

## SMOOTH DOWEL

### 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.

|               |                                                                                                                                                                                                                                                                                           |       |        |        |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------|--------|
| 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      | <div> <div> Zn<br/>ELECTRO<br/>PLATED </div> <div> electrogalvanized S355-S235<br/>carbon steel </div> </div> <div> <div>EC1</div> <div>EC2</div> <div>EC3</div> <div>EC4</div> </div> <div> <div>DRY</div> <div>C2</div> <div>T2</div> <div>WET</div> <div>C4</div> <div>T4</div> </div> |       |        |        |
|               | <div> <div>A2<br/>AISI 304</div> <div>stainless steel A2</div> </div>                                                                                                                                                                                                                     |       |        |        |

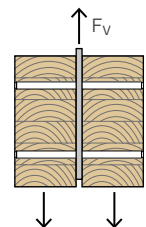
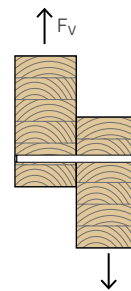


STA



STAS

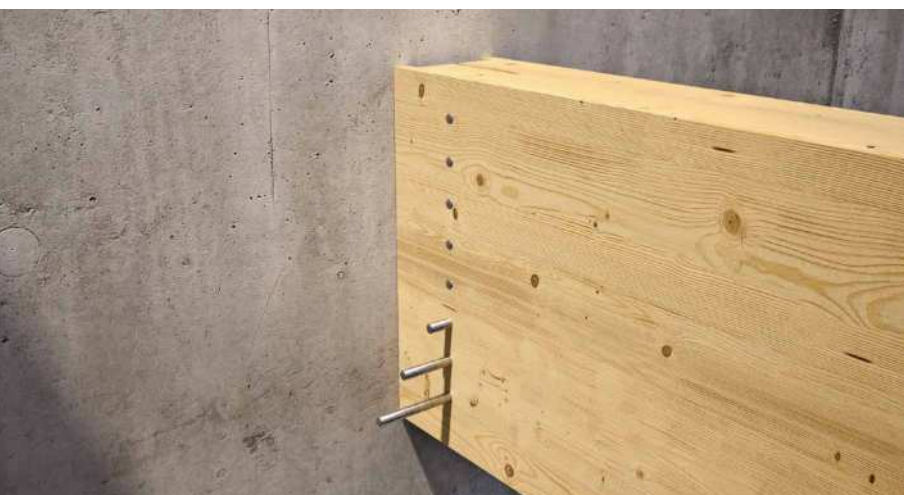
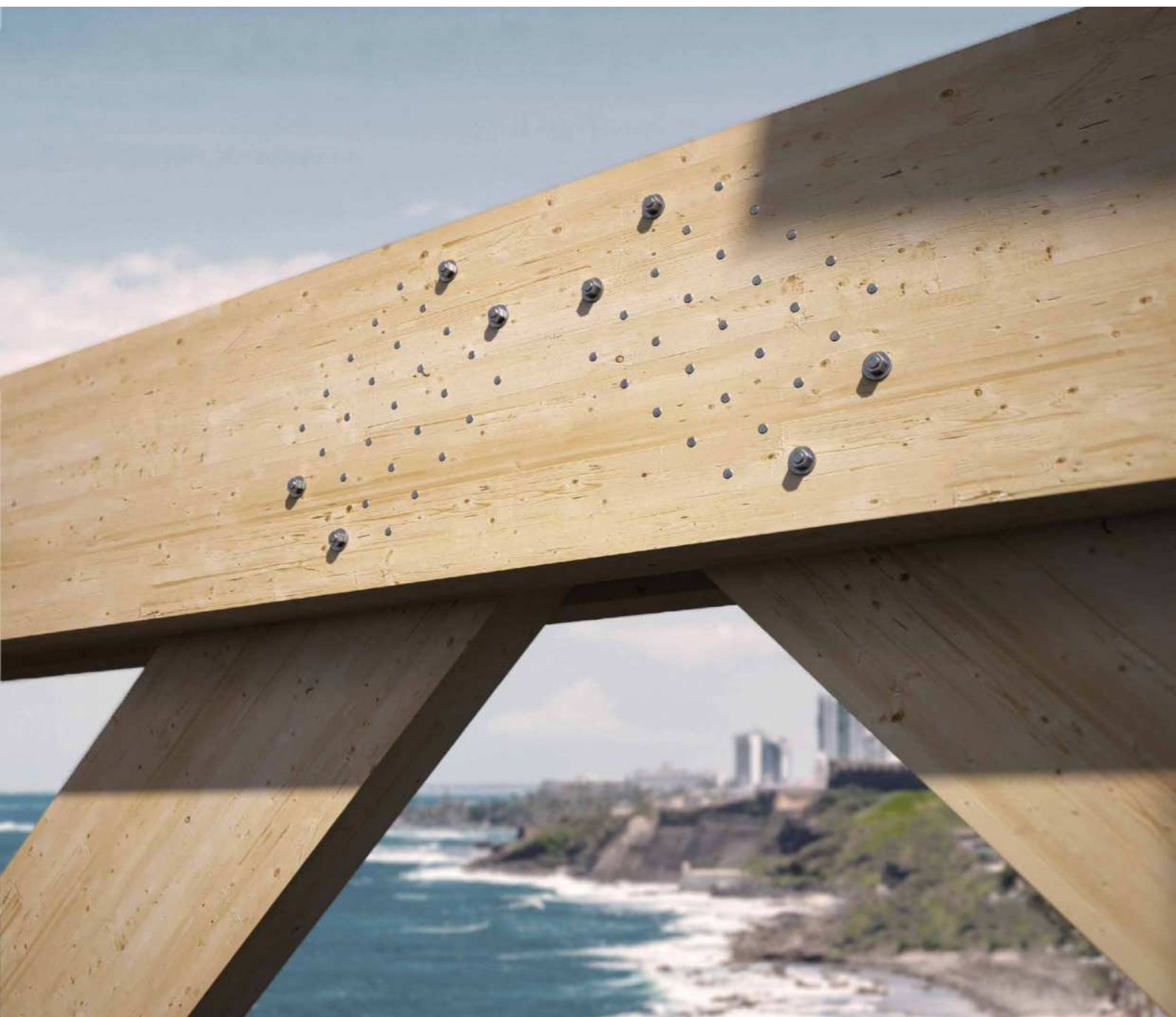
### EXTERNAL LOADS



### 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

STA - smooth dowel made of S235-S355 carbon steel

Zn  
ELECTRO  
PLATED

| d <sub>1</sub> | CODE       | L    |        | steel | pcs |
|----------------|------------|------|--------|-------|-----|
| [mm]<br>[in]   |            | [mm] | [in]   |       |     |
| 8<br>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<br>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<br>0.48     | STA121000B | 1000 | 39 3/8 | S235  | 1   |
| 16<br>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  |

| d <sub>1</sub> | CODE       | L    |        | steel | pcs |
|----------------|------------|------|--------|-------|-----|
| [mm]<br>[in]   |            | [mm] | [in]   |       |     |
| 16<br>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  |
| 20<br>0.79     | STA16500B  | 500  | 19 3/4 | S355  | 10  |
|                | STA161000B | 1000 | 39 3/8 | S355  | 1   |
|                | 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  |
| 20<br>0.79     | 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   |
|                | 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<sup>(1)</sup>

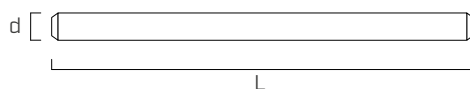
A2  
AISI 304

| d <sub>1</sub> | CODE       | L    |        | pcs |
|----------------|------------|------|--------|-----|
| [mm]<br>[in]   |            | [mm] | [in]   |     |
| 12<br>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<br>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  |

| d <sub>1</sub> | CODE       | L    |        | pcs |
|----------------|------------|------|--------|-----|
| [mm]<br>[in]   |            | [mm] | [in]   |     |
| 20<br>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   |

<sup>(1)</sup>Not holding CE marking.  
STA A2 | AISI304 codes are only available upon request.

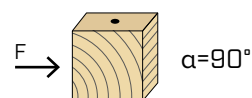
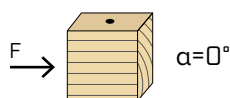
## GEOMETRY AND MECHANICAL CHARACTERISTICS



| 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

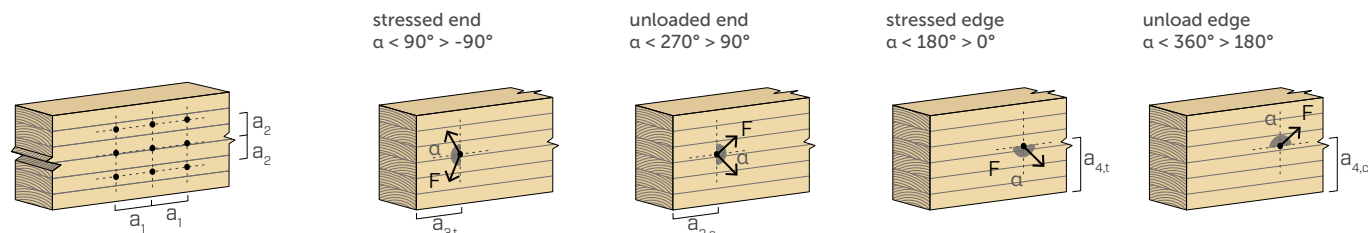


| $d_1$     | [in] |                    | 0.32   | 0.48   | 0.63    | 0.79    |
|-----------|------|--------------------|--------|--------|---------|---------|
|           | [mm] |                    | 8      | 12     | 16      | 20      |
| $a_1$     | [in] | 5·d                | 2 1/16 | 2 3/8  | 2 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       |

$\alpha$  = load-to-grain angle

d = nominal dowel diameter



### NOTE

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

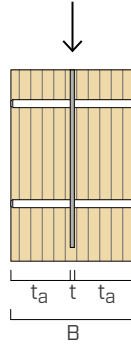
## EFFECTIVE NUMBER OF DOWELS $n_{ef}$ FOR $\alpha = 0^\circ$

|          |   | $a_1$ [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

$n_{ef}$  value given is a function of n and  $a_1$ .

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.



| d <sub>1</sub> | L     |         | steel plate thickness |      | Z <sub>  </sub> (0°) |                 | Z (30°)         |                 | Z (45°)         |                 | Z (60°)         |                 | Z <sub>⊥</sub> (90°) |                 |
|----------------|-------|---------|-----------------------|------|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------------|-----------------|
|                |       |         |                       |      | SP/HF<br>G≥0.42      | DF/SP<br>G≥0.49 | SP/HF<br>G≥0.42 | DF/SP<br>G≥0.49 | SP/HF<br>G≥0.42 | DF/SP<br>G≥0.49 | SP/HF<br>G≥0.42 | DF/SP<br>G≥0.49 | SP/HF<br>G≥0.42      | DF/SP<br>G≥0.49 |
| [mm]<br>[in]   | [mm]  | [in]    | [mm]                  | [in] | [lbf]                | [lbf]           | [lbf]           | [lbf]           | [lbf]           | [lbf]           | [lbf]           | [lbf]           | [lbf]                | [lbf]           |
| 8<br>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<br>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<br>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 <sub>1</sub> | L    |        | steel plate thickness |      | Z <sub>  </sub> (0°) |                 | Z (30°)         |                 | Z (45°)         |                 | Z (60°)         |                 | Z <sub>⊥</sub> (90°) |                 |
|----------------|------|--------|-----------------------|------|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------------|-----------------|
|                |      |        |                       |      | SP/HF<br>G≥0.42      | DF/SP<br>G≥0.49 | SP/HF<br>G≥0.42 | DF/SP<br>G≥0.49 | SP/HF<br>G≥0.42 | DF/SP<br>G≥0.49 | SP/HF<br>G≥0.42 | DF/SP<br>G≥0.49 | SP/HF<br>G≥0.42      | DF/SP<br>G≥0.49 |
| [mm]<br>[in]   | [mm] | [in]   | [mm]                  | [in] | [lbf]                | [lbf]           | [lbf]           | [lbf]           | [lbf]           | [lbf]           | [lbf]           | [lbf]           | [lbf]                | [lbf]           |
| 16<br>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<br>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:

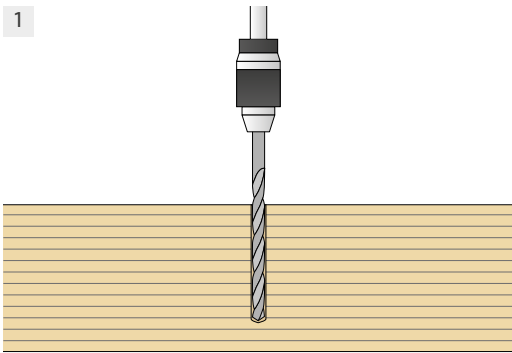
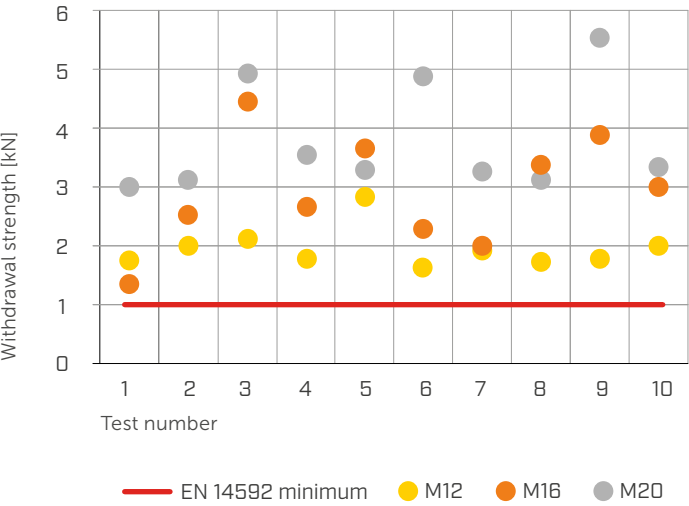
- Reference lateral design values (Z) have been calculated according to NDS yield limit equations and are representative of a single STA dowel.
- Tabulated values are based on standard load duration ( $C_D = 1.0$ ). Moisture and temperature effects have been neglected ( $C_M = 1.0$  and  $C_t = 1.0$ ). 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 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.



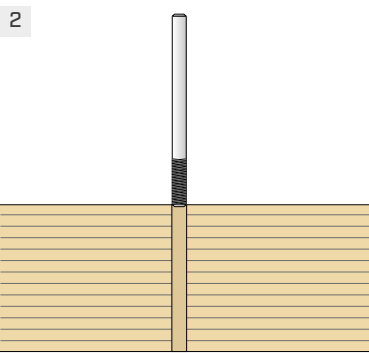
Knurled dowel available on request. Knurling limits the displacement of the dowels from the joint during an earthquake, as stipulated in Eurocode 8, and allows for a pull-out strength of 1 kN [224.8 lbf], as stipulated in EN 14592:2022.



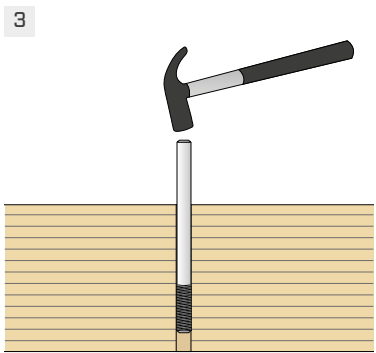
STAS - WITHDRAWAL VALUES



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.