



CERTIFIED SOLAR COLLECTOR

SUPPLIER:
Solimpeks Solar Energy Corp
 FEVZI ÇAKMAK MAH. 10753 Sk No:3/3A
 Karatay, KONYA 42050 Turkey
 www.solimpeks.com

BRAND: Wunder ALS
 MODEL: 2110
 COLLECTOR TYPE: Glazed Flat Plate
 CERTIFICATION #: 10001864
 Original Certification: August 22, 2013
 Expiration Date: July 17, 2025

The solar collector listed below has been evaluated by the Solar Rating & Certification Corporation™ (SRCC™), an ANSI 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 ² .day)	Medium Radiation (4.7 kWh/m ² .day)	Low Radiation (3.1 kWh/m ² .day)	Climate ->	High Radiation (2000 Btu/ft ² .day)	Medium Radiation (1500 Btu/ft ² .day)	Low Radiation (1000 Btu/ft ² .day)
Category (Ti-Ta)				Category (Ti-Ta)			
A (-5 °C)	9.2	7.0	4.7	A (-9 °F)	31.4	23.8	16.1
B (5 °C)	8.4	6.2	4.0	B (9 °F)	28.8	21.1	13.5
C (20 °C)	7.2	5.0	2.8	C (36 °F)	24.6	17.1	9.7
D (50 °C)	5.0	2.9	0.9	D (90 °F)	16.9	9.8	3.2
E (80 °C)	2.8	1.0	0.0	E (144 °F)	9.6	3.6	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					
Gross Area:	2.070 m ²	22.28 ft ²	Dry Weight:	37 kg	82 lb
Net Aperture Area:	1.921 m ²	20.68 ft ²	Fluid Capacity:	1.1 liter	0.3 gal
Absorber Area:	1.921 m ²	20.68 ft ²	Test Pressure:	1000 kPa	145 psi

TECHNICAL INFORMATION			Tested in accordance with: ISO 9806		
ISO Efficiency Equation [NOTE: Based on gross area and (P)=Ti-Ta]					
SI UNITS:	$\eta = 0.725 - 3.37040(P/G) - 0.00960(P^2/G)$	Y Intercept:	0.733	Slope:	-4.092 W/m ² .°C
IP UNITS:	$\eta = 0.725 - 0.59401(P/G) - 0.00094(P^2/G)$	Y Intercept:	0.733	Slope:	-0.721 Btu/hr.ft ² .°F

Incident Angle Modifier								Test Fluid:	
θ	10	20	30	40	50	60	70	Water	
K_{ra}	1.00	0.99	0.98	0.97	0.93	0.86	0.67	Test Mass Flow Rate:	0.0179 kg/(s m ²) 14.75 lb/(hr ft ²)
								Impact Safety Rating: 11	

REMARKS:

Jeri Higgins

Technical Director





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ADDITIONAL INFORMATION (click here to return to the rating page)			
Test Lab:	Forschungs- und Testzentrum für Solaranlagen (TZS) am Institut für Thermodynamik und Wärmetechnik (ITW) der Universität Stuttgart	Test Report Date:	July 17, 2013
Test Report Number:	12COL1129S	Test Location:	indoors

SOLAR COLLECTOR CONSTRUCTION DETAILS					
Gross Length:	1.988 m	Gross Width:	1.041 m	Gross Depth:	90.000 mm

COLLECTOR MATERIALS					
Outer Cover:	Glass sheet	Enclosure back:	Aluminum	Back Insulation:	Fiber, None
Inner Cover:	None	Enclosure side:	Aluminum	Side Insulation:	Fiber, None
Absorber Description:	Tubes connected to Single Sheet		Flow Pattern:	Parallel/Harp	
Riser Tube:	Copper		Fin:	Aluminum	
Absorber Coating:	Selective		Tube to fin connection	Laser Weld	

GLAZING	Outer Cover	Inner Cover
Material:	Glass sheet	None
Surface Characteristics:	Textured	
Thickness:	4.0 mm	N/A
Transmissivity:	High (equal to or greater than 90%)	
Length:	1.961 m	
Width:	1.014 m	
Tube Glazing to Header Enclosure Seal:	Silicone bead	

ABSORBER:		Absorber Coating:		Selective	
Header Material:	Copper	Header OD:	18.0 mm	Header Wall:	0.7 mm
Riser Tube Material:	Copper	Riser Tube OD:	8.0 mm	Riser Tube Wall Thickness:	0.4 mm
Fin Material:	Aluminum	Fin Thickness:	0.40 mm		





Certification #: 10001864
 Supplier: Solimpeks Solar Energy Corp
 Brand Name: Wunder ALS
 Model Number: 2110

Flow Pattern:	Parallel/Harp				
Number of Riser Tubes:	10	Tube Spacing:	95.0 mm	Number of times each riser crosses the absorber:	1
Length of Flow Path:	1.94 m	Riser to Fin/Plate Bond:	Laser Weld		

INSULATION:					
Location	Type	Thickness	Location	Type	Thickness
Back – Top Layer:	Fiber	50.0 mm	Sides – Inner Layer:	Fiber	20.0 mm
Back – Bottom Layer:	None		Sides – Outer Layer:	None	
Enclosure Fastening Methods:	Rivets				

Power Output per Collector(W) [Ti-Ta, G = 1000 W/m ²]					
0	10	30	50	70	
1500	1428	1273	1101	914	

PRESSURE DROP					
Flow	ΔP		Flow	ΔP	
ml/s	Pa		gpm	in H ₂ O	
20	0		0.32	0.0	
50	0		0.79	0.0	
80	0		1.27	0.0	

