European Technical Assessment

ETA-10/0021 of 23 April 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	CORONA, HWH, MH, DC and LP
Product family to which the construction product belongs	Fastening screws for metal members and sheeting
Manufacturer	RED HORSE dissing as Niels Bohrs Vej 25 8660 Skanderborg DÄNEMARK
Manufacturing plant	RED HORSE / dissing as Niels Bohr Vej 25-27 8660 Skanderborg Denmark GEXIN, No. 131, Yusing Road, Gushan District, Kaohsiung 804, Taiwan R.O.C.
This European Technical Assessment contains	40 pages including 35 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

Annex	Fastening screw	Description
Annex 4	CORONA 4,8L#1 TX20 EPDM-9,5B	with undercut, mushroom head with Torx T-20 drive and EPDM seal ring
Annex 5	CORONA 4,8L#2+ TX20 EPDM-9,5B	with undercut, mushroom head with Torx T-20 drive and EPDM seal ring
Annex 6*)	CORONA 4,8L#1 TX20 EPDM-9,5B for timber substructures	with undercut, mushroom head with Torx T-20 drive and EPDM seal ring
Annex 7	HWH 4,8L#1 HX8 ALU-14B	with hexagon head and seal washer ∅ ≥ 14 mm
Annex 8	HWH 4,8L#2+ HX8 ALU-14B	with hexagon head and seal washer ∅ ≥ 14 mm
Annex 9*)	HWH 4,8L#1 HX8 ALU-14B for timber substructures	with hexagon head and seal washer ∅ ≥ 14 mm
Annex 10	LP 4,8L#1 TX20 M-ALU-14B	with countersunk head with Torx T-20 drive and seal washer ∅ ≥ 14 mm
Annex 11	LP 4,8L#2+ TX20 M-ALU-14B	with countersunk head with Torx T-20 drive and seal washer ∅ ≥ 14 mm
Annex 12*)	LP 4,8L#1 TX20 M-ALU-14B for timber substructures	with countersunk head with Torx T-20 drive and seal washer ∅ ≥ 14 mm
Annex 13	HWH RXB 4,8xL#1 HX8 RX-14G	with hexagon head and seal washer ∅ ≥ 14 mm
Annex 14	HWH 4,8xL#1 HX8	with hexagon head
Annex 15*)	HWH RXB 4,8xL#1 HX8 RX-14G for timber substructures	with hexagon head and seal washer ∅ ≥ 14 mm
Annex 16	HWH RXB 5,5xL#1 HX8 RX-16G	with hexagon head and seal washer ∅ ≥ 16 mm
Annex 17	HWH RXB 5,5xL#2+ HX8 RX-16G	with hexagon head and seal washer ∅ ≥ 16 mm
Annex 18	HWH 5,5xL#2+ HX8 ALU-16B	with hexagon head and seal washer ∅ ≥ 16 mm
Annex 19	HWH RXB 5,5xL#2P+ HX8 RX-16G	with hexagon head and seal washer ∅ ≥ 16 mm
Annex 20	HWH RXB 5,5xL#2P+ HX8 RX-16G	with hexagon head and seal washer ∅ ≥ 16 mm

*) these fastening screws are applicable for fastening to timber substructures

Table 1 - continued

Annex	Fastening screw	Description
Annex 21	HWH 5,5xL#2P+ HX8 ALU-16B	with hexagon head and seal washer ∅ ≥ 16 mm
Annex 22	HWH 5,5xL#2P+ HX8 ALU-16B	with hexagon head and seal washer ∅ ≥ 16 mm
Annex 23	HWH RXB 5,5xL#5+ HX8 RX-16G	with hexagon head and seal washer ∅ ≥ 16 mm
Annex 24	HWH 5,5xL#5+ HX8 ALU-16B	with hexagon head and seal washer ∅ ≥ 16 mm
Annex 25	MH RXB 4,8xL#1 TX20	with mushroom head with Torx drive system
Annex 26	DC 4,8xL#1 TX20	with mushroom head with Torx drive system
Annex 27	CORONA RXB 4,8xL#1 TX20 EPDM-9,5B	with undercut, mushroom head with Torx drive system and EPDM seal ring
Annex 28*)	CORONA RXB 4,8xL#1 TX20 EPDM-9,5B for timber substructures	with undercut, mushroom head with Torx drive system and EPDM seal ring
Annex 29	CORONA RXB 5,5xL#2+ TX20 EPDM-9,5B	with undercut, mushroom head with Torx drive system and EPDM seal ring
Annex 30	CORONA 5,5xL#2+ TX20 EPDM-9,5B	with undercut, mushroom head with Torx drive system and EPDM seal ring
Annex 31	CORONA RXB 5,5xL#2P+ TX20 EPDM-9,5B	with undercut, mushroom head with Torx drive system and EPDM seal ring
Annex 32	CORONA RXB 5,5xL#2P+ TX20 EPDM-9,5B	with undercut, mushroom head with Torx drive system and EPDM seal ring
Annex 33	CORONA RXB 5,5xL#5 TX20 EPDM-9,5B	with undercut, mushroom head with Torx drive system and EPDM seal ring
Annex 34*)	LP 4,8/5,5L#1 TX20 M-ALU-14B for timber substructures	with countersunk head with Torx drive system and seal washer ∅ ≥ 14 mm
Annex 35	HWH RXB 4,8xL#2+ HX8 RX-14G	with hexagon head and seal washer ∅ ≥ 14 mm

*) these fastening screws are applicable for fastening to timber substructures

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 Annex (1-35).

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

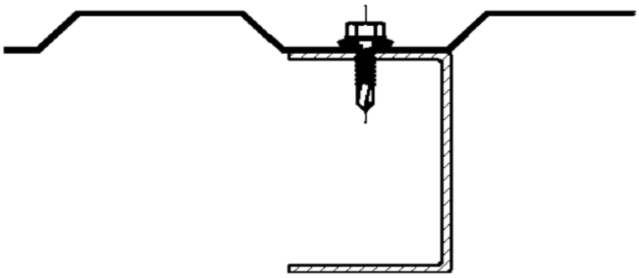
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 23 April 2018 by Deutsches Institut für Bautechnik

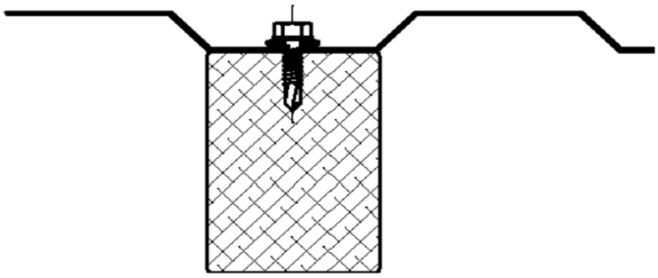
BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Schult

Examples of connections with metal and timber substructures

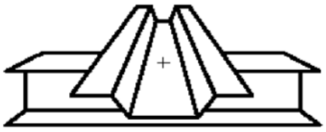


Substructure made of metal

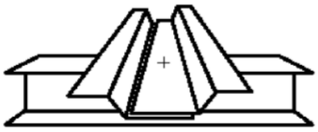


Substructure made of timber

Types of connection

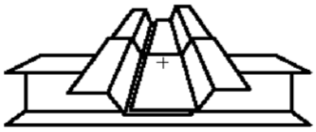


Type a
Single connection



Type b
Side lap connection

Type c
End overlap connection



Type d
Side lap and end overlap 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

$t_{N,I}$	Nominal thickness of component I
$t_{N,II}$	Nominal thickness of component II (metal substructure only)
l_{ef}	Effective screw-in length in component II without drill point (timber substructure only)

The thickness $t_{N,II}$ 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

Design relevant performance characteristics 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
$M_{t,nom}$	Nominal tightening torque

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

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

Design values

The verification concept stated in EN 1990:2002 + A1:2005 + A1:2005/AC:2010 is used for the design of the connections made with the fastening screws. The characteristic values (shear and tension resistance) stated in the Annexes are used for the design of the entire connections.

The following formulas are used to calculate the values of design resistance:

$$N_{R,d} = N_{R,k} / \gamma_M$$

$$V_{R,d} = V_{R,k} / \gamma_M$$

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

The recommended partial factor $\gamma_M = 1.33$ is used in order to determine the corresponding design resistances, provided no values are given in national regulations of the member state in which the fastening screws are used or in the respective National Annex to Eurocode 3.

Special conditions

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

The possibly required reduction of the pull-through resistance due to the position of the fastener is taken into account in accordance with EN 1993 1 3:2006 + AC:2009, section 8.3 (7) and Fig. 8.2 (if component I is made of steel) or EN 1999-1-4:2007 + A1:2011, section 8.1 (6) and Table 8.3 (if component I is made of aluminium).

For asymmetric metal substructures (e.g. Z- or C-shaped profiles) with $t_{N,II} \leq 5$ mm, the characteristic value $N_{R,k}$ has to be reduced by 70%.

In case of combined tension and shear forces the following linear interaction formula according to EN 1993-1-3:2006 + AC:2009, section 8.3 (8) is taken into account:

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

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

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

Additional rules for connections with timber substructures

As far as no other provisions are made in the following EN 1995-1-1:2004 + A1:2008 + A2:2014 applies. Drill points of self drilling screws are not taken into account for the effective screw-in length. The following formulas are used to calculate the values of characteristic resistance:

$$N_{R,k} = \min \{N_{R,I,k} \,;\, N_{R,II,k}\}$$

$$V_{R,k} = \min \{V_{R,I,k} \,;\, V_{R,II,k}\}$$

$$N_{R,II,k} = F_{ax,Rk} \cdot k_{mod}$$

$$V_{R,II,k} = F_{V,Rk} \cdot k_{mod}$$

$F_{ax,Rk}$ Characteristic withdrawal capacity with $\alpha = 90°$, EN 1995-1-1, section 8.7.2 (5)
$F_{V,Rk}$ Characteristic load-bearing capacity per shear plane, EN 1995-1-1, section 8.2.3
k_{mod} Strength modification factor, EN 1995-1-1, section 3.1.3

$N_{R,I,k}$ and $V_{R,I,k}$ are stated in the relevant annexes.

CORONA, HWH, MH, DC and LP	Annex 2
Design	

Installation conditions

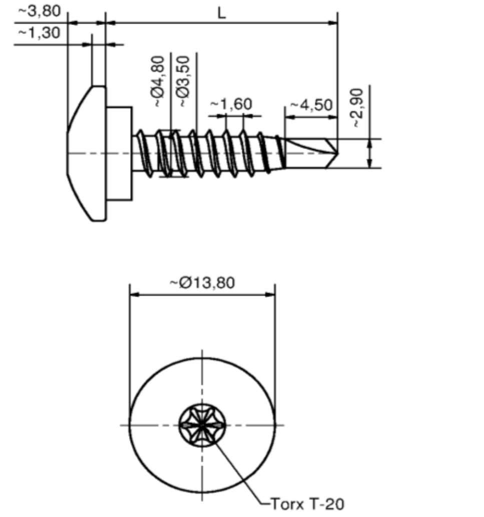
The installation is carried out according to the manufaturer's instructions.

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

The fastening screws must be installed with suitable equipment. Using an impact wrench is not allowed.

The fastening screws must be installed perpendicular to the plane of component I an II.

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



<u>Materials</u>

Fastener:	Carbon steel Quenched, tempered and galvanized
Washer:	None
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD, S320GD or S350GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

<u>Timber substructures</u>

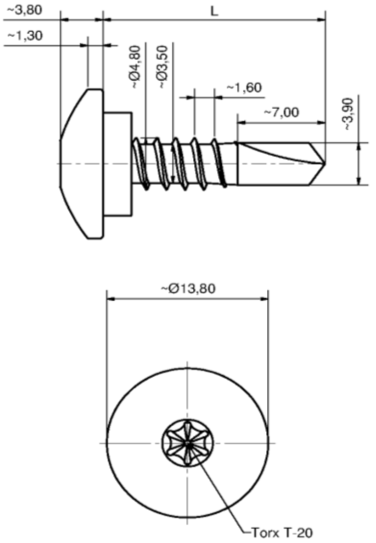
For timber substructures no perfomrance determined

	$t_{N,II}$ =	0,50		0,55		0,63		0,75		0,88		1,00		1,13		1,25	
	$M_{t,nom}$ =	4 Nm															
$V_{R,k}$ for $t_{N,I}$ =	0,50	1,07	-	1,07	-	1,07	-	1,07	-	1,07	-	1,07	-	1,07	-	1,07	-
	0,55	1,07	-	1,30	-	1,30	-	1,30	-	1,30	-	1,30	-	1,30	-	1,30	-
	0,63	1,07	-	1,30	-	1,65	-	1,65	-	1,65	-	1,65	-	1,65	-	1,65	-
	0,75	1,07	-	1,30	-	1,65	-	2,22	-	2,22	-	2,22	-	2,22	-	2,22	-
	0,88	1,07	-	1,30	-	1,65	-	2,22	-	2,62	-	2,62	-	2,62	-	2,62	-
	1,00	1,07	-	1,30	-	1,65	-	2,22	-	2,62	-	3,02	-	3,02	-	3,02	-
	1,13	1,07	-	1,30	-	1,65	-	2,22	-	2,62	-	3,02	-	3,56	-	3,56	-
	1,25	1,07	-	1,30	-	1,65	-	2,22	-	2,62	-	3,02	-	3,56	-	4,09	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,45	-	1,45	-	1,45	-
	0,55	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,65	-	1,65	-
	0,63	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	1,97	-
	0,75	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	0,88	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,00	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,13	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,25	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If both components I and II are made of S320GD or S350GD, all values may be increased by 8,3%.

CORONA, HWH, MH, DC and LP	Annex 4
CORONA 4.8XL #1 TX20 EPDM-9,5B with undercut, mushroom head with TX drive system and EPDM seal ring	

Deutsches Institut für Bautechnik DIBt



Materials

Fastener: Carbon steel
Quenched, tempered and galvanized
Washer: None
Component I: S280GD, S320GD or S350GD – EN 10346
Component II: S235 – EN 10025-2
S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 5{,}50$ mm

Timber substructures
For timber substructures no perfomrance determined

$t_{N,II}$ =		1,50		1,75		2,00		2,50		3,00		3,50		4,00	
$M_{t,nom}$ =		5 Nm													
$V_{R,k}$ for $t_{N,I}$ =	0,50	1,98[a]	-	1,98[a]	-	1,98[a]	-	1,98[a]	-	1,98[a]	-	1,98[a]	-	1,98[a]	-
	0,55	2,07	-	2,12	-	2,16[a]	-	2,16[a]	-	2,16[a]	-	2,16[a]	-	2,16[a]	-
	0,63	2,22	-	2,33	-	2,44[a]	-	2,44[a]	-	2,44[a]	-	2,44[a]	-	2,44[a]	-
	0,75	2,45	-	2,67	-	2,89[a]	-	2,89[a]	-	2,89[a]	-	2,89[a]	-	2,89[a]	-
	0,88	2,69	-	2,96	-	3,24	-	3,90	-	3,90	-	3,90	-	3,90	-
	1,00	2,92	-	3,25	-	3,58	-	4,24	-	4,90	-	4,90	-	4,90	-
	1,13	3,23	-	3,54	-	3,86	-	4,50	-	5,13	-	5,75	-	5,75	-
	1,25	3,53	-	3,84	-	4,14	-	4,75	-	5,37	-	5,98	-	6,59	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,45[a]	-	1,45[a]	-	1,45[a]	-	1,45[a]	-	1,45[a]	-	1,45[a]	-	1,45[a]	-
	0,55	1,65[a]	-	1,65[a]	-	1,65[a]	-	1,65[a]	-	1,65[a]	-	1,65[a]	-	1,65[a]	-
	0,63	1,97	-	1,97[a]	-	1,97[a]	-	1,97[a]	-	1,97[a]	-	1,97[a]	-	1,97[a]	-
	0,75	2,06	-	2,62	-	3,06	-	3,06[a]	-	3,06[a]	-	3,06[a]	-	3,06[a]	-
	0,88	2,06	-	2,62	-	3,18	-	3,68[a]	-	3,68[a]	-	3,68[a]	-	3,68[a]	-
	1,00	2,06	-	2,62	-	3,18	-	4,03	-	4,29[a]	-	4,29[a]	-	4,29[a]	-
	1,13	2,06	-	2,62	-	3,18	-	4,03	-	4,87	-	5,43[a]	-	5,43[a]	-
	1,25	2,06	-	2,62	-	3,18	-	4,03	-	4,87	-	6,13	-	6,56[a]	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If component I is made of S320GD or S350GD, the values marked with [a] may be increased by 8,3%.

CORONA, HWH, MH, DC and LP	Annex 5
CORONA 4.8XL #2+ TX20 EPDM-9,5B with undercut, mushroom head with TX drive system and EPDM seal ring	

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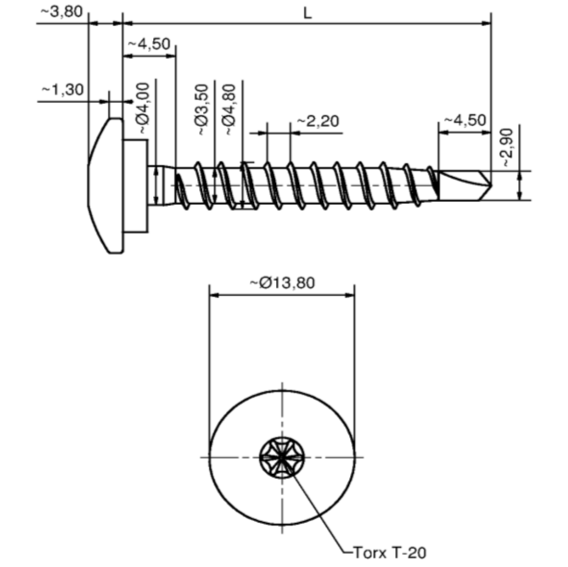

Materials

Fastener:	Carbon steel Quenched, tempered and galvanized
Washer:	None
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	Structural timber - EN 14081

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

Timber substructures

For timber substructures perfomrance determined with

$M_{y,Rk}$ = 4,992 Nm
$f_{ax,k}$ = 13,181 N/mm² for $l_{ef} \geq 24$ mm

	l_g =	29	31	33	35	37	39	41	43	45	47		
	$M_{t,nom}$ =	-											
$V_{R,k}$ for $t_{N,I}$ =	0,50	1,09^a)	1,09^a)	1,09^a)	1,09^a)	1,09^a)	1,09^a)	1,09^a)	1,09^a)	1,09^a)	1,09^a)	1,09^a)	Bearing resistance of component I, $V_{R,I,k}$
	0,55	1,20^a)	1,20^a)	1,20^a)	1,20^a)	1,20^a)	1,20^a)	1,20^a)	1,20^a)	1,20^a)	1,20^a)	1,20^a)	
	0,63	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,64	1,64^a)	
	0,75	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,66	2,18^a)	
	0,88	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,66	2,18^a)	
	1,00	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,66	2,18^a)	
	1,13	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,66	2,18^a)	
	1,25	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,66	2,18^a)	
	1,50	-	-	-	-	-	-	-	-	-	-	-	
	1,75	-	-	-	-	-	-	-	-	-	-	-	
	2,00	-	-	-	-"	-	-	-	-	-	-	-	
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,37	1,45	1,45^a)	1,45^a)	1,45^a)	1,45^a)	1,45^a)	1,45^a)	1,45^a)	1,45^a)	1,45^a)	Pull-through resistance of component I, $N_{R,I,k}$
	0,55	1,37	1,48	1,60	1,65	1,65^a)	1,65^a)	1,65^a)	1,65^a)	1,65^a)	1,65^a)	1,65^a)	
	0,63	1,37	1,48	1,60	1,65	1,71	1,82	1,94^a)	1,97^a)	1,97^a)	1,97^a)	1,97^a)	
	0,75	1,37	1,48	1,60	1,65	1,71	1,82	2,05	2,17	2,28	2,40	3,06^a)	
	0,88	1,37	1,48	1,60	1,65	1,71	1,82	2,05	2,17	2,28	2,40	3,68^a)	
	1,00	1,37	1,48	1,60	1,65	1,71	1,82	2,05	2,17	2,28	2,40	4,29^a)	
	1,13	1,37	1,48	1,60	1,65	1,71	1,82	2,05	2,17	2,28	2,40	5,43^a)	
	1,25	1,37	1,48	1,60	1,65	1,71	1,82	2,05	2,17	2,28	2,40	6,56^a)	
	1,50	-	-	-	-	-	-	-	-	-	-	-	
	1,75	-	-	-	-	-	-	-	-	-	-	-	
	2,00	-	-	-	-	-	-	-	-	-	-	-	

If component I is made of S320GD or S350GD, the values marked with a) may be increased by 8.3%.

The values listed above in dependence on the screw-in length l_g are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_k = 350 kg/m³).

CORONA, HWH, MH, DC and LP	Annex 6
CORONA 4.8XL #1 TX20 EPDM-9,5B for timber substructures with undercut, mushroom head with TX drive system and EPDM seal ring	

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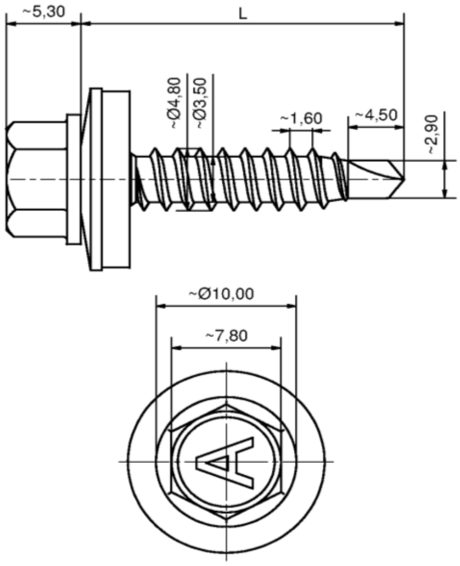

Materials

Fastener: Carbon steel
Quenched, tempered and galvanized
Washer: Aluminium (EN AW-1100-H18), t = 0,8 mm
Component I: S280GD, S320GD or S350GD – EN 10346
Component II: S235 – EN 10025-2
S280GD, S320GD or S350GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

Timber substructures
For timber substructures no perfomrance determined

$t_{N,II}$ =		0,50		0,55		0,63		0,75		0,88		1,00		1,13		1,25	
$M_{t,nom}$ =		4 Nm															
$V_{R,k}$ for $t_{N,I}$ =	0,50	0,95	-	0,95	-	0,95	-	0,95	-	0,95	-	0,95	-	0,95	-	0,95	-
	0,55	0,95	-	1,11	-	1,11	-	1,11	-	1,11	-	1,11	-	1,11	-	1,11	-
	0,63	0,95	-	1,11	-	1,36	-	1,36	-	1,36	-	1,36	-	1,36	-	1,36	-
	0,75	0,95	-	1,11	-	1,36	-	1,76	-	1,76	-	1,76	-	1,76	-	1,76	-
	0,88	0,95	-	1,11	-	1,36	-	1,76	-	2,36	-	2,36	-	2,36	-	2,36	-
	1,00	0,95	-	1,11	-	1,36	-	1,76	-	2,36	-	2,96	-	2,96	-	2,96	-
	1,13	0,95	-	1,11	-	1,36	-	1,76	-	2,36	-	2,96	-	3,32	-	3,32	-
	1,25	0,95	-	1,11	-	1,36	-	1,76	-	2,36	-	2,96	-	3,32	-	3,67	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,37	-	1,37	-	1,37	-
	0,55	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,45	-	1,45	-	1,45	-
	0,63	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,58	-	1,58	-	1,58	-
	0,75	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	0,88	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,00	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,13	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,25	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If both components I and II are made of S320GD or S350GD, all values may be increased by 8,3%.

CORONA, HWH, MH, DC and LP

HWH 4.8XL #1 HX8 ALU-14B
with hexagon head and seal washer ≥ Ø14 mm

Annex 7

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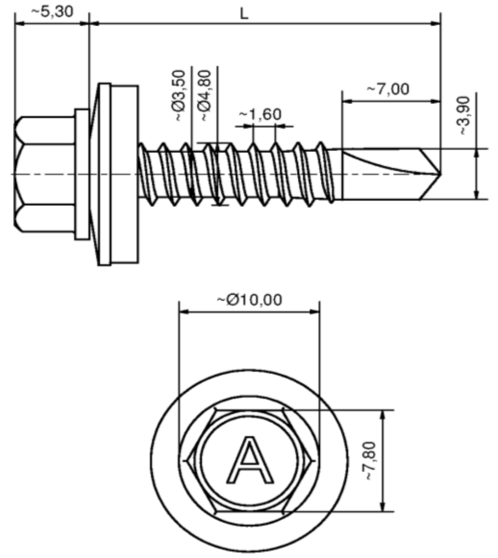

Materials

Fastener: Carbon steel
Quenched, tempered and galvanized

Washer: Aluminium (EN AW-1100-H18), t = 0,8 mm
Carbon steel, galvanized, t = 0,8 mm

Component I: S280GD, S320GD or S350GD – EN 10346

Component II: S235 – EN 10025-2
S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 5{,}50$ mm

Timber substructures

For timber substructures no perfomrance determined

$t_{N,II}$ =		1,50		1,75		2,00		2,50		3,00		3,50		4,00	
$M_{t,nom}$ =		5 Nm													
$V_{R,k}$ for $t_{N,I}$ =	0,50	1,89[a)]	ac	1,89[a)]	ac	1,89[a)]	ac	1,89[a)]	ac	1,89[a)]	ac	1,89[a)]	ac	1,89[a)]	ac
	0,55	2,00	-	2,05	-	2,09[a)]	ac	2,09[a)]	ac	2,09[a)]	ac	2,09[a)]	ac	2,09[a)]	ac
	0,63	2,18	-	2,29	-	2,40[a)]	ac	2,40[a)]	ac	2,40[a)]	ac	2,40[a)]	ac	2,40[a)]	ac
	0,75	2,46	-	2,69	-	2,91[a)]	ac	2,91[a)]	ac	2,91[a)]	ac	2,91[a)]	ac	2,91[a)]	a
	0,88	2,75	-	2,94	-	3,13	-	3,44	-	3,44	ac	3,44	ac	3,44	a
	1,00	3,03	-	3,19	-	3,34	-	3,65	-	3,96	ac	3,96	a	3,96	a
	1,13	3,40	-	3,56	-	3,71	-	4,03	-	4,34	-	4,66	-	4,66	a
	1,25	3,77	-	3,93	-	4,09	-	4,40	-	4,72	-	5,03	-	5,35	a
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,37[a)]	ac	1,37[a)]	ac	1,37[a)]	ac	1,37[a)]	ac	1,37[a)]	ac	1,37[a)]	ac	1,37[a)]	ac
	0,55	1,45[a)]	-	1,45[a)]	-	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac
	0,63	1,58[a)]	-	1,58[a)]	-	1,58[a)]	ac	1,58[a)]	ac	1,58[a)]	ac	1,58[a)]	ac	1,58[a)]	ac
	0,75	2,06	-	2,36[a)]	-	2,36[a)]	ac	2,36[a)]	ac	2,36[a)]	ac	2,36[a)]	ac	2,36[a)]	a
	0,88	2,06	-	2,62	-	2,69[a)]	-	2,69[a)]	-	2,69[a)]	ac	2,69[a)]	ac	2,69[a)]	a
	1,00	2,06	-	2,62	-	3,01	-	3,01[a)]	-	3,01[a)]	ac	3,01[a)]	a	3,01[a)]	a
	1,13	2,06	-	2,62	-	3,18	-	3,73[a)]	-	3,73[a)]	-	3,73[a)]	-	3,73[a)]	a
	1,25	2,06	-	2,62	-	3,18	-	4,03	-	4,44[a)]	-	4,44[a)]	-	4,44[a)]	a
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

CORONA, HWH, MH, DC and LP

HWH 4.8XL #2+ HX8 ALU-14B
with hexagon head and seal washer ≥ Ø14 mm

Annex 8

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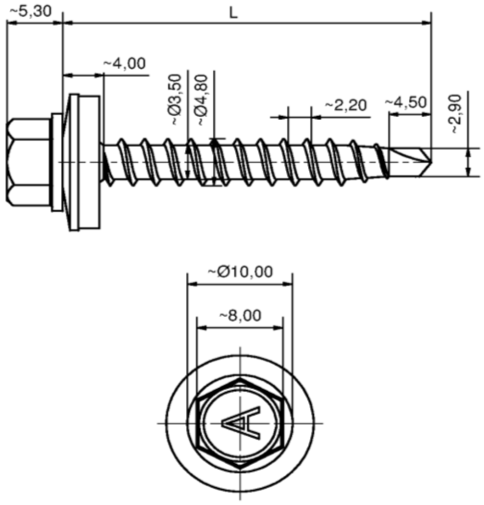

<u>Materials</u>

Fastener:	Carbon steel Quenched, tempered and galvanized
Washer:	Aluminium (EN AW-1100-H18), t = 0,8 mm Carbon steel, galvanized, t = 0,8 mm
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	Structural timber - EN 14081

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

<u>Timber substructures</u>

For timber substructures perfomrance determined with

$M_{y,Rk}$ = 4,992 Nm
$f_{ax,k}$ = 13,181 N/mm² for $l_{ef} \geq 24$ mm

	l_g =	29	31	33	35	37	39	41	43	45	47		
	$M_{t,nom}$ =	-											
$V_{R,k}$ for $t_{N,I}$ =	0,50	1,07 a)	1,07 a)	1,07 a)	1,07 a)	1,07 a)	1,07 a)	1,07 a)	1,07 a)	1,07 a)	1,07 a)	1,07 a)	Bearing resistance of component I, $V_{R,I,k}$
	0,55	1,12 a)	1,12 a)	1,12 a)	1,12 a)	1,12 a)	1,12 a)	1,12 a)	1,12 a)	1,12 a)	1,12 a)	1,12 a)	
	0,63	1,32	1,34	1,34 a)	1,34 a)	1,34 a)	1,34 a)	1,34 a)	1,34 a)	1,34 a)	1,34 a)	1,34 a)	
	0,75	1,32	1,37	1,41	1,45	1,49	1,54	1,58	1,60	1,60	1,60	1,60 a)	
	0,88	1,32	1,37	1,41	1,45	1,49	1,54	1,58	1,60	1,60	1,60	1,60 a)	
	1,00	1,32	1,37	1,41	1,45	1,49	1,54	1,58	1,60	1,60	1,60	1,60 a)	
	1,13	1,32	1,37	1,41	1,45	1,49	1,54	1,58	1,60	1,60	1,60	1,60 a)	
	1,25	1,32	1,37	1,41	1,45	1,49	1,54	1,58	1,60	1,60	1,60	1,60 a)	
	1,50	-	-	-	-	-	-	-	-	-	-	-	
	1,75	-	-	-	-	-	-	-	-	-	-	-	
	2,00	-	-	-	-	-	-	-	-	-	-	-	
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,37	1,37	1,37 a)	1,37 a)	1,37 a)	1,37 a)	1,37 a)	1,37 a)	1,37 a)	1,37 a)	1,37 a)	Pull-through resistance of component I, $N_{R,I,k}$
	0,55	1,37	1,45	1,45 a)	1,45 a)	1,45 a)	1,45 a)	1,45 a)	1,45 a)	1,45 a)	1,45 a)	1,45 a)	
	0,63	1,37	1,48	1,58	1,58	1,58 a)	1,58 a)	1,58 a)	1,58 a)	1,58 a)	1,58 a)	1,58 a)	
	0,75	1,37	1,48	1,60	1,71	1,82	1,94	2,05	2,17	2,28	2,36	2,36 a)	
	0,88	1,37	1,48	1,60	1,71	1,82	1,94	2,05	2,17	2,28	2,40	2,69 a)	
	1,00	1,37	1,48	1,60	1,71	1,82	1,94	2,05	2,17	2,28	2,40	3,01 a)	
	1,13	1,37	1,48	1,60	1,71	1,82	1,94	2,05	2,17	2,28	2,40	3,73 a)	
	1,25	1,37	1,48	1,60	1,71	1,82	1,94	2,05	2,17	2,28	2,40	4,44 a)	
	1,50	-	-	-	-	-	-	-	-	-	-	-	
	1,75	-	-	-	-	-	-	-	-	-	-	-	
	2,00	-	-	-	-	-	-	-	-"	-	-	-	

If component I is made of S320GD or S350GD, the values marked with a) may be increased by 8.3%.

The values listed above in dependence on the screw-in length l_g are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_k = 350 kg/m³).

CORONA, HWH, MH, DC and LP	Annex 9
HWH 4.8XL #1 HX8 ALU-14B for timber structrures with hexagon head and seal washer ≥ Ø14 mm	

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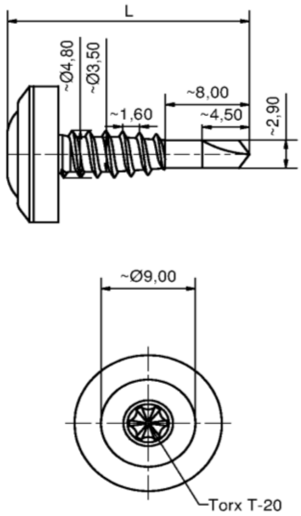


Materials

Fastener:	Carbon steel Quenched, tempered and galvanized
Washer:	Aluminium (EN AW-5052-H32), t = 0,8 mm
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD, S320GD or S350GD – EN 10346

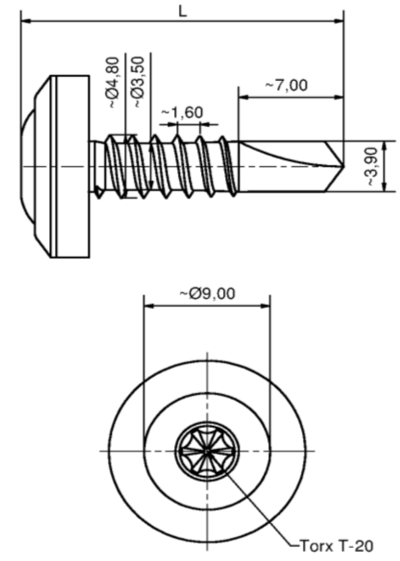
Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

Timber substructures
For timber substructures no perfomrance determined

$t_{N,II}$ =		0,50		0,55		0,63		0,75		0,88		1,00		1,13		1,25	
$M_{t,nom}$ =		4 Nm															
$V_{R,k}$ for $t_{N,I}$ =	0,50	0,82	-	0,82	-	0,82	-	0,82	-	0,82	-	0,82	-	0,82	-	0,82	-
	0,55	0,82	-	1,07	-	1,07	-	1,07	-	1,07	-	1,07	-	1,07	-	1,07	-
	0,63	0,82	-	1,07	-	1,44	-	1,44	-	1,44	-	1,44	-	1,44	-	1,44	-
	0,75	0,82	-	1,07	-	1,44	-	2,05	-	2,05	-	2,05	-	2,05	-	2,05	-
	0,88	0,82	-	1,07	-	1,44	-	2,05	-	2,70	-	2,70	-	2,70	-	2,70	-
	1,00	0,82	-	1,07	-	1,44	-	2,05	-	2,70	-	3,34	-	3,34	-	3,34	-
	1,13	0,82	-	1,07	-	1,44	-	2,05	-	2,70	-	3,34	-	3,88	-	3,88	-
	1,25	0,82	-	1,07	-	1,44	-	2,05	-	2,70	-	3,34	-	3,88	-	4,42	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	0,57	-	0,62	-	0,71	-	1,05	-	1,32	-	1,32	-	1,32	-	1,32	-
	0,55	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,35	-	1,35	-	1,35	-
	0,63	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,40	-	1,40	-	1,40	-
	0,75	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	1,92	-
	0,88	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,00	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,13	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,25	0,57	-	0,62	-	0,71	-	1,05	-	1,34	-	1,62	-	1,92	-	2,22	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If both components I and II are made of S320GD or S350GD, all values may be increased by 8,3%.

CORONA, HWH, MH, DC and LP	Annex 10
LP 4.8XL #1 TX20 M-ALU-14B with countersunk head with TX drive system and seal washer ≥ Ø14 mm	



Materials

Fastener:	Carbon steel Quenched, tempered and galvanized
Washer:	Aluminium (EN AW-5052-H32), t = 0,8 mm
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD, S320GD or S350GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 5{,}50$ mm

Timber substructures
For timber substructures no perfomrance determined

	$t_{N,II}$ =	1,50		1,75		2,00		2,50		3,00		3,50		4,00	
	$M_{t,nom}$ =	5 Nm													
$V_{R,k}$ for $t_{N,I}$ =	0,50	1,39	-	1,39	-	1,39	-	1,39	-	1,39	ac	1,39	ac	1,39	ac
	0,55	1,54	-	1,59	-	1,64	-	1,64	-	1,64	ac	1,64	ac	1,64	ac
	0,63	1,76	-	1,89	-	2,03	-	2,03	-	2,03	ac	2,03	ac	2,03	ac
	0,75	2,14	-	2,40	-	2,66	-	2,66	-	2,66	ac	2,66	ac	2,66	a
	0,88	2,51	-	2,79	-	3,08	-	3,71	-	3,71	ac	3,71	ac	3,71	a
	1,00	2,88	-	3,19	-	3,50	-	4,13	-	4,75	ac	4,75	a	4,75	a
	1,13	3,58	-	3,79	-	4,01	-	4,45	-	4,88	-	5,13	-	5,13	a
	1,25	4,27	-	4,39	-	4,52	-	4,77	-	5,01	-	5,26	-	5,51	a
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,32 a)	-	1,32 a)	-	1,32 a)	-	1,32 a)	-	1,32 a)	ac	1,32 a)	ac	1,32 a)	ac
	0,55	1,35 a)	-	1,35 a)	-	1,35 a)	-	1,35 a)	-	1,35 a)	ac	1,35 a)	ac	1,35 a)	ac
	0,63	1,40 a)	-	1,40 a)	-	1,40 a)	-	1,40 a)	-	1,40 a)	ac	1,40 a)	ac	1,40 a)	ac
	0,75	1,92	-	1,92 a)	-	1,92 a)	-	1,92 a)	-	1,92 a)	ac	1,92 a)	ac	1,92 a)	a
	0,88	2,06	-	2,29 a)	-	2,29 a)	-	2,29 a)	-	2,29 a)	ac	2,29 a)	ac	2,29 a)	a
	1,00	2,06	-	2,62	-	2,66 a)	-	2,66 a)	-	2,66 a)	ac	2,66 a)	a	2,66 a)	a
	1,13	2,06	-	2,62	-	2,96 a)	-	2,96 a)	-	2,96 a)	-	2,96 a)	-	2,96 a)	a
	1,25	2,06	-	2,62	-	3,18	-	3,25 a)	-	3,25 a)	-	3,25 a)	-	3,25 a)	a
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If component I is made of S320GD or S350GD, the values marked with a) may be increased by 8.3%.

CORONA, HWH, MH, DC and LP	Annex 11
LP 4.8XL #2+ TX20 M-ALU-14B with countersunk head with TX drive system and seal washer ≥ Ø14 mm	

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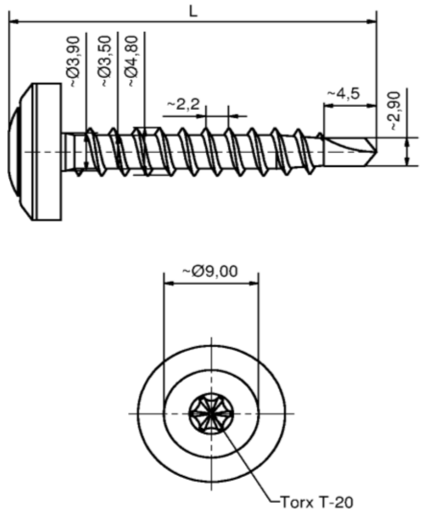

Materials

Fastener:	Carbon steel Quenched, tempered and galvanized
Washer:	Aluminium (EN AW-5052-H32), t = 0,8 mm
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	Structural timber - EN 14081

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

Timber substructures

For timber substructures perfomrance determined with

$M_{y,Rk}$ = 4,992 Nm
$f_{ax,k}$ = 13,181 N/mm² for $l_{ef} \geq 24$ mm

l_g =		29	31	33	35	37	39	41	43	45	47		
$M_{t,nom}$ =		-											
$V_{R,k}$ for $t_{N,I}$ =	0,50	1,41	1,44	1,47	1,49	1,52	1,53	1,53	1,53	1,53	1,53[a)]	1,53[a)]	Bearing resistance of component I, $V_{R,I,k}$
	0,55	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,59	1,59	1,59	1,59[a)]	
	0,63	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,66	1,82[a)]	
	0,75	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,66	2,10[a)]	
	0,88	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,66	2,10[a)]	
	1,00	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,66	2,10[a)]	
	1,13	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,66	2,10[a)]	
	1,25	1,41	1,44	1,47	1,49	1,52	1,55	1,58	1,61	1,64	1,66	2,10[a)]	
	1,50	-	-	-	-	-	-	-	-	-	-	-	
	1,75	-	-	-	-	-	-	-	-	-	-	-	
	2,00	-	-	-	-	-	-	-	-	-	-	-	
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,32	1,32[a)]	1,32[a)]	1,32[a)]	1,32[a)]	1,32[a)]	1,32[a)]	1,32[a)]	1,32[a)]	1,32[a)]	1,32[a)]	Pull-through resistance of component I, $N_{R,I,k}$
	0,55	1,35	1,35[a)]	1,35[a)]	1,35[a)]	1,35[a)]	1,35[a)]	1,35[a)]	1,35[a)]	1,35[a)]	1,35[a)]	1,35[a)]	
	0,63	1,37	1,40	1,40[a)]	1,40[a)]	1,40[a)]	1,40[a)]	1,40[a)]	1,40[a)]	1,40[a)]	1,40[a)]	1,40[a)]	
	0,75	1,37	1,48	1,60	1,71	1,82	1,92	1,92[a)]	1,92[a)]	1,92[a)]	1,92[a)]	1,92[a)]	
	0,88	1,37	1,48	1,60	1,71	1,82	1,94	2,05	2,17	2,28	2,29	2,29[a)]	
	1,00	1,37	1,48	1,60	1,71	1,82	1,94	2,05	2,17	2,28	2,40	2,66[a)]	
	1,13	1,37	1,48	1,60	1,71	1,82	1,94	2,05	2,17	2,28	2,40	2,96[a)]	
	1,25	1,37	1,48	1,60	1,71	1,82	1,94	2,05	2,17	2,28	2,40	3,25[a)]	
	1,50	-	-	-	-	-	-	-	-	-	-	-	
	1,75	-	-	-	-	-	-	-	-	-	-	-	
	2,00	-	-	-	-	-	-	-	-	-	-	-	

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

The values listed above in dependence on the screw-in length l_g are valid for k_{mod} = 0,90 and timber strength grade C24 (ρ_k = 350 kg/m³).

CORONA, HWH, MH, DC and LP	Annex 12
LP 4.8XL #1 TX20 M-ALU-14B for timber stuctures with countersunk head with TX drive system and seal washer ≥ Ø14 mm	

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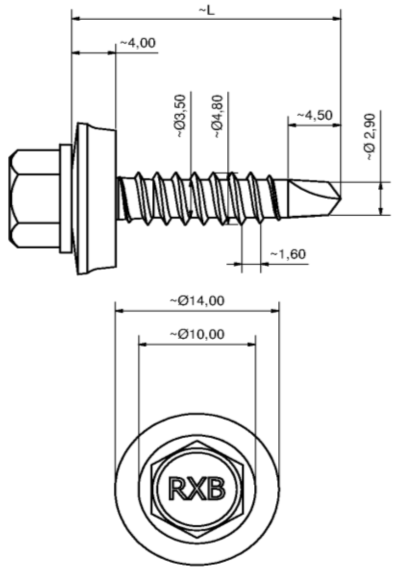

Materials

Fastener:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Washer:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD, S320GD or S350GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

Timber substructures
For timber substructures no perfomrance determined

	$t_{N,II}$ =	0,50		0,55		0,63		0,75		0,88		1,00		1,13		1,25	
	$M_{t,nom}$ =	-															
$V_{R,k}$ for $t_{N,I}$ =	0,50	0,95[a)]	-	0,95[a)]	-	0,95[a)]	-	0,95[a)]	-	0,95[a)]	-	0,95[a)]	-	0,95[a)]	-	0,95[a)]	-
	0,55	0,95[a)]	-	1,11[a)]	-	1,11[a)]	-	1,11[a)]	-	1,11[a)]	-	1,11[a)]	-	1,11[a)]	-	1,11[a)]	-
	0,63	0,95[a)]	-	1,11[a)]	-	1,36[a)]	-	1,36[a)]	-	1,36[a)]	-	1,36[a)]	-	1,36[a)]	-	1,36[a)]	-
	0,75	0,95[a)]	-	1,11[a)]	-	1,36[a)]	-	1,76[a)]	-	1,76[a)]	-	1,76[a)]	-	1,76[a)]	-	1,76[a)]	-
	0,88	0,95[a)]	-	1,11[a)]	-	1,36[a)]	-	1,76[a)]	-	2,36[a)]	-	2,36[a)]	-	2,36[a)]	-	2,36[a)]	-
	1,00	0,95[a)]	-	1,11[a)]	-	1,36[a)]	-	1,76[a)]	-	2,36[a)]	-	2,96[a)]	-	2,96[a)]	-	2,96[a)]	-
	1,13	0,95[a)]	-	1,11[a)]	-	1,36[a)]	-	1,76[a)]	-	2,36[a)]	-	2,96[a)]	-	3,32[a)]	-	3,32[a)]	-
	1,25	0,95[a)]	-	1,11[a)]	-	1,36[a)]	-	1,76[a)]	-	2,36[a)]	-	2,96[a)]	-	3,32[a)]	-	3,67[a)]	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,37[a)]	-	1,37[a)]	-	1,37[a)]	-
	0,55	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,45[a)]	-	1,45[a)]	-	1,45[a)]	-
	0,63	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,58[a)]	-	1,58[a)]	-	1,58[a)]	-
	0,75	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	0,88	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,00	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,13	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,25	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If both components I and II are made of S320GD or S350GD, the values marked with [a)] may be increased by 8,3%.

CORONA, HWH, MH, DC and LP	Annex 13
HWH RXB 4.8XL #1 HX8 RX-14G with hexagon head and seal washer ≥ Ø14 mm	

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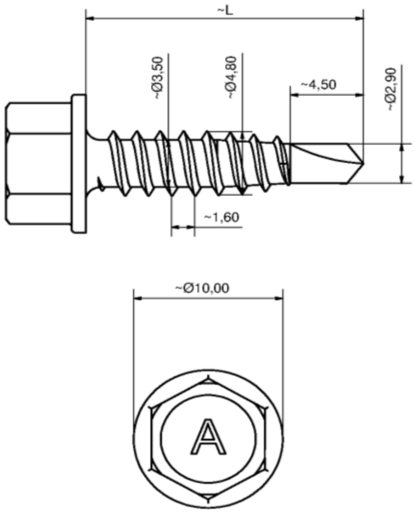

Materials

Fastener:	Carbon steel Case hardened and galvanized
Washer:	None
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD, S320GD or S350GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

Timber substructures

For timber substructures no perfomrance determined

$t_{N,II}$ =	0,50		0,55		0,63		0,75		0,88		1,00		1,13		1,25	
$M_{t,nom}$ =	-															
$V_{R,k}$ for $t_{N,I}$ = 0,50	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	
0,55	1,52[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-
0,63	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-
0,75	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,11[a)]	-	2,11[a)]	-	2,11[a)]	-	2,11[a)]	-
0,88	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	2,79[a)]	-	2,79[a)]	-	2,79[a)]	-
1,00	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	3,47[a)]	-	3,47[a)]	-	3,47[a)]	-
1,13	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	3,47[a)]	-	3,47[a)]	-	3,47[a)]	-
1,25	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	3,47[a)]	-	3,47[a)]	-	3,47[a)]	-
1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ = 0,50	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,35[a)]	-	1,35[a)]	-	1,35[a)]	
0,55	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,53[a)]	-	1,53[a)]	-	1,53[a)]	-
0,63	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,81	-	1,81	-
0,75	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
0,88	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
1,00	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
1,13	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
1,25	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

If both components I and II are made of S320GD or S350GD, the values marked with [a)] may be increased by 8,3%.

CORONA, HWH, MH, DC and LP	Annex 14
HWH 4.8XL #1 HX8 with hexagon head	

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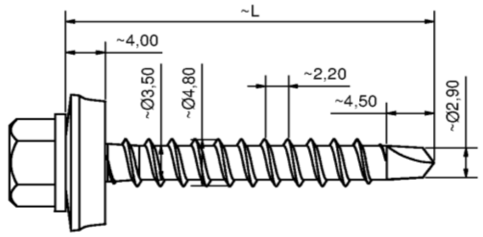

Materials

Fastener:	Stainless steel (1.4301) - EN 10088
	Stainless steel (1.4401) - EN 10088
Washer:	Stainless steel (1.4301) - EN 10088
	Stainless steel (1.4401) - EN 10088
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	Structural timber - EN 14081

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

Timber substructures

For timber substructures perfomrance determined with

$M_{y,Rk}$ = 4,992 Nm
$f_{ax,k}$ = 13,181 N/mm² for $l_{ef} \geq 24$ mm

$V_{R,k}$ for $t_{N,I}$ =	0,50	1,07[a)]	Bearing resistance of component I, $V_{R,I,k}$
	0,55	1,12[a)]	
	0,63	1,34[a)]	
	0,75	1,60[a)]	
	0,88	1,60[a)]	
	1,00	1,60[a)]	
	1,13	1,60[a)]	
	1,25	1,60[a)]	
	1,50	-	
	1,75	-	
	2,00	-	
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,37[a)]	Pull-through resistance of component I, $N_{R,I,k}$
	0,55	1,45[a)]	
	0,63	1,58[a)]	
	0,75	2,36[a)]	
	0,88	2,69[a)]	
	1,00	3,01[a)]	
	1,13	3,73	
	1,25	4,44	
	1,50	-	
	1,75	-	
	2,00	-	

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.
The values listed above are valid for component I. For component II see Annex 2

CORONA, HWH, MH, DC and LP	Annex 15
HWH RXB 4.8XL #1 HX8 RX-14G for timber substructures with hexagon head and seal washer ≥ Ø14 mm	

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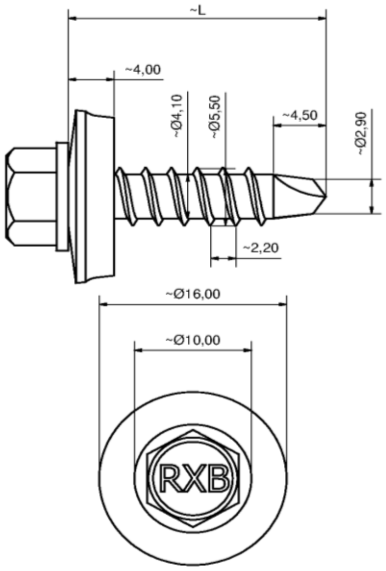

Materials

Fastener:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Washer:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD, S320GD or S350GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

Timber substructures

For timber substructures no perfomrance determined

$t_{N,II}$ =	0,50		0,55		0,63		0,75		0,88		1,00		1,13		1,25	
$M_{t,nom}$ =	-															
$V_{R,k}$ for $t_{N,I}$ = 0,50	0,96[a)]	-	0,96[a)]	-	0,96[a)]	-	0,96[a)]	-	0,96[a)]	-	0,96[a)]	-	0,96[a)]	-	0,96[a)]	-
0,55	0,96[a)]	-	1,11[a)]	-	1,11[a)]	-	1,11[a)]	-	1,11[a)]	-	1,11[a)]	-	1,11[a)]	-	1,11[a)]	-
0,63	0,96[a)]	-	1,11[a)]	-	1,35[a)]	-	1,35[a)]	-	1,35[a)]	-	1,35[a)]	-	1,35[a)]	-	1,35[a)]	-
0,75	0,96[a)]	-	1,11[a)]	-	1,35[a)]	-	1,73[a)]	-	1,73[a)]	-	1,73[a)]	-	1,73[a)]	-	1,73[a)]	-
0,88	0,96[a)]	-	1,11[a)]	-	1,35[a)]	-	1,73[a)]	-	2,07[a)]	-	2,07[a)]	-	2,07[a)]	-	2,07[a)]	-
1,00	0,96[a)]	-	1,11[a)]	-	1,35[a)]	-	1,73[a)]	-	2,07[a)]	-	2,41[a)]	-	2,41[a)]	-	2,41[a)]	-
1,13	0,96[a)]	-	1,11[a)]	-	1,35[a)]	-	1,73[a)]	-	2,07[a)]	-	2,41[a)]	-	2,41[a)]	-	2,41[a)]	-
1,25	0,96[a)]	-	1,11[a)]	-	1,35[a)]	-	1,73[a)]	-	2,07[a)]	-	2,41[a)]	-	2,41[a)]	-	2,41[a)]	-
1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ = 0,50	0,57[a)]	-	0,64[a)]	-	0,76[a)]	-	0,94[a)]	-	1,29[a)]	-	1,63[a)]	-	1,77[a)]	-	1,77[a)]	-
0,55	0,57[a)]	-	0,64[a)]	-	0,76[a)]	-	0,94[a)]	-	1,29[a)]	-	1,63[a)]	-	1,91	-	1,96[a)]	-
0,63	0,57[a)]	-	0,64[a)]	-	0,76[a)]	-	0,94[a)]	-	1,29[a)]	-	1,63[a)]	-	1,91	-	2,18	-
0,75	0,57[a)]	-	0,64[a)]	-	0,76[a)]	-	0,94[a)]	-	1,29[a)]	-	1,63[a)]	-	1,91	-	2,18	-
0,88	0,57[a)]	-	0,64[a)]	-	0,76[a)]	-	0,94[a)]	-	1,29[a)]	-	1,63[a)]	-	1,91	-	2,18	-
1,00	0,57[a)]	-	0,64[a)]	-	0,76[a)]	-	0,94[a)]	-	1,29[a)]	-	1,63[a)]	-	1,91	-	2,18	-
1,13	0,57[a)]	-	0,64[a)]	-	0,76[a)]	-	0,94[a)]	-	1,29[a)]	-	1,63[a)]	-	1,91	-	2,18	-
1,25	0,57[a)]	-	0,64[a)]	-	0,76[a)]	-	0,94[a)]	-	1,29[a)]	-	1,63[a)]	-	1,91	-	2,18	-
1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If both components I and II are made of S320GD or S350GD, the values marked with [a)] may be increased by 8,3%.

CORONA, HWH, MH, DC and LP	Annex 16
HWH RXB 5.5XL #1 HX8 RX-16G with hexagon head and seal washer ≥ Ø16 mm	

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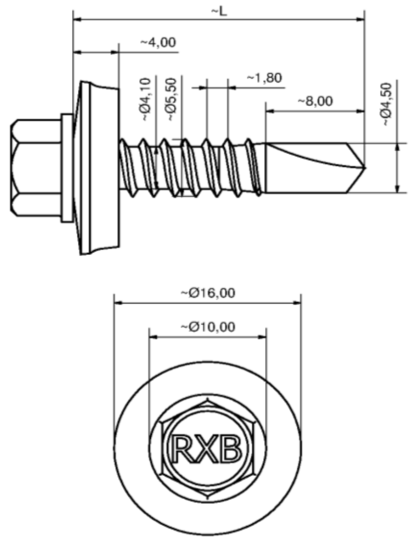


Materials

Fastener:	Stainless steel (1.4301) - EN 10088
	Stainless steel (1.4401) - EN 10088
Washer:	Stainless steel (1.4301) - EN 10088
	Stainless steel (1.4401) - EN 10088
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2
	S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 6{,}0$ mm

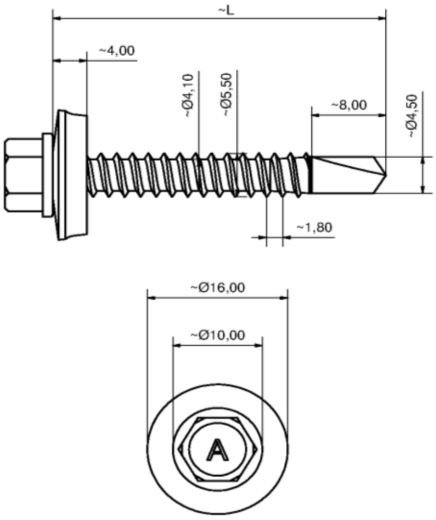
Timber substructures

For timber substructures no perfomrance determined

$t_{N,II}$ =		1,50		1,75		2,00		2,50		3,00		3,50		4,00	
$M_{t,nom}$ =		-													
$V_{R,k}$ for $t_{N,I}$ =	0,50	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac
	0,55	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac
	0,63	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac
	0,75	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac
	0,88	3,16	-	3,21	-	3,27	-	3,37	-	3,47[a)]	ac	3,47[a)]	ac	3,47[a)]	ac
	1,00	3,44	-	3,54	-	3,65	-	3,85	-	4,06[a)]	ac	4,06[a)]	ac	4,06[a)]	ac
	1,13	3,79	-	3,87	-	3,95	-	4,10	-	4,26	-	4,26	ac	4,26	ac
	1,25	4,14	-	4,19	-	4,25	-	4,35	-	4,45	-	4,45	-	4,45	-
	1,50	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
	1,75	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
	2,00	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,65	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac
	0,55	1,65	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac
	0,63	1,65	ac	2,14	ac	2,35	ac	2,35[a)]	ac	2,35[a)]	ac	2,35[a)]	ac	2,35[a)]	ac
	0,75	1,65	ac	2,14	ac	2,63	ac	2,73[a)]	ac	2,73[a)]	ac	2,73[a)]	ac	2,73[a)]	ac
	0,88	1,65	-	2,14	-	2,63	-	2,86[a)]	-	2,86[a)]	ac	2,86[a)]	ac	2,86[a)]	ac
	1,00	1,65	-	2,14	-	2,63	-	2,98[a)]	-	2,98[a)]	ac	2,98[a)]	ac	2,98[a)]	ac
	1,13	1,65	-	2,14	-	2,63	-	3,40	-	3,40	-	3,40	-	3,40	-
	1,25	1,65	-	2,14	-	2,63	-	3,81	-	3,81	-	3,81	-	3,81	-
	1,50	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	1,75	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	2,00	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8,3%.

CORONA, HWH, MH, DC and LP	Annex 17
HWH RXB 5.5XL #2+ HX8 RX-16G with hexagon head and seal washer ≥ Ø16 mm	



Materials

Fastener:	Carbon steel Case hardened and galvanized
Washer:	Aluminium (EN AW-1100-H18), t = 0,8 mm Carbon steel, galvanized, t = 0,8 mm
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 6{,}0$ mm

Timber substructures

For timber substructures no perfomrance determined

	$t_{N,II}$ =	1,50		1,75		2,00		2,50		3,00		3,50		4,00	
	$M_{t,nom}$ =	-													
$V_{R,k}$ for $t_{N,I}$ =	0,50	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac
	0,55	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac
	0,63	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac
	0,75	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac
	0,88	3,16	-	3,21	-	3,27	-	3,37	-	3,47[a)]	ac	3,47[a)]	ac	3,47[a)]	ac
	1,00	3,44	-	3,54	-	3,65	-	3,85	-	4,06[a)]	ac	4,06[a)]	ac	4,06[a)]	ac
	1,13	3,79	-	3,87	-	3,95	-	4,10	-	4,26	-	4,26	-	4,26	-
	1,25	4,14	-	4,19	-	4,25	-	4,35	-	4,45	-	4,45	-	4,45	-
	1,50	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
	1,75	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
	2,00	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,65	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac
	0,55	1,65	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac
	0,63	1,65	ac	2,14	ac	2,35	ac	2,35[a)]	ac	2,35[a)]	ac	2,35[a)]	ac	2,35[a)]	ac
	0,75	1,65	ac	2,14	ac	2,63	ac	2,73[a)]	ac	2,73[a)]	ac	2,73[a)]	ac	2,73[a)]	ac
	0,88	1,65	-	2,14	-	2,63	-	2,86[a)]	-	2,86[a)]	ac	2,86[a)]	ac	2,86[a)]	ac
	1,00	1,65	-	2,14	-	2,63	-	2,98[a)]	-	2,98[a)]	ac	2,98[a)]	ac	2,98[a)]	ac
	1,13	1,65	-	2,14	-	2,63	-	3,40	-	3,40	-	3,40	-	3,40	-
	1,25	1,65	-	2,14	-	2,63	-	3,81	-	3,81	-	3,81	-	3,81	-
	1,50	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	1,75	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	2,00	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

CORONA, HWH, MH, DC and LP	Annex 18
HWH 5.5XL #2+ HX8 ALU-16B with hexagon head and seal washer ≥ Ø16 mm	

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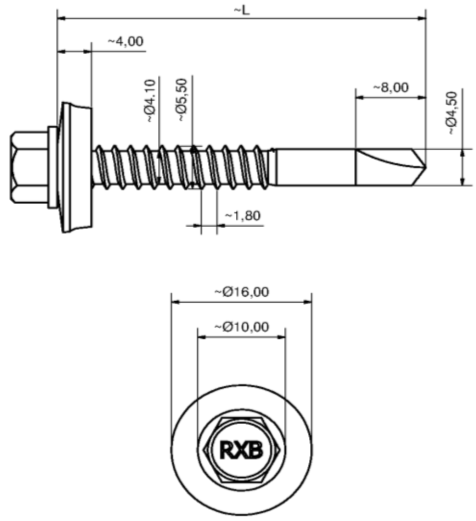

<u>Materials</u>

Fastener:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Washer:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 6{,}0$ mm

<u>Timber substructures</u>

For timber substructures no perfomrance determined

$t_{N,II}$ =		1,50		1,75		2,00		2,50		3,00		3,50		4,00	
$M_{t,nom}$ =		-													
$V_{R,k}$ for $t_{N,I}$ =	0,50	0,82[a)]	-	0,82[a)]	-	0,82[a)]	-	0,82[a)]	-	0,82[a)]	-	0,82[a)]	-	0,82[a)]	-
	0,55	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	0,63	0,84[a)]	-	0,84[a)]	-	0,84[a)]	-	0,84[a)]	-	0,84[a)]	-	0,84[a)]	-	0,84[a)]	-
	0,75	0,86[a)]	-	0,86[a)]	-	0,86[a)]	-	0,86[a)]	-	0,86[a)]	-	0,86[a)]	-	0,86[a)]	-
	0,88	0,92[a)]	-	1,00[a)]	-	1,09[a)]	-	1,26[a)]	-	1,43[a)]	-	1,43[a)]	-	1,43[a)]	-
	1,00	0,97[a)]	-	1,14[a)]	-	1,31[a)]	-	1,66[a)]	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
	1,13	1,09	-	1,24	-	1,39	-	1,70	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
	1,25	1,21	-	1,34	-	1,47	-	1,74	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
	1,50	1,44	-	1,53	-	1,63	-	1,81	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
	1,75	1,44	-	1,53	-	1,63	-	1,81	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
	2,00	1,44	-	1,53	-	1,63	-	1,81	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,65	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-
	0,55	1,65	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-
	0,63	1,65	-	2,14	-	2,35	-	2,35[a)]	-	2,35[a)]	-	2,35[a)]	-	2,35[a)]	-
	0,75	1,65	-	2,14	-	2,63	-	2,73[a)]	-	2,73[a)]	-	2,73[a)]	-	2,73[a)]	-
	0,88	1,65	-	2,14	-	2,63	-	2,86[a)]	-	2,86[a)]	-	2,86[a)]	-	2,86[a)]	-
	1,00	1,65	-	2,14	-	2,63	-	2,98[a)]	-	2,98[a)]	-	2,98[a)]	-	2,98[a)]	-
	1,13	1,65	-	2,14	-	2,63	-	3,40	-	3,40	-	3,40	-	3,40	-
	1,25	1,65	-	2,14	-	2,63	-	3,81	-	3,81	-	3,81	-	3,81	-
	1,50	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	1,75	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	2,00	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

The values listed above are valid for hard, non pre-drilled intermediate layers (plasterboard, timber or fiber cement sheets with thickness up to 9,5 mm) between component I and component II.

CORONA, HWH, MH, DC and LP	Annex 19
HWH RXB 5.5XL #2P+ HX8 RX-16G with hexagon head and seal washer ≥ Ø16 mm	

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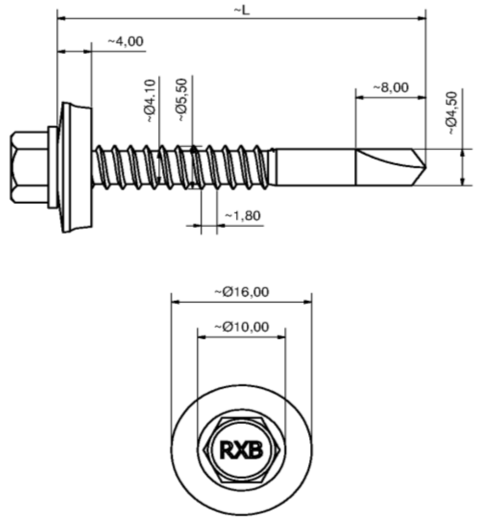

Materials

Fastener:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Washer:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 6{,}0$ mm

Timber substructures

For timber substructures no perfomrance determined

	$t_{N,II}$ =	1,50		1,75		2,00		2,50		3,00		3,50		4,00	
	$M_{t,nom}$ =	-													
$V_{R,k}$ for $t_{N,I}$ =	0,50	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-
	0,55	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-
	0,63	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-
	0,75	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-
	0,88	0,49[a)]	-	0,52[a)]	-	0,55[a)]	-	0,60[a)]	-	0,66[a)]	-	0,66[a)]	-	0,66[a)]	-
	1,00	0,49[a)]	-	0,55[a)]	-	0,60[a)]	-	0,72[a)]	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,13	0,57	-	0,91	-	0,65	-	0,72	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,25	0,64	-	0,67	-	0,70	-	0,77	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,50	0,79	-	0,80	-	0,80	-	0,82	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,75	0,79	-	0,80	-	0,80	-	0,82	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	2,00	0,79	-	0,80	-	0,80	-	0,82	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,65	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-
	0,55	1,65	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-
	0,63	1,65	-	2,14	-	2,35	-	2,35[a)]	-	2,35[a)]	-	2,35[a)]	-	2,35[a)]	-
	0,75	1,65	-	2,14	-	2,63	-	2,73[a)]	-	2,73[a)]	-	2,73[a)]	-	2,73[a)]	-
	0,88	1,65	-	2,14	-	2,63	-	2,86[a)]	-	2,86[a)]	-	2,86[a)]	-	2,86[a)]	-
	1,00	1,65	-	2,14	-	2,63	-	2,98[a)]	-	2,98[a)]	-	2,98[a)]	-	2,98[a)]	-
	1,13	1,65	-	2,14	-	2,63	-	3,40	-	3,40	-	3,40	-	3,40	-
	1,25	1,65	-	2,14	-	2,63	-	3,81	-	3,81	-	3,81	-	3,81	-
	1,50	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	1,75	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	2,00	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

The values listed above are valid for hard, non pre-drilled intermediate layers (plasterboard, timber or fiber cement sheets with thickness up to 19 mm) between component I and component II.

CORONA, HWH, MH, DC and LP	Annex 20
HWH RXB 5.5XL #2P+ HX8 RX-16G with hexagon head and seal washer ≥ Ø16 mm	

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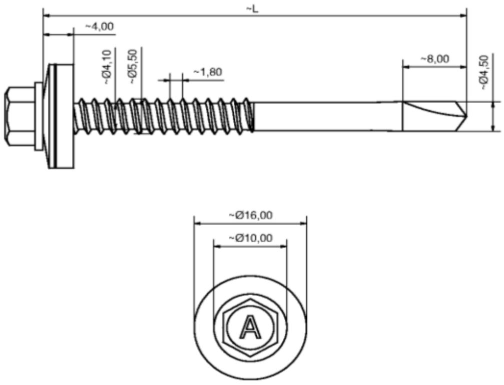


<u>Materials</u>

Fastener:	Carbon steel Case hardened and galvanized
Washer:	Aluminium (EN AW-1100-H18), t = 0,8 mm Carbon steel, galvanized, t = 0,8 mm
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 6{,}0$ mm

<u>Timber substructures</u>

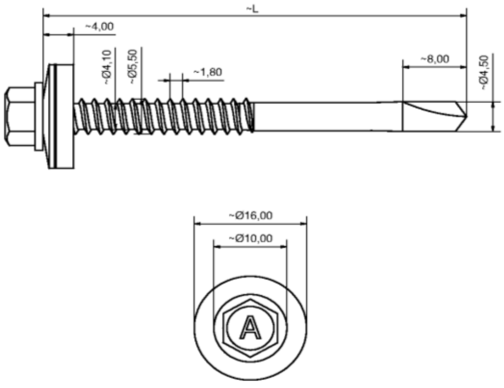
For timber substructures no perfomrance determined

$t_{N,II}$ =		1,50		1,75		2,00		2,50		3,00		3,50		4,00	
$M_{t,nom}$ =		-													
$V_{R,k}$ for $t_{N,I}$ =	0,50	0,82[a)]	-	0,82[a)]	-	0,82[a)]	-	0,82[a)]	-	0,82[a)]	-	0,82[a)]	-	0,82[a)]	-
	0,55	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	0,63	0,84[a)]	-	0,84[a)]	-	0,84[a)]	-	0,84[a)]	-	0,84[a)]	-	0,84[a)]	-	0,84[a)]	-
	0,75	0,86[a)]	-	0,86[a)]	-	0,86[a)]	-	0,86[a)]	-	0,86[a)]	-	0,86[a)]	-	0,86[a)]	-
	0,88	0,92[a)]	-	1,00[a)]	-	1,09[a)]	-	1,26[a)]	-	1,43[a)]	-	1,43[a)]	-	1,43[a)]	-
	1,00	0,97[a)]	-	1,14[a)]	-	1,31[a)]	-	1,66[a)]	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
	1,13	1,09	-	1,24	-	1,39	-	1,70	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
	1,25	1,21	-	1,34	-	1,47	-	1,74	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
	1,50	1,44	-	1,53	-	1,63	-	1,81	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
	1,75	1,44	-	1,53	-	1,63	-	1,81	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
	2,00	1,44	-	1,53	-	1,63	-	1,81	-	2,00[a)]	-	2,00[a)]	-	2,00[a)]	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,65	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-
	0,55	1,65	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-
	0,63	1,65	-	2,14	-	2,35	-	2,35[a)]	-	2,35[a)]	-	2,35[a)]	-	2,35[a)]	-
	0,75	1,65	-	2,14	-	2,63	-	2,73[a)]	-	2,73[a)]	-	2,73[a)]	-	2,73[a)]	-
	0,88	1,65	-	2,14	-	2,63	-	2,86[a)]	-	2,86[a)]	-	2,86[a)]	-	2,86[a)]	-
	1,00	1,65	-	2,14	-	2,63	-	2,98[a)]	-	2,98[a)]	-	2,98[a)]	-	2,98[a)]	-
	1,13	1,65	-	2,14	-	2,63	-	3,40	-	3,40	-	3,40	-	3,40	-
	1,25	1,65	-	2,14	-	2,63	-	3,81	-	3,81	-	3,81	-	3,81	-
	1,50	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	1,75	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	2,00	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

The values listed above are valid for hard, non pre-drilled intermediate layers (plasterboard, timber or fiber cement sheets with thickness up to 9,5 mm) between component I and component II.

CORONA, HWH, MH, DC and LP	Annex 21
HWH 5.5XL #2P+ HX8 ALU-16B with hexagon head and seal washer ≥ Ø16 mm	



Materials

Fastener:	Carbon steel Case hardened and galvanized
Washer:	Aluminium (EN AW-1100-H18), t = 0,8 mm Carbon steel, galvanized, t = 0,8 mm
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 6{,}0$ mm

Timber substructures

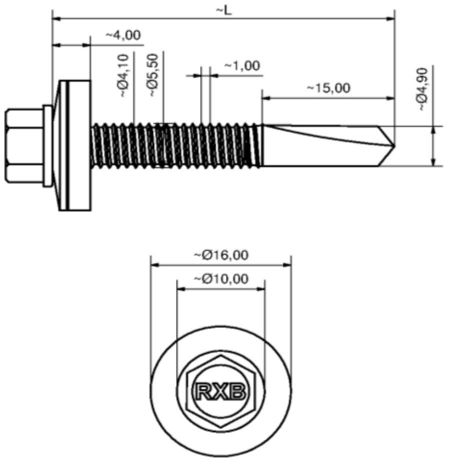
For timber substructures no perfomrance determined

$t_{N,II}$ =		1,50		1,75		2,00		2,50		3,00		3,50		4,00	
$M_{t,nom}$ =		-													
$V_{R,k}$ for $t_{N,I}$ =	0,50	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-
	0,55	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-
	0,63	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-
	0,75	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-
	0,88	0,49[a)]	-	0,52[a)]	-	0,55[a)]	-	0,60[a)]	-	0,66[a)]	-	0,66[a)]	-	0,66[a)]	-
	1,00	0,49[a)]	-	0,55[a)]	-	0,60[a)]	-	0,72[a)]	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,13	0,57	-	0,91	-	0,65	-	0,74	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,25	0,64	-	0,67	-	0,70	-	0,77	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,50	0,79	-	0,80	-	0,80	-	0,82	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,75	0,79	-	0,80	-	0,80	-	0,82	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	2,00	0,79	-	0,80	-	0,80	-	0,82	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,65	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-	1,77[a)]	-
	0,55	1,65	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-	1,96[a)]	-
	0,63	1,65	-	2,14	-	2,35	-	2,35[a)]	-	2,35[a)]	-	2,35[a)]	-	2,35[a)]	-
	0,75	1,65	-	2,14	-	2,63	-	2,73[a)]	-	2,73[a)]	-	2,73[a)]	-	2,73[a)]	-
	0,88	1,65	-	2,14	-	2,63	-	2,86[a)]	-	2,86[a)]	-	2,86[a)]	-	2,86[a)]	-
	1,00	1,65	-	2,14	-	2,63	-	2,98[a)]	-	2,98[a)]	-	2,98[a)]	-	2,98[a)]	-
	1,13	1,65	-	2,14	-	2,63	-	3,40	-	3,40	-	3,40	-	3,40	-
	1,25	1,65	-	2,14	-	2,63	-	3,81	-	3,81	-	3,81	-	3,81	-
	1,50	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	1,75	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-
	2,00	1,65	-	2,14	-	2,63	-	3,92	-	4,87	-	4,87	-	4,87	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

The values listed above are valid for hard, non pre-drilled intermediate layers (plasterboard, timber or fiber cement sheets with thickness up to 19 mm) between component I and component II.

CORONA, HWH, MH, DC and LP	Annex 22
HWH 5.5XL #2P+ HX8 ALU-16B with hexagon head and seal washer ≥ Ø16 mm	



Materials

Fastener:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Washer:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 12{,}5$ mm

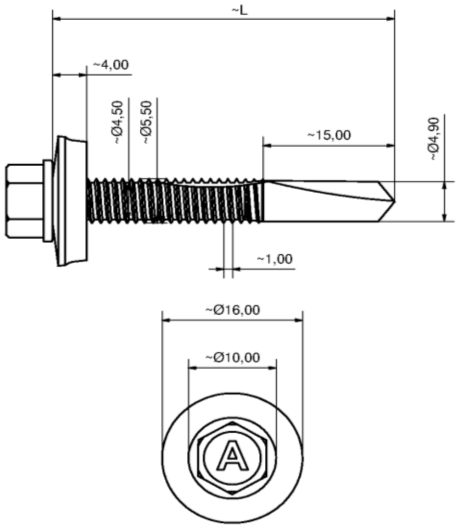
Timber substructures

For timber substructures no perfomrance determined

	$t_{N,II}$ =	4,00		5,00		6,00		8,00		10,00		12,00	
	$M_{t,nom}$ =	-											
$V_{R,k}$ for $t_{N,I}$ =	0,50	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	a
	0,55	2,54[a)]	ac	2,54[a)]	ac	2,54[a)]	ac	2,54[a)]	ac	2,54[a)]	ac	-	-
	0,63	2,97[a)]	ac	2,97[a)]	ac	2,97[a)]	ac	2,97[a)]	ac	2,97[a)]	ac	-	-
	0,75	3,67[a)]	ac	3,67[a)]	ac	3,67[a)]	ac	3,67[a)]	ac	3,67[a)]	ac	-	-
	0,88	4,38[a)]	ac	4,38[a)]	ac	4,38[a)]	ac	4,38[a)]	ac	4,38[a)]	ac	-	-
	1,00	5,08[a)]	ac	5,08[a)]	ac	5,08[a)]	ac	5,08[a)]	ac	5,08[a)]	ac	-	-
	1,13	5,53	ac	5,53	ac	5,53	ac	5,53	ac	5,53	a	-	-
	1,25	5,98	ac	5,98	ac	5,98	ac	5,98	ac	5,98	a	-	-
	1,50	6,87	ac	6,87	ac	6,87	ac	6,87	ac	6,87	a	-	-
	1,75	6,87	-	6,87	-	6,87	-	6,87	-	6,87	-	-	-
	2,00	6,87	-	6,87	-	6,87	-	6,87	-	6,87	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	a
	0,55	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	-	-
	0,63	2,35[a)]	ac	2,35[a)]	ac	2,35[a)]	ac	2,35[a)]	ac	2,35[a)]	ac	-	-
	0,75	2,73[a)]	ac	2,73[a)]	ac	2,73[a)]	ac	2,73[a)]	ac	2,73[a)]	ac	-	-
	0,88	2,86[a)]	ac	2,86[a)]	ac	2,86[a)]	ac	2,86[a)]	ac	2,86[a)]	ac	-	-
	1,00	2,98[a)]	ac	2,98[a)]	ac	2,98[a)]	ac	2,98[a)]	ac	2,98[a)]	ac	-	-
	1,13	3,40	ac	3,40	ac	3,40	ac	3,40	ac	3,40	a	-	-
	1,25	3,81	ac	3,81	ac	3,81	ac	3,81	ac	3,81	a	-	-
	1,50	4,87	ac	4,87	ac	4,87	ac	4,87	ac	4,87	a	-	-
	1,75	4,87	-	4,87	-	4,87	-	4,87	-	4,87	-	-	-
	2,00	4,87	-	4,87	-	4,87	-	4,87	-	4,87	-	-	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

CORONA, HWH, MH, DC and LP	Annex 23
HWH RXB 5.5XL #5 RX-16G with hexagon head and seal washer ≥ Ø16 mm	



Materials

Fastener:	Carbon steel Case hardened and galvanized
Washer:	Aluminium (EN AW-1100-H18), t = 0,8 mm Carbon steel, galvanized, t = 0,8 mm
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 12{,}5$ mm

Timber substructures

For timber substructures no perfomrance determined

$t_{N,II}$ =		4,00		5,00		6,00		8,00		10,00		12,00	
$M_{t,nom}$ =		-											
$V_{R,k}$ for $t_{N,I}$ =	0,50	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	a
	0,55	2,54[a)]	ac	2,54[a)]	ac	2,54[a)]	ac	2,54[a)]	ac	2,54[a)]	ac	-	-
	0,63	2,97[a)]	ac	2,97[a)]	ac	2,97[a)]	ac	2,97[a)]	ac	2,97[a)]	ac	-	-
	0,75	3,67[a)]	ac	3,67[a)]	ac	3,67[a)]	ac	3,67[a)]	ac	3,67[a)]	ac	-	-
	0,88	4,38[a)]	ac	4,38[a)]	ac	4,38[a)]	ac	4,38[a)]	ac	4,38[a)]	ac	-	-
	1,00	5,08[a)]	ac	5,08[a)]	ac	5,08[a)]	ac	5,08[a)]	ac	5,08[a)]	ac	-	-
	1,13	5,53	ac	5,53	ac	5,53	ac	5,53	ac	5,53	a	-	-
	1,25	5,98	ac	5,98	ac	5,98	ac	5,98	ac	5,98	a	-	-
	1,50	6,87	ac	6,87	ac	6,87	ac	6,87	ac	6,87	a	-	-
	1,75	6,87	-	6,87	-	6,87	-	6,87	-	6,87	-	-	-
	2,00	6,87	-	6,87	-	6,87	-	6,87	-	6,87	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	ac	1,77[a)]	a
	0,55	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	1,96[a)]	ac	-	-
	0,63	2,35[a)]	ac	2,35[a)]	ac	2,35[a)]	ac	2,35[a)]	ac	2,35[a)]	ac	-	-
	0,75	2,73[a)]	ac	2,73[a)]	ac	2,73[a)]	ac	2,73[a)]	ac	2,73[a)]	ac	-	-
	0,88	2,86[a)]	ac	2,86[a)]	ac	2,86[a)]	ac	2,86[a)]	ac	2,86[a)]	ac	-	-
	1,00	2,98[a)]	ac	2,98[a)]	ac	2,98[a)]	ac	2,98[a)]	ac	2,98[a)]	ac	-	-
	1,13	3,40	ac	3,40	ac	3,40	ac	3,40	ac	3,40	a	-	-
	1,25	3,81	ac	3,81	ac	3,81	ac	3,81	ac	3,81	a	-	-
	1,50	4,87	ac	4,87	ac	4,87	ac	4,87	ac	4,87	a	-	-
	1,75	4,87	-	4,87	-	4,87	-	4,87	-	4,87	-	-	-
	2,00	4,87	-	4,87	-	4,87	-	4,87	-	4,87	-	-	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

CORONA, HWH, MH, DC and LP	Annex 24
HWH 5.5XL #5 ALU-16G with hexagon head and seal washer ≥ Ø16 mm	

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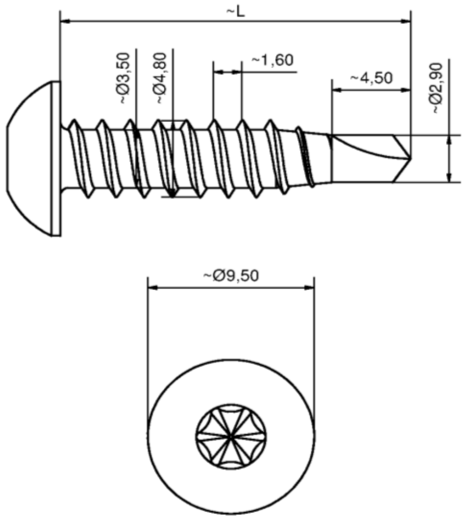


Materials

Fastener:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Washer:	None
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD, S320GD or S350GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

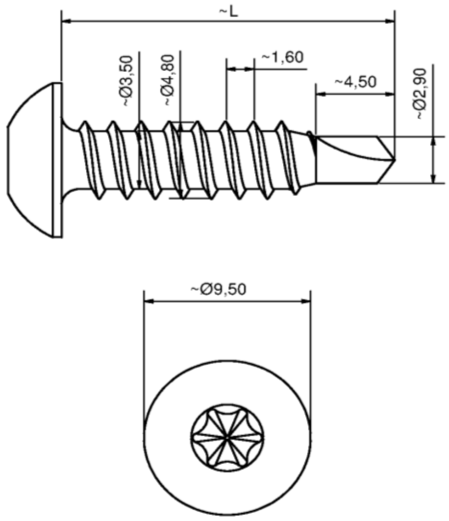
Timber substructures

For timber substructures no perfomrance determined

$t_{N,II}$ =		0,50		0,55		0,63		0,75		0,88		1,00		1,13		1,25	
$M_{t,nom}$ =		-															
$V_{R,k}$ for $t_{N,I}$ =	0,50	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-
	0,55	1,52[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-
	0,63	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-
	0,75	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,11[a)]	-	2,11[a)]	-	2,11[a)]	-	2,11[a)]	-
	0,88	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	2,79[a)]	-	2,79[a)]	-	2,79[a)]	-
	1,00	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	3,47[a)]	-	3,47[a)]	-	3,47[a)]	-
	1,13	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	3,47[a)]	-	3,47[a)]	-	3,47[a)]	-
	1,25	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	3,47[a)]	-	3,47[a)]	-	3,47[a)]	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,35[a)]	-	1,35[a)]	-	1,35[a)]	-
	0,55	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,53[a)]	-	1,53[a)]	-	1,53[a)]	-
	0,63	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,58[a)]	-	1,81[a)]	-	1,81[a)]	-
	0,75	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	0,88	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,00	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,13	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,25	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If both components I and II are made of S320GD or S350GD, the values marked with [a)] may be increased by 8,3%.

CORONA, HWH, MH, DC and LP	Annex 25
MH RXB 4.8XL #1 TX20 with mushroom head with TX drive system	



Materials

Fastener:	Carbon steel Case hardened and galvanized
Washer:	None
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD, S320GD or S350GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

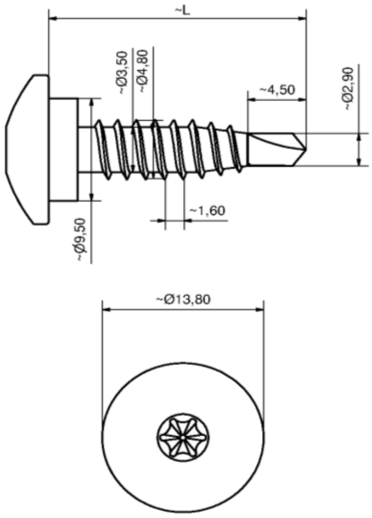
Timber substructures

For timber substructures no perfomrance determined

	$t_{N,II}$ =	0,50		0,55		0,63		0,75		0,88		1,00		1,13		1,25	
	$M_{t,nom}$ =	-															
$V_{R,k}$ for $t_{N,I}$ =	0,50	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-	1,52[a)]	-
	0,55	1,52[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-	1,64[a)]	-
	0,63	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-	1,82[a)]	-
	0,75	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,11[a)]	-	2,11[a)]	-	2,11[a)]	-	2,11[a)]	-
	0,88	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	2,79[a)]	-	2,79[a)]	-	2,79[a)]	-
	1,00	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	3,47[a)]	-	3,47[a)]	-	3,47[a)]	-
	1,13	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	3,47[a)]	-	3,47[a)]	-	3,47[a)]	-
	1,25	1,52[a)]	-	1,64[a)]	-	1,82[a)]	-	2,11[a)]	-	2,79[a)]	-	3,47[a)]	-	3,47[a)]	-	3,47[a)]	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,35[a)]	-	1,35[a)]	-	1,35[a)]	-
	0,55	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,53[a)]	-	1,53[a)]	-	1,53[a)]	-
	0,63	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,58[a)]	-	1,81[a)]	-	1,81[a)]	-
	0,75	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	0,88	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,00	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,13	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,25	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If both components I and II are made of S320GD or S350GD, the values marked with [a)] may be increased by 8,3%.

CORONA, HWH, MH, DC and LP	Annex 26
DC 4.8XL #1 TX20 with mushroom head with TX drive system	



Materials

Fastener:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Washer:	None
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD, S320GD or S350GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

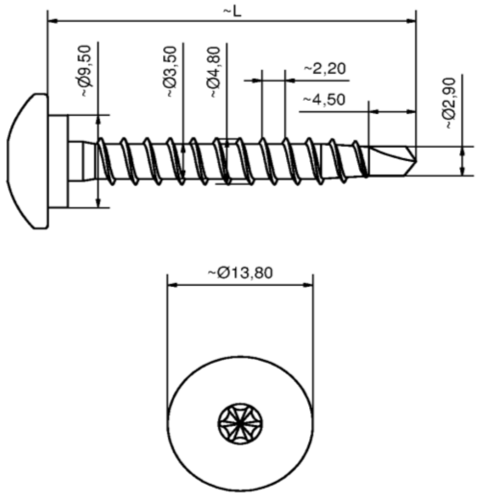
Timber substructures

For timber substructures no perfomrance determined

	$t_{N,II}$ =	0,50		0,55		0,63		0,75		0,88		1,00		1,13		1,25	
	$M_{t,nom}$ =	-															
$V_{R,k}$ for $t_{N,I}$ =	0,50	1,07[a)]	-	1,07[a)]	-	1,07[a)]	-	1,07[a)]	-	1,07[a)]	-	1,07[a)]	-	1,07[a)]	-	1,07[a)]	-
	0,55	1,07[a)]	-	1,30[a)]	-	1,30[a)]	-	1,30[a)]	-	1,30[a)]	-	1,30[a)]	-	1,30[a)]	-	1,30[a)]	-
	0,63	1,07[a)]	-	1,30[a)]	-	1,65[a)]	-	1,65[a)]	-	1,65[a)]	-	1,65[a)]	-	1,65[a)]	-	1,65[a)]	-
	0,75	1,07[a)]	-	1,30[a)]	-	1,65[a)]	-	2,22[a)]	-	2,22[a)]	-	2,22[a)]	-	2,22[a)]	-	2,22[a)]	-
	0,88	1,07[a)]	-	1,30[a)]	-	1,65[a)]	-	2,22[a)]	-	2,62[a)]	-	2,62[a)]	-	2,62[a)]	-	2,62[a)]	-
	1,00	1,07[a)]	-	1,30[a)]	-	1,65[a)]	-	2,22[a)]	-	2,62[a)]	-	3,02[a)]	-	3,02[a)]	-	3,02[a)]	-
	1,13	1,07[a)]	-	1,30[a)]	-	1,65[a)]	-	2,22[a)]	-	2,62[a)]	-	3,02[a)]	-	3,56[a)]	-	3,56[a)]	-
	1,25	1,07[a)]	-	1,30[a)]	-	1,65[a)]	-	2,22[a)]	-	2,62[a)]	-	3,02[a)]	-	3,56[a)]	-	4,09[a)]	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,45[a)]	-	1,45[a)]	-	1,45[a)]	-
	0,55	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,65[a)]	-	1,65[a)]	-
	0,63	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	1,97[a)]	-
	0,75	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	0,88	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,00	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,13	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,25	0,57[a)]	-	0,62[a)]	-	0,71[a)]	-	1,05[a)]	-	1,34[a)]	-	1,62[a)]	-	1,92	-	2,22	-
	1,50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1,75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

If both components I and II are made of S320GD or S350GD, the values marked with [a)] may be increased by 8,3%.

CORONA, HWH, MH, DC and LP	Annex 27
CORONA RXB 4.8XL #1 TX20 EPDM-9,5B with undercut, mushroom head with TX drive system and EPDM seal ring	



Materials

Fastener:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Washer:	None
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	Structural timber - EN 14081

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

Timber substructures

For timber substructures perfomrance determined with

$M_{y,Rk}$ = 4,992 Nm
$f_{ax,k}$ = 13,181 N/mm² for $l_{ef} \geq 24$ mm

$V_{R,k}$ for $t_{N,I}$ =	0,50	1,09[a)]	Bearing resistance of component I, $V_{R,I,k}$
	0,55	1,20[a)]	
	0,63	1,64[a)]	
	0,75	2,18[a)]	
	0,88	2,18[a)]	
	1,00	2,18[a)]	
	1,13	2,18[a)]	
	1,25	2,18[a)]	
	1,50	-	
	1,75	-	
	2,00	-	
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,45[a)]	Pull-through resistance of component I, $N_{R,I,k}$
	0,55	1,65[a)]	
	0,63	1,97[a)]	
	0,75	3,06[a)]	
	0,88	3,68[a)]	
	1,00	4,29[a)]	
	1,13	5,43	
	1,25	6,56	
	1,50	-	
	1,75	-	
	2,00	-	

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.
The values listed above are valid for component I. For component II see Annex 2.

CORONA, HWH, MH, DC and LP	Annex 28
CORONA RXB 4.8XL #1 TX20 EPDM-9,5B for timber substructures with undercut, mushroom head with TX drive system and EPDM seal ring	

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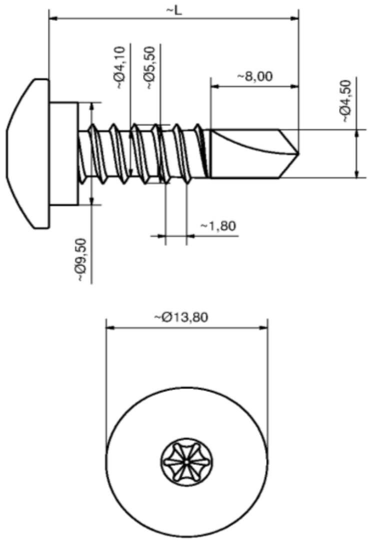

Materials

Fastener:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Washer:	None
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 6{,}0$ mm

Timber substructures
For timber substructures no perfomrance determined

$t_{N,II}$ =		1,50		1,75		2,00		2,50		3,00		3,50		4,00	
$M_{t,nom}$ =		-													
$V_{R,k}$ for $t_{N,I}$ =	0,50	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac
	0,55	2,21[a)]	-	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac
	0,63	2,46[a)]	-	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac
	0,75	2,88[a)]	-	2,88[a)]	ac	2,88[a)]	ac	2,88	ac	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac
	0,88	3,16	-	3,21	-	3,27	-	3,37	-	3,47[a)]	ac	3,47[a)]	ac	3,47[a)]	ac
	1,00	3,44	-	3,54	-	3,65	-	3,85	-	4,06[a)]	ac	4,06[a)]	ac	4,06[a)]	ac
	1,13	3,79	-	3,87	-	3,95	-	4,10	-	4,26	-	4,26	-	4,26	-
	1,25	4,14	-	4,19	-	4,25	-	4,35	-	4,45	-	4,45	-	4,45	-
	1,50	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
	1,75	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
	2,00	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac
	0,55	1,65	ac	1,65[a)]	ac	1,65[a)]	ac	1,65[a)]	ac	1,65[a)]	ac	1,65[a)]	ac	1,65[a)]	ac
	0,63	1,65	ac	1,97[a)]	ac	1,97[a)]	ac	1,97[a)]	ac	1,97[a)]	ac	1,97[a)]	ac	1,97[a)]	ac
	0,75	1,65	ac	2,14	ac	2,63	ac	3,06[a)]	ac	3,06[a)]	ac	3,06[a)]	ac	3,06[a)]	ac
	0,88	1,65	-	2,14	-	2,63	-	3,68[a)]	-	3,68[a)]	ac	3,68[a)]	ac	3,68[a)]	ac
	1,00	1,65	-	2,14	-	2,63	-	3,92	-	4,29[a)]	ac	4,29[a)]	ac	4,29[a)]	ac
	1,13	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,43	-	5,43	-
	1,25	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-
	1,50	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-
	1,75	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-
	2,00	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

CORONA, HWH, MH, DC and LP	Annex 29
CORONA RXB 5.5XL #2+ TX20 EPDM-9,5B with undercut, mushroom head with TX drive system and EPDM seal ring	

English translation prepared by DIBt

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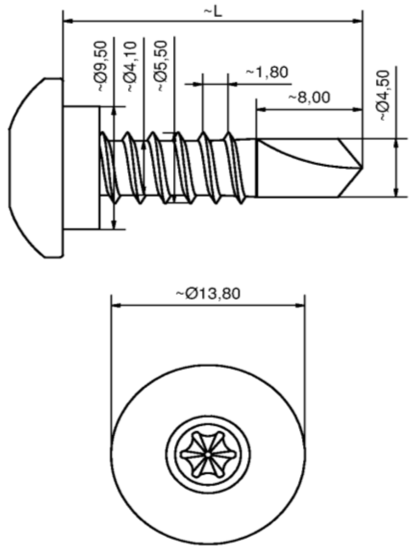


Materials

Fastener:	Carbon steel Case hardened and galvanized
Washer:	None
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD or S320GD – EN 10346

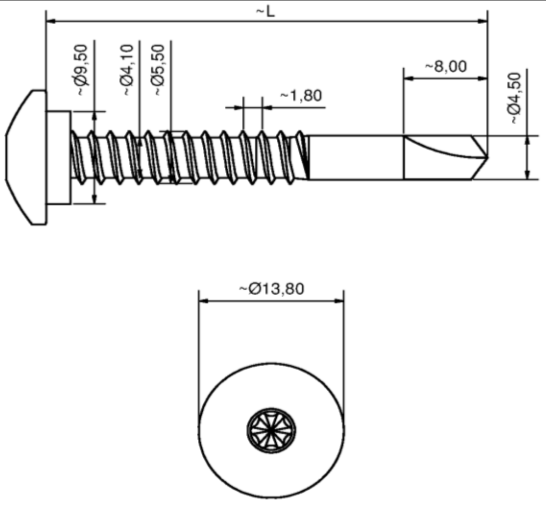
Drilling capacity: $\Sigma t_i \leq 6{,}0$ mm

Timber substructures
For timber substructures no perfomrance determined

	$t_{N,II}$ =	1,50		1,75		2,00		2,50		3,00		3,50		4,00	
	$M_{t,nom}$ =	-													
$V_{R,k}$ for $t_{N,I}$ =	0,50	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac	2,04[a)]	ac
	0,55	2,21[a)]	-	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac	2,21[a)]	ac
	0,63	2,46[a)]	-	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac	2,46[a)]	ac
	0,75	2,88[a)]	-	2,88[a)]	ac	2,88[a)]	ac	2,88	ac	2,88[a)]	ac	2,88[a)]	ac	2,88[a)]	ac
	0,88	3,16	-	3,21	-	3,27	-	3,37	-	3,47[a)]	ac	3,47[a)]	ac	3,47[a)]	ac
	1,00	3,44	-	3,54	-	3,65	-	3,85	-	4,06[a)]	ac	4,06[a)]	ac	4,06[a)]	ac
	1,13	3,79	-	3,87	-	3,95	-	4,10	-	4,26	-	4,26	-	4,26	-
	1,25	4,14	-	4,19	-	4,25	-	4,35	-	4,45	-	4,45	-	4,45	-
	1,50	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
	1,75	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
	2,00	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-	4,84	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac
	0,55	1,65	ac	1,65[a)]	ac	1,65[a)]	ac	1,65[a)]	ac	1,65[a)]	ac	1,65[a)]	ac	1,65[a)]	ac
	0,63	1,65	ac	1,97[a)]	ac	1,97[a)]	ac	1,97[a)]	ac	1,97[a)]	ac	1,97[a)]	ac	1,97[a)]	ac
	0,75	1,65	ac	2,14	ac	2,63	ac	3,06[a)]	ac	3,06[a)]	ac	3,06[a)]	ac	3,06[a)]	ac
	0,88	1,65	-	2,14	-	2,63	-	3,68[a)]	-	3,68[a)]	ac	3,68[a)]	ac	3,68[a)]	ac
	1,00	1,65	-	2,14	-	2,63	-	3,92	-	4,29[a)]	ac	4,29[a)]	ac	4,29[a)]	ac
	1,13	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,43	-	5,43	-
	1,25	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	6,19	-	6,56	-
	1,50	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	6,19	-	6,56	-
	1,75	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	6,19	-	6,56	-
	2,00	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	6,19	-	6,56	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

CORONA, HWH, MH, DC and LP	Annex 30
CORONA 5.5XL #2+ TX20 EPDM-9,5B with undercut, mushroom head with TX drive system and EPDM seal ring	



Materials

Fastener:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Washer:	None
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2 S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 6{,}0$ mm

Timber substructures

For timber substructures no perfomrance determined

	$t_{N,II}$ =	1,50		1,75		2,00		2,50		3,00		3,50		4,00	
	$M_{t,nom}$ =	-													
$V_{R,k}$ for $t_{N,I}$ =	0,50	0,82 a)	-	0,82 a)	-	0,82 a)	-	0,82 a)	-	0,82 a)	-	0,82 a)	-	0,82 a)	-
	0,55	0,83 a)	-	0,83 a)	-	0,83 a)	-	0,83 a)	-	0,83 a)	-	0,83 a)	-	0,83 a)	-
	0,63	0,84 a)	-	0,84 a)	-	0,84 a)	-	0,84 a)	-	0,84 a)	-	0,84 a)	-	0,84 a)	-
	0,75	0,86 a)	-	0,86 a)	-	0,86 a)	-	0,86 a)	-	0,86 a)	-	0,86 a)	-	0,86 a)	-
	0,88	0,92 a)	-	1,00 a)	-	1,09 a)	-	1,26 a)	-	1,43 a)	-	1,43 a)	-	1,43 a)	-
	1,00	0,97 a)	-	1,14 a)	-	1,31 a)	-	1,66 a)	-	2,00 a)	-	2,00 a)	-	2,00 a)	-
	1,13	1,09	-	1,24	-	1,39	-	1,70	-	2,00 a)	-	2,00 a)	-	2,00 a)	-
	1,25	1,21	-	1,34	-	1,47	-	1,74	-	2,00 a)	-	2,00 a)	-	2,00 a)	-
	1,50	1,44	-	1,53	-	1,63	-	1,81	-	2,00 a)	-	2,00 a)	-	2,00 a)	-
	1,75	1,44	-	1,53	-	1,63	-	1,81	-	2,00 a)	-	2,00 a)	-	2,00 a)	-
	2,00	1,44	-	1,53	-	1,63	-	1,81	-	2,00 a)	-	2,00 a)	-	2,00 a)	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,45 a)	-	1,45 a)	-	1,45 a)	-	1,45 a)	-	1,45 a)	-	1,45 a)	-	1,45 a)	-
	0,55	1,65	-	1,65 a)	-	1,65 a)	-	1,65 a)	-	1,65 a)	-	1,65 a)	-	1,65 a)	-
	0,63	1,65	-	1,97 a)	-	1,97 a)	-	1,97 a)	-	1,97 a)	-	1,97 a)	-	1,97 a)	-
	0,75	1,65	-	2,14	-	2,63	-	3,06 a)	-	3,06 a)	-	3,06 a)	-	3,06 a)	-
	0,88	1,65	-	2,14	-	2,63	-	3,68 a)	-	3,68 a)	-	3,68 a)	-	3,68 a)	-
	1,00	1,65	-	2,14	-	2,63	-	3,92	-	4,29 a)	-	4,29 a)	-	4,29 a)	-
	1,13	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,43	-	5,43	-
	1,25	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-
	1,50	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-
	1,75	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-
	2,00	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-

If component I is made of S320GD or S350GD, the values marked with a) may be increased by 8.3%.

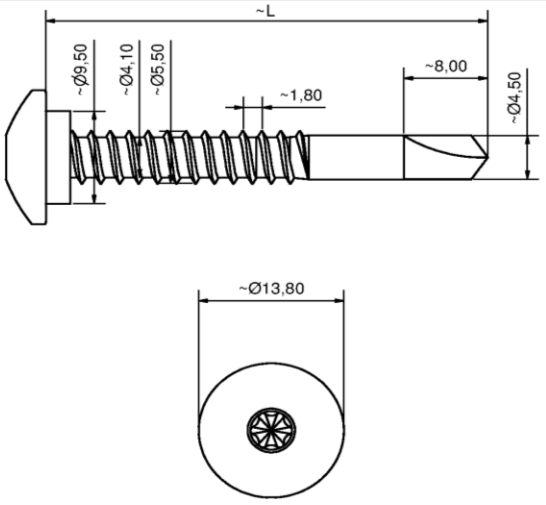
The values listed above are valid for hard, non pre-drilled intermediate layers (plasterboard, timber or fiber cement sheets with thickness up to 9,5 mm) between component I and component II.

CORONA, HWH, MH, DC and LP

CORONA RXB 5.5XL #2P+ TX20 EPDM-9,5B
with undercut, mushroom head with TX drive system and EPDM seal ring

Annex 31

Deutsches Institut für Bautechnik DIBt



Materials

Fastener: Stainless steel (1.4301) - EN 10088
Stainless steel (1.4401) - EN 10088
Washer: None
Component I: S280GD, S320GD or S350GD – EN 10346
Component II: S235 – EN 10025-2
S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 6{,}0$ mm

Timber substructures
For timber substructures no perfomrance determined

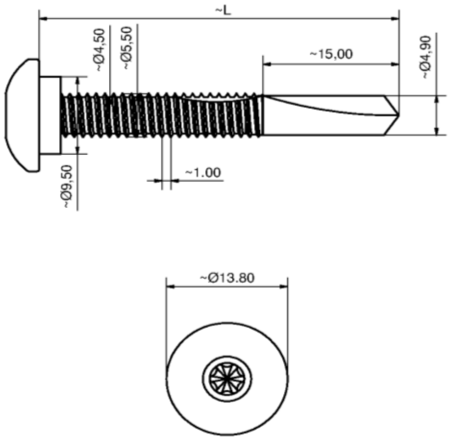
$t_{N,II}$ =		1,50		1,75		2,00		2,50		3,00		3,50		4,00	
$M_{t,nom}$ =		-													
$V_{R,k}$ for $t_{N,I}$ =	0,50	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-	0,34[a)]	-
	0,55	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-	0,37[a)]	-
	0,63	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-	0,42[a)]	-
	0,75	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-	0,49[a)]	-
	0,88	0,49[a)]	-	0,52[a)]	-	0,55[a)]	-	0,60[a)]	-	0,66[a)]	-	0,66[a)]	-	0,66[a)]	-
	1,00	0,49[a)]	-	0,55[a)]	-	0,60[a)]	-	0,72[a)]	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,13	0,57	-	0,91	-	0,65	-	0,74	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,25	0,64	-	0,67	-	0,70	-	0,77	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,50	0,79	-	0,80	-	0,80	-	0,82	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	1,75	0,79	-	0,80	-	0,80	-	0,82	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
	2,00	0,79	-	0,80	-	0,80	-	0,82	-	0,83[a)]	-	0,83[a)]	-	0,83[a)]	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,45[a)]	-	1,45[a)]	-	1,45[a)]	-	1,45[a)]	-	1,45[a)]	-	1,45[a)]	-	1,45[a)]	-
	0,55	1,65	-	1,65[a)]	-	1,65[a)]	-	1,65[a)]	-	1,65[a)]	-	1,65[a)]	-	1,65[a)]	-
	0,63	1,65	-	1,97[a)]	-	1,97[a)]	-	1,97[a)]	-	1,97[a)]	-	1,97[a)]	-	1,97[a)]	-
	0,75	1,65	-	2,14	-	2,63	-	3,06[a)]	-	3,06[a)]	-	3,06[a)]	-	3,06[a)]	-
	0,88	1,65	-	2,14	-	2,63	-	3,68[a)]	-	3,68[a)]	-	3,68[a)]	-	3,68[a)]	-
	1,00	1,65	-	2,14	-	2,63	-	3,92	-	4,29[a)]	-	4,29[a)]	-	4,29[a)]	-
	1,13	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,43	-	5,43	-
	1,25	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-
	1,50	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-
	1,75	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-
	2,00	1,65	-	2,14	-	2,63	-	3,92	-	5,21	-	5,63	-	6,05	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

The values listed above are valid for hard, non pre-drilled intermediate layers (plasterboard, timber or fiber cement sheets with thickness up to 19 mm) between component I and component II.

CORONA, HWH, MH, DC and LP	Annex 32
CORONA RXB 5.5XL #2P+ TX20 EPDM-9,5B with undercut, mushroom head with TX drive system and EPDM seal ring	

Deutsches Institut für Bautechnik DIBt



Materials

Fastener: Stainless steel (1.4301) - EN 10088
Stainless steel (1.4401) - EN 10088
Washer: None
Component I: S280GD, S320GD or S350GD – EN 10346
Component II: S235 – EN 10025-2
S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 12{,}5$ mm

Timber substructures
For timber substructures no perfomrance determined

	$t_{N,II}$ =	4,00		5,00		6,00		8,00		10,00		12,00	
	$M_{t,nom}$ =	-											
$V_{R,k}$ for $t_{N,I}$ =	0,50	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	ac	2,26[a)]	a
	0,55	2,54[a)]	ac	2,54[a)]	ac	2,54[a)]	ac	2,54[a)]	ac	2,54[a)]	ac	-	-
	0,63	2,97[a)]	ac	2,97[a)]	ac	2,97[a)]	ac	2,97[a)]	ac	2,97[a)]	ac	-	-
	0,75	3,67[a)]	ac	3,67[a)]	ac	3,67[a)]	ac	3,67[a)]	ac	3,67[a)]	ac	-	-
	0,88	4,38[a)]	ac	4,38[a)]	ac	4,38[a)]	ac	4,38[a)]	ac	4,38[a)]	ac	-	-
	1,00	5,08[a)]	ac	5,08[a)]	ac	5,08[a)]	ac	5,08[a)]	ac	5,08[a)]	ac	-	-
	1,13	5,53	ac	5,53	ac	5,53	ac	5,53	ac	5,53	a	-	-
	1,25	5,98	ac	5,98	ac	5,98	ac	5,98	ac	5,98	a	-	-
	1,50	6,87	ac	6,87	ac	6,87	ac	6,87	ac	6,87	a	-	-
	1,75	6,87	-	6,87	-	6,87	-	6,87	-	6,87	-	-	-
	2,00	6,87	-	6,87	-	6,87	-	6,87	-	6,87	-	-	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	a
	0,55	1,65[a)]	ac	1,65[a)]	ac	1,65[a)]	ac	1,65[a)]	ac	1,65[a)]	ac	-	-
	0,63	1,97[a)]	ac	1,97[a)]	ac	1,97[a)]	ac	1,97[a)]	ac	1,97[a)]	ac	-	-
	0,75	3,06[a)]	ac	3,06[a)]	ac	3,06[a)]	ac	3,06[a)]	ac	3,06[a)]	ac	-	-
	0,88	3,68[a)]	ac	3,68[a)]	ac	3,68[a)]	ac	3,68[a)]	ac	3,68[a)]	ac	-	-
	1,00	4,29[a)]	ac	4,29[a)]	ac	4,29[a)]	ac	4,29[a)]	ac	4,29[a)]	ac	-	-
	1,13	5,43	ac	6,56	ac	6,56	ac	6,56	ac	6,56	a	-	-
	1,25	5,74	ac	6,56	ac	6,56	ac	6,56	ac	6,56	a	-	-
	1,50	5,74	ac	6,56	ac	6,56	ac	6,56	ac	6,56	a	-	-
	1,75	5,74	-	6,56	-	6,56	-	6,56	-	6,56	-	-	-
	2,00	5,74	-	6,56	-	6,56	-	6,56	-	6,56	-	-	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

CORONA, HWH, MH, DC and LP	Annex 33
CORONA RXB 5.5XL #5 TX20 EPDM-9,5B with undercut, mushroom head with TX drive system and EPDM seal ring	

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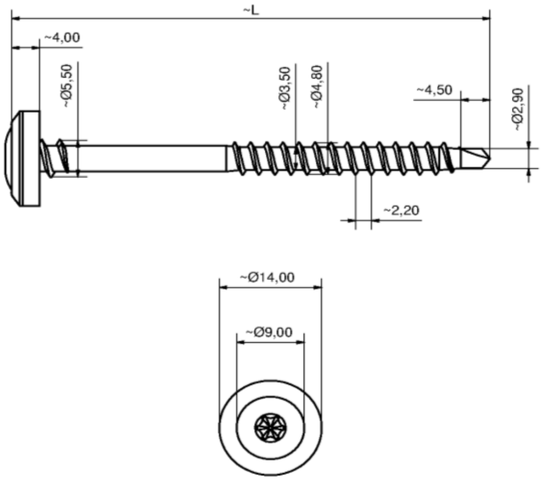


Materials

Fastener:	Stainless steel (1.4301) - EN 10088 Stainless steel (1.4401) - EN 10088
Washer:	Aluminium (EN AW-5052-H32), t = 0,8 mm
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	Structural timber - EN 14081

Drilling capacity: $\Sigma t_i \leq 2 \times 1{,}25$ mm

Timber substructures

For timber substructures perfomrance determined with

$M_{y,Rk}$ = 4,992 Nm
$f_{ax,k}$ = 13,181 N/mm² for $l_{ef} \geq 24$ mm

	$t_{N,I}$		
$V_{R,k}$ for $t_{N,I}$ =	0,50	-	Bearing resistance of component I, $V_{R,I,k}$
	0,55	-	
	0,63	-	
	0,75	-	
	0,88	-	
	1,00	-	
	1,13	-	
	1,25	-	
	1,50	-	
	1,75	-	
	2,00	-	
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,32	Pull-through resistance of component I, $N_{R,I,k}$
	0,55	1,35	
	0,63	1,40	
	0,75	1,92	
	0,88	2,29	
	1,00	2,66	
	1,13	2,96	
	1,25	3,25	
	1,50	-	
	1,75	-	
	2,00	-	

If component I is made of S320GD or S350GD, the values marked with a) may be increased by 8.3%.
The values listed above are valid for component I. For component II see Annex 2.

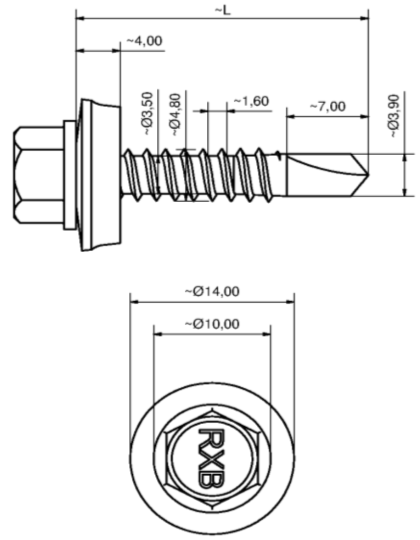
CORONA, HWH, MH, DC and LP

LP 4.8/5.5XL #1 TX20 M-ALU-14B for timber substructures
with countersunk head with TX drive system and seal washer ≥ Ø14 mm

Annex 34

English translation prepared by DIBt

Deutsches Institut für Bautechnik



Materials

Fastener:	Stainless steel (1.4301) - EN 10088
	Stainless steel (1.4401) - EN 10088
Washer:	Stainless steel (1.4301) - EN 10088
	Stainless steel (1.4401) - EN 10088
Component I:	S280GD, S320GD or S350GD – EN 10346
Component II:	S235 – EN 10025-2
	S280GD or S320GD – EN 10346

Drilling capacity: $\Sigma t_i \leq 6{,}0$ mm

Timber substructures
For timber substructures no perfomrance determined

$t_{N,II}$ =		1,50		1,75		2,00		2,50		3,00		3,50		4,00	
$M_{t,nom}$ =		-													
$V_{R,k}$ for $t_{N,I}$ =	0,50	1,89[a)]	ac	1,89[a)]	ac	1,89[a)]	ac	1,89[a)]	ac	1,89[a)]	ac	1,89[a)]	ac	1,89[a)]	ac
	0,55	2,00	-	2,05	-	2,09[a)]	ac	2,09[a)]	ac	2,09[a)]	ac	2,09[a)]	ac	2,09[a)]	ac
	0,63	2,18	-	2,29	-	2,40[a)]	ac	2,40[a)]	ac	2,40[a)]	ac	2,40[a)]	ac	2,40[a)]	ac
	0,75	2,46	-	2,69	-	2,91[a)]	ac	2,91[a)]	ac	2,91[a)]	ac	2,91[a)]	ac	2,91[a)]	ac
	0,88	2,75	-	2,94	-	3,13	-	3,44	-	3,44	ac	3,44	ac	3,44	ac
	1,00	3,03	-	3,19	-	3,34	-	3,65	-	3,96	ac	3,96	ac	3,96	ac
	1,13	3,40	-	3,56	-	3,71	-	4,03	-	4,34	-	4,66	-	4,66	a
	1,25	3,77	-	3,93	-	4,09	-	4,40	-	4,72	-	5,03	-	5,35	a
	1,50	3,77	-	3,93	-	4,09	-	4,40	-	4,72	-	5,03	-	5,35	-
	1,75	3,77	-	3,93	-	4,09	-	4,40	-	4,72	-	5,03	-	5,35	-
	2,00	3,77	-	3,93[a)]	-	4,09	-	4,40	-	4,72	-	5,03	-	5,35	-
$N_{R,k}$ for $t_{N,I}$ =	0,50	1,37[a)]	ac	1,37[a)]	ac	1,37[a)]	ac	1,37[a)]	ac	1,37[a)]	ac	1,37[a)]	ac	1,37[a)]	ac
	0,55	1,45[a)]	-	1,45[a)]	-	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac	1,45[a)]	ac
	0,63	1,58[a)]	-	1,58[a)]	-	1,58[a)]	ac	1,58[a)]	ac	1,58[a)]	ac	1,58[a)]	ac	1,58[a)]	ac
	0,75	1,77	-	2,18	-	2,36[a)]	ac	2,36[a)]	ac	2,36[a)]	ac	2,36[a)]	ac	2,36[a)]	ac
	0,88	1,77	-	2,18	-	2,58	-	2,69[a)]	-	2,69[a)]	ac	2,69[a)]	ac	2,69[a)]	ac
	1,00	1,77	-	2,18	-	2,58	-	3,01[a)]	-	3,01[a)]	ac	3,01[a)]	ac	3,01[a)]	ac
	1,13	1,77	-	2,18	-	2,58	-	3,57	-	3,73	-	3,73	-	3,73	a
	1,25	1,77	-	2,18	-	2,58	-	3,57	-	4,44	-	4,44	-	4,44	a
	1,50	1,77	-	2,18	-	2,58	-	3,57	-	4,44	-	4,44	-	4,44	-
	1,75	1,77	-	2,18	-	2,58	-	3,57	-	4,44	-	4,44	-	4,44	-
	2,00	1,77	-	2,18	-	2,58	-	3,57	-	4,44	-	4,44	-	4,44	-

If component I is made of S320GD or S350GD, the values marked with [a)] may be increased by 8.3%.

CORONA, HWH, MH, DC and LP	Annex 35
HWH RXB 4.8XL #2+ HX8 RX-14G with hexagon head and seal washer ≥ Ø14 mm	