



**CERTIFIED SOLAR COLLECTOR**

SUPPLIER:  
**SunEarth, Inc.**  
 8425 Almeria Avenue  
 Fontana, CA 92335 USA  
 www.sunearthinc.com

BRAND: Empire  
 MODEL: EP-40-1.5  
 COLLECTOR TYPE: Glazed Flat Plate  
 CERTIFICATION #: 2007032F  
 Original Certification: June 25, 2009  
 Expiration Date: January 05, 2021

The solar collector listed below has been evaluated by the Solar Rating & Certification Corporation™ (SRCC™) in accordance with SRCC OG-100, Operating Guidelines and Minimum Standards for Certifying Solar Collectors, and has been certified by the SRCC. This award of certification is subject to all terms and conditions of the Program Agreement and the documents incorporated therein by reference.

COLLECTOR THERMAL PERFORMANCE RATING							
Kilowatt-hours (thermal) Per Panel Per Day				Thousands of Btu Per Panel Per Day			
Climate -> Category (Ti-Ta)	High Radiation (6.3 kWh/m <sup>2</sup> .day)	Medium Radiation (4.7 kWh/m <sup>2</sup> .day)	Low Radiation (3.1 kWh/m <sup>2</sup> .day)	Climate -> Category (Ti-Ta)	High Radiation (2000 Btu/ft <sup>2</sup> .day)	Medium Radiation (1500 Btu/ft <sup>2</sup> .day)	Low Radiation (1000 Btu/ft <sup>2</sup> .day)
A (-5 °C)	15.5	11.6	7.8	A (-9 °F)	53.0	39.7	26.6
B (5 °C)	14.6	10.7	6.8	B (9 °F)	49.7	36.5	23.3
C (20 °C)	12.5	8.7	4.9	C (36 °F)	42.6	29.7	16.8
D (50 °C)	7.3	3.8	0.8	D (90 °F)	24.8	13.0	2.8
E (80 °C)	1.8	0.0	0.0	E (144 °F)	6.1	0.0	0.0

**A-** Pool Heating (Warm Climate) **B-** Pool Heating (Cool Climate) **C-** Water Heating (Warm Climate)  
**D-** Space & Water Heating (Cool Climate) **E-** Commercial Hot Water & Cooling

COLLECTOR SPECIFICATIONS					
<b>Gross Area:</b>	3.800 m <sup>2</sup>	40.90 ft <sup>2</sup>	<b>Dry Weight:</b>	68 kg	150 lb
<b>Net Aperture Area:</b>	3.449 m <sup>2</sup>	37.12 ft <sup>2</sup>	<b>Fluid Capacity:</b>	6.1 liter	1.6 gal
<b>Absorber Area:</b>	0.000 m <sup>2</sup>	0.00 ft <sup>2</sup>	<b>Test Pressure:</b>	1103 kPa	160 psi

TECHNICAL INFORMATION			Tested in accordance with: ISO 9806		
<b>ISO Efficiency Equation</b> [NOTE: Based on gross area and (P)=Ti-Ta]					
<b>SI UNITS:</b>	$\eta = 0.718 - 2.29060(P/G) - 0.04398(P^2/G)$		<b>Y Intercept:</b>	0.744	<b>Slope:</b> -5.151 W/m <sup>2</sup> .°C
<b>IP UNITS:</b>	$\eta = 0.718 - 0.40370(P/G) - 0.00430(P^2/G)$		<b>Y Intercept:</b>	0.744	<b>Slope:</b> -0.908 Btu/hr.ft <sup>2</sup> .°F

Incident Angle Modifier								Test Fluid:	
$\theta$	10	20	30	40	50	60	70	Water	
<b>K<math>\tau</math></b>	1.00	0.98	0.96	0.91	0.84	0.71	0.44	<b>Test Mass Flow Rate:</b>	0.0200 kg/(s m <sup>2</sup> )    14.75 lb/(hr ft <sup>2</sup> )
<b>Impact Safety Rating:</b>									

REMARKS:

*Jim Higgins*

Technical Director





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ADDITIONAL INFORMATION ( <a href="#">click here to return to the rating page</a> )			
Test Lab:	Bodycote	Test Report Date:	January 05, 2009
Test Report Number:	07-08-0532	Test conducted:	

SOLAR COLLECTOR CONSTRUCTION DETAILS					
Gross Length:	0.000 m	Gross Width:	0.000 m	Gross Depth:	0.0 mm

COLLECTOR MATERIALS					
Outer Cover:	Other	Enclosure back:	Aluminum	Back Insulation:	, Foam
Inner Cover:	None	Enclosure side:	Aluminum	Side Insulation:	Foam, None
Absorber Description:		Flow Pattern:			
Riser Tube:	Copper	Fin:			
Absorber Coating:	Moderately selective	Tube to fin connection			

Glazing	Outer Cover	Inner Cover
Material:	Other	None
Surface Characteristics:		
Thickness:	0.0 mm	N/A
Transmissivity:		
Length:	0.000 m	
Width:	0.000 m	
Tube Glazing to Header Enclosure Seal:		

ABSORBER:		Absorber Coating:		Moderately selective	
Header Material:		Header OD:		Header Wall:	
Riser Tube Material:	Copper	Riser Tube OD:		Riser Tube Wall Thickness:	
Fin Material:		Fin Thickness:	0.00 mm		





<b>Flow Pattern:</b>					
<b>Number of Riser Tubes:</b>	0	<b>Tube Spacing:</b>		<b>Number of times each riser crosses the absorber:</b>	0
<b>Length of Flow Path:</b>	0.00 m	<b>Riser to Fin/Plate Bond:</b>			

<b>INSULATION:</b>					
<b>Location</b>	<b>Type</b>	<b>Thickness</b>	<b>Location</b>	<b>Type</b>	<b>Thickness</b>
<b>Back – Top Layer:</b>			<b>Sides – Inner Layer:</b>	Foam	
<b>Back – Bottom Layer:</b>	Foam		<b>Sides – Outer Layer:</b>	None	
<b>Enclosure Fastening Methods:</b>					

<b>Power Output per Collector(W)</b> [ Ti-Ta, G = 1000 W/m <sup>2</sup> ]				
0	10	30	50	70

<b>PRESSURE DROP</b>				
<b>Flow</b>	<b>ΔP</b>		<b>Flow</b>	<b>ΔP</b>
<b>ml/s</b>	<b>Pa</b>		<b>gpm</b>	<b>in H<sub>2</sub>O</b>
20			0.32	
50			0.79	
80			1.27	

