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European Technical Assessment

ETA-16/0734 of 29/12/2020

General part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	ESPS-6-Z, ESPS-6-P, ESPS-6-SP, ESPS-6-B, ESPS-12-Z, ESPS-12-P, ESPS-12-SP, ESPS-12-B, ESPS-20-Z, ESPS-20-P, ESPS-20-SP, ESPS-CS2-Z, ESPS-CS2-P, ESPS-CS2-SP, ESTS-0A-Z, ESTS-0A-S
Product family to which the construction product belongs	Fastening screws for sandwich panels
Manufacturer	Van Roij Fasteners Europe B.V. Jan Tooropstraat 16 5753 DK Deurne Netherlands
Manufacturing plant(s)	Van Roij Fasteners Europe B.V. plants
This European Technical Assessment contains	102 pages including 98 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-16/0734 issued on 30/06/2020

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Specific part

1. Technical description of the product

The fastening screws for sandwich panels ESPS-6-Z, ESPS-6-P, ESPS-6-SP, ESPS-6-B, ESPS-12-Z, ESPS-12-P, ESPS-12-SP, ESPS-12-B, ESPS-20-Z, ESPS-20-P, ESPS-20-SP, ESPS-CS2-Z, ESPS-CS2-P, ESPS-CS2-SP, ESTS-0A-Z, ESTS-0A-S are a self-drilling and self-tapping screws listed in Table 1. Screws are completed with a steel or aluminum washer and an EPDM sealing ring. Screws can be completed with linear steel washer ELW-Z or ELW-S or saddle washer ESW. For details see the Annexes 2 to 97.

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

Table 1

No.	Screw	Material	Annex
1	ESPS-6-Z	galvanized carbon steel with ≥ 12 µm of zinc coating	2 to 7
2	ESPS-6-P	galvanized carbon steel with PREMIUM coating	8 to 13
3	ESPS-6-SP	galvanized carbon steel with SUPER PREMIUM coating	14 to 19
4	ESPS-6-B	stainless steel (bi-metal)	20 to 25
5	ESPS-12-Z	galvanized carbon steel with ≥ 12 µm of zinc coating	26 to 31
6	ESPS-12-P	galvanized carbon steel with PREMIUM coating	32 to 37
7	ESPS-12-SP	galvanized carbon steel with SUPER PREMIUM coating	38 to 43
8	ESPS-12-B	stainless steel (bi-metal)	44 to 49
9	ESPS-20-Z	galvanized carbon steel with ≥ 12 µm of zinc coating	50 to 55
10	ESPS-20-P	galvanized carbon steel with PREMIUM coating	56 to 61
11	ESPS-20-SP	galvanized carbon steel with SUPER PREMIUM coating	62 to 67
12	ESPS-CS2-Z	galvanized carbon steel with ≥ 12 µm of zinc coating	68 to 73
13	ESPS-CS2-P	galvanized carbon steel with PREMIUM coating	74 to 79
14	ESPS-CS2-SP	galvanized carbon steel with SUPER PREMIUM coating	80 to 85
15	ESTS-0A-Z	galvanized carbon steel with ≥ 12 µm of zinc coating	86 to 91
16	ESTS-0A-S	galvanized stainless steel	92 to 97

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 97. 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).

Example 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. Performances of the product and references to the methods used for their 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 97. The values were determined by tests according to EAD 330047-01-0602.

The design values shall be determined according to Annex 98 and EAD 330047-01-0602.

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

3.1.2. Safety in case of fire (BWR 2)

The 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 of the products 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 EC 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)

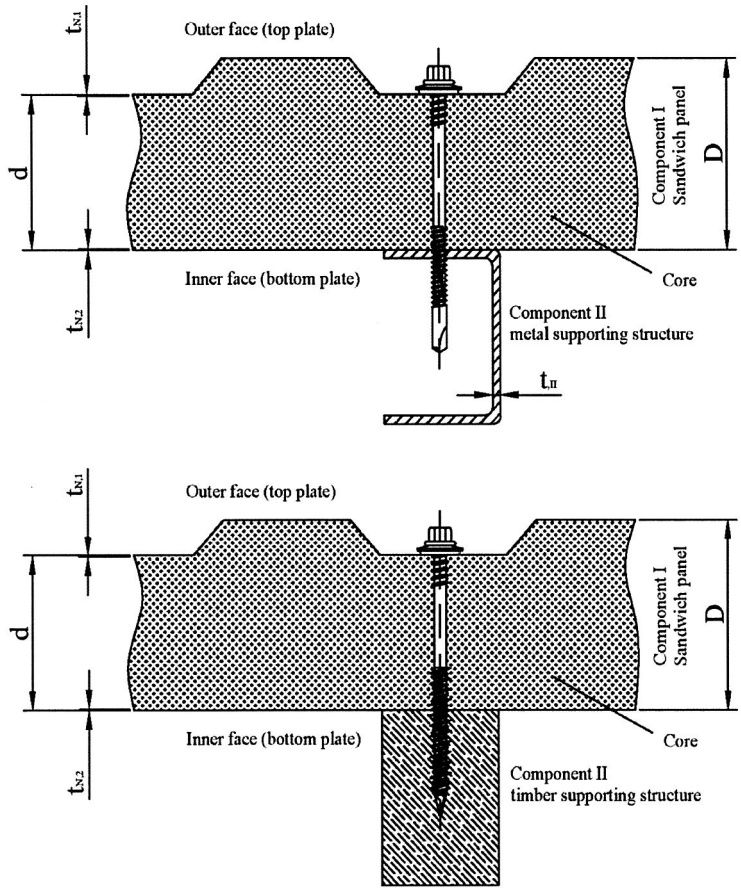
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at the Instytut Techniki Budowlanej.

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.

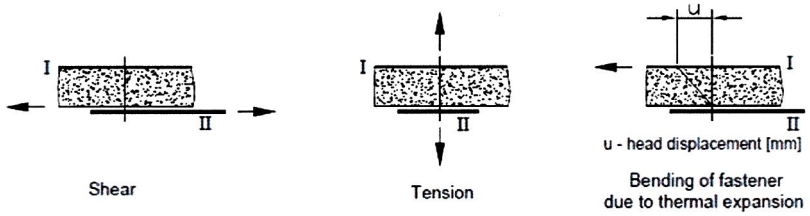
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Deputy Director of ITB

Examples of execution of a connections



Loading conditions



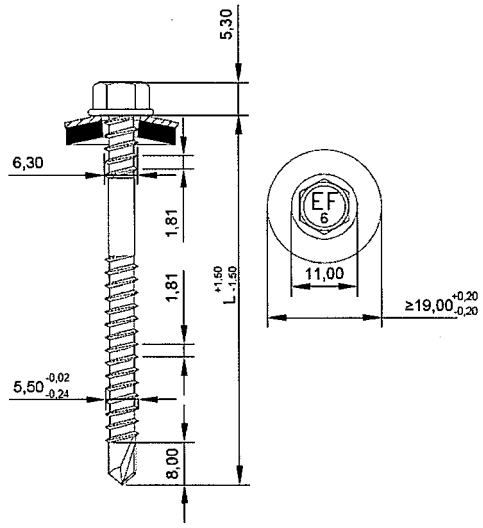
Fastening screws for sandwich panels	Annex 1
Example of execution of a connections. Loading conditions	of European Technical Assessment ETA-16/0734

Materials

Fastener:	carbon steel – SAE1022, quenched, tempered and coated: galvanized with PREMIUM coating
Washer:	A19, A22, A25, A29 – aluminum washer with EPDM ring
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-1 S280GD, S320GD or S350GD – EN 10346

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

Timber substructures
no performance assessed



$t_{N,II}$ [mm]		2,00	2,50	3,00	4,00	5,00
$V_{R,k}$ [kN] for $t_{N,2}$ [mm]	0,40	0,84	0,84	0,84	0,84	0,84
	0,50	1,72	1,72	1,72	1,72	1,72
	0,55	1,72	1,72	1,72	1,72	1,72
	0,60	1,72	1,72	1,72	1,72	1,72
	0,63	1,90	1,90	1,90	1,90	1,90
	0,70	1,99	1,99	1,99	1,99	1,99
	0,75	2,69	2,69	2,69	2,69	2,69
	0,88	2,69	2,69	2,69	2,69	2,69
	1,00	3,10	3,10	3,10	3,10	3,10
$N_{R,k}$ [kN] for $t_{N,1}$ [mm]	0,40	1,81	1,81	1,81	1,81	1,81
	0,50	3,10	3,10	4,10	4,14	4,14
	0,55	3,10	3,10	4,10	4,14	4,14
	0,60	3,10	3,10	4,10	4,14	4,14
	0,63	3,10	3,10	4,10	5,10	5,10
	0,70	3,10	3,10	4,10	5,50	5,50
	0,75	3,10	3,10	4,10	7,70	7,70
	0,88	3,10	3,10	4,10	7,70	7,70
	1,00	3,10	3,10	4,10	7,78	7,78
max. head displacement "u" depending on sandwich panel thickness [mm]	30	0,7	0,7	0,7	0,7	0,7
	40	0,9	0,9	0,9	0,9	0,9
	50	1,2	1,2	1,2	1,2	1,2
	60	1,4	1,4	1,4	1,4	1,4
	70	1,6	1,6	1,6	1,6	1,6
	80	1,8	1,8	1,8	1,8	1,8
	90	2,1	2,1	2,1	2,1	2,1
	100	2,3	2,3	2,3	2,3	2,3
	110	2,5	2,5	2,5	2,5	2,5
	120	2,8	2,8	2,8	2,8	2,8
	130	3,0	3,0	3,0	3,0	3,0
	≥140	3,2	3,2	3,2	3,2	3,2

Fastening screws for sandwich panels

Self-drilling screws ESPS-6-P 6,3/5,5xL with hexagon head and washer A19, A22, A25 or A29

Annex 8

of European Technical Assessment ETA-16/0734

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 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. The recommended partial safety factor γM 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 NR,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)

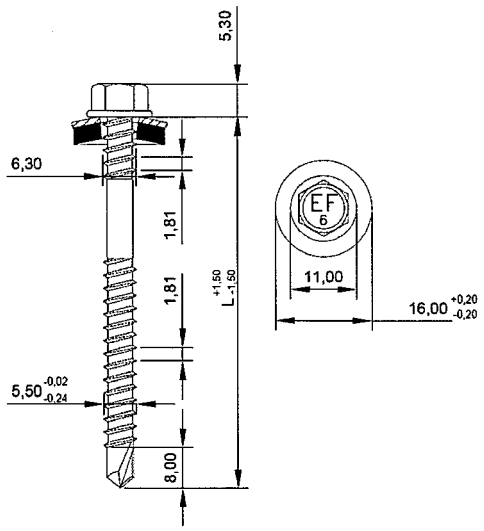
In case of combined tension and shear forces the linear interaction formula according to EN 1993-1-3, section 8.3 (8) or EN 1999-1-4, section 8.1 (7) should be taken into account.

Materials

Fastener:	carbon steel – SAE1022, quenched, tempered and coated: galvanized with PREMIUM coating
Washer:	A16 – aluminum washer with EPDM ring
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-1 S280GD, S320GD or S350GD – EN 10346

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

Timber substructures
no performance assessed



$t_{N,II}$ [mm]		2,00	2,50	3,00	4,00	5,00
$V_{R,k}$ [kN] for $t_{N,2}$ [mm]	0,40	0,84	0,84	0,84	0,84	0,84
	0,50	1,72	1,72	1,72	1,72	1,72
	0,55	1,72	1,72	1,72	1,72	1,72
	0,60	1,72	1,72	1,72	1,72	1,72
	0,63	1,90	1,90	1,90	1,90	1,90
	0,70	1,99	1,99	1,99	1,99	1,99
	0,75	2,69	2,69	2,69	2,69	2,69
	0,88	2,69	2,69	2,69	2,69	2,69
	1,00	3,10	3,10	3,10	3,10	3,10
$N_{R,k}$ [kN] for $t_{N,1}$ [mm]	0,40	1,40	1,40	1,40	1,40	1,40
	0,50	2,53	2,53	2,53	2,53	2,53
	0,55	2,53	2,53	2,53	2,53	2,53
	0,60	2,77	2,77	2,77	2,77	2,77
	0,63	2,77	2,77	2,77	2,77	2,77
	0,70	2,89	2,89	2,89	2,89	2,89
	0,75	2,89	2,89	2,89	2,89	2,89
	0,88	2,89	2,89	2,89	2,89	2,89
	1,00	3,10	3,10	4,10	4,27	4,27
max. head displacement "u" depending on sandwich panel thickness [mm]	30	0,7	0,7	0,7	0,7	0,7
	40	0,9	0,9	0,9	0,9	0,9
	50	1,2	1,2	1,2	1,2	1,2
	60	1,4	1,4	1,4	1,4	1,4
	70	1,6	1,6	1,6	1,6	1,6
	80	1,8	1,8	1,8	1,8	1,8
	90	2,1	2,1	2,1	2,1	2,1
	100	2,3	2,3	2,3	2,3	2,3
	110	2,5	2,5	2,5	2,5	2,5
	120	2,8	2,8	2,8	2,8	2,8
	130	3,0	3,0	3,0	3,0	3,0
	≥140	3,2	3,2	3,2	3,2	3,2

Fastening screws for sandwich panels

Self-drilling screws ESPS-6-P 6,3/5,5xL with hexagon head and washer A16

Annex 11

of European Technical Assessment ETA-16/0734