CARICOM REGIONAL STANDARD

CARICOM Application Document (CAD) for the ICC Solar Thermal System Standard

FDCRS/CAD/ICC 900/SRCC 300- 2015

CARICOM Regional Organisation for Standards and Quality (CROSQ)
2nd Floor, Baobab Towers
Warrens, St. Michael
Barbados
T: 246.622.7670 | F: 246.622.7678
Website: http://www.crosq.org

ISBN XXXX-XXXX-XXX
ICS xxxxxxx

AMENDMENTS ISSUED SINCE PUBLICATION

AMENDMENT NO.	DATE OF ISSUE	TYPE OF AMENDMENT	NO. OF TEXT AFFECTED	TEXT OF AMENDMENT

ATTACHMENT PAGE FOR CRS AMENDMENT SHEETS

Committee representation

This CARICOM Regional Standard was developed under the supervision of the Regional Project Team **for Solar Water Heaters**, hosted by the CARICOM Member State Saint Lucia, which was at the time comprised of the following members:

Members	Representing
David Hird (Chairperson)	General Interest
Andia Persad-Maharaj Kimberly Badloo (Alternate)	Trinidad and Tobago Bureau of Standards
Jonathan Platt	Barbados National Standards Institution
Mclaren O'Brien	Energy Management Systems Dominica
Olson Abrams Hemraj Sanichara (Alternate)	Guyana Energy Agency Guyana National Bureau of Standards
Orjan Joe Lindberg	Association of Professional Engineers of Saint Lucia
Stedroy Roache	Antigua Public Utilities Authority
Saskia Augustin (Technical Secretary)	Saint Lucia Bureau of Standards
Tzarmallah Haynes-Joseph (Secretary Support Team)	Saint Lucia Bureau of Standards

Contents Page

TABLE OF CONTENTS

(This page was intentionally left blank)

Regional Foreword

This CARICOM Regional Standard FDCRS/ICC 900/SRCC 300- 2015 CARICOM Application Document for the ICC Solar Thermal System Standard has been developed under the authority of the CARICOM Regional Organisation for Standards and Quality (CROSQ). This document represents the modifications to the ICC 900 CARICOM Application Document for the ICC Solar Thermal System Standard that are applicable to the CARICOM region when using the ICC Solar Thermal System Standard. This document was approved as a CARICOM Regional Standard by the CARICOM Council for Trade and Economic Development (COTED) at its <<xx Meeting in MMM YYYY.>>

This standard is intended to provide the minimum criteria for the design and installation of solar thermal systems. Futhermore, it describes the requirements and methodology for standardized solar thermal system design evaluation, including the analytical evaluation of its components.

The resulting document provides appropriate protections for health, safety and welfare while avoiding unnecessary restrictions on the use of new materials, technologies or designs.

This document is to be read in conjunction with the ICC 900/SRCC 300- 2015 Solar Thermal System Standard substituting the relevant clauses of the CAD in the ICC as applicable.

Applicable Version of the ICC 900

This Application Document is based on the 2015 version of the International Conservation Code ICC Solar Thermal System Standard. It shall be read in conjunction with this version of the ICC 900.

Subsequent versions of the ICC 900 may require subsequent versions of this Application Document.

Use and Structure

Users wishing to apply the ICC 900 in CARICOM must first consult this Application Document to get guidance on what applies, alternate compliance paths, additional data and information that applies only to CARICOM.

The structure of this CARICOM application document references only the sections of the ICC 900 which have been amended. The numbering system of the chapters is also maintained as far as is practicable.

Section and sub-section titles and numbering system are maintained according to the following:

1. Where there are regional requirements, the section and/or sub-section number and title along with the appropriate clause are included in this Application Document.

2. The number and title of sections and sub-sections follow the numbering sequence of the ICC 900;

This CAD does not follow the usual style and format of CARICOM standards and produces only changed text from ICC 900.

Additional requirements are represented by underline text in part of ICC clause with sub clause identified.

EXAMPLE:
"301.6.3 Wiring identification.
Control circuit wiring and terminals shall be identified in accordance with the electrical code approved by the authority having jurisdiction."

Requirements which are not applicable to the CARICOM version are shown with the use of strikethrough text and should not be used to determine complaince with the CARICOM version of the ICC 900.

EXAMPLE:
"~~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~~."

Text that is in plain text give instructions for application document or are directly reproduced as from the ICC 900 to provide context for the insertion or deletion of text accordingly.

EXAMPLE:

"All sections of Chapter 1 of ICC 900/SRCC 300- 2015 shall apply."

"All clauses of **SECTION 301** of ICC 900/SRCC 300- 2015 shall apply except the following which have been identified for change:"

CHAPTER 1
APPLICATION AND ADMINISTRATION

All sections of Chapter 1 of ICC 900/SRCC 300- 2015 shall apply.

CHAPTER 2
DEFINITIONS

SECTION 201 GENERAL

All clauses of Section 201 of ICC 900/SRCC 300- 2015 shall apply.

SECTION 202 DEFINED TERMS

All definitions in Section 202 of ICC 900/SRCC 300- 2015 shall apply **except:**

FREEZE TOLERANCE LIMIT.

Definition to be deleted because it is not relevant to Caribbean region.

CHAPTER 3
SYSTEM REQUIREMENTS

SECTION 301 OVERALL SYSTEM DESIGN CRITERIA

All clauses of **SECTION 301** of ICC 900/SRCC 300- 2015 shall apply except the following which have been identified for change:

301.1.4 Auxiliary heating equipment
A backup system shall be provided such that the combined solar and backup system will provide the same degree of reliability and performance as a conventional non-solar system. Alternatively, a hybrid system may be used that does not rely on energy sources of fossil fuels. 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.

301.3 Water heating equipment and storage tanks.
Water heating equipment and *storage tanks* shall comply with Sections 301.3.1 through 301.3.3 and shall comply with the plumbing code and mechanical code approved by the authority having jurisdiction, or, in the absence of such code, the *International Plumbing Code* and *International Mechanical Code.*

301.3.3.1 Shutdown

A means for disconnecting an electric hot water supply system from its energy supply shall be provided in accordance with the electrical code approved by the authority having jurisdiction.

301.6.1 General.
Controller subsystems shall facilitate installation, startup, operation, shutdown and maintenance of the solar thermal system. The controller subsystem shall include provisions for bypass, adjustment and override as established in a design evaluation in accordance with the requirements of this standard. Safety controls shall not have provision for bypass or override. Operational controls and means of disconnect and their function shall be labeled and readily accessible in accordance with the electrical code approved by the authority having jurisdiction. 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.

301.6.3 Wiring identification.
Control circuit wiring and terminals shall be identified in accordance with the electrical code approved by the authority having jurisdiction.

301.6.4 Temperature rating for sensor wiring.
Sensor wiring shall be rated in accordance with the electrical code approved by the authority having jurisdiction.

301.8 Plumbing and piping design criteria.
Plumbing and piping shall comply with Sections 301.8.1 through 301.8.13. Piping shall be installed in accordance with the plumbing code and mechanical code approved by the authority having jurisdiction, or, in the absence of such code, the International Plumbing Code and International Mechanical Code.

SECTION 302
RELIABILITY AND DURABILITY

All clauses of **SECTION 302** of ICC 900/SRCC 300- 2015 shall apply **except** the following:

Section 302.1.5 and subsections 302.1.5.1 to 302.1.5.3 to be deleted as references to freezing temperatures, freeze protection mechnism and freeze limit not applicable to the Carribbean Region.

~~**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~~

~~**302.1.5.1 Water exposed to freezing temperatures.**~~
~~For solar thermal 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 Section 302.5.2 shall be considered as one mechanism. Other acceptable mechanisms include but are not limited to thermal mass (protection, but protection is limited to the thermal capacitance of the system), automatic draining, and closed-loop recirculation (with uninterruptible power supply).~~

~~**302.1.5.2 Manual intervention freeze protection.**~~
~~For solar thermal systems that rely on manual intervention for freeze protection, not less than one freeze protection mechanism shall be provided to protect components from freeze damage under all conditions, including in the event of power failure. Acceptable manual intervention actions include but are not limited to:~~

~~1. Draining: 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.~~

~~2. Valve position adjustments: Valves must be labeled in accordance with Section 302.1.5.3.~~

~~Section deleted; References to freeze protection mechanisms are irrelevant to Caribbean climate.~~

~~**302.1.5.3 Labeling**~~

~~A conspicuously placed label shall be attached to the system explaining how the system is protected from freezing and what actions are required to prevent freeze damage and further leakage if rupture occurs. For systems that rely on manual intervention for freeze protection, this label shall indicate the freeze tolerance limit below which manual intervention is required and the procedure to be followed.~~

~~Section Delected; Freeze limit references are irrelevant to Caribbean climate.~~

SECTION 303
SAFETY CRITERIA

All clauses of **SECTION 303** of ICC 900/SRCC 300- 2015 shall apply except the following which have been identified for change:

303.1.1 Protection of electrical components.
Overload and overcurrent protection of electrically operated components shall be consistent with the maximum current rating of the device and the electrical code adopted by the authority having jurisdiction.

303.1.5 Protection of potable water from contamination.
Materials that come in direct contact with potable water shall not adversely affect the taste, odor or physical quality and appearance of the water and shall comply with drinking water quality standards approved by the authority having jurisdiction.

303.1.6.1 Food grade fluid additives.
Any food grade fluid used as a heat transfer fluid containing additives shall be third-party tested by an approved agency to the appropriate section of the Code of Federal Regulations, Title 21, Food and Drugs, Chapter 1, Food and Drug Administration, Parts 174–186.

303.1.6.2 Combustible and flammable fluids.
The storage, piping and handling of combustible and flammable fluids shall conform to the requirements of the fire code adopted by the authority having jurisdiction or in the absence of such a code, the International Fire Code.

303.1.6.4 Toxicity. The use of *toxic fluids* shall comply in accordance with the requirements of the authority having jurisdiction.

SECTION 304
OPERATION AND SERVICING CRITERIA

All clauses of **SECTION 304** of ICC 900/SRCC 300- 2015 shall apply except the following which have been identified for change:

304.1.3 Waste disposal.
Where fluid is automatically discharged in systems using a *toxic heat transfer fluid,* a means shall be provided for the catchment and removal of these fluids in accordance with the requirements of the authority having jurisdiction.

304.1.5 Maintenance and servicing.
Access to individual components of the system that require periodic examination, adjustment, service or maintenance shall be provided in accordance with the plumbing code and mechanical code approved by the authority having jurisdiction, or in the absence of such code, the *International Plumbing Code* and *International Mechanical Code***.**

SECTION 305
INSTALLATION CRITERIA

All clauses of **SECTION 305** of ICC 900/SRCC 300- 2015 shall apply except the following which have been identified for change:

305.1.1 Penetrations of floor/ceiling assemblies and fire-resistance-rated assemblies.
Penetrations of floor/ ceiling assemblies and assemblies required to have a fire-resistance rating shall be protected in accordance with building codes approved by the authority having jurisdiction**.**

305.1.5 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 vermin. Required roof penetrations shall be made in accordance with building codes approved by the authority having jurisdiction.

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

305.1.9 Penetration of structural members.
Where penetrations are required in structural members to accommodate passage of solar components, such modified structural members shall comply with the plumbing code and mechanical code approved by the authority having jurisdiction or, in the absence of such code, the International Plumbing Code and International Mechanical Code, as applicable.

305.1.13 Pipe and component supports.
Piping shall be installed and supported in accordance with the plumbing code and mechanical code approved by the authority having jurisdiction or, in the absence of such code, the International Plumbing Code and International Mechanical Code. Hangers shall provide support and maintain slope of pipes. Hangers or supports for insulated pipes and components shall be designed to not compress or damage the insulation material. Hangers shall not cause galvanic corrosion of the hanger or the pipe.

305.1.17 Rain ~~and snow~~ on collector.
Rain ~~and snow~~ on collector.

The location, orientation, and position of collectors relative to nearby objects and surfaces shall be such that water run-off from the collector surface is not impeded. ~~and excessive build-up of snow on lower portions of the collector glazing is not permitted to occur.~~

305.1.18 Lightning protection.

Lightning protection shall be provided for collectors in accordance with codes approved by the authority having jurisdiction.

SECTION 306
MANUAL CRITERIA

All clauses of **SECTION 306** of ICC 900/SRCC 300- 2015 shall apply except the following which have been identified for change:

306.1.1 Provision for manuals.
A manual or manuals shall be provided with each solar thermal system. The manual shall be written in the official language of the country and 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 Sections 306.1.1.1 through 306.1.1.3.

306.1.1.1 Installation instructions.

The manuals shall include an explanation of the physical and functional requirements of the system and its components and the general procedures for their proper installation. The instructions shall describe the interconnection requirements of the various subsystems and components and their interface requirements with the building and the site. Installation instructions shall prescribe installation complying with the building code, plumbing code, mechanical code, and fire code approved by the authority having jurisdiction or, in the absence of such codes, with the International Building Code, International Plumbing Code, International Mechanical Code, and International Fire Code.

306.1.1.2 Operation instructions.

Number 7 of clause to be deleted. Freeze limit references are irrelevant to Caribbean climate.

> ~~7 Indicate the *freeze tolerance limit* and freezing control measures and include the statement: "Freeze tolerance limits are based upon an assumed set of environmental conditions." Where 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 provided: "Extended periods of cold weather, including ambient air temperatures above the specified limit, might 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~~

SECTION 307
PUMP STATIONS

All clauses of **SECTION 307** of ICC 900/SRCC 300- 2015 shall apply except the following which have been identified for change:

307.5 Pump station failure.

The pump station shall comply with Section 303.1.2. The pump station shall remain in a secure state and keep the ~~freezing and~~ overheating protection mechanisms operable when tested in accordance with Sections 307.5.1 through 307.5.3.

307.21.2 Manuals and instructions.
Pump stations' operation, maintenance and installation instruction manuals from the manufacturer shall be supplied or made available in the official language of the country.Manufacturer's contact information shall be included within these documents.

CHAPTER 4
REFERENCED STANDARDS

ICC 900/SRCC 300- 2015 shall apply.

END OF DOCUMENT