

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

**ETA-10/0182
of 2 May 2019**

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

Hilti S-MD; Hilti S-MS

Product family
to which the construction product belongs

Fastening screws for metal members and sheeting

Manufacturer

Hilti AG
Feldkircherstraße 100
9494 Schaan
FÜRSTENTUM LIECHTENSTEIN

Manufacturing plant

Hilti AG, Plant 2855
Hilti AG, Plant 6522

This European Technical Assessment
contains

35 pages including 29 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

This version replaces

ETA-10/0182 issued on 6 April 2018

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Specific part

1 Technical description of the product

The fastening screws are self-drilling or self-piercing screws made of 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	Product	Component I	Component II	Description
4	Hilti S-MS 01 Z 4,8 x L Hilti S-MS 01 C 4,8 x L	Steel S280GD to S350GD	Steel S280GD to S350GD	Self-piercing screw, Carbon steel, with hexagon head
5	Hilti S-MS 41 Z 4,8 x L Hilti S-MS 41 C 4,8 x L Hilti S-MS 51 Z 4,8 x L Hilti S-MS 51 C 4,8 x L	Steel S280GD to S350GD	Steel S280GD to S350GD	Self-piercing screw, Carbon steel, with hexagon head and sealing washer Ø14 mm and Ø16 mm
6	Hilti S-MS 41 Z 4,8 x L Hilti S-MS 41 C 4,8 x L Hilti S-MS 51 Z 4,8 x L Hilti S-MS 51 C 4,8 x L	Aluminium alloy $R_m \geq 215 \text{ N/mm}^2$	Aluminium alloy $R_m \geq 215 \text{ N/mm}^2$	Self-piercing screw, Carbon steel, with hexagon head and sealing washer Ø14 mm and Ø16 mm
7	Hilti S-MS 41 Z 4,8 x L Hilti S-MS 41 C 4,8 x L Hilti S-MS 51 Z 4,8 x L Hilti S-MS 51 C 4,8 x L	Aluminium alloy $R_m \geq 165 \text{ N/mm}^2$	Aluminium alloy $R_m \geq 165 \text{ N/mm}^2$	Self-piercing screw, Carbon steel, with hexagon head and sealing washer Ø14 mm and Ø16 mm
8	Hilti S-MS 41 Z 4,8 x L Hilti S-MS 41 C 4,8 x L Hilti S-MS 51 Z 4,8 x L Hilti S-MS 51 C 4,8 x L	Aluminium alloy $R_m \geq 215 \text{ N/mm}^2$	Steel S280GD to S350GD	Self-piercing screw, Carbon steel, with hexagon head and sealing washer Ø14 mm and Ø16 mm
9	Hilti S-MS 41 Z 4,8 x L Hilti S-MS 41 C 4,8 x L Hilti S-MS 51 Z 4,8 x L Hilti S-MS 51 C 4,8 x L	Aluminium alloy $R_m \geq 165 \text{ N/mm}^2$	Steel S280GD to S350GD	Self-piercing screw, Carbon steel, with hexagon head and sealing washer Ø14 mm and Ø16 mm
10	Hilti S-MD 01 Z 4,2 x L Hilti S-MD 01 C 4,2 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head
11	Hilti S-MD 51 Z 4,2 x L Hilti S-MD 51 C 4,2 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head and sealing washer Ø16 mm
12	Hilti S-MD 01 Z 4,8 x L Hilti S-MD 01 C 4,8 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head

Table 1 – continued

Annex	Product	Component I	Component II	Description
13	Hilti S-MD 51 Z 4,8 x L Hilti S-MD 51 C 4,8 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head and sealing washer Ø16 mm
14	Hilti S-MD 01 Z 5,5 x L Hilti S-MD 01 C 5,5 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head
15	Hilti S-MD 51 Z 5,5 x L Hilti S-MD 51 C 5,5 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head and sealing washer Ø16 mm
16	Hilti S-MD 01 Z 6,3 x L Hilti S-MD 01 C 6,3 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head
17	Hilti S-MD 51 Z 6,3 x L Hilti S-MD 51 C 6,3 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head and sealing washer Ø16 mm
18	Hilti S-MD 01 LZ 4,8 x L Hilti S-MD 01 LC 4,8 x L	Steel S280GD to S390GD	Steel S280GD to S390GD S235 to S355	Self-drilling screw, Carbon steel, with hexagon head
19	Hilti S-MD 03 Z 4,8 x L Hilti S-MD 03 C 4,8 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head
20	Hilti S-MD 53 Z 4,8 x L Hilti S-MD 53 C 4,8 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head and sealing washer Ø16 mm
21	Hilti S-MD 03 Z 5,5 x L Hilti S-MD 03 C 5,5 x L	Steel S280GD to S390GD	Steel S280GD to S390GD S235 to S355	Self-drilling screw, Carbon steel, with hexagon head
22	Hilti S-MD 23 Z 5,5 x L Hilti S-MD 23 C 5,5 x L	Steel S280GD to S390GD	Steel S280GD to S390GD S235 to S355	Self-drilling screw, Carbon steel, with hexagon head with collar
23	Hilti S-MD 53 Z 5,5 x L Hilti S-MD 53 C 5,5 x L	Steel S280GD to S390GD	Steel S280GD to S390GD S235 to S355	Self-drilling screw, Carbon steel, with hexagon head and sealing washer Ø16 mm
24	Hilti S-MD 03 Z 6,3 x L Hilti S-MD 03 C 6,3 x L	Steel S280GD to S390GD	Steel S280GD to S390GD S235 to S355	Self-drilling screw, Carbon steel, with hexagon head
25	Hilti S-MD 23 Z 6,3 x L Hilti S-MD 23 C 6,3 x L	Steel S280GD to S390GD	Steel S280GD to S390GD S235 to S355	Self-drilling screw, Carbon steel, with hexagon head with collar

Table 1 – continued

Annex	Product	Component I	Component II	Description
26	Hilti S-MD 53 Z 6,3 x L Hilti S-MD 53 C 6,3 x L	Steel S280GD to S390GD	Steel S280GD to S390GD S235 to S355	Self-drilling screw, Carbon steel, with hexagon head and sealing washer Ø16 mm
27	Hilti S-MD 05 GZ 5,5 x L Hilti S-MD 05 GC 5,5 x L Hilti S-MD 05 Z 5,5 x L Hilti S-MD 05 C 5,5 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head
28	Hilti S-MD 25 Z 5,5 x L Hilti S-MD 25 C 5,5 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head with collar
29	Hilti S-MD 55 GZ 5,5 x L Hilti S-MD 55 GC 5,5 x L Hilti S-MD 55 Z 5,5 x L Hilti S-MD 55 C 5,5 x L	Steel S280GD to S320GD	Steel S280GD to S320GD S235	Self-drilling screw, Carbon steel, with hexagon head and sealing washer Ø16 mm

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 $\geq C2$ 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 (1-29).

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

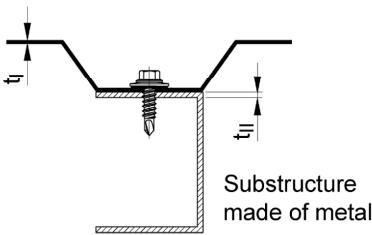
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 2 May 2019 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Hahn

Examples of execution of a connection



Materials and dimensions

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

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

- t_I Thickness of component I
- t_{II} Thickness of component II made of metal

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

Performance characteristics

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

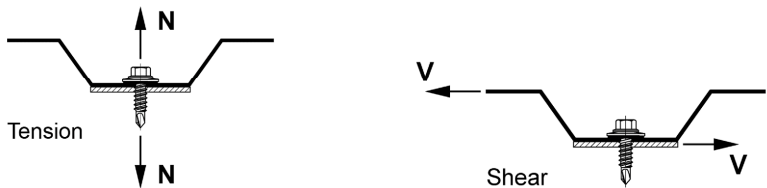
- $N_{R,k}$ Characteristic value of tension resistance
- $V_{R,k}$ Characteristic value of shear resistance

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

- $N_{R,I,k}$ Characteristic value of pull-through resistance for component I
- $N_{R,II,k}$ Characteristic value of pull-out resistance for component II
- $V_{R,I,k}$ Characteristic value of hole bearing resistance for component I
- $V_{R,II,k}$ Characteristic value of hole bearing resistance for component II

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

Occurred loadings of a connection



Design values

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

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

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

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

The recommended partial safety factor γ_M is 1,33, provided no partial safety factor is given in national regulations or national Annexes to Eurocode 3.

Special conditions

If the component thickness t_1 or t_{II} lies in between two indicated component thicknesses, the characteristic value may be calculated by linear interpolation.

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

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

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

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

Types of connection

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



Design	
Fastening screws for metal members and sheeting	Annex 2

Installation conditions

The installation is carried out according to manufacturer’s instruction.
The load bearing screw-in length of the fastening screw specified by the manufacturer has to be taken into account.
The fastening screws have to be processed with suitable drill driver (e.g. cordless drill driver with depth stop). The use of impact wrench is not allowed.
The fastening screws have to be fixed rectangular to the surface of the component.
Component I and component II have to be in direct contact to each other. The use of compression resistant thermal insulation strips up to a thickness of 3 mm is allowed.

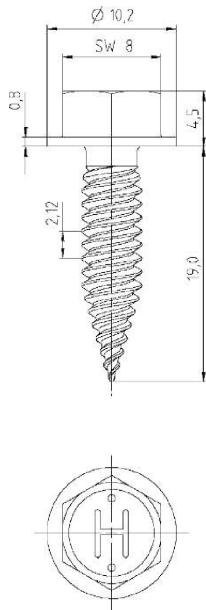
Component I made of aluminium alloy

The characteristic value of tension resistance is given in the Annex of the fastening screw.
If not, the characteristic value of tension resistance can be determined as follows:

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

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

Installation and additional provisions	Annex 3
Fastening screws for metal members and sheeting	



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

Washer: none

Component I: S280GD, S320GD, S350GD - EN 10346

Component II: S280GD, S320GD, S350GD - EN 10346

Drilling capacity: $\Sigma t_i \leq 2,50 \text{ mm}$

Timber substructures:

no performance determined

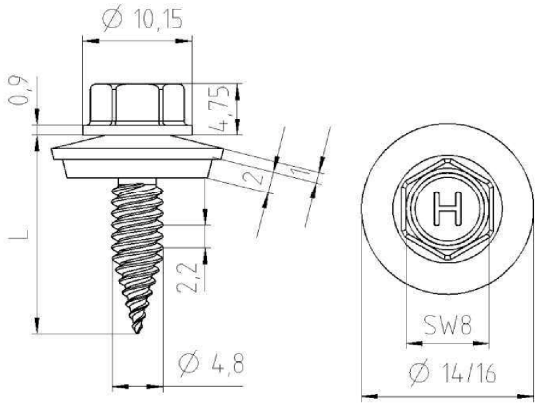
t_i [mm]	t_{II} [mm]							
	0,50	0,55	0,63	0,75	0,88	1,00	1,13	1,25
$V_{R,k}$ [kN]	0,50	1,29	1,37	1,51	1,71	1,71	1,71	1,71
	0,55	1,29	1,54	1,65	1,82	1,82	1,82	2,05
	0,63	1,29	1,54	1,80	2,00	2,00	2,00	2,59
	0,75	1,29	1,54	1,80	2,27	2,27	2,27	3,40
	0,88	1,29	1,54	1,80	2,27	2,96	2,96	3,40
	1,00	1,29	1,54	1,80	2,27	2,96	3,64	3,64
	1,13	1,29	1,54	1,80	2,27	2,96	3,64	3,87
	1,25	1,29	1,54	1,80	2,27	2,96	3,64	4,10
	1,50	1,29	1,54	1,80	2,27	2,96	3,64	—
	1,75	1,29	1,54	1,80	2,27	—	—	—
	2,00	1,29	—	—	—	—	—	—
$N_{R,k}$ [kN]	0,50	0,76	0,87	1,04	1,29	1,56	1,82	1,93
	0,55	0,76	0,87	1,04	1,29	1,56	1,82	2,25
	0,63	0,76	0,87	1,04	1,29	1,56	1,82	2,34
	0,75	0,76	0,87	1,04	1,29	1,56	1,82	2,34
	0,88	0,76	0,87	1,04	1,29	1,56	1,82	2,34
	1,00	0,76	0,87	1,04	1,29	1,56	1,82	2,34
	1,13	0,76	0,87	1,04	1,29	1,56	1,82	2,34
	1,25	0,76	0,87	1,04	1,29	1,56	1,82	2,34
	1,50	0,76	0,87	1,04	1,29	1,56	1,82	—
	1,75	0,76	0,87	1,04	1,29	—	—	—
	2,00	0,76	—	—	—	—	—	—
$M_{t,nom}$ [Nm]								

No additional regulations.

Self piercing screw

Hilti S-MS 01 Z 4,8 x L
Hilti S-MS 01 C 4,8 x L
with hexagon head

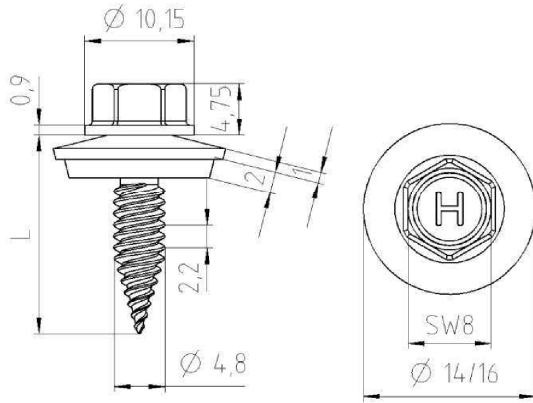
Annex 4

	<u>Material:</u> Fastener: carbon steel, case hardened and galvanized or coated Washer: carbon steel, galvanized or coated stainless Steel (1.4301) - EN 10088 Component I: S280GD, S320GD, S350GD - EN 10346 Component II: S280GD, S320GD, S350GD - EN 10346 <u>Drilling capacity:</u> $\Sigma t_i \leq 2,50 \text{ mm}$ <u>Timber substructures:</u> no performance determined
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t_i [mm]	0,40	0,50	0,55	0,63	0,75	0,88	1,00	1,25
$V_{R,k}$ [kN]	0,40	0,81 —	0,87 —	0,90 —	0,95 —	1,03 ac	1,03 ac	1,03 ac
	0,50	0,81 —	1,01 —	1,01 —	1,02 —	1,03 ac	1,03 ac	1,03 ac
	0,55	0,81 —	1,01 —	1,26 —	1,26 —	1,26 —	1,26 —	1,26 —
	0,63	0,81 —	1,01 —	1,26 —	1,66 —	1,66 —	1,66 —	1,66 —
	0,75	0,81 —	1,01 —	1,26 —	1,66 —	2,26 —	2,26 —	2,26 —
	0,88	0,81 —	1,01 —	1,26 —	1,66 —	2,26 —	2,77 —	2,77 —
	1,00	0,81 —	1,01 —	1,26 —	1,66 —	2,26 —	2,77 —	3,24 —
	1,25	0,81 —	1,01 —	1,26 —	1,66 —	2,26 —	2,77 —	3,24 —
$N_{R,k}$ [kN]	0,40	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,43 —	1,43 —
	0,50	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,80 —
	0,55	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —
	0,63	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —
	0,75	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —
	0,88	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —
	1,00	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —
	1,25	0,46 —	0,76 —	0,86 —	1,03 —	1,27 —	1,60 —	1,90 —
$M_{t,nom}$ [Nm]								

If both components I and II are made of S320GD or S350GD the grey highlighted values may be increased by 8,0%.

Self piercing screw		Annex 5
Hilti S-MS 41 Z 4,8 x L Hilti S-MS 41 C 4,8 x L Hilti S-MS 51 Z 4,8 x L Hilti S-MS 51 C 4,8 x L with hexagon head and sealing washer ≥ Ø14 mm		



Material:

Fastener: carbon steel, case hardened and galvanized or coated

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

Component I: aluminium alloy with $R_{m,min} = 215 \text{ N/mm}^2$ - EN 573

Component II: aluminium alloy with $R_{m,min} = 215 \text{ N/mm}^2$ - EN 573

Drilling capacity: $\Sigma t_i \leq 2,50 \text{ mm}$

Timber substructures:

no performance determined

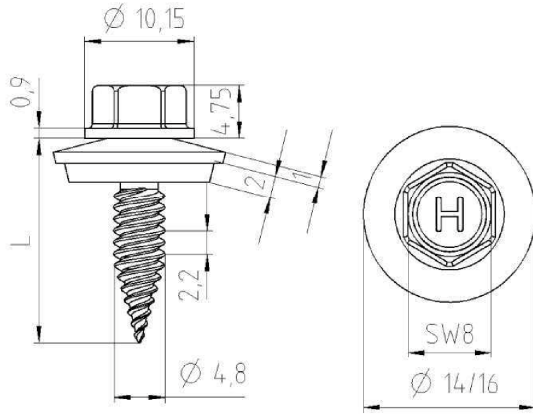
t_i [mm]	0,50	0,60	0,70	0,80	1,00	1,20
$V_{R,k}$ [kN]	0,50	0,71 —	0,71 —	0,71 —	0,71 —	0,71 —
	0,60	0,71 —	0,92 —	0,92 —	0,92 —	0,92 —
	0,70	0,71 —	0,92 —	1,14 —	1,14 —	1,14 —
	0,80	0,71 —	0,92 —	1,14 —	1,35 —	1,35 —
	1,00	0,71 —	0,92 —	1,14 —	1,35 —	1,88 —
	1,20	0,71 —	0,92 —	1,14 —	1,35 —	1,88 —
$N_{R,k}$ [kN]	0,50	0,35 —	0,49 —	0,52 —	0,52 —	0,52 —
	0,60	0,35 —	0,49 —	0,63 —	0,63 —	0,63 —
	0,70	0,35 —	0,49 —	0,63 —	0,73 —	0,73 —
	0,80	0,35 —	0,49 —	0,63 —	0,77 —	0,84 —
	1,00	0,35 —	0,49 —	0,63 —	0,77 —	1,00 —
	1,20	0,35 —	0,49 —	0,63 —	0,77 —	1,00 —
$N_{R,II,k}$ [kN]		0,35	0,49	0,63	0,77	1,00
$M_{t,nom}$ [Nm]						

The pull-through-capacities of the grey highlighted values $N_{R,k}$ have been determined according to EN 1999-1-4:2007 section 8.3.3.1 by calculation. This values $N_{R,k}$ may be increased by 6,9% when using the type „S-MS 5x“.

Self piercing screw

Hilti S-MS 41 Z 4,8 x L
Hilti S-MS 41 C 4,8 x L
Hilti S-MS 51 Z 4,8 x L
Hilti S-MS 51 C 4,8 x L
with hexagon head and sealing washer $\geq \varnothing 14 \text{ mm}$

Annex 6



Material:

Fastener: carbon steel, case hardened and galvanized or coated

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

Component I: aluminium alloy with $R_{m,min} = 165 \text{ N/mm}^2$ - EN 573

Component II: aluminium alloy with $R_{m,min} = 165 \text{ N/mm}^2$ - EN 573

Drilling capacity: $\Sigma t_i \leq 2,50 \text{ mm}$

Timber substructures:

no performance determined

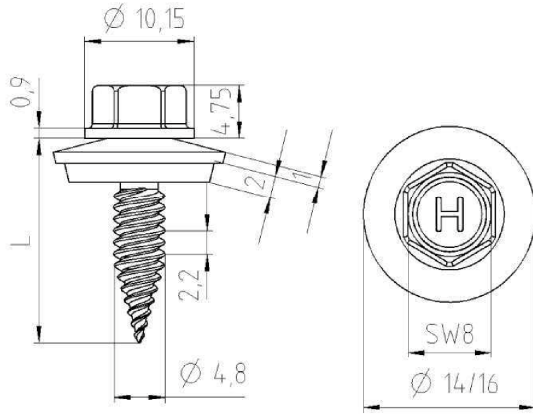
t_i [mm]	0,50	0,60	0,70	0,80	1,00	1,20
$V_{R,k}$ [kN]	0,50	0,55 —	0,55 —	0,55 —	0,55 —	0,55 —
	0,60	0,55 —	0,71 —	0,71 —	0,71 —	0,71 —
	0,70	0,55 —	0,71 —	0,88 —	0,88 —	0,88 —
	0,80	0,55 —	0,71 —	0,88 —	1,04 —	1,04 —
	1,00	0,55 —	0,71 —	0,88 —	1,04 —	1,44 —
	1,20	0,55 —	0,71 —	0,88 —	1,04 —	1,44 —
$N_{R,k}$ [kN]	0,50	0,27 —	0,38 —	0,40 —	0,40 —	0,40 —
	0,60	0,27 —	0,38 —	0,48 —	0,48 —	0,48 —
	0,70	0,27 —	0,38 —	0,48 —	0,56 —	0,56 —
	0,80	0,27 —	0,38 —	0,48 —	0,59 —	0,64 —
	1,00	0,27 —	0,38 —	0,48 —	0,59 —	0,76 —
	1,20	0,27 —	0,38 —	0,48 —	0,59 —	0,76 —
$N_{R,II,k}$ [kN]		0,27	0,38	0,48	0,59	0,76
$M_{t,nom}$ [Nm]						1,03

The pull-through-capacities of the grey highlighted values $N_{R,k}$ have been determined according to EN 1999-1-4:2007 section 8.3.3.1 by calculation. This values $N_{R,k}$ may be increased by 6,9% when using the type „S-MS 5x“.

Self piercing screw

Hilti S-MS 41 Z 4,8 x L
Hilti S-MS 41 C 4,8 x L
Hilti S-MS 51 Z 4,8 x L
Hilti S-MS 51 C 4,8 x L
with hexagon head and sealing washer $\geq \varnothing 14 \text{ mm}$

Annex 7



Material:

Fastener: carbon steel, case hardened and galvanized or coated

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

Component I: aluminium alloy with $R_{m,min} = 215 \text{ N/mm}^2$ - EN 573

Component II: S280GD, S320GD, S350GD - EN 10346

Drilling capacity: $\Sigma t_i \leq 2,50 \text{ mm}$

Timber substructures:

no performance determined

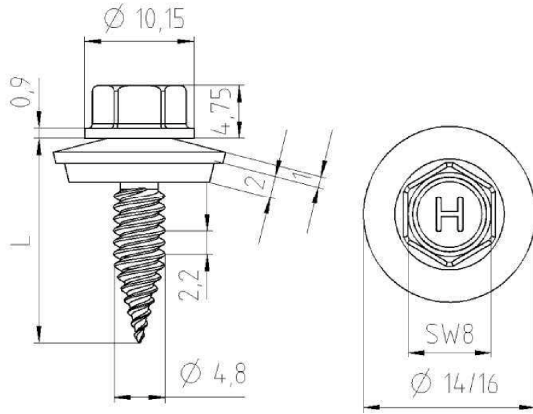
t_i [mm]	0,50	0,55	0,63	t_{II} [mm]	0,75	0,88	1,00	1,25
$V_{R,k}$ [kN]	0,50	0,71 —	0,71 —	0,71 —	0,71 —	0,71 —	0,71 —	0,71 —
	0,60	0,71 —	0,71 —	0,92 —	0,92 —	0,92 —	0,92 —	0,92 —
	0,70	0,71 —	0,71 —	0,92 —	1,14 —	1,14 —	1,14 —	1,14 —
	0,80	0,71 —	0,71 —	0,92 —	1,14 —	1,35 —	1,35 —	1,35 —
	1,00	0,71 —	0,71 —	0,92 —	1,14 —	1,35 —	1,88 —	1,88 —
	1,20	0,71 —	0,71 —	0,92 —	1,14 —	1,35 —	1,88 —	2,28 —
$N_{R,k}$ [kN]	0,50	0,52 —	0,52 —	0,52 —	0,52 —	0,52 —	0,52 —	0,52 —
	0,60	0,63 —	0,63 —	0,63 —	0,63 —	0,63 —	0,63 —	0,63 —
	0,70	0,73 —	0,73 —	0,73 —	0,73 —	0,73 —	0,73 —	0,73 —
	0,80	0,76 —	0,84 —	0,84 —	0,84 —	0,84 —	0,84 —	0,84 —
	1,00	0,76 —	0,87 —	1,04 —	1,05 —	1,05 —	1,05 —	1,05 —
	1,20	0,76 —	0,87 —	1,04 —	1,26 —	1,26 —	1,26 —	1,26 —
$N_{R,II,k}$ [kN]		0,76	0,87	1,04	1,28	1,58	1,86	2,42
$M_{t,nom}$ [Nm]								

The pull-through-capacities of the grey highlighted values $N_{R,k}$ have been determined according to EN 1999-1-4:2007 section 8.3.3.1 by calculation. This values $N_{R,k}$ may be increased by 6,9% when using the type „S-MS 5x“.

Self piercing screw

Hilti S-MS 41 Z 4,8 x L
Hilti S-MS 41 C 4,8 x L
Hilti S-MS 51 Z 4,8 x L
Hilti S-MS 51 C 4,8 x L
with hexagon head and sealing washer $\geq \varnothing 14 \text{ mm}$

Annex 8



Material:

Fastener: carbon steel, case hardened and galvanized or coated

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

Component I: aluminium alloy with $R_{m,min} = 165 \text{ N/mm}^2$ - EN 573

Component II: S280GD, S320GD, S350GD - EN 10346

Drilling capacity: $\Sigma t_i \leq 2,50 \text{ mm}$

Timber substructures:

no performance determined

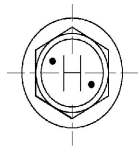
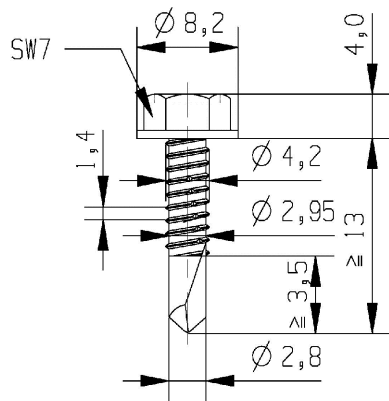
t_i [mm]	0,50	0,55	0,63	t_{II} [mm]	0,75	0,88	1,00	1,25
$V_{R,k}$ [kN]	0,50	0,55	0,55	0,55	0,55	0,55	0,55	0,55
	0,60	0,55	0,55	0,71	0,71	0,71	0,71	0,71
	0,70	0,55	0,55	0,71	0,88	0,88	0,88	0,88
	0,80	0,55	0,55	0,71	0,88	1,04	1,04	1,04
	1,00	0,55	0,55	0,71	0,88	1,04	1,44	1,44
	1,20	0,55	0,55	0,71	0,88	1,04	1,44	1,83
$N_{R,k}$ [kN]	0,50	0,40	0,40	0,40	0,40	0,40	0,40	0,40
	0,60	0,48	0,48	0,48	0,48	0,48	0,48	0,48
	0,70	0,56	0,56	0,56	0,56	0,56	0,56	0,56
	0,80	0,64	0,64	0,64	0,64	0,64	0,64	0,64
	1,00	0,76	0,80	0,80	0,80	0,80	0,80	0,80
	1,20	0,76	0,87	0,96	0,96	0,96	0,96	0,96
$N_{R,II,k}$ [kN]	0,76	0,87	1,04	1,28	1,58	1,86	2,42	
$M_{t,nom}$ [Nm]								

The pull-through-capacities of the grey highlighted values $N_{R,k}$ have been determined according to EN 1999-1-4:2007 section 8.3.3.1 by calculation. This values $N_{R,k}$ may be increased by 6,9% when using the type „S-MS 5x“.

Self piercing screw

Hilti S-MS 41 Z 4,8 x L
Hilti S-MS 41 C 4,8 x L
Hilti S-MS 51 Z 4,8 x L
Hilti S-MS 51 C 4,8 x L
with hexagon head and sealing washer $\geq \varnothing 14 \text{ mm}$

Annex 9



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

Washer: none

Component I: S280GD, S320GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 2,50 \text{ mm}$

Timber substructures:

no performance determined

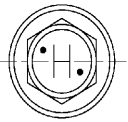
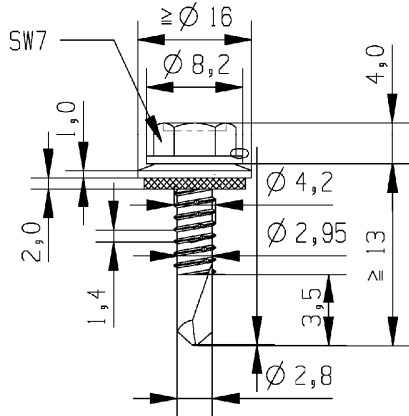
t_i [mm]	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_{R,k}$ [kN]								
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	1,50	2,00	2,50	2,60	2,60 ac	2,60 ac	2,60 a	—
0,75	1,70	2,10	2,60	3,00	3,60	4,00	4,00	—
0,88	1,80	2,20	2,80	3,30	4,00	4,50	4,50	—
1,00	1,90	2,40	3,00	3,60	4,30	5,00	5,00	—
1,13	1,90	2,40	3,00	3,60	4,30	5,00	—	—
1,25	1,90	2,40	3,00	3,60	4,30	5,00	—	—
1,50	1,90	2,40	3,00	3,60	—	—	—	—
1,75	1,90	2,40	—	—	—	—	—	—
2,00	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]								
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	0,90	1,20	1,40	1,40	1,40 ac	1,40 ac	1,40 a	—
0,75	0,90	1,20	1,40	1,70	1,90	2,00	2,00	—
0,88	0,90	1,20	1,40	1,70	1,90	2,20	2,70	—
1,00	0,90	1,20	1,40	1,70	1,90	2,20	2,80	—
1,13	0,90	1,20	1,40	1,70	1,90	2,20	—	—
1,25	0,90	1,20	1,40	1,70	1,90	2,20	—	—
1,50	0,90	1,20	1,40	1,70	—	—	—	—
1,75	0,90	1,20	—	—	—	—	—	—
2,00	—	—	—	—	—	—	—	—
$M_{t, \text{nom}}$ [Nm]	$\Sigma t \leq 1,25 \text{ mm} : 2 \text{ Nm}$				$\Sigma t > 1,25 \text{ mm} : 4 \text{ Nm}$			

No additional regulations.

Self drilling screw

Hilti S-MD 01 Z 4,2 x L
Hilti S-MD 01 C 4,2 x L
with hexagon head

Annex 10



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

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

Component I: S280GD, S320GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 2,50 \text{ mm}$

Timber substructures:

no performance determined

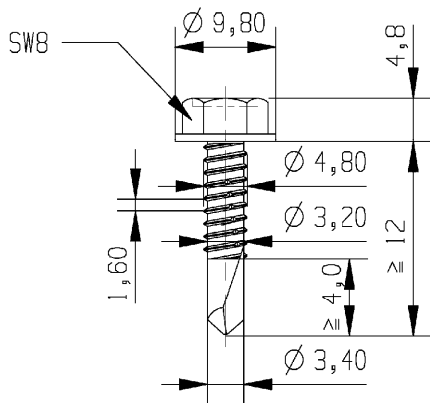
t_i [mm]	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_{R,k}$ [kN]	—	—	—	—	—	—	—	—
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	1,40	1,80	2,40	3,00	3,10 ac	3,10 ac	3,10 a	—
0,75	1,40	1,80	2,40	3,00	3,60	3,60 a	3,60 a	—
0,88	1,40	1,80	2,40	3,00	3,70	4,00	4,00	—
1,00	1,40	1,80	2,40	3,00	3,70	4,40	4,40	—
1,13	1,40	1,80	2,40	3,00	3,70	4,40	—	—
1,25	1,40	1,80	2,40	3,00	3,70	4,40	—	—
1,50	1,40	1,80	2,40	3,00	—	—	—	—
1,75	1,40	1,80	—	—	—	—	—	—
2,00	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	0,49	0,65	0,76	0,92	1,03 ac	1,19 ac	1,40 a	—
0,50	0,61	0,82	0,95	1,16	1,30 ac	1,50 ac	1,77 a	—
0,55	0,90	1,20	1,40	1,70	1,90 ac	2,20 ac	2,60 a	—
0,63	0,90	1,20	1,40	1,70	1,90	2,20 a	2,80 a	—
0,75	0,90	1,20	1,40	1,70	1,90	2,20	2,80	—
0,88	0,90	1,20	1,40	1,70	1,90	2,20	2,80	—
1,00	0,90	1,20	1,40	1,70	1,90	2,20	2,80	—
1,13	0,90	1,20	1,40	1,70	1,90	2,20	—	—
1,25	0,90	1,20	1,40	1,70	1,90	2,20	—	—
1,50	0,90	1,20	1,40	1,70	—	—	—	—
1,75	0,90	1,20	—	—	—	—	—	—
2,00	—	—	—	—	—	—	—	—
$M_{t, \text{nom}}$ [Nm]	$\Sigma t \leq 1,25 \text{ mm} : 2 \text{ Nm}$				$\Sigma t > 1,25 \text{ mm} : 4 \text{ Nm}$			

No additional regulations.

Self drilling screw

Hilti S-MD 51 Z 4,2 x L
Hilti S-MD 51 C 4,2 x L
with hexagon head and sealing washer $\geq \varnothing 16 \text{ mm}$

Annex 11



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

Washer: none

Component I: S280GD, S320GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 2,75 \text{ mm}$

Timber substructures:

no performance determined

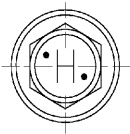
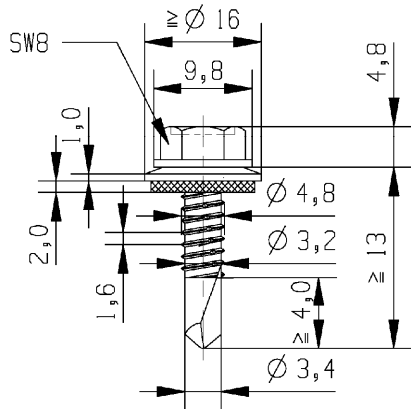
t_i [mm]	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
t_{II} [mm]	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	1,40	—	1,80	—	2,10	—	2,40
	0,75	1,40	—	1,90	—	2,30	—	2,70
	0,88	1,40	—	1,90	—	2,40	—	2,90
	1,00	1,40	—	1,90	—	2,40	—	3,00
	1,13	1,40	—	1,90	—	2,40	—	3,00
	1,25	1,40	—	1,90	—	2,40	—	3,00
	1,50	1,40	—	2,00	—	2,70	—	3,50
	1,75	1,40	—	2,00	—	2,70	—	3,50
	2,00	1,40	—	2,00	—	—	—	—
$N_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	0,80	—	1,00	—	1,30	—	1,40
	0,75	0,80	—	1,00	—	1,30	—	1,50
	0,88	0,80	—	1,00	—	1,30	—	1,50
	1,00	0,80	—	1,00	—	1,30	—	1,50
	1,13	0,80	—	1,00	—	1,30	—	1,50
	1,25	0,80	—	1,00	—	1,30	—	1,50
	1,50	0,80	—	1,00	—	1,30	—	1,50
	1,75	0,80	—	1,00	—	1,30	—	1,50
	2,00	0,80	—	1,00	—	—	—	—
$M_{t, \text{nom}}$ [Nm]	$\Sigma t \leq 1,25 \text{ mm} : 2 \text{ Nm}$				$\Sigma t > 1,25 \text{ mm} : 5 \text{ Nm}$			

No additional regulations.

Self drilling screw

Hilti S-MD 01 Z 4,8 x L
Hilti S-MD 01 C 4,8 x L
with hexagon head

Annex 12



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

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

Component I: S280GD, S320GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 2,75 \text{ mm}$

Timber substructures:

no performance determined

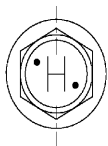
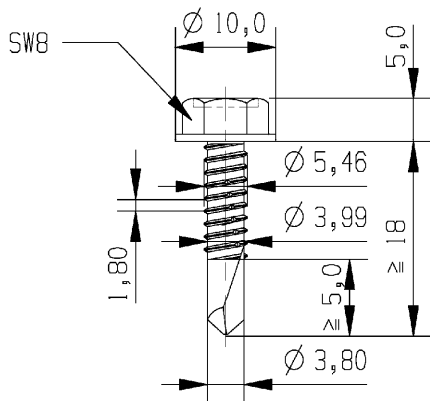
t_i [mm]	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
t_{II} [mm]								
$V_{R,k}$ [kN]								
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	1,30	1,80	2,30	2,90	2,90 ac	2,90 ac	2,90 ac	2,90 ac
0,75	1,30	1,80	2,30	2,90	3,51	3,70 ac	3,70 ac	3,70 a
0,88	1,30	1,80	2,30	2,90	3,51	4,10	4,80 a	—
1,00	1,30	1,80	2,30	2,90	3,51	4,10	5,60	—
1,13	1,30	1,80	2,30	2,90	3,51	4,10	5,60	—
1,25	1,30	1,80	2,30	2,90	3,51	4,10	5,60	—
1,50	1,30	1,90	2,70	3,60	4,70	5,90	—	—
1,75	1,30	1,90	2,70	3,60	—	—	—	—
2,00	1,30	1,90	—	—	—	—	—	—
$N_{R,k}$ [kN]								
0,50	0,43	0,54	0,70	0,81	0,97 ac	1,13 ac	1,40 ac	1,40 ac
0,55	0,55	0,68	0,89	1,02	1,23 ac	1,43 ac	1,77 ac	1,77 ac
0,63	0,80	1,00	1,30	1,50	1,80 ac	2,10 ac	2,60 ac	2,60 ac
0,75	0,80	1,00	1,30	1,50	1,80	2,10 ac	2,70 ac	2,70 a
0,88	0,80	1,00	1,30	1,50	1,80	2,10	2,70 a	—
1,00	0,80	1,00	1,30	1,50	1,80	2,10	2,70	—
1,13	0,80	1,00	1,30	1,50	1,80	2,10	2,70	—
1,25	0,80	1,00	1,30	1,50	1,80	2,10	2,70	—
1,50	0,80	1,00	1,30	1,50	1,80	2,10	—	—
1,75	0,80	1,00	1,30	1,50	—	—	—	—
2,00	0,80	1,00	—	—	—	—	—	—
$M_{t, \text{nom}}$ [Nm]	$\Sigma t_i \leq 1,25 \text{ mm} : 2 \text{ Nm}$				$\Sigma t_i > 1,25 \text{ mm} : 5 \text{ Nm}$			

No additional regulations.

Self drilling screw

Hilti S-MD 51 Z 4,8 x L
Hilti S-MD 51 C 4,8 x L
with hexagon head and sealing washer $\geq \varnothing 16 \text{ mm}$

Annex 13



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

Washer: none

Component I: S280GD, S320GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3,00 \text{ mm}$

Timber substructures:

no performance determined

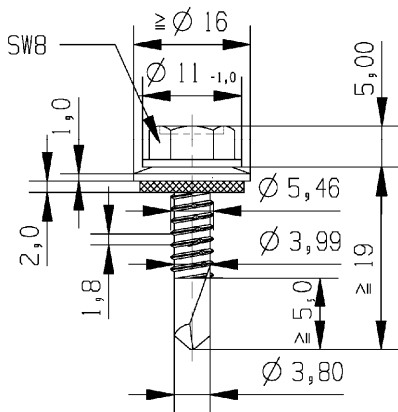
t_i [mm]	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
t_{II} [mm]	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	1,50	—	1,80	—	2,00	—	2,10
	0,75	1,60	—	2,00	—	2,50	—	2,90
	0,88	1,70	—	2,10	—	2,60	—	3,00
	1,00	1,90	—	2,30	—	2,80	—	3,20
	1,13	2,70	—	3,10	—	3,60	—	3,90
	1,25	3,50	—	3,90	—	4,30	—	4,60
	1,50	3,50	—	3,90	—	4,30	—	4,60
	1,75	3,50	—	3,90	—	4,30	—	4,60
	2,00	3,50	—	3,90	—	4,30	—	4,60
$N_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	0,90	—	1,20	—	1,50	—	1,70
	0,75	0,90	—	1,20	—	1,50	—	1,80
	0,88	0,90	—	1,20	—	1,50	—	1,80
	1,00	0,90	—	1,20	—	1,50	—	1,80
	1,13	0,90	—	1,20	—	1,50	—	1,80
	1,25	0,90	—	1,20	—	1,50	—	1,80
	1,50	0,90	—	1,20	—	1,50	—	1,80
	1,75	0,90	—	1,20	—	1,50	—	1,80
	2,00	0,90	—	1,20	—	1,50	—	1,80
$M_{t, \text{nom}}$ [Nm]	$\Sigma t \leq 1,25 \text{ mm} : 3 \text{ Nm}$				$\Sigma t > 1,25 \text{ mm} : 6 \text{ Nm}$			

No additional regulations.

Self drilling screw

Hilti S-MD 01 Z 5,5 x L
Hilti S-MD 01 C 5,5 x L
with hexagon head

Annex 14



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

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

Component I: S280GD, S320GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3,00 \text{ mm}$

Timber substructures:

no performance determined

$t_i [\text{mm}]$	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_{R,k} [\text{kN}]$								
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	1,30	1,70	2,30	2,90	3,20	ac	3,20	ac
0,75	1,30	1,70	2,30	2,90	3,60	ac	4,00	ac
0,88	1,30	1,70	2,30	2,90	3,60	—	4,80	a
1,00	1,30	1,70	2,30	2,90	3,60	—	5,60	a
1,13	1,60	2,00	2,60	3,20	3,80	—	5,80	—
1,25	1,60	2,00	2,60	3,50	4,10	—	6,00	—
1,50	1,60	2,00	2,60	4,60	5,10	—	6,50	—
1,75	1,60	2,00	2,60	4,60	5,10	—	—	—
2,00	1,60	2,00	2,60	4,60	—	—	—	—
$N_{R,k} [\text{kN}]$								
0,50	0,49	0,65	0,81	0,97	1,13	1,30	1,67	1,73
0,55	0,61	0,82	1,02	1,23	1,43	1,64	2,11	2,18
0,63	0,90	1,20	1,50	1,80	2,10	2,40	3,10	3,20
0,75	0,90	1,20	1,50	1,80	2,10	2,40	3,10	3,90
0,88	0,90	1,20	1,50	1,80	2,10	2,40	3,10	4,70
1,00	0,90	1,20	1,50	1,80	2,10	2,40	3,10	4,70
1,13	0,90	1,20	1,50	1,80	2,10	2,40	3,10	—
1,25	0,90	1,20	1,50	1,80	2,10	2,40	3,10	—
1,50	0,90	1,20	1,50	1,80	2,10	2,40	3,10	—
1,75	0,90	1,20	1,50	1,80	2,10	2,40	—	—
2,00	0,90	1,20	1,50	1,80	—	—	—	—
$M_{t, \text{nom}} [\text{Nm}]$	$\Sigma t \leq 1,25 \text{ mm} : 3 \text{ Nm}$				$\Sigma t > 1,25 \text{ mm} : 6 \text{ Nm}$			

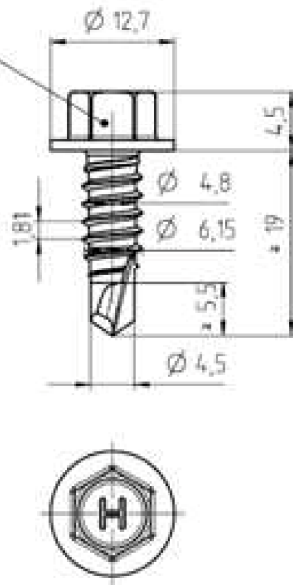
No additional regulations.

Self drilling screw

Hilti S-MD 51 Z 5,5 x L
Hilti S-MD 51 C 5,5 x L
with hexagon head and sealing washer $\geq \varnothing 16 \text{ mm}$

Annex 15

SW3/8" und SW8



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

Washer: none

Component I: S280GD, S320GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3,00 \text{ mm}$

Timber substructures:

no performance determined

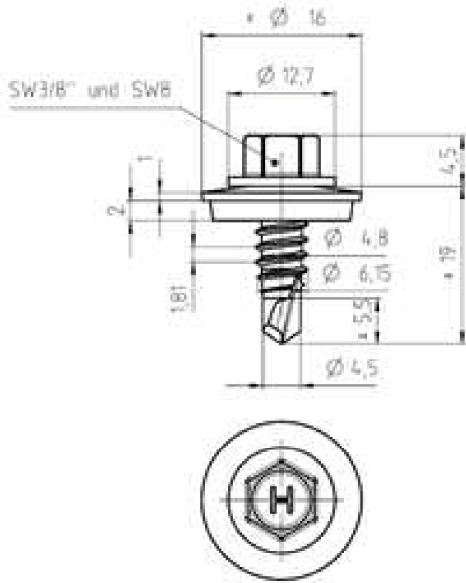
t_i [mm]	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_{R,k}$ [kN]								
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	1,50	2,00	2,50	2,90	3,50	3,70 ac	3,70 ac	3,70 ac
0,75	1,90	2,30	2,80	3,30	3,80	4,30	4,80 ac	4,80 ac
0,88	2,00	2,40	2,90	3,30	3,80	4,30	5,10	6,00 a
1,00	2,10	2,50	3,00	3,40	3,90	4,40	5,40	7,20
1,13	2,10	2,50	3,10	3,60	4,20	4,80	6,00	—
1,25	2,10	2,60	3,30	3,90	4,60	5,20	6,70	—
1,50	2,10	2,60	3,30	3,90	4,60	5,20	6,70	—
1,75	2,10	2,60	3,30	3,90	4,60	5,20	—	—
2,00	2,10	2,60	3,30	3,90	—	—	—	—
$N_{R,k}$ [kN]								
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	0,90	1,20	1,50	1,80	1,90	1,90 ac	1,90 ac	1,90 ac
0,75	0,90	1,20	1,50	1,80	2,10	2,40	2,40 ac	2,40 ac
0,88	0,90	1,20	1,50	1,80	2,10	2,40	3,10	3,40 a
1,00	0,90	1,20	1,50	1,80	2,10	2,40	3,10	4,30
1,13	0,90	1,20	1,50	1,80	2,10	2,40	3,10	—
1,25	0,90	1,20	1,50	1,80	2,10	2,40	3,10	—
1,50	0,90	1,20	1,50	1,80	2,10	2,40	3,10	—
1,75	0,90	1,20	1,50	1,80	2,10	2,40	—	—
2,00	0,90	1,20	1,50	1,80	—	—	—	—
$M_{t, \text{nom}}$ [Nm]	$\Sigma t \leq 1,25 \text{ mm} : 4 \text{ Nm}$				$\Sigma t > 1,25 \text{ mm} : 8 \text{ Nm}$			

No additional regulations.

Self drilling screw

Hilti S-MD 01 Z 6,3 x L
Hilti S-MD 01 C 6,3 x L
with hexagon head

Annex 16



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

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

Component I: S280GD, S320GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 3,00 \text{ mm}$

Timber substructures:

no performance determined

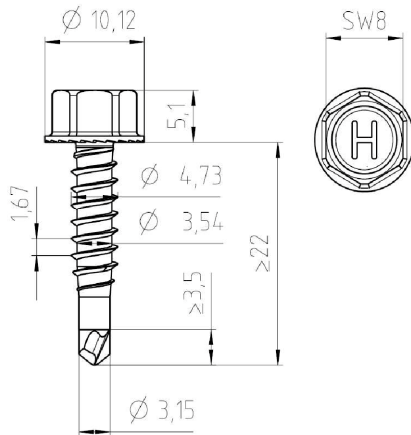
t_i [mm]	t_{II} [mm]																
	0,63		0,75		0,88		1,00		1,13		1,25		1,50		2,00		
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	0,63	1,60	—	2,10	—	2,70	—	3,30	—	3,30	ac	3,30	ac	3,30	ac	3,30	ac
	0,75	1,60	—	2,10	—	2,70	—	3,30	—	4,10	—	4,20	ac	4,20	ac	4,20	a
	0,88	1,70	—	2,20	—	2,80	—	3,40	—	4,10	—	4,40	—	5,20	ac	5,20	a
	1,00	1,80	—	2,40	—	3,00	—	3,50	—	4,10	—	4,60	—	5,80	—	6,30	a
	1,13	1,80	—	2,40	—	3,00	—	3,50	—	4,20	—	4,80	—	6,20	—	—	—
	1,25	1,80	—	2,40	—	3,00	—	3,60	—	4,20	—	5,00	—	6,50	—	—	—
	1,50	2,00	—	2,60	—	3,30	—	4,00	—	4,80	—	5,50	—	7,20	—	—	—
	1,75	2,00	—	2,60	—	3,30	—	4,00	—	4,80	—	5,50	—	—	—	—	—
	2,00	2,00	—	2,60	—	3,30	—	4,00	—	—	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	0,50	0,49	—	0,65	—	0,81	—	0,97	—	1,13	ac	1,30	ac	1,67	ac	1,73	ac
	0,55	0,61	—	0,82	—	1,02	—	1,23	—	1,43	ac	1,64	ac	2,11	ac	2,18	ac
	0,63	0,90	—	1,20	—	1,50	—	1,80	—	2,10	ac	2,40	ac	3,10	ac	3,20	ac
	0,75	0,90	—	1,20	—	1,50	—	1,80	—	2,10	—	2,40	ac	3,10	ac	4,00	a
	0,88	0,90	—	1,20	—	1,50	—	1,80	—	2,10	—	2,40	—	3,10	ac	4,60	a
	1,00	0,90	—	1,20	—	1,50	—	1,80	—	2,10	—	2,40	—	3,10	—	4,60	a
	1,13	0,90	—	1,20	—	1,50	—	1,80	—	2,10	—	2,40	—	3,10	—	—	—
	1,25	0,90	—	1,20	—	1,50	—	1,80	—	2,10	—	2,40	—	3,10	—	—	—
	1,50	0,90	—	1,20	—	1,50	—	1,80	—	2,10	—	2,40	—	3,10	—	—	—
	1,75	0,90	—	1,20	—	1,50	—	1,80	—	2,10	—	2,40	—	—	—	—	—
	2,00	0,90	—	1,20	—	1,50	—	1,80	—	—	—	—	—	—	—	—	—
$M_{t, \text{nom}}$ [Nm]	$\Sigma t \leq 1,25 \text{ mm} : 4 \text{ Nm}$								$\Sigma t > 1,25 \text{ mm} : 8 \text{ Nm}$								

No additional regulations.

Self drilling screw

Hilti S-MD 51 Z 6,3 x L
Hilti S-MD 51 C 6,3 x L
with hexagon head and sealing washer $\geq \varnothing 16 \text{ mm}$

Annex 17



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

Washer: none

Component I: S280GD, S320GD, S350GD, S390GD - EN 10346

Component II: S280GD, S320GD, S350GD, S390GD - EN 10346
S235, S275, S355 - EN 10025-1

Drilling capacity: $\Sigma t_i \leq 2,75 \text{ mm}$

Timber substructures:

no performance determined

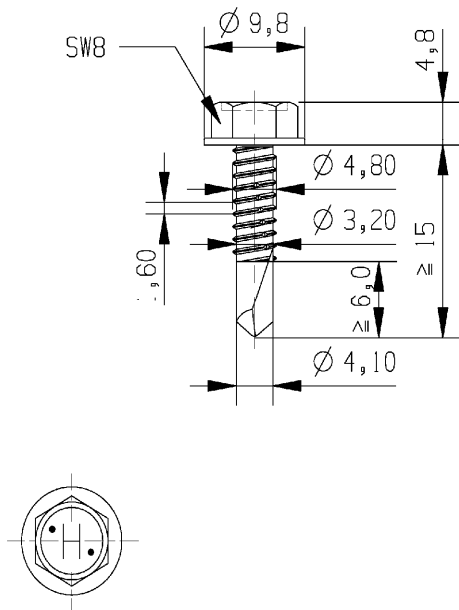
t_i [mm]	0,40	0,50	0,63	0,75	t_{II} [mm]					
	0,40	0,50	0,63	0,75	0,88	1,00	1,13	1,25	1,50	2,00
$V_{R,k}$ [kN]	0,40	0,68	0,68	0,68	0,68	0,68	0,68	0,68	0,68	0,68
	0,50	0,68	1,03	1,03	1,03	1,03	1,03	1,03	1,03	1,03
	0,55	0,68	1,03	1,23	1,23	1,23	1,23	1,23	1,23	1,23
	0,63	0,68	1,03	1,55	1,55	1,55	1,55	1,55	1,55	1,55
	0,75	0,68	1,03	1,55	2,03	2,03	2,03	2,03	2,03	2,03
	0,88	0,68	1,03	1,55	2,03	2,38	2,38	2,38	2,38	—
	1,00	0,68	1,03	1,55	2,03	2,38	2,71	2,71	2,71	—
	1,13	0,68	1,03	1,55	2,03	2,38	2,71	2,71	2,71	—
	1,25	0,68	1,03	1,55	2,03	2,38	2,71	2,71	2,71	—
	1,50	0,68	1,03	1,55	2,03	2,38	2,71	2,71	—	—
	1,75	0,68	1,03	1,55	2,03	2,38	2,71	—	—	—
	2,00	0,68	1,03	1,55	2,03	—	—	—	—	—
$N_{R,k}$ [kN]	0,40	0,46	0,70	0,77	1,04	1,04	1,04	1,04	1,04	1,04
	0,50	0,46	0,70	0,77	1,11	1,25	1,25	1,25	1,25	1,25
	0,55	0,46	0,70	0,77	1,11	1,33	1,33	1,33	1,33	1,33
	0,63	0,46	0,70	0,77	1,11	1,40	1,40	1,40	1,40	1,40
	0,75	0,46	0,70	0,77	1,11	1,40	1,69	2,00	2,00	2,00
	0,88	0,46	0,70	0,77	1,11	1,40	1,69	2,10	2,48	2,70
	1,00	0,46	0,70	0,77	1,11	1,40	1,69	2,10	2,48	2,70
	1,13	0,46	0,70	0,77	1,11	1,40	1,69	2,10	2,48	2,70
	1,25	0,46	0,70	0,77	1,11	1,40	1,69	2,10	2,48	2,70
	1,50	0,46	0,70	0,77	1,11	1,40	1,69	2,10	2,48	—
	1,75	0,46	0,70	0,77	1,11	1,40	1,69	—	—	—
	2,00	0,46	0,70	0,77	1,11	—	—	—	—	—
$M_{t,nom}$ [Nm]										

No additional regulations.

Self drilling screw

Hilti S-MD 01 LZ 4,8 x L
Hilti S-MD 01 LC 4,8 x L
with hexagon head

Annex 18



Material:

Fastener: carbon steel, case hardened and galvanized or coated

Washer: none

Component I: S280GD, S320GD - EN 10346

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

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

Timber substructures:

no performance determined

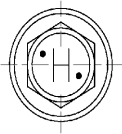
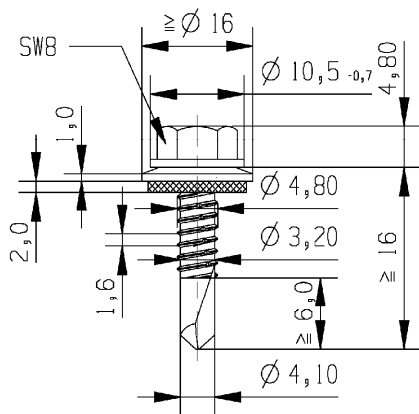
$t_{\perp}$ [mm]	$t_{\parallel}$ [mm]																		
	0,63		0,75		0,88		1,00		1,50		2,00		3,00		4,00		5,00		
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	0,63	1,29	—	1,29	—	1,29	—	1,74	—	2,30	—	2,70	ac	2,70	ac	2,70	ac	2,70	ac
	0,75	1,29	—	2,02	—	2,02	—	2,17	—	2,30	—	3,00	—	3,80	ac	3,80	ac	3,80	ac
	0,88	1,29	—	2,02	—	2,26	—	2,34	—	2,60	—	3,50	—	4,90	—	4,90	—	4,90	—
	1,00	1,29	—	2,02	—	2,26	—	2,49	—	2,90	—	4,00	—	6,00	—	6,00	—	6,00	—
	1,13	1,29	—	2,02	—	2,26	—	2,49	—	3,50	—	4,60	—	6,60	—	6,60	—	—	—
	1,25	1,29	—	2,02	—	2,26	—	2,49	—	4,10	—	5,20	—	7,10	—	7,10	—	—	—
	1,50	1,29	—	2,02	—	2,26	—	2,49	—	5,20	—	6,00	—	7,30	—	7,30	—	—	—
	1,75	1,29	—	2,02	—	2,26	—	2,49	—	5,20	—	6,00	—	7,30	—	7,30	—	—	—
2,00	1,29	—	2,02	—	2,26	—	2,49	—	5,20	—	6,00	—	7,30	—	7,30	—	—	—	
$N_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	0,61	—	0,88	—	1,07	—	1,24	—	1,60	—	1,60	ac	1,60	ac	1,60	ac	1,60	ac
	0,75	0,61	—	0,88	—	1,07	—	1,24	—	1,60	—	2,20	—	2,20	ac	2,20	ac	2,20	ac
	0,88	0,61	—	0,88	—	1,07	—	1,24	—	1,60	—	2,40	—	3,00	—	3,00	—	3,00	—
	1,00	0,61	—	0,88	—	1,07	—	1,24	—	1,60	—	2,40	—	3,90	—	3,90	—	3,90	—
	1,13	0,61	—	0,88	—	1,07	—	1,24	—	1,60	—	2,40	—	4,10	—	4,10	—	—	—
	1,25	0,61	—	0,88	—	1,07	—	1,24	—	1,60	—	2,40	—	4,10	—	4,10	—	—	—
	1,50	0,61	—	0,88	—	1,07	—	1,24	—	1,60	—	2,40	—	4,10	—	4,10	—	—	—
	1,75	0,61	—	0,88	—	1,07	—	1,24	—	1,60	—	2,40	—	4,10	—	4,10	—	—	—
2,00	0,61	—	0,88	—	1,07	—	1,24	—	1,60	—	2,40	—	4,10	—	4,10	—	—	—	
$N_{R,II,k}$ [kN]	0,61		0,88		1,07		1,24		1,60		2,40		4,10		4,10		4,10		
$M_{t,nom}$ [Nm]	$\Sigma t \leq 2,15 \text{ mm}: 2 \text{ Nm}$										$\Sigma t > 2,15 \text{ mm}: 6 \text{ Nm}$								

No additional regulations.

Self drilling screw

Hilti S-MD 03 Z 4,8 x L
Hilti S-MD 03 C 4,8 x L
with hexagon head

Annex 19



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

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

Component I: S280GD, S320GD - EN 10346

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

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

Timber substructures:

no performance determined

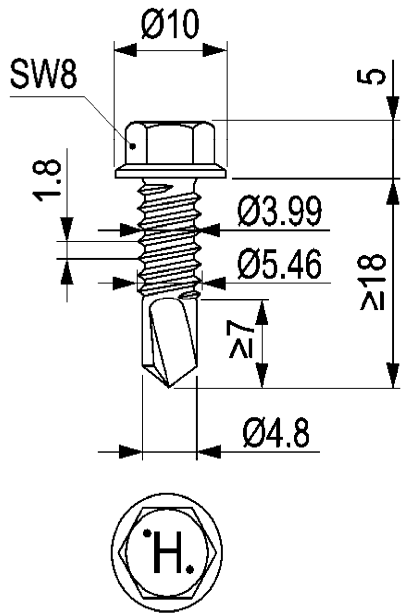
t_i [mm]	t_{II} [mm]									
	1,50	2,00	3,00	4,00	5,00	6,00	—	—	—	—
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—
	0,63	2,40	ac	2,70	ac	2,70	ac	—	—	—
	0,75	3,00	—	3,50	ac	3,90	ac	—	—	—
	0,88	3,40	—	4,10	—	5,40	—	—	—	—
	1,00	3,70	—	4,70	—	6,60	—	—	—	—
	1,13	4,00	—	5,00	—	6,70	—	—	—	—
	1,25	4,40	—	5,30	—	6,80	—	—	—	—
	1,50	4,90	—	5,60	—	6,90	—	—	—	—
	1,75	4,90	—	5,60	—	6,90	—	—	—	—
	2,00	4,90	—	5,60	—	6,90	—	—	—	—
$N_{R,k}$ [kN]	0,50	0,92	ac	1,40	ac	1,40	ac	—	—	—
	0,55	1,16	ac	1,77	ac	1,77	ac	—	—	—
	0,63	1,70	ac	2,60	ac	2,60	ac	—	—	—
	0,75	1,70	—	2,70	ac	3,30	ac	—	—	—
	0,88	1,70	—	2,70	—	4,20	—	—	—	—
	1,00	1,70	—	2,70	—	5,00	—	—	—	—
	1,13	1,70	—	2,70	—	5,20	—	—	—	—
	1,25	1,70	—	2,70	—	5,20	—	—	—	—
	1,50	1,70	—	2,70	—	5,20	—	—	—	—
	1,75	1,70	—	2,70	—	5,20	—	—	—	—
	2,00	1,70	—	2,70	—	5,20	—	—	—	—
$M_{t, \text{nom}}$ [Nm]	$\Sigma t \leq 2,15 \text{ mm} : 2 \text{ Nm}$					$\Sigma t > 2,15 \text{ mm} : 6 \text{ Nm}$				

No additional regulations.

Self drilling screw

Hilti S-MD 53 Z 4,8 x L
Hilti S-MD 53 C 4,8 x L
with hexagon head and sealing washer $\geq \varnothing 16 \text{ mm}$

Annex 20



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

Washer: none

Component I: S280GD, S320GD, S350GD, S390GD - EN 10346

Component II: S280GD, S320GD, S350GD, S390GD - EN 10346
S235, S275, S355 - EN 10025-1

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

Timber substructures:

no performance determined

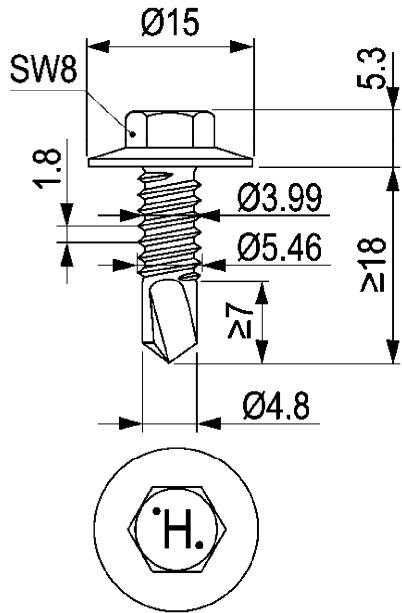
t_i [mm]	t_{II} [mm]																		
	0,63		0,75		0,88		1,00		1,50		2,00		3,00		4,00		5,00		
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	0,63	1,61	—	1,61	—	1,61	—	1,88	—	1,88	—	2,60	ac	2,60	ac	2,60	ac	2,60	ac
	0,75	1,61	—	1,88	—	1,88	—	2,06	—	2,06	—	3,70	ac	3,70	ac	3,70	ac	3,70	ac
	0,88	1,61	—	1,88	—	2,05	—	2,13	—	2,13	—	4,50	—	5,00	ac	5,00	ac	5,00	ac
	1,00	1,61	—	1,88	—	2,05	—	2,20	—	2,20	—	4,50	—	6,50	ac	6,50	ac	6,50	a
	1,13	1,61	—	1,88	—	2,05	—	2,20	—	2,76	—	4,90	—	7,00	—	7,90	—	—	—
	1,25	1,61	—	1,88	—	2,05	—	2,20	—	3,28	—	5,30	—	7,40	—	9,30	—	—	—
	1,50	1,61	—	1,88	—	2,05	—	2,20	—	4,36	—	6,20	—	8,30	—	9,50	—	—	—
	1,75	1,61	—	1,88	—	2,05	—	2,20	—	4,36	—	6,20	—	8,30	—	9,50	—	—	—
	2,00	1,61	—	1,88	—	2,05	—	2,20	—	4,36	—	7,80	—	9,40	—	9,50	—	—	—
$N_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	0,61	—	0,80	—	1,02	—	1,23	—	1,70	—	1,70	ac	1,70	ac	1,70	ac	1,70	ac
	0,75	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—	2,20	ac	2,20	ac	2,20	ac	2,20	ac
	0,88	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—	2,90	—	2,90	—	2,90	ac	2,90	ac
	1,00	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—	3,16	—	3,50	—	3,50	ac	3,50	a
	1,13	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—	3,16	—	4,30	—	4,30	—	—	—
	1,25	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—	3,16	—	5,10	—	5,10	—	—	—
	1,50	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—	3,16	—	5,48	—	6,90	—	—	—
	1,75	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—	3,16	—	5,48	—	8,20	—	—	—
	2,00	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—	3,16	—	5,48	—	8,20	—	—	—
$N_{R,II,k}$ [kN]	0,61		0,80		1,02		1,23		2,15		3,16		5,48		8,20		8,20		
$M_{t,nom}$ [Nm]	$\Sigma t \leq 3,00 \text{ mm}: 7 \text{ Nm}$												$\Sigma t > 3,00 \text{ mm}: 8 \text{ Nm}$						

No additional regulations.

Self drilling screw

Hilti S-MD 03 Z 5,5 x L
Hilti S-MD 03 C 5,5 x L
with hexagon head

Annex 21



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

Washer: none

Component I: S280GD, S320GD, S350GD, S390GD - EN 10346

Component II: S280GD, S320GD, S350GD, S390GD - EN 10346
S235, S275, S355 - EN 10025-1

Drilling capacity:

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

Timber substructures:

no performance determined

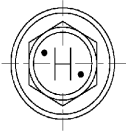
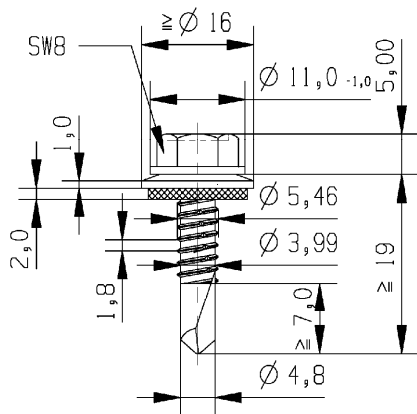
t_i [mm]	0,63	0,75	0,88	1,00	t_{II} [mm]		1,50	2,00	3,00	4,00	5,00
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—
	0,63	1,61	—	1,61	—	1,61	—	2,60	ac	2,60	ac
	0,75	1,61	—	1,88	—	2,06	—	3,70	ac	3,70	ac
	0,88	1,61	—	1,88	—	2,05	—	4,50	—	5,00	ac
	1,00	1,61	—	1,88	—	2,05	—	4,50	—	6,50	a
	1,13	1,61	—	1,88	—	2,05	—	4,90	—	7,00	—
	1,25	1,61	—	1,88	—	2,05	—	5,30	—	7,40	—
	1,50	1,61	—	1,88	—	2,05	—	6,20	—	8,30	—
	1,75	1,61	—	1,88	—	2,05	—	6,20	—	8,30	—
	2,00	1,61	—	1,88	—	2,05	—	7,80	—	9,40	—
$N_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—
	0,63	0,61	—	0,80	—	1,02	ac	1,23	—	2,15	—
	0,75	0,61	—	0,80	—	1,02	ac	1,23	—	2,15	—
	0,88	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—
	1,00	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—
	1,13	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—
	1,25	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—
	1,50	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—
	1,75	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—
	2,00	0,61	—	0,80	—	1,02	—	1,23	—	2,15	—
$N_{R,II,k}$ [kN]	0,61	0,80	1,02	1,23	2,15	3,16	5,48	8,20	8,20		
$M_{t,nom}$ [Nm]	$\Sigma t_i \leq 3,00 \text{ mm}: 7 \text{ Nm}$					$\Sigma t_i > 3,00 \text{ mm}: 8 \text{ Nm}$					

No additional regulations.

Self drilling screw

Hilti S-MD 23 Z 5,5 x L
Hilti S-MD 23 C 5,5 x L
with hexagon head with collar

Annex 22



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

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

Component I: S280GD, S320GD, S350GD, S390GD - EN 10346

Component II: S280GD, S320GD, S350GD, S390GD - EN 10346
S235, S275, S355 - EN 10025-1

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

Timber substructures:

no performance determined

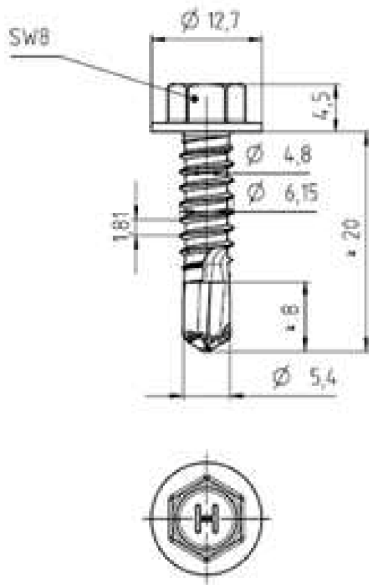
t_i [mm]	t_{ij} [mm]							
	0,63	0,75	0,88	1,00	1,50	2,00	3,00	4,00
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	—	—	—	—	3,10 ac	3,10 ac	3,10 abcd
	0,75	—	—	—	—	3,80 ac	3,80 ac	3,80 ac
	0,88	—	—	—	—	4,60 —	4,60 ac	4,60 ac
	1,00	—	—	—	—	5,30 —	5,40 —	5,40 a
	1,13	—	—	—	—	5,30 —	6,20 —	6,20 —
	1,25	—	—	—	—	5,30 —	7,60 —	9,50 —
	1,50	—	—	—	—	6,10 —	9,10 —	9,50 —
	1,75	—	—	—	—	6,10 —	9,10 —	9,50 —
	2,00	—	—	—	—	7,80 —	9,70 —	9,50 —
$N_{R,k}$ [kN]	0,50	0,61 —	0,80 —	1,02 —	1,23 —	1,73 —	1,73 ac	1,73 abcd
	0,55	0,61 —	0,80 —	1,02 —	1,23 —	2,15 —	2,18 ac	2,18 abcd
	0,63	0,61 —	0,80 —	1,02 —	1,23 —	2,15 —	3,16 ac	3,20 abcd
	0,75	0,61 —	0,80 —	1,02 —	1,23 —	2,15 —	3,16 ac	3,90 ac
	0,88	0,61 —	0,80 —	1,02 —	1,23 —	2,15 —	3,16 —	4,80 ac
	1,00	0,61 —	0,80 —	1,02 —	1,23 —	2,15 —	3,16 —	5,48 —
	1,13	0,61 —	0,80 —	1,02 —	1,23 —	2,15 —	3,16 —	6,50 —
	1,25	0,61 —	0,80 —	1,02 —	1,23 —	2,15 —	3,16 —	7,20 —
	1,50	0,61 —	0,80 —	1,02 —	1,23 —	2,15 —	3,16 —	8,20 —
	1,75	0,61 —	0,80 —	1,02 —	1,23 —	2,15 —	3,16 —	8,20 —
	2,00	0,61 —	0,80 —	1,02 —	1,23 —	2,15 —	3,16 —	8,20 —
$N_{R,II,k}$ [kN]	0,61	0,80	1,02	1,23	2,15	3,16	5,48	8,20
$M_{t,nom}$ [Nm]	$\Sigma t \leq 3,00 \text{ mm}: 7 \text{ Nm}$				$\Sigma t > 3,00 \text{ mm}: 8 \text{ Nm}$			

No additional regulations.

Self drilling screw

Hilti S-MD 53 Z 5,5 x L
Hilti S-MD 53 C 5,5 x L
with hexagon head and sealing washer $\geq \text{Ø}16 \text{ mm}$

Annex 23



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

Washer: none

Component I: S280GD, S320GD, S350GD, S390GD - EN 10346

Component II: S280GD, S320GD, S350GD, S390GD - EN 10346
S235, S275, S355 - EN 10025-1

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

Timber substructures:

no performance determined

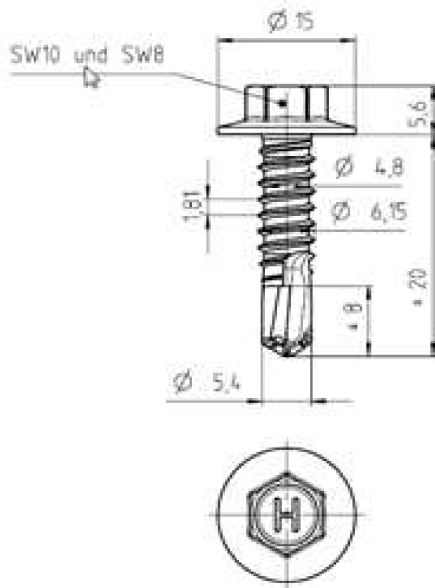
t_i [mm]	1,00	1,50	2,00	2,50	3,00	4,00	5,00	6,00
t_{II} [mm]	1,00	1,50	2,00	2,50	3,00	4,00	5,00	6,00
$V_{R,k}$ [kN]								
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	1,92	1,92	3,10	3,10	3,10	3,10	3,10	—
0,75	2,07	2,07	4,20	4,20	4,20	4,20	4,20	—
0,88	2,35	2,35	5,40	5,40	5,40	5,40	5,40	—
1,00	2,60	2,60	5,60	5,60	6,60	6,60	6,60	—
1,13	2,60	3,16	5,70	5,70	7,80	8,00	—	—
1,25	2,60	3,68	5,90	5,90	9,00	9,56	—	—
1,50	2,60	4,75	7,00	7,00	9,70	10,00	—	—
1,75	2,60	4,75	7,00	7,00	9,70	10,00	—	—
2,00	2,60	4,75	7,00	7,00	9,70	10,00	—	—
$N_{R,k}$ [kN]								
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	1,23	1,90	1,90	1,90	1,90	1,90	1,90	—
0,75	1,23	2,46	2,60	2,60	2,60	2,60	2,60	—
0,88	1,23	2,46	3,21	3,40	3,40	3,40	3,40	—
1,00	1,23	2,46	3,21	4,30	4,30	4,30	4,30	—
1,13	1,23	2,46	3,21	4,62	5,30	5,30	—	—
1,25	1,23	2,46	3,21	4,62	6,03	6,40	—	—
1,50	1,23	2,46	3,21	4,62	6,03	6,90	—	—
1,75	1,23	2,46	3,21	4,62	6,03	6,90	—	—
2,00	1,23	2,46	3,21	4,62	6,03	7,20	—	—
$M_{t, \text{nom}}$ [Nm]	$\Sigma t \leq 3,00 \text{ mm}: 7 \text{ Nm}$				$\Sigma t > 3,00 \text{ mm}: 8 \text{ Nm}$			

No additional regulations.

Self drilling screw

Hilti S-MD 03 Z 6,3 x L
Hilti S-MD 03 C 6,3 x L
with hexagon head

Annex 24



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

Washer: none

Component I: S280GD, S320GD, S350GD, S390GD - EN 10346

Component II: S280GD, S320GD, S350GD, S390GD - EN 10346
S235, S275, S355 - EN 10025-1

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

Timber substructures:

no performance determined

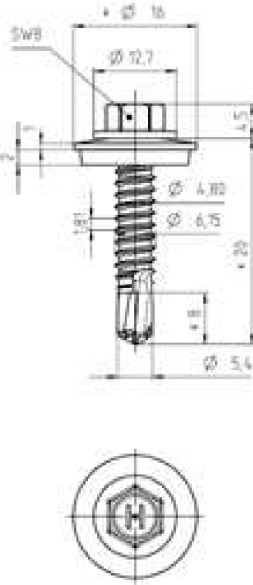
t_i [mm]	1,00	1,50	2,00	2,50	3,00	4,00	5,00	6,00
t_{II} [mm]	1,00	1,50	2,00	2,50	3,00	4,00	5,00	6,00
$V_{R,k}$ [kN]								
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	1,92	1,92	3,10	3,10	3,10	3,10	3,10	—
0,75	2,07	2,07	4,20	4,20	4,20	4,20	4,20	—
0,88	2,35	2,35	5,40	5,40	5,40	5,40	5,40	—
1,00	2,60	2,60	5,60	5,60	6,60	6,60	6,60	—
1,13	2,60	3,16	5,70	5,70	7,80	8,00	—	—
1,25	2,60	3,68	5,90	5,90	9,00	9,56	—	—
1,50	2,60	4,75	7,00	7,00	9,70	10,00	—	—
1,75	2,60	4,75	7,00	7,00	9,70	10,00	—	—
2,00	2,60	4,75	7,00	7,00	9,70	10,00	—	—
$N_{R,k}$ [kN]								
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	1,23	2,01	2,01	2,01	2,01	2,01	2,01	—
0,75	1,23	2,29	2,29	2,29	2,29	2,29	2,29	—
0,88	1,23	2,46	2,92	2,92	2,92	2,92	2,92	—
1,00	1,23	2,46	3,21	3,78	3,78	3,78	3,78	—
1,13	1,23	2,46	3,21	4,62	5,04	5,04	—	—
1,25	1,23	2,46	3,21	4,62	6,03	6,49	—	—
1,50	1,23	2,46	3,21	4,62	6,03	6,90	—	—
1,75	1,23	2,46	3,21	4,62	6,03	7,20	—	—
2,00	1,23	2,46	3,21	4,62	6,03	7,20	—	—
$M_{t, \text{nom}}$ [Nm]	$\Sigma t \leq 3,00 \text{ mm} : 7 \text{ Nm}$				$\Sigma t > 3,00 \text{ mm} : 8 \text{ Nm}$			

No additional regulations.

Self drilling screw

Hilti S-MD 23 Z 6,3 x L
Hilti S-MD 23 C 6,3 x L
with hexagon head with collar

Annex 25



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

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

Component I: S280GD, S320GD, S350GD, S390GD - EN 10346

Component II: S280GD, S320GD, S350GD, S390GD - EN 10346
S235, S275, S355 - EN 10025-1

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

Timber substructures:

no performance determined

t _i [mm]	t _{II} [mm]															
	1,50		2,00		2,50		3,00		4,00		5,00		6,00		—	
V _{R,k} [kN]	0,50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	0,63	—	—	3,00	ac	3,00	ac	3,00	abcd	3,00	abcd	3,00	abcd	—	—	—
	0,75	—	—	3,80	ac	3,80	ac	3,80	abcd	3,80	abcd	3,80	abcd	—	—	—
	0,88	—	—	4,80	—	4,80	—	4,80	ac	4,80	abc	4,80	abc	—	—	—
	1,00	—	—	5,10	—	5,10	—	5,70	ac	5,70	ac	5,70	ac	—	—	—
	1,13	—	—	5,50	—	5,50	—	6,80	ac	6,80	a	—	—	—	—	—
	1,25	—	—	6,10	—	6,10	—	7,90	ac	7,90	a	—	—	—	—	—
	1,50	—	—	6,40	—	6,40	—	9,00	—	10,00	a	—	—	—	—	—
	1,75	—	—	6,40	—	6,40	—	9,00	—	10,00	—	—	—	—	—	—
	2,00	—	—	7,80	—	7,80	—	9,40	—	10,00	—	—	—	—	—	—
N _{R,k} [kN]	0,50	—	—	1,78	ac	1,78	abcd	1,78	abcd	1,78	abcd	1,78	abcd	—	—	—
	0,55	—	—	2,25	ac	2,25	abcd	2,25	abcd	2,25	abcd	2,25	abcd	—	—	—
	0,63	—	—	3,21	ac	3,30	ac	3,30	abcd	3,30	abcd	3,30	abcd	—	—	—
	0,75	—	—	3,21	ac	4,00	ac	4,00	abcd	4,00	abcd	4,00	abcd	—	—	—
	0,88	—	—	3,21	—	4,62	—	4,80	ac	4,80	abc	4,80	abc	—	—	—
	1,00	—	—	3,21	—	4,62	—	5,60	ac	5,60	ac	5,60	ac	—	—	—
	1,13	—	—	3,21	—	4,62	—	6,03	ac	6,40	a	—	—	—	—	—
	1,25	—	—	3,21	—	4,62	—	6,03	ac	7,20	a	—	—	—	—	—
	1,50	—	—	3,21	—	4,62	—	6,03	—	7,20	a	—	—	—	—	—
	1,75	—	—	3,21	—	4,62	—	6,03	—	7,20	—	—	—	—	—	—
	2,00	—	—	3,21	—	4,62	—	6,03	—	7,20	—	—	—	—	—	—
M _{t,nom} [Nm]	Σt ≤ 3,00 mm: 7 Nm										Σt > 3,00 mm: 8 Nm					

No additional regulations.

Self drilling screw

Hilti S-MD 53 Z 6,3 x L
Hilti S-MD 53 C 6,3 x L
with hexagon head and sealing washer $\geq \varnothing 16 \text{ mm}$

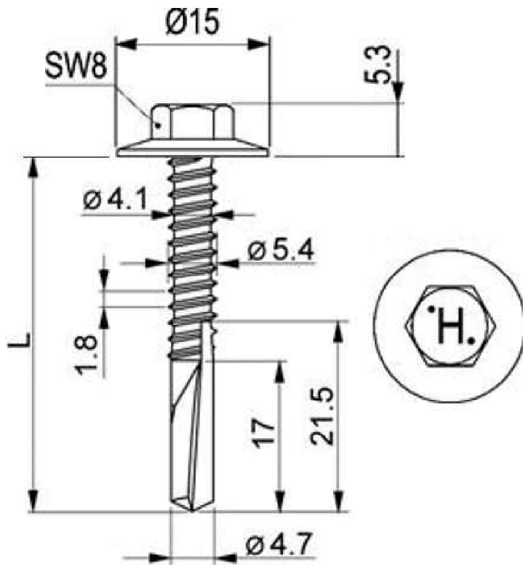
Annex 26

	<u>Material:</u> Fastener: carbon steel, case hardened and galvanized or coated Washer: none Component I: S280GD, S320GD - EN 10346 Component II: S280GD, S320GD - EN 10346 S235 - EN 10025-1
	<u>Drilling capacity:</u> $\Sigma t_i \leq 15,00$ mm
	<u>Timber substructures:</u> no performance determined

t_i [mm]	2,00	3,00	4,00	6,00	8,00	10,0	12,0	$\geq 14,0$
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	—	2,49	2,49	2,49	2,49	2,49	2,49
	0,75	—	3,04	3,04	3,04	3,04	3,04	3,04
	0,88	—	3,87	3,87	3,87	3,87	3,87	3,87
	1,00	—	4,91	4,91	4,91	4,91	4,91	4,91
	1,13	—	6,24	6,24	6,24	6,24	6,24	—
	1,25	—	7,69	7,69	7,69	7,69	7,69	—
	1,50	—	7,69	7,69	7,69	7,69	7,69	—
	1,75	—	7,69	7,69	7,69	7,69	7,69	—
	2,00	—	7,69	7,69	7,69	7,69	7,69	—
$N_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	—	2,50	2,50	2,50	2,50	2,50	2,50
	0,75	—	2,99	2,99	2,99	2,99	2,99	2,99
	0,88	—	3,50	3,50	3,50	3,50	3,50	3,50
	1,00	—	3,99	3,99	3,99	3,99	3,99	3,99
	1,13	—	4,50	4,50	4,50	4,50	4,50	—
	1,25	—	4,97	4,97	4,97	4,97	4,97	—
	1,50	—	5,99	5,99	5,99	5,99	5,99	—
	1,75	—	6,95	6,95	6,95	6,95	6,95	—
	2,00	—	7,96	7,96	7,96	7,96	7,96	—
$M_{t, nom}$ [Nm]	5 Nm							

No additional regulations.

Self drilling screw		Annex 27
Hilti S-MD 05 GZ 5,5 x L Hilti S-MD 05 GC 5,5 x L Hilti S-MD 05 Z 5,5 x L Hilti S-MD 05 C 5,5 x L with hexagon head		



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

Washer: none

Component I: S280GD, S320GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 15,00 \text{ mm}$

Timber substructures:

no performance determined

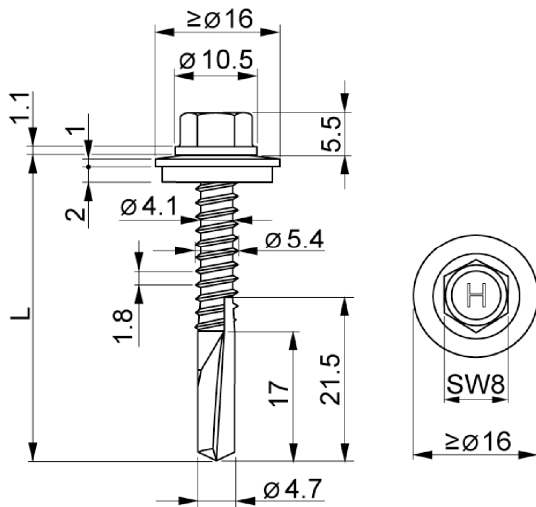
t_i [mm]	2,00	3,00	4,00	6,00	8,00	10,0	12,0	$\geq 14,0$
$V_{R,k}$ [kN]	—	—	—	—	—	—	—	—
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	—	—	2,49	2,49	2,49	2,49	2,49	2,49
0,75	—	—	3,04	3,04	3,04	3,04	3,04	3,04
0,88	—	—	3,87	3,87	3,87	3,87	3,87	3,87
1,00	—	—	4,91	4,91	4,91	4,91	4,91	4,91
1,13	—	—	6,24	6,24	6,24	6,24	6,24	—
1,25	—	—	7,69	7,69	7,69	7,69	7,69	—
1,50	—	—	7,69	7,69	7,69	7,69	7,69	—
1,75	—	—	7,69	7,69	7,69	7,69	7,69	—
2,00	—	—	7,69	7,69	7,69	7,69	7,69	—
$N_{R,k}$ [kN]	—	—	—	—	—	—	—	—
0,50	—	—	—	—	—	—	—	—
0,55	—	—	—	—	—	—	—	—
0,63	—	—	2,50	2,50	2,50	2,50	2,50	2,50
0,75	—	—	2,99	2,99	2,99	2,99	2,99	2,99
0,88	—	—	3,50	3,50	3,50	3,50	3,50	3,50
1,00	—	—	3,99	3,99	3,99	3,99	3,99	3,99
1,13	—	—	4,50	4,50	4,50	4,50	4,50	—
1,25	—	—	4,97	4,97	4,97	4,97	4,97	—
1,50	—	—	5,99	5,99	5,99	5,99	5,99	—
1,75	—	—	6,95	6,95	6,95	6,95	6,95	—
2,00	—	—	7,96	7,96	7,96	7,96	7,96	—
$M_{t, \text{nom}}$ [Nm]	5 Nm							

No additional regulations.

Self drilling screw

Hilti S-MD 25 Z 5,5 x L
Hilti S-MD 25 C 5,5 x L
with hexagon head with collar

Annex 28



Material:

Fastener: carbon steel, case hardened
and galvanized or coated

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

Component I: S280GD, S320GD - EN 10346

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

Drilling capacity: $\Sigma t_i \leq 15,00 \text{ mm}$

Timber substructures:

no performance determined

t_i [mm]	t_{II} [mm]							
	2,00	3,00	4,00	6,00	8,00	10,0	12,0	$\geq 14,0$
$V_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—
	0,55	—	—	—	—	—	—	—
	0,63	—	—	2,49	2,49	2,49	2,49	2,49
	0,75	—	—	3,04	3,04	3,04	3,04	3,04
	0,88	—	—	3,87	3,87	3,87	3,87	3,87
	1,00	—	—	4,91	4,91	4,91	4,91	4,91
	1,13	—	—	6,24	6,24	6,24	6,24	—
	1,25	—	—	7,69	7,69	7,69	7,69	—
	1,50	—	—	7,69	7,69	7,69	7,69	—
	1,75	—	—	7,69	7,69	7,69	7,69	—
	2,00	—	—	7,69	7,69	7,69	7,69	—
$N_{R,k}$ [kN]	0,50	—	—	—	—	—	—	—
	0,55	—	—	2,32	2,32	2,32	2,32	2,32
	0,63	—	—	2,55	2,55	2,55	2,55	2,55
	0,75	—	—	3,02	3,02	3,02	3,02	3,02
	0,88	—	—	3,51	3,51	3,51	3,51	3,51
	1,00	—	—	4,00	4,00	4,00	4,00	4,00
	1,13	—	—	4,51	4,51	4,51	4,51	—
	1,25	—	—	4,99	4,99	4,99	4,99	—
	1,50	—	—	6,06	6,06	6,06	6,06	—
	1,75	—	—	7,09	7,09	7,09	7,09	—
	2,00	—	—	8,23	8,23	8,23	8,23	—
$M_{t, \text{nom}}$ [Nm]	5 Nm							

No additional regulations.

Self drilling screw

Hilti S-MD 55 GZ 5,5 x L
Hilti S-MD 55 GC 5,5 x L
Hilti S-MD 55 Z 5,5 x L
Hilti S-MD 55 C 5,5 x L
with hexagon head and sealing washer $\geq \varnothing 16 \text{ mm}$

Annex 29