Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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European Technical Assessment ETA-10/0183 of 25 June 2018

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	OCWS 4,8 x L, OCWS 5,5 x L, OCS 5,5 x L, ONS 5,5 x L, ODWS 6,5 x L
Product family to which the construction product belongs	Fastening screws for metal members and sheeting
Manufacturer	RAWLPLUG S.A. Kwidzynska 6 51-416 WROCLAW POLEN
Manufacturing plant	Production plant No. 2
This European Technical Assessment contains	15 pages including 11 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	EAD 330046-01-0602

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Specific part

1 Technical description of the product

The fastening screws are self-drilling or self-tapping screws made of austenitic stainless steel or carbon steel with anticorrosion coating (listed in Table 1). The fastening screws are normally completed with sealing washers consisting of metal washer and EPDM-seal.

Table 1 – Fastening screws for metal members and sheeting

No.	Self drilling screw	Description	Annex
1	OCWS-4,8	with hexagon head and sealing washer ≥ Ø14 mm	Annex 4
2	OCWS-5,5	with hexagon head and sealing washer ≥ Ø16 mm	Annex 5
3	OCWS-5,5	with hexagon head and sealing washer ≥ Ø16 mm	Annex 6
4*)	ODWS-6,5	with hexagon head and sealing washer ≥ Ø16 mm	Annex 7
5*)	OCS-5,5	with hexagon head and sealing washer ≥ Ø16 mm	Annex 8
6	OCS-5,5	with hexagon head and sealing washer ≥ Ø16 mm	Annex 9
7	ONS-5,5	with hexagon head and sealing washer ≥ Ø16 mm	Annex 10
8	ONS-5,5	with hexagon head	Annex 11

*) **These self drilling screws are applicable for fastening to timber substructure.**

2 Specification of the intended use in accordance with the applicable European Assessment Document 330046-01-0602

The fastening screws are intended to be used for fastening metal sheeting to metal or timber substructures. The sheeting can either be used as wall or roof cladding or as load bearing wall and roof element. The fastening screws can also be used for the fastening of any other thin gauge metal members. 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). The fastening screws are not intended for re-use.

The performances given in Section 3 are only valid if the fastening screws are used in compliance with the specifications and conditions given in Annexes (1-11).

The verification and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastening screws of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Shear Resistance of the Connection	see Annexes to this ETA
Tension Resistance of the Connection	see Annexes to this ETA
Design Resistance in case of combined Tension and Shear Forces (interaction)	see Annexes to this ETA
Check of Deformation Capacity in case of constraining forces due to temperature	No performance assessed
Durability	No performance assessed

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Performance Class A1

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

In accordance with EAD No. 330046-01-0602, the applicable European legal act is: Commission Decision 1998/214/EC, amended by 2001/596/EC.

The system to be applied is: 2+

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

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

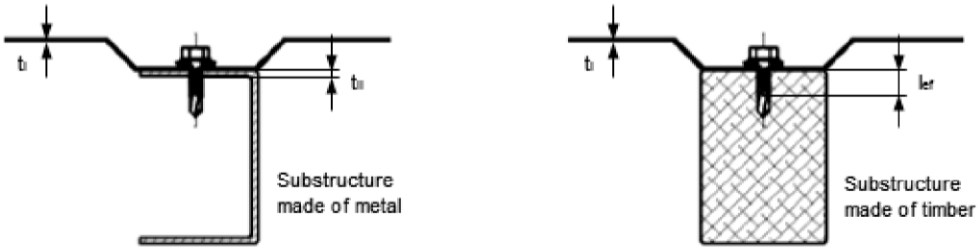
Issued in Berlin on 25 June 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Schult

Deutsches Institut für Bautechnik DIBt

Examples of execution of a connection



Materials and dimensions

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

Fastener	Material of the fastening screw
Washer	Material of the sealing washer
Component I	Material of the metal member or sheeting
Component II	Material of the substructure

t_I	Thickness 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)
d_{dp}	Pre-drill diameter of component I and component II
$d_{dp,I}$	Pre-drill diameter of component I

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

Performance characteristics

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

$N_{R,k}$	Characteristic value of tension resistance
$V_{R,k}$	Characteristic value of shear resistance

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

$N_{R,I,k}$	Characteristic value of pull-through resistance for component I
$N_{R,II,k}$	Characteristic value of pull-out resistance for component II
$V_{R,I,k}$	Characteristic value of hole bearing resistance for component I
$V_{R,II,k}$	Characteristic value of hole bearing resistance for component II
$M_{y,Rk}$	Characteristic value of yield moment of the fastening screw (for component II made of timber)
$f_{ax,k}$	Characteristic value of withdrawal strength for component II made of timber
$f_{h,k}$	Characteristic value of embedding strength for component II made of timber

Terms and explanations	Annex 1
Fastening screws for metal members and sheeting	

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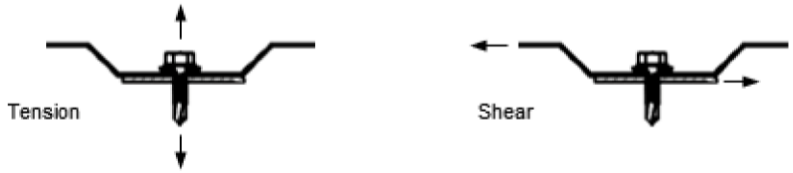
Occurred loadings of a connection



Design values

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

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

$N_{R,d}$	Design value of tension resistance
$V_{R,d}$	Design value of shear resistance
γ_M	Partial safety factor

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

Special conditions

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

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

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

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

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

Types of connection

For the types of connection (a, b, c, d) given in the Annexes of the fastening screws, it is not necessary to take into account the effect of constraints due to temperature. For other types of connection the effect of constraints have to be taken into account, unless they do not occur or are not significant (e.g. sufficient flexibility of the substructure).

Installation conditions

The installation is carried out according to manufacturer's instruction.

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

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

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

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

Design and installation	Annex 2
Fastening screws for metal members and sheeting	

Component I made of perforated sheeting

The characteristic values of tension and shear resistance are determined as follows:

$$N_{R,k} = \min \begin{Bmatrix} N_{R,I,k} \\ N_{R,II,k} \end{Bmatrix} \qquad V_{R,k} = \min \begin{Bmatrix} V_{R,I,k} \\ V_{R,k} \end{Bmatrix}$$

$N_{R,I,k}$ and $V_{R,I,k}$ are given in Annex 4 and 5.

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

Component I made of aluminium alloy

The characteristic value of tension resistance is determined as follows:

$$N_{R,k} = \min \begin{Bmatrix} N_{R,I,k} \\ N_{R,II,k} \end{Bmatrix}$$

$N_{R,I,k}$ is determined according to EN 1999-1-4:2007 + AC:2009, equation (8.13).

$N_{R,II,k}$ is given in the Annex of the fastening screw.

Component II made of timber

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

$$N_{R,k} = \min \begin{Bmatrix} N_{R,I,k} \\ N_{R,II,k} * k_{mod} \end{Bmatrix} \qquad V_{R,k} = \min \begin{Bmatrix} V_{R,I,k} \\ V_{R,II,k} * k_{mod} \end{Bmatrix}$$

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

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

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

Additional provisions	Annex 3
Fastening screws for metal members and sheeting	

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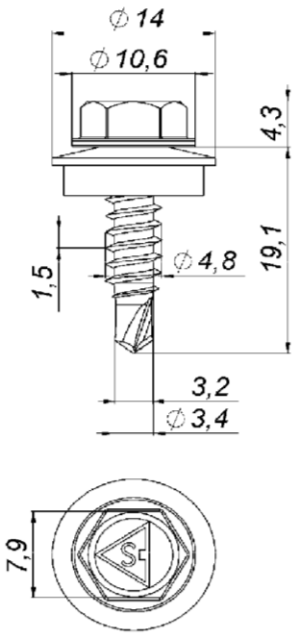

Materials

Fastener: stainless steel (1.4301) - EN 10088
Bi-metal

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: S280GD, S320GD or S350GD - EN 10346

Drilling capacity $\Sigma t_i \leq 2{,}00$ mm

Timber substructures

no performance determined

	$t_{N,II}$ [mm]	0,40	0,50	0,55	0,63	0,75	0,88	1,00	1,13	1,25	1,50
	$M_{t,nom}$	3 Nm							3,5 Nm		
$V_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,40	0,57	0,71	0,77	0,86	1,05	1,05	1,05	1,05	1,05	1,05
	0,50	0,57	0,88	0,94	1,07	1,05	1,05	1,05	1,05	1,05	1,05
	0,55	0,57	0,88	1,11	1,17	1,20	1,20	1,20	1,20	1,20	—
	0,63	0,57	0,88	1,11	1,34	1,34	1,34	1,34	1,34	1,34	—
	0,75	0,57	0,88	1,11	1,34	1,61	1,61	1,61	1,61	1,61	—
	0,88	0,57	0,88	1,11	1,34	1,61	2,01	2,01	—	—	—
	1,00	0,57	0,88	1,11	1,34	1,61	2,01	2,40	—	—	—
	1,13	0,57	0,88	1,11	1,34	1,61	—	—	—	—	—
	1,25	0,57	0,88	1,11	1,34	1,61	—	—	—	—	—
	1,50	0,57	0,88	—	—	—	—	—	—	—	—
	1,75	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,40	0,35	0,45	0,51	0,62	0,81	1,04	1,29	1,49	1,49	1,49
	0,50	0,35	0,45	0,51	0,62	0,81	1,04	1,29	1,49	1,49	1,49
	0,55	0,35	0,45	0,51	0,62	0,81	1,04	1,29	1,49	1,49	—
	0,63	0,35	0,45	0,51	0,62	0,81	1,04	1,29	1,49	1,49	—
	0,75	0,35	0,45	0,51	0,62	0,81	1,04	1,29	1,49	1,49	—
	0,88	0,35	0,45	0,51	0,62	0,81	1,04	1,29	—	—	—
	1,00	0,35	0,45	0,51	0,62	0,81	1,04	1,29	—	—	—
	1,13	0,35	0,45	0,51	0,62	0,81	—	—	—	—	—
	1,25	0,35	0,45	0,51	0,62	0,81	—	—	—	—	—
	1,50	0,35	0,45	—	—	—	—	—	—	—	—
	1,75	—	—	—	—	—	—	—	—	—	—

OCWS 4,8 x L, OCWS 5,5 x L, OCS 5,5 x L, ONS 5,5 x L,
ODWS 6,5 x L

OCWS-4,8
with hexagon head and sealing washer ≥ Ø14 mm

Annex 4

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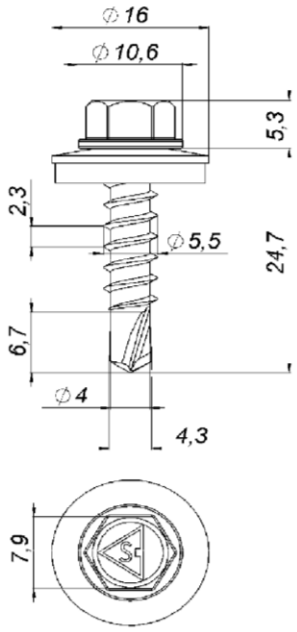

Materials

Fastener: stainless steel (1.4301) - EN 10088
Bi-metal

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: S235 or S275 - EN 10025-1
S280GD, S320GD or S350GD - EN 10346

Drilling capacity $\Sigma t_i \leq 6{,}00$ mm

Timber substructures

no performance determined

$t_{N,II}$ [mm]		1,00	1,13	1,25	1,50	1,75	2,00	2,50	3,00
$M_{t,nom}$		3 Nm		4 Nm					4,5 Nm
$V_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	1,30 —	1,30 —	1,30 —	1,30 —	1,30 —	1,30 —	1,30 —	1,30 —
	0,55	1,36 —	1,36 —	1,36 —	1,36 —	1,36 —	1,36 —	1,36 —	1,36 —
	0,63	1,45 —	1,68 —	1,91 —	1,91 —	1,91 —	1,91 —	1,91 —	1,91 —
	0,75	1,69 —	1,88 —	2,08 —	2,13 —	2,18 —	2,18 —	2,18 —	2,18 —
	0,88	1,90 —	2,08 —	2,26 —	2,36 —	2,47 —	2,63 —	2,87 —	3,13 —
	1,00	2,11 —	2,24 —	2,42 —	2,59 —	2,74 —	3,08 —	3,57 —	4,08 —
	1,13	2,11 —	2,24 —	2,42 —	2,71 —	2,99 —	3,40 —	4,13 —	4,88 —
	1,25	2,11 —	2,24 —	2,42 —	2,83 —	3,23 —	3,72 —	4,70 —	5,68 —
	1,50	2,11 —	2,24 —	2,42 —	2,83 —	3,23 —	3,72 —	4,70 —	5,68 —
	1,75	2,11 —	2,24 —	2,42 —	2,83 —	3,23 —	3,72 —	4,70 —	5,68 —
	2,00	2,11 —	2,24 —	2,42 —	2,83 —	3,23 —	3,72 —	4,70 —	5,68 —
$N_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	0,80 —	1,06 —	1,29 —	1,67 —	1,67 —	1,67 —	1,67 —	1,67 —
	0,55	0,80 —	1,06 —	1,29 —	1,79 —	1,92 —	1,92 —	1,92 —	1,92 —
	0,63	0,80 —	1,06 —	1,29 —	1,79 —	2,30 —	2,32 —	2,32 —	2,32 —
	0,75	0,80 —	1,06 —	1,29 —	1,79 —	2,30 —	2,81 —	2,93 —	2,93 —
	0,88	0,80 —	1,06 —	1,29 —	1,79 —	2,30 —	2,81 —	3,61 —	3,61 —
	1,00	0,80 —	1,06 —	1,29 —	1,79 —	2,30 —	2,81 —	3,85 —	4,25 —
	1,13	0,80 —	1,06 —	1,29 —	1,79 —	2,30 —	2,81 —	3,85 —	4,25 —
	1,25	0,80 —	1,06 —	1,29 —	1,79 —	2,30 —	2,81 —	3,85 —	4,25 —
	1,50	0,80 —	1,06 —	1,29 —	1,79 —	2,30 —	2,81 —	3,85 —	4,25 —
	1,75	0,80 —	1,06 —	1,29 —	1,79 —	2,30 —	2,81 —	3,85 —	4,25 —
	2,00	0,80 —	1,06 —	1,29 —	1,79 —	2,30 —	2,81 —	3,85 —	4,25 —

OCWS 4,8 x L, OCWS 5,5 x L, OCS 5,5 x L, ONS 5,5 x L,
ODWS 6,5 x L

OCWS-5,5
with hexagon head and sealing washer ≥ Ø16 mm

Annex 5

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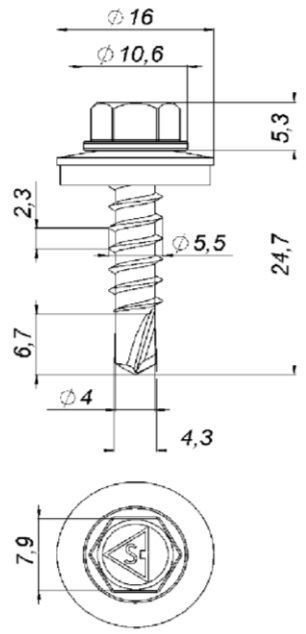

Materials

Fastener: stainless steel (1.4301) - EN 10088
Bi-metal

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: S280GD, S320GD or S350GD - EN 10346

Drilling capacity $\Sigma t_i \leq 6{,}00$ mm

Timber substructures

no performance determined

$t_{N,II}$ [mm]		2 x 0,63		2 x 0,75		2 x 0,88		2 x 1,00		—		—		—		—	
$M_{t,nom}$		5 Nm								—							
$V_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	1,17	—	1,17	—	1,17	—	1,17	—	—	—	—	—	—	—	—	—
	0,55	1,17	—	1,17	—	1,17	—	1,17	—	—	—	—	—	—	—	—	—
	0,63	1,17	—	1,47	—	1,47	—	1,47	—	—	—	—	—	—	—	—	—
	0,75	1,17	—	1,47	—	1,60	—	1,74	—	—	—	—	—	—	—	—	—
	0,88	1,17	—	1,47	—	1,60	—	1,74	—	—	—	—	—	—	—	—	—
	1,00	1,17	—	1,47	—	1,60	—	1,74	—	—	—	—	—	—	—	—	—
	1,13	1,17	—	1,47	—	1,60	—	1,74	—	—	—	—	—	—	—	—	—
	1,25	1,17	—	1,47	—	1,60	—	1,74	—	—	—	—	—	—	—	—	—
	1,50	1,17	—	1,47	—	1,60	—	1,74	—	—	—	—	—	—	—	—	—
	1,75	1,17	—	1,47	—	1,60	—	1,74	—	—	—	—	—	—	—	—	—
	2,00	1,17	—	1,47	—	1,60	—	1,74	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	1,03	—	1,41	—	1,67	—	1,67	—	—	—	—	—	—	—	—	—
	0,55	1,03	—	1,41	—	1,90	—	1,92	—	—	—	—	—	—	—	—	—
	0,63	1,03	—	1,41	—	1,90	—	2,32	—	—	—	—	—	—	—	—	—
	0,75	1,03	—	1,41	—	1,90	—	2,42	—	—	—	—	—	—	—	—	—
	0,88	1,03	—	1,41	—	1,90	—	2,42	—	—	—	—	—	—	—	—	—
	1,00	1,03	—	1,41	—	1,90	—	2,42	—	—	—	—	—	—	—	—	—
	1,13	1,03	—	1,41	—	1,90	—	2,42	—	—	—	—	—	—	—	—	—
	1,25	1,03	—	1,41	—	1,90	—	2,42	—	—	—	—	—	—	—	—	—
	1,50	1,03	—	1,41	—	1,90	—	2,42	—	—	—	—	—	—	—	—	—
	1,75	1,03	—	1,41	—	1,90	—	2,42	—	—	—	—	—	—	—	—	—
	2,00	1,03	—	1,41	—	1,90	—	2,42	—	—	—	—	—	—	—	—	—

OCWS 4,8 x L, OCWS 5,5 x L, OCS 5,5 x L, ONS 5,5 x L,
ODWS 6,5 x L

OCWS-5,5
with hexagon head and sealing washer ≥ Ø16 mm

Annex 6

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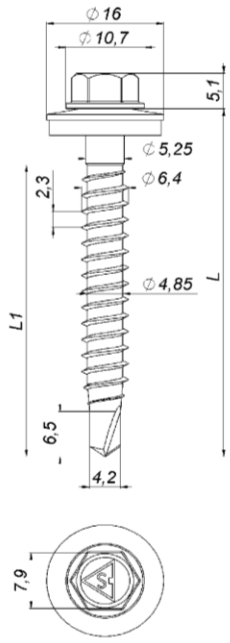

Materials

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Bi-metal
Washer: stainless steel (1.4301) - EN 10088
Component I: S280GD, S320GD or S350GD - EN 10346
Component II: S235 or S275 - EN 10025-1
S280GD, S320GD or S350GD - EN 10346

Drilling capacity

$\Sigma t_i \leq 6{,}00$ mm

Timber substructures

performance determined with

$M_{y,Rk}$ = 9,742 Nm
$f_{ax,k}$ = 11,070 N/mm² for $l_{ef} \geq 25{,}0$ mm

	$t_{N,II}$ [mm]	1,50		2,00		2,50		3,00		4,00		5,00		—			
	$M_{t,nom}$	5 Nm												—			
$V_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,40	1,02	—	1,02	—	1,02	—	1,02	—	1,02	—	1,02	—	—	—	1,02	bearing resistance of component I
	0,50	1,34	—	1,34	—	1,34	—	1,34	—	1,34	—	1,34	—	—	—	1,34	
	0,55	1,47	—	1,47	—	1,47	—	1,47	—	1,47	—	1,47	—	—	—	1,47	
	0,63	1,71	—	1,71	—	1,71	—	1,71	—	1,71	—	1,71	—	—	—	1,71	
	0,75	2,23	—	2,23	—	2,23	—	2,23	—	2,23	—	2,23	—	—	—	2,23	
	0,88	2,86	—	2,86	—	2,86	—	2,86	—	2,86	—	2,86	—	—	—	2,86	
	1,00	3,52	—	3,52	—	3,52	—	3,52	—	3,52	—	3,52	—	—	—	3,52	
	1,13	3,52	—	3,52	—	3,52	—	3,52	—	3,52	—	—	—	—	—	3,52	
	1,25	3,52	—	3,52	—	3,52	—	3,52	—	3,52	—	—	—	—	—	3,52	
	1,50	3,52	—	3,52	—	3,52	—	3,52	—	3,52	—	—	—	—	—	3,52	
	1,75	3,52	—	3,52	—	3,52	—	3,52	—	3,52	—	—	—	—	—	3,52	
$N_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,40	1,18	—	1,18	—	1,18	—	1,18	—	1,18	—	1,18	—	—	—	1,18	pull-through resistance of component I
	0,50	1,67	—	1,67	—	1,67	—	1,67	—	1,67	—	1,67	—	—	—	1,67	
	0,55	1,92	—	1,92	—	1,92	—	1,92	—	1,92	—	1,92	—	—	—	1,92	
	0,63	2,32	—	2,32	—	2,32	—	2,32	—	2,32	—	2,32	—	—	—	2,32	
	0,75	2,80	—	2,80	—	2,80	—	2,80	—	2,80	—	2,80	—	—	—	2,93	
	0,88	2,80	—	2,80	—	2,80	—	2,80	—	2,80	—	2,80	—	—	—	3,61	
	1,00	2,80	—	2,80	—	2,80	—	2,80	—	2,80	—	2,80	—	—	—	4,25	
	1,13	2,80	—	2,80	—	2,80	—	2,80	—	2,80	—	—	—	—	—	4,25	
	1,25	2,80	—	2,80	—	2,80	—	2,80	—	2,80	—	—	—	—	—	4,25	
	1,50	2,80	—	2,80	—	2,80	—	2,80	—	2,80	—	—	—	—	—	4,25	
	1,75	2,80	—	2,80	—	2,80	—	2,80	—	2,80	—	—	—	—	—	4,25	

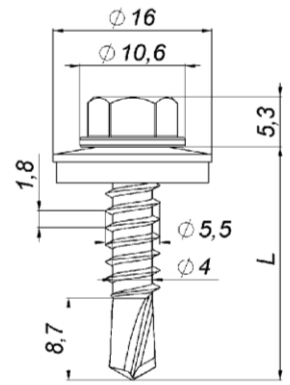
The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_a = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see Annex 3 (Component II made of timber).

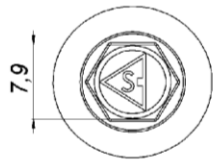
OCWS 4,8 x L, OCWS 5,5 x L, OCS 5,5 x L, ONS 5,5 x L,
ODWS 6,5 x L

ODWS-6,5
with hexagon head and sealing washer ≥ Ø16 mm

Annex 7

Deutsches Institut für Bautechnik DIBt





Materials

Fastener: stainless steel (1.4301) - EN 10088
Bi-metal
Washer: stainless steel (1.4301) - EN 10088
Component I: S280GD, S320GD or S350GD - EN 10346
Component II: S235 or S275 - EN 10025-1
S280GD, S320GD or S350GD - EN 10346

Drilling capacity

$\Sigma t_i \leq 6{,}00$ mm

Timber substructures

performance determined with

$M_{y,Rk}$ = 6,310 Nm
$f_{ax,k}$ = 10,860 N/mm² for $l_{ef} \geq 25{,}0$ mm

	$t_{N,II}$ [mm]	1,00		1,13		1,25		1,50		1,75		2,00		2,50		3,00		
	$M_{t,nom}$	4 Nm						4,5 Nm						5 Nm				
$V_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	1,21	—	1,21	—	1,21	—	1,21	—	1,21	—	1,21	—	1,21	—	1,21	—	1,23
	0,55	1,29	—	1,29	—	1,29	—	1,29	—	1,29	—	1,29	—	1,29	—	1,29	—	1,29
	0,63	1,42	—	1,42	—	1,42	—	1,50	—	1,57	—	1,57	—	1,57	—	1,57	—	1,57
	0,75	1,60	—	1,60	—	1,60	—	1,75	—	1,90	—	1,90	—	1,90	—	1,90	—	2,15
	0,88	1,76	—	1,76	—	1,76	—	2,01	—	2,26	—	2,26	—	2,26	—	2,26	—	2,26
	1,00	1,88	—	1,88	—	1,88	—	2,24	—	2,59	—	2,59	—	2,70	—	2,81	—	2,81
	1,13	1,88	—	1,88	—	1,88	—	2,43	—	2,98	—	2,98	—	3,20	—	3,42	—	3,42
	1,25	1,88	—	1,88	—	1,88	—	2,62	—	3,37	—	3,37	—	3,70	—	4,03	—	4,03
	1,50	1,88	—	1,88	—	1,88	—	2,62	—	3,37	—	3,37	—	3,70	—	4,03	—	4,03
	1,75	1,88	—	1,88	—	1,88	—	2,62	—	3,37	—	3,37	—	3,70	—	4,03	—	4,03
	2,00	1,88	—	1,88	—	1,88	—	2,62	—	3,37	—	3,37	—	3,70	—	4,03	—	4,03
$N_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	1,00	—	1,17	—	1,34	—	1,67	—	1,67	—	1,67	—	1,67	—	1,67	—	1,67
	0,55	1,00	—	1,17	—	1,34	—	1,71	—	1,92	—	1,92	—	1,92	—	1,92	—	1,92
	0,63	1,00	—	1,17	—	1,34	—	1,71	—	2,14	—	2,32	—	2,32	—	2,32	—	2,32
	0,75	1,00	—	1,17	—	1,34	—	1,71	—	2,14	—	2,60	—	2,93	—	2,93	—	2,93
	0,88	1,00	—	1,17	—	1,34	—	1,71	—	2,14	—	2,60	—	3,61	—	3,61	—	3,61
	1,00	1,00	—	1,17	—	1,34	—	1,71	—	2,14	—	2,60	—	3,68	—	4,25	—	4,25
	1,13	1,00	—	1,17	—	1,34	—	1,71	—	2,14	—	2,60	—	3,68	—	4,25	—	4,25
	1,25	1,00	—	1,17	—	1,34	—	1,71	—	2,14	—	2,60	—	3,68	—	4,25	—	4,25
	1,50	1,00	—	1,17	—	1,34	—	1,71	—	2,14	—	2,60	—	3,68	—	4,25	—	4,25
	1,75	1,00	—	1,17	—	1,34	—	1,71	—	2,14	—	2,60	—	3,68	—	4,25	—	4,25
	2,00	1,00	—	1,17	—	1,34	—	1,71	—	2,14	—	2,60	—	3,68	—	4,25	—	4,25

bearing resistance of component I

pull-through resistance of component I

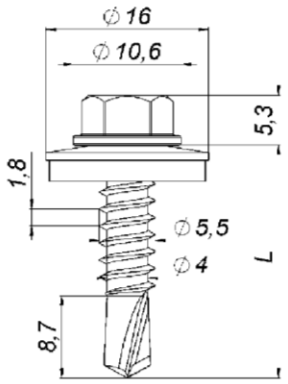
The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_a = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see Annex 3 (Component II made of timber).

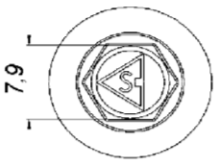
OCWS 4,8 x L, OCWS 5,5 x L, OCS 5,5 x L, ONS 5,5 x L,
ODWS 6,5 x L

OCS-5,5
with hexagon head and sealing washer ≥ Ø16 mm

Annex 8

Deutsches Institut für Bautechnik DIBt





Materials

Fastener: stainless steel (1.4301) - EN 10088
Bi-metal

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: S235 or S275 - EN 10025-1
S280GD, S320GD or S350GD - EN 10346

Drilling capacity $\Sigma t_i \leq 6{,}00$ mm

Timber substructures

no performance determined

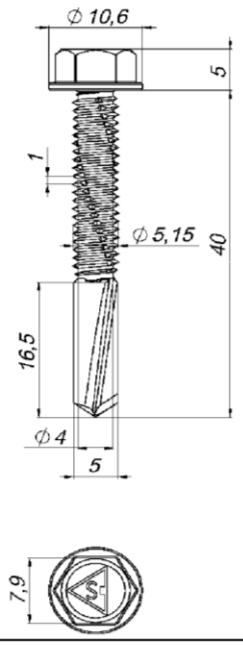
$t_{N,II}$ [mm]		2 x 0,63		2 x 0,75		2 x 0,88		2 x 1,00		—		—		—		—	
$M_{t,nom}$		4 Nm								—							
$V_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	1,23	—	1,23	—	1,23	—	1,23	—	—	—	—	—	—	—	—	—
	0,55	1,23	—	1,23	—	1,23	—	1,23	—	—	—	—	—	—	—	—	—
	0,63	1,23	—	1,51	—	1,51	—	1,51	—	—	—	—	—	—	—	—	—
	0,75	1,23	—	1,51	—	1,83	—	2,15	—	—	—	—	—	—	—	—	—
	0,88	1,23	—	1,51	—	1,83	—	2,15	—	—	—	—	—	—	—	—	—
	1,00	1,23	—	1,51	—	1,83	—	2,15	—	—	—	—	—	—	—	—	—
	1,13	1,23	—	1,51	—	1,83	—	2,15	—	—	—	—	—	—	—	—	—
	1,25	1,23	—	1,51	—	1,83	—	2,15	—	—	—	—	—	—	—	—	—
	1,50	1,23	—	1,51	—	1,83	—	2,15	—	—	—	—	—	—	—	—	—
	1,75	1,23	—	1,51	—	1,83	—	2,15	—	—	—	—	—	—	—	—	—
	2,00	1,23	—	1,51	—	1,83	—	2,15	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	0,98	—	1,33	—	1,66	—	1,67	—	—	—	—	—	—	—	—	—
	0,55	0,98	—	1,33	—	1,66	—	1,92	—	—	—	—	—	—	—	—	—
	0,63	0,98	—	1,33	—	1,66	—	1,93	—	—	—	—	—	—	—	—	—
	0,75	0,98	—	1,33	—	1,66	—	1,93	—	—	—	—	—	—	—	—	—
	0,88	0,98	—	1,33	—	1,66	—	1,93	—	—	—	—	—	—	—	—	—
	1,00	0,98	—	1,33	—	1,66	—	1,93	—	—	—	—	—	—	—	—	—
	1,13	0,98	—	1,33	—	1,66	—	1,93	—	—	—	—	—	—	—	—	—
	1,25	0,98	—	1,33	—	1,66	—	1,93	—	—	—	—	—	—	—	—	—
	1,50	0,98	—	1,33	—	1,66	—	1,93	—	—	—	—	—	—	—	—	—
	1,75	0,98	—	1,33	—	1,66	—	1,93	—	—	—	—	—	—	—	—	—
	2,00	0,98	—	1,33	—	1,66	—	1,93	—	—	—	—	—	—	—	—	—

OCWS 4,8 x L, OCWS 5,5 x L, OCS 5,5 x L, ONS 5,5 x L,
ODWS 6,5 x L

OCS-5,5
with hexagon head and sealing washer ≥ Ø16 mm

Annex 9

Deutsches Institut für Bautechnik DIBt



Materials

Fastener: stainless steel (1.4301) - EN 10088
Bi-metal

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: S235 or S275 - EN 10025-1
S280GD, S320GD or S350GD - EN 10346

Drilling capacity $\Sigma t_i \leq 12{,}00$ mm

Timber substructures

no performance determined

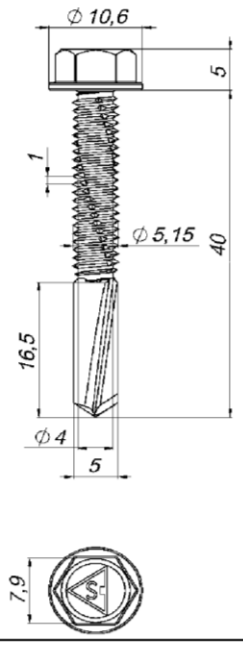
$t_{N,II}$ [mm]		4,00	5,00	6,00	7,00	8,00	9,00	10,0	11,0
$M_{t,nom}$		7 Nm							
$V_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	1,38 —	1,38 —	1,38 —	1,38 —	1,38 —	1,38 —	1,38 —	1,38 —
	0,55	1,53 —	1,53 —	1,53 —	1,53 —	1,53 —	1,53 —	1,53 —	1,53 —
	0,63	1,85 —	1,85 —	1,85 —	1,85 —	1,85 —	1,85 —	1,85 —	1,85 —
	0,75	2,18 —	2,18 —	2,18 —	2,18 —	2,18 —	2,18 —	2,18 —	2,18 —
	0,88	2,76 —	2,76 —	2,76 —	2,76 —	2,76 —	2,76 —	2,76 —	2,76 —
	1,00	3,22 —	3,22 —	3,22 —	3,22 —	3,22 —	3,22 —	3,22 —	3,22 —
	1,13	3,55 —	3,55 —	3,55 —	3,55 —	3,55 —	3,55 —	3,55 —	— —
	1,25	3,90 —	5,87 —	5,87 —	5,87 —	5,87 —	5,87 —	5,87 —	— —
	1,50	4,53 —	6,63 —	6,63 —	6,63 —	6,63 —	6,63 —	6,63 —	— —
	1,75	5,05 —	7,39 —	7,39 —	7,39 —	7,39 —	7,39 —	7,39 —	— —
	2,00	5,45 —	8,16 —	8,16 —	8,16 —	8,16 —	8,16 —	8,16 —	— —
$N_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	1,67 —	1,67 —	1,67 —	1,67 —	1,67 —	1,67 —	1,67 —	1,67 —
	0,55	1,92 —	1,92 —	1,92 —	1,92 —	1,92 —	1,92 —	1,92 —	1,92 —
	0,63	2,32 —	2,32 —	2,32 —	2,32 —	2,32 —	2,32 —	2,32 —	2,32 —
	0,75	2,93 —	2,93 —	2,93 —	2,93 —	2,93 —	2,93 —	2,93 —	2,93 —
	0,88	2,96 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —
	1,00	2,96 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —
	1,13	2,96 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	— —
	1,25	2,96 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	— —
	1,50	2,96 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	— —
	1,75	2,96 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	— —
	2,00	2,96 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	3,30 —	— —

OCWS 4,8 x L, OCWS 5,5 x L, OCS 5,5 x L, ONS 5,5 x L,
ODWS 6,5 x L

ONS-5,5
with hexagon head and sealing washer ≥ Ø16 mm

Annex 10

Deutsches Institut für Bautechnik DIBt



Materials

Fastener: stainless steel (1.4301) - EN 10088
Bi-metal

Washer: none

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: S235 or S275 - EN 10025-1
S280GD, S320GD or S350GD - EN 10346

Drilling capacity

$\Sigma t_i \leq 12{,}00$ mm

Timber substructures

no performance determined

$t_{N,II}$ [mm]		4,00	5,00	6,00	7,00	8,00	9,00	10,0	11,0
$M_{t,nom}$		7 Nm							
$V_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	1,38 —	1,38 —	1,38 —	1,38 —	1,38 —	1,38 —	1,38 —	1,38 —
	0,55	1,53 —	1,53 —	1,53 —	1,53 —	1,53 —	1,53 —	1,53 —	1,53 —
	0,63	1,85 —	1,85 —	1,85 —	1,85 —	1,85 —	1,85 —	1,85 —	1,85 —
	0,75	2,18 —	2,18 —	2,18 —	2,18 —	2,18 —	2,18 —	2,18 —	2,18 —
	0,88	2,76 —	2,76 —	2,76 —	2,76 —	2,76 —	2,76 —	2,76 —	2,76 —
	1,00	3,22 —	3,22 —	3,22 —	3,22 —	3,22 —	3,22 —	3,22 —	3,22 —
	1,13	3,55 —	3,55 —	3,55 —	3,55 —	3,55 —	3,55 —	3,55 —	— —
	1,25	3,90 —	5,87 —	5,87 —	5,87 —	5,87 —	5,87 —	5,87 —	— —
	1,50	4,53 —	6,63 —	6,63 —	6,63 —	6,63 —	6,63 —	6,63 —	— —
	1,75	5,05 —	7,39 —	7,39 —	7,39 —	7,39 —	7,39 —	7,39 —	— —
	2,00	5,45 —	8,16 —	8,16 —	8,16 —	8,16 —	8,16 —	8,16 —	— —
$N_{R,k}$ [kN] for $t_{N,I}$ [mm]	0,50	1,40 —	1,40 —	1,40 —	1,40 —	1,40 —	1,40 —	1,40 —	1,40 —
	0,55	1,57 —	1,57 —	1,57 —	1,57 —	1,57 —	1,57 —	1,57 —	1,57 —
	0,63	1,81 —	1,81 —	1,81 —	1,81 —	1,81 —	1,81 —	1,81 —	1,81 —
	0,75	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —
	0,88	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —
	1,00	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —
	1,13	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	— —
	1,25	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	— —
	1,50	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	— —
	1,75	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	— —
	2,00	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	2,09 —	— —

OCWS 4,8 x L, OCWS 5,5 x L, OCS 5,5 x L, ONS 5,5 x L, ODWS 6,5 x L

ONS-5,5
with hexagon head

Annex 11