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Authorised and notified according
to Article 29 of the Regulation (EU)
No 305/2011 of the European
Parliament and of the Council of 9
March 2011

MEMBER OF EOTA

European Technical Assessment ETA-22/0762 of 2022/12/20

General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:	EJOT Solar Fasteners
Product family to which the above construction product belongs:	Fastening screws with welded or cold formed set screws
Manufacturer:	EJOT SE & Co. KG Market Unit Construction In der Stockwiese 35 DE-57334 Bad Laasphe Telephone: +49 2752 9080 www.ejot.de
Manufacturing plant:	EJOT production plants
This European Technical Assessment contains:	14 pages including 9 annexes which form an integral part of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	EAD 220169-00-0402 – Fastening screws with welded or cold formed set screws
This version replaces:	-

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

The EJOT Solar Fasteners are fastening screws (self-drilling and self-tapping screws) with welded set screws for parallel or elevated solar and photovoltaic installations or support profiles of solar installations.

The fastening screw is threaded over part of its length and has a welded set screw with nuts and washers for fastening the brackets of the solar or photovoltaic frame. The drilling point or self-tapping tip/stud and the thread of the screw depends on the material of the supporting structure in which the screw is fixed, i.e. steel or timber.

This ETA covers fastening screws and set screws made of stainless steel.

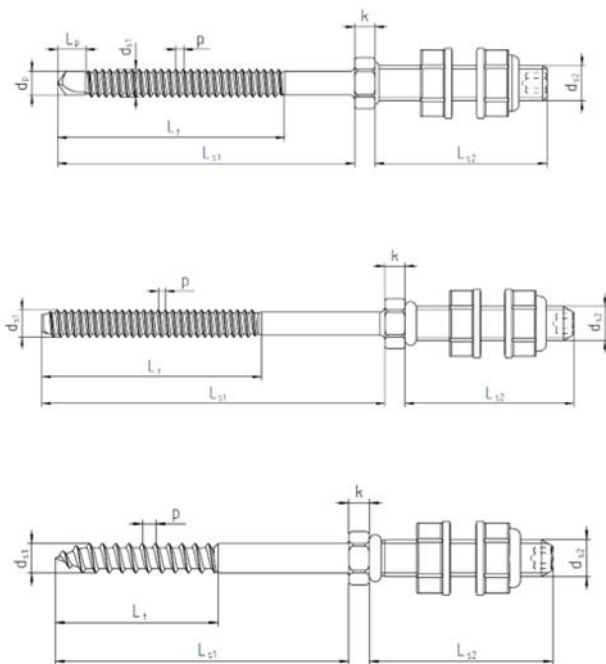Examples of the fasteners are shown in Figure 1.

Figure 1   Fastening screws with welded set screws

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

The EJOT Solar Fasteners with welded or cold formed set screws are intended for the systematic load-transmitting connection of add-on parts (especially for elevated solar and photovoltaic installations or support profiles of solar installations) with supporting structures made from steel, concrete or timber.

The Solar Fasteners are bolted through the crest of sheeting panels made from steel or aluminium or of sandwich panels with steel or aluminium faces.

The Solar Fasteners are subject to static and/or quasistatic loads in tension or compression, shear and a combination of tension or compression and shear.

The installation should be carried out according to the ETA holder's specifications, using the specific kit components, manufactured by suppliers of the ETA holder and carried out by appropriately qualified staff with supervision of the technical responsible of the site.

The verification and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of at least 25 years, that the conditions lay down for the installation, packaging, transport and storage as well as appropriate use, maintenance and repair are met.

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 product 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.

Characteristic	Assessment of characteristic
3.1 Mechanical resistance and stability (BWR 1)	
Characteristic pull-through resistance, $N_{Rk,I}$	See annex 15-16
Characteristic pull-out resistance, $N_{Rk,II}$	See annex 17 – 20
Bending capacity in case of thermal expansion of the outer face of sandwich panels, max u	See annex 17 – 20
Characteristic bearing resistance, F_{Rk}	See annex 15-16
Characteristic yield moment, $M_{y,Rk}$	See annex 17 – 20
3.2 Safety in case of fire (BWR 2)	
Reaction to fire	The EJOT Solar fasteners are classified as **Euroclass A1** in accordance with EN 13501-1 and Commission delegated Regulation 2016/364 on the basis of EC Decision 96/603/EC (as amended) without the need for further testing.
3.3 Aspects of durability	
Durability	See annex 7

3.8 Methods of verification
The product is assessed in accordance with EAD 220169-00-0402.

3.9 General aspects related to the fitness for use of the product.

The European Technical Assessment is issued for the product based on agreed data/information, deposited with ETA-Danmark, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark will decide if such changes affect the ETA and consequently the validity of the CE marking based on the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

The EJOT Solar fasteners are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base.
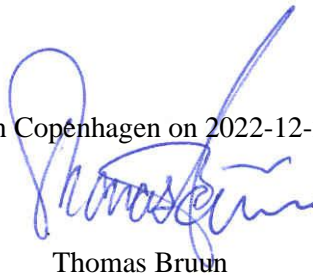
4.1 AVCP system
According to the decision 1998/214/ECEC of the European Commission, as amended by 2001/596/EC, the system(s) of assessment and verification of constancy of performance (see Annex III to Regulation (EU) No 305/2011) is 2+.

5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD.
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2022-12-20 by

Thomas Bruun
Managing Director, ETA-Danmark

Annex **1** of 21 of European Technical Assessment no. ETA-22/0762
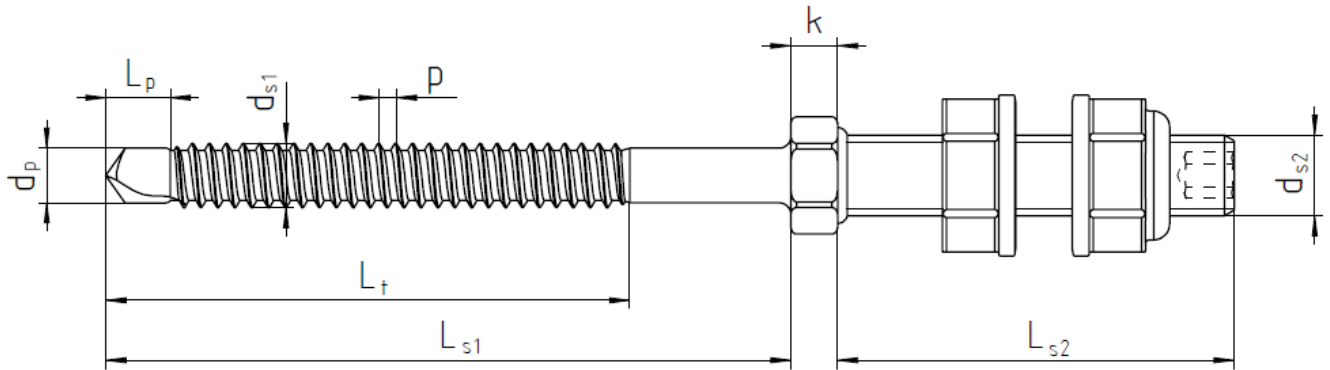
Figure 1: Solar Fastener with JT-thread for steel supporting structures
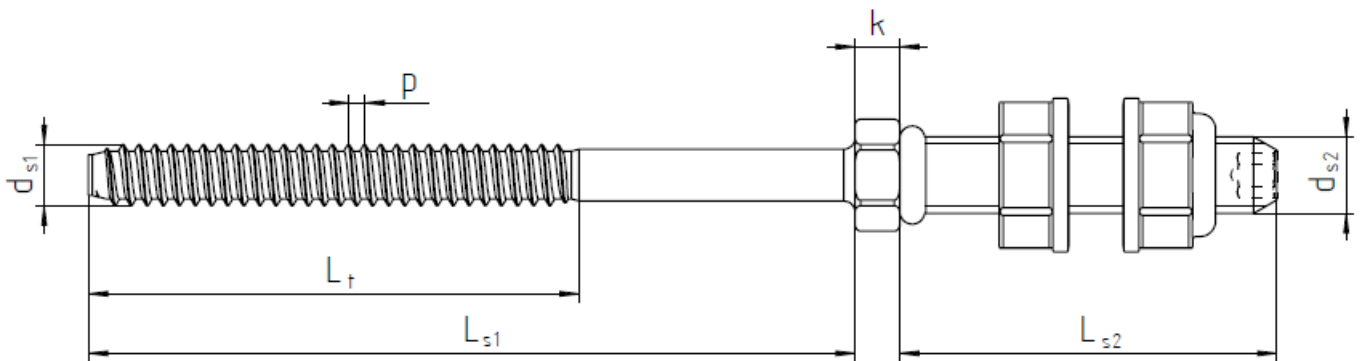
Figure 2: Solar Fastener with JZ-thread for steel supporting structures

Solar fastener JA, JT and JZ	
Terms and explanations	**Annex 1**

Annex **2** of 21 of European Technical Assessment no. ETA-22/0762
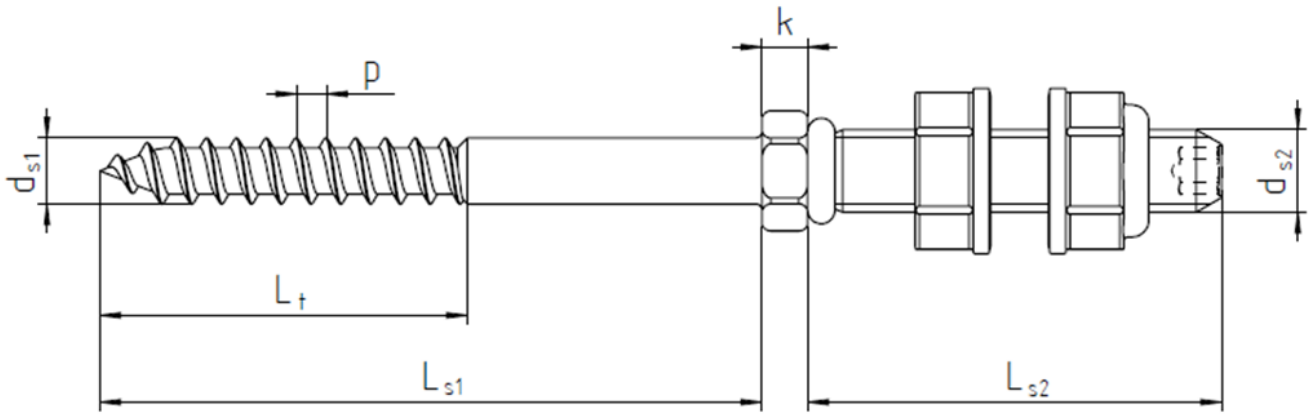
Figure 3: Solar Fastener with JA-thread for timber supporting structures

L_{s1}	Length of screw
L_{s2}	Length of set screw
L_t	Length of thread
L_p	Length of drill tip
k	Head height
d_{s1}	Diameter of screw
d_{s2}	Diameter of set screw
d_c	Core diameter
d_p	Diameter of drill tip
P	Pitch of the thread

Solar fastener JA, JT and JZ

Terms and explanations

Annex 2

Annex **3** of 21 of European Technical Assessment no. ETA-22/0762
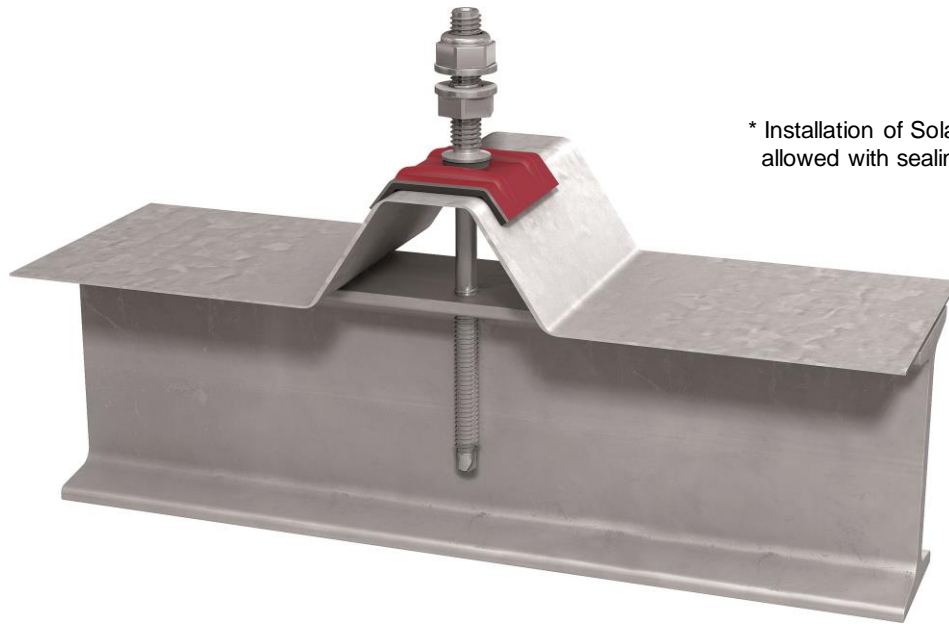
* Installation of Solar fastener is only
allowed with sealing washer ≥ 16mm.

**Figure 4: Application Solar Fastener on profiled sheeting (e.g. trapazoidal /
sinusoidal) and steel supporting structure**

L_2

L_1

Component I:
Trapezoidal sheeting

Component II:
Steel supporting
structure

**Figure 5: Application solar fastener on trapezoidal sheeting and steel supporting
structure**

Solar fastener JA, JT and JZ

Application example

Annex 3

Annex **4** of 21 of European Technical Assessment no. ETA-22/0762
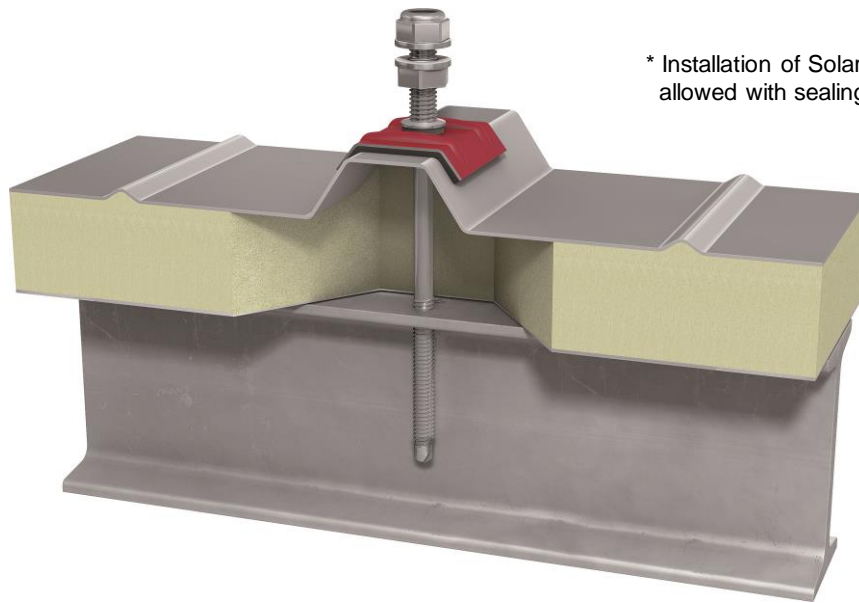
* Installation of Solar fastener is only allowed with sealing washer ≥ 16mm.

Figure 6: Application Solar Fastener on sandwich panel and steel supporting structure

Component I:
Sandwich panel

Component II:
Steel supporting structure

Figure 7: Application Solar Fastener on sandwich panel and steel supporting structure

Solar fastener JA, JT and JZ	
Application example	**Annex 4**

* Installation of Solar fastener is only
allowed with sealing washer ≥ 16mm.
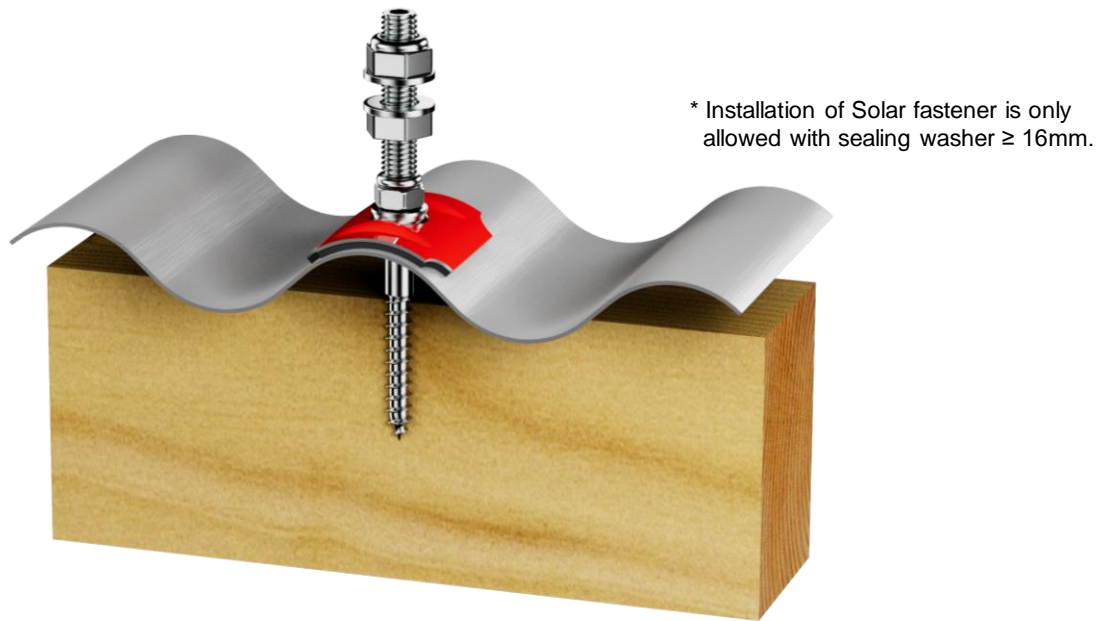
Figure 8: Application Solar Fastener on profiled sheeting (e.g. trapazoidal / sinusoidal) and timber supporting structure
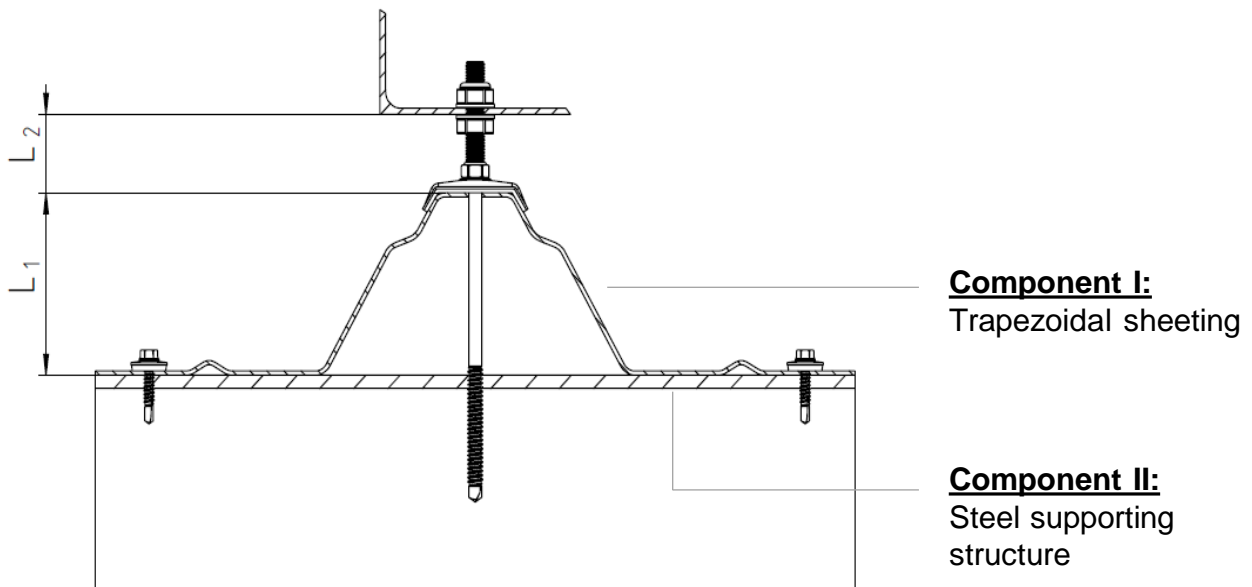
Component I:
Trapezoidal sheeting

Component II:
Timber supporting
structure
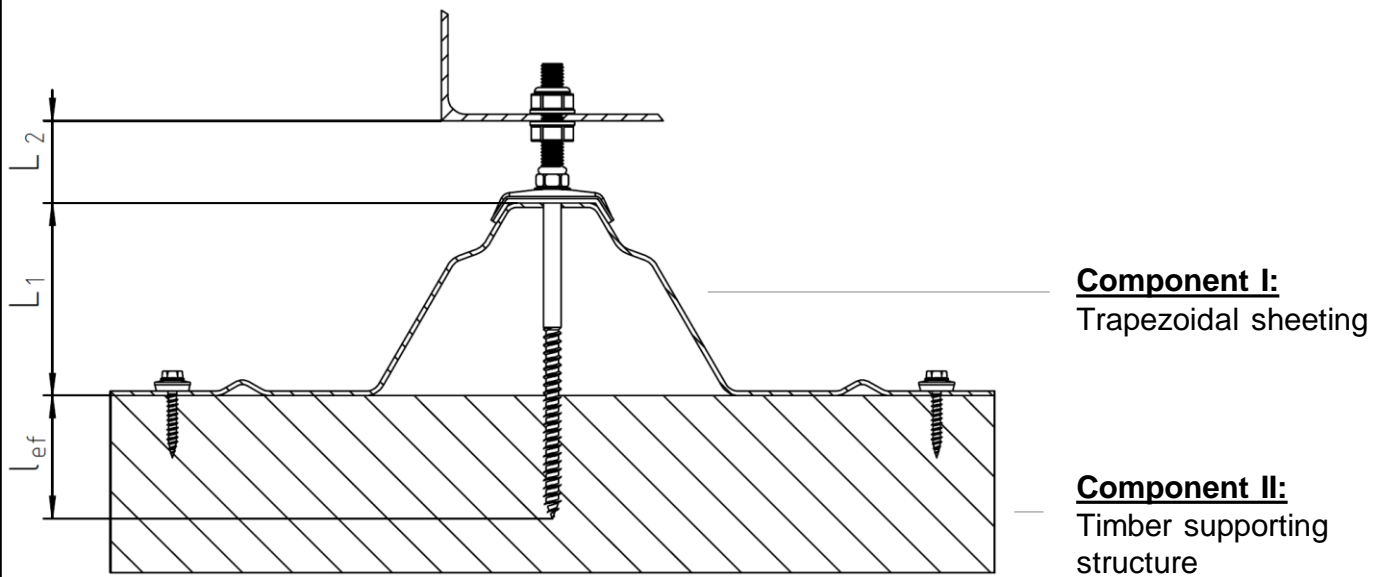
Figure 9: Application Solar Fastener on trapezoidal sheeting and timber supporting structure

Solar fastener JA, JT and JZ	
Application example	**Annex 5**

Annex **6** of 21 of European Technical Assessment no. ETA-x22/0762
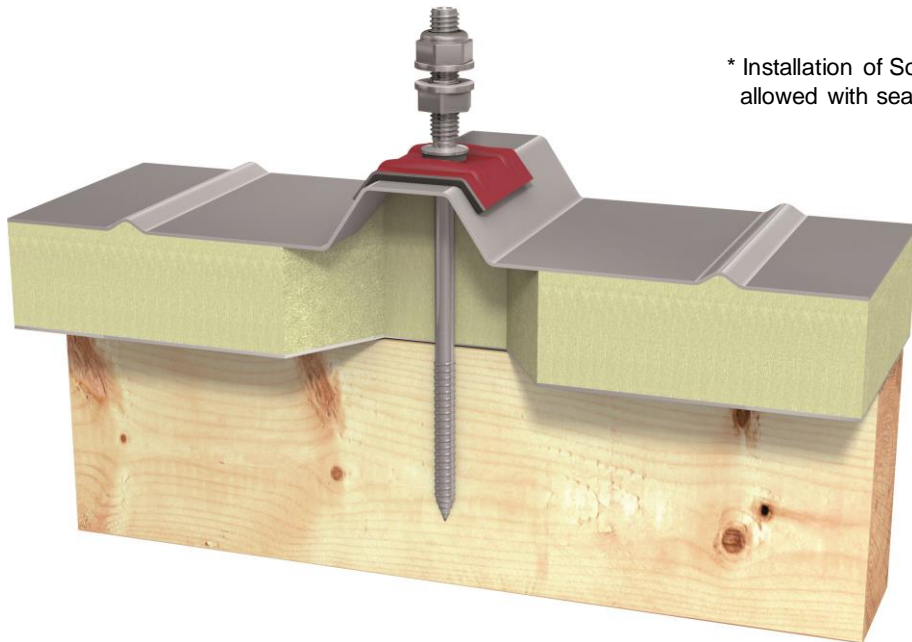
* Installation of Solar fastener is only allowed with sealing washer ≥ 16mm.

Figure 10: Application Solar Fastener on sandwich panel and timber supporting structure

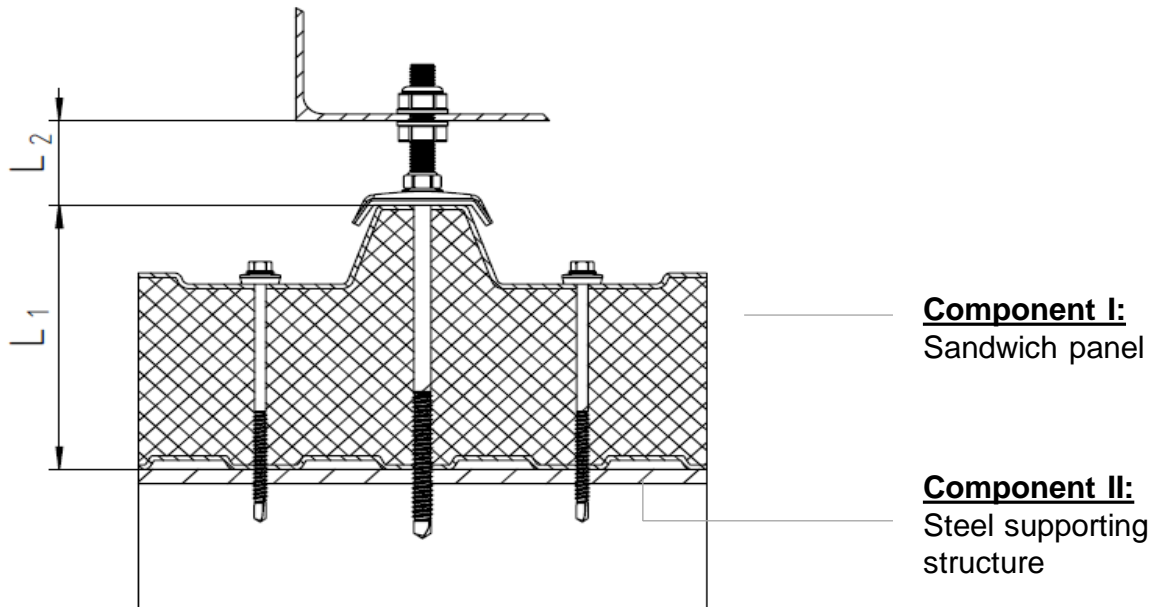**Component I:**
Sandwich panel

Component II:
Timber supporting structure

Figure 11: Application Solar Fastener on sandwich panel and timber supporting structure

Solar fastener JA, JT and JZ

Application example

Annex 6

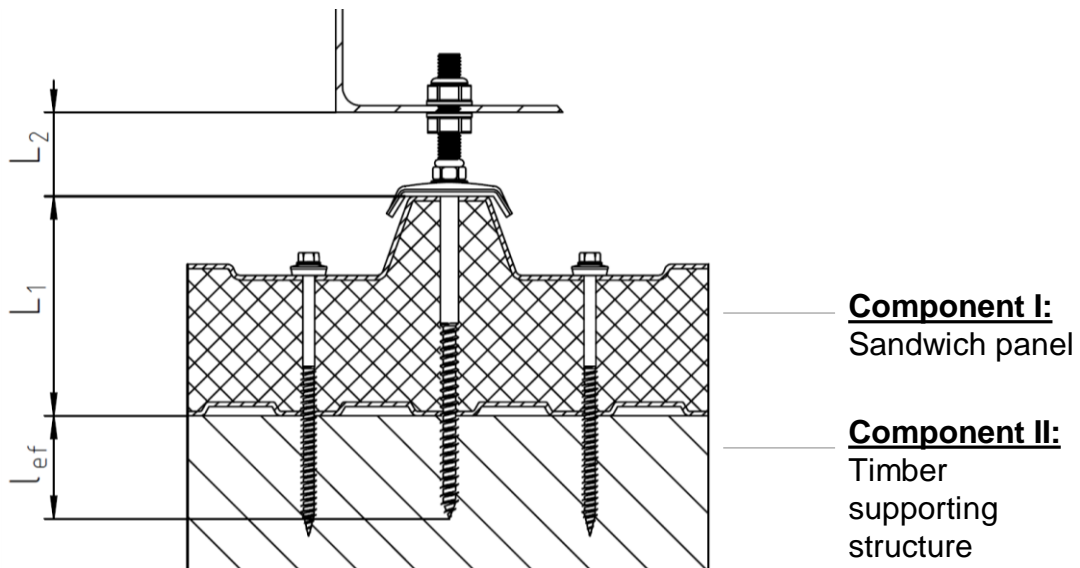Annex **7** of 21 of European Technical Assessment no. ETA-22/0762

Solar Fastener:

Material:	stainless steel A2 acc. to EN ISO 3506, min. CRC II acc. to EN 1993-1-4
	stainless steel A4 acc. to EN ISO 3506, min. CRC III acc. to EN 1993-1-4

Metal sheeting: (component I)

Material:	steel	$R_m \geq 360$ N/mm² (S280GD - EN 10346)
		$R_m \geq 390$ N/mm² (S320GD - EN 10346)
	aluminium	$R_m \geq 165$ N/mm²
		$R_m \geq 215$ N/mm²
Dimensions:	nominal sheet thickness	
	steel	$t_I \geq 0.40$ mm
	aluminium	$t_I \geq 0.50$ mm

Sandwich panels: (component I)

A national approval or CE-marking acc. EN 14509 of the sandwich panel is mandatory.

Exterior layer:

Material:	steel	$R_m \geq 360$ N/mm² (S280GD EN 10346)
		$R_m \geq 390$ N/mm² (S320GD EN 10346)
	aluminium	$R_m \geq 165$ N/mm²
		$R_m \geq 215$ N/mm²
Dimensions:	nominal sheet thickness	
	steel	$t_I \geq 0.40$ mm
	aluminium	$t_I \geq 0.50$ mm

Core material:

Cross panel tensile strength:	$f_{Ct} \geq 0.06$ N/mm²
Shear strength for short term loading:	$f_{Cv} \geq 0.05$ N/mm²

Supporting structure: (component II)

Material:	please see annex for corresponding fastener
Dimensions:	minimum thickness for steel is $t_{II} \geq 1.5$ mm
	screw-in length of timber supporting structure $\geq 4 \cdot d_{s1}$

Solar fastener JA, JT and JZ	**Annex 7**
Performance characteristics & special conditions	

Annex **8** of 21 of European Technical Assessment no. ETA-22/0762

Performance characteristics

$N_{Rk,I}$	Characteristic pull-through resistance (component I)
$N_{Rk,II}$	Characteristic pull-out resistance (component II made of steel)
$N_{Rk,II,t}$	Characteristic pull-out resistance (component II made of timber)
$N_{Rk,II,c}$	Characteristic compression resistance (component II made of timber)
max u	Maximum allowed head displacement of the fastening screw
$F_{Rk,I}$	Characteristic bearing resistance (component I)
$F_{Rk,II}$	Characteristic bearing resistance (component II)
$N_{pl,Rk}$	Characteristic value of the resistance to axial force of the cross-section
$M_{pl,Rk}$	Characteristic value of plastic bending moment resistance
$M_{y,Rk}$	Characteristic yield moment
$f_{ax,k}$	Characteristic withdrawal parameter (component II made of timber)
$f_{h,k}$	Characteristic value of embedding strength component II made of timber (acc. EN 1995-1-1:2004, section 8.3, equation (8.15))
l_{ef}	Effective screw-in length in component II made of timber

Special conditions

For asymmetric components II made of metal (e.g. Z- or C-shaped profiles) with component thickness $t_{II} \leq 2$ mm, the characteristic values $N_{Rk,I}$ and $N_{Rk,II}$ shall be reduced to 70%.

Solar fastener JA, JT and JZ	
Performance characteristics & special conditions	**Annex 8**

Annex **9** of 21 of European Technical Assessment no. ETA-22/0762

Design values

The design values have to be determined as following:

$F_{Rd,l}$	Design Value of bearing resistance
$M_{pl,Rd}$	Design value of plastic bending moment resistance
$M_{y,Rd}$	Design value of yield moment
γ_M	Partial factor for bearing resistance; 1.33 or acc. to National Annex to EN 1993-1-4
γ_{M0}	Partial factor for resistance of cross-section (yield moment and plastic bending resistance; 1.1 or acc. to National Annex EN 1993-1-4
γ_{M1}	Partial factor for resistance to instability; 1.1 or acc. to National Annex to EN 1993-1-4
k_{mod}	Modification factor according to National Annex to EN 1995-1-1

Solar fastener JA, JT and JZ

Design values

Annex 9

Annex **10** of 21 of European Technical Assessment no. ETA-22/0762

Design

The solar fastener is designed on the basis of a mechanical system of a simply supported member of span L_1 with a cantilever with length L_2 placed on top, see Figure 12). The forces V_{Ed} and N_{Ed} act at the head of the cantilever, causing both axial force and bending in the system. If N_{Ed} acts with an eccentricity to the screw axis, this results in an additional bending moment M_{Ed} at the head:

V_{Ed}   Force acting on the solar fastener, parallel to the plane of the sheeting or sandwich panel (e.g. caused by roof thrust $V_{Ed,x}$ plus a transverse shear force $V_{Ed,x}$, see Figure 13).

N_{Ed}   Force acting on the solar fastener, perpendicular to the plane of the sheeting or sandwich panel

M_{Ed}   Moment acting on the solar fastener (e.g. caused by eccentricity when using an adapter plate)

The resistances tabulated in Annexes 15 to 20 are the resistances at the supports of the member. Thus they are assigned to components I and II by subscripts I and II.
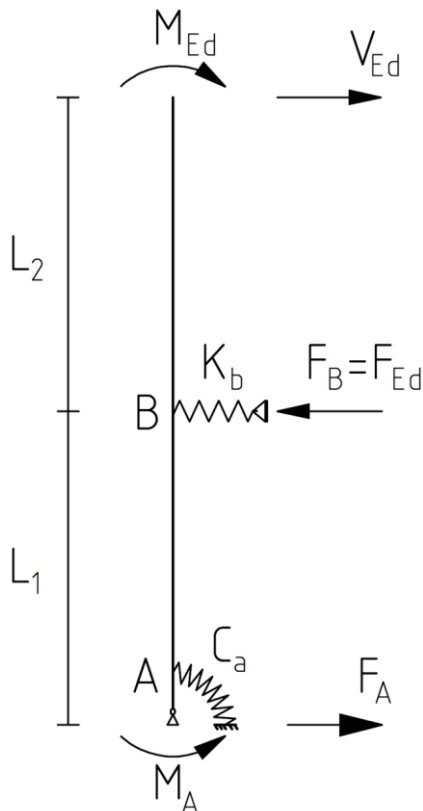
$$V_{Ed} = \sqrt{V_{Ed,x}^2 + V_{Ed,y}^2}$$

Figure 12: Mechanical system   **Figure 13: Resulting shear forces**
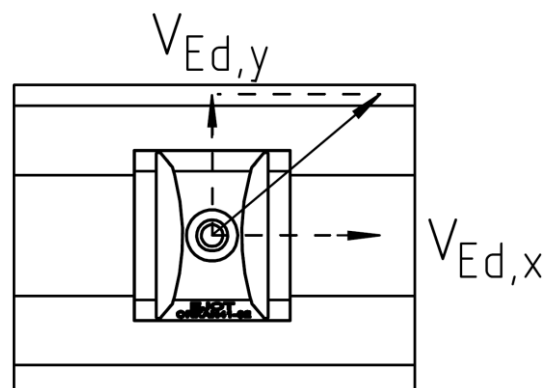
Solar fastener JA, JT and JZ

Design criteria

Annex 10

Design for shear forces V_{Ed} – General Method

L_1 and L_2	see figures 5/7/9/11
E	190000 N/mm^2
I	moment of inertia of the screw
K_b	spring stiffness at support provided by component I
C_a	spring stiffness (clamping in component II)
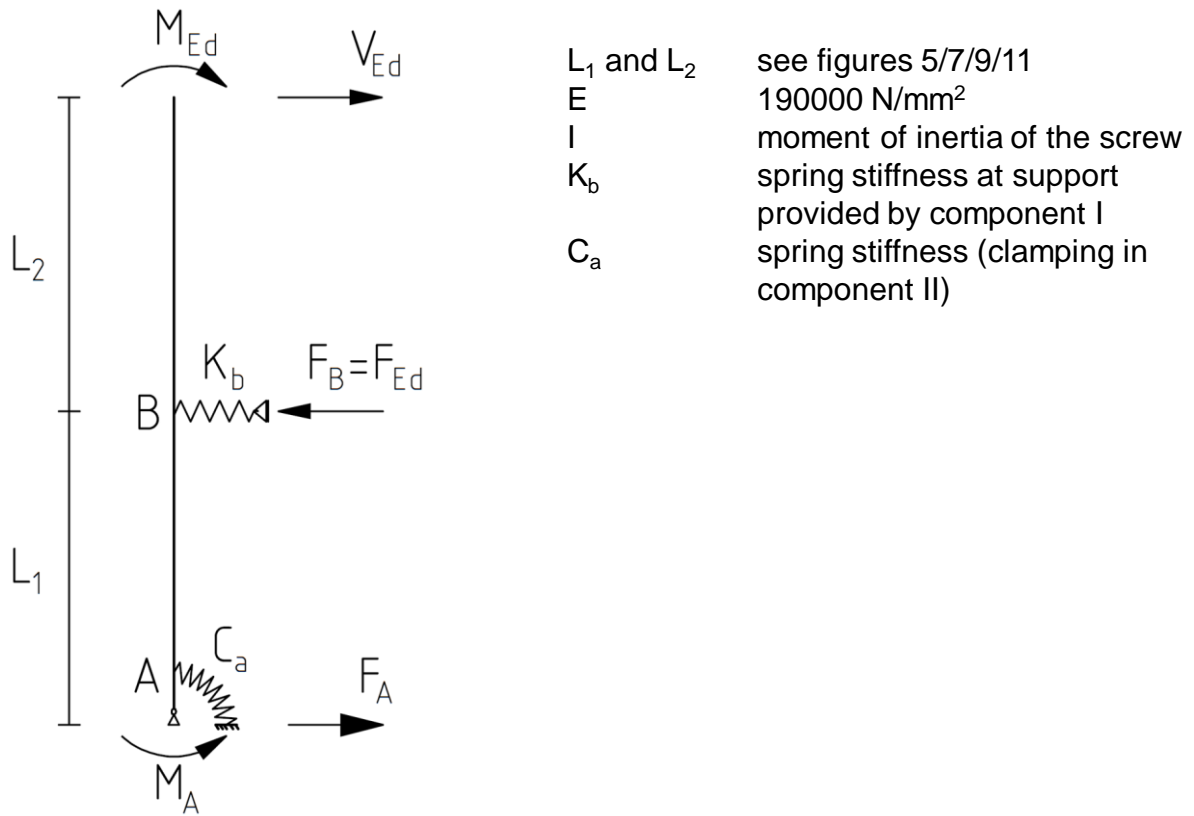
Figure 14: General mechanical system

$$\frac{V_{Ed}\,(L_1 + L_2) + M_{Ed}}{L_1} - \frac{-L_1^3\,K_b\,C_a\,(M_{Ed} + L_2\,V_{Ed}) + 6\,E\,I\,C_a\,(V_{Ed}(L_1 + L_2) + M_{Ed})}{2\,L_1^4\,K_b\,C_a + 6\,E\,I\,C_a\,L_1 + 6\,L_1^3\,K_b\,EI} \leq \frac{F_{Rk,I}}{\gamma_M}$$

Solar fastener JA, JT and JZ	
Design criteria	**Annex 11**

Annex **12** of 21 of European Technical Assessment no. ETA-22/0762

Design for shear forces V$_{Ed}$ – Simplified Method
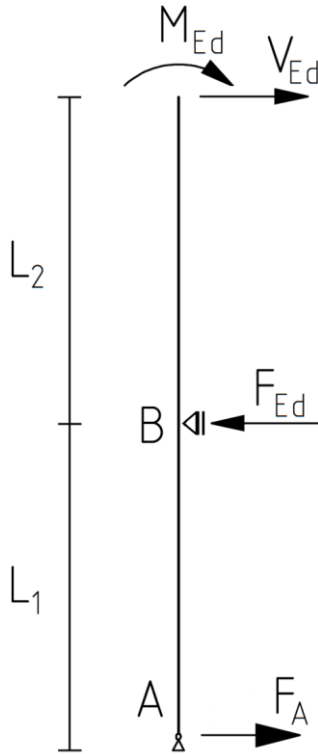
L_1 and L_2 see figures 5/7/9/11

Figure 15: Simplified mechanical system

Steel supporting structure $t_{II} \leq \frac{1}{2} d_{S1}$:

$$V_{Ed} \left(\frac{L_2}{L_1} + 1 \right) + \frac{M_{Ed}}{L_1} \leq \frac{F_{Rk,I}}{\gamma_M}$$

$$V_{Ed} \, L_2 + M_{Ed} \leq \frac{M_{pl,Rk}}{\gamma_{M0}}$$

Steel supporting structure $t_{II} > \frac{1}{2} d_{S1}$ and timber supporting structure:

$$V_{Ed} \left(\frac{3 \, L_2}{2 \, L_1} + 1 \right) + \frac{3 \, M_{Ed}}{2 \, L_1} \leq \frac{F_{Rk,I}}{\gamma_M}$$

$$V_{Ed} \, L_2 + M_{Ed} \leq \frac{M_{pl,Rk}}{\gamma_{M0}}$$

$$\frac{V_{Ed} \, L_2}{2} + \frac{M_{Ed}}{2} \leq \frac{M_{y,Rk}}{\gamma_M}$$

Solar fastener JA, JT and JZ

Design criteria

Annex 12

Design for shear forces $V_{Ed,y}$ – Sheeting

L_1 see figures 5/7/9/11
$f_{y,k}$ yield strength of the sheeting
a   distance between solar fasteners in x-direction (in the direction of span of the sheeting)
b_u, b_o, b_s see Figure xy

Figure 16: Dimensions of the sheeting

$$V_{Ed,x} \leq \frac{f_{y,k}}{\gamma_{M0}} \frac{a\, t_I^2 (b_u + 2\, b_u + b_o)}{3\, L_1 b_o}$$

Solar fastener JA, JT and JZ

Design criteria

Annex 13

Design for axial forces N_{Ed} and bending M_{Ed} – Buckling design
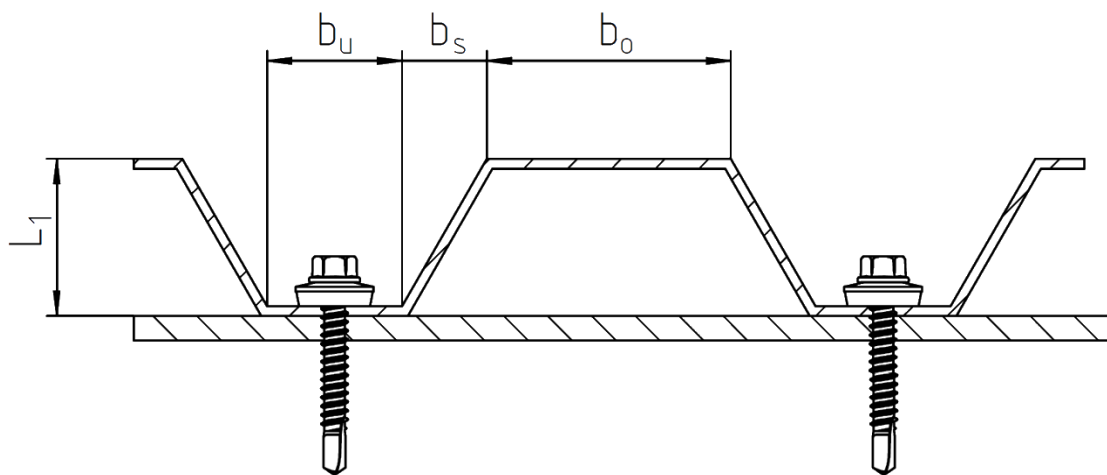
$$\frac{N_{Ed}}{N_{pl,Rd}} + \frac{\alpha \cdot V_{Ed} \cdot L_2}{M_{pl,Rd}} + \frac{\alpha \cdot N_{Ed} \cdot L_2}{20 \cdot M_{pl,Rd}} \leq 1$$

N_{Ed} design value of the acting compressive force

$N_{pl,Rd}$ design value of the resistance to axial force of the cross-section
$N_{pl,Rd} = N_{pl,Rk} / \gamma_{M1}$

JT3/6-3-SBx8.0xL $N_{pl,Rk} = 12{,}08$ kN
JZ3-SBx8.0xL $N_{pl,Rk} = 12{,}08$ kN
JA3-SBx8.0xL $N_{pl,Rk} = 9{,}85$ kN
JA3-SBx10.0xL $N_{pl,Rk} = 12{,}18$ kN

V_{Ed} design value of acting shear force

$M_{pl,Rd}$ design value of bending moment resistance
$M_{pl,Rd} = M_{pl,Rk} / \gamma_{M1}$

α amplification factor

$$\alpha = \frac{1}{1 - \dfrac{N_{Ed}}{N_{crd}}}$$

N_{cr} elastic critical axial force

$$N_{cr} = \frac{\pi^3 \, E \, d^4}{64 \, (\beta_1 \, L_1)^2}$$

E 190000 N/mm^2

L_1 and L_2 see figures 5/7/9/11

d   diameter

JT3/6-3-SBx8.0xL d = 6,75 mm
JZ3-SBx8.0xL   d = 6,75 mm
JA3-SBx8.0xL   d = 8,0 mm
JA3-SBx10.0xL   d = 10,0 mm

β_1 $1.0 + 1.87 \times L_2/L_1$ steel supporting structure $t_{\parallel} \leq \frac{1}{2}$ d
                     $0.7 + 1.85 \times L_2/L_1$ steel supporting structure $t_{\parallel} > \frac{1}{2}$ d or timber
                                            supporting structure

Solar fastener JA, JT and JZ

Design criteria

Annex 14

Annex **15** of 21 of European Technical Assessment no. ETA-22/0762

Pull-through resistance N$_{Rk,I}$

	t$_{N,I}$ [mm]	Head/washer diameter ≥ 16 mm
Steel R$_m$ ≥ 360 N/mm²	**0.40**	1.38
	0.50	1.77
	0.55	1.96
	0.63	2.27
	0.75	2.73
	0.88	3.23
	1.00	3.69

	t$_{N,I}$ [mm]	Head/washer diameter ≥ 16 mm
Steel R$_m$ ≥ 390 N/mm²	**0.40**	1.50
	0.50	1.91
	0.55	2.12
	0.63	2.45
	0.75	2.95
	0.88	3.49
	1.00	3.99

Characteristic bearing resistance F$_{Rk,I}$

	Material	Steel R$_m$ ≥ 360 N/mm²					
	Component I [mm]	0.40*	0.55*	0.63*	0.75	0.88	≥ 1.00
F$_{Rk,I}$ [kN]	JT3/JT6-SB-3-8.0xL	0.56	1.14	1.48	1.74	2.39	3.01
	JZ3-SB-8.xL	0.56	1.14	1.48	1.74	2.39	3.01
	JA3-SB-8.0xL	0.61	1.24	1.61	1.90	2.61	3.28
	JA3-SB-10.0xL	0.69	1.38	1.80	2.12	2.91	3.67

	Material	Steel R$_m$ ≥ 390 N/mm²					
	Component I [mm]	0.40*	0.55*	0.63*	0.75	0.88	≥ 1.00
F$_{Rk,I}$ [kN]	JT3/JT6-SB-3-8.0xL	0.61	1.23	1.60	1.99	2.74	3.44
	JZ3-SB-8.xL	0.61	1.23	1.60	1.99	2.74	3.44
	JA3-SB-8.0xL	0.66	1.34	1.75	2.17	2.98	3.75
	JA3-SB-10.0xL	0.74	1.50	1.95	2.42	3.33	4.19

* Intermediate values may be obtained by linear interpolation.

Solar fastener JA, JT and JZ	**Annex 15**
Pull-through & bearing resistance for component I made of steel	

Annex **16** of 21 of European Technical Assessment no. ETA-22/0762

Pull-through resistance $N_{Rk,I}$

	$t_{N,I}$ [mm]	Head/washer diameter ≥ 16 mm
Aluminium R_m ≥ 165 N/mm²	**0.40**	-
	0.50	0.46
	0.60	0.55
	0.70	0.64
	0.80	0.73
	0.90	0.82
	1.00	0.91

	$t_{N,I}$ [mm]	Head/washer diameter ≥ 16 mm
Aluminium R_m ≥ 215 N/mm²	**0.40**	-
	0.50	0.60
	0.60	0.72
	0.70	0.83
	0.80	0.95
	0.90	1.07
	1.00	1.19

Characteristic bearing resistance $F_{Rk,I}$

	Material	aluminium R_m ≥ 165 N/mm²		
	Component I [mm]	**0.50**	**0.60**	**≥ 0.70**
$F_{Rk,I}$ [kN]	JT3-SB-3-8.0xL	0.23	0.34	0.46
	JZ3-SB-8.0xL	0.23	0.34	0.46
	JA3-SB-8.0xL	0.25	0.37	0.49
	JA3-SB-10.0xL	0.28	0.42	0.56

|	Material	aluminium R_m ≥ 215 N/mm²		
	Component I [mm]	**0.50**	**0.60**	**≥ 0.70**
$F_{Rk,I}$ [kN]	JT3-SB-3-8.0xL	0.30	0.45	0.59
	JZ3-SB-8.0xL	0.30	0.45	0.59
	JA3-SB-8.0xL	0.33	0.49	0.65
	JA3-SB-10.0xL	0.37	0.54	0.72

* Intermediate values may be obtained by linear interpolation.

Solar fastener JA, JT and JZ	
Pull-through & bearing resistance for component I made of aluminium	**Annex 16**

Annex **17** of 21 of European Technical Assessment no. ETA-22/0762
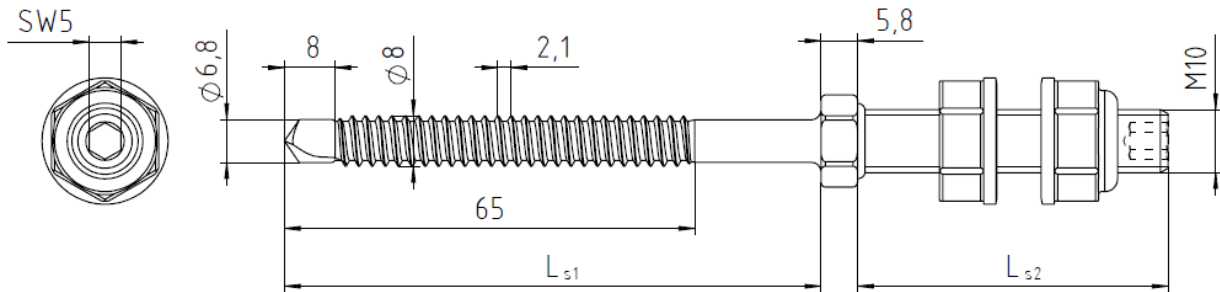
Material:

Component I: see annex 7

Component II: S235, S275, S355 - EN 10025-2
                       S280GD to S450GD & HX300LAD to HX460LAD - EN 10346

Drilling capacity: $t_{II} \leq 3$ mm

Pre-drill diameter: see table

$M_{pl,Rk}$:   33.35 Nm

$M_{y,Rk}$:   46.45 Nm

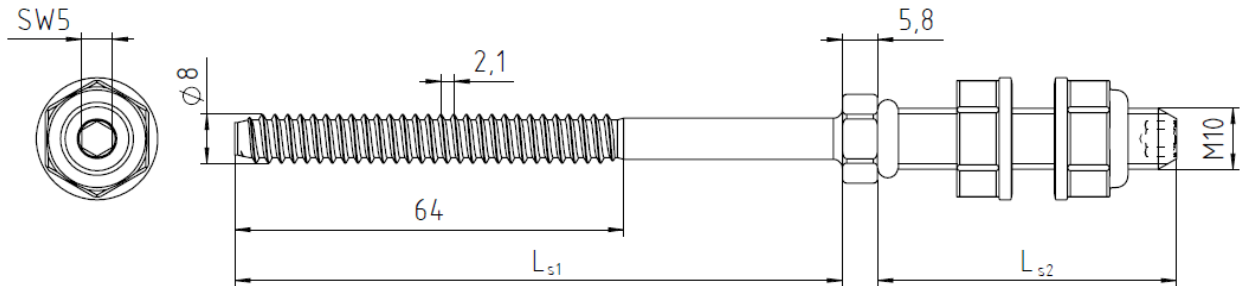| Component II t_{II} [mm]	1.50	2.00	3.00	4.00	5.00	6.00	8.00	≥ 10.00
$N_{Rk,II}$ [kN]	2.20	3.40	5.80	10.05	15.29	19.03	19.03	19.03
Max u [mm] for D_F 40	8.00	6.00	4.00	3.00	2.80	2.80	2.80	2.80
60	12.00	9.00	6.00	4.50	4.20	4.20	4.20	4.20
80	16.00	12.00	8.00	6.00	5.60	5.60	5.60	5.60
100	20.00	15.00	10.00	7.50	7.00	7.00	7.00	7.00
120	24.00	18.00	12.00	9.00	8.40	8.40	8.40	8.40
≥ 140	28.00	21.00	14.00	10.50	9.80	9.80	9.80	9.80
Pre-drill diameter [mm]	Not necessary	Not necessary	Not necessary	6.80	7.00	7.00	7.20	7.40

- For intermediate values for the thickness of supporting structure $N_{Rk,II}$ must be selected for the smaller component thickness

Solar fastener JA, JT and JZ

JT3-SB-3-8,0xL_{s1}/L_{s2}; JT6-SB-3-8,0xL_{s1}/L_{s2}

Annex 17

Annex **18** of 21 of European Technical Assessment no. ETA-22/0762

Material:

Component I: see annex 7

Component II: S235, S275 and S355 - EN 10025-2
                      S280GD to S350GD - EN 10346

Drilling capacity: -

Pre-drill diameter: see table

$M_{pl.Rk}$:   33.35 Nm

$M_{y,Rk}$:   46.45 Nm

| Component II t_{II} [mm]	1.50	2.00	3.00	4.00	5.00	6.00	8.00	≥ 10.00
$N_{Rk,II}$ [kN]	2.20	3.40	5.80	10.05	15.29	19.03	19.03	19.03
Max u [mm] for D_F 40	8.00	6.00	4.00	3.00	2.80	2.80	2.80	2.80
60	12.00	9.00	6.00	4.50	4.20	4.20	4.20	4.20
80	16.00	12.00	8.00	6.00	5.60	5.60	5.60	5.60
100	20.00	15.00	10.00	7.50	7.00	7.00	7.00	7.00
120	24.00	18.00	12.00	9.00	8.40	8.40	8.40	8.40
≥ 140	28.00	21.00	14.00	10.50	9.80	9.80	9.80	9.80
Pre-drill diameter [mm]	6.80	6.80	6.80	6.80	7.00	7.00	7.20	7.40

-   For intermediate values for the thickness of supporting structure $N_{Rk,II}$ must be selected for the smaller
    component thickness

Solar fastener JA, JT and JZ

JZ3-SB-8,0xL_{s1}/L_{s2}; JZ5-SB-8,0xL_{s1}/L_{s2}

Annex 18

Annex **19** of 21 of European Technical Assessment no. ETA-22/0762
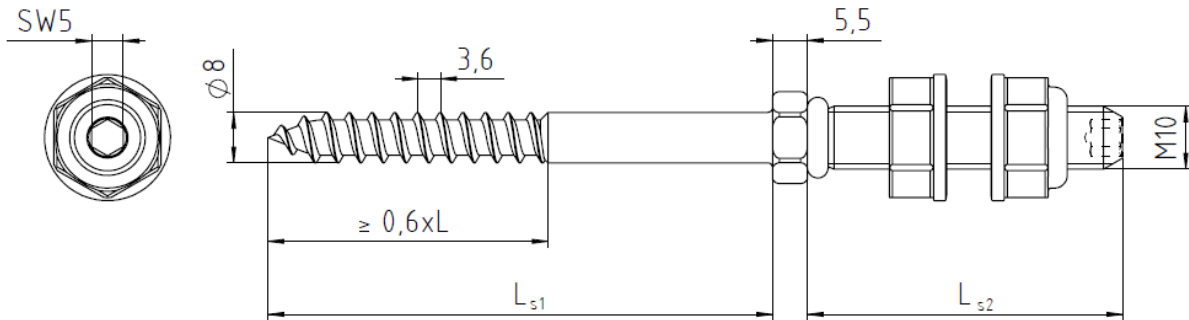
Material:
Component I: see annex 7
Component II: timber according EN 14080-1 & EN 14081

Drilling capacity: -
Pre-drill diameter: see table
$M_{pl,Rk}$:   40.66 Nm
$M_{y,Rk}$:   47.86 Nm
$f_{ax,k}$:   8.575 N/mm²

| Component II l_{ef} [mm]	32	40	48	56	64	72	80	88	96
$N_{Rk,II,t}$ [kN]	2.47	3.09	3.70	4.32	4.94	5.56	6.17	6.79	7.41
$N_{Rk,II,c}$ [kN]	1.10	1.37	1.65	1.92	2.20	2.47	2.74	3.02	3.29
Max u [mm] for D_F 40	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
60	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
80	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
100	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
120	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
≥ 140	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Pre-drill diameter [mm]	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50

- The values indicated above, depending on the screw depth l_{ef} shall apply to k_{mod} = 0.90 ($N_{Rk,II,t}$) / 0.50 ($N_{Rk,II,c}$) and the timber strength class C24 (ρ_k = 350 kg/m³). For other values of k_{mod} and strength classes see Annex 8.

Solar fastener JA, JT and JZ

JA3-SB-8.0 x L_{s1}/L_{s2}

Annex 19

Annex **20** of 21 of European Technical Assessment no. ETA-22/0762
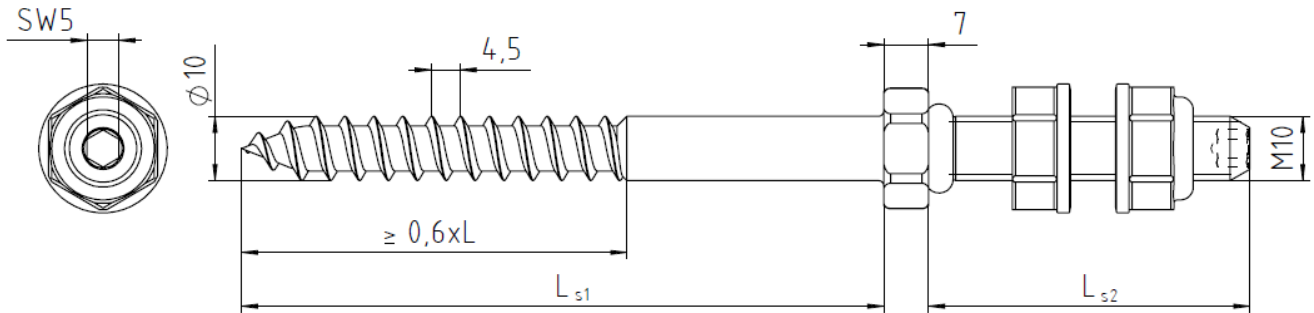
Material:

Component I: see annex 7

Component II: timber according EN 14080-1 & EN 14081

Drilling capacity: -

Pre-drill diameter: see table

$M_{pl,Rk}$: 40.66 Nm

$M_{y,Rk}$: 47.86 Nm

$f_{ax,k}$: 8.575 N/mm²

Component II l_{ef} [mm]	40	50	60	70	80	90	100	110	120
$N_{Rk,II,t}$ [kN]	3.09	3.86	4.63	5.40	6.17	6.95	7.72	8.49	9.26
$N_{Rk,II,c}$ [kN]	1.72	2.14	2.57	3.00	3.43	3.86	4.29	4.72	5.15
Max u [mm] for D_F 40	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
60	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
80	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
100	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
120	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
≥ 140	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Pre-drill diameter [mm]	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

- The values indicated above, depending on the screw depth l_{ef} shall apply to k_{mod} = 0.90 ($N_{Rk,II,t}$) / 0.50 ($N_{Rk,II,c}$) and the timber strength class C24 (ρ_k = 350 kg/m³). For other values of k_{mod} and strength classes see Annex 8.

Solar fastener JA, JT and JZ

JA3-SB-10.0 x L_{s1}/L_{s2}

Annex 20

Annex **21** of 21 of European Technical Assessment no. ETA-22/0762

Planning

- In case the Solar Fasteners should be loaded transverse to the profiled sheeting or sandwich panel (perpendicular to direction of span), the profiled sheeting or sandwich panels should be fastened to the supporting structure at the same height in the adjacent troughs (see figures 5,7,9,11). The fastenings must be designed that they transfer the shear forces from the Solar Fasteners into the supporting structure.

- In case the Solar Fasteners are loaded in longitudinal direction to the profile or sandwich panels remote fasteners between the corresponding sheeting or sandwich panel and the supporting structure may be used for load transfer.

- The edge distance of the Solar Fasteners in the direction of span of the sandwich panels shall be a minimum of 250mm.
- The distance of the Solar Fasteners in the clamping direction between one other should be a minimum of 500mm.

- A fastening in the edge ribs of the laying area is not permitted.

- Existing fastening points and their fasteners may be used and replaced by the Solar Fastener. In this case, the solar fastener may be used to stabilise the structure.

Design & Installation

- The structural design of the Solar Fasteners is shown in Figures 4 - 11.

- It must be ensured through the design that no contact corrosion can occur and that no compressive and tensile forces are introduced into the profile or sandwich panels.

- The Solar Fasteners should be installed at right angels to the part surface, to ensure a proper bearing and rain-proof fastening.

- When mounting Solar Fasteners via sandwich panels, it must be ensured that the roof shells are not excessively deformed.

- The Solar Fasteners, including the elements to be fastened, must be stored and mounted in a clean, dry and grease-free condition.

- The use of impact screw drivers is not permitted

- Only companies with the experience required are allowed to make connections via Solar Fasteners, unless the installation staff is instructed by specialists from companies experienced in this field.

Solar fastener JA, JT and JZ	**Annex 21**
Planning, design & installation	