


<p style="text-align: center;"><b>SOLAR COLLECTOR CERTIFICATION AND RATING</b></p>  <p style="text-align: center;">SRCC OG-100</p>	<p style="text-align: center;"><b><u>CERTIFIED SOLAR COLLECTOR</u></b></p> <p><b>SUPPLIER:</b> <b>Alternate Energy Technologies</b> 1057 N. Ellis Road Jacksonville, FL 32254</p> <p><b>MODEL:</b> Morning Star MSC-40 <b>COLLECTOR TYPE:</b> Glazed Flat-Plate <b>CERTIFICATION #:</b> 100-2002-002F</p>
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<b>COLLECTOR THERMAL PERFORMANCE RATING</b>							
<b>Megajoules Per Panel Per Day</b>				<b>Thousands of Btu Per Panel Per Day</b>			
CATEGORY (Ti-Ta)	CLEAR DAY 23 MJ/m <sup>2</sup> ·d	MILDLY CLOUDY 17 MJ/m <sup>2</sup> ·d	CLOUDY DAY 11 MJ/m <sup>2</sup> ·d	CATEGORY (Ti-Ta)	CLEAR DAY 2000 Btu/ft <sup>2</sup> ·d	MILDLY CLOUDY 1500 Btu/ft <sup>2</sup> ·d	CLOUDY DAY 1000 Btu/ft <sup>2</sup> ·d
A (-5°C)	58	44	30	A (-9°F)	55	42	28
B (5°C)	53	39	24	B (9°F)	50	37	23
C (20°C)	44	30	17	C (36°F)	42	29	16
D (50°C)	27	14	3	D (90°F)	25	13	3
E (80°C)	10	1		E (144°F)	10	1	

A-Pool Heating (Warm Climate) B-Pool Heating (Cool Climate) C-Water Heating (Warm Climate) D-Water Heating (Cool Climate) E-Air Conditioning

Original Certification Date: November 22, 2002

**COLLECTOR SPECIFICATIONS**

<b>Gross Area:</b>	3.916 m <sup>2</sup>	42.15 ft <sup>2</sup>	<b>Net Aperture Area:</b>	3.580 m <sup>2</sup>	38.54 ft <sup>2</sup>
<b>Dry Weight:</b>	72.1 kg	159 lb	<b>Fluid Capacity:</b>	6.1 l	1.6 gal
<b>Test Pressure:</b>	1103 kPa	160 psig	<b>Max. Oper. Temp.:</b>	176.7 °C	350 °F

**COLLECTOR MATERIALS**

<b>Frame:</b>	Anodized Aluminum
<b>Cover (Outer):</b>	Low Iron Tempered Glass
<b>Cover (Inner):</b>	None
<b>Absorber Material:</b>	Tube - Copper / Plate - Copper Fin
<b>Absorber Coating:</b>	Selective Coating
<b>Insulation (Side):</b>	Polyisocyanurate
<b>Insulation (Back):</b>	Polyisocyanurate

**PRESSURE DROP**

<b>Flow</b>		<b>Δ P</b>	
ml/s	gpm	Pa	in H <sub>2</sub> O

**TECHNICAL INFORMATION**

<b>Efficiency Equation [NOTE: (P) = Ti-Ta]</b>				<b>Y Intercept</b>	<b>Slope</b>
<b>S I Units:</b>	$\eta = 0.691 - 3.3960 (P)/I - 0.0019 (P)^2/I$		0.706	-4.9099	W/m <sup>2</sup> ·°C
<b>I P Units:</b>	$\eta = 0.691 - 0.5985 (P)/I - 0.0002 (P)^2/I$		0.706	-0.865	Btu/hr·ft <sup>2</sup> ·°F

<b>Incident Angle Modifier [(S) = 1/cos θ - 1, 0° ≤ θ ≤ 60°]</b>				<b>Model Tested:</b>	AE-21
<b>K<sub>arr</sub> = 1.0</b>	-0.1939 (S)	-0.0055 (S) <sup>2</sup>		<b>Test Fluid:</b>	Water
<b>K<sub>arr</sub> = 1.0</b>	-0.20 (S)	(Linear Fit)		<b>Test Flow Rate:</b>	39 ml/s      0.62 gpm

**REMARKS:**

October, 2004

Certification must be renewed annually. For current status contact:

SOLAR RATING & CERTIFICATION CORPORATION

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