CERTIFIED SOLAR COLLECTOR

SUPPLIER:
Advanced Thermal Solar, LLC
PO Box 270
Port Jefferson Station, NY 11776 USA
www.Advthermalsolar.com

BRAND:	ATS
MODEL:	ATS-20
COLLECTOR TYPE:	Tubular
CERTIFICATION #:	10001730
Original Certification:	August 15, 2012
Expiration Date:	July 28, 2023

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/m².day)	Medium Radiation (4.7 kWh/m².day)	Low Radiation (3.1 kWh/m².day)	Climate -> Category (Ti-Ta)	High Radiation (2000 Btu/ft².day)	Medium Radiation (1500 Btu/ft².day)	Low Radiation (1000 Btu/ft².day)
A (-5 °C)	8.8	6.6	4.5	A (-9 °F)	30.0	22.6	15.3
B (5 °C)	8.4	6.2	4.1	B (9 °F)	28.6	21.3	13.9
C (20 °C)	7.7	5.6	3.4	C (36 °F)	26.4	19.1	11.8
D (50 °C)	6.6	4.4	2.3	D (90 °F)	22.4	15.1	7.9
E (80 °C)	5.3	3.2	1.3	E (144 °F)	18.2	10.9	4.3

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:	3.431 m²	36.93 ft²	**Dry Weight:**	73 kg	161 lb
Net Aperture Area:	1.886 m²	20.30 ft²	**Fluid Capacity:**	2.0 liter	0.5 gal
Absorber Area:	1.637 m²	17.62 ft²	**Test Pressure:**	900 kPa	131 psi

TECHNICAL INFORMATION						**Tested in accordance with:** ISO 9806
ISO Efficiency Equation [NOTE: Based on gross area and (P)=Ti-Ta]						
SI UNITS:	η= 0.370 - 1.07480 *(P)/G - 0.00196 *(P)²/G		**Y Intercept:**	0.371	**Slope:**	-1.225 W/m².°C
IP UNITS:	η= 0.370 - 0.18943 *(P)/G - 0.00019 *(P)²/G		**Y Intercept:**	0.371	**Slope:**	-0.216 Btu/hr.ft².°F

Transverse Incident Angle Modifier								**Longitudinal Incident Angle Modifier at 50°:**		
θ	10	20	30	40	50	60	70	**Test Fluid:**	Water	
Kτα	1.02	1.07	1.16	1.29	1.42	1.42	0.45	**Test Mass Flow Rate:**	0.0034 kg/(s m²)	2.48 lb/(hr ft²)

REMARKS:

Jim Huggins
Technical Director

www.solar-rating.org ♦ 400 High Point Drive, Suite 400 ♦ Cocoa, Florida 32926 ♦ (321) 213-6037 ♦ Fax (321) 821-0910

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ADDITIONAL INFORMATION (click here to return to the rating page)			
Test Lab:	Fraunhofer Institute for Solare Energy Systems	Test Report Date:	July 28, 2011
Test Report Number:	KTB Nr.:2011-21	Test conducted:	outdoors

SOLAR COLLECTOR CONSTRUCTION DETAILS					
Header Enclosure:					
Gross Length:	2.030 m	**Gross Width:**	1.690 m	**Gross Depth:**	
Tube Bank:					
Gross Length:		**Gross Width:**			

COLLECTOR MATERIALS					
Outer Cover:	Glass sheet	**Enclosure back:**	Aluminum	**Back Insulation:**	,
Inner Cover:	Glass Tube	**Enclosure side:**	Aluminum	**Side Insulation:**	,
Absorber Description:			**Flow Pattern:**		
Riser Tube:	Copper		**Fin:**		
Absorber Coating:	Selective		**Tube to fin connection**		

Glazing	Outer Cover	Inner Cover
Material:	Glass sheet	Glass Tube
Surface Characteristics:		
Thickness:	1.6 mm	1.6 mm
Transmissivity:		
Gross Tube Length (uninstalled):	1.800 m	
Diameter:	1.160 m	
Tube Glazing to Header Enclosure Seal:		

Reflector Shape:		**Reflector Material:**	

ABSORBER:

Header Material:		**Header OD:**		**Header Wall:**	
Riser Tube Material:	Copper	**Riser Tube OD:**		**Riser Tube Wall Thickness:**	
Fin Material:		**Fin Thickness:**	0.30 mm		
Flow Pattern:		**Number of Flow Tubes / Heat Pipes:**	20	**Tube / Heat Pipe Spacing:**	
Number of absorber tubes:	20	**Flow Tube to Fin Bond:**		**Length of Flow Path:**	1.74 m
Length of Flow Path:	1.74 m	**Riser to Fin/Plate Bond:**			

INSULATION:					
Location	**Type**	**Thickness**	**Location**	**Type**	**Thickness**
Back – Top Layer:			**Sides – Inner Layer:**		
Back – Bottom Layer:			**Sides – Outer Layer:**		
Enclosure Fastening Methods:			**Header Enclosure:**		

Power Output per Collector(W) **[Ti-Ta, G = 1000 W/m²]**				
0	**10**	**30**	**50**	**70**

PRESSURE DROP				
Flow	**ΔP**		**Flow**	**ΔP**
ml/s	**Pa**		**gpm**	**in H_20**
20			0.32	
50			0.79	
80			1.27	