SOLAR RATING & CERTIFICATION CORPORATION

An ICC Evaluation Service Program

# OG-300 Solar Water Heating System Certification

**No./30004021**

*Issued: March 21, 2014*

*Expiration Date: October 01, 2026*

www.solar-rating.org | (800) 423-6587 | (562) 699-0543

| CERTIFICATION HOLDER: | EVALUATION SUBJECT | |
|---|---|---|
| **SunEarth, Inc.**<br>8425 Almeria Avenue<br>Fontana, CA 92335 USA<br>www.sunearthinc.com | **BRAND:** | Cascade 2 |
| | **MODEL:** | C2-32-80-TLG |
| | **TYPE:** | Pumped, Indirect |

**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.

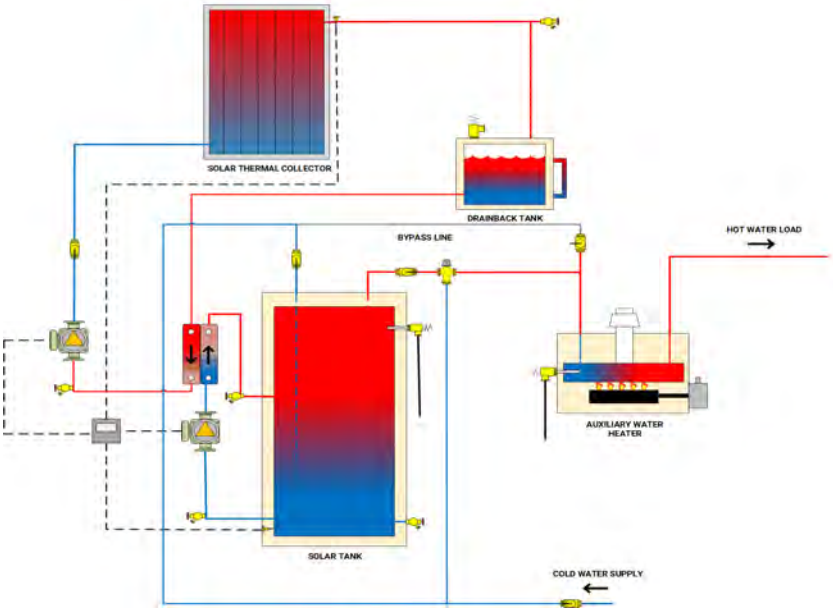
**COMPLIANCE WITH THE FOLLOWING STANDARD(S):** *ICC 900/SRCC 300 - 2015, Solar Thermal System Standard*

**SOLAR UNIFORM ENERGY FACTOR (SUEF):** 38.8, Low 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:




| COMPONENT IDENTIFICATION | | | |
|---|---|---|---|
| Thermostatic Mixing Valve | | Isolation Valve | |
| Pressure/Temp Valve | | Pressure Relief Valve | |
| Drain Valve | | Temperature Sensor | |
| Pump | | Controller | |

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**PARTS LIST:**

| Part | Quantity | Evaluated Component |
|---|---|---|
| Collector Option 1 | 1 | SunEarth, Inc. Model EP-32 / EP-32-0.75 (OG-100 2007032D) |
| Drainback Tank | 1 | SolarHot Model DBT 10 SS (38 L volume) |
| Solar Tank | 1 | A.O. Smith Model SE-80-6-NHE (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.
7. This document must be reproduced in its entirety.

**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 | 0.47 | 3710 |
| AZ - Phoenix | 2B | 0.92 | 5020 |
| CO - Denver | 5B | 0.80 | 5510 |
| FL - Tampa | 2A | 0.88 | 4680 |
| GA - Atlanta | 3A | 0.79 | 4850 |
| MA - Boston | 5A | 0.68 | 4630 |
| MO - St Louis | 4A | 0.72 | 4700 |
| MT - Helena | 6B | 0.65 | 4830 |
| TX - Dallas-Fort Worth | 3A | 0.83 | 4800 |
| WA - Seattle | 4C | 0.60 | 4080 |
| WI - Milwaukee | 6A | 0.64 | 4600 |

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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 | 0.66 | 4470 |
| CCZ 2 - Santa Rosa | 6B | 0.79 | 5120 |
| CCZ 3 - Oakland | 3C | 0.81 | 5220 |
| CCZ 4 - Sunnyvale | 4C | 0.83 | 5280 |
| CCZ 5 - Santa Maria | 5C | 0.86 | 5540 |
| CCZ 6 - Los Angeles | 3B | 0.88 | 5210 |
| CCZ 7 - San Diego | 3B | 0.87 | 5200 |
| CCZ 8 - El Toro | 3B | 0.89 | 5360 |
| CCZ 9 - Burbank | 3B | 0.86 | 5310 |
| CCZ 10 - Riverside | 3B | 0.89 | 5300 |
| CCZ 11 - Red Bluff | 3B | 0.80 | 4830 |
| CCZ 12 - Sacramento | 3B | 0.81 | 5000 |
| CCZ 13 - Fresno | 3B | 0.83 | 5030 |
| CCZ 14 - China Lake | 3B | 0.91 | 5270 |
| CCZ 15 - El Centro | 3B | 0.92 | 4850 |
| CCZ 16 - Mt. Shasta | 7 | 0.75 | 5140 |

* 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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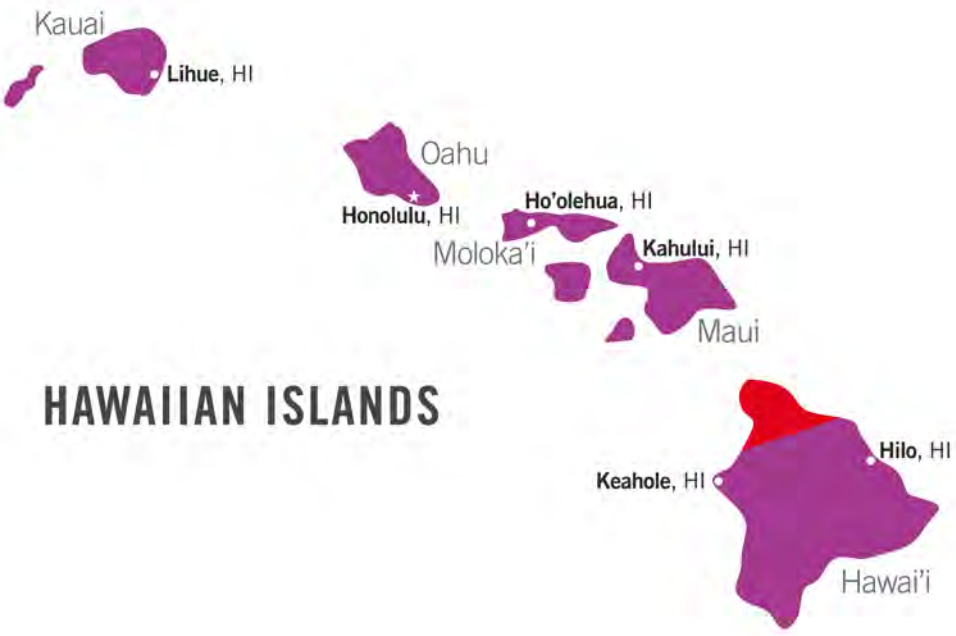
# HAWAIIAN ISLANDS

**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 | 0.85 | 4390 |
| Honolulu - Oahu Island | 1 | 0.92 | 4550 |
| Maui Island - Kahului | 1 | 0.91 | 4510 |
| Hawaii Island - Keahol | 1 | 0.91 | 4770 |
| Lihue - Kauai Island | 1 | 0.90 | 4570 |
| Ho'olehua - Molokai Island | 1 | 0.91 | 4550 |

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# CANADA

### CANADA SINGLE DAY RATING

The Canada Single Day Rating below provides annual estimated energy savings determined using computer modeling based on the standard day specified in the CAN/CSA F379 SERIES-09 (R2013) standard for a 300 litre/day hot water draw.
Baseline energy savings for single-tank electric and gas tank-type water heaters (with no solar input) are -1.11 and -4.83 GJ/year, respectively. Negative values are indicative of the difference between the energy input to the water heater and the energy delivered to the load, or the sum of the parasitic and standby losses. Therefore, a SWH system with a rating of zero is one where the solar energy input to the system offsets all of the standby and parasitic losses. If the solar contribution in a single-tank system is smaller than the parasitic and stand-by losses, the system will have a negative rating.

| ESTIMATED ENERGY SAVINGS (GJ/year for 300 L/day (80 gal/day) hot water load): | 4.9 |
|---|---|

### 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 | 0.64 | 5020 |
| NS - Halifax | 7A | 0.58 | 4200 |
| ON - Thunder Bay | 7A | 0.64 | 4620 |
| QC - Quebec City | 5 | 0.61 | 4630 |
| MB - Winnipeg | 7A | 0.63 | 4950 |
| AB - Calgary | 7A | 0.67 | 5180 |
| BC - Vancouver | 7 | 0.61 | 4220 |

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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) |
| Barbados - Christ Church | 1 | 0.95 | 4580 |
| Costa Rica - San Jose | 1 | 0.92 | 6270 |
| Jamaica - Kingston | 1 | 0.95 | 4600 |
| Mexico - Monterrey | 2 | 0.75 | 4370 |
| Mexico - Mexico City | 2 | 0.80 | 5460 |
| Belize - Belize City | 1 | 0.90 | 4360 |
| Puerto Rico - San Juan | 1 | 0.92 | 4480 |

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