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European Technical Assessment

**ETA-17/0518
of 26/06/2019**

General part

Technical Assessment Body issuing the European Technical Assessment

Instytut Techniki Budowlanej

Trade name of the construction product

R-OCR-55/63, R-ONR-55/63, R-ORR-63/70,
R-OTR-63/70

Product family to which the construction product belongs

Fastening screws for sandwich panels

Manufacturer

RAWLPLUG S.A.
Kwidzyńska 6
51-416 Wrocław, Poland

Manufacturing plants

Manufacturing Plant no. 2
Manufacturing Plant no. 23
Manufacturing Plant no. 24

This European Technical Assessment contains

10 pages including 6 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-17/0518 issued on 30/06/2017

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Specific part

1. Technical description of the product

The fastening screws for sandwich panels R-OCR-55/63, R-ONR-55/63, R-ORR-63/70 and R-OTR-63/70 are a self-drilling and self-tapping screws listed in Table 1. Screws are completed with aluminum washer and an EPDM sealing ring. For details see the Annexes 2 to 5.

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

Table 1

No.	Screw	Material	Annex
1	R-OCR-55/63	galvanized carbon steel with additional zinc flake coating	2
2	R-ONR-55/63		3
3	R-ORR-63/70		4
4	R-OTR-63/70		5

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 5. 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.

Fastening screws for sandwich panels are intended to be used in internal environments with C1 corrosion according to EN ISO 12944-2.

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 5. The values were determined by tests according to EAD 330047-01-0602.

The design values shall be determined according to Annex 6 and EAD 330047-01-0602.

For the corrosion protection the rules given in EN 1993-1-3 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 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.

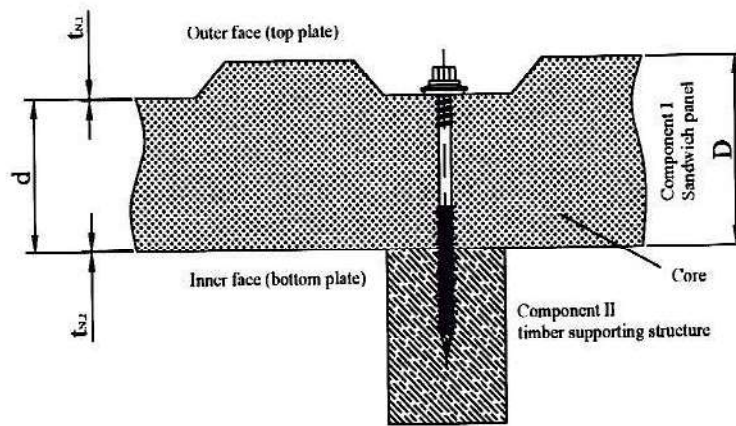
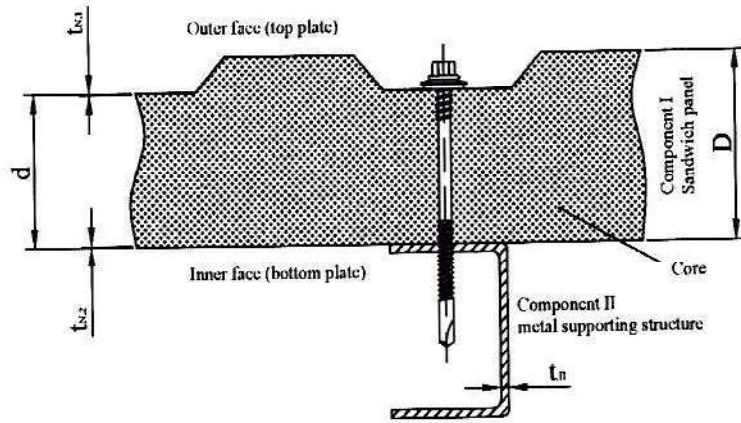
For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

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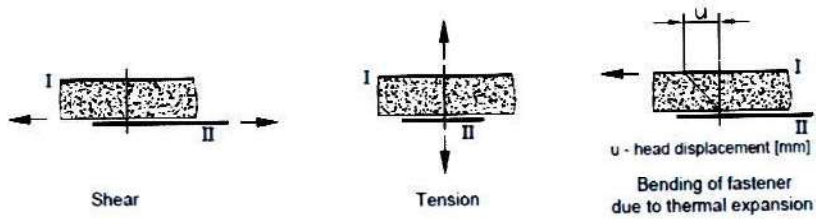


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Examples of execution of a connections



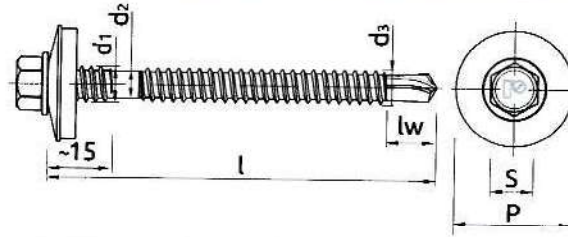
Loading conditions



Fastening screws for sandwich panels

Example of execution of a connections. Loading conditions

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Materials

Fastener: carbon steel – SAE1022 quenched, tempered and galvanized with additional zinc flake coating
 Washer: metallic washer made of aluminum with EPDM sealing ring

Component I: S280GD, S320GD or S350GD – EN 10346

Component II: S235 – EN 10025-1
 S280GD, S320GD or S350GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{I1}) \leq 6 \text{ mm}$

Timber substructures

no performance assessed

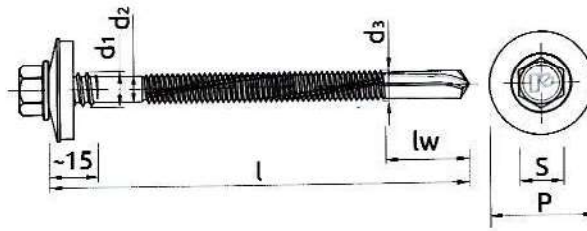
$t_{N,II}$ [mm]		1,50	2,00	2,50	3,00	4,00	$\geq 5,00$
$N_{R,k}$ [kN] for $t_{N,1}$ [mm]	0,40	1,86	1,86	1,86	1,86	1,86	1,86
	0,50	2,13	2,13	2,13	2,13	3,19	3,19
	0,55	2,13	2,13	2,13	2,13	3,19	3,19
	0,63	2,13	2,13	2,13	2,13	4,04	4,04
	0,75	2,13	2,13	2,13	2,13	4,15	4,15
	0,88	2,13	2,13	2,13	2,13	4,15	4,15
	1,00	2,13	2,13	2,13	2,13	4,15	4,15
$V_{R,k}$ [kN] for $t_{N,2}$ [mm]	0,40	0,86	0,86	0,86	0,86	0,86	0,86
	0,50	1,38	1,38	1,38	1,38	1,38	1,38
	0,55	1,38	1,38	1,38	1,38	1,38	1,38
	0,63	1,80	1,80	1,80	1,80	1,80	1,80
	0,75	2,23	2,23	2,23	2,23	2,23	2,23
	0,88	2,23	2,23	2,23	2,23	2,23	2,23
	1,00	2,23	2,23	2,23	2,23	2,23	2,23
max. head displacement "u" depending on sandwich panel thickness [mm]	30	12	12	12	12	1,5	1,5
	40	12	12	12	12	1,5	1,5
	50	12	12	12	12	1,5	1,5
	60	18	18	18	18	4	4
	70	18	18	18	18	4	4
	80	18	18	18	18	4	4
	90	23	23	23	23	10	10
	100	23	23	23	23	10	10
	110	23	23	23	23	10	10
	120	23	23	23	23	10	10
	130	23	23	23	23	10	10
≥ 140	23	23	23	23	10	10	

Fastening screws for sandwich panels

Self-drilling screws R-OCR-55/63 with hexagon head
 and aluminum washer $\geq \varnothing 19$

Annex 2

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 Technical Assessment
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Materials

Fastener: carbon steel – SAE1022 quenched, tempered and galvanized with additional zinc flake coating
 Washer: metallic washer made of aluminum with EPDM sealing ring

Component I: S280GD, S320GD or S350GD – EN 10346

Component II: S235 – EN 10025-1

S280GD, S320GD or S350GD – EN 10346

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

Timber substructures

no performance assessed

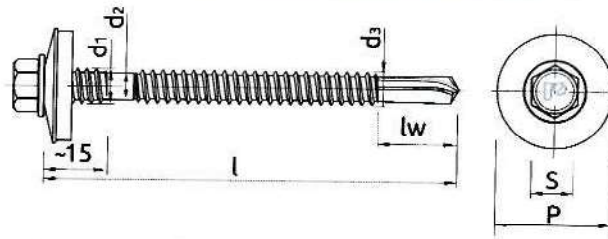
$t_{N,II}$ [mm]		4,00	5,00	6,00	7,00	$\geq 8,00$
$N_{R,k}$ [kN] for $t_{N,1}$ [mm]	0,40	1,86	1,86	1,86	1,86	1,86
	0,50	3,19	3,19	3,19	3,19	3,19
	0,55	3,19	3,19	3,19	3,19	3,19
	0,63	4,04	4,04	4,04	4,04	4,04
	0,75	4,15	4,15	4,15	4,15	4,15
	0,88	4,15	4,15	4,15	4,15	4,15
	1,00	4,15	4,15	4,15	4,15	4,15
$V_{R,k}$ [kN] for $t_{N,2}$ [mm]	0,40	0,86	0,86	0,86	0,86	0,86
	0,50	1,38	1,38	1,38	1,38	1,38
	0,55	1,38	1,38	1,38	1,38	1,38
	0,63	1,80	1,80	1,80	1,80	1,80
	0,75	2,23	2,23	2,23	2,23	2,23
	0,88	2,23	2,23	2,23	2,23	2,23
	1,00	2,23	2,23	2,23	2,23	2,23
max. head displacement "U" depending on sandwich panel thickness [mm]	30	1,5	1,5	1,5	1,5	1,5
	40	1,5	1,5	1,5	1,5	1,5
	50	1,5	1,5	1,5	1,5	1,5
	60	4	4	4	4	4
	70	4	4	4	4	4
	80	4	4	4	4	4
	90	10	10	10	10	10
	100	10	10	10	10	10
	110	10	10	10	10	10
	120	10	10	10	10	10
	≥ 140	10	10	10	10	10

Fastening screws for sandwich panels

Self-drilling screws R-ONR-55/63 with hexagon head
 and aluminum washer $\geq \varnothing 19$

Annex 3

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Materials

Fastener: carbon steel – SAE1022 quenched, tempered and galvanized with additional zinc flake coating
 Washer: metallic washer made of aluminum with EPDM sealing ring

Component I: S280GD, S320GD or S350GD – EN 10346

Component II: S235 – EN 10025-1
 S280GD, S320GD or S350GD – EN 10346

Drilling capacity: $\Sigma(t_{N2} + t_{II}) \leq 18 \text{ mm}$

Timber substructures

no performance assessed

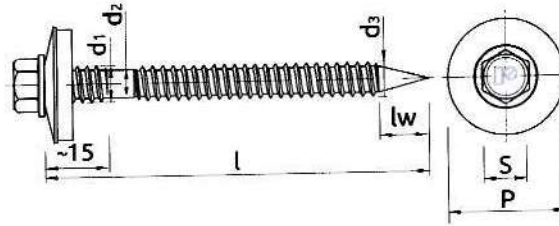
$t_{N,II} \text{ [mm]}$		8,00	9,00	10,00	11,00	$\geq 12,00$
$N_{R,k} \text{ [kN]}$ for $t_{N,1} \text{ [mm]}$	0,40	1,86	1,86	1,86	1,86	1,86
	0,50	3,19	3,19	3,19	3,19	3,19
	0,55	3,19	3,19	3,19	3,19	3,19
	0,63	4,04	4,04	4,04	4,04	4,04
	0,75	4,15	4,15	4,15	4,15	4,15
	0,88	4,15	4,15	4,15	4,15	4,15
	1,00	4,15	4,15	4,15	4,15	4,15
$V_{R,k} \text{ [kN]}$ for $t_{N,2} \text{ [mm]}$	0,40	1,10	1,10	1,10	1,10	1,10
	0,50	1,81	1,81	1,81	1,81	1,81
	0,55	1,81	1,81	1,81	1,81	1,81
	0,63	2,24	2,24	2,24	2,24	2,24
	0,75	2,84	2,84	2,84	2,84	2,84
	0,88	2,84	2,84	2,84	2,84	2,84
	1,00	2,84	2,84	2,84	2,84	2,84
max. head displacement "U" depending on sandwich panel thickness [mm]	30	1,5	1,5	1,5	1,5	1,5
	40	1,5	1,5	1,5	1,5	1,5
	50	1,5	1,5	1,5	1,5	1,5
	60	4	4	4	4	4
	70	4	4	4	4	4
	80	4	4	4	4	4
	90	10	10	10	10	10
	100	10	10	10	10	10
	110	10	10	10	10	10
	120	10	10	10	10	10
	130	10	10	10	10	10
≥ 140	10	10	10	10	10	

Fastening screws for sandwich panels

Self-drilling screws R-ORR-63/70 with hexagon head
 and aluminum washer $\geq \text{Ø } 19$

Annex 4

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Materials

Fastener: carbon steel – SAE1022 quenched, tempered and galvanized with additional zinc flake coating
 Washer: metallic washer made of aluminum with EPDM sealing ring

Component I: S280GD, S320GD or S350GD – EN 10346
 Component II: construction wood C24 – EN 14081

Drilling capacity: -

Timber substructures

for timber structures performance assessed with:

$M_{y,Rk} = 8,91 \text{ Nm}$

$f_{ax,k} = 17,362 \text{ N/mm}^2$ for $l_{ef} \geq 30 \text{ mm}$

Component II: wood class \geq C24		Effective length l_{ef} [mm]
		≥ 30
N_{Rk} [kN] for $t_{b,1}$ [mm]	0,40	1,86
	0,50	3,19
	0,55	3,19
	0,63	3,28
	0,75	3,28
	0,88	3,28
	1,00	3,28
V_{Rk} [kN] for $t_{b,2}$ [mm]	0,40	0,81
	0,50	1,38
	0,55	1,38
	0,63	1,66
	0,75	2,03
	0,88	2,03
	1,00	2,03
max. head displacement "u" depending on sandwich panel thickness [mm]	30	1
	40	1
	50	1
	60	1,5
	70	1,5
	80	1,5
	90	2
	100	2
	110	2
	120	2
	130	2
≥ 140	2	

Fastening screws for sandwich panels

Self-drilling screws R-OTR-63/70 with hexagon head and aluminum washer $\geq \text{Ø } 19$

Annex 5

of European Technical Assessment
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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 $\gamma_M = 1,33$. 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 $\gamma_M = 1,33$. 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 $\gamma_M = 1,33$. 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 $\gamma_M = 1,33$. 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 $\gamma_M = 1,33$. 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.

Fastening screws for sandwich panels

Determination of design values

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