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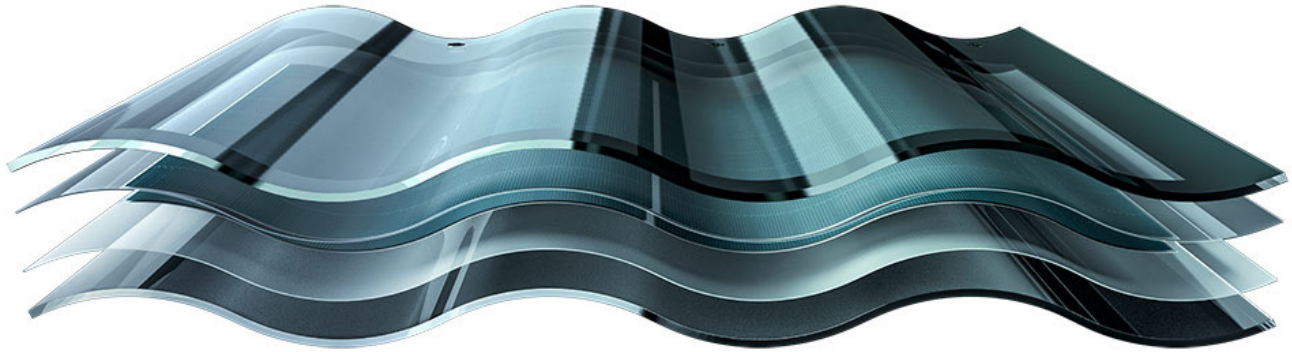

SOLAR ROOF TILES

A NEW TYPE OF TILES

Comparative characteristics

- **Universal installation**
- **Reliability and more energy production**
- **Design solutions**

- Installing the bracket damages the tiles
- Changing the appearance of the roof and architectural style
- Additional load on the roof

- The usable area of the panel is limited to the flat part of the tile
- Weak wind protection
- Not enough neat appearance

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COMPARISON OF EFFICIENCY

- A standard solar battery in cloudy weather is able to work only at 10% of its capacity, while solar tiles produce up to 50% of the nominal values.

- When dusty, the power loss of solar tiles is 1-2% due to the ability to transmit light and smooth glass surface, while traditional silicon panels have a loss of 6-10%.

- **Hantile has 24 bypass diodes per 1 square meter, while traditional panels have 2-4, which significantly increases the production of panels in cloudy weather and shading.**

- **Even in low light, the inverter turns on earlier and turns off later, thus increasing the working solar day.**

- **Annual production of kWh of the station from 1 kW of panels based on CIGS technology is 15-20% more than from 1 kW of crystalline panels**

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HANTILE ADVANTAGES

SAFETY

With the help of windproof hook tiles are securely fixed on the roof, easy replacement of tiles and disassembly of the roof.

PRACTICABILITY

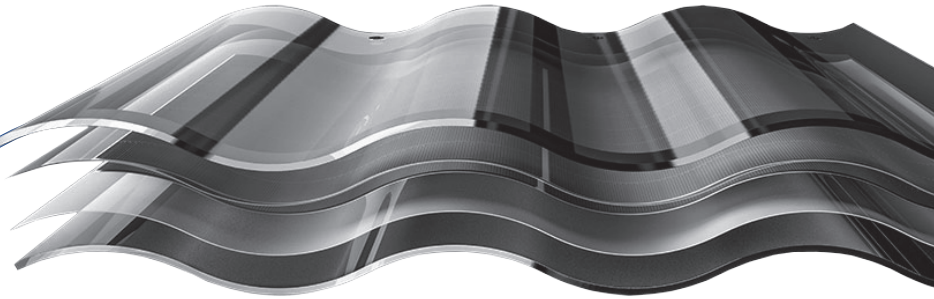
Glass surface of the panel, which can be walked on. The service life of building materials is increased in comparison with traditional ones and reaches 50%.

ECONOMICITY

Hantile can have the properties of both a building material and a PV module for generating electricity.

DESIGN

Creating different architectural styles. Great appearance.



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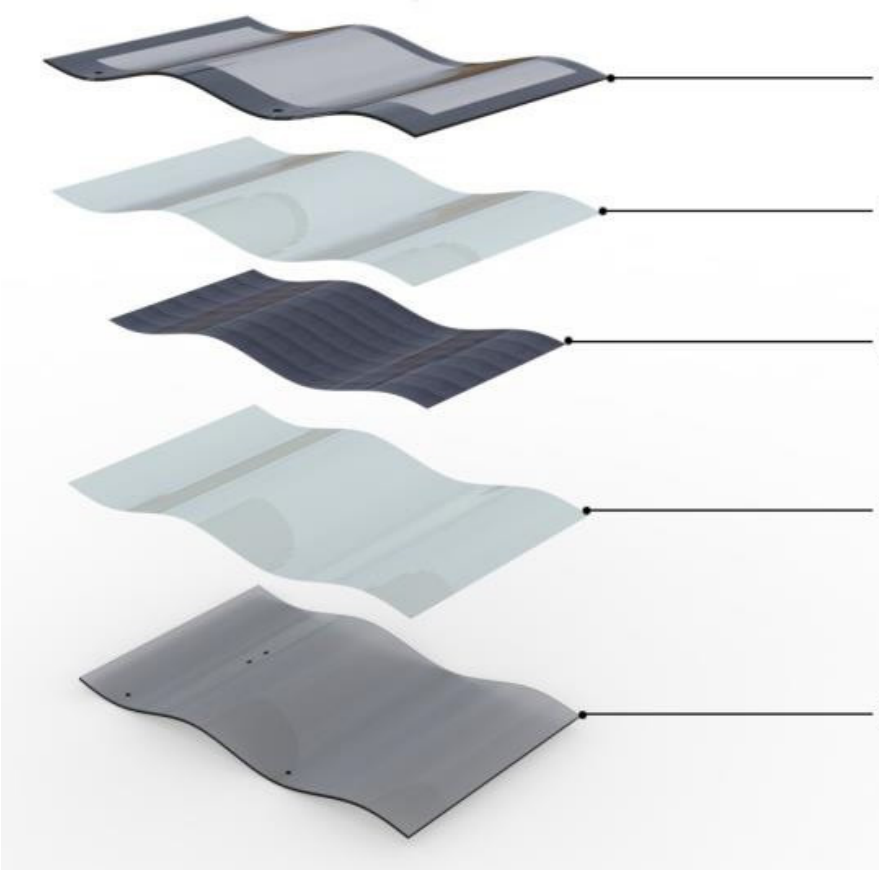
MODULE STRUCTURE



Glass

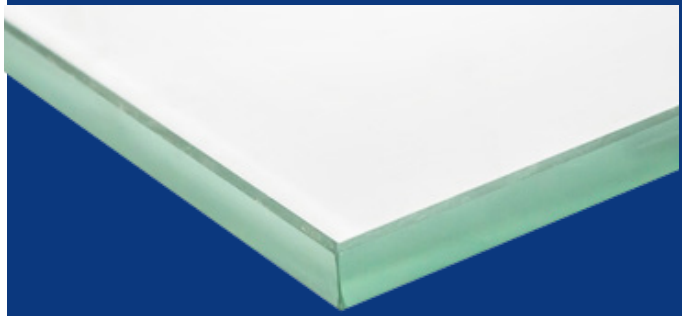
Polyethylene foil

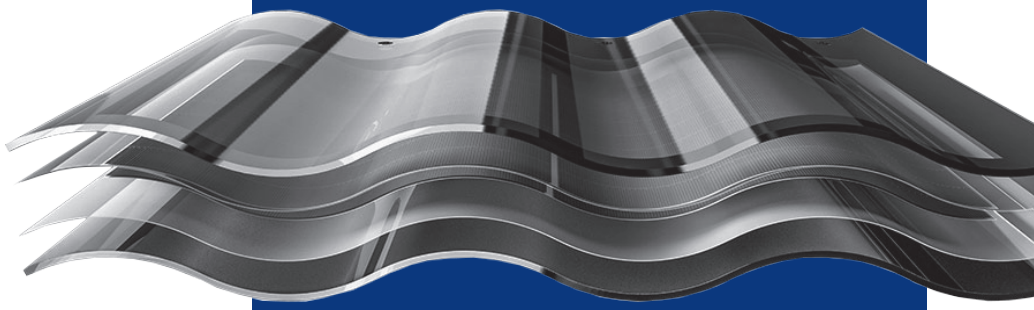
Microchip
MiaSolé

Polyethylene foil

Glass

- Ultra-polished glass - float glass (triplex)
- Glass thickness 10 mm





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TECHNOLOGY

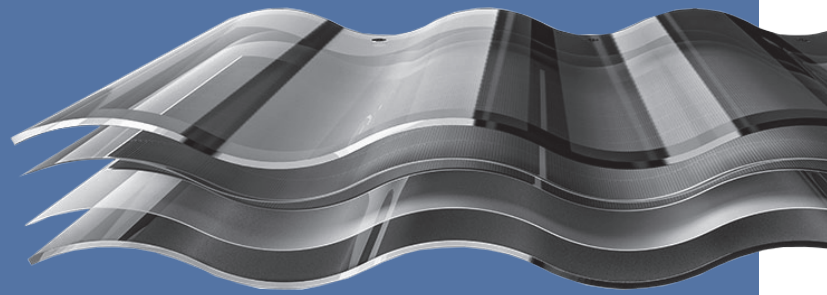
The flexible photovoltaic module inside the module is a MiaSole chip manufactured using CIGS technology (copper-indium-gallium selenide alloy) - Hanergy's patented technology.

ADVANTAGES:

- weight;
- dimension;
- flexibility;
- nefficiency;
- universality;
- economy;
- ecological compatibility;
- nease of use.

MiaSole – serially produced module (AA) with a maximum conversion efficiency of 17.44%. This is a world record for the generation of flexible CIGS film created by sputtering.

Due to its high conversion efficiency, light weight, ultra-thin design, flexibility, direct adhesion and low installation cost, MiaSole flexible thin-film panels are suitable for lightly loaded and curved roofs, and are used in both commercial and other projects.



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PRODUCT DESCRIPTION:
PHYSICAL AND ELECTRICAL CHARACTERISTICS

- **Dimensions:** 719(L)*500(W)*41(H)мм
- **Weight:** 10(±0.5)кг
- **Fire resistance grade:** UL Class A
- **Protection against humidity:** IP67
- **Protection against hail:** Level 4 (ANSI FM4473)

- Open circuit voltageVoc(V): 10.6V
- Current PMPP: 3.5A
- **Short-circuit current** Isc(A) : 4.0A
- Rated voltage Vm(V) : 8.6V
- **Operating humidity:** 0-80%
- Temperature factor V/K : 0,36%
- **Operating temperature:** -40℃~+85 ℃
- Connector type: MC4
- **Mechanical load:** 5400Pa
- **Type of microchip:** CIGS
- **Rated power** Pm(W) : 30Вт
- The drop in average energy production over 25 years is not more than 85%.

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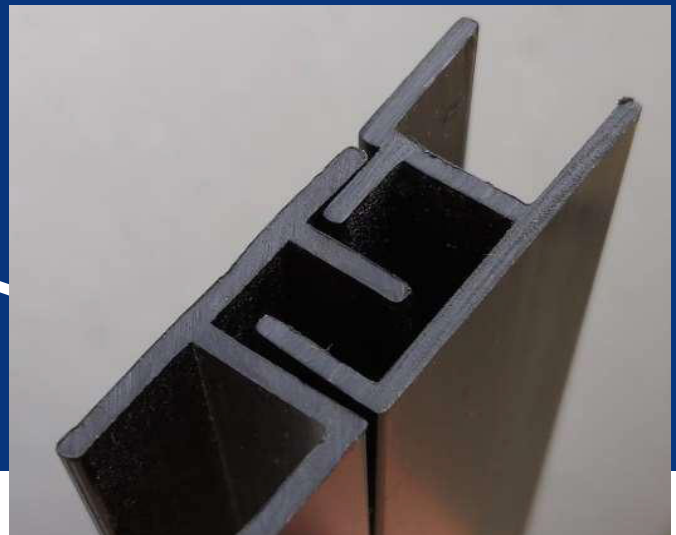
PRODUCT SPECIFICS.
MATERIAL AND TYPE OF MOUNTING FRAME

For installation and organization of module joints polyphenyl oxide material is used - one of the structural plastics with the lowest dielectric constant and losses. Suitable for high-electric fields, especially photovoltaic.

Polyphenylene plastic is one of the five used in the design. It has sufficient rigidity and high heat resistance, strength. It is characterized by low moisture absorption, pollution resistance, UV resistance, good stability. Due to good arc resistance and low angle tangent value dielectric losses, self-extinguishing, high spark resistance allow the use of polyphenylene oxide in the production of electronic equipment parts. Dielectric properties allow using this polymer as electrical insulation of high-voltage wires. The dimensions and shape of the products remain constant even under thermal influences up to 150 °C. In the 80s, EPR material was used in the construction of load-bearing walls and still their service life is more than 40 years, durability has been tested in practice.

Working temperature is 40-120 °C.

POLYPHENYLENE OXIDE MOUNTING FRAME WITH OVERLAPPING CONNECTION



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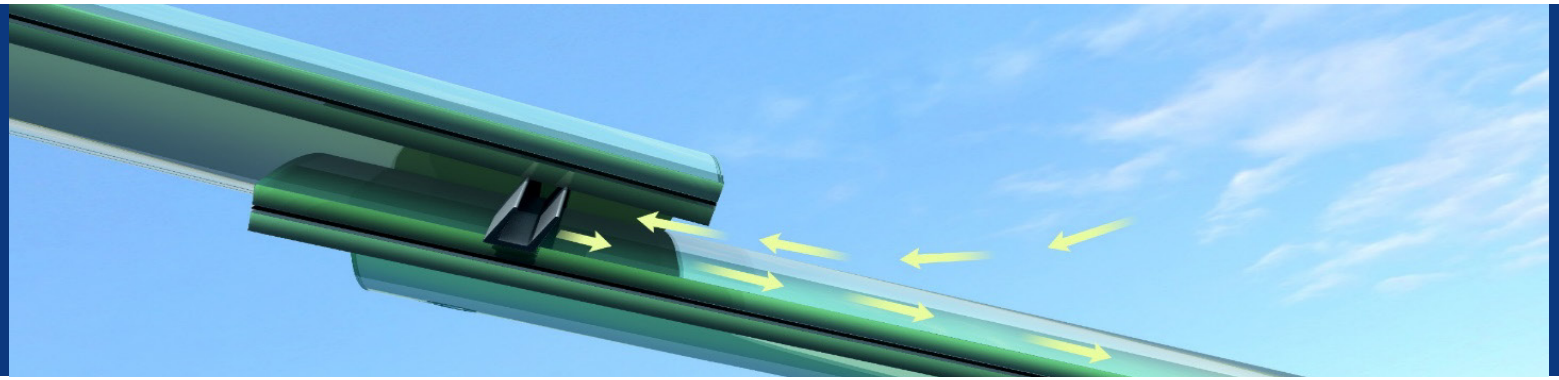
PRODUCT SPECIFICATIONS: HUMIDITY RESISTANCE

The waterproofness of the panel structure is provided by the rubber seal EPDM3, EPR.

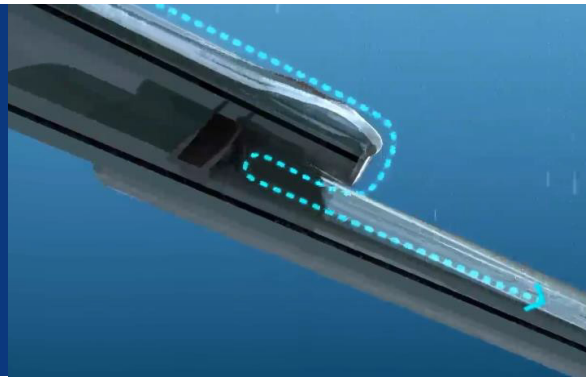
The material of the sealant is ethylene propylene rubber (EPDM3, EPR) - it is an electro- and weather-resistant rubber, resistant to ozone, sunlight, chemicals (diluted acids, alkalis and polar solvents).

The working temperature of EPDM rubber seals ranges from -55 до +140 °C.

Hygroscopicity (moisture absorption) is negligible 0,01.



MOISTURE FLOW AGAINST THE INSTALLATION LINE



WATER FLOW ALONG THE INSTALLATION LINE

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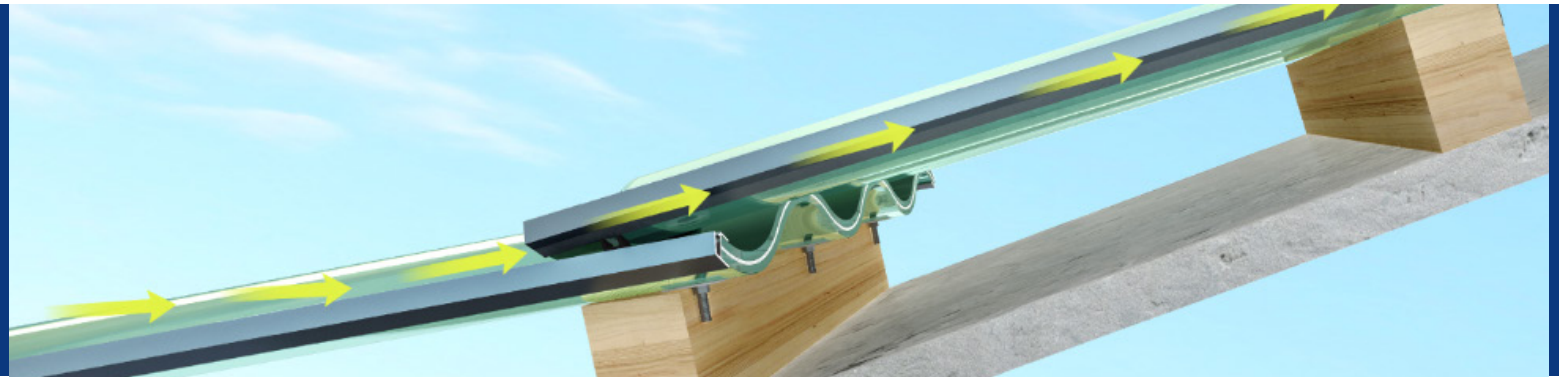
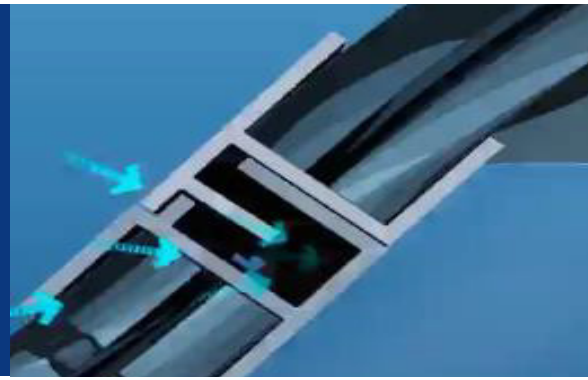
PRODUCT SPECIFICATIONS:
VENTILATION AND HEAT DISSIPATION

Ventilation structure of the rear wall of the panel:

The flow of outside air passes to the rear wall under the influence of atmospheric pressure, forming an external niche for air circulation under the panel. The air layer on the rear wall heats up and expands due to the Han Watts, rising, falling pressure.





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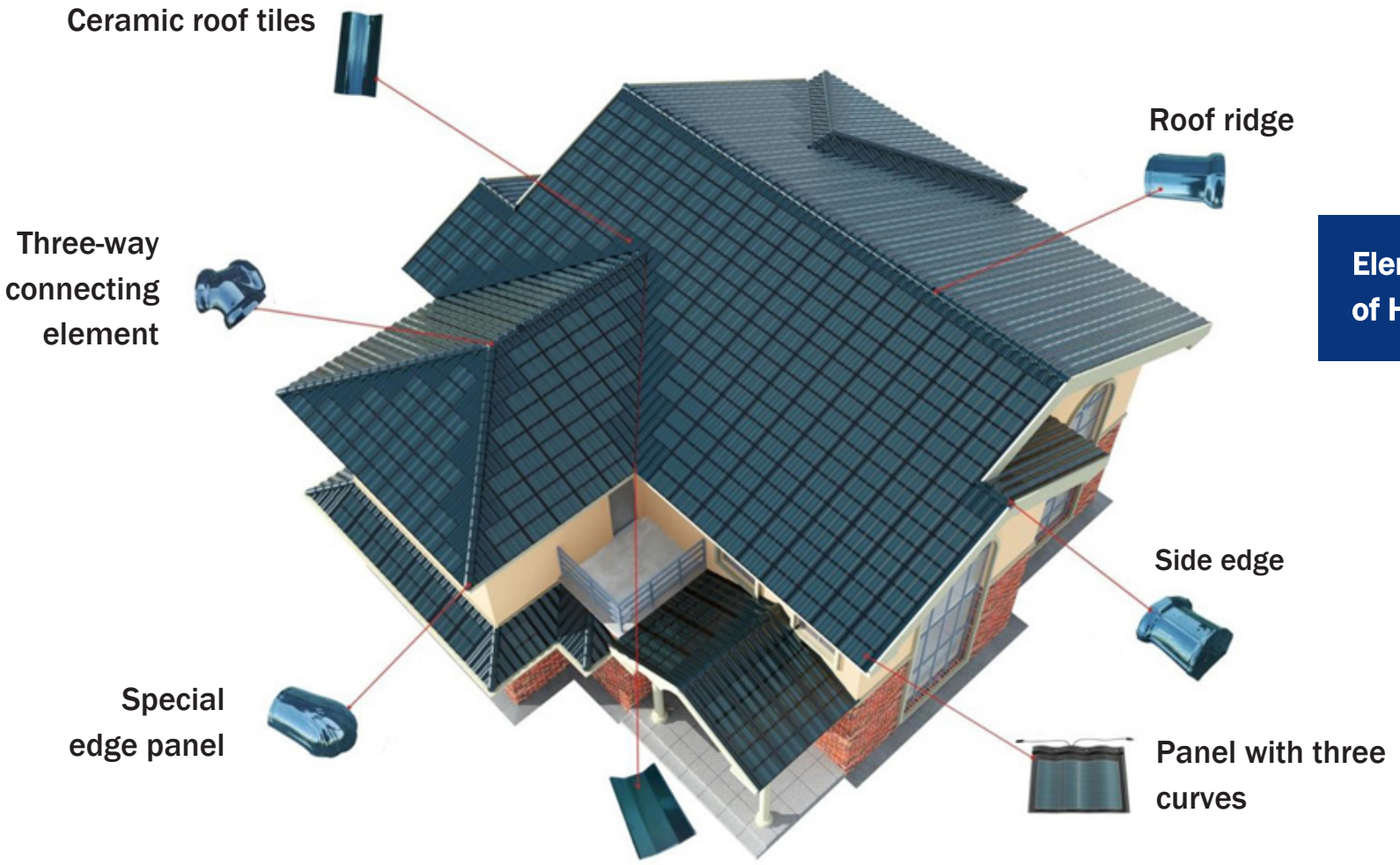
ADDITIONAL ITEMS



Elements for installation of HanTile panels

Gutter at the junction of two roof slopes

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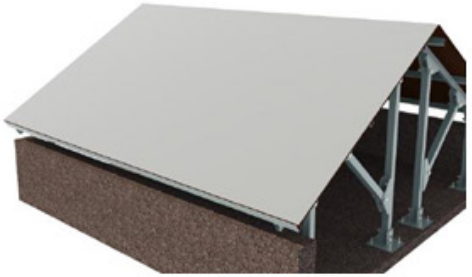
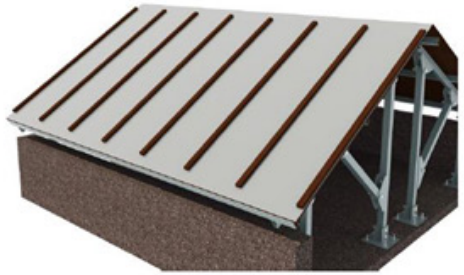
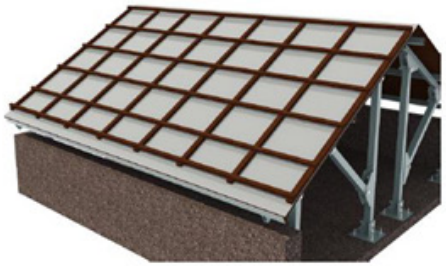
INSTALLATION METHOD OF SOLAR TILES



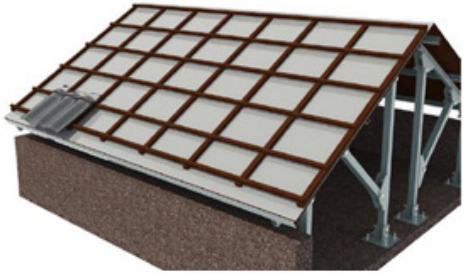
ITEM 1: installation of hydraulic barrier



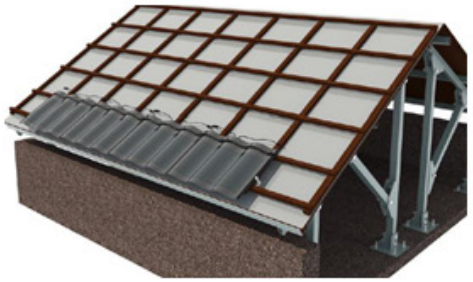
ITEM 2: install vertical rail



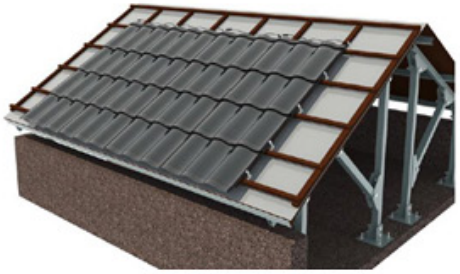
ITEM 3: install horizontal rail



ITEM 4: install the first tile from left to right



ITEM 5: install hantile one after another



ITEM 6: install hantile from bottom to top

ITEM 7: Install additional items

ITEM 8: set the roof ridge

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EXAMPLES OF FINISHED OBJECTS

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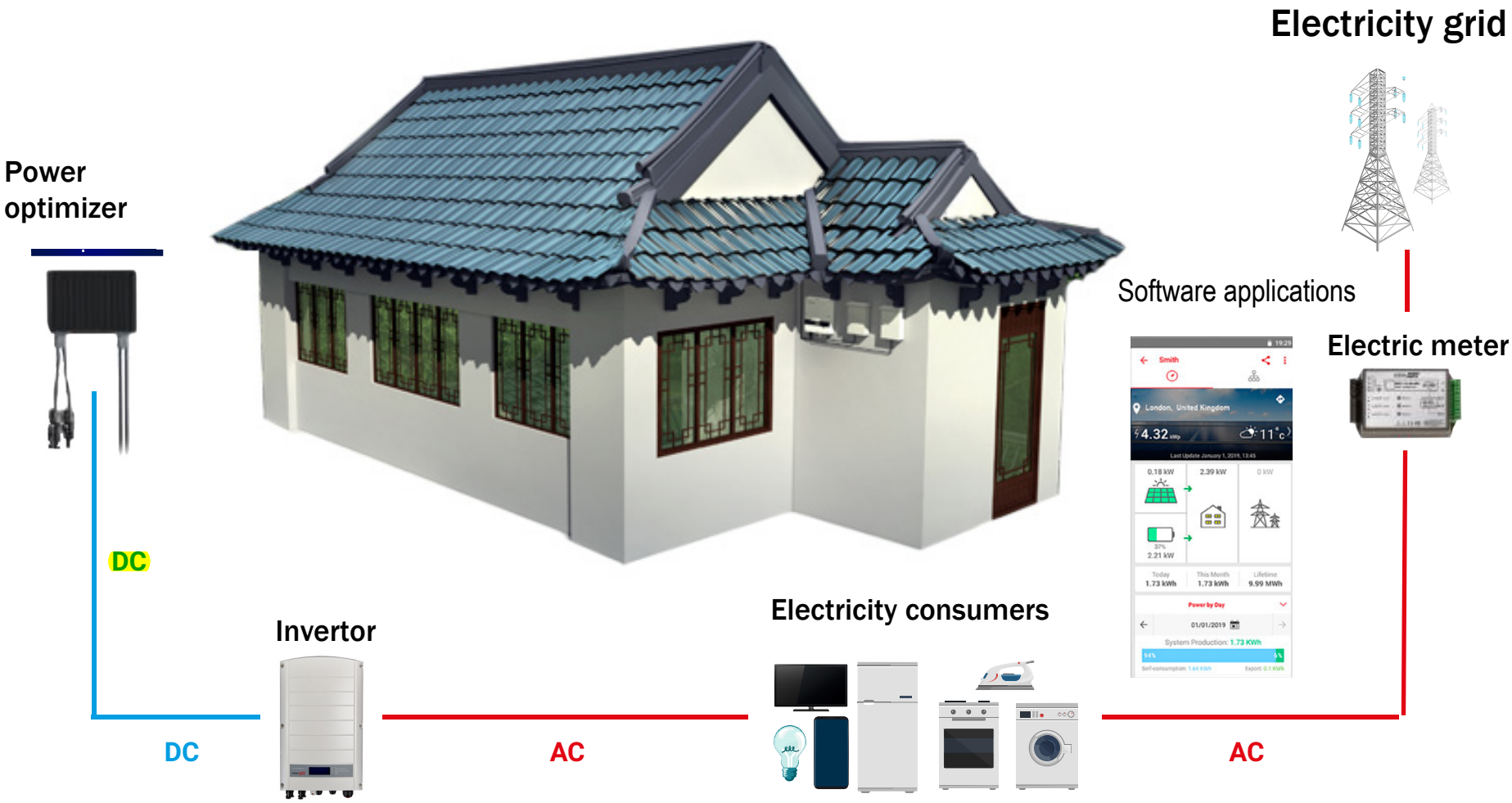
EXAMPLE OF THE CONNECTION DIAGRAM TO THE POWER GRID



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innovative solutions

ALTEN-TECHNO

History of development

The new history of the development of the renewable energy market in Ukraine began long before the creation of ALTEN-TECHNO. We started importing solar panels to Ukraine back in 1999, creating mini power plants, testing them, learning to evaluate their electricity production depending on climatic conditions, angle of inclination, falling shadow, type of panels and equipment features.

In fact, ALTEN-TECHNO is an alloy of several engineering and technical companies united by a common goal. Our specialists have come a long way from the creation of this market to the actual payback of solar power plants at the present time.

Our advantages

- More than 20 years of experience of specialists, and competitiveness.
- Integrated approach. We design not only a solar power plant, but also other related engineering systems, such as power plant protection systems, etc.
- Attention to details. For many years of experience, we have developed a special approach. We take into account the peculiarities of the equipment operation to the maximum, estimate the electricity generation on a monthly basis, recommend the use of certain equipment and systems and discuss the consequences of their use with the Client, make the most detailed estimate for the installation of a solar power plant and engineering systems.
- Use of the latest technologies.

How to make an order:

Whatever sets we would not form, each solar power plant is individual. It is necessary to take into account many factors when designing and calculating the cost of a solar power plant. Usually we preliminarily inspect the object where the power plant will be located, make a preliminary calculation of the commercial offer, discuss with the client all the nuances of the work. Then we calculate a detailed estimate, prepare working documentation, if necessary, make a working draft. Delivery, installation, connection and adjustment can be done both as a whole and in stages. It is also important to accompany the Client after the installation of the solar power plant, providing recommendations, or to carry out maintenance of the equipment at least once a year, three, five, ten, twenty-five years.

Therefore, if you decide that you have to take a step towards your energy independence, please write and call ALTEN-TECHNO and we will work for you.

OUR CONTACTS:
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Sofiyska Borshchagivka v.,
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