



VERSOL RENEWABLE SOLUTIONS - VERSOSUN



VERSOL Solar Collectors - Versosun Range

Since the very beginning the activity of VERSOL has been oriented towards the manufacturing of flat solar collectors, assembly sets as well as towards completing and selling solar fixtures and complete solar systems. Our design and engineering facilities enabled us to work out and implement our own solutions in several types of collectors diverse in respect of surface and hydraulic solutions. On the basis of a uniform supporting structure, we have created the whole family of collectors characterized by their innovative solutions and high quality as regards their aesthetic qualities and operational efficiency.

All products manufactured undergo testing and certification carried out by recognized research and certifying agencies of world renown, namely TOV Rheinland and DIN Certco, and they successfully pass all quality tests. International quality label "Solar Keymark" on most of our products constitutes an undeniable proof of that. High quality of products, as the main objective of our activity is not necessarily the cheapest solution at the investment stage. However, in view of twenty years of collector life it shall bring about measurable financial results. We have deliberately and intentionally chosen the most restrictive and reputable research centres, which in every respect confirm our products' quality in the eyes of our current as well as potential customers.

VEROSUN-WH-FP Range

FP2,0/Cu-Cu

Flat collector with double absorber
made of copper.



TÜVRheinland
Precisely Right.

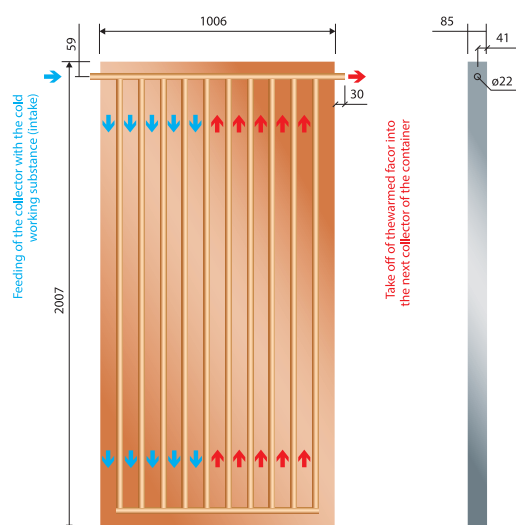


VERSOL solar collector FP2,0/Cu-Cu is designed for changing energy of solar radiation into useful thermal energy used for preparing warm service water, heating swimming-pools or supporting heat source in heating system.

Collector's housing construction is based on a rigid frame bent from the special aluminium profile. At the bottom the housing is closed with aluminium sheet, whereas the cover is made of special, high-transmission solar glass. The manner of fixing the glass ensures tightness of housing and minimizes the thermal tensions.

The main part of the collector is an absorber, the plate of which is made of copper sheet covered with the high selective coat in order to ensure high level of solar radiation absorption, which results in obtaining high efficiency of the energy conversion process. Absorber's plate is welded by means of ultrasonic welding with the system of copper tubes, in which the medium circulates. Heat losses were minimized by application of lower and lateral insulation made of mineral wool of low heat conduction. Specially designed assembly sets made of stainless steel or Galvanised Steel are used for trouble free and secure mounting of collectors to roof constructions with different angle of roof slope inclination. Flat collectors with prismatic glass have certificate of compatibility with norm DIN EN 12975-2:2006 conducted by TÜV Rheinland Immissionsschutz und Energiesysteme GmbH and Solar Keymark certificate

Dimensions of the collector and flow through the absorber

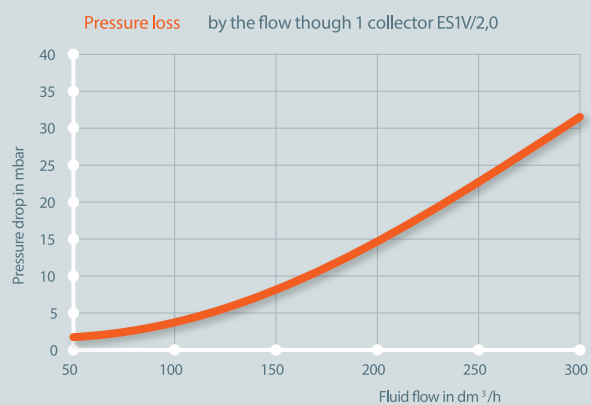
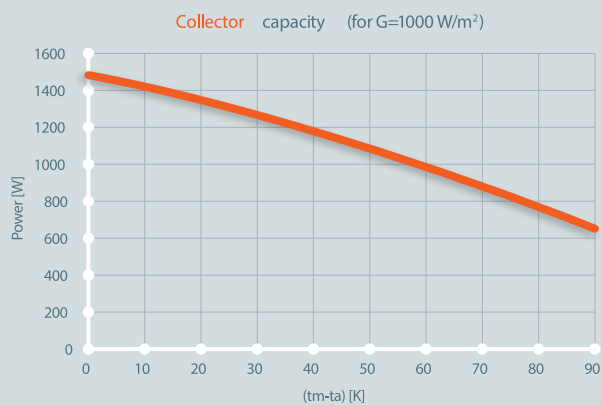
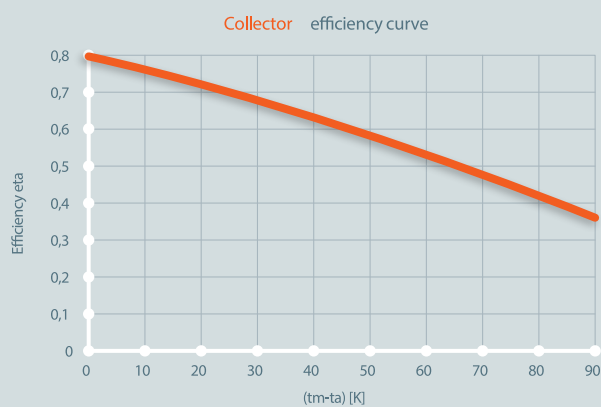


Cross-section of the collector



Technical specification FP2,0/Cu-Cu

Flat solar collector	value
width	1006 mm
height	2007 mm
depth	85 mm
weight	40 kg
surface	2,02 m ²
optical efficiency	80 %
coefficient a1	3,498 W/(m ² K)
coefficient a2	0,017 W/(m ² K ²)
connection: copper	22 mm
housing	alu-profile
cover	Prismatic solar glass, 4mm thickness
Absorber	
absorber's type	Copper sheet, 0,2mm in thickness
selective layer	Blue Tec eta plus
production technology	ultrasonic welding
absorption coefficient	95 %
mission coefficient	5 %
width	954 mm
height	1953 mm
absorber's surface	1,86 m ²
active surface	1,86 m ²
liquid content	1,8 dm ³
balance temperature	208 °C
guaranteed minimal thermal output	525 kWh/m ² ·year
flow: recommended	ok. / ca 60-90 l/h
permissible	ok. / ca 50-220 l/h
Insulation	mineral wool
conduction coefficient	0,035 W/mK
thickness of the insulation layer:	
lower	40 mm
lateral	10 mm



VEROSUN-WH-FP Range

FP2,0/Cu-Al

FP2,0/Cu-Al – flat solar collector with double absorber, made of copper and aluminum



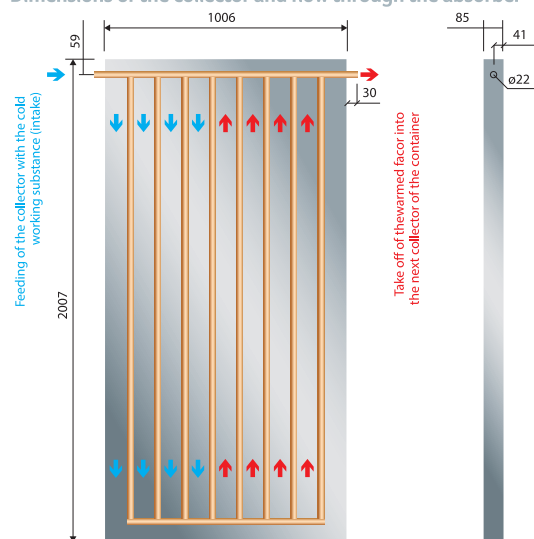
VERSOL solar collector FP2,0/Cu-Al is designed to convert energy of solar radiation into useful thermal energy used for preparing warm service water, heating swimming-pools or supporting heat source in the heating system.

Collector's housing construction is based on a rigid frame bent from the special aluminum profile. At the bottom the housing is closed with aluminum sheet, whereas the cover is made of special, high-transmission solar glass. The manner of fixing the glass ensures tightness of housing and minimizes the thermal tensions.

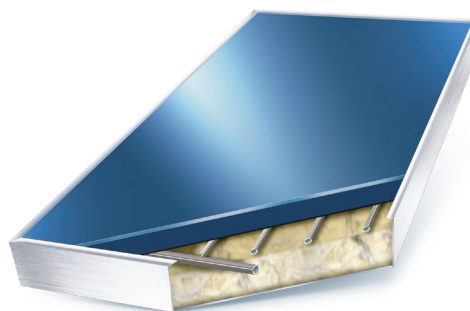
The main part of the collector is an absorber, the plate of which is made of aluminum sheet covered with the high selective coat in order to ensure high level of solar radiation absorption, which results in obtaining high efficiency of the energy conversion process. Absorber's plate is welded by means of laser welding with the system of copper tubes, in which the medium circulates. Meander absorber ensures steady heat removal through the circulating medium. Heat losses were minimized by application of lower and lateral insulation made of mineral wool of low heat conduction.

Specially designed assembly sets made of stainless steel or Galvanised Steel are used for trouble free and secure mounting of collectors to roof constructions with different angle of roof slope inclination.

Dimensions of the collector and flow through the absorber



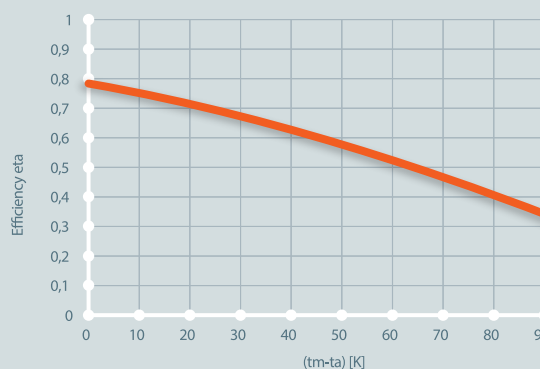
Cross-section of the collector



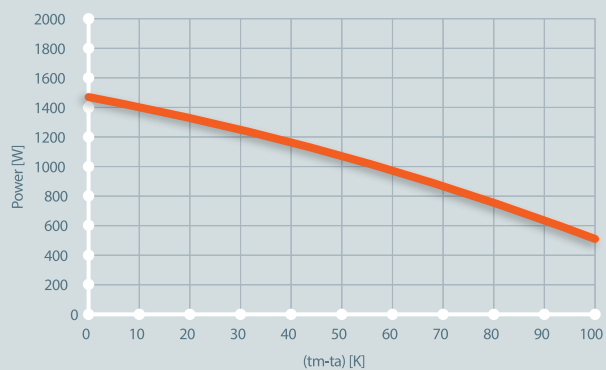
Technical specification

Flat solar collector	value
width	1006 mm
height	1988 mm
depth	85 mm
weight	39 kg
surface	2,0 m ²
optical efficiency	78,8 %
coefficient a1	3,485 W/(m ² K)
coefficient a2	0,017 W/(m ² K ²)
coefficient of the incline angle (IAM)	0,86
connection: copper	22 mm
housing	alu-profile
cover	Prismatic solar glass, 4mm in thickness
Absorber	
absorber's type	Metal sheet Al; thickness 0,5 mm
selective layer	Blue Tec
production technology	Laser welding
absorption coefficient	95 %
emission coefficient	5 %
width	964 mm
height	1946 mm
absorber's surface	1,876 m ²
active surface	1,876 m ²
liquid content	1,2 dm ³
balance temperature	208 °C
guaranteed minimal thermal output	525 kWh/m ² ·year
flow: recommended permissible	ok. / ca 60-90 l/h ok. / ca 50-220 l/h
insulation	mineral wool
conduction coefficient	0,035 W/mK
thickness of the insulation layer: lower lateral	40 mm 10 mm

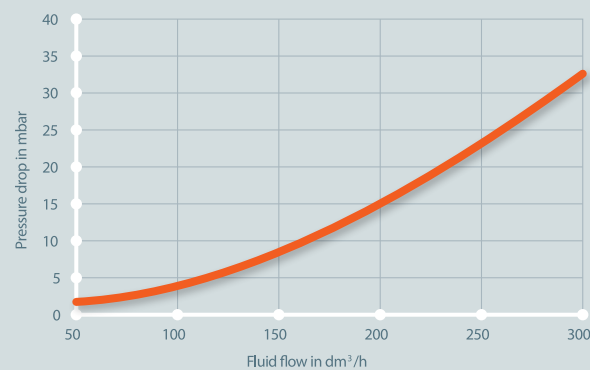
Collector efficiency curve



Collector capacity (for G=1000 W/m²)



Pressure loss by the flow though 1 collector EM1V/2,0



VEROSUN- Hybrid Pannels

PV-T2,0 | Hybrid collector

PV-T2,0 is a combination of a flat solar collector and photovoltaic module with polycrystalline silicon cell with power of 300 W.



By bionic exchanger waste heat is used for domestic hot water or central heating, photovoltaic module converts the solar energy into electricity.

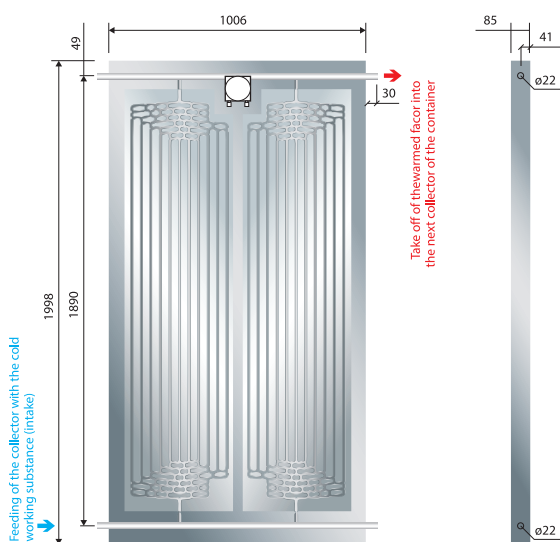
Photovoltaic module defined as a source of a pure electric energy is not without downsides; its efficiency lowers when the temperature of the module rises. When the temperature of cells goes up by 1 K, its capacity of producing energy goes down by 0,5%. Catalogue parameters of photovoltaic modules are given for the temperature of a module equal 25 degrees, with an insolation of 1000 W/m². During the work in a full, lasting for several hours insolation, the temperature of a module rises to a level which could cause the loss of efficiency reaching even 40%.

By using thermal system in a hybrid collector PVT occurs a reception of warmth with the use of cooling fluid flowing by Roll-Bond exchanger. By removing the heat, thermal system increases the capacity to process solar radiation into electric current, but also provides a lot of thermal energy. Hybrid collector PV-T2,0 is a technological progress in increasing efficiency of photovoltaic modules with a simultaneous exchange of a solar energy into thermal and electric energy.

Advantages of a hybrid collector PV-T2,0:

- > Higher efficiency of production of electric energy in comparison to standard photovoltaic modules,
- > Thermal part of a collector is used for heating domestic water and supporting central heating,
- > More economic possibilities – one module required for production of electrical current and heat,
- > Lower investment cost of both systems than in traditional devices (fluid thermal collectors and photovoltaic modules).

Dimensions of the collector and flow through the absorber

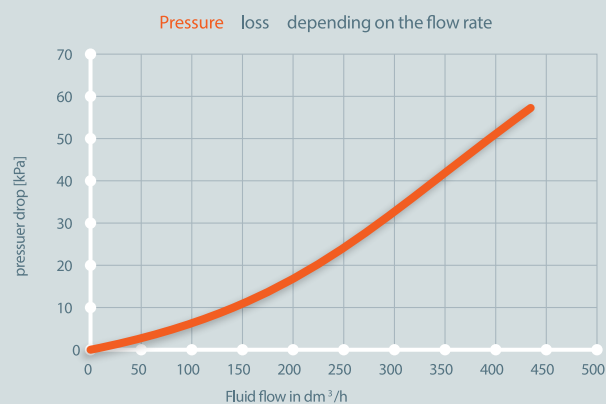
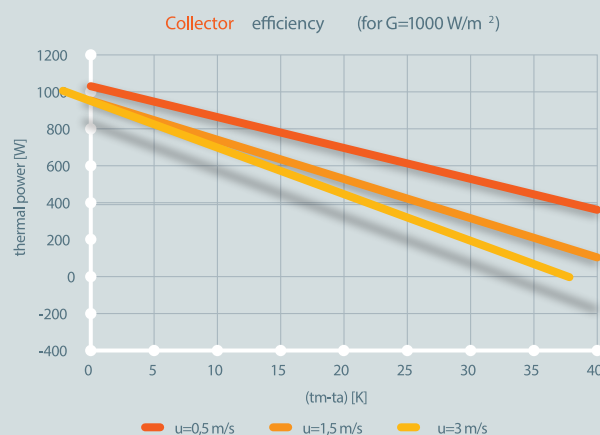


Cross-section of the collector



Technical specification

Flat solar collector	value
width	1006 mm
height	2007 mm
depth	85 mm
weight	37 kg
surface	2,02 m ²
housing	patented aluminium profile
technical parameters	
absorber's type	Aluminium exchanger Roll-Bond
selective layer	Blue Tec eta plus
aperture surface	1,86 m ²
width	954 mm
height	1959 mm
collector efficiency	55,5 %
Coefficient b_{u_i}	0,051 W/(m ² K ²)
Coefficient b_{1a}	9,547 W/(m ² K ²)
Coefficient b_{2a}	1,389 W/(m ² K ²)
maximum operating pressure	6 bar
maximum operating temp.	85 °C
fluid content	1,2 dm ³
electrical parameters	
Peak power (for 1000 W/m ²)	300 W
type of cell	polycrystalline
amount of cells	72
size of cells	156 x 156 mm
rated current	8,15 A
short-circuit current	8,75 A
nominal voltage	36,82 V
open-circuit voltage	45,31 V
Total peak Power (for 1000 W/m ²)	1175 W



VEROSUN- PV Range

PV 300 | Photovoltaic module PV

Photovoltaic module E-PV 300W is a device used for conversion of a solar radiation energy into electrical current.



Module has a polycrystalline silicone cells. They can be used in off-grid installations, as well as in the installations connected to the mains (on-grid). Module is made of 72 cells connected in a series-parallel way, tightly laminated, covered with a tempered glass with a thickness of 4mm, framed in a special, patented aluminium profile.

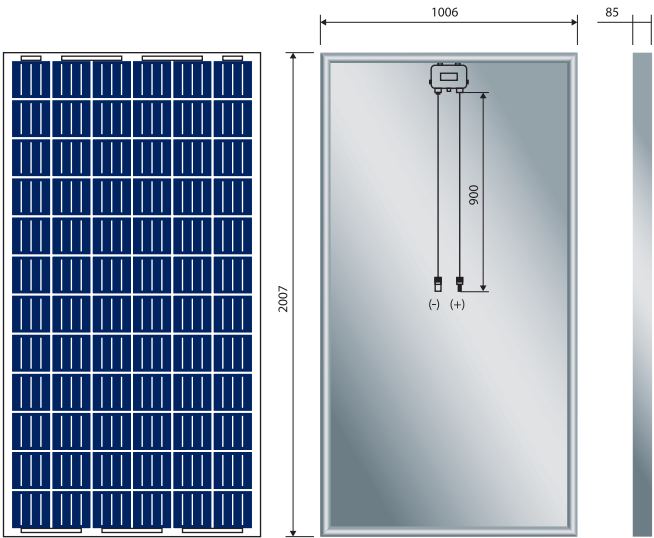
Cells are soldered without a contact with the use of hot air, which minimizes creation of micro-tensions in the structure of cells. The whole soldering process of a photovoltaic module is held in the high-class laminators in conditions of deep vacuum. Lamination parameters are strictly defined by technology and cannot be changed by its operators, which guarantees high quality and repetitiveness of a lamination.

Photovoltaic module PV 300 is controlled and monitored through the whole production process: conducting a computer controlled monitoring of the quality of cells before and after soldering, electrical parameters control on a special AAA class tester in accordance with IEC 60904-9.

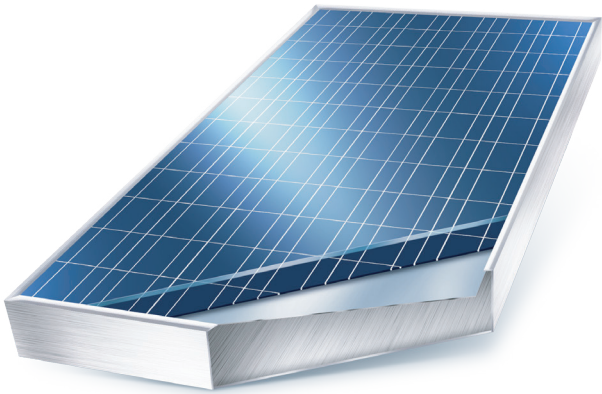
Advantages of a photovoltaic module PV 300:

- > Photovoltaic module PV 300 is the purest source of electric energy,
- > The use of high technology in the production process (soldering and lamination),
- > Computer monitoring of a cells soldering cells, specialistic electrical,
- > Parameters control and the quality of a production process control,
- > Long lifespan of a module.

Dimensions of the collector and flow through the absorber

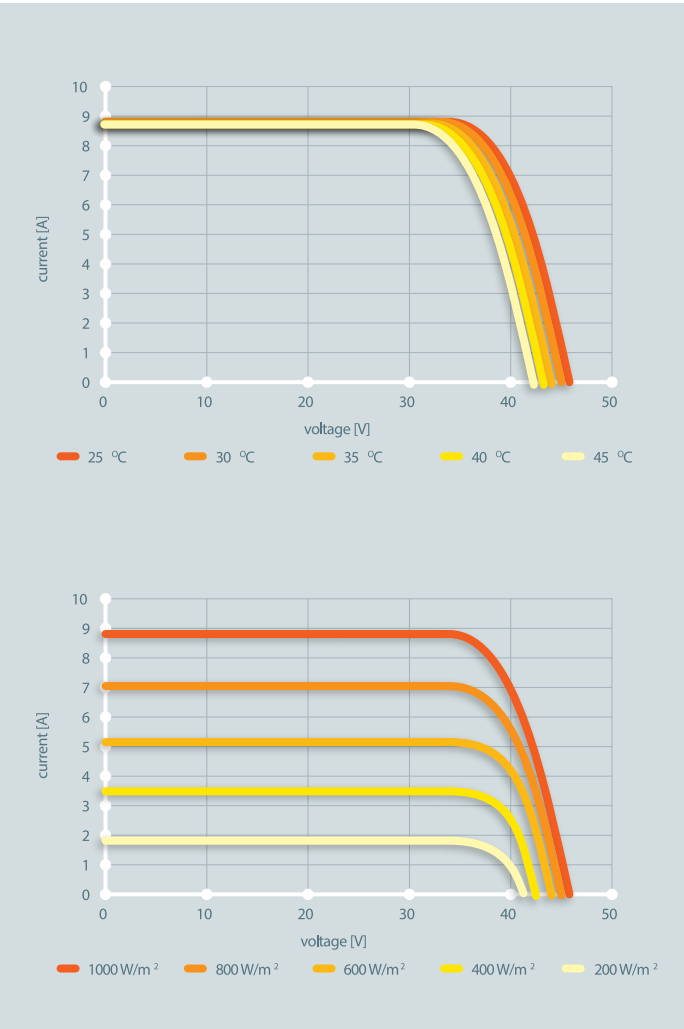


Cross-section of the collector



Technical specification

Flat solar collector	value
width	1006 mm
height	2007 mm
depth	85 mm
glass thickness	4 mm
surface	2,02 m ²
housing	patented aluminium profile
electrical parameters	
Peak power (for 1000 W/m ²)	300 W
type of cell	polycrystalline
amount of cells	72
size of cells	156 x 156 mm
rated current	8,15 A
short-circuit current	8,78 A
nominal voltage	36,82 V
open-circuit voltage	45,31 V
efficiency	15,4 %
maximum system voltage	1000 VDC
temperature range	-40 ÷ 85 °C



VEROSUN- PV Range

PV 250 | Photovoltaic module PV

Photovoltaic module PV 250 is a device used for conversion of a solar radiation energy into electrical current.



Module has a polycrystalline silicone cells. They can be used in off-grid installations, as well as in the installations connected to the mains (on-grid).

Module is made of 60 cells connected in a series-parallel way, tightly laminated, covered with a tempered glass with a thickness of 3,2 mm, framed in a special, patented aluminium profile.

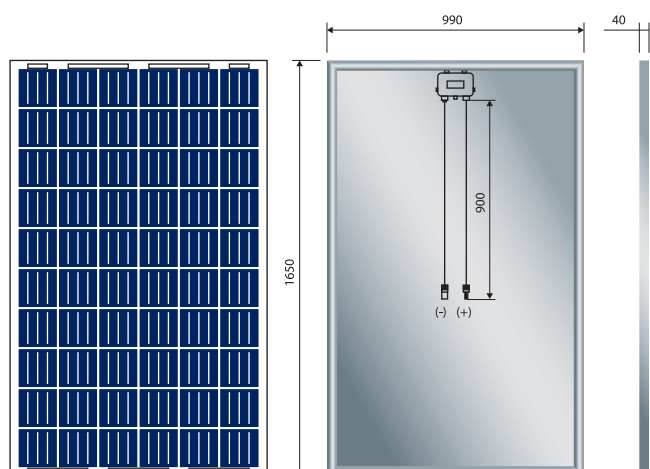
Cells are soldered without a contact with the use of hot air, which minimizes creation of micro-tensions in the structure of cells. The whole soldering process of a photovoltaic module is held in the high-class laminators in conditions of deep vacuum. Lamination parameters are strictly defined by technology and cannot be changed by its operators, which guarantees high quality and repetitiveness of a lamination.

Photovoltaic module PV 250 is controlled and monitored through the whole production process: conducting a computer controlled monitoring of the quality of cells before and after soldering, electrical parameters control on a special AAA class tester in accordance with IEC 60904-9,

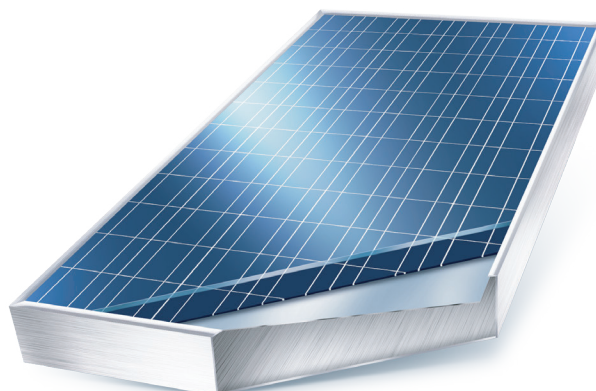
Advantages of a photovoltaic module PV 250:

- > Photovoltaic module PV 250 is the purest source of electric energy
- > The use of high technology in the production process (soldering and lamination)
- > Computer monitoring of a cells soldering cells, specialistic electrical parameters control and the quality of a production process control
- > Long lifespan of a module.

Dimensions of the collector and flow through the absorber

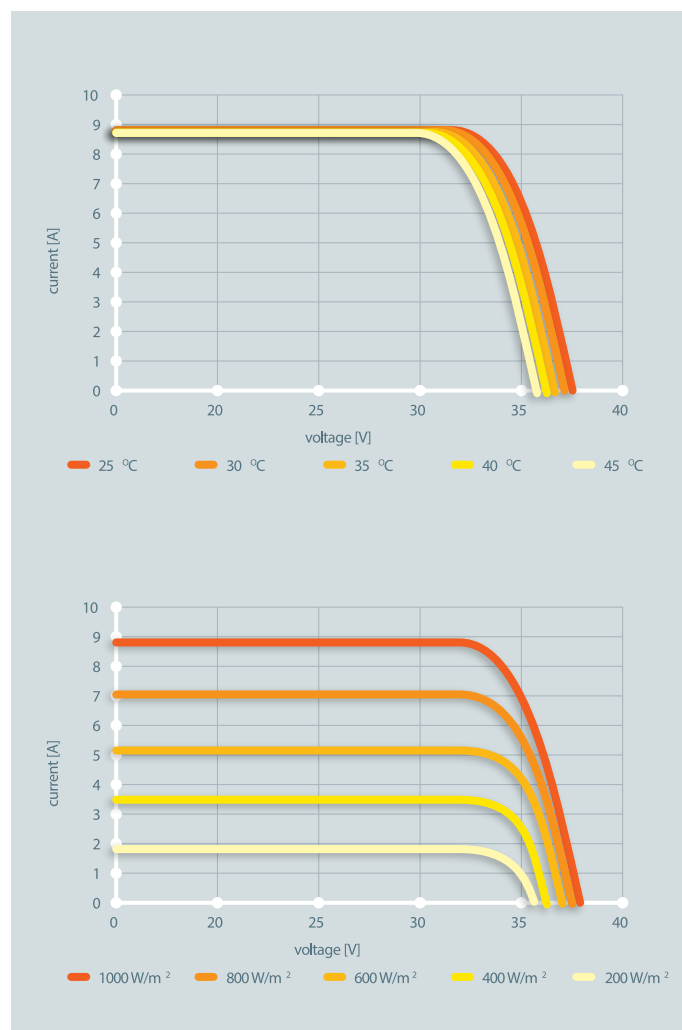


Cross-section of the collector



Technical specification

Flat solar collector	value
width	990 mm
height	1650 mm
depth	40 mm
glass thickness	3,2 mm
surface	2,02 m ²
housing	patented aluminium profile
electrical parameters	
Peak power (for 1000 W/m ²)	250 W
type of cell	polycrystalline
amount of cells	60
size of cells	156 x 156 mm
rated current	8,28 A
short-circuit current	8,81 A
nominal voltage	30,20 V
open-circuit voltage	37,72 V
efficiency	15,4 %
maximum system voltage	1000 V DC
temperature range	-40 ÷ 85 °C



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Storage Calorifiers

Heat Pump

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