

International Code Council (ICC) & Solar Rating and Certification Corporation (SRCC)



SOLAR THERMAL SYSTEMS STANDARD

ICC 900/SRCC 300-201x Public Comment Draft #2

The ICC Solar Thermal Standard Consensus Committee (IS-STSC) has held 1 public meetings to develop the second public comments draft of the ICC 900/SRCC 300-201* Solar Thermal Systems Standard. Public comments are requested on the strike-out underline portions only of this second public comments draft. The public comment deadline is December 29, 2014. Go to <http://www.iccsafe.org/cs/standards/IS-STSC/Pages/default.aspx> for more information.

CHAPTER 1 ADMINISTRATION

(no change)

CHAPTER 2 DEFINITIONS

202 DEFINED TERMS

Item Number:

ICC900/SRCC300-1

CONTROLLER. Any device or part thereof that regulates the operation of the solar ~~water heating~~ thermal system or component.

Item Number:

ICC900/SRCC300-2

READY ACCESS (TO). That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel, door or similar obstruction and without the use of a portable ladder, step stool or similar device [see "Access (to)"].

CHAPTER 3 SYSTEM REQUIREMENTS

301 OVERALL SYSTEM DESIGN CRITERIA

Item Number:

ICC900/SRCC300-4

301.1 Overall system design. The overall system design criteria of the *solar thermal system* shall comply with Sections 301.1.1 through 301.1.11.

301.1.1 Operating limits. Means shall be provided to protect the ~~the~~ all solar thermal system components within the design limits of temperature and pressure as specified by the manufacturer.

Item Number:

ICC900/SRCC300-5

301.1.2 Solar system isolation. Isolation valves shall be provided with ready access and installed to allow solar storage tanks to be bypassed in the case of a multi-tank system, or to shut off the cold water supply to the solar tank in a one-tank system. The normal operating position shall be marked on a label affixed to the isolation valve.

Item Number:

ICC900/SRCC300-6

301.1.2 Solar system isolation. Isolation valves shall be provided with ready access and installed to allow solar storage tanks to be bypassed in the case of a multi-tank system, or to shut off the cold water supply to the solar tank in a one-tank system. The normal operating position shall be marked on a label affixed to each the isolation valve.

Item Number:

ICC900/SRCC300-7

301.1.4 Auxiliary heating equipment. A backup system shall be provided such that the combined solar and back-up system will provide the same degree of reliability and performance as a conventional non-solar system. The backup system shall be sized to meet the design load without any solar contribution. *Auxiliary heating equipment shall be compatible with the solar thermal system heat output, temperatures, flow rates and heat transfer fluid types. Auxiliary heating equipment shall be listed and labeled by a recognized third party listing agency.*

Item Number:

ICC900/SRCC300-8

301.2 Collector(s) design criteria. Collectors shall comply with Sections 301.2.1 through 301.2.2. The collector(s) component(s) shall be listed and labeled to relevant sections of ICC 901/SRCC 100.

Item Number:

ICC900/SRCC300-9

301.5 Heat exchanger design criteria. *Heat exchangers* shall comply with Sections 301.5.1 through 301.5.2.

301.5.1 Double-wall heat exchangers. *Double wall heat exchangers* shall be required. *Double-wall heat exchanger* design shall be such that any failure of a barrier will allow the discharge of *heat transfer fluid* or potable water to the atmosphere. The discharge shall be readily observable and in accordance with Section 305.1.3.

Exception. *Single wall heat exchangers* shall be permitted when in compliance with both of the following:

1. ~~Only food grade fluids~~ Fluids containing only components that are food grade are used in the system.

Item Number:

ICC900/SRCC300-10

301.5 Heat exchanger design criteria. *Heat exchangers* shall comply with Sections 301.5.1 through 301.5.2.

301.5.1 Double-wall heat exchangers. *Double wall heat exchangers* shall be required. *Double-wall heat exchanger* design shall be such that any failure of a barrier will allow the discharge of *heat transfer fluid* or potable water to the atmosphere. The discharge shall be readily observable and in accordance with Section 305.1.3.

Exception. *Single wall heat exchangers* shall be permitted when in compliance with both of the following:

(no change to item 1)

2. The maximum operating pressure of the non-potable *heat transfer fluid* within the *heat exchanger* is less than the normal ~~minimum~~ operating pressure of the *potable water* system.

Item Number:

ICC900/SRCC300-11

301.7 Thermostatic mixing valve. Where hot water is supplied to a potable hot water distribution system for domestic use, a master thermostatic mixing valve complying with ASSE 1017 shall be provided to reduce water temperature to defined limits.

Item Number:

ICC900/SRCC300-12

301.8 Plumbing and piping design criteria. Plumbing and piping shall comply with Sections 301.7.1 through 301.7.7. Piping shall be installed in accordance with the plumbing code and mechanical code adopted by the authority having jurisdiction, or in the absence of such code, the International Plumbing Code and International Mechanical Code.

301.8.1 Protection of piping. Exterior piping insulation shall be protected from ultraviolet radiation and moisture damage ~~that is rated and shall be~~ for outdoor use. The exterior of piping shall be protected from corrosion and degradation.

Item Number:

ICC900/SRCC300-13

301.8 Plumbing and piping design criteria. Plumbing and piping shall comply with Sections 301.7.1 through 301.7.7. Piping shall be installed in accordance with the plumbing code and mechanical code adopted by the authority having jurisdiction, or in the absence of such code, the International Plumbing Code and International Mechanical Code.

301.8.7 Protection from foreign substances. The ~~solar collector loop system~~ shall be protected to prevent contamination by foreign substances that could impair the flow, and quality, and safety of the system ~~heat transfer fluid~~.

Item Number:

ICC900/SRCC300-15

301.8 Plumbing and piping design criteria. Plumbing and piping shall comply with Sections 301.7.1 through 301.7.7. Piping shall be installed in accordance with the plumbing code and mechanical code adopted by the authority having jurisdiction, or in the absence of such code, the International Plumbing Code and International Mechanical Code.

301.8.8 Insulation. Insulation shall be used on all ~~exposed hot water piping~~ solar system fluid piping and ducts and the final 1.5 meters (5.0 feet) of metallic cold water supply pipe leading into the system, or the length of piping that is exposed if less than 1.5 meters. Insulation shall have a value of $R-0.46 \text{ }^{\circ}\text{K m}^2/\text{W}$ ($R-2.6 \text{ }^{\circ}\text{F-ft}^2\text{-hr /Btu}$) or greater.

Exception: Non-metallic pipe and fittings approved for outdoor use that are exposed to solar radiation commensurate with the solar collector and contributes to the collection of energy.

302

RELIABILITY AND DURABILITY

Item Number:

ICC900/SRCC300-17

302.1 General. *Solar thermal systems* shall comply with Sections 302.1.1 through 302.1.13.

302.1.5 Freeze protection. Protection from freezing temperatures shall be provided for all system components subject to damage. The supplier shall specify a *freeze tolerance limit* for each system. *Solar thermal systems* shall comply with Section 302.1.5.1 through 302.1.5.3.

Exception: Systems installed in a location that has no record of an ambient temperature below 5°C (41°F) shall be exempted from the requirements of this paragraph, except the specification of a freeze tolerance limit.

302.1.5.1 Water exposed to freezing temperatures. For solar systems where water is exposed to freezing temperatures a minimum of two freeze protection mechanisms shall be provided on each system. Manual intervention in accordance with 302.5.2 shall be considered as one mechanism. Other acceptable mechanisms include, but are not limited to, thermal mass of a system can be considered another form of freeze protection, but (protection is limited to the thermal capacitance of the system), automatic draining, closed-loop recirculation (with uninterrupted power supply).

303
SAFETY CRITERIA

Item Number:

ICC900/SRCC300-20

303.1 General. *Solar thermal systems* shall comply with Sections 303.1.1 through 303.1.10.

303.1.10 Occupant protection ~~Heated components~~. System subassemblies and components that are exposed to the public and are maintained at elevated temperatures shall be insulated to maintain exposed surface temperatures below 49°C (120°F) during operation, or they shall be isolated.

304
OPERATION AND SERVICING CRITERIA

Item Number:

ICC900/SRCC300-21

304.1 General. *Solar thermal systems* shall comply with Sections 304.1.1 through 304.1.6.

304.1.1 Operating indicators. *Solar thermal systems* shall include means for an observer to readily determine that the system is operating properly ~~and providing solar heated water.~~

305
INSTALLATION CRITERIA

Item Number:

ICC900/SRCC300-23

305.1 General. *Solar thermal systems* shall comply with Sections 305.1.1 through 305.1.19.

305.1.4 Access. The location of solar components shall not impair access needed to maintain and protect the building or site.

Item Number:

ICC900/SRCC300-24

305.1 General. *Solar thermal systems* shall comply with Sections 305.1.1 through 305.1.19.

305.1.7 Relief valve discharge. Solar energy system components containing pressurized fluids shall be protected against pressures and temperatures exceeding design limitations with a pressure and temperature relief valve. Each section of the system in which excessive pressures are capable of developing shall have a relief device located so that a section cannot be isolated from a relief device. Relief valves shall comply with the requirements of Section 305.1.7.1 and discharge in accordance with Section 305.1.7.2.

Exception: Solar energy system collector loops containing pressurized fluids, and separated from a domestic water source by an approved heat exchanger, shall be protected against pressures exceeding design limitations with a pressure relief valve.

305.1.7.1 Safety and safety relief valves. Safety and safety relief valves shall be listed and labeled, and shall have a minimum rated capacity for the equipment or appliances served.

305.1.7.2 Discharge pipes. Safety and relief valve discharge pipes shall be of rigid pipe that is approved for the temperature of the system. The discharge pipe shall be the same diameter as the safety or relief valve outlet. Safety and relief valves shall not discharge so as to be a hazard, a potential cause of damage or otherwise a nuisance. Relief valves in partially filled collector loops capable of producing steam shall be discharged to the outside of the structure. Where a relief valve discharges inside a structure or to the drainage system, the installation shall conform with the plumbing code adopted by the authority having jurisdiction, or in the absence of such code, the International Plumbing Code. Where a solar system component requiring a relief valve is located outside the structure, ~~termination to a point not readily observable by building occupants shall be permitted.~~ The termination shall be not more than 6 inches (152 mm) above a splash block, a secured surface material or catchment method to prevent damage.

Item Number:

ICC900/SRCC300-25

305.1 General. *Solar thermal systems* shall comply with Sections 305.1.1 through 305.1.19.

~~**305.1.14 Pitch or angle of piping installation.** Where draining is used for freeze protection, solar water heating systems containing liquids shall be drainable. Piping shall be sloped continuously to drain with a drainage slope of not less than 2 cm vertical drop for each meter of horizontal length (1/4 inch per foot).~~

306 MANUAL CRITERIA

Item Number:

ICC900/SRCC300-27

306.1 General. *Solar thermal systems* shall comply with Sections 306.1.1 through 306.1.8.

306.1.1 Provision for manuals. A manual or manuals shall be provided with each *solar thermal 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 in accordance with Section 306.1.1.1 through Section 306.1.1.3.

306.1.1.2 Operation instructions. The manual shall:

1. Clearly describe the operation of the *solar thermal system*, explaining the function of each subsystem and component. Include a system diagram showing the components and their relationships in the typical installed system and list the system manufacturer's design flow range in each collector bank.

(no change to remaining items)

Item Number:

ICC900/SRCC300-28

306.1 General. *Solar thermal systems* shall comply with Sections 306.1.1 through 306.1.8.

306.1.3 Service and replacement parts. The manual shall include a parts list with 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. The manual shall list on the same page of both the installation and operation manuals the make and model of all options for the following components: solar collector, solar storage tank, pump, piping material, controller, heat exchanger, and heat transfer fluid. This page shall also include temperature, pressure, and flow conditions expected at system ~~access~~ monitoring points to allow simple operational checks. The number and piping connection arrangement of the solar collectors shall be included. The manual shall include contact information for not less than one company in close geographic proximity to the purchaser that offers service for the system.

307 Pump Stations

Item Number:

ICC900/SRCC300-29

307.6 Piping and fittings. ~~Pipe and fittings shall be listed and labeled by a recognized third-party listing agency.~~ Piping shall comply with Section 301.8.2 and 301.8.3. Fittings shall comply with 301.8.4 and 301.8.5.

CHAPTER 4 REFERENCED STANDARDS (no changes)