



OG-100 Solar Thermal Collector Certification

No./10002035

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CERTIFICATION HOLDER: INroof.solar 11 Chestnut St Amesbury, MA 01913 USA	EVALUATION SUBJECT BRAND: INroof.solar MODEL: Nor'Easter TYPE: Unglazed Flat Plate
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PRODUCT CERTIFICATION SYSTEM:

The ICC-SRCC OG-100 certification program includes evaluation and performance ratings for solar thermal collectors as established in the [ICC-SRCC Rules for Solar Heating & Cooling Product Listing Reports](#). The program also includes periodic factory inspections and surveillance of the manufacturer's quality management system.

COMPLIANCE WITH THE FOLLOWING STANDARD(S): [ICC 901/SRCC 100-2015](#)

OG-100 THERMAL PERFORMANCE RATINGS:

ICC-SRCC OG-100 thermal performance ratings provided for the collector are calculated for a 24-hour period using OG-100 standard conditions using collector parameters measured through laboratory testing. Actual performance will vary with local conditions, installation details and hot water usage.

OG-100 STANDARD DAILY PRODUCTION (Collector Tested per ISO 9806:2013)							
Kilowatt-hours (thermal) Per m ² Per Day				Thousands of Btu Per ft ² Per Day			
Climate ->	High Radiation	Medium Radiation	Low Radiation	Climate ->	High Radiation	Medium Radiation	Low Radiation
Category (Ti-Ta)	(6.3 kWh/m ² .day)	(4.7 kWh/m ² .day)	(3.1 kWh/m ² .day)	Category (Ti-Ta)	(2 kBtu/ft ² .day)	(1.5 kBtu/ft ² .day)	(1 kBtu/ft ² .day)
A (-5 °C)	3.5	2.7	2.0	A (-9 °F)	1.1	0.9	0.6
B (5 °C)	2.2	1.5	0.8	B (9 °F)	0.7	0.5	0.3
C (20 °C)	0.9	0.3	0.0	C (36 °F)	0.3	0.1	0.0
D (50 °C)	0.0	0.0	0.0	D (90 °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

	SunNet Blue	Hartford Green	Dark Bronze	Mansard Brown	Burgundy	Royal Blue	Forest Green	Matte Black	Medium Bronze	Colonial Red	Pacific Blue	Everglade Moss	Charcoal Gray	Sierra Tan	Deep Red	Slate Blue	Patina Green	Slate Gray	Sandstone	Terra Cotta	Bone White	Hemlock Green	Dove Gray	Stone White	Metallic Copper	Champagne	Prewathered Galvalume	Galvalume Plus	Almond	Brandywine	Cityscape	Dark Ivy	Extra Dark Bronze	Regal Blue	Regal Red	Sherwood Green	Sky Blue	Teal	Tropical Patina	Award Blue	Electric Blue	Classic Copper	Silver Metallic
Firestone	-	90	74	70	-	-	75	70	69	-	-	71	65	-	-	74	49	-	66	28	68	-	43	-	63	-	-	43	75	65	75	94	84	58	73	71	87	72	85	80	58	41	
Englert		72	71	69	65	72	71	72	68	63	72	68	70	65	58	69	61	60	49	65	33	72	38	56	62	54	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

THERMAL EFFICIENCY:

The efficiency of solar thermal collectors is determined using test methods set in ICC 901/SRCC 100, based on ISO 9806 procedures. Results are processed to provide unique coefficients ($\eta_{0,hem}$, a_1 , $a_2...$) for collection efficiency equations, provided in several forms below. For the simplified equations, instantaneous power is given by $Q = \eta_{hem} A_G G$. Incident Angle Modifiers (IAMs) are provided to indicate the change in output as the angle of solar irradiance changes in the transverse and longitudinal planes of the collector. The inputs to the equations are defined as:

T_i : Temperature of the fluid entering the collector

T_a : Temperature of the ambient air around the collector

G : Hemispherical solar irradiance. Sub-types include beam (b) and diffuse (d) irradiance.

A_G : Gross collector area

SIMPLIFIED THERMAL PERFORMANCE COEFFICIENTS (ISO 9806-2013, T_i , A_G)											
Second Order Thermal Efficiency Equation* $\eta_{hem} = \eta_{(0,hem)} - (a_1 (T_i - T_a)/G) - a_2 G((T_i - T_a)/G)^2$						Linearized Thermal Efficiency Equation* $\eta_{hem} = \eta_{(0,hem)} - a_1 (T_i - T_a)/G$					
UNITS:	η_{hem}	a_1	a_2	η_{hem} ("Intercept")		a_1 ("Slope")					
SI	0.000	0.000 (W/m ² .°C)	0.000 (W/m ² .°C)	0.600		0.000 (W/m ² .°C)					
IP	0.000	0.000 (Btu/hr.ft ² .°F)	0.000 (Btu/hr.ft ² .°F)	0.600		0.000 (Btu/hr.ft ² .°F)					
* Thermal efficiency equations per ISO 9806-2013 using inlet (T_i) fluid temperature, provided in second and first order (linearized) forms. The second order efficiency equation is a more accurate representation of the collector performance. The linearized efficiency equation is provided for use with incentive programs, regulations and software that require the simplified "slope" and "intercept" coefficients to describe collector performance.											
DIRECT INCIDENT ANGLE MODIFIERS (IAM)											
Angle (θ)	θ	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
Longitudinal IAM:	K_{la}	1.00	1.00	0.99	0.98	0.96	0.92	0.86	0.73	0.34	0.00
Transverse IAM:	K_{tra}	-	-	-	-	-	-	-	-	-	-

TEST SAMPLE SPECIFICATIONS:

The specifications of the collector sample submitted for testing are provided below.

TEST & SAMPLE SPECIFICATIONS					
Gross Area:	1.251 m ²	13.47 ft ²	Maximum Design Operating Temperature:		
Gross Length:	2.352 m	92.60 in	Maximum Design Operating Pressure:		
Gross Width:	0.532 m	20.94 in	Gross Depth:	66.7 mm	2.6 in
Test Fluid:	Water		Dry Weight:	11.7 kg	25.8 lb
Ave. Flowrate - Thermal Performance Testing:	0.022 Kg/sm ²	0.003 lb/stft ²	Fluid Capacity:	0.8 liter	0.2 gal
Test Standard(s):	ICC 901/SRCC 100:2015, ISO 9806:2013				
Notes:	All sizes of this collector are certified. Collectors with the colors below are certified, but performance ratings must be adjusted using the ratio of the absorptivity of the selected color to that of the tested collector (0.94).				

IDENTIFICATION:

Certified systems must be identified with the OG-100 certification mark below in accordance with the [Rules for Certification Mark and Certificate Use](#) and labeled in with the information below per ICC 901/SRCC 100:



1. Manufacturer's name and model number.
2. OG-100 collector certification number.
3. Maximum operating pressure.
4. Dry weight.
5. Fluid volume.
6. Compatible heat transfer fluids.
7. Standard stagnation temperature.
8. Year of manufacture and/or serial number.

CONDITIONS:

The certified solar water heating system must comply with the following conditions:

1. Collector must be installed and operated in accordance with the manufacturer's published instructions and local codes and regulations.
2. OG-100 Standard Performance Ratings and Standard Collector Power Output have been calculated for the tested components using standardized conditions established by the OG-100 program and associated test standards. Actual performance will vary based on the specific usage, installation and local environmental conditions.
3. The collector listed in this ICC-SRCC OG-100 certification must be labeled in accordance with the [Rules for Certification Mark and Certificate Use](#).
4. OG-100 certifications do not include mounting hardware and fixtures.
5. Solar thermal collectors and mounting hardware and appurtenances must comply with all applicable local requirements for fire resistance. Solar thermal collectors must be mounted in accordance with the requirements of the collector and mounting hardware manufacturers to comply with local codes for structural loading for wind, seismic, snow and other loads.
6. Solar thermal collectors must be used with the heat transfer fluids listed in this document.
7. Solar thermal collector manufactured under a quality control program subject to periodic evaluation in accordance with the requirements of ICC-SRCC.
8. This document must be reproduced in its entirety.
9. Certification status should be confirmed on the ICC-SRCC Directory at www.solar-rating.org

Shawn Martin

Vice President of Technical Services, ICC-SRCC

