

# VGS EVO

## FULLY THREADED SCREW WITH COUNTERSUNK OR HEXAGONAL HEAD

UK  
CA  
UKTA-0836  
22/6195

ICC  
ES  
AC233 | AC257  
ESR-4645

CE  
ETA-11/0030

### C4 EVO COATING

Surface treatment of epoxy resin and aluminium flakes. No rust after 1440 hours of salt spray exposure test, as per ISO 9227. Can be used in service class 3 outdoor applications and under class C4 atmospheric corrosion conditions.

### STRUCTURAL APPLICATIONS

Approved for structural applications subject to stresses in any direction vs the grain (0° - 90°). Safety certified by numerous tests carried out for any direction of insertion. Cyclical SEISMIC-REV tests according to EN 12512. Countersunk head up to L = 600 mm, ideal for use on plates or for concealed reinforcements.

### AUTOCLAVE-TREATED TIMBER

The C4 EVO coating has been certified according to US acceptance criterion AC257 for outdoor use with ACQ-treated timber.

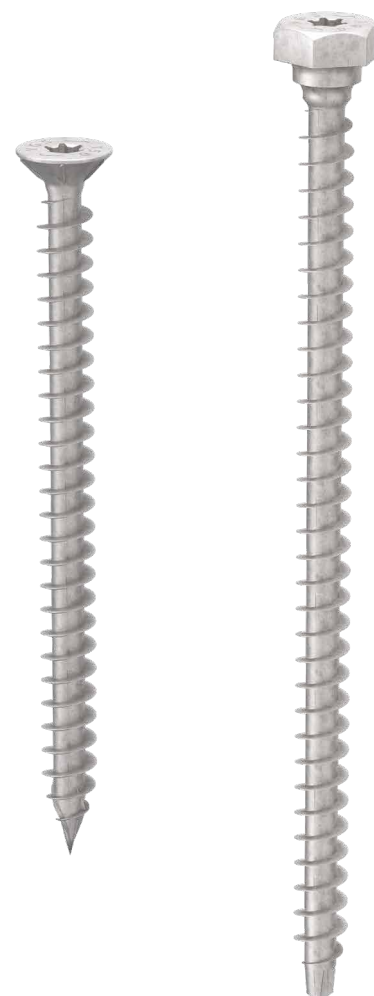
### 3 THORNS TIP

Thanks to the 3 THORNS tip, minimum installation distances are reduced. More screws can be used in less space and larger screws in smaller elements.



BIT INCLUDED

|                         |                                                 |
|-------------------------|-------------------------------------------------|
| DIAMETER [mm]           | 9 (9) 13 15                                     |
| LENGTH [mm]             | 80 (100) 800 2000                               |
| SERVICE CLASS           | SC1 SC2 SC3                                     |
| ATMOSPHERIC CORROSIVITY | C1 C2 C3 C4                                     |
| WOOD CORROSIVITY        | T1 T2 T3                                        |
| MATERIAL                | C4 EVO COATING carbon steel with C4 EVO coating |



METAL-to-TIMBER recommended use:



### FIELDS OF USE

- timber based panels
- solid timber and glulam
- CLT and LVL
- high density woods
- ACQ, CCA treated timber



## OUTDOOR STRUCTURAL PERFORMANCE

Ideal for fastening timber framed panels and trusses (Rafter, Truss). Values also tested, certified and calculated for high density woods. Ideal for fastening timber-framed panels and lattice beams (Rafter, Truss).

## CLT & LVL

Values also tested, certified and calculated for CLT and high density woods such as Microllam® LVL.

## CODES AND DIMENSIONS

| d <sub>1</sub><br>[mm] | CODE        | L<br>[mm] | b<br>[mm] | pcs |
|------------------------|-------------|-----------|-----------|-----|
| 9<br>TX 40             | VGSEVO9120  | 120       | 110       | 25  |
|                        | VGSEVO9160  | 160       | 150       | 25  |
|                        | VGSEVO9200  | 200       | 190       | 25  |
|                        | VGSEVO9240  | 240       | 230       | 25  |
|                        | VGSEVO9280  | 280       | 270       | 25  |
|                        | VGSEVO9320  | 320       | 310       | 25  |
|                        | VGSEVO9360  | 360       | 350       | 25  |
| 11<br>TX 50            | VGSEVO11100 | 100       | 90        | 25  |
|                        | VGSEVO11150 | 150       | 140       | 25  |
|                        | VGSEVO11200 | 200       | 190       | 25  |
|                        | VGSEVO11250 | 250       | 240       | 25  |
|                        | VGSEVO11300 | 300       | 290       | 25  |
|                        | VGSEVO11350 | 350       | 340       | 25  |
|                        | VGSEVO11400 | 400       | 390       | 25  |
|                        | VGSEVO11500 | 500       | 490       | 25  |
|                        | VGSEVO11600 | 600       | 590       | 25  |

| d <sub>1</sub><br>[mm] | CODE        | L<br>[mm] | b<br>[mm] | pcs |
|------------------------|-------------|-----------|-----------|-----|
| 13<br>TX 50            | VGSEVO13200 | 200       | 190       | 25  |
|                        | VGSEVO13300 | 300       | 280       | 25  |
|                        | VGSEVO13400 | 400       | 380       | 25  |
|                        | VGSEVO13500 | 500       | 480       | 25  |
|                        | VGSEVO13600 | 600       | 580       | 25  |
| 13<br>SW 19<br>TX 50   | VGSEVO13700 | 700       | 680       | 25  |
|                        | VGSEVO13800 | 800       | 780       | 25  |

## RELATED PRODUCTS

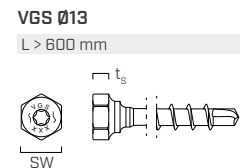
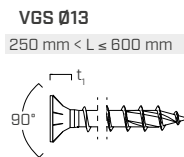
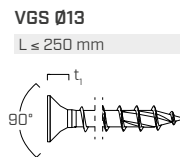
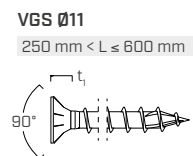
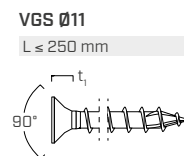
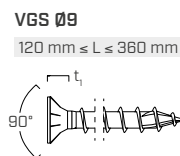
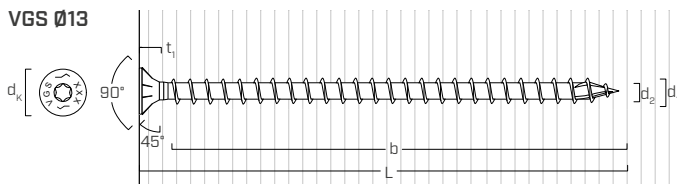
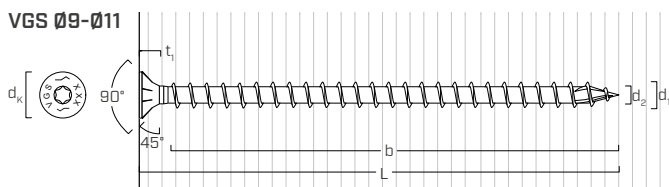


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## GEOMETRY AND MECHANICAL CHARACTERISTICS



| Nominal diameter                          | d <sub>1</sub>      | [mm]                 | 9     | 11    | 13       | 13       |
|-------------------------------------------|---------------------|----------------------|-------|-------|----------|----------|
| Length                                    | L                   | [mm]                 | -     | -     | ≤ 600 mm | > 600 mm |
| Countersunk head diameter                 | d <sub>K</sub>      | [mm]                 | 16,00 | 19,30 | 22,00    | -        |
| Countersunk head thickness                | t <sub>1</sub>      | [mm]                 | 6,50  | 8,20  | 9,40     | -        |
| Wrench size                               | SW                  | -                    | -     | -     | -        | SW 19    |
| Hexagonal head thickness                  | t <sub>s</sub>      | [mm]                 | -     | -     | -        | 7,50     |
| Thread diameter                           | d <sub>2</sub>      | [mm]                 | 5,90  | 6,60  | 8,00     | 8,00     |
| Pre-drilling hole diameter <sup>(1)</sup> | d <sub>V,S</sub>    | [mm]                 | 5,0   | 6,0   | 8,0      | 8,0      |
| Pre-drilling hole diameter <sup>(2)</sup> | d <sub>V,H</sub>    | [mm]                 | 6,0   | 7,0   | 9,0      | 9,0      |
| Characteristic tensile strength           | f <sub>tens,k</sub> | [kN]                 | 25,4  | 38,0  | 53,0     | 53,0     |
| Characteristic yield moment               | M <sub>y,k</sub>    | [Nm]                 | 27,2  | 45,9  | 70,9     | 70,9     |
| Characteristic yield strength             | f <sub>y,k</sub>    | [N/mm <sup>2</sup> ] | 1000  | 1000  | 1000     | 1000     |

<sup>(1)</sup> Pre-drilling valid for softwood.

<sup>(2)</sup> Pre-drilling valid for hardwood and beech LVL.

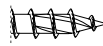
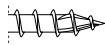
|                                 |                   |                      | softwood<br>(softwood) | LVL softwood<br>(LVL softwood) | pre-drilled beech LVL<br>(beech LVL predrilled) |
|---------------------------------|-------------------|----------------------|------------------------|--------------------------------|-------------------------------------------------|
| Withdrawal resistance parameter | f <sub>ax,k</sub> | [N/mm <sup>2</sup> ] | 11,7                   | 15,0                           | 29,0                                            |
| Associated density              | ρ <sub>a</sub>    | [kg/m <sup>3</sup> ] | 350                    | 500                            | 730                                             |
| Calculation density             | ρ <sub>k</sub>    | [kg/m <sup>3</sup> ] | ≤ 440                  | 410 ÷ 550                      | 590 ÷ 750                                       |

For applications with different materials please see ETA-11/0030.

## MINIMUM DISTANCES FOR AXIAL STRESSES



screws inserted **WITH** and **WITHOUT** pre-drilled hole

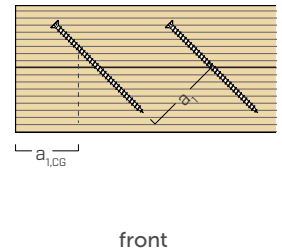
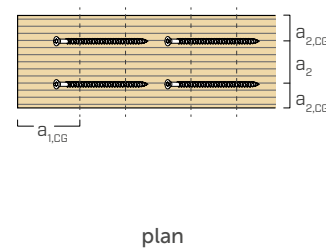
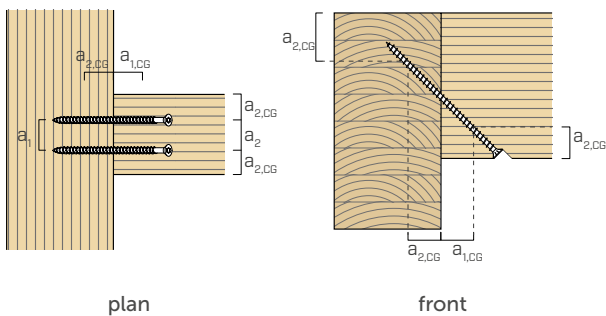


| $d_1$       | [mm] | 9             | 11 |
|-------------|------|---------------|----|
| $a_1$       | [mm] | $5 \cdot d$   | 45 |
| $a_2$       | [mm] | $5 \cdot d$   | 45 |
| $a_{2,LIM}$ | [mm] | $2,5 \cdot d$ | 23 |
| $a_{1,CG}$  | [mm] | $8 \cdot d$   | 72 |
| $a_{2,CG}$  | [mm] | $3 \cdot d$   | 27 |
| $a_{CROSS}$ | [mm] | $1,5 \cdot d$ | 14 |

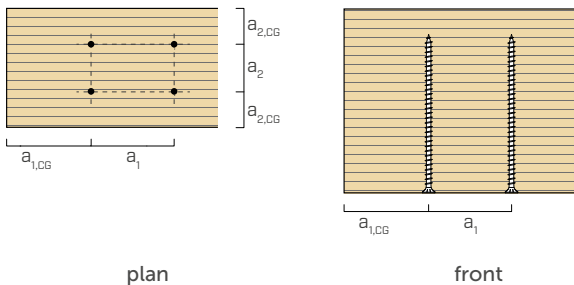
| $d_1$       | [mm] | 13            |
|-------------|------|---------------|
| $a_1$       | [mm] | $5 \cdot d$   |
| $a_2$       | [mm] | $5 \cdot d$   |
| $a_{2,LIM}$ | [mm] | $2,5 \cdot d$ |
| $a_{1,CG}$  | [mm] | $8 \cdot d$   |
| $a_{2,CG}$  | [mm] | $3 \cdot d$   |
| $a_{CROSS}$ | [mm] | $1,5 \cdot d$ |

| $d_1$       | [mm] | 13            |
|-------------|------|---------------|
| $a_1$       | [mm] | $5 \cdot d$   |
| $a_2$       | [mm] | $5 \cdot d$   |
| $a_{2,LIM}$ | [mm] | $2,5 \cdot d$ |
| $a_{1,CG}$  | [mm] | $5 \cdot d$   |
| $a_{2,CG}$  | [mm] | $3 \cdot d$   |
| $a_{CROSS}$ | [mm] | $1,5 \cdot d$ |

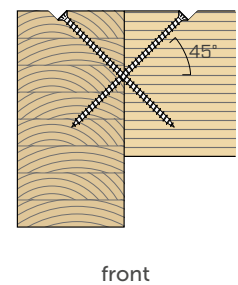
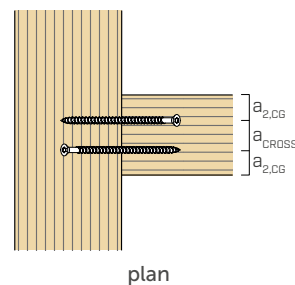
### SCREWS UNDER TENSION INSERTED WITH AN ANGLE $\alpha$ WITH RESPECT TO THE GRAIN



### SCREWS INSERTED WITH $\alpha = 90^\circ$ ANGLE WITH RESPECT TO THE GRAIN



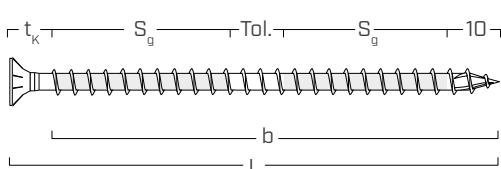
### CROSS SCREWS INSERTED WITH AN ANGLE $\alpha$ WITH RESPECT TO THE GRAIN



#### NOTES

- Minimum distances according to ETA-11/0030.
- The minimum distances are independent of the insertion angle of the connector and the angle of the force with respect to the grain.
- The axial distance  $a_2$  can be reduced down to  $a_{2,LIM}$  if for each connector a "joint surface"  $a_1 a_2 = 25 d_1^2$  is maintained.
- For 3 THORNS tip, RBSN and self-drilling tip screws, the minimum distances in the table are derived from experimental tests; alternatively, adopt  $a_{1,CG} = 10 \cdot d$  and  $a_{2,CG} = 4 \cdot d$  in accordance with EN 1995:2014.
- For minimum distances for shear load screws see VGS on page 169.

## EFFECTIVE THREAD USED IN CALCULATION



$$b = S_{g,tot} = L - t_K$$

$$S_g = (L - t_K - 10 \text{ mm} - \text{Tol.})/2$$

$$t_K = 10 \text{ mm (countersunk head)}$$

$$t_K = 20 \text{ mm (hexagonal head)}$$

represents the entire length of the threaded part

represents the partial length of the threaded part net of a laying tolerance (Tol.) of 10 mm



| TENSION / COMPRESSION |           |                         |                   |                       |                      |                           |                   |                       |                      |                      |                                       |
|-----------------------|-----------|-------------------------|-------------------|-----------------------|----------------------|---------------------------|-------------------|-----------------------|----------------------|----------------------|---------------------------------------|
| geometry              |           | total thread withdrawal |                   |                       |                      | partial thread withdrawal |                   |                       |                      | steel tension        | instability<br>$\varepsilon=90^\circ$ |
|                       |           | $\varepsilon=90^\circ$  |                   | $\varepsilon=0^\circ$ |                      | $\varepsilon=90^\circ$    |                   | $\varepsilon=0^\circ$ |                      |                      |                                       |
|                       |           |                         |                   |                       |                      |                           |                   |                       |                      |                      |                                       |
| $d_1$<br>[mm]         | L<br>[mm] | $S_{g,tot}$<br>[mm]     | $A_{min}$<br>[mm] | $R_{ax,90,k}$<br>[kN] | $R_{ax,0,k}$<br>[kN] | $S_g$<br>[mm]             | $A_{min}$<br>[mm] | $R_{ax,90,k}$<br>[kN] | $R_{ax,0,k}$<br>[kN] | $R_{tens,k}$<br>[kN] | $R_{ki,90,k}$<br>[kN]                 |
| 9                     | 120       | 110                     | 130               | 12,50                 | 3,75                 | 45                        | 65                | 5,11                  | 1,53                 | 25,40                | 17,25                                 |
|                       | 160       | 150                     | 170               | 17,05                 | 5,11                 | 65                        | 85                | 7,39                  | 2,22                 |                      |                                       |
|                       | 200       | 190                     | 210               | 21,59                 | 6,48                 | 85                        | 105               | 9,66                  | 2,90                 |                      |                                       |
|                       | 240       | 230                     | 250               | 26,14                 | 7,84                 | 105                       | 125               | 11,93                 | 3,58                 |                      |                                       |
|                       | 280       | 270                     | 290               | 30,68                 | 9,21                 | 125                       | 145               | 14,21                 | 4,26                 |                      |                                       |
|                       | 320       | 310                     | 330               | 35,23                 | 10,57                | 145                       | 165               | 16,48                 | 4,94                 |                      |                                       |
|                       | 360       | 350                     | 370               | 39,78                 | 11,93                | 165                       | 185               | 18,75                 | 5,63                 |                      |                                       |
| 11                    | 100       | 90                      | 110               | 12,50                 | 3,75                 | 35                        | 55                | 4,86                  | 1,46                 | 38,00                | 21,93                                 |
|                       | 150       | 140                     | 160               | 19,45                 | 5,83                 | 60                        | 80                | 8,33                  | 2,50                 |                      |                                       |
|                       | 200       | 190                     | 210               | 26,39                 | 7,92                 | 85                        | 105               | 11,81                 | 3,54                 |                      |                                       |
|                       | 250       | 240                     | 260               | 33,34                 | 10,00                | 110                       | 130               | 15,28                 | 4,58                 |                      |                                       |
|                       | 300       | 290                     | 310               | 40,28                 | 12,08                | 135                       | 155               | 18,75                 | 5,63                 |                      |                                       |
|                       | 350       | 340                     | 360               | 47,22                 | 14,17                | 160                       | 180               | 22,22                 | 6,67                 |                      |                                       |
|                       | 400       | 390                     | 410               | 54,17                 | 16,25                | 185                       | 205               | 25,70                 | 7,71                 |                      |                                       |
|                       | 500       | 490                     | 510               | 68,06                 | 20,42                | 235                       | 255               | 32,64                 | 9,79                 |                      |                                       |
| 13                    | 600       | 590                     | 610               | 81,95                 | 24,58                | 285                       | 305               | 39,59                 | 11,88                | 53,00                | 32,69                                 |
|                       | 200       | 190                     | 210               | 31,19                 | 9,36                 | 85                        | 105               | 13,95                 | 4,19                 |                      |                                       |
|                       | 300       | 280                     | 310               | 45,96                 | 13,79                | 130                       | 150               | 21,34                 | 6,40                 |                      |                                       |
|                       | 400       | 380                     | 410               | 62,38                 | 18,71                | 180                       | 200               | 29,55                 | 8,86                 |                      |                                       |
|                       | 500       | 480                     | 510               | 78,79                 | 23,64                | 230                       | 250               | 37,75                 | 11,33                |                      |                                       |
|                       | 600       | 580                     | 610               | 95,21                 | 28,56                | 280                       | 300               | 45,96                 | 13,79                |                      |                                       |
|                       | 700       | 680                     | 710               | 111,62                | 33,49                | 330                       | 350               | 54,17                 | 16,25                |                      |                                       |
|                       | 800       | 780                     | 810               | 128,04                | 38,41                | 380                       | 400               | 62,38                 | 18,71                |                      |                                       |

## NOTES

- The characteristic thread withdrawal resistances were evaluated considering both an  $\varepsilon$  angle of  $90^\circ$  ( $R_{ax,90,k}$ ) and of  $0^\circ$  ( $R_{ax,0,k}$ ) between the grains of the timber element and the connector.
- The characteristic sliding strengths were evaluated by considering an angle  $\varepsilon$  of  $45^\circ$  between the grains of the timber element and the connector.
- The plate thickness ( $S_{PLATE}$ ) are understood to be the minimum values to allow the head of the screw to be accommodated.
- The characteristic timber-to-timber shear strengths were evaluated considering both an  $\varepsilon$  angle of  $90^\circ$  ( $R_{V,90,k}$ ) and  $0^\circ$  ( $R_{V,0,k}$ ) between the grains of the second element and the connector.
- For the calculation process a timber characteristic density  $\rho_k = 385 \text{ kg/m}^3$  has been considered.  
For different  $\rho_k$  values, the strength values in the table (withdrawal, compression, sliding and shear) can be converted via the  $k_{dens}$  coefficient.

$$R'_{ax,k} = k_{dens,ax} \cdot R_{ax,k}$$

$$R'_{ki,k} = k_{dens,ki} \cdot R_{ki,k}$$

$$R'_{V,k} = k_{dens,V} \cdot R_{V,k}$$

$$R'_{V,90,k} = k_{dens,V} \cdot R_{V,90,k}$$

$$R'_{V,0,k} = k_{dens,V} \cdot R_{V,0,k}$$

| $\rho_k$<br>[kg/m <sup>3</sup> ] | 350  | 380  | 385   | 405   | 425   | 430   | 440   |
|----------------------------------|------|------|-------|-------|-------|-------|-------|
| C-GL                             | C24  | C30  | GL24h | GL26h | GL28h | GL30h | GL32h |
| $k_{dens,ax}$                    | 0,92 | 0,98 | 1,00  | 1,04  | 1,08  | 1,09  | 1,11  |
| $k_{dens,ki}$                    | 0,97 | 0,99 | 1,00  | 1,00  | 1,01  | 1,02  | 1,02  |
| $k_{dens,V}$                     | 0,90 | 0,98 | 1,00  | 1,02  | 1,05  | 1,05  | 1,07  |

Strength values thus determined may differ, for higher safety standards, from those resulting from an exact calculation.

|               |           | SLIDING          |           |                   |                   |                     |               |                   |                   | SHEAR                   |                                            |           |                                           |                     |
|---------------|-----------|------------------|-----------|-------------------|-------------------|---------------------|---------------|-------------------|-------------------|-------------------------|--------------------------------------------|-----------|-------------------------------------------|---------------------|
| geometry      |           | timber-to-timber |           |                   |                   | steel-to-timber     |               |                   |                   | steel tension           | timber-to-timber<br>$\varepsilon=90^\circ$ |           | timber-to-timber<br>$\varepsilon=0^\circ$ |                     |
|               |           |                  |           |                   |                   |                     |               |                   |                   |                         |                                            |           |                                           |                     |
| $d_1$<br>[mm] | L<br>[mm] | $S_g$<br>[mm]    | A<br>[mm] | $B_{min}$<br>[mm] | $R_{V,k}$<br>[kN] | $S_{PLATE}$<br>[mm] | $S_g$<br>[mm] | $A_{min}$<br>[mm] | $R_{V,k}$<br>[kN] | $R_{tens,45,k}$<br>[kN] | $S_g$<br>[mm]                              | A<br>[mm] | $R_{V,90,k}$<br>[kN]                      | $R_{V,0,k}$<br>[kN] |
| 9             | 120       | 45               | 45        | 60                | 3,62              | 15                  | 105           | 95                | 8,44              | 17,96                   | 45                                         | 60        | 4,53                                      | 2,30                |
|               | 160       | 65               | 60        | 75                | 5,22              |                     | 145           | 125               | 11,65             |                         | 65                                         | 80        | 5,10                                      | 2,81                |
|               | 200       | 85               | 75        | 90                | 6,83              |                     | 185           | 150               | 14,87             |                         | 85                                         | 100       | 5,67                                      | 3,18                |
|               | 240       | 105              | 90        | 105               | 8,44              |                     | 225           | 180               | 18,08             |                         | 105                                        | 120       | 6,23                                      | 3,35                |
|               | 280       | 125              | 105       | 120               | 10,04             |                     | 265           | 205               | 21,29             |                         | 125                                        | 140       | 6,50                                      | 3,52                |
|               | 320       | 145              | 120       | 135               | 11,65             |                     | 305           | 235               | 24,51             |                         | 145                                        | 160       | 6,50                                      | 3,69                |
|               | 360       | 165              | 130       | 145               | 13,26             |                     | 345           | 265               | 27,72             |                         | 165                                        | 180       | 6,50                                      | 3,86                |
| 11            | 100       | 35               | 40        | 55                | 3,44              | 18                  | 80            | 75                | 7,86              | 26,87                   | 35                                         | 50        | 4,72                                      | 2,69                |
|               | 150       | 60               | 60        | 75                | 5,89              |                     | 130           | 110               | 12,77             |                         | 60                                         | 75        | 6,61                                      | 3,33                |
|               | 200       | 85               | 75        | 90                | 8,35              |                     | 180           | 145               | 17,68             |                         | 85                                         | 100       | 7,48                                      | 4,10                |
|               | 250       | 110              | 95        | 110               | 10,80             |                     | 230           | 185               | 22,59             |                         | 110                                        | 125       | 8,35                                      | 4,57                |
|               | 300       | 135              | 110       | 125               | 13,26             |                     | 280           | 220               | 27,50             |                         | 135                                        | 150       | 9,06                                      | 4,83                |
|               | 350       | 160              | 130       | 145               | 15,71             |                     | 330           | 255               | 32,41             |                         | 160                                        | 175       | 9,06                                      | 5,09                |
|               | 400       | 185              | 145       | 160               | 18,17             |                     | 380           | 290               | 37,32             |                         | 185                                        | 200       | 9,06                                      | 5,35                |
|               | 500       | 235              | 180       | 195               | 23,08             |                     | 480           | 360               | 47,14             |                         | 235                                        | 250       | 9,06                                      | 5,87                |
| 13            | 600       | 285              | 215       | 230               | 27,99             | 20                  | 580           | 430               | 56,96             | 37,48                   | 285                                        | 300       | 9,06                                      | 6,39                |
|               | 200       | 85               | 75        | 90                | 9,87              |                     | 180           | 145               | 20,89             |                         | 85                                         | 100       | 9,46                                      | 4,88                |
|               | 300       | 130              | 110       | 125               | 15,09             |                     | 280           | 220               | 32,50             |                         | 130                                        | 145       | 11,31                                     | 6,11                |
|               | 400       | 180              | 145       | 160               | 20,89             |                     | 380           | 290               | 44,11             |                         | 180                                        | 195       | 11,94                                     | 6,73                |
|               | 500       | 230              | 180       | 195               | 26,70             |                     | 480           | 360               | 55,71             |                         | 230                                        | 245       | 11,94                                     | 7,35                |
|               | 600       | 280              | 215       | 230               | 32,50             |                     | 580           | 430               | 67,32             |                         | 280                                        | 295       | 11,94                                     | 7,96                |
|               | 700       | 330              | 250       | 265               | 38,30             |                     | -             | -                 | -                 |                         | 330                                        | 345       | 11,94                                     | 8,58                |
|               | 800       | 380              | 285       | 300               | 44,11             |                     | -             | -                 | -                 |                         | 380                                        | 395       | 11,94                                     | 9,03                |

## GENERAL PRINCIPLES

- Characteristic values comply with the EN 1995:2014 standard in accordance with ETA-11/0030.
- The tensile design strength of the connector is the lower between the timber-side design strength ( $R_{ax,d}$ ) and the steel-side design strength ( $R_{tens,d}$ ).

$$R_{ax,d} = \min \left\{ \frac{R_{ax,k} \cdot k_{mod}}{\gamma_M}, \frac{R_{tens,k}}{\gamma_{M2}} \right\}$$

- The compression design strength of the connector is the lower between the timber-side design strength ( $R_{ax,d}$ ) and the instability design strength ( $R_{ki,d}$ ).

$$R_{ax,d} = \min \left\{ \frac{R_{ax,k} \cdot k_{mod}}{\gamma_M}, \frac{R_{ki,k}}{\gamma_{M1}} \right\}$$

- The design sliding strength of the joint is either the timber-side design strength ( $R_{V,d}$ ) and the design strength on the steel side projected ( $R_{tens,45,d}$ ), whichever is lower:

$$R_{V,d} = \min \left\{ \frac{R_{V,k} \cdot k_{mod}}{\gamma_M}, \frac{R_{tens,45,k}}{\gamma_{M2}} \right\}$$

- The design shear strength of the connector is obtained from the characteristic value as follows:

$$R_{V,d} = \frac{R_{V,k} \cdot k_{mod}}{\gamma_M}$$

- The coefficients  $\gamma_M$  and  $k_{mod}$  should be taken according to the current regulations used for the calculation.
- For the mechanical resistance values and the geometry of the screws, reference was made to ETA-11/0030.
- Dimensioning and verification of the timber elements must be carried out separately.
- The screws must be positioned in accordance with the minimum distances.
- The characteristic thread withdrawal strengths were evaluated considering a penetration length of  $S_{g,tot}$  or  $S_g$ , as shown in the table. For intermediate values of  $S_g$  it is possible to linearly interpolate.
- The shear strength and sliding values were evaluated considering the centre of gravity of the connector placed in correspondence with the shear plane.
- The characteristic shear resistances are calculated for screws inserted without pre-drilling hole. In the case of screws inserted with pre-drilling hole, greater resistance values can be obtained.
- For different calculation configurations, the MyProject software is available ([www.rotehoblaas.com](http://www.rotehoblaas.com)).
- For minimum distances and structural values for cross connectors in shear connection main beam - secondary beam see VGZ on page 130.
- For minimum distances and structural values on CLT and LVL see VGZ on page 134.