

SMOOTH DOWEL

STEEL

S355 steel grade to provide higher shear strength to the standard sizes used in structural design Ø16 and Ø20 (0.63 and 0.79).

GEOMETRY

Tapered end for an easy insertion of the fastener into the pre drilled timber element. Available in 1,0 m (39 3/8 in.) long version.

SPECIAL VERSION

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



CHARACTERISTICS

FOCUS	concealed joints
DIAMETER	from 8,0 to 20,0 mm (from 0.32 to 0.79 in.)
LENGTH	from 60 to 500 mm (from 2 3/8 to 19 3/4 in.)
STEEL	S235 (Ø8 - Ø12) (0.32 - 0.48) - S355 (Ø16 - Ø20) (0.63 - 0.79)



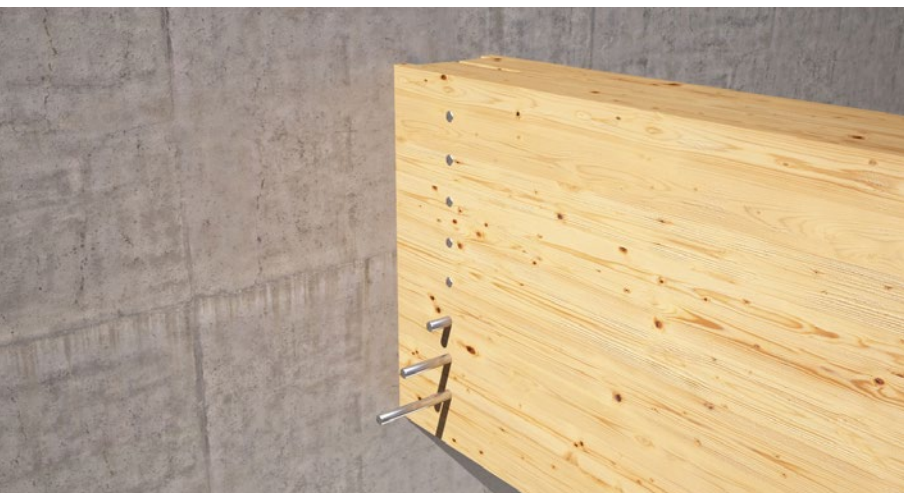
MATERIAL

Bright zinc plated carbon steel.

FIELDS OF USE

Timber-to-timber and steel to timber shear connections

- solid timber and glulam
- CLT, LVL
- timber based panels



LARGE SCALE STRUCTURES

Calculation accuracy: CE marking guarantees the usage suitability. Improved bond version ideal in seismic areas.

TIMBER-TO-METAL

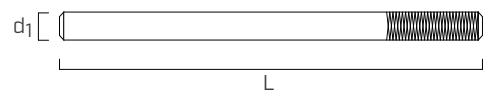
Ideal for being used with ALU brackets in realizing concealed joints. When used with wood taps it meets the fire safety requirements and provides a rewarding aesthetic appearance.

CODES AND DIMENSIONS

d ₁ [mm] [in]	CODE	L [mm] [in]	steel	pcs
8 0.32	STA860B	60 2 3/8	S235	200
	STA880B	80 3 1/8	S235	200
	STA8100B	100 4	S235	200
	STA8120B	120 4 3/4	S235	200
	STA8140B	140 5 1/2	S235	200
12 0.48	STA1260B	60 2 3/8	S235	100
	STA1270B	70 2 3/4	S235	100
	STA1280B	80 3 1/8	S235	100
	STA1290B	90 3 1/2	S235	100
	STA12100B	100 4	S235	100
	STA12110B	110 4 3/8	S235	100
	STA12120B	120 4 3/4	S235	100
	STA12130B	130 5 1/8	S235	100
	STA12140B	140 5 1/2	S235	100
	STA12150B	150 6	S235	100
	STA12160B	160 6 1/4	S235	100
	STA12170B	170 6 3/4	S235	100
	STA12180B	180 7 1/8	S235	100
	STA12200B	200 8	S235	100
	STA12220B	220 8 5/8	S235	100
	STA12240B	240 9 1/2	S235	100
16 0.63	STA12260B	260 10 1/4	S235	100
	STA12280B	280 11	S235	100
	STA12320B	320 12 5/8	S235	100
	STA12340B	340 13 3/8	S235	100
	STA121000B	1000 39 3/8	S235	1
	STA1680B	80 3 1/8	S355	50
	STA16100B	100 4	S355	50
	STA16110B	110 4 3/8	S355	50
	STA16120B	120 4 3/4	S355	50
	STA16130B	130 5 1/8	S355	50
	STA16140B	140 5 1/2	S355	50
	STA16150B	150 6	S355	50
	STA16160B	160 6 1/4	S355	50
	STA16170B	170 6 3/4	S355	50
	STA16180B	180 7 1/8	S355	50
	STA16190B	190 7 1/2	S355	50

d ₁ [mm] [in]	CODE	L [mm] [in]	steel	pcs
16 0.63	STA16200B	200 8	S355	50
	STA16220B	220 8 5/8	S355	50
	STA16240B	240 9 1/2	S355	50
	STA16260B	260 10 1/4	S355	50
	STA16280B	280 11	S355	50
	STA16300B	300 11 3/4	S355	50
	STA16320B	320 12 5/8	S355	50
	STA16340B	340 13 3/8	S355	50
	STA16360B	360 14 1/4	S355	50
	STA16380B	380 15	S355	50
20 0.79	STA16400B	400 15 3/4	S355	50
	STA16420B	420 16 9/16	S355	50
	STA16500B	500 19 3/4	S355	50
	STA161000B	1000 39 3/8	S355	1
	STA20120B	120 4 3/4	S355	25
	STA20140B	140 5 1/2	S355	25
	STA20160B	160 6 1/4	S355	25
	STA20180B	180 7 1/8	S355	25
	STA20190B	190 7 1/2	S355	25
	STA20200B	200 8	S355	25
20 0.79	STA20220B	220 8 5/8	S355	25
	STA20240B	240 9 1/2	S355	25
	STA20260B	260 10 1/4	S355	25
	STA20300B	300 11 3/4	S355	25
	STA20320B	320 12 5/8	S355	25
	STA20360B	360 14 1/4	S355	25
	STA20400B	400 15 3/4	S355	25
	STA201000B	1000 39 3/8	S355	25

Available upon request: high bond steel and shaped to avoid pull-out when used in seismic areas (e.g. STAS16200).
Minimum quantity 1000 pieces.



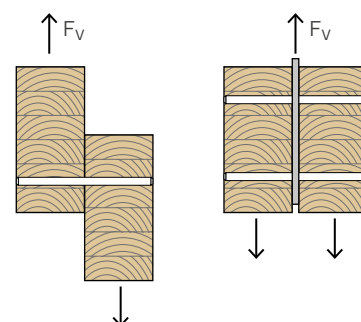
MATERIAL AND DURABILITY

STA Ø8 - Ø12 (0.32 - 0.48): S235 bright zinc plated carbon steel.
STA Ø16 - Ø20 (0.63 - 0.79): S355 bright zinc plated carbon steel.
To be used in service classes 1 and 2 (EN 1995-1-1).

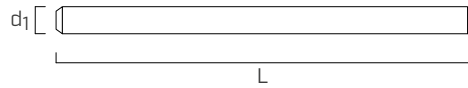
FIELD OF USE

- Timber-to-timber joints
- Timber-steel-timber joints

EXTERNAL LOADS



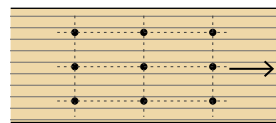
■ GEOMETRY AND MECHANICAL CHARACTERISTICS



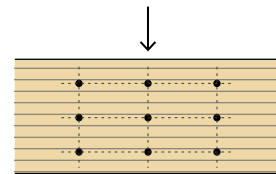
Nominal diameter	d_1	[mm] [in]	8 0.32	12 0.48	16 0.63	20 0.79
Length	L	[mm] [in]	60 - 140 2 3/8 - 5 1/2	60 - 340 2 3/8 - 13 3/8	80 - 500 3 1/8 - 19 3/4	120 - 400 4 3/4 - 15 3/4
Material	steel		S235	S235	S355	S355
Specified Bending Yield Strength	F_{yb}	[psi]	40.000	40.000	55.000	55.000

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

■ MINIMUM DISTANCES FOR CONNECTORS SUBJECTED TO SHEAR STRESS⁽¹⁾

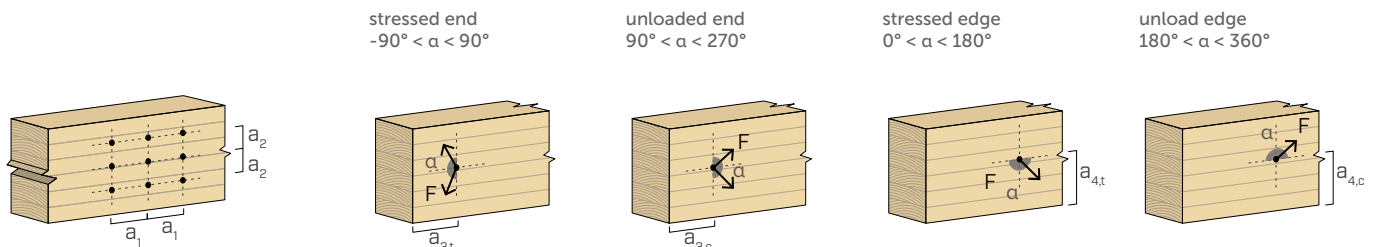


Load-to-grain angle $\alpha = 0^\circ$



Load-to-grain angle $\alpha = 90^\circ$

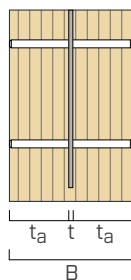
d_1	[mm] [in]	8	0.32	12	0.48	16	0.63	20	0.79	8	0.32	12	0.48	16	0.63	20	0.79
a_1	[mm] [in]	40	1 9/16	60	2 3/8	80	3 1/8	100	4	24	15/16	36	1 7/16	48	1 7/8	60	2 3/8
a_2	[mm] [in]	24	15/16	36	1 7/16	48	1 7/8	60	2 3/8	24	15/16	36	1 7/16	48	1 7/8	60	2 3/8
$a_{3,t}$	[mm] [in]	80	3 1/8	84	3 5/16	112	4 7/16	140	5 1/2	80	3 1/8	84	3 5/16	112	4 7/16	140	5 1/2
$a_{3,c}$	[mm] [in]	40	1 9/16	42	1 5/8	56	2 3/16	70	2 3/4	80	3 1/8	84	3 5/16	112	4 7/16	140	5 1/2
$a_{4,t}$	[mm] [in]	24	15/16	36	1 7/16	48	1 7/8	60	2 3/8	32	1 1/4	48	1 7/8	64	2 1/2	80	3 1/8
$a_{4,c}$	[mm] [in]	24	15/16	36	1 7/16	48	1 7/8	60	2 3/8	24	15/16	36	1 7/16	48	1 7/8	60	2 3/8



NOTES:

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

■ STRUCTURAL VALUES | ASD REFERENCE LATERAL DESIGN VALUES [Z]



d ₁ [mm] [in]	L		steel plate thickness		Z (0°)		Z (30°)		Z (45°)		Z (60°)		Z _⊥ (90°)	
	[mm]	[in]	[mm]	[in]	SP/HF (G≥0.42)	DF/SP (G≥0.49)	SP/HF (G≥0.42)	DF/SP (G≥0.49)	SP/HF (G≥0.42)	DF/SP (G≥0.49)	SP/HF (G≥0.42)	DF/SP (G≥0.49)	SP/HF (G≥0.42)	DF/SP (G≥0.49)
8 0.32	60	2 3/8	3,2	1/8	567	636	480	545	428	491	386	446	340	395
	80	3 1/8			672	727	562	640	496	580	443	523	386	459
	≥ 100	≥ 4			676	727	588	640	538	590	494	547	442	492
	60	2 3/8	4,8	3/16	560	626	474	537	423	485	382	441	336	390
	80	3 1/8			663	727	555	639	490	572	438	516	382	453
	≥ 100	≥ 4			676	727	588	640	538	590	494	547	442	492
	60	2 3/8	6,4	1/4	552	617	468	530	419	478	378	435	333	386
	80	3 1/8			654	727	547	630	484	564	433	509	378	448
	≥ 100	≥ 4			676	727	588	640	538	590	494	547	442	492
12 0.48	60	2 3/8	4,8	3/16	1.105	1.209	896	1.011	732	893	613	759	506	633
	80	3 1/8			1.206	1.341	978	1.101	849	963	752	856	653	746
	100	4			1.370	1.545	1.092	1.250	934	1.079	816	948	700	817
	120	4 3/4			1.521	1.636	1.210	1.394	1.025	1.198	888	1.045	756	894
	140	5 1/2			1.521	1.636	1.279	1.394	1.127	1.253	970	1.137	821	981
	160	6 1/4			1.521	1.636	1.279	1.394	1.139	1.253	1.026	1.137	892	1.005
	≥ 180	≥ 7 1/8			1.521	1.636	1.279	1.394	1.139	1.253	1.026	1.137	902	1.005
	60	2 3/8	6,4	1/4	1.100	1.201	491	614	869	1.006	711	867	595	737
	80	3 1/8			1.195	1.328	651	742	971	1.092	844	956	749	851
	100	4			1.358	1.529	696	811	1.083	1.238	927	1.070	811	941
	120	4 3/4			1.521	1.636	751	887	1.199	1.386	1.017	1.188	882	1.037
	140	5 1/2			1.521	1.636	815	974	1.279	1.394	1.118	1.253	963	1.137
	160	6 1/4			1.521	1.636	886	1.005	1.279	1.394	1.139	1.253	1.026	1.137
	≥ 180	≥ 7 1/8			1.521	1.636	902	1.005	1.279	1.394	1.139	1.253	1.026	1.137
	60	2 3/8	8	5/16	1.094	1.193	843	1.002	689	841	577	714	476	596
	80	3 1/8			1.185	1.315	964	1.083	840	950	745	846	649	738
	100	4			1.345	1.513	1.074	1.227	920	1.061	805	933	692	805
	120	4 3/4			1.506	1.636	1.189	1.373	1.009	1.177	875	1.028	746	881
	140	5 1/2			1.521	1.636	1.279	1.394	1.109	1.253	956	1.134	810	966
	160	6 1/4			1.521	1.636	1.279	1.394	1.139	1.253	1.026	1.137	880	1.005
	≥ 180	≥ 7 1/8			1.521	1.636	1.279	1.394	1.139	1.253	1.026	1.137	902	1.005
16 0.63	80	3 1/8	6,4	1/4	2.083	2.430	1.492	1.791	1.174	1.436	957	1.186	774	968
	100	4			2.358	2.594	1.876	2.086	1.540	1.806	1.255	1.555	1.014	1.269
	120	4 3/4			2.501	2.780	1.957	2.202	1.665	1.884	1.456	1.651	1.221	1.423
	140	5 1/2			2.678	3.001	2.067	2.349	1.739	1.989	1.506	1.728	1.287	1.478
	160	6 1/4			2.878	3.246	2.196	2.517	1.830	2.113	1.572	1.822	1.335	1.549
	180	7 1/8			3.132	3.412	2.365	2.731	1.952	2.276	1.664	1.949	1.403	1.646
	200	8			3.172	3.412	2.548	2.831	2.088	2.451	1.768	2.088	1.482	1.754
	220	8 5/8			3.172	3.412	2.594	2.831	2.191	2.497	1.848	2.193	1.543	1.837
	240	9 1/2			3.172	3.412	2.594	2.831	2.267	2.497	1.966	2.235	1.635	1.955
	260	10 1/4			3.172	3.412	2.594	2.831	2.267	2.497	2.015	2.235	1.717	1.955
	80	3 1/8	8	5/16	2.037	2.376	1.459	1.752	1.148	1.404	936	1.159	756	946
	100	4			2.348	2.580	1.871	2.078	1.514	1.801	1.234	1.528	997	1.247
	120	4 3/4			2.488	2.762	1.949	2.191	1.660	1.876	1.453	1.645	1.204	1.419
	140	5 1/2			2.662	2.981	2.057	2.336	1.732	1.979	1.501	1.721	1.284	1.473
	160	6 1/4			2.861	3.225	2.185	2.502	1.822	2.102	1.566	1.814	1.330	1.543
	180	7 1/8			3.114	3.412	2.352	2.715	1.943	2.263	1.657	1.939	1.398	1.639
	200	8			3.172	3.412	2.534	2.831	2.078	2.438	1.761	2.077	1.476	1.746
	220	8 5/8			3.172	3.412	2.594	2.831	2.180	2.497	1.840	2.182	1.537	1.829
	240	9 1/2			3.172	3.412	2.594	2.831	2.267	2.497	1.957	2.235	1.628	1.950
	260	10 1/4			3.172	3.412	2.594	2.831	2.267	2.497	2.015	2.235	1.710	1.955

d ₁ [mm] [in]	L		steel plate thickness [mm] [in]	Z (0°)		Z (30°)		Z (45°)		Z (60°)		Z _⊥ (90°)	
	[mm]	[in]		SP/HF (G≥0.42)	DF/SP (G≥0.49)	SP/HF (G≥0.42)	DF/SP (G≥0.49)	SP/HF (G≥0.42)	DF/SP (G≥0.49)	SP/HF (G≥0.42)	DF/SP (G≥0.49)	SP/HF (G≥0.42)	DF/SP (G≥0.49)
16 0.63	80	3 1/8	9,6 3/8	1.990	2.322	1.426	1.712	1.122	1.372	915	1.133	739	924
	100	4		2.338	2.567	1.866	2.070	1.487	1.796	1.212	1.502	980	1.226
	120	4 3/4		2.474	2.746	1.942	2.180	1.655	1.869	1.450	1.640	1.186	1.416
	140	5 1/2		2.647	2.962	2.047	2.323	1.725	1.970	1.496	1.714	1.281	1.468
	160	6 1/4		2.843	3.204	2.173	2.488	1.813	2.091	1.560	1.806	1.326	1.536
	180	7 1/8		3.095	3.412	2.340	2.700	1.934	2.251	1.650	1.930	1.392	1.631
	200	8		3.172	3.412	2.521	2.831	2.068	2.426	1.753	2.067	1.470	1.738
	220	8 5/8		3.172	3.412	2.594	2.831	2.170	2.497	1.832	2.171	1.531	1.820
	240	9 1/2		3.172	3.412	2.594	2.831	2.267	2.497	1.949	2.235	1.621	1.941
	260	10 1/4		3.172	3.412	2.594	2.831	2.267	2.497	2.015	2.235	1.703	1.955
20 0.79	120	4 3/4	6,4 1/4	3.651	4.007	2.805	3.148	2.143	2.625	1.713	2.124	1.365	1.707
	140	5 1/2		3.815	4.224	2.918	3.268	2.458	2.763	2.003	2.406	1.596	1.996
	160	6 1/4		4.018	4.281	3.029	3.423	2.523	2.864	2.177	2.473	1.827	2.111
	180	7 1/8		4.281	4.281	3.188	3.634	2.625	3.010	2.245	2.577	1.902	2.183
	200	8		4.281	4.281	3.371	3.872	2.749	3.178	2.331	2.701	1.962	2.274
	220	8 5/8		4.281	4.281	3.513	3.952	2.847	3.310	2.402	2.800	2.013	2.347
	240	9 1/2		4.281	4.281	3.723	3.952	2.996	3.505	2.512	2.949	2.093	2.460
	260	10 1/4		4.281	4.281	3.913	3.952	3.132	3.681	2.613	3.085	2.168	2.564
	120	4 3/4	9,6 3/8	3.628	3.976	2.726	3.132	2.083	2.551	1.665	2.064	1.327	1.659
	140	5 1/2		3.785	4.185	2.903	3.245	2.445	2.748	1.954	2.397	1.557	1.948
	160	6 1/4		3.982	4.437	3.009	3.395	2.510	2.845	2.169	2.461	1.788	2.102
	180	7 1/8		4.250	4.769	3.164	3.602	2.609	2.987	2.234	2.561	1.895	2.172
	200	8		4.547	5.132	3.343	3.836	2.730	3.153	2.318	2.683	1.952	2.260
	220	8 5/8		4.772	5.331	3.484	4.016	2.827	3.283	2.387	2.780	2.002	2.332
	240	9 1/2		4.956	5.331	3.692	4.280	2.974	3.476	2.495	2.927	2.081	2.443
	260	10 1/4		4.956	5.331	3.881	4.327	3.109	3.651	2.596	3.062	2.155	2.546
	120	4 3/4	12,7 1/2	3.607	3.947	2.647	3.117	2.023	2.477	1.616	2.004	1.288	1.611
	140	5 1/2		3.755	4.147	2.888	3.224	2.385	2.735	1.906	2.363	1.519	1.899
	160	6 1/4		3.947	4.392	2.989	3.368	2.499	2.827	2.162	2.448	1.750	2.094
	180	7 1/8		4.209	4.720	3.140	3.571	2.594	2.965	2.223	2.545	1.888	2.160
	200	8		4.503	5.079	3.317	3.802	2.712	3.128	2.305	2.664	1.943	2.246
	220	8 5/8		4.727	5.331	3.455	3.979	2.807	3.256	2.373	2.760	1.992	2.317
	240	9 1/2		4.956	5.331	3.662	4.241	2.952	3.448	2.479	2.905	2.069	2.427
	260	10 1/4		4.956	5.331	3.849	4.327	3.086	3.622	2.579	3.039	2.143	2.528

GENERAL PRINCIPLES:

- Reference lateral design values (Z) have been calculated according to NDS yield limit equations and are representative of a single STA dowel.
- Tabulated values are based on standard load duration ($C_D = 1.0$). Moisture and temperature effects have been neglected ($C_M = 1.0$ and $C_t = 1.0$). Values must be multiplied by all applicable adjustment factors from the NDS for use with Allowable Stress Design (ASD).
- The steel plate is assumed to be ASTM A36 with minimum ultimate tensile strength equal to 58 ksi (400 Mpa).
- 1/16" tolerance has been assumed for the timber slot.
- Wood and steel members must be checked by the designer for localized stresses including group effects and tear out or block shear.
- Most common wood materials are assumed such as Spruce-Pine-Fir, Hem-Fir, Douglas Fir, and Southern Pine

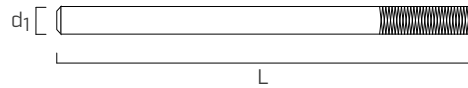
EFFECTIVE NUMBER OF DOWELS n_{ef} FOR $\alpha = 0^\circ$

		a ₁ [mm]						
n. STA		5·d	7·d	10·d	12·d	16·d	18·d	20·d
n _{ef}	2	1,47	1,60	1,75	1,83	1,97	2,00	2,00
	3	2,12	2,30	2,52	2,63	2,83	2,92	2,99
	4	2,74	2,98	3,26	3,41	3,67	3,78	3,88
	5	3,35	3,65	3,99	4,17	4,48	4,62	4,74
	6	3,95	4,30	4,70	4,92	5,28	5,44	5,59
	7	4,54	4,94	5,40	5,65	6,07	6,25	6,42

d = nominal dowel diameter

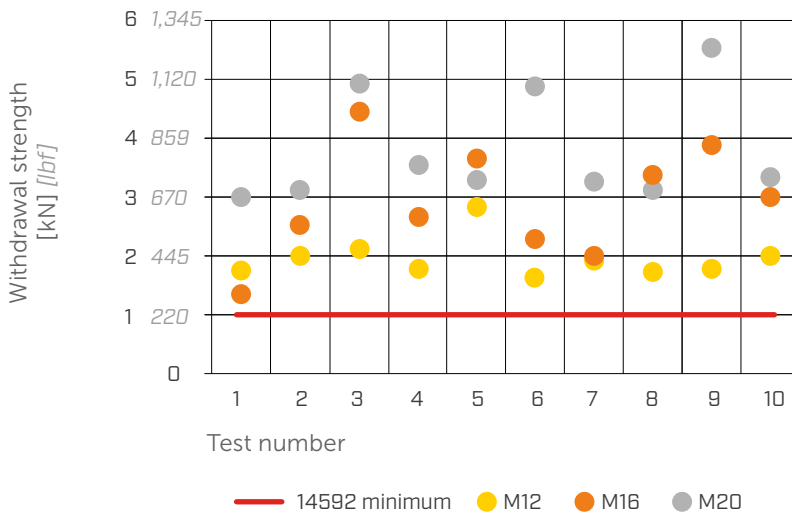
In lieu of the provisions established in EC5, the Group Action Factor, C_g , prescribed in NDS Section 11.3.6 should be used to calculate the reduced shear capacity of multiple dowels loaded in a group for any load direction with respect to wood grain direction.

■ STAS - IMPROVED BOND DOWEL FOR SEISMIC LOADS



The knurled dowel is available on request and it has the standard requirement of the new EN 14592:2022, guaranteeing a minimum withdrawal strength of 1 kN, necessary in seismic areas. The knurling also responds to the provision of EC8 aimed at preventing the cylindrical shank elements from coming out from the joints in the seismic zone.

STAS - WITHDRAWAL VALUES



"Knurled pins" are the submitted to a utility model.

