



**CERTIFIED SOLAR COLLECTOR**

SUPPLIER:  
**Sunvelope Solar**  
 96 Glen Carran Cir. #105  
 Sparks, NV 89431 USA  
 www.sunvelope.com  
 In Accordance with:  
**SRCC Standard 100-2013-11**

BRAND: Sunvelope Solar  
 MODEL: FPE-21  
 COLLECTOR TYPE: Glazed Flat Plate  
 CERTIFICATION #: 10001919  
 Original Certification: July 24, 2014  
 Expiration Date: May 13, 2026

The solar collector listed below has been evaluated by the Solar Rating & Certification Corporation™ (SRCC™), an ISO/IEC 17065 accredited and EPA recognized Certification Body, 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. This document must be reproduced in its entirety.

COLLECTOR THERMAL PERFORMANCE RATING							
Kilowatt-hours (thermal) Per Panel Per Day				Thousands of Btu Per Panel Per Day			
Climate ->	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 ->	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)
Category (Ti-Ta)				Category (Ti-Ta)			
A (-5 °C)	8.5	6.5	4.5	A (-9 °F)	29.0	22.2	15.4
B (5 °C)	7.1	5.1	3.1	B (9 °F)	24.1	17.3	10.5
C (20 °C)	5.1	3.1	1.3	C (36 °F)	17.3	10.7	4.6
D (50 °C)	1.7	0.3	0.0	D (90 °F)	5.6	1.1	0.0
E (80 °C)	0.0	0.0	0.0	E (144 °F)	0.0	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>	2.069 m <sup>2</sup>	22.27 ft <sup>2</sup>	<b>Dry Weight:</b>	43 kg	95 lb
<b>Net Aperture Area:</b>	1.850 m <sup>2</sup>	19.91 ft <sup>2</sup>	<b>Fluid Capacity:</b>	1.9 liter	0.5 gal
<b>Absorber Area:</b>	1.951 m <sup>2</sup>	21.00 ft <sup>2</sup>	<b>Test Pressure:</b>	1103 kPa	160 psi

TECHNICAL INFORMATION			Tested in accordance with: ISO 9806:1994		
ISO Efficiency Equation [NOTE: Based on gross area and (P)=Ti-Ta]					
<b>SI UNITS:</b>	$\eta = 0.649 - 6.30240(P/G) - 0.01680(P^2/G)$	<b>Y Intercept:</b>	0.655	<b>Slope:</b>	-7.315 W/m <sup>2</sup> .°C
<b>IP UNITS:</b>	$\eta = 0.649 - 1.11075(P/G) - 0.00164(P^2/G)$	<b>Y Intercept:</b>	0.655	<b>Slope:</b>	-1.289 Btu/hr.ft <sup>2</sup> .°F

Incident Angle Modifier								Test Fluid:	
$\theta$	10	20	30	40	50	60	70	Water	
<b>K<sub>ra</sub></b>	1.00	0.99	0.98	0.96	0.92	0.83		<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: 11</b>	

REMARKS:

*Jeri Higgins*

Technical Director





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ADDITIONAL INFORMATION <a href="#">(click here to return to the rating page)</a>			
Test Lab:	LabTest Certification, Inc.	Test Date:	May 13, 2014
Test Report Number:	14002-1SC_Sunvelope Test Report Rev1	Test Location:	outdoors

SOLAR COLLECTOR CONSTRUCTION DETAILS					
<b>Gross Length:</b>	2.172 m	<b>Gross Width:</b>	0.953 m	<b>Gross Depth:</b>	111.125 mm

COLLECTOR MATERIALS					
<b>Outer Cover:</b>	Glass sheet	<b>Enclosure back:</b>	Aluminum	<b>Back Insulation:</b>	Foam, None
<b>Inner Cover:</b>	None	<b>Enclosure side:</b>	Aluminum	<b>Side Insulation:</b>	None, None
<b>Absorber Description:</b>	Channel / Sheets		<b>Flow Pattern:</b>	Plate	
<b>Riser Tube:</b>	Stainless Steel		<b>Fin:</b>	Stainless Steel	
<b>Absorber Coating:</b>	Moderately selective		<b>Tube to fin connection</b>	Other	

GLAZING	Outer Cover	Inner Cover
<b>Material:</b>	Glass sheet	None
<b>Surface Characteristics:</b>	Smooth	
<b>Thickness:</b>	3.2 mm	N/A
<b>Transmissivity:</b>	High (equal to or greater than 90%)	
<b>Length:</b>	2.134 m	
<b>Width:</b>	0.914 m	
<b>Tube Glazing to Header Enclosure Seal:</b>	Silicone bead	

<b>ABSORBER:</b>		<b>Absorber Coating:</b>	Moderately selective		
<b>Header Material:</b>		<b>Header OD:</b>		<b>Header Wall:</b>	
<b>Riser Tube Material:</b>	Stainless Steel	<b>Riser Tube OD:</b>	457.2 mm	<b>Riser Tube Wall Thickness:</b>	0.4 mm
<b>Fin Material:</b>	Stainless Steel	<b>Fin Thickness:</b>	0.38 mm		





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<b>Flow Pattern:</b>	Plate				
<b>Number of Riser Tubes:</b>	1	<b>Tube Spacing:</b>	457.2 mm	<b>Number of times each riser crosses the absorber:</b>	1
<b>Length of Flow Path:</b>	2.13 m	<b>Riser to Fin/Plate Bond:</b>	Other		

INSULATION:					
Location	Type	Thickness	Location	Type	Thickness
<b>Back – Top Layer:</b>	Foam	25.4 mm	<b>Sides – Inner Layer:</b>	None	
<b>Back – Bottom Layer:</b>	None		<b>Sides – Outer Layer:</b>	None	
<b>Enclosure Fastening Methods:</b>	Screws				

Power Output per Collector(W) [ Ti-Ta, G = 1000 W/m² ]				
0	10	30	50	70
1342	1208	920	603	259

PRESSURE DROP				
Flow	ΔP		Flow	ΔP
ml/s	Pa		gpm	in H <sub>2</sub> O
20	443		0.32	1.8
50	2466		0.79	9.9
80	6119		1.27	24.6

