

Camel-Plasma PVT hybrid collector

Producer: Plasma doo; PV modules: PiKCELL Group; Solar thermal absorber: Camel Solar doo

PVT collectors provide both electrical and thermal energy.

Electrical power is around 20% more than standard PV panel during summer period plus 3 to 4 times more thermal power compare with electrical power from PV standard module.

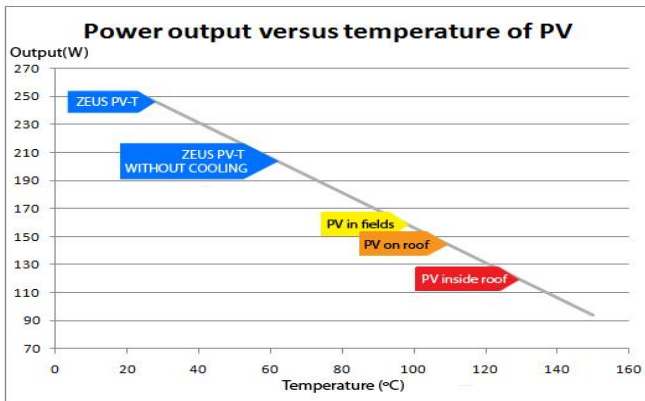
Introduction with PVT: The greater part of the absorbed solar radiation by photovoltaic is converted into heat (at about 70% - 80%), small part reflected and the rest into electricity. As result of that cell temperature of PV is increasing. This effect reduces PV electrical efficiency. **(picture a).**

In **façade or inclined roof installation** on buildings the thermal losses are reduced due to the thermal protection of PV rear surface and PV modules operate at higher temperatures.

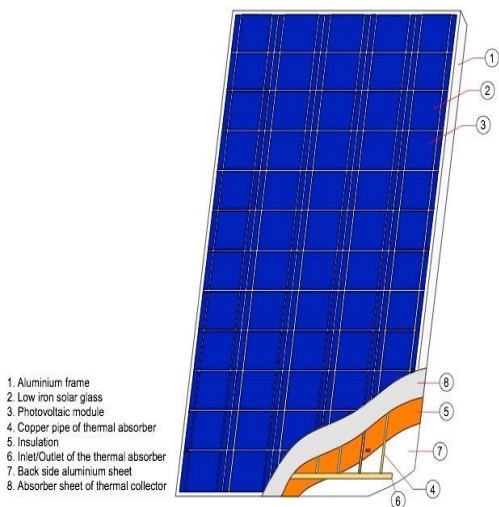
This undesirable effect can be partially avoided by **PVT hybrid collector (pictures b and c)** applying a suitable heat extraction with a fluid circulation, keeping the electrical efficiency at a satisfactory level.

PVT collector divided in two groups:

- a) **Glazed: PV panel** with additional glass above PV panel which produce more thermal power and
- b) **Unglazed: PV panel** without additional glass, which produces more electrical power.



a)



b)



c)

Test center



Test center has two separate equipment's and software's for measurement's and on line monitoring nearly all parameter's of PVT collectors: Solar radiation, ambient temperature and conditions, temperatures in boilers, in let and out let temperatures on PVT, I (Amperes), U (Volts) and power out put (W) from every PVT .

Based of these measurement's bellow are technical characteristics of PVT.

Technical characteristics of C-P PVT collector:

MODEL		C-P PVT
Photovoltaic part	Dimensions	1640 x 992 x 45
	Weight	33 kg
	Type of frame	Aluminium
	Front side	Low iron ,AR glass 3.2mm
	Number of PV cells	60 (6x10)
	Type of PV	Polycrystal /monocrystal
	Dimensions of PV cells	156x156 mm
	Max. el .Power Pmax ,Hybrid PVT)	280 Wp
	Module Efficiency	15,37%
	Nominal Operating Cell Temperature	44,4±2 °C
	Temp. Coeff. Of Pmax (TK Pmax)	-0.44 % / °C
	Temp. Coeff. Of Voc (TK Voc)	-0.34 % / °C
	Average el. power output (kWh/year)	250 kWh/m2/y
	Gross area	1.62m2
Thermal part	Pic thermal power per collector	910 W
	Average thermal power per PVT coll./y	989 kWh/coll./y
	Type of medium	Propylene glycol
	Quantity of medium	1.5 l
	Absorber Sheet	Aluminum
	Register	Copper pipe Fi 8mm
	Insulation	Stone wool 35 mm.

Solar key mark certification is on procedure.

Installed PVT systems

