

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

ETA-13/0170  
of 4 April 2018

English translation prepared by DIBt - Original version in German language

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Twistec self drilling screws

Product family  
to which the construction product belongs

Fastening screws for metal members and sheeting

Manufacturer

Nögel Montagetechnik Vertriebsgesellschaft mbH  
Koppelweg 1  
49767 Twist  
DEUTSCHLAND

Manufacturing plant

Manufacturing plant 1  
Manufacturing plant 2  
Manufacturing plant 3

This European Technical Assessment  
contains

17 pages including 13 annexes which form an integral  
part of this assessment

This European Technical Assessment is  
issued in accordance with Regulation (EU)  
No 305/2011, on the basis of

EAD 330046-01-0602

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**Specific Part**

**1 Technical description of the product**

The fastening screws Twistec are self-drilling screws listed in Table 1. The fastening screws are made of stainless steel or carbon steel with anticorrosion coating. The fastening screws are normally completed with sealing washers consisting of metal washer and EPDM-seal.

**Table 1 – Fastening screws for metal members and sheeting**

| Annex                  | Fastening screw           | Description  |
|------------------------|---------------------------|--|
| Annex 4 <sup>*)</sup>  | Twistec Typ A 4,8 x L     | with hexagon head and EPDM-sealing washer $\geq \text{Ø}14$ mm |
| Annex 5                | Twistec Typ A 4,8 x L     | with hexagon head and EPDM-sealing washer $\geq \text{Ø}14$ mm |
| Annex 6 <sup>*)</sup>  | Twistec Typ A 4,8 x L     | with hexagon head and EPDM-sealing washer $\geq \text{Ø}14$ mm |
| Annex 7                | Twistec Typ A 4,8 x L     | with hexagon head and EPDM-sealing washer $\geq \text{Ø}14$ mm |
| Annex 8                | Twistec Typ E 5,5 x L     | with hexagon head and EPDM-sealing washer $\geq \text{Ø}16$ mm |
| Annex 9                | Twistec Typ E 5,5 x L     | with hexagon head and EPDM-sealing washer $\geq \text{Ø}16$ mm |
| Annex 10               | Twistec Typ P 5,5 x L     | with hexagon head and EPDM-sealing washer $\geq \text{Ø}16$ mm |
| Annex 11               | Twistec Typ L 5,5 x L     | with hexagon head and EPDM-sealing washer $\geq \text{Ø}16$ mm |
| Annex 12 <sup>*)</sup> | Twistec Colorhead 4,8 x L | with hexagon head and EPDM-sealing washer $\geq \text{Ø}14$ mm |
| Annex 13               | Twistec Colorhead 4,8 x L | with hexagon head and EPDM-sealing washer $\geq \text{Ø}14$ mm |

<sup>\*)</sup> These fastening screws are applicable for fastening to timber substructures.

**2 Specification of the intended use in accordance with the applicable European Assessment Document 330046-01-0602**

The fastening screws are intended to be used for fastening metal sheeting to metal or timber substructures. The sheeting can either be used as wall or roof cladding or as load bearing wall and roof element. The fastening screws can also be used for the fastening of any other thin gauge metal members. The intended use comprises fastening screws and connections for indoor and outdoor applications. Fastening screws which are intended to be used in external environments with  $\geq \text{C}2$  corrosion according to the standard EN ISO 12944-2 are made of stainless steel. Furthermore the intended use comprises connections with predominantly static loads (e. g. wind loads, dead loads). The fastening screws are not intended for re-use.

The performances given in Section 3 are only valid if the fastening screws for sandwich panels are used in compliance with the specifications and conditions given in Annex 1-13.

The verification and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastening screws of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

**3 Performance of the product and references to the methods used for its assessment**

**3.1 Mechanical resistance and stability (BWR 1)**

| Essential characteristic  | Performance             |
|---|-------------------------|
| Shear Resistance of the Connection  | see Annexes to this ETA |
| Tension Resistance of the Connection  | see Annexes to this ETA |
| Design Resistance in case of combined Tension and Shear Forces (interaction)    | see Annexes to this ETA |
| Check of Deformation Capacity in case of constraining forces due to temperature | No performance assessed |
| Durability  | No performance assessed |

**3.2 Safety in case of fire (BWR 2)**

| Essential characteristic | Performance          |
|--------------------------|----------------------|
| Reaction to fire         | Performance Class A1 |

**4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base**

In accordance with EAD No. 330046-01-0602, the applicable European legal act is: Commission Decision 1998/214/EC, amended by 2001/596/EC.

The system to be applied is: 2+

**5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD**

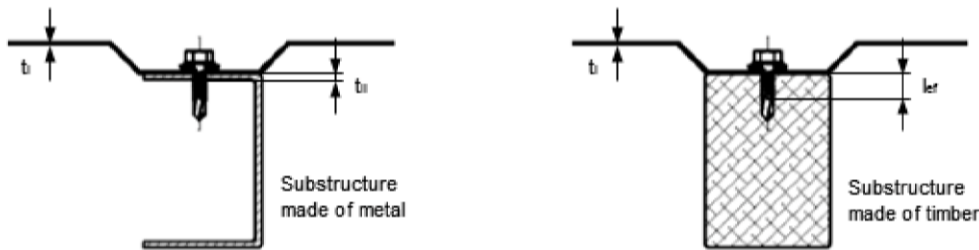
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 4 April 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Schult

### Examples of execution of a connection



### Materials and dimensions

Design relevant materials and dimensions are indicated in the Annexes of the fastening screws:

|              |  |
|--------------|--|
| Fastener     | Material of the fastening screw          |
| Washer       | Material of the sealing washer           |
| Component I  | Material of the metal member or sheeting |
| Component II | Material of the substructure             |

|            |  |
|------------|--|
| $t_I$      | Thickness of component I   |
| $t_{II}$   | Thickness of component II made of metal  |
| $l_{eff}$  | Effective screw-in length in component II made of timber (without drill point) |
| $d_{dp}$   | Pre-drill diameter of component I and component II                             |
| $d_{dp,I}$ | Pre-drill diameter of component I  |

The thickness  $t_{II}$  corresponds to the load-bearing screw-in length of the fastening screw in component II, if the load-bearing screw-in length does not cover the entire component thickness.

### Performance characteristics

The design relevant performance characteristics of a connection are indicated in the Annexes of the fastening screws.

|           |  |
|-----------|--|
| $N_{R,k}$ | Characteristic value of tension resistance |
| $V_{R,k}$ | Characteristic value of shear resistance   |

In some cases component-specific performance characteristics are indicated for an individual calculation of the design relevant performance characteristics of a connection:

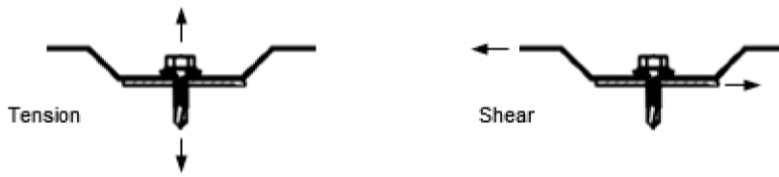
|              |   |
|--------------|---|
| $N_{R,I,k}$  | Characteristic value of pull-through resistance for component I                               |
| $N_{R,II,k}$ | Characteristic value of pull-out resistance for component II                                  |
| $V_{R,I,k}$  | Characteristic value of hole bearing resistance for component I                               |
| $V_{R,II,k}$ | Characteristic value of hole bearing resistance for component II                              |
| $M_{y,Rk}$   | Characteristic value of yield moment of the fastening screw (for component II made of timber) |
| $f_{ax,k}$   | Characteristic value of withdrawal strength for component II made of timber                   |
| $f_{h,k}$    | Characteristic value of embedding strength for component II made of timber                    |

### Terms and explanations

Fastening screws for metal members and sheeting

### Annex 1

### Occurred loadings of a connection



### Design values

The design values of tension and shear resistance of a connection have to be determined as follows:

$$N_{R,d} = \frac{N_{R,k}}{\gamma_M}$$

$$V_{R,d} = \frac{V_{R,k}}{\gamma_M}$$

$N_{R,d}$  Design value of tension resistance  
 $V_{R,d}$  Design value of shear resistance  
 $\gamma_M$  Partial safety factor

The recommended partial safety factor  $\gamma_M$  is 1.33, provided no partial safety factor is given in national regulations or national Annexes to Eurocode 3.

### Special conditions

If the component thickness  $t_I$  or  $t_{II}$  lies in between two indicated component thicknesses, the characteristic value may be calculated by linear interpolation.

For asymmetric components II made of metal (e.g. Z- or C-shaped profiles) with component thickness  $t_{II} < 5$  mm, the characteristic value  $N_{R,k}$  has to be reduced to 70%.

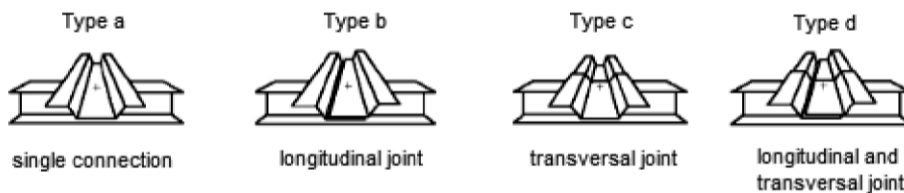
In case of combined loading by tension and shear forces the following interaction equation has to be taken into account:

$$\frac{N_{S,d}}{N_{R,d}} + \frac{V_{S,d}}{V_{R,d}} \leq 1,0$$

$N_{S,d}$  Design value of the applied tension forces  
 $V_{S,d}$  Design value of the applied shear forces

### Types of connection

For the types of connection (a, b, c, d) given in the Annexes of the fastening screws, it is not necessary to take into account the effect of constraints due to temperature. For other types of connection the effect of constraints have to be taken into account, unless they do not occur or are not significant (e.g. sufficient flexibility of the substructure).



### Installation conditions

The installation is carried out according to manufacturer's instruction.

The load-bearing screw-in length of the fastening screw specified by the manufacturer has to be taken into account.

The fastening screws have to be processed with suitable drill driver (e.g. cordless drill driver with depth stop). The use of impact wrench is not allowed.

The fastening screws have to be fixed rectangular to the surface of the component.

Component I and component II have to be in direct contact to each other. The use of compression resistant thermal insulation strips up to a thickness of 3 mm is allowed.

### Design and installation

Fastening screws for metal members and sheeting

Annex 2

### Component I made of perforated sheeting

The characteristic values of tension and shear resistance are determined as follows:

$$N_{R,k} = \min \left\{ \begin{array}{l} N_{R,I,k} \\ N_{R,II,k} \end{array} \right. \quad V_{R,k} = \min \left\{ \begin{array}{l} V_{R,I,k} \\ V_{R,k} \end{array} \right.$$

$N_{R,I,k}$  and  $V_{R,I,k}$  are given in Annex 4 and 5.

$N_{R,II,k}$  and  $V_{R,k}$  are given in the Annex of the fastening screw.

### Component I made of aluminium alloy

The characteristic value of tension resistance is determined as follows:

$$N_{R,k} = \min \left\{ \begin{array}{l} N_{R,I,k} \\ N_{R,II,k} \end{array} \right.$$

$N_{R,I,k}$  is determined according to EN 1999-1-4:2007 + AC:2009, equation (8.13).

$N_{R,II,k}$  is given in the Annex of the fastening screw.

### Component II made of timber

The characteristic values of tension and shear resistance for other  $k_{mod}$  or  $\rho_k$  as indicated in the Annex of the fastening screw can be determined as follows:

$$N_{R,k} = \min \left\{ \begin{array}{l} N_{R,I,k} \\ N_{R,II,k} * k_{mod} \end{array} \right. \quad V_{R,k} = \min \left\{ \begin{array}{l} V_{R,I,k} \\ V_{R,II,k} * k_{mod} \end{array} \right.$$

$N_{R,I,k}$  and  $V_{R,I,k}$  are given in the Annex of the fastening screw.

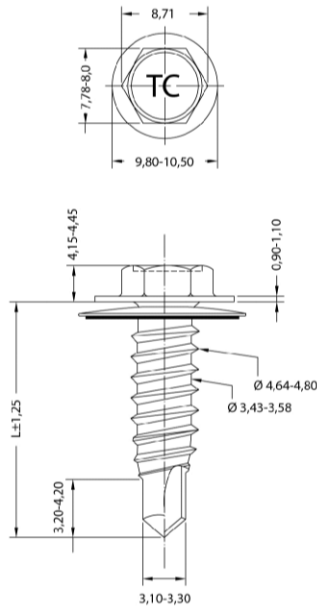
$N_{R,II,k}$  is determined according to EN 1995-1-1:2004 + A1:2008, equation (8.40a), with  $f_{ax,k}$  given in the Annex of the fastening screw.

$V_{R,II,k}$  is determined according to EN 1995-1-1:2004 + A1:2008, equation (8.9), with  $M_{y,Rk}$  and  $f_{h,k}$  given in the Annex of the fastening screw.

### Additional provisions

Fastening screws for metal members and sheeting

### Annex 3



Material:

Fastener: stainless steel (1.4301) - EN 10088  
ruspert coated

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: S235 - EN 10025-1  
S280GD, S320GD - EN 10346  
Structural timber - EN 14081

Drilling capacity:  $\Sigma t_i \leq 3,00$  mm

Timber substructures:

performance determined with

$M_{y,Rk} = 3,110$  Nm  
 $f_{ax,k} = 14,400$  N/mm<sup>2</sup> for  $l_{ef} \geq 25,0$  mm

| $t_i$ [mm]       | $t_i$ [mm] |      |      |      |      |      |      |      |      |      |      | $V_{I,R,k}$<br>$N_{I,R,k}$ |
|------------------|------------|------|------|------|------|------|------|------|------|------|------|----------------------------|
|                  | 0,40       | 0,50 | 0,55 | 0,63 | 0,75 | 0,88 | 1,00 | 1,13 | 1,25 | 1,50 | 1,75 |                            |
| $V_{R,k}$ [kN]   | 0,40       | 0,50 | 0,55 | 0,63 | 0,75 | 0,88 | 1,00 | 1,13 | 1,25 | 1,50 | 1,75 | 0,52                       |
|                  | 0,50       | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88                       |
|                  | 0,55       | 0,88 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12                       |
|                  | 0,63       | 0,88 | 1,12 | 1,37 | 1,37 | 1,37 | 1,37 | 1,37 | 1,37 | 1,37 | 1,37 | 1,37                       |
|                  | 0,75       | 0,88 | 1,12 | 1,37 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87                       |
|                  | 0,88       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40                       |
|                  | 1,00       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92                       |
|                  | 1,13       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92                       |
|                  | 1,25       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92                       |
|                  | 1,50       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,92 | 2,92 | 2,92 | 2,92 | —    | 2,92                       |
|                  | 1,75       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,92 | 2,92 | 2,92 | —    | —    | 2,92                       |
| $N_{R,k}$ [kN]   | 0,40       | 0,55 | 0,64 | 0,74 | 0,97 | 1,14 | 1,14 | 1,14 | 1,14 | 1,14 | 1,14 | 1,14                       |
|                  | 0,50       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 1,74                       |
|                  | 0,55       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 2,13                       |
|                  | 0,63       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 2,50                       |
|                  | 0,75       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 3,19                       |
|                  | 0,88       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 3,84                       |
|                  | 1,00       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 4,41                       |
|                  | 1,13       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 4,41                       |
|                  | 1,25       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 4,41                       |
|                  | 1,50       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | —    | 4,41                       |
|                  | 1,75       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | —    | —    | 4,41                       |
| $M_{t,nom}$ [Nm] |            |      |      |      |      |      |      |      |      |      |      |                            |

The values listed above in dependence on the screw-in length  $l_{ef}$  are valid for  $k_{mod} = 0,90$  and timber strength grade C24 ( $\rho_a = 350$  kg/m<sup>3</sup>). For other combinations of  $k_{mod}$  and timber strength grades see Annex 3 (Component II made of timber).

Self drilling screw

Twistec® Typ A 4,8 x L  
with hexagon head and sealing washer  $\geq \varnothing 14$  mm

Annex 4



English translation prepared by DIBt

|  |   |
|--|---|
|  | <p><b>Material:</b></p> <p>Fastener: stainless steel (1.4301) - EN 10088<br/>ruspert coated</p> <p>Washer: stainless steel (1.4301) - EN 10088</p> <p>Component I: S280GD, S320GD, S350GD - EN 10346</p> <p>Component II: S235 - EN 10025-1<br/>S280GD, S320GD - EN 10346</p> |
|  | <p><b>Drilling capacity:</b> <math>\Sigma t_i \leq 3,00</math> mm</p>   |
|  | <p><b>Timber substructures:</b><br/>no performance determined</p>   |

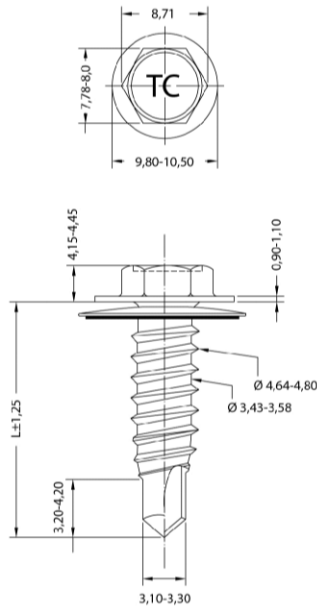
|                  | $t_i$ [mm] | $t_{II}$ [mm] |          |          |          |          |          |   | — | — | — |
|------------------|------------|---------------|----------|----------|----------|----------|----------|---|---|---|---|
|                  |            | 2 x 0,63      | 2 x 0,75 | 2 x 0,88 | 2 x 1,00 | 2 x 1,13 | 2 x 1,25 | — |   |   |   |
| $V_{R,k}$ [kN]   | 0,40       | —             | —        | —        | —        | —        | —        | — | — | — | — |
|                  | 0,50       | 1,73          | 1,73     | 1,73     | 1,73     | 1,73     | 1,73     | — | — | — | — |
|                  | 0,55       | 1,97          | 1,97     | 1,97     | 1,97     | 1,97     | —        | — | — | — | — |
|                  | 0,63       | 2,15          | 2,15     | 2,15     | 2,15     | 2,15     | —        | — | — | — | — |
|                  | 0,75       | 2,29          | 2,29     | 2,29     | 2,29     | —        | —        | — | — | — | — |
|                  | 0,88       | 2,29          | 2,29     | 2,29     | 2,29     | —        | —        | — | — | — | — |
|                  | 1,00       | 2,29          | 2,29     | 2,29     | 2,29     | —        | —        | — | — | — | — |
|                  | 1,13       | 2,29          | 2,29     | 2,29     | —        | —        | —        | — | — | — | — |
|                  | 1,25       | 2,29          | 2,29     | —        | —        | —        | —        | — | — | — | — |
|                  | 1,50       | 2,29          | 2,29     | —        | —        | —        | —        | — | — | — | — |
|                  | 1,75       | —             | —        | —        | —        | —        | —        | — | — | — | — |
| $N_{R,k}$ [kN]   | 0,40       | 1,14          | 1,14     | 1,14     | 1,14     | 1,14     | 1,14     | — | — | — | — |
|                  | 0,50       | 1,35          | 1,35     | 1,35     | 1,35     | 1,35     | 1,35     | — | — | — | — |
|                  | 0,55       | 1,35          | 1,35     | 1,35     | 1,35     | 1,35     | —        | — | — | — | — |
|                  | 0,63       | 1,35          | 1,35     | 1,35     | 1,35     | 1,35     | —        | — | — | — | — |
|                  | 0,75       | 1,35          | 1,35     | 1,35     | 1,35     | —        | —        | — | — | — | — |
|                  | 0,88       | 1,35          | 1,35     | 1,35     | 1,35     | —        | —        | — | — | — | — |
|                  | 1,00       | 1,35          | 1,35     | 1,35     | 1,35     | —        | —        | — | — | — | — |
|                  | 1,13       | 1,35          | 1,35     | 1,35     | —        | —        | —        | — | — | — | — |
|                  | 1,25       | 1,35          | 1,35     | —        | —        | —        | —        | — | — | — | — |
|                  | 1,50       | 1,35          | 1,35     | —        | —        | —        | —        | — | — | — | — |
|                  | 1,75       | —             | —        | —        | —        | —        | —        | — | — | — | — |
| $M_{t,nom}$ [Nm] |            |               |          |          |          |          |          |   |   |   |   |

No additional regulations.

Self drilling screw

Twistec® Typ A 4,8 x L  
with hexagon head and sealing washer  $\geq \text{Ø}14$  mm

Annex 5



Material:

Fastener: stainless steel (1.4301) - EN 10088  
ruspert coated

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: S235 - EN 10025-1  
S280GD, S320GD - EN 10346  
Structural timber - EN 14081

Drilling capacity:  $\Sigma t_i \leq 3,00$  mm

Timber substructures:

performance determined with

$M_{y,Rk} = 3,110$  Nm  
 $f_{ax,k} = 14,400$  N/mm<sup>2</sup> for  $l_{ef} \geq 25,0$  mm

| $t_i$ [mm]       | $t_i$ [mm] |      |      |      |      |      |      |      |      |      |      | $V_{I,R,k}$<br>$N_{I,R,k}$ |
|------------------|------------|------|------|------|------|------|------|------|------|------|------|----------------------------|
|                  | 0,40       | 0,50 | 0,55 | 0,63 | 0,75 | 0,88 | 1,00 | 1,13 | 1,25 | 1,50 | 1,75 |                            |
| $V_{R,k}$ [kN]   | 0,40       | 0,50 | 0,55 | 0,63 | 0,75 | 0,88 | 1,00 | 1,13 | 1,25 | 1,50 | 1,75 | 0,52                       |
|                  | 0,50       | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88 | 0,88                       |
|                  | 0,55       | 0,88 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12 | 1,12                       |
|                  | 0,63       | 0,88 | 1,12 | 1,37 | 1,37 | 1,37 | 1,37 | 1,37 | 1,37 | 1,37 | 1,37 | 1,37                       |
|                  | 0,75       | 0,88 | 1,12 | 1,37 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87                       |
|                  | 0,88       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40                       |
|                  | 1,00       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92                       |
|                  | 1,13       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92                       |
|                  | 1,25       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92 | 2,92                       |
|                  | 1,50       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,92 | 2,92 | 2,92 | 2,92 | —    | 2,92                       |
|                  | 1,75       | 0,88 | 1,12 | 1,37 | 1,87 | 2,40 | 2,92 | 2,92 | 2,92 | —    | —    | 2,92                       |
| $N_{R,k}$ [kN]   | 0,40       | 0,55 | 0,64 | 0,74 | 0,97 | 1,14 | 1,14 | 1,14 | 1,14 | 1,14 | 1,14 | 1,14                       |
|                  | 0,50       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 1,74                       |
|                  | 0,55       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 2,13                       |
|                  | 0,63       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 2,50                       |
|                  | 0,75       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 3,19                       |
|                  | 0,88       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 3,84                       |
|                  | 1,00       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 4,41                       |
|                  | 1,13       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 4,41                       |
|                  | 1,25       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | 1,56 | 4,41                       |
|                  | 1,50       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | 1,56 | —    | 4,41                       |
|                  | 1,75       | 0,55 | 0,64 | 0,74 | 0,97 | 1,25 | 1,56 | 1,56 | 1,56 | —    | —    | 4,41                       |
| $M_{t,nom}$ [Nm] |            |      |      |      |      |      |      |      |      |      |      |                            |

The values listed above in dependence on the screw-in length  $l_{ef}$  are valid for  $k_{mod} = 0,90$  and timber strength grade C24 ( $\rho_a = 350$  kg/m<sup>3</sup>). For other combinations of  $k_{mod}$  and timber strength grades see Annex 3 (Component II made of timber).

Self drilling screw

Twistec® Typ H 4,8 x L  
with hexagon head and sealing washer  $\geq \varnothing 14$  mm

Annex 6

English translation prepared by DIBt

|  |   |
|--|---|
|  | <p><b>Material:</b></p> <p>Fastener: stainless steel (1.4301) - EN 10088<br/>ruspert coated</p> <p>Washer: stainless steel (1.4301) - EN 10088</p> <p>Component I: S280GD, S320GD, S350GD - EN 10346</p> <p>Component II: S235 - EN 10025-1<br/>S280GD, S320GD - EN 10346</p> |
|  | <p><b>Drilling capacity:</b> <math>\Sigma t_i \leq 3,00 \text{ mm}</math></p>   |
|  | <p><b>Timber substructures:</b><br/>no performance determined</p>   |

|                  | $t_i$ [mm] | $t_{II}$ [mm] |          |          |          |          |          |   | — | — | — |
|------------------|------------|---------------|----------|----------|----------|----------|----------|---|---|---|---|
|                  |            | 2 x 0,63      | 2 x 0,75 | 2 x 0,88 | 2 x 1,00 | 2 x 1,13 | 2 x 1,25 | — |   |   |   |
| $V_{R,k}$ [kN]   | 0,40       | —             | —        | —        | —        | —        | —        | — | — | — | — |
|                  | 0,50       | 1,73          | 1,73     | 1,73     | 1,73     | 1,73     | 1,73     | — | — | — | — |
|                  | 0,55       | 1,97          | 1,97     | 1,97     | 1,97     | 1,97     | —        | — | — | — | — |
|                  | 0,63       | 2,15          | 2,15     | 2,15     | 2,15     | 2,15     | —        | — | — | — | — |
|                  | 0,75       | 2,29          | 2,29     | 2,29     | 2,29     | —        | —        | — | — | — | — |
|                  | 0,88       | 2,29          | 2,29     | 2,29     | 2,29     | —        | —        | — | — | — | — |
|                  | 1,00       | 2,29          | 2,29     | 2,29     | 2,29     | —        | —        | — | — | — | — |
|                  | 1,13       | 2,29          | 2,29     | 2,29     | —        | —        | —        | — | — | — | — |
|                  | 1,25       | 2,29          | 2,29     | —        | —        | —        | —        | — | — | — | — |
|                  | 1,50       | 2,29          | 2,29     | —        | —        | —        | —        | — | — | — | — |
|                  | 1,75       | —             | —        | —        | —        | —        | —        | — | — | — | — |
| $N_{R,k}$ [kN]   | 0,40       | 1,14          | 1,14     | 1,14     | 1,14     | 1,14     | 1,14     | — | — | — | — |
|                  | 0,50       | 1,35          | 1,35     | 1,35     | 1,35     | 1,35     | 1,35     | — | — | — | — |
|                  | 0,55       | 1,35          | 1,35     | 1,35     | 1,35     | 1,35     | —        | — | — | — | — |
|                  | 0,63       | 1,35          | 1,35     | 1,35     | 1,35     | 1,35     | —        | — | — | — | — |
|                  | 0,75       | 1,35          | 1,35     | 1,35     | 1,35     | —        | —        | — | — | — | — |
|                  | 0,88       | 1,35          | 1,35     | 1,35     | 1,35     | —        | —        | — | — | — | — |
|                  | 1,00       | 1,35          | 1,35     | 1,35     | 1,35     | —        | —        | — | — | — | — |
|                  | 1,13       | 1,35          | 1,35     | 1,35     | —        | —        | —        | — | — | — | — |
|                  | 1,25       | 1,35          | 1,35     | —        | —        | —        | —        | — | — | — | — |
|                  | 1,50       | 1,35          | 1,35     | —        | —        | —        | —        | — | — | — | — |
|                  | 1,75       | —             | —        | —        | —        | —        | —        | — | — | — | — |
| $M_{t,nom}$ [Nm] |            |               |          |          |          |          |          |   |   |   |   |

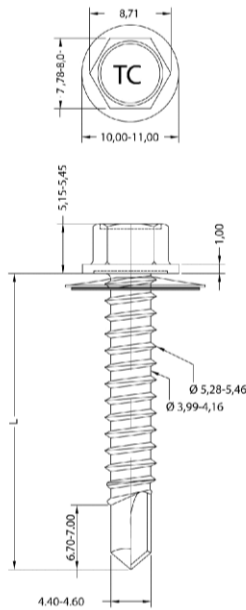
No additional regulations.

Self drilling screw

Twistec® Typ H 4,8 x L  
with hexagon head and sealing washer  $\geq \text{Ø}14 \text{ mm}$

Annex 7

English translation prepared by DIBt



Material:

Fastener: stainless steel (1.4301) - EN 10088  
ruspert coated

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: S235 - EN 10025-1  
S280GD, S320GD - EN 10346

Drilling capacity:  $\Sigma t_i \leq 3,50$  mm

Timber substructures:

no performance determined

| $t_i$ [mm]       | $t_{II}$ [mm] |      |      |      |      |      |      |      |      |   |   |   |
|------------------|---------------|------|------|------|------|------|------|------|------|---|---|---|
|                  | 1,00          | 1,13 | 1,25 | 1,50 | 1,75 | 2,00 | 2,50 | 3,00 | —    | — | — |   |
| $V_{R,k}$ [kN]   | 0,50          | 1,60 | 1,60 | 1,60 | 1,60 | 1,60 | 1,60 | 1,60 | 1,60 | — | — | — |
|                  | 0,55          | 1,70 | 1,70 | 1,70 | 1,70 | 1,70 | 1,70 | 1,70 | —    | — | — | — |
|                  | 0,63          | 1,79 | 2,10 | 2,42 | 2,42 | 2,42 | 2,42 | 2,42 | —    | — | — | — |
|                  | 0,75          | 1,93 | 2,19 | 2,44 | 2,70 | 2,72 | 2,73 | 2,73 | —    | — | — | — |
|                  | 0,88          | 2,02 | 2,25 | 2,48 | 2,92 | 3,04 | 3,16 | 3,16 | —    | — | — | — |
|                  | 1,00          | 2,06 | 2,29 | 2,52 | 3,16 | 3,40 | 3,64 | 3,64 | —    | — | — | — |
|                  | 1,13          | 2,06 | 2,29 | 2,52 | 3,16 | 3,40 | 3,64 | —    | —    | — | — | — |
|                  | 1,25          | 2,06 | 2,29 | 2,52 | 3,16 | 3,40 | 3,64 | —    | —    | — | — | — |
|                  | 1,50          | 2,06 | 2,29 | 2,52 | 3,16 | 3,40 | 3,64 | —    | —    | — | — | — |
|                  | 1,75          | 2,06 | 2,29 | 2,52 | 3,16 | 3,40 | —    | —    | —    | — | — | — |
|                  | 2,00          | 2,06 | 2,29 | 2,52 | 3,16 | —    | —    | —    | —    | — | — | — |
| $N_{R,k}$ [kN]   | 0,50          | 1,11 | 1,41 | 1,68 | 1,81 | 1,81 | 1,81 | 1,81 | 1,81 | — | — | — |
|                  | 0,55          | 1,11 | 1,41 | 1,68 | 2,15 | 2,15 | 2,15 | 2,15 | —    | — | — | — |
|                  | 0,63          | 1,11 | 1,41 | 1,68 | 2,22 | 2,46 | 2,46 | 2,46 | —    | — | — | — |
|                  | 0,75          | 1,11 | 1,41 | 1,68 | 2,22 | 2,70 | 2,97 | 2,97 | —    | — | — | — |
|                  | 0,88          | 1,11 | 1,41 | 1,68 | 2,22 | 2,70 | 3,17 | 3,35 | —    | — | — | — |
|                  | 1,00          | 1,11 | 1,41 | 1,68 | 2,22 | 2,70 | 3,17 | 3,59 | —    | — | — | — |
|                  | 1,13          | 1,11 | 1,41 | 1,68 | 2,22 | 2,70 | 3,17 | —    | —    | — | — | — |
|                  | 1,25          | 1,11 | 1,41 | 1,68 | 2,22 | 2,70 | 3,17 | —    | —    | — | — | — |
|                  | 1,50          | 1,11 | 1,41 | 1,68 | 2,22 | 2,70 | 3,17 | —    | —    | — | — | — |
|                  | 1,75          | 1,11 | 1,41 | 1,68 | 2,22 | 2,70 | —    | —    | —    | — | — | — |
|                  | 2,00          | 1,11 | 1,41 | 1,68 | 2,22 | —    | —    | —    | —    | — | — | — |
| $M_{t,nom}$ [Nm] |               |      |      |      |      |      |      |      |      |   |   |   |

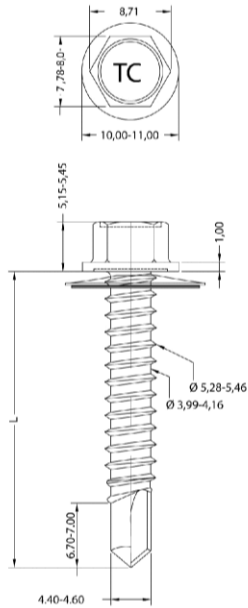
No additional regulations.

Self drilling screw

Twistec® Typ E 5,5 x L  
with hexagon head and sealing washer  $\geq \text{Ø}16$  mm

Annex 8

English translation prepared by DIBt



**Material:**

Fastener: stainless steel (1.4301) - EN 10088  
ruspert coated  
Washer: stainless steel (1.4301) - EN 10088  
Component I: S280GD, S320GD, S350GD - EN 10346  
Component II: S235 - EN 10025-1  
S280GD, S320GD - EN 10346

**Drilling capacity:**  $\Sigma t_i \leq 3,50$  mm

**Timber substructures:**  
no performance determined

|                  | $t_i$ [mm] | $t_{II}$ [mm] |          |          |          |          |          |          |   |   |
|------------------|------------|---------------|----------|----------|----------|----------|----------|----------|---|---|
|                  |            | 2 x 0,63      | 2 x 0,75 | 2 x 0,88 | 2 x 1,00 | 2 x 1,13 | 2 x 1,25 | 2 x 1,50 | — | — |
| $V_{R,k}$ [kN]   | 0,50       | 1,65          | 1,65     | 1,65     | 1,65     | 1,65     | 1,65     | 1,65     | — | — |
|                  | 0,55       | 1,79          | 1,79     | 1,79     | 1,79     | 1,79     | 1,79     | —        | — |   |
|                  | 0,63       | 1,91          | 1,91     | 1,91     | 1,91     | 1,91     | 1,91     | —        | — |   |
|                  | 0,75       | 2,05          | 2,05     | 2,05     | 2,05     | 2,05     | 2,05     | —        | — |   |
|                  | 0,88       | 2,05          | 2,05     | 2,05     | 2,05     | 2,05     | 2,05     | —        | — |   |
|                  | 1,00       | 2,05          | 2,05     | 2,05     | 2,05     | 2,05     | 2,05     | —        | — |   |
|                  | 1,13       | 2,05          | 2,05     | 2,05     | 2,05     | 2,05     | —        | —        | — |   |
|                  | 1,25       | 2,05          | 2,05     | 2,05     | 2,05     | —        | —        | —        | — |   |
|                  | 1,50       | 2,05          | 2,05     | 2,05     | 2,05     | —        | —        | —        | — |   |
|                  | 1,75       | 2,05          | 2,05     | —        | —        | —        | —        | —        | — |   |
| 2,00             | 2,05       | 2,05          | —        | —        | —        | —        | —        | —        |   |   |
| $N_{R,k}$ [kN]   | 0,50       | 1,18          | 1,18     | 1,18     | 1,18     | 1,18     | 1,18     | 1,18     | — | — |
|                  | 0,55       | 1,18          | 1,18     | 1,18     | 1,18     | 1,18     | 1,18     | —        | — |   |
|                  | 0,63       | 1,18          | 1,18     | 1,18     | 1,18     | 1,18     | 1,18     | —        | — |   |
|                  | 0,75       | 1,18          | 1,18     | 1,18     | 1,18     | 1,18     | 1,18     | —        | — |   |
|                  | 0,88       | 1,18          | 1,18     | 1,18     | 1,18     | 1,18     | 1,18     | —        | — |   |
|                  | 1,00       | 1,18          | 1,18     | 1,18     | 1,18     | 1,18     | 1,18     | —        | — |   |
|                  | 1,13       | 1,18          | 1,18     | 1,18     | 1,18     | 1,18     | —        | —        | — |   |
|                  | 1,25       | 1,18          | 1,18     | 1,18     | 1,18     | —        | —        | —        | — |   |
|                  | 1,50       | 1,18          | 1,18     | 1,18     | 1,18     | —        | —        | —        | — |   |
|                  | 1,75       | 1,18          | 1,18     | —        | —        | —        | —        | —        | — |   |
| 2,00             | 1,18       | 1,18          | —        | —        | —        | —        | —        | —        |   |   |
| $M_{t,nom}$ [Nm] |            |               |          |          |          |          |          |          |   |   |

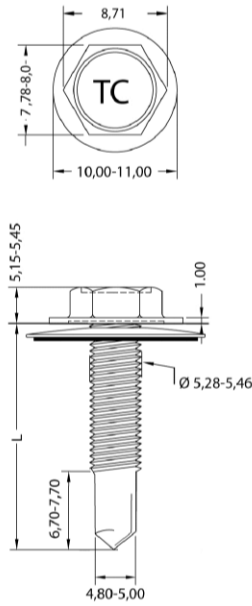
No additional regulations.

Self drilling screw

Twistec® Typ E 5,5 x L  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 9

English translation prepared by DIBt



Material:

Fastener: stainless steel (1.4301) - EN 10088  
ruspert coated

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: S235 - EN 10025-1  
S280GD, S320GD - EN 10346

Drilling capacity:  $\Sigma t_i \leq 6,00$  mm

Timber substructures:

no performance determined

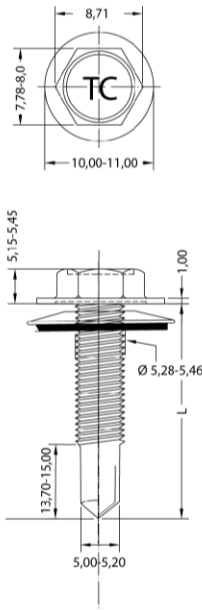
| $t_f$ [mm]       | $t_{II}$ [mm] |      |      |      |      |      |      |      |   |   |   |   |
|------------------|---------------|------|------|------|------|------|------|------|---|---|---|---|
|                  | 1,50          | 1,75 | 2,00 | 2,50 | 3,00 | 4,00 | 5,00 | —    | — | — | — |   |
| $V_{R,k}$ [kN]   | 0,50          | 1,73 | 1,73 | 1,73 | 1,73 | 1,73 | 1,73 | 1,73 | — | — | — | — |
|                  | 0,55          | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | — | — | — | — |
|                  | 0,63          | 2,01 | 2,01 | 2,01 | 2,01 | 2,01 | 2,01 | 2,01 | — | — | — | — |
|                  | 0,75          | 2,33 | 2,59 | 2,85 | 2,85 | 2,85 | 2,85 | 2,85 | — | — | — | — |
|                  | 0,88          | 2,69 | 2,91 | 3,12 | 3,12 | 3,12 | 3,12 | 3,12 | — | — | — | — |
|                  | 1,00          | 3,07 | 3,24 | 3,42 | 3,42 | 3,42 | 3,42 | 3,42 | — | — | — | — |
|                  | 1,13          | 3,07 | 3,24 | 3,42 | 3,42 | 3,68 | 3,68 | —    | — | — | — | — |
|                  | 1,25          | 3,07 | 3,24 | 3,42 | 3,42 | 3,95 | 3,95 | —    | — | — | — | — |
|                  | 1,50          | 3,07 | 3,24 | 3,42 | 3,42 | 4,21 | 4,21 | —    | — | — | — | — |
|                  | 1,75          | 3,07 | 3,24 | 3,42 | 3,42 | 4,21 | 4,21 | —    | — | — | — | — |
|                  | 2,00          | 3,07 | 3,24 | 3,42 | 3,42 | 4,21 | 4,21 | —    | — | — | — | — |
| $N_{R,k}$ [kN]   | 0,50          | 1,46 | 1,81 | 1,81 | 1,81 | 1,81 | 1,81 | 1,81 | — | — | — | — |
|                  | 0,55          | 1,46 | 2,06 | 2,15 | 2,15 | 2,15 | 2,15 | 2,15 | — | — | — | — |
|                  | 0,63          | 1,46 | 2,06 | 2,46 | 2,46 | 2,46 | 2,46 | 2,46 | — | — | — | — |
|                  | 0,75          | 1,46 | 2,06 | 2,64 | 2,97 | 2,97 | 2,97 | 2,97 | — | — | — | — |
|                  | 0,88          | 1,46 | 2,06 | 2,64 | 3,35 | 3,35 | 3,35 | 3,35 | — | — | — | — |
|                  | 1,00          | 1,46 | 2,06 | 2,64 | 3,58 | 3,59 | 3,59 | 3,59 | — | — | — | — |
|                  | 1,13          | 1,46 | 2,06 | 2,64 | 3,58 | 3,59 | 3,59 | —    | — | — | — | — |
|                  | 1,25          | 1,46 | 2,06 | 2,64 | 3,58 | 3,59 | 3,59 | —    | — | — | — | — |
|                  | 1,50          | 1,46 | 2,06 | 2,64 | 3,58 | 3,59 | 3,59 | —    | — | — | — | — |
|                  | 1,75          | 1,46 | 2,06 | 2,64 | 3,58 | 3,59 | 3,59 | —    | — | — | — | — |
|                  | 2,00          | 1,46 | 2,06 | 2,64 | 3,58 | 3,59 | 3,59 | —    | — | — | — | — |
| $M_{t,nom}$ [Nm] |               |      |      |      |      |      |      |      |   |   |   |   |

No additional regulations.

Self drilling screw

Twistec® Typ P 5,5 x L  
with hexagon head and sealing washer  $\geq \text{Ø}16$  mm

Annex 10



Material:

Fastener: stainless steel (1.4301) - EN 10088  
ruspert coated

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: S235 - EN 10025-1  
S280GD, S320GD - EN 10346

Drilling capacity:  $\Sigma t_i \leq 12,50$  mm

Timber substructures:  
no performance determined

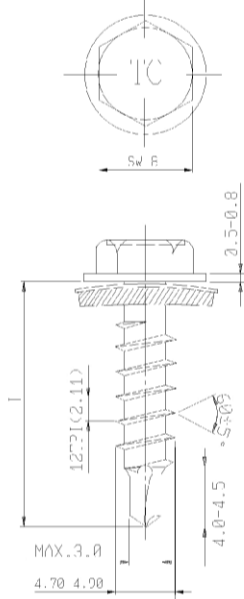
| $t_i$ [mm]       | $t_{ii}$ [mm] |      |      |       |       |      |   |   |   |   |   |   |
|------------------|---------------|------|------|-------|-------|------|---|---|---|---|---|---|
|                  | 6,00          | 7,00 | 8,00 | 10,00 | 12,00 | —    | — | — | — | — | — |   |
| $V_{R,k}$ [kN]   | 0,50          | 1,71 | 1,71 | 1,71  | 1,71  | 1,71 | — | — | — | — | — | — |
|                  | 0,55          | 2,06 | 2,06 | 2,06  | 2,06  | —    | — | — | — | — | — | — |
|                  | 0,63          | 2,41 | 2,41 | 2,41  | 2,41  | —    | — | — | — | — | — | — |
|                  | 0,75          | 3,06 | 3,06 | 3,06  | 3,06  | —    | — | — | — | — | — | — |
|                  | 0,88          | 3,69 | 3,69 | 3,69  | 3,69  | —    | — | — | — | — | — | — |
|                  | 1,00          | 4,25 | 4,25 | 4,25  | 4,25  | —    | — | — | — | — | — | — |
|                  | 1,13          | 4,78 | 4,78 | 4,78  | 4,78  | —    | — | — | — | — | — | — |
|                  | 1,25          | 5,22 | 5,22 | 5,22  | 5,22  | —    | — | — | — | — | — | — |
|                  | 1,50          | 6,03 | 6,03 | 6,03  | 6,03  | —    | — | — | — | — | — | — |
|                  | 1,75          | 6,61 | 6,61 | 6,61  | 6,61  | —    | — | — | — | — | — | — |
|                  | 2,00          | 7,03 | 7,03 | 7,03  | 7,03  | —    | — | — | — | — | — | — |
| $N_{R,k}$ [kN]   | 0,50          | 1,86 | 1,86 | 1,86  | 1,86  | 1,86 | — | — | — | — | — | — |
|                  | 0,55          | 2,15 | 2,15 | 2,15  | 2,15  | —    | — | — | — | — | — | — |
|                  | 0,63          | 2,45 | 2,45 | 2,45  | 2,45  | —    | — | — | — | — | — | — |
|                  | 0,75          | 3,06 | 3,06 | 3,06  | 3,06  | —    | — | — | — | — | — | — |
|                  | 0,88          | 3,74 | 3,74 | 3,74  | 3,74  | —    | — | — | — | — | — | — |
|                  | 1,00          | 4,42 | 4,42 | 4,42  | 4,42  | —    | — | — | — | — | — | — |
|                  | 1,13          | 4,42 | 4,42 | 4,42  | 4,42  | —    | — | — | — | — | — | — |
|                  | 1,25          | 4,42 | 4,42 | 4,42  | 4,42  | —    | — | — | — | — | — | — |
|                  | 1,50          | 4,42 | 4,42 | 4,42  | 4,42  | —    | — | — | — | — | — | — |
|                  | 1,75          | 4,42 | 4,42 | 4,42  | 4,42  | —    | — | — | — | — | — | — |
|                  | 2,00          | 4,42 | 4,42 | 4,42  | 4,42  | —    | — | — | — | — | — | — |
| $M_{t,nom}$ [Nm] |               |      |      |       |       |      |   |   |   |   |   |   |

No additional regulations.

Self drilling screw

Twistec® Typ L 5,5 x L  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 11



Material:

Fastener: carbon steel (1.0501)  
case hardened and galvanized

Washer: stainless steel (1.4301) - EN 10088  
carbon steel (JIS G3302)  
aluminium

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: S235 - EN 10025-1  
S280GD, S320GD - EN 10346  
Structural timber - EN 14081

Drilling capacity:  $\Sigma t_i \leq 2,00$  mm

Timber substructures:

performance determined with

$M_{y,Rk} = 9,840$  Nm  
 $f_{ax,k} = 12,300$  N/mm<sup>2</sup> for  $l_{ef} \geq 25,0$  mm

| $t_i$ [mm]       | $t_i$ [mm] |      |      |      |      |      |      |      |      |      |      |   | $V_{I,R,k}$<br>$N_{I,R,k}$ |
|------------------|------------|------|------|------|------|------|------|------|------|------|------|---|----------------------------|
|                  | 0,40       | 0,50 | 0,55 | 0,63 | 0,75 | 0,88 | 1,00 | 1,13 | 1,25 | 1,50 | 1,75 |   |                            |
| $V_{R,k}$ [kN]   | 0,40       | 0,50 | 0,55 | 0,63 | 0,75 | 0,88 | 1,00 | 1,13 | 1,25 | 1,50 | 1,75 |   | 0,63                       |
|                  | 0,50       | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | — | 0,99                       |
|                  | 0,55       | 0,99 | 1,22 | 1,22 | 1,22 | 1,22 | 1,22 | 1,22 | 1,22 | 1,22 | —    | — | 1,22                       |
|                  | 0,63       | 0,99 | 1,22 | 1,45 | 1,45 | 1,45 | 1,45 | 1,45 | 1,45 | 1,45 | —    | — | 1,45                       |
|                  | 0,75       | 0,99 | 1,22 | 1,45 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 | —    | — | 1,90                       |
|                  | 0,88       | 0,99 | 1,22 | 1,45 | 1,90 | 2,35 | 2,35 | —    | —    | —    | —    | — | 2,35                       |
|                  | 1,00       | 0,99 | 1,22 | 1,45 | 1,90 | 2,35 | 2,77 | —    | —    | —    | —    | — | 2,77                       |
|                  | 1,13       | 0,99 | 1,22 | 1,45 | 1,90 | —    | —    | —    | —    | —    | —    | — | 2,77                       |
|                  | 1,25       | 0,99 | 1,22 | 1,45 | 1,90 | —    | —    | —    | —    | —    | —    | — | 2,77                       |
|                  | 1,50       | 0,99 | —    | —    | —    | —    | —    | —    | —    | —    | —    | — | 2,77                       |
|                  | 1,75       | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | — | —                          |
| $N_{R,k}$ [kN]   | 0,40       | 0,51 | 0,62 | 0,74 | 1,01 | 1,14 | 1,14 | 1,14 | 1,14 | 1,14 | 1,14 | — | 1,14                       |
|                  | 0,50       | 0,51 | 0,62 | 0,74 | 1,01 | 1,32 | 1,65 | 1,65 | 1,65 | 1,65 | 1,65 | — | 1,74                       |
|                  | 0,55       | 0,51 | 0,62 | 0,74 | 1,01 | 1,32 | 1,65 | 1,65 | 1,65 | 1,65 | —    | — | 2,13                       |
|                  | 0,63       | 0,51 | 0,62 | 0,74 | 1,01 | 1,32 | 1,65 | 1,65 | 1,65 | 1,65 | —    | — | 2,50                       |
|                  | 0,75       | 0,51 | 0,62 | 0,74 | 1,01 | 1,32 | 1,65 | 1,65 | 1,65 | 1,65 | —    | — | 3,19                       |
|                  | 0,88       | 0,51 | 0,62 | 0,74 | 1,01 | 1,32 | 1,65 | —    | —    | —    | —    | — | 3,84                       |
|                  | 1,00       | 0,51 | 0,62 | 0,74 | 1,01 | 1,32 | 1,65 | —    | —    | —    | —    | — | 4,41                       |
|                  | 1,13       | 0,51 | 0,62 | 0,74 | 1,01 | —    | —    | —    | —    | —    | —    | — | 4,41                       |
|                  | 1,25       | 0,51 | 0,62 | 0,74 | 1,01 | —    | —    | —    | —    | —    | —    | — | 4,41                       |
|                  | 1,50       | 0,51 | —    | —    | —    | —    | —    | —    | —    | —    | —    | — | 4,41                       |
|                  | 1,75       | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | — | 4,41                       |
| $M_{t,nom}$ [Nm] |            |      |      |      |      |      |      |      |      |      |      |   |                            |

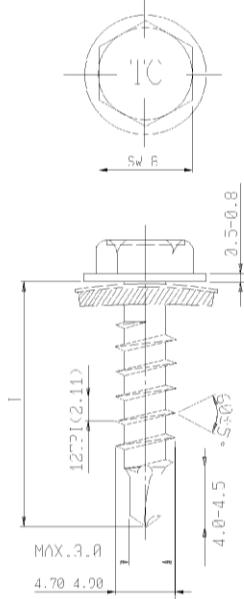
The values listed above in dependence on the screw-in length  $l_{ef}$  are valid for  $k_{mod} = 0,90$  and timber strength grade C24 ( $\rho_a = 350$  kg/m<sup>3</sup>). For other combinations of  $k_{mod}$  and timber strength grades see Annex 3 (Component II made of timber).

Self drilling screw

Twistec® Colorhead 4,8 x L  
with hexagon head and sealing washer  $\geq \varnothing 14$  mm

Annex 12





Material:

Fastener: carbon steel (1.0501)  
case hardened and galvanized

Washer: stainless steel (1.4301) - EN 10088  
carbon steel (JIS G3302)  
aluminium

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: S235 - EN 10025-1  
S280GD, S320GD - EN 10346

Drilling capacity:  $\Sigma t_i \leq 2,00$  mm

Timber substructures:  
no performance determined

| $t_i$ [mm]       | $t_{ii}$ [mm] |          |   |   |   |   |   |   |   |
|------------------|---------------|----------|---|---|---|---|---|---|---|
|                  | 2 x 0,63      | 2 x 0,75 | — | — | — | — | — | — | — |
| $V_{R,k}$ [kN]   | —             | —        | — | — | — | — | — | — | — |
| 0,40             | —             | —        | — | — | — | — | — | — | — |
| 0,50             | 1,43          | 1,43     | — | — | — | — | — | — | — |
| 0,55             | 1,72          | —        | — | — | — | — | — | — | — |
| 0,63             | 2,05          | —        | — | — | — | — | — | — | — |
| 0,75             | —             | —        | — | — | — | — | — | — | — |
| 0,88             | —             | —        | — | — | — | — | — | — | — |
| 1,00             | —             | —        | — | — | — | — | — | — | — |
| 1,13             | —             | —        | — | — | — | — | — | — | — |
| 1,25             | —             | —        | — | — | — | — | — | — | — |
| 1,50             | —             | —        | — | — | — | — | — | — | — |
| 1,75             | —             | —        | — | — | — | — | — | — | — |
| $N_{R,k}$ [kN]   | 1,14          | 1,14     | — | — | — | — | — | — | — |
| 0,40             | 1,14          | 1,14     | — | — | — | — | — | — | — |
| 0,50             | 1,53          | 1,53     | — | — | — | — | — | — | — |
| 0,55             | 1,53          | —        | — | — | — | — | — | — | — |
| 0,63             | 1,53          | —        | — | — | — | — | — | — | — |
| 0,75             | —             | —        | — | — | — | — | — | — | — |
| 0,88             | —             | —        | — | — | — | — | — | — | — |
| 1,00             | —             | —        | — | — | — | — | — | — | — |
| 1,13             | —             | —        | — | — | — | — | — | — | — |
| 1,25             | —             | —        | — | — | — | — | — | — | — |
| 1,50             | —             | —        | — | — | — | — | — | — | — |
| 1,75             | —             | —        | — | — | — | — | — | — | — |
| $M_{t,nom}$ [Nm] |               |          |   |   |   |   |   |   |   |

No additional regulations.

Self drilling screw

Twistec® Colorhead 4,8 x L  
with hexagon head and sealing washer  $\geq \varnothing 14$  mm

Annex 13