

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-17/0323
of 6 October 2020

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

DAA2, KDHT3, KDHT5, KDHTMU3, KDHTMU5, KDHT1,
KDHTQ6

Product family
to which the construction product belongs

Fastening screws for sandwich panels

Manufacturer

ROSETER INFO TRADE CO., LTD
11F., No.213, Fu-Nong Rd.
Gu-Shan Dist.
KAOHSIUNG CITY 80454
TAIWAN R.O.C

Manufacturing plant

Plant 1
Plant 2
Plant 3
Plant 4
Plant 5

This European Technical Assessment
contains

15 pages including 10 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

This version replaces

ETA-17/0323 issued on 19 June 2017

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Specific part

1 Technical description of the product

The products are fastening screws for sandwich panels (self-drilling screws). The fastening screws for sandwich panels are completed with a metallic washer and an EPDM sealing washer. The fastening screws for sandwich panels are made of austenitic stainless steel or a bimetal combination with drill bits made of galvanised/painted carbon steel. The fastening screws for sandwich panels and the corresponding connections are subject to tension and/or shear forces. Samples of fastenings screws for sandwich panels are shown in Figure 1.

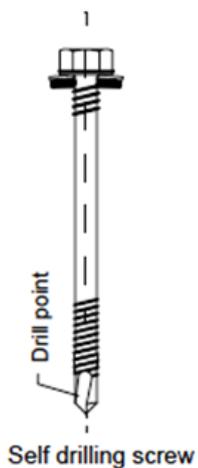


Figure 1: Fastening screws for sandwich panels.

The components and the system setup of the product are given in Annex (1-10).

Table 1 – Types of the fastening screws for sandwich panels

Annex	Fastening Screw
Annex 4	DAA2 x L
Annex 5	KDHT1 x L
Annex 6	KDHT3 x L
Annex 7	KDHT5 x L
Annex 8	KDHTMU3 x L
Annex 9	KDHTMU5 x L
Annex 10	KDHTQ6 x L

2 Specification of the intended use in accordance with the applicable European Assessment Document 330047-01-0602

The fastening screws for sandwich panels 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 for sandwich panels 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 for sandwich panels are not intended for re-use.

The performances given in Section 3 are only valid if the fastening screws for sandwich panels are used in compliance with the specifications and conditions given in Annex (1-10).

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastening screws for sandwich panels of at least 25 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
Shear Resistance of the Connection	see Annex 2-3 and 4-10
Tension Resistance of the Connection	see Annex 2-3 and 4-10
Design Resistance in case of combined Tension and Shear Forces (interaction)	see Annex 2 and 4-10
Check of Bending Capacity in case of Thermal Expansion of the outer face of Sandwich Panels	see Annex 2 and 4-10
Durability	see Annexes 4-10

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

English translation prepared by DIBt

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 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

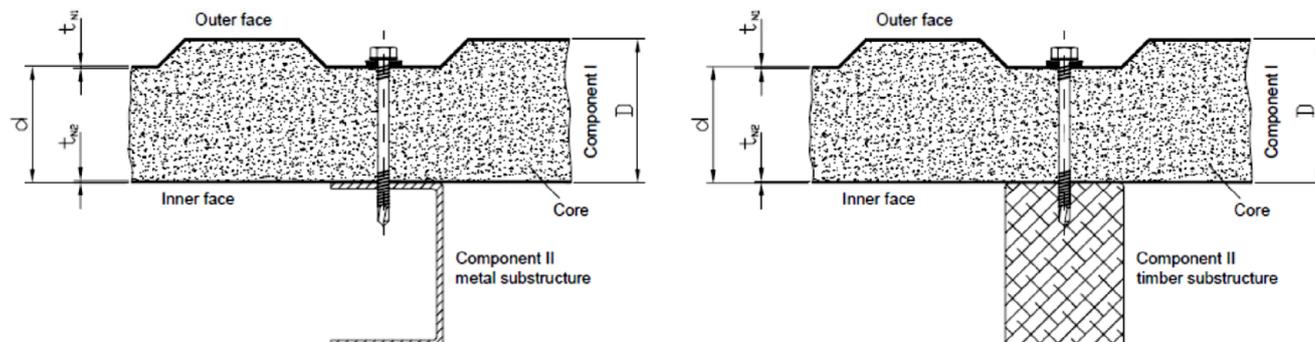
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 6 October 2020 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Hahn

Examples of execution of a connection



Terms for materials

Fastener	Fastening screw
Washer	Sealing washer
Component I	Outer face and inner face of the sandwich panel
Component II	Substructure

Terms for dimensions

D or d	Thickness of sandwich panel
t_{N1}	Thickness of the outer face of sandwich panel
t_{N2}	Thickness of the inner face of sandwich panel
t_{II}	Thickness of metal substructure
l_{ef}	Effective screw-in length in timber substructure (without drill point)
d_{dp}	Pre-drill diameter of sandwich panel and substructure

Terms for performances

$V_{R,k}$	Characteristic value of shear resistance of the connection
$N_{R,k}$	Characteristic value of tension resistance of the connection
$V_{R,I,k}$	Characteristic value of shear resistance of the sandwich panel
$N_{R,I,k}$	Characteristic value of tension resistance (pull-through) of the sandwich panel
$N_{R,II,k}$	Characteristic value of tension resistance (pull-out) of the substructure
u	Maximum allowed displacement of the fastening screw head

Additionally for timber substructure the following terms are used:

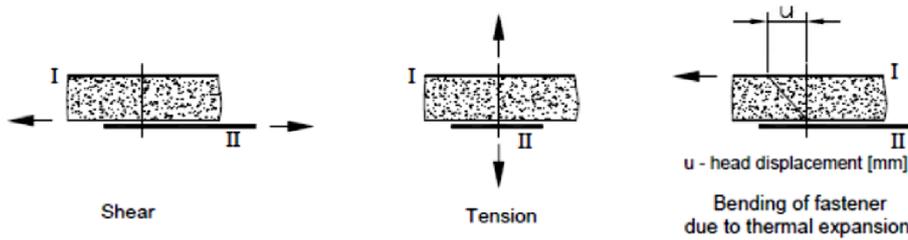
$M_{y,Rk}$	Characteristic value of yield moment
$f_{ax,k}$	Characteristic value of withdrawal strength
$f_{h,k}$	Characteristic value of embedding strength

Used terms in the Annexes

Fastening screws for sandwich panels

Annex 1

Occurred loadings of a connection



Determination of Design Values

The design value of tension and shear resistance has to be determined as follows:

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

The characteristic values $N_{R,k}$ and $V_{R,k}$ are given in the Annexes. For intermediate dimension of sandwich panel or substructure the characteristic value of the thinner dimension is used.

The recommended partial safety factor $\gamma_M = 1,33$ is used, provided no partial safety factor is given in national regulations or national Annexes to Eurocode 3.

For asymmetric metal substructures with thickness $t_{II} < 5$ mm (for instance Z- or C-shaped profiles), the characteristic value $N_{R,k}$ given in the Annexes has to be reduced to 70%.

In case of combined tension and shear forces the following interaction equation is taken into account:

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

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

The design value of bending capacity of the fastening screw in case of thermal expansion of the outer face of sandwich panels corresponds to the maximum allowed displacement of the fastening screw head given in the Annexes.

Installation conditions

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

The fastening screws are screwed-in with electric screw driver. The use of impact wrenches is not allowed.

The fastening screws are fixed rectangular to the surface of the sandwich panel.

The sandwich panel and substructure are in contact to each other. The use of compression resistant thermal insulation strips up to a thickness of 3 mm is allowed.

The thickness (or minimum thickness) of metal substructure needs to be covered by the clamping length of the fastening screw. Otherwise only the screwed-in clamping length of the fastening screw may be considered.

Basics for the design

Fastening screws for sandwich panels

Annex 2

Timber substructures

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

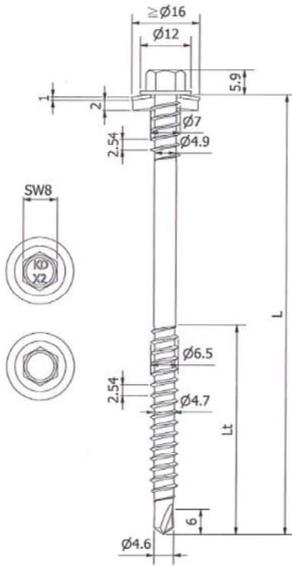
$$N_{R,k} = \min \left\{ \begin{array}{l} N_{R,I,k} \\ F_{ax,Rk} * k_{mod} \end{array} \right. \quad V_{R,k} = \min \left\{ \begin{array}{l} V_{R,I,k} \\ F_{v,Rk} * k_{mod} \end{array} \right.$$

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

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

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

Specific notes to the Annexes	Annex 3
Fastening screws for sandwich panels	



Materials

Fastener: Stainless steel 1.4301- EN 10088
 Washer: Stainless steel 1.4301- EN 10088 with vulcanized EPDM-seal
 Component I: S280GD to S350GD - EN 10346
 Component II: Timber – EN 14081

Drilling-capacity $\Sigma(t_i) \leq 2.00$ mm

Characteristics

$M_{y,Rk} = 14.20$ Nm
 $f_{ax,k} = 11.80$ N/mm² ($l_g = 39$ mm, $\rho_a = 350$ kg/m³)
 $f_{h,0,k} = 24.3$ N/mm² ($\rho_a = 350$ kg/m³)
 $f_{h,90,k} = 19.2$ N/mm² ($\rho_a = 350$ kg/m³)

		Component II				
		Timber \geq C24, $\rho_a \geq 350$ kg/m ³				
		$L_g \geq 39$ mm	$L_g \geq 44$ mm	$L_g \geq 54$ mm	$L_g \geq 71$ mm	$L_g \geq 80$ mm
Component I S280 GD to S350 GD - 10346	$V_{R,k}$ [kN]	0,40	0,81	0,81	0,81	0,81
		0,50	1,07 ¹⁾	1,07 ¹⁾	1,07 ¹⁾	1,07 ¹⁾
		0,55	1,25	1,25	1,25	1,25
		0,63	1,53	1,53	1,53	1,53
		0,75	1,96	1,96	1,96	1,96
		0,88	2,08	2,08	2,08	2,08
		1,00	2,19 ¹⁾	2,19 ¹⁾	2,19 ¹⁾	2,19 ¹⁾
	$N_{R,k,I}$ [kN]	0,40	1,60	1,60	1,60	1,60
		0,50	1,85 ¹⁾	1,85 ¹⁾	1,85 ¹⁾	1,85 ¹⁾
		0,55	2,12	2,12	2,12	2,12
		0,63	2,53	2,55	2,55	2,55
		0,75	2,53	2,91	3,19	3,19
		0,88	2,53	2,91	3,19	3,19
		1,00	2,53	2,91	3,19	3,19
	$N_{R,k,II}$	2,53	2,91	3,68	4,99	5,68
max. head displacement u [mm]	30	3,0				
	40	4,0				
	50	5,0				
	60	6,0				
	80	8,0				
	100	10,0				
	120	12,0				
≥ 140	14,0					

¹⁾ If component I is made of S320GD to S350GD the values may be increased by 8.3%.

sandwich screw

DAA2 x L

Annex 4

	<p>Materials</p> <p>Fastener: Stainless steel 1.4301- EN 10088</p> <p>Washer: Stainless steel 1.4301- EN 10088 with vulcanized EPDM-seal</p> <p>Component I: S280GD to S350GD - EN 10346</p> <p>Component II: S280GD to S350GD - EN 10346 S235 to S355 – EN 10025-2</p>
	<p>Drilling-capacity $\Sigma(t_I + t_{II}) \leq 3.00$ mm</p>

		Component II	
		S280 GD to S350 GD S235 to S355 t II [mm]	
		1,50	2,00
Component I S280 GD to S350 GD - 10346 t I [mm]	V _{R,k} [kN]	0,40	0,90 - 0,90 -
		0,50	1,72 ¹⁾ - 1,72 ¹⁾ -
		0,55	1,94 ¹⁾ - 1,94 ¹⁾ -
		0,63	2,29 ¹⁾ - 2,29 ¹⁾ -
		0,75	2,81 ¹⁾ - 2,81 ¹⁾ -
		0,88	3,47 ¹⁾ - 3,47 ¹⁾ -
	N _{R,k} [kN]	1,00	4,08 ¹⁾ - 4,08 ¹⁾ -
		0,40	1,81 - 1,81 -
		0,50	2,28 ¹⁾ - 2,28 ¹⁾ -
		0,55	2,70 ¹⁾ - 2,70 ¹⁾ -
		0,63	3,38 ¹⁾ - 3,38 ¹⁾ -
		0,75	4,40 ¹⁾ - 4,40 ¹⁾ -
	max. head displacement u [mm]	0,88	4,40 ¹⁾ - 4,40 ¹⁾ -
		1,00	4,40 ¹⁾ - 4,40 ¹⁾ -
	N _{R,k,II}	5,03 - 5,03 -	
	40	6,0 - 6,0 -	
	50	7,5 - 7,5 -	
	60	9,0 - 9,0 -	
	80	12,0 - 12,0 -	
	100	15,0 - 15,0 -	
	120	18,0 - 18,0 -	
	≥ 140	18,0 - 18,0 -	

¹⁾ if component I and component II are made of S320GD to S350GD the values may be increased by 8.3%.

sandwich screw	Annex 5
KDHT1 x L	

	<p>Materials</p> <p>Fastener: Stainless steel 1.4301- EN 10088</p> <p>Washer: Stainless steel 1.4301- EN 10088 with vulcanized EPDM-seal</p> <p>Component I: S280GD to S350GD - EN 10346</p> <p>Component II: S280GD to S350GD - EN 10346 S235 to S355 – EN 10025-2</p>
	<p>Drilling-capacity $\Sigma(t_I + t_{II}) \leq 6.50$ mm</p>

		Component II						
		S280 GD to S350 GD – 10346 S235 to S355 – EN 10025-2 t II [mm]						
		1,50	2,00	2,50	3,00	4,00	5,00	
Component I S280 GD to S350 GD - 10346	V _{R,k} [kN]	0,40	1,01 -	1,01 -	1,01 -	1,01 -	1,01 -	1,01 -
		0,50	1,28 ¹⁾ -					
		0,55	1,48 -	1,48 -	1,48 -	1,48 -	1,48 -	1,48 -
		0,63	1,79 -	1,79 -	1,79 -	1,79 -	1,79 -	1,79 -
		0,75	2,26 -	2,26 -	2,26 -	2,26 -	2,26 -	2,26 -
		0,88	2,75 -	2,75 -	2,75 -	2,75 -	2,75 -	2,75 -
		1,00	3,21 ¹⁾ -					
	N _{R,k} [kN]	0,40	1,11 -	1,11 -	1,11 -	1,11 -	1,11 -	1,11 -
		0,50	1,67 ¹⁾ -	1,67 -	1,67 -	1,67 -	1,67 -	1,67 -
		0,55	1,82 -	2,14 -	2,14 -	2,14 -	2,14 -	2,14 -
		0,63	1,82 -	2,77 -	2,89 -	2,89 -	2,89 -	2,89 -
		0,75	1,82 -	2,77 -	3,88 -	4,02 -	4,02 -	4,02 -
		0,88	1,82 -	2,77 -	3,88 -	4,02 -	4,02 -	4,02 -
		1,00	1,82 -	2,77 -	3,88 -	4,02 -	4,02 -	4,02 -
	N _{R,k,II}	1,82 -	2,77 -	3,88 -	4,98 ¹⁾ -	5,30 ¹⁾ -	5,62 ¹⁾ -	
max. head displacement u [mm]	30	4,0	2,0	2,0	2,0	2,0	2,0	
	40	5,3	2,7	2,7	2,7	2,7	2,7	
	50	6,7	3,3	3,3	3,3	3,3	3,3	
	60	8,0	4,0	4,0	4,0	4,0	4,0	
	80	9,3	4,7	4,7	4,7	4,7	4,7	
	100	10,7	5,3	5,3	5,3	5,3	5,3	
	120	13,3	6,7	6,7	6,7	6,7	6,7	
	≥ 140	16,0	8,0	8,0	8,0	8,0	8,0	

¹⁾ if component I and component II are made of S320GD to S350GD the values may be increased by 8.3%.

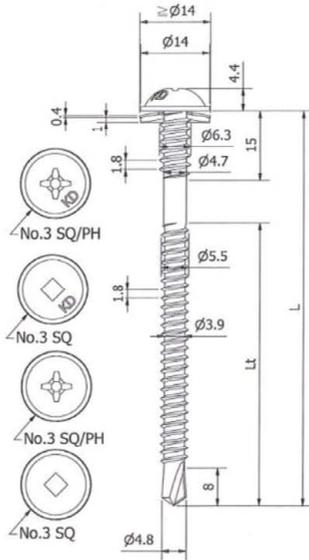
Sandwich screw	Annex 6
KDHT3 x L	

	<p>Materials</p> <p>Fastener: Stainless steel 1.4301- EN 10088</p> <p>Washer: Stainless steel 1.4301- EN 10088 with vulcanized EPDM-seal</p> <p>Component I: S280GD to S350GD - EN 10346</p> <p>Component II: S280GD to S350GD - EN 10346 S235 to S355 – EN 10025-2</p>
	<p>Drilling-capacity $\Sigma(t_I + t_{II}) \leq 14.00$ mm</p>

		Component II							
		S280 GD to S350 GD – 10346 S235 to S355 – EN 10025-2 t II [mm]							
		3,00	4,00	5,00	6,00	8,00	10,00	12,00	
Component I S280 GD to S350 GD - 10346	$V_{R,k}$ [kN]	0,40	1,02 -	1,02 -	1,02 -	1,02 -	1,02 -	1,02 -	1,02 -
		0,50	1,38 ¹⁾ -						
		0,55	1,69 -	1,69 -	1,69 -	1,69 -	1,69 -	1,69 -	1,69 -
		0,63	2,18 -	2,18 -	2,18 -	2,18 -	2,18 -	2,18 -	2,18 -
		0,75	2,92 -	2,92 -	2,92 -	2,92 -	2,92 -	2,92 -	2,92 -
		0,88	3,37 -	3,37 -	3,37 -	3,37 -	3,37 -	3,37 -	3,37 -
		1,00	3,79 ¹⁾ -						
	$N_{R,k}$ [kN]	0,40	1,52 -	1,52 -	1,52 -	1,52 -	1,52 -	1,52 -	1,52 -
		0,50	1,68 ¹⁾ -						
		0,55	2,04 -	2,04 -	2,04 -	2,04 -	2,04 -	2,04 -	2,04 -
max. head displacement u [mm]	0,63	2,62 -	2,62 -	2,62 -	2,62 -	2,62 -	2,62 -	2,62 -	
	0,75	3,48 -	3,48 -	3,48 -	3,48 -	3,48 -	3,48 -	3,48 -	
	0,88	3,48 -	3,48 -	3,48 -	3,48 -	3,48 -	3,48 -	3,48 -	
	1,00	3,48 -	3,48 -	3,48 -	3,48 -	3,48 -	3,48 -	3,48 -	
	$N_{R,k,II}$	4,56 ¹⁾ -	5,88 ¹⁾ -	6,71 ¹⁾ -	7,61 ¹⁾ -	7,61 ¹⁾ -	7,61 ¹⁾ -	7,61 ¹⁾ -	
	30	2,0	2,0	2,0	2,0	2,0	2,0	2,0	
	40	2,7	2,7	2,7	2,7	2,7	2,7	2,7	
50	3,3	3,3	3,3	3,3	3,3	3,3	3,3		
60	4,0	4,0	4,0	4,0	4,0	4,0	4,0		
80	4,7	4,7	4,7	4,7	4,7	4,7	4,7		
100	5,3	5,3	5,3	5,3	5,3	5,3	5,3		
120	6,7	6,7	6,7	6,7	6,7	6,7	6,7		
≥ 140	8,0	8,0	8,0	8,0	8,0	8,0	8,0		

¹⁾ if component I and component II are made of S320GD to S350GD the values may be increased by 8.3%.

sandwich screw	Annex 7
KDHT5 x L	



Materials

Fastener: Stainless steel 1.4567- EN 10088
Washer: Stainless steel 1.4301- EN 10088 with vulcanized EPDM-seal
Component I: S280GD to S350GD - EN 10346
Component II: S280GD to S350GD - EN 10346
S235 to S355 – EN 10025-2

Drilling-capacity $\Sigma(t_I + t_{II}) \leq 6.50$ mm

		Component II					
		S280 GD to S350 GD – 10346 S235 to S355 – EN 10025-2 t II [mm]					
		1,50	2,00	2,50	3,00	4,00	5,00
Component I S280 GD to S350 GD - 10346 t I [mm]	V _{R,k} [kN]	0,40	1,01 - 1,01	1,01 - 1,01	1,01 - 1,01	1,01 - 1,01	1,01 - 1,01
		0,50	1,28 ¹⁾ - 1,28 ¹⁾				
		0,55	1,48 - 1,48	1,48 - 1,48	1,48 - 1,48	1,48 - 1,48	1,48 - 1,48
		0,63	1,79 - 1,79	1,79 - 1,79	1,79 - 1,79	1,79 - 1,79	1,79 - 1,79
		0,75	2,26 - 2,26	2,26 - 2,26	2,26 - 2,26	2,26 - 2,26	2,26 - 2,26
		0,88	2,75 - 2,75	2,75 - 2,75	2,75 - 2,75	2,75 - 2,75	2,75 - 2,75
	1,00	3,21 ¹⁾ - 3,21 ¹⁾	3,21 ¹⁾ - 3,21 ¹⁾	3,21 ¹⁾ - 3,21 ¹⁾	3,21 ¹⁾ - 3,21 ¹⁾	3,21 ¹⁾ - 3,21 ¹⁾	
	N _{R,k} [kN]	0,40	0,96 - 0,96	0,96 - 0,96	0,96 - 0,96	0,96 - 0,96	0,96 - 0,96
		0,50	1,27 ¹⁾ - 1,27 ¹⁾				
		0,55	1,58 - 1,58	1,58 - 1,58	1,58 - 1,58	1,58 - 1,58	1,58 - 1,58
0,63		1,82 - 2,08	2,08 - 2,08	2,08 - 2,08	2,08 - 2,08	2,08 - 2,08	
0,75		1,82 - 2,77	2,77 - 2,83	2,83 - 2,83	2,83 - 2,83	2,83 - 2,83	
0,88	1,82 - 2,77	2,77 - 2,83	2,83 - 2,83	2,83 - 2,83	2,83 - 2,83		
1,00	1,82 - 2,77	2,77 - 2,83	2,83 - 2,83	2,83 - 2,83	2,83 - 2,83		
N _{R,k,II}	1,82 - 2,77 ¹⁾	2,77 ¹⁾ - 3,88 ¹⁾	3,88 ¹⁾ - 4,98 ¹⁾	4,98 ¹⁾ - 5,30 ¹⁾	5,30 ¹⁾ - 5,62 ¹⁾	5,62 ¹⁾ -	
max. head displacement u [mm]	30	4,0	2,0	2,0	2,0	2,0	2,0
	40	5,3	2,7	2,7	2,7	2,7	2,7
	50	6,7	3,3	3,3	3,3	3,3	3,3
	60	8,0	4,0	4,0	4,0	4,0	4,0
	80	9,3	4,7	4,7	4,7	4,7	4,7
	100	10,7	5,3	5,3	5,3	5,3	5,3
	120	13,3	6,7	6,7	6,7	6,7	6,7
≥ 140	16,0	8,0	8,0	8,0	8,0	8,0	

¹⁾ if component I and component II are made of S320GD to S350GD the values may be increased by 8.3%.

sandwich screw

KDHTMU3 x L

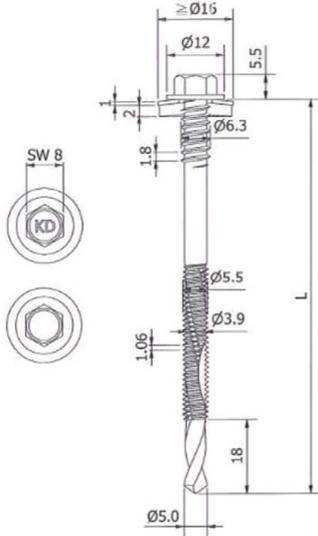
Annex 8

	<p>Materials</p> <p>Fastener: Stainless steel 1.4567- EN 10088</p> <p>Washer: Stainless steel 1.4301- EN 10088 with vulcanized EPDM-seal</p> <p>Component I: S280GD to S350GD - EN 10346</p> <p>Component II: S280GD to S350GD - EN 10346 S235 to S355 – EN 10025-2</p>
	<p>Drilling-capacity $\Sigma(t_I + t_{II}) \leq 14.00$ mm</p>

		Component II							
		S280 GD to S350 GD – 10346 S235 to S355 – EN 10025-2 t II [mm]							
		3,00	4,00	5,00	6,00	8,00	10,00	12,00	
Component I S280 GD to S350 GD - 10346	t I [mm]	0,40	1,02 -	1,02 -	1,02 -	1,02 -	1,02 -	1,02 -	1,02 -
		0,50	1,38 ¹⁾ -						
		0,55	1,69 -	1,69 -	1,69 -	1,69 -	1,69 -	1,69 -	1,69 -
		0,63	2,18 -	2,18 -	2,18 -	2,18 -	2,18 -	2,18 -	2,18 -
		0,75	2,92 -	2,92 -	2,92 -	2,92 -	2,92 -	2,92 -	2,92 -
		0,88	3,37 -	3,37 -	3,37 -	3,37 -	3,37 -	3,37 -	3,37 -
		1,00	3,79 ¹⁾ -						
	N _{R,k} [kN]	0,40	1,01 -	1,01 -	1,01 -	1,01 -	1,01 -	1,01 -	1,01 -
		0,50	1,20 ¹⁾ -						
		0,55	1,49 -	1,49 -	1,49 -	1,49 -	1,49 -	1,49 -	1,49 -
		0,63	1,96 -	1,96 -	1,96 -	1,96 -	1,96 -	1,96 -	1,96 -
		0,75	2,66 -	2,66 -	2,66 -	2,66 -	2,66 -	2,66 -	2,66 -
		0,88	2,66 -	2,66 -	2,66 -	2,66 -	2,66 -	2,66 -	2,66 -
		1,00	2,66 -	2,66 -	2,66 -	2,66 -	2,66 -	2,66 -	2,66 -
N _{R,k,II}	4,56 ¹⁾ -	5,88 ¹⁾ -	6,71 ¹⁾ -	7,61 ¹⁾ -	7,61 ¹⁾ -	7,61 ¹⁾ -	7,61 ¹⁾ -		
max. head displacement u [mm]	30	2,0	2,0	2,0	2,0	2,0	2,0	2,0	
	40	2,7	2,7	2,7	2,7	2,7	2,7	2,7	
	50	3,3	3,3	3,3	3,3	3,3	3,3	3,3	
	60	4,0	4,0	4,0	4,0	4,0	4,0	4,0	
	80	4,7	4,7	4,7	4,7	4,7	4,7	4,7	
	100	5,3	5,3	5,3	5,3	5,3	5,3	5,3	
	120	6,7	6,7	6,7	6,7	6,7	6,7	6,7	
	≥ 140	8,0	8,0	8,0	8,0	8,0	8,0	8,0	

¹⁾ if component I and component II are made of S320GD to S350GD the values may be increased by 8.3%.

sandwich screw	Annex 9
KDHTMU5 x L	



Materials

Fastener: Stainless steel 1.4301 or 1.4567- EN 10088

Washer: Stainless steel 1.4301- EN 10088
with vulcanized EPDM-seal

Component I: S280GD to S350GD - EN 10346

Component II: S280GD to S350GD - EN 10346
S235 to S355 – EN 10025-2

Drilling-capacity $\Sigma(t_i + t_{ii}) \leq 16.00$ mm

		Component II								
		S280 GD to S350 GD – 10346 S235 to S355 – EN 10025-2 t II [mm]								
		3,00	4,00	5,00	6,00	8,00	10,00	12,00	15,00	
Component I S280 GD to S350 GD - 10346 t I [mm]	V _{R,k} [kN]	0,40	0,72	0,72	0,72	0,72	0,72	0,72	0,72	0,72
		0,50	1,14	1,14	1,14	1,14	1,14	1,14	1,14	1,14
		0,55	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,30
		0,63	1,55	1,55	1,55	1,55	1,55	1,55	1,55	1,55
		0,75	1,94	1,94	1,94	1,94	1,94	1,94	1,94	1,94
	N _{R,k} [kN]	0,88	2,70	2,70	2,70	2,70	2,70	2,70	2,70	2,70
		1,00	3,40	3,40	3,40	3,40	3,40	3,40	3,40	3,40
		0,40	1,71	1,71	1,71	1,71	1,71	1,71	1,71	1,71
		0,50	2,30 ¹⁾							
		0,55	2,91 ¹⁾							
max. head displacement u [mm]	0,63	3,13	3,13	3,13	3,13	3,13	3,13	3,13	3,13	
	0,75	3,77 ¹⁾	3,89	3,89	3,89	3,89	3,89	3,89	3,89	
	0,88	3,77 ¹⁾	4,11	4,11	4,11	4,11	4,11	4,11	4,11	
	1,00	3,77 ¹⁾	4,31	4,31	4,31	4,31	4,31	4,31	4,31	
	N _{R,k,II}	3,77 ¹⁾	4,73 ¹⁾	5,68 ¹⁾	6,09 ¹⁾	6,89 ¹⁾	7,97 ¹⁾	7,97 ¹⁾	7,97 ¹⁾	
	40	6,0	6,0	5,0	5,0	5,0	5,0	5,0	5,0	
	50	7,5	7,5	6,0	6,0	6,0	6,0	6,0	6,0	
60	9,0	9,0	7,5	7,5	7,5	7,5	7,5	7,5		
80	12,0	12,0	10,0	10,0	10,0	10,0	10,0	10,0		
100	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5		
120	18,0	18,0	15,0	15,0	15,0	15,0	15,0	15,0		
≥ 140	21,0	21,0	17,5	17,5	17,5	17,5	17,5	17,5		

¹⁾ if component I and component II are made of S320GD to S350GD the values may be increased by 8.3%.

sandwich screw

KDHTQ6 x L

Annex 10