

## Standards & Certifications

ISO 14001:2004	International
ISO 9001:2008	International
Solar Keymark Certification - EN12975	Europe
Solar Rating and Certification Corporation (S.R.C.C) - OG100	U.S.A
NSF-50	U.S.A
FSEC	U.S.A



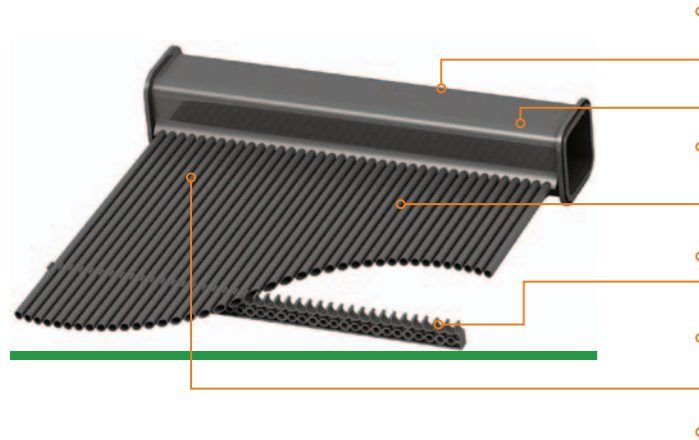
T +972.8.998.3201 • F +972.8.998.5034 • Kibbutz Magen 8546500, Israel • [www.magen-ecoenergy.com](http://www.magen-ecoenergy.com)



**Solar pool  
heating Collector.  
Make everyday a  
summer day!**



## Sunstar Unique Features



**Square Manifold Header** Unique square design that assures tight fastening and mounting of the panel on any roof type.

**Over-Molding Injection Technology** One of a kind injection process connects riser tubes to the manifold header, creating a single polymer panel with no leaks.

**Individual Tube Design** Minimizes wind effects on the panel and creates extreme mechanical stability.

**Spacer Bars** Prevent warping of the panel over time, as well as prevents abrasion of the riser tubes due to thermal expansion of the panel.

**Specially Formulated Polymer Material** As tested in authorized laboratories, a unique polymer formula stabilizes against sustained ultraviolet radiation, extreme weather and aging.

**Modular Structure** Enables fast and firm connection between panels, creating any size absorption area over any type of roof imaginable.

**Sunstar Mounting Pad** Almost invisible when installed. Simple and fast assembly. Assures minimum roof penetration (only one drill needed).



**Parts & Fittings** All-Polymer parts, creating simple connection between panels and standard plumbing pipes.

## Dimensions & Design Parameters

Collectors Type		HC-50 1.2x3.85m 4'x12.5'	HC-40 1.2x3.23m 4'x10.5'	HC-38 1.2x2.92m 4'x10'	HC-30 1.2x2.31m 4'x8'
M.E.E. Cat No.		127212	127211	127210	127208
Length	m	3.85	3.23	2.92	2.31
Width	m	1.2	1.2	1.2	1.2
Area	m <sup>2</sup>	4.62	3.85	3.52	2.77
Weight "Dry"	Kg.	10.7	8.6	8.2	6.8
Volume Capacity	Lit.	14.4	11.7	11.4	9
Weight "Wet"	Kg.	25.1	20.3	19.6	13.9
No. of Spacers	#	12	10	9	7
Filled Area Weight	Kg. / m <sup>2</sup>	5.4	5.3	5.3	5.7
Rec. Flow Rate	Lit. / hr	1200	900	900	720

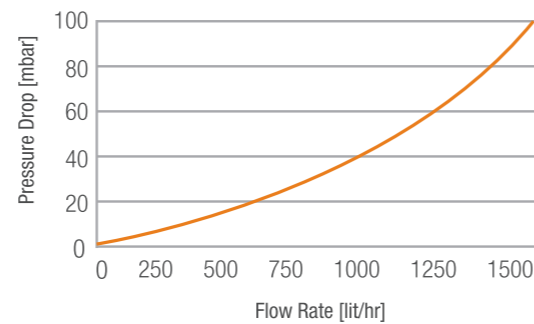
### Potable Water & Foodstuffs Contact Certification

Polypropylene is certified for use with potable water, as specified in the German standard DVGW-W270, and for foodstuffs contact as specified in the Swiss standard KsV-817041 and the British standard SI2000-3162.

### Chemical Resistance

The Polymer, polypropylene material is highly durable against: Corrosion, Lime scale, Chlorine, Bromine, Iodine, HCL, Salts and Sea water, and other swimming pool disinfectants.

### Panel Pressure drop



$$[\text{mbar}] = 3E-5(l/h)^2 + 0.0134(l/h) + 0.2343$$

## Thermal Performance Rating & Daily Energy Output

Kilowatt-hours (thermal) Per m <sup>2</sup> Per Day			Thousands of Btu Per ft <sup>2</sup> Per Day		
Climate Category (T <sub>i</sub> -T <sub>a</sub> )	High Radiation (6.3 kWh/m <sup>2</sup> .day)	Medium Radiation (4.7 kWh/m <sup>2</sup> .day)	Climate Category (T <sub>i</sub> -T <sub>a</sub> )	High Radiation (2000 Btu/ft <sup>2</sup> .day)	Medium Radiation (1500 Btu/ft <sup>2</sup> .day)
A (-5 °C)	6.5	5.1	A (-9 °F)	2.1	1.6
B (5 °C)	3.3	2.0	B (9 °F)	1.0	0.6

TECHNICAL INFORMATION

Tested in accordance with: ISO 9806:1994

ISO Efficiency Equation [NOTE: Based on gross area and (P)=T<sub>i</sub>-T<sub>a</sub>]

SI UNITS:	Wind speed (u) in m/s, Temperature (Ti-Ta) in °C, Radiation (G") in W/m <sup>2</sup> $\eta = (0.909)(1 - 0.0460u) - (11.9716 + 14.2950u)(P/G")$
IP UNITS:	Wind speed (u) in mph, Temperature (Ti-Ta) in °F, Radiation (G") in Btu/hr-ft <sup>2</sup> $\eta = (0.909)(1 - 0.0206u) - (2.1084 + 1.1254u)(P/G")$

### Power output per m<sup>2</sup>

Wind Speed [m/s]	<0.5	1.5±0.5	3.0±0.5
Power output [Watt/m <sup>2</sup> ]	712	660	608

G" = 1000 W/m<sup>2</sup>; Tm-Ta= 2°K,

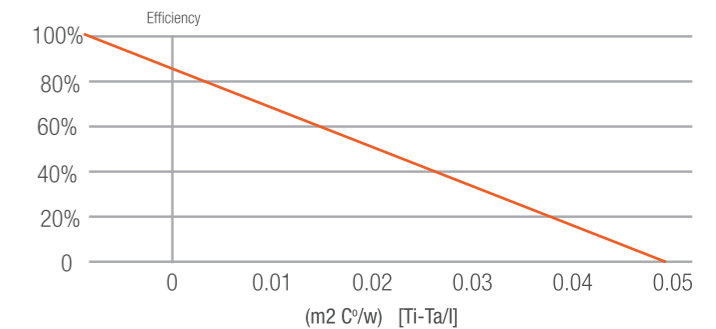
$\eta_{oa}$	$b_{1a}$ W/(m <sup>2</sup> K)	$b_{2a}$ W/(m <sup>2</sup> K <sup>2</sup> )	$b_u$
0.805	46.63	7.6285	0.024



## Mechanical Stability

Water Temperature	°C	20	40	60
	°F	68	104	140
Maximum Recommended Operating Pressure	bar	8	6	4
	psi	120	90	60
Burst Pressure	bar	25	18	14
	psi	360	260	200

## Sunstar Efficiency Graph



## How Does the Solar System Work?

1. The existing pool pump directs pool water via a controlled motorized valve to the solar collector.
2. Pool water enters the solar collector at the bottom and rises to the top through the individual tubes of the collector.
3. Solar energy heats the water as it flows through the collector.
4. The Vacuum release/air evacuation protects the system from freezing.
5. The heated water then returns to the pool, and the cycle is repeated until the pool has been sufficiently warmed by the sun.
6. The solar heating process is fully automatic, using temperature sensors and a differential controller.

