# Guide to the Province of BC Solar Hot Water Ready Regulation 2013

## Introduction

This guide is intended to clarify the application of the Solar Hot Water Ready Regulation. The regulation is currently set out in two parts: the original BC Regulation 101/2011 and the amendment, BC Regulation 163/2013. For convenience, the appendix to this guide includes a consolidated version of the two regulations.

The guide does not form part of the regulation, but is intended to provide further information on the installation of rough-ins for solar domestic hot water systems (SDHWS). Some information is also provided related to installation of a SDHWS. With this kind of information it is hoped that users will have a better understanding of the regulation requirements for future installation of a solar domestic hot water system. It must, however, be clearly understood that the explanatory text contained in the guide cannot be construed as providing legal interpretations of requirements contained in the regulation.

The text extracted from the Solar Hot Water Ready Regulation is printed on a shaded background.

Explanatory text is written below each shaded section.

Comments on this guide are welcome. Please submit to Building.Safety@gov.bc.ca.

May 2013
2nd Edition

**BC Regulation 163/2013**

**Definitions**

1 In this regulation, the terms in *italics* have the same meaning as in the 2012 British Columbia Building Code.

**Application**

2 This regulation applies to the local government jurisdictions set out in the Schedule.

Sections 1 and 2 of the regulation are self explanatory.

**Solar collectors for a solar domestic hot water system**

3 (1) Subject to subsection (2), 2 conduit runs and an area that

(a) is not less than 9.3 square meters,

(b) has no dimensions less than 2.7 meters, and

(c) is designated for future installation of solar collectors for a solar domestic hot water system in compliance with CAN/CSA-F383-87

must be incorporated in construction of new *buildings* of *residential occupancy* that contain

(a) one *dwelling unit*, or

(b) one *dwelling unit* and one *secondary suite*.

Section 3 describes the requirement to provide for the future installation of a solar domestic hot water system. This is the requirement to allocate an area on or near the building that will be designated for the future installation of solar hot water collectors (also known as solar panels or solar collectors). The designated area is approximately the size of 2 typical solar hot water collectors. Solar collectors may be installed on a roof, wall, building lot, or accessory building such as a garage. A roof area directly above an accessible attic space is the preferred location for solar hot water collectors. Section 3 also requires that 2 conduit runs (typically but not necessarily run in parallel) be incorporated into construction of solar ready homes. The specifications for conduit runs are described further in section 5.

The latter part of Section 3, Subsection (1) specifies that the regulation applies only to detached single family homes, and detached single family homes containing a secondary suite as defined in the BC Building Code.

(2) Subsection (1) does not apply with respect to new construction referred to in that subsection if the local government of the jurisdiction to which this regulation applies and within which the new construction is to occur is satisfied that *building* site conditions do not permit effective use of solar hot water heating.

Section 3, Subsection (2) describes where the regulation does not apply. If a building site is unsuitable for a solar domestic hot water installation, and it is therefore not anticipated that a rough-in will be used in future, a building owner may discuss with the local government having jurisdiction if this exemption to could be applied in their case. This exemption is intended for buildings that are in permanent shade, such as from a tall building or tall trees adjacent to the south side. It is not the intent of this regulation to require removal of objects that may shade a potential area designated for installation of a solar collector.

All options for alternate placement of the area designated for installation of a solar collector should be examined prior to applying this exemption. Note that a home's roof slope and orientation may not necessarily need to be altered to accommodate installation of a solar hot water collector, as rack mounting systems are available. However, in this case, it would be known that the future solar collectors will not be directly surface-mounted. This has direct implications in the application of Section 4(2) later on in the regulation.

The regulation is designed to accommodate as many potential areas designated for installation of a solar collector as possible including roofs, walls, building lots and accessory buildings. Local governments are ultimately responsible for the decision and any administrative process involved in determining whether a building site qualifies for an exemption to the regulation.

**Structural requirements**

4 (1) Except as permitted by subsection (2) of this section, structural members located in areas referred to in section 3 (1) must be designed to accommodate

(a) a uniform dead load of 0.24 kPa, in addition to design loads required by the British Columbia Building Code, and

(b) anticipated point loads where it is known that the solar collectors for a solar domestic hot water system will not be directly surface-mounted.

(2) Roof trusses located in areas referred to in section 3 (1) must be designed to accommodate the anticipated load, including

(a) a uniform dead load of 0.24 kPa, in addition to design loads required by the British Columbia Building Code, and

(b) point loads resulting from the uniform dead load referred to in paragraph (a).

Typically, designers must determine or calculate certain values (such as but not limited to snow load or clear spans) in order to specify the appropriate materials. The regulation requires designers to add an additional load value into the calculations. Note that roof mounted solar collectors are often mounted with brackets spaced two or four feet apart. They do not transfer their weight evenly to the roof structure. This creates point loading on to the structural members of the roof. This situation is exacerbated if snow accumulates on the solar collector. A structural member to which the bracket is attached beneath the solar collectors must be designed to accommodate this additional load. The requirements differ if the roof is constructed with roof joists or rafters versus roof trusses, as explained below.

### Roof Joists or Rafters and Other Structural Members

Section 4, Subsection (1) describes the additional loading requirements for roof joists or rafters and other structural members (such as a wall designated for a solar collector). If you are constructing a roof using conventional roof joists or roof rafters, the starting point is to assume that the solar collector will bear directly on the roof and only the uniform load of 0.24 kPa (in addition to snow load) is required to be accommodated in the design of the roof area. In this case, it is assumed that the load of future solar collectors will be evenly distributed along the roof rafter or joist. If it is known that the solar collector will sit on a rack or brackets above the roof surface, point loads should also be considered.

Since the BC Building Code's Part 9 span tables for roof joists and rafters are not designed to accommodate point loads, an engineer may be required to calculate anticipated point loads where it is known that the solar collectors will not be directly surface-mounted for roof joists or rafters.

Other structural members (such as a wall designated for a solar collector) must also be designed to accommodate a minimum additional load of 0.24 kPa.

**Roof Trusses**

Section 4, Subsection (2) describes the additional loading requirements for roof trusses. If you are constructing a Solar Hot Water Ready roof using conventional roof trusses, an additional load must be incorporated into the design of the trusses. In this case, because trusses are typically engineered, anticipated point loads can be accommodated. This additional load must account for rack or bracket mounted solar collectors.

For information on truss design, see Truss Plate Institute of Canada (TPIC) Bulletin #7 (March 12, 2012). While these are not compliance documents for the BC Solar Hot Water Ready Regulation, they provide guidance for the design of trusses in order to accommodate solar collectors. The design criteria used in TPIC's Bulletin #7 is a uniform dead load of 0.24 kPa and the additional point loads this creates when mounted to the roof. Bulletin #7 is primarily designed for the Natural Resources Canada Solar Ready program, which requires a larger roof space than does the BC Solar Hot Water Ready Regulation. However, the same truss design principles can be applied.

If the area designated for future installation of the solar collector is a roof system that uses roof trusses, be sure to inform your roof truss supplier that you are building a home that must comply with the Solar Hot Water Ready Regulation. The truss supplier should be informed as early as possible in the construction process by the builder or homeowner so that any potential changes in truss design can be accommodated.

**IMPORTANT**

The design parameters in this regulation for structural members of roofs simply provide additional structural capacity for future installation of a solar domestic hot water system, and as such cannot account for all potential future factors. Owners are still responsible for an assessment before installing solar collectors in future, as loading implications will depend on installation methods, collector size and configuration, and so on.

**Conduit runs**

5 (1) A minimum of 2 conduit runs must be provided that extend from the area directly adjacent to the *building*'s primary *service water heater* to

Section 5, Subsection (1) describes the requirement for the rough-in piping (conduit) that will later accommodate the solar hot water tubing. The conduit runs are typically installed in parallel and the choice of materials is the decision of the owner. In future, 2 tubing runs (typically copper pipe) are generally required to install a solar hot water system. Each required conduit run is provided to accommodate the installation of one ½" or ¾" tubing run plus insulation. The rough-in pipes should begin as near as possible to the home's primary hot water heater. The rough-in piping should terminate in one of the three areas described in (a) through (c).

(a) an accessible attic space adjacent to the roof area designated for installation of solar collectors for a solar domestic hot water system,

If the attic is accessible, the termination for the rough-in piping is best left in the attic, just above the level of the insulation, so it can easily be seen and identified at the installation stage.

(b) the roof area designated for installation of solar collectors for a solar domestic hot water system, or

Option (b) is to terminate the conduit above the roof surface itself. This option would be appropriate for an attic with limited access, such as a low slope, flat, cathedral or roof joist design.

(c) the exterior wall surface directly adjacent to the area designated for installation of solar collectors for a solar domestic hot water system.

Some installations will be designed for a wall area or perhaps a back yard installation, or installation on an accessory building. In these cases, the conduit should terminate at the outside wall nearest to the area designated for the solar hot water collector, as described in Option (c).

(2) Conduit runs described in subsection (1) must

(a) be accessible at both ends,

(b) be capped or sealed at both ends to prevent water ingress and air leakage,

(c) be identified by markings that are permanent, distinct and easily recognized,

(d) have a minimum inside diameter of 50 mm, and

(e) be able to accommodate the installation of insulated plumbing service for a solar domestic hot water system in compliance with CAN/CSA-F383, Installation Code for Solar Domestic Hot Water Systems, as referred to in the British Columbia Building Code.

Section 5, Subsection (2) describes the requirements for the rough-in conduit itself. In cases where the conduit runs cannot be straight or continuous, it may be necessary to break the conduit into 2 or more sections, or to provide for bends in the conduit. In these cases, each section of conduit (conduit run) should be accessible at both ends in order to facilitate the future installation of the solar hot water tubing.

More information on solar hot water rough-in, as well as best practice guides can be found at the following links:

http://www.cansia.ca/government-regulatory-issues/provincial/solar-ready

http://canmetenergy-canmetenergie.nrcan-rncan.gc.ca/eng/renewables/solar_thermal.html\

These best practice guides are NOT compliance documents for the Province of BC Solar Hot Water Ready Regulation. Links are included for information only.

## Appendix

**Consolidated version of the two regulations**:
BC Regulation 101/2011
BC Regulation 163/2013

*Contents*



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must be incorporated in construction of new *buildings* of *residential occupancy* that contain

(a) one *dwelling unit*, or
(b) one *dwelling unit* and one *secondary suite*.

(2) Subsection (1) does not apply with respect to new construction referred to in that subsection if the local government of the jurisdiction to which this regulation applies and within which the new construction is to occur is satisfied that *building* site conditions do not permit effective use of solar hot water heating.

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(b) anticipated point loads where it is known that the solar collectors for a solar domestic hot water system will not be directly surface-mounted.

(2) Roof trusses located in areas referred to in section 3 (1) must be designed to accommodate the anticipated load, including

(a) a uniform dead load of 0.24 kPa, in addition to design loads required by the British Columbia Building Code, and

(b) point loads resulting from the uniform dead load referred to in paragraph (a).

**Conduit runs**

5 (1) A minimum of 2 conduit runs must be provided that extend from the area directly adjacent to the *building*'s primary *service water heater* to

(a) an accessible attic space adjacent to the roof area designated for installation of solar collectors for a solar domestic hot water system,

(b) the roof area designated for installation of solar collectors for a solar domestic hot water system, or

(c) the exterior wall surface directly adjacent to the area designated for installation of solar collectors for a solar domestic hot water system.

(2) Conduit runs described in subsection (1) must

(a) be accessible at both ends,

(b) be capped or sealed at both ends to prevent water ingress and air leakage,

(c) be identified by markings that are permanent, distinct and easily recognized,

(d) have a minimum inside diameter of 50 mm, and

(e) be able to accommodate the installation of insulated plumbing service for a solar domestic hot water system in compliance with CAN/CSA-F383, Installation Code for Solar Domestic Hot Water Systems, as referred to in the British Columbia Building Code.

**Schedule**

*(Section 2)*

| Local Government Jurisdictions |
|---|
| Cariboo Regional District |
| City of Abbotsford |
| City of Campbell River |
| City of Chillwack |
| City of Colwood |
| City of Cranbrook |
| City of Dawson Creek |
| City of Duncan |
| City of Fernie |
| City of Fort St. John |
| City of Kelowna |
| City of Kimberley |
| City of Langley |
| City of New Westminster |
| City of North Vancouver |
| City of Penticton |
| City of Pitt Meadows |
| City of Port Coquitlam |
| City of Port Moody |
| City of Richmond |
| Corporation of Delta |
| Cowichan Valley Regional District |
| District of Coldstream |
| District of Elkford |
| District of Hudson's Hope |
| District of Invermere |
| District of Maple Ridge |
| District of Metchosin |
| District of North Vancouver |
| District of Peachland |
| District of Sechelt |
| District of Sparwood |
| District of Tofino |
| District of West Vancouver |
| Greater Vancouver Regional District |
| Municipality of North Cowichan |
| Resort Municipality of Whistler |
| Squamish-Lillooet Regional District |
| Sunshine Coast Regional District |
| Town of Qualicum Beach |
| Town of Sidney |
| Town of View Royal |
| Township of Esquimalt |
| Township of Langley |
| Village of Ashcroft |
| Village of Kaslo |
| Village of Midway |
| Village of Valemount |