

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-13/0184
of 4 April 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

Twistec self-drilling screws

Product family
to which the construction product belongs

Fastening screws for sandwich panels

Manufacturer

Nögel Montagetechnik Vertriebsgesellschaft mbH
Koppelweg 1
49767 Twist
DEUTSCHLAND

Manufacturing plant

Manufacturing plant 1
Manufacturing plant 4

This European Technical Assessment
contains

9 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 330047-01-0602

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Specific Part

1 Technical description of the product

The fastening screws for sandwich panels are self-drilling screws listed in Table 1. The fastening screws for sandwich panels are made of stainless steel. They are completed with metallic washers and EPDM sealing rings. For details see the appropriate Annexes.

Table 1 – Fastening screws for sandwich panels

Annex	Fastening screw	Description
Annex 4	Twistec Typ HT 6,3/5,5 x L	with hexagon head and sealing washer ≥ Ø 16 mm
Annex 5	Twistec Typ HTL 6,3/5,5 x L	with hexagon head and sealing washer ≥ Ø 22 mm

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

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

The performances given in Section 3 are only valid if the fastening screws are used in compliance with the specifications and conditions given in Annex (1-5).

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

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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Shear Resistance of the Connection	see Annexes to this ETA
Tension Resistance of the Connection	see Annexes to this ETA
Design Resistance in case of combined Tension and Shear Forces (interaction)	see Annexes to this ETA
Check of Bending Capacity in case of constraining forces due to temperature	see Annexes to this ETA
Durability	No performance assessed

English translation prepared by DIBt

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Performance Class A1

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

In accordance with EAD No. 330047-01-0602, the applicable European legal act is: Commission Decision 1998/214/EC, amended by 2001/596/EC.

The system to be applied is: 2+

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

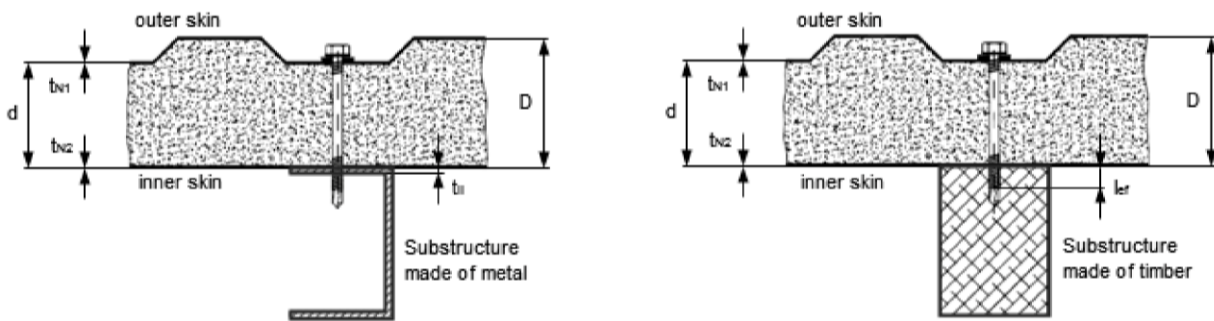
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 4 April 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Schult

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 sandwich panel (outer skin and inner skin)
Component II	Material of the substructure

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

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
u	Maximum allowed head displacement of the fastening screw

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

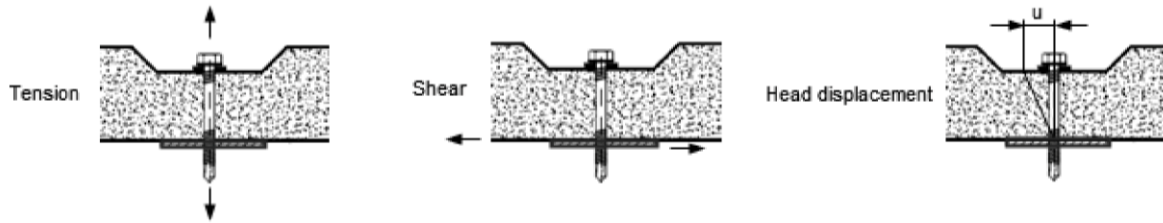
$N_{R,I,k}$	Characteristic value of pull-through resistance for the outer skin of component I
$N_{R,II,k}$	Characteristic value of pull-out resistance for component II
$V_{R,I,k}$	Characteristic value of hole bearing resistance for the inner skin of component I
$V_{R,II,k}$	Characteristic value of hole bearing resistance for component II
$M_{y,Rk}$	Characteristic value of yield moment of the fastening screw (for component II made of timber)
$f_{ax,k}$	Characteristic value of withdrawal strength for component II made of timber
$f_{h,k}$	Characteristic value of embedding strength for component II made of timber

Terms and explanations

Fastening screws for sandwich panels

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:

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

$N_{R,d}$ 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_{N1} , t_{N2} 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

Head displacement

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

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.

Design and installation

Fastening screws for sandwich panels

Annex 2

Component II made of timber

The characteristic values of tension and shear resistance for other k_{mod} or ρ_k as indicated in the Annex of the fastening screw can be determined as follows:

$$N_{R,k} = \min \left\{ \begin{array}{l} N_{R,I,k} \\ N_{R,II,k} * k_{mod} \end{array} \right. \quad V_{R,k} = \min \left\{ \begin{array}{l} V_{R,I,k} \\ V_{R,II,k} * k_{mod} \end{array} \right.$$

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

$N_{R,II,k}$ is determined according to EN 1995-1-1:2004 + A1:2008, equation (8.40a), with $f_{ax,k}$ given in the Annex of the fastening screw.

$V_{R,II,k}$ is determined according to EN 1995-1-1:2004 + A1:2008, equation (8.9), with $M_{y,Rk}$ and $f_{h,k}$ given in the Annex of the fastening screw.

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Additional provisions	Annex 3
Fastening screws for sandwich panels	

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	<p>Material:</p> <p>Fastener: stainless steel (1.4301) - EN 10088 ruspert coated</p> <p>Washer: stainless steel (1.4301) - EN 10088</p> <p>Component I: S280GD, S320GD, S350GD - EN 10346</p> <p>Component II: S235 - EN 10025-1 S280GD, S320GD - EN 10346</p>
	<p>Drilling capacity: $\Sigma t_i \leq 5,00$ mm</p>
<p>Timber substructures: no performance determined</p>	

t_{N1}, t_{N2}, d, D [mm]	$t_{N,II}$ [mm]									
	1,50	1,75	2,00	2,50	3,00	4,00	—	—	—	—
$V_{R,k}$ [kN]	0,40	0,75	0,75	0,75	0,75	0,75	0,75	—	—	—
	0,50	1,10	1,10	1,10	1,10	1,10	1,10	—	—	—
	0,55	1,30	1,30	1,30	1,30	1,30	1,30	—	—	—
	0,63	1,47	1,47	1,47	1,47	1,47	1,47	—	—	—
	0,75	1,47	1,47	1,47	1,47	1,47	1,47	—	—	—
	0,88	1,47	1,47	1,47	1,47	1,47	1,47	—	—	—
	1,00	1,47	1,47	1,47	1,47	1,47	1,47	—	—	—
$N_{R,k}$ [kN]	0,40	1,24	1,24	1,24	1,24	1,24	1,24	—	—	—
	0,50	1,81	1,81	1,81	1,81	1,81	1,81	—	—	—
	0,55	2,15	2,15	2,15	2,15	2,15	2,15	—	—	—
	0,63	2,22	2,46	2,46	2,46	2,46	2,46	—	—	—
	0,75	2,22	2,70	2,97	2,97	2,97	2,97	—	—	—
	0,88	2,22	2,70	3,17	3,35	3,35	3,35	—	—	—
	1,00	2,22	2,70	3,17	3,59	3,59	3,59	—	—	—
u [mm]	40	10,0	8,5	7,0	4,0	3,7	3,0	—	—	—
	50	12,5	10,8	9,1	5,8	5,2	4,0	—	—	—
	60	15,0	13,1	11,3	7,5	6,7	5,0	—	—	—
	70	17,5	15,4	13,4	9,3	8,2	6,0	—	—	—
	80	20,0	17,8	15,5	11,0	9,7	7,0	—	—	—
	100	25,0	22,4	19,8	14,5	12,7	9,0	—	—	—
	120	30,0	27,0	24,0	18,0	15,7	11,0	—	—	—
	140	35,0	31,6	28,3	21,5	18,7	13,0	—	—	—
	≥ 160	40,0	36,3	32,5	25,0	21,7	15,0	—	—	—

No additional regulations.

Self drilling screw

Twistec® Typ HT 6,3/5,5 x L
with hexagon head and sealing washer $\geq \varnothing 16$ mm

Annex 4

	<p>Material:</p> <p>Fastener: stainless steel (1.4301) - EN 10088 ruspert coated</p> <p>Washer: stainless steel (1.4301) - EN 10088</p> <p>Component I: S280GD, S320GD, S350GD - EN 10346</p> <p>Component II: S235 - EN 10025-1 S280GD, S320GD - EN 10346</p>
	<p>Drilling capacity: $\Sigma t_i \leq 12,50$ mm</p>
	<p>Timber substructures: no performance determined</p>

t_{N1}, t_{N2}, d, D [mm]	$t_{N,II}$ [mm]									
	3,00	4,00	—	—	—	—	—	—	—	—
$V_{R,k}$ [kN]	0,40	1,07	1,07	—	—	—	—	—	—	—
	0,50	1,46	1,46	—	—	—	—	—	—	—
	0,55	1,64	1,64	—	—	—	—	—	—	—
	0,63	1,76	1,76	—	—	—	—	—	—	—
	0,75	1,76	1,76	—	—	—	—	—	—	—
	0,88	1,76	1,76	—	—	—	—	—	—	—
	1,00	1,76	1,76	—	—	—	—	—	—	—
$N_{R,k}$ [kN]	0,40	1,57	1,57	—	—	—	—	—	—	—
	0,50	2,45	2,45	—	—	—	—	—	—	—
	0,55	2,91	2,91	—	—	—	—	—	—	—
	0,63	3,29	3,29	—	—	—	—	—	—	—
	0,75	3,77	3,77	—	—	—	—	—	—	—
	0,88	3,88	3,88	—	—	—	—	—	—	—
	1,00	3,88	3,88	—	—	—	—	—	—	—
u [mm]	40	5,0	5,0	—	—	—	—	—	—	—
	50	8,8	5,8	—	—	—	—	—	—	—
	60	12,5	6,5	—	—	—	—	—	—	—
	70	16,3	7,3	—	—	—	—	—	—	—
	80	20,0	8,0	—	—	—	—	—	—	—
	100	27,5	9,5	—	—	—	—	—	—	—
	120	35,0	11,0	—	—	—	—	—	—	—
	140	40,0	12,5	—	—	—	—	—	—	—
≥ 160	40,0	14,0	—	—	—	—	—	—	—	

No additional regulations.

Self drilling screw

Twistec® Typ HTL 6,3/5,5 x L
with hexagon head and sealing washer $\geq \varnothing 22$ mm

Annex 5