

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-13/0182**  
**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  
Industriestrasse 34  
1791 COURTAMAN  
SCHWEIZ

Manufacturing plant

Plant 1  
Plant 2  
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

**European Technical Assessment**

**ETA-13/0182**

English translation prepared by DIBt

**Page 2 of 31 | 25 March 2019**

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

**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 $\geq \varnothing 16,0$ mm
5	PMJ-tec TOPEX 7520-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
6	PMJ-tec TOPEX PIASTA 7530-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
7	PMJ-tec TOPPEX 7565-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
8	PMJ-tec TOPEX 7565-S19	with hexagon head and sealing washer $\geq \varnothing 19,0$ mm
9	PMJ-tec TOPEX 7570-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
10	PMJ-tec TOPEX 7570-S19	with hexagon head and sealing washer $\geq \varnothing 19,0$ mm
11	PMJ-tec TOPEX 7571-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
12	PMJ-tec TOPEX 7571-S19	with hexagon head and sealing washer $\geq \varnothing 19,0$ mm
13	PMJ-tec TOPEX 7575-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
14	PMJ-tec TOPEX 7575-S19	with hexagon head and sealing washer $\geq \varnothing 19,0$ mm
15	PMJ-tec TOPEX-PIASTA 7580-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
16	PMJ-tec TOPEX-PIASTA 7580-S19	with hexagon head and sealing washer $\geq \varnothing 19,0$ mm
17	PMJ-tec TOPEX 7653-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
18	PMJ-tec TOPEX 7653-S19	with hexagon head and sealing washer $\geq \varnothing 19,0$ mm
19	PMJ-tec TOPEX 7673-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
20	PMJ-tec TOPEX 7673-S19	with hexagon head and sealing washer $\geq \varnothing 19,0$ mm
21	PMJ-tec TOPEX 7680-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
22	PMJ-tec TOPEX 7680-S19	with hexagon head and sealing washer $\geq \varnothing 19,0$ mm
23	PMJ-tec TOPEX 7360-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
24	PMJ-tec TOPEX 7360-S19	with hexagon head and sealing washer $\geq \varnothing 19,0$ mm
25	PMJ-tec TOPEX 7362-S16	with hexagon head and sealing washer $\geq \varnothing 16,0$ mm
26	PMJ-tec TOPEX 7362-S19	with hexagon head and sealing washer $\geq \varnothing 19,0$ 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  $\geq C2$  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**

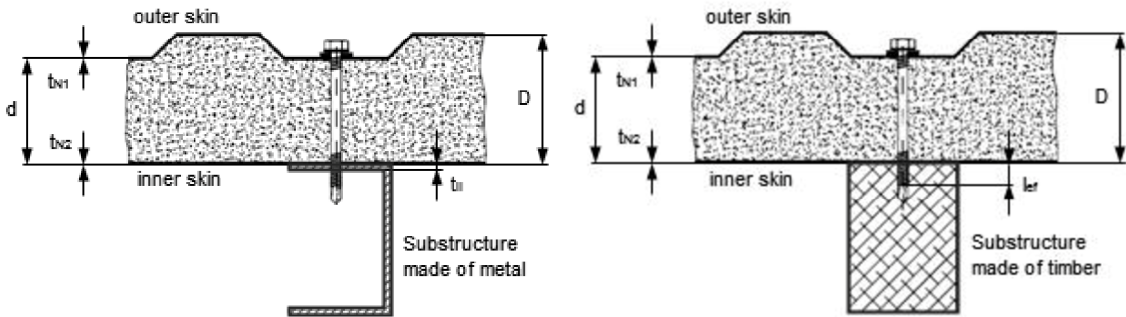
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

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

BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Hahn

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
tN1	Thickness of the outer skin of component I
tN2	Thickness of the inner skin of component I
tII	Thickness of component II made of metal
lef	Effective screw-in length in component II made of timber (without drill point)
d <sub>dp</sub>	Pre-drill diameter of component I and component II

Terms for performances

V <sub>R,k</sub>	Characteristic value of shear resistance of the connection
N <sub>R,k</sub>	Characteristic value of tension resistance of the connection
V <sub>R,I,k</sub>	Characteristic value of shear resistance of metal member or sheeting
N <sub>R,I,k</sub>	Characteristic value of tension resistance (pull-through) of metal member or sheeting
N <sub>R,II,k</sub>	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:

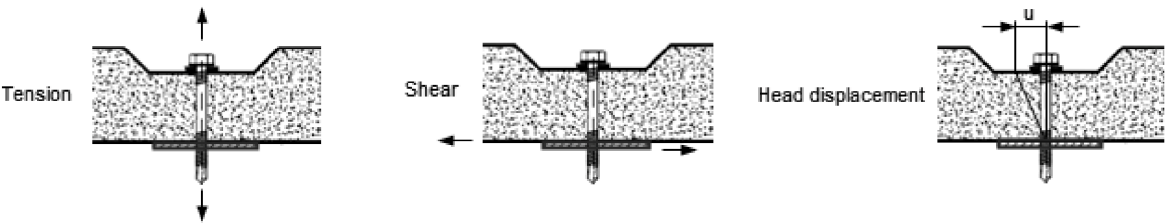
M <sub>y,Rk</sub>	Characteristic value of yield moment
f <sub>ax,k</sub>	Characteristic value of withdrawal strength

Used terms in the Annexes

Fastening screws for sandwich panels

Annex 1

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

Fastening screws for sandwich panels

Annex 2

### Timber substructures

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

$$N_{R,k} = \min \left\{ \begin{array}{l} N_{R,I,k} \\ F_{ax,Rk} \cdot k_{mod} \end{array} \right. \quad V_{R,k} = \min \left\{ \begin{array}{l} V_{R,I,k} \\ F_{v,Rk} \cdot k_{mod} \end{array} \right.$$

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.

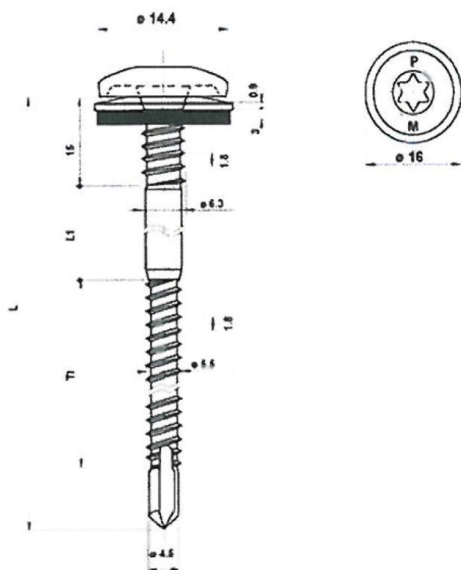
$F_{v,Rk}$  indicates the characteristic shear resistance of timber substructure. The value has to be determined according to EN 1995-1-1:2004 + A1:2008, equation (8.9) with  $M_{y,Rk}$  given in the corresponding Annex of the fastening screw.

### Specific notes to the Annexes

Fastening screws for sandwich panels

### Annex 3





## 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  
S280GD to S320GD - EN 10346

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

## Timber substructures

no performance determined

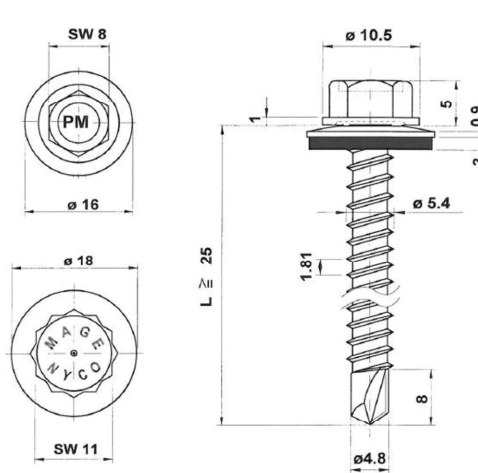
			Component II					
			t II [mm]					
			1,50	2,00	2,50	3,00	4,00	
Component I	t <sub>N2</sub> [mm]	V <sub>R,k</sub> [kN]	0,50	1,10	1,10	1,10	1,10	
			0,55	1,40	1,40	1,40	1,40	
			0,63	1,70	1,70	1,70	1,70	
			0,75	1,70	1,70	1,70	1,70	
			0,88	1,70	1,70	1,70	1,70	
			1,00	1,70	1,70	1,70	1,70	
	t <sub>N1</sub> [mm]	N <sub>R,k</sub> [kN]	0,50	1,60	1,70	1,70	1,70	
			0,55	2,00 <sup>a</sup>	2,30	2,30	2,30	
			0,63	2,00 <sup>a</sup>	2,50	2,50	2,50	
			0,75	2,00 <sup>a</sup>	2,90 <sup>a</sup>	3,20	3,20	
			0,88	2,00 <sup>a</sup>	2,90 <sup>a</sup>	3,80	3,80	
			1,00	2,00 <sup>a</sup>	2,90 <sup>a</sup>	3,90 <sup>a</sup>	4,40	
			N <sub>R,k,II</sub>	2,00 <sup>a</sup>	2,90 <sup>a</sup>	3,90 <sup>a</sup>	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  $\geq \varnothing 19,0$  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  $\geq \varnothing 16,0$  mm

## Annex 4

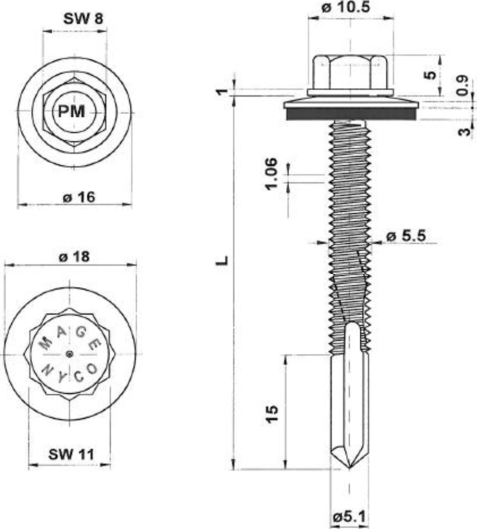
	<p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Washer: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Component I: S280GD to S320GD - EN 10346</p> <p>Component II: S235 - EN 10025-1 S280GD to S350GD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 6.00</math> mm</p> <p><b>Timber substructures</b> no performance determined</p>
---	---

		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
	$D \geq 40$ 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
D, d [mm]	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
	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
	$\geq 140$	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  $\geq \varnothing 16,0$  mm

**Annex 5**

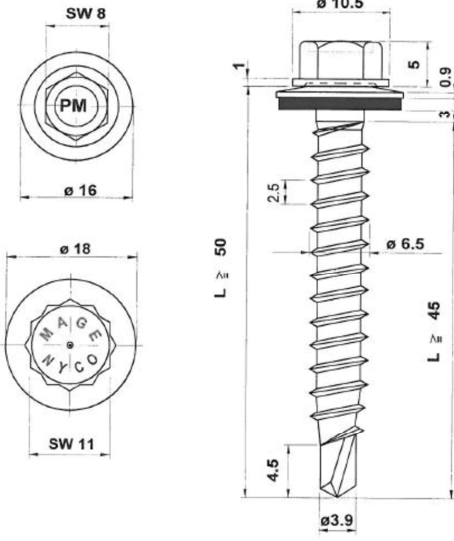
	<p><u>Materials</u></p> <p>Fastener: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Washer: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Component I: S280GD to S320GD - EN 10346</p> <p>Component II: S235 - EN 10025-1 S280GD to S350GD - EN 10346</p> <p><u>Drilling-capacity</u> <math>\Sigma(t_i) \leq 12.50</math> mm</p> <p><u>Timber substructures</u></p> <p>no performance determined</p>
---	---

		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
	$D \geq 40$ 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  $\geq \varnothing 16,0$  mm

**Annex 6**

	<p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Washer: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Component I: S280GD to S320GD - EN 10346</p> <p>Component II: S235 - EN 10025-1 S280GD to S350GD - EN 10346 Timber – EN 14081</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 2.50</math> mm</p> <p><b>Timber substructures</b></p> <p><math>M_{y,Rk} = 9,742</math> Nm</p> <p><math>f_{ax,k} = 8,575</math> N/mm<sup>2</sup> for <math>l_{ef} \geq 45,0</math> mm</p>
---	--

		Component II			
		Steel, t II [mm]	1,50	2,00	Timber $\geq$ C24, $l_{ef} \geq 45,0$ mm
Component I	$t_{N2}$ [mm] $V_{R,k}$ [kN]	0,40	0,82	0,82	0,82
		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
		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	
	$\geq 140$	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/m<sup>3</sup>. For other combinations of  $k_{mod}$  and timber densities see Annex 3.

<p><b>Sandwich screw</b></p>	<p><b>Annex 7</b></p>
<p>PMJ-tec TOPEX 7565-S16 with hexagon head and sealing washer <math>\geq \varnothing 16,0</math> mm</p>	

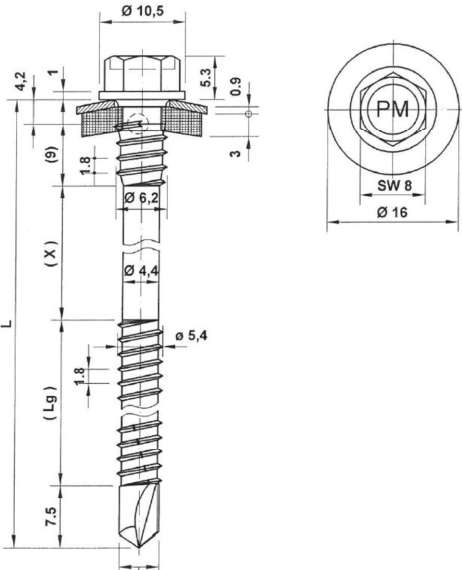
	<p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Washer: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Component I: S280GD to S320GD - EN 10346</p> <p>Component II: S235 - EN 10025-1 S280GD to S350GD - EN 10346 Timber – EN 14081</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 2.50</math> mm</p> <p><b>Timber substructures</b></p> <p><math>M_{y,Rk} = 9,742</math> Nm</p> <p><math>f_{ax,k} = 8,575</math> N/mm<sup>2</sup> for <math>l_{ef} \geq 45,0</math> mm</p>
--	--

		Component II			
		Steel, t II [mm]	1,50	2,00	Timber $\geq$ C24, $l_{ef} \geq 45,0$ mm
Component I	$t_{N2}$ [mm] $V_{R,k}$ [kN]	0,40	0,82	0,82	0,82
		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
		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	
	$\geq 140$	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/m<sup>3</sup>. For other combinations of  $k_{mod}$  and timber densities see Annex 3.

<p><b>Sandwich screw</b></p>	
<p>PMJ-tec TOPEX 7565-S19 with hexagon head and sealing washer <math>\geq \varnothing 19,0</math> mm</p>	<p><b>Annex 8</b></p>

	<p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Washer: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Component I: S280GD to S320GD - EN 10346</p> <p>Component II: S235 to S420 - EN 10025-1 S280GD to S350GD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 6.00 \text{ mm}</math></p> <p><b>Timber substructures</b></p> <p>-</p>
---	--

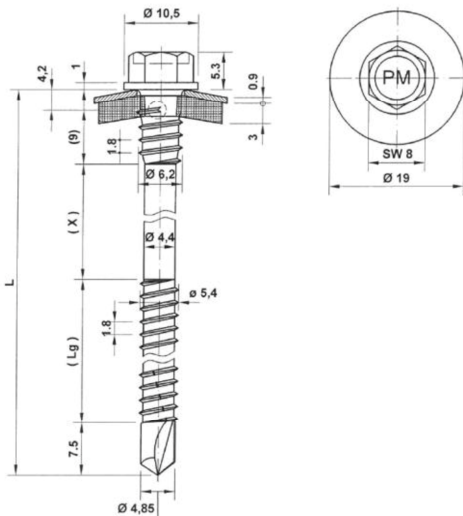
		Component II t II [mm]					
		1,50	2,00	2,50	3,00	4,00	5,00
Component I	t <sub>N2</sub> [mm] V <sub>R,k</sub> [kN]	0,40	0,75	0,82	0,82	0,82	0,82
		0,50	1,00	1,00	1,10	1,10	1,10
		0,55	1,00	1,00	1,10	1,10	1,10
		0,63	1,00	1,00	1,10	1,10	1,10
		0,75	1,00	1,00	1,10	1,10	1,10
		0,88	1,00	1,00	1,10	1,10	1,10
		1,00	1,00	1,00	1,10	1,10	1,10
	t <sub>N1</sub> [mm] N <sub>R,k</sub> [kN]	0,40	1,10	1,33	1,33	1,33	1,33
		0,50	1,10	1,40	1,40	1,40	1,40
		0,55	1,10	1,90	1,90	1,90	1,90
		0,63	1,10	2,00	2,20	2,20	2,20
		0,75	1,10	2,00	2,20	2,20	2,20
		0,88	1,10	2,00	2,20	2,20	2,20
		1,00	1,10	2,00	2,20	2,20	2,20
	N <sub>R,k,II</sub>	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  $\geq \text{Ø } 16,0 \text{ mm}$

**Annex 9**



#### 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 S280GD to S350GD - EN 10346

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

Timber substructures

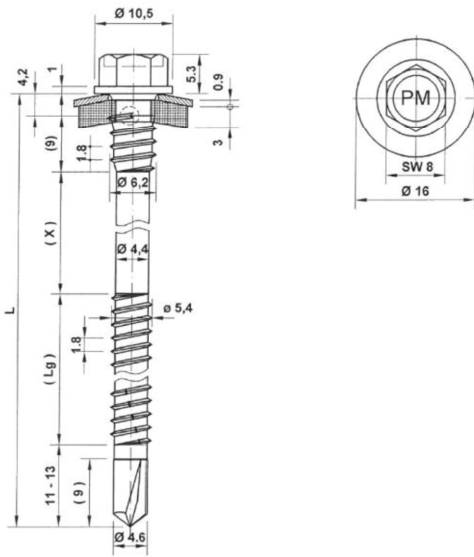
		Component II t II [mm]					
		1,50	2,00	2,50	3,00	4,00	5,00
Component I	t <sub>N2</sub> [mm] V <sub>R,k</sub> [kN]	0,40	0,75	0,82	0,82	0,82	0,82
		0,50	1,10	1,10	1,20	1,20	1,20
		0,55	1,10	1,10	1,20	1,20	1,20
		0,63	1,10	1,10	1,20	1,20	1,20
		0,75	1,10	1,10	1,20	1,20	1,20
		0,88	1,10	1,10	1,20	1,20	1,20
		1,00	1,10	1,10	1,20	1,20	1,20
	t <sub>N1</sub> [mm] N <sub>R,k</sub> [kN]	0,40	1,10	1,33	1,33	1,33	1,33
		0,50	1,10	1,40	1,40	1,40	1,40
		0,55	1,10	2,00	2,10	2,10	2,10
		0,63	1,10	2,00	2,40	2,40	2,40
		0,75	1,10	2,00	2,40	2,40	2,40
		0,88	1,10	2,00	2,40	2,40	2,40
		1,00	1,10	2,00	2,40	2,40	2,40
	N <sub>R,k,II</sub>	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  $\geq \varnothing 19,0$  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 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 <sub>N2</sub> [mm] V <sub>R,k</sub> [kN]	0,50	1,10	1,10	1,10	1,10
		0,55	1,40	1,40	1,40	1,40
		0,63	1,70	1,70	1,70	1,70
		0,75	1,70	1,70	1,70	1,70
		0,88	1,70	1,70	1,70	1,70
		1,00	1,70	1,70	1,70	1,70
	t <sub>N1</sub> [mm] N <sub>R,k</sub> [kN]	0,50	1,60	1,70	1,70	1,70
		0,55	2,00 <sup>a</sup>	2,30	2,30	2,30
		0,63	2,00 <sup>a</sup>	2,50	2,50	2,50
		0,75	2,00 <sup>a</sup>	2,90 <sup>a</sup>	3,20	3,20
		0,88	2,00 <sup>a</sup>	2,90 <sup>a</sup>	3,80	3,80
		1,00	2,00 <sup>a</sup>	2,90 <sup>a</sup>	3,90 <sup>a</sup>	4,40
	N <sub>R,k,II</sub>	2,00 <sup>a</sup>	2,90 <sup>a</sup>	3,90 <sup>a</sup>	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

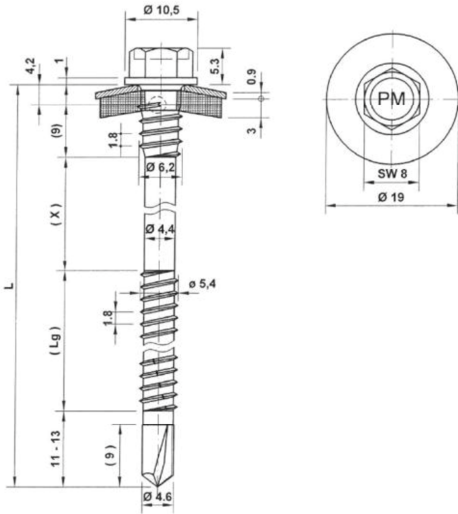
Index a: For Component II made of S320GD, the values may be increased by 8.2 %.

#### Sandwich screw

PMJ-tec TOPEX 7571-S16  
with hexagon head and sealing washer  $\geq \varnothing 16,0$  mm

#### Annex 11





#### 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  
S280GD to S320GD - EN 10346

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

Timber substructures

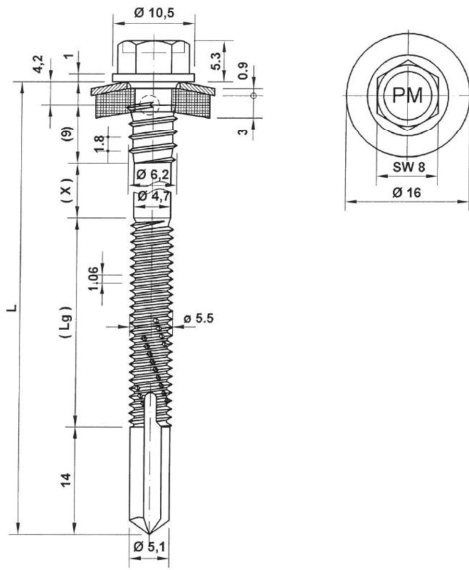
-

		Component II t II [mm]				
		1,50	2,00	2,50	3,00	4,00
Component I	t <sub>N2</sub> [mm] V <sub>R,k</sub> [kN]	0,50	1,20	1,20	1,20	1,20
		0,55	1,50	1,50	1,50	1,50
		0,63	1,90	1,90	1,90	1,90
		0,75	1,90	1,90	1,90	1,90
		0,88	1,90	1,90	1,90	1,90
		1,00	1,90	1,90	1,90	1,90
	t <sub>N1</sub> [mm] N <sub>R,k</sub> [kN]	0,50	1,60	1,70	1,70	1,70
		0,55	2,00	2,50	2,50	2,50
		0,63	2,00	2,80	2,80	2,80
		0,75	2,00	2,90	3,50	3,50
		0,88	2,00	2,90	3,90	4,20
		1,00	2,00	2,90	3,90	4,90
	N <sub>R,k,II</sub>	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  $\geq \varnothing 19,0$  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  
S280GD to S320GD - EN 10346

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

Timber substructures

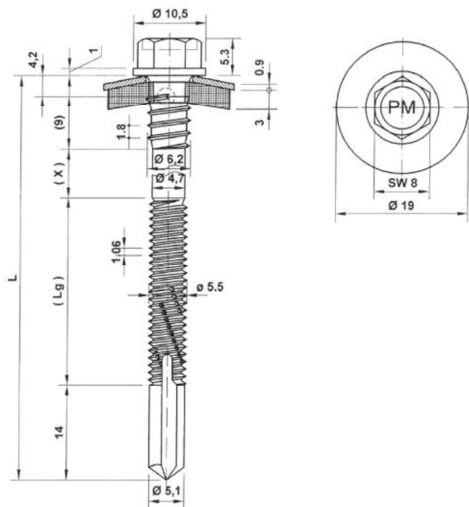
-

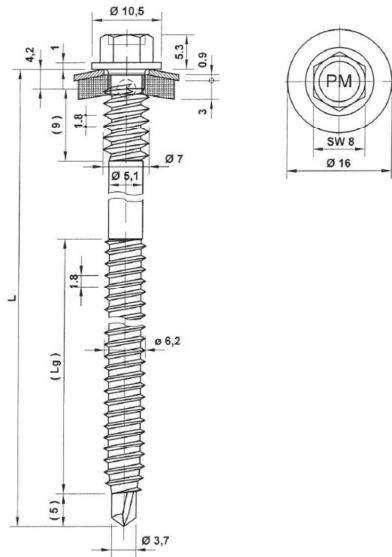
		Component II t II [mm]					
		3,00	4,00	5,00	6,00	8,00	≥ 10,0
Component I	t <sub>N2</sub> [mm]						
	D < 40 mm t <sub>N2</sub> ≥ 0,50	0,80	0,80	0,80	0,80	0,80	0,80
	D ≥ 40 mm t <sub>N2</sub> ≥ 0,50	1,10	1,10	1,10	1,10	1,10	1,10
	t <sub>N1</sub> [mm]	0,50	1,40	1,40	1,40	1,40	1,40
		0,55	1,90	1,90	1,90	1,90	1,90
		0,63	2,20	2,20	2,20	2,20	2,20
		0,75	2,20	2,20	2,20	2,20	2,20
		0,88	2,20	2,20	2,20	2,20	2,20
		1,00	2,20	2,20	2,20	2,20	2,20
		N <sub>R,k,II</sub>	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
		50	5,0	5,0	5,0	5,0	5,0
		60	6,0	6,0	6,0	6,0	6,0
		70	7,5	7,5	7,5	7,5	7,5
		80	9,0	9,0	9,0	9,0	9,0
		100	12,0	12,0	12,0	12,0	12,0
		120	12,0	12,0	12,0	12,0	12,0
		≥ 140	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:	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<sup>2</sup> for  $l_{ef} \geq 50,0$  mm

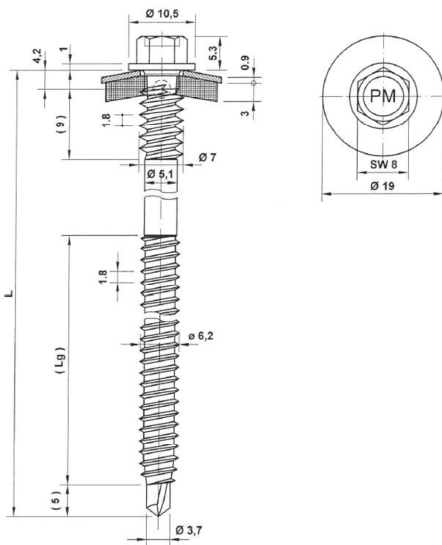
		Component II t II [mm]								
		30	40	50	60	70	80	100	120	≥ 140
Component I	$t_{N2}$ [mm] $V_{R,k}$ [kN]	0,50	1,00	1,10	1,10	1,10	1,10	1,10	1,10	1,10
		0,55	1,00	1,10	1,10	1,10	1,10	1,10	1,10	1,10
		0,63	1,00	1,10	1,10	1,10	1,10	1,10	1,10	1,10
		0,75	1,00	1,10	1,10	1,10	1,10	1,10	1,10	1,10
		0,88	1,00	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	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<sup>3</sup>. 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  $\geq \varnothing 16,0$  mm

#### Annex 15



#### 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<sup>2</sup> for  $l_{ef} \geq 50,0$  mm

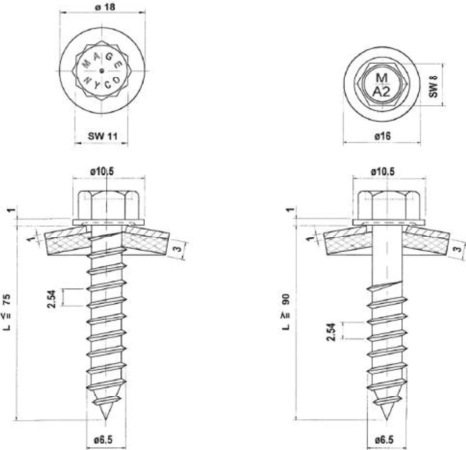
		Component II t II [mm]									
		30	40	50	60	70	80	100	120	≥ 140	
Component I	t <sub>N2</sub> [mm] V <sub>R,k</sub> [kN]	0,50	1,10	1,20	1,20	1,20	1,20	1,20	1,20	1,20	1,20
		0,55	1,10	1,20	1,20	1,20	1,20	1,20	1,20	1,20	1,20
		0,63	1,10	1,20	1,20	1,20	1,20	1,20	1,20	1,20	1,20
		0,75	1,10	1,20	1,20	1,20	1,20	1,20	1,20	1,20	1,20
		0,88	1,10	1,20	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	1,20
	t <sub>N1</sub> [mm] N <sub>R,k</sub> [kN]	0,50	1,40	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	2,10
		0,63	2,40	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	2,40
		0,88	2,40	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	2,40
N <sub>R,k,II</sub>		2,40	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<sup>3</sup>. 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  $\geq \varnothing 19,0$  mm

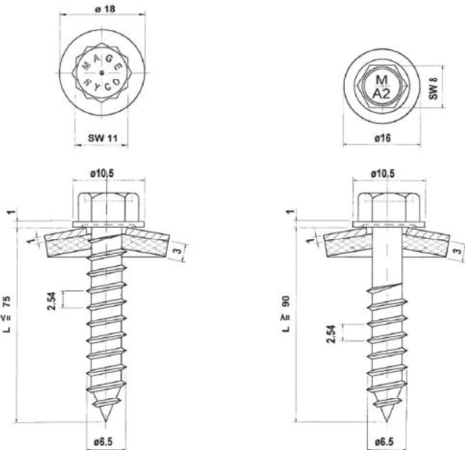
#### Annex 16

	<b>Materials</b> 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
	<b>Pre drill diameter</b> Ø 4,8 mm
	<b>Timber substructures</b> $M_{y,Rk} = 14,830 \text{ Nm}$ $f_{ax,k} = 8,575 \text{ N/mm}^2$ for $l_{ef} \geq 35,0 \text{ mm}$

		Component II t II [mm]								
		30	40	50	60	70	80	100	120	≥ 140
Component I	t <sub>N2</sub> [mm] V <sub>R,k</sub> [kN]	0,40	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
		0,55	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
		0,75	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
		1,00	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74
	t <sub>N1</sub> [mm] N <sub>R,k</sub> [kN]	0,50	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
		0,63	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
		0,88	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
		N <sub>R,k,II</sub>	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<sub>N1</sub> 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<sub>ef</sub> are valid for k<sub>mod</sub> = 0,90 and ρ<sub>k</sub> = 350 kg/m<sup>3</sup>. For other combinations of k<sub>mod</sub> and timber densities see Annex 3.

<b>Sandwich screw</b>	<b>Annex 17</b>
PMJ-tec TOPEX 7653-S16 with hexagon head and sealing washer ≥ Ø 16,0 mm	

	<p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Washer: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Component I: S280GD to S320GD - EN 10346</p> <p>Component II: Timber – EN 14081</p> <p><b>Pre drill diameter</b> Ø 4,8 mm</p> <p><b>Timber substructures</b></p> <p><math>M_{y,Rk} = 14,830 \text{ Nm}</math></p> <p><math>f_{ax,k} = 8,575 \text{ N/mm}^2</math> for <math>l_{ef} \geq 35,0 \text{ mm}</math></p>
---	---

		Component II t II [mm]								
		30	40	50	60	70	80	100	120	≥ 140
Component I	t <sub>N2</sub> [mm] V <sub>R,k</sub> [kN]	0,40	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
		0,55	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
		0,75	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
		1,00	1,74	1,74	1,74	1,74	1,74	1,74	1,74	1,74
	t <sub>N1</sub> [mm] N <sub>R,k</sub> [kN]	0,50	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
		0,63	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
		0,88	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
		N <sub>R,k,II</sub>	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<sub>N1</sub> 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<sub>ef</sub> are valid for k<sub>mod</sub> = 0,90 and ρ<sub>k</sub> = 350 kg/m<sup>3</sup>. For other combinations of k<sub>mod</sub> and timber densities see Annex 3.

Sandwich screw	Annex 18
PMJ-tec TOPEX 7653-S19 with hexagon head and sealing washer ≥ Ø 19,0 mm	

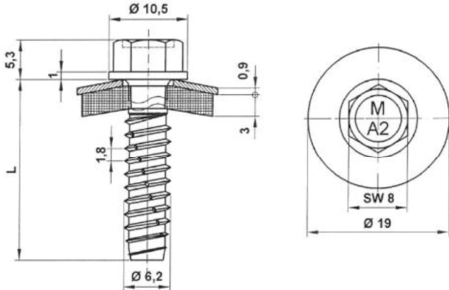
	<p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Washer: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Component I: S280GD to S350GD - EN 10346</p> <p>Component II: S235 – EN 10025-1 S280GD to S320GD - EN 10346</p> <p><b>Pre drill diameter</b> see table below</p> <p><b>Timber substructures</b></p> <p>-</p>
--	---

		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 <sub>N2</sub> [mm] V <sub>R,k</sub> [kN]	0,40	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
		0,55	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
		0,75	1,53	1,53	1,53	1,70	1,86	2,03	2,03	2,03
		0,88	1,53	1,53	1,53	1,70	1,86	2,03	2,03	2,03
		1,00	1,53	1,53	1,53	1,70	1,86	2,03	2,03	2,03
	t <sub>N1</sub> [mm] N <sub>R,k</sub> [kN]	0,40	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
		0,55	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
		0,75	2,33	2,71	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
		1,00	2,33	2,71	4,00	4,00	4,00	4,00	4,00	4,00
	N <sub>R,k,II</sub>	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 <sub>pd</sub> [mm]	Ø 5,0	Ø 5,3					Ø 5,5	Ø 5,7	

For component t<sub>N1</sub> or t<sub>N2</sub> made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

<p><b>Sandwich screw</b></p>	<p><b>Annex 19</b></p>
<p>PMJ-tec TOPEX 7673-S16 with hexagon head and sealing washer ≥ Ø 16,0 mm</p>	





#### 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  
S280GD to S320GD - EN 10346

#### Pre drill diameter

see table below

#### Timber substructures

-

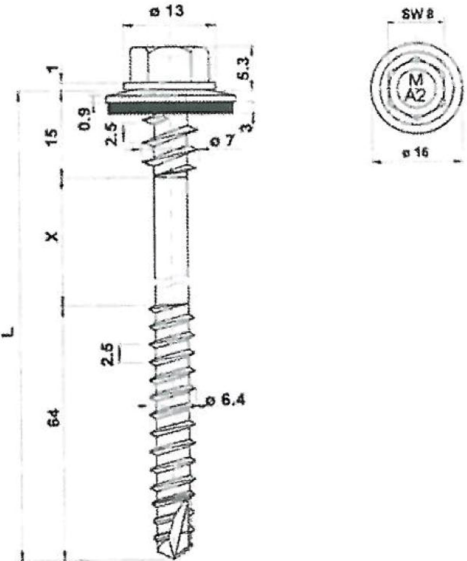
		Component II t II [mm]								
		1,50	2,00	2,50	3,00	4,00	5,00	6,00	7,00	≥ 10,0
Component I	t <sub>N2</sub> [mm] V <sub>R,k</sub> [kN]	0,40	1,09	1,09	1,09	1,09	1,09	1,09	1,09	1,09
		0,50	1,17	1,17	1,17	1,17	1,17	1,17	1,17	1,17
		0,55	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24
		0,63	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35
		0,75	1,53	1,53	1,53	1,70	1,86	2,03	2,03	2,03
		0,88	1,53	1,53	1,53	1,70	1,86	2,03	2,03	2,03
		1,00	1,53	1,53	1,53	1,70	1,86	2,03	2,03	2,03
	t <sub>N1</sub> [mm] N <sub>R,k</sub> [kN]	0,40	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
		0,55	2,33	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
		0,75	2,33	2,71	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
		1,00	2,33	2,71	4,00	4,00	4,00	4,00	4,00	4,00
	N <sub>R,k,II</sub>	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 <sub>pd</sub> [mm]		Ø 5,0	Ø 5,3					Ø 5,5	Ø 5,7	

For component t<sub>N1</sub> or t<sub>N2</sub> 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

	<p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Washer: Stainless steel A2, A4, A5 – EN ISO 3506</p> <p>Component I: S280GD to S320GD - EN 10346</p> <p>Component II: Timber – EN 14081</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 1.00</math> mm</p> <p><b>Timber substructures</b></p> <p><math>M_{y,Rk} = 14,830</math> Nm</p> <p><math>f_{ax,k} = 8,575</math> N/mm<sup>2</sup> for <math>l_{ef} \geq 35,0</math> mm</p>
---	---

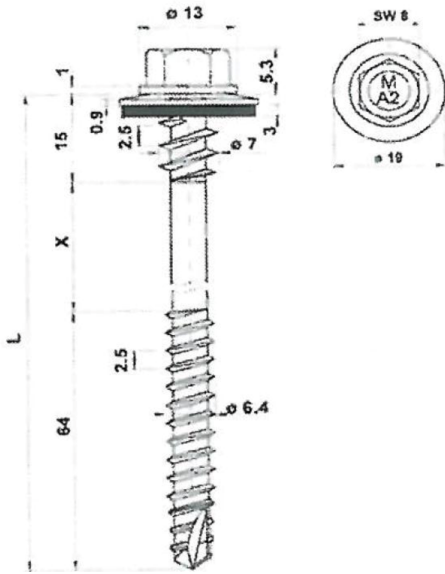
		Component II t II [mm]									
		30	40	50	60	70	80	100	120	≥ 140	
Component I	t <sub>N2</sub> [mm] V <sub>R,k</sub> [kN]	0,40	0,76	0,76	0,76	0,76	0,76	0,76	0,76	0,76	0,76
		0,50	1,19	1,19	1,19	1,19	1,19	1,19	1,19	1,19	1,19
		0,55	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,30
		0,63	1,47	1,47	1,47	1,47	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 <sub>N1</sub> [mm] N <sub>R,k</sub> [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 <sub>R,k,II</sub>	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/m<sup>3</sup>. 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  $\geq \varnothing 16,0$  mm

**Annex 21**



#### 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<sup>2</sup> for  $l_{ef} \geq 35,0$  mm

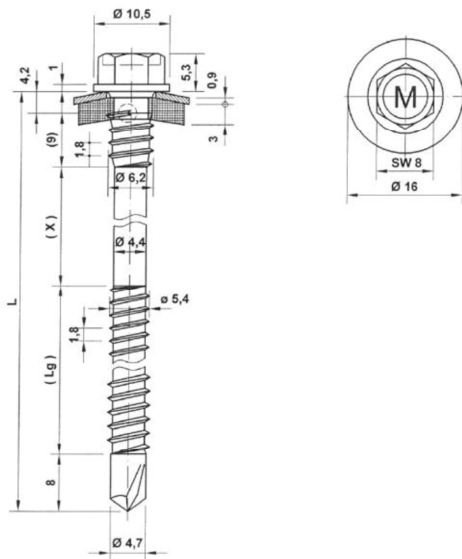
		Component II t II [mm]								
		30	40	50	60	70	80	100	120	≥ 140
Component I	t <sub>N2</sub> [mm]  V <sub>R,k</sub> [kN]	0,50	0,90	0,90	0,90	0,90	0,90	0,90	0,90	0,90
		0,55	1,20	1,20	1,20	1,20	1,20	1,20	1,20	1,20
		0,63	1,60	1,60	1,60	1,60	1,60	1,60	1,60	1,60
		0,75	2,10	2,10	2,10	2,10	2,10	2,10	2,10	2,10
		0,88	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
	t <sub>N1</sub> [mm]  N <sub>R,k</sub> [kN]	0,50	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
		0,63	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
		0,88	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
		N <sub>R,k,II</sub>	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<sup>3</sup>. 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  $\geq \varnothing 19,0$  mm

#### Annex 22



#### 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

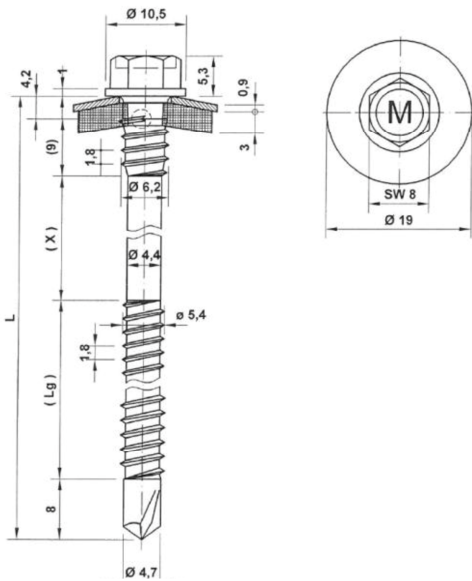
no performance determined

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				
	$\geq 100$	30,0	5,0				

#### Sandwich screw

PMJ-tec TOPEX 7360  
with hexagon head and sealing washer  $\geq \varnothing 16,0$  mm

#### Annex 23



#### 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

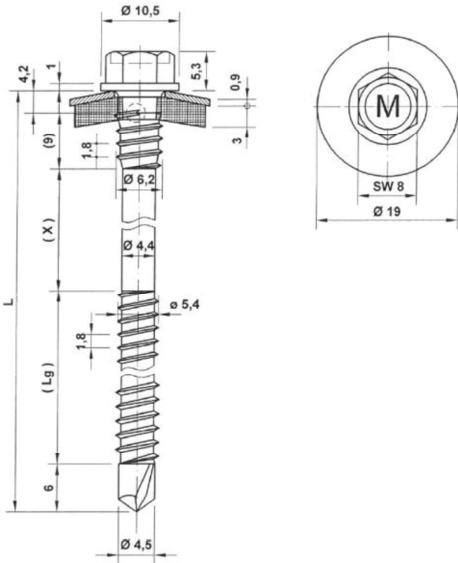
7360 55		$t_{II}$ [mm]					
		1.50	2.00	2.50	3.00	4.00	5.00
$V_{R,k}$ [kN] $t_{N2}$ [mm]	0.40	0,75	0,82	0,82	0,82	0,82	0,82
	0.50	1,10	1,10	1,20	1,20	1,20	1,20
	0.55	1,10	1,10	1,20	1,20	1,20	1,20
	0.63	1,10	1,10	1,20	1,20	1,20	1,20
	0.75	1,10	1,10	1,20	1,20	1,20	1,20
	0.88	1,10	1,10	1,20	1,20	1,20	1,20
	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				
	$\geq 100$	30,0	5,0				

#### Sandwich screw

PMJ-tec TOPEX 7360  
with hexagon head and sealing washer  $\geq \varnothing 19,0$  mm

#### Annex 24





#### 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				
	$\geq 100$	30,0	5,0				

#### Sandwich screw

PMJ-tec TOPEX 7362  
with hexagon head and sealing washer  $\geq \varnothing 19,0$  mm

#### Annex 26