E-PVT2,0 – Hybrid collector PVT

Collector E-PVT2,0 is a combination of a flat solar collector and a photovoltaic module with polycrystalline silicon cell. Solar collector is responsible for a conversion of a solar radiation to thermal energy, used for heating domestic water and central heating, while photovoltaic module changes solar energy into electric energy.

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/m^2. 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 E-PVT2,0 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 E-PVT2,0:

- 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)

Collector E-PVT2,0:	Symbol	Unit	Value
Width	A	mm	1006
Height	B	mm	2007
Depth	C	mm	85
Surface	S	m^2	2,02
Casing	Patented aluminium profile		
Technical parameters			
Peak power for 1000 W/m^2)	**Q**	**W**	**895**
Absorber's pipe	Aluminium exchanger Roll-Bond		
Aperture surface	S_n	m^2	1,86
Width	a	mm	954
Height	b	mm	1953
Collector efficiency	η	%	55,5
Coefficient	b_u	W/(m^{2}K^2)	0,051
Coefficient	b_{1a}	W/(m^{2}K^2)	9,547
Coefficient	b_{2a}	W/(m^{2}K^2)	1,389
Maximum operating pressure	Pmax	bar	6
Maximum operating temp.	tmax	°C	85
Fluid content	V	dm^3	1,2
Electrical parameters			
Peak power (for 1000 W/m^2)	**Pmax**	**W**	**280**
Type of cell	Policrystalline		
Amount of cells		pcs	72
Size of a cell		mm	156 x 156
Rated current	Impp	A	8,0
Short-circuit current	Isc	A	8,4
Nominal voltage	Vmpp	V	35,0
Open-circuit voltage	Voc	V	44,4
Total peak Power (for 1000 W/m^2)	**Qmax**	**W**	**1175**

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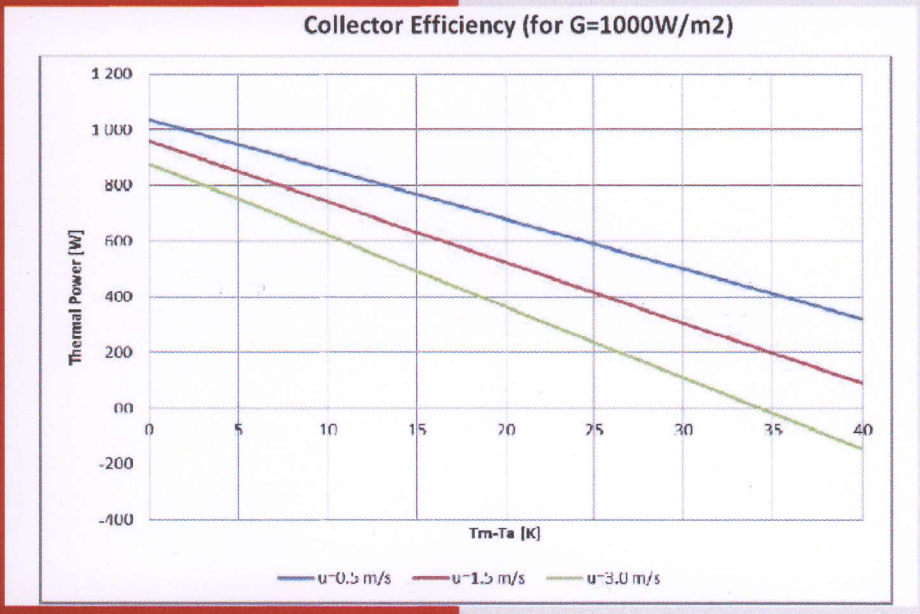

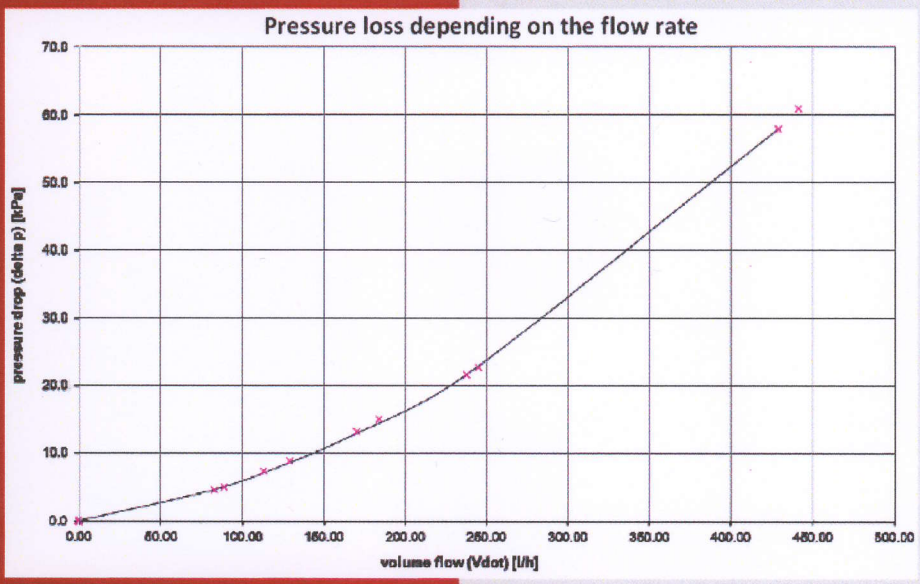

Legend:

tm - average temperature of liquid

ta - ambient temperature

G - solar irradiance