



# SUORITUSTASOILMOITUS

Nro: DoP-170079 [FI]



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## Tuotetyypin yksilöllinen tunnistus:

Sandwich Panel Screw ESSVE-ST (self-drilling for steel)  
Sandwich Panel Screw ESSVE-WD (self-tapping for wood)

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## Aiottu käyttötarkoitus (aiotut käyttötarkoitukset):

The screws ESSVE-ST / ESSVE-WD are intended to be used for fastening sandwich panels to steel or timber substructures. The sandwich panel can either be used as wall or roof cladding or as load bearing wall and roof element.

Fastening screws for sandwich panels are intended to be used in internal environments with corrosion class C1 in accordance with EN ISO 12944-2.

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## Eurooppalainen arviointiasiakirja:

EAD 330047-01-0602

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## Eurooppalainen tekninen arviointi:

ETA-17/0079 (issued on 2020-03-27)

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## Suoritustason pysyvyyden arvioinnissa ja varmentamisessa käytetty järjestelmä/käytetyt järjestelmät:

2+

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## Valmistaja:

ESSVE Produkter AB  
BOX 7091  
164 07 Kista  
Sweden

[info@essve.se](mailto:info@essve.se)

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## Teknisestä arvioinnista vastaava laitos:

INSTYTUT TECHNIKI BUDOWLANEJ (ITB)

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## Ilmoitettu laitos/ilmoitetut laitokset:

1488



# SUORITUSTASOILMOITUS

Nro: DoP-170079 [FI]

**ESSVE**  
GET IT DONE

## Ilmoitettu suoritustaso/ilmoitetut suoritustasot:

In the ETA the component to be fastened is component I and the supporting structure is component II. Component I is always a sandwich panel (of varying thickness), component II has declared values for either steel or timber, as indicated by the Annex.

ID code	Article Number	Material/Coating	Max. drill capacity [mm]	Perusominaisuudet	Suoritustaso	Yhdenmukaistetut tekniset eritelmät
ESSVE-ST	10563170, 10563172, 10563174, 10563176, 10563178, 10563180, 10563182, 10563184, 10563188, 10563189	EZP	6,0	$N_{R,k}$ [kN] $V_{R,k}$ [kN] u [mm]	Annex 2 (steel supporting structure)	ETA-17/0079
ESSVE-ST	10563156, 10563158, 10563160, 10563163, 10563164, 10563166, 10563167, 10563168, 10563169, 10563190, 10563192	EZP	12,0	$N_{R,k}$ [kN] $V_{R,k}$ [kN] u [mm]	Annex 4 (steel supporting structure)	ETA-17/0079
ESSVE-ST	10567070, 10567090, 10567110, 10567125, 10567135, 10567150, 10567175, 10567186, 10567200, 10567230, 10567250, 10567285, 10567300	CorrSeal	12,0	$N_{R,k}$ [kN] $V_{R,k}$ [kN] u [mm]	Annex 5 (steel supporting structure)	ETA-17/0079
ESSVE-WD	10565100, 10565102, 10565104, 10565106, 10565108, 10565110, 10565112, 10565114	RUSPERT	1,0	$N_{R,k}$ [kN] $V_{R,k}$ [kN] u [mm]	Annex 6 (timber supporting structure)	ETA-17/0079

Edellä yksilöidyn tuotteen suoritustaso on ilmoitettujen suoritustasojen joukon mukainen. Tämä suoritustasoilmoitus on asetuksen (EU) N:o 305/2011 mukaisesti annettu edellä ilmoitetun valmistajan yksinomaisella vastuulla.

Valmistajan puolesta allekirjoittanut:

Viktor Bukowski  
Product Developer/Technical expert – Fasteners

Kista 2021-10-07



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tel.: (+48 22) 825-04-71  
(+48 22) 825-76-55  
fax: (+48 22) 825-52-86  
[www.itb.pl](http://www.itb.pl)



## European Technical Assessment

**ETA-17/0079  
of 27/03/2020**

### General Part

**Technical Assessment Body issuing the European Technical Assessment**

Instytut Techniki Budowlanej

**Trade name of the construction product**

SANDWICHPANEL SCREW ESSVE-ST and SANDWICHPANEL SCREW ESSVE-WD

**Product family to which the construction product belongs**

Fastening screws for sandwich panels

**Manufacturer**

ESSVE PRODUKTER AB  
Esbogatan 14  
SE-16474 Kista  
Sweden

**Manufacturing plants**

Essve plants

**This European Technical Assessment contains**

11 pages including 7 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**

European Assessment Document EAD 330047-01-0602 "Fastening screws for sandwich panels"

**This version replaces**

ETA-17/0079 issued on 30/03/2017

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## Specific Part

### 1 Technical description of the product

The fastening screws for sandwich panels SANDWICH PANEL SCREW ESSVE-ST and SANDWICH PANEL SCREW ESSVE-WD are a self-drilling and self-tapping screws listed in Table 1. Screws are supplied with a steel washers and an EPDM sealing rings. For details see the Annexes 2 to 6.

The fastening screw for sandwich panels and the corresponding connections are subject to tension and shear forces.

**Table 1**

No.	Screw	Material	Annex
1	SANDWICH PANEL SCREW ESSVE-ST-EZP 5,5/6,3xL	galvanized carbon steel with $\geq 10 \mu\text{m}$ of zinc	2
2	SANDWICH PANEL SCREW ESSVE-ST-Corrseal 5,5/6,3xL/6	galvanized carbon steel with ceramic coating	3
3	SANDWICH PANEL SCREW ESSVE-ST-EZP 5,5/6,3xL/12	galvanized carbon steel with $\geq 10 \mu\text{m}$ of zinc	4
4	SANDWICH PANEL SCREW ESSVE-ST-Corrseal 5,5/6,3xL/12	galvanized carbon steel with ceramic coating	5
5	SANDWICH PANEL SCREW ESSVE-WD-Corrseal 6,3/7,0xL	galvanized carbon steel with ceramic coating	6

### 2 Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

The fastening screws for sandwich panels are intended to be used for fastening sandwich panels to steel or timber substructures. For details see the Annexes 2 to 6. The component to be fastened is component I and the supporting structure is component II. The sandwich panel can either be used as wall or roof cladding or as load bearing wall and roof element.

Fastening screws for sandwich panels are intended to be used in internal environments with corrosion category class C1 in accordance with EN ISO 12944-2.

Furthermore the intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads).

Example of execution of a connections are given in Annex 1.

The provisions made in this European Technical Assessment are based on an assumed working life of the fasteners of 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer or Technical Assessment Body, 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 Performance of the product

##### 3.1.1 Mechanical resistance and stability (BWR 1)

The characteristic values of the shear resistance of connections and tension resistance of connections with the fasteners as well as the maximum head displacement are given in Annex 2 to 6. The values were determined by tests according to EAD 330047-01-0602.

The design values shall be determined according to Annex 7 and EAD 330047-01-0602.

For the corrosion protection the rules given in EN 1993-1-3 and EN 1993-1-4 shall be taken into account.

### **3.1.2 Safety in case of fire (BWR 2)**

The fastening screws are considered to satisfy the requirements of performance class A1 of reaction to fire, in accordance with the provisions of the EC Decision 96/603/EC (as amended) without the need for testing on the basis of its listing in that decision.

### **3.2 Methods used for the assessment**

The assessment of the products has been made in accordance with EAD 330047-01-0602.

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


According to Decision 1998/214/EC, amended by 2001/596/EC, of the European Commission the system 2+ of assessment and verification of constancy of performance applies (see Annex V to Regulation (EU) No 305/2011).

## **5 Technical details necessary for the implementation of the AVCP system, as provided in the applicable European Assessment Document (EAD)**

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited in Instytut Techniki Budowlanej.

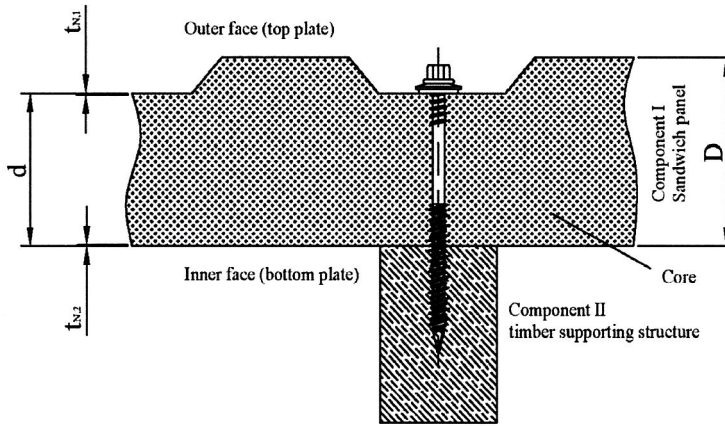
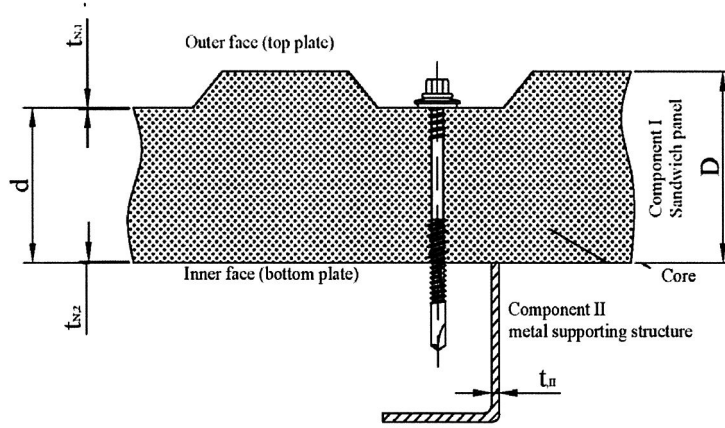
For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 27/03/2020 by Instytut Techniki Budowlanej

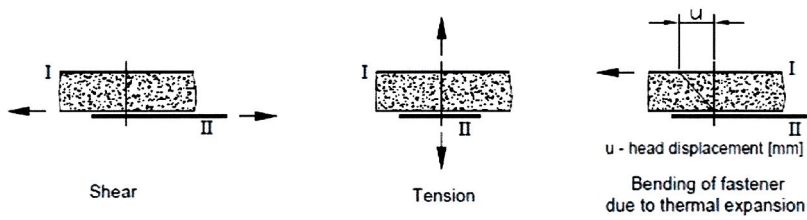


Anna Panek, MSc  
Deputy Director of ITB

**Examples of execution of a connections**



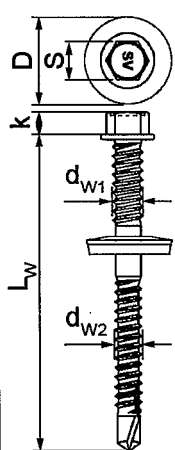
**Type of loading**



**SANDWICH PANEL SCREW ESSVE-ST and SANDWICH PANEL SCREW ESSVE-WD Fastening screws for sandwich panels**

Example of execution of a connections. Type of loading.

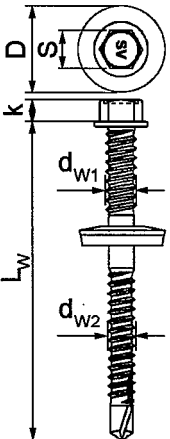
**Annex 1**  
of European  
Technical Assessment  
ETA-17/0079

<p><b>Materials</b></p> <p>Fastener: carbon steel – SAE1022 quenched, tempered and galvanized</p> <p>Washer: EPDM sealing ring with metal top made of carbon steel, galvanized</p> <p>Component I: S280GD, S320GD or S350GD – EN 10346</p> <p>Component II: <math>t_{II} \leq 2</math> mm: S280GD, S320GD or S350GD – EN 10346 <math>t_{II} &gt; 2</math> mm: S235 – EN 10025-1</p> <p>Drilling capacity: <math>\Sigma(t_{N2} + t_{II}) \leq 6</math> mm</p>	 <p style="font-size: small;"> <math>L_W = 65 - 275</math> mm  <math>d_{W1} = 6,3</math> mm  <math>d_{W2} = 5,5</math> mm  <math>k = 5,5</math> mm  <math>S = 8,0</math> mm  <math>D = 19,0</math> mm         </p>
<p><b>Timber substructures</b> no performance assessed</p>	

<b>Component II: <math>t_{II}</math> [mm]</b>		<b>2,00</b>	<b>2,50</b>	<b>3,00</b>	<b>4,00</b>	<b>5,00</b>
<b>Component I: <math>t_{N1}</math> or <math>t_{N2}</math> [mm]</b>	<b><math>V_{R,k}</math> [kN]</b>	<b>0,50</b>	1,60	1,60	1,60	1,60
		<b>0,55</b>	1,60	1,60	1,60	1,60
		<b>0,63</b>	2,03	2,03	2,03	2,03
		<b>0,75</b>	2,72	2,72	2,72	2,72
		<b>0,88</b>	2,72	2,72	2,72	2,72
		<b>1,00</b>	2,72	2,72	2,72	2,72
	<b><math>N_{R,k}</math> [kN]</b>	<b>0,50</b>	2,58	2,58	2,58	2,58
		<b>0,55</b>	2,58	2,58	2,58	2,58
		<b>0,63</b>	2,58	2,58	2,58	4,69
		<b>0,75</b>	2,58	2,58	2,58	5,38
		<b>0,88</b>	2,58	2,58	2,58	5,38
		<b>1,00</b>	2,58	2,58	2,58	5,38
<b>Max. head displacement u depending on the sandwich panel thickness [mm]</b>	<b>30</b>	12	12	12	1,5	1,5
	<b>40</b>	12	12	12	1,5	1,5
	<b>50</b>	12	12	12	1,5	1,5
	<b>60</b>	18	18	18	4	4
	<b>70</b>	18	18	18	4	4
	<b>80</b>	18	18	18	4	4
	<b>90</b>	23	23	23	10	10
	<b>100</b>	23	23	23	10	10
	<b>120</b>	23	23	23	10	10
	<b>&gt;140</b>	23	23	23	10	10

<p><b>SANDWICHPANEL SCREW ESSVE-ST and SANDWICHPANEL SCREW ESSVE-WD</b> Fastening screws for sandwich panels</p>	<p><b>Annex 2</b></p>
<p>SANDWICHPANEL SCREW ESSVE-ST-EZP 5,5/6,3xL/6 self-drilling screws with hexagon head and sealing washer <math>\varnothing 19</math> mm with metal top made of carbon steel galvanized (S)</p>	<p>of European Technical Assessment ETA-17/0079</p>



<p><b>Materials</b></p> <p><b>Fastener:</b> carbon steel – SAE1022 quenched, tempered, galvanized and additionally protected by ceramic coating CorrSeal or the equivalent ceramic coating</p> <p><b>Washer:</b> EPDM sealing ring with metal top made of stainless steel</p> <p><b>Component I:</b> S280GD, S320GD or S350GD – EN 10346</p> <p><b>Component II:</b> <math>t_{II} \leq 2</math> mm: S280GD, S320GD or S350GD – EN 10346 <math>t_{II} &gt; 2</math> mm: S235 – EN 10025-1</p> <p><b>Drilling capacity:</b> <math>\Sigma(t_{N2} + t_{II}) \leq 6</math> mm</p>	 <p><math>L_w = 65 - 275</math> mm <math>d_{w1} = 6,3</math> mm <math>d_{w2} = 5,5</math> mm <math>k = 5,5</math> mm <math>S = 8,0</math> mm <math>D = 19,0</math> mm</p>
<p><b>Timber substructures</b> no performance assessed</p>	

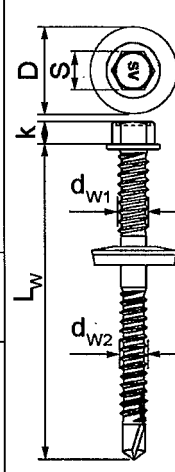
		<b>Component II: <math>t_{II}</math> [mm]</b>					
		<b>2,00</b>	<b>2,50</b>	<b>3,00</b>	<b>4,00</b>	<b>5,00</b>	
<b>Component I: <math>t_{N1}</math> or <math>t_{N2}</math> [mm]</b>	<b><math>V_{R,k}</math> [kN]</b>	<b>0,50</b>	1,60	1,60	1,60	1,60	1,60
		<b>0,55</b>	1,60	1,60	1,60	1,60	1,60
		<b>0,63</b>	2,03	2,03	2,03	2,03	2,03
		<b>0,75</b>	2,72	2,72	2,72	2,72	2,72
		<b>0,88</b>	2,72	2,72	2,72	2,72	2,72
		<b>1,00</b>	2,72	2,72	2,72	2,72	2,72
	<b><math>N_{R,k}</math> [kN]</b>	<b>0,50</b>	2,58	2,58	2,58	2,58	2,58
		<b>0,55</b>	2,58	2,58	2,58	2,58	2,58
		<b>0,63</b>	2,58	2,58	2,58	4,69	4,69
		<b>0,75</b>	2,58	2,58	2,58	5,38	5,38
<b>0,88</b>		2,58	2,58	2,58	5,38	5,38	
<b>1,00</b>	2,58	2,58	2,58	5,38	5,38		
<b>Max. head displacement u depending on the sandwich panel thickness [mm]</b>	<b>30</b>	12	12	12	1,5	1,5	
	<b>40</b>	12	12	12	1,5	1,5	
	<b>50</b>	12	12	12	1,5	1,5	
	<b>60</b>	18	18	18	4	4	
	<b>70</b>	18	18	18	4	4	
	<b>80</b>	18	18	18	4	4	
	<b>90</b>	23	23	23	10	10	
	<b>100</b>	23	23	23	10	10	
	<b>120</b>	23	23	23	10	10	
<b>&gt;140</b>	23	23	23	10	10		

<p><b>SANDWICHPANEL SCREW ESSVE-ST and SANDWICHPANEL SCREW ESSVE-WD</b> <b>Fastening screws for sandwich panels</b></p>	<p><b>Annex 3</b> of European Technical Assessment ETA-17/0079</p>
<p>SANDWICHPANEL SCREW ESSVE-ST-CorrSeal 5,5/6,3xL/6 self-drilling screws with hexagon head and sealing washer <math>\varnothing 19</math> mm with metal top made of stainless steel (S)</p>	

<p><b>Materials</b> Fastener: carbon steel – SAE1022 quenched, tempered and galvanized</p> <p>Washer: EPDM sealing ring with metal top made of carbon steel, galvanized</p> <p>Component I: S280GD, S320GD or S350GD – EN 10346</p> <p>Component II: <math>t_{II} \leq 2</math> mm: S280GD, S320GD or S350GD – EN 10346 <math>t_{II} &gt; 2</math> mm: S235 – EN 10025-1</p> <p>Drilling capacity: <math>\Sigma(t_{N2} + t_{II}) \leq 12</math> mm</p>		<p><math>L_w = 65 - 300</math>mm <math>d_{w1} = 6,3</math> mm <math>d_{w2} = 5,5</math> mm <math>k = 5,5</math> mm <math>S = 8,0</math> mm <math>D = 19,0</math> mm</p>
<p><b>Timber substructures</b> no performance assessed</p>		

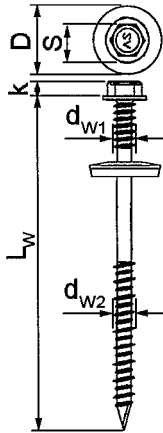
		Component II: $t_{II}$ [mm]	4,00	5,00	6,00	8,00	10,00	11,00
Component I: $t_{N,1}$ or $t_{N,2}$ [mm]	V <sub>R,k</sub> [kN]	0,50	1,73	1,73	1,73	1,73	1,73	1,73
		0,55	1,73	1,73	1,73	1,73	1,73	1,73
		0,63	2,24	2,24	2,24	2,24	2,24	2,24
		0,75	3,10	3,10	3,10	3,10	3,10	3,10
		0,88	3,10	3,10	3,10	3,10	3,10	3,10
		1,00	3,10	3,10	3,10	3,10	3,10	3,10
	N <sub>R,k</sub> [kN]	0,50	3,75	3,75	3,75	3,75	3,75	3,75
		0,55	3,75	3,75	3,75	3,75	3,75	3,75
		0,63	4,69	4,69	4,69	4,69	4,69	4,69
		0,75	5,38	5,38	5,38	5,38	5,38	5,38
		0,88	5,38	5,38	5,38	5,38	5,38	5,38
		1,00	5,38	5,38	5,38	5,38	5,38	5,38
Max. head displacement u depending on the sandwich panel thickness [mm]	30	1,5	1,5	1,5	1,5	1,5	1,5	
	40	1,5	1,5	1,5	1,5	1,5	1,5	
	50	1,5	1,5	1,5	1,5	1,5	1,5	
	60	4	4	4	4	4	4	
	70	4	4	4	4	4	4	
	80	4	4	4	4	4	4	
	90	10	10	10	10	10	10	
	100	10	10	10	10	10	10	
	120	10	10	10	10	10	10	
	>140	10	10	10	10	10	10	

<p><b>SANDWICHPANEL SCREW ESSVE-ST and SANDWICHPANEL SCREW ESSVE-WD</b> Fastening screws for sandwich panels</p>	<p><b>Annex 4</b> of European Technical Assessment ETA-17/0079</p>
<p>SANDWICHPANEL SCREW ESSVE-ST-EZP 5,5/6,3xL/12 self-drilling screws with hexagon head and sealing washer Ø19 mm with metal top made of carbon steel galvanized (S)</p>	

<p><b>Materials</b> Fastener: carbon steel – SAE1022 quenched, tempered, galvanized and additionally protected by ceramic coating CorrSeal or the equivalent ceramic coating</p> <p>Washer: EPDM sealing ring with metal top made of stainless steel</p> <p>Component I: S280GD, S320GD or S350GD – EN 10346</p> <p>Component II: <math>t_{fi} \leq 2</math> mm: S280GD, S320GD or S350GD – EN 10346 <math>t_{fi} &gt; 2</math> mm: S235 – EN 10025-1</p> <p>Drilling capacity: <math>\Sigma(t_{N2} + t_{fi}) \leq 12</math> mm</p>	 <p style="text-align: right;"> <math>L_w = 70 - 300</math> mm  <math>d_{w1} = 6,3</math> mm  <math>d_{w2} = 5,5</math> mm  <math>k = 5,5</math> mm  <math>S = 8,0</math> mm  <math>D = 19,0</math> mm         </p>
<p><b>Timber substructures</b> no performance assessed</p>	

Component II: $t_{fi}$ [mm]		4,00	5,00	6,00	8,00	10,00	11,00
Component I: $t_{N1}$ or $t_{N2}$ [mm]	V <sub>R,k</sub> [kN]	0,50	1,73	1,73	1,73	1,73	1,73
		0,55	1,73	1,73	1,73	1,73	1,73
		0,63	2,24	2,24	2,24	2,24	2,24
		0,75	3,10	3,10	3,10	3,10	3,10
		0,88	3,10	3,10	3,10	3,10	3,10
	N <sub>R,k</sub> [kN]	0,50	3,75	3,75	3,75	3,75	3,75
		0,55	3,75	3,75	3,75	3,75	3,75
		0,63	4,69	4,69	4,69	4,69	4,69
		0,75	5,38	5,38	5,38	5,38	5,38
		0,88	5,38	5,38	5,38	5,38	5,38
Max. head displacement u depending on the sandwich panel thickness [mm]	30	1,5	1,5	1,5	1,5	1,5	
	40	1,5	1,5	1,5	1,5	1,5	
	50	1,5	1,5	1,5	1,5	1,5	
	60	4	4	4	4	4	
	70	4	4	4	4	4	
	80	4	4	4	4	4	
	90	10	10	10	10	10	
	100	10	10	10	10	10	
	120	10	10	10	10	10	
	>140	10	10	10	10	10	

<p><b>SANDWICH PANEL SCREW ESSVE-ST and SANDWICH PANEL SCREW ESSVE-WD</b> Fastening screws for sandwich panels</p>	<p><b>Annex 5</b> of European Technical Assessment ETA-17/0079</p>
<p>SANDWICH PANEL SCREW ESSVE-ST-CorrSeal 5,5/6,3xL/12 self-drilling screws with hexagon head and sealing washer Ø19 mm with metal top made of stainless steel (S)</p>	

<p><b>Materials</b>                  Fastener: carbon steel – SAE1022                  quenched, galvanized and additionally protected by ceramic coating CorrSeal or the equivalent ceramic coating</p> <p>Washer: EPDM sealing ring with metal top made of stainless steel</p> <p>Component I: S280GD, S320GD or S350GD – EN 10346</p> <p>Component II: Structural timber – EN 14081</p>	
Drilling capacity: -	
<p><b>Timber substructures</b>                  For timber substructures performance assessed with</p> <p><math>M_{y,Rk} = 8,910 \text{ Nm}</math>  <math>f_{ax,k} = 14,444 \text{ N/mm}^2</math> for <math>l_{ef} \geq 30 \text{ mm}</math></p>	<p><math>L_w = 100 - 310 \text{ mm}</math>  <math>d_{w1} = 7,0 \text{ mm}</math>  <math>d_{w2} = 6,3 \text{ mm}</math>  <math>k = 5,5 \text{ mm}</math>  <math>S = 8,0 \text{ mm}</math>  <math>D = 19,0 \text{ mm}</math></p>

Component II: wood class $\geq$ C24		Effective length $l_{ef}$ [mm]	
		$\geq 30,00$	
Component I: $t_{N,1}$ or $t_{N,2}$ [mm]	$V_{R,k}$ [kN]	0,50	1,85
		0,55	1,85
		0,63	2,38
		0,75	2,77
		0,88	2,77
		1,00	2,77
	$N_{R,k}$ [kN]	0,50	2,73
		0,55	2,73
		0,63	2,73
		0,75	2,73
		0,88	2,73
		1,00	2,73
Max. head displacement u depending on the sandwich panel thickness [mm]	30	1	
	40	1	
	50	1	
	60	1,5	
	70	1,5	
	80	1,5	
	90	2	
	100	2	
	$\geq 140$	2	

<p><b>SANDWICHPANEL SCREW ESSVE-ST and SANDWICHPANEL SCREW ESSVE-WD</b>                  Fastening screws for sandwich panels</p>	<p><b>Annex 6</b>                  of European                  Technical Assessment                  ETA-17/0079</p>
<p>SANDWICHPANEL SCREW ESSVE-WD-CorrSeal 6,3/7,0xL                  self-tapping screws with hexagon head and sealing washer <math>\varnothing 19 \text{ mm}</math>                  with metal top made of stainless steel (S)</p>	

## Determination of Design Values

### 1. Determination of Design Shear Resistance

The determination of the design values of the shear resistance depends on the type of substructure.

For Metal Supporting Substructures the following applies:

The design values  $V_{R,d}$  of the shear resistance are the characteristic values of the shear resistance divided by the recommended partial safety factor  $\gamma_M = 1,33$ . The recommended partial safety factor  $\gamma_M$  should be used in cases where no value is given in national regulations of the Member State where the fastening screws are used.

For Timber Supporting Substructures the following applies:

The design values  $V_{R,d}$  of the shear resistance are the characteristic values of the shear resistance multiplied by  $k_{mod}$  according to EN 1995-1-1 Section 8.7 (Screwed connections), Table 3.1, and divided by the recommended partial safety factor  $\gamma_M = 1,33$ . If failure of the inner face with the thickness  $t_{N2}$  and not failure of the timber substructure is the relevant failure mode then  $k_{mod} = 1.0$ .

The recommended partial safety factor  $\gamma_M$  should be used in cases where no value is given in national regulations of the Member State where the fastening screws are used.

### 2. Determination of Design Pull-through, Pull-out and Tension Resistance

The design values of the pull-through resistance are the characteristic values of the pull-through resistance divided by the recommended partial safety factor  $\gamma_M = 1,33$ . The recommended partial safety factor  $\gamma_M$  should be used in cases where no value is given in national regulations of the Member State where the fastening screws are used.

The determination of the design values of the pull-out resistance depends on the type of substructure.

For Metal Supporting Substructures the following applies:

The design values of the pull-out resistance are the characteristic values of the pull-out resistance divided by the recommended partial safety factor  $\gamma_M = 1,33$ . The recommended partial safety factor  $\gamma_M$  should be used in cases where no value is given in national regulations of the Member State where the fastening screws are used.

For Timber Supporting Substructures the following applies:

The design values of the pull-out resistance are the characteristic values of the pull-out resistance multiplied by  $k_{mod}$  according to EN 1995-1-1 Section 8.7 (Screwed connections), Table 3.1, and divided by the recommended partial safety factor  $\gamma_M = 1,33$ . The recommended partial safety factor  $\gamma_M$  should be used in cases where no value is given in national regulations of the Member State where the fastening screws are used.

The design tension resistance  $N_{R,d}$  is the minimum value of the design values of either pull-through resistance or relevant pull-out resistance for the corresponding connection.

### 3. Design Resistance in case of combined Tension and Shear Forces (interaction)

In case of combined tension and shear forces the linear interaction formula according to EN 1993-1-3, section 8.3 (8) should be taken into account.

**SANDWICH PANEL SCREW ESSVE-ST and  
SANDWICH PANEL SCREW ESSVE-WD  
Fastening screws for sandwich panels**

Determination of Design Values

**Annex 7**  
of European  
Technical Assessment  
ETA-17/0079