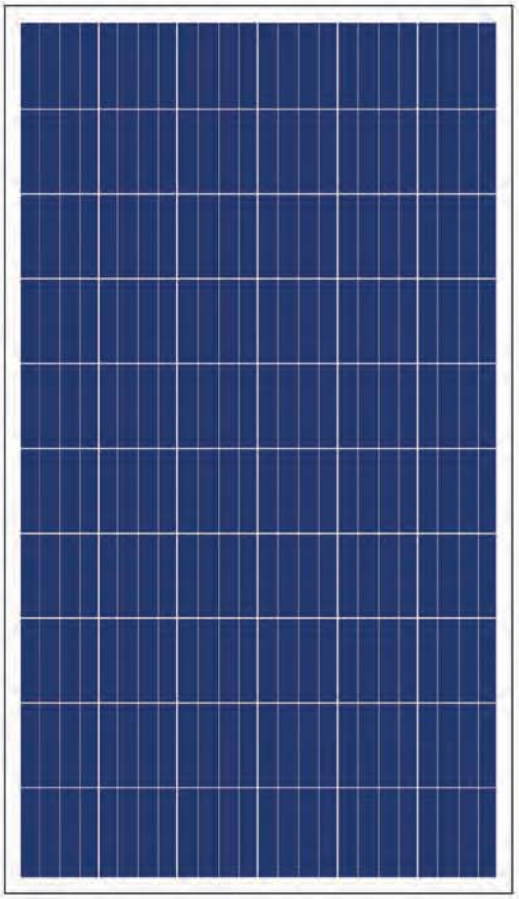
AnafSolar

PHOTOVOLTAIC / THERMAL PANEL H-NRG

High Energy (H-NRG) represents the next generation of Photovoltaic-Thermal (PVT) panels.
The H-NRG is a combination of Photovoltaic cells combined with a very efficient Aluminium thermal collector, a single device which converts solar radiation into electricity and thermal energy at the same time.
This combination works with most kinds of heating systems in three unique ways:
1. To provide domestic hot water;
2. Connected with a heat pump to provide hot water for heating and domestic hot water;
3. Cooling for the panel cells thus optimizing panel performance with increased annual electrical yield.



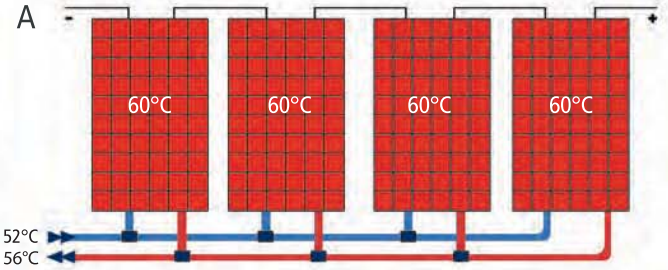
Polycrystalline module H-NRG

ADVANTAGES

- Significant increase in electrical cell output.
- Significant increase in heat pump COP (Coefficient of performance).
- Hot water generation.
- Heating pool and sanitary hot water generation.
- Floor heating for civil and industrial buildings.
- Winter snow removal through the control of roof temperature.
- Reduced aging of photovoltaic modules.
- PVT systems, due to the increased efficiency and the possibility of cogeneration, electrical and thermal, allow significant savings in installation if compared to standard PV and dual separate (PV+T).

OPERATION PROFILE

A



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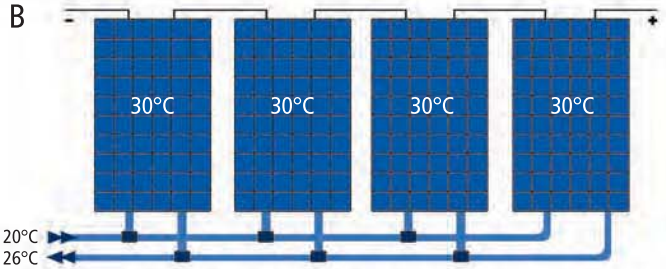

MAXIMUM HOT WATER TEMPERATURE

Water will flow out of the panels at temperatures comparable to the thermal solar panel installation (60° in summer, 30° in winter).
The electrical output is increased.

MAXIMUM ENERGY OUTPUT

The electrical output of the photovoltaic panel is increased by approximately 15% on yearly basis at Milan latitude.
It generates a large volume of water at approximately 26°.

DIMENSIONI E PARAMETRI FISICI			
Length (mm)	1652	Iron content in the glass (ppm)	90 ~ 120
Width (mm)	1000	Glass thickness (mm)	4
Thickness (mm)	45	Encapsulating Film	E.V.A. Bridgestone
Mass (Kg)	34	Back Protection	TPT e TPE Krempel
Cell Type	Polycrystalline	Frame	Anodized aluminium
Unit Cell Dimension (mm)	156 x 156	Cables and Junction Boxes	Single wire cable L 900 mm Ø 4mm
Number of cells	60	Insulation Class, Junction Box	IP65
Cell Layout	6 x 10	Number of Bypass Diodes	3

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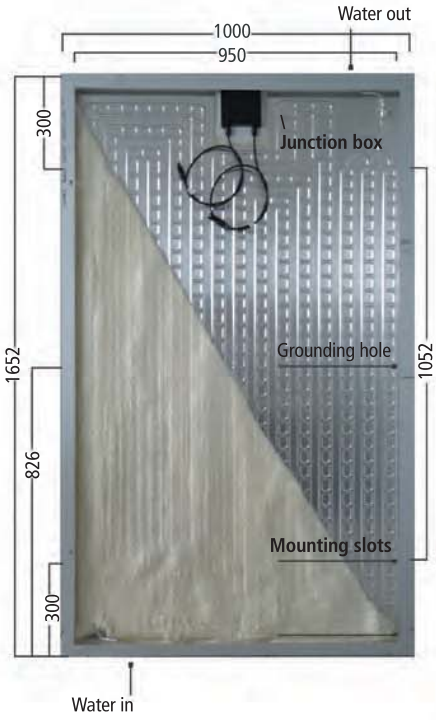
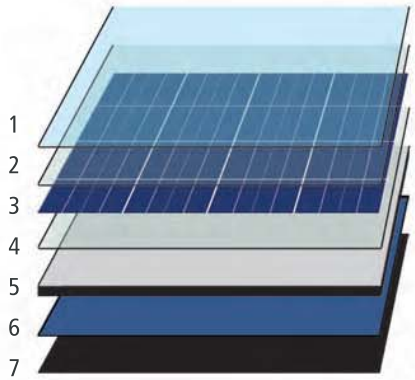


FUNCTIONAL PARAMETERS		
Optical efficiency	η_0	0,513
Coefficient of linear thermal dispersion	a_1	7,680 W/(m²°K)
Thermal coefficient	a_2	0,014 W/(m²°K²)
Angle of incidence 50°, reduced optical efficiency	kΘ (50°)	94 %
Pressure drop		150 mbar
Maximum allowable operating temperature		80 °C
Maximum working pressure		3 bar
Recommended flow		1,2 l/min
Weight empty panel		34 Kg
Panel fluid volume		0,8 l
Total Area		1,65 m²
Open area		1,52 m²
Absorption area		1,46 m²
Tubing diameter for connection	Ø	8 x 1 mm x mm
Reference standard		UNI EN 12975 CEI EN 61215 CEI EN 61730

Parameters related to the surface of the absorption area.



1. Tempered Glass, Low Iron Content, High Transmitance
2. E.V.A. (Ethyl Vinyl Acetate) Encapsulating Film
3. Solar Collectors
4. E.V.A. (Ethyl Vinyl Acetate) Encapsulating Film
5. Back Sheet TPT and TPE Protection
6. Aluminium H-NRG system
7. Insulating layer (optional)

TECHNICAL PARAMETERS	
Peak output Pm (W)	230W
Tolerance (%)	-0+3
MPP voltage Vm (V)	30
MPP current Im (A)	7,67
Open Circuit voltage Voc (V)	36,8
Closed circuit voltage Isc (A)	8,34
Max. system voltage (VDC)	1000
Panel efficiency (%)	13,9%
Max surface load	2400N/m²
Insulation resistance	>100MΩ

TEMPERATURE COEFFICIENTS	
Power temp. coefficient W%°C	-0,45 %/°C
Voltage temp. coefficient Voc%°C	-0,36 %/°C
Current temp. coefficient Isc%°C%	+0,05 %/°C
NOCT	45 ± 3°C
Working temperature range	-40°C ~ +85°C

Standard test conditions: Radiation 1000W/m², ambient temperature 25°C, wind 1,5 m/s.

MADE IN ITALY

Output defficiency: 90% 12 years, 80% 25 years.