STA

SMOOTH DOWEL

CE
EN 14592

HIGH-RESISTANCE STEEL
Dowel Ø16 and Ø20 made of S355 steel grade to provide higher shear strength to the standard sizes used in structural design.

TAPERED TIP
The end is narrowed for easy insertion inside the prepared hole in the timber. Available in 1,0 m long version.

FOR SEISMIC ZONES
Available upon request in high bond steel and geometry designed to avoid pull-out when used in seismic areas.

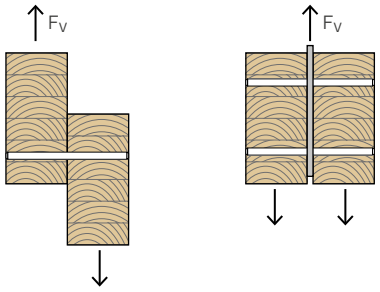
STAINLESS STEEL VERSION
Available in A2 | AISI304 stainless steel for outdoor structural applications.

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

STA STAS

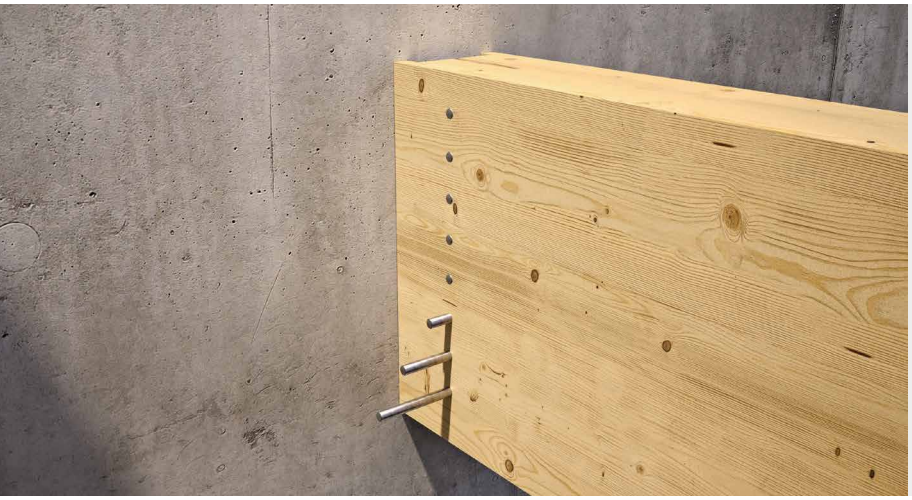
DIAMETER [mm]	7,5	8 – 20	
LENGTH [mm]	55	60 – 1000	
MATERIAL			
Zn ELECTRO PLATED — S235-S355 electrogalvanized carbon steel			DRY C2 T2
A2 AISI 304 — A2 stainless steel			WET C4 T4

EXTERNAL LOADS



FIELDS OF USE

Assembly and structural connection of timber components for timber-to-timber and timber-to-steel shear connections
- solid timber and glulam
- CLT, LVL
- timber based panels



LARGE STRUCTURES ALSO OUTDOOR

Stainless steel A2 version suitable for outdoor applications up to 1 km from the sea and on class T4 acid wood.

TIMBER-TO-METAL

Ideal for being used with ALU and ALUMEGA brackets in realizing concealed joints. When used with wood taps it meets the fire safety requirements and provides an optimal aesthetic appearance.

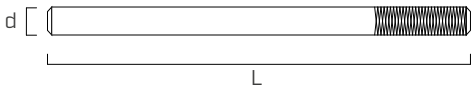
CODES AND DIMENSIONS

Zn ELECTRO PLATED

STA - smooth dowel made of S235-S355 carbon steel

d [mm] [in]	CODE	L [mm]	L [in]	steel	pcs
8 0.32	STA860B	60	2 3/8	S235	100
	STA880B	80	3 1/8	S235	100
	STA8100B	100	4	S235	100
	STA8120B	120	4 3/4	S235	100
	STA8140B	140	5 1/2	S235	100
12 0.48	STA1260B	60	2 3/8	S235	50
	STA1270B	70	2 3/4	S235	50
	STA1280B	80	3 1/8	S235	50
	STA1290B	90	3 1/2	S235	50
	STA12100B	100	4	S235	50
	STA12110B	110	4 3/8	S235	50
	STA12120B	120	4 3/4	S235	50
	STA12130B	130	5 1/8	S235	50
	STA12140B	140	5 1/2	S235	25
	STA12150B	150	6	S235	25
	STA12160B	160	6 1/4	S235	25
	STA12170B	170	6 3/4	S235	25
	STA12180B	180	7 1/8	S235	25
	STA12200B	200	8	S235	25
	STA12220B	220	8 5/8	S235	25
	STA12240B	240	9 1/2	S235	25
	STA12260B	260	10 1/4	S235	25
	STA12280B	280	11	S235	25
	STA12320B	320	12 5/8	S235	25
	STA12340B	340	13 3/8	S235	25
12 0.48	STA121000B	1000	39 3/8	S235	1
16 0.63	STA1680B	80	3 1/8	S355	25
	STA16100B	100	4	S355	25
	STA16110B	110	4 3/8	S355	25
	STA16120B	120	4 3/4	S355	25
	STA16130B	130	5 1/8	S355	25
	STA16140B	140	5 1/2	S355	25
	STA16150B	150	6	S355	25
	STA16160B	160	6 1/4	S355	15
	STA16170B	170	6 3/4	S355	15
	STA16180B	180	7 1/8	S355	15
16 0.63	STA16190B	190	7 1/2	S355	15
	STA16200B	200	8	S355	15
	STA16220B	220	8 5/8	S355	15
	STA16240B	240	9 1/2	S355	15
	STA16260B	260	10 1/4	S355	10
	STA16280B	280	11	S355	10
	STA16300B	300	11 3/4	S355	10
	STA16320B	320	12 5/8	S355	10
	STA16340B	340	13 3/8	S355	10
	STA16360B	360	14 1/4	S355	10
	STA16380B	380	15	S355	10
	STA16400B	400	15 3/4	S355	10
	STA16500B	500	19 3/4	S355	10
16 0.63	STA161000B	1000	39 3/8	S355	1
20 0.79	STA20120B	120	4 3/4	S355	10
	STA20140B	140	5 1/2	S355	10
	STA20160B	160	6 1/4	S355	10
	STA20180B	180	7 1/8	S355	10
	STA20190B	190	7 1/2	S355	10
	STA20200B	200	8	S355	10
	STA20220B	220	8 5/8	S355	10
	STA20240B	240	9 1/2	S355	10
	STA20260B	260	10 1/4	S355	5
	STA20300B	300	11 3/4	S355	5
	STA20320B	320	12 5/8	S355	5
	STA20360B	360	14 1/4	S355	5
	STA20400B	400	15 3/4	S355	5
20 0.79	STA201000B	1000	39 3/8	S355	1

Available upon request the STAS high bond steel and geometry designed to avoid pull-out when used in seismic areas (e.g. STAS16200).
Minimum quantity: 1000 pcs



STA A2 | AISI304 - stainless steel smooth dowel[1]

A2 AISI 304

d [mm] [in]	CODE	L [mm]	L [in]	pcs
12 0.48	STA12100A2	100	4	25
	STA12120A2	120	4 3/4	25
	STA12140A2	140	5 1/2	25
	STA12160A2	160	6 1/4	25
	STA12180A2	180	7 1/8	25
	STA12200A2	200	8	25
	STA12220A2	220	8 5/8	25
	STA12240A2	240	9 1/2	25
	STA12260A2	260	10 1/4	25
16 0.63	STA16120A2	120	4 3/4	25
	STA16140A2	140	5 1/2	10
	STA16150A2	150	6	10
	STA16160A2	160	6 1/4	10
	STA16180A2	180	7 1/8	10
	STA16200A2	200	8	10
	STA16220A2	220	8 5/8	10
	STA16240A2	240	9 1/2	10
	STA16260A2	260	10 1/4	10
	STA16280A2	280	11	10
	STA16300A2	300	11 3/4	10
20 0.79	STA20160A2	160	6 1/4	10
	STA20180A2	180	7 1/8	10
	STA20200A2	200	8	10
	STA20220A2	220	8 5/8	10
	STA20240A2	240	9 1/2	10
	STA20260A2	260	10 1/4	5
	STA20280A2	280	11	5
	STA20300A2	300	11 3/4	5
	STA20320A2	320	12 5/8	5
	STA20340A2	340	13 3/8	5
	STA20360A2	360	14 1/4	5
	STA20380A2	380	15	5

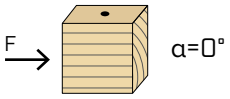
[1]Not holding CE marking.
STA A2 | AISI304 codes are only available on request, with an estimated lead time of 30 days.

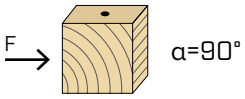
GEOMETRY AND MECHANICAL CHARACTERISTICS

Nominal diameter	d	[mm]	8	12	16	20
		[in]	*0.32*	*0.48*	*0.63*	*0.79*
Length	L	[mm]	60 - 140	60 - 340	80 - 500	120 - 400
		[in]	*2 3/8 - 5 1/2*	*2 3/8 - 13 3/8*	*3 1/8 - 19 3/4*	*4 3/4 - 15 3/4*
Material	steel		S235	S235	S355	S355
Characteristic yield moment	F_{yb}	[MPa]	275,79	275,79	379,21	379,21

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

MINIMUM DISTANCES FOR DOWELS SUBJECT TO SHEAR

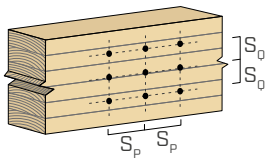




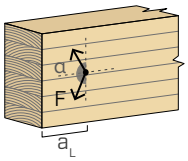
d_1	[mm] *[in]*	minimum distances	8 *0.32*	12 *0.48*	16 *0.63*	20 *0.79*
s_P	[mm] *[in]*	4·d	32 *1 1/4*	48 *1 7/8*	64 *2 1/2*	80 *3 1/8*
s_Q	[mm] *[in]*	3·d	24 *15/16*	36 *1 7/16*	48 *1 7/8*	60 *2 3/8*
a_L	[mm] *[in]*	max (5·d; 50mm)	50 *2*	60 *2 3/8*	80 *3 1/8*	100 *3 15/16*
a	[mm] *[in]*	max (4·d; 50mm)	50 *2*	50 *2*	64 *2 1/2*	80 *3 1/8*
e_Q	[mm] *[in]*	4·d	32 *1 1/4*	48 *1 7/8*	64 *2 1/2*	80 *3 1/8*
e_P	[mm] *[in]*	max (1,5·d; 1/2 S_Q)	12 *1/2*	18 *11/16*	24 *15/16*	30 *1 3/16*

d_1	[mm] *[in]*	minimum distances	8 *0.32*	12 *0.48*	16 *0.63*	20 *0.79*
s_P	[mm] *[in]*	3·d	24 *15/16*	36 *1 7/16*	48 *1 7/8*	60 *2 3/8*
s_Q	[mm] *[in]*	3·d	24 *15/16*	36 *1 7/16*	48 *1 7/8*	60 *2 3/8*
a_L	[mm] *[in]*	max (4·d; 50mm)	50 *2*	60 *2 3/8*	80 *3 1/8*	100 *3 15/16*
a	[mm] *[in]*	max (4·d; 50mm)	50 *2*	50 *2*	64 *2 1/2*	80 *3 1/8*
e_Q	[mm] *[in]*	4·d	32 *1 1/4*	48 *1 7/8*	64 *2 1/2*	80 *3 1/8*
e_P	[mm] *[in]*	1,5·d	12 *1/2*	18 *11/16*	24 *15/16*	30 *1 3/16*

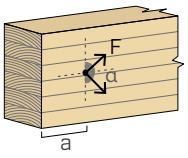
α = load-to-grain angle
d = nominal dowel diameter



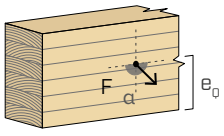
stressed end
-90° < α < 90°



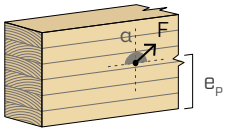
unloaded end
90° < α < 270°



stressed edge
0° < α < 180°



unload edge
180° < α < 360°

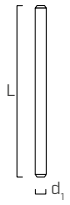
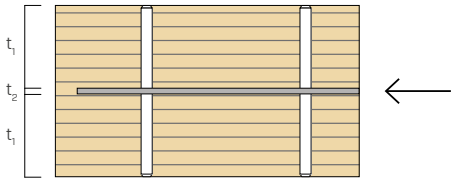


NOTES

- Minimum distances FOR CONNECTORS SUBJECTED TO SHEAR STRESS in accordance with CSA O86 2019 Clause 12.4.3.

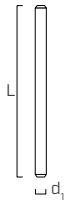
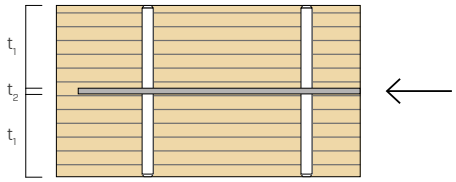
STRUCTURAL VALUES | LATERAL RESISTANCE

1 INTERNAL PLATE

geometry			double shear - timber-to-steel-to-timber													
																
d_1	L		steel plate thickness = t_2 [2]		embedment length = t_1 [3]	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]		
8 *0.32*	60	*2 3/8*	3,2	*1/8*	27,6	3,91	2,87	2,34	4,40	3,21	2,62	4,86	3,54	2,88	5,25	3,81	3,09
	80	*3 1/8*			37,6	4,32	3,12	2,53	4,89	3,51	2,84	5,44	3,89	3,13	5,90	4,20	3,38
	100	*4*			47,6	4,73	3,37	2,71	5,39	3,81	3,05	6,02	4,24	3,39	6,54	4,60	3,66
	120	*4 3/4*			57,6	5,14	3,62	2,89	5,88	4,12	3,27	6,54	4,60	3,64	6,92	4,99	3,95
	140	*5 1/2*			67,6	5,54	3,87	3,07	6,06	4,42	3,49	6,54	4,95	3,90	6,92	5,39	4,23
	60	*2 3/8*	4,8	*3/16*	26,8	3,87	2,85	2,33	4,36	3,19	2,60	4,82	3,51	2,86	5,20	3,78	3,07
	80	*3 1/8*			36,8	4,29	3,10	2,51	4,85	3,49	2,82	5,39	3,86	3,11	5,84	4,17	3,36
	100	*4*			46,8	4,70	3,35	2,69	5,35	3,79	3,04	5,97	4,21	3,37	6,49	4,57	3,64
	120	*4 3/4*			56,8	5,11	3,60	2,87	5,84	4,09	3,25	6,54	4,57	3,62	6,92	4,96	3,93
	140	*5 1/2*			66,8	5,52	3,85	3,05	6,06	4,39	3,47	6,54	4,92	3,87	6,92	5,36	4,21
	60	*2 3/8*	6,4	*1/4*	26,0	3,84	2,83	2,32	4,32	3,16	2,58	4,77	3,48	2,84	5,15	3,74	3,05
	80	*3 1/8*			36,0	4,25	3,08	2,50	4,81	3,46	2,80	5,35	3,83	3,09	5,79	4,14	3,33
	100	*4*			46,0	4,67	3,33	2,68	5,31	3,77	3,02	5,92	4,19	3,35	6,44	4,54	3,62
	120	*4 3/4*			56,0	5,08	3,58	2,86	5,80	4,07	3,24	6,50	4,54	3,60	6,92	4,93	3,90
	140	*5 1/2*			66,0	5,49	3,83	3,04	6,06	4,37	3,45	6,54	4,89	3,85	6,92	5,33	4,19
12 *0.48*	60	*2 3/8*	4,8	*3/16*	26,8	7,68	4,85	3,49	8,57	5,82	4,19	9,42	6,79	4,89	10,11	7,50	5,48
	70	*2 3/4*			31,8	7,98	5,75	4,14	8,93	6,61	4,97	9,83	7,25	5,80	10,57	7,78	6,38
	80	*3 1/8*			36,8	8,27	6,11	4,79	9,28	6,82	5,59	10,24	7,51	6,14	11,04	8,07	6,58
	90	*3 1/2*			41,8	8,57	6,29	5,14	9,64	7,04	5,75	10,66	7,76	6,32	11,50	8,35	6,79
	100	*4*			46,8	8,86	6,47	5,27	9,99	7,26	5,90	11,07	8,01	6,50	11,97	8,63	6,99
	110	*4 3/8*			51,8	9,16	6,65	5,40	10,35	7,48	6,06	11,49	8,26	6,68	12,43	8,92	7,20
	120	*4 3/4*			56,8	9,46	6,83	5,53	10,70	7,69	6,22	11,90	8,52	6,86	12,90	9,20	7,40
	130	*5 1/8*			61,8	9,75	7,01	5,66	11,06	7,91	6,37	12,31	8,77	7,05	13,36	9,49	7,61
	140	*5 1/2*			66,8	10,05	7,19	5,79	11,41	8,13	6,53	12,73	9,02	7,23	13,83	9,77	7,81
	150	*6*			71,8	10,34	7,37	5,92	11,77	8,34	6,68	13,14	9,28	7,41	14,29	10,05	8,01
	160	*6 1/4*			76,8	10,64	7,55	6,05	12,12	8,56	6,84	13,56	9,53	7,59	14,76	10,34	8,22
	170	*6 3/4*			81,8	10,93	7,73	6,19	12,48	8,78	7,00	13,97	9,78	7,78	15,22	10,62	8,42
	180	*7 1/8*			86,8	11,23	7,91	6,32	12,83	8,99	7,15	14,38	10,04	7,96	15,23	10,91	8,63
	200	*8*			96,8	11,82	8,27	6,58	13,34	9,43	7,46	14,39	10,54	8,32	15,23	11,47	9,04
	220	*8 5/8*			106,8	12,19	8,64	6,84	13,34	9,86	7,78	14,39	11,05	8,69	15,23	11,95	9,45
	240	*9 1/2*			116,8	12,19	9,00	7,10	13,34	10,29	8,09	14,39	11,29	9,05	15,23	11,95	9,85
	260	*10 1/4*			126,8	12,19	9,36	7,36	13,34	10,46	8,40	14,39	11,29	9,41	15,23	11,95	10,15
	280	*11*			136,8	12,19	9,55	7,62	13,34	10,46	8,71	14,39	11,29	9,59	15,23	11,95	10,15
	320	*12 5/8*			156,8	12,19	9,55	8,11	13,34	10,46	8,88	14,39	11,29	9,59	15,23	11,95	10,15
	340	*13 3/8*			166,8	12,19	9,55	8,11	13,34	10,46	8,88	14,39	11,29	9,59	15,23	11,95	10,15
	60	*2 3/8*	6,4	*1/4*	26,0	7,63	4,70	3,39	8,52	5,64	4,06	9,35	6,59	4,74	10,04	7,39	5,32
	70	*2 3/4*			31,0	7,93	5,61	4,04	8,87	6,57	4,84	9,76	7,21	5,65	10,50	7,74	6,34
	80	*3 1/8*			36,0	8,23	6,08	4,69	9,23	6,79	5,57	10,18	7,47	6,11	10,96	8,02	6,55
	90	*3 1/2*			41,0	8,52	6,26	5,12	9,58	7,01	5,72	10,59	7,72	6,29	11,43	8,30	6,75
	100	*4*			46,0	8,82	6,44	5,25	9,94	7,22	5,88	11,01	7,97	6,47	11,89	8,59	6,96
	110	*4 3/8*			51,0	9,11	6,62	5,38	10,29	7,44	6,03	11,42	8,22	6,65	12,36	8,87	7,16
	120	*4 3/4*			56,0	9,41	6,80	5,51	10,65	7,66	6,19	11,83	8,48	6,84	12,82	9,16	7,37
	130	*5 1/8*			61,0	9,70	6,98	5,64	11,00	7,87	6,35	12,25	8,73	7,02	13,29	9,44	7,57
	140	*5 1/2*			66,0	10,00	7,16	5,77	11,36	8,09	6,50	12,66	8,98	7,20	13,75	9,72	7,78
	150	*6*			71,0	10,30	7,34	5,90	11,71	8,31	6,66	13,08	9,24	7,38	14,22	10,01	7,98
	160	*6 1/4*			76,0	10,59	7,52	6,03	12,06	8,52	6,81	13,49	9,49	7,56	14,68	10,29	8,19
	170	*6 3/4*			81,0	10,89	7,70	6,16	12,42	8,74	6,97	13,90	9,74	7,75	15,15	10,58	8,39
	180	*7 1/8*			86,0	11,18	7,88	6,29	12,77	8,96	7,13	14,32	10,00	7,93	15,23	10,86	8,59
	200	*8*			96,0	11,77	8,25	6,55	13,34	9,39	7,44	14,39	10,50	8,29	15,23	11,43	9,00
	220	*8 5/8*			106,0	12,19	8,61	6,81	13,34	9,83	7,75	14,39	11,01	8,66	15,23	11,95	9,41
	240	*9 1/2*			116,0	12,19	8,97	7,08	13,34	10,26	8,06	14,39	11,29	9,02	15,23	11,95	9,82
	260	*10 1/4*			126,0	12,19	9,33	7,34	13,34	10,46	8,38	14,39	11,29	9,39	15,23	11,95	10,15
	280	*11*			136,0	12,19	9,55	7,60	13,34	10,46	8,69	14,39	11,29	9,59	15,23	11,95	10,15
	320	*12 5/8*			156,0	12,19	9,55	8,11	13,34	10,46	8,88	14,39	11,29	9,59	15,23	11,95	10,15
	340	*13 3/8*			166,0	12,19	9,55	8,11	13,34	10,46	8,88	14,39	11,29	9,59	15,23	11,95	10,15

STRUCTURAL VALUES | LATERAL RESISTANCE

1 INTERNAL PLATE

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

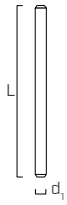
d_1	L		steel plate thickness = t_2 [2]		embedment length = t_1 [3]	factored lateral resistance N_r [1]											
						G=0.35			G=0.42			G=0.49			G=0.55		
						0°	45°	90°	0°	45°	90°	0°	45°	90°	0°	45°	90°
[mm] *[in]*	[mm]	*[in]*	[mm]	*[in]*	[mm]	[kN]			[kN]			[kN]			[kN]		
	60	*2 3/8*			25,2	7,46	4,56	3,28	8,46	5,47	3,94	9,29	6,38	4,60	9,96	7,17	5,16
	70	*2 3/4*			30,2	7,88	5,46	3,93	8,82	6,54	4,72	9,70	7,17	5,51	10,43	7,69	6,18
	80	*3 1/8*			35,2	8,18	6,05	4,58	9,17	6,76	5,50	10,11	7,43	6,08	10,89	7,98	6,52
	90	*3 1/2*			40,2	8,47	6,23	5,10	9,52	6,97	5,70	10,53	7,68	6,26	11,36	8,26	6,72
	100	*4*			45,2	8,77	6,41	5,23	9,88	7,19	5,85	10,94	7,93	6,44	11,82	8,54	6,93
	110	*4 3/8*			50,2	9,07	6,59	5,36	10,23	7,41	6,01	11,36	8,18	6,62	12,28	8,83	7,13
	120	*4 3/4*			55,2	9,36	6,77	5,49	10,59	7,62	6,17	11,77	8,44	6,81	12,75	9,11	7,34
	130	*5 1/8*			60,2	9,66	6,95	5,62	10,94	7,84	6,32	12,18	8,69	6,99	13,21	9,40	7,54
	140	*5 1/2*			65,2	9,95	7,13	5,75	11,30	8,06	6,48	12,60	8,94	7,17	13,68	9,68	7,74
12	150	*6*	8	*5/16*	70,2	10,25	7,31	5,88	11,65	8,27	6,63	13,01	9,20	7,35	14,14	9,96	7,95
0.48	160	*6 1/4*			75,2	10,54	7,49	6,01	12,01	8,49	6,79	13,42	9,45	7,54	14,61	10,25	8,15
	170	*6 3/4*			80,2	10,84	7,68	6,14	12,36	8,71	6,95	13,84	9,70	7,72	15,07	10,53	8,36
	180	*7 1/8*			85,2	11,14	7,86	6,27	12,72	8,92	7,10	14,25	9,96	7,90	15,23	10,82	8,56
	200	*8*			95,2	11,73	8,22	6,53	13,34	9,36	7,41	14,39	10,46	8,26	15,23	11,38	8,97
	220	*8 5/8*			105,2	12,19	8,58	6,79	13,34	9,79	7,73	14,39	10,97	8,63	15,23	11,95	9,38
	240	*9 1/2*			115,2	12,19	8,94	7,05	13,34	10,22	8,04	14,39	11,29	8,99	15,23	11,95	9,79
	260	*10 1/4*			125,2	12,19	9,30	7,31	13,34	10,46	8,35	14,39	11,29	9,36	15,23	11,95	10,15
	280	*11*			135,2	12,19	9,55	7,57	13,34	10,46	8,66	14,39	11,29	9,59	15,23	11,95	10,15
	320	*12 5/8*			155,2	12,19	9,55	8,10	13,34	10,46	8,88	14,39	11,29	9,59	15,23	11,95	10,15
	340	*13 3/8*			165,2	12,19	9,55	8,11	13,34	10,46	8,88	14,39	11,29	9,59	15,23	11,95	10,15
	80	*3 1/8*			36,0	13,56	8,29	5,97	16,27	9,94	7,16	18,46	11,60	8,35	19,78	13,02	9,38
	100	*4*			46,0	15,88	10,59	7,62	17,75	12,70	9,15	19,51	14,46	10,67	20,96	15,50	11,98
	110	*4 3/8*			51,0	16,26	11,74	8,45	18,20	13,47	10,14	20,04	14,78	11,83	21,55	15,86	13,00
	120	*4 3/4*			56,0	16,63	12,30	9,28	18,65	13,74	11,13	20,56	15,10	12,36	22,15	16,22	13,26
	130	*5 1/8*			61,0	17,01	12,53	10,11	19,10	14,02	11,47	21,09	15,42	12,60	22,74	16,58	13,52
	140	*5 1/2*			66,0	17,39	12,76	10,45	19,55	14,29	11,67	21,62	15,75	12,83	23,33	16,94	13,78
	150	*6*			71,0	17,76	12,99	10,61	20,00	14,57	11,87	22,15	16,07	13,06	23,92	17,31	14,04
	160	*6 1/4*			76,0	18,14	13,22	10,78	20,45	14,85	12,07	22,67	16,39	13,29	24,51	17,67	14,30
	170	*6 3/4*			81,0	18,52	13,45	10,95	20,91	15,12	12,27	23,20	16,71	13,52	25,10	18,03	14,56
	180	*7 1/8*			86,0	18,89	13,68	11,11	21,36	15,40	12,46	23,73	17,03	13,75	25,69	18,39	14,82
	190	*7 1/2*			91,0	19,27	13,91	11,28	21,81	15,67	12,66	24,25	17,36	13,99	26,28	18,75	15,08
16	200	*8*	6,4	*1/4*	96,0	19,65	14,14	11,44	22,26	15,95	12,86	24,78	17,68	14,22	26,88	19,11	15,34
0.63	220	*8 5/8*			106,0	20,40	14,60	11,77	23,16	16,50	13,26	25,83	18,32	14,68	28,06	19,83	15,86
	240	*9 1/2*			116,0	21,15	15,06	12,10	24,07	17,05	13,66	26,89	18,97	15,15	29,24	20,56	16,38
	260	*10 1/4*			126,0	21,90	15,52	12,44	24,97	17,61	14,05	27,94	19,61	15,61	30,42	21,28	16,90
	280	*11*			136,0	22,66	15,98	12,77	25,87	18,16	14,45	28,99	20,25	16,07	31,04	22,00	17,42
	300	*11 3/4*			146,0	23,41	16,44	13,10	26,78	18,71	14,85	29,32	20,90	16,54	31,04	22,73	17,94
	320	*12 5/8*			156,0	24,16	16,90	13,43	27,18	19,26	15,25	29,32	21,54	17,00	31,04	23,45	18,46
	340	*13 3/8*			166,0	24,83	17,36	13,76	27,18	19,81	15,64	29,32	22,19	17,46	31,04	24,17	18,98
	360	*14 1/4*			176,0	24,83	17,82	14,09	27,18	20,36	16,04	29,32	22,83	17,93	31,04	24,34	19,50
	380	*15*			186,0	24,83	18,28	14,42	27,18	20,92	16,44	29,32	22,99	18,39	31,04	24,34	20,02
	400	*15 3/4*			196,0	24,83	18,74	14,75	27,18	21,30	16,84	29,32	22,99	18,85	31,04	24,34	20,54
	500	*19 3/4*			246,0	24,83	19,46	16,41	27,18	21,30	18,09	29,32	22,99	19,53	31,04	24,34	20,69

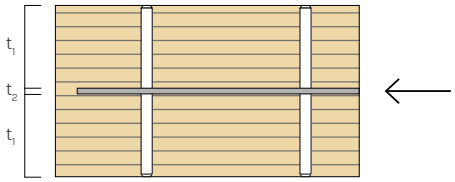
NOTES and GENERAL PRINCIPLES on page 9.

STRUCTURAL VALUES | LATERAL RESISTANCE

1 INTERNAL PLATE

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





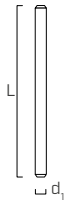
d_1	L		steel plate thickness = t_2 [2]		embedment length = t_1 [3]	factored lateral resistance N_r [1]											
						G=0.35			G=0.42			G=0.49			G=0.55		
						0°	45°	90°	0°	45°	90°	0°	45°	90°	0°	45°	90°
[mm] *[in]*	[mm]	*[in]*	[mm]	*[in]*	[mm]	[kN]			[kN]			[kN]			[kN]		
	80	*3 1/8*			35,2	13,26	8,10	5,83	15,91	9,72	7,00	18,37	11,35	8,17	19,69	12,73	9,17
	100	*4*			45,2	15,82	10,40	7,49	17,67	12,48	8,99	19,43	14,41	10,49	20,87	15,44	11,77
	110	*4 3/8*			50,2	16,20	11,55	8,32	18,13	13,42	9,98	19,95	14,73	11,65	21,46	15,80	12,96
	120	*4 3/4*			55,2	16,57	12,27	9,15	18,58	13,70	10,98	20,48	15,05	12,33	22,05	16,16	13,22
	130	*5 1/8*			60,2	16,95	12,50	9,97	19,03	13,97	11,44	21,01	15,37	12,56	22,64	16,52	13,48
	140	*5 1/2*			65,2	17,33	12,73	10,42	19,48	14,25	11,64	21,54	15,70	12,79	23,23	16,89	13,74
	150	*6*			70,2	17,70	12,96	10,59	19,93	14,53	11,84	22,06	16,02	13,02	23,83	17,25	14,00
	160	*6 1/4*			75,2	18,08	13,19	10,75	20,38	14,80	12,04	22,59	16,34	13,25	24,42	17,61	14,26
	170	*6 3/4*			80,2	18,46	13,42	10,92	20,83	15,08	12,23	23,12	16,66	13,49	25,01	17,97	14,52
	180	*7 1/8*			85,2	18,83	13,65	11,08	21,29	15,35	12,43	23,64	16,98	13,72	25,60	18,33	14,78
	190	*7 1/2*			90,2	19,21	13,88	11,25	21,74	15,63	12,63	24,17	17,31	13,95	26,19	18,69	15,04
	200	*8*	8	*5/16*	95,2	19,59	14,11	11,42	22,19	15,91	12,83	24,70	17,63	14,18	26,78	19,05	15,30
	220	*8 5/8*			105,2	20,34	14,57	11,75	23,09	16,46	13,23	25,75	18,27	14,65	27,97	19,78	15,82
	240	*9 1/2*			115,2	21,09	15,03	12,08	24,00	17,01	13,63	26,80	18,92	15,11	29,15	20,50	16,34
	260	*10 1/4*			125,2	21,84	15,49	12,41	24,90	17,56	14,02	27,86	19,56	15,57	30,33	21,22	16,86
	280	*11*			135,2	22,60	15,95	12,74	25,80	18,11	14,42	28,91	20,20	16,04	31,04	21,95	17,38
	300	*11 3/4*			145,2	23,35	16,41	13,07	26,71	18,67	14,82	29,32	20,85	16,50	31,04	22,67	17,90
	320	*12 5/8*			155,2	24,10	16,87	13,40	27,18	19,22	15,22	29,32	21,49	16,96	31,04	23,39	18,42
	340	*13 3/8*			165,2	24,83	17,33	13,73	27,18	19,77	15,61	29,32	22,13	17,43	31,04	24,11	18,94
	360	*14 1/4*			175,2	24,83	17,79	14,06	27,18	20,32	16,01	29,32	22,78	17,89	31,04	24,34	19,46
	380	*15*			185,2	24,83	18,25	14,40	27,18	20,87	16,41	29,32	22,99	18,35	31,04	24,34	19,98
	400	*15 3/4*			195,2	24,83	18,71	14,73	27,18	21,30	16,80	29,32	22,99	18,82	31,04	24,34	20,50
16	500	*19 3/4*			245,2	24,83	19,46	16,38	27,18	21,30	18,09	29,32	22,99	19,53	31,04	24,34	20,69
0.63	80	*3 1/8*			34,4	12,96	7,92	5,70	15,55	9,51	6,84	18,15	11,09	7,98	19,59	12,45	8,96
	100	*4*			44,4	15,76	10,22	7,36	17,60	12,27	8,83	19,34	14,31	10,30	20,77	15,38	11,56
	110	*4 3/8*			49,4	16,14	11,37	8,19	18,05	13,38	9,82	19,87	14,68	11,46	21,37	15,74	12,87
	120	*4 3/4*			54,4	16,52	12,23	9,01	18,51	13,65	10,82	20,40	15,00	12,29	21,96	16,11	13,18
	130	*5 1/8*			59,4	16,89	12,46	9,84	18,96	13,93	11,41	20,92	15,32	12,52	22,55	16,47	13,44
	140	*5 1/2*			64,4	17,27	12,69	10,40	19,41	14,21	11,61	21,45	15,64	12,75	23,14	16,83	13,70
	150	*6*			69,4	17,64	12,92	10,56	19,86	14,48	11,81	21,98	15,97	12,99	23,73	17,19	13,96
	160	*6 1/4*			74,4	18,02	13,15	10,73	20,31	14,76	12,00	22,51	16,29	13,22	24,32	17,55	14,22
	170	*6 3/4*			79,4	18,40	13,38	10,89	20,76	15,03	12,20	23,03	16,61	13,45	24,91	17,91	14,48
	180	*7 1/8*			84,4	18,77	13,61	11,06	21,21	15,31	12,40	23,56	16,93	13,68	25,51	18,27	14,74
	190	*7 1/2*			89,4	19,15	13,84	11,22	21,67	15,59	12,60	24,09	17,25	13,91	26,10	18,64	15,00
	200	*8*	9,6	*3/8*	94,4	19,53	14,07	11,39	22,12	15,86	12,80	24,61	17,58	14,14	26,69	19,00	15,26
	220	*8 5/8*			104,4	20,28	14,53	11,72	23,02	16,41	13,20	25,67	18,22	14,61	27,87	19,72	15,78
	240	*9 1/2*			114,4	21,03	14,99	12,05	23,92	16,97	13,59	26,72	18,86	15,07	29,05	20,44	16,30
	260	*10 1/4*			124,4	21,78	15,45	12,38	24,83	17,52	13,99	27,77	19,51	15,54	30,24	21,17	16,82
	280	*11*			134,4	22,54	15,91	12,71	25,73	18,07	14,39	28,83	20,15	16,00	31,04	21,89	17,34
	300	*11 3/4*			144,4	23,29	16,37	13,05	26,63	18,62	14,79	29,32	20,80	16,46	31,04	22,61	17,86
	320	*12 5/8*			154,4	24,04	16,83	13,38	27,18	19,17	15,18	29,32	21,44	16,93	31,04	23,33	18,38
	340	*13 3/8*			164,4	24,79	17,29	13,71	27,18	19,73	15,58	29,32	22,08	17,39	31,04	24,06	18,90
	360	*14 1/4*			174,4	24,83	17,75	14,04	27,18	20,28	15,98	29,32	22,73	17,85	31,04	24,34	19,42
	380	*15*			184,4	24,83	18,21	14,37	27,18	20,83	16,38	29,32	22,99	18,32	31,04	24,34	19,94
	400	*15 3/4*			194,4	24,83	18,67	14,70	27,18	21,30	16,77	29,32	22,99	18,78	31,04	24,34	20,46
	500	*19 3/4*			244,4	24,83	19,46	16,36	27,18	21,30	18,09	29,32	22,99	19,53	31,04	24,34	20,69

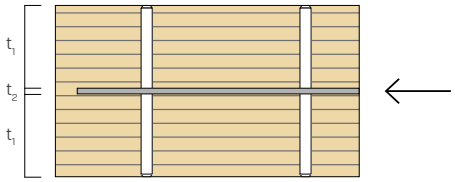
NOTES and GENERAL PRINCIPLES on page 9.

STRUCTURAL VALUES | LATERAL RESISTANCE

1 INTERNAL PLATE

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





d_1	L		steel plate thickness = t_2 [2]		embedment length = t_1 [3]	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]		
	120	*4 3/4*			56,0	23,96	15,34	11,04	26,75	18,41	13,25	29,39	21,48	15,46	31,56	23,38	17,36
	140	*5 1/2*			66,0	24,86	18,08	13,02	27,83	20,58	15,62	30,65	22,59	18,22	32,97	24,25	19,86
	160	*6 1/4*			76,0	25,75	19,00	14,99	28,90	21,24	17,39	31,90	23,36	19,09	34,38	25,11	20,48
	180	*7 1/8*			86,0	26,65	19,55	15,99	29,98	21,89	17,87	33,16	24,13	19,64	35,79	25,97	21,10
	200	*8*			96,0	27,54	20,09	16,39	31,05	22,55	18,34	34,41	24,89	20,19	37,19	26,83	21,72
	220	*8 5/8*	6,4	*1/4*	106,0	28,44	20,64	16,78	32,13	23,21	18,81	35,66	25,66	20,75	38,60	27,69	22,34
	240	*9 1/2*			116,0	29,34	21,19	17,17	33,20	23,87	19,28	36,92	26,43	21,30	40,01	28,55	22,96
	260	*10 1/4*			126,0	30,23	21,74	17,57	34,28	24,52	19,76	38,17	27,19	21,85	41,42	29,41	23,58
	300	*11 3/4*			146,0	32,02	22,83	18,36	36,43	25,84	20,70	40,68	28,73	22,95	44,23	31,13	24,82
	320	*12 5/8*			156,0	32,92	23,38	18,75	37,50	26,49	21,18	41,94	29,49	23,51	45,64	31,99	25,44
	360	*14 1/4*			176,0	34,71	24,47	19,54	39,65	27,81	22,12	44,45	31,03	24,61	47,35	33,71	26,68
	400	*15 3/4*			196,0	36,50	25,57	20,33	41,45	29,12	23,07	44,73	32,56	25,71	47,35	35,43	27,92
	120	*4 3/4*			54,4	23,82	14,91	10,73	26,58	17,89	12,88	29,19	20,87	15,02	31,34	23,25	16,86
	140	*5 1/2*			64,4	24,71	17,64	12,70	27,65	20,48	15,24	30,45	22,47	17,78	32,75	24,11	19,77
	160	*6 1/4*			74,4	25,61	18,91	14,67	28,73	21,13	17,32	31,70	23,24	19,00	34,15	24,97	20,39
	180	*7 1/8*			84,4	26,51	19,46	15,93	29,81	21,79	17,79	32,96	24,00	19,55	35,56	25,83	21,01
	200	*8*			94,4	27,40	20,01	16,32	30,88	22,45	18,26	34,21	24,77	20,11	36,97	26,69	21,62
20	220	*8 5/8*	9,6	*3/8*	104,4	28,30	20,55	16,72	31,96	23,10	18,74	35,47	25,54	20,66	38,38	27,55	22,24
0.79	240	*9 1/2*			114,4	29,19	21,10	17,11	33,03	23,76	19,21	36,72	26,30	21,21	39,79	28,41	22,86
	260	*10 1/4*			124,4	30,09	21,65	17,51	34,11	24,42	19,68	37,97	27,07	21,76	41,19	29,27	23,48
	300	*11 3/4*			144,4	31,88	22,74	18,29	36,26	25,73	20,63	40,48	28,60	22,87	44,01	30,99	24,72
	320	*12 5/8*			154,4	32,78	23,29	18,69	37,33	26,39	21,10	41,74	29,37	23,42	45,42	31,85	25,34
	360	*14 1/4*			174,4	34,57	24,39	19,48	39,48	27,70	22,05	44,25	30,90	24,52	47,35	33,57	26,58
	400	*15 3/4*			194,4	36,36	25,48	20,27	41,45	29,02	22,99	44,73	32,44	25,63	47,35	35,29	27,82
	120	*4 3/4*			52,9	23,68	14,47	10,42	26,41	17,37	12,50	28,99	20,26	14,59	31,11	22,74	16,37
	140	*5 1/2*			62,9	24,57	17,21	12,39	27,48	20,37	14,87	30,25	22,35	17,35	32,52	23,97	19,47
	160	*6 1/4*			72,9	25,47	18,82	14,36	28,56	21,03	17,23	31,50	23,12	18,92	33,93	24,83	20,29
	180	*7 1/8*			82,9	26,36	19,37	15,87	29,63	21,69	17,72	32,76	23,88	19,47	35,34	25,69	20,91
	200	*8*			92,9	27,26	19,92	16,26	30,71	22,34	18,19	34,01	24,65	20,02	36,75	26,55	21,53
	220	*8 5/8*	12,7	*1/2*	102,9	28,16	20,47	16,65	31,79	23,00	18,66	35,27	25,42	20,57	38,15	27,41	22,15
	240	*9 1/2*			112,9	29,05	21,01	17,05	32,86	23,66	19,13	36,52	26,18	21,12	39,56	28,27	22,77
	260	*10 1/4*			122,9	29,95	21,56	17,44	33,94	24,31	19,61	37,77	26,95	21,68	40,97	29,13	23,38
	300	*11 3/4*			142,9	31,74	22,66	18,23	36,09	25,63	20,55	40,28	28,48	22,78	43,79	30,86	24,62
	320	*12 5/8*			152,9	32,64	23,21	18,63	37,16	26,28	21,03	41,54	29,25	23,33	45,19	31,72	25,24
	360	*14 1/4*			172,9	34,43	24,30	19,41	39,31	27,60	21,97	44,05	30,78	24,43	47,35	33,44	26,48
	400	*15 3/4*			192,9	36,22	25,40	20,20	41,45	28,91	22,92	44,73	32,32	25,54	47,35	35,16	27,72

STRUCTURAL VALUES

GENERAL PRINCIPLES

- The values are valid for a beam width equal to or greater than the dowel length. The dowels are installed symmetrically with the steel plate in the center of the beam.
- 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).
- 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=042), Douglas Fir (G=0.49), and Southern Pine (G=0.55).
- 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 for different load-to grain angles according to Clause 12.4 as per CSA-O86 2019 and are representative of a single dowel with two shear planes.

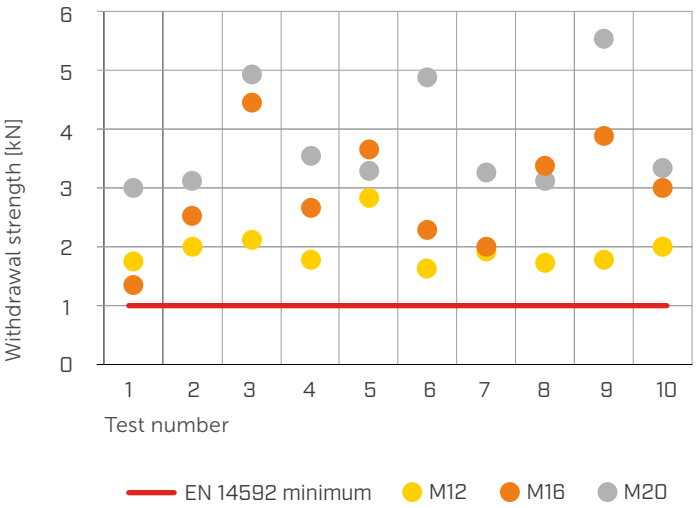
(2) 1/16 inch tolerance has been assumed for the timber slot.

(3) The embedment length is calculated using the following equation t_1 = (L- t_2 - t_{mill})/ 2. Where L is the 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, 1/16 inch was considered for the tabulated values.

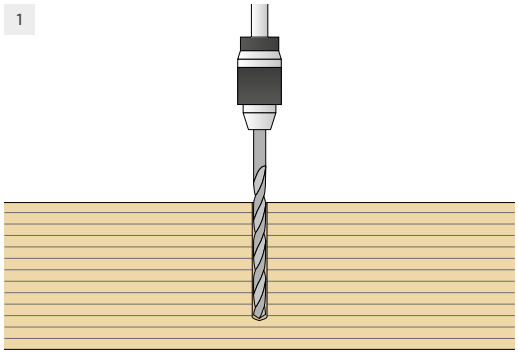
STAS | IMPROVED BOND DOWEL FOR SEISMIC LOADS

Knurled dowel available on request. Knurling limits the displacement of the dowels from the joint during an earthquake, as stipulated in Eurocode 8, and allows for a pull-out strength of 1 kN, as stipulated in EN 14592:2022.

STAS - WITHDRAWAL VALUES

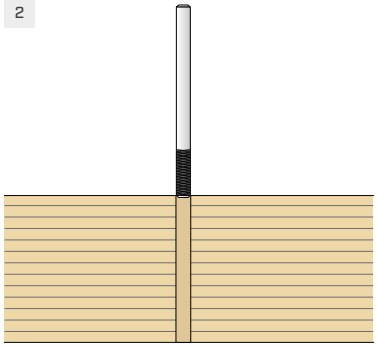


1



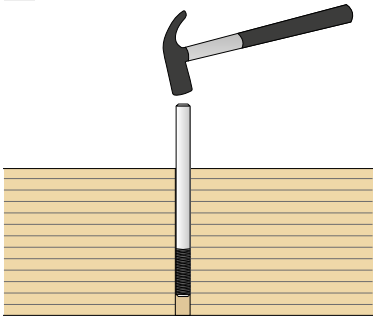
Make a pre-drilling hole with a diameter equal to the diameter of the dowel using a drill press or CNC machine. The hole must be perfectly perpendicular.

2



Clean the hole and place the dowel with the knurling in contact with the timber.

3



Drive the dowel into the hole using a hammer.