

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-13/0183
of 6 September 2023

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

SX, SXC, SXCW, SDT, SDTW, SXW, TDA, TDB, CXCW

Product family
to which the construction product belongs

Fastening screws for sandwichpanels

Manufacturer

SFS Group Schweiz AG
Rosenbergsaustraße 10
9435 HEERBRUGG
SCHWEIZ

Manufacturing plant

SFS plants 5, 7, 16

This European Technical Assessment
contains

41 pages including 35 annexes which form an integral
part of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

330047-01-0602

This version replaces

ETA-13/0183 issued on 1 June 2022

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

Table 1 – Fastening screws for sandwich panels

Annex	Fastening screw	Description	Material Fastener	Material Component II
4 / 5	SXC5-S16-6,3 x L SXC5-L12-S16-6,3 x L	Self-drilling screw with sealing washer Ø 16 mm	Stainless steel	Steel
6	SX5-S16-6,3 x L SX5-L12-S16-6,3 x L			Timber
7 / 8	SXC5-S19/S22-6,3 x L SXC5-L12-S19/S22-6,3 x L	Self-drilling screw with sealing washer Ø 19 / 22 mm	Stainless steel	Steel
9	SX5-S19/S22-6,3 x L SX5-L12-S19/S22-6,3 x L			Timber
10 / 11	SXC5-S29-6,3 x L SXC5-L12-S29-6,3 x L	Self-drilling screw with sealing washer Ø 29 mm	Stainless steel	Steel
12	SX5-S29-6,3 x L SX5-L12-S29-6,3 x L			Timber
13	SXC16-S16-5,8 x L SXC16-L12-S16-5,8 x L SX16-S16-5,8 x L SX16-L12-S16-5,8 x L	Self-drilling screw with sealing washer Ø 16 mm	Stainless steel	Steel
14	SXC16-S19/S22-5,8 x L SXC16-L12-S19/S22-5,8 x L SX16-S19/S22-5,8 x L SX16-L12-S19/S22-5,8 x L	Self-drilling screw with sealing washer Ø 19 / 22 mm	Stainless steel	Steel
15	SXC16-S29-5,8 x L SXC16-L12-S29-5,8 x L SX16-S29-5,8 x L SX16-L12-S29-5,8 x L	Self-drilling screw with sealing washer Ø 29 mm	Stainless steel	Steel
16	SX5-S16-5,5 x L SX5-L12-S16-5,5 x L	Self-drilling screw with sealing washer Ø 16 mm	Stainless steel	Steel
17	SX5-S19/S22/S29-5,5 x L SX5-L12-S19/S22/S29-5,5 x L	Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm	Stainless steel	Steel
18	SX14-S16-5,5 x L SX14-L12-S16-5,5 x L	Self-drilling screw with sealing washer Ø 16 mm	Stainless steel	Steel
19	SX14-S19/S22/S29-5,5 x L SX14-L12-S19/S22/S29-5,5 x L	Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm	Stainless steel	Steel
20	TDB-S-S16-6,3 x L TDB-S16-6,3 x L	Self-tapping screw with sealing washer Ø 16 mm	Stainless steel	Steel
21	TDB-S-S19/S22/S29-6,3 x L TDB-S19/S22/S29-6,3 x L	Self-tapping screw with sealing washer Ø 19 / 22 / 29 mm	Stainless steel	Steel
22	CXCW-S16-6,5 x L CXCW-L12-S16-6,5 x L	Self-drilling screw with sealing washer Ø 16 mm	Stainless steel	Timber
23	CXCW-S19/S22/S29-6,5 x L CXCW-L12-S19/S22/S29-6,5 x L	Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm	Stainless steel	Timber

Table 1 - Continued

Annex	Fastening screw	Description	Material Fastener	Material Component II
24	SXW-S16-6,5 x L SXW-L12-S16-6,5 x L	Self-drilling screw with sealing washer Ø 16 mm	Stainless steel	Timber
25	SXW-S19/S22/S29-6,5 x L SXW-L12-S19/S22/S29-6,5 x L	Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm	Stainless steel	Timber
26	TDA-S-S16-6,5 x L TDA-S16-6,5 x L	Self-tapping screw with sealing washer Ø 16 mm	Stainless steel	Timber
27	TDA-S-S19/S22/S29-6,5 x L TDA-S19/S22/S29-6,5 x L	Self-tapping screw with sealing washer Ø 19 / 22 / 29 mm	Stainless steel	Timber
28	SDT5-S16-5,5 x L SDT5-L12-S16-5,5 x L SDT5-T16-5,5 x L SDT5-L12-T16-5,5 x L	Self-drilling screw with sealing washer Ø 16 mm	Carbon steel	Steel
29	SDT5-S19/S22/S29-5,5 x L SDT5-L12-S19/S22/S29-5,5 x L SDT5-T19-5,5 x L SDT5-L12-T19-5,5 x L	Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm	Carbon steel	Steel
30	SDT14-S16-5,5 x L SDT14-L12-S16-5,5 x L SDT14-T16-5,5 x L SDT14-L12-T16-5,5 x L	Self-drilling screw with sealing washer Ø 16 mm	Carbon steel	Steel
31	SDT14-S19/S22/S29-5,5 x L SDT14-L12-S19/S22/S29-5,5 x L SDT14-T19-5,5 x L SDT14-L12-T19-5,5 x L	Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm	Carbon steel	Steel
32	SDTW-S16-6,5 x L SDTW-L12-S16-6,5 x L SDTW-T16-6,5 x L SDTW-L12-T16-6,5 x L	Self-drilling screw with sealing washer Ø 16 mm	Carbon steel	Timber
33	SDTW-S19/S22/S29-6,5 x L SDTW-L12-S19/S22/S29-6,5 x L SDTW-T19-6,5 x L SDTW-L12-T19-6,5 x L	Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm	Carbon steel	Timber
34	SXC5-S16-5,5 x L SXC5-L12-S16-5,5 x L	Self-drilling screw with sealing washer Ø 16 mm	Stainless steel	Steel
35	SXC5-S19/S22/S29-5,5 x L SXC5-L12-S19/S22/S29-5,5 x L	Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm	Stainless 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 $\geq C2$ corrosion according to the standard EN ISO 12944-2 are made of stainless steel. Furthermore the intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads). The fastening screws are not intended for re-use.

The performances given in Section 3 are only valid if the fastening screws are used in compliance with the specifications and conditions given in Annex (1-35).

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

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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Shear Resistance of the Connection	see Annexes to this ETA
Tension Resistance of the Connection	see Annexes to this ETA
Design Resistance in combination of 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	Class A1

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

In accordance with EAD 330047-01-0602, the applicable European legal act is:

Commission Decision 98/214/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

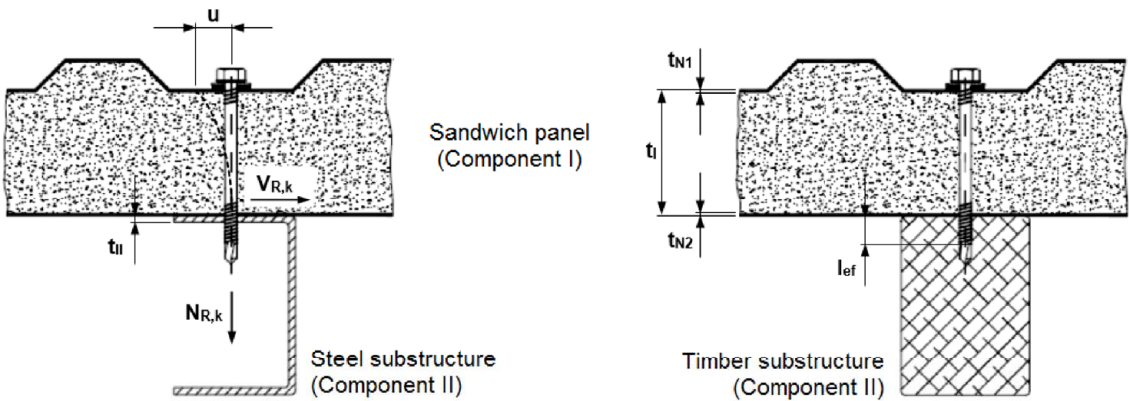
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 6 September 2023 by Deutsches Institut für Bautechnik

BD Dr.-Ing. Ronald Schwuchow
Head of Section

beglaubigt:
Hahn

Examples of connections



Description of the components

- Component I Sandwich panel with outer and inner skin made of steel
Component II Substructure made of steel or timber

Dimensions of the components

- tI Nominal thickness of sandwich panel
tN1 Nominal thickness of sandwich panel outer skin
tN2 Nominal thickness of sandwich panel inner skin
tII Nominal thickness of steel substructure
lef Screw-in length in timber substructure (without drill point or thread point)
d_{dp} Pre-drill diameter of the connection

Assessed performance characteristics

- N_{R,k} Characteristic value of tension resistance of the connection
V_{R,k} Characteristic value of shear resistance of the connection
u Bending capacity of the fastening screw

V_{R,I,k} Characteristic value of hole bearing resistance of the sandwich panel inner skin
N_{R,I,k} Characteristic value of pull-through resistance of the sandwich panel outer skin
N_{R,II,k} Characteristic value of pull-out resistance of the substructure
f_{ax,k} Characteristic value of withdrawal strength of the fastening screw
M_{y,Rk} Characteristic value of yield moment of the fastening screw

Fastening screws for sandwich panels	Annex 1
Basics	

Assessment of performance characteristics

The declared performance characteristics have been assessed according to EAD 330046-01-0602.

The characteristic value of tension resistance of a connection ($N_{R,k}$) results from the minimum of the tension resistance of the fastening screw (N_{screw}), the pull-through resistance of the sandwich panel outer skin ($N_{R,I,k}$) and the pull-out resistance of the substructure ($N_{R,II,k}$). The pull-through resistance includes a reduction factor 2/3 to take the influence of repeated wind loads into account.

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

The characteristic value of shear resistance of a connection ($V_{R,k}$) results from the minimum of the shear resistance of the fastening screw (V_{screw}) and the shear resistance of the connection between sandwich panel inner skin and substructure ($V_{R,I/II,k}$).

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

The characteristic values consider minimum thicknesses of the declared nominal thicknesses (t_{N1} , t_{N2} , t_{II}) according to the following table:

Nominal thickness [mm]	Minimum thickness [mm]	Nominal thickness [mm]	Minimum thickness [mm]	Nominal thickness [mm]	Minimum thickness [mm]	Nominal thickness [mm]	Minimum thickness [mm]
0.40	0.33	0.70	0.62	2.00	1.87	8.00	6.80
0.45	0.38	0.75	0.67	2.50	2.36	10.00	8.50
0.50	0.42	0.88	0.79	3.00	2.85	12.00	10.20
0.55	0.47	1.00	0.91	4.00	3.40		
0.60	0.52	1.25	1.13	5.00	4.25		
0.63	0.55	1.50	1.38	6.00	5.10		

The characteristic values consider a minimum tensile strength of 360 N/mm² of the declared steel materials (S280GD or S235) resp. the minimum density of 350 kg/m³ of the declared timber materials (C24).

Characteristic values for component thicknesses (t_{N1} , t_{N2} , t_{II}) or screw-in lengths (l_{ef}) that are between two declared component thicknesses or screw-in lengths may be determined by linear interpolation.

The characteristic values may be applied for further steel materials according to EN 1993-1-1 (table 3.1) and EN 1993-1-3 (table 3.1) as long as the material properties corresponds to the declared materials.

The bending capacity of the fastening screw (u) describes the maximum allowed displacement of the screw head caused by thermal expansions of sandwich panels.

Fastening screws for sandwich panels

Basics

Annex 2

Recommendation for design values

Provisions for the design of a connection are given in Eurocode 0 (EN 1990: Basis of structural design), Eurocode 3 (EN 1993: Design of steel structures) and Eurocode 5 (EN 1995: Design of timber structures).

The design value of tension and shear resistance of a connection ($N_{R,d}$ resp. $V_{R,d}$) shall be determined by taking into account a partial safety factor (γ_M). Recommended is $\gamma_M = 1.33$ unless otherwise stated in National Regulations or National Annexes of Eurocode 0, Eurocode 3 or Eurocode 5.

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

Application specific conditions shall be taken into account:

- In case of combined tension and shear load of a connection, the condition according to EN 1993-1-3 (equation 8.2) shall be fulfilled.
- In case of timber substructure, a modification factor (k_{mod}) according to EN 1995-1-1 (table 3.1) shall be applied at pull-out resistance ($N_{R,II,k}$).
- In case of eccentric fastening of sandwich panels or asymmetrical steel substructure, a reduction of tension resistance ($N_{R,k}$) according to EN 1090-4 (section B.5) and EN 1993-1-3 (section 8.3) shall be applied.
- In case of hidden fastening of sandwich panels with load distribution plate, the pull-through resistance ($N_{R,I,k}$) declared in sandwich panel approvals may be applied.

Thermal expansions of sandwich panels may not exceed the bending capacity of the fastening screw (u).

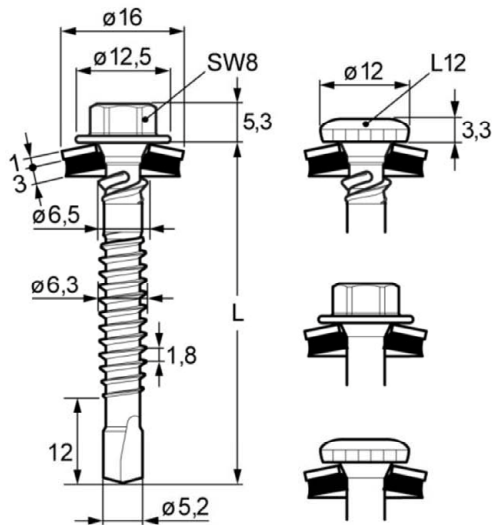
Installation requirements

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

Installation instructions given in corresponding European Standards shall be taken into account:

- Requirements on the installation of fastening screws are given in EN 1090-2 (section 8.8) and EN 1090-4 (section 8.1 and 8.2).
- Requirements on minimum distances between fastening screws and minimum distances to component edges and ends are given in EN 1090-4 (section 8.7), EN 1993-1-3 (section 8.3) and EN 1995-1-1 (section 8.7).
- Requirements on the minimum screw-in depth in steel substructure are given in EN 1090-4 (section 8.5).

Fastening screws for sandwich panels	Annex 3
Basics	



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: S235 to S355 - EN 10025
S280GD to S450GD - EN 10346

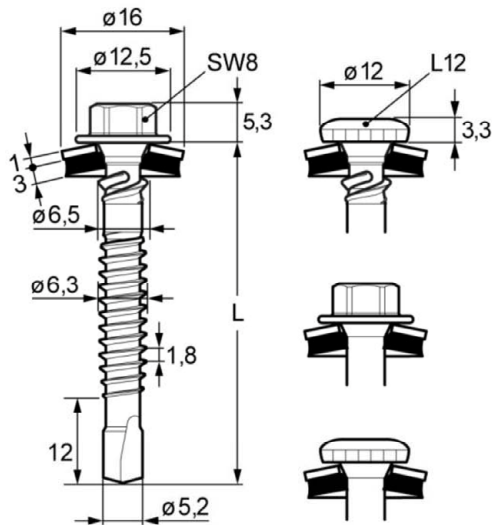
Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$

		$t_{II} [\text{mm}]$						
		1.00	1.25	1.50	2.00	2.50	3.00	4.00
$V_{R,k} [\text{kN}]$	0.40	1.18	1.18	1.18	1.18	1.18	1.18	1.18
	0.45	1.32	1.32	1.32	1.32	1.32	1.32	1.32
	0.50	1.46	1.46	1.46	1.46	1.46	1.46	1.46
	0.55	1.69	1.69	1.69	1.69	1.69	1.69	1.69
	0.60	1.91	1.91	1.91	1.91	1.91	1.91	1.91
	0.63	2.05	2.05	2.05	2.05	2.05	2.05	2.05
	0.70	2.32	2.32	2.32	2.32	2.32	2.32	2.32
	≥ 0.75	2.51	2.51	2.51	2.51	2.51	2.51	2.51
$N_{R,k} [\text{kN}]$	0.40	1.46	1.73					
	0.45	1.46	1.92					
	0.50	1.46	2.11					
	0.55	1.46	2.15	2.58				
	0.60	1.46	2.15	2.84	3.04			
	0.63	1.46	2.15	2.84	3.32			
	0.70	1.46	2.15	2.84	3.82			
	≥ 0.75	1.46	2.15	2.84	4.09	4.17		
$N_{R,II,k} [\text{kN}]$		1.46	2.15	2.84	4.09	6.00	7.91	9.45
$u [\text{mm}]$	40	3.0						
	60	4.5						
	80	6.0						
$t_I [\text{mm}]$		≥ 100						
		7.5						

Self-drilling screw with sealing washer Ø 16 mm

SXC5-S16-6,3xL, SXC5-L12-S16-6,3xL
SX5-S16-6,3xL, SX5-L12-S16-6,3xL

Annex 4



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: S235 to S355 - EN 10025
S280GD to S450GD - EN 10346

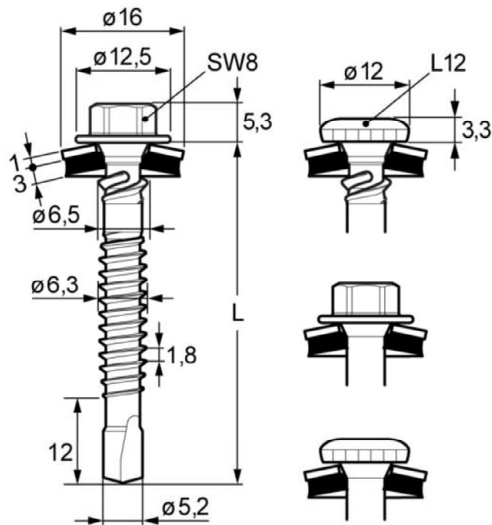
Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$

		$t_{II} [\text{mm}]$					
		2x0.75	2x0.88	2x1.00	2x1.25	2x1.50	2x2.00
$V_{R,k} [\text{kN}]$	0.40	0.94	0.94	0.94	0.94	0.94	0.94
	0.45	1.13	1.13	1.13	1.13	1.13	1.13
	0.50	1.32	1.32	1.32	1.32	1.32	1.32
	0.55	1.33	1.33	1.33	1.33	1.33	1.33
	0.60	1.34	1.34	1.34	1.34	1.34	1.34
	0.63	1.35	1.35	1.35	1.35	1.35	1.35
	0.70	2.20	2.20	2.20	2.20	2.20	2.20
	≥ 0.75	2.80	2.80	2.80	2.80	2.80	2.80
$N_{R,k} [\text{kN}]$	0.40	1.73					
	0.45	1.92					
	0.50	1.92	2.11				
	0.55	1.92	2.58				
	0.60	1.92	2.59	2.99	3.04		
	0.63	1.92	2.59	2.99	3.32		
	0.70	1.92	2.59	2.99	3.82		
	≥ 0.75	1.92	2.59	2.99	3.92	4.17	
$N_{R,II,k} [\text{kN}]$		1.92	2.59	2.99	3.92	5.60	5.60
$u [\text{mm}]$	40	3.0					
	60	4.5					
	80	6.0					
	≥ 100	7.5					

Self-drilling screw with sealing washer Ø 16 mm

SXC5-S16-6,3xL, SXC5-L12-S16-6,3xL
SX5-S16-6,3xL, SX5-L12-S16-6,3xL

Annex 5



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: Coniferous timber $\geq$ C24 - EN 14081

Drilling-capacity: $\Sigma(t_{N1} + t_{N2}) \leq 2.00$ mm

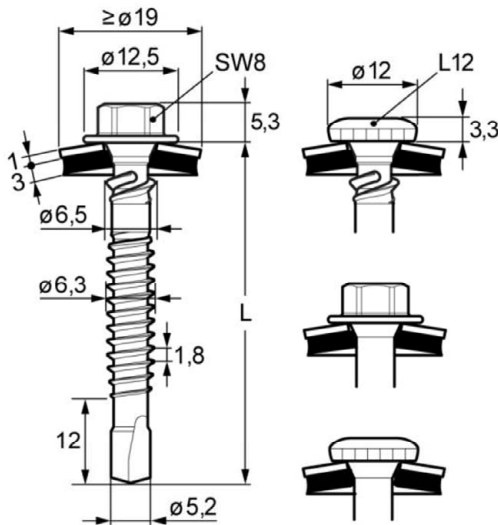
Characteristics: $M_{y,Rk} = 11.2$ Nm
 $f_{ax,k} = 11.6$ N/mm² ($l_{ef} = 25$ mm, $\rho_a = 350$ kg/m³)
 $f_{ax,k} = 10.4$ N/mm² ($l_{ef} = 35$ mm, $\rho_a = 350$ kg/m³)

		l _{ef} [mm]					Failure of component I	
		25	35	45	55	65		
V _{R,k} [kN]	0.40	0.69	0.81	0.81	0.81	0.81	0.81	V _{R,I,k} [kN]
	0.45	0.89	0.99	0.99	0.99	0.99	0.99	
	0.50	1.08	1.17	1.17	1.17	1.17	1.17	
	0.55	1.11	1.26	1.26	1.26	1.26	1.26	
	0.60	1.13	1.35	1.35	1.35	1.35	1.35	
	0.63	1.15	1.40	1.40	1.40	1.40	1.40	
	0.70	1.15	1.53	1.53	1.53	1.53	1.53	
	≥ 0.75	1.15	1.62	1.62	1.62	1.62	1.62	
N _{R,k} [kN]	0.40	1.73					1.73	N _{R,I,k} [kN]
	0.45	1.83	1.92				1.92	
	0.50	1.83	2.11				2.11	
	0.55	1.83	2.29	2.58			2.58	
	0.60	1.83	2.29	2.95	3.04		3.04	
	0.63	1.83	2.29	2.95	3.32		3.32	
	0.70	1.83	2.29	2.95	3.60	3.82	3.82	
	≥ 0.75	1.83	2.29	2.95	3.60	4.17	4.17	
N _{R,II,k} [kN]		1.83	2.29	2.95	3.60	4.26		
u [mm]	40	3.0						
	60	4.5						
t _i [mm]	80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer $\varnothing$ 16 mm

SXC5-S16-6,3xL, SXC5-L12-S16-6,3xL
SX5-S16-6,3xL, SX5-L12-S16-6,3xL

Annex 6



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: S235 to S355 - EN 10025
S280GD to S450GD - EN 10346

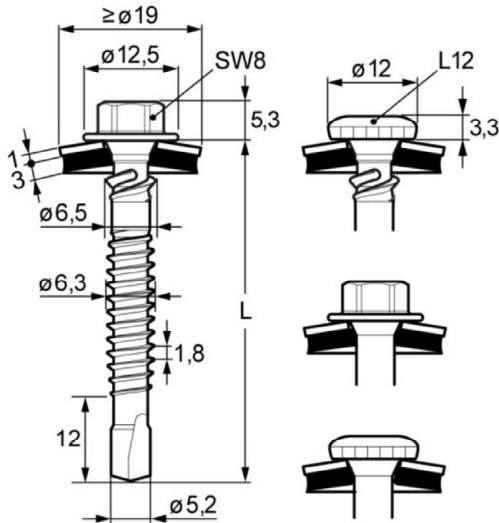
Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$

		$t_{II} [\text{mm}]$						
		1.00	1.25	1.50	2.00	2.50	3.00	4.00
$V_{R,k} [\text{kN}]$	0.40	1.18	1.18	1.18	1.18	1.18	1.18	1.18
	0.45	1.32	1.32	1.32	1.32	1.32	1.32	1.32
	0.50	1.46	1.46	1.46	1.46	1.46	1.46	1.46
	0.55	1.69	1.69	1.69	1.69	1.69	1.69	1.69
	0.60	1.91	1.91	1.91	1.91	1.91	1.91	1.91
	0.63	2.05	2.05	2.05	2.05	2.05	2.05	2.05
	0.70	2.32	2.32	2.32	2.32	2.32	2.32	2.32
	≥ 0.75	2.51	2.51	2.51	2.51	2.51	2.51	2.51
$N_{R,k} [\text{kN}]$	0.40	1.46	2.08					
	0.45	1.46	2.08					
	0.50	1.46	2.08					
	0.55	1.46	2.15	2.53				
	0.60	1.46	2.15	2.84	2.97			
	0.63	1.46	2.15	2.84	3.24			
	0.70	1.46	2.15	2.84	3.99			
	≥ 0.75	1.46	2.15	2.84	4.09	4.53		
$N_{R,II,k} [\text{kN}]$		1.46	2.15	2.84	4.09	6.00	7.91	9.45
$u [\text{mm}]$	40	3.0						
	60	4.5						
	80	6.0						
$t_I [\text{mm}]$		≥ 100						
		7.5						

Self-drilling screw with sealing washer $\varnothing 19 / 22 \text{ mm}$

SXC5-S19/S22-6,3xL, SXC5-L12-S19/S22-6,3xL
SX5-S19/S22-6,3xL, SX5-L12-S19/S22-6,3xL

Annex 7



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: S235 to S355 - EN 10025
S280GD to S450GD - EN 10346

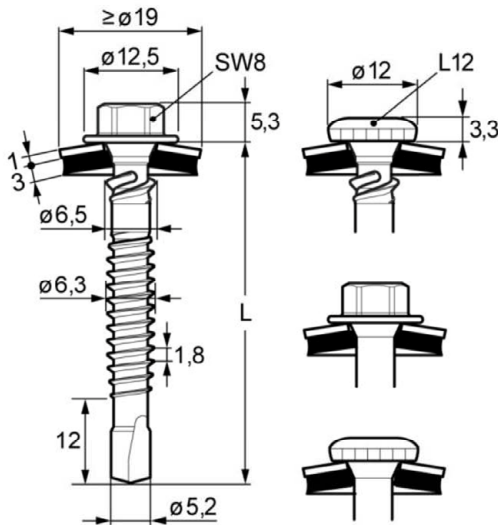
Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$

		$t_{II} [\text{mm}]$					
		2x0.75	2x0.88	2x1.00	2x1.25	2x1.50	2x2.00
$V_{R,k} [\text{kN}]$	0.40	0.94	0.94	0.94	0.94	0.94	0.94
	0.45	1.13	1.13	1.13	1.13	1.13	1.13
	0.50	1.32	1.32	1.32	1.32	1.32	1.32
	0.55	1.33	1.33	1.33	1.33	1.33	1.33
	0.60	1.34	1.34	1.34	1.34	1.34	1.34
	0.63	1.35	1.35	1.35	1.35	1.35	1.35
	0.70	2.20	2.20	2.20	2.20	2.20	2.20
	≥ 0.75	2.80	2.80	2.80	2.80	2.80	2.80
$N_{R,k} [\text{kN}]$	0.40	1.92	2.08				
	0.45	1.92	2.08				
	0.50	1.92	2.08				
	0.55	1.92	2.53				
	0.60	1.92	2.59	2.97			
	0.63	1.92	2.59	2.99	3.24		
	0.70	1.92	2.59	2.99	3.92	3.99	
	≥ 0.75	1.92	2.59	2.99	3.92	4.53	
$N_{R,II,k} [\text{kN}]$		1.92	2.59	2.99	3.92	5.60	5.60
$u [\text{mm}]$	40	3.0					
	60	4.5					
	80	6.0					
	≥ 100	7.5					

Self-drilling screw with sealing washer Ø 19 / 22 mm

SXC5-S19/S22-6,3xL, SXC5-L12-S19/S22-6,3xL
SX5-S19/S22-6,3xL, SX5-L12-S19/S22-6,3xL

Annex 8



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: Coniferous timber $\geq$ C24 - EN 14081

Drilling-capacity: $\Sigma(t_{N1} + t_{N2}) \leq 2.00$ mm

Characteristics: $M_{y,Rk} = 11.2$ Nm
 $f_{ax,k} = 11.6$ N/mm² ($l_{ef} = 25$ mm, $\rho_a = 350$ kg/m³)
 $f_{ax,k} = 10.4$ N/mm² ($l_{ef} = 35$ mm, $\rho_a = 350$ kg/m³)

		l _{ef} [mm]					Failure of component I	
		25	35	45	55	65		
V _{R,k} [kN]	0.40	0.69	0.81	0.81	0.81	0.81	0.81	V _{R,I,k} [kN]
	0.45	0.89	0.99	0.99	0.99	0.99	0.99	
	0.50	1.08	1.17	1.17	1.17	1.17	1.17	
	0.55	1.11	1.26	1.26	1.26	1.26	1.26	
	0.60	1.13	1.35	1.35	1.35	1.35	1.35	
	0.63	1.15	1.40	1.40	1.40	1.40	1.40	
	0.70	1.15	1.53	1.53	1.53	1.53	1.53	
	≥ 0.75	1.15	1.62	1.62	1.62	1.62	1.62	
N _{R,k} [kN]	0.40	1.83	2.08				2.08	N _{R,I,k} [kN]
	0.45	1.83	2.08				2.08	
	0.50	1.83	2.08				2.08	
	0.55	1.83	2.29	2.53			2.53	
	0.60	1.83	2.29	2.95	2.97		2.97	
	0.63	1.83	2.29	2.95	3.24		3.24	
	0.70	1.83	2.29	2.95	3.60	3.99	3.99	
	≥ 0.75	1.83	2.29	2.95	3.60	4.26	4.53	
N _{R,II,k} [kN]		1.83	2.29	2.95	3.60	4.26		
u [mm]	40	3.0						
	60	4.5						
t _i [mm]	80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer $\varnothing 19 / 22$ mm

SXC5-S19/S22-6,3xL, SXC5-L12-S19/S22-6,3xL
SX5-S19/S22-6,3xL, SX5-L12-S19/S22-6,3xL

Annex 9

	Materials: Fastener: Stainless steel A2 or A4 - EN ISO 3506 Washer: Stainless steel A2 or A4 - EN ISO 3506 with EPDM-seal Component I: S280GD to S450GD - EN 10346 Component II: S235 to S355 - EN 10025 S280GD to S450GD - EN 10346 Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$
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		$t_{II} [\text{mm}]$						
		1.00	1.25	1.50	2.00	2.50	3.00	4.00
$V_{R,k} [\text{kN}]$	0.40	1.18	1.18	1.18	1.18	1.18	1.18	1.18
	0.45	1.32	1.32	1.32	1.32	1.32	1.32	1.32
	0.50	1.46	1.46	1.46	1.46	1.46	1.46	1.46
	0.55	1.69	1.69	1.69	1.69	1.69	1.69	1.69
	0.60	1.91	1.91	1.91	1.91	1.91	1.91	1.91
	0.63	2.05	2.05	2.05	2.05	2.05	2.05	2.05
	0.70	2.32	2.32	2.32	2.32	2.32	2.32	2.32
	≥ 0.75	2.51	2.51	2.51	2.51	2.51	2.51	2.51
$N_{R,k} [\text{kN}]$	0.40	1.46	1.80 ¹⁾²⁾					
	0.45	1.46	2.15	2.31 ¹⁾²⁾				
	0.50	1.46	2.15	2.82	2.82 ¹⁾²⁾			
	0.55	1.46	2.15	2.84	3.17 ¹⁾²⁾			
	0.60	1.46	2.15	2.84	3.53 ¹⁾²⁾			
	0.63	1.46	2.15	2.84	3.74 ¹⁾	3.74 ¹⁾²⁾		
	0.70	1.46	2.15	2.84	4.09	4.24 ¹⁾²⁾		
	≥ 0.75	1.46	2.15	2.84	4.09	4.60 ¹⁾²⁾		
$N_{R,II,k} [\text{kN}]$		1.46	2.15	2.84	4.09	6.00	7.91	9.45
$u [\text{mm}]$	40	3.0						
	60	4.5						
	80	6.0						
$t_I [\text{mm}]$		≥ 100						
		7.5						

Additional definitions

Index ¹⁾: For component I made of S320GD the resistance value may be increased by 8.3%.

Index ²⁾: For component I made of S350GD to S450GD the resistance value may be increased by 16.6%.

Self-drilling screw with sealing washer Ø 29 mm	
SXC5-S29-6,3xL, SXC5-L12-S29-6,3xL SX5-S29-6,3xL, SX5-L12-S29-6,3xL	Annex 10

	Materials: Fastener: Stainless steel A2 or A4 - EN ISO 3506 Washer: Stainless steel A2 or A4 - EN ISO 3506 with EPDM-seal Component I: S280GD to S450GD - EN 10346 Component II: S235 to S355 - EN 10025 S280GD to S450GD - EN 10346 Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$
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		$t_{II} [\text{mm}]$					
		2x0.75	2x0.88	2x1.00	2x1.25	2x1.50	2x2.00
$V_{R,k} [\text{kN}]$	0.40	0.94	0.94	0.94	0.94	0.94	0.94
	0.45	1.13	1.13	1.13	1.13	1.13	1.13
	0.50	1.32	1.32	1.32	1.32	1.32	1.32
	0.55	1.33	1.33	1.33	1.33	1.33	1.33
	0.60	1.34	1.34	1.34	1.34	1.34	1.34
	0.63	1.35	1.35	1.35	1.35	1.35	1.35
	0.70	2.20	2.20	2.20	2.20	2.20	2.20
	≥ 0.75	2.80	2.80	2.80	2.80	2.80	2.80
$N_{R,k} [\text{kN}]$	0.40	1.80	1.80 ¹⁾²⁾				
	0.45	1.92	2.31 ¹⁾	2.31 ¹⁾²⁾			
	0.50	1.92	2.59	2.82	2.82 ¹⁾²⁾		
	0.55	1.92	2.59	2.99	3.17 ¹⁾²⁾		
	0.60	1.92	2.59	2.99	3.53 ¹⁾	3.53 ¹⁾²⁾	
	0.63	1.92	2.59	2.99	3.74	3.74 ¹⁾²⁾	
	0.70	1.92	2.59	2.99	3.92	4.24 ¹⁾²⁾	
	≥ 0.75	1.92	2.59	2.99	3.92	4.60 ¹⁾²⁾	
$N_{R,II,k} [\text{kN}]$		1.92	2.59	2.99	3.92	5.60	5.60
$u [\text{mm}]$	40	3.0					
	60	4.5					
	80	6.0					
$t_I [\text{mm}]$		≥ 100					
		7.5					

Additional definitions

Index ¹⁾: For component I made of S320GD the resistance value may be increased by 8.3%.

Index ²⁾: For component I made of S350GD to S450GD the resistance value may be increased by 16.6%.

Self-drilling screw with sealing washer Ø 29 mm	
SXC5-S29-6,3xL, SXC5-L12-S29-6,3xL SX5-S29-6,3xL, SX5-L12-S29-6,3xL	Annex 11

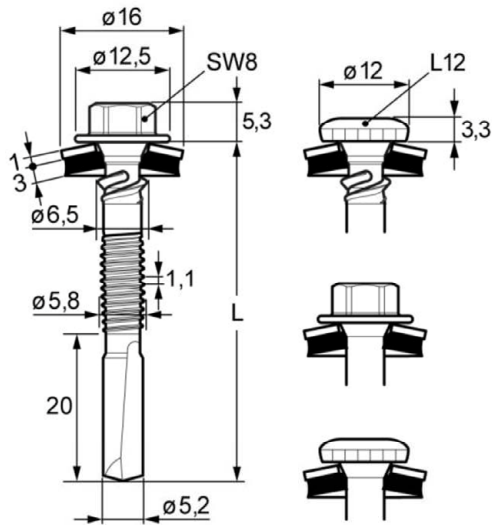
	Materials: Fastener: Stainless steel A2 or A4 - EN ISO 3506 Washer: Stainless steel A2 or A4 - EN ISO 3506 with EPDM-seal Component I: S280GD to S450GD - EN 10346 Component II: Coniferous timber ≥ C24 - EN 14081 Drilling-capacity: $\Sigma(t_{N1} + t_{N2}) \leq 2.00 \text{ mm}$ Characteristics: $M_{y,Rk} = 11.2 \text{ Nm}$ $f_{ax,k} = 11.6 \text{ N/mm}^2$ ($l_{ef} = 25 \text{ mm}$, $\rho_a = 350 \text{ kg/m}^3$) $f_{ax,k} = 10.4 \text{ N/mm}^2$ ($l_{ef} = 35 \text{ mm}$, $\rho_a = 350 \text{ kg/m}^3$)
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		l _{ef} [mm]					Failure of component I	
		25	35	45	55	65		
V _{R,k} [kN]	0.40	0.69	0.81	0.81	0.81	0.81	0.81	V _{R,I,k} [kN]
	0.45	0.89	0.99	0.99	0.99	0.99	0.99	
	0.50	1.08	1.17	1.17	1.17	1.17	1.17	
	0.55	1.11	1.26	1.26	1.26	1.26	1.26	
	0.60	1.13	1.35	1.35	1.35	1.35	1.35	
	0.63	1.15	1.40	1.40	1.40	1.40	1.40	
	0.70	1.15	1.53	1.53	1.53	1.53	1.53	
	≥ 0.75	1.15	1.62	1.62	1.62	1.62	1.62	
N _{R,k} [kN]	0.40	1.65	1.80				1.80	N _{R,I,k} [kN]
	0.45	1.65	2.29	2.31			2.31	
	0.50	1.65	2.29	2.82			2.82	
	0.55	1.65	2.29	2.95	3.17		3.17	
	0.60	1.65	2.29	2.95	3.53		3.53	
	0.63	1.65	2.29	2.95	3.60	3.74	3.74	
	0.70	1.65	2.29	2.95	3.60	4.24	4.24	
	≥ 0.75	1.65	2.29	2.95	3.60	4.26	4.60	
N _{R,II,k} [kN]		1.83	2.29	2.95	3.60	4.26		
u [mm]	40	3.0					-	
	60	4.5						
t _i [mm]	80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer Ø 29 mm

SXC5-S29-6,3xL, SXC5-L12-S29-6,3xL
SX5-S29-6,3xL, SX5-L12-S29-6,3xL

Annex 12



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: S235 to S355 - EN 10025
S280GD to S450GD - EN 10346

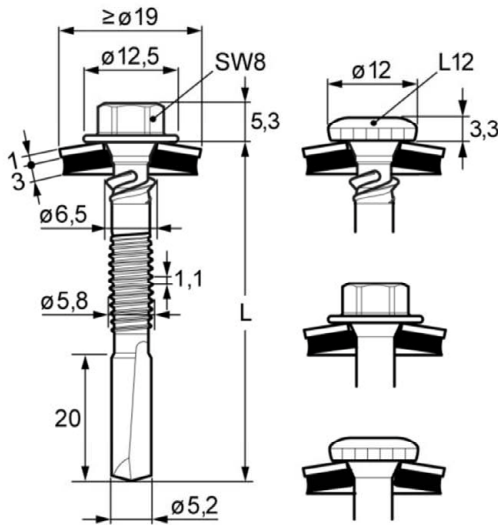
Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 16.00 \text{ mm}$

		$t_{II} [\text{mm}]$						
		3.00	4.00	6.00	8.00	10.00	12.00	14.00
$V_{R,k} [\text{kN}]$	0.40	1.18	1.18	1.18	1.18	1.18	1.18	1.18
	0.45	1.32	1.32	1.32	1.32	1.32	1.32	1.32
	0.50	1.46	1.46	1.46	1.46	1.46	1.46	1.46
	0.55	1.69	1.69	1.69	1.69	1.69	1.69	1.69
	$t_{N2} [\text{mm}]$ 0.60	1.91	1.91	1.91	1.91	1.91	1.91	1.91
	0.63	2.05	2.05	2.05	2.05	2.05	2.05	2.05
	0.70	2.32	2.32	2.32	2.32	2.32	2.32	2.32
	≥ 0.75	2.51	2.51	2.51	2.51	2.51	2.51	2.51
$N_{R,k} [\text{kN}]$	0.40	1.73						
	0.45	1.92						
	0.50	2.11						
	0.55	2.58						
	$t_{N1} [\text{mm}]$ 0.60	3.04						
	0.63	3.32						
	0.70	3.82						
	≥ 0.75	4.17						
$N_{R,II,k} [\text{kN}]$		6.76	7.01	9.60	11.01	11.01	11.01	11.01
$u [\text{mm}]$	40	3.0						
	60	4.5						
	$t_I [\text{mm}]$ 80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer Ø 16 mm

SXC16-S16-5,8xL, SXC16-L12-S16-5,8xL
SX16-S16-5,8xL, SX16-L12-S16-5,8xL

Annex 13



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: S235 to S355 - EN 10025
S280GD to S450GD - EN 10346

Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 16.00 \text{ mm}$

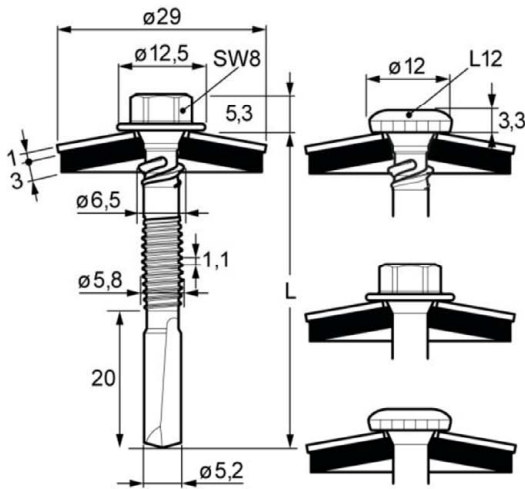
		$t_{II} [\text{mm}]$						
		3.00	4.00	6.00	8.00	10.00	12.00	14.00
$V_{R,k} [\text{kN}]$	0.40	1.18	1.18	1.18	1.18	1.18	1.18	1.18
	0.45	1.32	1.32	1.32	1.32	1.32	1.32	1.32
	0.50	1.46	1.46	1.46	1.46	1.46	1.46	1.46
	0.55	1.69	1.69	1.69	1.69	1.69	1.69	1.69
	$t_{N2} [\text{mm}]$ 0.60	1.91	1.91	1.91	1.91	1.91	1.91	1.91
	0.63	2.05	2.05	2.05	2.05	2.05	2.05	2.05
	0.70	2.32	2.32	2.32	2.32	2.32	2.32	2.32
	≥ 0.75	2.51	2.51	2.51	2.51	2.51	2.51	2.51
$N_{R,k} [\text{kN}]$	0.40	2.08						
	0.45	2.08						
	0.50	2.08						
	0.55	2.53						
	$t_{N1} [\text{mm}]$ 0.60	2.97						
	0.63	3.24						
	0.70	3.99						
	≥ 0.75	4.53						
$N_{R,II,k} [\text{kN}]$		6.76	7.01	9.60	11.01	11.01	11.01	11.01
$u [\text{mm}]$	40	3.0						
	60	4.5						
	$t_I [\text{mm}]$ 80	6.0						
	≥ 100	7.5						

Additional definitions

Self-drilling screw with sealing washer Ø 19 / 22 mm

SXC16-S19/S22-5,8xL, SXC16-L12-S19/S22-5,8xL
SX16-S19/S22-5,8xL, SX16-L12-S19/S22-5,8xL

Annex 14



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: S235 to S355 - EN 10025
S280GD to S450GD - EN 10346

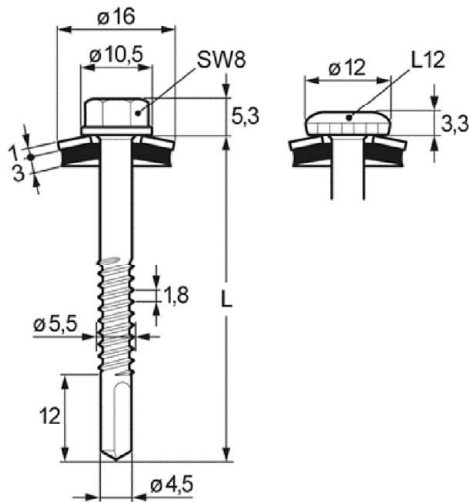
Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 16.00 \text{ mm}$

		$t_{II} [\text{mm}]$						
		3.00	4.00	6.00	8.00	10.00	12.00	14.00
$V_{R,k} [\text{kN}]$	0.40	1.18	1.18	1.18	1.18	1.18	1.18	1.18
	0.45	1.32	1.32	1.32	1.32	1.32	1.32	1.32
	0.50	1.46	1.46	1.46	1.46	1.46	1.46	1.46
	0.55	1.69	1.69	1.69	1.69	1.69	1.69	1.69
	$t_{N2} [\text{mm}]$ 0.60	1.91	1.91	1.91	1.91	1.91	1.91	1.91
	0.63	2.05	2.05	2.05	2.05	2.05	2.05	2.05
	0.70	2.32	2.32	2.32	2.32	2.32	2.32	2.32
	≥ 0.75	2.51	2.51	2.51	2.51	2.51	2.51	2.51
$N_{R,k} [\text{kN}]$	0.40	2.08						
	0.45	2.41						
	0.50	2.90						
	0.55	3.26						
	$t_{N1} [\text{mm}]$ 0.60	3.61						
	0.63	3.82						
	0.70	4.32						
	≥ 0.75	4.67						
$N_{R,II,k} [\text{kN}]$		6.76	7.01	9.60	11.01	11.01	11.01	11.01
$u [\text{mm}]$	40	3.0						
	60	4.5						
	$t_I [\text{mm}]$ 80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer Ø 29 mm

SXC16-S29-5,8xL, SXC16-L12-S29-5,8xL
SX16-S29-5,8xL, SX16-L12-S29-5,8xL

Annex 15



Materials:

Fastener:	Stainless steel A2 or A4 - EN ISO 3506
Washer:	Stainless steel A2 or A4 - EN ISO 3506 with EPDM-seal
Component I:	S280GD to S450GD - EN 10346
Component II:	S235 to S355 - EN 10025 S280GD to S450GD - EN 10346

Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$

		$t_{II} [\text{mm}]$					
		1.50	1.75	2.00	2.50	3.00	4.00
$V_{R,k} [\text{kN}]$	0.40	0.81 ¹⁾	0.81 ¹⁾	0.81 ¹⁾	0.81 ¹⁾	0.81 ¹⁾	0.81 ¹⁾
	0.45	0.98 ¹⁾	0.98 ¹⁾	0.98 ¹⁾	0.98 ¹⁾	0.98 ¹⁾	0.98 ¹⁾
	0.50	1.14 ¹⁾	1.14 ¹⁾	1.14 ¹⁾	1.14 ¹⁾	1.14 ¹⁾	1.14 ¹⁾
	0.55	1.29 ¹⁾	1.31 ¹⁾	1.32 ¹⁾	1.35 ¹⁾	1.38 ¹⁾	1.38 ¹⁾
	0.60	1.44 ¹⁾	1.47 ¹⁾	1.50 ¹⁾	1.56 ¹⁾	1.63 ¹⁾	1.63 ¹⁾
	0.63	1.53 ¹⁾	1.57 ¹⁾	1.61 ¹⁾	1.69 ¹⁾	1.77 ¹⁾	1.77 ¹⁾
	0.70	1.74 ¹⁾	1.80 ¹⁾	1.87 ¹⁾	1.99 ¹⁾	2.11 ¹⁾	2.11 ¹⁾
	≥ 0.75	1.89 ¹⁾	1.97 ¹⁾	2.05 ¹⁾	2.20 ¹⁾	2.36 ¹⁾	2.36 ¹⁾
$N_{R,k} [\text{kN}]$	0.40	1.15 ¹⁾					
	0.45	1.34 ¹⁾					
	0.50	1.52 ¹⁾					
	0.55	1.88	1.91 ¹⁾				
	0.60	1.88	2.31	2.31 ¹⁾			
	0.63	1.88	2.38	2.55 ¹⁾			
	0.70	1.88	2.38	2.87	3.10 ¹⁾		
	≥ 0.75	1.88	2.38	2.87	3.50 ¹⁾		
$N_{R,II,k} [\text{kN}]$		1.88	2.38	2.87	4.34	5.81	7.28
$u [\text{mm}]$	40	3.0					
	60	4.5					
	80	6.0					
$t_I [\text{mm}]$		≥ 100					
		7.5					

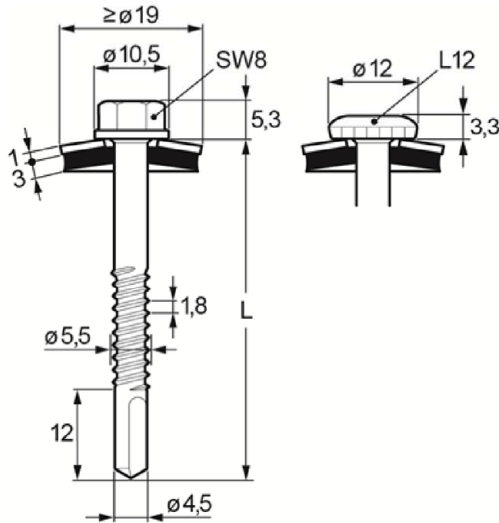
Additional definitions

Index ¹⁾: For component I made of S320GD to S450GD the resistance value may be increased by 8.3%.

Self-drilling screw with sealing washer Ø 16 mm

SX5-S16-5,5xL, SX5-L12-S16-5,5xL

Annex 16



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: S235 to S355 - EN 10025
S280GD to S450GD - EN 10346

Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$

		$t_{II} [\text{mm}]$					
		1.50	1.75	2.00	2.50	3.00	4.00
$V_{R,k} [\text{kN}]$	0.40	0.81 ¹⁾	0.81 ¹⁾	0.81 ¹⁾	0.81 ¹⁾	0.81 ¹⁾	0.81 ¹⁾
	0.45	0.98 ¹⁾	0.98 ¹⁾	0.98 ¹⁾	0.98 ¹⁾	0.98 ¹⁾	0.98 ¹⁾
	0.50	1.14 ¹⁾	1.14 ¹⁾	1.14 ¹⁾	1.14 ¹⁾	1.14 ¹⁾	1.14 ¹⁾
	0.55	1.29 ¹⁾	1.31 ¹⁾	1.32 ¹⁾	1.35 ¹⁾	1.38 ¹⁾	1.38 ¹⁾
	0.60	1.44 ¹⁾	1.47 ¹⁾	1.50 ¹⁾	1.56 ¹⁾	1.63 ¹⁾	1.63 ¹⁾
	0.63	1.53 ¹⁾	1.57 ¹⁾	1.61 ¹⁾	1.69 ¹⁾	1.77 ¹⁾	1.77 ¹⁾
	0.70	1.74 ¹⁾	1.80 ¹⁾	1.87 ¹⁾	1.99 ¹⁾	2.11 ¹⁾	2.11 ¹⁾
	≥ 0.75	1.89 ¹⁾	1.97 ¹⁾	2.05 ¹⁾	2.20 ¹⁾	2.36 ¹⁾	2.36 ¹⁾
$N_{R,k} [\text{kN}]$	0.40	1.43 ¹⁾					
	0.45	1.65 ¹⁾					
	0.50	1.87	1.87 ¹⁾				
	0.55	1.88	2.36	2.36 ¹⁾			
	0.60	1.88	2.38	2.38 ¹⁾			
	0.63	1.88	2.38	2.87	3.14 ¹⁾		
	0.70	1.88	2.38	2.87	3.82		
	≥ 0.75	1.88	2.38	2.87	4.31		
$N_{R,II,k} [\text{kN}]$		1.88	2.38	2.87	4.34	5.81	7.28
$u [\text{mm}]$	40	3.0					
	60	4.5					
	80	6.0					
$t_I [\text{mm}]$		≥ 100					
		7.5					

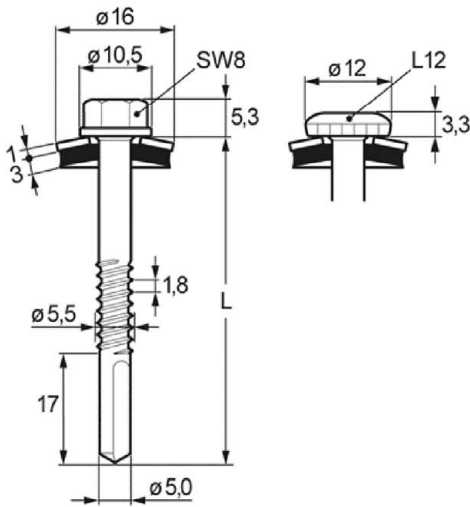
Additional definitions

Index ¹⁾: For component I made of S320GD to S450GD the resistance value may be increased by 8.3%.

Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm

SX5-S19/S22/S29-5,5xL, SX5-L12-S19/S22/S29-5,5xL

Annex 17



Materials:

Fastener:	Stainless steel A2 or A4 - EN ISO 3506
Washer:	Stainless steel A2 or A4 - EN ISO 3506 with EPDM-seal
Component I:	S280GD to S450GD - EN 10346
Component II:	S235 to S355 - EN 10025 S280GD to S450GD - EN 10346

Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 14.00 \text{ mm}$

		$t_{II} [\text{mm}]$					
		4.00	5.00	6.00	8.00	10.00	12.00
$V_{R,k} [\text{kN}]$	0.40	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾
	0.45	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾
	0.50	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾
	0.55	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾
	0.60	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾
	0.63	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾
	0.70	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾
	≥ 0.75	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾
$N_{R,k} [\text{kN}]$	0.40	1.16 ¹⁾					
	0.45	1.41 ¹⁾					
	0.50	1.65 ¹⁾					
	0.55	1.96 ¹⁾					
	0.60	2.25 ¹⁾					
	0.63	2.43 ¹⁾					
	0.70	2.89 ¹⁾					
	≥ 0.75	3.21 ¹⁾					
$N_{R,II,k} [\text{kN}]$		4.97	6.41	7.84	10.71	10.71	10.71
$u [\text{mm}]$	40	3.0					
	60	4.5					
	80	6.0					
$t_I [\text{mm}]$		≥ 100					

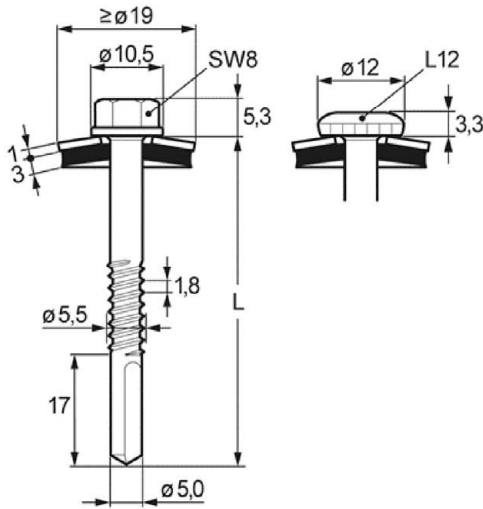
Additional definitions

Index ¹⁾: For component I made of S320GD to S450GD the resistance value may be increased by 8.3%.

Self-drilling screw with sealing washer Ø 16 mm

SX14-S16-5,5xL, SX14-L12-S16-5,5xL

Annex 18



Materials:

Fastener:	Stainless steel A2 or A4 - EN ISO 3506
Washer:	Stainless steel A2 or A4 - EN ISO 3506 with EPDM-seal
Component I:	S280GD to S450GD - EN 10346
Component II:	S235 to S355 - EN 10025 S280GD to S450GD - EN 10346

Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 14.00 \text{ mm}$

		$t_{II} [\text{mm}]$					
		4.00	5.00	6.00	8.00	10.00	12.00
$V_{R,k} [\text{kN}]$	0.40	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾
	0.45	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾
	0.50	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾
	0.55	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾
	0.60	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾
	0.63	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾
	0.70	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾
	≥ 0.75	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾
$N_{R,k} [\text{kN}]$	0.40	1.16 ¹⁾					
	0.45	1.41 ¹⁾					
	0.50	1.65 ¹⁾					
	0.55	1.96 ¹⁾					
	0.60	2.25 ¹⁾					
	0.63	2.43 ¹⁾					
	0.70	2.89 ¹⁾					
	≥ 0.75	3.21 ¹⁾					
$N_{R,II,k} [\text{kN}]$		4.97	6.41	7.84	10.71	10.71	10.71
$u [\text{mm}]$	40	3.0					
	60	4.5					
	80	6.0					
$t_I [\text{mm}]$		7.5					

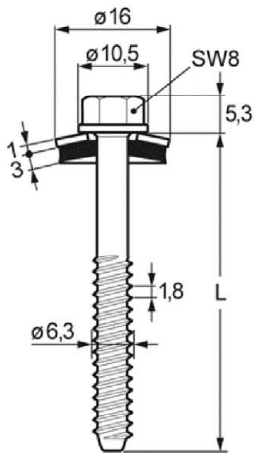
Additional definitions

Index ¹⁾: For component I made of S320GD to S450GD the resistance value may be increased by 8.3%.

Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm

SX14-S19/S22/S29-5,5xL, SX14-L12-S19/S22/S29-5,5xL

Annex 19



Materials:

Fastener:	Stainless steel A2 or A4 - EN ISO 3506
Washer:	Stainless steel A2 or A4 - EN ISO 3506 with EPDM-seal
Component I:	S280GD to S450GD - EN 10346
Component II:	S235 to S355 - EN 10025 S280GD to S450GD - EN 10346

Predrill diameter: d_{pd} = see table

		t_{II} [mm]								
		1.50	2.00	2.50	3.00	4.00	6.00	8.00	10.00	> 10.00 ¹⁾
d_{pd} [mm] ²		5.00	5.30				5.50	5.70		5.80
$V_{R,k}$ [kN]	0.40	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
	0.45	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
	0.50	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
	0.55	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
	0.60	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
	0.63	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
	0.70	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
	≥ 0.75	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
$N_{R,k}$ [kN]	0.40	1.68								
	0.45	1.85								
	0.50	2.01								
	0.55	2.39								
	0.60	2.57	2.77							
	0.63	2.57	3.01							
	0.70	2.57	3.44	3.55						
	≥ 0.75	2.57	3.44	3.93						
$N_{R,II,k}$ [kN]		2.57	3.44	4.96	6.48	9.19	12.22	15.24	15.24	15.24
u [mm]	40	3.0								
	60	4.5								
	80	6.0								
t_I [mm]		7.5								

Additional definitions

Index ¹⁾: Only valid for component II made of S235 or S280GD.

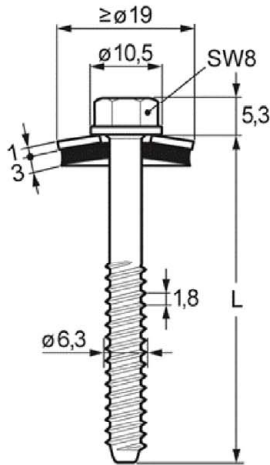
Index ²⁾: The pre-drill diameter d_{pd} for not indicated thicknesses t_{II} is defined as follows:

$d_{pd} = 5.3$ mm for $t_{II} = 1.6 - 4.0$ mm, $d_{pd} = 5.5$ mm for $t_{II} = 4.1 - 6.0$ mm, $d_{pd} = 5.7$ mm for $t_{II} = 6.1 - 10.0$ mm

Self-tapping screw with sealing washer Ø 16 mm

TDB-S-S16-6,3xL, TDB-S16-6,3xL

Annex 20



Materials:

Fastener:	Stainless steel A2 or A4 - EN ISO 3506
Washer:	Stainless steel A2 or A4 - EN ISO 3506 with EPDM-seal
Component I:	S280GD to S450GD - EN 10346
Component II:	S235 to S355 - EN 10025 S280GD to S450GD - EN 10346

Predrill diameter: d_{pd} = see table

		t_{II} [mm]								
		1.50	2.00	2.50	3.00	4.00	6.00	8.00	10.00	> 10.00 ¹⁾
d_{pd} [mm] ²⁾		5.00	5.30				5.50	5.70		5.80
$V_{R,k}$ [kN]	0.40	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
	0.45	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
	0.50	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
	0.55	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
	0.60	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
	0.63	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
	0.70	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
	≥ 0.75	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
$N_{R,k}$ [kN]	0.40	1.75								
	0.45	2.00								
	0.50	2.25								
	0.55	2.57	2.72							
	0.60	2.57	3.19							
	0.63	2.57	3.44	3.48						
	0.70	2.57	3.44	4.13						
	≥ 0.75	2.57	3.44	4.61						
$N_{R,II,k}$ [kN]		2.57	3.44	4.96	6.48	9.19	12.22	15.24	15.24	15.24
u [mm]	40	3.0								
	60	4.5								
	80	6.0								
t_I [mm]	≥ 100	7.5								

Additional definitions

Index ¹⁾: Only valid for component II made of S235 or S280GD.

Index ²⁾: The pre-drill diameter d_{pd} for not indicated thicknesses t_{II} is defined as follows:

$d_{pd} = 5.3$ mm for $t_{II} = 1.6 - 4.0$ mm, $d_{pd} = 5.5$ mm for $t_{II} = 4.1 - 6.0$ mm, $d_{pd} = 5.7$ mm for $t_{II} = 6.1 - 10.0$ mm

Self-tapping screw with sealing washer Ø 19 / 22 / 29 mm

TDB-S-S19/S22/S29-6,3xL, TDB-S19/S22/S29-6,3xL

Annex 21

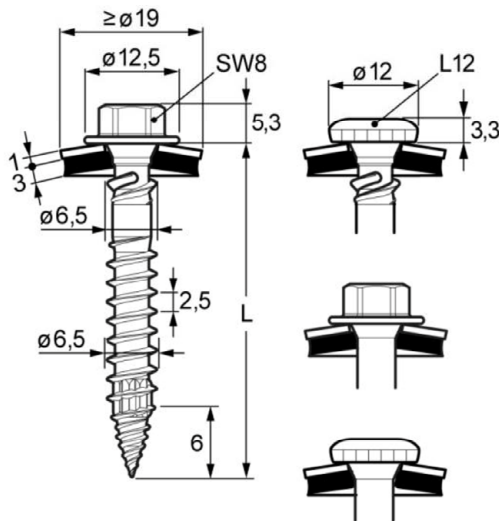
	Materials: Fastener: Stainless steel A2 or A4 - EN ISO 3506 Washer: Stainless steel A2 or A4 - EN ISO 3506 with EPDM-seal Component I: S280GD to S450GD - EN 10346 Component II: Coniferous timber $\geq$ C24 - EN 14081 Drilling-capacity: $\Sigma(t_{N1} + t_{N2}) \leq 2.00$ mm Characteristics: $M_{y,Rk} = 10.2$ Nm $f_{ax,k} = 13.1$ N/mm² ($l_{ef} = 25$ mm, $\rho_a = 350$ kg/m³)
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		l _{ef} [mm]					Failure of component I	
		25	35	45	55	65		
V _{R,k} [kN]	0.40	0.92	0.92	0.92	0.92	0.92	0.92	V _{R,I,k} [kN]
	0.45	1.02	1.02	1.02	1.02	1.02	1.02	
	0.50	1.11	1.11	1.11	1.11	1.11	1.11	
	0.55	1.22	1.22	1.22	1.22	1.22	1.22	
	0.60	1.33	1.33	1.33	1.33	1.33	1.33	
	0.63	1.40	1.40	1.40	1.40	1.40	1.40	
	0.70	1.41	1.41	1.41	1.41	1.41	1.41	
	≥ 0.75	1.42	1.42	1.42	1.42	1.42	1.42	
N _{R,k} [kN]	0.40	1.73					1.73	N _{R,I,k} [kN]
	0.45	1.92					1.92	
	0.50	2.11					2.11	
	0.55	2.14	2.58				2.58	
	0.60	2.14	2.99	3.04			3.04	
	0.63	2.14	2.99	3.32			3.32	
	0.70	2.14	2.99	3.82			3.82	
	≥ 0.75	2.14	2.99	3.84	4.17		4.17	
N _{R,II,k} [kN]		2.14	2.99	3.84	4.70	5.55		
u [mm]	40	3.0						
	60	4.5						
t _I [mm]	80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer $\varnothing$ 16 mm

CXCW-S16-6,5xL, CXCW-L12-S16-6,5xL

Annex 22



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: Coniferous timber $\geq$ C24 - EN 14081

Drilling-capacity: $\Sigma(t_{N1} + t_{N2}) \leq 2.00$ mm

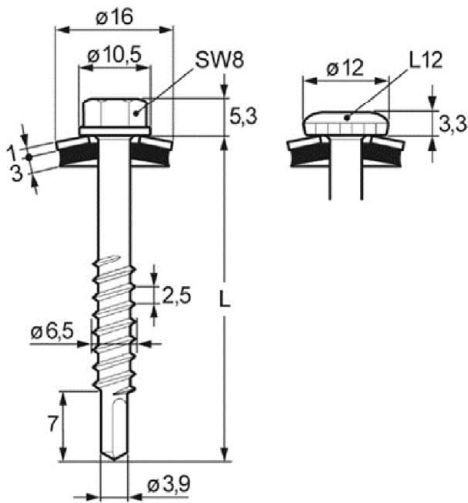
Characteristics: $M_{y,Rk} = 10.2$ Nm
 $f_{ax,k} = 13.1$ N/mm² ($l_{ef} = 25$ mm, $\rho_a = 350$ kg/m³)

		l _{ef} [mm]					Failure of component I	
		25	35	45	55	65		
V _{R,k} [kN]	0.40	0.92	0.92	0.92	0.92	0.92	0.92	V _{R,I,k} [kN]
	0.45	1.02	1.02	1.02	1.02	1.02	1.02	
	0.50	1.11	1.11	1.11	1.11	1.11	1.11	
	0.55	1.22	1.22	1.22	1.22	1.22	1.22	
	0.60	1.33	1.33	1.33	1.33	1.33	1.33	
	0.63	1.40	1.40	1.40	1.40	1.40	1.40	
	0.70	1.41	1.41	1.41	1.41	1.41	1.41	
	≥ 0.75	1.42	1.42	1.42	1.42	1.42	1.42	
N _{R,k} [kN]	0.40	2.08					2.08	N _{R,I,k} [kN]
	0.45	1.92	2.08				2.08	
	0.50	1.92	2.08				2.08	
	0.55	1.92	2.53				2.53	
	0.60	1.92	2.97				2.97	
	0.63	1.92	2.99	3.24			3.24	
	0.70	1.92	2.99	3.84	3.99		3.99	
	≥ 0.75	1.92	2.99	3.84	4.53		4.53	
N _{R,II,k} [kN]		2.14	2.99	3.84	4.70	5.55		
u [mm]	40	3.0						
	60	4.5						
t _I [mm]	80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm

CXCW-S19/S22/S29-6,5xL, CXCW-L12-S19/S22/S29-6,5xL

Annex 23



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: Coniferous timber $\geq$ C24 - EN 14081

Drilling-capacity: $\Sigma(t_{N1} + t_{N2}) \leq 2.00$ mm

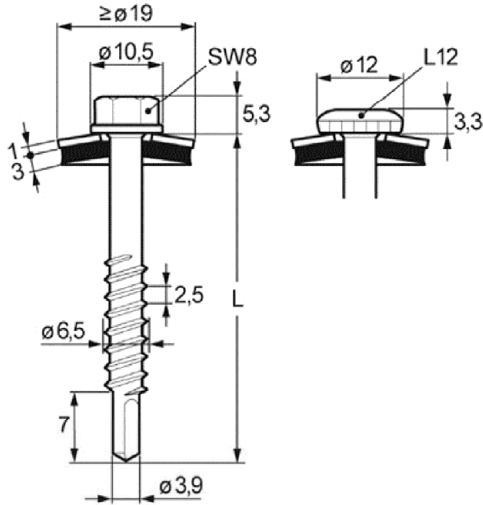
Characteristics: $M_{y,Rk} = 12.1$ Nm
 $f_{ax,k} = 13.2$ N/mm² ($l_{ef} = 35$ mm, $\rho_a = 350$ kg/m³)

		l _{ef} [mm]					Failure of component I	
		35	45	55	65	75		
V _{R,k} [kN]	0.40	0.81	0.81	0.81	0.81	0.81	0.81	V _{R,I,k} [kN]
	0.45	0.98	0.98	0.98	0.98	0.98	0.98	
	0.50	1.15	1.15	1.15	1.15	1.15	1.15	
	0.55	1.24	1.24	1.24	1.24	1.24	1.24	
	0.60	1.33	1.33	1.33	1.33	1.33	1.33	
	0.63	1.39	1.39	1.39	1.39	1.39	1.39	
	0.70	1.51	1.51	1.51	1.51	1.51	1.51	
	≥ 0.75	1.61	1.61	1.61	1.61	1.61	1.61	
N _{R,k} [kN]	0.40	1.56					1.56	N _{R,I,k} [kN]
	0.45	1.61					1.61	
	0.50	1.66					1.66	
	0.55	1.96					1.96	
	0.60	2.26					2.26	
	0.63	2.45					2.45	
	0.70	2.87					2.87	
	≥ 0.75	3.03	3.18				3.18	
N _{R,II,k} [kN]		3.03	3.86	4.72	5.58	6.44		
u [mm]	40	3.0						
	60	4.5						
t _I [mm]	80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer $\varnothing$ 16 mm

SXW-S16-6,5xL, SXW-L12-S16-6,5xL

Annex 24



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: Coniferous timber ≥ C24 - EN 14081

Drilling-capacity: $\Sigma(t_{N1} + t_{N2}) \leq 2.00 \text{ mm}$

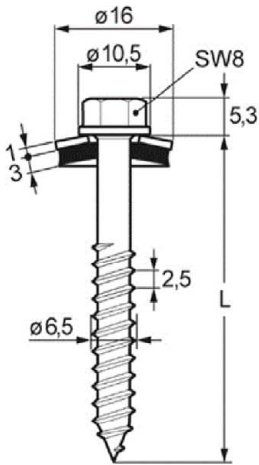
Characteristics: $M_{y,Rk} = 12.1 \text{ Nm}$
 $f_{ax,k} = 13.2 \text{ N/mm}^2$ ($l_{ef} = 35 \text{ mm}$, $\rho_a = 350 \text{ kg/m}^3$)

		l _{ef} [mm]					Failure of component I	
		35	45	55	65	75		
V _{R,k} [kN]	0.40	0.81	0.81	0.81	0.81	0.81	0.81	V _{R,I,k} [kN]
	0.45	0.98	0.98	0.98	0.98	0.98	0.98	
	0.50	1.15	1.15	1.15	1.15	1.15	1.15	
	0.55	1.24	1.24	1.24	1.24	1.24	1.24	
	0.60	1.33	1.33	1.33	1.33	1.33	1.33	
	0.63	1.39	1.39	1.39	1.39	1.39	1.39	
	0.70	1.51	1.51	1.51	1.51	1.51	1.51	
	≥ 0.75	1.61	1.61	1.61	1.61	1.61	1.61	
N _{R,k} [kN]	0.40	1.62					1.62	N _{R,I,k} [kN]
	0.45	1.86					1.86	
	0.50	2.10					2.10	
	0.55	2.37					2.37	
	0.60	2.64					2.64	
	0.63	2.81					2.81	
	0.70	3.03	3.18				3.18	
	≥ 0.75	3.03	3.46				3.46	
N _{R,II,k} [kN]		3.03	3.86	4.72	5.58	6.44		
u [mm]	40	3.0						
	60	4.5						
t _I [mm]	80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm

SXW-S19/S22/S29-6,5xL, SXW-L12-S19/S22/S29-6,5xL

Annex 25



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: Coniferous timber $\geq$ C24 - EN 14081

Predrill diameter: d_{pd} = see table

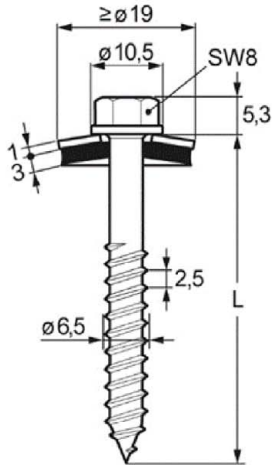
Characteristics: $M_{y,Rk} = 13.9 \text{ Nm}$
 $f_{ax,k} = 13.2 \text{ N/mm}^2$ ($l_{ef} = 29 \text{ mm}$, $\rho_a = 350 \text{ kg/m}^3$)

		$l_{ef} \text{ [mm]}$					Failure of component I	
		35	45	55	65	75		
$d_{pd} \text{ [mm]}$		4.00						
$V_{R,k} \text{ [kN]}$	0.40	0.81	0.81	0.81	0.81	0.81	0.81	$V_{R,I,k} \text{ [kN]}$
	0.45	0.98	0.98	0.98	0.98	0.98	0.98	
	0.50	1.15	1.15	1.15	1.15	1.15	1.15	
	0.55	1.24	1.24	1.24	1.24	1.24	1.24	
	0.60	1.33	1.33	1.33	1.33	1.33	1.33	
	0.63	1.39	1.39	1.39	1.39	1.39	1.39	
	0.70	1.51	1.51	1.51	1.51	1.51	1.51	
	≥ 0.75	1.61	1.61	1.61	1.61	1.61	1.61	
$N_{R,k} \text{ [kN]}$	0.40	1.56					1.56	$N_{R,I,k} \text{ [kN]}$
	0.45	1.61					1.61	
	0.50	1.66					1.66	
	0.55	1.96					1.96	
	0.60	2.26					2.26	
	0.63	2.45					2.45	
	0.70	2.87					2.87	
	≥ 0.75	3.00	3.18				3.18	
$N_{R,II,k} \text{ [kN]}$		3.00	3.86	4.72	5.58	6.44		
$u \text{ [mm]}$	40	3.0						
	60	4.5						
$t_l \text{ [mm]}$	80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer $\varnothing 16 \text{ mm}$

TDA-S-S16-6,5xL, TDA-S16-6,5xL

Annex 26



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: Coniferous timber $\geq$ C24 - EN 14081

Predrill diameter: d_{pd} = see table

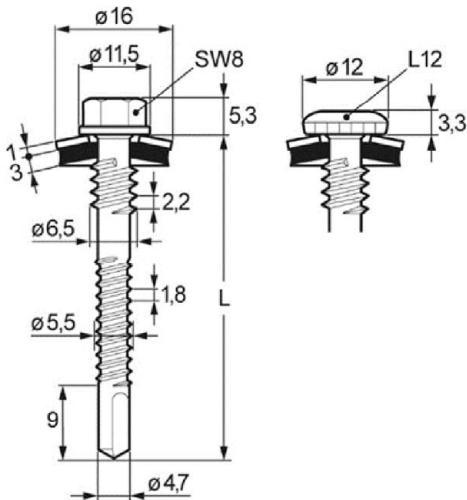
Characteristics: $M_{y,Rk} = 13.9 \text{ Nm}$
 $f_{ax,k} = 13.2 \text{ N/mm}^2$ ($l_{ef} = 29 \text{ mm}$, $\rho_a = 350 \text{ kg/m}^3$)

		$l_{ef} \text{ [mm]}$					Failure of component I	
		35	45	55	65	75		
$d_{pd} \text{ [mm]}$		4.00						
$V_{R,k} \text{ [kN]}$	0.40	0.81	0.81	0.81	0.81	0.81	0.81	$V_{R,I,k} \text{ [kN]}$
	0.45	0.98	0.98	0.98	0.98	0.98	0.98	
	0.50	1.15	1.15	1.15	1.15	1.15	1.15	
	0.55	1.24	1.24	1.24	1.24	1.24	1.24	
	0.60	1.33	1.33	1.33	1.33	1.33	1.33	
	0.63	1.39	1.39	1.39	1.39	1.39	1.39	
	0.70	1.51	1.51	1.51	1.51	1.51	1.51	
	≥ 0.75	1.61	1.61	1.61	1.61	1.61	1.61	
$N_{R,k} \text{ [kN]}$	0.40	1.62					1.62	$N_{R,I,k} \text{ [kN]}$
	0.45	1.86					1.86	
	0.50	2.10					2.10	
	0.55	2.37					2.37	
	0.60	2.64					2.64	
	0.63	2.81					2.81	
	0.70	3.00	3.18			3.18	3.18	
	≥ 0.75	3.00	3.46			3.46	3.46	
$N_{R,II,k} \text{ [kN]}$		3.00	3.86	4.72	5.58	6.44		
$u \text{ [mm]}$	40	3.0						
	60	4.5						
$t_l \text{ [mm]}$	80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer $\varnothing 19 / 22 / 29 \text{ mm}$

TDA-S-S19/S22/S29-6,5xL, TDA-S19/S22/S29-6,5xL

Annex 27



Materials:

Fastener:	Carbon steel with anticorrosion coating
Washer:	Stainless steel A2 or A4 - EN ISO 3506 or carbon steel with anticorrosion coating with EPDM-seal
Component I:	S280GD to S450GD - EN 10346
Component II:	S235 to S355 - EN 10025 S280GD to S450GD - EN 10346

Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$

		$t_{II} [\text{mm}]$					
		1.50	1.75	2.00	2.50	3.00	4.00
$V_{R,k} [\text{kN}]$	0.40	0.67 ¹⁾	0.85 ¹⁾	0.85 ¹⁾	0.85 ¹⁾	0.85 ¹⁾	0.85 ¹⁾
	0.45	0.90 ¹⁾	0.90 ¹⁾	0.90 ¹⁾	0.90 ¹⁾	0.90 ¹⁾	0.90 ¹⁾
	0.50	1.12 ¹⁾	1.25 ¹⁾	1.25 ¹⁾	1.25 ¹⁾	1.25 ¹⁾	1.25 ¹⁾
	0.55	1.34 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾
	0.60	1.57 ¹⁾	1.69 ¹⁾	1.69 ¹⁾	1.69 ¹⁾	1.69 ¹⁾	1.69 ¹⁾
	0.63	1.70 ¹⁾	1.84 ¹⁾	1.84 ¹⁾	1.84 ¹⁾	1.84 ¹⁾	1.84 ¹⁾
	0.70	1.70 ¹⁾	1.93 ¹⁾	1.93 ¹⁾	1.93 ¹⁾	1.93 ¹⁾	1.93 ¹⁾
	≥ 0.75	1.70 ¹⁾	1.99 ¹⁾	1.99 ¹⁾	1.99 ¹⁾	1.99 ¹⁾	1.99 ¹⁾
$N_{R,k} [\text{kN}]$	0.40	1.48 ¹⁾					
	0.45	1.64 ¹⁾					
	0.50	1.79	1.79 ¹⁾				
	0.55	1.82	2.04 ¹⁾				
	0.60	1.82	2.29	2.29 ¹⁾			
	0.63	1.82	2.41	2.46 ¹⁾			
	0.70	1.82	2.41	2.82	2.82 ¹⁾		
	≥ 0.75	1.82	2.41	3.00	3.07 ¹⁾		
$N_{R,II,k} [\text{kN}]$		1.82	2.41	3.00	4.31	5.61	10.77
$u [\text{mm}]$	40	2.0					
	60	4.0					
	80	5.7					
$t_I [\text{mm}]$		≥ 100					
		7.1					

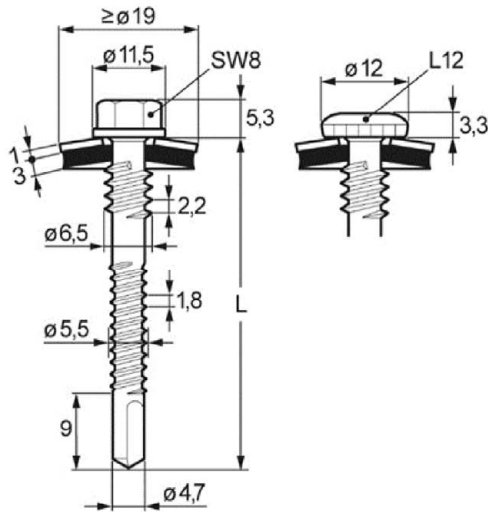
Additional definitions

Index ¹⁾: For component I made of S320GD to S450GD the resistance value may be increased by 8.3%.

Self-drilling screw with sealing washer Ø 16 mm

SDT5-S16-5,5xL, SDT5-L12-S16-5,5xL,
SDT5-T16-5,5xL, SDT5-L12-T16-5,5xL

Annex 28



Materials:

Fastener:	Carbon steel with anticorrosion coating
Washer:	Stainless steel A2 or A4 - EN ISO 3506 or carbon steel with anticorrosion coating with EPDM-seal
Component I:	S280GD to S450GD - EN 10346
Component II:	S235 to S355 - EN 10025 S280GD to S450GD - EN 10346

Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$

		$t_{II} [\text{mm}]$					
		1.50	1.75	2.00	2.50	3.00	4.00
$V_{R,k} [\text{kN}]$	0.40	0.67 ¹⁾	0.85 ¹⁾	0.85 ¹⁾	0.85 ¹⁾	0.85 ¹⁾	0.85 ¹⁾
	0.45	0.90 ¹⁾	0.90 ¹⁾	0.90 ¹⁾	0.90 ¹⁾	0.90 ¹⁾	0.90 ¹⁾
	0.50	1.12 ¹⁾	1.25 ¹⁾	1.25 ¹⁾	1.25 ¹⁾	1.25 ¹⁾	1.25 ¹⁾
	0.55	1.34 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾
	0.60	1.57 ¹⁾	1.69 ¹⁾	1.69 ¹⁾	1.69 ¹⁾	1.69 ¹⁾	1.69 ¹⁾
	0.63	1.70 ¹⁾	1.84 ¹⁾	1.84 ¹⁾	1.84 ¹⁾	1.84 ¹⁾	1.84 ¹⁾
	0.70	1.70 ¹⁾	1.93 ¹⁾	1.93 ¹⁾	1.93 ¹⁾	1.93 ¹⁾	1.93 ¹⁾
	≥ 0.75	1.70 ¹⁾	1.99 ¹⁾	1.99 ¹⁾	1.99 ¹⁾	1.99 ¹⁾	1.99 ¹⁾
$N_{R,k} [\text{kN}]$	0.40	1.53 ¹⁾					
	0.45	1.69	1.69 ¹⁾				
	0.50	1.82	1.84 ¹⁾				
	0.55	1.82	2.10 ¹⁾				
	0.60	1.82	2.37	2.37 ¹⁾			
	0.63	1.82	2.41	2.53 ¹⁾			
	0.70	1.82	2.41	2.90	2.90 ¹⁾		
	≥ 0.75	1.82	2.41	3.00	3.17 ¹⁾		
$N_{R,II,k} [\text{kN}]$		1.82	2.41	3.00	4.31	5.61	10.77
$u [\text{mm}]$	40	2.0					
	60	4.0					
	80	5.7					
$t_I [\text{mm}]$		≥ 100					
		7.1					

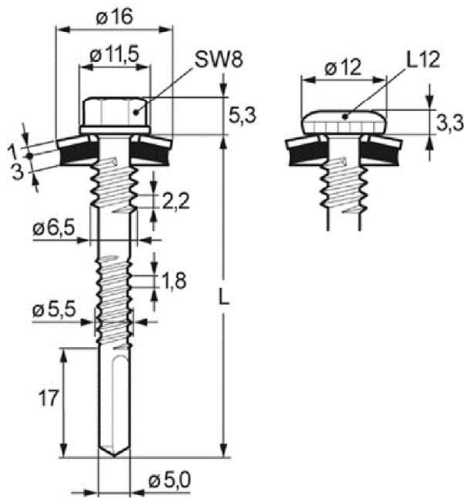
Additional definitions

Index ¹⁾: For component I made of S320GD to S450GD the resistance value may be increased by 8.3%.

Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm

SDT5-S19/S22/S29-5,5xL, SDT5-L12-S19/S22/S29-5,5xL,
SDT5-T19-5,5xL, SDT5-L12-T19-5,5xL

Annex 29



Materials:

Fastener:	Carbon steel with anticorrosion coating
Washer:	Stainless steel A2 or A4 - EN ISO 3506 or carbon steel with anticorrosion coating with EPDM-seal
Component I:	S280GD to S450GD - EN 10346
Component II:	S235 to S355 - EN 10025 S280GD to S450GD - EN 10346

Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 14.00 \text{ mm}$

		$t_{II} [\text{mm}]$					
		4.00	5.00	6.00	8.00	10.00	12.00
$V_{R,k} [\text{kN}]$	0.40	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾
	0.45	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾
	0.50	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾
	0.55	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾
	0.60	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾
	0.63	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾
	0.70	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾
	≥ 0.75	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾
$N_{R,k} [\text{kN}]$	0.40	1.16 ¹⁾					
	0.45	1.41 ¹⁾					
	0.50	1.65 ¹⁾					
	0.55	1.96 ¹⁾					
	0.60	2.25 ¹⁾					
	0.63	2.43 ¹⁾					
	0.70	2.89 ¹⁾					
	≥ 0.75	3.21 ¹⁾					
$N_{R,II,k} [\text{kN}]$		4.97	6.41	7.84	10.71	10.71	10.71
$u [\text{mm}]$	40	1.8					
	60	3.3					
	80	4.6					
$t_I [\text{mm}]$		≥ 100					
		5.7					

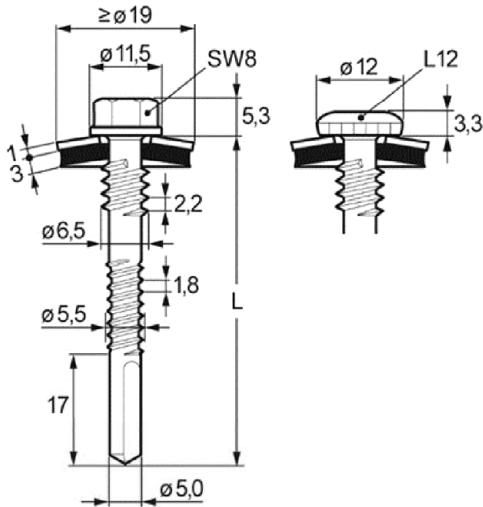
Additional definitions

Index ¹⁾: For component I made of S320GD to S450GD the resistance value may be increased by 8.3%.

Self-drilling screw with sealing washer Ø 16 mm

SDT14-S16-5,5xL, SDT14-L12-S16-5,5xL,
SDT14-T16-5,5xL, SDT14-L12-T16-5,5xL

Annex 30



Materials:

Fastener:	Carbon steel with anticorrosion coating
Washer:	Stainless steel A2 or A4 - EN ISO 3506 or carbon steel with anticorrosion coating with EPDM-seal
Component I:	S280GD to S450GD - EN 10346
Component II:	S235 to S355 - EN 10025 S280GD to S450GD - EN 10346

Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 14.00 \text{ mm}$

		$t_{II} [\text{mm}]$					
		4.00	5.00	6.00	8.00	10.00	12.00
$V_{R,k} [\text{kN}]$	0.40	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾	0.86 ¹⁾
	0.45	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾	1.02 ¹⁾
	0.50	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾	1.18 ¹⁾
	0.55	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾	1.32 ¹⁾
	0.60	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾	1.45 ¹⁾
	0.63	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾	1.52 ¹⁾
	0.70	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾	1.91 ¹⁾
	≥ 0.75	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾	2.18 ¹⁾
$N_{R,k} [\text{kN}]$	0.40	1.24 ¹⁾					
	0.45	1.64 ¹⁾					
	0.50	2.04 ¹⁾					
	0.55	2.34 ¹⁾					
	0.60	2.64 ¹⁾					
	0.63	2.82 ¹⁾					
	0.70	2.89 ¹⁾					
	≥ 0.75	3.52 ¹⁾					
$N_{R,II,k} [\text{kN}]$		4.97	6.41	7.84	10.71	10.71	10.71
$u [\text{mm}]$	40	1.8					
	60	3.3					
	80	4.6					
$t_I [\text{mm}]$		5.7					

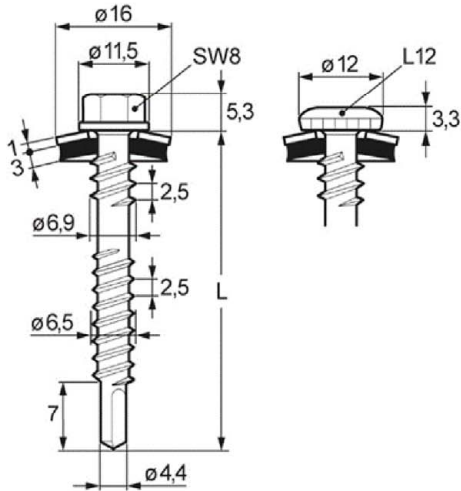
Additional definitions

Index ¹⁾: For component I made of S320GD to S450GD the resistance value may be increased by 8.3%.

Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm

SDT14-S19/S22/S29-5,5xL, SDT14-L12-S19/S22/S29-5,5xL,
SDT14-T19-5,5xL, SDT14-L12-T19-5,5xL

Annex 31



Materials:

Fastener:	Stainless steel A2 or A4 - EN ISO 3506
Washer:	Stainless steel A2 or A4 - EN ISO 3506 or carbon steel with anticorrosion coating with EPDM-seal
Component I:	S280GD to S450GD - EN 10346
Component II:	Coniferous timber $\geq$ C24 - EN 14081

Drilling-capacity: $\Sigma(t_{N1} + t_{N2}) \leq 2.00$ mm

Characteristics: $M_{y,Rk} = 15.4$ Nm
 $f_{ax,k} = 13.2$ N/mm² ($l_{ef} = 35$ mm, $\rho_a = 350$ kg/m³)

		l _{ef} [mm]					Failure of component I	
		35	45	55	65	75		
V _{R,k} [kN]	0.40	n/a	n/a	n/a	n/a	n/a	n/a	V _{R,I,k} [kN]
	0.45	n/a	n/a	n/a	n/a	n/a	n/a	
	0.50	1.00 ¹⁾	1.00 ¹⁾	1.00 ¹⁾	1.00 ¹⁾	1.00 ¹⁾	1.00 ¹⁾	
	0.55	1.20 ¹⁾	1.20 ¹⁾	1.20 ¹⁾	1.20 ¹⁾	1.20 ¹⁾	1.20 ¹⁾	
	0.60	1.39 ¹⁾	1.39 ¹⁾	1.39 ¹⁾	1.39 ¹⁾	1.39 ¹⁾	1.39 ¹⁾	
	0.63	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	
	0.70	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	
	≥ 0.75	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	
N _{R,k} [kN]	0.40	n/a					n/a	N _{R,I,k} [kN]
	0.45	n/a					n/a	
	0.50	1.33 ¹⁾					1.33 ¹⁾	
	0.55	1.67 ¹⁾					1.67 ¹⁾	
	0.60	1.72 ¹⁾					1.72 ¹⁾	
	0.63	1.75 ¹⁾					1.75 ¹⁾	
	0.70	1.75 ¹⁾					1.75 ¹⁾	
	≥ 0.75	1.75 ¹⁾					1.75 ¹⁾	
N _{R,II,k} [kN]		3.00	3.86	4.72	5.58	6.44		
u [mm]	40	2.8						
	60	4.3						
t _I [mm]	80	5.7						
	≥ 100	7.1						

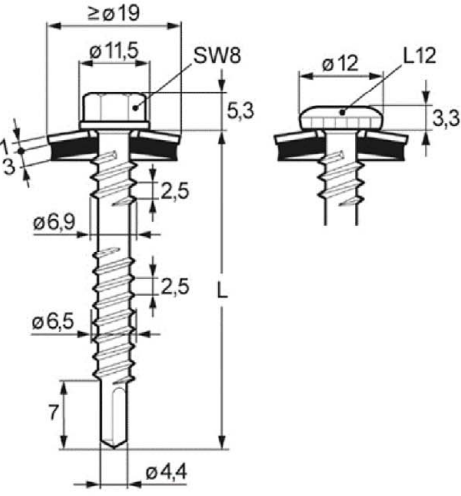
Additional definitions

Index ¹⁾: For component I made of S320GD to S450GD the resistance value may be increased by 8.3%.

Self-drilling screw with sealing washer Ø 16 mm

SDTW-S16-6,5xL, SDTW-L12-S16-6,5xL,
SDTW-T16-6,5xL, SDTW-L12-T16-6,5xL

Annex 32

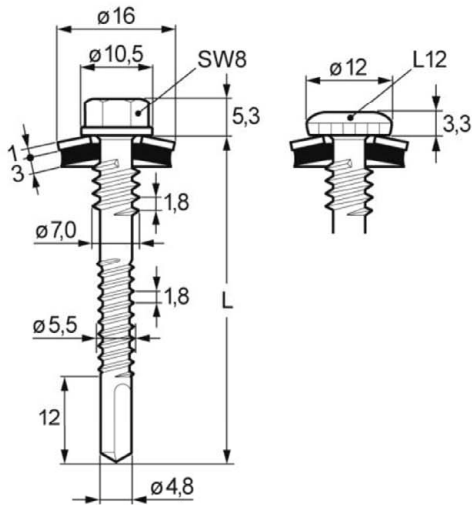
	Materials: Fastener: Stainless steel A2 or A4 - EN ISO 3506 Washer: Stainless steel A2 or A4 - EN ISO 3506 or carbon steel with anticorrosion coating with EPDM-seal Component I: S280GD to S450GD - EN 10346 Component II: Coniferous timber $\geq$ C24 - EN 14081 Drilling-capacity: $\Sigma(t_{N1} + t_{N2}) \leq 2.00$ mm Characteristics: $M_{y,Rk} = 15.4$ Nm $f_{ax,k} = 13.2$ N/mm² ($l_{ef} = 35$ mm, $\rho_a = 350$ kg/m³)
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		l _{ef} [mm]					Failure of component I	
		35	45	55	65	75		
V _{R,k} [kN] t _{N2} [mm]	0.40	n/a	n/a	n/a	n/a	n/a	n/a	V _{R,I,k} [kN]
	0.45	n/a	n/a	n/a	n/a	n/a	n/a	
	0.50	1.00 ¹⁾	1.00 ¹⁾	1.00 ¹⁾	1.00 ¹⁾	1.00 ¹⁾	1.00 ¹⁾	
	0.55	1.20 ¹⁾	1.20 ¹⁾	1.20 ¹⁾	1.20 ¹⁾	1.20 ¹⁾	1.20 ¹⁾	
	0.60	1.39 ¹⁾	1.39 ¹⁾	1.39 ¹⁾	1.39 ¹⁾	1.39 ¹⁾	1.39 ¹⁾	
	0.63	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	
	0.70	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	
	≥ 0.75	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	1.50 ¹⁾	
N _{R,k} [kN] t _{N1} [mm]	0.40	n/a					n/a	N _{R,I,k} [kN]
	0.45	n/a					n/a	
	0.50	1.60 ¹⁾					1.60 ¹⁾	
	0.55	2.00 ¹⁾					2.00 ¹⁾	
	0.60	2.06 ¹⁾					2.06 ¹⁾	
	0.63	2.10 ¹⁾					2.10 ¹⁾	
	0.70	2.10 ¹⁾					2.10 ¹⁾	
	≥ 0.75	2.10 ¹⁾					2.10 ¹⁾	
N _{R,II,k} [kN]		3.00	3.86	4.72	5.58	6.44		
u [mm]	40	2.8						
	60	4.3						
t _I [mm]	80	5.7						
	≥ 100	7.1						
							-	

Additional definitions

Index ¹⁾: For component I made of S320GD to S450GD the resistance value may be increased by 8.3%.

Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm	Annex 33
SDTW-S19/S22/S29-6,5xL, SDTW-L12-S19/S22/S29-6,5xL, SDTW-T19-6,5xL, SDTW-L12-T19-6,5xL	



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: S235 to S355 - EN 10025
S280GD to S450GD - EN 10346

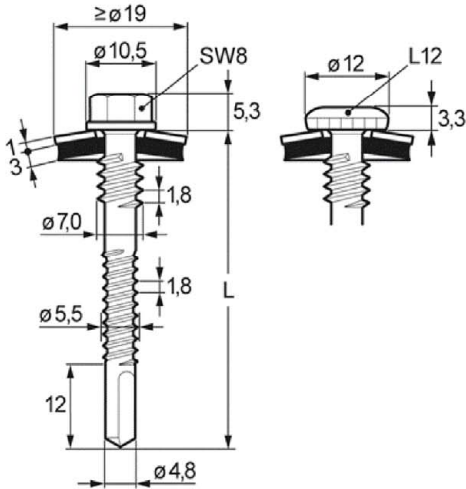
Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$

		$t_{II} [\text{mm}]$						
		1.25	1.50	1.75	2.00	2.50	3.00	4.00
$V_{R,k} [\text{kN}]$	0.40	0.96	0.96	0.96	0.96	0.96	0.96	0.96
	0.45	1.26	1.26	1.26	1.26	1.26	1.26	1.26
	0.50	1.56	1.56	1.56	1.56	1.56	1.56	1.56
	0.55	1.67	1.67	1.67	1.67	1.67	1.67	1.67
	0.60	1.78	1.78	1.78	1.78	1.78	1.78	1.78
	0.63	1.85	1.85	1.85	1.85	1.85	1.85	1.85
	0.70	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	≥ 0.75	2.11	2.11	2.11	2.11	2.11	2.11	2.11
$N_{R,k} [\text{kN}]$	0.40	1.26	1.27					
	0.45	1.26	1.42					
	0.50	1.26	1.56					
	0.55	1.26	1.82	1.86				
	0.60	1.26	1.82	2.16				
	0.63	1.26	1.82	2.34				
	0.70	1.26	1.82	2.41	2.76			
	≥ 0.75	1.26	1.82	2.41	3.00	3.06		
$N_{R,II,k} [\text{kN}]$		1.26	1.82	2.41	3.00	4.31	5.61	10.77
$u [\text{mm}]$	40	3.0						
	60	4.5						
	80	6.0						
	≥ 100	7.5						

Self-drilling screw with sealing washer Ø 16 mm

SXC5-S16-5,5xL, SXC5-L12-S16-5,5xL

Annex 34



Materials:

Fastener: Stainless steel A2 or A4 - EN ISO 3506

Washer: Stainless steel A2 or A4 - EN ISO 3506
with EPDM-seal

Component I: S280GD to S450GD - EN 10346

Component II: S235 to S355 - EN 10025
S280GD to S450GD - EN 10346

Drilling-capacity: $\Sigma(t_{N1} + t_{N2} + t_{II}) \leq 6.00 \text{ mm}$

		$t_{II} [\text{mm}]$						
		1.25	1.50	1.75	2.00	2.50	3.00	4.00
$V_{R,k} [\text{kN}]$	0.40	0.96	0.96	0.96	0.96	0.96	0.96	0.96
	0.45	1.26	1.26	1.26	1.26	1.26	1.26	1.26
	0.50	1.56	1.56	1.56	1.56	1.56	1.56	1.56
	0.55	1.67	1.67	1.67	1.67	1.67	1.67	1.67
	0.60	1.78	1.78	1.78	1.78	1.78	1.78	1.78
	0.63	1.85	1.85	1.85	1.85	1.85	1.85	1.85
	0.70	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	≥ 0.75	2.11	2.11	2.11	2.11	2.11	2.11	2.11
$N_{R,k} [\text{kN}]$	0.40	1.26	1.56					
	0.45	1.26	1.77					
	0.50	1.26	1.82	1.98				
	0.55	1.26	1.82	2.35				
	0.60	1.26	1.82	2.41	2.72			
	0.63	1.26	1.82	2.41	2.95			
	0.70	1.26	1.82	2.41	3.00	3.47		
	≥ 0.75	1.26	1.82	2.41	3.00	3.85		
$N_{R,II,k} [\text{kN}]$		1.26	1.82	2.41	3.00	4.31	5.61	10.77
$u [\text{mm}]$	40	3.0						
	60	4.5						
	80	6.0						
$t_I [\text{mm}]$		≥ 100						
		7.5						

Self-drilling screw with sealing washer Ø 19 / 22 / 29 mm

SXC5-S19/S22/S29-5,5xL, SXC5-L12-S19/S22/S29-5,5xL

Annex 35