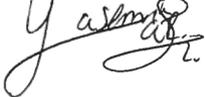
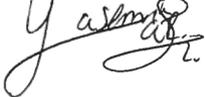
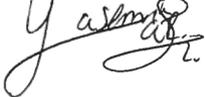


Number BAR 19-091/01/A Replaces: -	  <p style="text-align: center;">BDA Agrément® BAR 19-091/01/A</p>	Category Pitched roofs			
Date 2019-02-05		Phase Assessment			
Project number 17-C-0135		Subject Mounting system PV panels			
Validity See www.kiwabda.nl					
System	ClickFit EVO roof hooks – for pitched roof mounting system for PV panels 				
Agrément holder	Esdec B.V. Londenstraat 16 NL-7418 EE Deventer T: +31 (0)85 070 20 00 E: info@esdec.nl I: www.esdec.nl				
Description	The roof hooks of the ClickFit EVO pitched roof mounting system are steel roof hooks of which the fixing height and assembly height can be adjusted, with a Magnelis® metallic coating. The roof hooks are fixed behind the tile battens to which mounting profiles and PV panels are then attached.				
Scope (use)	Fastening system for PV panels on thermally uninsulated or thermally insulated pitched roofs with tiles and a pitch of between 25° and 60° in the Netherlands.				
Summary	This BDA Agrément® contains the following assessment aspects: <ul style="list-style-type: none"> • Conditions of use • Frame of reference • Independently determined system data • Points of attention for the specifier • Roofing constructions • Points of attention during installation • Installation procedure • Compliance with the Dutch Building Decree 				
Statement	<p>In accordance with the assessment of the Kiwa BDA Expert Centre Building Envelope (ECBE), as required in the BDA Guideline - BDA Agrément® the roof hooks of the Esdec ClickFit EVO mounting system can perform as indicated in section 3 in this BDA Agrément® if designed, produced and used in accordance with the instructions in this BDA Agrément®.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%; text-align: center;"> Professor Nico Hendriks, MSc  ECBE Chairman </td> <td style="width: 33%; text-align: center;"> Yasemin Sari, BSc  Kiwa BDA Project Leader </td> <td style="width: 33%; text-align: center;"> Chris van der Meijden, MSc  Kiwa BDA Technical Director </td> </tr> </table>		Professor Nico Hendriks, MSc  ECBE Chairman	Yasemin Sari, BSc  Kiwa BDA Project Leader	Chris van der Meijden, MSc  Kiwa BDA Technical Director
Professor Nico Hendriks, MSc  ECBE Chairman	Yasemin Sari, BSc  Kiwa BDA Project Leader	Chris van der Meijden, MSc  Kiwa BDA Technical Director			
Version 01	<p style="text-align: center;">Kiwa BDA Expert Centre Building Envelope</p> Department of Kiwa BDA Avelingen West 33 P.O. Box 389 NL-4200 AJ Gorinchem T: +31 (0)183 669690 E: groep@bda.n I : www.kiwabda.nl Copyright © 2019 Kiwa BDA				

<p>1 Conditions of use</p>	<p>1 Application The assessment of ClickFit EVO - roof hooks concerns their use on pitched roofs with tiles. The roofing construction must have been designed and produced in accordance with the design and construction guidelines for roofing constructions, the ISSO Solar Energy Manual² and the instructions in this BDA Agrément® with particular attention for:</p> <ul style="list-style-type: none"> - the wind resistance; - the snow load; - the rain proofing. <p>2 Assessment ECBE determined the system performance using practical research³ and control calculations⁷, or checked them on the basis of reports by independent and accredited laboratories, including Kiwa BDA Testing B.V. Kiwa BDA Testing B.V. assessed the ClickFit EVO roof hooks for the sloping roof mounting system, as used in a pitched roof with tiles in combination with PV panels, in terms of wind resistance in accordance with NEN 7250¹³ and the water tightness/resistance to driving rain in accordance with NEN 2778¹⁹. The mechanical resistance of the tiles, in combination with the ClickFit EVO roof hooks, has been assessed in accordance with the principle referred to in NEN-EN 491¹⁸.</p> <p>3 Installation It is recommended that the quality of the construction and the workmanship of the constructing party are tested by an experienced, independent inspector. This inspector may be a qualified employee of the supplier or an engineering consultancy. The system must be attached in accordance with the instructions of the supplier and the instructions in this BDA Agrément®.</p> <p>4 Geographical scope The validity of this document is limited to the Netherlands, with due regard for section 8 (Assessment against the Buildings Decree 2012²³) of this document.</p> <p>5 Validity This BDA Agrément® is valid for a maximum of three years after the issue date, after which the period of validity can be extended by three years on each occasion, but only after a positive re-evaluation. The validity lapses if ECBE establishes that the clause in section 4, point 05 of this document is not being fulfilled.</p>	
<p>2 Frame of reference</p>	<ol style="list-style-type: none"> 1 BDA Guideline – BDA Agrément®, 30 June 2015 2 ISSO Solar Energy Manual, Stichting ISSO – Rotterdam, March 2016 3 Kiwa BDA practical visits report 17-C-0135/02 ClickFit EVO system, Kiwa BDA Dakadvies B.V., Gorinchem, 8 November 2018 4 Kiwa BDA report 0131-L-18/5: ClickFit EVO fastening system – determination of the weathertightness / resistance to wind driven rain, Kiwa BDA Testing B.V., 1 February 2019 5 Kiwa BDA report 0131-L-18/2: ClickFit EVO fastening system – determination of the wind uplift resistance, Kiwa BDA Testing B.V., 2 August 2018 6 Kiwa BDA report 0131-L-18/3: ClickFit EVO fastening system – determination of mechanical resistance (compressive strength), Kiwa BDA Testing B.V., 2 August 2018 7 Kiwa BDA report 17-C-0135: calculation of resistance to snow and ice – roof hook system, Kiwa BDA Dak- en Geveladvies B.V., Gorinchem, 5 December 2018 8 Esdec B.V., Manual ClickFit EVO mounting system for sloping roof with roof tiles for solar panels, 28 November 2017 9 Esdec B.V., brochure: The ultimate new mounting standard for sloping roofs, ClickFit EVO, tiled roof, no date 10 Swedish Technical Approval no. SC0559-13, project 3P03199, Magnelis ZM310, Corrosion protection coating, SP Technical Research Institute of Sweden, 5 June 2014 11 ArcelorMittal, Magnelis® technical guide, no date 12 French Corrosion Institute, test report no. IC 89713-8, Exposure in marine atmosphere – Brest test site, Institut de la Corrosion, 26 May 2014 13 NEN 7250:2014/A1:2015 nl: Solar energy systems - integration in roofs and façades - Building aspects 14 NEN-EN 1991-1-4+NB: Eurocode 1: General actions – wind actions 15 NEN 6707:2011: Fixing of roof coverings - Requirements and determination methods 16 NPR 6708:2013: Fixing of roof coverings - Code of Practice 17 NEN-EN 14437:2004: Determination of the uplift resistance of installed clay or concrete tiles for roofing - Roof system test method 18 NEN-EN 491:2011: Concrete roofing tiles and fittings for roof covering and wall cladding - Test methods 19 NEN 2778:2015: Moisture control in buildings 	
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2 Frame of reference
(continued)

- 20 BRL 4708:2013: National assessment guideline – rainproof and water-retaining membranes for pitched roofs
- 21 NEN-EN-ISO 12944-2:2018: Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 2: Classification of environments
- 22 Roof reflector, Attachment of solar energy systems on pitched roofs, Holland Solar 2016
- 23 Dutch Building Decree 2012, complete with additions up to January 2019
- 24 URL 0179/15: Design and construction guidelines for roofing constructions with concrete tiles, 4 June 2015
- 25 URL 0180/15: Design and construction guidelines for roofing constructions with ceramic tiles, 4 June 2015
- 26 Arbouw, Pitched Roofs A-sheet, April 2015

Remark:

In the text of this document reference is made to some of these sources by adding the relevant reference number in superscript.

3 Independently determined system data

Wind resistance – roof hook⁵

The wind resistance per roof hook is determined in accordance with NEN 7250¹³. Table 1 shows the wind resistance of the roof hook, whereby a distinction is made in the characteristic value (R_k) and the calculation value (R_d) per roof hook, when using three roof hooks per PV panel. Hereby the PV panels are tested in both the vertical and horizontal positions. The calculation value (R_d) is determined by dividing the characteristic value (R_k) by the material factor $Y_m = 1.5$.

Table 1

Positioning of the tested PV panels	Number of PV panels	Number of roof hooks per PV panel	R_k per roof hook	R_d per roof hook
Vertical	2	3	774 N	516 N
Horizontaal	2	3	740 N	493 N

The roof hooks are hooked behind the tile battens.

The constructional strength of the tile battens and the fixing of the tile battens will, in most cases, be normative and must be assessed (in accordance with the principle of the relevant Eurocode) per project, per roof zone (in accordance with NEN-EN 1991-1-4+NB)¹⁴.

Rain proofing⁴

The level of rain proofing of the mounting system is determined and classified in accordance with NEN 2778¹⁹. Table 2 shows the conditions of use of the ClickFit EVO mounting system.

Table 2

Type of roof tile	Roof incline	Provision ²⁾³⁾	Class
Sneldek Novo+	≥ 25° - 30°	Not grinded roof tiles ¹⁾	at 30 Pa pressure difference: Class 2
Sneldek Novo+	≥ 30°	Not grinded roof tiles ¹⁾	at 30 Pa pressure difference: Class 2
OVH 206	≥ 25	Not grinded roof tiles ¹⁾	at 30 Pa pressure difference: Class 2

¹⁾ The maximum opening between the tiles (head lock) is 10 mm

²⁾ In the event of vertical positioning (portrait positioning) and horizontal positioning (landscape positioning) the PV panels must sufficiently cover the overlap of the tiles through which the roof hooks are inserted (at least 400 mm), otherwise all the tiles must be grinded near the lowest row of roof hooks.

³⁾ The roof tiles must be grinded in the case of single (unconnected) PV panels.

3 Independently determined system data
(continued)

Mechanical strength⁶

The compressive strength of new tiles, used in combination with the ClickFit EVO roof hooks (under axial load), whereby a distinction is made in the characteristic value (R_k) and the calculation value (R_d) per roof hook, is shown in Table 3. The calculation value (R_d) is determined by dividing the characteristic value (R_k) by the material factor $Y_m = 1.4$.

Table 3

Tested roof tile in combination with the ClickFit EVO roof hook	Axial load [average failure load]	R_k per roof hook	R_d per roof hook
Sneldek Novo+, left trough (new roof tile)	1039 N	947 N	676 N
Sneldek Novo+, right trough (new roof tile)	1418 N	1271 N	908 N
OVH 206 (new roof tile)	1323 N	1092 N	780 N

Test results relating to the compressive strength of existing tiles in combination with the ClickFit EVO roof hooks⁶ show that comparable or even higher values can be achieved. The suitability of the tiles must be assessed for each project.

Corrosion resistance^{10,11,12}

The roof hook of the ClickFit EVO mounting system consists of Magnelis[®] galvanised steel. Magnelis[®] is an innovative metallic coating by ArcelorMittal, composed of an alloy of zinc (93.5%), aluminium (3.5%) and magnesium (3%).

The MagnelisZM310 coating is used for the roof hooks of the ClickFit EVO mounting system with a layer thickness of 25 μm . On the basis of the commission by ArcelorMittal, the Technical Research Institute of Sweden demonstrated that this coating is suitable for the highest corrosiveness class, namely class C5 (in accordance with the classes as defined EN ISO 12944-2²¹), based on an expected life of 15 years¹⁰. In addition to a high resistance to corrosion the coating offers self-repairing protection for cutting edges and damage. ArcelorMittal commissioned the French Corrosion Institute to test the self-repairing effect¹². When affected by weather conditions a red-brown rusty colour may initially appear which, over time, is encapsulated by a white zinc oxide layer and then passivates, thereby forming the protective layer.

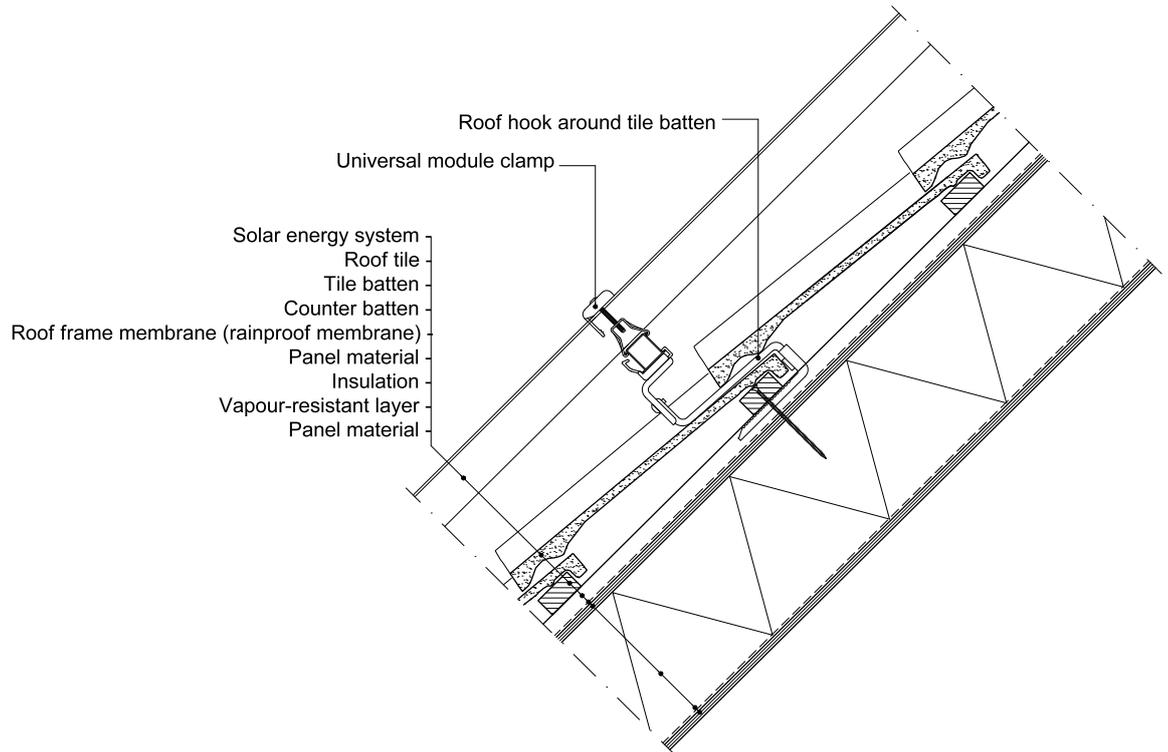
<p>4 Points of attention for the specifier</p>	<p>1 Strength of the construction The use of solar energy systems on pitched roofs leads to extra weight in terms of assembly systems. Depending on the size of the solar energy system to be fitted, the loadbearing structure must be assessed accordingly. The original constructional calculations serve as a basis for determining the construction's own weight and how much extra weight is possible.</p> <p>2 Wind load and wind resistance The wind load on the solar energy system must be determined in accordance with NEN-EN 1991-1-4+NB¹⁴ and NEN 7250¹³. This calculation will produce the roof zoning (corner (F), edge (G), ridge (J), gutter (G), and middle zones (H and I)) and the calculation value for the wind load per roof zone. The wind load is dependent on the wind area in the Netherlands, the ruggedness of the site, the height of the ridge, the roof incline and the location of the panels on the roof. The reference height of a pitched roof is the height of the ridge compared to the adjacent site. In principle the assumption in terms of the ruggedness of the site is an undeveloped area (excluding coastal zone). The ruggedness of the site must be determined in accordance with NEN-EN 1991-1-4+NB¹⁴. When positioning the PV system, a zone of at least 300 mm must be kept free of PV panels. In other words at least 300 mm from the ridge and the gutter and at least 300 mm from the sides of the roof. The number of roof hooks to be used depends on the wind load, the calculation value per roof hook and the calculation value for the wind resistance of the roof hook (see section 3). The calculation value for the wind load per roof hook must be determined in accordance with the science of mechanics and is dependent on, among other things:</p> <ul style="list-style-type: none"> • the dimensions of the PV panel; • the distribution of the rows roof hooks compared to the position of the PV panels; • the centre-to-centre distance of the tile battens; • the distribution and position of the roof hooks in the row, also compared to the counter battens/tracks. <p>The roof hooks are to be attached to the tile battens. The strength and fixing of these tile battens must be checked (against the calculation value for the wind load per roof hook). The strength of the roof tile must also be checked. See also sections 5 and 6.</p> <p>3 Snow load The maximum distance between the ridge and the top of the solar energy system is two metres. In the event of a greater distance between the ridge and the top of the solar energy system a check must be carried out per project of the resistance to snow load. The strength and fixing of the tiles and tile battens must be checked (calculation value of snow load per roof hook). See also sections 5 and 6. The calculation value for the snow load per roof hook must be determined in accordance with the science of mechanics (see also section 4.2).</p> <p>4 Water tightness The roof hooks are to be inserted through the head lock of the tiles. Section 3 – Rain proofing contains the conditions of use for the ClickFit EVO mounting system. 2) In the event of vertical positioning (portrait positioning) and horizontal positioning (landscape positioning) the PV panels must sufficiently cover the overlap of the tiles through which the roof hooks are inserted (at least 400 mm), otherwise the tiles at the lowest row of roof hooks must be grinded. The roof frame must comply with class 2 in accordance with NEN 2778.</p> <p>5 Deviations Deviations from the ClickFit EVO mounting system, both in terms of the structure and the construction (as described in this BDA Agrément®), are exclusively permitted after written permission from both the owner of this document and the Kiwa BDA Expert Centre Building Envelope (ECBE). See also section 1, point 5 and section 7, point 01 of this document.</p>	
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<p>5 Roof covering constructions</p>	<p>Type of roof frame constructions Roof frame constructions for pitched roofs can be divided into traditional roof and prefab roof elements.</p> <p>Traditional roof The traditional roof generally consists of purlins (sometimes of tracks) possibly with insulation in between, possibly finished on the underside with a ceiling construction and, in most cases, finished at the top with roof boarding.</p> <p>Roof membrane elements and single shell elements These elements consist of longitudinal ribs and possibly transverse or end ribs, with panel material being attached to the underside. Insulation is added between the ribs. In practice this is usually PUR (polyurethane), PIR (polyisocyanurate), MWG (glass wool) or MWR (rock wool). The longitudinal ribs are attached in the direction of the span and extend onto the support. If transverse or end ribs are used, these must be positioned between the longitudinal ribs. These ribs serve to close off the element, support the panel edges and connect to the other elements. All joints and connections must be sealed, for example with PUR/PIR foam and tape clamped with slats. The elements with mineral wool insulation are to be fitted with a rainproof (breathable) membrane at the top.</p> <p>Roof box elements Roof boxes are, in effect, constructed in the same way as roof membrane elements with the difference being that panel material is attached not only on the underside but also on the upper side. Roof boxes also involve the use of a roof frame membrane (rainproof breathable membrane).</p> <p>Sandwich elements Sandwich elements consist of relatively thin lower and upper panels of moisture resistant chipboard or OSB board in between which a hard foam core (usually PUR/PIR or EPS) is completely attached to the panel material, as a result of which it contributes to the strength and stiffness of the elements. Counter battens are glued to the upper panels. The vertical joints are sealed with a plastic profiled coping and/or with PUR foam. As regards the sandwich panels, evidence must be provided that these are suitable for the fixing of the solar energy system (constructional strength in general and specifically the adhesive strength of the counter batten and the upper panel).</p> <p>Tile battens and counter battens The tile battens are attached to counter battens on the base construction. The constructional strength and fixing of the tile batten and the counter batten (and in the case of sandwich elements also the adhesion to the upper panel) must be checked and be sufficient in relation to the calculation value of the roof hook when assessing wind resistance and resistance to snow load, determined in accordance with NEN 7250¹³ and the relevant standards from the Eurocode series. In the process account must be taken of the distribution across the tile battens and the positioning compared to the counter battens. It will often be necessary for the tile battens to be additionally fixed with screws. In that case the following will apply:</p> <ul style="list-style-type: none"> • Determine the necessary adhesive length and thickness of the screw (calculation value). • Check suitability of construction (thickness and/or edge distance and condition). • The possible need for pre-boring. <p>The strength characteristics must be known in order to determine the strength of the tile battens and the counter battens. This can be determined by establishing the strength class or by means of in situ tests based on NEN-EN 1990. When assessing the strength and fixing of the tile battens it will often be the case that the positioning of the solar energy system in the corner, edge, ridge, and gutter zone (determined in accordance with NEN-EN 1991-1-4+NB)¹⁴ will only be partially possible or impossible.</p>	
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5 Roof covering constructions (continued)

Use of the ClickFit EVO mounting system - roof hooks

Figure 1 – Example of ClickFit EVO mounting system roof hooks in conjunction with pitched roof with concrete Sneldek tiles and roof box elements



Structural survey

A structural survey must be carried out for each project in advance to demonstrate that the roof construction is suitable for the use of the ClickFit EVO mounting system.

See also Holland Solar - Roof reflector²².

Roof frame

- 1 The roof frame must be watertight in relation to the quantity of water ingress through the tiled roof and the solar energy system (class 2 in accordance with NEN 2778), the expected condensation/ice formation, specifically due to night-time radiation and risk of drifting snow.
- 2 If a roof frame foil (rainproof membrane) is used, the choice of the type of roof frame foil must be attuned to the base. If the roof frame foil is directly in contact with the base (for example roof boxes), a special roof frame foil must be used so that no water can penetrate through direct contact with the base.
- 3 The diffusion resistance of this rainproof membrane must be attuned to the further base construction (in connection with restricting internal condensation due to diffusion). It may be necessary to use a vapour-resistant layer and sealed connections.
- 4 If a roof frame foil is used, this must be a rainproof membrane in accordance with BRL 4708²⁰, with the following specifications, suitable for class 2 rain proofing, in accordance with NEN 2778¹⁹:
 - water tightness class: W1;
 - diffusion resistance $S_d < 0.2$ m;
 - class for tensile strength in the event of strain and breakage PS, QR of QS.
- 5 In the event of rain proofing class 3 (in accordance with NEN 2778¹⁹) a special roof frame foil must be used (determined in accordance with NEN 2778¹⁹).

Roof tiles

The following guidelines are available for the design and the construction of pitched roofs with tiles (concrete or ceramic):

- URL 0179/15, Design and construction guidelines for roofing constructions with concrete tiles²⁴;
- URL 0180/15, Design and construction guidelines for roofing constructions with ceramic tiles²⁵.

These also include the conditions for the tile battens and counter battens.

The following guideline applies to the design and construction of solar energy systems on pitched roofs:

- ISSO Solar Energy Manual, Stichting ISSO – Rotterdam, March 2016².

<p>6 Points of attention during installation</p>	<p>Existing tiles Check the existing roof tiles for movement, condition (breaks, cracks, perforation and flaking) and mechanical strength (see section 3). Where necessary adjust the way the roof tiles are laid or replace the roof tiles with tiles of the same type and colour. Check, during and after the fitting of the roof hooks and the PV system, whether there is any damage to the existing roof tiles and, if necessary, replace these roof tiles with tiles of the same type and colour. Fix the roof tiles in accordance with NPR 6708¹⁶.</p> <p>Existing tile battens and base construction Check the condition of the existing tile battens (deterioration, cracking and breaks), fixing (corrosion) and dimension, constructional strength in relation to wind resistance and resistance to snow load, whereby the strength class must be determined, or tests must be carried out in situ. If necessary replace the tile battens and/or additionally fix (screws), in such a way that the required calculation value for the fixing for the PV panels is met. Also check the condition of the base construction and, if necessary (for example in the event of deterioration), replace the relevant parts.</p> <p>Existing roof frame Check the suitability of the existing roof frame in such a way that it can function as a rainproof layer under the tiles in combination with the solar energy system. Where necessary carry out repairs and/or fit a new roof frame (rainproof membrane) where the solar energy system is to be installed (from ridge to gutter) (rainproof membrane requirements, see section 5). When assessing the suitability of the roof frame, the risk of drifting snow must also be taken into account. If necessary, make additional provisions (such as installing a rainproof membrane or grinding the roof tiles at the roof hooks).</p> <p>Placement of the solar energy system</p> <ol style="list-style-type: none"> 1 Determine the positioning and the number of roof hooks in accordance with the calculation value for the wind and snow load. Four roof hooks must be used per single PV panel. In the case of connected PV panels, at least three roof hooks must be used per PV panel⁷. 2 The cables must be fed through the roof tiles using special prefab ducts (tile models). The cables must not be fed through the tile overlaps. 3 The cables must be fed through the roof frame in a way that they are protected from the rain. This means either a rainproof membrane or a rainproof roof construction top. Ducts through this layer must be closed off so they are watertight. There are several ways of doing this. First of all there is a special self adhesive material (tape) that can be attached to the duct and stuck to the roof frame. A second possibility is a duct with a self-adhesive sleeve. 4 An airtight connection must be created on the underside of the roof between the installed cable and the underside of the roof construction. It is extremely important to create this airtight connection and care must therefore be taken. Depending on the installed cables and the size of the hole the remaining space must, for example, first be sealed with a sealing agent such as cellular tape, mineral wool or PU foam. In addition, a special sealing element or sleeve must always be attached to the underside. 5 The cables of the PV panels must be laid stably and protected on their way to the duct through the roof. <p>Ventilation/contamination Sufficient space must be retained between the frame of the PV panels and the tiles, both for sufficient ventilation as well as to prevent contamination by leaves which may get stuck between the roof and the frame.</p> <p>Safe working on roofs The Working Conditions Act [Arbowet] applies in full to working on and inspecting pitched roofs. The practical interpretation is explained in more detail in the Pitched Roofs A Sheet Working Conditions Catalogue²⁶ and in the ISSO Solar Energy Manua².</p>	
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7 Installation procedure

General installation procedure

- 01 The ClickFit EVO mounting system must be installed in accordance with the installation procedure⁸ of the holder of this BDA Agrément® and the rules of good workmanship.
- 02 During the installation steps must be taken to ensure that the product and the underlying construction (roof tiles, roof frame and base construction) are not damaged.

Description of the components

The four basic components of the ClickFit EVO mounting system are: the adjustable roof hook, the mounting rail, the module clamp and the end cap.

Figure 2 – Roof hook with rotatable clamping bracket/click bracket



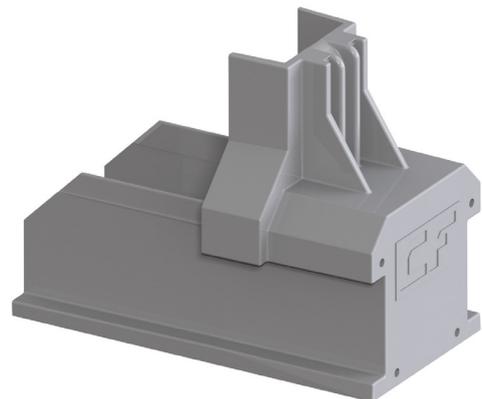
Figure 3 – Mounting rail



Figure 4 – Module clamp



Figure 5 – End cap



- Roof hook: the roof hook is fitted with a rotatable click bracket so that the mounting rail can be clicked onto the roof hook both horizontally and vertically. This means that the roof hook can be used in both portrait and landscape PV configurations.
- A screw is included in the uppermost adjustable part of the roof hook. This means that the roof hook can be clamped around the tile batten.
- The clamping range of the adjustable roof hook (tile batten thickness + roof tile thickness) is 30 mm – 65 mm.
- Adjusting the height of the adjustable roof hooks: 68 mm – 98 mm.
- Mounting rail: a profile that connects a PV panel and the roof hooks.
- Module clamp: a clamping plate to be used as a middle clamp between the PV panels and end clamp in combination with the end cap.
- End clamp: a clamping plate for use in conjunction with a PV panel at the end of the row/column.

7 Installation procedure
(continued)

Accessories (optional)

Figure 6 – Mounting rail connector



Figure 7 – Mounting rail cable clip



Figure 8 – Filling rubber

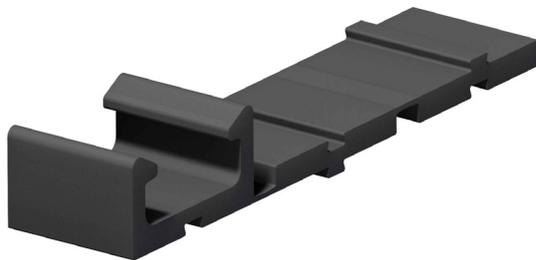


Figure 9 – Mounting aid



Accessories (optional)

- Coupling strip: to couple mounting rails in the event of rows/columns longer than 6 metres.
- Cable clip: to guide the cables from the PV panel through the click bracket of the roof hook and the cable clip. This enables neater and safer binding of the cabling and the plugs.
- Filling rubber: to support the roof hook on the roof tile. The rubber can be folded up to create the desired thickness. The possible thicknesses are 5 mm, 10 mm and 15 mm.
- Mounting aid: to click the cables from the PV panel into the cable clamp on the mounting aid on the rear of the panel before placing the panel on the mounting rail.

Fixing

- Roof hooks. The roof hooks can be hooked behind the tile battens and placed in the valley of the underlying roof tile. The roof hook, which has a screw at the top, can be clamped around the tile batten.
- Mounting rails. The mounting rails are fixed to the roof hooks using a click connection. No additional materials or tools are necessary for this. However, the vertically clicked mounting rails must be secured with a self-tapping stainless steel screw on the lowest roof hook in order to prevent the mounting rails shifting down once.
- PV panels. The panels are fixed to the mounting rails by means of module clamps.
- Only use stainless steel screws (Torx screw T30) when fixing the components of the Clickfit EVO mounting system and use a drill screwdriver set to the correct tightening torques, in accordance with the installation procedure⁸ of the holder of this BDA Agrément®.

