STA

SMOOTH DOWEL

CE
EN 14592

HIGH-RESISTANCE STEEL
Dowel 0.63 and 0.79 inch diameter 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 39 3/8" 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.

STA STAS

DIAMETER [in]	0.30	**0.32**	**0.79**	0.79
LENGTH [in]	2 3/16	**2 3/8**	**39 3/8**	39 3/8

MATERIAL

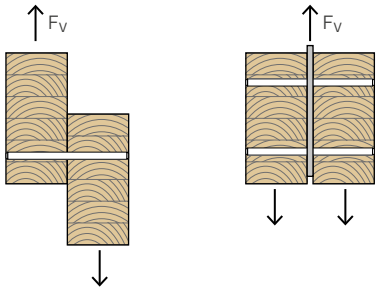
Zn ELECTRO PLATED — electrogalvanized S355-S235 carbon steel

EC1 DRY C2 T2

A2 AISI 304 — stainless steel A2

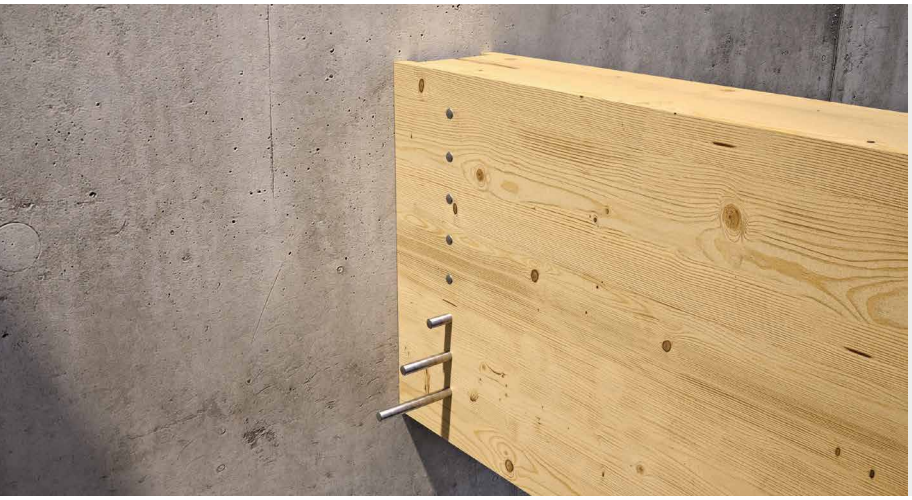
EC1 EC2 EC3 WET C4 T4

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 [0.62 mi] 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_1 [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_1 [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

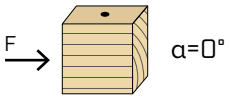
[1]Not holding CE marking.
STA A2 | AISI304 codes are only available upon request.

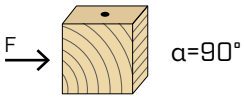
GEOMETRY AND MECHANICAL CHARACTERISTICS

Nominal diameter	d_1	[in]	0.32	0.48	0.63	0.79
		[mm]	8	12	16	20
Length		[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
Steel			S235	S235	S355	S355
Specified bending yield strength	F_{yb}	[psi]	40000	40000	55000	55000

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

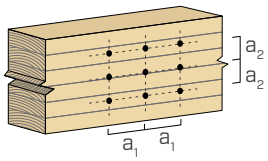




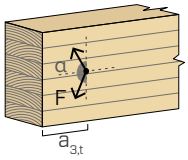
d_1	[in]		0.32	0.48	0.63	0.79
	[mm]		8	12	16	20
a_1	[in]	**5·d**	2 1/16	2 3/8	2 11/16	2 15/16
a_2	[in]	**3·d**	11/16	13/16	7/8	1
$a_{3,t}$	[in]	**max(7·d ; 80 mm)**	2 1/16	2 3/8	2 11/16	2 15/16
$a_{3,c}$	[in]	**max(3,5·d ; 40 mm)**	1 3/8	1 9/16	1 3/4	1 15/16
$a_{4,t}$	[in]	**3·d**	1 3/8	1 9/16	1 3/4	1 15/16
$a_{4,c}$	[in]	**3·d**	11/16	13/16	7/8	1

	0.32	0.48	0.63	0.79
	8	12	16	20
3·d	1 3/8	1 9/16	1 3/4	1 15/16
3·d	11/16	13/16	7/8	1
max(7·d ; 80 mm)	2 1/16	2 3/8	2 11/16	2 15/16
max(7·d ; 80 mm)	1 3/8	1 9/16	1 3/4	1 15/16
4·d	1 3/8	1 9/16	1 3/4	1 15/16
3·d	11/16	13/16	7/8	1

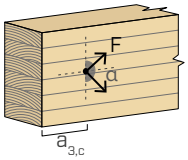
α = load-to-grain angle
d = nominal dowel diameter



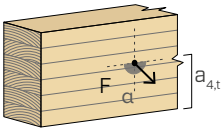
stressed end
α < 90° > -90°



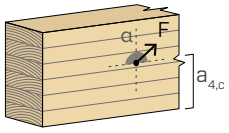
unloaded end
α < 270° > 90°



stressed edge
α < 180° > 0°



unload edge
α < 360° > 180°



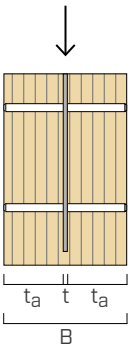
NOTE
- Minimum distances for connectors subject to shear stress in accordance with EN 1995:2014.

EFFECTIVE NUMBER OF DOWELS n_{ef} FOR α = 0°

		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
n_{ef} value given is a function of n and a_1.
In lieu of the provisions established in EC5, the Group Action Factor, Cg, 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.

STRUCTURAL VALUES | TIMBER-TO-STEEL AND ALUMINIUM



d_1	L		steel plate thickness		$Z_{\parallel}$ (0°)		Z (30°)		Z (45°)		Z (60°)		$Z_{\perp}$ (90°)	
					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
[mm] [in]	[mm]	[in]	[mm]	[in]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]
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	1105	1209	896	1011	732	893	613	759	506	633
	80	3 1/8			1206	1341	978	1101	849	963	752	856	653	746
	100	4			1370	1545	1092	1250	934	1079	816	948	700	817
	120	4 3/4			1521	1636	1210	1394	1025	1198	888	1045	756	894
	140	5 1/2			1521	1636	1279	1394	1127	1253	970	1137	821	981
	160	6 1/4			1521	1636	1279	1394	1139	1253	1026	1137	892	1005
	≥ 180	≥ 7 1/8			1521	1636	1279	1394	1139	1253	1026	1137	902	1005
	60	2 3/8	6,4	1/4	1100	1201	491	614	869	1006	711	867	595	737
	80	3 1/8			1195	1328	651	742	971	1092	844	956	749	851
	100	4			1358	1529	696	811	1083	1238	927	1070	811	941
	120	4 3/4			1521	1636	751	887	1199	1386	1017	1188	882	1037
	140	5 1/2			1521	1636	815	974	1279	1394	1118	1253	963	1137
	160	6 1/4			1521	1636	886	1005	1279	1394	1139	1253	1026	1137
	≥ 180	≥ 7 1/8			1521	1636	902	1005	1279	1394	1139	1253	1026	1137
	60	2 3/8	8	5/16	1094	1193	843	1002	689	841	577	714	476	596
	80	3 1/8			1185	1315	964	1083	840	950	745	846	649	738
	100	4			1345	1513	1074	1227	920	1061	805	933	692	805
	120	4 3/4			1506	1636	1189	1373	1009	1177	875	1028	746	881
	140	5 1/2			1521	1636	1279	1394	1109	1253	956	1134	810	966
	160	6 1/4			1521	1636	1279	1394	1139	1253	1026	1137	880	1005
	≥ 180	≥ 7 1/8			1521	1636	1279	1394	1139	1253	1026	1137	902	1005
16 **0.63**	80	3 1/8	6,4	1/4	2083	2430	1492	1791	1174	1436	957	1186	774	968
	100	4			2358	2594	1876	2086	1540	1806	1255	1555	1014	1269
	120	4 3/4			2501	2780	1957	2202	1665	1884	1456	1651	1221	1423
	140	5 1/2			2678	3001	2067	2349	1739	1989	1506	1728	1287	1478
	160	6 1/4			2878	3246	2196	2517	1830	2113	1572	1822	1335	1549
	180	7 1/8			3132	3412	2365	2731	1952	2276	1664	1949	1403	1646
	200	8			3172	3412	2548	2831	2088	2451	1768	2088	1482	1754
	220	8 5/8			3172	3412	2594	2831	2191	2497	1848	2193	1543	1837
	240	9 1/2			3172	3412	2594	2831	2267	2497	1966	2235	1635	1955
	260	10 1/4			3172	3412	2594	2831	2267	2497	2015	2235	1717	1955

d_1	L		steel plate thickness		$Z_{\parallel}$ (0°)		Z (30°)		Z (45°)		Z (60°)		$Z_{\perp}$ (90°)	
					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
[mm] [in]	[mm]	[in]	[mm]	[in]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]
16 **0.63**	80	3 1/8	8	5/16	2037	2376	1459	1752	1148	1404	936	1159	756	946
	100	4			2348	2580	1871	2078	1514	1801	1234	1528	997	1247
	120	4 3/4			2488	2762	1949	2191	1660	1876	1453	1645	1204	1419
	140	5 1/2			2662	2981	2057	2336	1732	1979	1501	1721	1284	1473
	160	6 1/4			2861	3225	2185	2502	1822	2102	1566	1814	1330	1543
	180	7 1/8			3114	3412	2352	2715	1943	2263	1657	1939	1398	1639
	200	8			3172	3412	2534	2831	2078	2438	1761	2077	1476	1746
	220	8 5/8			3172	3412	2594	2831	2180	2497	1840	2182	1537	1829
	240	9 1/2			3172	3412	2594	2831	2267	2497	1957	2235	1628	1950
	260	10 1/4			3172	3412	2594	2831	2267	2497	2015	2235	1710	1955
	80	3 1/8	9,6	3/8	1990	2322	1426	1712	1122	1372	915	1133	739	924
	100	4			2338	2567	1866	2070	1487	1796	1212	1502	980	1226
	120	4 3/4			2474	2746	1942	2180	1655	1869	1450	1640	1186	1416
	140	5 1/2			2647	2962	2047	2323	1725	1970	1496	1714	1281	1468
	160	6 1/4			2843	3204	2173	2488	1813	2091	1560	1806	1326	1536
	180	7 1/8			3095	3412	2340	2700	1934	2251	1650	1930	1392	1631
	200	8			3172	3412	2521	2831	2068	2426	1753	2067	1470	1738
	220	8 5/8			3172	3412	2594	2831	2170	2497	1832	2171	1531	1820
	240	9 1/2			3172	3412	2594	2831	2267	2497	1949	2235	1621	1941
	260	10 1/4			3172	3412	2594	2831	2267	2497	2015	2235	1703	1955
20 **0.79**	120	4 3/4	6,4	1/4	3651	4007	2805	3148	2143	2625	1713	2124	1365	1707
	140	5 1/2			3815	4224	2918	3268	2458	2763	2003	2406	1596	1996
	160	6 1/4			4018	4281	3029	3423	2523	2864	2177	2473	1827	2111
	180	7 1/8			4281	4.281	3188	3634	2625	3010	2245	2577	1902	2183
	200	8			4281	4281	3371	3872	2749	3178	2331	2701	1962	2274
	220	8 5/8			4281	4281	3513	3952	2847	3310	2402	2800	2013	2347
	240	9 1/2			4281	4281	3723	3952	2996	3505	2512	2949	2093	2460
	260	10 1/4			4281	4281	3913	3952	3132	3681	2613	3085	2168	2564
	120	4 3/4	9,6	3/8	3628	3976	2726	3132	2083	2551	1665	2064	1327	1659
	140	5 1/2			3785	4185	2903	3245	2445	2748	1954	2397	1557	1948
	160	6 1/4			3982	4437	3009	3395	2510	2845	2169	2461	1788	2102
	180	7 1/8			4250	4769	3164	3602	2609	2987	2234	2561	1895	2172
	200	8			4547	5132	3343	3836	2730	3153	2318	2683	1952	2260
	220	8 5/8			4772	5331	3484	4016	2827	3283	2387	2780	2002	2332
	240	9 1/2			4956	5331	3692	4280	2974	3476	2495	2927	2081	2443
	260	10 1/4			4956	5331	3881	4327	3109	3651	2596	3062	2155	2546
	120	4 3/4	12,7	1/2	3607	3947	2647	3117	2023	2477	1616	2004	1288	1611
	140	5 1/2			3755	4147	2888	3224	2385	2735	1906	2363	1519	1899
	160	6 1/4			3947	4392	2989	3368	2499	2827	2162	2448	1750	2094
	180	7 1/8			4209	4720	3140	3571	2594	2965	2223	2545	1888	2160
	200	8			4503	5079	3317	3802	2712	3128	2305	2664	1943	2246
	220	8 5/8			4727	5331	3455	3979	2807	3256	2373	2760	1992	2317
	240	9 1/2			4956	5331	3662	4241	2952	3448	2479	2905	2069	2427
	260	10 1/4			4956	5331	3849	4327	3086	3622	2579	3039	2143	2528

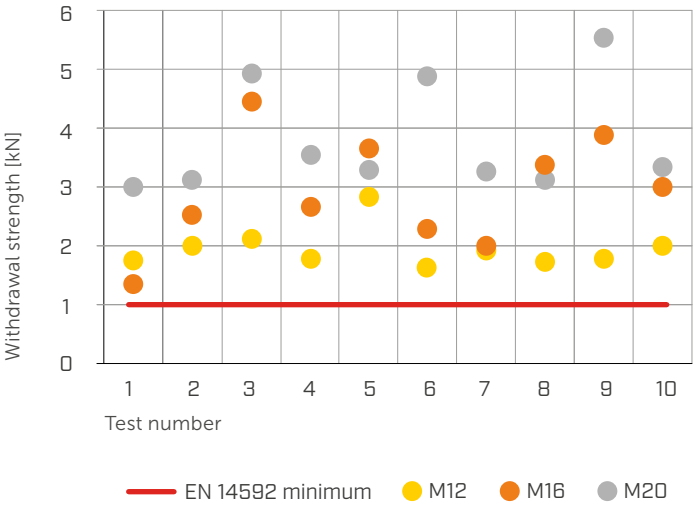
GENERAL PRINCIPLES:

- 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 minimm 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.

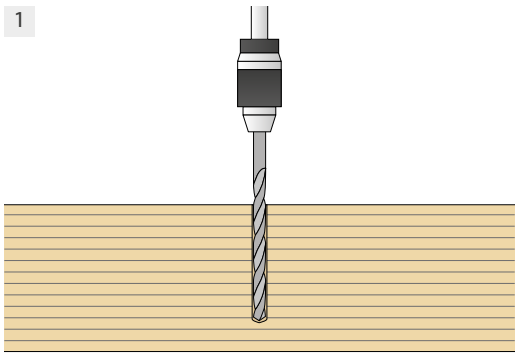
STAS | IMPROVED BOND DOWEL FOR SEISMIC LOADS

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 [224.8 lbf], as stipulated in EN 14592:2022.

STAS - WITHDRAWAL VALUES

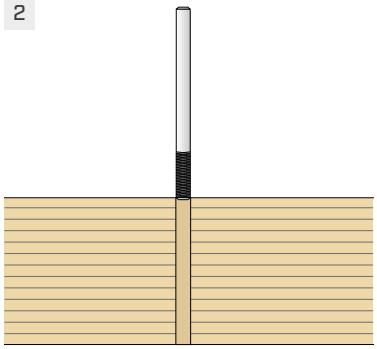


1



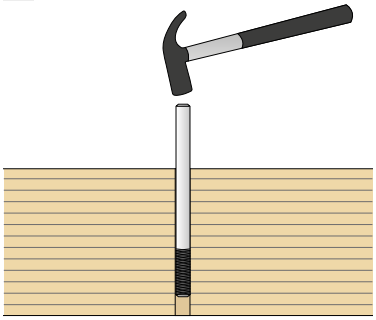
Make a pre-drilling hole with a diameter equal to the diameter of the dowel using a drill press or CNC machine. The hole must be perfectly perpendicular.

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.