

# LOAD CAPACITY

Wood screw ESSDRIVE countersunk 5.0 – 6.0 mm. CorrSeal surface treatment

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## Conditions for tabulated load capacity

The tabulated values are calculated in accordance with Eurocode 5 (EN 1995-1-1:2004 incl. AC:2006, A1:2008 and A2:2014). The calculation assumes that the entire threaded part B is screwed into the underlying timber part and that it has at minimum the same thickness, i.e.  $t_2 \geq B$ . Furthermore it is assumed the two timber parts are made of the same timber quality class (e.g. C24). If the screw is subjected to both axial and shear load the total load capacity must be verified. The tabulated loads are for one screw, if more screws are used a reduction may be needed depending on spacing. The final design should consider edge and spacing distances.

## Recommended load

The recommended load given in unit [kg] can be applied directly since all safety factors have been considered incl. a factor on the applied load ( $\gamma = 1.4$ ). It is calculated for a permanent load and service class 3 (acc. to Eurocode 5), e.g. a location directly exposed to rain.

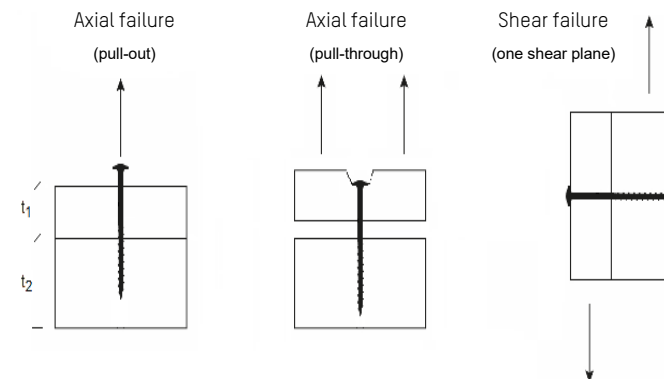
## Characteristic resistance

The characteristic resistance given in unit [kN] is intended for an engineer that wants to do a detailed analysis of the timber connection using the appropriate partial coefficients for design resistance based on load duration and service class in accordance with Eurocode 5 eq. (2.17):

$$R_d = k_{mod} \frac{R_k}{\gamma_M}$$

*All information in this document is given in accordance with known facts and information at the time of writing. The information is subject to change without further notification. The document is updated continuously in conjunction with regular revision or in the event of major-specific technical changes.*

*All advice given by ESSVE should only be seen as guidance and does not mean that ESSVE can be held responsible for the advice provided. It is always the customer's own responsibility to decide on the choice of product, usage, application, etc. The supplier's advice is only a part of the customer's basis for decision making.*



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## Recommended load

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| Art. No. | CE-marking<br>EN 14592 | Dimension<br><br>dk × L<br>[mm] | Thread length<br><br>B<br>[mm] | Inner thread<br>diameter<br><br>d <sub>1</sub><br>[mm] | Head diameter<br><br>D<br>[mm] | Timber tickness<br>at screw head<br><br>t <sub>1</sub><br>[mm] | Timber tickness<br>at screw tip<br><br>t <sub>2</sub><br>[mm] | Axial direction<br>(pull-out/-through)<br><br>F <sub>ax,rec</sub><br>[kg] |     | Shear direction<br>(one shear plane)<br><br>F <sub>v,rec</sub><br>[kg] |     |
|----------|------------------------|---------------------------------|--------------------------------|--------------------------------------------------------|--------------------------------|----------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------|-----|------------------------------------------------------------------------|-----|
|          |                        |                                 |                                |                                                        |                                |                                                                |                                                               | C14                                                                       | C24 | C14                                                                    | C24 |
| 137 160  | ✓                      | 5.0 × 40                        | 24                             | 3.0                                                    | 10                             | 16                                                             | 24                                                            | 50                                                                        | 55  | 20                                                                     | 25  |
| 137 113  | ✓                      | 5.0 × 50                        | 30                             | 3.0                                                    | 10                             | 20                                                             | 30                                                            | 50                                                                        | 60  | 25                                                                     | 30  |
| 137 114  | ✓                      | 5.0 × 60                        | 36                             | 3.0                                                    | 10                             | 24                                                             | 36                                                            | 50                                                                        | 60  | 30                                                                     | 35  |
| 137 116  | ✓                      | 5.0 × 70                        | 42                             | 3.0                                                    | 10                             | 28                                                             | 42                                                            | 50                                                                        | 60  | 30                                                                     | 35  |
| 137 118  | ✓                      | 5.0 × 80                        | 42                             | 3.0                                                    | 10                             | 38                                                             | 42                                                            | 50                                                                        | 60  | 30                                                                     | 35  |
| 137 120  | ✓                      | 5.0 × 90                        | 42                             | 3.0                                                    | 10                             | 48                                                             | 42                                                            | 50                                                                        | 60  | 30                                                                     | 35  |
| 137 122  | ✓                      | 5.0 × 100                       | 53                             | 3.0                                                    | 10                             | 47                                                             | 53                                                            | 50                                                                        | 60  | 30                                                                     | 35  |
| 137 124  | ✓                      | 5.0 × 120                       | 62                             | 3.0                                                    | 10                             | 58                                                             | 62                                                            | 50                                                                        | 60  | 30                                                                     | 35  |

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|----------|------------------------|---------------------------------|--------------------------------|--------------------------------------------------------|--------------------------------|----------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------|-----|------------------------------------------------------------------------|-----|
|          |                        |                                 |                                |                                                        |                                |                                                                |                                                               | C14                                                                       | C24 | C14                                                                    | C24 |
| 137 126  | ✓                      | 6.0 × 60                        | 36                             | 3.6                                                    | 12                             | 24                                                             | 36                                                            | 75                                                                        | 85  | 40                                                                     | 45  |
| 137 127  | ✓                      | 6.0 × 70                        | 43                             | 3.6                                                    | 12                             | 27                                                             | 43                                                            | 75                                                                        | 85  | 40                                                                     | 50  |
| 137 128  | ✓                      | 6.0 × 80                        | 43                             | 3.6                                                    | 12                             | 37                                                             | 43                                                            | 75                                                                        | 85  | 45                                                                     | 55  |
| 137 130  | ✓                      | 6.0 × 90                        | 43                             | 3.6                                                    | 12                             | 47                                                             | 43                                                            | 75                                                                        | 85  | 50                                                                     | 55  |
| 137 132  | ✓                      | 6.0 × 100                       | 53                             | 3.6                                                    | 12                             | 47                                                             | 53                                                            | 75                                                                        | 85  | 50                                                                     | 55  |
| 137 133  | ✓                      | 6.0 × 110                       | 62                             | 3.6                                                    | 12                             | 48                                                             | 62                                                            | 75                                                                        | 85  | 50                                                                     | 55  |
| 137 134  | ✓                      | 6.0 × 120                       | 72                             | 3.6                                                    | 12                             | 48                                                             | 72                                                            | 75                                                                        | 85  | 50                                                                     | 55  |
| 137 136  | ✓                      | 6.0 × 140                       | 72                             | 3.6                                                    | 12                             | 68                                                             | 72                                                            | 75                                                                        | 85  | 50                                                                     | 55  |
| 137 138  | ✓                      | 6.0 × 160                       | 72                             | 3.6                                                    | 12                             | 88                                                             | 72                                                            | 75                                                                        | 85  | 50                                                                     | 55  |
| 137 140  | ✓                      | 6.0 × 180                       | 72                             | 3.6                                                    | 12                             | 108                                                            | 72                                                            | 75                                                                        | 85  | 50                                                                     | 55  |
| 137 142  | ✓                      | 6.0 × 220                       | 72                             | 3.6                                                    | 12                             | 148                                                            | 72                                                            | 75                                                                        | 85  | 50                                                                     | 55  |

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|----------|------------------------|---------------------------------|--------------------------------|--------------------------------------------------------|--------------------------------|----------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------|-----|-----------------------------------------------------------------------|-----|
|          |                        |                                 |                                |                                                        |                                |                                                                |                                                               | C14                                                                      | C24 | C14                                                                   | C24 |
| 137 160  | ✓                      | 5.0 × 40                        | 24                             | 3.0                                                    | 10                             | 16                                                             | 24                                                            | 1.8                                                                      | 2.1 | 0.9                                                                   | 1.1 |
| 137 113  | ✓                      | 5.0 × 50                        | 30                             | 3.0                                                    | 10                             | 20                                                             | 30                                                            | 1.9                                                                      | 2.2 | 1.0                                                                   | 1.2 |
| 137 114  | ✓                      | 5.0 × 60                        | 36                             | 3.0                                                    | 10                             | 24                                                             | 36                                                            | 1.9                                                                      | 2.2 | 1.1                                                                   | 1.3 |
| 137 116  | ✓                      | 5.0 × 70                        | 42                             | 3.0                                                    | 10                             | 28                                                             | 42                                                            | 1.9                                                                      | 2.2 | 1.1                                                                   | 1.3 |
| 137 118  | ✓                      | 5.0 × 80                        | 42                             | 3.0                                                    | 10                             | 38                                                             | 42                                                            | 1.9                                                                      | 2.2 | 1.2                                                                   | 1.3 |
| 137 120  | ✓                      | 5.0 × 90                        | 42                             | 3.0                                                    | 10                             | 48                                                             | 42                                                            | 1.9                                                                      | 2.2 | 1.2                                                                   | 1.3 |
| 137 122  | ✓                      | 5.0 × 100                       | 53                             | 3.0                                                    | 10                             | 47                                                             | 53                                                            | 1.9                                                                      | 2.2 | 1.2                                                                   | 1.3 |
| 137 124  | ✓                      | 5.0 × 120                       | 62                             | 3.0                                                    | 10                             | 58                                                             | 62                                                            | 1.9                                                                      | 2.2 | 1.2                                                                   | 1.3 |

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|----------|------------------------|---------------------------------|--------------------------------|--------------------------------------------------------|--------------------------------|----------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------|-----|-----------------------------------------------------------------------|-----|
|          |                        |                                 |                                |                                                        |                                |                                                                |                                                               | C14                                                                      | C24 | C14                                                                   | C24 |
| 137 126  | ✓                      | 6.0 × 60                        | 36                             | 3.6                                                    | 12                             | 24                                                             | 36                                                            | 2.7                                                                      | 3.2 | 1.5                                                                   | 1.8 |
| 137 127  | ✓                      | 6.0 × 70                        | 43                             | 3.6                                                    | 12                             | 27                                                             | 43                                                            | 2.7                                                                      | 3.2 | 1.6                                                                   | 1.8 |
| 137 128  | ✓                      | 6.0 × 80                        | 43                             | 3.6                                                    | 12                             | 37                                                             | 43                                                            | 2.7                                                                      | 3.2 | 1.7                                                                   | 2.0 |
| 137 130  | ✓                      | 6.0 × 90                        | 43                             | 3.6                                                    | 12                             | 47                                                             | 43                                                            | 2.7                                                                      | 3.2 | 1.8                                                                   | 2.1 |
| 137 132  | ✓                      | 6.0 × 100                       | 53                             | 3.6                                                    | 12                             | 47                                                             | 53                                                            | 2.7                                                                      | 3.2 | 1.9                                                                   | 2.1 |
| 137 133  | ✓                      | 6.0 × 110                       | 62                             | 3.6                                                    | 12                             | 48                                                             | 62                                                            | 2.7                                                                      | 3.2 | 1.9                                                                   | 2.1 |
| 137 134  | ✓                      | 6.0 × 120                       | 72                             | 3.6                                                    | 12                             | 48                                                             | 72                                                            | 2.7                                                                      | 3.2 | 1.9                                                                   | 2.1 |
| 137 136  | ✓                      | 6.0 × 140                       | 72                             | 3.6                                                    | 12                             | 68                                                             | 72                                                            | 2.7                                                                      | 3.2 | 1.9                                                                   | 2.1 |
| 137 138  | ✓                      | 6.0 × 160                       | 72                             | 3.6                                                    | 12                             | 88                                                             | 72                                                            | 2.7                                                                      | 3.2 | 1.9                                                                   | 2.1 |
| 137 140  | ✓                      | 6.0 × 180                       | 72                             | 3.6                                                    | 12                             | 108                                                            | 72                                                            | 2.7                                                                      | 3.2 | 1.9                                                                   | 2.1 |
| 137 142  | ✓                      | 6.0 × 220                       | 72                             | 3.6                                                    | 12                             | 148                                                            | 72                                                            | 2.7                                                                      | 3.2 | 1.9                                                                   | 2.1 |

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## Conversion factors for load-duration and service classes

The conversion factors can be used to re-calculated the recommended load in the tables for other load-durations and service classes. The conversion factors are based on the factor  $k_{mod}$  in Eurocode 5.

Load-duration classes can differ between different countries due to climate-based loads (snow, wind).

## Conversion factors from permanent load duration in service class 3

| Load-duration | Examples of loading      | Service class 1-2 | Service class 3 |
|---------------|--------------------------|-------------------|-----------------|
| Permanent     | Self-weight              | 1.20              | 1.00            |
| Long-term     | Storage                  | 1.40              | 1.10            |
| Medium-term   | Imposed floor load, snow | 1.60              | 1.30            |
| Short-term    | Snow, wind               | 1.80              | 1.40            |
| Instantaneous | Wind, accidental load    | 2.20              | 1.80            |

## Corrosion protection

Rules and best practice for corrosion protection may differ among European countries. The end-user should ensure that the corrosion protection is suitable for the current application.

## Conversion to different timber quality

Re-calculation of load capacity in the axial direction for a different timber quality (characteristic density) is possible according to the formula below:

$$F_{ax(\rho_{k,1})} \times \left( \frac{\rho_{k,2}}{\rho_{k,1}} \right)^{0,8} = F_{ax(\rho_{k,2})}$$

If for example the load capacity in axial direction is 60 kg in C14-timber the load capacity in C35-timber is increased to:

$$60kg \times \left( \frac{400}{290} \right)^{0,8} = 75kg$$

Re-calculation for load capacity in the shear direction in the same way is however not possible. For guidance please contact ESSVE technical support.

| Material | Density<br>$\rho_k$<br>[kg/m <sup>3</sup> ] |
|----------|---------------------------------------------|
| C14      | 290                                         |
| C18      | 320                                         |
| C24      | 350                                         |
| C30      | 380                                         |
| C35      | 400                                         |
| C40      | 420                                         |