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Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

European Technical Assessment ETA-21/0318 of 2025/07/03

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S	
Trade name of the construction product:	BiGHTY SWPS BiGHTY SWPS BIM BiGHTY BIM DSS
Product family to which the above construction product belongs:	Fastening screws for use in sandwich panels
Manufacturer:	EuroTec GmbH Unter dem Hofe 5 DE-58099 Hagen Telephone +49 2331 62450 Internet: www.eurotec.team
Manufacturing plant:	Manufacturing plant HSW 42
This European Technical Assessment contains:	20 pages including 13 annexes which form an integral part of the document.
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	EAD 330047-01-0602, Fastening Screws for Sandwich Panels
This version replaces:	The ETA with the same number issued on 2024-09-24

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of the product

The products are fastening screws for sandwich panels (self-drilling and self-tapping screws) made of steel. 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 galvanized/painted carbon steel or a bimetal combination with drill bits made of galvanized/painted carbon steel.

For details see Annex 3-13.

Screws or washers for which the stainless-steel grade A2 according to EN ISO 3506-1 is given in the respective Annexes (e. g. 1.4301 or 1.4567) may be made of stainless-steel grade A4 (e. g. 1.4401 or 1.4578) as well, more information in table 1.

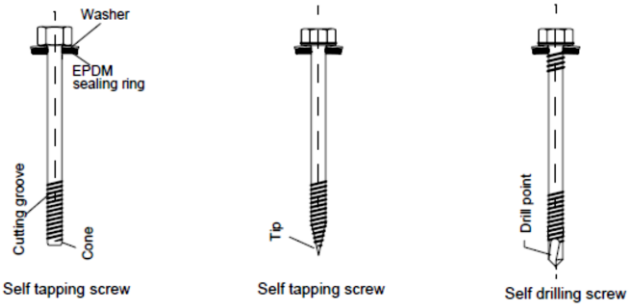


Illustration 1: Fastening screws for sandwich panels.

Table 1. Fasteners

Screw	Material	Washer
BiGHTY SWPS BIM DSS DP5 6,3-5,5	stainless steel (1.4301) EN10088	≥ 16,0 mm
BiGHTY SWPS DSS DP5 6,3-5,5	carbon steel case hardened and galvanized	
BiGHTY SWPS BIM DSS DP12 6,3-5,5 Long drill bit	stainless steel (1.4301) EN10088	
BiGHTY SWPS DSS DP12 6,3-5,5 Long drill bit	carbon steel case hardened and galvanized	
BiGHTY SWPS BIM DSS DP 5 8,0/6,3 x L	stainless steel (1.4301) EN10088	
BiGHTY SWPS BIM DSS DP 12 8,0/6,3 x L	stainless steel (1.4301) EN10088	
BiGHTY SWPS BIM DSS DP2 8,0/6,4 x L	stainless steel (1.4301) EN10088	
BiGHTY BIM DSS 6,5 x L	stainless steel (1.4301) EN10088	≥ 14,0 mm

Examples of fastening screws for sandwich panels and a corresponding connection are shown in Annex 2. The fastening screws for sandwich panels and the corresponding connections are subject to tension and shear forces.

2 Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)

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 ≥ 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.

Table 2. Summary of the fastening screws for sandwich panels

Product	Components		Annex
BiGHTY SWPS BIM DSS DP5 6,3-5,5	Steel	Steel	4
BiGHTY SWPS DSS DP5 6,3-5,5	Steel	Steel	5
BiGHTY SWPS BIM DSS DP12 6,3-5,5 Long drill bit	Steel	Steel	6
BiGHTY SWPS DSS DP12 6,3-5,5 Long drill bit	Steel	Steel	7
BiGHTY SWPS BIM DSS DP 5 8,0/6,3 x L	Steel	Steel	8
BiGHTY SWPS BIM DSS DP 12 8,0/6,3 x L	Steel	Steel	9
BiGHTY SWPS BIM DSS DP2 8,0/6,4 x L	Steel	Timber	10
BiGHTY BIM DSS 6,5 x L	Steel	Timber	11-13

The performances given in Section 3 are only valid if the fastening screws are used in compliance with the specifications and conditions given in Annex 1 to 6.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the screws of 25 years.

The indications given on the intended working life cannot be interpreted as a guarantee given by the producer or the Technical Assessment Body but are to be regarded only as a means for selecting the appropriate 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

Characteristic		Assessment of characteristic
3.1	**Mechanical resistance and stability (BWR 1)**	
	Shear Resistance of the Connection	**See Annex 4-10**
	Tension Resistance of the Connection	**See Annex 4-10**
	Design Resistance in case of combined Tension and Shear Forces (interaction)	**See Annex 2**
	Check of Bending Capacity in case of thermal expansion of the outer face of sandwich panels	**Pass**
	Durability	For corrosion protection the rules given in EN 1993-1-3, EN 1993-1-4 and EN 1999-1-4 shall be taken into account. 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, see table 1.
3.2	**Safety in case of fire (BWR2)**	
	Reaction to fire	The metal parts of fastening screws are considered to be classified as **Euroclass A1** in accordance with EN 13501-1 and Commission Delegated Regulation 2016/364

*) See additional information in section 3.8-3.9

3.8 Methods of verification

The assessment of fitness for the fasteners for the declared intended use has been made in accordance with EAD 330047-04-0602, Fastening Screws for Sandwich Panels.

3.9 General aspects related to the fitness for use of the product

The European Technical Assessment is issued for the product based on agreed data/information, deposited with ETA-Danmark, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark will decide if such changes affect the ETA and consequently the validity of the CE marking based on the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

The BiGHTY SWPS & BiGHTY SWPS BIM screws for use in sandwich panels are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.

4 Attestation and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base.

4.1 AVCP system

According to the decision 1998/214/EC of the European Commission 1, as amended by 2001/596/EC, the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is: **2+**

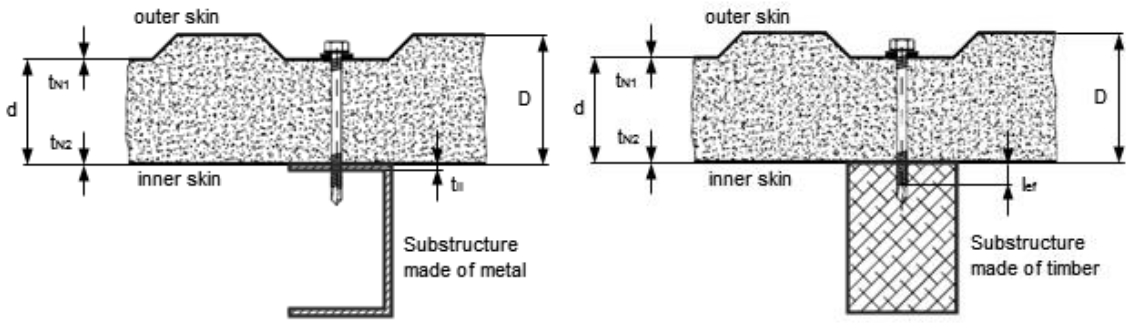
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD.

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2025-07-03 by

Thomas Bruun
Managing Director, ETA-Danmark

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)

Terms for performances

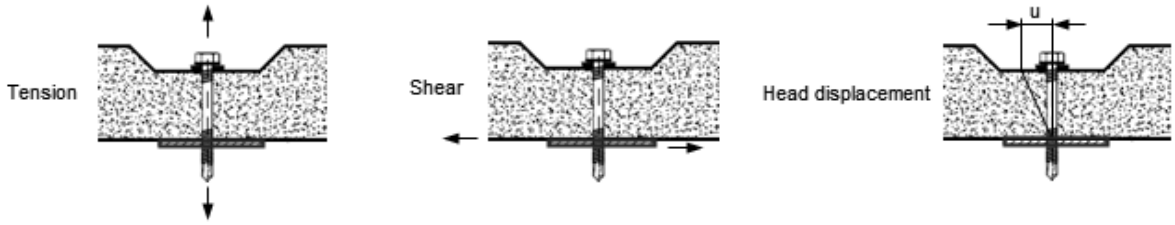
$V_{R,k}$	Characteristic value of shear resistance of the connection
$N_{R,k}$	Characteristic value of tension resistance of the connection
$V_{R,I,k}$	Characteristic value of shear resistance of metal member or sheeting
$N_{R,I,k}$	Characteristic value of tension resistance (pull-through) of metal member 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	

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 γ_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

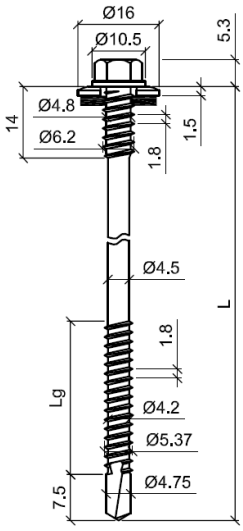
Characteristic values of tension and shear resistance of the connection for other k_{mod} or ρ_k as indicated in the Annexes can be determined as follows:

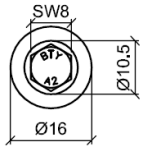
$$N_{R,k} = \min \begin{cases} N_{R,I,k} \\ F_{ax,Rk} * k_{mod} \end{cases} \qquad V_{R,k} = \min \begin{cases} V_{R,I,k} \\ F_{v,Rk} * k_{mod} \end{cases}$$

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.





Materials

Fastener: stainless steel (1.4301) - EN10088
Washer: stainless steel (1.4301) - EN10088 with vulcanized EPDM

Component I: S280GD to S350GD - EN 10346

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

Drilling-capacity $\Sigma(t_{N2} + t_{II}) \leq 5.00$ mm

Timber substructures

No performance assessed

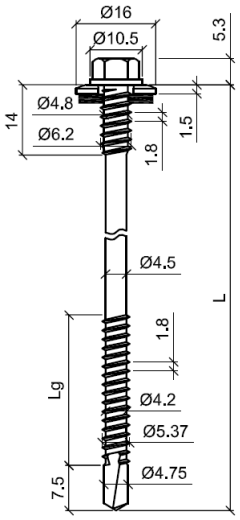
			Component II t II [mm]				
			1,50	1,75	2,00	3,00	4,00
Component I	t_{N2} [mm] / $V_{R,k}$ [kN]	0,40	0,57 a)	0,57 a)	0,57 a)	0,57 a)	0,57 a)
		0,50	0,91 a)	0,91 a)	0,91 a)	0,91 a)	0,91 a)
		0,55	1,02 a)	1,06 a)	1,10 a)	1,10 a)	1,10 a)
		0,63	1,19 a)	1,28 a)	1,38 a)	1,38 a)	1,38 a)
		0,75	1,47 a)	1,66 a)	1,84 a)	1,84 a)	1,84 a)
		0,88	1,47 a)	1,66 a)	1,84 a)	1,84 a)	1,84 a)
		1,00	1,47 a)	1,66 a)	1,84 a)	1,84 a)	1,84 a)
	t_{N1} [mm] / $N_{R,k}$ [kN]	0,40	1,39 a)	1,39 a)	1,39 a)	1,39 a)	1,39 a)
		0,50	1,84	1,84 a)	1,84 a)	1,84 a)	1,84 a)
		0,55	1,89	2,14	2,14 a)	2,14 a)	2,14 a)
		0,63	1,89	2,24	2,58	2,58 a)	2,58 a)
		0,75	1,89	2,24	2,58	3,32 a)	3,32 a)
		0,88	1,89	2,24	2,58	3,67 a)	3,67 a)
		1,00	1,89	2,24	2,58	4,01 a)	4,01 a)
		$N_{R,k,II}$	1,89	2,24	2,58	4,76 a)	4,76 a)
D, d [mm] / max. head displacement u [mm]		30	12	12	12	3,0	3,0
		40	15	15	15	4,6	4,6
		50	19	19	19	6,2	6,2
		60	22	22	22	7,8	7,8
		70	26	26	26	9,4	9,4
		80	30	30	30	11	11
		100	30	30	30	11	11
		120	30	30	30	11	11

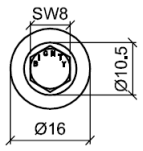
a) If component t_{N1} resp. t_{N2} is made of S320GD or S350GD the values may be increased by 8.2 %.

Fastening screws for sandwich panels

BiGHTY SWPS BIM DSS DP5 6,3/5,5 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 4





Materials

Fastener:	carbon steel case hardened and galvanized
Washer:	stainless steel (1.4301) - EN10088 Carbon steel with vulcanized EPDM
Component I:	S280GD to S350GD - EN 10346
Component II:	S235 - EN 10025-1 S280GD to S350GD - EN 10346

Drilling-capacity $\Sigma(t_{N2} + t_{II}) \leq 5.00$ mm

Timber substructures

No performance assessed

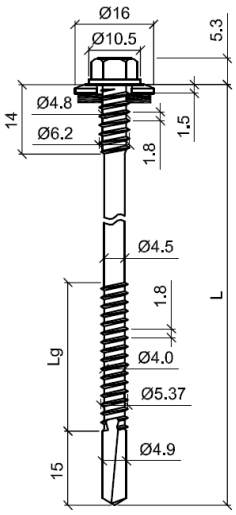
			Component II t II [mm]				
			1,50	1,75	2,00	3,00	4,00
Component I	t_{N2} [mm] / $V_{R,k}$ [kN]	0,40	0,57 a)	0,57 a)	0,57 a)	0,57 a)	0,57 a)
		0,50	0,91 a)	0,91 a)	0,91 a)	0,91 a)	0,91 a)
		0,55	1,02 a)	1,06 a)	1,10 a)	1,10 a)	1,10 a)
		0,63	1,19 a)	1,28 a)	1,38 a)	1,38 a)	1,38 a)
		0,75	1,47 a)	1,66 a)	1,84 a)	1,84 a)	1,84 a)
		0,88	1,47 a)	1,66 a)	1,84 a)	1,84 a)	1,84 a)
		1,00	1,47 a)	1,66 a)	1,84 a)	1,84 a)	1,84 a)
	t_{N1} [mm] / $N_{R,k}$ [kN]	0,40	1,39 a)	1,39 a)	1,39 a)	1,39 a)	1,39 a)
		0,50	1,84	1,84 a)	1,84 a)	1,84 a)	1,84 a)
		0,55	1,89	2,14	2,14 a)	2,14 a)	2,14 a)
		0,63	1,89	2,24	2,58	2,58 a)	2,58 a)
		0,75	1,89	2,24	2,58	3,32 a)	3,32 a)
		0,88	1,89	2,24	2,58	3,67 a)	3,67 a)
		1,00	1,89	2,24	2,58	4,01 a)	4,01 a)
		$N_{R,k,II}$	1,89	2,24	2,58	4,76 a)	4,76 a)
D, d [mm] / max. head displacement u [mm]		30	12	12	12	2,5	2,5
		40	15	15	15	3,0	3,0
		50	19	19	19	3,5	3,5
		60	22	22	22	4,0	4,0
		70	26	26	26	4,5	4,5
		80	30	30	30	5,0	5,0
		100	30	30	30	5,0	5,0
		120	30	30	30	5,0	5,0

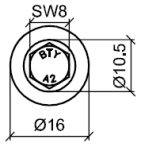
a) If component t_{N1} resp. t_{N2} is made of S320GD or S350GD the values may be increased by 8.2 %.

Fastening screws for sandwich panels

BiGHTY SWPS DSS DP5 6,3/5,5 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 5





Materials

Fastener: stainless steel (1.4301) - EN10088
Washer: stainless steel (1.4301) - EN10088 with vulcanized EPDM

Component I: S280GD to S350GD - EN 10346

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

Drilling-capacity $\Sigma(t_{N2} + t_{II}) \leq 12.00$ mm

Timber substructures

No performance assessed

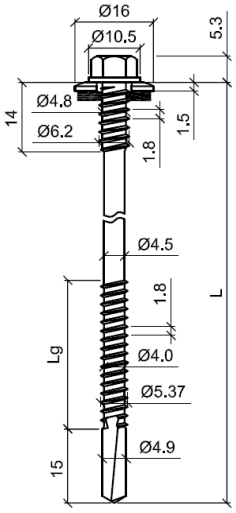
			Component II t_{II} [mm]				
			4,00	5,00	6,00	8,00	10,00
Component I	t_{N2} [mm] / $V_{R,k}$ [kN]	0,40	0,67 a)	0,67 a)	0,67 a)	0,67 a)	0,67 a)
		0,50	1,03 a)	1,03 a)	1,03 a)	1,03 a)	1,03 a)
		0,55	1,14 a)	1,14 a)	1,14 a)	1,14 a)	1,14 a)
		0,63	1,32 a)	1,32 a)	1,32 a)	1,32 a)	1,32 a)
		0,75	1,60 a)	1,60 a)	1,60 a)	1,60 a)	1,60 a)
		0,88	1,60 a)	1,60 a)	1,60 a)	1,60 a)	1,60 a)
		1,00	1,60 a)	1,60 a)	1,60 a)	1,60 a)	1,60 a)
	t_{N1} [mm] / $N_{R,k}$ [kN]	0,40	1,39 a)	1,39 a)	1,39 a)	1,39 a)	1,39 a)
		0,50	1,84	1,84 a)	1,84 a)	1,84 a)	1,84 a)
		0,55	1,89	2,14	2,14 a)	2,14 a)	2,14 a)
		0,63	1,89	2,24	2,58	2,58 a)	2,58 a)
		0,75	1,89	2,24	2,58	3,32 a)	3,32 a)
		0,88	1,89	2,24	2,58	3,67 a)	3,67 a)
		1,00	1,89	2,24	2,58	4,01 a)	4,01 a)
		$N_{R,k,II}$	1,89	2,24	2,58	4,76 a)	4,76 a)
D, d [mm] / max. head displacement u [mm]		30	1,5	1,5	1,5	1,5	1,5
		40	3,2	3,2	3,2	3,2	3,2
		50	4,9	4,9	4,9	4,9	4,9
		60	6,6	6,6	6,6	6,6	6,6
		70	8,3	8,3	8,3	8,3	8,3
		80	10	10	10	10	10
		100	10	10	10	10	10
		120	10	10	10	10	10
		≥ 140	10	10	10	10	10

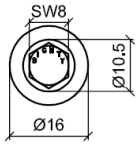
a) If component t_{N1} resp. t_{N2} is made of S320GD or S350GD the values may be increased by 8.2 %.

Fastening screws for sandwich panels

BiGHTY SWPS BIM DSS DP12 6,3/5,5 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 6





Materials

Fastener:	carbon steel case hardened and galvanized
Washer:	stainless steel (1.4301) - EN10088 Carbon steel with vulcanized EPDM
Component I:	S280GD to S350GD - EN 10346
Component II:	S235 - EN 10025-1 S280GD to S350GD - EN 10346

Drilling-capacity $\Sigma(t_{N2} + t_{II}) \leq 12.00$ mm

Timber substructures

No performance assessed

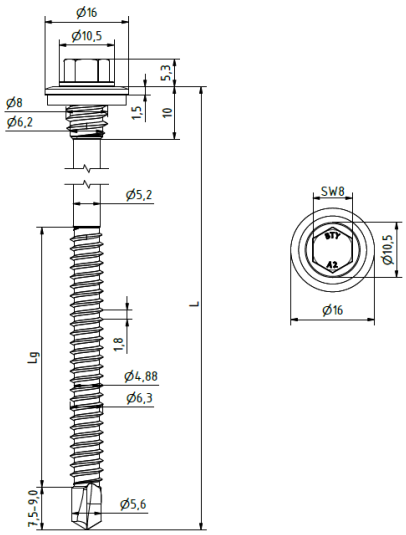
			Component II t II [mm]				
			4,00	5,00	6,00	8,00	10,00
Component I	t_{N2} [mm] / $V_{R,k}$ [kN]	0,40	0,67 a)	0,67 a)	0,67 a)	0,67 a)	0,67 a)
		0,50	1,03 a)	1,03 a)	1,03 a)	1,03 a)	1,03 a)
		0,55	1,14 a)	1,14 a)	1,14 a)	1,14 a)	1,14 a)
		0,63	1,32 a)	1,32 a)	1,32 a)	1,32 a)	1,32 a)
		0,75	1,60 a)	1,60 a)	1,60 a)	1,60 a)	1,60 a)
		0,88	1,60 a)	1,60 a)	1,60 a)	1,60 a)	1,60 a)
		1,00	1,60 a)	1,60 a)	1,60 a)	1,60 a)	1,60 a)
	t_{N1} [mm] / $N_{R,k}$ [kN]	0,40	1,39 a)	1,39 a)	1,39 a)	1,39 a)	1,39 a)
		0,50	1,84	1,84 a)	1,84 a)	1,84 a)	1,84 a)
		0,55	1,89	2,14	2,14 a)	2,14 a)	2,14 a)
		0,63	1,89	2,24	2,58	2,58 a)	2,58 a)
		0,75	1,89	2,24	2,58	3,32 a)	3,32 a)
		0,88	1,89	2,24	2,58	3,67 a)	3,67 a)
		1,00	1,89	2,24	2,58	4,01 a)	4,01 a)
		$N_{R,k,II}$	1,89	2,24	2,58	4,76 a)	4,76 a)
D, d [mm] / max. head displacement u [mm]		30	1,0	1,0	1,0	1,0	1,0
		40	2,0	2,0	2,0	2,0	2,0
		50	3,0	3,0	3,0	3,0	3,0
		60	4,0	4,0	4,0	4,0	4,0
		70	5,0	5,0	5,0	5,0	5,0
		80	6,0	6,0	6,0	6,0	6,0
		100	6,0	6,0	6,0	6,0	6,0
		120	6,0	6,0	6,0	6,0	6,0
		≥ 140	6,0	6,0	6,0	6,0	6,0

a) If component t_{N1} resp. t_{N2} is made of S320GD or S350GD the values may be increased by 8.2 %.

Fastening screws for sandwich panels

BiGHTY SWPS DSS DP 12 6,3/5,5 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 7



Materials

Fastener: stainless steel (1.4301) - EN10088

Washer: stainless steel (1.4301) - EN10088
with vulcanized EPDM

Component I: S280GD to S350GD - EN 10346

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

Drilling-capacity $\Sigma(t_{N2} + t_{II}) \leq 5.00$ mm

Timber substructures

No performance assessed

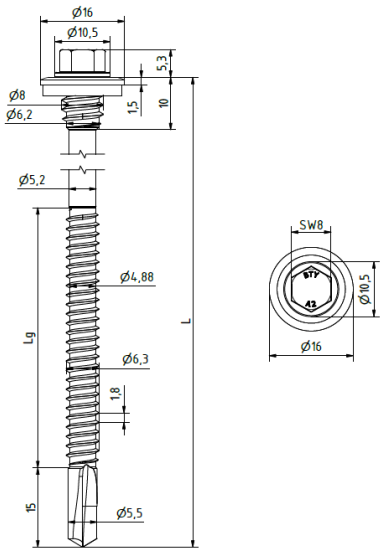
			Component II t II [mm]						
			1.50	1.75	2.00	2.50	3.00	3.50	4.00
Component I	t_{N2} [mm]	$V_{R,k}$ [kN]	0.40	0.99	0.99	0.99	0.99	0.99	0.99	0.99
			0.50	0.99	0.99	0.99	0.99	0.99	0.99	0.99
			0.55	1.18	1.18	1.18	1.18	1.18	1.18	1.18
			0.63	1.47	1.47	1.47	1.47	1.47	1.47	1.47
			0.75	1.92	1.92	1.92	1.92	1.92	1.92	1.92
			0.88	2.06	2.06	2.06	2.06	2.06	2.06	2.06
			1.00	2.19	2.19	2.19	2.19	2.19	2.19	2.19
	t_{N1} [mm]	$N_{R,k}$ [kN]	0.40	1.22	1.22	1.22	1.22	1.22	1.22	1.22
			0.50	1.31	1.31	1.31	1.31	1.31	1.31	1.31
			0.55	1.53	1.53	1.53	1.53	1.53	1.53	1.53
			0.63	1.88	1.88	1.88	1.88	1.88	1.88	1.88
			0.75	2.08	2.41	2.41	2.41	2.41	2.41	2.41
			0.88	2.08	2.48	2.55	2.55	2.55	2.55	2.55
			1.00	2.08	2.48	2.67	2.67	2.67	2.67	2.67
			$N_{R,k,II}$	2.08	2.48	2.87	4.22	5.56	6.36	7.16
D. d [mm]	max. head displacement u [mm]		30	4.9	4.9	4.9	4.9	4.9	4.9	4.9
			40	6.5	6.5	6.5	6.5	6.5	6.5	6.5
			50	8.1	8.1	8.1	8.1	8.1	8.1	8.1
			60	9.8	9.8	9.8	9.8	9.8	9.8	9.8
			70	11.4	11.4	11.4	11.4	11.4	11.4	11.4
			80	13.0	13.0	13.0	13.0	13.0	13.0	13.0
			100	16.3	16.3	16.3	16.3	16.3	16.3	16.3
			120	19.5	19.5	19.5	19.5	19.5	19.5	19.5
			≥ 140	22.8	22.8	22.8	22.8	22.8	22.8	22.8

Component I and component II can be pre-drilled with Ø ≤ 5.0 mm.

Fastening screws for sandwich panels

BiGHTY SWPS BIM DSS DP 5 8,0/6,3 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 8



Materials

Fastener: stainless steel (1.4301) - EN10088

Washer: stainless steel (1.4301) - EN10088
with vulcanized EPDM

Component I: S280GD to S350GD - EN 10346

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

Drilling-capacity $\Sigma(t_{N2} + t_{II}) \leq 12.0$ mm

Timber substructures

No performance assessed

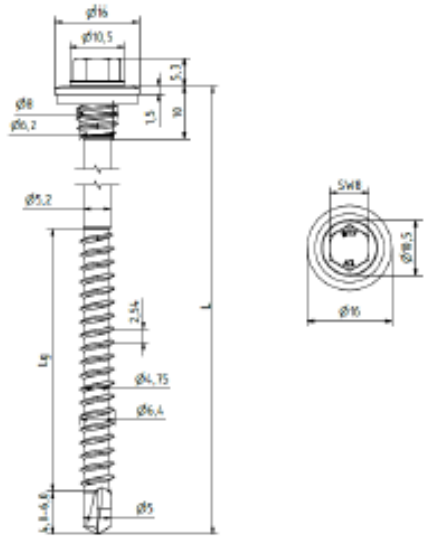
			Component II t II [mm]						
			4.00	5.00	6.00	7.00	8.00	9.00	10.00
Component I	t_{N2} [mm]	$V_{R,k}$ [kN]	0.40	0.99	0.99	0.99	0.99	0.99	0.99	0.99
			0.50	0.99	0.99	0.99	0.99	0.99	0.99	0.99
			0.55	1.18	1.18	1.18	1.18	1.18	1.18	1.18
			0.63	1.47	1.47	1.47	1.47	1.47	1.47	1.47
			0.75	1.92	1.92	1.92	1.92	1.92	1.92	1.92
			0.88	2.06	2.06	2.06	2.06	2.06	2.06	2.06
			1.00	2.19	2.19	2.19	2.19	2.19	2.19	2.19
	t_{N1} [mm]	$N_{R,k}$ [kN]	0.40	1.22	1.22	1.22	1.22	1.22	1.22	1.22
			0.50	1.31	1.31	1.31	1.31	1.31	1.31	1.31
			0.55	1.53	1.53	1.53	1.53	1.53	1.53	1.53
			0.63	1.88	1.88	1.88	1.88	1.88	1.88	1.88
			0.75	2.41	2.41	2.41	2.41	2.41	2.41	2.41
			0.88	2.55	2.55	2.55	2.55	2.55	2.55	2.55
			1.00	2.67	2.67	2.67	2.67	2.67	2.67	2.67
			$N_{R,k,II}$	8.13	8.80	9.47	9.47	9.47	9.47	9.47
D. d [mm]	max. head displacement u [mm]		30	4.9	4.9	4.9	4.9	4.9	4.9	4.9
			40	6.5	6.5	6.5	6.5	6.5	6.5	6.5
			50	8.1	8.1	8.1	8.1	8.1	8.1	8.1
			60	9.8	9.8	9.8	9.8	9.8	9.8	9.8
			70	11.4	11.4	11.4	11.4	11.4	11.4	11.4
			80	13.0	13.0	13.0	13.0	13.0	13.0	13.0
			100	16.3	16.3	16.3	16.3	16.3	16.3	16.3
			120	19.5	19.5	19.5	19.5	19.5	19.5	19.5
			≥ 140	22.8	22.8	22.8	22.8	22.8	22.8	22.8

Component I and component II can be pre-drilled with Ø ≤ 5.0 mm.

Fastening screws for sandwich panels

BiGHTY SWPS BIM DSS DP 12 8,0/6,3 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 9



Materials

Fastener:	stainless steel (1.4301) - EN10088
Washer:	stainless steel (1.4301) - EN10088 with vulcanized EPDM
Component I:	S280GD to S350GD - EN 10346
Component II:	timber ≥ C24 - EN 14081

Drilling-capacity $\Sigma(t_{N2}) \leq 2.00$ mm

For Timber substructures

$M_{y,Rk}$ = 10.45 Nm

$f_{ax,k}$ = 14.40 N/mm² für lef ≥ 26.0 mm

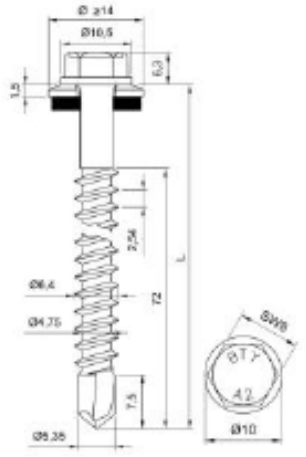
		lef [mm]								Failure of component I	
		26	30	35	40	45	50	55	60		
$V_{R,k}$ [kN]	0.40	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	$V_{R,I,k}$ [kN]
	0.50	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
	0.55	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
	0.63	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
	0.75	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	
	0.88	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	
	1.00	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	
$N_{R,k}$ [kN]	0.40	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	$N_{R,I,k}$ [kN]
	0.50	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	
	0.55	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	
	0.63	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	
	0.75	2.14	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	
	0.88	2.14	2.47	2.55	2.55	2.55	2.55	2.55	2.55	2.55	
	1.00	2.14	2.47	2.67	2.67	2.67	2.67	2.67	2.67	2.67	
$N_{R,II,k}$ [kN]		2.14	2.47	2.88	3.29	3.70	4.11	4.52	4.94	-	
D. d [mm] max. head dsplacement u [mm]	40	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5		
	50	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1		
	60	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8		
	80	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4		
	90	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0		
	100	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3		
	120	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5		
	≥140	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8		

Component I and component II can be pre-drilled with Ø ≤ 5.0 mm.

Fastening screws for sandwich panels

BiGHTY SWPS BIM DSS DP2 8,0/6,4 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 10



Materials

Fastener:	stainless steel (1.4301) - EN10088
Washer:	stainless steel (1.4301) - EN10088 with vulcanized EPDM
Component I:	S280GD to S350GD - EN 10346
Component II:	timber ≥ C24 - EN 14081

Drilling-capacity $\Sigma(t_{N2}) \leq 2.00$ mm

For Timber substructures

$M_{y,Rk}$ = 12.227 Nm

$f_{ax,k}$ = 8.575 N/mm² für l_{ef} ≥ 32.5 mm

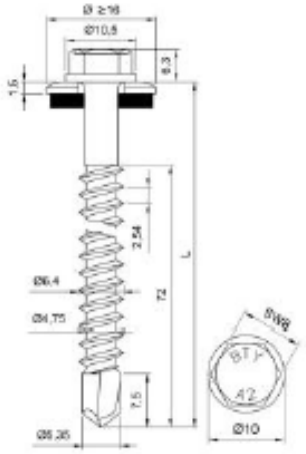
		l_{ef} [mm]								Failure of component I	
		32.5	36.5	40.5	44.5	48.5	52.5	56.5	60.5		
$V_{R,k}$ [kN]	0.50	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	$V_{R,I,k}$ [kN]
	0.55	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
	0.63	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
	0.75	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	
	0.88	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	
	1.00	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	
$N_{R,k}$ [kN]	0.50	1.38	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	$N_{R,I,k}$ [kN]
	0.55	1.38	1.55	1.68	1.68	1.68	1.68	1.68	1.68	1.68	
	0.63	1.38	1.55	1.72	1.89	2.06	2.09	2.09	2.09	2.09	
	0.75	1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.52	2.52	
	0.88	1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	2.99	
	1.00	1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	3.44	
$N_{R,II,k}$ [kN]		1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	-	
D. d [mm] max. head displacement u [mm]	40	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5		
	50	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1		
	60	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8		
	80	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4		
	90	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0		
	100	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3		
	120	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5		
	≥140	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8		

Component I and component II can be pre-drilled with Ø ≤ 5.0 mm.

Fastening screws for sandwich panels

BiGHTY BIM DSS 6,5 x L
with hexagon head and sealing washer ≥ Ø14 mm

Annex 11



Materials

Fastener: stainless steel (1.4301) - EN10088
Washer: stainless steel (1.4301) - EN10088 with vulcanized EPDM

Component I: S280GD to S350GD - EN 10346

Component II: timber ≥ C24 - EN 14081

Drilling-capacity $\Sigma(t_{NG}) \leq 2.00$ mm

For Timber substructures

$M_{y,Rk}$ = 12.227 Nm

$f_{ax,k}$ = 8.575 N/mm² für l_{ef} ≥ 32.5 mm

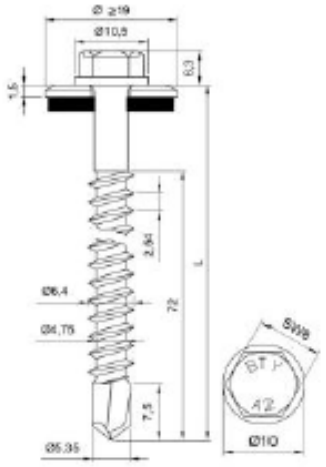
		l_{ef} [mm]								Failure of component I	
		32.5	36.5	40.5	44.5	48.5	52.5	56.5	60.5		
$V_{R,k}$ [kN]	0.50	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	$V_{R,I,k}$ [kN]
	0.55	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
	0.63	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
	0.75	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	
	0.88	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	
	1.00	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	
$N_{R,k}$ [kN]	0.50	1.38	1.55	1.61	1.61	1.61	1.61	1.61	1.61	1.61	$N_{R,I,k}$ [kN]
	0.55	1.38	1.55	1.72	1.89	1.91	1.91	1.91	1.91	1.91	
	0.63	1.38	1.55	1.72	1.89	2.06	2.23	2.37	2.37	2.37	
	0.75	1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	3.13	
	0.88	1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	3.61	
	1.00	1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	4.08	
$N_{R,II,k}$ [kN]		1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	-	
D. d [mm] max. head displacement u [mm]	40	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5		
	50	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1		
	60	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8		
	80	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4		
	90	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0		
	100	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3		
	120	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5		
	≥140	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8		

Component I and component II can be pre-drilled with Ø ≤ 5.0 mm.

Fastening screws for sandwich panels

BiGHTY BIM DSS 6,5 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 12



Materials

Fastener:	stainless steel (1.4301) - EN10088
Washer:	stainless steel (1.4301) - EN10088 with vulcanized EPDM
Component I:	S280GD to S350GD - EN 10346
Component II:	timber ≥ C24 - EN 14081

Drilling-capacity $\Sigma(t_{N2}) \leq 2.00$ mm

For Timber substructures

$M_{y,Rk}$ = 12.227 Nm

$f_{ax,k}$ = 8.575 N/mm² für l_{ef} ≥ 32.5 mm

		l_{ef} [mm]								Failure of component I	
		32.5	36.5	40.5	44.5	48.5	52.5	56.5	60.5		
$V_{R,k}$ [kN]	0.50	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	$V_{R,I,k}$ [kN]
	0.55	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
	0.63	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
	0.75	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	
	0.88	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	
	1.00	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17	
$N_{R,k}$ [kN]	0.50	1.38	1.55	1.72	1.85	1.85	1.85	1.85	1.85	1.85	$N_{R,I,k}$ [kN]
	0.55	1.38	1.55	1.72	1.89	2.06	2.20	2.20	2.20	2.20	
	0.63	1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	2.73	
	0.75	1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	3.60	
	0.88	1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	4.15	
	1.00	1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	4.69	
$N_{R,II,k}$ [kN]		1.38	1.55	1.72	1.89	2.06	2.23	2.40	2.57	-	
D, d [mm] max. head displacement u [mm]	40	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5		
	50	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1		
	60	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8		
	80	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4		
	90	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0		
	100	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.3		
	120	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5		
	≥140	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8		

Component I and component II can be pre-drilled with Ø ≤ 5.0 mm.

Fastening screws for sandwich panels

BiGHTY BIM DSS 6,5 x L
with hexagon head and sealing washer ≥ Ø19 mm

Annex 13