Deutsches Institut für Bautechnik

DIBt

Member of EOTA

www.eota.eu

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-13/0181 of 15 June 2018

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Fastening screws for sandwich panels E-X
Product family to which the construction product belongs	Fastening screws for sandwich panels
Manufacturer	Guntram End GmbH Untertürkheimer Straße 20 66117 Saarbrücken DEUTSCHLAND
Manufacturing plant	Guntram End GmbH Untertürkheimer Straße 20 66117 Saarbrücken DEUTSCHLAND
This European Technical Assessment contains	13 pages including 9 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 330047-01-0602

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

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 completed with sealing washers consisting of metal washer and EPDM-seal.

Table 1 – Fastening screws for sandwich panels

Annex	Fastening screw	Description of product	Application
4	E-X Bohr 3 HT 5,5 x L	Self-drilling screw with hexagon head and sealing washer ≥ ø 16 mm	Steel / Steel
5	E-X Bohr 5 HT 5,5 x L	Self-drilling screw with hexagon head and sealing washer ≥ ø 16 mm	Steel / Steel
6	E-X Bohr RS HT 6,5 x L	Self-drilling screw with hexagon head and sealing washer ≥ ø 16 mm	Steel / Timber
7	E-X A 6,5 x L E-X 8 A 6,5 x L	Self-tapping screw with hexagon head and sealing washer ≥ ø 16 mm	Steel / Timber
8	E-X BZ 6,3 x L E-X 8 BZ 6,3 x L	Self-tapping screw with hexagon head and sealing washer ≥ ø 16 mm	Steel / Steel
9	E-X BZ 6,3 x L E-X 8 BZ 6,3 x L	Self-tapping screw with hexagon head and sealing washer ≥ ø 16 mm	Steel / Steel

2 Specification of the intended use in accordance with the applicable European Assessment Document

The fastening screws are intended to be used for fastening sandwich panels to metal or timber substructures. The sandwich panel can either be used as wall or roof cladding or as load bearing wall and roof element. The intended use comprises fastening screws and connections for indoor and outdoor applications. Fastening screws which are intended to be used in external environments with ≥ C2 corrosion according to the standard EN ISO 12944-2 are made of stainless steel. Furthermore the intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads). The fastening screws are not intended for re-use.

The performances given in Section 3 are only valid if the fastening screws are used in compliance with the specifications and conditions given in Annexes (1-9).

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 Bending Capacity in case of constraining forces due to temperature	see Annexes to this ETA
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. 330047-01-0602, 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.

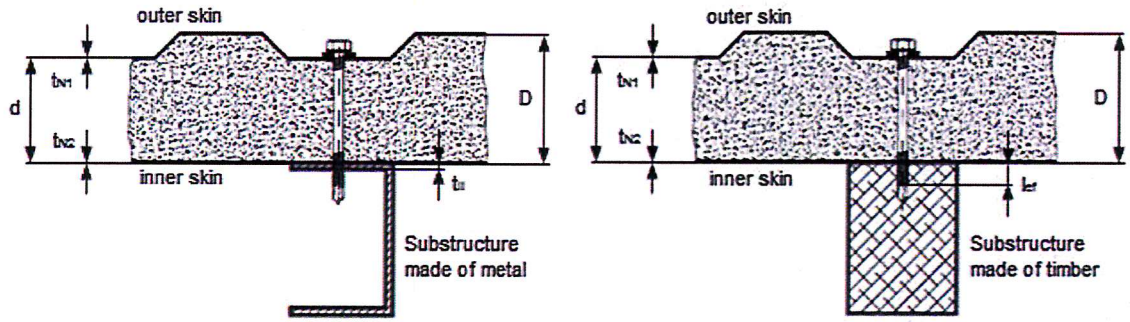
Issued in Berlin on 15 June 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Schult

Deutsches Institut für Bautechnik DIBt

Examples of execution of a connection



Terms for materials

Fastener	Material of the fastening screw
Washer	Material of the sealing washer
Component I	Material of the sandwich panel (outer skin and inner skin)
Component II	Material of the substructure

Terms for dimensions

D, d	Total thickness of component I
t_{N1}	Thickness of the outer skin of component I
t_{N2}	Thickness of the inner skin of component I
t_{II}	Thickness of component II made of metal
l_{ef}	Effective screw-in length in component II made of timber (without drill point)
d_{pd}	Pre-drill diameter of component I and component II

Terms for performances

$V_{R,k}$	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 of metal member or sheeting
$N_{R,I,k}$	Characteristic value of tension resistance (pull-through) of metal member or sheeting
$N_{R,II,k}$	Characteristic value of tension resistance (pull-out) of the substructure
u	Maximum allowed head displacement of the fastening screw

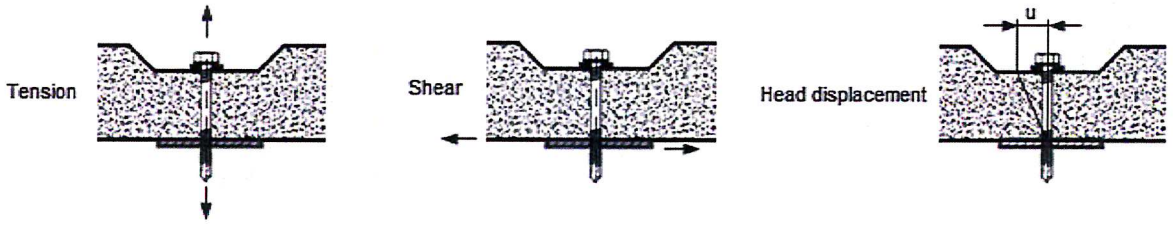
Additionally for timber substructure the following terms are used

$M_{y,Rk}$	Characteristic value of yield moment
$f_{ax,k}$	Characteristic value of withdrawal strength

Used terms in the Annexes	Annex 1
Fastening screws for sandwich panels	

Deutsches Institut für Bautechnik DIBt

Types of connection and occurred 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 asymmetric metal substructures with thickness $t_{II} < 5.0$ 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:

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

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

Head displacement
The head displacement of the fastening screw as a result of thermal expansion of the outer skin of the sandwich panel may not exceed the maximum allowed head displacement u of the fastening screw according to the Annexes.

Installation conditions

The installation is carried out according to the manufacturer's instructions.
The fastening screws are screwed-in with electric screw driver. 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 3.0 mm is allowed.

Basics for the design	Annex 2
Fastening screws for sandwich panels	

Timber substructures

Characteristic values of tension and shear resistance of the connection for other k_{mod} or ρ_k as indicated in the Annexes can be determined as follows:

$$N_{R,k} = \min \left\{ \begin{matrix} N_{R,I,k} \\ F_{ax,Rk} * k_{mod} \end{matrix} \right. \qquad V_{R,k} = \min \left\{ \begin{matrix} V_{R,I,k} \\ F_{v,Rk} * k_{mod} \end{matrix} \right.$$

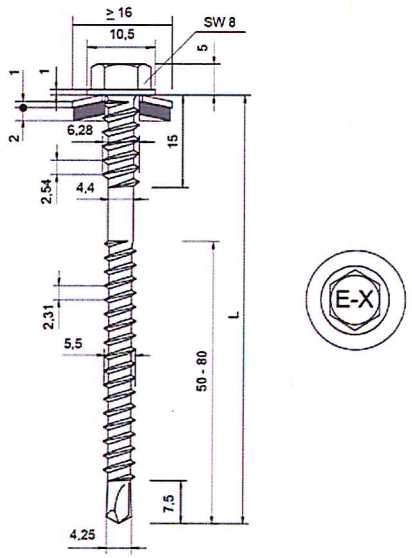
The characteristic values $N_{R,I,k}$ and $V_{R,I,k}$ are given in the corresponding Annex of the fastening screw.

$F_{ax,Rk}$ indicates the characteristic value of tension resistance of timber substructure. The value has to be determined according to EN 1995-1-1:2004 + A1:2008, equation (8.40a) with $f_{ax,k}$ given in the corresponding Annex of the fastening screw.

$F_{v,Rk}$ indicates the characteristic shear resistance of timber substructure. The value has to be determined according to EN 1995-1-1:2004 + A1:2008, equation (8.9) with $M_{y,Rk}$ given in the corresponding Annex of the fastening screw.

Specific notes for timber substructures	Annex 3
Fastening screws for sandwich panels	

Deutsches Institut für Bautechnik DIBt



Material:

Fastener: stainless Steel (1.4301) - EN 10088

Washer: stainless Steel (1.4301) - EN 10088 with EPDM- seal

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: S235, S275, S355 - EN 10025-1
S280GD, S320GD, S350GD - EN 10346

Drilling capacity: $\Sigma (t_{N2} + t_{II}) \leq 5.50$ mm

Timber substructures:

no performance determined

t_{N1}, t_{N2}, d, D [mm]		t_{II} [mm]								
		1.50	2.00	2.50	3.00	4.00	5.00	6.00	8.00	≥ 10.0
$V_{R,k}$ [kN]	0.50	1.36	1.45	1.50	1.55	1.63	—	—	—	—
	0.55	1.53	1.63	1.68	1.74	1.83	—	—	—	—
	0.63	1.80	1.91	1.98	2.04	2.15	—	—	—	—
	0.75	2.20	2.34	2.42	2.50	2.64	—	—	—	—
	0.88	2.53	2.63	2.69	2.75	2.88	—	—	—	—
	1.00	2.83	2.90	2.94	2.99	3.10	—	—	—	—
$N_{R,k}$ [kN]	0.40	—	—	—	—	—	—	—	—	—
	0.50	2.10	2.20	2.20	2.20	2.20	—	—	—	—
	0.55	2.10	2.60	2.60	2.60	2.60	—	—	—	—
	0.63	2.10	3.00	3.00	3.00	3.00	—	—	—	—
	0.75	2.10	3.20	3.70	3.70	3.70	—	—	—	—
	0.88	2.10	3.20	3.80	3.80	3.80	—	—	—	—
	1.00	2.10	3.20	4.00	4.00	4.00	—	—	—	—
u [mm]	30	—	—	—	—	—	—	—	—	—
	40	10.0	3.5	3.5	3.5	3.5	—	—	—	—
	50	12.5	4.5	4.5	4.5	4.5	—	—	—	—
	60	15.0	6.0	6.0	6.0	5.8	—	—	—	—
	70	17.5	7.5	7.5	7.5	7.3	—	—	—	—
	80	20.0	9.0	9.0	9.0	8.8	—	—	—	—
	100	20.0	12.0	12.0	12.0	11.7	—	—	—	—
	120	20.0	12.0	12.0	12.0	11.7	—	—	—	—
	≥ 140	20.0	12.0	12.0	12.0	11.7	—	—	—	—

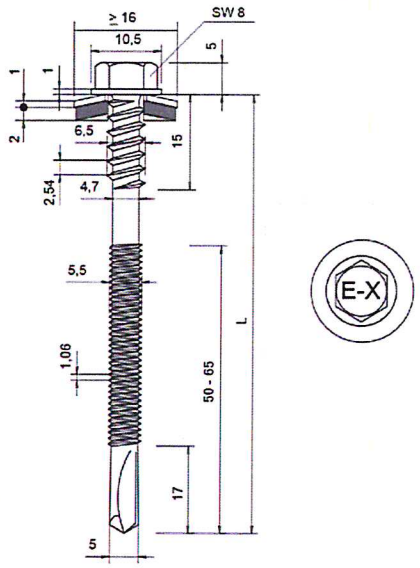
If component t_{N2} is made of S320GD the values $V_{R,k}$ may be increased by 8.2%.
If component t_{N2} is made of S350GD the values $V_{R,k}$ may be increased by 16.7%.

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

E-X Bohr 3 HT 5,5 x L

Annex 4

Deutsches Institut für Bautechnik DIBt



Material:

Fastener: stainless Steel (1.4301) - EN 10088

Washer: stainless Steel (1.4301) - EN 10088 with EPDM- seal

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: S235, S275, S355 - EN 10025-1
S280GD, S320GD, S350GD - EN 10346

Drilling capacity: $\Sigma (t_{N2} + t_{II}) \leq 14.0$ mm

Timber substructures:

no performance determined

t_{N1}, t_{N2}, d, D [mm]		t_{II} [mm]								
		1.50	2.00	2.50	3.00	4.00	5.00	6.00	8.00	≥ 10.0
$V_{R,k}$ [kN]	0.50	—	—	—	1.18	1.20	1.23	1.23	1.23	1.30
	0.55	—	—	—	1.58	1.61	1.65	1.65	1.65	1.70
	0.63	—	—	—	2.21	2.25	2.31	2.31	2.31	2.40
	0.75	—	—	—	3.17	3.24	3.31	3.31	3.31	3.40
	0.88	—	—	—	3.50	3.58	3.66	3.66	3.66	3.70
	1.00	—	—	—	3.81	3.89	3.98	3.98	3.98	4.00
$N_{R,k}$ [kN]	0.40	—	—	—	—	—	—	—	—	—
	0.50	—	—	—	2.40	2.40	2.40	2.40	2.40	2.40
	0.55	—	—	—	2.60	2.60	2.60	2.60	2.60	2.60
	0.63	—	—	—	3.00	3.00	3.00	3.00	3.00	3.00
	0.75	—	—	—	3.60	3.60	3.60	3.60	3.60	3.60
	0.88	—	—	—	4.20	4.20	4.20	4.20	4.20	4.20
	1.00	—	—	—	4.70	4.70	4.70	4.70	4.70	4.70
u [mm]	30	—	—	—	—	—	—	—	—	—
	40	—	—	—	3.5	3.0	3.0	3.0	3.0	3.0
	50	—	—	—	5.0	5.0	5.0	5.0	5.0	5.0
	60	—	—	—	6.0	6.0	6.0	6.0	6.0	6.0
	70	—	—	—	7.5	7.5	7.5	7.5	7.5	7.5
	80	—	—	—	9.0	9.0	9.0	9.0	9.0	9.0
	100	—	—	—	12.0	12.0	12.0	12.0	12.0	12.0
	120	—	—	—	12.0	12.0	12.0	12.0	12.0	12.0
	≥ 140	—	—	—	12.0	12.0	12.0	12.0	12.0	12.0

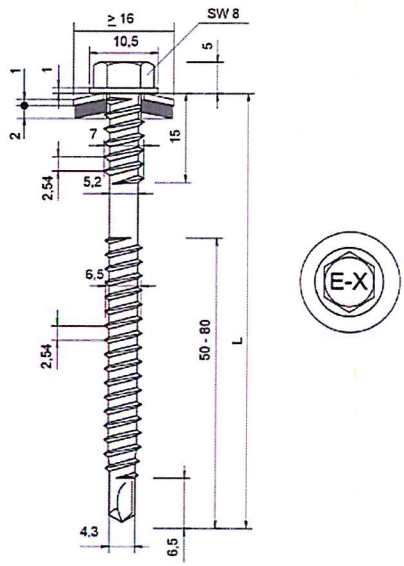
If component t_{N2} is made of S320GD the values $V_{R,k}$ may be increased by 8.2%.
If component t_{N2} is made of S350GD the values $V_{R,k}$ may be increased by 16.7%.

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

E-X Bohr 5 HT 5,5 x L

Annex 5

Deutsches Institut für Bautechnik DIBt



Material:

Fastener: stainless Steel (1.4301) - EN 10088

Washer: stainless Steel (1.4301) - EN 10088 with EPDM- seal

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: Structural timber – EN 14081, ≥ C24

Drilling capacity: $\Sigma t_i \leq 2.0$ mm

Timber substructures:
performance determined with

$M_{y.k}$ = 18.13 Nm

$f_{ax.k}$ = 12.22 N/mm² for $l_{ef} \geq 40.0$ mm

	t_{N1}, t_{N2} [mm]	l_{ef} [mm]								
		40	50	60	70	≥ 80	—	—	—	—
$V_{R,k}$ [kN]	0.40	—	—	—	—	—	—	—	—	—
	0.50	1.56[1) 2)]	1.56[1) 2)]	1.56[1) 2)]	1.56[1) 2)]	1.56[1) 2)]	—	—	—	—
	0.55	1.78[1) 2)]	1.78[1) 2)]	1.78[1) 2)]	1.78[1) 2)]	1.78[1) 2)]	—	—	—	—
	0.63	2.13[1) 2)]	2.13[1) 2)]	2.13[1) 2)]	2.13[1) 2)]	2.13[1) 2)]	—	—	—	—
	0.75	2.51[3)]	2.65[1) 2)]	2.65[1) 2)]	2.65[1) 2)]	2.65[1) 2)]	—	—	—	—
	0.88	2.51[3)]	3.14[3)]	3.22[1) 2)]	3.22[1) 2)]	3.22[1) 2)]	—	—	—	—
	1.00	2.51[3)]	3.14[3)]	3.68[3)]	3.74[1) 2)]	3.74[1) 2)]	—	—	—	—
$N_{R,k}$ [kN]	0.40	—	—	—	—	—	—	—	—	—
	0.50	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	—	—	—	—
	0.55	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	—	—	—	—
	0.63	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	—	—	—	—
	0.75	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	—	—	—	—
	0.88	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	—	—	—	—
	1.00	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	2.00[1) 2)]	—	—	—	—

	d, D [mm]								
	30	40	50	60	70	80	100	120	≥ 140
u [mm]	—	5.0	6.0	7.0	8.0	9.0	16.0	16.0	16.0

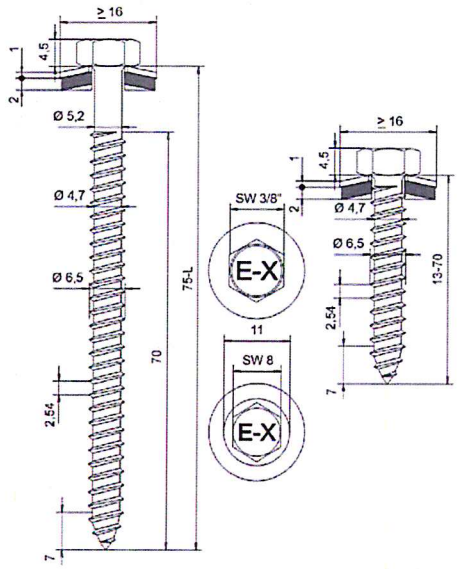
[1)] If component t_{N2} is made of S320GD the values $V_{R.k}$ may be increased by 8.2%.
[2)] If component t_{N2} is made of S350GD the values $V_{R.k}$ may be increased by 16.7%.
[3)] These values apply to $k_{mod} \geq 0.9$

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

E-X Bohr RS HT 6,5 x L

Annex 6

Deutsches Institut für Bautechnik DIBt



Material:

Fastener: stainless Steel (1.4301) - EN 10088

Washer: stainless Steel (1.4301) - EN 10088 with EPDM- seal

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: Structural timber – EN 14081, ≥ C24

Predrill diameter: see Table below

Timber substructures:
performance determined with

$M_{y,k}$ = 18.39 Nm

$f_{ax,k}$ = 14.20 N/mm² for l_{ef} ≥ 40.0 mm

	t_{N1}, t_{N2} [mm]	l_{ef} [mm]								
		40	50	60	70	≥ 80	—	—	—	—
$V_{R,k}$ [kN]	0.40	—	—	—	—	—	—	—	—	—
	0.50	1.52[a]	1.52[a]	1.52[a]	1.52[a]	1.52[a]	—	—	—	—
	0.55	1.80[a]	1.80[a]	1.80[a]	1.80[a]	1.80[a]	—	—	—	—
	0.63	2.25[a]	2.25[a]	2.25[a]	2.25[a]	2.25[a]	—	—	—	—
	0.75	2.51[c]	2.93[a]	2.93[a]	2.93[a]	2.93[a]	—	—	—	—
	0.88	2.51[c]	3.14[c]	3.48[a]	3.48[a]	3.48[a]	—	—	—	—
	1.00	2.51[c]	3.14[c]	3.74[c]	3.98[a]	3.98[a]	—	—	—	—
$N_{R,k}$ [kN]	0.40	—	—	—	—	—	—	—	—	—
	0.50	1.60	1.60	1.60	1.60	1.60	—	—	—	—
	0.55	1.90[b]	1.90[b]	1.90[b]	1.90[b]	1.90[b]	—	—	—	—
	0.63	2.30[b]	2.30[b]	2.30[b]	2.30[b]	2.30[b]	—	—	—	—
	0.75	2.80[b]	2.80[b]	2.80[b]	2.80[b]	2.80[b]	—	—	—	—
	0.88	2.80[b]	2.80[b]	2.80[b]	2.80[b]	2.80[b]	—	—	—	—
	1.00	2.80[b]	2.80[b]	2.80[b]	2.80[b]	2.80[b]	—	—	—	—
u [mm]		d, D [mm]								
		30	40	50	60	70	80	100	120	≥ 140
		4.0	6.0	7.0	9.0	11.0	13.0	18.0	18.0	18.0
d_{pd} [mm]		Ø 4.8								

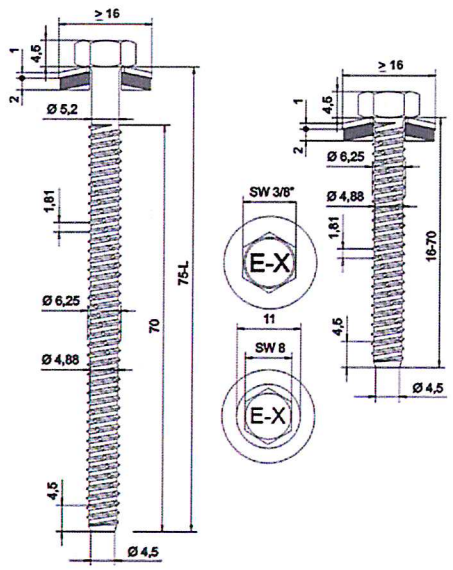
[a] If component t_{N2} is made of S320GD the values $V_{R,k}$ may be increased by 8.2%.
[b] If component t_{N1} is made of S320GD the values $N_{R,k}$ may be increased by 8.2%.
[c] These values apply to k_{mod} ≥ 0.9

Self-tapping screw with hexagon head and sealing washer ≥ Ø 16 mm

E-X A 6,5 x L, E-X 8 A 6,5 x L

Annex 7

Deutsches Institut für Bautechnik DIBt



Material:

Fastener: stainless Steel (1.4301) - EN 10088

Washer: stainless Steel (1.4301) - EN 10088 with EPDM- seal

Component I: S280GD - EN 10346

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

Predrill diameter: see Table below

Timber substructures:

no performance determined

t_{N1}, t_{N2}, d, D [mm]		t_{II} [mm]								
		1.25	1.50	2.00	2.50	3.00	4.00	5.00	6.00	≥ 7.00
$V_{R,k}$ [kN]	0.40	—	—	—	—	—	—	—	—	—
	0.50	1.43	1.45	1.48	1.83	2.19	2.19	2.19	2.19	2.19
	0.55	1.55	1.57	1.60	1.98	2.37	2.37	2.37	2.37	2.37
	0.63	1.74	1.88	1.92	2.38	2.84	2.84	2.84	2.84	2.84
	0.75	2.02	2.04	2.09	2.59	3.09	3.09	3.09	3.09	3.09
	1.00	2.92	2.97	3.12	3.60	3.75	3.75	3.75	3.75	3.75
$N_{R,k}$ [kN]	0.40	—	—	—	—	—	—	—	—	—
	0.50	1.20	1.60[a)]	2.10	2.10	2.10	2.10	2.10	2.10	2.10
	0.55	1.20	1.60[a)]	2.30	2.30	2.30	2.30	2.30	2.30	2.30
	0.63	1.20	1.60[a)]	2.60	2.60	2.60	2.60	2.60	2.60	2.60
	0.75	1.20	1.60[a)]	2.80[a)]	3.00	3.00	3.00	3.00	3.00	3.00
	0.88	1.20	1.60[a)]	2.80[a)]	3.40[a)]	3.40[a)]	3.40[a)]	3.40[a)]	3.40[a)]	3.40[a)]
	1.00	1.20	1.60[a)]	2.80[a)]	3.80	3.80	3.80	3.80	3.80	3.80
u [mm]	30	—	—	—	—	—	—	—	—	—
	40	26.5	26.5	10.0	9.0	8.0	7.0	5.5	4.5	4.5
	50	40.0	40.0	12.5	11.5	10.5	8.5	7.0	5.5	5.5
	60	40.0	40.0	15.5	14.5	13.5	10.0	8.5	7.0	7.0
	70	40.0	40.0	18.5	16.0	14.0	11.5	10.0	9.0	9.0
	80	40.0	40.0	21.5	18.0	14.5	13.5	12.5	11.5	11.5
	100	40.0	40.0	27.0	23.0	19.0	17.5	15.5	14.0	14.0
	120	40.0	40.0	32.5	29.5	26.5	25.0	23.0	21.0	21.0
	≥ 140	40.0	40.0	38.5	36.5	34.5	32.5	30.0	28.0	28.0
d_{pd} [mm]		Ø 5.0		Ø 5.3					Ø 5.5	Ø 5.7

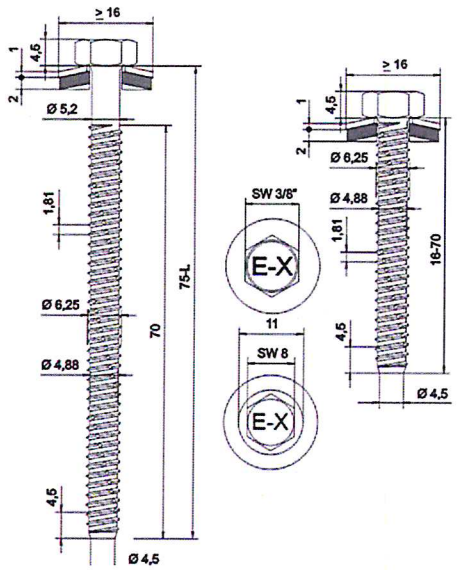
[a)] If component t_{II} is made of S320GD these values may be increased by 0.20 kN.

Self-tapping screw with hexagon head and sealing washer ≥ Ø 16 mm

E-X BZ 6,3 x L, E-X 8 BZ 6,3 x L

Annnex 8

Deutsches Institut für Bautechnik DIBt



Material:

Fastener: stainless Steel (1.4301) - EN 10088

Washer: stainless Steel (1.4301) - EN 10088 with EPDM- seal

Component I: S320GD, D350GD - EN 10346

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

Predrill diameter: see Table below

Timber substructures:

no performance determined

t_{N1}, t_{N2}, d, D [mm]		t_{II} [mm]								
		1.25	1.50	2.00	2.50	3.00	4.00	5.00	6.00	≥ 7.00
$V_{R,k}$ [kN]	0.40	—	—	—	—	—	—	—	—	—
	0.50	1.55	1.55	1.60	2.00	2.35	2.35	2.35	2.35	2.35
	0.55	1.65	1.70	1.75	2.15	2.55	2.55	2.55	2.55	2.55
	0.63	1.90	2.05	2.10	2.55	3.05	3.05	3.05	3.05	3.05
	0.75	2.15	2.20	2.25	2.80	3.35	3.35	3.35	3.35	3.35
	1.00	3.15	3.20	3.35	3.90	4.05	4.05	4.05	4.05	4.05
$N_{R,k}$ [kN]	0.40	—	—	—	—	—	—	—	—	—
	0.50	1.20	1.80	2.20	2.20	2.20	2.20	2.20	2.20	2.20
	0.55	1.20	1.80	2.40	2.40	2.40	2.40	2.40	2.40	2.40
	0.63	1.20	1.80	2.70	2.70	2.70	2.70	2.70	2.70	2.70
	0.75	1.20	1.80	3.00	3.10	3.10	3.10	3.10	3.10	3.10
	0.88	1.20	1.80	3.00	3.60	3.60	3.60	3.60	3.60	3.60
	1.00	1.20	1.80	3.00	4.10	4.10	4.10	4.10	4.10	4.10
u [mm]	30	—	—	—	—	—	—	—	—	—
	40	26.5	26.5	10.0	9.0	8.0	7.0	5.5	4.5	4.5
	50	40.0	40.0	12.5	11.5	10.5	8.5	7.0	5.5	5.5
	60	40.0	40.0	15.5	14.5	13.5	10.0	8.5	7.0	7.0
	70	40.0	40.0	18.5	16.0	14.0	11.5	10.0	9.0	9.0
	80	40.0	40.0	21.5	18.0	14.5	13.5	12.5	11.5	11.5
	100	40.0	40.0	27.0	23.0	19.0	17.5	15.5	14.0	14.0
	120	40.0	40.0	32.5	29.5	26.5	25.0	23.0	21.0	21.0
	≥ 140	40.0	40.0	38.5	36.5	34.5	32.5	30.0	28.0	28.0
d_{pd} [mm]		Ø 5.0		Ø 5.3					Ø 5.5	Ø 5.7

No further specifications.

Self-tapping screw with hexagon head and sealing washer ≥ Ø 16 mm

E-X BZ 6,3 x L, E-X 8 BZ 6,3 x L

Annex 9