STA

SMOOTH DOWEL

CE
EN 14592

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

GEOMETRY
Tapered end for an easy insertion of the fastener into the pre drilled timber element. Available in 1,0 m 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
LENGTH	from 60 to 500 mm
STEEL	S235 (Ø8-Ø12) - S355 (Ø16-Ø20)

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

d_1 [mm]	CODE	L [mm]	steel	pcs
16	**STA16200B**	200	S355	50
	STA16220B	220	S355	50
	STA16240B	240	S355	50
	STA16260B	260	S355	50
	STA16280B	280	S355	50
	STA16300B	300	S355	50
	STA16320B	320	S355	50
	STA16340B	340	S355	50
	STA16360B	360	S355	50
	STA16380B	380	S355	50
	STA16400B	400	S355	50
	STA16420B	420	S355	50
	STA16500B	500	S355	50
16	**STA161000B**	1000	S355	1
20	**STA20120B**	120	S355	25
	STA20140B	140	S355	25
	STA20160B	160	S355	25
	STA20180B	180	S355	25
	STA20190B	190	S355	25
	STA20200B	200	S355	25
	STA20220B	220	S355	25
	STA20240B	240	S355	25
	STA20260B	260	S355	25
	STA20300B	300	S355	25
	STA20320B	320	S355	25
	STA20360B	360	S355	25
	STA20400B	400	S355	25
20	**STA201000B**	1000	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.

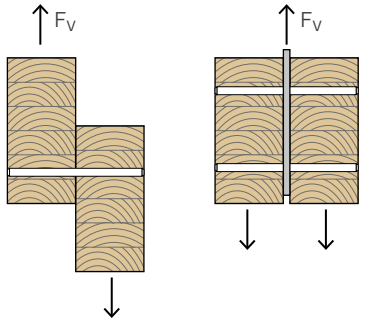
MATERIAL AND DURABILITY

STA Ø8-Ø12: S235 bright zinc plated carbon steel.
STA Ø16-Ø20: 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

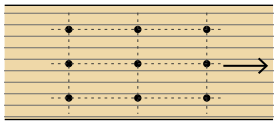


GEOMETRY AND MECHANICAL CHARACTERISTICS

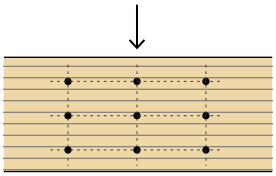
Nominal diameter	**d_1**	**[mm]**	**8**	**12**	**16**	**20**
Length	L	[mm]	60 ÷ 140	60 ÷ 340	80 ÷ 500	120 ÷ 400
Material	steel		S235	S235	S355	S355
	$f_{u,k,min}$	[N/mm^2]	360	360	460	460
	$f_{y,k,min}$	[N/mm^2]	235	235	355	355
Characteristic yield moment	$M_{y,k}$	[Nmm]	24100	69100	191000	340000

Mechanical parameters according to CE marking, in accordance with EN 14592.

MINIMUM DISTANCES FOR CONNECTORS SUBJECTED TO SHEAR STRESS[1]

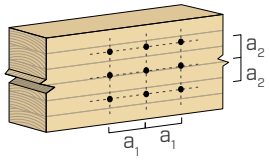


Load-to-grain angle α = 0°

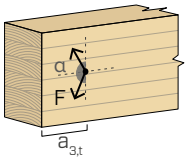


Load-to-grain angle α = 90°

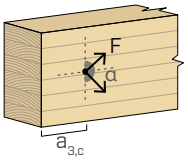
d_1	**[mm]**	**8**	**12**	**16**	**20**	**8**	**12**	**16**	**20**
a_1	[mm]	40	60	80	100	24	36	48	60
a_2	[mm]	24	36	48	60	24	36	48	60
$a_{3,t}$	[mm]	80	84	112	140	80	84	112	140
$a_{3,c}$	[mm]	40	42	56	70	80	84	112	140
$a_{4,t}$	[mm]	24	36	48	60	32	48	64	80
$a_{4,c}$	[mm]	24	36	48	60	24	36	48	60



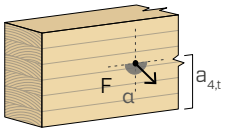
stressed end
-90° < α < 90°



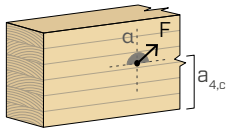
unloaded end
90° < α < 270°



stressed edge
0° < α < 180°



unload edge
180° < α < 360°

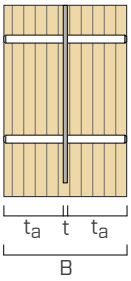


NOTES:

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

TIMBER-TO-STEEL AND ALUMINIUM STATIC VALUES

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



d_1 [mm]	L [mm]	B [mm]	t_a [mm]	$R_{vk,0°}$ [kN]	$R_{vk,30°}$ [kN]	$R_{vk,45°}$ [kN]	$R_{vk,60°}$ [kN]	$R_{vk,90°}$ [kN]
12	60	60	27	13,9	12,9	12,2	11,5	11,0
	80	80	37	15,2	13,9	12,9	12,1	11,5
	100	100	47	17,0	15,4	14,2	13,2	12,4
	120	120	57	19,1	17,2	15,7	14,6	13.6
	140	140	67	21,4	19,2	17,5	16,1	14,9
	160	160	77	22,1	20,7	19,3	17,7	16,4
	> 180	-	-	22,1	20,7	19,6	18,7	17,8
16	80	80	37	25,5	23,6	22,2	21,0	19,7
	100	100	47	26,8	24,6	22,8	21,4	20,2
	120	120	57	28,7	26,1	24,0	22,4	21,0
	140	140	67	31,1	28,0	25,6	23,7	22,2
	160	160	77	33,7	30,2	27,4	25,3	23,5
	180	180	87	36,5	32,5	29,5	27,0	25,0
	200	200	97	39,4	35,0	31,6	28,9	26,7
	220	220	107	40,9	37,6	33,9	30,9	28,4
	240	240	117	40,9	38,2	36,0	32,9	30,3
20	120	120	57	39,0	35,5	32,8	30,6	28,9
	140	140	67	41,2	37,1	34,1	31,6	29,7
	160	160	77	43,8	39,2	35,8	33,0	30,8
	180	180	87	46,8	41,6	37,7	34,7	32,2
	190	180	87	46,8	41,6	37,7	34,7	32,2
	200	200	97	50,0	44,3	39,9	36,5	33,8
	220	220	107	53,3	47,0	42,3	38,6	35,6
	240	240	117	56,8	50,0	44,8	40,7	37,4

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 plate, a 6 mm thick grooved cut in the timber and a single STA dowel.
- For the calculation process a timber density ρ_k = 385 kg/m^3 has been considered.
- Sizing and verification of the timber elements and metal plate must be done separately.

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

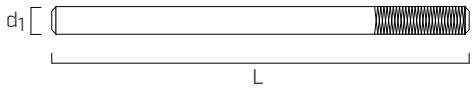
For different densities ρ_k the wood-side design strength is calculated as: $R'_{V,d} = R_{V,d} \cdot k_F$.

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

		a_1 [mm]						
	n. 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

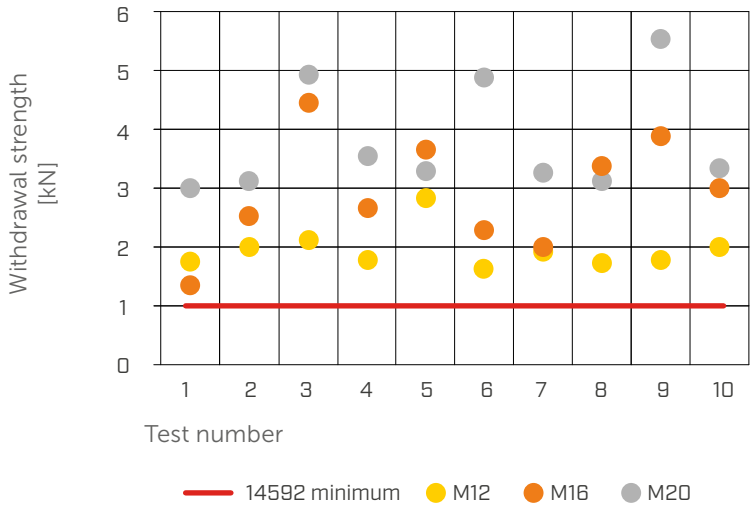
In the case of multiple dowels placed parallel to the fibres, the effective number must be taken into account $R'_{v,d} = R_{v,d} \cdot n_{ef}$.
d = nominal dowel diameter

STAS - IMPROVED BOND DOWEL FOR SEISMIC LOADS



The knurled dowel is available on request, it anticipates the standard requirement of the new EN 14592 ("FINAL DRAFT FprEN 14592:2019", 04/03/2019), 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.