Deutsches Institut für Bautechnik DIBt

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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

# European Technical Assessment	# ETA-12/0063 of 17 July 2018

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	SFS Self-tapping Screws WT
Product family to which the construction product belongs	Screws for use in timber constructions
Manufacturer	SFS intec AG Division Construction Rosenbergsaustraße 10 9435 HEERBRUGG SCHWEIZ
Manufacturing plant	HW-1, HW-2
This European Technical Assessment contains	16 pages including 5 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 130118-00-0603

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Specific Part

1 Technical description of the product

SFS fasteners WT-T-6,5 and WT-T-8,2 are self-tapping screws made from special carbon steel. WT-S-6,5 are self-tapping screws made from stainless steel. The screws may have an anti-friction coating. The outer thread diameter is not less than 6.5 mm and not greater than 8.2 mm. The overall length of the screw is ranging from 65 mm to 330 mm (nominal dimension). Further dimensions are shown in Annex 5.

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

The performances given in Section 3 are only valid if the SFS fasteners are used in compliance with the specifications and conditions given in Annex 1 and 2.

Durability is only ensured if the specifications of intended use according to Annex 1 and 2 are taken into account.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the screws of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, 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
Dimensions	See Annex 5
Characteristic yield moment	See Annex 2
Characteristic withdrawal parameter	See Annex 2
Characteristic head pull-through parameter	See Annex 2
Characteristic tensile strength	See Annex 2
Characteristic yield strength	See Annex 2
Characteristic torsional strength	See Annex 2
Insertion moment	See Annex 2
Spacing, end and edge distances of the screws and minimum thickness of the wood based material	See Annex 2
Slip modulus for mainly axially loaded screws	See Annex 2

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

3.3 Safety and accessibility in use (BWR 4)

Same as BWR 1

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

In accordance with EAD No. 130118-00-0603, the applicable European legal act is: 97/176/EC.

The system to be applied is: 3

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 17 July 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow   *beglaubigt:*
Head of Department   Dewitt

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Annex 1 Specifications of intended use

A.1.1 Use of the SFS screws WT only for:

– Static and quasi-static loads

A.1.2 Base materials

The screws are used for connections in load bearing timber structures between wood-based members or between those members and steel members:

– Solid timber (softwood) according to EN 14081-1[1],
– Glued laminated timber (softwood) according to EN 14080[2],
– Laminated veneer lumber LVL made of softwood according to EN 14374[3],
– Glued solid timber according to EN 14080 or national provisions that apply at the installation site,
– Cross-laminated timber according to European Technical Assessments or national provisions that apply at the installation site.

The screws may be used for connecting the following wood-based panels to the timber members mentioned above:

– Plywood according to EN 636[4] and EN 13986[5],
– Oriented Strand Board, OSB according to EN 300[6] and EN 13986,
– Particleboard according to EN 312[7] and EN 13986,
– Fibreboards according to EN 622-2[8], EN 622-3[9] and EN 13986,
– Cement-bonded particle boards according to EN 634-2[10] and EN 13986,
– Solid-wood panels according to EN 13353[11] and EN 13986.

Wood-based panels shall only be arranged on the side of the screw head.

SFS screws WT may be used for reinforcing of timber structures perpendicular to the grain.

[1]	EN 14081-1:2005+A1:2011	Timber structures – Strength graded structural timber with rectangular cross section – Part 1: General requirements
[2]	EN 14080:2013	Timber structures - Glued laminated timber and glued solid timber - Requirements
[3]	EN 14374:2004	Timber structures - Structural laminated veneer lumber - Requirements
[4]	EN 636:2012+A1:2015	Plywood - Specifications
[5]	EN 13986:2004+A1:2015	Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking
[6]	EN 300:2006	Oriented strand boards (OSB) – Definition, classification and specifications
[7]	EN 312:2010	Particleboards - Specifications
[8]	EN 622-2:2004	Fibreboards – Specifications – Part 2: Requirements for hardboards
[9]	EN 622-3:2004	Fibreboards - Specifications - Part 3: Requirements for medium boards
[10]	EN 634-2:2007	Cement-bonded particleboards – Specifications – Part 2: Requirements for OPC bonded particleboards for use in dry, humid and external conditions
[11]	EN 13353:2008+A1:2011	Solid wood panels (SWP) – Requirements

SFS Self-tapping Screws WT	Annex 1
Specifications of intended use	

A.1.3 Use Conditions (environmental conditions)

The corrosion protection of the SFS screws WT is specified in Annex A.2.6. With regard to the use and the environmental conditions the national provisions of the place of installation apply.

A.1.4 Installation provisions

EN 1995-1-1[12] in conjunction with the respective national annex applies for the installation.

The screws are either driven into the wood-based member made of softwood without pre-drilling or in pre-drilled holes with a diameter according to Table A.1.

Table A.1 Diameter of the pre-drilled holes

Outer thread diameter [mm]	Diameter of the pre-drilled hole with a tolerance of ± 0.1 mm [mm]
WT-S-6,5	3.5
WT-T-6,5	3.5
WT-T-8,2	5.0

The screw holes in steel members shall be pre-drilled with an adequate diameter greater than the outer thread diameter.

A minimum of two screws shall be used for connections in load bearing timber structures. This does not apply for special situations specified in National Annexes to EN 1995-1-1.

If the screws with an outer thread diameter $d \geq 8$ mm are driven into the wood-based member without pre-drilling, the structural solid or glued laminated timber, laminated veneer lumber and similar glued members shall be from spruce, pine or fir.

By fastening screws in wood-based members the head of the screws shall be flush with the surface of the wood-based member.

[12]   EN 1995-1-1:2004+A1:2008+A2:2014   Eurocode 5: Design of timber structures – Part 1-1: General - Common rules and rules for buildings

SFS Self-tapping Screws WT	Annex 1
Installation provisions	

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Annex 2   Characteristic load-bearing capacity values

Table A.2.1 Characteristic load-bearing capacities of SFS screws WT

	WT-T-6,5 carbon steel	WT-S-6,5 stainless steel	WT-T-8,2 carbon steel
Outer thread diameter [mm]	**6.5**	**6.5**	**8.2**
Characteristic yield moment $M_{y,k}$ [Nm]	12.5	8.0	25.0
Characteristic tensile strength $f_{tens,k}$ [kN]	12.5	8.5	22.0
Characteristic torsional strength $f_{tor,k}$ [Nm]	12.5	8.5	25.0

A.2.1   General

The minimum penetration length of the threaded part of the screw l_{ef} shall be

$$l_{ef} = \min \begin{cases} \dfrac{4 \cdot d}{\sin \alpha} \\ 20 \cdot d \end{cases} \qquad (2.1)$$

where

α angle between screw axis and grain direction

d   outer thread diameter of the screw.

The inner thread diameter d_1 of the screws shall be greater than the maximal width of the gaps in the layer of cross laminated timber.

A.2.2   Laterally loaded screws

The outer thread diameter d shall be used as effective diameter of the screw according to EN 1995-1-1.

The embedding strength for the screws in wood-based members or in wood-based panels shall be taken from EN 1995-1-1 or from national provisions that apply at the installation site.

The embedding strength for screws in the edges of LVL shall be assumed as given in the technical specification of the LVL at the installation site.

A.2.3   Axially loaded screws

A.2.3.1   Axial slip modulus

The axial slip modulus K_{ser} of the threaded part of a screw for the serviceability limit state per side shall be taken independent of angle α to the grain as:

$$K_{ser} = 25 \cdot l_{ef} \cdot d \qquad \text{[N/mm]} \qquad (2.2)$$

where

d   outer thread diameter of the screw [mm]
l_{ef} penetration length of the threaded part of the screw in the wood-based member [mm].

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Characteristic values of the load-carrying capacities	

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A.2.3.2 Axial withdrawal capacity

The characteristic withdrawal capacity in solid timber, glued laminated timber, cross laminated timber or laminated veneer lumber members at an angle of $0° ≤ \alpha ≤ 90°$ to the grain shall be calculated as:

$$F_{ax,\alpha.Rk} = n_{ef} \cdot k_{ax} \cdot f_{ax,k} \cdot d \cdot l_{ef} \cdot \left(\frac{\rho_k}{350}\right)^{0,8}$$ (2.3)

where

$F_{ax,\alpha,Rk}$ Characteristic withdrawal capacity of a screw group at an angle α to the grain [N]

n_{ef} Effective number of screws according to EN 1995-1-1, clause 8.7.2 (8)

k_{ax} Factor, taking into account the angle α between screw axis and grain direction

        $k_{ax} = 1.0$ for $45° ≤ \alpha ≤ 90°$

        $k_{ax} = 0.3 + \dfrac{0.7 \cdot \alpha}{45°}$ for $15° ≤ \alpha < 45°$ (2.4)

        Equation (2.4) may be used for angles α between screw axis and grain direction $0° ≤ \alpha < 15°$ if the following requirements are fulfilled:

       1. The screws are inserted in solid timber, glued laminated timber, glued solid timber or laminated veneer lumber made from softwood.

       2. The penetration length of the threaded part of the screws is

$$l_{ef,req} = \min \begin{cases} \dfrac{4 \cdot d}{\sin \alpha} \\ \\ 20 \cdot d \end{cases}$$

       3. At least four screws are used in a connection.

$f_{ax,k}$ Characteristic withdrawal parameter at an angle $\alpha = 90°$ based on a characteristic density of the wood-based member ρ_a of 350 kg/m³

        $f_{ax,k} = 12.8$ N/mm²

        The characteristic withdrawal parameter for LVL shall be assumed as given in the technical specification of the LVL at the installation site.

        The characteristic withdrawal parameter is also valid for softwood layers of cross-laminated timber.

l_{ef} penetration length of the threaded part of the screw in the wood-based member [mm]

ρ_k Characteristic density of the wood-based member, for LVL $\rho_k ≤ 500$ kg/m³.

For screws penetrating more than one layer of cross laminated timber the different layers may be taken into account proportionally. In the lateral surfaces of the cross laminated timber the screws shall be fully inserted in one layer of cross-laminated timber.

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Characteristic values of the load-carrying capacities	

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A.2.3.3 Head pull-through capacity

The characteristic value of the head pull-through parameter for SFS screws for a characteristic density of 350 kg/m³ of the softwood-based member and for wood-based panel like

- Plywood according to EN 636 and EN 13986
- Oriented Strand Board, OSB according to EN 300 and EN 13986
- Particleboard according to EN 312 and EN 13986
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986
- Cement-bonded particle boards according to EN 634-2 and EN 13986,
- Solid-wood panels according to EN 13353 and EN 13986

with a thickness of more than 20 mm is

$f_{head,k}$ =   10.0 N/mm² for screws with countersunk head.

For wood-based panels a maximum characteristic density of 380 kg/m³ and for LVL a maximum characteristic density of 500 kg/m³ shall be used in equation (8.40b) of EN 1995-1-1.

For wood based panels with a thickness 12 mm ≤ t ≤ 20 mm the characteristic value of the head pull-through parameter for SFS screws is:

$f_{head,k}$ = 8 N/mm²

For wood based panels with a thickness of less than 12 mm the characteristic head pull-through capacity for SFS screws shall be based on a characteristic value of the head pull-through parameter of 8 N/mm², and limited to 400 N complying with the minimum thickness of the wood based panels of 1.2·d, with d as outer thread diameter and the values in Table A.2.2.

Table A.2.2 Minimum thickness of wood based panels

Wood based panel	Minimum thickness [mm]
Plywood	6
Fibreboards (hardboards and medium boards)	6
Oriented Strand Boards, OSB	8
Particleboards	8
Cement-bonded particle board	8
Solid wood Panels	12

For SFS screws WT the withdrawal capacity of the thread in the wood-based member with the screw head may be taken into account instead of the head pull-through capacity.

In steel-to-timber connections the head pull-through capacity is not governing.

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A.2.3.4 Compressive capacity of SFS screws WT

The design axial capacity $F_{ax,Rd}$ of SFS screws WT embedded in solid timber, glued solid timber or glued laminated timber made from softwood with an angle between screw axis and grain direction of 30° ≤ α ≤ 90° is the minimum of the axial resistance against pushing-in and the buckling resistance of the screw.

$$F_{ax,Rd} = \min \{k_{ax} \cdot f_{ax,d} \cdot d \cdot l_{ef} \; ; \; \kappa_c \cdot N_{pl,d}\} \tag{2.5}$$

k_{ax} Factor, taking into account the angle α between screw axis and grain direction according to clause A.2.3.2

$f_{ax,d}$ design value of the axial withdrawal capacity of the threaded part of the screw [N/mm²]

d outer thread diameter of the screw [mm]

l_{ef} penetration length of the threaded part of the screw in the timber member [mm]

$$\kappa_c = 1 \qquad \text{for } \overline{\lambda}_k \leq 0,2 \tag{2.6}$$

$$\kappa_c = \frac{1}{k + \sqrt{k^2 - \overline{\lambda}_k^2}} \qquad \text{for } \overline{\lambda}_k > 0,2 \tag{2.7}$$

$$k = 0,5 \cdot \left[1 + 0,49 \cdot \left(\overline{\lambda}_k - 0,2 \right) + \overline{\lambda}_k^2 \right] \tag{2.8}$$

and a relative slenderness ratio $\overline{\lambda}_k = \sqrt{\dfrac{N_{pl,k}}{N_{ki,k}}}$ (2.9)

where:

$N_{pl,k}$ characteristic plastic normal force related to the net cross-section of the inner thread diameter:

$$N_{pl,k} = \pi \cdot \frac{d_1^2}{4} \cdot f_{y,k} \tag{2.10}$$

$f_{y,k}$ characteristic yield strength, $f_{y,k}$ = 870 N/mm² for SFS screws WT-T
                                     $f_{y,k}$ = 550 N/mm² for SFS screws WT-S

d_1 inner thread diameter of the screw [mm]

$$N_{pl,d} = \frac{N_{pl,k}}{\gamma_{M1}} \tag{2.11}$$

γ_{M1} partial factor according to EN 1993-1-1 in conjunction with the particular national annex

characteristic ideal elastic buckling load:

$$N_{ki,k} = \sqrt{c_h \cdot E_S \cdot I_S} \quad [N] \tag{2.12}$$

elastic foundation of the screw:

$$c_h = (0.19 + 0.012 \cdot d) \cdot \rho_k \cdot \left(\frac{90° + \alpha}{180°} \right) \quad [N/mm²] \tag{2.13}$$

ρ_k characteristic density of the wood-based member [kg/m³],

α angle between screw axis and grain direction, 30° ≤ α ≤ 90°

modulus of elasticity:

E_s = 210.000 N/mm²

second moment of area:

$$I_s \qquad \frac{\pi \cdot d_1^4}{64} \quad [mm^4] \tag{2.14}$$

SFS Self-tapping Screws WT	Annex 2
Characteristic values of the load-carrying capacities	

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A.2.4 Spacing, end and edge distances of the screws and minimum thickness of the wood based material

Minimum thickness for structural wood-based members made from solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 30 mm for screws with d = 6.5 mm and t = 40 mm for screws with d = 8.2 mm.

A.2.4.1 Laterally and/or axially loaded screws

Screws in pre-drilled holes

For SFS screws WT in pre-drilled holes the minimum spacings, end and edge distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in pre-drilled holes. Here, the outer thread diameter d shall be considered.

Screws in non pre-drilled holes

For SFS screws WT minimum spacing and distances are given in EN 1995-1-1, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes. Here, the outer thread diameter d shall be considered.

For Douglas fir members minimum spacing and distances parallel to the grain shall be increased by 50%.

Minimum distances from the unloaded edge perpendicular to the grain may be reduced to $3 \cdot d$ also for timber thickness $t < 5 \cdot d$, if the spacing parallel to the grain and the end distance is at least $25 \cdot d$.

A.2.4.2 Only axially loaded screws

For SFS screws WT loaded only axially, the following minimum spacings, end and edge distances apply alternatively to clause A.2.4.1 for solid timber, glued laminated timber and similar glued products:

Spacing a_1 in a plane parallel to grain:	a_1	$= 12 \cdot d$
Spacing a_2 perpendicular to a plane parallel to grain:	a_2	$= 3 \cdot d$
End distance of the centre of gravity of the threaded part in the timber member:	$a_{1,CG}$	$= 8 \cdot d$
Edge distance of the centre of gravity of the threaded part in the timber member:	$a_{2,CG}$	$= 3 \cdot d$

For screws in non pre-drilled holes a minimum timber thickness of 10 d is required.

For a crossed screw couple in solid timber, glued laminated timber and similar glued products or in laminated veneer lumber the minimum spacing between the crossing screws may be reduced by the factor $(1 - \alpha_k/180°)$ with $0° \leq \alpha_k \leq 90°$, where α_k is the crossing angle of the screws. The minimum spacing shall be at least 1.5 d. Appropriate means have to ensure that the crossed screws threads do not touch each other when being inserted in the timber member.

Are the spacing, end and edge distances less than the distances and thicknesses given in EN 1995-1-1 the verification of resistance according to EN 1995-1-1, clause 8.7.2 (1) the failure along the circumference of a group of screws has to be considered also for connections without steel plates.

A.2.5 Insertion moment

The ratio between the characteristic torsional strength $f_{tor,k}$ and the mean value of insertion moment $R_{tor,mean}$ fulfills the requirement for all screws.

A.2.6 Durability against corrosion

The screws are coated with the zinc flake system "Durocoat" or they are electrogalvanized (minimum thickness: 5 μ) or they are zinc-nickel coated (minimum thickness: 5 μ).

Steel no. 1.4301, 1.4539, 1.4567 or 1.4578 are used for screws WT-S-6,5.

SFS Self-tapping Screws WT	
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ANNEX 3   Compression reinforcement perpendicular to the grain

A.3.1   General

SFS screws WT may be used for compression reinforcement perpendicular to the grain. The provisions are valid for reinforcing timber members made from solid timber, glued solid timber or glued laminated timber made from softwood. The compression force shall evenly be distributed to the screws used as compression reinforcement.

The screws are driven into the timber member perpendicular to the contact surface under an angle between the screw axis and the grain direction of 45° to 90°. The screw heads must be flush with the timber surface.

A.3.2   Design

For the design of reinforced contact areas the following conditions must be met independently of the angle between the screw axis and the grain direction.

The design resistance of a reinforced contact area is:

$$R_{90,d} = \min \begin{cases} k_{c,90} \cdot B \cdot l_{ef,1} \cdot f_{c,90,d} + n \cdot \min\{R_{ax,d}; \kappa_c \cdot N_{pl,d}\} \\ \\ B \cdot l_{ef,2} \cdot f_{c,90,d} \end{cases} \qquad (3.1)$$

where:

$k_{c,90}$ Parameter according to EN 1995-1-1, clause 6.1.5

B Bearing width [mm]

$l_{ef,1}$ Effective contact length according to EN 1995-1-1, clause 6.1.5 [mm]

$f_{c,90,d}$ Design compressive strength perpendicular to the grain [N/mm²]

n Number of reinforcing screws, $n = n_0 \cdot n_{90}$

n_0 Number of reinforcing screws arranged in a row parallel to the grain

n_{90} Number of reinforcing screws arranged in a row perpendicular to the grain

$R_{ax,d}$ $= f_{ax,d} \cdot d \cdot l_{ef}$ [N]   (3.2)

$f_{ax,d}$ design value of the axial withdrawal capacity of the threaded part of the screw [N/mm²]

d outer thread diameter of the screw [mm]

κ_c according to annex A.2.3.4,

$N_{pl,d}$ according to annex A.2.3.4 [N]

$l_{ef,2}$ Effective contact length in the plane of the screw tips (see Figure 3.1) [mm]

$l_{ef,2} = \{l_{ef} + (n_0 - 1) \cdot a_1 + \min(l_{ef} ; a_{1,C})\}$ for end supports (see Figure 3.1 left)

$l_{ef,2} = \{2 \cdot l_{ef} + (n_0 - 1) \cdot a_1\}$ for intermediate supports (see Figure 3.1 right)

l_{ef} Penetration length of the threaded part of the screw in the timber member [mm]

a_1 Spacing a_1 in a plane parallel to grain, see chapter A.2.4.2 [mm]

$a_{1,CG}$ End distance of the centre of gravity of the threaded part in the timber member, see chapter A.2.4.2 [mm]

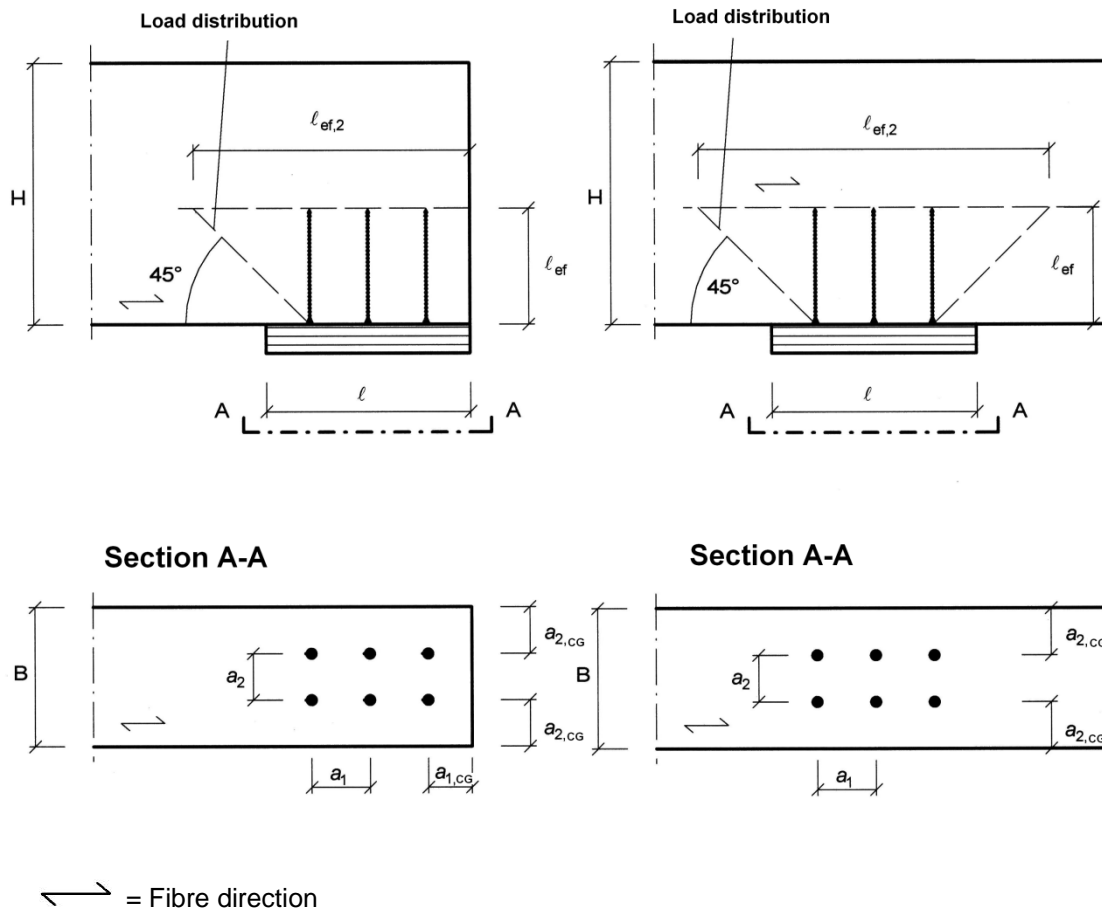| SFS Self-tapping Screws WT	Annex 3
Compression reinforcement perpendicular to the grain	

= Fibre direction

Figure 3.1:   Reinforced end support (left) and reinforced intermediate support (right)

SFS Self-tapping Screws WT	
Compression reinforcement perpendicular to the grain	Annex 3

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ANNEX 4 Header-joist connections

The characteristic load-bearing capacity for header-joist connections with inclined screws ($\alpha = 45°$) should be calculated as:

$$F_{90,Rk} = \frac{1.25 \cdot n_{ef} \cdot f_{ax,k} \cdot d \cdot l_{ef}}{\sqrt{2}} \qquad (4.1)$$

and for header-joist connections with a crossed screw couple ($\alpha = 45°$):

$$F_{90,Rk} = \frac{2 \cdot n_{ef} \cdot f_{ax,k} \cdot d \cdot l_{ef}}{\sqrt{2}} \qquad (4.2)$$

Where:

α	angle α between screw axis and grain direction, $\alpha = 45°$
n_{ef}	Effective number of inclined screws or crossed screw couples in the connection
	$n_{ef} = \max \left\{ n^{0.9}; 0.9 \cdot n \right\}$
n	number of inclined screws or crossed screw couples in the connection
$f_{ax,k}$	Characteristic withdrawal parameter at an angle $\alpha = 90°$ according to clause A.2.3.2
d	outer thread diameter of the screws [mm]
l_{ef}	penetration length of the threaded part of the screw near the screw head or near the screw tip in the wood-based member, whichever is the smaller [mm]

Equation (4.1) and (4.2) are only valid if the requirements according to Table A.4.1 are met.

Table A.4.1 Minimum spacing and distances of the screws and height of the joists

|	SFS WT 6.5	SFS-WT 8.2
Minimum end distance of the centre of gravity of the threaded part in the timber member $a_{1,CG}$	32 mm	40 mm
Minimum edge distance of the centre of gravity of the threaded part in the timber member $a_{2,CG}$	20 mm	24 mm
Minimum spacing a_2 perpendicular to a plane parallel to grain	25 mm	32 mm
Minimum spacing between crossing screws	10 mm	12 mm
Minimum height of the joists	76 mm	96 mm

SFS Self-tapping Screws WT	Annex 5
Header-joist connections	

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WT-S-6,5 x L
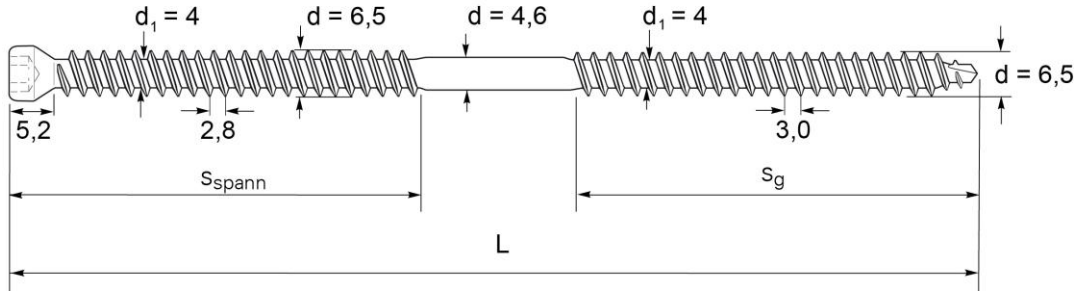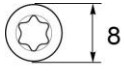
65 mm ≤ L ≤ 130 mm
28 mm ≤ s_{spann} ≤ 55 mm
28 mm ≤ s_g ≤ 55 mm

WT-T-6,5 x L
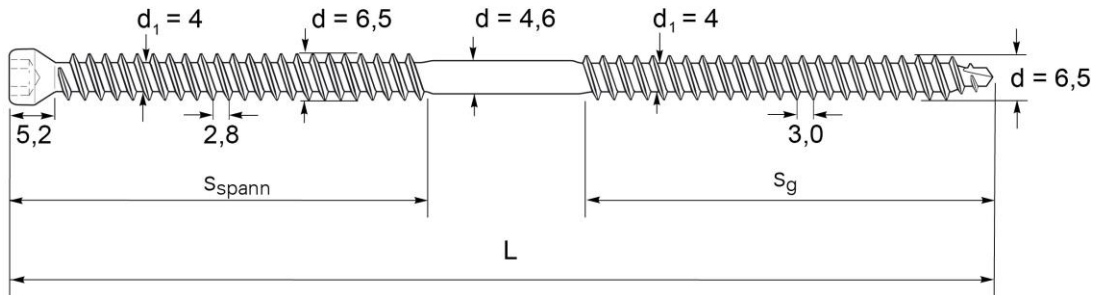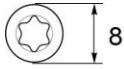
65 mm ≤ L ≤ 220 mm
28 mm ≤ s_{spann} ≤ 95 mm
28 mm ≤ s_g ≤ 95 mm

Alternative screw tip for screws WT-T-6,5
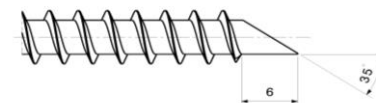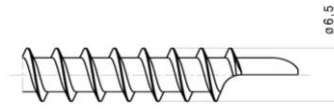
Tolerances	
Length	± 5%
Diameter	± 5%

SFS Self-tapping Screws WT	
Self-tapping screws WT-T-6,5 Dimensions	Annex 5.1

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WT-T-8,2 x L

10

$d_1 = 5,4$ $d = 8,9$ $d = 6,3$ $d_1 = 5,4$ $d = 8,2$

6,5   3,2   3,2

s_{spann} s_g

L
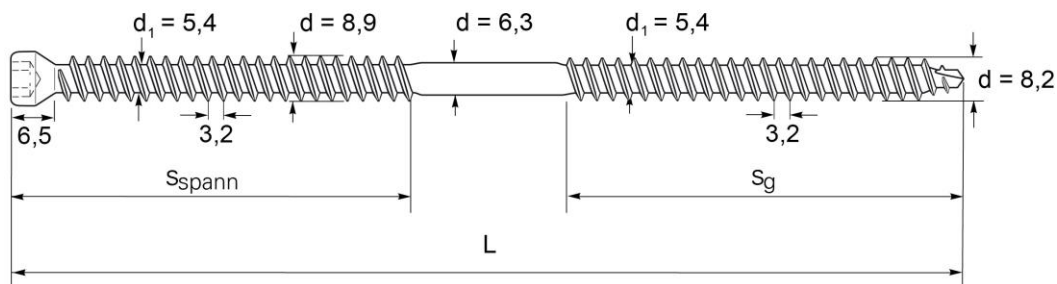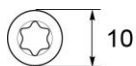
160 mm ≤ L ≤ 330 mm
65 mm ≤ s_{spann} ≤ 135 mm
65 mm ≤ s_g ≤ 135 mm

Tolerances	
Length	± 5%
Diameter	± 5%

Alternative screw tip for screws WT-T-8,2

ø8,2

35

8

SFS Self-tapping Screws WT	
Self-tapping screws WT-T-8,2 Dimensions	Annex 5.2