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	TECHNICAL DATA SHEET	Doc. n°. SDT130A2E Rev. 5 10/11/2017 Page 1 of 15
Subject: SolarFish system for sloped roof (roof tiles, Arabic tiles)		

	Processed by	Verified by	Approved by
Signature:	***Mazzucato F.***	***Tresoldi A.***	***Martini M.***
Office:	***R&D***	***R&D***	***R&D***

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1 General information

1.1 General description

Mounting system for the installation of photovoltaic (PV) or solar thermal (ST) panels.

1.2 Reference documents

Standards for the system development:

- EN 755-2«Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2: Mechanical properties»
- EN ISO 3506-1«Mechanical properties of corrosion-resistant stainless-steel fasteners - Part 1: Bolts, screws and studs»
- EN ISO 3506-2«Mechanical properties of corrosion-resistant stainless-steel fasteners - Part 2: Nuts»
- EN 10088-2« Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes»
- EN 1990/A1«Eurocode - Basis of structural design»
- EN 1991-1-3«Eurocode 1 - Actions on structures - Part 1-3: General actions - Snow loads»
- EN 1991-1-4/A1« Eurocode 1 - Actions on structures - Part 1-4: General actions - Wind actions»
- EN 1999-1-1«Eurocode 9 - Design of aluminium structures - Part 1-1: General structural rules»

Standards for the installation:

- BGV A1, BGV A3, BGV C22 - German standards for accident prevention
- DIN 18338 – Roofing work
- DIN 18451 – Scaffolding work
- DIN EN 62305 - Lightning Protection
- DIN VDE 0185 part Lightning Protection Components (LPC)
- DIN VDE 0100 part 410 – Grounding
- DIN VDE 0105 - Operation of electrical installations
- DIN VDE 0298 - Application of cables and cords in power installations
- VDS 2023 – Electrical installations in structural works with mainly flammable materials
- DIN 4102 - Fire behavior of building materials and building components
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Test reports:

- RP083-07 “Sistema Solar-fix”
- RP037-17 “Gancio GTA - GTPA – GTLA”

1.3 Application filed

The system has been conceived for the fixing of PV and ST on sloped surfaces, in order to obtain an architectural semi-integration of the plant with the covering, generally with variable inclinations from 10° to 50°.
Compatible with fischer SaMontec system.
Designers an/or installators must check the durability of the system considering the environmental conditions, according to Eurocode 9.

1.4 Type of surface

The system is suitable for applications on sloped surfaces, especially civil and industrial building covers made by roof tiles, Arabic tiles, etc. The bearing structure of the roof cover can be concrete, hollow slabs, concrete and bricks, wood, etc…

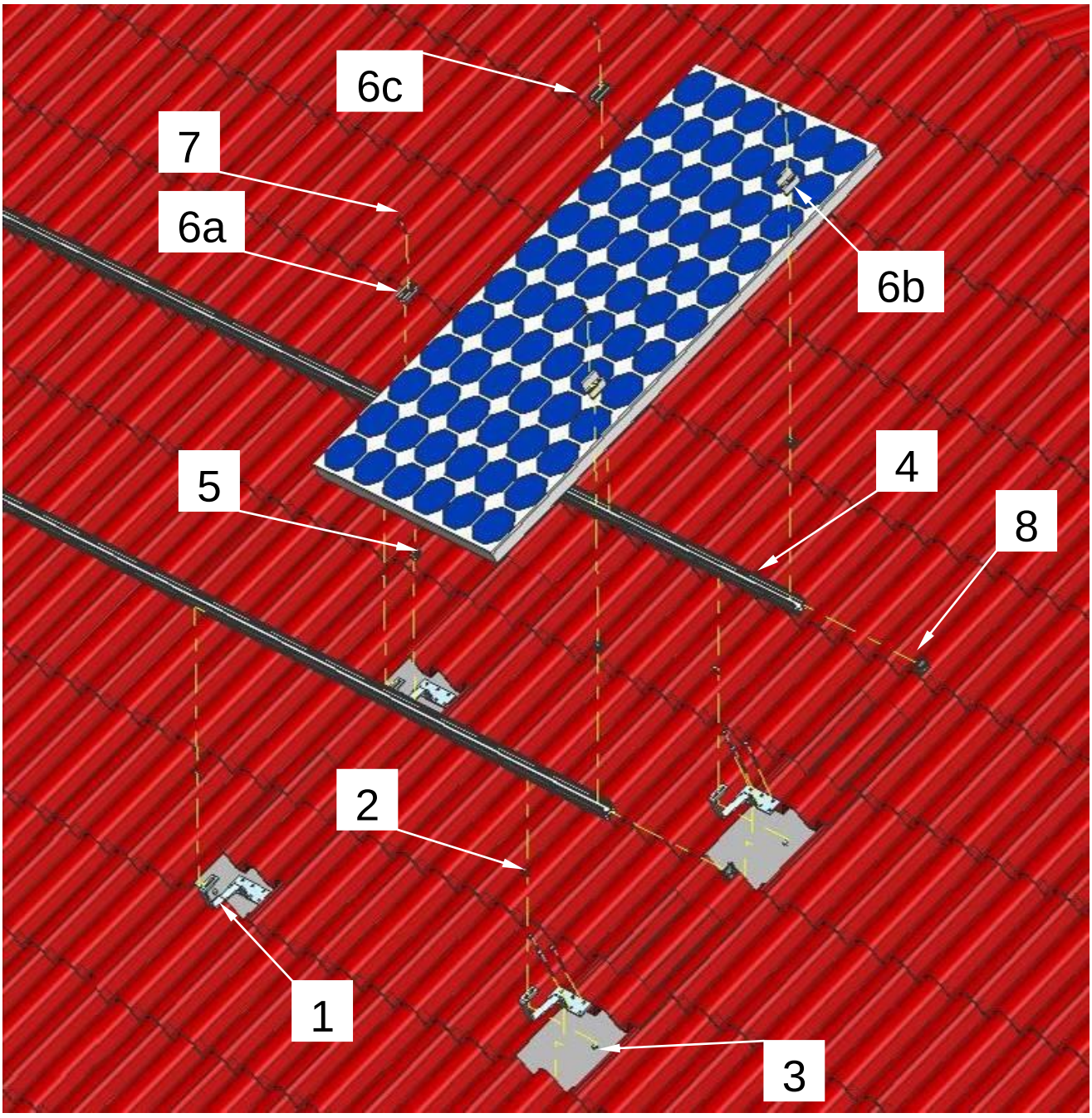
As the load bearing capacity of the system depends on the proper installation of the metal structure, designers and/or installators must check the type and conditions of the surface and choose the fixing accordingly.

1.5 General safety

- Ensure that the safety requirements of installation and maintenance are always observed.
- Installation and commissioning of the plant must be performed by qualified personnel who, due to their specific training or professional experience, are able to ensure that the work is performed correctly and to a high standard.
- Comply with all rules and regulations of local and national building codes, and regulations relating to the environment.
- Comply with all regulations and national laws and local regulations regarding health and safety, accident prevention and the rules of professional associations. Particularly, it is necessary to wear personal protective equipment: helmet, protective gloves, safety shoes, etc.
- At least two people should be at work during the editing process
- The earth connection is essential. The correct lightning protection of the devices are guaranteed using the PMC GROUND clamp (pos. 6c).
- If you must cut the mounting rails for the installation path, you must be sure to remove the burrs on surfaces affected by cutting, in order to eliminate any possible risk of injury.
- The electrical installation must be performed only by qualified personnel who, due to their specific training or professional experience, are able to ensure that the work is performed correctly and to a high standard. The wiring of the PV modules must be made to avoid the possible creation of loops.
- In case of roof and/or wall device, existing structures on which the system is to be mounted must be checked to ensure that the load capacity of the building / structure is adequate
- If the system is to be mounted on a high from the ground surface, observe the safety regulations for work at height using seat belts, falling objects, signs, etc
- For flat roof systems the standard DIN 18531 must be applied. If the installation is on a foil material the quality and technical information of the material must be know
- Position of panel and inclination must be defined according to roof quality, slope and panel characteristics
- During the installation avoid to create areas where it can stop dirt or water (see picture pag. 10)
- The structural stability of the PV system must be verified before installation. The building must be able to support the additional weight safely
- The routine maintenance for SolarFish systems is on an annual basis. This maintenance includes cleaning of the system and the verification of any failure.

2 Building requirements

2.1 Drawing of the system on sloped roof



Notes:

- PV module is not supplied by fischer;
- choose the proper fixing system according to the type of substrate: for a correct choice see fischer General Catalogue or contact fischer Technical Service, toll-free number. 800-844078.

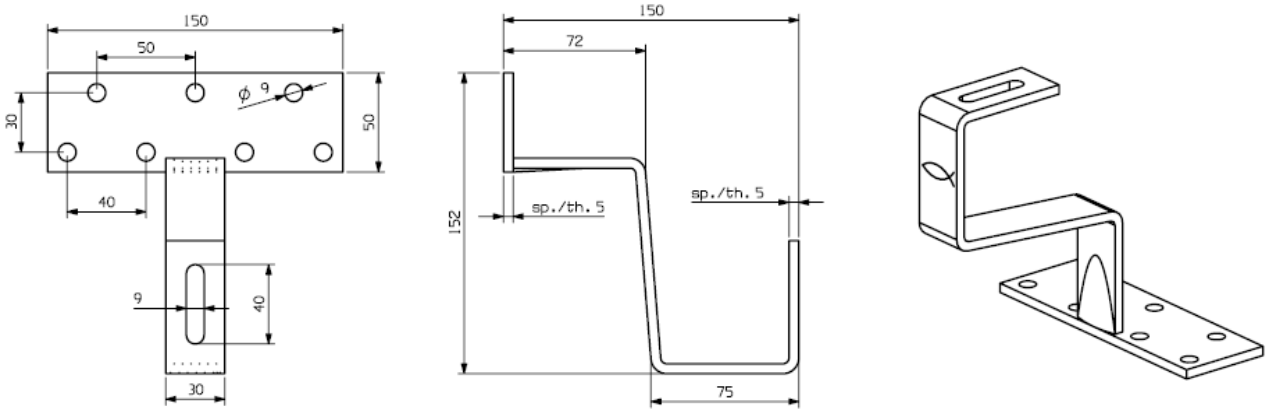
2.2 System components and accessories

n°	name	drawing	description	material	notes
1	GT150	130-2-1	roof tile hook h=150mm	Stainless steel X5CrNi 18-10 EN 10088-2	Alternative hooks, to be chosen according to surface and loads
	GT130	130-2-2	roof tile hook h=130mm	Stainless steel X5CrNi 18-10 EN 10088-2	
	GTR	130-2-07	adjustable roof tile hook with TB M8 DIN603 screws+ M8 DIN6923/EN1661 flanged nuts	Stainless steel X5CrNi 18-10 EN 10088-2+ Stainless steel A2-70 EN ISO 3506-1/-2	
	GTA	130-30-01	GTA aluminium tiles hook	Alluminum	
	GTLA	130-30-02	GTLA aluminium tiles hook	Alluminum	
	GTPA	130-30-03	GTPA aluminium tiles hook	Alluminum	
	GC	130-2-04	adjustable roof tile hook TB with M8 DIN603 nuts + M8 DIN6923/EN1661 flanged nuts	Stainless steel X5CrNi 18-10 EN 10088-2+ Stainless steel A2-70 EN ISO 3506-1/-2	
	GTP	130-2-3	flat roof tile hook	Stainless steel X5CrNi 18-10 EN 10088-2	
2	SKS	n.a.	M8 DIN933/EN-ISO4017 hex head screw	Stainless steel A2-70 EN ISO 3506-1	
3	MU F	n.a.	M8 DIN6923/EN1661 flanged nut	Stainless steel A2-70 EN ISO 3506-2	
4	SolarFish	130-3-24	Profile	Aluminium	see SDT130A1
5	FCN	130-4-01	M8 hammer nut	Aluminium + nylon	
6a	PMCU	130-13-02	Universal middle clamp	Aluminium	
	MC	130-5-1	Middle clamp	Aluminium	
6b	PMU	130-13-01	Universal clamp	Aluminium	
	MF	130-05-2	Final clamp	Aluminium	
6c	MC Ground	130-19-01	Middle clamp ground	Aluminium + Stainless Steel	
7	TCEI	n.a.	TCEI M8 DIN912/EN-ISO4762 screw	Stainless steel	
8	AK SP	130-7-1	Cap for SolarFish profile	Nylon	

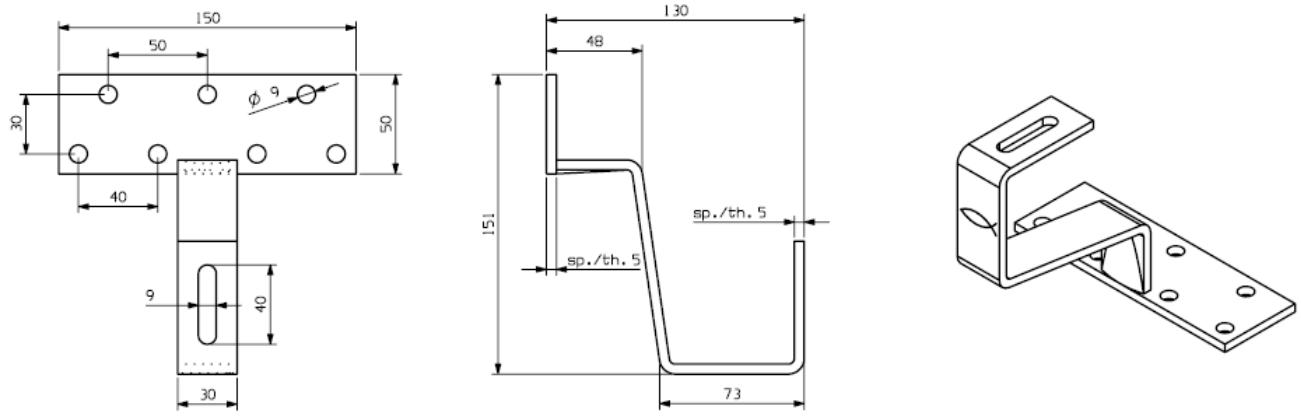
3 Technical data

3.1 Main dimensions and mechanical features

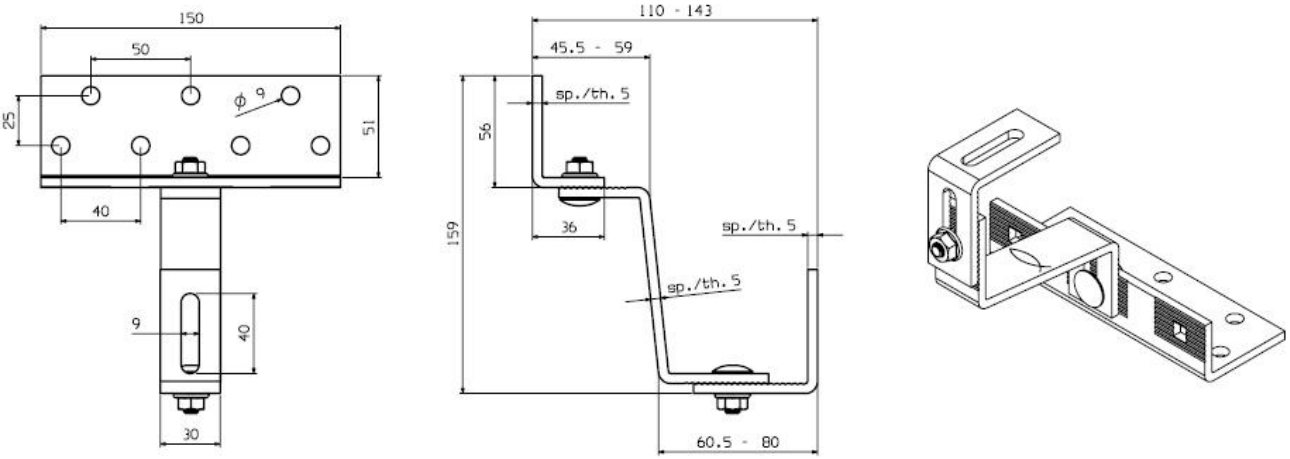
GT150 roof tile hook (weight 0,60 kg)



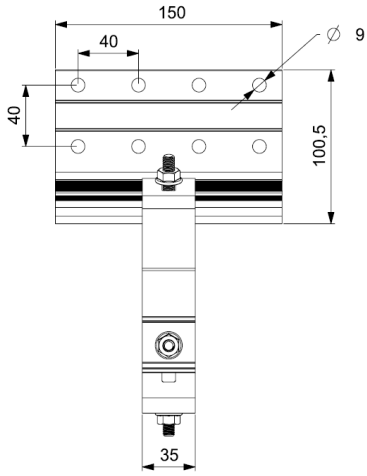
- GT130 roof tile hook (weight 0,57 kg)

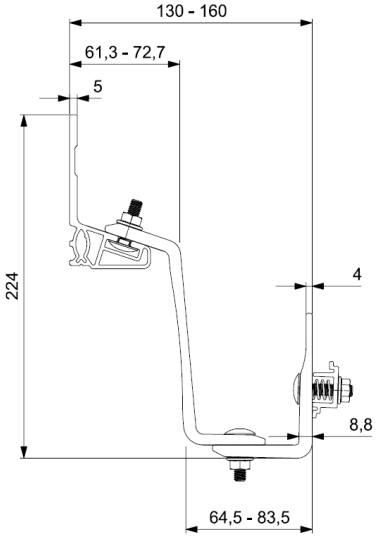


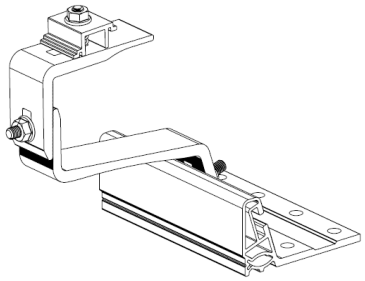
- GTR adjustable roof tile hook (hook height 110/143mm, weight 0,83 kg)



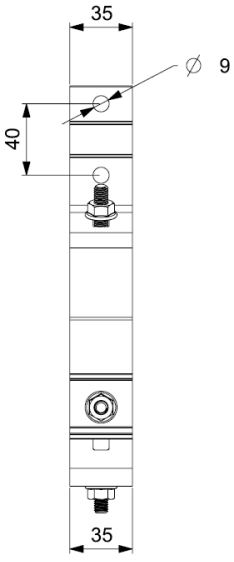
- GTA aluminium tiles hook (hook height 130/160mm, weight 0,65 kg)

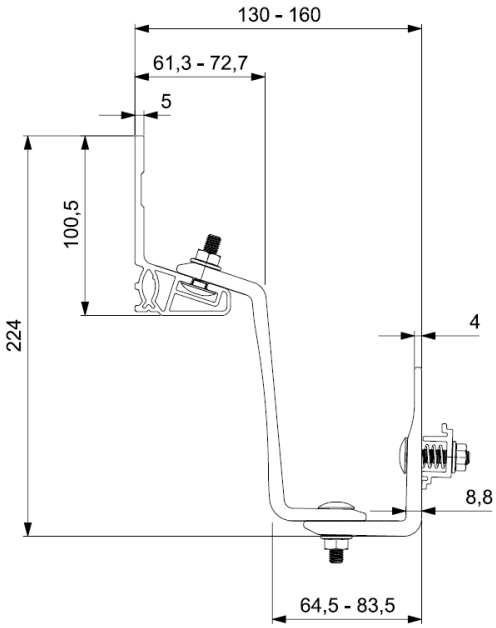


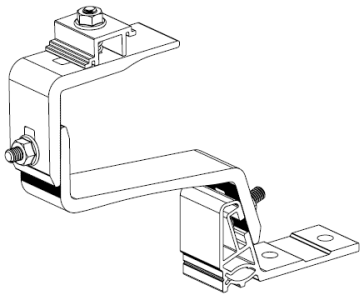




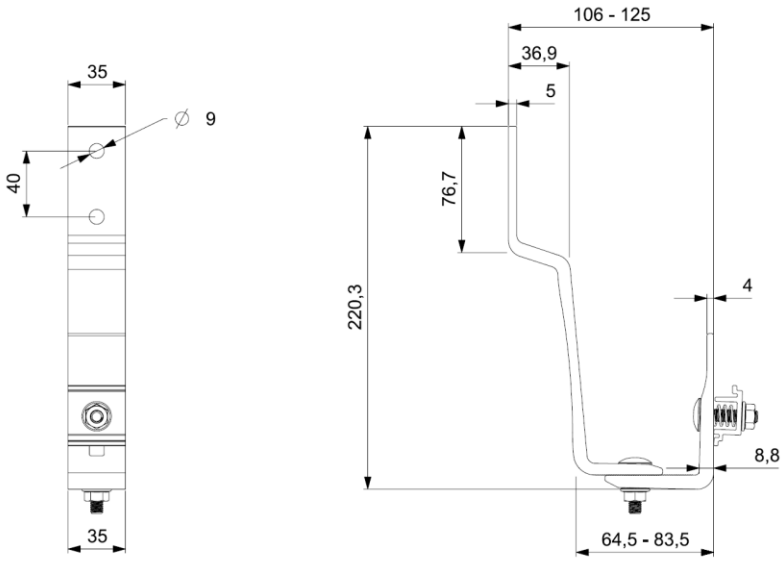
- GTLA aluminium tiles hook (hook height 130/160mm, weight 0,40 kg)

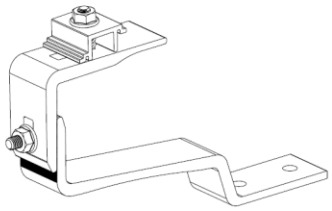




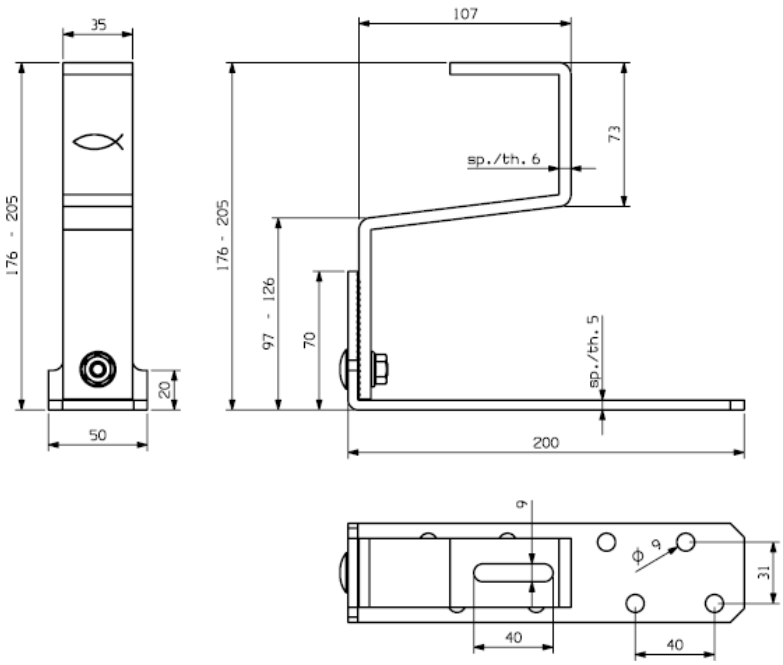


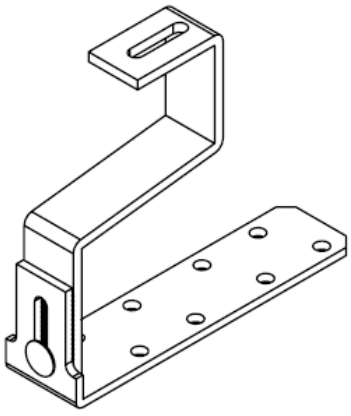
- GTPA aluminium tiles hook (hook height 106/125mm, weight 0,33 kg)



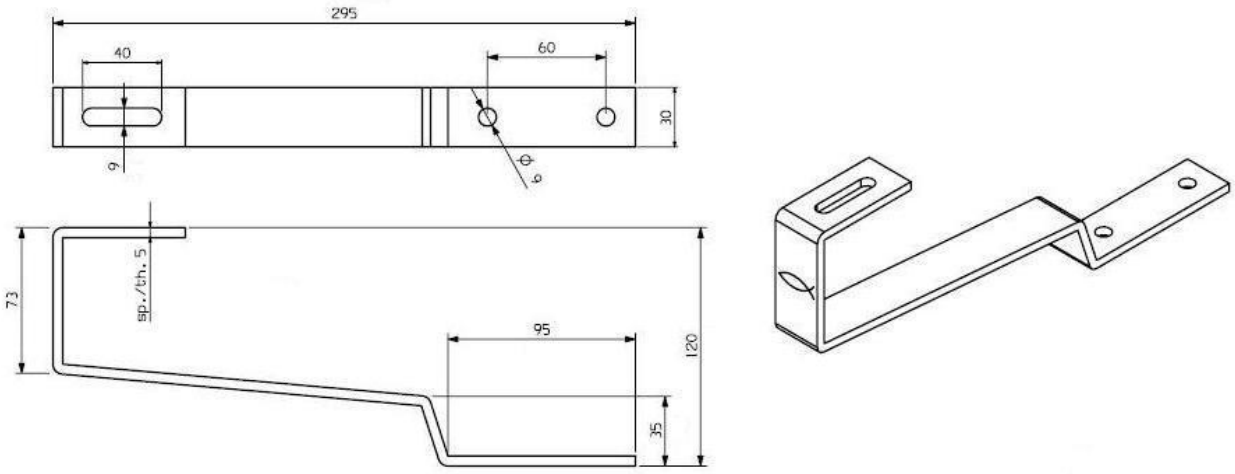


- GC adjustable rabic tile hook (hook height 176/205mm, weight 1,00 kg)

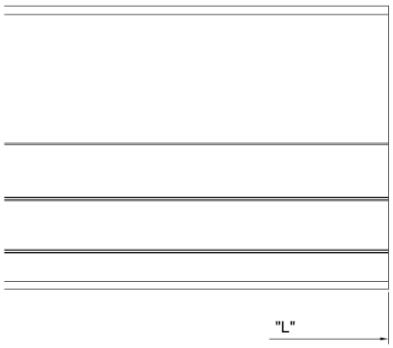


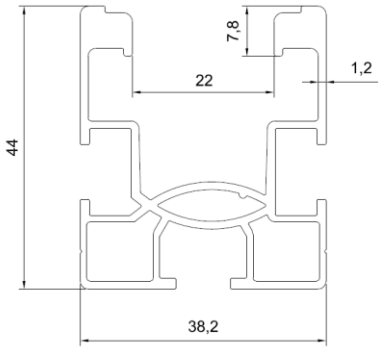


- GTP flat tile hook (weight 0,50 kg)



- SolarFish Profile





Area/section
A = 341,67 mm2

Peso/weigth
P = 0,92 kg/m

Momento/inertia
Ix = 72720 mm4
Iy = 64555 mm4

3.2 Installation instruction

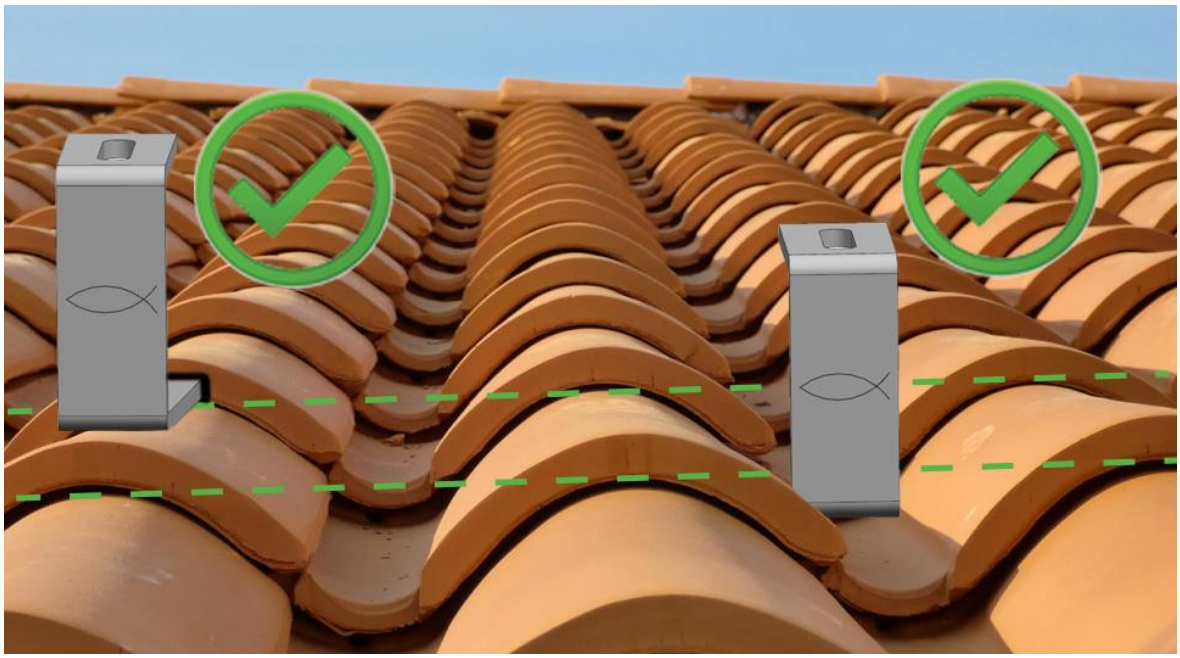
For standard mounting those tools are needed: n.1 socket (or open end) wrench size 13mm for SKS and MU F nuts (to fix SolarFish profile to GT/GTR/GTT/GC hooks- torque 10Nm) and n.1 Allen wrench size 6mm for TCEI screws (to fix MC-MF-PMC-PMF clamps- torque 10Nm).
Fixing between Solar-fix structure and roof has to be chosen paying attention to the type of substrate under the covering:

- for concrete and bricks, several fischer mechanical and chemical fixings are available, to be used with hooks (Ø9mm holes);
- for wood, TE Ø8 hexagonal head screws have to be used with hooks.

For the installation of TE wood n.1 socket or open end wrench size 13mm is needed

Recommendations:

- fix the hook to the support always using the existing holes of the base (at least two fixings for each hook, possibly not with contiguous holes);
- tighten up (torque at least 10 Nm) the screws of adjustable brackets (GTR, GTT and GC) before installing the profiles;
- use always the existing slot in the higher part of the hook for the fixing of SolarFish profile.



Subject: SolarFish system for sloped roof (roof tiles, Arabic tiles)

STEP 1

- Select hook positions based on roof structure, wind and snow load calculations and panel layout required.
- Remove tile and fasten hook with appropriate anchor.
- If necessary, adjust the hook to fit the geometry of the tile / arabic tile and tighten the screws with a torque of 10 Nm.
- Replace the tile correctly in order to maintain weatherproofing of the roof. Machining a clearance slot in the tile may be required.

⚠ Use always a minimum of 2 of the existing holes supplied in each hook.

STEP 2

- Install the profiles using the hex head bolts and MU nuts provided with the hooks.
- For vertical adjustment use bracket XC or PXC.
- Do not tighten the screws until completion of the row of profiles.

⚠ The maximum overhang from the last hook of the profile must not exceed 1/3 of the hook spacing.

The minimum distance of the hooks to the tiles must be 5 mm.

STEP 3

- If necessary, connect more profiles with a pair of joints CPN AL. Insert the joints into the sides of the profile. The small protrusion indicates a full assembly. The next profile can then be pushed in place.
- After placing all profiles tighten the connecting screws to the hooks with a torque of 10 Nm.

⚠ To avoid problems related to thermal expansion we recommend a maximum length of 15 m per row.

⚠ If the connection is on the side spans, the joints CPN AL have to be fixed with self drilling screws.

⚠ Do not join profiles in the projecting section.

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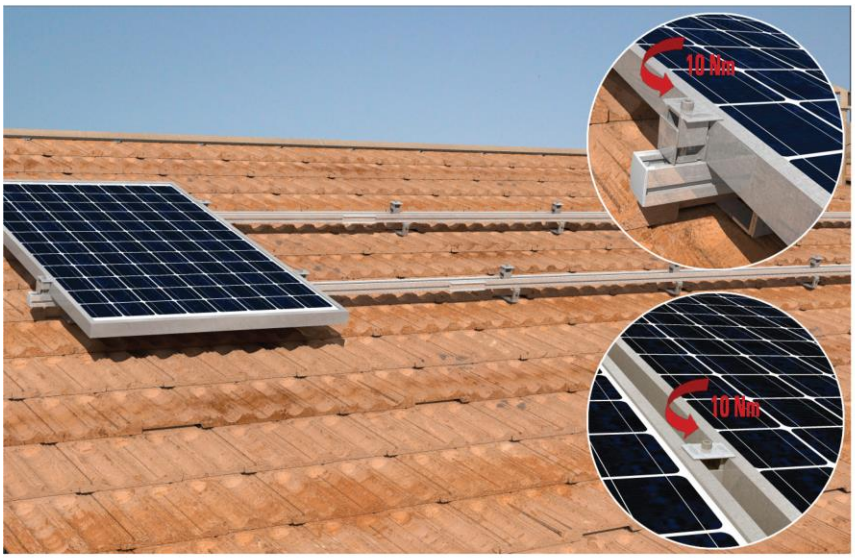
STEP 4

- Put the final and middle clamps on the profiles with a gap equal to the width of the panel.
- To avoid the panels sliding during installation, use the FV-PS supports in the top profile.



STEP 5

- Place the first photovoltaic panel and tighten the final clamps to fasten the panel with a torque of 10 Nm.

STEP 6

- Place side by side the subsequent PV panels to completion of the row and fasten progressively with final and middle clamps.

3.3 Cabling and electric connection

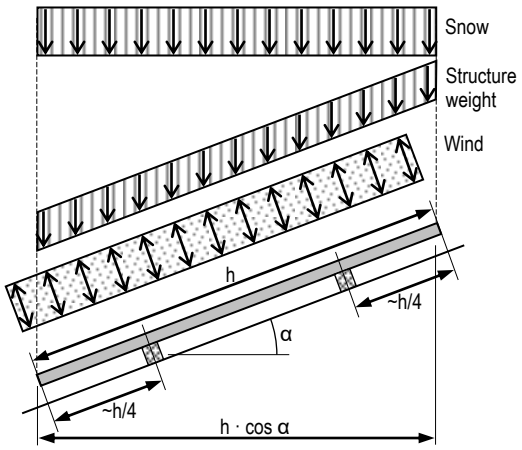
The electrical installation must be performed only by qualified personnel who, due to their specific training or professional experience, are able to ensure that the work is performed correctly and to a high standard. The wiring of the PV modules must be made to avoid the possible creation of loops

During the phases of wiring observe much attention to the positions of the cables.
Do not allow the same come into contact with the sharp edges of the aluminum structure, position fasteners for cables in order to avoid possible movements free.

Prepare a grounding for the entire plant, for photovoltaic modules and aluminum structures.

4 Statics of the system

4.1 General information and reference standards
The dimensioning of profile and support elements has been done on the basis of static analysis according to Eurocodes EC0 and EC9 (EN 1990 and EN 1999-1-1). Snow and wind loads for European countries can be found in Eurocode EC1 (EN 1991-1-3 and EN 1991-1-4).



4.2 Load cases
All loads (structure weight, snow, wind) are supposed not to work at the same moment having maximum intensity, but they could work togeteher with different ratio (semi-probabilistic method).
Worst “Load Cases” (LC) are:
LC1: 1.35*structure weight + 1.5*(snow + 0.6*wind)
LC2: 1.35*structure weight + 1.5*(0.5*snow + wind)
LC3: 0.9*structure weight + 1.5*wind
LC1 and LC2 are worst conditions for pressure wind, LC3 for wind in depression.

Coefficients 1.35, 1.5 e 0.9 are used as ”elastic” ultimate limit state of elements, where stresses are limited to Rp0,2 (about profile SolarFish) or where stress causes a 0.8mm maximum permanent deformation at the end of wing (about hooks).
At the same time, structures have to satisfy working limit state for overmuch deformations: this calculation is made having former coefficients = 1 and deformations limited to 1/150 of distance between supports (about profile SolarFish) or 10mm (about hooks).
Weight of PV-modules is supposed to be 15 Kg/m².

5 General safety and installation instructions

- The work have to be performed in accordance to electrical standard which is beeing used in the region of installation. The quality level of this standard needs to be equal or higher as the standard which is mentioned.”

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- All products must be used and installed strictly according to the instructions published by fischer Italia.

- Periodically, the system should be visually inspected and should be checked for the torque of the connections. This maintenance should be performed at intervals not exceeding 6 months

- Personnel involved with the installation of the system must always have a current copy of the instruction manual. In case, is it possible to ask an updated copy of installation manual to **engineering@fischeritalia.it**

- Information and advices in this Technical Data Sheet are based on principles and calculations defined in fischer technical instructions, manuals, standards or other information hold as correct when it was written. Values resulted from tests made in lab conditions. User has responsibility to verify and control if site conditions, components, fixing devices, tools, etc. are complying with Technical Data Sheet conditions. Responsibility on product choice about final using appertain to the Customer.

- Under no circumstances is fischer Italia responsible for indirect, incidental or consequential damages, losses or expenses in connection with, or by reason of, the use of, or inability to use the products for any intention

- The warranty is valid only if the system is installed in accordance with this technical data sheet. Each operation performed differently from that stated will void the warranty.

- For PV and/or Inverter installation please refer to the manufacturer's manual

- Solar fix system can be changed. Before starting the installation, check that this is the last version of the user guide and if it isn't the latest updated, send update request to **engineering@fischeritalia.it**

- For installation of PV panels and inverters, check the manufactor's datasheet

- Solar-fix system is completely pre-assembled and modular.

For more details, please call Customer Service at the number **800-844-078**