SOLAR RATING & CERTIFICATION CORPORATION

An ICC Evaluation Service Program

OG-300 Solar Water Heating System Certification

No./30004375

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CERTIFICATION HOLDER:	EVALUATION SUBJECT	
Universal Solar Products, Inc. PO Box 364027 San Juan, 00936 Puerto Rico www.universalsolar.com	**BRAND:**	USP
	MODEL:	A80-18
	TYPE:	Thermosiphon, Direct

PRODUCT CERTIFICATION SYSTEM:

The ICC-SRCC OG-300 system certification program includes evaluation and performance ratings for solar water heating systems 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.

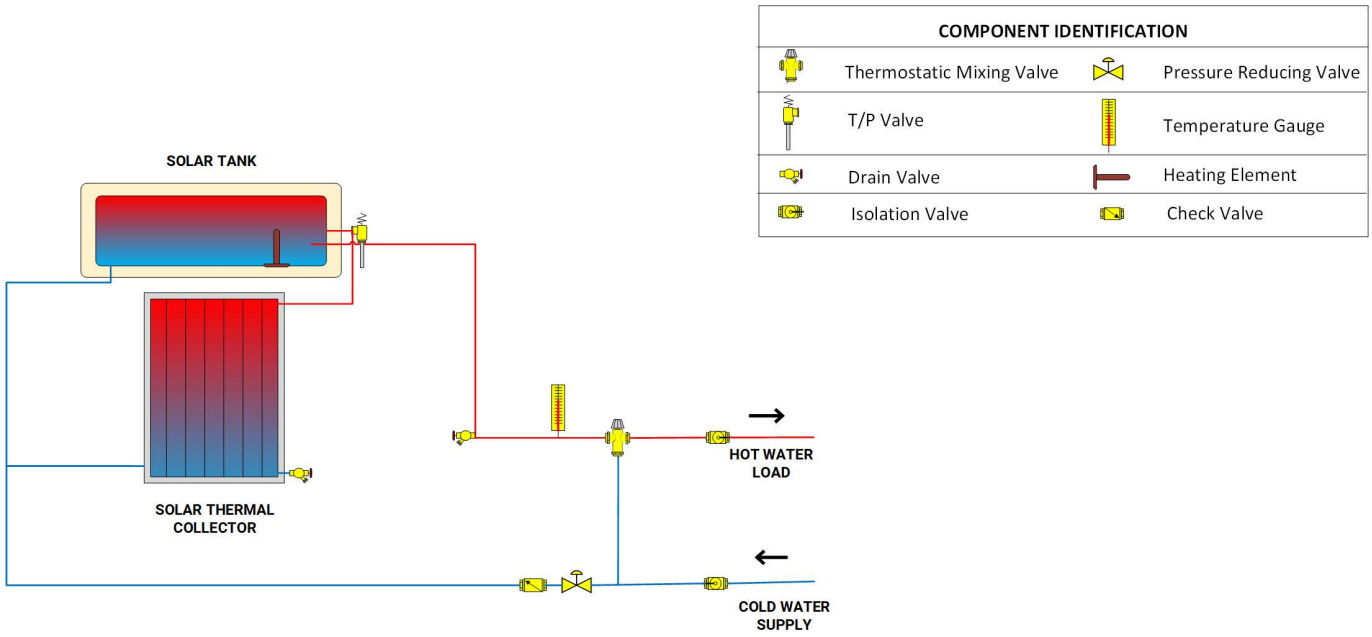
COMPLIANCE WITH THE FOLLOWING STANDARD(S): *ICC 900/SRCC 300 - 2020, Solar Thermal System Standard*
ENERGY STAR Residential Water Heater Specification (v.5.0)

SOLAR UNIFORM ENERGY FACTOR (SUEF): 99.0, Very Small Draw Pattern

The Solar Uniform Energy Factor (SUEF) is determined through computer modeling per the specification established in *ICC 900/SRCC 300, Appendix B*.

INSTALLATION:

The solar water heating system must be installed in accordance with the manufacturer's published installation instructions. Installation must conform to the requirements of the applicable code and is subject to approval by the code official having jurisdiction. This certification is valid only for a system composed of the components configured as shown in the schematic below:



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PARTS LIST:

Part	Quantity	Evaluated Component
Collector	1	Universal Solar Products, Inc. Model USP-619 (OG-100 10002151)
Solar Tank	1	USP Model TS82-SS (303 L volume)

IDENTIFICATION:

Certified systems must be identified with the OG-300 certification mark below in accordance with the *Rules for Certification Mark and Certificate Use* and labeled in with the information below per *ICC 900/SRCC 300*:

1. Manufacturer's name and model number.
2. OG-300 system certification number
3. OG-100 collector certification number(s) and quantity.
4. Heat transfer fluid and concentration range.
5. Storage and expansion tank volumes.
6. Relief valve specification and setpoint.
7. Maximum water supply pressure.
8. Maximum solar loop pressure.
9. Flow rate range (where a flow meter is installed).
10. Backup energy rating. For electrical, phase/volts/amps. For gas, minimum pressure.
11. Installation date field (to be entered by the installer in the field).

CONDITIONS:

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

1. Systems must be installed and operated in accordance with the manufacturer's instructions and local code.
2. Systems must include all components installed in the configuration shown in the schematic in the OG-300 certification document.
3. Systems must use one of the OG-100 certified solar collector options from the list above. Where more than one collector is installed in a system, all collectors must be the same model.
4. Systems must utilize heat transfer fluids approved by the manufacturer.
5. Certifications are not to be construed as representing aesthetics or any other attributes not specifically addressed, nor are they to be construed as an endorsement of the subject of the report or a recommendation for its use.
6. There is no warranty by ICC-SRCC express or implied, as to any finding or other matter in this certification, or as to any product covered by the certification.

REGIONAL RATINGS:

Thermal performance ratings are provided for the system based on computer modeling to standard OG-300 rating conditions and a hot water load of 64.3 gallons per day (243.4 litres per day) at a setpoint of 125°F (51.7°C) for comparison. Performance is given using the following values:

- Annual Solar Fraction (SF_A): The portion of the total conventional hot water heating load (including tank standby losses) provided by solar energy averaged over one year.
- Annual Energy Savings (AES): The projected energy savings over a period of one year for the system compared to a baseline tank-type water heater using the same fuel source.

Results are given for several climate zones throughout North America. Climate zones are as established in *ANSI/ASHRAE 169, Climatic Data for Building Design Statndard*. Actual thermal performance and energy savings for an installed system will vary with local conditions, installation details and hot water usage.

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UNITED STATES OF AMERICA

OG-300 LOCAL ANNUAL SOLAR WATER HEATING SYSTEM PERFORMANCE

System performance at several geographic locations in the United States corresponding to climate zones as established in ASHRAE 169 is provided below. Ratings are determined using weather data, solar irradiance and water supply temperature over a period of one year for the specific locations listed below. Ratings for locations in California and Hawaii are provided on separate state maps on the following pages.

USA			
Location	Climate Zone (ASHRAE 169)	Solar Fraction (SF_A)	Annual Energy Savings (kWh)
AK - Anchorage	7	-0.08	-440
AZ - Phoenix	2B	0.49	1740
CO - Denver	5B	0.18	810
FL - Tampa	2A	0.35	1200
GA - Atlanta	3A	0.21	860
MA - Boston	5A	0.08	370
MO - St Louis	4A	0.14	600
MT - Helena	6B	0.05	280
TX - Dallas-Fort Worth	3A	0.28	1060
WA - Seattle	4C	0.04	180
WI - Milwaukee	6A	0.05	220

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STATE OF CALIFORNIA

OG-300 LOCAL ANNUAL SOLAR WATER HEATING SYSTEM PERFORMANCE

System performance at several geographic locations in the state of California corresponding to building climate zones as established by the California Energy Commission (CEC) is provided below. Ratings are determined using weather data, solar irradiance and water supply temperature over a period of one year for the specific locations listed below.

State of California			
Location **	**Climate Zone (ASHRAE 169)***	**Solar Fraction (SF_A)**	**Annual Energy Savings (kWh)**
CCZ 1 - Arcata	7	0.06	290
CCZ 2 - Santa Rosa	6B	0.22	920
CCZ 3 - Oakland	3C	0.21	880
CCZ 4 - Sunnyvale	4C	0.24	1020
CCZ 5 - Santa Maria	5C	0.24	1050
CCZ 6 - Los Angeles	3B	0.28	1080
CCZ 7 - San Diego	3B	0.28	1090
CCZ 8 - El Toro	3B	0.30	1200
CCZ 9 - Burbank	3B	0.30	1220
CCZ 10 - Riverside	3B	0.33	1300
CCZ 11 - Red Bluff	3B	0.28	1110
CCZ 12 - Sacramento	3B	0.28	1130
CCZ 13 - Fresno	3B	0.33	1330
CCZ 14 - China Lake	3B	0.37	1400
CCZ 15 - El Centro	3B	0.51	1720
CCZ 16 - Mt. Shasta	7	0.16	720

* Climate zones are as established in ANSI/ASHRAE 169, Climatic Data for Building Design Standard.

** California Building Climate Zones and representative cities are established by the California Energy Commission for use in the CA Title 24 Energy Efficiency Standards

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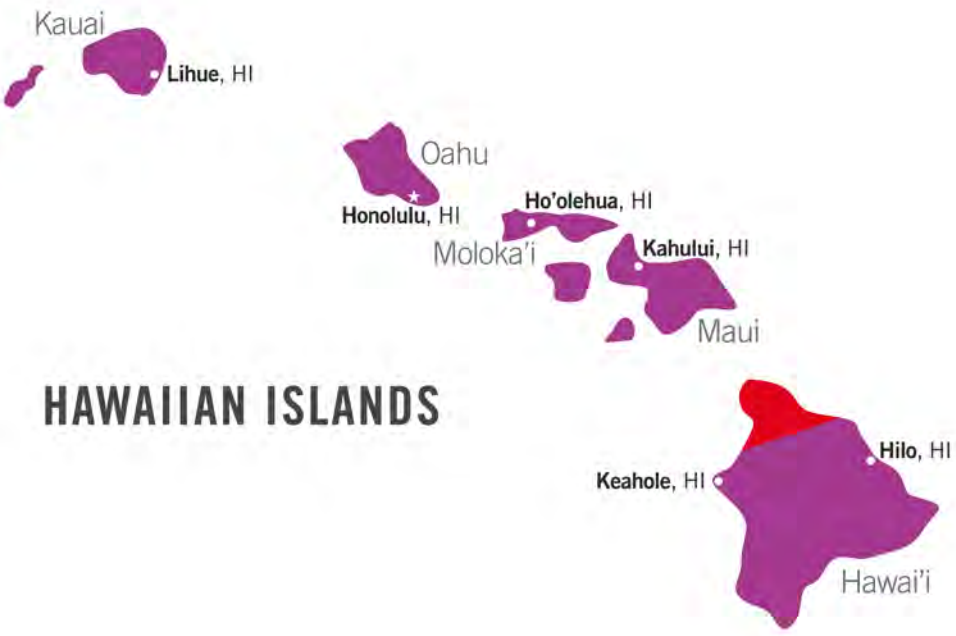
HAWAIIAN ISLANDS

OG-300 LOCAL ANNUAL SOLAR WATER HEATING SYSTEM PERFORMANCE

System performance at several geographic locations in the Hawaiian Islands corresponding to climate zones as established in ASHRAE 169 is provided below. Ratings are determined using weather data, solar irradiance and water supply temperature over a period of one year for the specific locations listed below.



State of Hawaii			
Location	Climate Zone (ASHRAE 169)	Solar Fraction (SF_A)	Annual Energy Savings (kWh)
Hawaii Island - Hilo	1	0.26	870
Honolulu - Oahu Island	1	0.41	1300
Maui Island - Kahului	1	0.42	1350
Hawaii Island - Keahol	1	0.39	1330
Lihue - Kauai Island	1	0.36	1180
Ho'olehua - Molokai Island	1	0.42	1360

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CANADA

OG-300 LOCAL ANNUAL SOLAR WATER HEATING SYSTEM PERFORMANCE

System performance at several geographic locations in Canada corresponding to climate zones as established in ASHRAE 169 is provided below. Ratings are determined using weather data, solar irradiance and water supply temperature over a period of one year for the specific locations listed below. The local annual ratings are provided for a 243 L/day (64.3 gal/day) hot water load.

Canada			
Location	Climate Zone (ASHRAE 169)	Solar Fraction (SF_A)	Annual Energy Savings (kWh)
AB - Edmonton	5	0.01	60
NS - Halifax	7A	-0.01	-20
ON - Thunder Bay	7A	0.06	270
QC - Quebec City	5	0.02	80
MB - Winnipeg	7A	0.01	70
AB - Calgary	7A	0.04	240
BC - Vancouver	7	0.04	210

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CENTRAL AMERICA AND CARIBBEAN REGION

OG-300 LOCAL ANNUAL SOLAR WATER HEATING SYSTEM PERFORMANCE

System performance at several geographic locations in Central America and the Caribbean region corresponding to climate zones as established in ASHRAE 169 is provided below. Ratings are determined using weather data, solar irradiance and water supply temperature over a period of one year for the specific locations listed below.

Central America & Carribean Region			
Location	Climate Zone (ASHRAE 169)	Solar Fraction (SF_A)	Annual Energy Savings (kWh)
Puerto Rico - Mercedita	1	0.34	1250
Puerto Rico - Aguadilla	1	0.35	1280
Puerto Rico - Roosevelt Roads	1	0.33	1220
USVI - Charlotte Amalie	1	0.35	1310
Barbados - Christ Church	1	0.52	1610
Costa Rica - San Jose	1	0.36	1640
Jamaica - Kingston	1	0.58	1800
Mexico - Monterrey	2	0.21	780
Mexico - Mexico City	2	0.19	880
Belize - Belize City	1	0.39	1190
Puerto Rico - San Juan	1	0.46	1430

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PUERTO RICO SUPPLEMENT TO OG-300 30004375

This Puerto Rico Supplement provides OG-300 performance ratings for several locations in Puerto Rico and the US Virgin Islands under several daily hot water draws. These OG-300 annual solar fraction (SF) ratings apply to the use of the listed solar water heating system installed with or without a backup heater and are calculated using typical local weather data and water supply temperatures.

CAUTION – SOLAR-ONLY SOLAR WATER HEATING SYSTEMS (WITHOUT A BACKUP HEATER) MAY BE UNABLE TO MEET HOT WATER DEMAND UNDER CERTAIN WEATHER AND USAGE CONDITIONS.

SOLAR-ONLY SYSTEMS SHOULD NOT BE INSTALLED WHERE PROHIBITED BY LOCAL CODES.

OG-300 PERFORMANCE RATING:
Annual Solar Fraction (SF_A) per Location, Configuration and Daily Hot Water Draw

Location	Configuration Backup Water Heater?	DOE Very Small 10 gpd	DOE Low 38 gpd	DOE Medium 55 gpd	SRCC OG-300 64 gpd	DOE High 84 gpd
San Juan, PR	Yes	97%	62%	49%	46%	37%
Aguadilla-Borinquen, PR	Yes	97%	65%	51%	48%	38%
Mercedita, PR	Yes	96%	63%	50%	47%	37%
Roosevelt Roads NAS, PR	Yes	97%	62%	49%	46%	37%
Charlotte Amalie AP, USVI	Yes	97%	65%	51%	49%	39%
ALL LOCATIONS	No	100%	100%	100%	100%	100%

* DOE standardized draw patterns specified in 10 CFR 430, Subpart B, Appendix E, *Uniform Test Method for Measuring the Energy Consumption of Water Heaters* ENERGY STAR Single-Family New Homes Caribbean Program Requirements, Version 3 (Rev. 13) allows for the use of the "Low" or "Medium" DOE Draw pattern, depending on the building size.

Standard SRCC OG-300 performance ratings are based on a hot water draw pattern consuming 64.3 gallons per day (gpd). This Puerto Rico Supplement also provides performance ratings for the system for four other draw profiles published by the U.S. Department of Energy. They are labeled "Very Small", "Low", "Medium" and "High" and have total daily hot water consumptions of 10, 38, 55 and 84 gpd, respectively. The additional ratings are provided to support local incentive programs. The size and location of each specific project using this system should be used to determine the appropriate performance rating.

This system has also been evaluated in a solar-only configuration - without a backup heater. Solar-only systems may only be used where appropriate for the building, allowed by the manufacturer and permitted by local codes. Without a backup heater, solar energy is the only energy source used to heat the water delivered by the system. SRCC defines Solar Fraction as the percentage of the energy used to heat the water delivered by the system. Therefore, the Annual Solar Fraction (SF_A) for a solar-only system is 100% in all locations.

NOTE: The Solar Fraction does not show how well a solar-only system will meet the day-to-day hot water demand in a specific building. Without a backup water heater, this system may not be able to provide sufficient hot water at all times - depending on usage, weather and installation.

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