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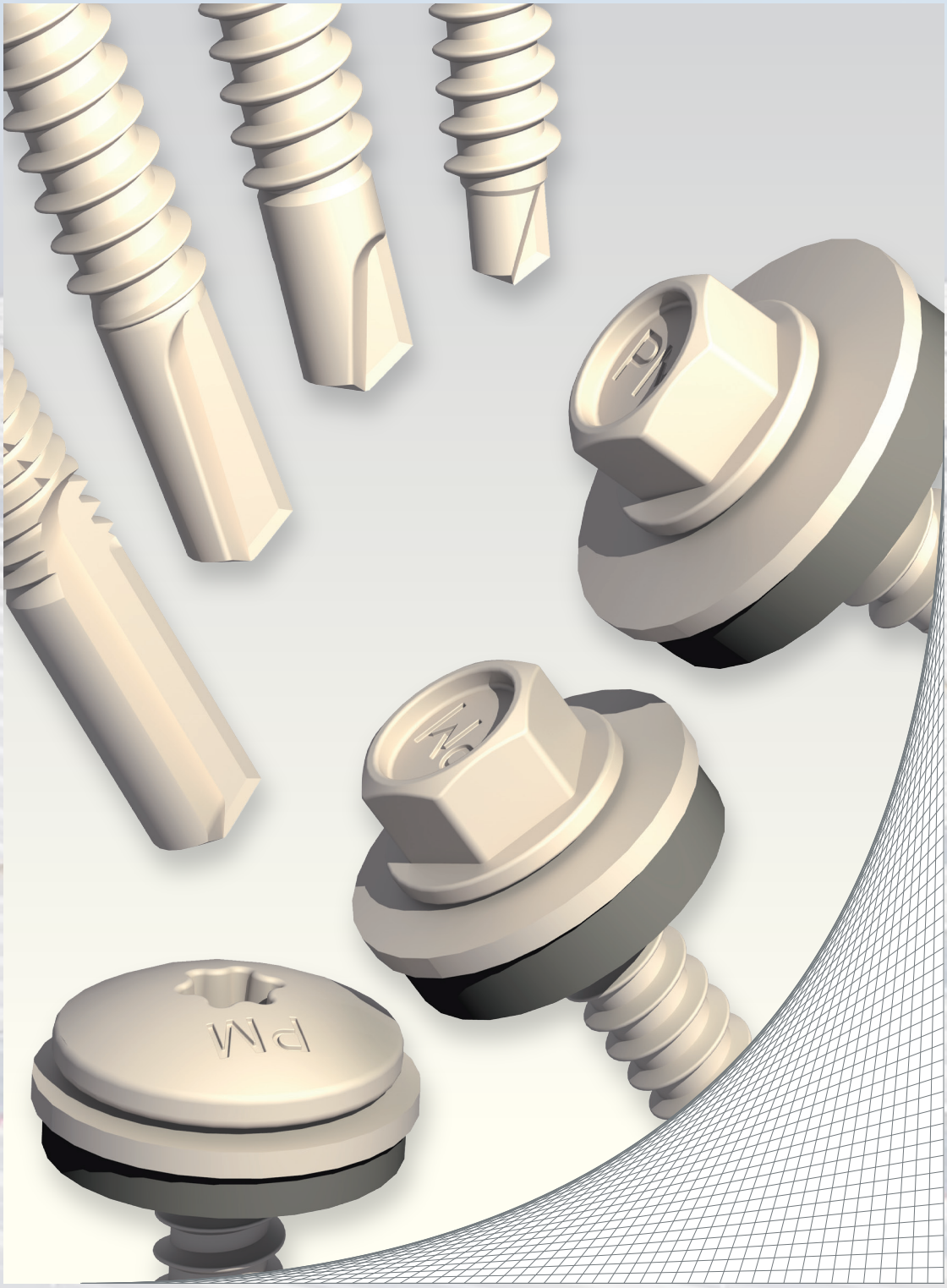
PMJ swiss quality



PMJ-tec European Technical Assessments

# PMJ-tec European Technical Assessment
# ETA-13/0182 25 March 2019
# Fastening screws for sandwich panels

EOTA European Organisation for Technical Assessment

PMJ-tec is a Swiss roofing and facade fastener manufacturer specialising in A2, A4 and other high grade corrosion resistant stainless steel products, which can be supplied with a colour powder coated or nyco moulded head.

People are at the heart of our 'service and innovation' culture, along with a commitment to provide the ever-changing European and world markets with high quality product for both on and off site production, fully supported by experienced and honest technical expertise.

As a European manufacturer, we offer technical and application assistance worldwide.

The PMJ range of stainless steel fasteners is fully warranted and CE marked (supported by European Technical Assessments) and a suite of CAD and BIM models are available.

Deutsches Institut für Bautechnik

Member of EOTA
www.eota.eu

**Approval body for construction products and types of construction**

**Bautechnisches Prüfamt**

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

# European Technical Assessment ETA-13/0182 of 25 March 2019

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 | Sandwich screws of PMJ-tec AG |
| Product family to which the construction product belongs | Fastening screws for sandwich panels |
| Manufacturer | PMJ-tec AG<br>Industriestrasse 34<br>1791 COURTAMAN<br>SCHWEIZ |
| Manufacturing plant | Plant 1<br>Plant 2<br>Plant 3 |
| This European Technical Assessment contains | 31 pages including 26 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 330047-01-0602 |
| This version replaces | ETA-13/0182 issued on 25 April 2013 |

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## Specific part

### 1 Technical description of the product

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

**Table 1 – Fastening screws for sandwich panels**

| Annex | Screw | Description |
|---|---|---|
| 4 | PMJ-tec TOPEX 7171 | with flat head, DS drive and sealing washer ≥ Ø 16,0 mm |
| 5 | PMJ-tec TOPEX 7520-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 6 | PMJ-tec TOPEX PIASTA 7530-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 7 | PMJ-tec TOPPEX 7565-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 8 | PMJ-tec TOPEX 7565-S19 | with hexagon head and sealing washer ≥ Ø 19,0 mm |
| 9 | PMJ-tec TOPEX 7570-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 10 | PMJ-tec TOPEX 7570-S19 | with hexagon head and sealing washer ≥ Ø 19,0 mm |
| 11 | PMJ-tec TOPEX 7571-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 12 | PMJ-tec TOPEX 7571-S19 | with hexagon head and sealing washer ≥ Ø 19,0 mm |
| 13 | PMJ-tec TOPEX 7575-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 14 | PMJ-tec TOPEX 7575-S19 | with hexagon head and sealing washer ≥ Ø 19,0 mm |
| 15 | PMJ-tec TOPEX-PIASTA 7580-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 16 | PMJ-tec TOPEX-PIASTA 7580-S19 | with hexagon head and sealing washer ≥ Ø 19,0 mm |
| 17 | PMJ-tec TOPEX 7653-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 18 | PMJ-tec TOPEX 7653-S19 | with hexagon head and sealing washer ≥ Ø 19,0 mm |
| 19 | PMJ-tec TOPEX 7673-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 20 | PMJ-tec TOPEX 7673-S19 | with hexagon head and sealing washer ≥ Ø 19,0 mm |
| 21 | PMJ-tec TOPEX 7680-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 22 | PMJ-tec TOPEX 7680-S19 | with hexagon head and sealing washer ≥ Ø 19,0 mm |
| 23 | PMJ-tec TOPEX 7360-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 24 | PMJ-tec TOPEX 7360-S19 | with hexagon head and sealing washer ≥ Ø 19,0 mm |
| 25 | PMJ-tec TOPEX 7362-S16 | with hexagon head and sealing washer ≥ Ø 16,0 mm |
| 26 | PMJ-tec TOPEX 7362-S19 | with hexagon head and sealing washer ≥ Ø 19,0 mm |

## 2 Specification of the intended use in accordance with the applicable European Assessment Document

The fastening screws are intended to be used for fastening sandwich panels to metal or timber substructures. The sandwich panel can either be used as wall or roof cladding or as load bearing wall and roof element. 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 ≥C2 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 are used in compliance with the specifications and conditions given in Annexes (1-26).

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 combination of tension and shear forces (interaction) | see Annexes to this ETA |
| Check of Bending Capacity in case of constraining forces due to temperature | see Annexes to this ETA |
| Durability | No performance assessed |

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

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

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

In accordance with EAD 330047-01-0602, the applicable European legal act is: Commission Decision 98/214/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.

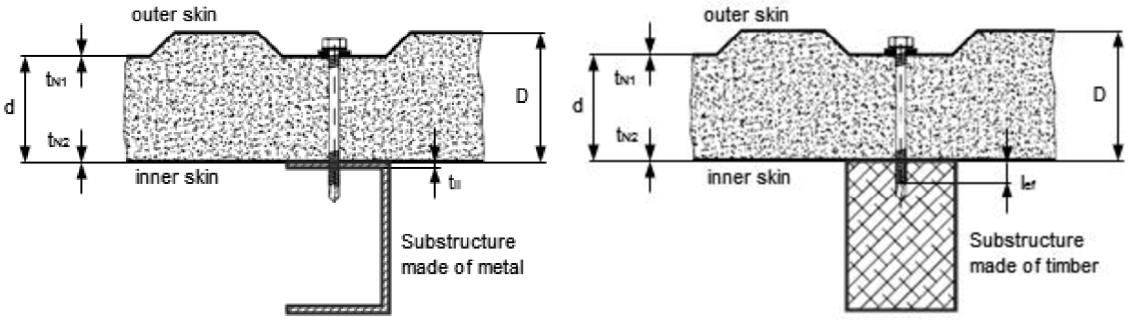
Issued in Berlin on 25 March 2019 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

*beglaubigt:*
Hahn

Deutsches Institut für Bautechnik DIBt

**Examples of execution of a connection**




**Terms for materials**

| | |
|---|---|
| Fastener | Material of the fastening screw |
| Washer | Material of the sealing washer |
| Component I | Material of the sandwich panel (outer skin and inner skin) |
| Component II | Material of the substructure |

**Terms for dimensions**

| | |
|---|---|
| D, d | Total thickness of component I |
| $t_{N1}$ | Thickness of the outer skin of component I |
| $t_{N2}$ | Thickness of the inner skin of component I |
| $t_{II}$ | Thickness of component II made of metal |
| $l_{ef}$ | Effective screw-in length in component II made of timber (without drill point) |
| $d_{dp}$ | Pre-drill diameter of component I and component II |

**Terms for performances**

| | |
|---|---|
| $V_{R,k}$ | Characteristic value of shear resistance of the connection |
| $N_{R,k}$ | Characteristic value of tension resistance of the connection |
| $V_{R,I,k}$ | Characteristic value of shear resistance of metal member or sheeting |
| $N_{R,I,k}$ | Characteristic value of tension resistance (pull-through) of metal member or sheeting |
| $N_{R,II,k}$ | Characteristic value of tension resistance (pull-out) of the substructure |
| u | Maximum allowed head displacement of the fastening screw |

Additionally for timber substructure the following terms are used:

| | |
|---|---|
| $M_{y,Rk}$ | Characteristic value of yield moment |
| $f_{ax,k}$ | Characteristic value of withdrawal strength |

| **Used terms in the Annexes** | **Annex 1** |
|---|---|
| Fastening screws for sandwich panels | |

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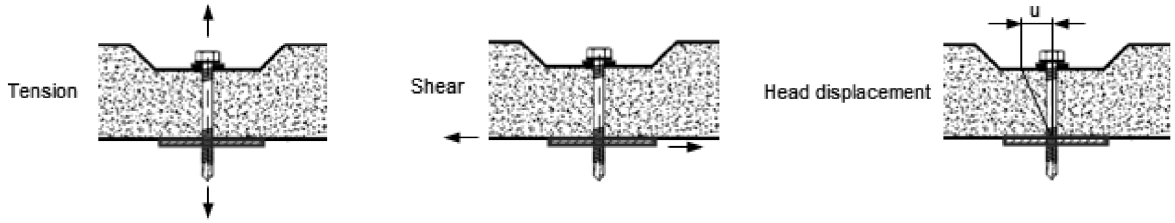
**Types of connection and occurred loadings**




**Determination of Design Values**

The design value of tension and shear resistance has to be determined as follows:

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

The characteristic values $N_{R,k}$ and $V_{R,k}$ are given in the Annexes. For intermediate dimension of metal member or sheeting or substructure the characteristic value of the thinner dimension is used.

The recommended partial safety factor $\gamma_M$ = 1,33 is used, provided no partial safety factor is given in national regulations or national Annexes to Eurocode 3.

For asymmetric metal substructures with thickness $t_{II}$ < 5 mm (for instance Z- or C-shaped profiles), the characteristic value $N_{R,k}$ given in the Annexes has to be reduced to 70%.

In case of combined tension and shear forces the following interaction equation is taken into account:

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

$N_{S,d}$ and $V_{S,d}$ indicate the design values of applied tension and shear forces.

**Head displacement**

The head displacement of the fastening screw as a result of thermal expansion of the outer skin of the sandwich panel may not exceed the maximum allowed head displacement of the fastening screw.

**Installation conditions**

The installation is carried out according to the manufacturer's instructions.

The fastening screws are screwed-in with electric screw driver. The use of impact wrenches is not allowed.

The fastening screws are fixed rectangular to the surface of the metal member or sheeting.

The metal member or sheeting and substructure are in contact to each other. The use of compression resistant thermal insulation strips up to a thickness of 3 mm is allowed.

| **Basics for the design** | **Annex 2** |
|---|---|
| Fastening screws for sandwich panels | |

**Timber substructures**

Characteristic values of tension and shear resistance of the connection for other $k_{mod}$ or $\rho_k$ as indicated in the Annexes can be determined as follows:

$$N_{R,k} = \min \left\{ \begin{matrix} N_{R,I,k} \\ F_{ax,Rk} * k_{mod} \end{matrix} \right. \qquad V_{R,k} = \min \left\{ \begin{matrix} V_{R,I,k} \\ F_{v,Rk} * k_{mod} \end{matrix} \right.$$

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

$F_{ax,Rk}$ indicates the characteristic value of tension resistance of timber substructure. The value has to be determined according to EN 1995-1-1:2004 + A1:2008, equation (8.40a) with $f_{ax,k}$ given in the corresponding Annex of the fastening screw.

$F_{v,Rk}$ indicates the characteristic shear resistance of timber substructure. The value has to be determined according to EN 1995-1-1:2004 + A1:2008, equation (8.9) with $M_{y,Rk}$ given in the corresponding Annex of the fastening screw.

| **Specific notes to the Annexes** | **Annex 3** |
|---|---|
| Fastening screws for sandwich panels | |

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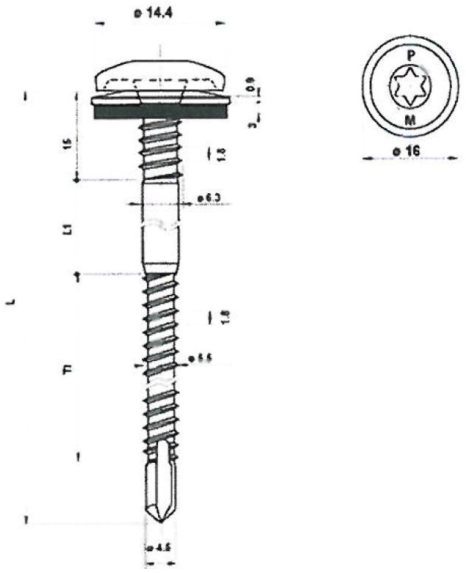


Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | S235 - EN 10025-1<br>S280GD to S320GD - EN 10346 |

Drilling-capacity $\Sigma(t_i) \leq 5.00$ mm

Timber substructures

no performance determined

| | | | Component II t II [mm] | | | | |
|---|---|---|---|---|---|---|---|
| | | | 1,50 | 2,00 | 2,50 | 3,00 | 4,00 |
| Component I | $t_{N2}$ [mm] / $V_{R,k}$ [kN] | 0,50 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | 0,55 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 |
| | | 0,63 | 1,70 | 1,70 | 1,70 | 1,70 | 1,70 |
| | | 0,75 | 1,70 | 1,70 | 1,70 | 1,70 | 1,70 |
| | | 0,88 | 1,70 | 1,70 | 1,70 | 1,70 | 1,70 |
| | | 1,00 | 1,70 | 1,70 | 1,70 | 1,70 | 1,70 |
| | $t_{N1}$ [mm] / $N_{R,k}$ [kN] | 0,50 | 1,60 | 1,70 | 1,70 | 1,70 | 1,70 |
| | | 0,55 | 2,00[a] | 2,30 | 2,30 | 2,30 | 2,30 |
| | | 0,63 | 2,00[a] | 2,50 | 2,50 | 2,50 | 2,50 |
| | | 0,75 | 2,00[a] | 2,90[a] | 3,20 | 3,20 | 3,20 |
| | | 0,88 | 2,00[a] | 2,90[a] | 3,80 | 3,80 | 3,80 |
| | | 1,00 | 2,00[a] | 2,90[a] | 3,90[a] | 4,40 | 4,40 |
| | | $N_{R,k,II}$ | 2,00[a] | 2,90[a] | 3,90[a] | 4,40 | 4,40 |
| D, d [mm] / max. head displacement u [mm] | | 40 | 20,0 | 15,0 | 9,0 | 7,0 | 4,0 |
| | | 50 | 21,0 | 17,0 | 10,0 | 8,0 | 5,0 |
| | | 60 | 22,0 | 20,0 | 11,0 | 9,0 | 7,0 |
| | | 70 | 23,0 | 20,0 | 13,0 | 11,0 | 8,0 |
| | | 80 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |
| | | 100 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |
| | | 120 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |
| | | ≥ 140 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |

Index a: If Component II is made of S320GD, the values may be increased by 8,2%.
For sealing washers ≥ Ø 19,0 mm, the grey highlighted values $V_{R,k}$ may be increased by 8.0 %.

**Sandwich screw**

PMJ-tec TOPEX 7171
with flat head, DS drive and sealing washer ≥ Ø 16,0 mm

**Annex 4**

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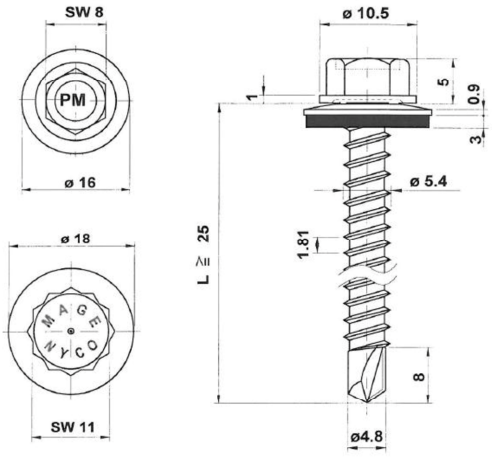


Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | S235 - EN 10025-1<br>S280GD to S350GD - EN 10346 |

Drilling-capacity $\Sigma(t_i) \leq 6.00$ mm

Timber substructures

no performance determined

| | | | Component II t II [mm] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,50 | 2,00 | 2,50 | 3,00 | 4,00 | 5,00 |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] D < 40 mm $t_{N2} \geq 0,50$ | 0,70 | 0,70 | 0,80 | 0,80 | 0,80 | 0,80 |
| | | $V_{R,k}$ [kN] D ≥ 40 mm $t_{N2} \geq 0,50$ | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] 0,50 | 1,10 | 1,57 | 1,57 | 1,57 | 1,57 | 1,57 |
| | | 0,55 | 1,10 | 1,98 | 1,98 | 1,98 | 1,98 | 1,98 |
| | | 0,63 | 1,10 | 2,00 | 2,00 | 2,90 | 2,90 | 2,90 |
| | | 0,75 | 1,10 | 2,00 | 2,00 | 3,40 | 3,40 | 3,40 |
| | | 0,88 | 1,10 | 2,00 | 2,00 | 4,00 | 4,00 | 4,00 |
| | | 1,00 | 1,10 | 2,00 | 2,00 | 4,30 | 4,50 | 4,50 |
| | | $N_{R,k,II}$ | 1,10 | 2,00 | 2,00 | 4,30 | 4,50 | 4,50 |
| D, d [mm] | max. head displacement u [mm] | 40 | 16,0 | 3,5 | 3,5 | 3,5 | 2,5 | 2,0 |
| | | 50 | 20,0 | 5,0 | 5,0 | 5,0 | 3,5 | 3,0 |
| | | 60 | 25,0 | 6,0 | 6,0 | 6,0 | 4,5 | 3,5 |
| | | 70 | 29,0 | 7,5 | 7,5 | 7,5 | 5,5 | 4,5 |
| | | 80 | 33,0 | 9,0 | 9,0 | 9,0 | 6,5 | 5,0 |
| | | 100 | 40,0 | 12,0 | 12,0 | 12,0 | 9,0 | 7,0 |
| | | 120 | 40,0 | 12,0 | 12,0 | 12,0 | 9,0 | 7,0 |
| | | ≥ 140 | 40,0 | 12,0 | 12,0 | 12,0 | 9,0 | 7,0 |

**Sandwich screw**

PMJ-tec TOPEX 7520-S16
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 5**

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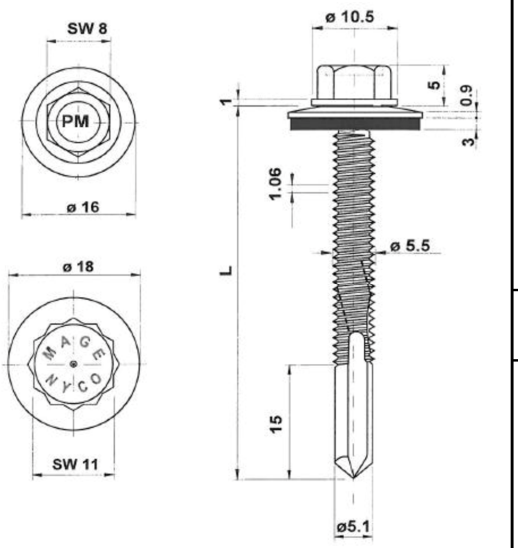



Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | S235 - EN 10025-1<br>S280GD to S350GD - EN 10346 |

Drilling-capacity $\Sigma(t_i) \leq 12.50$ mm

Timber substructures

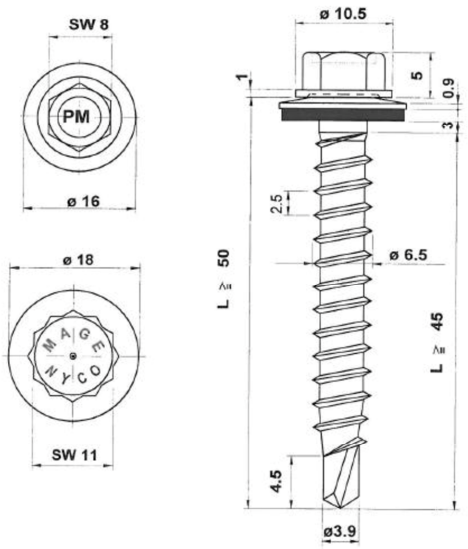
no performance determined

| | | | Component II t II [mm] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 3,00 | 4,00 | 5,00 | 6,00 | 8,00 | ≥ 10,0 |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] | | | | | | |
| | | D < 40 mm $t_{N2} \geq 0,50$ | 0,80 | 0,80 | 0,80 | 0,80 | 0,80 | 0,80 |
| | | D ≥ 40 mm $t_{N2} \geq 0,50$ | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] | | | | | | |
| | | 0,50 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 |
| | | 0,55 | 1,71 | 1,71 | 1,71 | 1,71 | 1,71 | 1,71 |
| | | 0,63 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | 0,75 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | 0,88 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | 1,00 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | $N_{R,k,II}$ | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| D, d [mm] | max. head displacement u [mm] | 40 | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 |
| | | 50 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 |
| | | 60 | 6,0 | 6,0 | 6,0 | 6,0 | 6,0 | 6,0 |
| | | 70 | 7,5 | 7,5 | 7,5 | 7,5 | 7,5 | 7,5 |
| | | 80 | 9,0 | 9,0 | 9,0 | 9,0 | 9,0 | 9,0 |
| | | 100 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |
| | | 120 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |
| | | ≥ 140 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |

**Sandwich screw**

PMJ-tec TOPEX PIASTA 7530-S16
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 6**




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | S235 - EN 10025-1<br>S280GD to S350GD - EN 10346<br>Timber – EN 14081 |

Drilling-capacity $\Sigma(t_i) \leq 2.50$ mm

Timber substructures

$M_{y,Rk}$ = 9,742 Nm

$f_{ax,k}$ = 8,575 N/mm² for $l_{ef} \geq 45{,}0$ mm

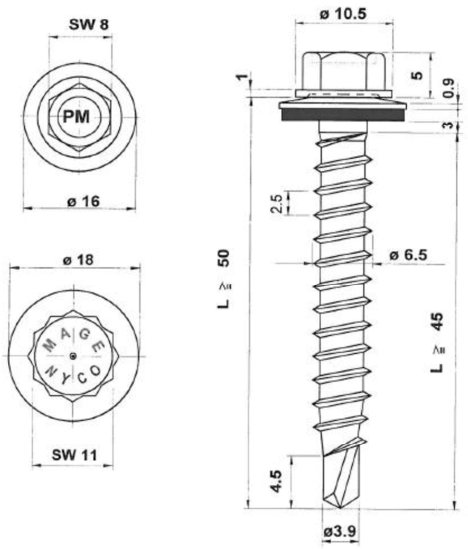
| | | | Component II | | | |
|---|---|---|---|---|---|---|
| | | | Steel, t II [mm] | | Timber ≥ C24, $l_{ef} \geq 45{,}0$ mm | |
| | | | 1,50 | 2,00 | | |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] | | | | |
| | 0,40 | | 0,82 | 0,82 | 0,82 | Failure of component I |
| | 0,50 | | 1,74 | 1,74 | 1,74 | |
| | 0,55 | | 1,74 | - | 1,74 | |
| | 0,63 | | 1,74 | - | 1,74 | |
| | 0,75 | | 1,74 | - | 1,74 | |
| | 0,88 | | 1,74 | - | 1,74 | |
| | 1,00 | | 1,74 | - | 1,74 | |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] | | | | |
| | 0,40 | | 1,34 | 1,34 | 1,34 | Failure of component I |
| | 0,50 | | 1,34 | 1,34 | 1,34 | |
| | 0,55 | | 1,57 | - | 1,57 | |
| | 0,63 | | 2,30 | - | 2,30 | |
| | 0,75 | | 2,80 | - | 2,80 | |
| | 0,88 | | 3,45 | - | 3,45 | |
| | 1,00 | | 3,45 | - | 3,45 | |
| | $N_{R,k,II}$ | | 3,45 | - | | |
| D, d [mm] | max. head displacement u [mm] | | | | | |
| | 30 | | 15,0 | - | 3,5 | - |
| | 40 | | 20,0 | - | 5,0 | |
| | 50 | | 25,0 | - | 6,5 | |
| | 60 | | 30,0 | - | 8,0 | |
| | 70 | | 30,0 | - | 11,0 | |
| | 80 | | 30,0 | - | 12,5 | |
| | 100 | | 30,0 | - | 14,0 | |
| | 120 | | 30,0 | - | 14,0 | |
| | ≥ 140 | | 30,0 | - | 14,0 | |

For $t_{N1}$ or $t_{N2}$ made of S320GD, the grey highlighted values may be increased by 8.3 %.
The values listed above in dependence on the screw in length $l_{ef}$ are valid for $k_{mod}$ = 0,90 and $\rho_k$ = 350 kg/m³. For other combinations of $k_{mod}$ and timber densities see Annex 3.

**Sandwich screw**

PMJ-tec TOPEX 7565-S16
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 7**




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | S235 - EN 10025-1<br>S280GD to S350GD - EN 10346<br>Timber – EN 14081 |

Drilling-capacity $\Sigma(t_i) \leq 2.50$ mm

Timber substructures

$M_{y,Rk}$ = 9,742 Nm

$f_{ax,k}$ = 8,575 N/mm² for $l_{ef} \geq 45{,}0$ mm

| | | | Component II | | | |
|---|---|---|---|---|---|---|
| | | | Steel, t II [mm] | | Timber ≥ C24, $l_{ef} \geq 45{,}0$ mm | |
| | | | 1,50 | 2,00 | | |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] | | | | |
| | 0,40 | | 0,82 | 0,82 | 0,82 | Failure of component I |
| | 0,50 | | 1,74 | 1,74 | 1,74 | |
| | 0,55 | | 1,74 | - | 1,74 | |
| | 0,63 | | 1,74 | - | 1,74 | |
| | 0,75 | | 1,74 | - | 1,74 | |
| | 0,88 | | 1,74 | - | 1,74 | |
| | 1,00 | | 1,74 | - | 1,74 | |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] | | | | |
| | 0,40 | | 1,56 | 1,56 | 1,56 | Failure of component I |
| | 0,50 | | 1,96 | 1,96 | 1,96 | |
| | 0,55 | | 2,25 | - | 2,25 | |
| | 0,63 | | 2,71 | - | 2,71 | |
| | 0,75 | | 3,40 | - | 3,40 | |
| | 0,88 | | 3,45 | - | 3,45 | |
| | 1,00 | | 3,45 | - | 3,45 | |
| | | $N_{R,k,II}$ | 3,45 | - | | |
| D, d [mm] | max. head displacement u [mm] | | | | | |
| | 30 | | 15,0 | - | 3,5 | - |
| | 40 | | 20,0 | - | 5,0 | |
| | 50 | | 25,0 | - | 6,5 | |
| | 60 | | 30,0 | - | 8,0 | |
| | 70 | | 30,0 | - | 11,0 | |
| | 80 | | 30,0 | - | 12,5 | |
| | 100 | | 30,0 | - | 14,0 | |
| | 120 | | 30,0 | - | 14,0 | |
| | ≥ 140 | | 30,0 | - | 14,0 | |

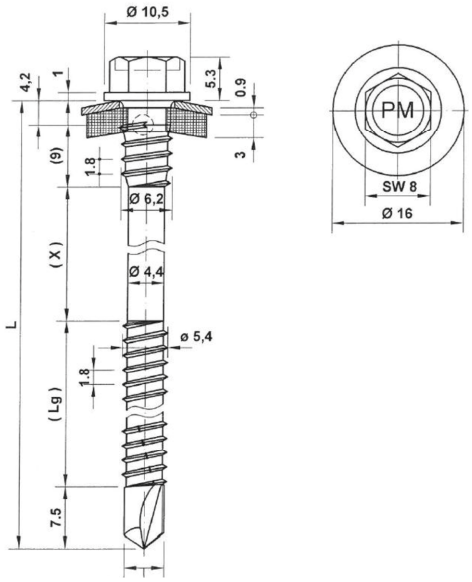
For $t_{N1}$ or $t_{N2}$ made of S320GD, the grey highlighted values may be increased by 8.3 %.
The values listed above in dependence on the screw in length $l_{ef}$ are valid for $k_{mod}$ = 0,90 and $\rho_k$ = 350 kg/m³. For other combinations of $k_{mod}$ and timber densities see Annex 3.

**Sandwich screw**

PMJ-tec TOPEX 7565-S19
with hexagon head and sealing washer ≥ Ø 19,0 mm

**Annex 8**

Deutsches Institut für Bautechnik DIBt




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | S235 to S420 - EN 10025-1<br>S280GD to S350GD - EN 10346 |

Drilling-capacity $\Sigma(t_i) \leq 6.00$ mm

Timber substructures

-

| | | | Component II t II [mm] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,50 | 2,00 | 2,50 | 3,00 | 4,00 | 5,00 |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] | | | | | | |
| | | 0,40 | 0,75 | 0,82 | 0,82 | 0,82 | 0,82 | 0,82 |
| | | 0,50 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | 0,55 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | 0,63 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | 0,75 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | 0,88 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | 1,00 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] | | | | | | |
| | | 0,40 | 1,10 | 1,33 | 1,33 | 1,33 | 1,33 | 1,33 |
| | | 0,50 | 1,10 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 |
| | | 0,55 | 1,10 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 |
| | | 0,63 | 1,10 | 2,00 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | 0,75 | 1,10 | 2,00 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | 0,88 | 1,10 | 2,00 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | 1,00 | 1,10 | 2,00 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | $N_{R,k,II}$ | 1,10 | 2,00 | 2,20 | 2,20 | 2,20 | 2,20 |
| D, d [mm] | max. head displacement u [mm] | | | | | | | |
| | | 40 | 16,0 | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 |
| | | 50 | 20,0 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 |
| | | 60 | 25,0 | 6,0 | 6,0 | 6,0 | 6,0 | 6,0 |
| | | 70 | 29,0 | 7,5 | 7,5 | 7,5 | 7,5 | 7,5 |
| | | 80 | 33,0 | 9,0 | 9,0 | 9,0 | 9,0 | 9,0 |
| | | 100 | 40,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |
| | | 120 | 40,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |
| | | ≥ 140 | 40,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |

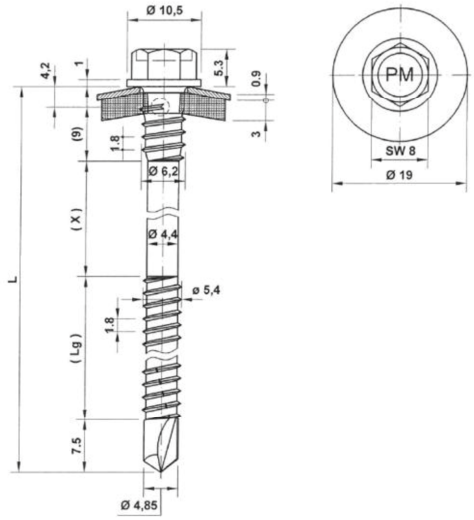
For Component II made of S320GD, the grey highlighted values may be increased by 8.2 %.

**Sandwich screw**

PMJ-tec TOPEX 7570-S16
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 9**

Deutsches Institut für Bautechnik DIBt




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | S235 to S420 - EN 10025-1<br>S280GD to S350GD - EN 10346 |

Drilling-capacity $\Sigma(t_i) \leq 6.00$ mm

Timber substructures

-

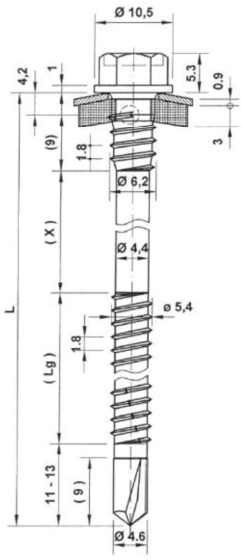
| | | | Component II t II [mm] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,50 | 2,00 | 2,50 | 3,00 | 4,00 | 5,00 |
| Component I | $t_{N2}$ [mm] / $V_{R,k}$ [kN] | 0,40 | 0,75 | 0,82 | 0,82 | 0,82 | 0,82 | 0,82 |
| | | 0,50 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | 0,55 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | 0,63 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | 0,75 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | 0,88 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | 1,00 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| | $t_{N1}$ [mm] / $N_{R,k}$ [kN] | 0,40 | 1,10 | 1,33 | 1,33 | 1,33 | 1,33 | 1,33 |
| | | 0,50 | 1,10 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 |
| | | 0,55 | 1,10 | 2,00 | 2,10 | 2,10 | 2,10 | 2,10 |
| | | 0,63 | 1,10 | 2,00 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | 0,75 | 1,10 | 2,00 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | 0,88 | 1,10 | 2,00 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | 1,00 | 1,10 | 2,00 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | $N_{R,k,II}$ | 1,10 | 2,00 | 2,40 | 2,40 | 2,40 | 2,40 |
| D, d [mm] / max. head displacement u [mm] | | 40 | 16,0 | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 |
| | | 50 | 20,0 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 |
| | | 60 | 25,0 | 6,0 | 6,0 | 6,0 | 6,0 | 6,0 |
| | | 70 | 29,0 | 7,5 | 7,5 | 7,5 | 7,5 | 7,5 |
| | | 80 | 33,0 | 9,0 | 9,0 | 9,0 | 9,0 | 9,0 |
| | | 100 | 40,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |
| | | 120 | 40,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |
| | | ≥ 140 | 40,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |

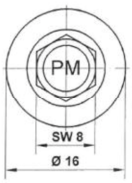
For Component II made of S320GD, the grey highlighted values may be increased by 8.2 %.

**Sandwich screw**

PMJ-tec TOPEX 7570-S19
with hexagon head and sealing washer ≥ Ø 19,0 mm

**Annex 10**




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | S235 - EN 10025-1<br>S280GD to S320GD - EN 10346 |

Drilling-capacity $\Sigma(t_i) \leq 5.00$ mm

Timber substructures

-

| | | | Component II t II [mm] | | | | |
|---|---|---|---|---|---|---|---|
| | | | 1,50 | 2,00 | 2,50 | 3,00 | 4,00 |
| Component I | $t_{N2}$ [mm] / $V_{R,k}$ [kN] | 0,50 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | 0,55 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 |
| | | 0,63 | 1,70 | 1,70 | 1,70 | 1,70 | 1,70 |
| | | 0,75 | 1,70 | 1,70 | 1,70 | 1,70 | 1,70 |
| | | 0,88 | 1,70 | 1,70 | 1,70 | 1,70 | 1,70 |
| | | 1,00 | 1,70 | 1,70 | 1,70 | 1,70 | 1,70 |
| | $t_{N1}$ [mm] / $N_{R,k}$ [kN] | 0,50 | 1,60 | 1,70 | 1,70 | 1,70 | 1,70 |
| | | 0,55 | 2,00[a] | 2,30 | 2,30 | 2,30 | 2,30 |
| | | 0,63 | 2,00[a] | 2,50 | 2,50 | 2,50 | 2,50 |
| | | 0,75 | 2,00[a] | 2,90[a] | 3,20 | 3,20 | 3,20 |
| | | 0,88 | 2,00[a] | 2,90[a] | 3,80 | 3,80 | 3,80 |
| | | 1,00 | 2,00[a] | 2,90[a] | 3,90[a] | 4,40 | 4,40 |
| | | $N_{R,k,II}$ | 2,00[a] | 2,90[a] | 3,90[a] | 4,40 | 4,40 |
| D, d [mm] | max. head displacement u [mm] | 40 | 20,0 | 15,0 | 9,0 | 7,0 | 4,0 |
| | | 50 | 21,0 | 17,0 | 10,0 | 8,0 | 5,0 |
| | | 60 | 22,0 | 20,0 | 11,0 | 9,0 | 7,0 |
| | | 70 | 23,0 | 20,0 | 13,0 | 11,0 | 8,0 |
| | | 80 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |
| | | 100 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |
| | | 120 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |
| | | ≥ 140 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |

Index a: For Component II made of S320GD, the values may be increased by 8.2 %.

**Sandwich screw**

PMJ-tec TOPEX 7571-S16
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 11**

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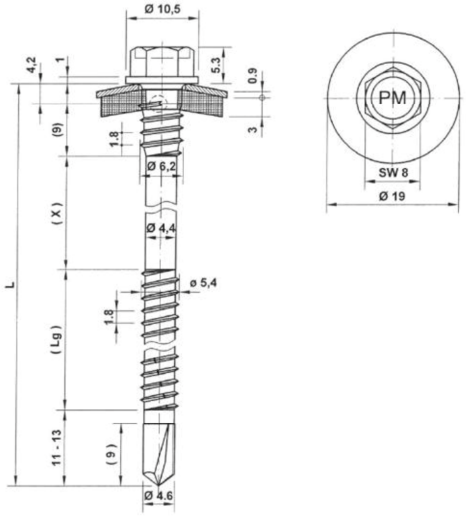



Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | S235 - EN 10025-1<br>S280GD to S320GD - EN 10346 |

Drilling-capacity $\Sigma(t_i) \leq 5.00$ mm

Timber substructures

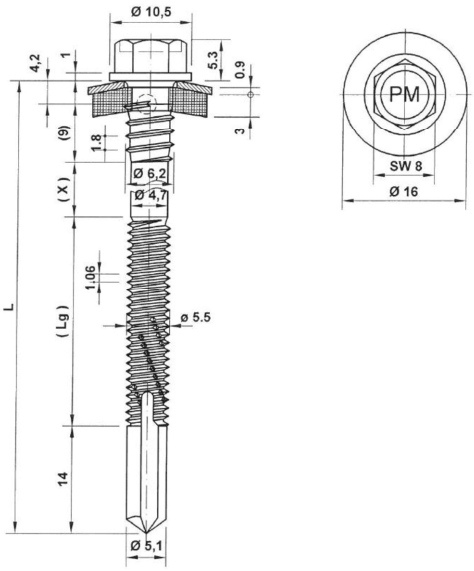
-

| | | | Component II t II [mm] | | | | |
|---|---|---|---|---|---|---|---|
| | | | 1,50 | 2,00 | 2,50 | 3,00 | 4,00 |
| Component I | $t_{N2}$ [mm] / $V_{R,k}$ [kN] | 0,50 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | 0,55 | 1,50 | 1,50 | 1,50 | 1,50 | 1,50 |
| | | 0,63 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 |
| | | 0,75 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 |
| | | 0,88 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 |
| | | 1,00 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 |
| | $t_{N1}$ [mm] / $N_{R,k}$ [kN] | 0,50 | 1,60 | 1,70 | 1,70 | 1,70 | 1,70 |
| | | 0,55 | 2,00 | 2,50 | 2,50 | 2,50 | 2,50 |
| | | 0,63 | 2,00 | 2,80 | 2,80 | 2,80 | 2,80 |
| | | 0,75 | 2,00 | 2,90 | 3,50 | 3,50 | 3,50 |
| | | 0,88 | 2,00 | 2,90 | 3,90 | 4,20 | 4,20 |
| | | 1,00 | 2,00 | 2,90 | 3,90 | 4,90 | 4,90 |
| | | $N_{R,k,II}$ | 2,00 | 2,90 | 3,90 | 4,90 | 4,90 |
| D, d [mm] | max. head displacement u [mm] | 40 | 20,0 | 15,0 | 9,0 | 7,0 | 4,0 |
| | | 50 | 21,0 | 17,0 | 10,0 | 8,0 | 5,0 |
| | | 60 | 22,0 | 20,0 | 11,0 | 9,0 | 7,0 |
| | | 70 | 23,0 | 20,0 | 13,0 | 11,0 | 8,0 |
| | | 80 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |
| | | 100 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |
| | | 120 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |
| | | ≥ 140 | 25,0 | 20,0 | 16,0 | 14,0 | 10,0 |

**Sandwich screw**

PMJ-tec TOPEX 7571-S19
with hexagon head and sealing washer ≥ Ø 19,0 mm

**Annex 12**




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | S235 - EN 10025-1<br>S280GD to S320GD - EN 10346 |

Drilling-capacity $\Sigma(t_i) \leq 12.50$ mm

Timber substructures

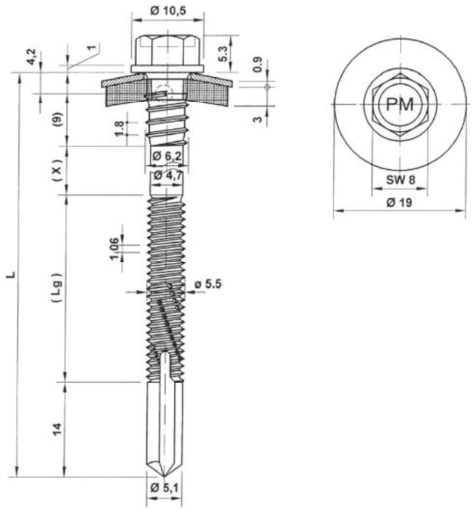
-

| | | | Component II t II [mm] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 3,00 | 4,00 | 5,00 | 6,00 | 8,00 | ≥ 10,0 |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] D < 40 mm $t_{N2} \geq 0,50$ | 0,80 | 0,80 | 0,80 | 0,80 | 0,80 | 0,80 |
| | | $V_{R,k}$ [kN] D ≥ 40 mm $t_{N2} \geq 0,50$ | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] 0,50 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 |
| | | 0,55 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 |
| | | 0,63 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | 0,75 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | 0,88 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | 1,00 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | $N_{R,k,II}$ | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| D, d [mm] | max. head displacement u [mm] | 40 | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 |
| | | 50 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 |
| | | 60 | 6,0 | 6,0 | 6,0 | 6,0 | 6,0 | 6,0 |
| | | 70 | 7,5 | 7,5 | 7,5 | 7,5 | 7,5 | 7,5 |
| | | 80 | 9,0 | 9,0 | 9,0 | 9,0 | 9,0 | 9,0 |
| | | 100 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |
| | | 120 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |
| | | ≥ 140 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |

**Sandwich screw**

PMJ-tec TOPEX 7575-S16
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 13**




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | S235 - EN 10025-1<br>S280GD to S320GD - EN 10346 |

Drilling-capacity $\Sigma(t_i) \leq 12.50$ mm

Timber substructures

-

| | | | Component II t II [mm] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 3,00 | 4,00 | 5,00 | 6,00 | 8,00 | ≥ 10,0 |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] | | | | | | |
| | | D < 40 mm $t_{N2} \geq 0,50$ | 0,90 | 0,90 | 0,90 | 0,90 | 0,90 | 0,90 |
| | | D ≥ 40 mm $t_{N2} \geq 0,50$ | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] | | | | | | |
| | | 0,50 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 |
| | | 0,55 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 |
| | | 0,63 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | 0,75 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | 0,88 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | 1,00 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | $N_{R,k,II}$ | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 |
| D, d [mm] | max. head displacement u [mm] | 40 | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 | 3,5 |
| | | 50 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 | 5,0 |
| | | 60 | 6,0 | 6,0 | 6,0 | 6,0 | 6,0 | 6,0 |
| | | 70 | 7,5 | 7,5 | 7,5 | 7,5 | 7,5 | 7,5 |
| | | 80 | 9,0 | 9,0 | 9,0 | 9,0 | 9,0 | 9,0 |
| | | 100 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |
| | | 120 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |
| | | ≥ 140 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 |

**Sandwich screw**

PMJ-tec TOPEX 7575-S19
with hexagon head and sealing washer ≥ Ø 19,0 mm

**Annex 14**

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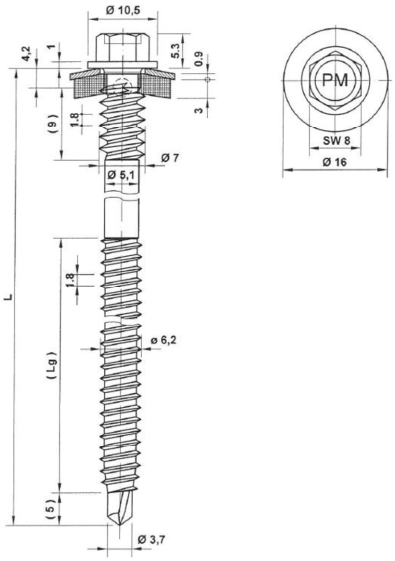



Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | Timber – EN 14081 |

Drilling-capacity $\Sigma(t_i) \leq 1.00$ mm

Timber substructures

$M_{y,Rk} = 8{,}981$ Nm

$f_{ax,k} = 8{,}575$ N/mm$^2$ for $l_{ef} \geq 50{,}0$ mm

| | | | Component II t II [mm] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 30 | 40 | 50 | 60 | 70 | 80 | 100 | 120 | ≥ 140 |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] | 0,50 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | | 0,55 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | | 0,63 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | | 0,75 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | | 0,88 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 |
| | | | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 | 1,10 |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] | 0,50 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 |
| | | | 0,55 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 |
| | | | 0,63 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | | 0,75 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | | 0,88 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | | 1,00 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | | $N_{R,k,II}$ | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| max. head displacement u [mm] | | | | - | 5,0 | 5,5 | 7,0 | 11,0 | 15,0 | 15,0 | 15,0 | 15,0 |

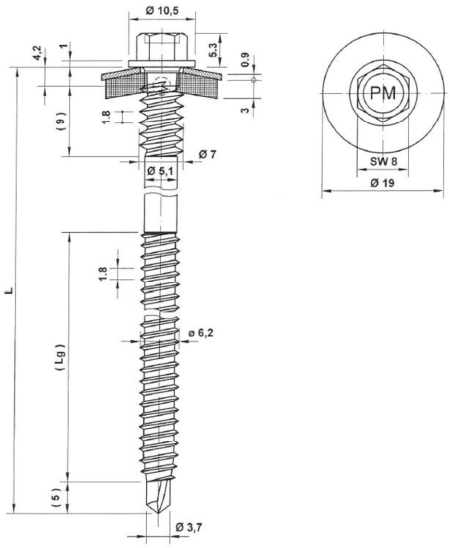
The values listed above in dependence on the screw in length $l_{ef}$ are valid for $k_{mod} = 0{,}90$ and $\rho_k = 350$ kg/m$^3$. For other combinations of $k_{mod}$ and timber densities see Annex 3.

**Sandwich screw**

PMJ-tec TOPEX-PIASTA 7580-S16
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 15**

Deutsches Institut für Bautechnik DIBt




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | Timber – EN 14081 |

Drilling-capacity $\Sigma(t_i) \leq 1.00$ mm

Timber substructures

$M_{y,Rk}$ = 8,981 Nm

$f_{ax,k}$ = 8,575 N/mm$^2$ for $l_{ef} \geq 50,0$ mm

| | | | Component II t II [mm] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 30 | 40 | 50 | 60 | 70 | 80 | 100 | 120 | ≥ 140 |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] | 0,50 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | | 0,55 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | | 0,63 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | | 0,75 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | | 0,88 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | | 1,00 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] | 0,50 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 |
| | | | 0,55 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 |
| | | | 0,63 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | | 0,75 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | | 0,88 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | | 1,00 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 |
| | | | $N_{R,k,II}$ | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 | 2,40 |
| max. head displacement u [mm] | | | | - | 5,0 | 5,5 | 7,0 | 11,0 | 15,0 | 15,0 | 15,0 | 15,0 |

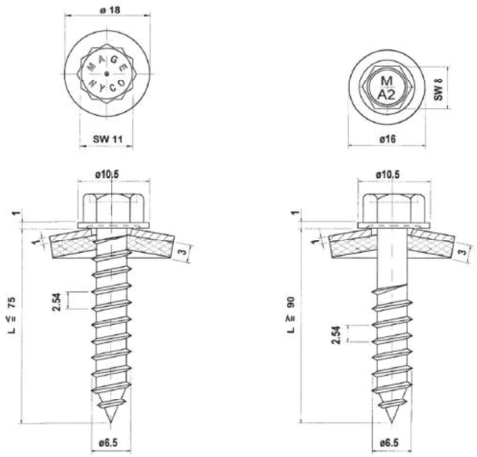
The values listed above in dependence on the screw in length $l_{ef}$ are valid for $k_{mod}$ = 0,90 and $\rho_k$ = 350 kg/m$^3$. For other combinations of $k_{mod}$ and timber densities see Annex 3.

**Sandwich screw**

PMJ-tec TOPEX-PIASTA 7580-S19
with hexagon head and sealing washer ≥ Ø 19,0 mm

**Annex 16**

Deutsches Institut für Bautechnik DIBt




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | Timber – EN 14081 |

Pre drill diameter Ø 4,8 mm

Timber substructures

$M_{y,Rk}$ = 14,830 Nm

$f_{ax,k}$ = 8,575 N/mm² for $l_{ef} \geq$ 35,0 mm

| Component I $t_{N1}$ [mm] | $N_{R,k}$ [kN] | Component I $t_{N2}$ [mm] | $V_{R,k}$ [kN] | Component II t II [mm] 30 | 40 | 50 | 60 | 70 | 80 | 100 | 120 | ≥ 140 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0,40 | | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 |
| | | 0,50 | | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 |
| | | 0,55 | | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 |
| | | 0,63 | | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 |
| | | 0,75 | | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 |
| | | 0,88 | | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 |
| | | 1,00 | | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 |
| | 0,50 | | | 1,57 | 1,57 | 1,57 | 1,57 | 1,57 | 1,57 | 1,57 | 1,57 | 1,57 |
| | 0,55 | | | 1,78 | 1,78 | 1,78 | 1,78 | 1,78 | 1,78 | 1,78 | 1,78 | 1,78 |
| | 0,63 | | | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | 0,75 | | | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 |
| | 0,88 | | | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 |
| | 1,00 | | | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 |
| | $N_{R,k,II}$ | | | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 |
| max. head displacement u [mm] | | | | 4,0 | 6,0 | 8,0 | 10,0 | 10,0 | 10,0 | 10,0 | 10,0 | 10,0 |

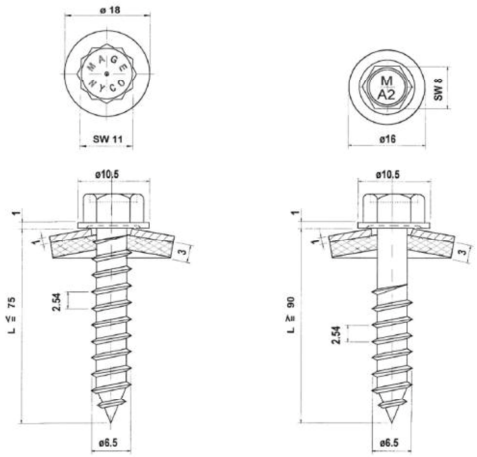
For component $t_{N1}$ made of S320GD or S350GD, the grey highlighted values may be increased by 8%.
The values listed above in dependence on the screw in length $l_{ef}$ are valid for $k_{mod}$ = 0,90 and $\rho_k$ = 350 kg/m³. For other combinations of $k_{mod}$ and timber densities see Annex 3.

**Sandwich screw**

PMJ-tec TOPEX 7653-S16
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 17**

Deutsches Institut für Bautechnik DIBt




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | Timber – EN 14081 |

Pre drill diameter Ø 4,8 mm

Timber substructures

$M_{y,Rk}$ = 14,830 Nm

$f_{ax,k}$ = 8,575 N/mm² for $l_{ef} \geq$ 35,0 mm

| Component I | | | Component II t II [mm] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 30 | 40 | 50 | 60 | 70 | 80 | 100 | 120 | ≥ 140 |
| $t_{N2}$ [mm] | $V_{R,k}$ [kN] | 0,40 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 |
| | | 0,50 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 |
| | | 0,55 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 |
| | | 0,63 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 |
| | | 0,75 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 |
| | | 0,88 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 |
| | | 1,00 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 |
| $t_{N1}$ [mm] | $N_{R,k}$ [kN] | 0,50 | 1,64 | 1,64 | 1,64 | 1,64 | 1,64 | 1,64 | 1,64 | 1,64 | 1,64 |
| | | 0,55 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 |
| | | 0,63 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | | 0,75 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 |
| | | 0,88 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 |
| | | 1,00 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 |
| | | $N_{R,k,II}$ | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 |
| max. head displacement u [mm] | | | 4,0 | 6,0 | 8,0 | 10,0 | 10,0 | 10,0 | 10,0 | 10,0 | 10,0 |

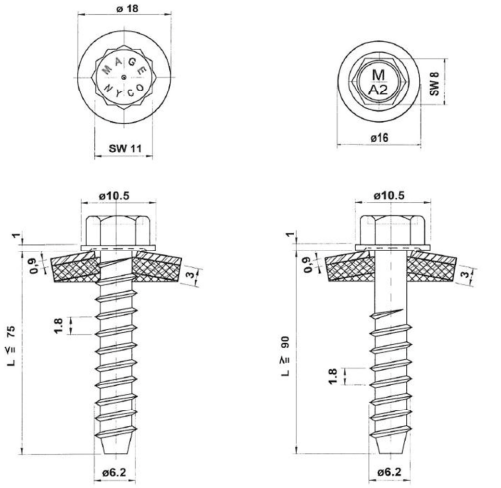
For component $t_{N1}$ made of S320GD or S350GD, the grey highlighted values may be increased by 8%.
The values listed above in dependence on the screw in length $l_{ef}$ are valid for $k_{mod}$ = 0,90 and $\rho_k$ = 350 kg/m³. For other combinations of $k_{mod}$ and timber densities see Annex 3.

**Sandwich screw**

PMJ-tec TOPEX 7653-S19
with hexagon head and sealing washer ≥ Ø 19,0 mm

**Annex 18**

Deutsches Institut für Bautechnik DIBt




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S350GD - EN 10346 |
| Component II: | S235 – EN 10025-1<br>S280GD to S320GD - EN 10346 |

Pre drill diameter: see table below

Timber substructures

-

| | | Component II t II [mm] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,50 | 2,00 | 2,50 | 3,00 | 4,00 | 5,00 | 6,00 | 7,00 | ≥ 10,0 |
| Component I $t_{N2}$ [mm] $V_{R,k}$ [kN] | 0,40 | 1,09 | 1,09 | 1,09 | 1,09 | 1,09 | 1,09 | 1,09 | 1,09 | 1,09 |
| | 0,50 | 1,17 | 1,17 | 1,17 | 1,17 | 1,17 | 1,17 | 1,17 | 1,17 | 1,17 |
| | 0,55 | 1,24 | 1,24 | 1,24 | 1,24 | 1,24 | 1,24 | 1,24 | 1,24 | 1,24 |
| | 0,63 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 |
| | 0,75 | 1,53 | 1,53 | 1,53 | 1,53 | 1,70 | 1,86 | 2,03 | 2,03 | 2,03 |
| | 0,88 | 1,53 | 1,53 | 1,53 | 1,53 | 1,70 | 1,86 | 2,03 | 2,03 | 2,03 |
| | 1,00 | 1,53 | 1,53 | 1,53 | 1,53 | 1,70 | 1,86 | 2,03 | 2,03 | 2,03 |
| Component I $t_{N1}$ [mm] $N_{R,k}$ [kN] | 0,40 | 1,38 | 1,38 | 1,38 | 1,38 | 1,38 | 1,38 | 1,38 | 1,38 | 1,38 |
| | 0,50 | 2,00 | 2,00 | 2,00 | 2,00 | 2,00 | 2,00 | 2,00 | 2,00 | 2,00 |
| | 0,55 | 2,31 | 2,31 | 2,31 | 2,31 | 2,31 | 2,31 | 2,31 | 2,31 | 2,31 |
| | 0,63 | 2,33 | 2,71 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 |
| | 0,75 | 2,33 | 2,71 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 |
| | 0,88 | 2,33 | 2,71 | 3,80 | 3,80 | 3,80 | 3,80 | 3,80 | 3,80 | 3,80 |
| | 1,00 | 2,33 | 2,71 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 |
| | $N_{R,k,II}$ | 2,33 | 2,71 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 |
| D, d [mm] max. head displacement u [mm] | 30 | 12,0 | 10,0 | 9,0 | 8,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |
| | 40 | 13,6 | 11,6 | 10,6 | 9,6 | 3,2 | 3,2 | 3,2 | 3,1 | 3,1 |
| | 50 | 15,2 | 13,2 | 12,2 | 11,2 | 4,4 | 4,4 | 4,4 | 4,2 | 4,2 |
| | 60 | 16,8 | 14,8 | 13,8 | 12,8 | 5,6 | 5,6 | 5,6 | 5,3 | 5,3 |
| | 70 | 18,4 | 16,4 | 15,4 | 14,4 | 6,8 | 6,8 | 6,8 | 6,4 | 6,4 |
| | 80 | 20,0 | 18,0 | 17,0 | 16,0 | 8,0 | 8,0 | 8,0 | 7,5 | 7,5 |
| | 100 | 20,0 | 18,0 | 17,0 | 16,0 | 8,0 | 8,0 | 8,0 | 7,5 | 7,5 |
| | 120 | 20,0 | 18,0 | 17,0 | 16,0 | 8,0 | 8,0 | 8,0 | 7,5 | 7,5 |
| | ≥ 140 | 20,0 | 18,0 | 17,0 | 16,0 | 8,0 | 8,0 | 8,0 | 7,5 | 7,5 |
| $d_{pd}$ [mm] | | Ø 5,0 | Ø 5,3 | | | | | Ø 5,5 | Ø 5,7 | |

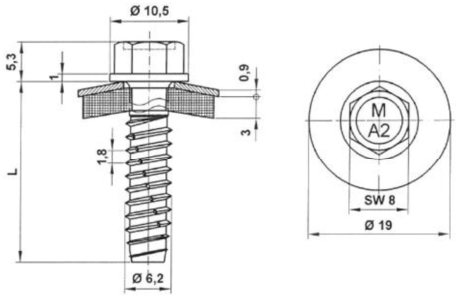
For component $t_{N1}$ or $t_{N2}$ made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

**Sandwich screw**

PMJ-tec TOPEX 7673-S16
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 19**

Deutsches Institut für Bautechnik DIBt




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S350GD - EN 10346 |
| Component II: | S235 – EN 10025-1<br>S280GD to S320GD - EN 10346 |

Pre drill diameter: see table below

Timber substructures

-

| | | | Component II t II [mm] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,50 | 2,00 | 2,50 | 3,00 | 4,00 | 5,00 | 6,00 | 7,00 | ≥ 10,0 |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] | 0,40 | 1,09 | 1,09 | 1,09 | 1,09 | 1,09 | 1,09 | 1,09 | 1,09 | 1,09 |
| | | | 0,50 | 1,17 | 1,17 | 1,17 | 1,17 | 1,17 | 1,17 | 1,17 | 1,17 | 1,17 |
| | | | 0,55 | 1,24 | 1,24 | 1,24 | 1,24 | 1,24 | 1,24 | 1,24 | 1,24 | 1,24 |
| | | | 0,63 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 | 1,35 |
| | | | 0,75 | 1,53 | 1,53 | 1,53 | 1,53 | 1,70 | 1,86 | 2,03 | 2,03 | 2,03 |
| | | | 0,88 | 1,53 | 1,53 | 1,53 | 1,53 | 1,70 | 1,86 | 2,03 | 2,03 | 2,03 |
| | | | 1,00 | 1,53 | 1,53 | 1,53 | 1,53 | 1,70 | 1,86 | 2,03 | 2,03 | 2,03 |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] | 0,40 | 1,62 | 1,62 | 1,62 | 1,62 | 1,62 | 1,62 | 1,62 | 1,62 | 1,62 |
| | | | 0,50 | 2,13 | 2,13 | 2,13 | 2,13 | 2,13 | 2,13 | 2,13 | 2,13 | 2,13 |
| | | | 0,55 | 2,33 | 2,39 | 2,39 | 2,39 | 2,39 | 2,39 | 2,39 | 2,39 | 2,39 |
| | | | 0,63 | 2,33 | 2,71 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 | 2,80 |
| | | | 0,75 | 2,33 | 2,71 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 | 3,60 |
| | | | 0,88 | 2,33 | 2,71 | 3,80 | 3,80 | 3,80 | 3,80 | 3,80 | 3,80 | 3,80 |
| | | | 1,00 | 2,33 | 2,71 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 |
| | | | $N_{R,k,II}$ | 2,33 | 2,71 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 |
| D, d [mm] | max. head displacement u [mm] | | 30 | 12,0 | 10,0 | 9,0 | 8,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |
| | | | 40 | 13,6 | 11,6 | 10,6 | 9,6 | 3,2 | 3,2 | 3,2 | 3,1 | 3,1 |
| | | | 50 | 15,2 | 13,2 | 12,2 | 11,2 | 4,4 | 4,4 | 4,4 | 4,2 | 4,2 |
| | | | 60 | 16,8 | 14,8 | 13,8 | 12,8 | 5,6 | 5,6 | 5,6 | 5,3 | 5,3 |
| | | | 70 | 18,4 | 16,4 | 15,4 | 14,4 | 6,8 | 6,8 | 6,8 | 6,4 | 6,4 |
| | | | 80 | 20,0 | 18,0 | 17,0 | 16,0 | 8,0 | 8,0 | 8,0 | 7,5 | 7,5 |
| | | | 100 | 20,0 | 18,0 | 17,0 | 16,0 | 8,0 | 8,0 | 8,0 | 7,5 | 7,5 |
| | | | 120 | 20,0 | 18,0 | 17,0 | 16,0 | 8,0 | 8,0 | 8,0 | 7,5 | 7,5 |
| | | | ≥ 140 | 20,0 | 18,0 | 17,0 | 16,0 | 8,0 | 8,0 | 8,0 | 7,5 | 7,5 |
| $d_{pd}$ [mm] | | | | Ø 5,0 | Ø 5,3 | | | | | Ø 5,5 | Ø 5,7 | |

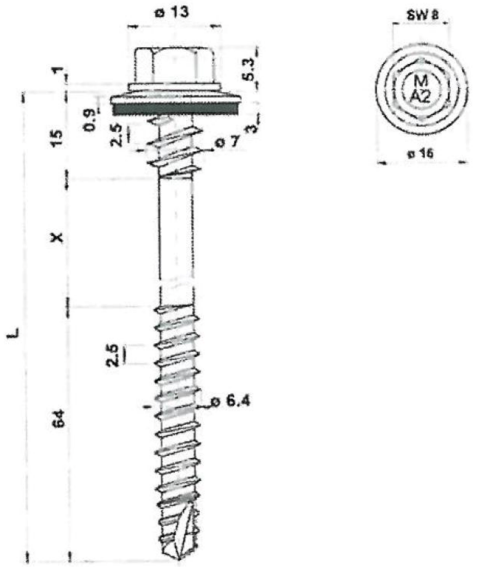
For component $t_{N1}$ or $t_{N2}$ made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

**Sandwich screw**

PMJ-tec TOPEX 7673-S19
with hexagon head and sealing washer ≥ Ø 19,0 mm

**Annex 20**

Deutsches Institut für Bautechnik DIBt




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | Timber – EN 14081 |

Drilling-capacity $\Sigma(t_i) \leq 1.00$ mm

Timber substructures

$M_{y,Rk}$ = 14,830 Nm

$f_{ax,k}$ = 8,575 N/mm² for $l_{ef} \geq 35{,}0$ mm

| | | | Component II t II [mm] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 30 | 40 | 50 | 60 | 70 | 80 | 100 | 120 | ≥ 140 |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] | | | | | | | | | |
| | | 0,40 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 | 0,76 |
| | | 0,50 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 | 1,19 |
| | | 0,55 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 | 1,30 |
| | | 0,63 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 | 1,47 |
| | | 0,75 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 |
| | | 0,88 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 |
| | | 1,00 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 | 1,74 |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] | | | | | | | | | |
| | | 0,50 | 1,64 | 1,64 | 1,64 | 1,64 | 1,64 | 1,64 | 1,64 | 1,64 | 1,64 |
| | | 0,55 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 | 1,87 |
| | | 0,63 | 2,23 | 2,23 | 2,23 | 2,23 | 2,23 | 2,23 | 2,23 | 2,23 | 2,23 |
| | | 0,75 | 2,81 | 2,81 | 2,81 | 2,81 | 2,81 | 2,81 | 2,81 | 2,81 | 2,81 |
| | | 0,88 | 3,25 | 3,25 | 3,25 | 3,25 | 3,25 | 3,25 | 3,25 | 3,25 | 3,25 |
| | | 1,00 | 3,69 | 3,69 | 3,69 | 3,69 | 3,69 | 3,69 | 3,69 | 3,69 | 3,69 |
| | | $N_{R,k,II}$ | 3,69 | 3,69 | 3,69 | 3,69 | 3,69 | 3,69 | 3,69 | 3,69 | 3,69 |
| max. head displacement u [mm] | | | 4,0 | 6,0 | 8,0 | 10,0 | 10,0 | 10,0 | 10,0 | 10,0 | 10,0 |

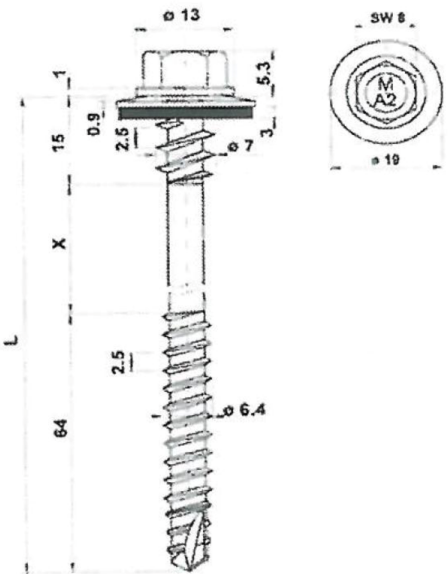
The values listed above in dependence on the screw in length $l_{ef}$ are valid for $k_{mod}$ = 0,90 and $\rho_k$ = 350 kg/m³. For other combinations of $k_{mod}$ and timber densities see Annex 3.

**Sandwich screw**

PMJ-tec TOPEX 7680-S16
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 21**

Deutsches Institut für Bautechnik DIBt




Materials

| | |
|---|---|
| Fastener: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Washer: | Stainless steel A2, A4, A5 – EN ISO 3506 |
| Component I: | S280GD to S320GD - EN 10346 |
| Component II: | Timber – EN 14081 |

Drilling-capacity $\Sigma(t_i) \leq 1.00$ mm

Timber substructures

$M_{y,Rk}$ = 14,830 Nm

$f_{ax,k}$ = 8,575 N/mm$^2$ for $l_{ef} \geq 35{,}0$ mm

| | | | Component II t II [mm] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 30 | 40 | 50 | 60 | 70 | 80 | 100 | 120 | ≥ 140 |
| Component I | $t_{N2}$ [mm] | $V_{R,k}$ [kN] | | | | | | | | | |
| | | 0,50 | 0,90 | 0,90 | 0,90 | 0,90 | 0,90 | 0,90 | 0,90 | 0,90 | 0,90 |
| | | 0,55 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 | 1,20 |
| | | 0,63 | 1,60 | 1,60 | 1,60 | 1,60 | 1,60 | 1,60 | 1,60 | 1,60 | 1,60 |
| | | 0,75 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 |
| | | 0,88 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 |
| | | 1,00 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 | 2,10 |
| | $t_{N1}$ [mm] | $N_{R,k}$ [kN] | | | | | | | | | |
| | | 0,50 | 1,72 | 1,72 | 1,72 | 1,72 | 1,72 | 1,72 | 1,72 | 1,72 | 1,72 |
| | | 0,55 | 1,96 | 1,96 | 1,96 | 1,96 | 1,96 | 1,96 | 1,96 | 1,96 | 1,96 |
| | | 0,63 | 2,21 | 2,21 | 2,21 | 2,21 | 2,21 | 2,21 | 2,21 | 2,21 | 2,21 |
| | | 0,75 | 2,73 | 2,73 | 2,73 | 2,73 | 2,73 | 2,73 | 2,73 | 2,73 | 2,73 |
| | | 0,88 | 3,32 | 3,32 | 3,32 | 3,32 | 3,32 | 3,32 | 3,32 | 3,32 | 3,32 |
| | | 1,00 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 |
| | | $N_{R,k,II}$ | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 | 3,50 |
| max. head displacement u [mm] | | | - | 5,0 | 7,0 | 9,0 | 11,0 | 13,0 | 18,0 | 18,0 | 18,0 |

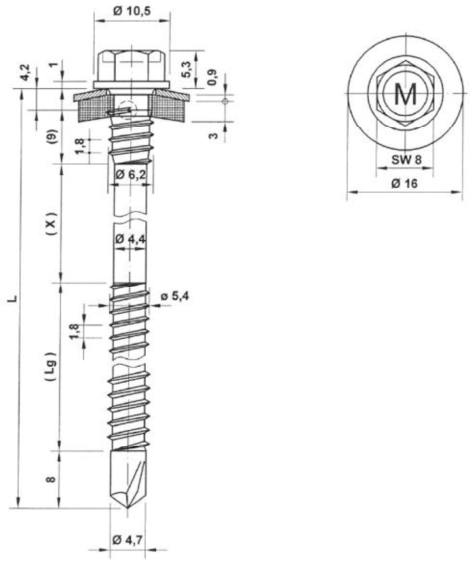
The values listed above in dependence on the screw in length $l_{ef}$ are valid for $k_{mod}$ = 0,90 and $\rho_k$ = 350 kg/m$^3$. For other combinations of $k_{mod}$ and timber densities see Annex 3.

**Sandwich screw**

PMJ-tec TOPEX 7680-S19
with hexagon head and sealing washer ≥ Ø 19,0 mm

**Annex 22**

Deutsches Institut für Bautechnik DIBt




Materials

Fastener: carbon steel; case hardened and galvanized

Washer: steel, zinc coated and with vulcanized EPDM

Component I: S280GD to S350GD - EN 10346

Component II: S235 - EN 10025-1
S280GD to S350GD - EN 10346

Drilling-capacity $\Sigma(t_i) \leq 5.00$ mm

Timber substructures

no performance determined

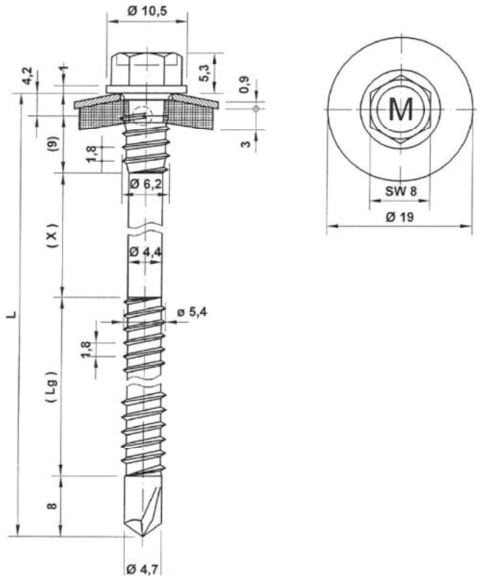
| 7360 55 | | $t_{II}$ [mm] | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1.50 | 2.00 | 2.50 | 3.00 | 4.00 | 5.00 |
| **$V_{R,k}$ [kN]** $t_{N2}$ [mm] | 0.40 | 0,75 | 0,82 | 0,82 | 0,82 | 0,82 | 0,82 |
| | 0.50 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | 0.55 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | 0.63 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | 0.75 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | 0.88 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| | 1.00 | 1,00 | 1,00 | 1,10 | 1,10 | 1,10 | 1,10 |
| **$N_{R,k}$ [kN]** $t_{N1}$ [mm] | 0.40 | 1,33 | 1,33 | 1,33 | 1,33 | 1,33 | 1,33 |
| | 0.50 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 |
| | 0.55 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 |
| | 0.63 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | 0.75 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | 0.88 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | 1.00 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| **$N_{R,II,k}$ [kN]** | | 2,30 | 3,53 | 4,87 | 6,20 | 7,81 | 9,41 |
| **u [mm]** D [mm] | 40 | 12,0 | 2,0 | | | | |
| | 60 | 18,0 | 3,0 | | | | |
| | 80 | 24,0 | 4,0 | | | | |
| | ≥ 100 | 30,0 | 5,0 | | | | |

**Sandwich screw**

PMJ-tec TOPEX 7360
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 23**

Deutsches Institut für Bautechnik DIBt




Materials

| | |
|---|---|
| Fastener: | carbon steel; case hardened and galvanized |
| Washer: | steel, zinc coated and with vulcanized EPDM |
| Component I: | S280GD to S350GD - EN 10346 |
| Component II: | S235 - EN 10025-1<br>S280GD to S350GD - EN 10346 |

Drilling-capacity $\Sigma(t_i) \leq 5.00$ mm

Timber substructures

no performance determined

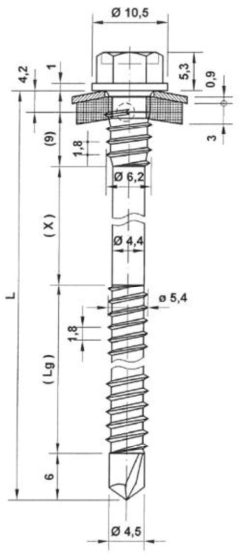
| 7360 55 | | $t_{II}$ [mm] | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1.50 | 2.00 | 2.50 | 3.00 | 4.00 | 5.00 |
| **$V_{R,k}$ [kN]** $t_{N2}$ [mm] | 0.40 | 0,75 | 0,82 | 0,82 | 0,82 | 0,82 | 0,82 |
| | 0.50 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| | 0.55 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| | 0.63 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| | 0.75 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| | 0.88 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| | 1.00 | 1,10 | 1,10 | 1,20 | 1,20 | 1,20 | 1,20 |
| **$N_{R,k}$ [kN]** $t_{N1}$ [mm] | 0.40 | 1,33 | 1,33 | 1,33 | 1,33 | 1,33 | 1,33 |
| | 0.50 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 | 1,40 |
| | 0.55 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 | 1,90 |
| | 0.63 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | 0.75 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | 0.88 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| | 1.00 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 | 2,20 |
| **$N_{R,II,k}$ [kN]** | | 2,30 | 3,53 | 4,87 | 6,20 | 7,81 | 9,41 |
| **u [mm]** D [mm] | 40 | 12,0 | 2,0 | | | | |
| | 60 | 18,0 | 3,0 | | | | |
| | 80 | 24,0 | 4,0 | | | | |
| | ≥ 100 | 30,0 | 5,0 | | | | |

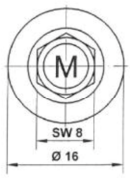
**Sandwich screw**

PMJ-tec TOPEX 7360
with hexagon head and sealing washer ≥ Ø 19,0 mm

**Annex 24**

Deutsches Institut für Bautechnik DIBt




Materials

| | |
|---|---|
| Fastener: | carbon steel; case hardened and galvanized |
| Washer: | steel, zinc coated and with vulcanized EPDM |
| Component I: | S280GD to S350GD - EN 10346 |
| Component II: | S235 - EN 10025-1<br>S280GD to S350GD - EN 10346 |

Drilling-capacity $\Sigma(t_i) \leq 3.50$ mm

Timber substructures

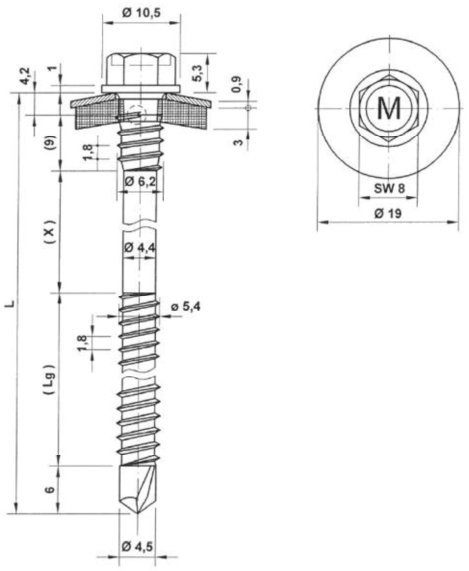
no performance determined

| 7362 55 | | $t_{II}$ [mm] | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1.50 | 2.00 | 2.50 | 3.00 | 4.00 | 5.00 |
| **$V_{R,k}$ [kN]** $t_{N2}$ [mm] | 0.40 | 0,75 | 0,82 | 0,82 | 0,82 | - | - |
| | 0.50 | 1,10 | 1,10 | 1,10 | 1,10 | - | - |
| | 0.55 | 1,40 | 1,40 | 1,40 | - | - | - |
| | 0.63 | 1,70 | 1,70 | 1,70 | - | - | - |
| | 0.75 | 1,70 | 1,70 | 1,70 | - | - | - |
| | 0.88 | 1,70 | 1,70 | 1,70 | - | - | - |
| | 1.00 | 1,70 | 1,70 | 1,70 | - | - | - |
| **$N_{R,k}$ [kN]** $t_{N1}$ [mm] | 0.40 | 1,33 | 1,33 | 1,33 | 1,33 | - | - |
| | 0.50 | 1,70 | 1,70 | 1,70 | 1,70 | - | - |
| | 0.55 | 2,30 | 2,30 | 2,30 | - | - | - |
| | 0.63 | 2,30 | 2,50 | 2,50 | - | - | - |
| | 0.75 | 2,30 | 3,20 | 3,20 | - | - | - |
| | 0.88 | 2,30 | 3,53 | 3,80 | - | - | - |
| | 1.00 | 2,30 | 3,53 | 4,40 | - | - | - |
| **$N_{R,II,k}$ [kN]** | | 2,30 | 3,53 | 4,87 | - | - | - |
| **u [mm]** D [mm] | 40 | 12,0 | 2,0 | | | | |
| | 60 | 18,0 | 3,0 | | | | |
| | 80 | 24,0 | 4,0 | | | | |
| | ≥ 100 | 30,0 | 5,0 | | | | |

**Sandwich screw**

PMJ-tec TOPEX 7362
with hexagon head and sealing washer ≥ Ø 16,0 mm

**Annex 25**




Materials

Fastener: carbon steel; case hardened and galvanized

Washer: steel, zinc coated and with vulcanized EPDM

Component I: S280GD to S350GD - EN 10346

Component II: S235 - EN 10025-1
S280GD to S350GD - EN 10346

Drilling-capacity $\Sigma(t_i) \leq 3.50$ mm

Timber substructures

no performance determined

| 7362 55 | | $t_{II}$ [mm] | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1.50 | 2.00 | 2.50 | 3.00 | 4.00 | 5.00 |
| **$V_{R,k}$ [kN]** $t_{N2}$ [mm] | 0.40 | 0,75 | 0,82 | 0,82 | 0,82 | - | - |
| | 0.50 | 1,50 | 1,50 | 1,50 | 1,50 | - | - |
| | 0.55 | 1,50 | 1,50 | 1,50 | - | - | - |
| | 0.63 | 1,90 | 1,90 | 1,90 | - | - | - |
| | 0.75 | 1,90 | 1,90 | 1,90 | - | - | - |
| | 0.88 | 1,90 | 1,90 | 1,90 | - | - | - |
| | 1.00 | 1,90 | 1,90 | 1,90 | - | - | - |
| **$N_{R,k}$ [kN]** $t_{N1}$ [mm] | 0.40 | 1,33 | 1,33 | 1,33 | 1,33 | - | - |
| | 0.50 | 1,70 | 1,70 | 1,70 | 1,70 | - | - |
| | 0.55 | 2,30 | 2,50 | 2,50 | - | - | - |
| | 0.63 | 2,30 | 2,80 | 2,80 | - | - | - |
| | 0.75 | 2,30 | 3,50 | 3,50 | - | - | - |
| | 0.88 | 2,30 | 3,53 | 4,20 | - | - | - |
| | 1.00 | 2,30 | 3,53 | 4,87 | - | - | - |
| **$N_{R,II,k}$ [kN]** | | 2,30 | 3,53 | 4,87 | - | - | - |
| **u [mm]** D [mm] | 40 | 12,0 | 2,0 | | | | |
| | 60 | 18,0 | 3,0 | | | | |
| | 80 | 24,0 | 4,0 | | | | |
| | ≥ 100 | 30,0 | 5,0 | | | | |

**Sandwich screw**

PMJ-tec TOPEX 7362
with hexagon head and sealing washer ≥ Ø 19,0 mm

**Annex 26**

## PMJ-tec Technical Information

ETAs - European Technical Assessments - are a cornerstone of our commitment to proven quality and reliability. Available exclusively to European manufacturers, it demonstrates independently assessed standards and differentiates PMJ-tec as a fastener manufacturer from non-manufacturers who supply and distribute generic fasteners.

DIBt - Deutsches Institut für Bautechnik - are the approval body for construction products that controls and issues our ETAs.

The CE mark indicates that a fastener is consistent with the data provided in the relevant Declaration of Performance as issued by PMJ-tec AG.

Information correct at time of going to print. For the purposes of continuous improvement we reserve the right to change product specifications. E. & O. E.

Quality

Reliability

Verified

Warrantied

Approved


**Headquarters and Manufacturing Centre**

**PMJ-tec AG**

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