

SRCC DOCUMENT OG-300



OPERATING GUIDELINES AND MINIMUM STANDARDS FOR CERTIFYING SOLAR WATER HEATING SYSTEMS

June 2008

www.solar-rating.org

Solar Rating and Certification Corporation
1679 Clearlake Road
Cocoa, Florida 32922-5703
(321) 638-1537 Fax (321) 638-1010

1.0 PURPOSE

The purpose of this optional solar water heating system certification and rating program is to ensure product safety, reliability and performance by giving suppliers the opportunity to submit their SWH system designs to an open-ended review in which standard practices and field experiences can be brought to suppliers' attention in order that they may produce the best possible products.

This document contains the methodology and requirements for certifying solar water heating systems based on review of a solar water heating (SWH) system's design and analytical evaluation of its components. This document also contains the methodology for rating the performance of SWH systems based on performance projections and test data of SRCC certified and rated solar collectors used in the systems.

2.0 SCOPE

This document applies to packaged domestic solar water heating systems for residential and small commercial buildings including conventional active systems, integral-collector-storage systems (ICS) and thermosyphon systems. For active systems, the solar collectors shall have been tested according to SRCC Standard 100, "Test Methods and Minimum Standards for Certifying Solar Collectors" and rated according to SRCC Document RM-1, "Methodology for Determining the Thermal Performance Ratings of Solar Collectors." For passive (ICS, self pumping, and thermosyphon systems), the solar system shall have been tested according to SRCC TM-1, "SDHW System and Component Test Protocols", or a similar test procedure approved by SRCC as specified in 6.1.2.1 of this document.

3.0 REQUIREMENTS

Certification and thermal performance ratings shall only be awarded to those solar system suppliers who explicitly follow the process established in this document. All components shall be installed in accordance with the manufacturer's instructions unless an alternate method of installation is approved by SRCC.

Installed certified solar energy systems shall comply with all codes in force at the installation site.

In order to be awarded certification, the design and analytical evaluation of components which comprise the SWH system, i.e., collectors, controls, sensors, fluids, heat exchangers, pumps, plumbing, piping and tanks, shall meet or exceed the minimum standards established in this document.

4.0 DEFINITIONS AND REFERENCES

4.1 Definitions

Accreditation - Formal evaluation and notification by the SRCC that a laboratory is qualified to perform the specific tests listed in the accreditation for the purpose of providing test data to support requests for solar equipment certification.

Accredited Laboratory - A laboratory possessing the SRCC accreditation.

Acidic/Caustic Fluids - A fluid is considered to be acidic if its pH is less than 6.7 and caustic if its pH is greater than 7.3.

Approved - Deemed acceptable in writing by authorized representative(s) of the SRCC.

Approved (component) - Evaluated on the basis of suppliers' data and application information and considered by SRCC to be suitable for use in solar energy systems. Tests are required for some components and limitations on suitable uses may be stated.

Auxiliary Heating Equipment - Equipment utilizing energy other than solar to supplement the output provided by the solar energy system.

Backflow - The reversal of the normal direction of fluid flow.

Closed Loop - Refers to systems in which the fluid in the solar loop circulates between the solar collector(s) and a heat exchanger and is not drained from the system, nor is it supplied to the load, during normal operation.

Controller - Any device which regulates the operation of the solar water heating system.

Design Life - The intended useful operation life of the system as defined by the Supplier.

Double Wall Heat Exchanger - A heat exchanger design in which a single failure of any fluid barrier will not cause a cross connection or permit back siphonage of heat transfer fluid into the potable water system. Any barrier which fails shall allow the discharge of exchanger fluid and/or potable water to the atmosphere at a location visible to the operator or owner.

Drain-Back - Refers to systems in which the fluid in the solar loop is drained from the collector into a holding tank under prescribed circumstances.

Drain-Down - Refers to systems in which the fluid in the solar collector is drained from the system under prescribed circumstances.

Drainage Slope - The designed downward slope of installed piping or other components toward drain points.

Equivalent - Those alternatives which have been officially approved by the SRCC.

Indoor Tank - A tank which is not directly exposed to weather conditions.

In-Service Conditions - The conditions to which a SWH system and its components will be exposed.

Licensee - A person or business which provides a product or service under legal agreement with another person or business.

Manual - The total documentation package to be provided by the supplier to the purchaser which describes the general operation and maintenance procedures of the system. The manual will include a parts list, a system diagram, a description of major components, and other features required by this document.

May - Action indicated is allowed.

No-Flow Condition - The condition obtained when the heat transfer fluid is not flowing through the collector array due to automatic shutdown or malfunction.

Nonpotable Water - Water containing impurities in amounts sufficient to cause disease or harmful physiological effects when taken internally by humans or domesticated animals.

Non-Toxic Fluids - Additives to the heat transfer medium which are listed on the Code of Federal Regulations, Title 21, Food and Drugs; Chapter 1, Food and Drug Administration; Part 182, Substances Generally Recognized as Safe; Part 184, Direct Food Substances Affirmed as Generally Recognized As Safe.

Owner - The person, group or organization who contracts to lease or buy the solar energy system.

Packaged - A standard system which is sold complete with collectors, tanks, pumps, controls, gauges, valves, etc., for the purpose of providing solar water heating.

Potable Water - Water free from impurities in amounts sufficient to cause disease or harmful physiological effects when taken internally by humans or domesticated animals.

Revoke - Certification withdrawn.

Seller - The solar equipment supplier or dealer who requests approval of components or a system.

Shall - The criterion is required to comply with the standard.

Should - Recommended, but not required.

Significant Deterioration - Deterioration that results either in the creation of a hazard or a debilitating decrease in performance as determined by the SRCC.

Solar Loop - The portion of the solar system which transports the heated gas or fluid to storage and back to the collector.

SRCC - The Solar Rating and Certification Corporation, Inc., the organization which is responsible for conducting the program, described herein, for certifying SWH systems.

Subsystem - A separable, functional assembly of components.

Supplemental Heating Equipment - Equipment utilizing energy other than solar to supplement the output provided by the solar energy system.

Supplier - An entity which assumes responsibility for the solar water heating system approved by the SRCC, according to the procedures described herein.

Suspend - Certification temporarily placed in inactive status pending further action as specified by the SRCC.

SWH - Solar water heating.

System (Also referred to as Solar Water Heating System, or SWH System or Solar Water Heater) - A unit or package of components designed to provide solar heated water to residential-type loads.

Toxic Fluids - Fluids which are poisonous or irritating in nature or composition.

Water Hammer - The hammering noises and severe shock that occurs in pressurized water supply systems when flow is halted abruptly.

4.2 References

The following documents are referenced in OG-300.

ANSI Z21.10.1-2004/CSA 4.1-2004 Gas Water Heaters Volume 1, Storage Water Heaters With Input Ratings of 75,000 Btu Per Hour or Less

ANSI Z21.10.3-2004/CSA 4.3-2004 Gas Water Heaters - Volume III, Storage Water Heaters With Input Ratings Above 75,000 Btu per Hour, Circulating and Instantaneous.

SRCC Standard 100, "Test Methods and Minimum Standards for Certifying Solar Collectors"

SRCC Document OG-100, "Operating Guidelines for Certifying Solar Collectors"

SRCC Document TM-1, "SDHW System and Component Test Protocols"

SRCC Document RM-1, "Methodology for Determining the Thermal Performance Ratings of Solar Collectors"

SRCC Document CS-1, “Operating Guidelines Governing Component Substitution in the SRCC Solar Collector and Solar Water Heating System Certification and Rating Programs”

SRCC Document PI-1, “Operating Guidelines Governing Product Inspections at Suppliers’ Facilities in the SRCC Solar Collector and Solar Water Heating System Certification and Rating Programs”

HUD Minimum Property Standard 4930.2

ASME Boiler and Pressure Vessel Code, Division 1, Section VIII, “Rules for Construction of Pressure Vessels”

ASME Boiler and Pressure Vessel Code, Section X, “Fiber-Reinforced Plastic Pressure Vessels”

Code of Federal Regulations, Title 21, Food and Drugs, Chapter 1, Food and Drug Administration, Part 182, “Substances Generally Recognized as Safe;” Part 184, “Direct Food Substances Affirmed as Generally Recognized as Safe”

American Water Works Association, Cross Connection Control Manual

National Sanitation Foundation

Federal Hazardous Substances Act, Title 15

National Fire Protection Association (NFPA) No. 30, “Flammable and Combustible Liquid Code”

National Fire Protection Association (NFPA) No. 321, “Basic Classification of Flammable and Combustible Liquids”

National Roofing Contractors Association

U.S. Department of Energy test for water heaters (Federal Register volume 55 number 201 page 42161 – 42177, October 17, 1990)

GAMA Consumers’ Directory of Certified Efficiency Ratings for Residential Heating and Water Heating Equipment, April 1994 (page 134)

National Electrical Code

TRNSYS: A Transient System Simulation Program, Solar Energy Laboratory, University of Wisconsin – Madison, Madison, WI, July 1994

5.0 CERTIFICATION GUIDELINES

5.1 Initiating the Process

The supplier shall initiate the system certification process by submitting a complete application for system certification using the forms provided by the SRCC.

5.2 Confidentiality

Any supplier who submits information to the SRCC may designate information to be kept confidential by making such a request in a plain and legible manner on the application. Certified performance ratings calculated in accordance with this document, however, may not be designated confidential, i.e., all ratings certified by SRCC shall be published.

5.3 System Identification

- A. Supplier's model name or number for the system.
- B. Collector name and model number, SRCC collector certification number, number of collectors used in the system, and collector or system performance rating, cumulative for all collectors in the system.
- C. Storage tank(s) name and model number, and volumetric capacity.
- D. Method of heat transfer to tank: direct or through a heat exchanger and model and type of heat exchanger where applicable.
- E. Pump(s) name and model number and rating where applicable.
- F. Controller name and model number, and operational type where applicable.
- G. System diagram showing components and their interconnection.

5.4 System Classification

A supplier may submit certification application(s) for basic, equivalent, or similar system(s) as given below.

5.4.1 Basic System

A system with a particular design including the plumbing arrangement and control scheme is a basic system.

5.4.2 Equivalent System

A system which has one or more components which differ from those of the basic system but which produces essentially the same performance rating is an equivalent system. Equivalent systems may include component options within the limitations in this section. However, the combination of components which results in the lowest rating will be used for determining the system's Solar Energy Factor.

- A. Collectors: Shall be in the same collector class as identified in the SRCC OG-100 Collector Program.
- B. Storage Tanks: Shall be of similar design and within $\pm 5\%$ of the same volumetric capacity.
- C. Circulating Pumps: Shall be of the same design principle, performance and durability.
- D. Controllers: Shall be of the same operational type, performance and durability.

5.4.3 Similar System

A system which has one or more components which differ from those in a basic system only in size is a similar system. There may be equivalent similar systems based on the same basic system, but the combination of components which results in the lowest rating will be used for determining the system's Solar Energy Factor.

5.5 Component Substitution

Substitution of components which were not approved as a part of either the originally certified basic system or its equivalent systems shall be submitted to SRCC to determine if the new system is eligible for certification as an equivalent system.

Certification may be reissued subject to review by the SRCC following the procedures contained in SRCC Document CS-1, "Operating Guidelines Governing Component Substitution in the SRCC Solar Collector and Solar Water Heating System Certification and Rating Programs". The analysis shall detail any and all changes and their effect on durability, safety and performance and shall clearly indicate that the new system is equal to or better in all respects than the system originally certified.

5.6 Systems Supplied by Licensees

A SWH system certified by SRCC that also is fabricated/assembled and sold by another supplier who is a licensee of the first (where fabrication/assembly entails activities which include packaging of the system), may be certified by SRCC upon (1) authorization from the original applicant to issue certification to the Licensee/Private Labeler, (2) execution by the Licensee/Private Labeler of a Solar Water Heating System Certification Program Agreement and Solar Water Heating System Certification and License, (3) submittal by the Licensee/Private Labeler of a complete system certification application, and (4) payment of requisite fees.

Private Labelers shall meet the same conditions and program requirements for certification as are required of other SRCC solar water heating system certification program participants.

5.7 Application Requirements

A complete listing and description of all components used in the system shall be included with the application on forms supplied by SRCC. Test reports, suppliers' specification sheets, and supplemental drawings and/or specifications shall be provided which accurately detail their construction and function and which document the systems compliance with these minimum standards. Compliance with industrial standards and/or listing by approved agencies shall be documented.

The following minimum information shall be supplied, where applicable, on the major components of the basic system and shall be part of the system certification file:

A. Solar Collector

1. Manufacturer's name and address.
2. Model number.
3. SRCC Solar Collector Certification License Number and a copy of the SRCC Solar Collector Certification Award. (For active systems, the collector component of the system shall be SRCC tested, rated, and certified in order for the system to be eligible for certification under this document.)
4. Certification of compliance with standards concerning ultraviolet stability for glazing, sealants, gaskets, and other materials exposed to ultraviolet radiation.

B. Controller

1. Manufacturer's name and address.
2. Model number.
3. Descriptive brochure including specifications and application information.
4. Reports on safety or other certification tests, if available.
5. Operating temperature differences and tolerances, and environmental temperature limitations.
6. Statement by the manufacturer or by an independent laboratory that the unit meets all applicable provisions of the National Electrical Code.
7. Recognized third party listing agency approval file number (where applicable).

C. Storage Tanks

1. Manufacturer's name and address.
2. Model number.
3. Descriptive brochure including specifications and application information.
4. Dimensions and construction of integral heat exchanger if one is used.
5. Recognized third party listing agency approved file number (where applicable).
6. R-Value rating of tank insulation

D. Pumps

1. Manufacturer's name and address.
2. Model number.
3. Descriptive brochure including specifications and application number.
4. Materials of pump body and impeller in contact with the pumped fluid.
5. Recognized third party listing agency approved file number and description of overload protection, such as by overcurrent or overtemperature device or by impedance of windings according to the National Electrical Code.
6. Maintenance requirements.
7. Limitations on fluids used.

E. Heat Exchanger

1. Manufacturer's name and address.
2. Model number.
3. Descriptive brochure including specifications and applications information.
4. Materials in contact with heat transfer fluids on both sides of the heat exchanger.
5. Heat Exchanger effectiveness from independent test laboratory when available.

F. Other Components

1. Manufacturer's name and address.
2. Model number.
3. Descriptive brochure.
4. Appropriate approvals from recognized third party listing agencies.
5. Performance information.

Separate application forms shall be submitted for separate water heating system designs.

5.8 Review of Application

The SRCC shall review the application submitted and give written notice to the supplier of certification or denial of certification.

SRCC shall review the components, assemblies and materials in the system for compatibility.

Major system components, the contents of the supplier's manual delivered with the system, and the supplier's instructions for system installation shall be approved by SRCC. Certification shall be awarded based upon the determination by SRCC that the system successfully meets the minimum design, reliability and durability, safety, operation and servicing, installation, and manual criteria contained herein.

If the SRCC determines that the applicant does not satisfy all the criteria for certification, the SRCC shall give the applicant written notice containing a statement of reasons for the denial. An applicant denied certification may file within thirty (30) days a written request for review with the SRCC. The SRCC shall appoint a review board which will consider the evidence on file. The SRCC shall, based upon the recommendation of the review board, affirm, modify or reverse the initial decision and shall inform the applicant of the review board's recommendations.

5.9 Labeling

The supplier of a certified solar system shall identify that system as certified by means of a label. Certification label specifications shall be provided by the SRCC upon approval of the application for certification. An approved certification label shall be permanently and conspicuously affixed to all production units of the certified solar system within sixty (60) days from receipt of notice of certification. In addition, the supplier shall be required to include a Certification Award as provided by SRCC with every certified solar system shipped, sold, or offered for sale and/or on display.

The SRCC registered certification trademark may be used in advertising, in catalogs and sales promotion material by the supplier of a certified system provided clear reference is made as to which system(s) certification applies.

5.10 Periodic Verification of SRCC Certification

Each SWH system model which has been granted SRCC certification and an SRCC thermal performance rating shall be recertified every five (5) years, for as long as that system is manufactured.

5.10.1 Verification of Supplier Compliance with Certification

Each SWH system which has been granted SRCC certification and an SRCC thermal performance rating shall be subject to periodic verification and review in accordance with SRCC Document PI-1, "Operating Guidelines Governing Product Inspections at Suppliers' Facilities in the SRCC Solar Collector and Solar Water Heating System Certification and Rating Programs."

5.10.2 Field Verification

System installations will be inspected in accordance with procedures established by SRCC. Systems found to be installed in non-compliance with the requirements of this document are liable to have their certification revoked by SRCC.

5.11 Suspending, Revoking, or Terminating Certification and/or Program Agreement

5.11.1 Supplier Initiated

The supplier of a certified SWH system may voluntarily terminate certification by giving written notification to the SRCC.

5.11.2 SRCC Initiated

The SRCC may revoke or suspend certification of a SWH system or may terminate the Program Agreement in the event of:

1. Misrepresentation of material fact in an application for certification.

2. Misrepresentation that a certification of a particular model applies to other models which have not been officially certified. This includes the use of components other than those listed with the original certification application.
3. Component changes not approved by the SRCC.
4. Claiming continued certification for a solar water heating system which, after certification, has been changed or modified without the written approval of the SRCC.
5. Failure to comply with a condition of certification or labeling.
6. Failure to meet the rectification criteria as stated in Section 5.10.
7. Failure to comply with the conditions and terms of the System Program Agreement and/or System Certification and License.
8. Failure to pay fees as established by the SRCC Board of Directors.

The SRCC shall determine if suspension or revocation of a previously granted certification or the termination of a participant's Program Agreement is warranted. If so, the SRCC shall give the program participant confidential written notice containing a statement of reasons for the proposed action and those steps, if any, available to the program participant to avoid the proposed action. Where applicable, specific instructions of steps which shall be taken to correct the cause(s) for revoking or suspending certification shall also be contained in the notice.

The program participant may contest the reason(s) for the proposed revocation, suspension or termination by filing with the SRCC a written request for review within thirty (30) days of receipt of the written notice. In the event of a request for review, the SRCC Board of Directors shall conduct an independent review of the evidence on file and the reasons for contention. The SRCC shall, based upon the recommendation of the review report, affirm, modify, or reverse the proposed revocation, suspension or termination and shall so inform the program participant of the review board's recommendations. If a written request for review is not received by SRCC within thirty (30) days of the program participant's receipt of the written notice, the proposed action of the SRCC shall become final and conclusive.

In the event of revocation, suspension or termination in accordance with the preceding paragraph, notice to such effect shall be made pursuant to Paragraph 5 of the Solar Water Heating System Certification Program Agreement. In the event of revocation, suspension, or termination, the right to the use of the Official Seal and SRCC ratings by the program participant shall, consistent with the action to be taken, cease and be concluded immediately. If the program participant fails to discontinue use of the Official Seal and all references to SRCC certification and/or ratings, SRCC shall have the right to an immediate temporary and/or permanent injunction restraining the system supplier from any and all further use of, or reference to, the Official Seal, certification and/or ratings.

6.0 CERTIFICATION CRITERIA

6.1 Design Criteria

6.1.1 Overall System Design Criteria

6.1.1.1 Operating Limits

Means shall be provided to protect the SWH system within the design limits of temperature and pressure.

6.1.1.2 Solar Loop Isolation

Isolation/bypass valves must be installed to allow the system owner to bypass the solar storage tank in the case of a two-tank system, or to shut off the cold water supply to the solar tank in a one-tank system. All isolation valves shall be labeled with their normal operating position indicated.

6.1.1.3 Thermal Expansion

The system design, components and subassemblies shall include adequate provisions for the thermal contraction and expansion of heat transfer fluids, thermal storage fluids and system components that will occur over the design temperature range.

6.1.1.4 Auxiliary Water Heating Equipment

A backup system shall be provided such that the combined system will provide the same degree of reliability and performance as a conventional system.

Auxiliary (nonsolar) water heating equipment shall be compatible with the solar system heat output, temperatures, flow rates and fluid types. Auxiliary equipment shall be listed and labeled by a recognized third party listing agency.

6.1.1.5 Back Thermosyphon Prevention

Means shall be provided to prevent undesired escape of thermal energy from storage through thermosyphoning action.

6.1.1.6 Fluid System Sizing

Pumps, piping, fans, ducts and other components shall be sized to carry the heat transfer fluid at design flow rates without significant operational impairment, erosion or corrosion. Consideration should be given to minimizing pressure drops and vibrations. The SRCC rating will be determined for 4.9 meter (16 ft.) head and 7.6 meter (25 ft.) pipe runs to and from the collector array.

6.1.1.7 Blank

6.1.1.8 Vacuum-Induced Pressure Protection

All components of the solar energy system shall be protected against the maximum vacuum which could occur within the system.

6.1.1.9 Thermal Shock Protection

The system shall be able to withstand any thermal shock caused by an electric power failure.

6.1.1.10 Different Metallic Materials

All metals used in the storage system which come into contact with the heat transfer fluid shall be in accordance with Tables S-515-2.3.2 or S-515-2.3.3 of HUD Minimum Property Standard 4930.2. Documentation shall be provided to demonstrate that material usages not covered in these tables meet the intent of S-515-1.4 and S-515-7.4

6.1.1.11 Airborne Pollutants

Solar components and materials that are exposed to airborne pollutants such as ozone, salt spray, SO₂ or NO_x shall not be adversely affected by these factors to the extent that their function will be significantly impaired during their design life.

6.1.1.12 Effects Of Decomposition Products

Chemical decomposition products that are expelled from solar components under in-service conditions shall not cause the degradation of solar components or building elements to the extent that would significantly impair their ability to perform their intended function over their design life.

6.1.2 Collector Design Criteria

6.1.2.1 Collectors

The collector component(s) shall be tested in accordance with either SRCC Standard 100, "Test Methods and Minimum Standards for Certifying Solar Collectors," SRCC TM-1, "SDHW System and Component Test Protocols," or a similar test procedure approved by SRCC provided that the alternate test procedure includes the durability tests specified in Section IV of SRCC Standard 100 and the collector component of the system meets the collector standards specified in Section VI of SRCC Standard 100.

6.1.2.2 Protection From Ultraviolet Radiation

Ultraviolet radiation shall not significantly alter the performance of any component or subcomponent of the system.

6.1.2.3 Blank

6.1.2.4 Collector Flow Rate/Distribution

In multiple collector arrays, the instantaneous flow rate variations between collectors shall not exceed 10% of the array average flow.

When an array of collectors is connected by manifolds to form a parallel flow configuration, provision shall be incorporated in the manifold and/or collectors to maintain the proper design flow rate of the heat transfer fluid through each collector.

6.1.2.5 Blank

6.1.2.6 Blank

6.1.2.7 Collector Circulation Control

The collector subsystem control shall be designed to be compatible with control requirements of the system.

6.1.3 Tank and Heat Exchanger Design Criteria

6.1.3.1 Tank Design Requirements

Both pressurized and non-pressurized tanks shall meet the requirements set by a nationally accepted standard setting organization.

Non-pressurized tanks shall be vented to atmospheric pressure.

Non-Fiberglass hot water storage tanks shall comply with ASME Boiler and Pressure Vessel Code, Division 1, Section VIII, "Rules for Construction of Pressure Vessels" unless they fall into one of the classes of vessels exempted in Part U-1(c) .

Fiber-reinforced plastic pressure vessels shall comply with ASME Boiler and Pressure Vessel Code, Section X, "Fiber-Reinforced Plastic Pressure Vessels" unless they fall into one of the classes of vessels exempted in Part RG-121.

Gas water heaters shall comply with ANSI Z21.10.1-2004/CSA 4.1-2004 'Gas Water Heaters Volume 1, Storage Water Heaters With Input Ratings of 75,000 Btu Per Hour or Less' or ANSI Z21.10.3-2004/CSA 4.3-2004 'Gas Water Heaters - Volume III, Storage Water Heaters With Input Ratings Above 75,000 Btu per Hour, Circulating and Instantaneous'.

6.1.3.2 Tank Insulation

Except where required by system design or constrained by safety considerations tank insulation shall have a minimum of $R-2.1 \text{ } ^\circ\text{K}\cdot\text{m}^2/\text{W}$ ($R-12 \text{ } ^\circ\text{F}\cdot\text{ft}^2\cdot\text{hr}/\text{Btu}$). An exterior insulation blanket may be used to satisfy this requirement.

6.1.3.3 Waterproofing

Underground and above ground unsheltered storage tanks shall be waterproofed to prevent water seepage.

6.1.3.4 Expansion Tanks

Expansion tanks shall be sized in accordance with ASHRAE recommendations.

6.1.3.5 Blank

6.1.3.6 Heat Exchanger

When toxic fluids are used as the heat transfer medium, a double wall heat exchanger shall be used. The heat exchanger design shall be such that any failure of a barrier material shall allow the discharge of exchanger fluid and/or potable water to the atmosphere. The discharge location shall be visible to the operator or owner of the system and be located so that no hazards are created by such discharge.

A single wall heat exchanger may be used when in compliance with both of the following:

1. Heat transfer medium is taken from a potable water source or is distilled water suitable for domestic use. Any additives shall be listed in the Code of Federal Regulations, Title 21, Food and Drugs, Chapter 1, Food and Drug Administration, Part 182, "Substances Generally Recognized as Safe," Part 184, "Direct Food Substances Affirmed as Generally Recognized as Safe."
2. Operating pressure within the heat exchanger shall be less than the normal minimum operating pressure of the potable water system.

6.1.4 Blank

6.1.5 Pumps and Controls Design Criteria

6.1.5.1 Blank

6.1.5.2 Control System Override

The control subsystem shall include such provision for bypass, adjustment or override controls as are required to facilitate installation, startup, operation, shutdown and maintenance of the system. Safety controls shall not have provision for bypass or override. All switches and their function shall be labeled and easily accessible.

6.1.5.3 Wiring Identification

Control circuit wiring and terminals shall be identified in accordance with Chapter 2 of the National Electrical Code.

6.1.5.4 Temperature Rating

Wiring under insulation shall be rated for expected increased temperature conditions.

6.1.5.5 Control Lines and Sensors

All wires and connections, sensors, pneumatic lines, hydraulic lines or other means for transmitting sensor outputs to control devices shall be sufficiently protected from degradation or from introducing false signals as a result of environmental or system operating conditions.

6.1.5.6 Temperature Control

The system shall be equipped with a means for automatically limiting the temperature of the hot water at the fixtures to a selectable temperature. The range of selectability shall be at least 10°C (18°F) and shall include a set point of 50°C (122°F).

6.1.6 Plumbing and Piping Design Criteria

6.1.6.1 Protection From Foreign Substances

The entire heat transport system shall be protected to prevent contamination by foreign substances that could impair the flow and quality of the heat transfer fluid beyond acceptable limits.

6.1.6.2 Blank

6.1.6.3 Insulation

All interconnecting hot water piping and the final 1.5 meters (5.0 feet) of metallic cold water supply pipe leading to the system, or the length of piping which is accessible if less than 1.5 meters, shall be insulated with $R-0.46 \text{ }^\circ\text{K m}^2/\text{W}$ ($R-2.6 \text{ }^\circ\text{F-ft}^2\text{-hr /Btu}$) or greater insulation.

All exterior piping insulation shall be protected from ultraviolet radiation and moisture damage.

6.1.6.4 Blank

6.1.6.5 Water Shut-Off

The SWH system shall be valved to provide for shut-off from the service water supply without interrupting normal cold water service to the residence.

6.1.6.6 Service Connections

Suitable connections shall be provided at readily accessible locations for filling, draining and flushing liquid systems.

6.1.6.7 Filters

Filters, if included, shall be designed and located so that they can be cleaned or replaced with minimum disruption to the system and adjacent equipment.

6.1.6.8 Blank

6.1.6.9 Blank

6.1.6.10 Coupling Hoses

Coupling hoses shall be tested in accordance with the current version of ASTM D750, ASTM D471, and ASTM D1149.

6.1.6.11 Piping System

The piping system shall be provided with valves which can be closed for the purpose of isolating the solar hot water supply system from the auxiliary hot water heater, thereby permitting operation of the auxiliary hot water heater when the solar hot water system is inoperative or being serviced.

6.2 Reliability and Durability Criteria

6.2.1 Stagnation

The system shall be able to withstand prolonged periods of stagnation (high solar flux, no hot water demand) without significant system deterioration and with no maintenance. This includes conditions during loss of electric power to the system.

6.2.2 Solar Degradation

Components or materials shall not be affected by exposure to sunlight to an extent that will significantly deteriorate their function during their design life.

6.2.3 Operation Conditions

Collectors, tanks, pumps, valves, regulating orifices, pressure regulators, heat exchangers, piping, hoses and other components shall be capable of operating within design pressures and design temperature ranges and withstanding environmental extremes anticipated in actual service without significantly reducing system design life.

6.2.4 Incompatible Materials

Incompatible materials shall be isolated or treated to prevent degradation to the extent that their function could be significantly impaired under in-service conditions.

6.2.5 Freeze Protection

Protection from freeze damage under the most severe environmental conditions that can be expected in actual use shall be provided for all system components containing heat transfer liquids. The Supplier of each system shall specify the limit ("Freeze Tolerance Limit") to the system's tolerance of freezing weather conditions. Systems installed in a location which has no record of an ambient air temperature below 5°C (41°F) may be exempted from the requirements of this paragraph except the specification of a freeze tolerance limit.

For systems that rely on manual intervention for freeze protection, the Supplier shall specify the system's freeze tolerance limit based on exposure for 18 hours to a constant atmospheric temperature. SRCC will evaluate the system design to determine the reasonableness of the specified limit.

For solar systems where the collector fluid is water, a minimum of two freeze protection mechanisms shall be provided on each system. Manual intervention (draining, changing valve positions, etc.) is suitable as one mechanism. At least one freeze protection mechanism, in addition to manual intervention, shall be designed to protect components from freeze damage, even in the event of power failure. The thermal mass of a system can be considered to be a limited form of freeze protection.

A system in which components and/or piping are subject to damage by freezing shall have the proper fittings, pipe slope and collector design to allow for manual gravity draining and air filling of the affected components and piping. Pipe slope for gravity draining shall have a minimum 2 cm vertical drop for each meter of horizontal length (1/4 inch per foot). This also applies to any header pipes or absorber plate riser tubes internal to the collector.

At the time of installation, a conspicuously placed label explaining how the system is protected from freezing and what actions the homeowner should take shall be attached to the system. For systems which rely on manual intervention for freeze protection, this label shall indicate the minimum ambient temperature conditions (Freeze Tolerance Limit) below which owner action is recommended and the procedure to be followed.

6.2.6 Protection From Leaks

All potable water sections of a solar water heating system shall not leak when tested in accordance with the codes in force at the installation site. All non-potable sections of a solar water heating system shall be tested for leaks in accordance with the supplier's instructions.

6.2.7 Fluid Compatibility

Fluids in contact with SWH system materials shall not corrode or otherwise adversely affect system materials to the extent that their function will be significantly impaired during the design life.

6.2.8 Deterioration Of Fluids

Except when allowed by the system design, fluids shall not freeze, give rise to excessive precipitation or otherwise lose their homogeneity, boil or develop excessive vapor pressure, change absorptivity, or change pH, viscosity or thermal properties beyond design ranges when exposed to their maximum and minimum service temperatures and pressures during their design life.

6.2.9 Thermal Storage System

Materials comprising the thermal storage system shall not cause corrosive wear which would result in premature failure or degradation in performance greater than that specified within the system.

6.2.10 Buried Components

Solar components and materials that are intended to be buried in soils shall be protected from degradation under in-service conditions to insure that their function shall not be impaired.

6.2.11 Deterioration Protection

Gaskets, sealants, and coupling hoses shall not be adversely affected by contact with fluids or the environment to an extent that will significantly impair their ability to function (See 6.1.6.10).

6.2.12 Water Hammer

When a liquid is used as the transfer fluid and quick-closing valves are employed in the design, the piping system shall be able to control or withstand the effects of water hammer.

6.2.13 Sound And Vibration Control

Piping and associated fittings shall be designed to carry the heat transfer fluid at design flow rates without excessive noise or vibrations which could be annoying or induce mechanical stress levels high enough to cause damage.

Pumps and compressors, or other components involving moving parts, shall be balanced or mounted in such a manner that they do not induce excessive noise or vibration that could be annoying or cause damage.

6.3 Safety Criteria

6.3.1 Blank

6.3.2 Protection Of Electrical Components

Overload and overcurrent protection of electrically operated components shall be consistent with the maximum current rating of the device and with the provisions of Article 240, Chapter 2 of the National Electrical Code.

6.3.3 Blank

6.3.4 System Failure Prevention

The control subsystem shall be so designed that, in the event of a power failure or a failure of any of the system components, the temperatures or pressures developed in the SWH system shall not damage the system, or the building, or endanger its occupants.

6.3.5 High Temperature Control

Means shall be provided to limit tank temperatures to a value not to exceed the tank supplier's specified high temperature limit. The pressure/temperature relief valve shall not be used for this purpose under normal operating conditions.

6.3.6 Protection Against Auto-Ignition Of Combustibles

Combustible materials used in solar equipment shall not be exposed to elevated temperatures which could cause ignition.

6.3.7 Fluid Safety Labeling

Labels shall mark all drain and fill valves in the SWH system. Each label shall identify the fluid in that loop. The location of fluid handling instructions shall be referenced. The label shall list the heat exchanger type and heat transfer fluid class as defined by the American Water Works Association, Cross Connection Control Manual. The label shall include a warning that fluid may be discharged at high temperature and/or pressure. The label shall contain the following warning:

“No other fluid shall be used that would change the original classification of this system. Unauthorized alterations to this system could result in a hazardous health condition.”

6.3.8 Contamination Of Potable Water

Materials which come in direct contact with potable water shall not adversely affect the taste, odor or physical quality and appearance of the water and shall meet the standards of the National Sanitation Foundation.

6.3.9 Entrapped Air

Suitable means air or gas removal from all high points in the piping system and any other location where air is most likely to accumulate shall be provided. The method of removal shall be appropriate for the system type as follows:

- Automatic for open loop (direct) circulating systems using potable water as the heat transfer fluid,
- Manual or automatic for closed loop (indirect) systems,
- Not required for integral collector storage (ICS) and open loop thermosiphon systems.

6.3.10 Backflow

Means shall be provided to prevent backflow of non-potable fluids into the potable water system.

6.3.11 Blank

6.3.12 Toxicity

The use of toxic fluids shall comply with the Federal Hazardous Substances Act, Title 15, or its equivalent, and the requirements of the health authority having jurisdiction.

6.3.13 Combustible Liquids

The storage, piping and handling of combustible liquids shall conform to the requirements of the National Fire Protection Association (NFPA) No. 30, “Flammable and Combustible Liquid Code.”

6.3.14 Liquid Flash Point

The flash point of a heat transfer fluid shall exceed by 28°C (50°F), or more, the design maximum no-flow temperature to be reached by the fluid in the collector. The flash point shall be determined by the methods described in National Fire Protection Association (NFPA) No. 321, “Basic Classification of Flammable and Combustible Liquids.” In systems using a gaseous heat transfer fluid; a flammable gas shall not be used.

6.3.15 Blank

6.3.16 Pressure Relief

Each portion of the system where excessive pressures can develop shall have a pressure relief device to ensure that no section can be valved off or otherwise isolated from a relief device. Automatic pressure relief devices shall be set to open at not more than maximum design pressure.

6.3.17 Heated Components

System subassemblies which are exposed to public traffic and are maintained at elevated temperatures shall either be insulated sufficiently to keep exposed surface temperatures below 60°C (140°F) during operation, or they shall be suitably isolated. Any other exposed areas that are maintained at hazardous temperatures shall be identified with appropriate warnings.

6.4 Operation and Servicing Criteria

6.4.1 Operating Indicators

The SWH systems shall include means for an observer to determine readily that the system is operating properly and providing solar heated water.

6.4.2 Blank

6.4.3 Tanks

Fiberglass reinforced tanks shall be used within the temperature limitations established by the tank supplier. Tanks shall be labeled to show the maximum operating pressure and temperature.

6.4.4 Waste Disposal

Systems utilizing a toxic heat transfer fluid or thermal storage fluid shall provide for the catchments and harmless removal of these fluids from vents where fluid may be automatically discharged.

6.4.5 Dirt Retention And Staining

Solar systems and collectors shall be accessible for periodic cleaning if conditions are such that self-cleaning by rain is not sufficient to keep the collectors operating efficiently.

6.4.6 Maintenance And Servicing

All individual components of the system which may require periodic examination, adjustment, service and/or maintenance shall be easily and safely accessible by the owner and in accordance with the codes in force at the installation site. Individual collectors in any array shall be replaceable or repairable without disturbing any other collector in the array.

6.4.7 Permanent Maintenance Accessories

Permanent maintenance accessories such as hose bibs and drains necessary for maintenance of the system shall be provided.

6.4.8 Blank

6.5 Installation Criteria

6.5.1 Firestopping

The SWH system components shall be assembled such that firestopping shall be possible at time of installation, if required by local codes and ordinances.

6.5.2 Auxiliary System

Interconnection of the auxiliary system to the solar energy system shall be made in a manner which will not result in excessive temperature or pressure in the auxiliary system or bypassing of safety devices of the auxiliary system.

6.5.3 Space Use

Solar components should not reduce or increase humidity, temperature or thermal radiation beyond acceptable levels or interfere with required headroom or air circulation space.

6.5.4 Accessibility

The location of the solar components should not impair accessibility needed to maintain the building or site.

6.5.5 Building Penetrations

Penetrations of the building through which piping or wiring is passed shall not reduce or impair the function of the enclosure. Penetrations through walls or other surfaces shall not allow intrusion by insects and/or vermin. Required roof penetrations shall be made in accordance with applicable codes and also by practices recommended by the National Roofing Contractors Association.

6.5.6 Water Damage

Collectors and support shall be installed in such a manner that water flowing off the collector surface will not damage the building or cause premature erosion of the roof. Water tanks located in or above the living space shall be installed on a drip pan with a drain line to a waste line or outside or have other means to safely remove any excess liquid.

6.5.7 Blank

6.5.8 Structural Supports

Neither wind loading (including uplift) nor the additional weight of filled collectors shall exceed the live or dead load ratings of the building, roof, roof anchorage, foundation or soil. Collector supports shall not impose undue stresses on the collectors. The design load shall be as specified by the codes in force at the installation site and shall include an additional load due to snow accumulation for applicable locations.

6.5.9 Expansion And Contraction Of Supports

Structural supports shall be selected and installed in such a manner that thermal expansion of the collector and piping will not cause damage to the collector structural frame or the building.

6.5.10 Penetration Of Structural Members

When penetrations are required in structural members to accompany passage of solar components, those modified structural members shall comply with local building codes.

6.5.11 Protection From Thermal Deterioration

Building materials adjacent to solar equipment shall not be exposed to elevated temperatures which could accelerate their deterioration. Many non-metal roofing materials will soften in the temperature range of 60 - 80°C (140-180°F) and begin to degrade above this temperature.

6.5.12 Tilt And Azimuth

The collector shall be installed on a mount capable of maintaining tilt and azimuth to design conditions.

6.5.13 Shading Of Collector

The location and orientation of the collector shall be such that it is not shaded by external obstructions or mutual shadowing more than the specified period allowed in the design.

6.5.14 Pipe And Component Supports

Hangers shall provide adequate support and correct pitch of pipes. Hangers or supports for insulated pipes or components shall be designed to avoid compressing or damaging the insulation material.

6.5.15 Pitch Or Angle Of Piping Installation

Piping should be sloped toward drain ports with a drainage slope of no less than 2 cm vertical drop for each meter of horizontal length (1/4 inch per foot).

6.5.16 Blank

6.5.17 Underground Piping

Underground piping subject to vehicular traffic shall be installed to withstand the additional loading applied by this traffic. The trenches and backfill shall be free of sharp objects in contact with the pipe.

6.5.18 Control Sensor Installation

Control sensors and the means for transmitting sensor outputs to control devices shall be protected from environmental influence such as wind, moisture, temperature or other factors which may alter their intended sensing function.

6.5.19 Penetrations Through Fire-Rated Assemblies

Penetrations through fire-rated assemblies etc. shall not reduce the building's fire resistance required by local codes, ordinances and applicable standards.

6.5.20 Emergency Egress And Access

The design and installation of systems shall not impair emergency movement of the building occupants.

6.5.21 Rain and Snow on Collector

The location, orientation, and position of the collector relative to nearby objects and surfaces shall be such that water run-off from the collector surface is not impeded nor is excessive build-up of snow on lower portions of the collector glazing permitted to occur.

6.6 Manual Criteria

6.6.1 Provision For Manuals

A manual or manuals shall be provided with each SWH system. The manual shall contain the name and address of the system supplier, the system model name or number and shall describe the operation of the system and its components and the procedures for installation, operation and maintenance.

Manuals shall be approved by the SRCC for content as described in Sections 6.6.2 to 6.6.7. This approval shall be indicated on the manuals as follows:

"The solar energy system described by this manual, when properly installed and maintained, meets the minimum standards established by the SRCC. This certification does not imply endorsement or warranty of this product by SRCC."

6.6.2 Installation Instructions

The manual(s) shall include an explanation of physical and functional requirements of the system and its components and the general procedures for their proper installation. The instructions shall describe the interconnection requirement of the various subsystems and components and their interface requirements with the building and the site. The instructions shall be available at the installation site or from normally accessible sources.

6.6.3 Operation Instructions

The manual shall clearly describe the operation of the SWH system, explaining the function of each subsystem and component. The manual shall include a system diagram showing the components and their relationships in the typical installed system. Major components shall be described in a separate section or by enclosed descriptive material furnished by the supplier of the components.

The manual shall describe procedures for system start-up, routine maintenance and special conditional operations such as drain-down. The manual shall specify fill weights, pressure ratings and temperature ratings for servicing and routine maintenance of the system. It shall also specify temperature, pressure and flow conditions expected at various access points to allow simple operational checks and troubleshooting. The manual shall include instructions for valving off different sections of the system in emergency situations and shall include instructions for leaving the system unattended and unused for long periods of time. The manual shall indicate the minimum ambient temperature above which the system is designed not to be damaged due to freezing (Freeze Tolerance Limit). The manual shall include the statement:

"Freeze tolerance limits are based upon an assumed set of environmental conditions."

If the freezing point of the fluid in an exposed part of the system is above the freeze tolerance limit specified for the system, the following statement shall be added to the one above:

“Extended periods of cold weather, including ambient air temperatures above the specified limit, may cause freezing in exposed parts of the system. It is the owner’s responsibility to protect the system in accordance with the Supplier’s instructions if the air temperature is anticipated to approach the specified freeze tolerance limit.”

6.6.4 Maintenance Plan

The manual shall include a comprehensive plan for maintaining the specified performance of the SWH system.

The plan shall include a schedule and description of procedures for ordinary and preventive maintenance including cleaning of collector exterior surfaces. The manual shall describe minor repairs and give the projections for equipment replacement.

6.6.5 Fluid Quality

The manual shall identify the fluid(s) used in the SWH system and state whether or not the fluid(s) are toxic or hazardous. Proper procedures for handling, safe disposal, and first aid shall be provided for hazardous fluids. A technical data sheet shall be provided for each non-water fluid used in the system.

Procedures shall be described for maintaining the heat transfer fluid's chemical composition at levels adequate to prevent unacceptable deposits on the heat transfer surfaces, corrosion of the heat transfer surfaces or loss of freeze resistance.

6.6.6 Service And Replacement Parts

The manual shall include a parts list giving a sufficient description of each part for ordering a replacement. Parts, components and equipment required for service, repair or replacement shall be commercially available or available from the system or subsystem supplier. All options (make and model), allowed by the Participant holding the OG-300 certification, for the following components must be listed on the same page of both the installation and operation manuals: solar collector, solar storage tank, pump, controller, heat exchanger, and heat transfer fluid. The piping material(s) shall be listed. This page shall also include temperature, pressure, and/or flow conditions expected at system access points to allow simple operational checks. The manual shall include the name and address of at least one company in close geographic proximity to the purchaser that offers service on the system. An 800 telephone number maintained by the supplier that a consumer can call to get in contact with a local service agent will satisfy this requirement.

6.6.7 Hazards

The manual shall provide warning against health and safety hazards that could arise in the operation and maintenance of the system and shall fully describe the precautions that shall be taken to avoid these hazards. For collector(s) that are not grounded via the plumbing components, a warning label shall be affixed to the system and the manual should recommend lightning protection.

6.6.8 Warranty Coverage

The manual shall provide a full description of the warranty coverage on the system. In addition, the manual shall describe what actions the purchaser shall undertake to obtain warranty coverage.

6.7 Blank

7.0 PERFORMANCE RATING

7.1 Determination of Thermal Performance Rating

A thermal performance rating shall be based upon component tests completed in accordance with Section 6.1.2.1 of this document in conjunction with a computer program. The computer program shall be based on the TRNSYS computer code version 13.1 or later or an approved equivalent code. The test data will provide performance parameters for the solar collectors and any other components as deemed necessary. The computer program will use these performance parameters along with accepted engineering practices and the conditions presented in section 7.3 of this document to model the balance of the system and calculate the performance ratings.

The performance rating is presented as a Solar Energy Factor (SEF) defined as the energy delivered by the system divided by the electrical and/or gas energy put into the system:

$$SEF = Q_{DEL} / (Q_{AUX} + Q_{PAR})$$

Where:

Q_{DEL} = Daily energy delivered to the hot water load MJ (Btu).

Q_{AUX} = Daily amount of energy used by the auxiliary water heater or backup element, MJ(Btu).

Q_{PAR} = Daily amounts of energy used to power pumps, controllers, shutters, trackers, or any other item needed to operate the SWH system, MJ(Btu). Parasitic energy)

7.2 Blank

7.3 Rating Conditions

The following conditions shall be used for calculating the daily energy savings and the solar energy factor. These conditions are the same as those used in the U.S. Department of Energy test for water heaters (Federal Register volume 55 number 201 page 42161 - 42177, October 17, 1990) except for the following:

- a solar radiation profile has been added.
- an outdoor ambient air temperature profile has been added.
- the draw profile has been set to begin at 9:30 am solar time.
- the amount of energy to be drawn from the system was obtained from the GAMA Consumers' Directory of Certified Efficiency Ratings for Residential Heating and Water Heating Equipment, April 1994 (page 134). This amount of energy is drawn rather than the normalized volume draw specified in the DOE test.
- the performance of the systems is determined from a computer simulation as specified in Section 7.1 above rather than by the actual test specified by the DOE procedure.

Rating Conditions:

| | | |
|---------------------------|------------------------------------|--------------|
| Environmental Temperature | 19.7°C | (67.5°F) |
| Auxiliary Set Temperature | 57.2°C | (135°F) |
| Water Mains Temperature | 14.4°C | (58°F) |
| Draw Type | energy | |
| Number of Draws | 6-one each hour starting at 9:30am | |
| Total Energy Draw | 43.302 MJ | (41,045 Btu) |
| Approximate Volume Draw | 243 l | (64.3 gal) |
| Draw Rate | 0.189 l/s | (3.0 gpm) |

The outdoor ambient temperature, solar radiation, and incident angle profiles are defined as follows:

| Solar Time (hour) | Ambient Temperature | | Solar Radiation | | Incident Angle |
|----------------------|---------------------|------|------------------------|---------------------------|----------------|
| | (°C) | (°F) | (W-hr/m ²) | (Btu/hr-ft ²) | |
| 0 - 1 | 13 | 55.4 | 0 | 0 | -- |
| 1 - 2 | 12 | 53.6 | 0 | 0 | -- |
| 2 - 3 | 11 | 51.8 | 0 | 0 | -- |
| 3 - 4 | 10 | 50.0 | 0 | 0 | -- |
| 4 - 5 | 9 | 48.2 | 0 | 0 | -- |
| 5 - 8 | 8 | 46.4 | 0 | 0 | -- |
| 8 - 9 | 8 | 46.4 | 315 | 100 | 60 |
| 9 - 10 | 11 | 51.8 | 470 | 150 | 45 |
| 10 - 11 | 13 | 55.4 | 570 | 180 | 30 |
| 11 - 12 | 15 | 59.0 | 660 | 210 | 15 |
| 12 - 13 | 17 | 62.6 | 700 | 220 | 0 |
| 13 - 14 | 19 | 66.2 | 660 | 210 | 15 |
| 14 - 17 | 21 | 69.8 | 570 | 180 | 30 |
| 15 - 16 | 21 | 69.8 | 470 | 150 | 45 |
| 16 - 17 | 21 | 69.8 | 315 | 100 | 60 |
| 17 - 18 | 20 | 68.0 | 0 | 0 | -- |
| 18 - 19 | 19 | 66.2 | 0 | 0 | -- |
| 19 - 20 | 18 | 64.4 | 0 | 0 | -- |
| 20 - 21 | 17 | 62.6 | 0 | 0 | -- |
| 21 - 22 | 16 | 60.8 | 0 | 0 | -- |
| 22 - 23 | 15 | 59.0 | 0 | 0 | -- |
| 23 - 24 | 14 | 57.2 | 0 | 0 | -- |

8.0 PROCEDURE FOR THE CHALLENGE OF EXISTING SRCC CERTIFICATION

This section addresses the function of the SRCC to ensure that products being produced and marketed conform to the SRCC requirements. In addition, it addresses the procedures for handling the challenges to SRCC certification of a product by an interested party or by the SRCC.

Under the provisions of this section, the SRCC, or its designated representative, may conduct periodic inspections of manufacturing facilities and/or field inspections of certified installed systems for the purpose of ascertaining if the certified product conforms to the product description on file with SRCC. (As used in this section, the phrase "product description" shall be understood to mean the description provided to SRCC by the Supplier for certification as it relates to all aspects of the material, specifications, parts design, and construction techniques of the product.) This action may be taken at the SRCC's request or as the result of a formal challenge by an interested third party.

If a site-inspection initiated either by the SRCC or the challenge by an interested third party documents a change in product description not previously approved by SRCC, the SRCC representative will be given access to the Suppliers premises to permit the inspection of any current production unit or units designated by SRCC.

NOTE: Additional details on site inspections and program enforcement require further development by the Standards Committee.

9.0 AGREEMENT FOR CERTIFYING AND LABELING SWH SYSTEMS

An agreement (known as the Solar Water Heating System Certification Program Agreement and Solar Water Heating System Certification and License) between the Solar Rating and Certification Corporation and a supplier is required for certification of a solar water heating system meeting the requirements of SRCC Document OG-300, "Operating Guidelines and Minimum Standards for Certifying Solar Water Heating Systems". The System Certification Program Agreement shall be renewed annually in order to continue participation in the program. The Certification and License shall be executed with each grant of system model certification and rating. These agreements are governed by the SRCC Board of Directors and shall accompany this document as a separate addendum.

10.0 SOLAR WATER HEATING SYSTEM CERTIFICATION PROGRAM FEES

The costs of participating in the SRCC Solar Water Heating System Certification and Rating Program are governed by the SRCC Board of Directors and shall accompany this document as a separate addendum.

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