in]*	b_1 [mm]	b_2 [mm]	pcs
7,5 *0.30* TX 40	**SBD7595**	95	*3 3/4*	40	10	50
	SBD75115	115	*4 1/2*	40	10	50
	SBD75135	135	*5 5/16*	40	10	50
	SBD75155	155	*6 1/8*	40	20	50
	SBD75175	175	*6 7/8*	40	40	50
	SBD75195	195	*7 11/16*	40	40	50
	SBD75215	215	*8 7/16*	40	40	50
	SBD75235	235	*9 1/4*	40	40	50

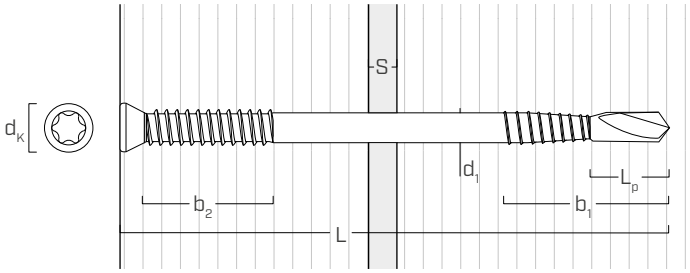
SBD L ≤ 75 mm



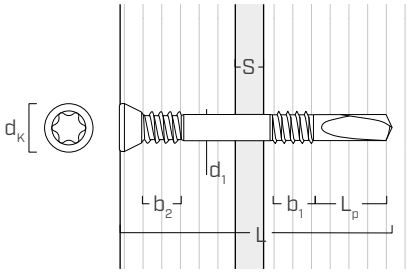
d_1 [mm] *[in]*	CODE	L [mm]	*L [in]*	b_1 [mm]	b_2 [mm]	pcs
7,5 *0.30* TX 40	**SBD7555**	55	*2 3/16*	-	10	50
	SBD7575	75	*2 15/16*	8	10	50

GEOMETRY AND MECHANICAL CHARACTERISTICS

SBD L ≥ 95 mm



SBD L ≤ 75 mm



Nominal diameter	d_1	[mm]	SBD L ≥ 95 mm **7,5**	SBD L ≤ 75 mm **7,5**
Head diameter	d_K	[mm]	11,00	11,00
Tip length	L_p	[mm]	20,0	24,0
Effective length	L_{eff}	[mm]	L-15,0	L-8,0
Specified bending yield strength	F_{yb}	[MPa]	1034,21	1034,21

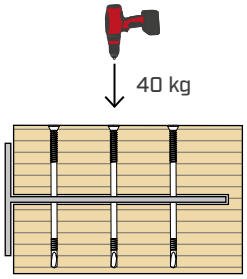
Bending yield strength has been tested and evaluated in accordance with ASTM F1575 and ICC-ES Acceptance Criteria AC233.

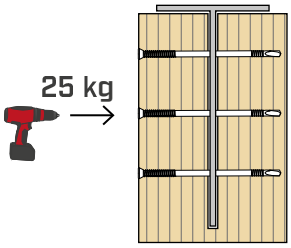
NOTES and GENERAL PRINCIPLES on page 10.

INSTALLATION | ALUMINIUM PLATE

plate	single plate [mm]
ALUMINI	6
ALUMIDI	6
ALUMAXI	10

It is suggested to have a milling in the wood equal to the thickness of the plate increased by at least 1 mm.





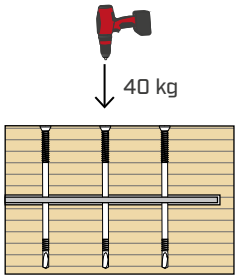
pressure to be applied	40 kg
recommended screwdriver	Mafell A 18M BL
recommended speed	1st gear (600-1000 rpm)

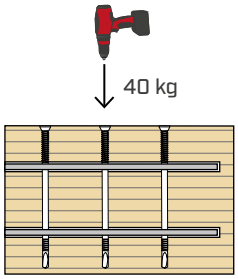
pressure to be applied	25 kg
recommended screwdriver	Mafell A 18M BL
recommended speed	1st gear (600-1000 rpm)

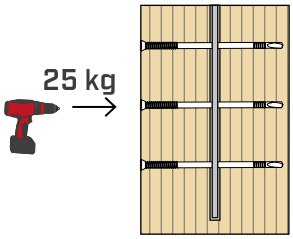
INSTALLATION | STEEL PLATE

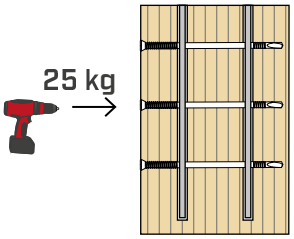
plate	single plate [mm]	double plate [mm]
S235 steel	10	8
S275 steel	10	6
S355 steel	10	5

It is suggested to have a milling in the wood equal to the thickness of the plate increased by at least 1 mm.









pressure to be applied	40 kg
recommended screwdriver	Mafell A 18M BL
recommended speed	2nd gear (1000-1500 rpm)

pressure to be applied	25 kg
recommended screwdriver	Mafell A 18M BL
recommended speed	2nd gear (1500-2000 rpm)

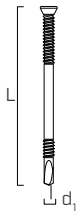
PLATE HARDNESS

The steel plate hardness can greatly vary the pull-through times of the dowels.
Hardness is in fact defined as the material's strength to drilling or cutting.
In general, the harder the plate, the longer the drilling time.
The hardness of the plate does not always depend on the strength of the steel, it can vary from point to point and is strongly influenced by heat treatments: normalized plates have a medium to low hardness, while the hardening process gives the steel high hardnesses.

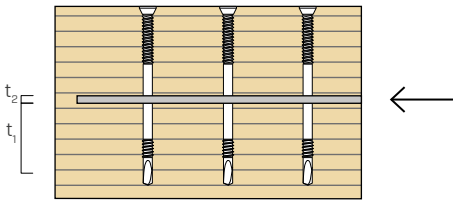
STRUCTURAL VALUES | LATERAL RESISTANCE

1 INTERNAL PLATE - DOWEL HEAD INSTALLATION DEPTH 0 mm

geometry



double shear - timber-to-steel-to-timber



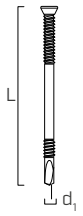
d_1	L		steel plate thickness = t_2		embedment length = t_1[2]	factored lateral resistance N_r[1]											
						G=0.35			G=0.42			G=0.49			G=0.55		
						0°	45°	90°	0°	45°	90°	0°	45°	90°	0°	45°	90°
[mm] *[in]*	[mm]	*[in]*	[mm]	*[in]*	[mm]	[kN]			[kN]			[kN]			[kN]		
7,5 *0.30*	55	*2 3/16*	3,2	*1/8*	15	2,82	1,72	1,24	3,38	2,07	1,49	3,94	2,41	1,74	4,43	2,70	1,95
	75	*2 15/16*			25	4,76	2,91	2,09	5,71	3,49	2,51	6,66	4,07	2,93	7,40	4,57	3,29
	95	*3 3/4*			28	5,34	3,26	2,35	6,41	3,92	2,82	7,07	4,57	3,29	7,58	5,13	3,69
	115	*4 1/2*			33	5,99	3,86	2,78	6,69	4,63	3,33	7,35	5,40	3,89	7,89	5,84	4,37
	135	*5 5/16*			30	5,83	3,56	2,56	6,57	4,27	3,08	7,21	4,99	3,59	7,74	5,60	4,03
	155	*6 1/8*			50	6,67	4,89	4,00	7,50	5,48	4,47	8,30	6,04	4,91	8,96	6,50	5,28
	175	*6 7/8*			50	6,67	4,89	4,00	7,50	5,48	4,47	8,30	6,04	4,91	8,96	6,50	5,28
	195	*7 11/16*			70	7,45	5,36	4,34	8,43	6,05	4,88	9,39	6,70	5,39	10,18	7,24	5,82
	215	*8 7/16*			65	7,25	5,25	4,26	8,20	5,91	4,78	9,11	6,54	5,27	9,87	7,06	5,68
	235	*9 1/4*			85	8,03	5,72	4,60	9,13	6,47	5,19	10,20	7,20	5,75	11,09	7,80	6,22
	55	*2 3/16*	4,8	*3/16*	14	2,62	1,60	1,15	3,15	1,92	1,38	3,67	2,24	1,62	4,12	2,52	1,81
	75	*2 15/16*			24	4,56	2,79	2,01	5,48	3,35	2,41	6,39	3,91	2,81	7,17	4,38	3,16
	95	*3 3/4*			27	5,15	3,15	2,26	6,18	3,77	2,72	7,02	4,40	3,17	7,52	4,94	3,56
	115	*4 1/2*			32	5,95	3,74	2,69	6,64	4,49	3,23	7,29	5,24	3,77	7,83	5,81	4,23
	135	*5 5/16*			29	5,63	3,44	2,48	6,52	4,13	2,97	7,16	4,82	3,47	7,67	5,41	3,89
	155	*6 1/8*			49	6,63	4,87	3,98	7,46	5,45	4,45	8,24	6,00	4,89	8,90	6,46	5,25
	175	*6 7/8*			49	6,63	4,87	3,98	7,46	5,45	4,45	8,24	6,00	4,89	8,90	6,46	5,25
	195	*7 11/16*			69	7,41	5,34	4,32	8,39	6,02	4,86	9,33	6,67	5,37	10,12	7,21	5,79
	215	*8 7/16*			64	7,21	5,22	4,24	8,15	5,88	4,76	9,06	6,50	5,25	9,81	7,02	5,66
	235	*9 1/4*			84	7,99	5,70	4,58	9,09	6,45	5,17	10,15	7,17	5,73	11,03	7,77	6,19
	55	*2 3/16*	6,4	*1/4*	13	2,53	1,54	1,11	3,03	1,85	1,33	3,54	2,16	1,56	3,97	2,43	1,75
	75	*2 15/16*			23	4,47	2,73	1,97	5,36	3,28	2,36	6,25	3,82	2,75	7,02	4,29	3,09
	95	*3 3/4*			26	5,05	3,09	2,22	6,06	3,70	2,67	6,99	4,32	3,11	7,49	4,85	3,49
	115	*4 1/2*			31	5,93	3,68	2,65	6,62	4,42	3,18	7,26	5,15	3,71	7,80	5,78	4,16
	135	*5 5/16*			29	5,54	3,38	2,44	6,50	4,06	2,92	7,13	4,74	3,41	7,64	5,32	3,83
	155	*6 1/8*			49	6,61	4,85	3,97	7,43	5,44	4,44	8,22	5,99	4,88	8,87	6,44	5,24
	175	*6 7/8*			49	6,61	4,85	3,97	7,43	5,44	4,44	8,22	5,99	4,88	8,87	6,44	5,24
	195	*7 11/16*			69	7,39	5,33	4,32	8,36	6,00	4,85	9,30	6,65	5,36	10,09	7,19	5,78
	215	*8 7/16*			64	7,19	5,21	4,23	8,13	5,86	4,75	9,03	6,49	5,24	9,78	7,00	5,64
	235	*9 1/4*			84	7,97	5,69	4,57	9,06	6,43	5,16	10,12	7,15	5,72	11,00	7,75	6,18
	55	*2 3/16*	8	*5/16*	12	2,33	1,42	1,03	2,80	1,71	1,23	3,26	1,99	1,44	3,66	2,24	1,61
	75	*2 15/16*			22	4,27	2,61	1,88	5,13	3,13	2,26	5,98	3,66	2,63	6,72	4,10	2,95
	95	*3 3/4*			25	4,86	2,97	2,14	5,83	3,56	2,56	6,80	4,15	2,99	7,43	4,66	3,36
	115	*4 1/2*			30	5,83	3,56	2,56	6,57	4,27	3,08	7,21	4,99	3,59	7,74	5,60	4,03
	135	*5 5/16*			28	5,34	3,26	2,35	6,41	3,92	2,82	7,07	4,57	3,29	7,58	5,13	3,69
	155	*6 1/8*			48	6,57	4,83	3,96	7,39	5,41	4,42	8,16	5,95	4,85	8,80	6,40	5,21
	175	*6 7/8*			48	6,57	4,83	3,96	7,39	5,41	4,42	8,16	5,95	4,85	8,80	6,40	5,21
	195	*7 11/16*			68	7,35	5,31	4,30	8,32	5,98	4,83	9,25	6,62	5,33	10,03	7,15	5,75
	215	*8 7/16*			63	7,15	5,19	4,21	8,08	5,83	4,73	8,98	6,45	5,21	9,72	6,96	5,62
	235	*9 1/4*			83	7,93	5,66	4,56	9,02	6,40	5,14	10,07	7,12	5,69	10,94	7,71	6,15
	55	*2 3/16*	9,6	*3/8*	11	2,14	1,31	0,94	2,56	1,57	1,13	2,99	1,83	1,32	3,36	2,05	1,48
	75	*2 15/16*			21	4,08	2,49	1,79	4,90	2,99	2,15	5,71	3,49	2,51	6,41	3,92	2,82
	95	*3 3/4*			24	4,66	2,85	2,05	5,59	3,42	2,46	6,53	3,99	2,87	7,33	4,48	3,22
	115	*4 1/2*			29	5,63	3,44	2,48	6,52	4,13	2,97	7,16	4,82	3,47	7,67	5,41	3,89
	135	*5 5/16*			27	5,15	3,15	2,26	6,18	3,77	2,72	7,02	4,40	3,17	7,52	4,94	3,56
	155	*6 1/8*			47	6,53	4,81	3,94	7,34	5,38	4,40	8,11	5,92	4,83	8,74	6,37	5,19
	175	*6 7/8*			47	6,53	4,81	3,94	7,34	5,38	4,40	8,11	5,92	4,83	8,74	6,37	5,19
	195	*7 11/16*			67	7,31	5,28	4,28	8,27	5,95	4,81	9,20	6,59	5,31	9,96	7,11	5,72
	215	*8 7/16*			62	7,12	5,16	4,20	8,04	5,81	4,71	8,92	6,42	5,19	9,66	6,93	5,59
	235	*9 1/4*			82	7,89	5,64	4,54	8,97	6,38	5,12	10,01	7,08	5,67	10,88	7,67	6,13

NOTES and GENERAL PRINCIPLES on page 10.

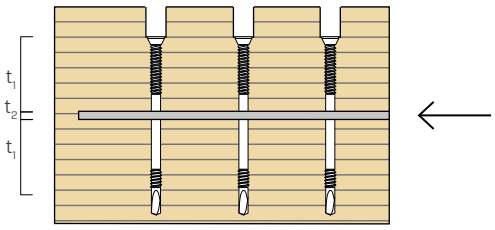
STRUCTURAL VALUES | LATERAL RESISTANCE

1 INTERNAL PLATE - OPTIMAL EMBEDMENT LENGTH

geometry



double shear - timber-to-steel-to-timber



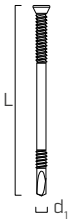
d_1	L		steel plate thickness = t_2		embedment length = t_1[2]	factored lateral resistance N_r[1]											
						G=0.35			G=0.42			G=0.49			G=0.55		
						0°	45°	90°	0°	45°	90°	0°	45°	90°	0°	45°	90°
[mm] *[in]*	[mm]	*[in]*	[mm]	*[in]*	[mm]	[kN]			[kN]			[kN]			[kN]		
7,5 *0.30*	55	*2 3/16*	3,2	*1/8*	21	4,08	2,49	1,79	4,90	2,99	2,15	5,71	3,49	2,51	6,41	3,92	2,82
	75	*2 15/16*			31	5,93	3,68	2,65	6,62	4,42	3,18	7,26	5,15	3,71	7,80	5,78	4,16
	95	*3 3/4*			38	6,18	4,45	3,21	6,92	5,12	3,85	7,62	5,62	4,49	8,19	6,03	4,94
	115	*4 1/2*			48	6,57	4,83	3,96	7,39	5,41	4,42	8,16	5,95	4,85	8,80	6,40	5,21
	135	*5 5/16*			58	6,96	5,07	4,13	7,85	5,69	4,62	8,71	6,29	5,09	9,41	6,78	5,48
	155	*6 1/8*			68	7,35	5,31	4,30	8,32	5,98	4,83	9,25	6,62	5,33	10,03	7,15	5,75
	175	*6 7/8*			78	7,74	5,54	4,47	8,78	6,26	5,03	9,79	6,95	5,57	10,64	7,52	6,02
	195	*7 11/16*			88	8,13	5,78	4,64	9,25	6,55	5,24	10,34	7,28	5,81	11,25	7,90	6,29
	215	*8 7/16*			98	8,51	6,02	4,81	9,72	6,83	5,44	10,88	7,62	6,05	11,81	8,27	6,56
	235	*9 1/4*			108	8,90	6,26	4,98	10,18	7,12	5,65	11,16	7,95	6,29	11,81	8,64	6,82
	55	*2 3/16*	4,8	*3/16*	20	3,89	2,37	1,71	4,66	2,85	2,05	5,44	3,32	2,39	6,11	3,73	2,69
	75	*2 15/16*			30	5,83	3,56	2,56	6,57	4,27	3,08	7,21	4,99	3,59	7,74	5,60	4,03
	95	*3 3/4*			37	6,14	4,33	3,12	6,87	5,09	3,74	7,56	5,59	4,37	8,13	5,99	4,90
	115	*4 1/2*			47	6,53	4,81	3,94	7,34	5,38	4,40	8,11	5,92	4,83	8,74	6,37	5,19
	135	*5 5/16*			57	6,92	5,04	4,11	7,80	5,66	4,60	8,65	6,25	5,07	9,35	6,74	5,45
	155	*6 1/8*			67	7,31	5,28	4,28	8,27	5,95	4,81	9,20	6,59	5,31	9,96	7,11	5,72
	175	*6 7/8*			77	7,70	5,52	4,45	8,74	6,23	5,01	9,74	6,92	5,55	10,57	7,49	5,99
	195	*7 11/16*			87	8,09	5,76	4,62	9,20	6,52	5,22	10,28	7,25	5,79	11,18	7,86	6,26
	215	*8 7/16*			97	8,47	5,99	4,79	9,67	6,80	5,42	10,83	7,58	6,03	11,80	8,23	6,53
	235	*9 1/4*			107	8,86	6,23	4,97	10,14	7,09	5,63	11,16	7,91	6,27	11,81	8,61	6,80
	55	*2 3/16*	6,4	*1/4*	20	3,79	2,31	1,67	4,55	2,78	2,00	5,30	3,24	2,33	5,95	3,64	2,62
	75	*2 15/16*			30	5,73	3,50	2,52	6,55	4,20	3,03	7,18	4,90	3,53	7,71	5,50	3,96
	95	*3 3/4*			36	6,12	4,27	3,08	6,85	5,08	3,69	7,54	5,57	4,31	8,10	5,98	4,84
	115	*4 1/2*			46	6,51	4,79	3,93	7,32	5,36	4,39	8,08	5,90	4,82	8,71	6,35	5,17
	135	*5 5/16*			56	6,90	5,03	4,10	7,78	5,65	4,59	8,62	6,24	5,06	9,32	6,72	5,44
	155	*6 1/8*			66	7,29	5,27	4,27	8,25	5,93	4,80	9,17	6,57	5,30	9,93	7,09	5,71
	175	*6 7/8*			76	7,68	5,51	4,44	8,71	6,22	5,00	9,71	6,90	5,54	10,54	7,47	5,98
	195	*7 11/16*			86	8,07	5,74	4,62	9,18	6,50	5,21	10,26	7,23	5,78	11,15	7,84	6,25
	215	*8 7/16*			96	8,46	5,98	4,79	9,65	6,79	5,41	10,80	7,57	6,01	11,76	8,21	6,52
	235	*9 1/4*			106	8,84	6,22	4,96	10,11	7,07	5,62	11,16	7,90	6,25	11,81	8,59	6,78
	55	*2 3/16*	8	*5/16*	19	3,59	2,20	1,58	4,31	2,64	1,90	5,03	3,07	2,21	5,65	3,45	2,48
	75	*2 15/16*			29	5,54	3,38	2,44	6,50	4,06	2,92	7,13	4,74	3,41	7,64	5,32	3,83
	95	*3 3/4*			35	6,09	4,15	2,99	6,80	4,99	3,59	7,48	5,54	4,19	8,04	5,94	4,70
	115	*4 1/2*			45	6,47	4,77	3,85	7,27	5,34	4,37	8,03	5,87	4,79	8,65	6,31	5,15
	135	*5 5/16*			55	6,86	5,01	4,09	7,73	5,62	4,57	8,57	6,20	5,03	9,26	6,68	5,41
	155	*6 1/8*			65	7,25	5,25	4,26	8,20	5,91	4,78	9,11	6,54	5,27	9,87	7,06	5,68
	175	*6 7/8*			75	7,64	5,48	4,43	8,67	6,19	4,98	9,66	6,87	5,51	10,48	7,43	5,95
	195	*7 11/16*			85	8,03	5,72	4,60	9,13	6,47	5,19	10,20	7,20	5,75	11,09	7,80	6,22
	215	*8 7/16*			95	8,42	5,96	4,77	9,60	6,76	5,39	10,75	7,53	5,99	11,70	8,18	6,49
	235	*9 1/4*			105	8,81	6,20	4,94	10,07	7,04	5,60	11,16	7,86	6,23	11,81	8,55	6,76
	55	*2 3/16*	9,6	*3/8*	18	3,40	2,08	1,50	4,08	2,49	1,79	4,76	2,91	2,09	5,34	3,26	2,35
	75	*2 15/16*			28	5,34	3,26	2,35	6,41	3,92	2,82	7,07	4,57	3,29	7,58	5,13	3,69
	95	*3 3/4*			34	6,05	4,04	2,91	6,76	4,84	3,49	7,43	5,51	4,07	7,98	5,90	4,57
	115	*4 1/2*			44	6,44	4,75	3,76	7,22	5,31	4,35	7,97	5,84	4,77	8,59	6,27	5,12
	135	*5 5/16*			54	6,82	4,98	4,07	7,69	5,59	4,55	8,52	6,17	5,01	9,20	6,65	5,39
	155	*6 1/8*			64	7,21	5,22	4,24	8,15	5,88	4,76	9,06	6,50	5,25	9,81	7,02	5,66
	175	*6 7/8*			74	7,60	5,46	4,41	8,62	6,16	4,96	9,60	6,83	5,49	10,42	7,39	5,92
	195	*7 11/16*			84	7,99	5,70	4,58	9,09	6,45	5,17	10,15	7,17	5,73	11,03	7,77	6,19
	215	*8 7/16*			94	8,38	5,93	4,75	9,55	6,73	5,37	10,69	7,50	5,97	11,64	8,14	6,46
	235	*9 1/4*			104	8,77	6,17	4,92	10,02	7,02	5,58	11,16	7,83	6,21	11,81	8,51	6,73

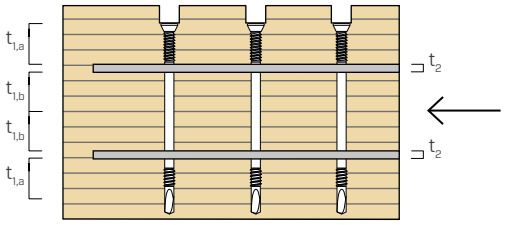
NOTES and GENERAL PRINCIPLES on page 10.

STRUCTURAL VALUES | LATERAL RESISTANCE

2 INTERNAL PLATES - OPTIMAL EMBEDMENT LENGTH

geometry	double shear - timber-to-steel-to-timber



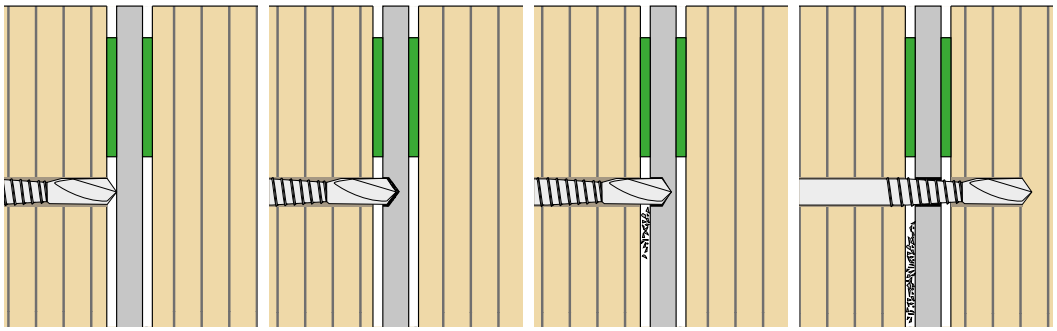


d_1	L		steel plate thickness = t_2		embedment length = $t_{1,a} = t_{1,b}$ (2)	factored lateral resistance N_r (1)											
						G=0.35			G=0.42			G=0.49			G=0.55		
						0°	45°	90°	0°	45°	90°	0°	45°	90°	0°	45°	90°
[mm] *[in]*	[mm]	*[in]*	[mm]	*[in]*	[mm]	[kN]			[kN]			[kN]			[kN]		
7,5 *0.30*	135	*5 5/16*	3,2	*1/8*	28	10,68	6,53	4,70	12,82	7,83	5,64	14,15	9,14	6,58	15,17	10,26	7,39
	155	*6 1/8*			33	11,98	7,72	5,56	13,37	9,26	6,67	14,69	10,80	7,78	15,78	11,69	8,73
	175	*6 7/8*			34	12,07	8,01	5,77	13,49	9,62	6,92	14,83	10,99	8,08	15,93	11,78	9,07
	195	*7 11/16*			40	12,54	9,30	6,80	14,05	10,37	8,16	15,49	11,40	9,34	16,67	12,23	10,01
	215	*8 7/16*			48	13,14	9,66	7,91	14,77	10,81	8,84	16,32	11,91	9,71	17,61	12,81	10,43
	235	*9 1/4*			53	13,53	9,90	8,09	15,24	11,10	9,04	16,87	12,24	9,95	18,22	13,18	10,69
	135	*5 5/16*	4,8	*3/16*	27	10,30	6,29	4,53	12,35	7,55	5,44	14,04	8,81	6,34	15,04	9,89	7,12
	155	*6 1/8*			32	11,90	7,48	5,38	13,28	8,97	6,46	14,58	10,47	7,54	15,65	11,61	8,46
	175	*6 7/8*			33	12,00	7,78	5,60	13,40	9,33	6,72	14,72	10,89	7,84	15,81	11,71	8,80
	195	*7 11/16*			39	12,47	9,21	6,63	13,96	10,32	7,96	15,38	11,33	9,29	16,55	12,16	9,96
	215	*8 7/16*			47	13,06	9,61	7,88	14,68	10,76	8,79	16,22	11,84	9,66	17,49	12,73	10,37
	235	*9 1/4*			52	13,45	9,85	8,05	15,14	11,04	9,00	16,76	12,17	9,90	18,10	13,11	10,64
	135	*5 5/16*	6,4	*1/4*	26	10,10	6,17	4,44	12,12	7,41	5,33	13,99	8,64	6,22	14,98	9,70	6,98
	155	*6 1/8*			31	11,86	7,36	5,30	13,23	8,83	6,36	14,53	10,30	7,42	15,59	11,57	8,33
	175	*6 7/8*			32	11,96	7,66	5,51	13,35	9,19	6,62	14,66	10,72	7,72	15,75	11,67	8,66
	195	*7 11/16*			38	12,43	9,09	6,55	13,91	10,29	7,86	15,32	11,30	9,17	16,48	12,12	9,93
	215	*8 7/16*			46	13,03	9,59	7,86	14,63	10,73	8,77	16,16	11,81	9,64	17,42	12,70	10,34
	235	*9 1/4*			51	13,41	9,83	8,03	15,10	11,01	8,98	16,70	12,14	9,88	18,04	13,07	10,61
	135	*5 5/16*	8	*5/16*	25	9,71	5,94	4,27	11,66	7,12	5,13	13,60	8,31	5,98	14,86	9,33	6,72
	155	*6 1/8*			30	11,66	7,12	5,13	13,14	8,55	6,15	14,42	9,97	7,18	15,47	11,19	8,06
	175	*6 7/8*			31	11,88	7,42	5,34	13,26	8,90	6,41	14,56	10,39	7,48	15,62	11,60	8,39
	195	*7 11/16*			37	12,35	8,86	6,38	13,82	10,23	7,65	15,21	11,23	8,93	16,36	12,05	9,88
	215	*8 7/16*			45	12,95	9,54	7,69	14,54	10,67	8,73	16,05	11,74	9,59	17,30	12,62	10,29
	235	*9 1/4*			50	13,34	9,78	8,00	15,00	10,96	8,94	16,60	12,07	9,83	17,91	13,00	10,56
	135	*5 5/16*	9,6	*3/8*	24	9,32	5,70	4,10	11,19	6,84	4,92	13,05	7,98	5,74	14,65	8,95	6,45
	155	*6 1/8*			29	11,27	6,89	4,96	13,05	8,26	5,95	14,31	9,64	6,94	15,35	10,82	7,79
	175	*6 7/8*			30	11,75	7,18	5,17	13,16	8,62	6,21	14,45	10,05	7,24	15,50	11,29	8,13
	195	*7 11/16*			36	12,27	8,62	6,21	13,73	10,18	7,45	15,11	11,16	8,69	16,24	11,97	9,75
	215	*8 7/16*			44	12,87	9,49	7,52	14,44	10,61	8,69	15,94	11,67	9,54	17,18	12,55	10,24
	235	*9 1/4*			49	13,26	9,73	7,97	14,91	10,90	8,90	16,49	12,01	9,78	17,79	12,92	10,51

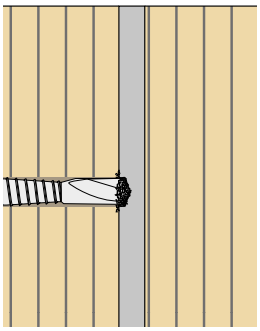
NOTES and GENERAL PRINCIPLES on page 10.

INSTALLATION

It is suggested to have **a milling in the wood equal to the thickness of the plate, increased by at least 1-2 mm**, placing SHIM spacers between the wood and the plate to centre it in the milling.
In this way, the steel residue from the drilling of the metal has an outlet to escape and does not obstruct the passage of the drill through the plate, thus avoiding overheating of the plate and timber and also preventing the generation of smoke during installation.



Cutter increased by 1 mm on each side.



Shavings obstructing the holes in the steel during drilling (spacers not installed).

To avoid breakage of the tip at the moment of pin-plate contact, it is recommended to **reach the plate slowly, pushing with a lower force until the moment of impact and then increasing it to the recommended value** (40 kg for top-down applications and 25 kg for horizontal installations). Try to keep the dowel as perpendicular as possible to the surface of the timber and the plate.

Intact tip after correct installation of the dowel.

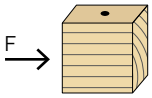
Broken (cut) tip due to excessive force during impact with metal.

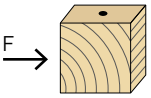
If the steel plate is too hard, the dowel tip may shrink significantly or even melt. In this case, it is advisable to check the material certificates for any heat treatment or hardness tests performed. Try decreasing the force applied or alternatively changing the type of plate.

Tip melted during installation on a too hard plate without spacers between timber and plate.

Reduction of the tip when drilling the plate due to the high hardness of the plate.

MINIMUM DISTANCES FOR DOWELS SUBJECT TO SHEAR

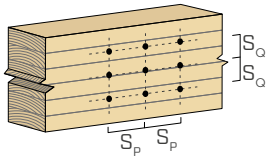




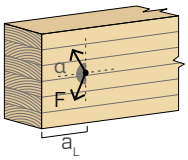
d_1	[mm] *[in]*	minimum distances	7,5 *0.30*
S_P	[mm] *[in]*	**4·d**	30 *1 3/16*
S_Q	[mm] *[in]*	**3·d**	22,5 *7/8*
a_L	[mm] *[in]*	**max (5·d; 50mm)**	50 *1 15/16*
a	[mm] *[in]*	**max (4·d; 50mm)**	50 *1 15/16*
e_Q	[mm] *[in]*	**4·d**	30 *1 3/16*
e_P	[mm] *[in]*	**max (1,5·d; 1/2 S_Q)**	11,25 *7/16*

d_1	[mm] *[in]*	minimum distances	7,5 *0.30*
S_P	[mm] *[in]*	**3·d**	22,5 *7/8*
S_Q	[mm] *[in]*	**3·d**	22,5 *7/8*
a_L	[mm] *[in]*	**max (4·d; 50mm)**	50 *1 15/16*
a	[mm] *[in]*	**max (4·d; 50mm)**	50 *1 15/16*
e_Q	[mm] *[in]*	**4·d**	30 *1 3/16*
e_P	[mm] *[in]*	**1,5·d**	11,25 *7/16*

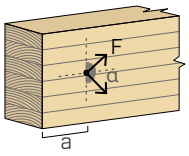
α = load-to-grain angle
d = d_1 = nominal dowel diameter



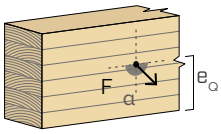
stressed end
-90° < α < 90°



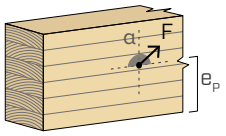
unloaded end
90° < α < 270°



stressed edge
0° < α < 180°



unload edge
180° < α < 360°



NOTES

- Minimum distances FOR CONNECTORS SUBJECTED TO SHEAR STRESS in accordance with CSA O86 Clause 12.4.3.

STRUCTURAL VALUES

GENERAL PRINCIPLES

- The steel plate is assumed to be 300 W and 350 W with a minimum ultimate tensile strength equal to 65.3 ksi (450 MPa).
- G is the mean relative density according to Table A.11. Most common wood species are assumed such as Northern species (G=0.35), Spruce-Pine-Fir (G=0.42), Douglas Fir (G=0.49), and Southern Pine (G=0.55).
- The effective length is L - 15 mm for SBD L ≥ 95 mm, and L - 8 mm for SBD L ≤ 75 mm.
- The dimension b_1 of the dowel should be positioned at the far right end of the section, after the steel plate. Meanwhile, the head thread b_2 must remain within the wooden part and should not go through the steel plate.
- The dowels must be positioned in accordance with the minimum distances.
- Dimensioning and verification of timber elements and steel plates must be carried out separately.

NOTES

(1) The reference factored lateral resistance (N_r) has been calculated according to Clause 12.4 as per CSA-O86 2019 and are representative of a single dowel. Listed values are based on standard load duration factor (K_D = 1), permanent dry service condition factor (K_{SF} = 1), and treatment factor (K_T = 1).

(2) The embedment length is calculated using the following equation:
$t_1 = (L_{eff} - t_2 - t_{mill})/2$
where L_{eff} is the effective length of the dowel, t_2 is the thickness of the steel plate, and t_{mill} is the thickness of the milled cut in the wood section, 2 mm was considered for the tabulated values.
For the double shear, the calculated values consider that the steel plate is placed in the cross section so that the SBD has the optimum distance between each shear plane, i.e., $t_{1,a} = t_{1,b}$. In the case of a non-symmetrically dowel, the lowest embedment length was considered.