

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-17/0293**  
**of 12 July 2017**

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

5.5-6.3BP5, 5.5-6.3BP3, 6.3-7.0BP2

Product family  
to which the construction product belongs

Fastening screws for sandwich panels

Manufacturer

Fastener Point B.V.  
Bonnetstraat 24  
6718XN EDE  
NIEDERLANDE

Manufacturing plant

Plant 1  
Plant 2

This European Technical Assessment  
contains

20 pages including 15 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

European Assessment Document (EAD)  
330047-01-0602, "Fastening screws for sandwich panels",  
Version 1

**European Technical Assessment**

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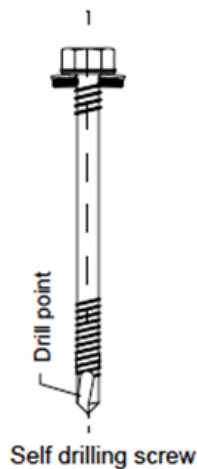
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## Specific part

### 1 Technical description of the product

The products are fastening screws for sandwich panels (self-drilling screws). The fastening screws for sandwich panels are completed with a metallic washer and an EPDM sealing washer. The fastening screws for sandwich panels are made of austenitic stainless steel or a bimetal combination with drill bits made of galvanised/painted carbon steel. The fastening screws for sandwich panels and the corresponding connections are subject to tension and/or shear forces. Samples of fastenings screws for sandwich panels are shown in Figure 1.



**Figure 1: Fastening screws for sandwich panels.**

The components and the system setup of the product are given in Annex (1-15).

**Table 1 – Types of the fastening screws for sandwich panels**

Annex	Fastening Screw
Annex 4	5,5/6,3xL BP5 Washer Ø16,0
Annex 5	5,5/6,3xL BP5 Washer Ø19,0
Annex 6	5,5/6,3xL BP5 Washer Ø22,0
Annex 7	5,5/6,3xL BP3 Washer Ø16,0
Annex 8	5,5/6,3xL BP3 Washer Ø19,0
Annex 9	5,5/6,3xL BP3 Washer Ø22,0
Annex 10	6,3/7,0xL BP2 Washer Ø16,0
Annex 11	6,3/7,0xL BP2 Washer Ø19,0

**Table 1: Continuation**

Annex 12	6,3/7,0xL BP2 Washer Ø22,0
Annex 13	6,3/7,0xL BP2 Washer Ø16,0
Annex 14	6,3/7,0xL BP2 Washer Ø19,0
Annex 15	6,3/7,0xL BP2 Washer Ø22,0

## 2 Specification of the intended use in accordance with the applicable European Assessment Document 330047-01-0602

The fastening screws for sandwich panels 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 for sandwich panels 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 for sandwich panels are not intended for re-use.

The performances given in Section 3 are only valid if the fastening screws for sandwich panels are used in compliance with the specifications and conditions given in Annex (1-15).

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastening screws for sandwich panels of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, 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 Annex 2-3 and 4-15
Tension Resistance of the Connection	see Annex 2-3 and 4-15
Design Resistance in case of combined Tension and Shear Forces (interaction)	see Annex 2 and 4-15
Check of Bending Capacity in case of Thermal Expansion of the outer face of Sandwich Panels	No performance assessed
Durability	No performance assessed

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

Essential characteristic	Performance
Reaction to fire	Performance Class A1 in accordance with EC decision 96/603/EC (as amended)

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

In accordance with EAD No. 330047-01-0602, the applicable European legal act is Decision 1998/214/EC, amended by 2001/596/EC.

The system to be applied is: **2+**

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

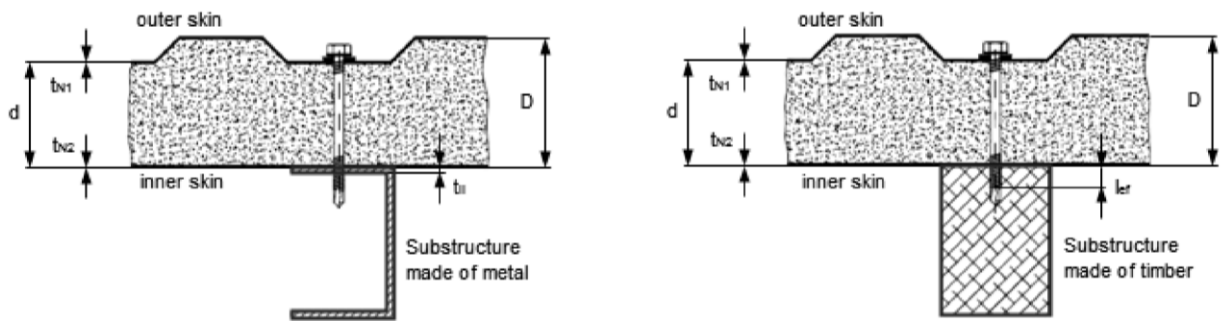
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 12 July 2017 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Schult

Examples of execution of a connection



Materials and dimensions

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

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

D, d	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
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

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

Performance characteristics

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

N R,k	Characteristic value of tension resistance
V R,k	Characteristic value of shear resistance
u	Maximum allowed head displacement of the fastening screw

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

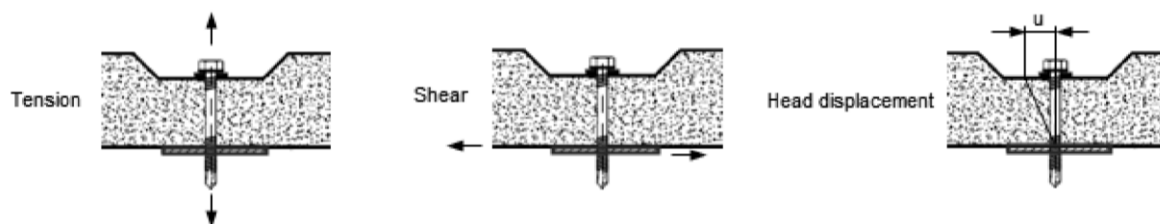
N R,I,k	Characteristic value of pull-through resistance for the outer skin of component I
N R,II,k	Characteristic value of pull-out resistance for component II
V R,I,k	Characteristic value of hole bearing resistance for the inner skin of component I
V R,II,k	Characteristic value of hole bearing resistance for component II
M y,Rk	Characteristic value of yield moment of the fastening screw (for component II made of timber)
f ax,k	Characteristic value of withdrawal strength for component II made of timber
f h,k	Characteristic value of embedding strength for component II made of timber

Terms and explanations

Fastening screws for sandwich panels

Annex 1

### Occurred loadings of a connection



### Design values

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

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

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

$N_{R,d}$  Design value of tension resistance

$V_{R,d}$  Design value of shear resistance

$\gamma_M$  Partial safety factor

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

### Special conditions

If the component thickness  $t_{N1}$ ,  $t_{N2}$  or  $t_{II}$  lies in between two indicated component thicknesses, the characteristic value may be calculated by linear interpolation.

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

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

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

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

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

### 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 manufacturer's instruction.

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

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

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

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

### Design and installation

Fastening screws for sandwich panels

### Annex 2

**Component II made of timber**

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

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

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

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

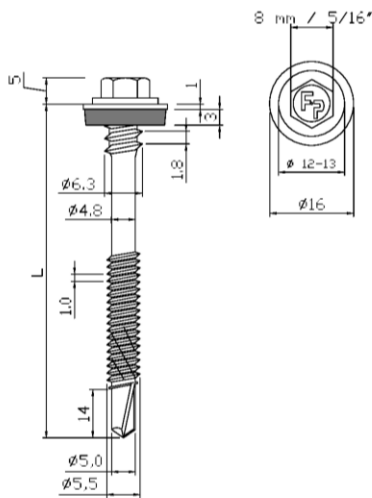
$V_{R,II,k}$  is determined according to EN 1995-1-1:2004 + A1:2008, equation (8.9), with  $M_{y,Rk}$  and  $f_{h,k}$  given in the Annex of the fastening screw.

**Additional provisions**

Fastening screws for sandwich panels

**Annex 3**





#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506

Washer: Stainless steel 1.4301 (A2) – EN ISO 3506

Component I: S280GD, S320GD and S350GD - EN 10346

Component II: S235 – EN 10025-2

S280GD, S320GD and S350GD - EN 10346

Drill capacity: ≤ 12 mm

#### Timber substructures:

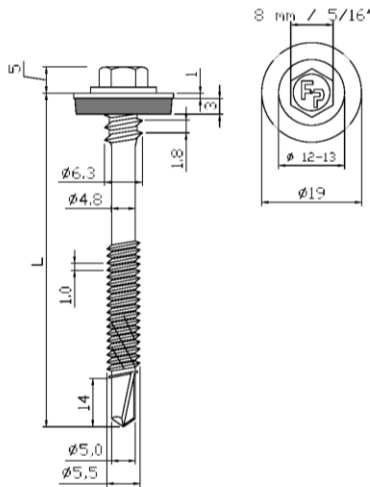
No performance determined

$t_i$ [mm]		$t_{ii}$ [mm]									
		0,75	0,88	1,00	1,13	1,25	1,50	2,00	3,00	4,00	≥ 6,00
$V_{R,k}$ [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94
	0,50	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14
	0,55	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24
	0,63	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39
	0,75	1,63	1,84	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,88	1,63	1,84	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	1,00	1,63	1,84	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
$N_{R,k}$ [kN]	0,40	0,60	0,74	0,86	1,09	1,30	1,48	1,48	1,48	1,48	1,48
	0,50	0,60	0,74	0,86	1,09	1,30	1,51	1,51	1,51	1,51	1,51
	0,55	0,60	0,74	0,86	1,09	1,30	1,74	1,82	1,82	1,82	1,82
	0,63	0,60	0,74	0,86	1,09	1,30	1,74	2,31	2,31	2,31	2,31
	0,75	0,60	0,74	0,86	1,09	1,30	1,74	2,62	3,04	3,04	3,04
	0,88	0,60	0,74	0,86	1,09	1,30	1,74	2,62	3,04	3,04	3,04
	1,00	0,60	0,74	0,86	1,09	1,30	1,74	2,62	3,04	3,04	3,04
$u$ [mm]	40	10,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	3,0	3,0
	50	12,5	6,3	6,3	6,3	6,3	6,3	6,3	6,3	3,8	3,8
	60	15,0	7,5	7,5	7,5	7,5	7,5	7,5	7,5	4,5	4,5
	80	20,0	10,0	10,0	10,0	10,0	10,0	10,0	10,0	6,0	6,0
	100	25,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	7,5	7,5
	120	30,0	15,0	15,0	15,0	15,0	15,0	15,0	15,0	9,0	9,0
	140	35,0	17,5	17,5	17,5	17,5	17,5	17,5	17,5	10,5	10,5
	≥160	40,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	12,0	12,0

#### „Self drilling Screws“

Screw for Sandwich panels 5,5/6,3 x L – BP5, washer size Ø 16,0 mm

#### Annex 4



#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506  
Washer: Stainless steel 1.4301 (A2) – EN ISO 3506  
Component I: S280GD, S320GD and S350GD - EN 10346  
Component II: S235 – EN 10025-2  
S280GD, S320GD and S350GD - EN 10346

Drill capacity:  $\Sigma t_i \leq 12,00$  mm

#### Timber substructures:

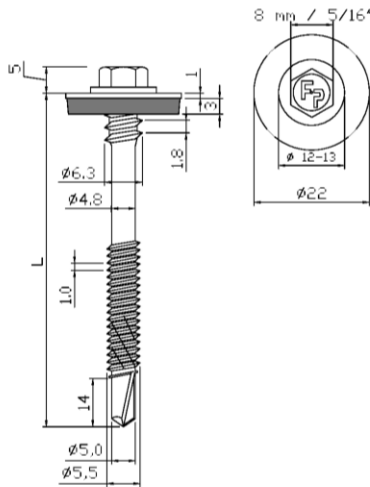
No performance determined

$t_{N1}, t_{N2}, d, D$		$t_{ii}$ [mm]									
		0,75	0,88	1,00	1,13	1,25	1,50	2,00	3,00	4,00	$\geq 6,00$
$V_{R,k}$ [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94
	0,50	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14
	0,55	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24
	0,63	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39
	0,75	1,63	1,84	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,88	1,63	1,84	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	1,00	1,63	1,84	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
$N_{R,k}$ [kN]	0,40	0,60	0,74	0,86	1,09	1,30	1,74	1,87	1,87	1,87	1,87
	0,50	0,60	0,74	0,86	1,09	1,30	1,74	1,89	1,89	1,89	1,89
	0,55	0,60	0,74	0,86	1,09	1,30	1,74	2,30	2,30	2,30	2,30
	0,63	0,60	0,74	0,86	1,09	1,30	1,74	2,62	2,96	2,96	2,96
	0,75	0,60	0,74	0,86	1,09	1,30	1,74	2,62	3,65	3,95	3,95
	0,88	0,60	0,74	0,86	1,09	1,30	1,74	2,62	3,65	3,95	3,95
	1,00	0,60	0,74	0,86	1,09	1,30	1,74	2,62	3,65	3,95	3,95
$u$ [mm]	40	10,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	3,0	3,0
	50	12,5	6,3	6,3	6,3	6,3	6,3	6,3	6,3	3,8	3,8
	60	15,0	7,5	7,5	7,5	7,5	7,5	7,5	7,5	4,5	4,5
	80	20,0	10,0	10,0	10,0	10,0	10,0	10,0	10,0	6,0	6,0
	100	25,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	7,5	7,5
	120	30,0	15,0	15,0	15,0	15,0	15,0	15,0	15,0	9,0	9,0
	140	35,0	17,5	17,5	17,5	17,5	17,5	17,5	17,5	10,5	10,5
	$\geq 160$	40,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	12,0	12,0

#### „Self drilling Screws“

Screw for Sandwich panels 5,5/6,3 x L – BP5, washer size Ø 19,0 mm

#### Annex 5



#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506  
Washer: Stainless steel 1.4301 (A2) – EN ISO 3506  
Component I: S280GD, S320GD and S350GD - EN 10346  
Component II: S235 – EN 10025-2  
S280GD, S320GD and S350GD - EN 10346

Drill capacity:  $\Sigma t_i \leq 12,00$  mm

#### Timber substructures:

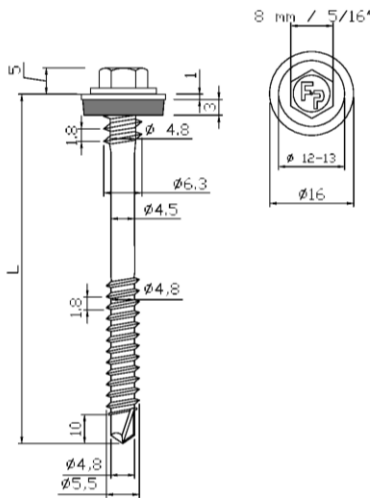
No performance determined

$t_{N1}, t_{N2}, d, D$		$t_{ii}$ [mm]									
		0,75	0,88	1,00	1,13	1,25	1,50	2,00	3,00	4,00	$\geq 6,00$
$V_{R,k}$ [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94
	0,50	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14
	0,55	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24	1,24
	0,63	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39
	0,75	1,63	1,84	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,88	1,63	1,84	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	1,00	1,63	1,84	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
$N_{R,k}$ [kN]	0,40	0,60	0,74	0,86	1,09	1,30	1,74	1,78	1,78	1,78	1,78
	0,50	0,60	0,74	0,86	1,09	1,30	1,74	2,53	2,53	2,53	2,53
	0,55	0,60	0,74	0,86	1,09	1,30	1,74	2,62	2,90	2,90	2,90
	0,63	0,60	0,74	0,86	1,09	1,30	1,74	2,62	3,49	3,49	3,49
	0,75	0,60	0,74	0,86	1,09	1,30	1,74	2,62	3,65	4,37	4,37
	0,88	0,60	0,74	0,86	1,09	1,30	1,74	2,62	3,65	4,37	4,37
	1,00	0,60	0,74	0,86	1,09	1,30	1,74	2,62	3,65	4,37	4,37
$u$ [mm]	40	10,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	3,0	3,0
	50	12,5	6,3	6,3	6,3	6,3	6,3	6,3	6,3	3,8	3,8
	60	15,0	7,5	7,5	7,5	7,5	7,5	7,5	7,5	4,5	4,5
	80	20,0	10,0	10,0	10,0	10,0	10,0	10,0	10,0	6,0	6,0
	100	25,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	7,5	7,5
	120	30,0	15,0	15,0	15,0	15,0	15,0	15,0	15,0	9,0	9,0
	140	35,0	17,5	17,5	17,5	17,5	17,5	17,5	17,5	10,5	10,5
	$\geq 160$	40,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	12,0	12,0

#### „Self drilling Screws“

Screw for Sandwich panels 5,5/6,3 x L – BP5, washer size Ø 22,0 mm

#### Annex 6



#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506  
Washer: Stainless steel 1.4301 (A2) – EN ISO 3506  
Component I: S280GD, S320GD and S350GD - EN 10346  
Component II: S235 – EN 10025-2  
S280GD, S320GD and S350GD - EN 10346

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

#### Timber substructures:

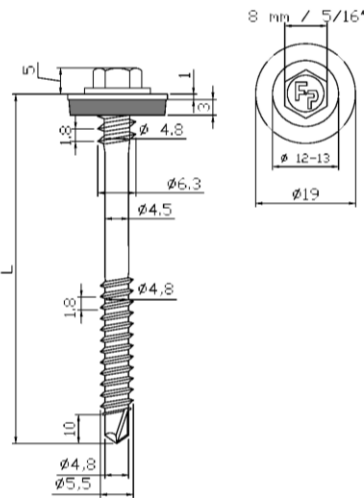
No performance determined

$t_{N1}, t_{N2}, d, D$		$t_{ii}$ [mm]								
		0,75	1,00	1,50	2,00	3,00	4,00	6,00	-	-
$V_{R,k}$ [kN]	0,40	0,83	0,83	0,83	0,83	0,83	0,83	0,83	-	-
	0,50	0,93	0,93	0,93	0,93	0,93	0,93	0,93	-	-
	0,55	1,11	1,11	1,11	1,11	1,11	1,11	1,11	-	-
	0,63	1,39	1,39	1,39	1,39	1,39	1,39	1,39	-	-
	0,75	1,82	1,91	1,91	1,91	1,91	1,91	1,91	-	-
	0,88	1,82	1,91	1,91	1,91	1,91	1,91	1,91	-	-
	1,00	1,82	1,91	1,91	1,91	1,91	1,91	1,91	-	-
$N_{R,k}$ [kN]	0,40	0,60	0,66	1,58	1,58	1,58	1,58	1,58	-	-
	0,50	0,60	0,66	1,77	1,80	1,80	1,80	1,80	-	-
	0,55	0,60	0,66	1,77	2,11	2,11	2,11	2,11	-	-
	0,63	0,60	0,66	1,77	2,61	2,61	2,61	2,61	-	-
	0,75	0,60	0,66	1,77	2,87	3,36	3,36	3,36	-	-
	0,88	0,60	0,66	1,77	2,87	3,36	3,36	3,36	-	-
	1,00	0,60	0,66	1,77	2,87	3,36	3,36	3,36	-	-
$u$ [mm]	40	6,0	3,0	3,0	3,0	3,0	2,0	2,0	-	-
	50	7,5	3,5	3,5	3,5	3,5	2,5	2,5	-	-
	60	9,0	4,5	4,5	4,5	4,5	3,0	3,0	-	-
	80	12,0	6,0	6,0	6,0	6,0	4,0	4,0	-	-
	100	15,0	7,5	7,5	7,5	7,5	5,0	5,0	-	-
	120	18,0	9,0	9,0	9,0	9,0	6,0	6,0	-	-
	140	21,0	10,5	10,5	10,5	10,5	7,0	7,0	-	-
	$\geq 160$	24,0	12,0	12,0	12,0	12,0	8,0	8,0	-	-

#### „Self drilling Screws“

Screw for Sandwich panels 5,5/6,3 x L – BP3, washer size Ø 16,0 mm

#### Annex 7



#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506  
Washer: Stainless steel 1.4301 (A2) – EN ISO 3506  
Component I: S280GD, S320GD and S350GD - EN 10346  
Component II: S235 – EN 10025-2  
S280GD, S320GD and S350GD - EN 10346

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

#### Timber substructures:

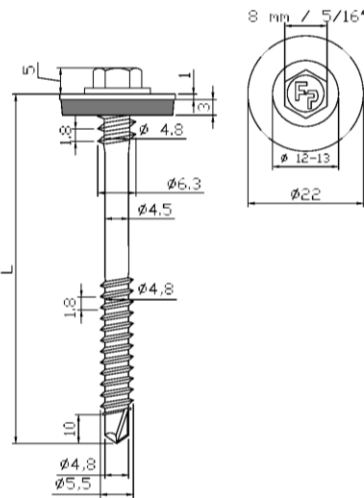
No performance determined

$t_{N1}, t_{N2}, d, D$		$t_{ii}$ [mm]								
		0,75	1,00	1,50	2,00	3,00	4,00	6,00	-	-
$V_{R,k}$ [kN]	0,40	0,83	0,83	0,83	0,83	0,83	0,83	0,83	-	-
	0,50	0,93	0,93	0,93	0,93	0,93	0,93	0,93	-	-
	0,55	1,11	1,11	1,11	1,11	1,11	1,11	1,11	-	-
	0,63	1,39	1,39	1,39	1,39	1,39	1,39	1,39	-	-
	0,75	1,82	1,91	1,91	1,91	1,91	1,91	1,91	-	-
	0,88	1,82	1,91	1,91	1,91	1,91	1,91	1,91	-	-
	1,00	1,82	1,91	1,91	1,91	1,91	1,91	1,91	-	-
$N_{R,k}$ [kN]	0,40	0,60	0,66	1,77	2,14	2,14	2,14	2,14	-	-
	0,50	0,60	0,66	1,77	2,30	2,30	2,30	2,30	-	-
	0,55	0,60	0,66	1,77	2,62	2,62	2,62	2,62	-	-
	0,63	0,60	0,66	1,77	2,87	3,14	3,14	3,14	-	-
	0,75	0,60	0,66	1,77	2,87	3,55	3,91	3,91	-	-
	0,88	0,60	0,66	1,77	2,87	3,55	3,91	3,91	-	-
	1,00	0,60	0,66	1,77	2,87	3,55	3,91	3,91	-	-
$u$ [mm]	40	6,0	3,0	3,0	3,0	3,0	2,0	2,0	-	-
	50	7,5	3,5	3,5	3,5	3,5	2,5	2,5	-	-
	60	9,0	4,5	4,5	4,5	4,5	3,0	3,0	-	-
	80	12,0	6,0	6,0	6,0	6,0	4,0	4,0	-	-
	100	15,0	7,5	7,5	7,5	7,5	5,0	5,0	-	-
	120	18,0	9,0	9,0	9,0	9,0	6,0	6,0	-	-
	140	21,0	10,5	10,5	10,5	10,5	7,0	7,0	-	-
	$\geq 160$	24,0	12,0	12,0	12,0	12,0	8,0	8,0	-	-

#### „Self drilling Screws“

Screw for Sandwich panels 5,5/6,3 x L – BP3, washer size Ø 19,0 mm

#### Annex 8



#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506  
Washer: Stainless steel 1.4301 (A2) – EN ISO 3506  
Component I: S280GD, S320GD and S350GD - EN 10346  
Component II: S235 – EN 10025-2  
S280GD, S320GD and S350GD - EN 10346

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

#### Timber substructures:

No performance determined

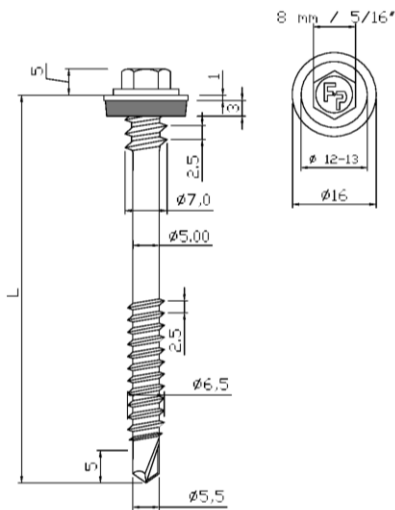
$t_{N1}, t_{N2}, d, D$		$t_{ii}$ [mm]								
		0,75	1,00	1,50	2,00	3,00	4,00	6,00	-	-
$V_{R,k}$ [kN]	0,40	0,83	0,83	0,83	0,83	0,83	0,83	0,83	-	-
	0,50	0,93	0,93	0,93	0,93	0,93	0,93	0,93	-	-
	0,55	1,11	1,11	1,11	1,11	1,11	1,11	1,11	-	-
	0,63	1,39	1,39	1,39	1,39	1,39	1,39	1,39	-	-
	0,75	1,82	1,91	1,91	1,91	1,91	1,91	1,91	-	-
	0,88	1,82	1,91	1,91	1,91	1,91	1,91	1,91	-	-
	1,00	1,82	1,91	1,91	1,91	1,91	1,91	1,91	-	-
$N_{R,k}$ [kN]	0,40	0,60	0,66	1,77	2,21	2,21	2,21	2,21	-	-
	0,50	0,60	0,66	1,77	2,42	2,42	2,42	2,42	-	-
	0,55	0,60	0,66	1,77	2,80	2,80	2,80	2,80	-	-
	0,63	0,60	0,66	1,77	2,87	3,42	3,42	3,42	-	-
	0,75	0,60	0,66	1,77	2,87	3,55	4,22	4,34	-	-
	0,88	0,60	0,66	1,77	2,87	3,55	4,22	4,34	-	-
	1,00	0,60	0,66	1,77	2,87	3,55	4,22	4,34	-	-
$u$ [mm]	40	6,0	3,0	3,0	3,0	3,0	2,0	2,0	-	-
	50	7,5	3,5	3,5	3,5	3,5	2,5	2,5	-	-
	60	9,0	4,5	4,5	4,5	4,5	3,0	3,0	-	-
	80	12,0	6,0	6,0	6,0	6,0	4,0	4,0	-	-
	100	15,0	7,5	7,5	7,5	7,5	5,0	5,0	-	-
	120	18,0	9,0	9,0	9,0	9,0	6,0	6,0	-	-
	140	21,0	10,5	10,5	10,5	10,5	7,0	7,0	-	-
	$\geq 160$	24,0	12,0	12,0	12,0	12,0	8,0	8,0	-	-

#### „Self drilling Screws“

Screw for Sandwich panels 5,5/6,3 x L – BP3, washer size Ø 22,0 mm

#### Annex 9





#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506  
Washer: Stainless steel 1.4301 (A2) – EN ISO 3506  
Component I: S280GD, S320GD and S350GD - EN 10346  
Component II: S235 – EN 10025-2  
S280GD, S320GD and S350GD - EN 10346

Drill capacity:  $\Sigma t_i \leq 1,50$  mm

#### Timber substructures:

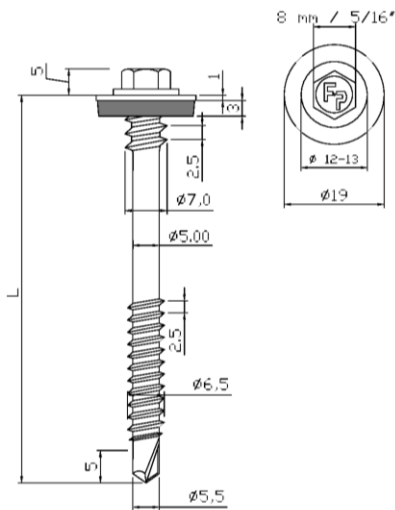
No performance determined

$t_{N1}, t_{N2}, d, D$		$t_{ii}$ [mm]									
		0,75	0,88	1,00	1,13	1,25	1,50	-	-	-	-
$V_{R,k}$ [kN]	0,40	0,67	0,67	0,67	0,67	0,67	0,67	-	-	-	-
	0,50	1,31	1,31	1,31	1,31	1,31	1,31	-	-	-	-
	0,55	1,48	1,48	1,48	1,48	1,48	1,48	-	-	-	-
	0,63	1,76	1,76	1,76	1,76	1,76	1,76	-	-	-	-
	0,75	2,17	2,17	2,17	2,17	2,17	2,17	-	-	-	-
	0,88	2,17	2,17	2,17	2,17	2,17	2,17	-	-	-	-
	1,00	2,17	2,17	2,17	2,17	2,17	2,17	-	-	-	-
$N_{R,k}$ [kN]	0,40	0,99	1,15	1,29	1,31	1,31	1,31	-	-	-	-
	0,50	0,99	1,15	1,29	1,39	1,39	1,39	-	-	-	-
	0,55	0,99	1,15	1,29	1,50	1,64	1,64	-	-	-	-
	0,63	0,99	1,15	1,29	1,50	1,69	2,04	-	-	-	-
	0,75	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
	0,88	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
	1,00	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
$u$ [mm]	40	8,0	8,0	8,0	8,0	8,0	10,0	-	-	-	-
	50	10,0	10,0	10,0	10,0	10,0	12,5	-	-	-	-
	60	12,0	12,0	12,0	12,0	12,0	15,0	-	-	-	-
	80	16,0	16,0	16,0	16,0	16,0	20,0	-	-	-	-
	100	20,0	20,0	20,0	20,0	20,0	25,0	-	-	-	-
	120	24,0	24,0	24,0	24,0	24,0	30,0	-	-	-	-
	140	28,0	28,0	28,0	28,0	28,0	35,0	-	-	-	-
	$\geq 160$	32,0	32,0	32,0	32,0	32,0	40,0	-	-	-	-

#### „Self drilling Screws“

Screw for Sandwich panels 6,3/7,0 x L – BP2, washer size  $\varnothing$  16,0 mm

#### Annex 10



#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506  
Washer: Stainless steel 1.4301 (A2) – EN ISO 3506  
Component I: S280GD, S320GD and S350GD - EN 10346  
Component II: S235 – EN 10025-2  
S280GD, S320GD and S350GD - EN 10346

Drill capacity:  $\Sigma t_i \leq 1,50$  mm

#### Timber substructures:

No performance determined

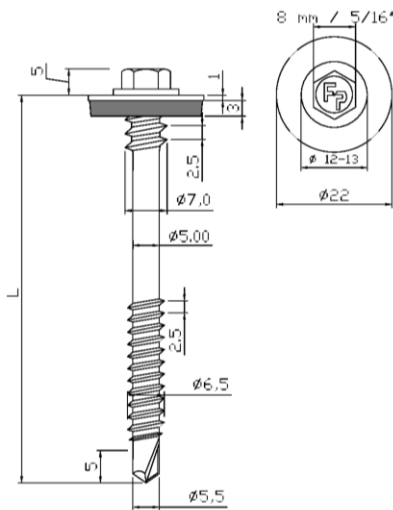
$t_{N1}, t_{N2}, d, D$		$t_{ii}$ [mm]									
		0,75	0,88	1,00	1,13	1,25	1,50	-	-	-	-
$V_{R,k}$ [kN]	0,40	0,67	0,67	0,67	0,67	0,67	0,67	-	-	-	-
	0,50	1,31	1,31	1,31	1,31	1,31	1,31	-	-	-	-
	0,55	1,48	1,48	1,48	1,48	1,48	1,48	-	-	-	-
	0,63	1,76	1,76	1,76	1,76	1,76	1,76	-	-	-	-
	0,75	2,17	2,17	2,17	2,17	2,17	2,17	-	-	-	-
	0,88	2,17	2,17	2,17	2,17	2,17	2,17	-	-	-	-
	1,00	2,17	2,17	2,17	2,17	2,17	2,17	-	-	-	-
$N_{R,k}$ [kN]	0,40	0,99	1,15	1,29	1,50	1,69	1,70	-	-	-	-
	0,50	0,99	1,15	1,29	1,50	1,69	1,70	-	-	-	-
	0,55	0,99	1,15	1,29	1,50	1,69	2,03	-	-	-	-
	0,63	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
	0,75	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
	0,88	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
	1,00	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
$u$ [mm]	40	8,0	8,0	8,0	8,0	8,0	10,0	-	-	-	-
	50	10,0	10,0	10,0	10,0	10,0	12,5	-	-	-	-
	60	12,0	12,0	12,0	12,0	12,0	15,0	-	-	-	-
	80	16,0	16,0	16,0	16,0	16,0	20,0	-	-	-	-
	100	20,0	20,0	20,0	20,0	20,0	25,0	-	-	-	-
	120	24,0	24,0	24,0	24,0	24,0	30,0	-	-	-	-
	140	28,0	28,0	28,0	28,0	28,0	35,0	-	-	-	-
	$\geq 160$	32,0	32,0	32,0	32,0	32,0	40,0	-	-	-	-

#### „Self drilling Screws“

Screw for Sandwich panels 6,3/7,0 x L – BP2, washer size Ø 19,0 mm

#### Annex 11





#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506  
Washer: Stainless steel 1.4301 (A2) – EN ISO 3506  
Component I: S280GD, S320GD and S350GD - EN 10346  
Component II: S235 – EN 10025-2  
S280GD, S320GD and S350GD - EN 10346

Drill capacity:  $\Sigma t_i \leq 1,50$  mm

#### Timber substructures:

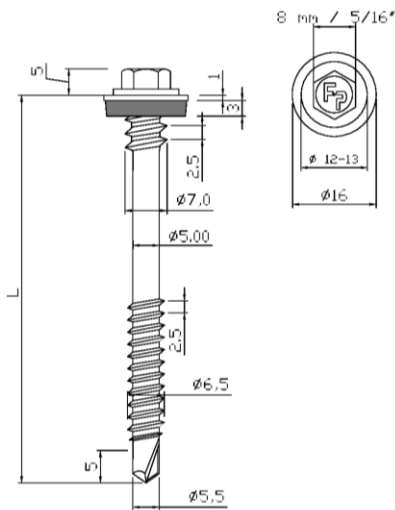
No performance determined

$t_{N1}, t_{N2}, d, D$		$t_{ii}$ [mm]									
		0,75	0,88	1,00	1,13	1,25	1,50	-	-	-	-
$V_{R,k}$ [kN]	0,40	0,67	0,67	0,67	0,67	0,67	0,67	-	-	-	-
	0,50	1,31	1,31	1,31	1,31	1,31	1,31	-	-	-	-
	0,55	1,48	1,48	1,48	1,48	1,48	1,48	-	-	-	-
	0,63	1,76	1,76	1,76	1,76	1,76	1,76	-	-	-	-
	0,75	2,17	2,17	2,17	2,17	2,17	2,17	-	-	-	-
	0,88	2,17	2,17	2,17	2,17	2,17	2,17	-	-	-	-
	1,00	2,17	2,17	2,17	2,17	2,17	2,17	-	-	-	-
$N_{R,k}$ [kN]	0,40	0,99	1,15	1,29	1,50	1,69	1,90	-	-	-	-
	0,50	0,99	1,15	1,29	1,50	1,69	2,03	-	-	-	-
	0,55	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
	0,63	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
	0,75	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
	0,88	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
	1,00	0,99	1,15	1,29	1,50	1,69	2,08	-	-	-	-
$u$ [mm]	40	8,0	8,0	8,0	8,0	8,0	10,0	-	-	-	-
	50	10,0	10,0	10,0	10,0	10,0	12,5	-	-	-	-
	60	12,0	12,0	12,0	12,0	12,0	15,0	-	-	-	-
	80	16,0	16,0	16,0	16,0	16,0	20,0	-	-	-	-
	100	20,0	20,0	20,0	20,0	20,0	25,0	-	-	-	-
	120	24,0	24,0	24,0	24,0	24,0	30,0	-	-	-	-
	140	28,0	28,0	28,0	28,0	28,0	35,0	-	-	-	-
	$\geq 160$	32,0	32,0	32,0	32,0	32,0	40,0	-	-	-	-

#### „Self drilling Screws“

Screw for Sandwich panels 6,3/7,0 x L – BP2, washer size Ø 22,0 mm

#### Annex 12



#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506

Washer: Stainless steel 1.4301 (A2) – EN ISO 3506

Component I: S280GD, S320GD and S350GD - EN 10346

Component II: Timber substructure according to DIN EN 338  
 $\rho = 350 \text{ kg/m}^3$  (min. C24)

Drill capacity:  $\Sigma t_i \leq 1,50 \text{ mm}$

#### Timber substructures:

Performance determined with

$$M_{y,Rk} = 10,7 \text{ Nm}$$

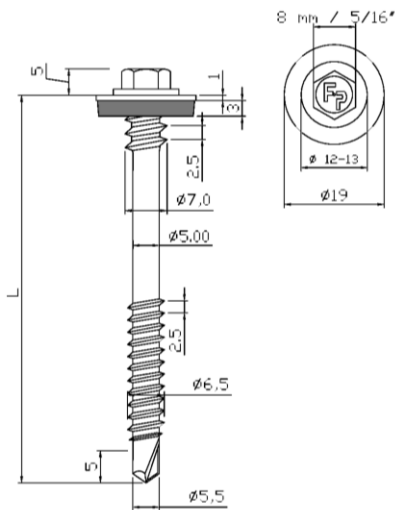
$$f_{ax,k} = 8,041 \text{ N/mm}^2 \text{ for } l_{eff} \geq 40,0 \text{ mm}$$

$t_{N1}, t_{N2} [\text{mm}]$		$d, D [\text{mm}]$									
		30	40	50	60	70	80	100	120	140	$\geq 160$
$V_{R,k} [\text{kN}]$	0,40	1,03	1,03	1,03	1,03	1,03	1,03	1,03	1,03	1,03	1,03
	0,50	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35
	0,55	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51
	0,63	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76
	0,75	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14
	0,88	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14
	1,00	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14
$N_{R,k} [\text{kN}]$	0,40	1,31	1,31	1,31	1,31	1,31	1,31	1,31	1,31	1,31	1,31
	0,50	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39	1,39
	0,55	1,64	1,64	1,64	1,64	1,64	1,64	1,64	1,64	1,64	1,64
	0,63	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,75	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,88	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	1,00	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
$u [\text{mm}]$	-	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0

#### „Self drilling Screws“

Screw for Sandwich panels 6,3/7,0 x L – BP2, washer size Ø 16,0 mm

#### Annex 13



#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506

Washer: Stainless steel 1.4301 (A2) – EN ISO 3506

Component I: S280GD, S320GD and S350GD - EN 10346

Component II: Timber substructure according to DIN EN 338  
 $\rho = 350 \text{ kg/m}^2$  (min. C24)

Drill capacity:  $\Sigma t_i \leq 1,50 \text{ mm}$

#### Timber substructures:

Performance determined with

$$M_{y,Rk} = 10,7 \text{ Nm}$$

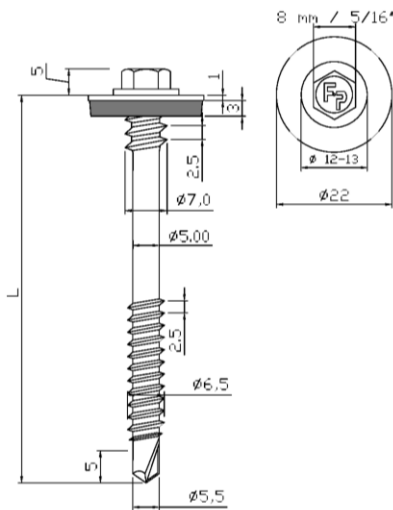
$$f_{ax,k} = 8,041 \text{ N/mm}^2 \text{ for } l_{eff} \geq 40,0 \text{ mm}$$

$t_{N1}, t_{N2} [\text{mm}]$		$d, D [\text{mm}]$									
		30	40	50	60	70	80	100	120	140	$\geq 160$
$V_{R,k} [\text{kN}]$	0,40	1,03	1,03	1,03	1,03	1,03	1,03	1,03	1,03	1,03	1,03
	0,50	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35
	0,55	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51
	0,63	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76
	0,75	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14
	0,88	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14
	1,00	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14
$N_{R,k} [\text{kN}]$	0,40	1,70	1,70	1,70	1,70	1,70	1,70	1,70	1,70	1,70	1,70
	0,50	1,70	1,70	1,70	1,70	1,70	1,70	1,70	1,70	1,70	1,70
	0,55	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,63	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,75	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,88	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	1,00	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
$u [\text{mm}]$	-	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0

#### „Self drilling Screws“

Screw for Sandwich panels 6,3/7,0 x L – BP2, washer size Ø 19,0 mm

#### Annex 14



#### Materials

Screw: Stainless steel 1.4301 (A2) – EN ISO 3506  
Washer: Stainless steel 1.4301 (A2) – EN ISO 3506  
Component I: S280GD, S320GD and S350GD - EN 10346  
Component II: Timber substructure according to DIN EN 338  
 $\rho = 350 \text{ kg/m}^2$  (min. C24)

Drill capacity:  $\Sigma t_i \leq 1,50 \text{ mm}$

#### Timber substructures:

Performance determined with  
 $M_{y,Rk} = 10,7 \text{ Nm}$   
 $f_{ax,k} = 8,041 \text{ N/mm}^2$  for  $l_{eff} \geq 40,0 \text{ mm}$

$t_{N1}, t_{N2} [\text{mm}]$		$d, D [\text{mm}]$									
		30	40	50	60	70	80	100	120	140	$\geq 160$
$V_{R,k} [\text{kN}]$	0,40	1,03	1,03	1,03	1,03	1,03	1,03	1,03	1,03	1,03	1,03
	0,50	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35	1,35
	0,55	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51	1,51
	0,63	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76	1,76
	0,75	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14
	0,88	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14
	1,00	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14	2,14
$N_{R,k} [\text{kN}]$	0,40	1,90	1,90	1,90	1,90	1,90	1,90	1,90	1,90	1,90	1,90
	0,50	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,55	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,63	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,75	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	0,88	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
	1,00	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
$u [\text{mm}]$	-	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0

„Self drilling Screws“

Screw for Sandwich panels 6,3/7,0 x L – BP2, washer size  $\varnothing 22,0 \text{ mm}$

Annex 15