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European Technical Assessment

ETA-13/0421 of 30/06/2022

General part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	WKSPW
Product family to which the construction product belongs	Fastening screws for sandwich panels
Manufacturer	P.H. HAMAR Sp. J. B. i H. Grzesiak ul. Hutnicza 7 81-061 Gdynia, Poland
Manufacturing plants	HAMAR manufacturing plants
This European Technical Assessment contains	28 pages including 24 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) EAD 330047-01-0602 "Fastening screws for sandwich panels"
This version replaces	ETA-13/0421 issued on 29/09/2017

Specific part

1. Technical description of the product

The fastening screws for sandwich panels WKSPW are a self-drilling and self-tapping screws listed in Table 1. The fastening screws WKSPW (H) are made of galvanized carbon steel. The fastening screws WKSPW PROTECT (H) are made of galvanized carbon steel additionally protected by the PROTECT coating. The fastening screws WKSPW (HS2) are made of stainless steel (bi-metal). The fastening screws WKSPW (HSA2) are made of stainless steel. Screws are supplied with a steel washer and an EPDM sealing ring. For details see the Annexes 2 to 20. All screws can be completed with additional washer PWP, saddle washer KAL or linear washer PWL (Annex 21 to 23).

The fastening screw for sandwich panels and the corresponding connections are subject to tension and shear forces.

Table 1

No.	Screw	Material	Annex
1	WKSPW (H) 5,5/6,3-6 x L	galvanized carbon steel	2, 3
2	WKSPW PROTECT (H) 5,5/6,3-6 x L	galvanized carbon steel with PROTECT coating	2, 3
3	WKSPW (H) 5,5/6,3-12 x L	galvanized carbon steel	4, 5
4	WKSPW PROTECT (H) 5,5/6,3-12 x L	galvanized carbon steel with PROTECT coating	4, 5
5	WKSPW PROTECT (H) 5,5/6,3-16 x L	galvanized carbon steel with PROTECT coating	6, 7
6	WKSPW (H) 5,5/6,3-20 x L	galvanized carbon steel	8, 9
7	WKSPW PROTECT (H) 5,5/6,3-20 x L	galvanized carbon steel with PROTECT coating	8, 9
8	WKSPW (H) 5,5/6,3-25 x L	galvanized carbon steel	10, 11
9	WKSPW PROTECT (H) 5,5/6,3-25 x L	galvanized carbon steel with PROTECT coating	10, 11
10	WKSPW (HS2) 5,5/6,3-6 x L	stainless steel, Bi-metal	12, 13
11	WKSPW (HS2) 5,5/6,3-12 x L	stainless steel, Bi-metal	14, 15
12	WKSPW (HS2) 5,5/6,3-6 x L	stainless steel, Bi-metal	16
13	WKSPW (H) 6,5 x L	galvanized carbon steel	17, 18
14	WKSPW PROTECT (H) 6,5 x L	galvanized carbon steel with PROTECT coating	17, 18
15	WKSPW (HSA2) 6,5 x L	stainless steel	19, 20

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

The fastening screws for sandwich panels are intended to be used for fastening sandwich panels to steel or timber substructures. For details see the Annexes 2 to 20. The component to be fastened is component I and the supporting structure is component II. The sandwich panel can either be used as wall or roof cladding or as load bearing wall and roof element.

The intended use comprises fastening screws and connections for indoor and outdoor applications. Fastening screws which are intended to be used in external environments with ≥ C2 corrosion according to the standard EN ISO 12944-2 are made of stainless steel.

Furthermore the intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads).

Examples of execution of a connections are given in Annex 1.

The provisions made in this European Technical Assessment are based on an assumed working life of the fasteners of 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer or Technical Assessment Body, 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. Performance of the product

3.1.1. Mechanical resistance and stability (BWR 1)

The characteristic values of the shear resistance of connections and tension resistance of connections with the fasteners as well as the maximum head displacement are given in Annex 2 to 20. The values were determined by tests according to EAD 330047-01-0602.

The design values shall be determined according to Annex 24 and EAD 330047-01-0602.

For the corrosion protection the rules given in EN 1993-1-3, EN 1993-1-4 and EN 1999-1-4 shall be taken into account.

3.1.2. Safety in case of fire (BWR 2)

The steel fastening screws are considered to satisfy the requirements of performance class A1 of reaction to fire, in accordance with the provisions of the EC Decision 96/603/EC (as amended) without the need for testing on the basis of its listing in that decision.

3.2. Methods used for the assessment

The assessment has been made in accordance with EAD 330047-01-0602.

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

According to Decision 1998/214/EC, amended by 2001/596/EC, of the European Commission the system 2+ of assessment and verification of constancy of performance applies (see Annex V to regulation (EU) No 305/2011).

5. Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document (EAD)

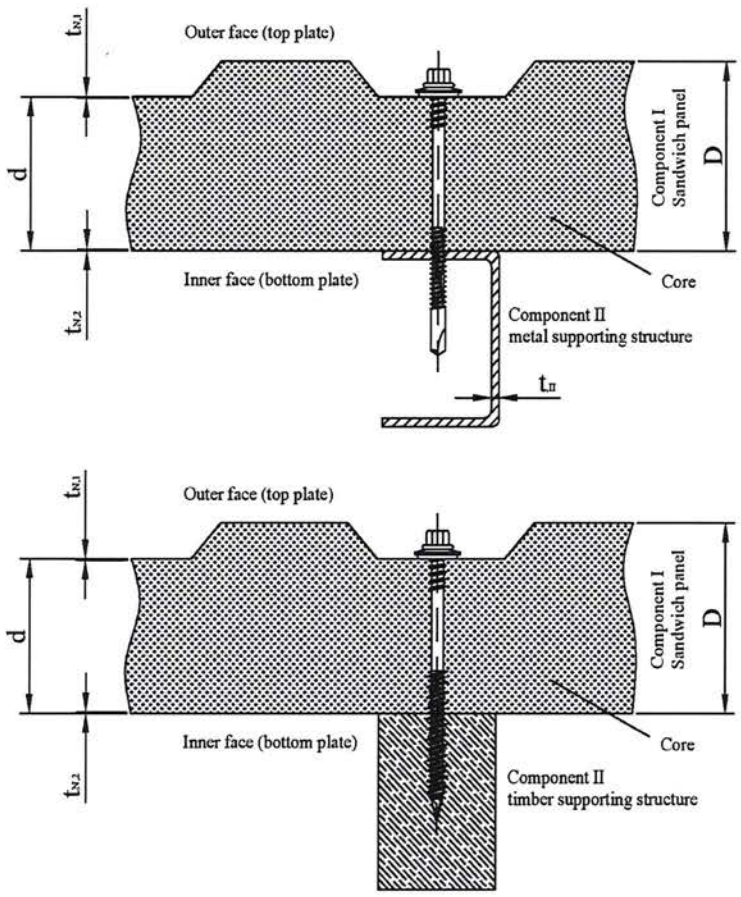
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at the Instytut Techniki Budowlanej.

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

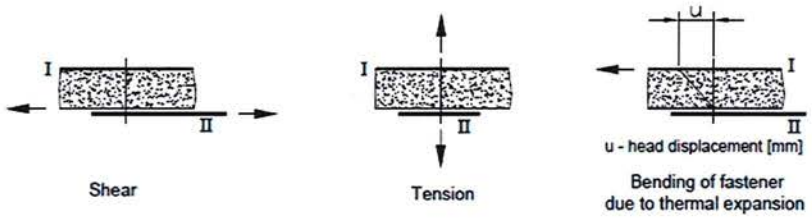
Issued in Warsaw on 30/06/2022 by Instytut Techniki Budowlanej

Anna Panek, MSc
Deputy Director of ITB

Examples of execution of a connections



Loading conditions



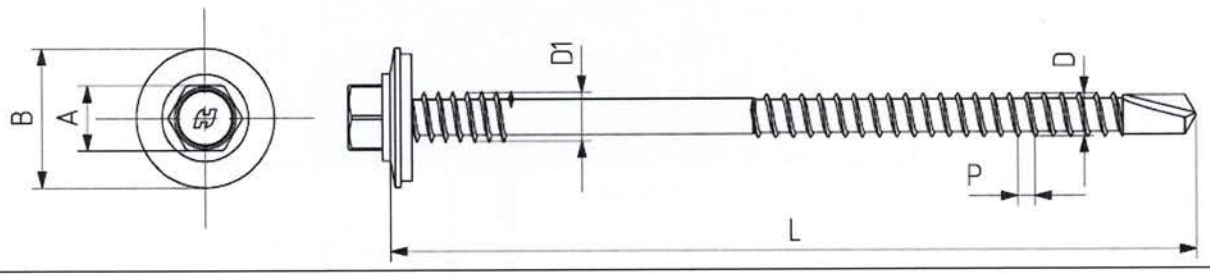
WKSPW Fastening screws for sandwich panels	Annex 1 of European Technical Assessment ETA-13/0421
Example of execution of a connections. Loading conditions	

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized (≥ 12 µm) or quenched, tempered and galvanized, with PROTECT coating
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 6$ mm

Timber substructure:
No performance assessed



Component II: t_{II} in [mm]			1,00	1,25	1,50	2,00	2,50	3,00	4,00	5,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,90	0,90	0,91	0,91	0,91	0,91	0,91	0,91
		0,50	0,90	0,90	1,62	1,62	1,62	1,62	1,62	1,62
		0,55	0,90	0,90	1,62	1,62	1,62	1,62	1,62	1,62
		0,63	0,90	0,90	1,80	1,80	1,80	1,80	1,80	1,80
		0,75	0,90	0,90	2,26	2,26	2,26	2,26	2,26	2,26
		0,88	0,90	0,90	2,26	2,26	2,26	2,26	2,26	2,26
		1,00	0,90	0,90	2,26	2,26	2,26	2,26	2,26	2,26
	$N_{R,I,k}$ in [kN]	0,40	0,90	0,90	1,83	1,83	1,83	1,83	1,83	1,83
		0,50	0,90	0,90	1,85	2,80	2,80	2,80	3,07	3,07
		0,55	0,90	0,90	1,85	2,80	2,80	2,80	3,07	3,07
		0,63	0,90	0,90	1,85	3,59	3,59	3,59	3,92	3,92
		0,75	0,90	0,90	1,85	3,59	3,59	3,59	5,10	5,10
		0,88	0,90	0,90	1,85	3,59	3,59	3,59	5,10	5,10
		1,00	0,90	0,90	1,85	3,59	3,59	3,59	5,29	5,29
$N_{R,II,k}$ [kN] (pull out)			0,90	0,90	1,85	3,59	3,59	3,59	7,32	7,32
max. head displacement u depending on the sandwich panel thickness in [mm]		30	10	10	10	10	10	10	0,7	0,7
		40	10	10	10	10	10	10	0,7	0,7
		50	10	10	10	10	10	10	0,7	0,7
		60	10	10	10	10	10	10	2	2
		70	10	10	10	10	10	10	2	2
		80	10	10	10	10	10	10	2	2
		90	10	10	10	10	10	10	3	3
		100	10	10	10	10	10	10	3	3
		120	10	10	10	10	10	10	3	3
		≥ 140	10	10	10	10	10	10	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW (H) 5,5/6,3-6 x L and WKSPW PROTECT (H) 5,5/6,3-6 x L with hexagon head and sealing washer Ø16 mm

Annex 2

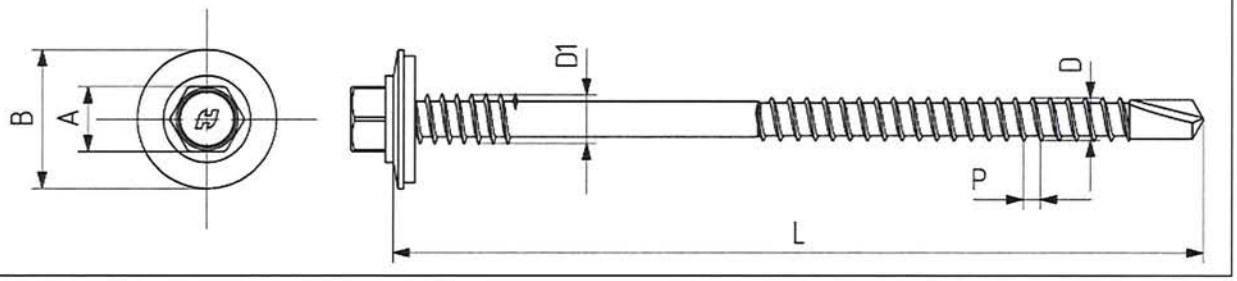
of European Technical Assessment ETA-13/0421

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized (≥ 12 µm) or quenched, tempered and galvanized, with PROTECT coating
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 6$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			1,00	1,25	1,50	2,00	2,50	3,00	4,00	5,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,90	0,90	0,91	0,91	0,91	0,91	0,91	0,91
		0,50	0,90	0,90	1,62	1,62	1,62	1,62	1,62	1,62
		0,55	0,90	0,90	1,62	1,62	1,62	1,62	1,62	1,62
		0,63	0,90	0,90	1,80	1,80	1,80	1,80	1,80	1,80
		0,75	0,90	0,90	2,26	2,26	2,26	2,26	2,26	2,26
		0,88	0,90	0,90	2,26	2,26	2,26	2,26	2,26	2,26
		1,00	0,90	0,90	2,26	2,26	2,26	2,26	2,26	2,26
	$N_{R,I,k}$ in [kN]	0,40	0,90	0,90	1,85	2,03	2,03	2,03	2,03	2,03
		0,50	0,90	0,90	1,85	3,36	3,36	3,36	3,70	3,70
		0,55	0,90	0,90	1,85	3,36	3,36	3,36	3,70	3,70
		0,63	0,90	0,90	1,85	3,59	3,59	3,59	4,49	4,49
		0,75	0,90	0,90	1,85	3,59	3,59	3,59	6,41	6,41
		0,88	0,90	0,90	1,85	3,59	3,59	3,59	6,41	6,41
		1,00	0,90	0,90	1,85	3,59	3,59	3,59	6,41	6,41
$N_{R,II,k}$ [kN] (pull out)			0,90	0,90	1,85	3,59	3,59	3,59	7,32	7,32
max. head displacement u depending on the sandwich panel thickness in [mm]		30	10	10	10	10	10	10	0,7	0,7
		40	10	10	10	10	10	10	0,7	0,7
		50	10	10	10	10	10	10	0,7	0,7
		60	10	10	10	10	10	10	2	2
		70	10	10	10	10	10	10	2	2
		80	10	10	10	10	10	10	2	2
		90	10	10	10	10	10	10	3	3
		100	10	10	10	10	10	10	3	3
		120	10	10	10	10	10	10	3	3
		≥ 140	10	10	10	10	10	10	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW (H) 5,5/6,3-6 x L and WKSPW PROTECT (H) 5,5/6,3-6 x L
with hexagon head and sealing washer ≥ Ø19 mm

Annex 3

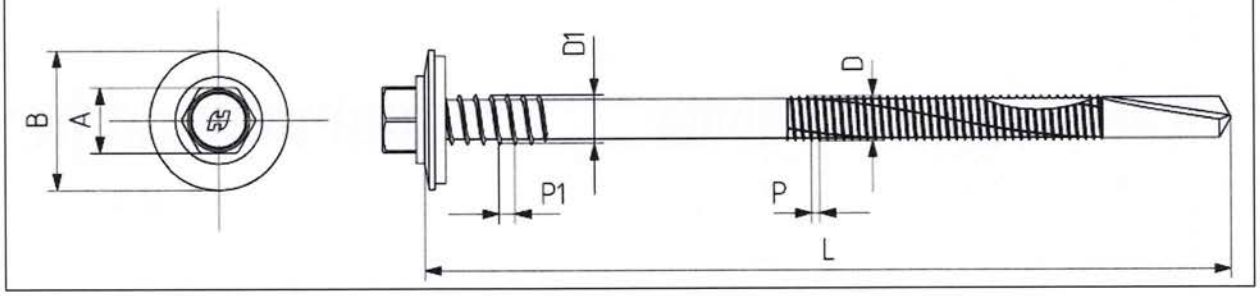
of European
Technical Assessment
ETA-13/0421

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized (≥ 12 µm) or quenched, tempered and galvanized, with PROTECT coating
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 12$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			4,00	5,00	6,00	8,00	10,00	11,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94
		0,50	1,54	1,54	1,54	1,54	1,54	1,54
		0,55	1,54	1,54	1,54	1,54	1,54	1,54
		0,63	1,85	1,85	1,85	1,85	1,85	1,85
		0,75	2,34	2,34	2,34	2,34	2,34	2,34
		0,88	2,34	2,34	2,34	2,34	2,34	2,34
		1,00	2,34	2,34	2,34	2,34	2,34	2,34
	$N_{R,I,k}$ in [kN]	0,40	1,83	1,83	1,83	1,83	1,83	1,83
		0,50	3,07	3,07	3,07	3,07	3,07	3,07
		0,55	3,07	3,07	3,07	3,07	3,07	3,07
		0,63	3,92	3,92	3,92	3,92	3,92	3,92
		0,75	5,10	5,10	5,10	5,10	5,10	5,10
		0,88	5,10	5,10	5,10	5,10	5,10	5,10
		1,00	5,10	5,10	5,10	5,10	5,10	5,10
$N_{R,II,k}$ [kN] (pull out)			7,51	7,51	15,28	15,28	15,28	15,28
max. head displacement u depending on the sandwich panel thickness in [mm]		30	0,7	0,7	0,7	0,7	0,7	0,7
		40	0,7	0,7	0,7	0,7	0,7	0,7
		50	0,7	0,7	0,7	0,7	0,7	0,7
		60	2	2	2	2	2	2
		70	2	2	2	2	2	2
		80	2	2	2	2	2	2
		90	3	3	3	3	3	3
		100	3	3	3	3	3	3
		120	3	3	3	3	3	3
		≥ 140	3	3	3	3	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW (H) 5,5/6,3-12 x L and WKSPW PROTECT (H) 5,5/6,3-12 x L with hexagon head and sealing washer Ø16 mm

Annex 4

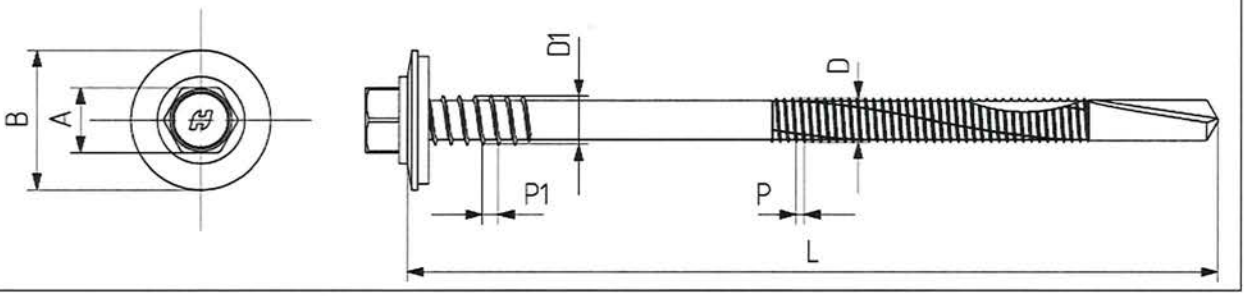
of European Technical Assessment ETA-13/0421

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized (≥ 12 µm) or quenched, tempered and galvanized, with PROTECT coating
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 12$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			4,00	5,00	6,00	8,00	10,00	11,00
Component I: $t_{N,I}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94
		0,50	1,54	1,54	1,54	1,54	1,54	1,54
		0,55	1,54	1,54	1,54	1,54	1,54	1,54
		0,63	1,85	1,85	1,85	1,85	1,85	1,85
		0,75	2,34	2,34	2,34	2,34	2,34	2,34
		0,88	2,34	2,34	2,34	2,34	2,34	2,34
		1,00	2,34	2,34	2,34	2,34	2,34	2,34
	$N_{R,I,k}$ in [kN]	0,40	2,03	2,03	2,03	2,03	2,03	2,03
		0,50	3,70	3,70	3,70	3,70	3,70	3,70
		0,55	3,70	3,70	3,70	3,70	3,70	3,70
		0,63	4,49	4,49	4,49	4,49	4,49	4,49
		0,75	6,41	6,41	6,41	6,41	6,41	6,41
		0,88	6,41	6,41	6,41	6,41	6,41	6,41
		1,00	6,41	6,41	6,41	6,41	6,41	6,41
$N_{R,II,k}$ [kN] (pull out)			7,51	7,51	15,28	15,28	15,28	15,28
max. head displacement u depending on the sandwich panel thickness in [mm]		30	0,7	0,7	0,7	0,7	0,7	0,7
		40	0,7	0,7	0,7	0,7	0,7	0,7
		50	0,7	0,7	0,7	0,7	0,7	0,7
		60	2	2	2	2	2	2
		70	2	2	2	2	2	2
		80	2	2	2	2	2	2
		90	3	3	3	3	3	3
		100	3	3	3	3	3	3
		120	3	3	3	3	3	3
		≥ 140	3	3	3	3	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW (H) 5,5/6,3-12 x L and WKSPW PROTECT (H) 5,5/6,3-12 x L
with hexagon head and sealing washer ≥ Ø19 mm

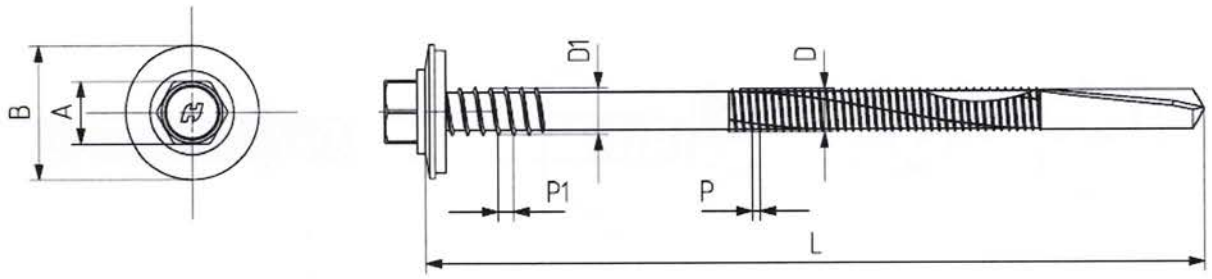
Annex 5
of European Technical Assessment ETA-13/0421

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized, additional coating PROTECT
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 16$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			6,00	8,00	10,00	11,00	12,00	14,00	15,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94	0,94
		0,50	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,55	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,63	1,85	1,85	1,85	1,85	1,85	1,85	1,85
		0,75	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		0,88	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		1,00	2,34	2,34	2,34	2,34	2,34	2,34	2,34
	$N_{R,I,k}$ in [kN]	0,40	1,83	1,83	1,83	1,83	1,83	1,83	1,83
		0,50	3,07	3,07	3,07	3,07	3,07	3,07	3,07
		0,55	3,07	3,07	3,07	3,07	3,07	3,07	3,07
		0,63	3,92	3,92	3,92	3,92	3,92	3,92	3,92
		0,75	5,10	5,10	5,10	5,10	5,10	5,10	5,10
		0,88	5,10	5,10	5,10	5,10	5,10	5,10	5,10
		1,00	5,10	5,10	5,10	5,10	5,10	5,10	5,10
$N_{R,II,k}$ [kN] (pull out)			15,28	15,30	19,37	19,37	19,37	19,37	19,37
max. head displacement u depending on the sandwich panel thickness in [mm]		30	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		40	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		50	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		60	2	2	2	2	2	2	2
		70	2	2	2	2	2	2	2
		80	2	2	2	2	2	2	2
		90	3	3	3	3	3	3	3
		100	3	3	3	3	3	3	3
		120	3	3	3	3	3	3	3
		≥ 140	3	3	3	3	3	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW PROTECT (H) 5,5/6,3-16 x L
with hexagon head and sealing washer Ø16 mm

Annex 6

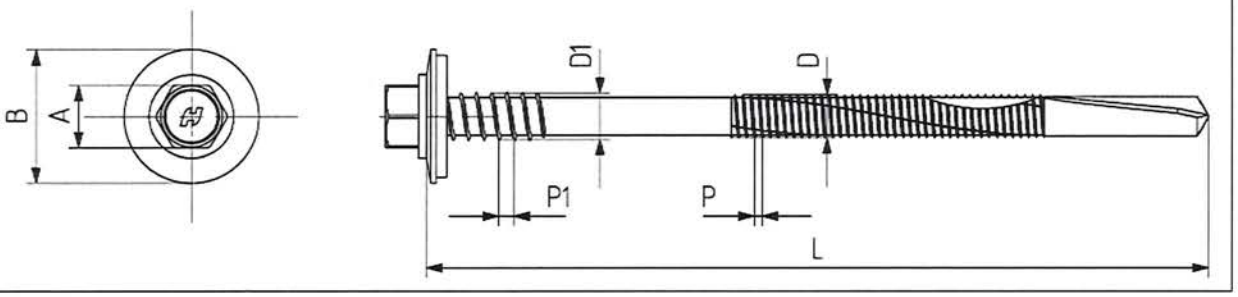
of European Technical Assessment ETA-13/0421

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized, additional coating PROTECT
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 16$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			6,00	8,00	10,00	11,00	12,00	14,00	15,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94	0,94
		0,50	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,55	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,63	1,85	1,85	1,85	1,85	1,85	1,85	1,85
		0,75	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		0,88	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		1,00	2,34	2,34	2,34	2,34	2,34	2,34	2,34
	$N_{R,I,k}$ in [kN]	0,40	2,03	2,03	2,03	2,03	2,03	2,03	2,03
		0,50	3,70	3,70	3,70	3,70	3,70	3,70	3,70
		0,55	3,70	3,70	3,70	3,70	3,70	3,70	3,70
		0,63	4,49	4,49	4,49	4,49	4,49	4,49	4,49
		0,75	6,41	6,41	6,41	6,41	6,41	6,41	6,41
		0,88	6,41	6,41	6,41	6,41	6,41	6,41	6,41
		1,00	6,41	6,41	6,41	6,41	6,41	6,41	6,41
$N_{R,II,k}$ [kN] (pull out)			15,28	15,30	19,37	19,37	19,37	19,37	19,37
max. head displacement u depending on the sandwich panel thickness in [mm]		30	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		40	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		50	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		60	2	2	2	2	2	2	2
		70	2	2	2	2	2	2	2
		80	2	2	2	2	2	2	2
		90	3	3	3	3	3	3	3
		100	3	3	3	3	3	3	3
		120	3	3	3	3	3	3	3
		≥ 140	3	3	3	3	3	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW PROTECT (H) 5,5/6,3-16 x L
with hexagon head and sealing washer ≥ Ø19 mm

Annex 7

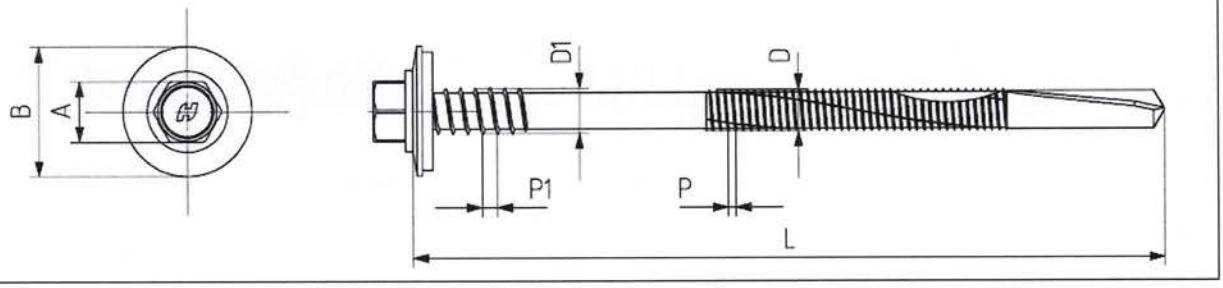
of European
Technical Assessment
ETA-13/0421

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized (≥ 12 µm) or quenched, tempered and galvanized, with PROTECT coating
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 20$ mm

Timber substructure:
No performance assessed



Component II: t_{II} in [mm]			6,00	8,00	10,00	11,00	12,00	14,00	15,00	≥ 16,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94
		0,50	1,54	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,55	1,54	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,63	1,85	1,85	1,85	1,85	1,85	1,85	1,85	1,85
		0,75	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		0,88	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		1,00	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
	$N_{R,I,k}$ in [kN]	0,40	1,83	1,83	1,83	1,83	1,83	1,83	1,83	1,83
		0,50	3,07	3,07	3,07	3,07	3,07	3,07	3,07	3,07
		0,55	3,07	3,07	3,07	3,07	3,07	3,07	3,07	3,07
		0,63	3,92	3,92	3,92	3,92	3,92	3,92	3,92	3,92
		0,75	5,10	5,10	5,10	5,10	5,10	5,10	5,10	5,10
		0,88	5,10	5,10	5,10	5,10	5,10	5,10	5,10	5,10
		1,00	5,10	5,10	5,10	5,10	5,10	5,10	5,10	5,10
$N_{R,II,k}$ [kN] (pull out)			15,28	15,30	19,37	19,37	19,37	19,37	19,37	19,37
max. head displacement u depending on the sandwich panel thickness in [mm]		30	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		40	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		50	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		60	2	2	2	2	2	2	2	2
		70	2	2	2	2	2	2	2	2
		80	2	2	2	2	2	2	2	2
		90	3	3	3	3	3	3	3	3
		100	3	3	3	3	3	3	3	3
		120	3	3	3	3	3	3	3	3
		≥ 140	3	3	3	3	3	3	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

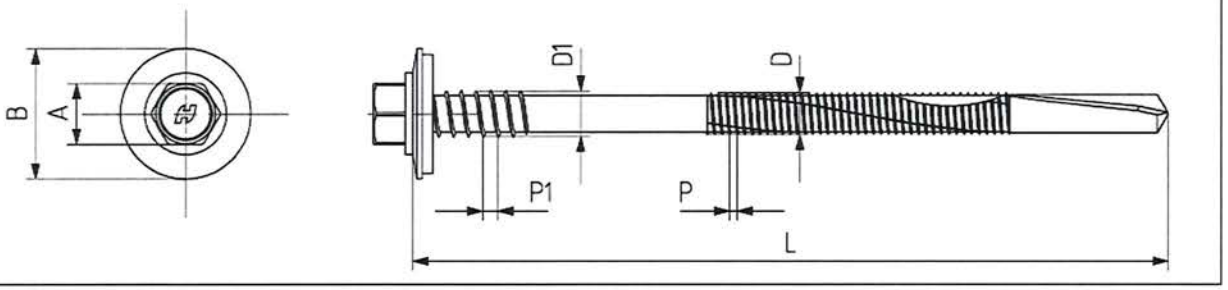
WKSPW **Fastening screws for sandwich panels**	**Annex 8** of European Technical Assessment ETA-13/0421
WKSPW (H) 5,5/6,3-20 x L and WKSPW PROTECT (H) 5,5/6,3-20 x L with hexagon head and sealing washer Ø16 mm	

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized (≥ 12 µm) or quenched, tempered and galvanized, with PROTECT coating
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 20$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			6,00	8,00	10,00	11,00	12,00	14,00	15,00	≥ 16,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94
		0,50	1,54	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,55	1,54	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,63	1,85	1,85	1,85	1,85	1,85	1,85	1,85	1,85
		0,75	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		0,88	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		1,00	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
	$N_{R,I,k}$ in [kN]	0,40	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
		0,50	3,70	3,70	3,70	3,70	3,70	3,70	3,70	3,70
		0,55	3,70	3,70	3,70	3,70	3,70	3,70	3,70	3,70
		0,63	4,49	4,49	4,49	4,49	4,49	4,49	4,49	4,49
		0,75	6,41	6,41	6,41	6,41	6,41	6,41	6,41	6,41
		0,88	6,41	6,41	6,41	6,41	6,41	6,41	6,41	6,41
		1,00	6,41	6,41	6,41	6,41	6,41	6,41	6,41	6,41
$N_{R,II,k}$ [kN] (pull out)			15,28	15,30	19,37	19,37	19,37	19,37	19,37	19,37
max. head displacement u depending on the sandwich panel thickness in [mm]		30	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		40	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		50	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		60	2	2	2	2	2	2	2	2
		70	2	2	2	2	2	2	2	2
		80	2	2	2	2	2	2	2	2
		90	3	3	3	3	3	3	3	3
		100	3	3	3	3	3	3	3	3
		120	3	3	3	3	3	3	3	3
		≥ 140	3	3	3	3	3	3	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

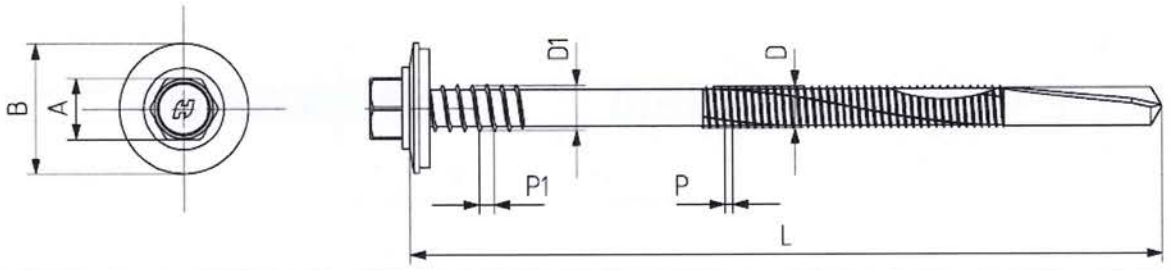
WKSPW **Fastening screws for sandwich panels**	**Annex 9**
WKSPW (H) 5,5/6,3-20 x L and WKSPW PROTECT (H) 5,5/6,3-20 x L with hexagon head and sealing washer ≥ Ø19 mm	of European Technical Assessment ETA-13/0421

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized (≥ 12 µm) or quenched, tempered and galvanized, with PROTECT coating
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 25$ mm

Timber substructure:
No performance assessed



Component II: t_{II} in [mm]			8,00	10,00	11,00	12,00	14,00	15,00	16,00	≥ 18,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94
		0,50	1,54	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,55	1,54	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,63	1,85	1,85	1,85	1,85	1,85	1,85	1,85	1,85
		0,75	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		0,88	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		1,00	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
	$N_{R,I,k}$ in [kN]	0,40	1,83	1,83	1,83	1,83	1,83	1,83	1,83	1,83
		0,50	3,07	3,07	3,07	3,07	3,07	3,07	3,07	3,07
		0,55	3,07	3,07	3,07	3,07	3,07	3,07	3,07	3,07
		0,63	3,92	3,92	3,92	3,92	3,92	3,92	3,92	3,92
		0,75	5,10	5,10	5,10	5,10	5,10	5,10	5,10	5,10
		0,88	5,10	5,10	5,10	5,10	5,10	5,10	5,10	5,10
		1,00	5,10	5,10	5,10	5,10	5,10	5,10	5,10	5,10
$N_{R,II,k}$ [kN] (pull out)			15,30	19,37	19,37	19,37	19,37	19,37	19,37	19,37
max. head displacement u depending on the sandwich panel thickness in [mm]		30	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		40	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		50	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		60	2	2	2	2	2	2	2	2
		70	2	2	2	2	2	2	2	2
		80	2	2	2	2	2	2	2	2
		90	3	3	3	3	3	3	3	3
		100	3	3	3	3	3	3	3	3
		120	3	3	3	3	3	3	3	3
		≥ 140	3	3	3	3	3	3	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

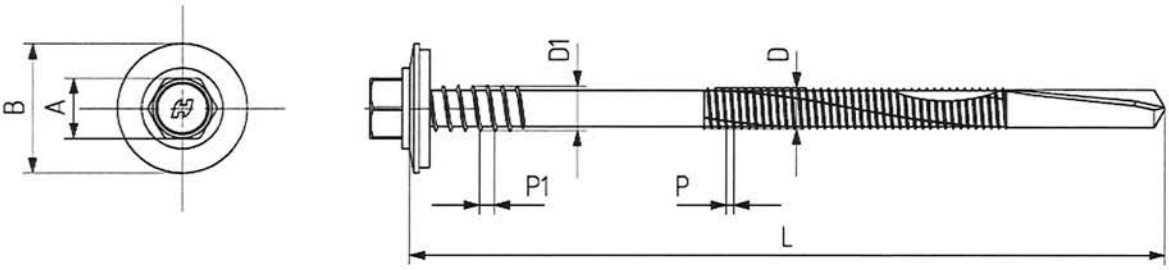
WKSPW **Fastening screws for sandwich panels**	**Annex 10** of European Technical Assessment ETA-13/0421
WKSPW (H) 5,5/6,3-25 x L and WKSPW PROTECT (H) 5,5/6,3-25 x L with hexagon head and sealing washer Ø16 mm	

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized (≥ 12 µm) or quenched, tempered and galvanized, with PROTECT coating
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 25$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			8,00	10,00	11,00	12,00	14,00	15,00	16,00	≥ 18,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94	0,94	0,94
		0,50	1,54	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,55	1,54	1,54	1,54	1,54	1,54	1,54	1,54	1,54
		0,63	1,85	1,85	1,85	1,85	1,85	1,85	1,85	1,85
		0,75	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		0,88	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
		1,00	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34
	$N_{R,I,k}$ in [kN]	0,40	2,03	2,03	2,03	2,03	2,03	2,03	2,03	2,03
		0,50	3,70	3,70	3,70	3,70	3,70	3,70	3,70	3,70
		0,55	3,70	3,70	3,70	3,70	3,70	3,70	3,70	3,70
		0,63	4,49	4,49	4,49	4,49	4,49	4,49	4,49	4,49
		0,75	6,41	6,41	6,41	6,41	6,41	6,41	6,41	6,41
		0,88	6,41	6,41	6,41	6,41	6,41	6,41	6,41	6,41
		1,00	6,41	6,41	6,41	6,41	6,41	6,41	6,41	6,41
$N_{R,II,k}$ [kN] (pull out)			15,30	19,37	19,37	19,37	19,37	19,37	19,37	19,37
max. head displacement u depending on the sandwich panel thickness in [mm]		30	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		40	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		50	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
		60	2	2	2	2	2	2	2	2
		70	2	2	2	2	2	2	2	2
		80	2	2	2	2	2	2	2	2
		90	3	3	3	3	3	3	3	3
		100	3	3	3	3	3	3	3	3
		120	3	3	3	3	3	3	3	3
		≥ 140	3	3	3	3	3	3	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW (H) 5,5/6,3-25 x L and WKSPW PROTECT (H) 5,5/6,3-25 x L
with hexagon head and sealing washer ≥ Ø19 mm

Annex 11

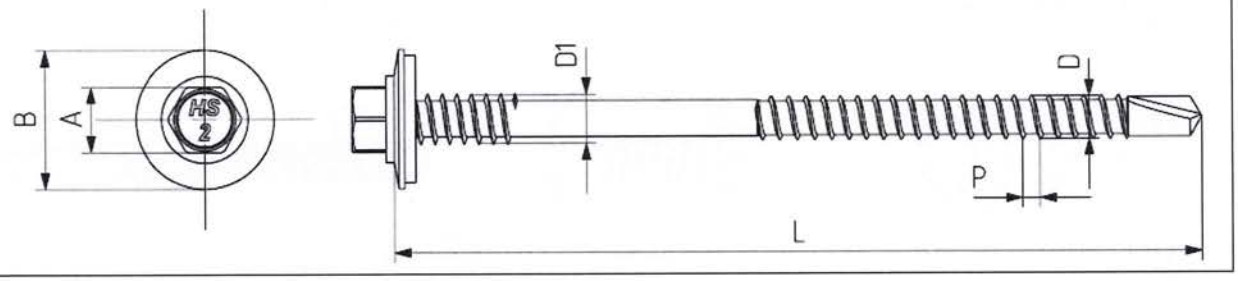
of European
Technical Assessment
ETA-13/0421

Materials:

Fastener:	stainless steel – SAE 304, Bi-metal
Washer:	metallic washer made of stainless steel with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 6$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			1,00	1,25	1,50	2,00	2,50	3,00	4,00	5,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91
		0,50	1,24	1,24	1,62	1,62	1,62	1,62	1,62	1,62
		0,55	1,24	1,24	1,62	1,62	1,62	1,62	1,62	1,62
		0,63	1,24	1,24	1,80	1,80	1,80	1,80	1,80	1,80
		0,75	1,24	1,24	2,26	2,26	2,26	2,26	2,26	2,26
		0,88	1,24	1,24	2,26	2,26	2,26	2,26	2,26	2,26
		1,00	1,24	1,24	2,26	2,26	2,26	2,26	2,26	2,26
	$N_{R,I,k}$ in [kN]	0,40	1,24	1,24	1,83	1,83	1,83	1,83	1,83	1,83
		0,50	1,24	1,24	2,16	2,80	2,80	2,80	3,07	3,07
		0,55	1,24	1,24	2,16	2,80	2,80	2,80	3,07	3,07
		0,63	1,24	1,24	2,16	3,60	3,60	3,60	3,92	3,92
		0,75	1,24	1,24	2,16	3,80	3,80	3,80	4,59	4,59
		0,88	1,24	1,24	2,16	3,80	3,80	3,80	4,59	4,59
		1,00	1,24	1,24	2,16	3,80	3,80	3,80	4,59	4,59
$N_{R,II,k}$ [kN] (pull out)			1,24	1,24	2,16	3,80	3,80	3,80	4,59	4,59
max. head displacement u depending on the sandwich panel thickness in [mm]		30	10	10	10	10	10	10	0,7	0,7
		40	10	10	10	10	10	10	0,7	0,7
		50	10	10	10	10	10	10	0,7	0,7
		60	10	10	10	10	10	10	2	2
		70	10	10	10	10	10	10	2	2
		80	10	10	10	10	10	10	2	2
		90	10	10	10	10	10	10	3	3
		100	10	10	10	10	10	10	3	3
		120	10	10	10	10	10	10	3	3
		≥ 140	10	10	10	10	10	10	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW (HS2) 5,5/6,3-6 x L
with hexagon head and sealing washer Ø16 mm

Annex 12

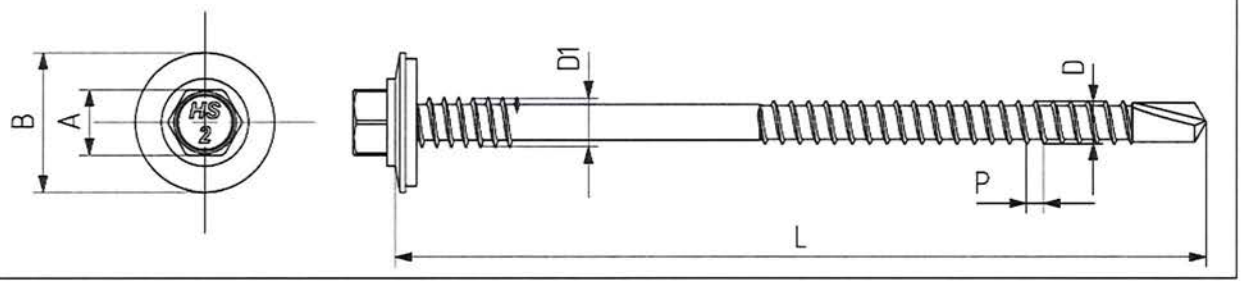
of European
Technical Assessment
ETA-13/0421

Materials:

Fastener:	stainless steel – SAE 304, Bi-metal
Washer:	metallic washer made of stainless steel with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 6$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			1,00	1,25	1,50	2,00	2,50	3,00	4,00	5,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91
		0,50	1,24	1,24	1,62	1,62	1,62	1,62	1,62	1,62
		0,55	1,24	1,24	1,62	1,62	1,62	1,62	1,62	1,62
		0,63	1,24	1,24	1,80	1,80	1,80	1,80	1,80	1,80
		0,75	1,24	1,24	2,26	2,26	2,26	2,26	2,26	2,26
		0,88	1,24	1,24	2,26	2,26	2,26	2,26	2,26	2,26
		1,00	1,24	1,24	2,26	2,26	2,26	2,26	2,26	2,26
	$N_{R,I,k}$ in [kN]	0,40	1,24	1,24	2,03	2,03	2,03	2,03	2,03	2,03
		0,50	1,24	1,24	2,16	3,36	3,36	3,36	3,70	3,70
		0,55	1,24	1,24	2,16	3,36	3,36	3,36	3,70	3,70
		0,63	1,24	1,24	2,16	3,80	3,80	3,80	4,49	4,49
		0,75	1,24	1,24	2,16	3,80	3,80	3,80	4,59	4,59
		0,88	1,24	1,24	2,16	3,80	3,80	3,80	4,59	4,59
		1,00	1,24	1,24	2,16	3,80	3,80	3,80	4,59	4,59
$N_{R,II,k}$ [kN] (pull out)			1,24	1,24	2,16	3,80	3,80	3,80	4,59	4,59
max. head displacement u depending on the sandwich panel thickness in [mm]		30	10	10	10	10	10	10	0,7	0,7
		40	10	10	10	10	10	10	0,7	0,7
		50	10	10	10	10	10	10	0,7	0,7
		60	10	10	10	10	10	10	2	2
		70	10	10	10	10	10	10	2	2
		80	10	10	10	10	10	10	2	2
		90	10	10	10	10	10	10	3	3
		100	10	10	10	10	10	10	3	3
		120	10	10	10	10	10	10	3	3
		≥ 140	10	10	10	10	10	10	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW (HS2) 5,5/6,3-6 x L
with hexagon head and sealing washer ≥ Ø19 mm

Annex 13

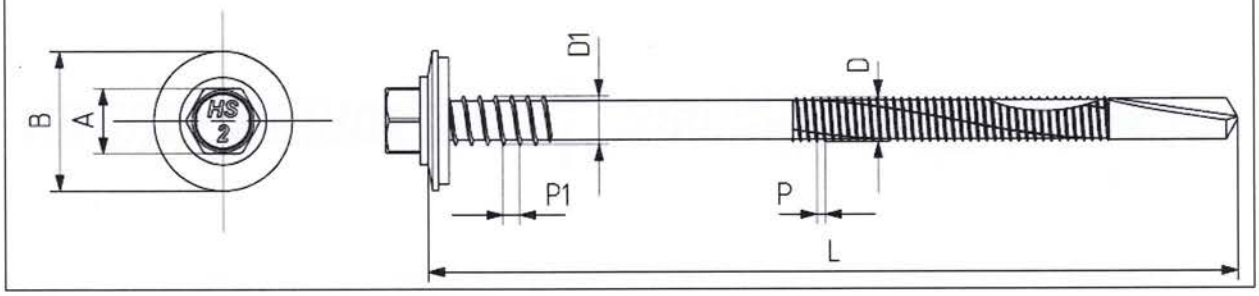
of European
Technical Assessment
ETA-13/0421

Materials:

Fastener:	stainless steel – SAE 304, Bi-metal
Washer:	metallic washer made of stainless steel with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 12$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			4,00	5,00	6,00	8,00	10,00	11,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94
		0,50	1,54	1,54	1,54	1,54	1,54	1,54
		0,55	1,54	1,54	1,54	1,54	1,54	1,54
		0,63	1,85	1,85	1,85	1,85	1,85	1,85
		0,75	2,34	2,34	2,34	2,34	2,34	2,34
		0,88	2,34	2,34	2,34	2,34	2,34	2,34
		1,00	2,34	2,34	2,34	2,34	2,34	2,34
	$N_{R,I,k}$ in [kN]	0,40	1,83	1,83	1,83	1,83	1,83	1,83
		0,50	3,07	3,07	3,07	3,07	3,07	3,07
		0,55	3,07	3,07	3,07	3,07	3,07	3,07
		0,63	3,92	3,92	3,92	3,92	3,92	3,92
		0,75	5,10	5,10	5,10	5,10	5,10	5,10
		0,88	5,10	5,10	5,10	5,10	5,10	5,10
		1,00	5,10	5,10	5,10	5,10	5,10	5,10
$N_{R,II,k}$ [kN] (pull out)			6,50	6,50	9,72	9,72	9,72	9,72
max. head displacement u depending on the sandwich panel thickness in [mm]		30	0,7	0,7	0,7	0,7	0,7	0,7
		40	0,7	0,7	0,7	0,7	0,7	0,7
		50	0,7	0,7	0,7	0,7	0,7	0,7
		60	2	2	2	2	2	2
		70	2	2	2	2	2	2
		80	2	2	2	2	2	2
		90	3	3	3	3	3	3
		100	3	3	3	3	3	3
		120	3	3	3	3	3	3
		≥ 140	3	3	3	3	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW (HS2) 5,5/6,3-12 x L
with hexagon head and sealing washer Ø16 mm

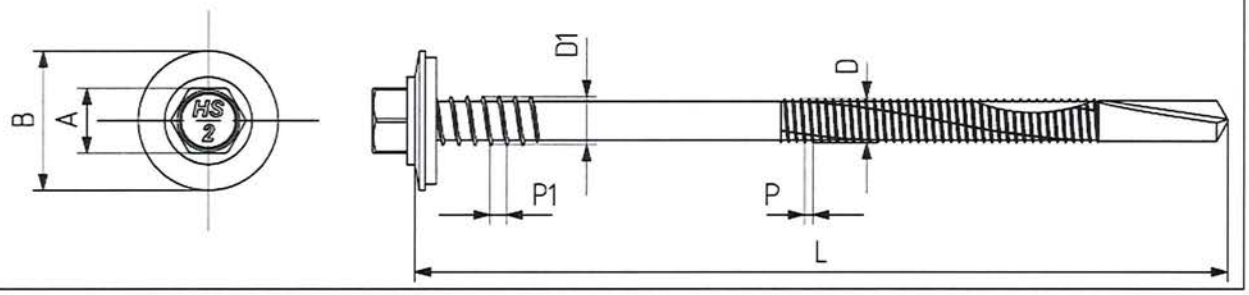
Annex 14
of European Technical Assessment ETA-13/0421

Materials:

Fastener:	stainless steel – SAE 304, Bi-metal
Washer:	metallic washer made of stainless steel with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	S235 to S355 – EN 10025-1 S280GD to S450GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 12$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			4,00	5,00	6,00	8,00	10,00	11,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,40	0,94	0,94	0,94	0,94	0,94	0,94
		0,50	1,54	1,54	1,54	1,54	1,54	1,54
		0,55	1,54	1,54	1,54	1,54	1,54	1,54
		0,63	1,85	1,85	1,85	1,85	1,85	1,85
		0,75	2,34	2,34	2,34	2,34	2,34	2,34
		0,88	2,34	2,34	2,34	2,34	2,34	2,34
		1,00	2,34	2,34	2,34	2,34	2,34	2,34
	$N_{R,I,k}$ in [kN]	0,40	2,03	2,03	2,03	2,03	2,03	2,03
		0,50	3,70	3,70	3,70	3,70	3,70	3,70
		0,55	3,70	3,70	3,70	3,70	3,70	3,70
		0,63	4,49	4,49	4,49	4,49	4,49	4,49
		0,75	6,41	6,41	6,41	6,41	6,41	6,41
		0,88	6,41	6,41	6,41	6,41	6,41	6,41
		1,00	6,41	6,41	6,41	6,41	6,41	6,41
$N_{R,II,k}$ [kN] (pull out)			6,50	6,50	9,72	9,72	9,72	9,72
max. head displacement u depending on the sandwich panel thickness in [mm]		30	0,7	0,7	0,7	0,7	0,7	0,7
		40	0,7	0,7	0,7	0,7	0,7	0,7
		50	0,7	0,7	0,7	0,7	0,7	0,7
		60	2	2	2	2	2	2
		70	2	2	2	2	2	2
		80	2	2	2	2	2	2
		90	3	3	3	3	3	3
		100	3	3	3	3	3	3
		120	3	3	3	3	3	3
		≥ 140	3	3	3	3	3	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$N_{R,II,k}$ may be increased by 8,3% for component II made of S320GD and by 16,6% for component II made of S350GD to S450GD, S275 and S355.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

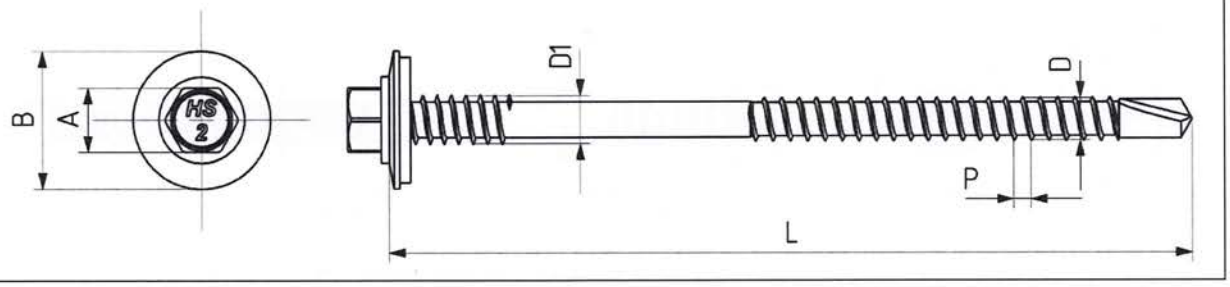
WKSPW (HS2) 5,5/6,3-12 x L
with hexagon head and sealing washer ≥ Ø19 mm

Annex 15
of European Technical Assessment ETA-13/0421

Materials:
- Fastener: stainless steel – SAE 304, Bi-metal
- Washer: metallic washer made of stainless steel with EPDM sealing ring
- Component I: 1050A – EN 485
- Component II: 1050A – EN 485

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 6$ mm

Timber substructure
No performance assessed



Component II: t_{II} in [mm]			0,50	0,80	1,00	1,20	1,50	2,00	3,00
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ in [kN]	0,50	0,34	0,34	0,34	0,34	0,34	0,34	0,34
		0,80	-	0,47	0,47	0,47	0,47	0,47	0,47
		1,00	-	-	0,65	0,65	0,65	0,65	0,65
		1,20	-	-	-	0,65	0,65	0,65	0,65
		1,50	-	-	-	-	1,41	1,41	1,41
		2,00	-	-	-	-	-	1,60	1,60
		3,00	-	-	-	-	-	-	1,99
	$N_{R,I,k}$ in [kN]	0,50	0,63	0,63	0,63	0,63	0,63	0,63	0,63
		0,80	-	0,73	0,73	0,73	0,73	0,73	0,73
		1,00	-	-	0,83	0,83	0,83	0,83	0,83
		1,20	-	-	-	0,83	0,83	0,83	0,83
		1,50	-	-	-	-	1,06	1,06	1,06
		2,00	-	-	-	-	-	1,63	1,63
		3,00	-	-	-	-	-	-	2,75
$N_{R,II,k}$ [kN] (pull out)			0,63	0,73	0,83	0,83	1,06	1,63	2,75
max. head displacement u depending on the sandwich panel thickness in [mm]		30	10	10	10	10	10	10	0,7
		40	10	10	10	10	10	10	0,7
		50	10	10	10	10	10	10	0,7
		60	10	10	10	10	10	10	2
		70	10	10	10	10	10	10	2
		80	10	10	10	10	10	10	2
		90	10	10	10	10	10	10	3
		100	10	10	10	10	10	10	3
		120	10	10	10	10	10	10	3
		≥ 140	10	10	10	10	10	10	3

$N_{R,I,k}$ may be increased by 8,3% for component I made of aluminum alloy with $R_m \geq 100$ MPa and by 16,6% for component I made of aluminum alloy with $R_m \geq 140$ MPa.
$N_{R,II,k}$ may be increased by 8,3% for component II made of aluminum alloy with $R_m \geq 100$ MPa and by 16,6% for component II made of aluminum alloy with $R_m \geq 140$ MPa.
$V_{R,k}$ may be increased by 8,3% for component I made of aluminum alloy with $R_m \geq 100$ MPa and by 16,6% for component I made of aluminum alloy with $R_m \geq 140$ MPa.

WKSPW
Fastening screws for sandwich panels

WKSPW (HS2) 5,5/6,3-6 x L
with hexagon head and sealing washer ≥ Ø16 mm

Annex 16
of European Technical Assessment ETA-13/0421

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized (≥ 12 µm) or quenched, tempered and galvanized, with PROTECT coating
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	structural timber – EN 14081

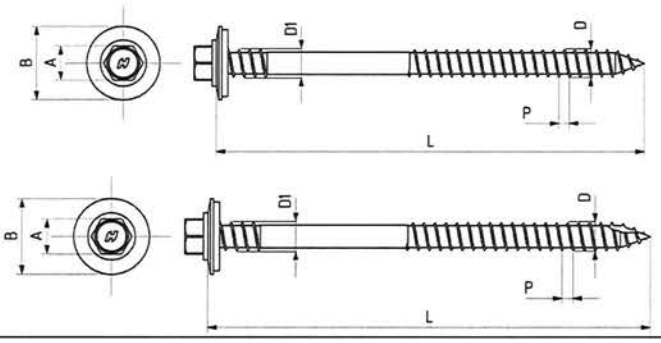
Drilling capacity: -

Timber substructure

For timber substructures performance determined with:

$M_{y,Rk}$ = 9,660 Nm

$f_{ax,k}$ = 16,627 N/mm² for l_{ef} ≥ 20 mm



Component II: wood class ≥ C24			Effective length l_{ef} [mm]	
			≥ 20	≥ 30
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ [kN] for $t_{N,2}$ [mm]	0,40	0,91	0,91
		0,50	1,62	1,62
		0,55	1,62	1,62
		0,63	1,80	1,80
		0,75	2,26	2,26
		0,88	2,26	2,26
		1,00	2,26	2,26
	$N_{R,I,k}$ [kN] for $t_{N,1}$ [mm]	0,40	1,65	1,65
		0,50	2,16	3,07
		0,55	2,16	3,07
		0,63	2,16	3,43
		0,75	2,16	3,43
		0,88	2,16	3,43
		1,00	2,16	3,43
$N_{R,II,k}$ [kN] (pull out)			2,16	3,43
max. head displacement u depending on sandwich panel thickness [mm]		30	1	1
		40	1	1
		50	1	1
		60	1	1
		70	1	1
		80	1	1
		90	1	1
		100	1	1
		120	1	1
		≥ 140	1	1

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW **Fastening screws for sandwich panels**	**Annex 17**
WKSPW (H) 6,5 x L and WKSPW PROTECT (H) 6,5 x L with hexagon head and sealing washer Ø16 mm	of European Technical Assessment ETA-13/0421

Materials:

Fastener:	carbon steel – SAE 1022, quenched, tempered and galvanized (≥ 12 µm) or quenched, tempered and galvanized, with PROTECT coating
Washer:	metallic washer made of zinc-coated carbon steel or stainless steel, with EPDM sealing ring
Component I:	S280GD to S450GD – EN 10346
Component II:	structural timber – EN 14081

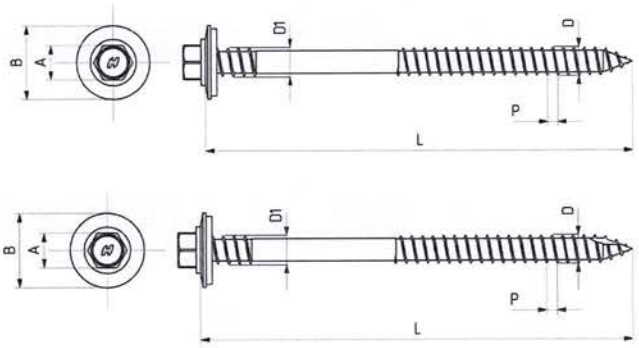
Drilling capacity: -

Timber substructure

For timber substructures performance determined with:

$M_{y,Rk}$ = 9,660 Nm

$f_{ax,k}$ = 16,627 N/mm² for l_{ef} ≥ 20 mm



Component II: wood class ≥ C24			Effective length l_{ef} [mm]	
			≥ 20	≥ 30
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ [kN] for $t_{N,2}$ [mm]	0,40	0,91	0,91
		0,50	1,62	1,62
		0,55	1,62	1,62
		0,63	1,80	1,80
		0,75	2,26	2,26
		0,88	2,26	2,26
		1,00	2,26	2,26
	$N_{R,I,k}$ [kN] for $t_{N,1}$ [mm]	0,40	1,84	1,84
		0,50	2,16	3,43
		0,55	2,16	3,43
		0,63	2,16	3,43
		0,75	2,16	3,43
		0,88	2,16	3,43
		1,00	2,16	3,43
$N_{R,II,k}$ [kN] (pull out)			2,16	3,43
max. head displacement u depending on sandwich panel thickness [mm]		30	1	1
		40	1	1
		50	1	1
		60	1	1
		70	1	1
		80	1	1
		90	1	1
		100	1	1
		120	1	1
		≥ 140	1	1

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW (H) 6,5 x L and WKSPW PROTECT (H) 6,5 x L
with hexagon head and sealing washer ≥ Ø19 mm

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of European
Technical Assessment
ETA-13/0421

Materials:
- Fastener: stainless steel – SAE 304
- Washer: metallic washer made of stainless steel with EPDM sealing ring
- Component I: S280GD to S450GD – EN 10346
- Component II: structural timber – EN 14081

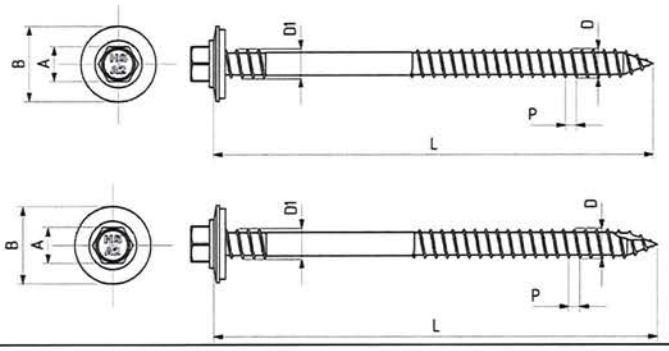
Drilling capacity: -

Timber substructures

For timber structures performance assessed with:

$M_{y,Rk}$ = 7,404 Nm

$f_{ax,k}$ = 16,627 N/mm² for $l_{ef} \geq 20$ mm



Component II: wood class ≥ C24			Effective length l_{ef} [mm]	
			≥ 20	≥ 30
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ [kN] for $t_{N,2}$ [mm]	0,40	0,91	0,91
		0,50	1,62	1,62
		0,55	1,62	1,62
		0,63	1,80	1,80
		0,75	2,26	2,26
		0,88	2,26	2,26
		1,00	2,26	2,26
	$N_{R,I,k}$ [kN] for $t_{N,1}$ [mm	0,40	1,83	1,83
		0,50	2,16	3,07
		0,55	2,16	3,07
		0,63	2,16	3,43
		0,75	2,16	3,43
		0,88	2,16	3,43
		1,00	2,16	3,43
$N_{R,II,k}$ [kN] (pull out)			2,16	3,43
max. head displacement u depending on sandwich panel thickness [mm]		30	1	1
		40	1	1
		50	1	1
		60	1	1
		70	1	1
		80	1	1
		90	1	1
		100	1	1
		120	1	1
		≥ 140	1	1

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

WKSPW
Fastening screws for sandwich panels

WKSPW (HSA2) 6,5 x L
with hexagon head and sealing washer Ø16 mm

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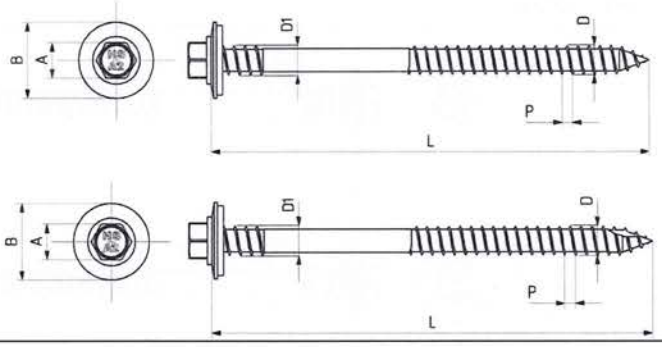
of European Technical Assessment ETA-13/0421

Materials:
- Fastener: stainless steel – SAE 304
- Washer: metallic washer made of stainless steel with EPDM sealing ring
- Component I: S280GD to S450GD – EN 10346
- Component II: structural timber – EN 14081

Drilling capacity: -

Timber substructures

For timber structures performance assessed with:
- $M_{y,Rk}$ = 7,404 Nm
- $f_{ax,k}$ = 16,627 N/mm² for $l_{ef} \geq 20$ mm



Component II: wood class ≥ C24			Effective length l_{ef} [mm]	
			≥ 20	≥ 30
Component I: $t_{N,1}$ or $t_{N,2}$ in [mm]	$V_{R,k}$ [kN] for $t_{N,2}$ [mm]	0,40	0,91	0,91
		0,50	1,62	1,62
		0,55	1,62	1,62
		0,63	1,80	1,80
		0,75	2,26	2,26
		0,88	2,26	2,26
		1,00	2,26	2,26
	$N_{R,I,k}$ [kN] for $t_{N,1}$ [mm	0,40	2,03	2,03
		0,50	2,16	3,43
		0,55	2,16	3,43
		0,63	2,16	3,43
		0,75	2,16	3,43
		0,88	2,16	3,43
		1,00	2,16	3,43
$N_{R,II,k}$ [kN] (pull out)			2,16	3,43
max. head displacement u depending on sandwich panel thickness [mm]		30	1	1
		40	1	1
		50	1	1
		60	1	1
		70	1	1
		80	1	1
		90	1	1
		100	1	1
		120	1	1
		≥ 140	1	1

$N_{R,I,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.
$V_{R,k}$ may be increased by 8,3% for component I made of S320GD and by 16,6% for component I made of S350GD to S450GD.

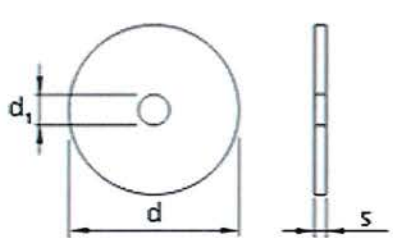
WKSPW
Fastening screws for sandwich panels

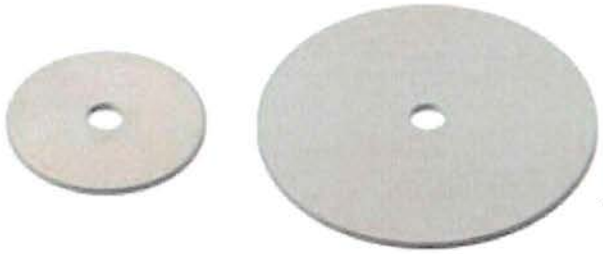
WKSPW (HSA2) 6,5 x L
with hexagon head and sealing washer ≥ Ø19 mm

Annex 20

of European Technical Assessment ETA-13/0421

Washers PWP

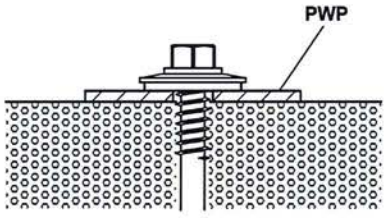




	d	d_1	s
PWP-409010	40	7,4	2,0
PWP-709010	70	7,4	2,0

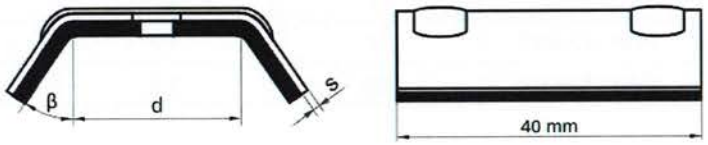
Materials:

carbon steel $R_m \geq 250$ MPa and galvanized (≥ 140 g/m^2) with powder coating
or stainless steel 1.4301 according to EN 10088, with powder coating
or stainless steel 1.4401 according to EN 10088, with powder coating



WKSPW **Fastening screws for sandwich panels**	**Annex 21** of European Technical Assessment ETA-13/0421
Washers PWP	

Saddle washer KAL



d	s	β
[mm]	[mm]	[°]
≥ 20	≥ 1	≥ 29

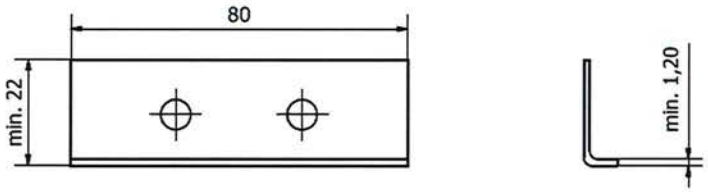
Materials:

aluminium $R_m \geq 125$ MPa

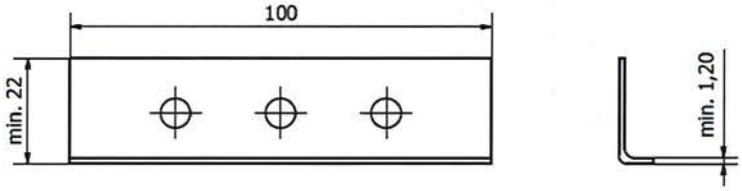
WKSPW **Fastening screws for sandwich panels**	**Annex 22** of European Technical Assessment ETA-13/0421
Saddle washer KAL	

Linear washers PWL

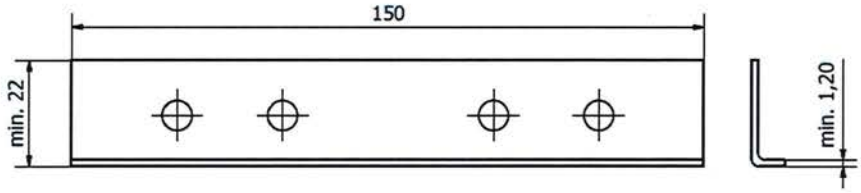
PWL 80/30



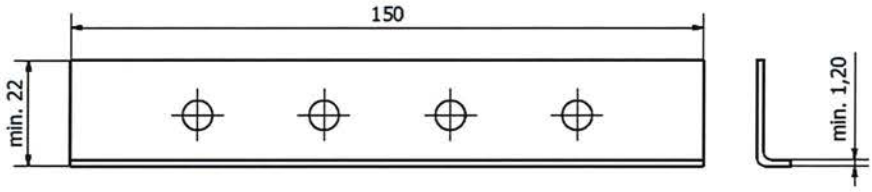
PWL 100/25



PWL 150/25



PWL 150/30



Dimensions in mm

Materials:
carbon steel $R_m \geq 360$ MPa, galvanized (≥ 200 g/m^2)
or stainless steel 1.4301 according to EN 10088
or stainless steel 1.4401 according to EN 10088

WKSPW **Fastening screws for sandwich panels**	**Annex 23** of European Technical Assessment ETA-13/0421
Linear washers PWL	

Determination of design values

1. **Determination of Design Shear Resistance**

The determination of the design values of the shear resistance depends on the type of substructure.

For Metal Supporting Substructures the following applies:

The design values $V_{R,d}$ of the shear resistance are the characteristic values of the shear resistance divided by the recommended partial safety factor γ_M = 1,33. The recommended partial safety factor γ_M should be used in cases where no value is given in national regulations of the Member State where the fastening screws are used.

For Timber Supporting Substructures the following applies:

The design values $V_{R,d}$ of the shear resistance are the characteristic values of the shear resistance multiplied by k_{mod} according to EN 1995-1-1, Section 8.7 (Screwed connections), Table 3.1, and divided by the recommended partial safety factor γ_M = 1,33. If failure of the inner face with the thickness t_{N2} and not failure of the timber substructure is the relevant failure mode then k_{mod} = 1.0.

The recommended partial safety factor γ_M should be used in cases where no value is given in national regulations of the Member State where the fastening screws are used.

2. **Determination of Design Pull-through, Pull-out and Tension Resistance**

The design values of the pull-through resistance are the characteristic values of the pull-through resistance divided by the recommended partial safety factor γ_M = 1,33. The recommended partial safety factor γ_M should be used in cases where no value is given in national regulations of the Member State where the fastening screws are used.

The determination of the design values of the pull-out resistance depends on the type of substructure.

For Metal Supporting Substructures the following applies:

The design values of the pull-out resistance are the characteristic values of the pull-out resistance divided by the recommended partial safety factor γ_M = 1,33. The recommended partial safety factor γ_M should be used in cases where no value is given in national regulations of the Member State where the fastening screws are used.

For Timber Supporting Substructures the following applies:

The design values of the pull-out resistance are the characteristic values of the pull-out resistance multiplied by kmod according to EN 1995-1-1, Section 8.7 (Screwed connections), Table 3.1, and divided by the recommended partial safety factor γ_M = 1,33. The recommended partial safety factor γ_M should be used in cases where no value is given in national regulations of the Member State where the fastening screws are used.

The design tension resistance $N_{R,d}$ is the minimum value of the design values of either pull-through resistance or relevant pull-out resistance for the corresponding connection.

3. **Design Resistance in case of combined Tension and Shear Forces (interaction)**

In case of combined tension and shear forces the linear interaction formula according to EN 1993-1-3, Section 8.3 (8) should be taken into account.