OG-100 ICC-SRCC™ CERTIFIED SOLAR THERMALCOLLECTOR #10002137

SUPPLIER:
DualSun
2 rue Marc Donadille
CS 80001-013453 Marseille
Cedex 13
France
www.dualsun.fr

BRAND: DualSun
MODEL: DSTNxxxG1-360SBB5
CERTIFICATION NO: 10002137
COLLECTOR TYPE: PV Thermal Hybrid (PVT)
EFFECTIVE DATE: May 1, 2021
EXPIRATION DATE: * February 1, 2024
**Certifications must be renewed annually*

PRODUCT: Photovoltaic thermal hybrid solar collector (PVT) for liquid heating with integral PV cells.
COMPLIES WITH: ICC 901/SRCC 100-2020 *Solar Thermal Collector Standard*

The solar collector listed above has been evaluated, rated and certified by the Solar Rating & Certification Corporation (ICC-SRCC™), an ISO/IEC 17065 accredited Certification Body, in accordance with the latest version of the ICC-SRCC *Rules for Solar Heating & Cooling Product Listing Reports*. This award of certification is subject to all terms and conditions of the ICC-SRCC OG-100 program and the documents incorporated therein by reference. Thermal performance ratings calculated in accordance with standard OG-100 rating conditions are provided below. This document must be reproduced in its entirety.

OG-100 SOLAR THERMAL COLLECTOR STANDARD PERFORMANCE RATINGS

Kilowatt-hours (thermal) Per Collector Per Day				Thousands of Btu Per Collector Per Day			
Climate → / Category (T_i-T_a)	High Radiation (6.3 kWh/m²•day)	Medium Radiation (4.7 kWh/m²•day)	Low Radiation (3.1 kWh/m²•day)	Climate → / Category (T_i-T_a)	High Radiation (2000 Btu/ft²•day)	Medium Radiation (1500 Btu/ft²•day)	Low Radiation (1000 Btu/ft²•day)
A (-5˚C)	5.72	4.45	3.17	A (-9˚F)	19.53	15.17	10.82
B (5˚C)	3.28	2.05	0.90	B (9˚F)	11.19	7.00	3.06
C (20˚C)	0.73	0.03	0.00	C (36˚F)	2.48	0.10	0.00
D (60˚C)	0.00	0.00	0.00	D (90˚F)	0.00	0.00	0.00
E (80˚C)	0.00	0.00	0.00	E (144˚F)	0.00	0.00	0.00

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ACCREDITED
CERTIFICATE # 3299.03

SOLAR RATING & CERTIFICATION CORPORATION

THERMAL PERFORMANCE COEFFICIENTS (2013, T_i)

ISO Efficiency Equation: [Note: Based on gross area and P = T_i-T_a -in accordance with ISO 9806-2013][1]

SI UNITS	η_{hem} = 0.4950 *(1 - 0.0859 *u) - (11.8332 + 0.5199*u)*(P)/G"
IP UNITS	η_{hem} = 0.4950 *(1 - 0.3840*u) - (2.0839 + 0.0409*u)*(P)/G"

1: Second order thermal efficiency equation provided in accordance with ISO 9806-2013 using measured data. Wind speed (u) in m/s, Temperature (Ti-Ta) in °C, Radiation (G") in W/m² for SI units. Average flowrate during performance measurements $\dot{m}$ =135 kg/h

	$\eta_{0,hem}$	b_u	b_1	b_2
Value	0.4950	0.0859	11.8332	0.5199
Units	-	s/m	W/(m²K)	Ws/(m³K)

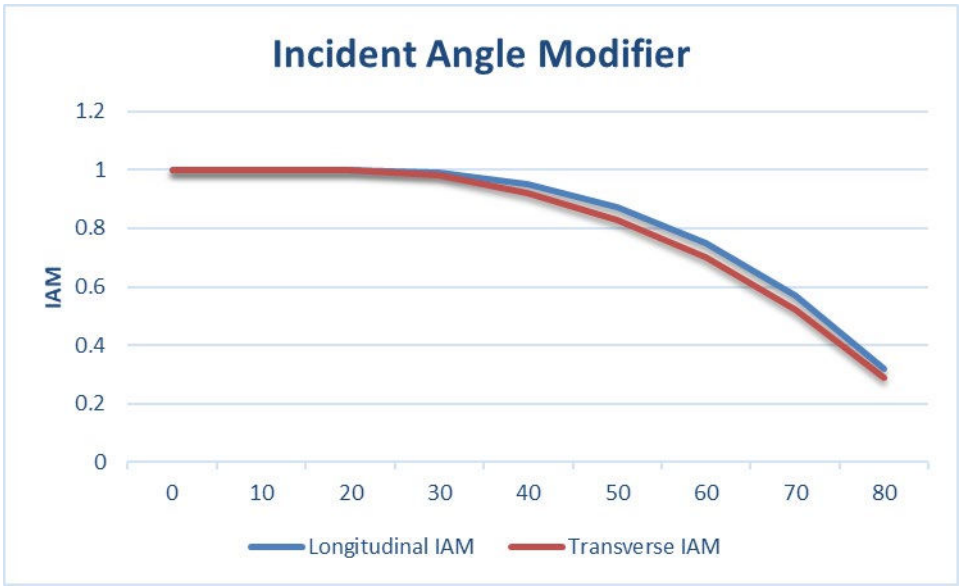
THERMAL PERFORMANCE COEFFICIENTS (2017, T_m)

ISO Efficiency Equation: [Note: Based on gross area and (P) = T_m-T_a -in accordance with ISO 9806-2017][2]

	$\eta_{0,hem}$	$\eta_{0,b}$	K_d	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	C/A
Value	0.537	0.551	0.83	12.73	0.00	0.610	0.46	40572	0.041	0.04	0	40572
Units	-	-	-	W/(m²K)	W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	Ws/(m²K)

2: General thermal efficiency equation provided in accordance with ISO 9806-2017 using measured data. Wind speed (u) in m/s, Temperature (Tm-Ta) in °C or °K, Radiation (G") in W/m² for SI units. Average flowrate during performance measurements $\dot{m}$ =135 kg/h

Longitudinal and Transverse Incident Angle Modifier (IAM)									
θ	0°	10°	20°	30°	40°	50°	60°	70°	80°
$K_b(\theta_L,0)$	1.00	1.00	1.00	0.99	0.95	0.87	0.75	0.57	0.32
$K_b(0,\theta_T)$	1.00	1.00	1.00	0.98	0.92	0.83	0.70	0.52	0.29



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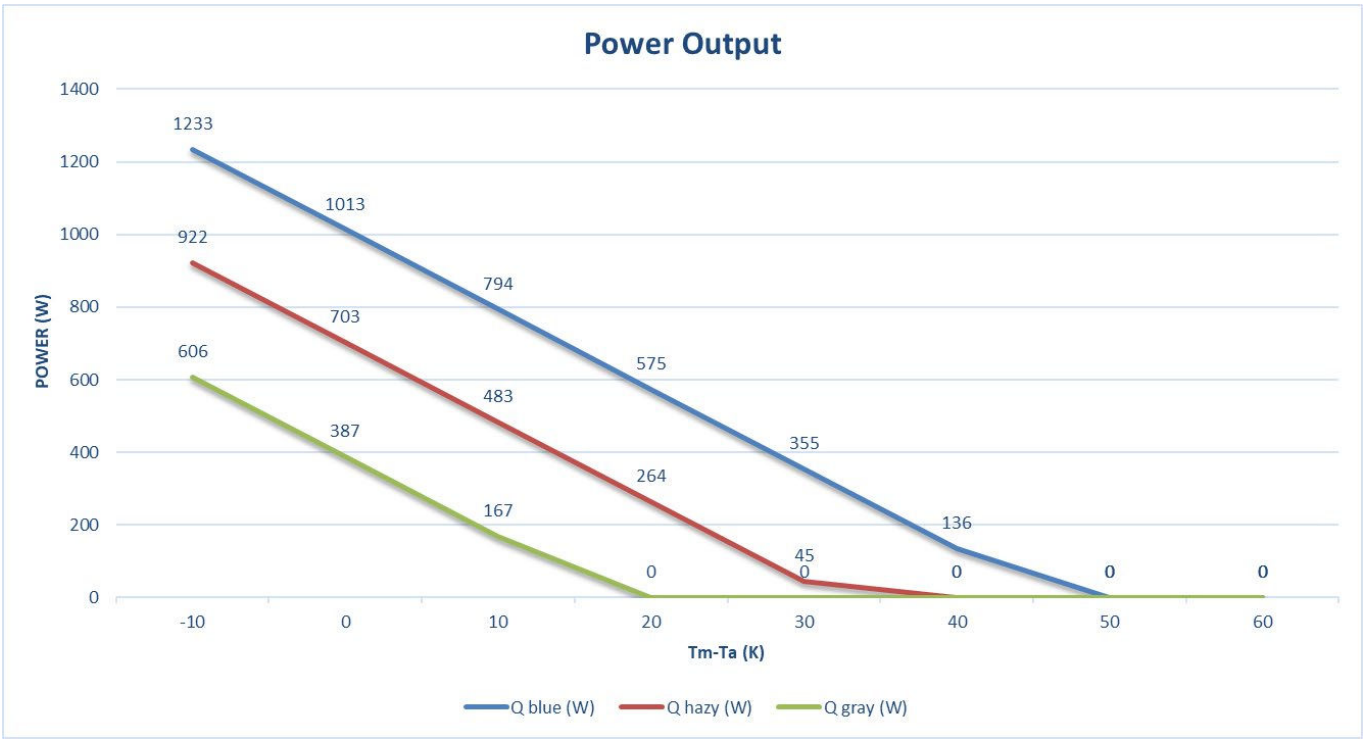
COLLECTOR POWER OUTPUT (W)			
Note: Based on Standard Rating Conditions (SRC) and T_m-T_a in accordance with ISO 9806-2017 Reduce G_b at 20° transversal incidence angle			
T_m-T_a (K)	**BLUE SKY** G_b =799 G_d = 150 (W/m^2)	**HAZY SKY** G_b = 413 G_d = 260 (W/m^2)	**GREY SKY** G_b = 0 G_d = 400 (W/m^2)
-10	1233	922	606
0	1013	703	387
10	794	483	167
20	575	264	0
30	355	45	0
40	136	0	0
50	0	0	0
60	0	0	0
Q_{peak}	1013 W		



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LABORATORY TEST INFORMATION			
Test Lab:	Kiwa Cermet Italia S.p.A.	**Report No.**	L0004807/D, L0004807/A
Test Standard:	EN ISO 9806:2017	**Issue Date:**	April 4, 2021

TESTED COLLECTOR SPECIFICATIONS					
Gross Area:	1.876 m²	20.19 ft²	**Gross Depth:**	0.035 m	0.11 ft
Gross Length:	1.646 m	5.4 ft	**Gross Width:**	1.14 m	3.74 ft
Maximum Design Pressure:	500 kPa	72.51 psi	**Design Flow Range:**	Not declared	Not declared
Maximum Operating Temperature:	70˚C	158˚F	**Dry Weight:**	26.3 kg	57.98 lb
HT Fluid Compatibility:	Propylene Glycol Mix / Chlorine Water		**Fluid Capacity:**	5 L	1.32 gal
Notes:	Tested PV collector: DSTN375G1-360SBB5 (integrated)				

ICC-SRCC OG-100 CERTIFICATION LABEL:

This product certified by the
Solar Rating & Certification Corporation™
www.solar-rating.org

OG-100 Certification Number:	10002137
Certification Standard:	ICC-SRCC 901
Model:	DSTxxxG1-360SBB5
Certification Holder:	DualSun
Manufactured in:	France
Serial Number:	

Collector Type:	PVT
Dimensions:	1646 x 1140 x 35 mm
Gross Area:	1.876 m^2
Max Operating Pressure:	500 Kpa
Standard Stagnation Temperature:	70 °C
Empty Weight:	26.3 Kg
Fluid Volume:	5 Lts
Fluid(s):	Chlorine Water / Water Glycol Mixture

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REMARKS AND CONDITIONS OF CERTIFICATION:

1. The collector listed in this ICC-SRCC OG-100 certification has been evaluated to the ICC 901/SRCC100-2020 standard and has been found to comply in accordance with the *ICC-SRCC Rules for Solar Heating & Cooling Product Listing Reports*.
2. OG-100 Standard Performance Ratings have been calculated for the tested components at the standardized conditions established by the OG-100 program. Actual results will vary based on the specific usage, installation and local environmental conditions.
3. Collectors listed in this ICC-SRCC OG-100 certification must display a label within the installation and operation manual(s) in accordance with the *ICC-SRCC Rules for Mark and Certificate Use*.
4. The listed collector must be installed in accordance with the manufacturer's published installation instructions and applicable codes.
5. Solar thermal collectors and mounting hardware and appurtenances must comply with all local codes and requirements for fire resistance. OG-100 certifications do not include mounting hardware and appurtenances. 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. All wiring, connections, components and labeling shall comply with the National Electrical Code (NFPA 70), other local codes and as specified by the manufacturer.
8. PVT collectors certified under the ICC-SRCC OG-100 program include the assembly of components that convert solar radiation to thermal energy in a fluid. In this case, the collector is comprised of the PV cells in the front of the panel and a solar thermal fluid heat exchanger in the backplane of the panel. Photovoltaic modules used as part of this PVT must match the one tested or meet all of the following:
    1. P_{max} of each module between 370W to 400W (@STC per UL 1703 or UL 61730),
    2. Module is listed and labeled to UL 1703 or UL 61730 with a Class A fire rating,
    3. Selected and installed in accordance with manufacturer's specifications.

Shawn Martin
Vice President of Technical Services, ICC-SRCC