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-10/0020 of 27 November 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	Fastening screws BI and CF
Product family to which the construction product belongs	Fastening screws for metal members and sheeting
Manufacturer	IPEX Beheer B.V. Postbus 82 7468 ZH ENTER NIEDERLANDE
Manufacturing plant	IPEX Beheer B.V. Vonderweg 14 7468 DC ENTER NIEDERLANDE
This European Technical Assessment contains	47 pages including 41 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 of product	Application
4	IPEX - 0300Bl - 4,8 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Steel
5	IPEX - 0300CF- 4,8 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Steel
6	IPEX - 0300Bl - 6,3 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 11 mm	Steel / Steel
7	IPEX - 0300CF - 6,3 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 11 mm	Steel / Steel
8	IPEX - 0301Bl - 4,8 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Timber
9	IPEX - 0301CF- 4,8 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Timber
10	IPEX - 0301Bl - 5,5 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Timber
11	IPEX - 0301CF- 5,5 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Timber
12	IPEX - 0302Bl - 4,8 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Steel
13	IPEX - 0302CF - 4,8 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Steel
14	IPEX - 0302BL- 5,5 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Steel
15	IPEX - 0302CF- 5,5 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Steel
16	IPEX - 0303Bl - 5,5 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Steel
17	IPEX - 0303CF - 5,5 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Steel
18	IPEX - 0305Bl - 5,5 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Steel
19	IPEX - 0305CF- 5,5 x L	Self-drilling screw with mushroom head with torx drive and seal washer ≥ Ø 9.5 mm	Steel / Steel
20	IPEX - 0310Bl - 4,8 x L	Self-drilling screw with undercut, hexagon head and seal washer ≥ Ø 14 mm	Steel / Steel

Table 1 - continued

Annex	Fastening screw	Description of product	Application
21	IPEX - 0310CF - 4,8 x L	Self-drilling screw with undercut, hexagon head and seal washer ≥ Ø 14 mm	Steel / Steel
22	IPEX - 0310Bl - 5,5 x L	Self-drilling screw with undercut, hexagon head and seal washer ≥ Ø 14 mm	Steel / Steel
23	IPEX - 0310CF - 5,5 x L	Self-drilling screw with undercut, hexagon head and seal washer ≥ Ø 14 mm	Steel / Steel
24	IPEX - 0310Bl - 6,3 x L	Self-drilling screw with undercut, hexagon head and seal washer ≥ Ø 14 mm	Steel / Steel
25	IPEX - 0310CF - 6,3 x L	Self-drilling screw with undercut, hexagon head and seal washer ≥ Ø 14 mm	Steel / Steel
26	IPEX - 0311Bl - 4,8 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 14 mm	Steel / Timber
27	IPEX - 0311CF - 4,8 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 14 mm	Steel / Timber
28	IPEX - 0311Bl - 5,5 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 14 mm	Steel / Timber
29	IPEX - 0311CF - 5,5 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 14 mm	Steel / Timber
30	IPEX - 0312Bl - 4,8 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Steel
31	IPEX - 0312CF - 4,8 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Steel
32	IPEX - 0312Bl - 5,5 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Steel
33	IPEX - 0312CF - 5,5 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Steel
34	IPEX - 0313Bl - 5,5 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Steel
35	IPEX - 0313CF - 5,5 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Steel
36	IPEX - 0313Bl - 6,3 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Steel
37	IPEX - 0313CF – 6,3 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Steel
38	IPEX - 0315Bl - 5,5 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Steel
39	IPEX - 0315CF - 5,5 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Steel
40	IPEX - 0319Bl - 6,5 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Timber
41	IPEX - 0319CF - 6,5 x L	Self-drilling screw with hexagon head and seal washer ≥ Ø 16 mm	Steel / Timber

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 (1-41).

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.

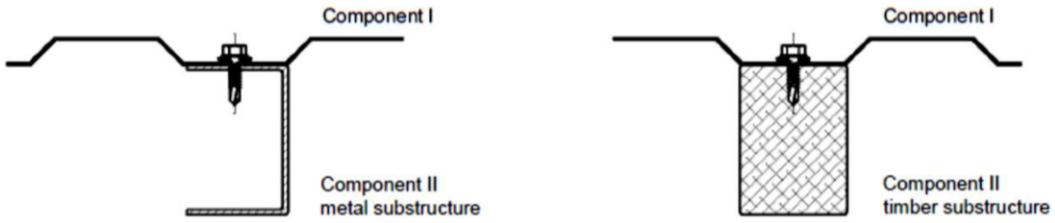
Issued in Berlin on 27 November 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Hahn

Deutsches Institut für Bautechnik DIBt

Examples of execution of a connection



Terms for materials

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

Terms for dimensions [mm]

$t_{N,I}$	Thickness of component I
$t_{N,II}$	Thickness of component II
$\Sigma(t_i)$	Sum of the thicknesses of all components
l_{ef}	Effective screw-in length in timber substructure (without drill point)
d_{pd}	Pre-drill diameter of component I and component II
$d_{pd,I}$	Pre-drill diameter of component I

Terms for performances [kN]

$V_{R,k}$	Characteristic value of shear resistance of the connection
$N_{R,k}$	Characteristic value of tension resistance of the connection
$V_{R,I,k}$	Characteristic value of shear resistance (load bearing) of component I
$N_{R,I,k}$	Characteristic value of tension resistance (pull-through) of component I
$N_{R,II,k}$	Characteristic value of tension resistance (pull-out) of component II

Additionally for timber substructure the following terms are used:

$M_{y,Rk}$	Characteristic value of yield moment
$f_{ax,k}$	Characteristic value of withdrawal strength
$f_{h,k}$	Characteristic value of embedding strength
ρ_k	Characteristic value of raw density of structural timber in kg/m³
ρ_a	Existing value of raw density of structural timber in kg/m³

Used terms in the Annexes	Annex 1
Fastening screws for metal members and sheeting	

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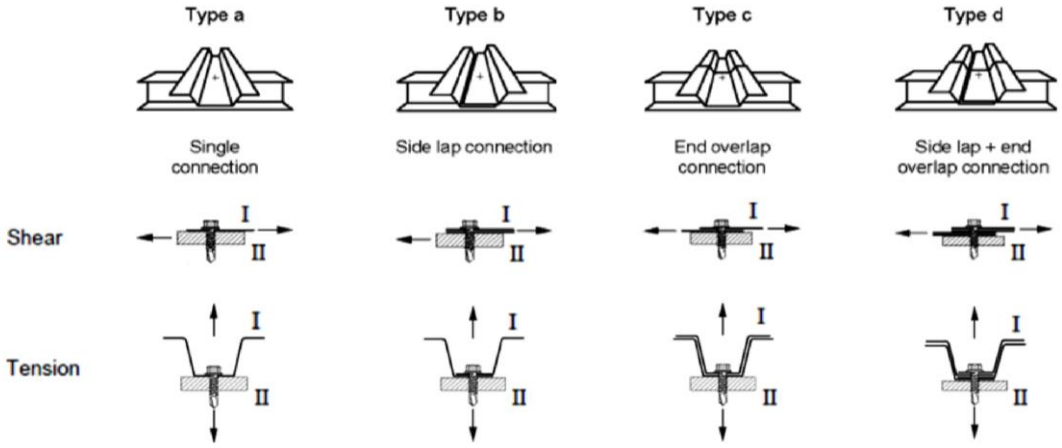
Types of connection and occurring loadings



Determination of Design Values

The design value of tension and shear resistance has to be determined as follows:

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

The characteristic values $N_{R,k}$ and $V_{R,k}$ are given in the Annexes. For intermediate dimension of metal member or sheeting or substructure the characteristic value of the thinner dimension is used.

The recommended partial safety factor $\gamma_M = 1.33$ is used, provided no partial safety factor is given in national regulations or national Annexes to Eurocode 3.

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

For asymmetric metal substructures with thickness $t_{II} < 5$ mm (for instance Z- or C-shaped profiles), the characteristic value $N_{R,k}$ given in the Annexes has to be reduced to 70%.

In case of combined tension and shear forces the following interaction equation is taken into account:

$$\frac{N_{S,d}}{N_{R,d}} + \frac{V_{S,d}}{V_{R,d}} \le 1.0$$

$N_{S,d}$ and $V_{S,d}$ indicates the design values of applied tension and shear forces.

Installation conditions

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

The load-bearing screw-in length of the fastening screw given by the manufacturer shall be considered.

The fastening screws are screwed-in with electric screw driver with depth stop. The use of impact wrenches is not allowed.

The fastening screws are fixed rectangular to the surface of the metal member or sheeting.

The metal member or sheeting and substructure are in contact to each other. The use of compression resistant thermal insulation strips up to a thickness of 3 mm is allowed.

Basics for the design	Annex 2
Fastening screws for metal members and sheeting	

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Timber substructures

Characteristic values of tension and shear resistance of the connection for $k_{mod} \neq 0.9$ and / or $\rho_k > 350$ kg/m³ can be determined as follows:

$$N_{R,k} = \min \begin{cases} N_{R,I,k} \\ N_{R,II,k} \cdot k_{mod} / 0.9 \cdot (\rho_a / 350)^{0.8} \end{cases} \qquad V_{R,k} = \min \begin{cases} V_{R,I,k} \\ V_{R,II,k} \cdot k_{mod} / 0.9 \cdot (\rho_a / 350)^{0.8} \end{cases}$$

$N_{R,I,k}$ und $V_{R,I,k}$ are given in the corresponding Annex of the fastening screw.
As far as $N_{R,II,k}$ and $V_{R,II,k}$ are not given in the corresponding Annex of the fastening screw applies:

$$N_{R,II,k} = f_{ax,k} \cdot d \cdot l_{ef} \cdot k_{mod}$$
$$V_{R,II,k} = F_{v,Rk} \cdot k_{mod}$$

$F_{v,Rk}$ has to be determined according to EN 1995-1-1:2004 + A1:2008, equation (8.9) with $M_{y,Rk}$ and $f_{h,k}$ given in the corresponding Annex of the fastening screw and $f_{h,k}$ according to:

$$f_{h,k} = 0.082(1 - 0.01 \cdot d) \cdot \rho_k$$

with $\rho_k = 350$ kg/m³ as far as no specific value is known.

The characteristic values of resistance of the connection shall be determined as follows:

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

$$V_{R,k} = \min \begin{cases} V_{R,I,k} \\ V_{R,II,k} \end{cases}$$

Aluminium members and sheeting

Characteristic values of tension resistance of the connection can be determined as follows:

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

The characteristic value $N_{R,I,k}$ has to be determined according to EN 1999-1-4:2007 + AC:2009, equation (8.13).
The characteristic value $N_{R,II,k}$ is given in the corresponding Annex of the fastening screw.

Specific notes to the Annexes	Annex 3
Fastening screws for metal members and sheeting	

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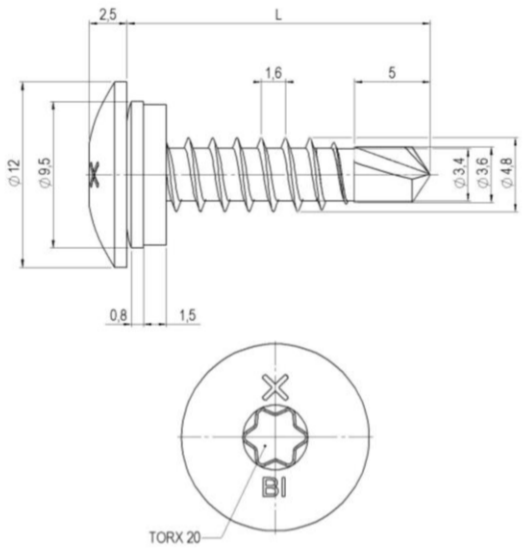

Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 2.00$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	0.50		0.63		0.75		0.88		1.00		1.13		1.25		1.50	
$V_{R,k}$ for $t_{N,I}$ =	0.50	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—
	0.55	0.67	—	0.76	—	0.76	—	0.76	—	0.76	—	0.76	—	0.76	—	—	—
	0.63	0.67	—	0.90	—	0.90	—	0.90	—	0.90	—	0.90	—	0.90	—	—	—
	0.75	0.67	—	0.90	—	1.12	—	1.12	—	1.12	—	1.12	—	1.12	—	—	—
	0.88	0.67	—	0.90	—	1.12	—	1.82	—	1.82	—	1.82	—	—	—	—	—
	1.00	0.67	—	0.90	—	1.12	—	1.82	—	2.51	a	—	—	—	—	—	—
	1.13	0.67	—	0.90	—	1.12	—	1.82	—	—	—	—	—	—	—	—	—
	1.25	0.67	—	0.90	—	1.12	—	—	—	—	—	—	—	—	—	—	—
	1.50	0.67	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1.75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.35	—	0.52	—	0.68	—	0.90	—	1.12	—	1.29	—	1.29	—	1.29	—
	0.55	0.35	—	0.52	—	0.68	—	0.90	—	1.12	—	1.29	—	1.46	—	—	—
	0.63	0.35	—	0.52	—	0.68	—	0.90	—	1.12	—	1.29	—	1.46	—	—	—
	0.75	0.35	—	0.52	—	0.68	—	0.90	—	1.12	—	1.29	—	1.46	—	—	—
	0.88	0.35	—	0.52	—	0.68	—	0.90	—	1.12	—	1.29	—	—	—	—	—
	1.00	0.35	—	0.52	—	0.68	—	0.90	—	1.12	a	—	—	—	—	—	—
	1.13	0.35	—	0.52	—	0.68	—	0.90	—	—	—	—	—	—	—	—	—
	1.25	0.35	—	0.52	—	0.68	—	—	—	—	—	—	—	—	—	—	—
	1.50	0.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1.75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

If both components I and II are made of S320GD or S350GD, all values may be increased by 8.3%.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX - 0300BI – 4,8 x L

Annex 4

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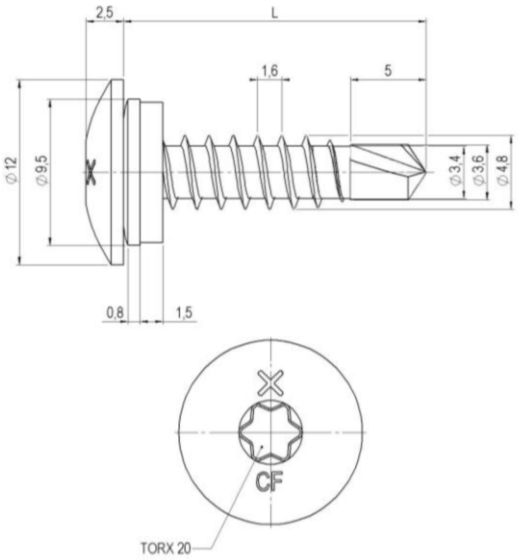


Materials:

Fastener: carbon steel
Quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 2.00$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	0.50		0.63		0.75		0.88		1.00		1.13		1.25		1.50	
$V_{R,k}$ for $t_{N,I}$ =	0.50	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—
	0.55	0.67	—	0.76	—	0.76	—	0.76	—	0.76	—	0.76	—	0.76	—	—	—
	0.63	0.67	—	0.90	—	0.90	—	0.90	—	0.90	—	0.90	—	0.90	—	—	—
	0.75	0.67	—	0.90	—	1.12	—	1.12	—	1.12	—	1.12	—	1.12	—	—	—
	0.88	0.67	—	0.90	—	1.12	—	1.82	—	1.82	—	1.82	—	—	—	—	—
	1.00	0.67	—	0.90	—	1.12	—	1.82	—	2.51	a	—	—	—	—	—	—
	1.13	0.67	—	0.90	—	1.12	—	1.82	—	—	—	—	—	—	—	—	—
	1.25	0.67	—	0.90	—	1.12	—	—	—	—	—	—	—	—	—	—	—
	1.50	0.67	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1.75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.35	—	0.52	—	0.68	—	0.90	—	1.12	—	1.29	—	1.29	—	1.29	—
	0.55	0.35	—	0.52	—	0.68	—	0.90	—	1.12	—	1.29	—	1.46	—	—	—
	0.63	0.35	—	0.52	—	0.68	—	0.90	—	1.12	—	1.29	—	1.46	—	—	—
	0.75	0.35	—	0.52	—	0.68	—	0.90	—	1.12	—	1.29	—	1.46	—	—	—
	0.88	0.35	—	0.52	—	0.68	—	0.90	—	1.12	—	1.29	—	—	—	—	—
	1.00	0.35	—	0.52	—	0.68	—	0.90	—	1.12	a	—	—	—	—	—	—
	1.13	0.35	—	0.52	—	0.68	—	0.90	—	—	—	—	—	—	—	—	—
	1.25	0.35	—	0.52	—	0.68	—	—	—	—	—	—	—	—	—	—	—
	1.50	0.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1.75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

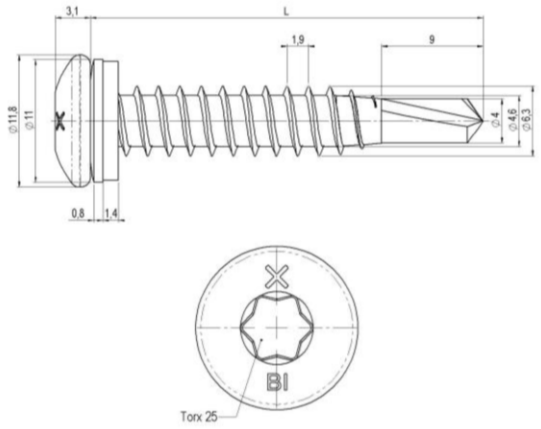
If both components I and II are made of S320GD or S350GD, all values may be increased by 8.3%.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX – 0300CF – 4,8 x L

Annex 5

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 2.50$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25	1.50
$V_{R,k}$ for $t_{N,I}$ =	0.50	0.93 ac	0.93 —	0.93 —	0.93 —	0.93 —	0.93 —	0.93 —	0.93 —	0.93 —
	0.55	0.93 —	1.09 —	1.09 —	1.09 —	1.09 —	1.09 —	1.09 —	1.09 —	1.09 —
	0.63	0.93 —	1.09 —	1.34 —	1.34 —	1.34 —	1.34 —	1.34 —	1.34 —	1.34 —
	0.75	0.93 —	1.09 —	1.34 —	1.74 —	1.74 —	1.74 —	1.74 —	1.74 —	1.74 —
	0.88	0.93 —	1.09 —	1.34 —	1.74 —	2.39 —	2.39 —	2.39 —	2.39 —	2.39 —
	1.00	0.93 —	1.09 —	1.34 —	1.74 —	2.39 —	3.04 —	3.04 —	3.04 —	3.04 —
	1.13	0.93 —	1.09 —	1.34 —	1.74 —	2.39 —	3.04 —	3.77 —	3.77 —	— —
	1.25	0.93 —	1.09 —	1.34 —	1.74 —	2.39 —	3.04 —	3.77 —	4.50 —	— —
	1.50	0.93 —	1.09 —	1.34 —	1.74 —	2.39 —	3.04 —	— —	— —	— —
	1.75	0.93 —	1.09 —	1.34 —	1.74 —	— —	— —	— —	— —	— —
	2.00	0.93 —	— —	— —	— —	— —	— —	— —	— —	— —
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.59 ac	0.64 —	0.71 —	0.82 —	1.17 —	1.48 —	1.48 —	1.48 —	1.48 —
	0.55	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.65 —	1.65 —	1.65 —
	0.63	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	1.92 —	1.92 —
	0.75	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	2.23 —	2.27 —
	0.88	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	2.23 —	2.89 —
	1.00	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	2.23 —	3.00 —
	1.13	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	2.23 —	— —
	1.25	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	2.23 —	— —
	1.50	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	— —	— —	— —
	1.75	0.59 —	0.64 —	0.71 —	0.82 —	— —	— —	— —	— —	— —
	2.00	0.59 —	— —	— —	— —	— —	— —	— —	— —	— —

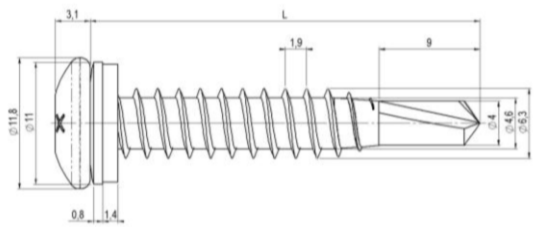
If both components I and II are made of S320GD or S350GD, all values may be increased by 8.3%.

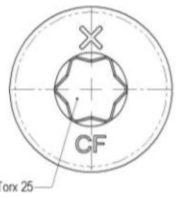
Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 11 mm

IPEX - 0300BI – 6,3 x L

Annex 6

Deutsches Institut für Bautechnik DIBt





Materials:

Fastener: carbon steel
quenched. tempered and galvanized

Washer: carbon steel. galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 2.50$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25	1.50
$V_{R,k}$ for $t_{N,I}$ =	0.50	0.93 ac	0.93 —	0.93 —	0.93 —	0.93 —	0.93 —	0.93 —	0.93 —	0.93 —
	0.55	0.93 —	1.09 —	1.09 —	1.09 —	1.09 —	1.09 —	1.09 —	1.09 —	1.09 —
	0.63	0.93 —	1.09 —	1.34 —	1.34 —	1.34 —	1.34 —	1.34 —	1.34 —	1.34 —
	0.75	0.93 —	1.09 —	1.34 —	1.74 —	1.74 —	1.74 —	1.74 —	1.74 —	1.74 —
	0.88	0.93 —	1.09 —	1.34 —	1.74 —	2.39 —	2.39 —	2.39 —	2.39 —	2.39 —
	1.00	0.93 —	1.09 —	1.34 —	1.74 —	2.39 —	3.04 —	3.04 —	3.04 —	3.04 —
	1.13	0.93 —	1.09 —	1.34 —	1.74 —	2.39 —	3.04 —	3.77 —	3.77 —	— —
	1.25	0.93 —	1.09 —	1.34 —	1.74 —	2.39 —	3.04 —	3.77 —	4.50 —	— —
	1.50	0.93 —	1.09 —	1.34 —	1.74 —	2.39 —	3.04 —	— —	— —	— —
	1.75	0.93 —	1.09 —	1.34 —	1.74 —	— —	— —	— —	— —	— —
	2.00	0.93 —	— —	— —	— —	— —	— —	— —	— —	— —
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.59 ac	0.64 —	0.71 —	0.82 —	1.17 —	1.48 —	1.48 —	1.48 —	1.48 —
	0.55	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.65 —	1.65 —	1.65 —
	0.63	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	1.92 —	1.92 —
	0.75	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	2.23 —	2.27 —
	0.88	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	2.23 —	2.89 —
	1.00	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	2.23 —	3.00 —
	1.13	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	2.23 —	— —
	1.25	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	1.88 —	2.23 —	— —
	1.50	0.59 —	0.64 —	0.71 —	0.82 —	1.17 —	1.52 —	— —	— —	— —
	1.75	0.59 —	0.64 —	0.71 —	0.82 —	— —	— —	— —	— —	— —
	2.00	0.59 —	— —	— —	— —	— —	— —	— —	— —	— —

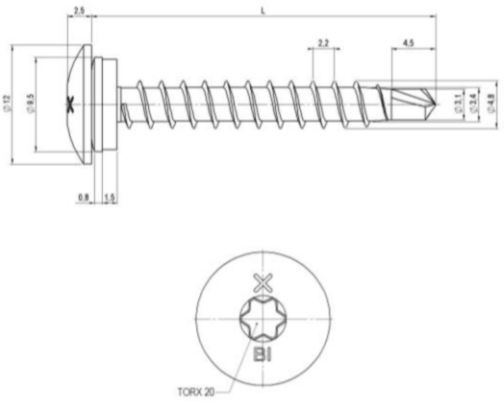
If both components I and II are made of S320GD or S350GD, all values may be increased by 8.3%.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 11 mm

IPEX – 0300CF – 6,3 x L

Annex 7

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088
Washer: stainless steel (1.4301) - EN 10088
Component I: S280GD, S320GD or S350GD - EN 10346
Component II: structural timber - EN 14081, ≥ C24

Drilling capacity: $\Sigma t_i \leq 2.50$ mm

Timber substructures:
performance determined with

$M_{y,Rk}$ = 4.937 Nm
$f_{ax,k}$ = 12.237 N/mm² for $l_{ef} \geq 24.0$ mm

	l_{ef} =	24	26	28	30	32	34	36	38	40	42	$V_{R,I,k}$ [kN] / $N_{R,I,k}$ [kN]	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	Sheer resistance (load bearing) of component I
	0.55	1.36	1.39	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	
	0.63	1.36	1.39	1.42	1.44	1.47	1.49	4.52	1.55	1.57	1.57	1.57	
	0.75	1.36	1.39	1.42	1.44	1.47	1.49	1.52	1.55	1.57	1.60	1.82	
	0.88	1.36	1.39	1.42	1.44	1.47	1.49	1.52	1.55	1.57	1.60	1.82	
	1.00	1.36	1.39	1.42	1.44	1.47	1.49	1.52	1.55	1.57	1.60	1.82	
	1.13	1.36	1.39	1.42	1.44	1.47	1.49	1.52	1.55	1.57	1.60	1.85	
	1.25	1.36	1.39	1.42	1.44	1.47	1.49	1.52	1.55	1.57	1.60	1.88	
	1.50	1.36	1.39	1.42	1.44	1.47	1.49	1.52	1.55	1.57	1.60	1.88	
	1.75	1.36	1.39	1.42	1.44	1.47	1.49	1.52	1.55	1.57	1.60	1.88	
	2.00	1.36	1.39	1.42	1.44	1.47	1.49	1.52	1.55	1.57	1.60	1.88	
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.27	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	Tension resistance (pull through) of component I
	0.55	1.27	1.37	1.48	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	
	0.63	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.02	2.02	2.02	
	0.75	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	2.45	
	0.88	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.19	
	1.00	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.92	
	1.13	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	4.32	
	1.25	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	4.73	
	1.50	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	4.73	
	1.75	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	4.73	
	2.00	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	4.73	

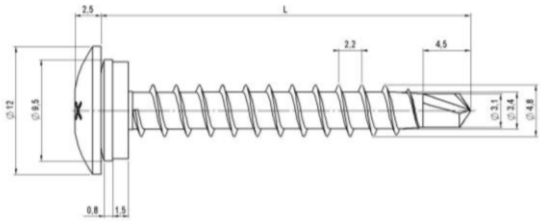
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.
The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0.90 and timber strength grade C24 (ρ_k = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see annex 3.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX - 0301BI – 4,8 x L

Annex 8

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: structural timber - EN 14081, ≥ C24

Drilling capacity: $\Sigma t_i \leq 2.50$ mm

Timber substructures:
performance determined with

$M_{y,Rk}$ = 6.848 Nm
$f_{ax,k}$ = 12.237 N/mm² for $l_{ef} \geq 24.0$ mm

	l_{ef} =	24	26	28	30	32	34	36	38	40	42	$V_{R,l,k}$ [kN] / $N_{R,l,k}$ [kN]	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	Sheer resistance (load bearing) of component I
	0.55	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	
	0.63	1.55	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	
	0.75	1.55	1.57	1.60	1.63	1.65	1.68	1.71	1.73	1.76	1.79	1.82	
	0.88	1.55	1.57	1.60	1.63	1.65	1.68	1.71	1.73	1.76	1.79	1.82	
	1.00	1.55	1.57	1.60	1.63	1.65	1.68	1.71	1.73	1.76	1.79	1.82	
	1.13	1.55	1.57	1.60	1.63	1.65	1.68	1.71	1.73	1.76	1.79	1.85	
	1.25	1.55	1.57	1.60	1.63	1.65	1.68	1.71	1.73	1.76	1.79	1.88	
	1.50	1.55	1.57	1.60	1.63	1.65	1.68	1.71	1.73	1.76	1.79	1.88	
	1.75	1.55	1.57	1.60	1.63	1.65	1.68	1.71	1.73	1.76	1.79	1.88	
	2.00	1.55	1.57	1.60	1.63	1.65	1.68	1.71	1.73	1.76	1.79	1.88	
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.27	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	Tension resistance (pull through) of component I
	0.55	1.27	1.37	1.48	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	
	0.63	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.02	2.02	2.02	
	0.75	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	2.45	
	0.88	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	2.96	
	1.00	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.47	
	1.13	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.47	
	1.25	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.47	
	1.50	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.47	
	1.75	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.47	
	2.00	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.47	

If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

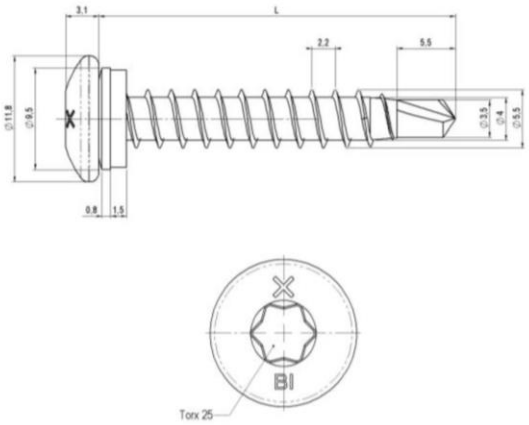
The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0.90 and timber strength grade C24 (ρ_k = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see annex 3.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX – 0301CF – 4,8 x L

Annex 9

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088
Washer: stainless steel (1.4301) - EN 10088
Component I: S280GD, S320GD or S350GD - EN 10346
Component II: structural timber - EN 14081, ≥ C24

Drilling capacity: $\Sigma t_i \leq 2.50$ mm

Timber substructures:
performance determined with

$M_{y,Rk}$ = 6.133 Nm
$f_{ax,k}$ = 12.137 N/mm² for $l_{ef} \geq 28.0$ mm

	l_{ef} =	28	30	32	34	36	38	40	42	44	46	$V_{R,I,k}$ [kN] / $N_{R,I,k}$ [kN]	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	Sheer resistance (load bearing) of component I
	0.55	1.68	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	
	0.63	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.10	
	0.75	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	0.88	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	1.00	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	1.13	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	1.25	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	1.50	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	1.75	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	2.00	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	Tension resistance (pull through) of component I
	0.55	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	
	0.63	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	
	0.75	1.68	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	
	0.88	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.50	2.50	2.50	2.50	
	1.00	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	3.26	
	1.13	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	3.82	
	1.25	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	4.37	
	1.50	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	4.37	
	1.75	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	4.37	
	2.00	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	4.37	

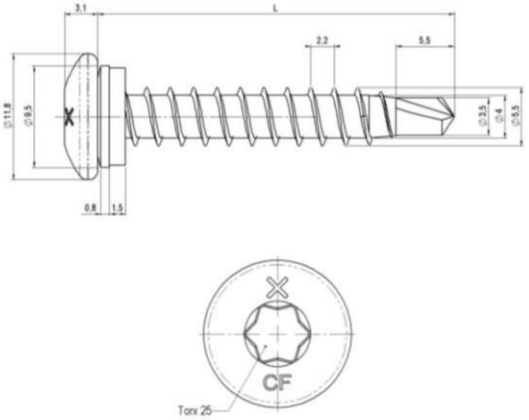
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.
The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0.90 and timber strength grade C24 (ρ_k = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see annex 3.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX - 0301BI – 5,5 x L

Annex 10

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: structural timber - EN 14081, ≥ C24

Drilling capacity: $\Sigma t_i \leq 2.50$ mm

Timber substructures:
performance determined with

$M_{y,Rk}$ = 7.064 Nm
$f_{ax,k}$ = 12.137 N/mm² for $l_{ef} \geq 28.0$ mm

	l_{ef} =	28	30	32	34	36	38	40	42	44	46	$V_{R,l,k}$ [kN] / $N_{R,l,k}$ [kN]	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	Sheer resistance (load bearing) of component I
	0.55	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	
	0.63	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.10	
	0.75	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	0.88	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	1.00	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	1.13	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	1.25	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	1.50	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	1.75	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	2.00	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	Tension resistance (pull through) of component I
	0.55	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	
	0.63	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	
	0.75	1.68	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	
	0.88	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.50	2.50	2.50	2.50	
	1.00	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	3.26	
	1.13	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	3.82	
	1.25	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	4.37	
	1.50	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	4.37	
	1.75	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	4.37	
	2.00	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	4.37	

If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

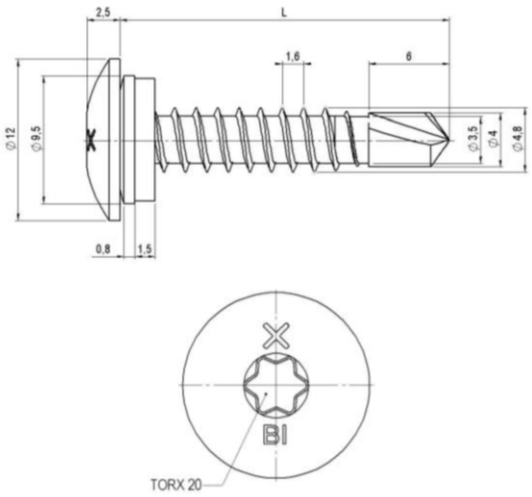
The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0.90 and timber strength grade C24 (ρ_k = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see annex 3.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX – 0301CF – 5,5 x L

Annex 11

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3.50$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	1.00		1.13		1.25		1.50		1.75		2.00		2.50		3.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.27	ac	1.29	ac	1.31	ac	1.34	ac	1.34	ac	1.34	ac	1.34	ac	1.34	a
	0.55	1.37	ac	1.39	ac	1.41	ac	1.43	ac	1.43	ac	1.43	ac	1.43	a	—	—
	0.63	1.54	ac	1.55	ac	1.56	ac	1.58	ac	1.58	ac	1.58	ac	1.58	a	—	—
	0.75	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	a	—	—
	0.88	2.02	ac	2.15	ac	2.27	ac	2.52	ac	2.54	ac	2.55	a	2.59	a	—	—
	1.00	2.23	ac	2.48	ac	2.73	ac	3.23	ac	3.26	a	3.30	a	3.36	a	—	—
	1.13	2.23	ac	2.53	ac	2.83	ac	3.43	a	3.48	a	3.52	a	—	—	—	—
	1.25	2.23	ac	2.58	a	2.93	a	3.64	a	3.69	a	3.75	a	—	—	—	—
	1.50	2.23	a	2.68	a	3.14	a	4.04	a	4.12	a	4.21	a	—	—	—	—
	1.75	2.23	a	2.68	a	3.14	a	4.04	a	4.12	a	—	—	—	—	—	—
	2.00	2.23	a	2.68	a	3.14	a	4.04	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.06	ac	1.27	ac	1.29	ac	1.29	ac	1.29	ac	1.29	ac	1.29	ac	1.29	a
	0.55	1.06	ac	1.27	ac	1.47	ac	1.57	ac	1.57	ac	1.57	ac	1.57	a	—	—
	0.63	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.02	ac	2.02	ac	2.02	a	—	—
	0.75	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	ac	2.45	ac	2.45	a	—	—
	0.88	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	ac	2.54	a	3.19	a	—	—
	1.00	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	a	2.54	a	3.21	a	—	—
	1.13	1.06	ac	1.27	ac	1.47	ac	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.25	1.06	ac	1.27	a	1.47	a	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.50	1.06	a	1.27	a	1.47	a	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.75	1.06	a	1.27	a	1.47	a	1.83	a	2.19	a	—	—	—	—	—	—
	2.00	1.06	a	1.27	a	1.47	a	1.83	a	—	—	—	—	—	—	—	—

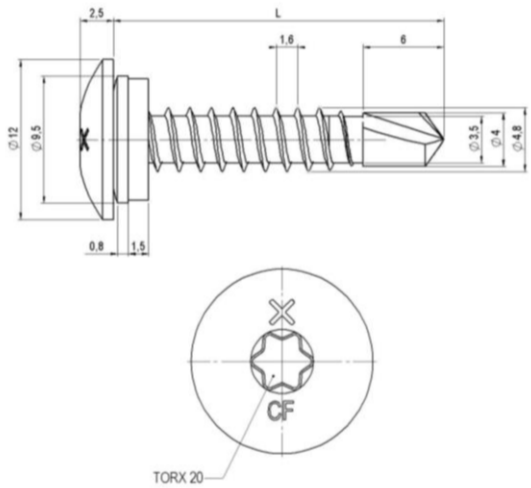
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX - 0302BI – 4,8 x L

Annex 12

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3.50$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	1.00		1.13		1.25		1.50		1.75		2.00		2.50		3.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.27	ac	1.29	ac	1.31	ac	1.34	ac	1.34	ac	1.34	ac	1.34	ac	1.34	a
	0.55	1.37	ac	1.39	ac	1.41	ac	1.43	ac	1.43	ac	1.43	ac	1.43	a	—	—
	0.63	1.54	ac	1.55	ac	1.56	ac	1.58	ac	1.58	ac	1.58	ac	1.58	a	—	—
	0.75	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	a	—	—
	0.88	2.02	ac	2.15	ac	2.27	ac	2.52	ac	2.54	ac	2.55	a	2.59	a	—	—
	1.00	2.23	ac	2.48	ac	2.73	ac	3.23	ac	3.26	a	3.30	a	3.36	a	—	—
	1.13	2.23	ac	2.53	ac	2.83	ac	3.43	a	3.48	a	3.52	a	—	—	—	—
	1.25	2.23	ac	2.58	a	2.93	a	3.64	a	3.69	a	3.75	a	—	—	—	—
	1.50	2.23	a	2.68	a	3.14	a	4.04	a	4.12	a	4.21	a	—	—	—	—
	1.75	2.23	a	2.68	a	3.14	a	4.04	a	4.12	a	—	—	—	—	—	—
	2.00	2.23	a	2.68	a	3.14	a	4.04	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.06	ac	1.27	ac	1.29	ac	1.29	ac	1.29	ac	1.29	ac	1.29	ac	1.29	a
	0.55	1.06	ac	1.27	ac	1.47	ac	1.57	ac	1.57	ac	1.57	ac	1.57	a	—	—
	0.63	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.02	ac	2.02	ac	2.02	a	—	—
	0.75	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	ac	2.45	ac	2.45	a	—	—
	0.88	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	ac	2.54	a	3.19	a	—	—
	1.00	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	a	2.54	a	3.21	a	—	—
	1.13	1.06	ac	1.27	ac	1.47	ac	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.25	1.06	ac	1.27	a	1.47	a	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.50	1.06	a	1.27	a	1.47	a	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.75	1.06	a	1.27	a	1.47	a	1.83	a	2.19	a	—	—	—	—	—	—
	2.00	1.06	a	1.27	a	1.47	a	1.83	a	—	—	—	—	—	—	—	—

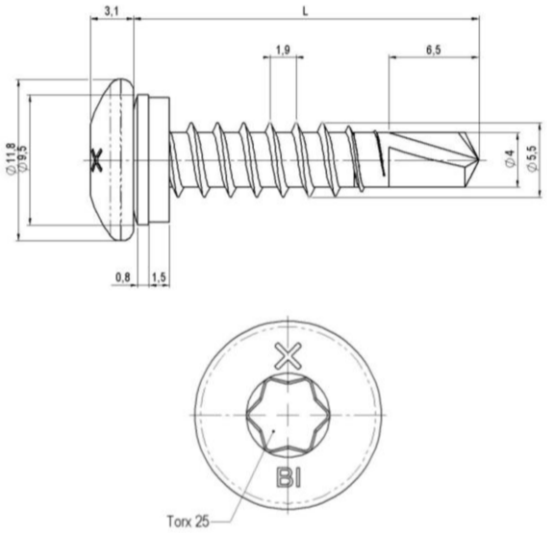
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX – 0302CF – 4,8 x L

Annex 13

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3.50$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	1.00		1.13		1.25		1.50		1.75		2.00		2.50		3.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.36	ac	1.42	ac	1.48	ac	1.59	ac	1.59	ac	1.59	ac	1.59	ac	1.59	a
	0.55	1.46	ac	1.51	ac	1.55	ac	1.64	ac	1.64	ac	1.64	ac	1.64	a	—	—
	0.63	1.60	ac	1.63	ac	1.66	ac	1.72	ac	1.72	ac	1.72	ac	1.72	a	—	—
	0.75	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	a	—	—
	0.88	2.19	ac	2.37	ac	2.53	ac	2.87	ac	2.93	ac	2.99	a	3.12	a	—	—
	1.00	2.53	ac	2.88	ac	3.21	ac	3.89	ac	4.02	a	4.14	a	4.39	a	—	—
	1.13	2.53	ac	2.93	ac	3.3	ac	4.06	a	4.17	a	4.28	a	—	—	—	—
	1.25	2.53	ac	2.97	a	3.38	a	4.23	a	4.33	a	4.42	a	—	—	—	—
	1.50	2.53	a	3.06	a	3.55	a	4.56	a	4.63	a	4.70	a	—	—	—	—
	1.75	2.53	a	3.06	a	3.55	a	4.56	a	4.63	a	—	—	—	—	—	—
	2.00	2.53	a	3.06	a	3.55	a	4.56	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	a
	0.55	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	a	—	—
	0.63	1.21	ac	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	a	—	—
	0.75	1.21	ac	1.48	ac	1.74	ac	1.74	ac	1.74	ac	1.74	ac	1.74	a	—	—
	0.88	1.21	ac	1.48	ac	1.75	ac	2.35	ac	2.50	ac	2.50	a	2.50	a	—	—
	1.00	1.21	ac	1.48	ac	1.75	ac	2.35	ac	2.94	a	3.26	a	3.26	a	—	—
	1.13	1.21	ac	1.48	ac	1.75	ac	2.35	a	2.94	a	3.54	a	—	—	—	—
	1.25	1.21	ac	1.48	a	1.75	a	2.35	a	2.94	a	3.54	a	—	—	—	—
	1.50	1.21	a	1.48	a	1.75	a	2.35	a	2.94	a	3.54	a	—	—	—	—
	1.75	1.21	a	1.48	a	1.75	a	2.35	a	2.94	a	—	—	—	—	—	—
	2.00	1.21	a	1.48	a	1.75	a	2.35	a	—	—	—	—	—	—	—	—

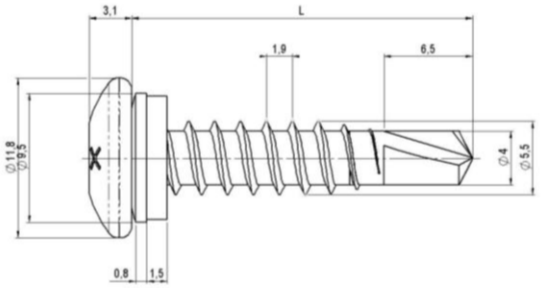
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX - 0302BI - 5,5 x L

Annex 14

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3.50$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	1.00		1.13		1.25		1.50		1.75		2.00		2.50		3.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.36	ac	1.42	ac	1.48	ac	1.59	ac	1.59	ac	1.59	ac	1.59	ac	1.59	a
	0.55	1.46	ac	1.51	ac	1.55	ac	1.64	ac	1.64	ac	1.64	ac	1.64	a	—	—
	0.63	1.60	ac	1.63	ac	1.66	ac	1.72	ac	1.72	ac	1.72	ac	1.72	a	—	—
	0.75	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	a	—	—
	0.88	2.19	ac	2.37	ac	2.53	ac	2.87	ac	2.93	ac	2.99	a	3.12	a	—	—
	1.00	2.53	ac	2.88	ac	3.21	ac	3.89	ac	4.02	a	4.14	a	4.39	a	—	—
	1.13	2.53	ac	2.93	ac	3.3	ac	4.06	a	4.17	a	4.28	a	—	—	—	—
	1.25	2.53	ac	2.97	a	3.38	a	4.23	a	4.33	a	4.42	a	—	—	—	—
	1.50	2.53	a	3.06	a	3.55	a	4.56	a	4.63	a	4.70	a	—	—	—	—
	1.75	2.53	a	3.06	a	3.55	a	4.56	a	4.63	a	—	—	—	—	—	—
	2.00	2.53	a	3.06	a	3.55	a	4.56	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	a
	0.55	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	a	—	—
	0.63	1.21	ac	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	a	—	—
	0.75	1.21	ac	1.48	ac	1.74	ac	1.74	ac	1.74	ac	1.74	ac	1.74	a	—	—
	0.88	1.21	ac	1.48	ac	1.75	ac	2.35	ac	2.50	ac	2.50	a	2.50	a	—	—
	1.00	1.21	ac	1.48	ac	1.75	ac	2.35	ac	2.94	a	3.26	a	3.26	a	—	—
	1.13	1.21	ac	1.48	ac	1.75	ac	2.35	a	2.94	a	3.54	a	—	—	—	—
	1.25	1.21	ac	1.48	a	1.75	a	2.35	a	2.94	a	3.54	a	—	—	—	—
	1.50	1.21	a	1.48	a	1.75	a	2.35	a	2.94	a	3.54	a	—	—	—	—
	1.75	1.21	a	1.48	a	1.75	a	2.35	a	2.94	a	—	—	—	—	—	—
	2.00	1.21	a	1.48	a	1.75	a	2.35	a	—	—	—	—	—	—	—	—

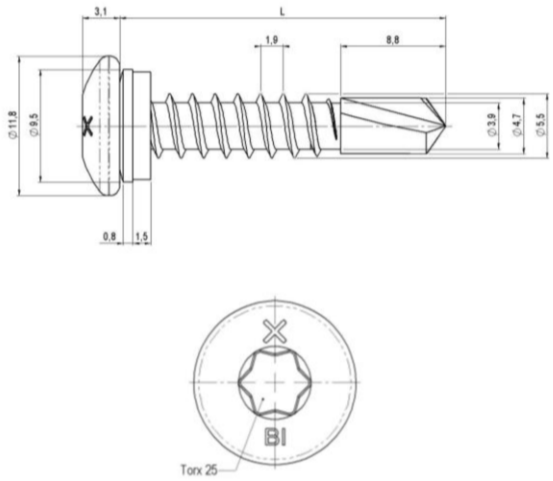
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX - 0302CF - 5,5 x L

Annex 15

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 6.00$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	2.00		2.50		3.00		4.00		5.00		6.00		7.00		8.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.35	ac	1.35	ac	1.35	ac	1.35	ac	1.35	ac	—	—	—	—	—	—
	0.55	1.53	ac	1.53	ac	1.53	ac	1.53	ac	1.53	a	—	—	—	—	—	—
	0.63	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	a	—	—	—	—	—	—
	0.75	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	a	—	—	—	—	—	—
	0.88	2.66	ac	2.66	ac	2.66	ac	2.66	ac	2.66	a	—	—	—	—	—	—
	1.00	3.04	ac	3.04	ac	3.04	ac	3.04	ac	3.04	a	—	—	—	—	—	—
	1.13	3.32	ac	3.77	ac	3.77	ac	3.77	a	—	—	—	—	—	—	—	—
	1.25	3.60	ac	4.05	ac	4.50	ac	4.50	a	—	—	—	—	—	—	—	—
	1.50	4.15	ac	4.34	ac	4.53	ac	4.73	a	—	—	—	—	—	—	—	—
	1.75	4.15	ac	4.34	ac	4.53	a	4.73	a	—	—	—	—	—	—	—	—
	2.00	4.15	ac	4.34	a	4.53	a	4.73	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	—	—	—	—	—	—
	0.55	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	a	—	—	—	—	—	—
	0.63	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	a	—	—	—	—	—	—
	0.75	1.74	ac	1.74	ac	1.74	ac	1.74	ac	1.74	a	—	—	—	—	—	—
	0.88	2.50	ac	2.50	ac	2.50	ac	2.50	ac	2.50	a	—	—	—	—	—	—
	1.00	3.01	ac	3.26	ac	3.26	ac	3.26	ac	3.26	a	—	—	—	—	—	—
	1.13	3.01	ac	3.79	ac	3.82	ac	3.82	a	—	—	—	—	—	—	—	—
	1.25	3.01	ac	3.79	ac	4.37	ac	4.37	a	—	—	—	—	—	—	—	—
	1.50	3.01	ac	3.79	ac	4.37	ac	4.37	a	—	—	—	—	—	—	—	—
	1.75	3.01	ac	3.79	ac	4.37	a	4.37	a	—	—	—	—	—	—	—	—
	2.00	3.01	ac	3.79	a	4.37	a	4.37	a	—	—	—	—	—	—	—	—

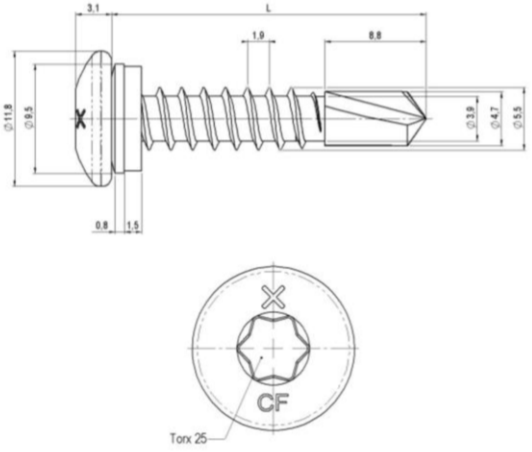
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX - 0303BI – 5,5 x L

Annex 16

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 6.00$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	2.00		2.50		3.00		4.00		5.00		6.00		7.00		8.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.35	ac	1.35	ac	1.35	ac	1.35	ac	1.35	ac	—	—	—	—	—	—
	0.55	1.53	ac	1.53	ac	1.53	ac	1.53	ac	1.53	a	—	—	—	—	—	—
	0.63	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	a	—	—	—	—	—	—
	0.75	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	a	—	—	—	—	—	—
	0.88	2.66	ac	2.66	ac	2.66	ac	2.66	ac	2.66	a	—	—	—	—	—	—
	1.00	3.04	ac	3.04	ac	3.04	ac	3.04	ac	3.04	a	—	—	—	—	—	—
	1.13	3.32	ac	3.77	ac	3.77	ac	3.77	a	—	—	—	—	—	—	—	—
	1.25	3.60	ac	4.05	ac	4.50	ac	4.50	a	—	—	—	—	—	—	—	—
	1.50	4.15	ac	4.34	ac	4.53	ac	4.73	a	—	—	—	—	—	—	—	—
	1.75	4.15	ac	4.34	ac	4.53	a	4.73	a	—	—	—	—	—	—	—	—
	2.00	4.15	ac	4.34	a	4.53	a	4.73	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	—	—	—	—	—	—
	0.55	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	a	—	—	—	—	—	—
	0.63	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	a	—	—	—	—	—	—
	0.75	1.74	ac	1.74	ac	1.74	ac	1.74	ac	1.74	a	—	—	—	—	—	—
	0.88	2.50	ac	2.50	ac	2.50	ac	2.50	ac	2.50	a	—	—	—	—	—	—
	1.00	3.01	ac	3.26	ac	3.26	ac	3.26	ac	3.26	a	—	—	—	—	—	—
	1.13	3.01	ac	3.79	ac	3.82	ac	3.82	a	—	—	—	—	—	—	—	—
	1.25	3.01	ac	3.79	ac	4.37	ac	4.37	a	—	—	—	—	—	—	—	—
	1.50	3.01	ac	3.79	ac	4.37	ac	4.37	a	—	—	—	—	—	—	—	—
	1.75	3.01	ac	3.79	ac	4.37	a	4.37	a	—	—	—	—	—	—	—	—
	2.00	3.01	ac	3.79	a	4.37	a	4.37	a	—	—	—	—	—	—	—	—

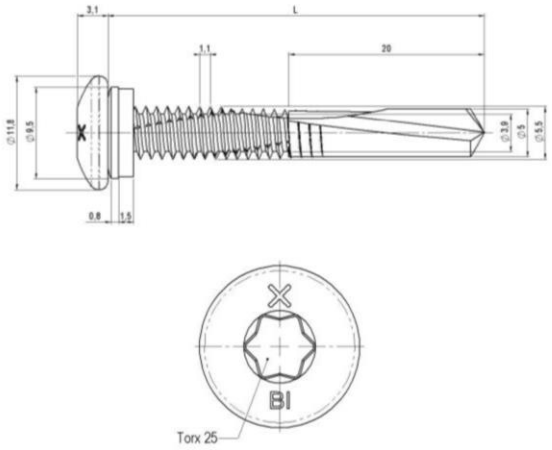
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX - 0303CF - 5,5 x L

Annex 17

Deutsches Institut für Bautechnik DIBt



Materials:

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

Drilling capacity: $\Sigma t_i \leq 13.00$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	4.00		5.00		6.00		7.00		8.00		10.00		12.00		14.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	—	—
	0.55	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	a	—	—
	0.63	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	a	—	—
	0.75	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	a	—	—
	0.88	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	a	—	—
	1.00	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	a	—	—
	1.13	3.93	ac	4.05	ac	4.18	ac	4.31	ac	4.43	ac	4.44	ac	4.44	a	—	—
	1.25	4.06	ac	4.30	ac	4.55	ac	4.79	ac	5.03	ac	5.04	ac	5.05	a	—	—
	1.50	4.34	ac	4.83	ac	5.31	ac	5.80	ac	6.28	ac	6.30	ac	6.32	a	—	—
	1.75	4.34	ac	4.83	ac	5.31	ac	5.80	a	6.28	a	6.30	a	6.32	a	—	—
	2.00	4.34	ac	4.83	a	5.31	a	5.80	a	6.28	a	6.30	a	6.32	a	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	—	—
	0.55	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	a	—	—
	0.63	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	a	—	—
	0.75	1.74	ac	1.74	ac	1.74	ac	1.74	ac	1.74	ac	1.74	ac	1.74	a	—	—
	0.88	2.50	ac	2.50	ac	2.50	ac	2.50	ac	2.50	ac	2.50	ac	2.50	a	—	—
	1.00	3.26	ac	3.26	ac	3.26	ac	3.26	ac	3.26	ac	3.26	ac	3.26	a	—	—
	1.13	3.82	ac	3.82	ac	3.82	ac	3.82	ac	3.82	ac	3.82	ac	3.82	a	—	—
	1.25	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	a	—	—
	1.50	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	a	—	—
	1.75	4.37	ac	4.37	ac	4.37	ac	4.37	a	4.37	a	4.37	a	4.37	a	—	—
	2.00	4.37	ac	4.37	a	4.37	a	4.37	a	4.37	a	4.37	a	4.37	a	—	—

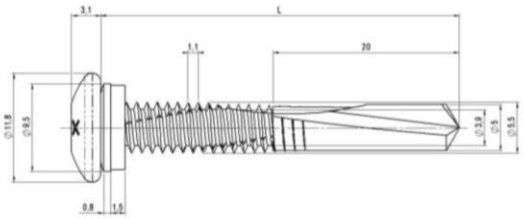
If component I is made of S320GD or S350GD, all values may be increased by 8.3%.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX - 0305BI – 5,5 x L

Annex 18

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: S235 - EN 10025-1

Drilling capacity: $\Sigma t_i \leq 13.00$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	4.00		5.00		6.00		7.00		8.00		10.00		12.00		14.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	—	—
	0.55	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	a	—	—
	0.63	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	a	—	—
	0.75	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	a	—	—
	0.88	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	a	—	—
	1.00	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	a	—	—
	1.13	3.93	ac	4.05	ac	4.18	ac	4.31	ac	4.43	ac	4.44	ac	4.44	a	—	—
	1.25	4.06	ac	4.30	ac	4.55	ac	4.79	ac	5.03	ac	5.04	ac	5.05	a	—	—
	1.50	4.34	ac	4.83	ac	5.31	ac	5.80	ac	6.28	ac	6.30	ac	6.32	a	—	—
	1.75	4.34	ac	4.83	ac	5.31	ac	5.80	a	6.28	a	6.30	a	6.32	a	—	—
	2.00	4.34	ac	4.83	a	5.31	a	5.80	a	6.28	a	6.30	a	6.32	a	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	0.82	ac	—	—
	0.55	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	ac	1.13	a	—	—
	0.63	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	ac	1.43	a	—	—
	0.75	1.74	ac	1.74	ac	1.74	ac	1.74	ac	1.74	ac	1.74	ac	1.74	a	—	—
	0.88	2.50	ac	2.50	ac	2.50	ac	2.50	ac	2.50	ac	2.50	ac	2.50	a	—	—
	1.00	3.26	ac	3.26	ac	3.26	ac	3.26	ac	3.26	ac	3.26	ac	3.26	a	—	—
	1.13	3.82	ac	3.82	ac	3.82	ac	3.82	ac	3.82	ac	3.82	ac	3.82	a	—	—
	1.25	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	a	—	—
	1.50	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	ac	4.37	a	—	—
	1.75	4.37	ac	4.37	ac	4.37	ac	4.37	a	4.37	a	4.37	a	4.37	a	—	—
	2.00	4.37	ac	4.37	a	4.37	a	4.37	a	4.37	a	4.37	a	4.37	a	—	—

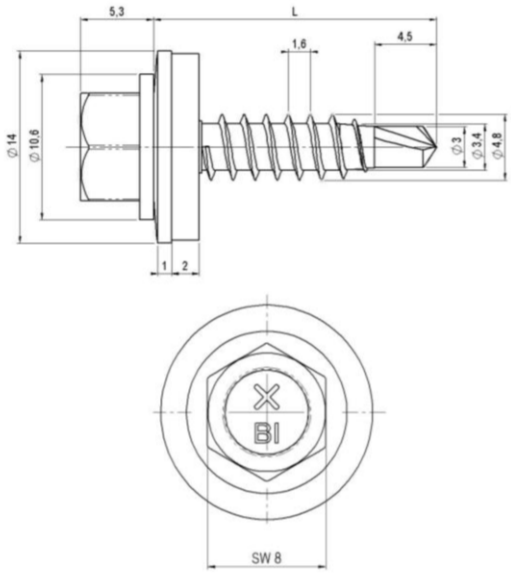
If component I is made of S320GD or S350GD, all values may be increased by 8.3%.

Self drilling screw with mushroom head with Torx® drive system and seal washer ≥ Ø 9.5 mm

IPEX – 0305CF – 5,5 x L

Annex 19

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 2.40$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	0.50		0.63		0.75		0.88		1.00		1.13		1.25		1.50	
$V_{R,k}$ for $t_{N,I}$ =	0.50	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—
	0.55	0.67	—	0.76	—	0.76	—	0.76	—	0.76	—	0.76	—	0.76	—	0.76	—
	0.63	0.67	—	0.90	—	0.90	—	0.90	—	0.90	—	0.90	—	0.90	—	0.90	—
	0.75	0.67	—	0.90	—	1.12	—	1.12	—	1.12	—	1.12	—	1.12	—	1.12	—
	0.88	0.67	—	0.90	—	1.12	—	1.82	—	1.82	—	1.82	—	1.82	—	1.82	—
	1.00	0.67	—	0.90	—	1.12	—	1.82	—	2.51	a	2.51	a	2.51	a	—	—
	1.13	0.67	—	0.90	—	1.12	—	1.82	—	2.51	a	2.80	a	2.80	a	—	—
	1.25	0.67	—	0.90	—	1.12	—	1.82	—	2.51	a	2.80	a	—	—	—	—
	1.50	0.67	—	0.90	—	1.12	—	1.82	—	—	—	—	—	—	—	—	—
	1.75	0.67	—	0.90	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.45	—	0.66	—	0.87	—	1.15	—	1.36	—	1.36	—	1.36	—	1.36	—
	0.55	0.45	—	0.66	—	0.87	—	1.15	—	1.42	—	1.67	—	1.67	—	1.67	—
	0.63	0.45	—	0.66	—	0.87	—	1.15	—	1.42	—	1.67	—	1.91	—	2.17	—
	0.75	0.45	—	0.66	—	0.87	—	1.15	—	1.42	—	1.67	—	1.91	—	2.60	—
	0.88	0.45	—	0.66	—	0.87	—	1.15	—	1.42	—	1.67	—	1.91	—	2.60	—
	1.00	0.45	—	0.66	—	0.87	—	1.15	—	1.42	a	1.67	a	1.91	a	—	—
	1.13	0.45	—	0.66	—	0.87	—	1.15	—	1.42	a	1.67	a	1.91	a	—	—
	1.25	0.45	—	0.66	—	0.87	—	1.15	—	1.42	a	1.67	a	—	—	—	—
	1.50	0.45	—	0.66	—	0.87	—	1.15	—	—	—	—	—	—	—	—	—
	1.75	0.45	—	0.66	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

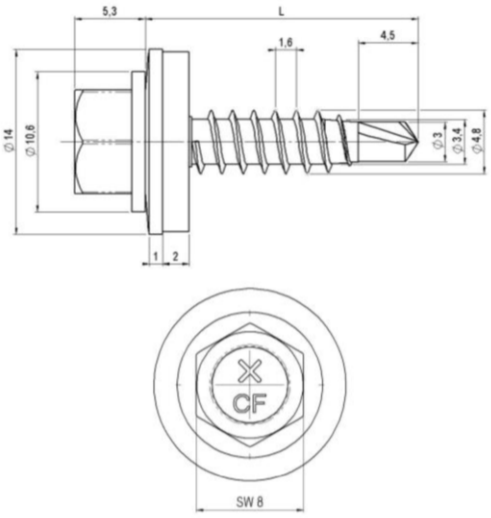
If both components I and II are made of S320GD or S350GD, all values may be increased by 8.3%.

Self drilling screw with undercut, hexagon head and seal washer ≥ Ø 14 mm

IPEX - 0310BI - 4,8 x L

Annex 20

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 2.40$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	0.50		0.63		0.75		0.88		1.00		1.13		1.25		1.50	
$V_{R,k}$ for $t_{N,I}$ =	0.50	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—	0.67	—
	0.55	0.67	—	0.76	—	0.76	—	0.76	—	0.76	—	0.76	—	0.76	—	0.76	—
	0.63	0.67	—	0.90	—	0.90	—	0.90	—	0.90	—	0.90	—	0.90	—	0.90	—
	0.75	0.67	—	0.90	—	1.12	—	1.12	—	1.12	—	1.12	—	1.12	—	1.12	—
	0.88	0.67	—	0.90	—	1.12	—	1.82	—	1.82	—	1.82	—	1.82	—	1.82	—
	1.00	0.67	—	0.90	—	1.12	—	1.82	—	2.51	a	2.51	a	2.51	a	—	—
	1.13	0.67	—	0.90	—	1.12	—	1.82	—	2.51	a	2.80	a	2.80	a	—	—
	1.25	0.67	—	0.90	—	1.12	—	1.82	—	2.51	a	2.80	a	—	—	—	—
	1.50	0.67	—	0.90	—	1.12	—	1.82	—	—	—	—	—	—	—	—	—
	1.75	0.67	—	0.90	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.45	—	0.66	—	0.87	—	1.15	—	1.36	—	1.36	—	1.36	—	1.36	—
	0.55	0.45	—	0.66	—	0.87	—	1.15	—	1.42	—	1.67	—	1.67	—	1.67	—
	0.63	0.45	—	0.66	—	0.87	—	1.15	—	1.42	—	1.67	—	1.91	—	2.17	—
	0.75	0.45	—	0.66	—	0.87	—	1.15	—	1.42	—	1.67	—	1.91	—	2.60	—
	0.88	0.45	—	0.66	—	0.87	—	1.15	—	1.42	—	1.67	—	1.91	—	2.60	—
	1.00	0.45	—	0.66	—	0.87	—	1.15	—	1.42	a	1.67	a	1.91	a	—	—
	1.13	0.45	—	0.66	—	0.87	—	1.15	—	1.42	a	1.67	a	1.91	a	—	—
	1.25	0.45	—	0.66	—	0.87	—	1.15	—	1.42	a	1.67	a	—	—	—	—
	1.50	0.45	—	0.66	—	0.87	—	1.15	—	—	—	—	—	—	—	—	—
	1.75	0.45	—	0.66	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

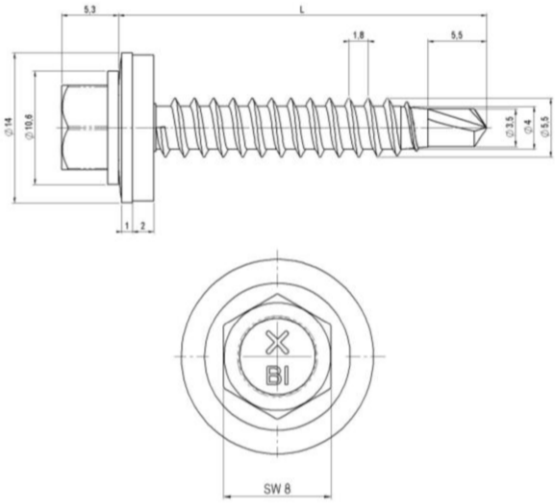
If both components I and II are made of S320GD or S350GD, all values may be increased by 8.3%.

Self drilling screw with undercut, hexagon head and seal washer ≥ Ø 14 mm

IPEX - 0310CF - 4,8 x L

Annex 21

Deutsches Institut für Bautechnik DIBt



Materials:

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

Drilling capacity: $\Sigma t_i \leq 2.40$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	0.50		0.55		0.63		0.75		0.88		1.00		1.13		1.25		1.50	
$V_{R,k}$ for $t_{N,I}$ =	0.50	0.71	—	0.71	—	0.71	—	0.71	—	0.71	—	0.71	—	0.71	—	0.71	—	0.71	—
	0.55	0.71	—	0.91	—	0.91	—	0.91	—	0.91	—	0.91	—	0.91	—	0.91	—	0.91	—
	0.63	0.71	—	0.91	—	1.22	—	1.22	—	1.22	—	1.22	—	1.22	—	1.22	—	1.22	—
	0.75	0.71	—	0.91	—	1.22	—	1.73	—	1.73	—	1.73	—	1.73	—	1.73	—	1.73	—
	0.88	0.71	—	0.91	—	1.22	—	1.73	—	2.27	—	2.27	—	2.27	—	2.27	—	2.27	—
	1.00	0.71	—	0.91	—	1.22	—	1.73	—	2.27	—	2.80	a	2.80	a	2.80	a	—	—
	1.13	0.71	—	0.91	—	1.22	—	1.73	—	2.27	—	2.80	a	3.59	a	3.59	a	—	—
	1.25	0.71	—	0.91	—	1.22	—	1.73	—	2.27	—	2.80	a	3.59	a	—	—	—	—
	1.50	0.71	—	0.91	—	1.22	—	1.73	—	2.27	—	—	—	—	—	—	—	—	—
	1.75	0.71	—	0.91	—	1.22	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.63	—	0.73	—	0.89	—	1.14	—	1.36	—	1.36	—	1.36	—	1.36	—	1.36	—
	0.55	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	—	1.67	—	1.67	—	1.67	—
	0.63	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	—	1.94	—	2.17	—	2.17	—
	0.75	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	—	1.94	—	2.21	—	3.13	—
	0.88	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	—	1.94	—	2.21	—	3.13	—
	1.00	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	a	1.94	a	2.21	a	—	—
	1.13	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	a	1.94	a	2.21	a	—	—
	1.25	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	a	1.94	a	—	—	—	—
	1.50	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	—	—	—	—	—	—	—	—
	1.75	0.63	—	0.73	—	0.89	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

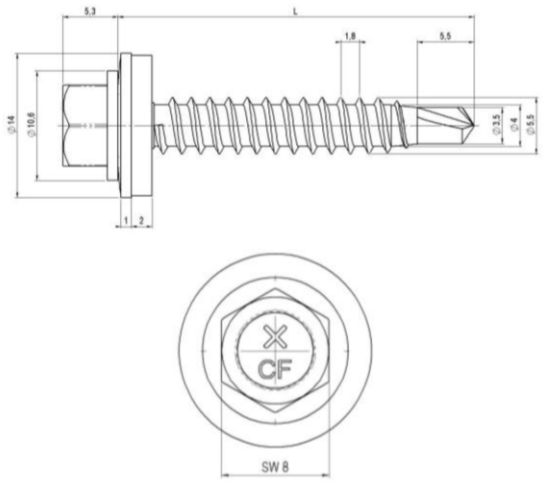
If both components I and II are made of S320GD or S350GD, all values may be increased by 8.3%.

Self drilling screw with undercut. hexagon head and seal washer ≥ Ø 14 mm

IPEX - 0310BI - 5,5 x L

Annex 22

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_I \leq 2.40$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	0.50		0.55		0.63		0.75		0.88		1.00		1.13		1.25		1.50	
$V_{R,k}$ for $t_{N,I}$ =	0.50	0.71	—	0.71	—	0.71	—	0.71	—	0.71	—	0.71	—	0.71	—	0.71	—	0.71	—
	0.55	0.71	—	0.91	—	0.91	—	0.91	—	0.91	—	0.91	—	0.91	—	0.91	—	0.91	—
	0.63	0.71	—	0.91	—	1.22	—	1.22	—	1.22	—	1.22	—	1.22	—	1.22	—	1.22	—
	0.75	0.71	—	0.91	—	1.22	—	1.73	—	1.73	—	1.73	—	1.73	—	1.73	—	1.73	—
	0.88	0.71	—	0.91	—	1.22	—	1.73	—	2.27	—	2.27	—	2.27	—	2.27	—	2.27	—
	1.00	0.71	—	0.91	—	1.22	—	1.73	—	2.27	—	2.80	a	2.80	a	2.80	a	—	—
	1.13	0.71	—	0.91	—	1.22	—	1.73	—	2.27	—	2.80	a	3.59	a	3.59	a	—	—
	1.25	0.71	—	0.91	—	1.22	—	1.73	—	2.27	—	2.80	a	3.59	a	—	—	—	—
	1.50	0.71	—	0.91	—	1.22	—	1.73	—	2.27	—	—	—	—	—	—	—	—	—
	1.75	0.71	—	0.91	—	1.22	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.63	—	0.73	—	0.89	—	1.14	—	1.36	—	1.36	—	1.36	—	1.36	—	1.36	—
	0.55	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	—	1.67	—	1.67	—	1.67	—
	0.63	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	—	1.94	—	2.17	—	2.17	—
	0.75	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	—	1.94	—	2.21	—	3.13	—
	0.88	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	—	1.94	—	2.21	—	3.13	—
	1.00	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	a	1.94	a	2.21	a	—	—
	1.13	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	a	1.94	a	2.21	a	—	—
	1.25	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	1.66	a	1.94	a	—	—	—	—
	1.50	0.63	—	0.73	—	0.89	—	1.14	—	1.40	—	—	—	—	—	—	—	—	—
	1.75	0.63	—	0.73	—	0.89	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

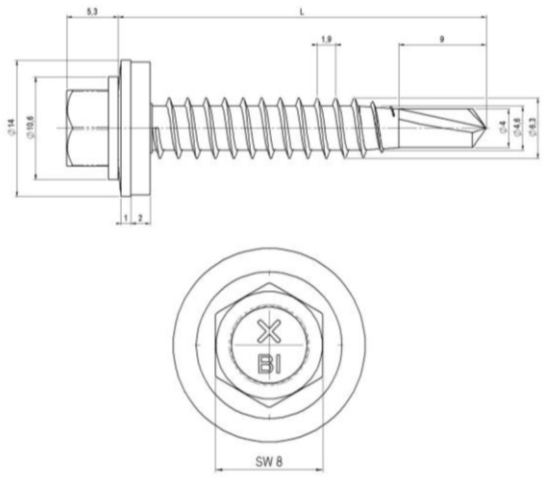
If both components I and II are made of S320GD or S350GD, all values may be increased by 8.3%.

Self drilling screw with undercut, hexagon head and seal washer ≥ Ø 14 mm

IPEX - 0310CF - 5,5 x L

Annex 23

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 2.40$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	0.50		0.55		0.63		0.75		0.88		1.00		1.13		1.25		1.50	
$V_{R,k}$ for $t_{N,I}$ =	0.50	0.93	ac	0.93	ac	0.93	ac	0.93	ac	0.93	ac	0.93	ac	0.93	ac	0.93	ac	0.93	a
	0.55	0.93	ac	1.09	—	1.09	—	1.09	—	1.09	—	1.09	—	1.09	—	1.09	—	1.09	—
	0.63	0.93	ac	1.09	—	1.34	—	1.34	—	1.34	—	1.34	—	1.34	—	1.34	—	1.34	—
	0.75	0.93	ac	1.09	—	1.34	—	1.74	—	1.74	—	1.74	—	1.74	—	1.74	—	1.74	—
	0.88	0.93	ac	1.09	—	1.34	—	1.74	—	2.39	—	2.39	—	2.39	—	2.39	—	2.39	—
	1.00	0.93	ac	1.09	—	1.34	—	1.74	—	2.39	—	3.04	—	3.04	—	3.04	—	—	—
	1.13	0.93	ac	1.09	—	1.34	—	1.74	—	2.39	—	3.04	—	3.77	—	3.77	—	—	—
	1.25	0.93	ac	1.09	—	1.34	—	1.74	—	2.39	—	3.04	—	—	—	—	—	—	—
	1.50	0.93	ac	1.09	—	1.34	—	1.74	—	—	—	—	—	—	—	—	—	—	—
	1.75	0.93	ac	1.09	—	1.34	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	ac	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.59	ac	0.64	ac	0.71	ac	0.82	ac	1.17	ac	1.46	ac	1.46	ac	1.46	ac	1.46	a
	0.55	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.77	—	1.77	—	1.77	—
	0.63	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.88	—	2.23	—	2.27	—
	0.75	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.88	—	2.23	—	3.00	—
	0.88	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.88	—	2.23	—	3.00	—
	1.00	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.88	—	2.23	—	—	—
	1.13	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.88	—	2.23	—	—	—
	1.25	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	—	—	—	—	—	—
	1.50	0.59	ac	0.64	—	0.71	—	0.82	—	—	—	—	—	—	—	—	—	—	—
	1.75	0.59	ac	0.64	—	0.71	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	ac	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

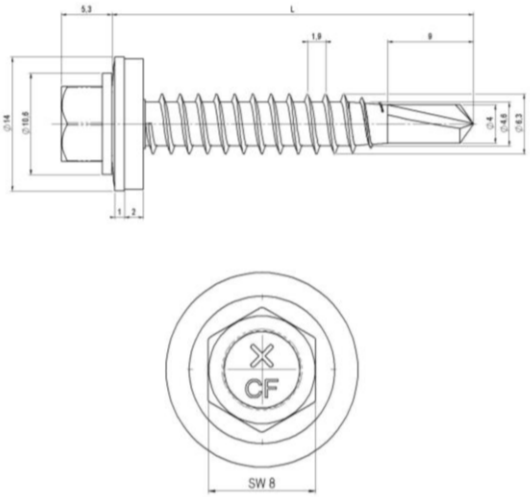
If both components I and II are made of S320GD or S350GD, all values may be increased by 8.3%.

Self drilling screw with undercut, hexagon head and seal washer ≥ Ø 14 mm

IPEX - 0310BI - 6,3 x L

Annex 24

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener:	carbon steel quenched, tempered and galvanized
Washer:	carbon steel, galvanized stainless steel (1.4301) - EN 10088
Component I:	S280GD, S320GD or S350GD - EN 10346
Component II:	S235 - EN 10025-1 S280GD, S320GD or S350GD - EN 10346

Drilling capacity: $\Sigma t_i \leq 2.40$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	0.50		0.55		0.63		0.75		0.88		1.00		1.13		1.25		1.50	
$V_{R,k}$ for $t_{N,I}$ =	0.50	0.93	ac	0.93	ac	0.93	ac	0.93	ac	0.93	ac	0.93	ac	0.93	ac	0.93	ac	0.93	a
	0.55	0.93	ac	1.09	—	1.09	—	1.09	—	1.09	—	1.09	—	1.09	—	1.09	—	1.09	—
	0.63	0.93	ac	1.09	—	1.34	—	1.34	—	1.34	—	1.34	—	1.34	—	1.34	—	1.34	—
	0.75	0.93	ac	1.09	—	1.34	—	1.74	—	1.74	—	1.74	—	1.74	—	1.74	—	1.74	—
	0.88	0.93	ac	1.09	—	1.34	—	1.74	—	2.39	—	2.39	—	2.39	—	2.39	—	2.39	—
	1.00	0.93	ac	1.09	—	1.34	—	1.74	—	2.39	—	3.04	—	3.04	—	3.04	—	—	—
	1.13	0.93	ac	1.09	—	1.34	—	1.74	—	2.39	—	3.04	—	3.77	—	3.77	—	—	—
	1.25	0.93	ac	1.09	—	1.34	—	1.74	—	2.39	—	3.04	—	—	—	—	—	—	—
	1.50	0.93	ac	1.09	—	1.34	—	1.74	—	—	—	—	—	—	—	—	—	—	—
	1.75	0.93	ac	1.09	—	1.34	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	ac	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	0.59	ac	0.64	ac	0.71	ac	0.82	ac	1.17	ac	1.46	ac	1.46	ac	1.46	ac	1.46	a
	0.55	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.77	—	1.77	—	1.77	—
	0.63	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.88	—	2.23	—	2.27	—
	0.75	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.88	—	2.23	—	3.00	—
	0.88	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.88	—	2.23	—	3.00	—
	1.00	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.88	—	2.23	—	—	—
	1.13	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	1.88	—	2.23	—	—	—
	1.25	0.59	ac	0.64	—	0.71	—	0.82	—	1.17	—	1.52	—	—	—	—	—	—	—
	1.50	0.59	ac	0.64	—	0.71	—	0.82	—	—	—	—	—	—	—	—	—	—	—
	1.75	0.59	ac	0.64	—	0.71	—	—	—	—	—	—	—	—	—	—	—	—	—
	2.00	—	ac	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

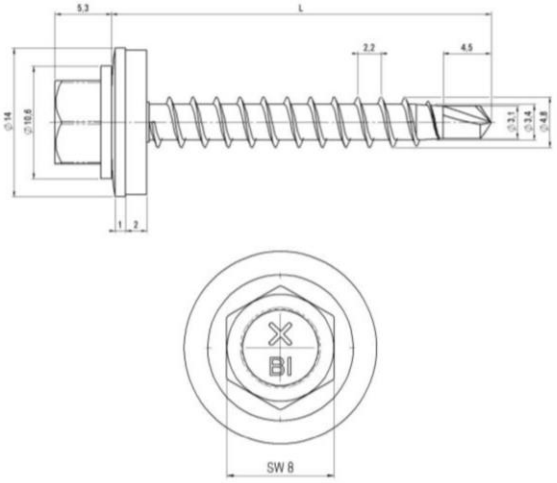
If both components I and II are made of S320GD or S350GD, all values may be increased by 8.3%

Self drilling screw with undercut, hexagon head and seal washer ≥ Ø 14 mm

IPEX - 0310CF - 6,3 x L

Annex 25

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088
Washer: stainless steel (1.4301) - EN 10088
Component I: S280GD, S320GD or S350GD - EN 10346
Component II: structural timber - EN 14081, ≥ C24

Drilling capacity: $\Sigma t_i \leq 2.50$ mm

Timber substructures:
performance determined with

$M_{y,Rk}$ = 5.320 Nm
$f_{ax,k}$ = 12.237 N/mm² for $l_{ef} \geq 24.0$ mm

	l_{ef} =	24	26	28	30	32	34	36	38	40	42	$V_{R,I,k}$ [kN] / $N_{R,I,k}$ [kN]	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	Sheer resistance (load bearing) of component I
	0.55	1.40	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	
	0.63	1.40	1.43	1.46	1.48	1.51	1.53	1.56	1.57	1.57	1.57	1.57	
	0.75	1.40	1.43	1.46	1.48	1.51	1.53	1.56	1.59	1.61	1.64	1.82	
	0.88	1.40	1.43	1.46	1.48	1.51	1.53	1.56	1.59	1.61	1.64	1.82	
	1.00	1.40	1.43	1.46	1.48	1.51	1.53	1.56	1.59	1.61	1.64	1.82	
	1.13	1.40	1.43	1.46	1.48	1.51	1.53	1.56	1.59	1.61	1.64	1.85	
	1.25	1.40	1.43	1.46	1.48	1.51	1.53	1.56	1.59	1.61	1.64	1.88	
	1.50	1.40	1.43	1.46	1.48	1.51	1.53	1.56	1.59	1.61	1.64	1.88	
	1.75	1.40	1.43	1.46	1.48	1.51	1.53	1.56	1.59	1.61	1.64	1.88	
	2.00	1.40	1.43	1.46	1.48	1.51	1.53	1.56	1.59	1.61	1.64	1.88	
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.27	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	Tension resistance (pull through) of component I
	0.55	1.27	1.37	1.48	1.59	1.67	1.67	1.67	1.67	1.67	1.67	1.67	
	0.63	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.17	2.17	
	0.75	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.21	
	0.88	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.83	
	1.00	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	4.44	
	1.13	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	4.96	
	1.25	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	5.48	
	1.50	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	5.48	
	1.75	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	5.48	
	2.00	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	5.48	

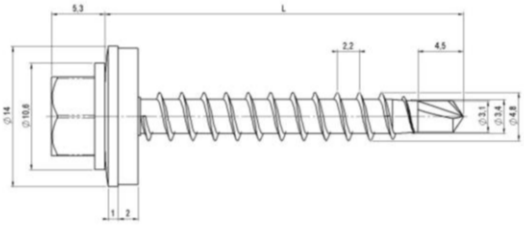
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.
The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0.90 and timber strength grade C24 (ρ_k = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see annex 3.

Self drilling screw with hexagon head and seal washer ≥ Ø 14 mm

IPEX - 0311BI - 4,8 x L

Annex 26

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: structural timber - EN 14081, ≥ C24

Drilling capacity: $\Sigma t_i \leq 2.50$ mm

Timber substructures:
performance determined with

$M_{y,Rk}$ = 7.518 Nm
$f_{ax,k}$ = 12.237 N/mm² for $l_{ef} \geq 24.0$ mm

	l_{ef} =	24	26	28	30	32	34	36	38	40	42	$V_{R,l,k}$ [kN] / $N_{R,l,k}$ [kN]	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	Sheer resistance (load bearing) of component I
	0.55	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	
	0.63	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	
	0.75	1.61	1.63	1.66	1.69	1.71	1.74	1.77	1.79	1.82	1.82	1.82	
	0.88	1.61	1.63	1.66	1.69	1.71	1.74	1.77	1.79	1.82	1.82	1.82	
	1.00	1.61	1.63	1.66	1.69	1.71	1.74	1.77	1.79	1.82	1.82	1.82	
	1.13	1.61	1.63	1.66	1.69	1.71	1.74	1.77	1.79	1.82	1.85	1.85	
	1.25	1.61	1.63	1.66	1.69	1.71	1.74	1.77	1.79	1.82	1.85	1.88	
	1.50	1.61	1.63	1.66	1.69	1.71	1.74	1.77	1.79	1.82	1.85	1.88	
	1.75	1.61	1.63	1.66	1.69	1.71	1.74	1.77	1.79	1.82	1.85	1.88	
	2.00	1.61	1.63	1.66	1.69	1.71	1.74	1.77	1.79	1.82	1.85	1.88	
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.27	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	Tension resistance (pull through) of component I
	0.55	1.27	1.37	1.48	1.59	1.67	1.67	1.67	1.67	1.67	1.67	1.67	
	0.63	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.17	2.17	
	0.75	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.21	
	0.88	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	3.83	
	1.00	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	4.44	
	1.13	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	4.96	
	1.25	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	5.48	
	1.50	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	5.48	
	1.75	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	5.48	
	2.00	1.27	1.37	1.48	1.59	1.69	1.80	1.90	2.01	2.11	2.22	5.48	

If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

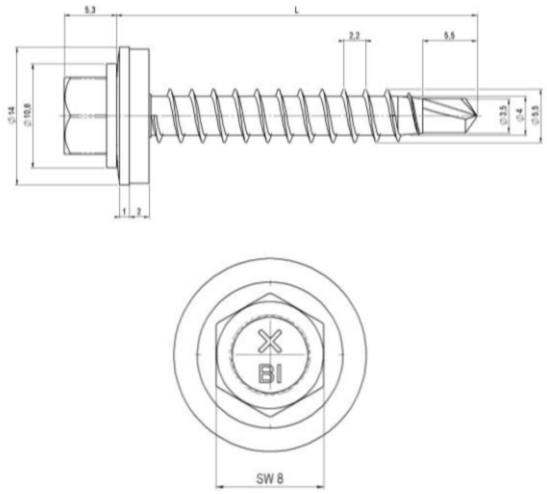
The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0.90 and timber strength grade C24 (ρ_k = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see annex 3.

Self drilling screw with hexagon head and seal washer ≥ Ø 14 mm

IPEX - 0311CF - 4,8 x L

Annex 27

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: structural timber - EN 14081, ≥ C24

Drilling capacity: $\Sigma t_i \leq 2.50$ mm

Timber substructures:
performance determined with

$M_{y,Rk}$ = 6.133 Nm

$f_{ax,k}$ = 12.137 N/mm² for $l_{ef} \geq 28.0$ mm

	l_{ef} =	28	30	32	34	36	38	40	42	44	46	$V_{R,I,k}$ [kN] / $N_{R,I,k}$ [kN]	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	Sheer resistance (load bearing) of component I
	0.55	1.68	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	
	0.63	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.10	
	0.75	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	0.88	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	1.00	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	1.13	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	1.25	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	1.50	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	1.75	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
	2.00	1.68	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	2.77	
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	Tension resistance (pull through) of component I
	0.55	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	
	0.63	1.68	1.80	1.92	2.04	2.16	2.17	2.17	2.17	2.17	2.17	2.17	
	0.75	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	3.21	
	0.88	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	3.83	
	1.00	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	4.44	
	1.13	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	6.33	
	1.25	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	8.22	
	1.50	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	8.22	
	1.75	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	8.22	
	2.00	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	8.22	

If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

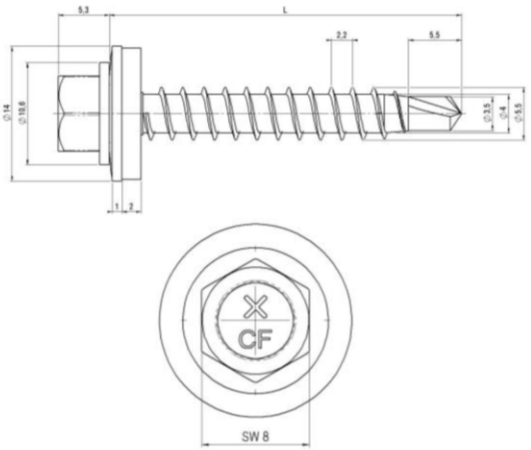
The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0.90 and timber strength grade C24 (ρ_k = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see annex 3.

Self drilling screw with hexagon head and seal washer ≥ Ø 14 mm

IPEX - 0311BI - 5,5 x L

Annex 28

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: structural timber - EN 14081, ≥ C24

Drilling capacity: $\Sigma t_i \leq 2.50$ mm

Timber substructures:
performance determined with

$M_{y,Rk}$ = 7.064 Nm
$f_{ax,k}$ = 12.137 N/mm² for $l_{ef} \geq 28.0$ mm

	l_{ef} =	28	30	32	34	36	38	40	42	44	46	$V_{R,I,k}$ [kN] / $N_{R,I,k}$ [kN]	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	Sheer resistance (load bearing) of component I
	0.55	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	
	0.63	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.10	
	0.75	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	0.88	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	1.00	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	1.13	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	1.25	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	1.50	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	1.75	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
	2.00	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98	2.01	2.04	2.77	
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	Tension resistance (pull through) of component I
	0.55	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	
	0.63	1.68	1.80	1.92	2.04	2.16	2.17	2.17	2.17	2.17	2.17	2.17	
	0.75	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	3.21	
	0.88	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	3.83	
	1.00	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	4.44	
	1.13	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	6.33	
	1.25	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	8.22	
	1.50	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	8.22	
	1.75	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	8.22	
	2.00	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.76	8.22	

If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

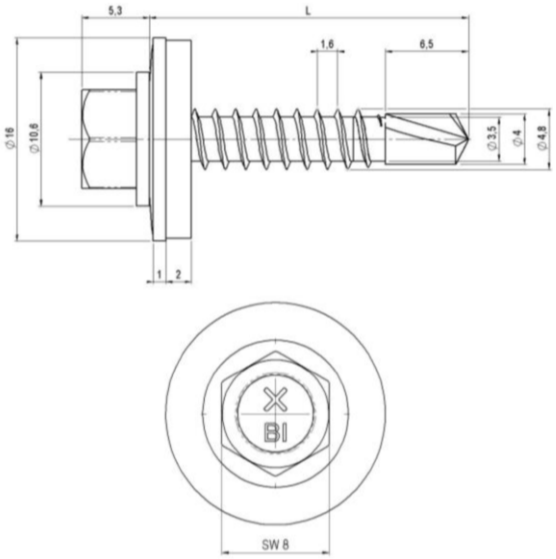
The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0.90 and timber strength grade C24 (ρ_k = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see annex 3.

Self drilling screw with hexagon head and seal washer ≥ Ø 14 mm

IPEX - 0311CF - 5,5 x L

Annex 29

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3.50$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	1.00		1.13		1.25		1.50		1.75		2.00		2.50		3.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.27	ac	1.29	ac	1.31	ac	1.34	ac	1.34	ac	1.34	ac	1.34	ac	1.34	a
	0.55	1.37	ac	1.39	ac	1.41	ac	1.43	ac	1.43	ac	1.43	ac	1.43	a	—	—
	0.63	1.54	ac	1.55	ac	1.56	ac	1.58	ac	1.58	ac	1.58	ac	1.58	a	—	—
	0.75	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	a	—	—
	0.88	2.02	ac	2.15	ac	2.27	ac	2.52	ac	2.54	ac	2.55	a	2.59	a	—	—
	1.00	2.23	ac	2.48	ac	2.73	ac	3.23	ac	3.26	a	3.30	a	3.36	a	—	—
	1.13	2.23	ac	2.53	ac	2.83	ac	3.43	a	3.48	a	3.52	a	—	—	—	—
	1.25	2.23	ac	2.58	a	2.93	a	3.64	a	3.69	a	3.75	a	—	—	—	—
	1.50	2.23	a	2.68	a	3.14	a	4.04	a	4.12	a	4.21	a	—	—	—	—
	1.75	2.23	a	2.68	a	3.14	a	4.04	a	4.12	a	—	—	—	—	—	—
	2.00	2.23	a	2.68	a	3.14	a	4.04	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.06	ac	1.27	ac	1.47	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac	1.71	a
	0.55	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.01	ac	1.57	ac	1.57	a	—	—
	0.63	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	ac	2.49	ac	2.49	a	—	—
	0.75	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	ac	2.54	ac	3.21	a	—	—
	0.88	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	ac	2.54	a	3.21	a	—	—
	1.00	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	a	2.54	a	3.21	a	—	—
	1.13	1.06	ac	1.27	ac	1.47	ac	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.25	1.06	ac	1.27	a	1.47	a	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.50	1.06	a	1.27	a	1.47	a	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.75	1.06	a	1.27	a	1.47	a	1.83	a	2.19	a	—	—	—	—	—	—
	2.00	1.06	a	1.27	a	1.47	a	1.83	a	—	—	—	—	—	—	—	—

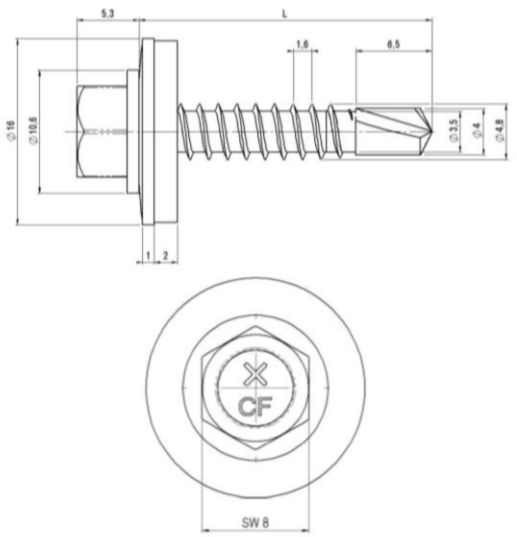
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0312BI - 4,8 x L

Annex 30

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3.50$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	1.00		1.13		1.25		1.50		1.75		2.00		2.50		3.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.27	ac	1.29	ac	1.31	ac	1.34	ac	1.34	ac	1.34	ac	1.34	ac	1.34	a
	0.55	1.37	ac	1.39	ac	1.41	ac	1.43	ac	1.43	ac	1.43	ac	1.43	a	—	—
	0.63	1.54	ac	1.55	ac	1.56	ac	1.58	ac	1.58	ac	1.58	ac	1.58	a	—	—
	0.75	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	a	—	—
	0.88	2.02	ac	2.15	ac	2.27	ac	2.52	ac	2.54	ac	2.55	a	2.59	a	—	—
	1.00	2.23	ac	2.48	ac	2.73	ac	3.23	ac	3.26	a	3.30	a	3.36	a	—	—
	1.13	2.23	ac	2.53	ac	2.83	ac	3.43	a	3.48	a	3.52	a	—	—	—	—
	1.25	2.23	ac	2.58	a	2.93	a	3.64	a	3.69	a	3.75	a	—	—	—	—
	1.50	2.23	a	2.68	a	3.14	a	4.04	a	4.12	a	4.21	a	—	—	—	—
	1.75	2.23	a	2.68	a	3.14	a	4.04	a	4.12	a	—	—	—	—	—	—
	2.00	2.23	a	2.68	a	3.14	a	4.04	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.06	ac	1.27	ac	1.47	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac	1.71	a
	0.55	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.01	ac	1.57	ac	1.57	a	—	—
	0.63	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	ac	2.49	ac	2.49	a	—	—
	0.75	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	ac	2.54	ac	3.21	a	—	—
	0.88	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	ac	2.54	a	3.21	a	—	—
	1.00	1.06	ac	1.27	ac	1.47	ac	1.83	ac	2.19	a	2.54	a	3.21	a	—	—
	1.13	1.06	ac	1.27	ac	1.47	ac	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.25	1.06	ac	1.27	a	1.47	a	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.50	1.06	a	1.27	a	1.47	a	1.83	a	2.19	a	2.54	a	—	—	—	—
	1.75	1.06	a	1.27	a	1.47	a	1.83	a	2.19	a	—	—	—	—	—	—
	2.00	1.06	a	1.27	a	1.47	a	1.83	a	—	—	—	—	—	—	—	—

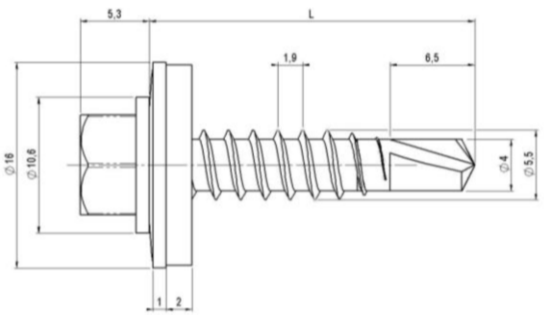
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0312CF - 4,8 x L

Annex 31

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3.50$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	1.00		1.13		1.25		1.50		1.75		2.00		2.50		3.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.36	ac	1.42	ac	4.48	ac	1.59	ac	1.59	ac	1.59	ac	1.59	ac	1.59	ac
	0.55	1.46	ac	1.51	ac	1.55	ac	1.64	ac	1.64	ac	1.64	ac	1.64	a	—	—
	0.63	1.60	ac	1.63	ac	1.66	ac	1.72	ac	1.72	ac	1.72	ac	1.72	a	—	—
	0.75	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	a	—	—
	0.88	2.19	ac	2.37	ac	2.53	ac	2.87	ac	2.93	ac	2.99	a	3.12	a	—	—
	1.00	2.53	ac	2.88	ac	3.21	ac	3.89	ac	4.02	a	4.14	a	4.39	a	—	—
	1.13	2.53	ac	2.93	ac	3.30	ac	4.06	a	4.17	a	4.28	a	—	—	—	—
	1.25	2.53	ac	2.97	a	3.38	a	4.23	a	4.33	a	4.42	a	—	—	—	—
	1.50	2.53	a	3.06	a	3.55	a	4.56	a	4.63	a	4.70	a	—	—	—	—
	1.75	2.53	a	3.06	a	3.55	a	4.56	a	4.63	a	—	—	—	—	—	—
	2.00	2.53	a	3.06	a	3.55	a	4.56	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.21	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac
	0.55	1.21	ac	1.75	ac	2.01	ac	2.01	ac	2.01	ac	2.01	ac	2.01	a	—	—
	0.63	1.21	ac	1.75	ac	2.35	ac	2.49	ac	2.49	ac	2.49	ac	2.49	a	—	—
	0.75	1.21	ac	1.75	ac	2.35	ac	2.94	ac	3.43	ac	3.43	ac	3.43	a	—	—
	0.88	1.21	ac	1.75	ac	2.35	ac	2.94	ac	3.54	ac	4.63	a	4.63	a	—	—
	1.00	1.21	ac	1.75	ac	2.35	ac	2.94	ac	3.54	a	4.67	a	5.80	a	—	—
	1.13	1.21	ac	1.75	ac	2.35	ac	2.94	a	3.54	a	4.67	a	—	—	—	—
	1.25	1.21	ac	1.75	a	2.35	a	2.94	a	3.54	a	4.67	a	—	—	—	—
	1.50	1.21	a	1.75	a	2.35	a	2.94	a	3.54	a	4.67	a	—	—	—	—
	1.75	1.21	a	1.75	a	2.35	a	2.94	a	3.54	a	—	—	—	—	—	—
	2.00	1.21	a	1.75	a	2.35	a	2.94	a	—	—	—	—	—	—	—	—

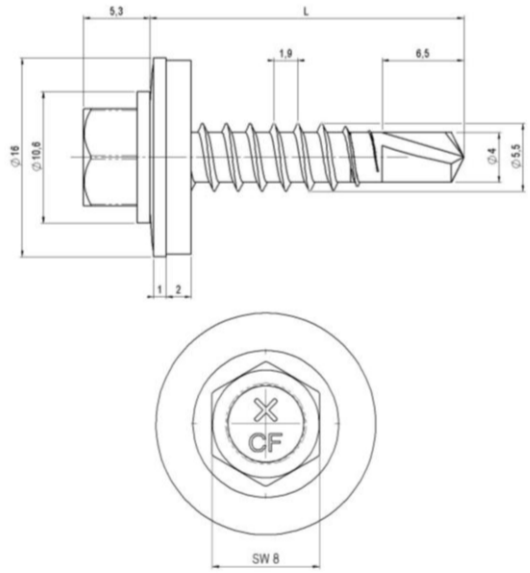
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0312BI - 5,5 x L

Annex 32

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3.50$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	1.00		1.13		1.25		1.50		1.75		2.00		2.50		3.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.36	ac	1.42	ac	4.48	ac	1.59	ac	1.59	ac	1.59	ac	1.59	ac	1.59	ac
	0.55	1.46	ac	1.51	ac	1.55	ac	1.64	ac	1.64	ac	1.64	ac	1.64	a	—	—
	0.63	1.60	ac	1.63	ac	1.66	ac	1.72	ac	1.72	ac	1.72	ac	1.72	a	—	—
	0.75	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	ac	1.84	a	—	—
	0.88	2.19	ac	2.37	ac	2.53	ac	2.87	ac	2.93	ac	2.99	a	3.12	a	—	—
	1.00	2.53	ac	2.88	ac	3.21	ac	3.89	ac	4.02	a	4.14	a	4.39	a	—	—
	1.13	2.53	ac	2.93	ac	3.30	ac	4.06	a	4.17	a	4.28	a	—	—	—	—
	1.25	2.53	ac	2.97	a	3.38	a	4.23	a	4.33	a	4.42	a	—	—	—	—
	1.50	2.53	a	3.06	a	3.55	a	4.56	a	4.63	a	4.70	a	—	—	—	—
	1.75	2.53	a	3.06	a	3.55	a	4.56	a	4.63	a	—	—	—	—	—	—
	2.00	2.53	a	3.06	a	3.55	a	4.56	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.21	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac
	0.55	1.21	ac	1.75	ac	2.01	ac	2.01	ac	2.01	ac	2.01	ac	2.01	a	—	—
	0.63	1.21	ac	1.75	ac	2.35	ac	2.49	ac	2.49	ac	2.49	ac	2.49	a	—	—
	0.75	1.21	ac	1.75	ac	2.35	ac	2.94	ac	3.43	ac	3.43	ac	3.43	a	—	—
	0.88	1.21	ac	1.75	ac	2.35	ac	2.94	ac	3.54	ac	4.63	a	4.63	a	—	—
	1.00	1.21	ac	1.75	ac	2.35	ac	2.94	ac	3.54	a	4.67	a	5.80	a	—	—
	1.13	1.21	ac	1.75	ac	2.35	ac	2.94	a	3.54	a	4.67	a	—	—	—	—
	1.25	1.21	ac	1.75	a	2.35	a	2.94	a	3.54	a	4.67	a	—	—	—	—
	1.50	1.21	a	1.75	a	2.35	a	2.94	a	3.54	a	4.67	a	—	—	—	—
	1.75	1.21	a	1.75	a	2.35	a	2.94	a	3.54	a	—	—	—	—	—	—
	2.00	1.21	a	1.75	a	2.35	a	2.94	a	—	—	—	—	—	—	—	—

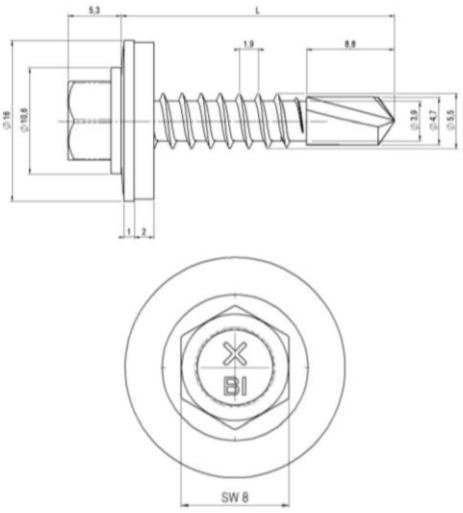
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0312CF - 5,5 x L

Annex 33

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 6.00$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	2.00		2.50		3.00		4.00		5.00		6.00		7.00		8.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.35	ac	1.35	ac	1.35	ac	1.35	ac	1.35	ac	—	—	—	—	—	—
	0.55	1.53	ac	1.53	ac	1.53	ac	1.53	ac	1.53	a	—	—	—	—	—	—
	0.63	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	a	—	—	—	—	—	—
	0.75	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	a	—	—	—	—	—	—
	0.88	2.66	ac	2.66	ac	2.66	ac	2.66	ac	2.66	a	—	—	—	—	—	—
	1.00	3.04	ac	3.04	ac	3.04	ac	3.04	ac	3.04	a	—	—	—	—	—	—
	1.13	3.32	ac	3.77	ac	3.77	ac	3.77	a	—	—	—	—	—	—	—	—
	1.25	3.60	ac	4.05	ac	4.50	ac	4.50	a	—	—	—	—	—	—	—	—
	1.50	4.15	ac	4.34	ac	4.53	ac	4.73	a	—	—	—	—	—	—	—	—
	1.75	4.15	ac	4.34	ac	4.53	a	4.73	a	—	—	—	—	—	—	—	—
	2.00	4.15	ac	4.34	a	4.53	a	4.73	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.71	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac	—	—	—	—	—	—
	0.55	2.01	ac	2.01	ac	2.01	ac	2.01	ac	2.01	a	—	—	—	—	—	—
	0.63	2.49	ac	2.49	ac	2.49	ac	2.49	ac	2.49	a	—	—	—	—	—	—
	0.75	3.11	ac	3.43	ac	3.43	ac	3.43	ac	3.43	a	—	—	—	—	—	—
	0.88	3.11	ac	3.84	ac	4.56	ac	4.63	ac	4.63	a	—	—	—	—	—	—
	1.00	3.11	ac	3.84	ac	4.56	ac	5.58	ac	5.83	a	—	—	—	—	—	—
	1.13	3.11	ac	3.84	ac	4.56	ac	5.58	a	—	—	—	—	—	—	—	—
	1.25	3.11	ac	3.84	ac	4.56	ac	5.58	a	—	—	—	—	—	—	—	—
	1.50	3.11	ac	3.84	ac	4.56	ac	5.58	a	—	—	—	—	—	—	—	—
	1.75	3.11	ac	3.84	ac	4.56	a	5.58	a	—	—	—	—	—	—	—	—
	2.00	3.11	ac	3.84	a	4.56	a	5.58	a	—	—	—	—	—	—	—	—

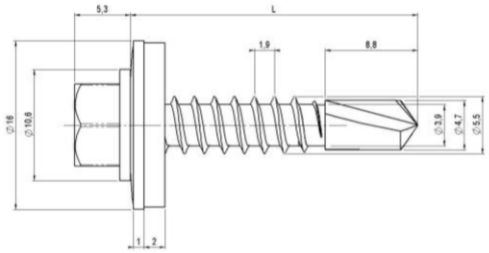
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0313BI - 5,5 x L

Annex 34

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 6.00$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	2.00		2.50		3.00		4.00		5.00		6.00		7.00		8.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.35	ac	1.35	ac	1.35	ac	1.35	ac	1.35	ac	—	—	—	—	—	—
	0.55	1.53	ac	1.53	ac	1.53	ac	1.53	ac	1.53	a	—	—	—	—	—	—
	0.63	1.81	ac	1.81	ac	1.81	ac	1.81	ac	1.81	a	—	—	—	—	—	—
	0.75	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	a	—	—	—	—	—	—
	0.88	2.66	ac	2.66	ac	2.66	ac	2.66	ac	2.66	a	—	—	—	—	—	—
	1.00	3.04	ac	3.04	ac	3.04	ac	3.04	ac	3.04	a	—	—	—	—	—	—
	1.13	3.32	ac	3.77	ac	3.77	ac	3.77	a	—	—	—	—	—	—	—	—
	1.25	3.60	ac	4.05	ac	4.50	ac	4.50	a	—	—	—	—	—	—	—	—
	1.50	4.15	ac	4.34	ac	4.53	ac	4.73	a	—	—	—	—	—	—	—	—
	1.75	4.15	ac	4.34	ac	4.53	a	4.73	a	—	—	—	—	—	—	—	—
	2.00	4.15	ac	4.34	a	4.53	a	4.73	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.71	ac	1.71	ac	1.71	ac	1.71	ac	1.71	ac	—	—	—	—	—	—
	0.55	2.01	ac	2.01	ac	2.01	ac	2.01	ac	2.01	a	—	—	—	—	—	—
	0.63	2.49	ac	2.49	ac	2.49	ac	2.49	ac	2.49	a	—	—	—	—	—	—
	0.75	3.11	ac	3.43	ac	3.43	ac	3.43	ac	3.43	a	—	—	—	—	—	—
	0.88	3.11	ac	3.84	ac	4.56	ac	4.63	ac	4.63	a	—	—	—	—	—	—
	1.00	3.11	ac	3.84	ac	4.56	ac	5.58	ac	5.83	a	—	—	—	—	—	—
	1.13	3.11	ac	3.84	ac	4.56	ac	5.58	a	—	—	—	—	—	—	—	—
	1.25	3.11	ac	3.84	ac	4.56	ac	5.58	a	—	—	—	—	—	—	—	—
	1.50	3.11	ac	3.84	ac	4.56	ac	5.58	a	—	—	—	—	—	—	—	—
	1.75	3.11	ac	3.84	ac	4.56	a	5.58	a	—	—	—	—	—	—	—	—
	2.00	3.11	ac	3.84	a	4.56	a	5.58	a	—	—	—	—	—	—	—	—

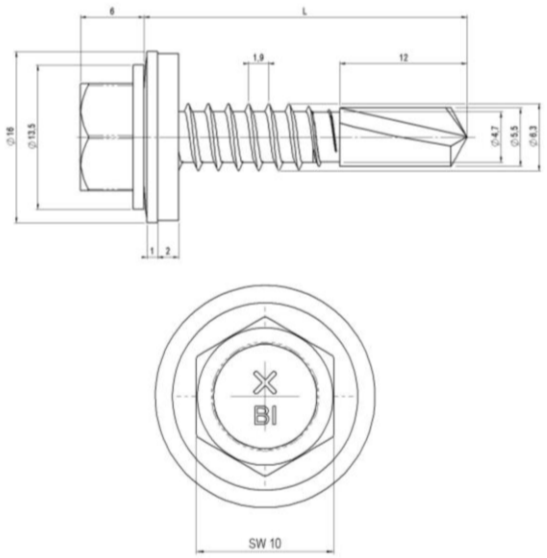
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0313CF - 5,5 x L

Annex 35

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088

Washer: stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 6.30$ mm

Timber substructures:

no performance determined

$t_{N,II}$ =		2.00		2.50		3.00		4.00		5.00		6.00		7.00		8.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.70	ac	1.70	ac	1.70	ac	1.70	ac	1.70	ac	—	—	—	—	—	—
	0.55	1.90	ac	1.90	ac	1.90	ac	1.90	ac	1.90	ac	—	—	—	—	—	—
	0.63	2.19	ac	2.19	ac	2.19	ac	2.19	ac	2.19	ac	—	—	—	—	—	—
	0.75	2.68	ac	2.68	ac	2.68	ac	2.68	ac	2.68	a	—	—	—	—	—	—
	0.88	3.26	ac	3.26	ac	3.26	ac	3.26	ac	3.26	a	—	—	—	—	—	—
	1.00	3.83	ac	3.83	ac	3.83	ac	3.83	ac	3.83	a	—	—	—	—	—	—
	1.13	4.29	ac	4.53	ac	4.53	ac	4.53	ac	4.58	a	—	—	—	—	—	—
	1.25	4.75	ac	4.99	ac	5.23	ac	5.23	a	5.33	a	—	—	—	—	—	—
	1.50	5.67	ac	5.87	ac	6.06	ac	6.44	a	—	—	—	—	—	—	—	—
	1.75	5.67	ac	5.87	ac	6.06	a	6.44	a	—	—	—	—	—	—	—	—
	2.00	5.67	ac	5.87	a	6.06	a	6.44	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.69	ac	1.69	ac	1.69	ac	1.69	ac	1.69	ac	—	—	—	—	—	—
	0.55	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	ac	—	—	—	—	—	—
	0.63	2.28	ac	2.28	ac	2.28	ac	2.28	ac	2.28	ac	—	—	—	—	—	—
	0.75	3.24	ac	3.42	ac	3.42	ac	3.42	ac	3.42	a	—	—	—	—	—	—
	0.88	3.24	ac	3.77	ac	3.77	ac	3.77	ac	3.77	a	—	—	—	—	—	—
	1.00	3.24	ac	4.11	ac	4.11	ac	4.11	ac	4.11	a	—	—	—	—	—	—
	1.13	3.24	ac	4.19	ac	5.13	ac	5.33	ac	5.33	a	—	—	—	—	—	—
	1.25	3.24	ac	4.19	ac	5.13	ac	6.55	a	6.55	a	—	—	—	—	—	—
	1.50	3.24	ac	4.19	ac	5.13	ac	6.55	a	—	—	—	—	—	—	—	—
	1.75	3.24	ac	4.19	ac	5.13	a	6.55	a	—	—	—	—	—	—	—	—
	2.00	3.24	ac	4.19	a	5.13	a	6.55	a	—	—	—	—	—	—	—	—

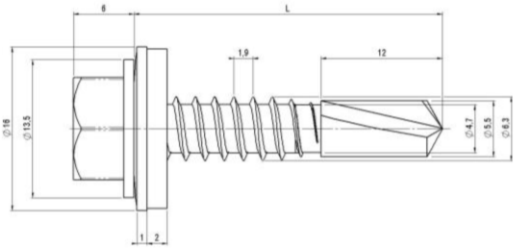
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0313BI - 6,3 x L

Annex 36

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 6.30$ mm

Timber substructures:

no performance determined

$t_{N,II}$ =		2.00		2.50		3.00		4.00		5.00		6.00		7.00		8.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.70	ac	1.70	ac	1.70	ac	1.70	ac	1.70	ac	—	—	—	—	—	—
	0.55	1.90	ac	1.90	ac	1.90	ac	1.90	ac	1.90	ac	—	—	—	—	—	—
	0.63	2.19	ac	2.19	ac	2.19	ac	2.19	ac	2.19	ac	—	—	—	—	—	—
	0.75	2.68	ac	2.68	ac	2.68	ac	2.68	ac	2.68	a	—	—	—	—	—	—
	0.88	3.26	ac	3.26	ac	3.26	ac	3.26	ac	3.26	a	—	—	—	—	—	—
	1.00	3.83	ac	3.83	ac	3.83	ac	3.83	ac	3.83	a	—	—	—	—	—	—
	1.13	4.29	ac	4.53	ac	4.53	ac	4.53	ac	4.58	a	—	—	—	—	—	—
	1.25	4.75	ac	4.99	ac	5.23	ac	5.23	a	5.33	a	—	—	—	—	—	—
	1.50	5.67	ac	5.87	ac	6.06	ac	6.44	a	—	—	—	—	—	—	—	—
	1.75	5.67	ac	5.87	ac	6.06	a	6.44	a	—	—	—	—	—	—	—	—
	2.00	5.67	ac	5.87	a	6.06	a	6.44	a	—	—	—	—	—	—	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.69	ac	1.69	ac	1.69	ac	1.69	ac	1.69	ac	—	—	—	—	—	—
	0.55	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	ac	—	—	—	—	—	—
	0.63	2.28	ac	2.28	ac	2.28	ac	2.28	ac	2.28	ac	—	—	—	—	—	—
	0.75	3.24	ac	3.42	ac	3.42	ac	3.42	ac	3.42	a	—	—	—	—	—	—
	0.88	3.24	ac	3.77	ac	3.77	ac	3.77	ac	3.77	a	—	—	—	—	—	—
	1.00	3.24	ac	4.11	ac	4.11	ac	4.11	ac	4.11	a	—	—	—	—	—	—
	1.13	3.24	ac	4.19	ac	5.13	ac	5.33	ac	5.33	a	—	—	—	—	—	—
	1.25	3.24	ac	4.19	ac	5.13	ac	6.55	a	6.55	a	—	—	—	—	—	—
	1.50	3.24	ac	4.19	ac	5.13	ac	6.55	a	—	—	—	—	—	—	—	—
	1.75	3.24	ac	4.19	ac	5.13	a	6.55	a	—	—	—	—	—	—	—	—
	2.00	3.24	ac	4.19	a	5.13	a	6.55	a	—	—	—	—	—	—	—	—

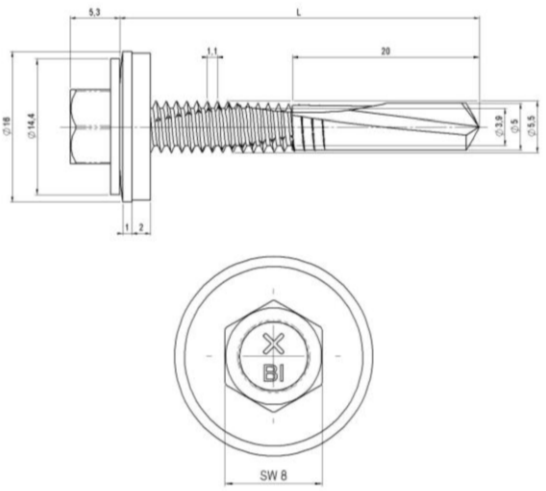
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0313CF - 6,3 x L

Annex 37

Deutsches Institut für Bautechnik DIBt



Materials:

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

Drilling capacity: $\Sigma t_i \leq 13.0$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	4.00		5.00		6.00		7.00		8.00		10.00		12.00		14.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	—	—
	0.55	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	a	—	—
	0.63	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	a	—	—
	0.75	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	a	—	—
	0.88	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	a	—	—
	1.00	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	a	—	—
	1.13	3.93	ac	4.05	ac	4.18	ac	4.31	ac	4.43	ac	4.44	ac	4.44	a	—	—
	1.25	4.06	ac	4.3	ac	4.55	ac	4.79	ac	5.03	ac	5.04	ac	5.05	a	—	—
	1.50	4.34	ac	4.83	ac	5.31	ac	5.80	ac	6.28	ac	6.30	ac	6.32	a	—	—
	1.75	4.34	ac	4.83	ac	5.31	ac	5.80	a	6.28	a	6.30	a	6.32	a	—	—
	2.00	4.34	ac	4.83	a	5.31	a	5.80	a	6.28	a	6.30	a	6.32	a	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.69	ac	1.69	ac	1.69	ac	1.69	ac	1.69	ac	1.69	ac	1.69	ac	—	—
	0.55	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	a	—	—
	0.63	2.28	ac	2.28	ac	2.28	ac	2.28	ac	2.28	ac	2.28	ac	2.28	a	—	—
	0.75	3.42	ac	3.42	ac	3.42	ac	3.42	ac	3.42	ac	3.42	ac	3.42	a	—	—
	0.88	3.77	ac	3.77	ac	3.77	ac	3.77	ac	3.77	ac	3.77	ac	3.77	a	—	—
	1.00	4.11	ac	4.11	ac	4.11	ac	4.11	ac	4.11	ac	4.11	ac	4.11	a	—	—
	1.13	5.33	ac	5.33	ac	5.33	ac	5.33	ac	5.33	ac	5.33	ac	5.33	a	—	—
	1.25	6.46	ac	6.46	ac	6.55	ac	6.55	ac	6.55	ac	6.55	ac	6.55	a	—	—
	1.50	6.46	ac	6.46	ac	6.55	ac	6.55	ac	6.55	ac	6.55	ac	6.55	a	—	—
	1.75	6.46	ac	6.46	ac	6.55	ac	6.55	a	6.55	a	6.55	a	6.55	a	—	—
	2.00	6.46	ac	6.46	ac	6.55	a	6.55	a	6.55	a	6.55	a	6.55	a	—	—

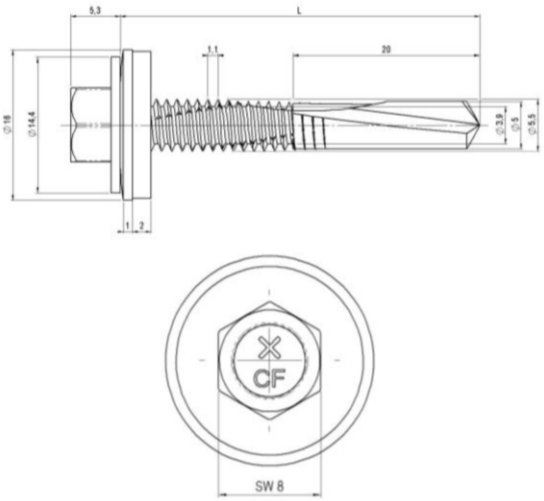
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0315BI - 5,5 x L

Annex 38

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: S235 - EN 10025-1

Drilling capacity: $\Sigma t_i \leq 13.0$ mm

Timber substructures:

no performance determined

	$t_{N,II}$ =	4.00		5.00		6.00		7.00		8.00		10.00		12.00		14.00	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	1.48	ac	—	—
	0.55	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	ac	1.63	a	—	—
	0.63	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	ac	1.86	a	—	—
	0.75	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	ac	2.24	a	—	—
	0.88	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	ac	3.01	a	—	—
	1.00	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	ac	3.78	a	—	—
	1.13	3.93	ac	4.05	ac	4.18	ac	4.31	ac	4.43	ac	4.44	ac	4.44	a	—	—
	1.25	4.06	ac	4.3	ac	4.55	ac	4.79	ac	5.03	ac	5.04	ac	5.05	a	—	—
	1.50	4.34	ac	4.83	ac	5.31	ac	5.80	ac	6.28	ac	6.30	ac	6.32	a	—	—
	1.75	4.34	ac	4.83	ac	5.31	ac	5.80	a	6.28	a	6.30	a	6.32	a	—	—
	2.00	4.34	ac	4.83	a	5.31	a	5.80	a	6.28	a	6.30	a	6.32	a	—	—
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.69	ac	1.69	ac	1.69	ac	1.69	ac	1.69	ac	1.69	ac	1.69	ac	—	—
	0.55	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	ac	2.27	a	—	—
	0.63	2.28	ac	2.28	ac	2.28	ac	2.28	ac	2.28	ac	2.28	ac	2.28	a	—	—
	0.75	3.42	ac	3.42	ac	3.42	ac	3.42	ac	3.42	ac	3.42	ac	3.42	a	—	—
	0.88	3.77	ac	3.77	ac	3.77	ac	3.77	ac	3.77	ac	3.77	ac	3.77	a	—	—
	1.00	4.11	ac	4.11	ac	4.11	ac	4.11	ac	4.11	ac	4.11	ac	4.11	a	—	—
	1.13	5.33	ac	5.33	ac	5.33	ac	5.33	ac	5.33	ac	5.33	ac	5.33	a	—	—
	1.25	6.55	ac	6.55	ac	6.55	ac	6.55	ac	6.55	ac	6.55	ac	6.55	a	—	—
	1.50	6.55	ac	6.55	ac	6.55	ac	6.55	ac	6.55	ac	6.55	ac	6.55	a	—	—
	1.75	6.55	ac	6.55	ac	6.55	ac	6.55	a	6.55	a	6.55	a	6.55	a	—	—
	2.00	6.55	ac	6.55	a	6.55	a	6.55	a	6.55	a	6.55	a	6.55	a	—	—

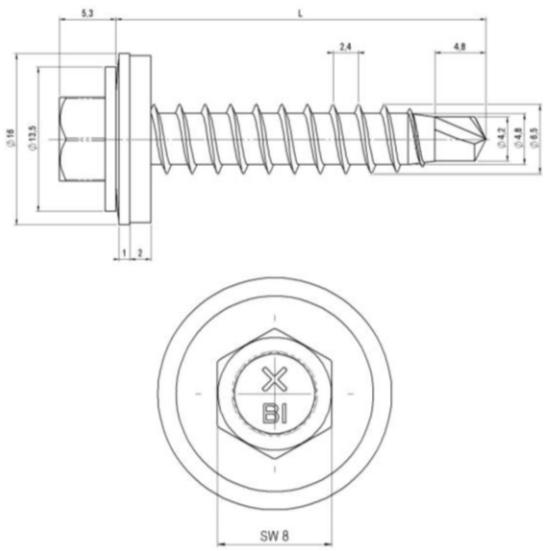
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0315CF - 5,5 x L

Annex 39

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: stainless steel (1.4301) - EN 10088
Washer: stainless steel (1.4301) - EN 10088
Component I: S280GD, S320GD or S350GD - EN 10346
Component II: structural timber - EN 14081, ≥ C24

Drilling capacity: $\Sigma t_i \leq 2.00$ mm

Timber substructures:
performance determined with

$M_{y,Rk}$ = 9.528 Nm
$f_{ax,k}$ = 9.621 N/mm² for $l_{ef} \geq 33.0$ mm

	l_{ef} =	33	37	41	45	49	53	57	61	65	69	$V_{R,I,k}$ [kN] / $N_{R,I,k}$ [kN]	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	Sheer resistance (load bearing) of component I
	0.55	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	
	0.63	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	
	0.75	2.18	2.23	2.29	2.34	2.40	2.46	2.46	2.46	2.46	2.46	2.46	
	0.88	2.18	2.23	2.29	2.34	2.40	2.46	2.51	2.57	2.63	2.68	2.78	
	1.00	2.18	2.23	2.29	2.34	2.40	2.46	2.51	2.57	2.63	2.68	3.09	
	1.13	2.18	2.23	2.29	2.34	2.40	2.46	2.51	2.57	2.63	2.68	3.19	
	1.25	2.18	2.23	2.29	2.34	2.40	2.46	2.51	2.57	2.63	2.68	3.29	
	1.50	2.18	2.23	2.29	2.34	2.40	2.46	2.51	2.57	2.63	2.68	3.48	
	1.75	2.18	2.23	2.29	2.34	2.40	2.46	2.51	2.57	2.63	2.68	3.48	
	2.00	2.18	2.23	2.29	2.34	2.40	2.46	2.51	2.57	2.63	2.68	3.48	
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	Tension resistance (pull through) of component I
	0.55	1.86	2.08	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	
	0.63	1.86	2.08	2.31	2.53	2.76	2.93	2.93	2.93	2.93	2.93	2.93	
	0.75	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.48	3.48	
	0.88	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	3.96	
	1.00	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	4.44	
	1.13	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	5.45	
	1.25	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	6.46	
	1.50	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	7.68	
	1.75	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	7.68	
	2.00	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	7.68	

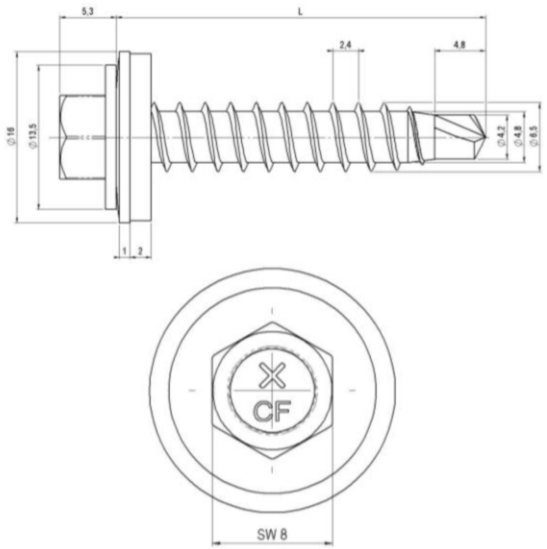
If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.
The values listed above in dependence on the screw-in length l_{ef} are valid for k_{mod} = 0.90 and timber strength grade C24 (ρ_k = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see annex 3.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0319BI - 6,5 x L

Annex 40

Deutsches Institut für Bautechnik DIBt



Materials:

Fastener: carbon steel
quenched, tempered and galvanized

Washer: carbon steel, galvanized
stainless steel (1.4301) - EN 10088

Component I: S280GD, S320GD or S350GD - EN 10346

Component II: structural timber - EN 14081, ≥ C24

Drilling capacity: $\Sigma t_i \leq 2.00$ mm

Timber substructures:
performance determined with

$M_{y,Rk}$ = 12.033 Nm
$f_{ax,k}$ = 9.621 N/mm² for $l_{ef} \geq 33.0$ mm

	l_{ef} =	33	37	41	45	49	53	57	61	65	69	$V_{R,l,k}$ [kN] / $N_{R,l,k}$ [kN]	
$V_{R,k}$ for $t_{N,I}$ =	0.50	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	Sheer resistance (load bearing) of component I
	0.55	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	
	0.63	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	
	0.75	2.39	2.44	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	
	0.88	2.39	2.44	2.50	2.56	2.61	2.67	2.73	2.78	2.78	2.78	2.78	
	1.00	2.39	2.44	2.50	2.56	2.61	2.67	2.73	2.78	2.84	2.89	3.09	
	1.13	2.39	2.44	2.50	2.56	2.61	2.67	2.73	2.78	2.84	2.89	3.19	
	1.25	2.39	2.44	2.50	2.56	2.61	2.67	2.73	2.78	2.84	2.89	3.29	
	1.50	2.39	2.44	2.50	2.56	2.61	2.67	2.73	2.78	2.84	2.89	3.48	
	1.75	2.39	2.44	2.50	2.56	2.61	2.67	2.73	2.78	2.84	2.89	3.48	
	2.00	2.39	2.44	2.50	2.56	2.61	2.67	2.73	2.78	2.84	2.89	3.48	
$N_{R,k}$ for $t_{N,I}$ =	0.50	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	Tension resistance (pull through) of component I
	0.55	1.86	2.08	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	
	0.63	1.86	2.08	2.31	2.53	2.76	2.93	2.93	2.93	2.93	2.93	2.93	
	0.75	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.48	3.48	
	0.88	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	3.96	
	1.00	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	4.44	
	1.13	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	5.45	
	1.25	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	6.46	
	1.50	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	7.68	
	1.75	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	7.68	
	2.00	1.86	2.08	2.31	2.53	2.76	2.93	3.21	3.43	3.48	3.88	7.68	

If component I is made of S320GD or S350GD, the grey highlighted values may be increased by 8.3%.

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_k = 350 kg/m³). For other combinations of k_{mod} and timber strength grades see annex 3.

Self drilling screw with hexagon head and seal washer ≥ Ø 16 mm

IPEX - 0319CF - 6,5 x L

Annex 41