Doors, Windows and Skylights Code Changes

Effective date: December 11, 2015

Building and Safety Standards Branch
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Background

- 2012 BC Building Code adopted December 2012
  - AAMA/WDMA/CSA 101/I.S.2/A440-08 North American Fenestration Standard/Specification for Windows, Doors, and Skylights (NAFS 08); and
  - CSA A440S1-09, “Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440 North American Fenestration Standard/Specification for Windows, Doors, and Skylights.
- NAFS delayed to July 2013
- NAFS delayed to December 2013

Background

- Industry challenges continue
  - Limited Water Ratings
  - Other glazed products – curtain wall, sloped glazing, window wall, etc.
  - Site Built products –what are they?
  - Exemptions for main entrance doors? Doors in garages?

- Changes proposed in response to issues faced by industry

(manufacturers, specifiers including sales rep, designers, architects, engineers, builders, owners, building officials)

Changes to BC Building Code

- Changes to Part 5 and Part 9
- Part 5 changes include
  - Expand scope to include other glazed products such as curtain wall and provide clear compliance path
  - Clarification of intent that NAFS or Part 5 general requirements are always an option
  - Clarification that NAFS or Part 4 calculations are acceptable
  - Exclude fire rated windows

Part 9 Changes

- NAFS is only required where products are in scope of NAFS. Other fenestration would have to conform to Part 5 in general. No testing is required for this compliance path (engineering is typical)
- Clarification of application of section 9.6 for glass design
- Deletion of confusing 9.7.3. “Performance expectations”
- Clarification of application of NAFS and application to other glazed products

Part 9 Changes

- Deletion of “site built” requirements in Subsection 9.7.5.
- Clarification of security requirements- application to all windows, doors and skylights
- Clarification of “Limited Water” doors in NAFS
- Clarification of performance grades (no more open/rough terrain judgements)
- Clarification of Installation requirements

Division B, Part 1 Changes

1.1.3.1.

1) Except as required by Sentence 9.7.4.3.(2), the climatic and seismic values required for the design of *buildings* under this Code shall be in conformance with the values established by the *authority having jurisdiction* or, in the absence of such data, with Sentence (2) and the climatic and seismic values in Appendix C.

(See Appendix A)

Division B, Part 1 Changes

(d) by repealing the following item:

CSA	AAMA/WDMA/CSA 101/I.S.2/A440-08	NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights	5.10.2.2.(1) 5.10.2.2.(3) 9.7.4.1.(1) 9.7.4.2.(1) 9.7.4.3.(2) 9.7.5.1.(1) 9.7.5.3.(1) 9.36.2.9.(3)

and substituting the following:

CSA	AAMA/WDMA/CSA 101/I.S.2/A440-08	NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights	5.10.2.2.(1) 9.7.4.2.(1) 9.7.4.2.(2) 9.7.5.3.(1) 9.36.2.9.(3)

Division B, Part 3 Changes

Sentence 3.3.4.9.(1)

1) Dwelling units shall conform to Article 9.7.2.1. and Subsection 9.7.5.

Division B, Part 4 Changes

4.3.6.1. Design Basis for Glass

1) Glass used in *buildings* shall be designed in conformance with

a)CAN/CGSB-12.20-M, “Structural Design of Glass for Buildings,” or

b)ASTM E1300, “Standard Practice for Determining Load Resistance of Glass in Buildings.”

Division B, Part 4 Changes

ASTM E1300 – 12a´1

"Standard Practice for Determining Load Resistance of Glass in Buildings"

1.2 This practice applies to vertical and sloped glazing in buildings for which the specified design loads consist of wind load, snow load and self-weight with a total combined magnitude less than or equal to 15 kPa (315 psf). This practice shall not apply to other applications including, but not limited to, balustrades, glass floor panels, aquariums, structural glass members, and glass shelves.

Part 5 Changes

5.10.2. Windows, Doors, Skylights and Other Glazed Products .

5.10.2.1. General

1) This Subsection applies to windows, doors, skylights, other glazed products and their components that separate

a) interior space from exterior space, or

b) environmentally dissimilar interior spaces.

2) For the purposes of this Subsection, the term “skylight” refers to unit skylights, roof windows and tubular daylighting devices.

3) Windows, doors, skylights, other glazed products and their components that are required to have a *fire-protection rating* need not conform to this Subsection. (See Appendix A.)

Part 5 Changes

5.10.2.2. Design and Construction

(See Appendix A.)

1) Windows, doors, skylights and their components shall be designed and constructed in accordance with

a) Subsection 5.1.4., Section 5.3., Section 5.4. and Section 5.6., or

b) the following standards:

i) AAMA/WDMA/CSA 101/I.S.2/A440, “NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights,” and

ii) except as permitted by Sentence (3), CSA A440S1, “Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights.”

(See Appendix A.)

Part 5 Changes

2) Other glazed products and their components shall be designed and constructed in accordance with Subsection 5.1.4., Section 5.3., Section 5.4. and Section 5.6. (See Appendix A.)

3) For the purposes of conformance with Subclause (1)(b)(ii), loads and procedures from Section 5.2. may be used instead of the loads and procedures set out in the standard. (See Appendix A.)

Part 5 Changes

- **A-5.10.2.2.(1) Two Compliance Paths.** It is intended that any fenestration product that conforms to this Part may choose to comply with either Clause (a) or Clause (b) of Sentence 5.10.2.2.(1). Even if a product is in scope of the standards referenced via Clause (b) (NAFS and the Canadian Supplement to NAFS), the compliance path in Clause (a) may be used. However, it is not intended that the compliance path in Clause (b) be used where fenestration products are not within the scope of the referenced standards.
- **A-5.10.2.2.(2) Other Glazed Products.** Glazed products such as curtain walls or sloped glazing that are not typically considered windows but are installed as part of a separation described in Sentence 5.10.2.1.1.(1) are not within the scope of the referenced standards and therefore must conform to Subsection 5.1.4. and Sections 5.3., 5.4. and 5.6.
- **A-5.10.2.2.(4) Loads and Procedures.** For windows within the scope of the "Canadian Supplement" referred to in Sentence 5.10.2.2.(1), structural and wind loads are included and may be calculated in accordance with that standard. As an alternative, structural and wind loads from Section 5.2. may be used to select fenestration products that are appropriate for the point of installation. Values derived from the referenced standard, which uses a simplified calculation method, are typically higher than those derived from calculations done in conformance with Section 5.2.

Part 5 Changes

Questions?

Part 9 Changes

9.6.1.1. Application

1) This Section applies to glass, and the protection of glass, in

a) doors, including closet doors and sidelights for doors,

b) windows,

c) skylights as defined in Sentence 9.7.1.1.(2),

d) shower or bathtub enclosures, and

e) glazed panels and partitions.

(See Appendix A.)

A-9.6.1.1.(1) Application. The scope of this Section includes glass installed on the interior or on the exterior of a building.

Part 9 Changes

9.6.1.3. Structural Sufficiency of Glass

1) Except as permitted by Sentence (2), glass used in buildings shall be designed in conformance with

a) CAN/CGSB-12.20-M, “Structural Design of Glass for Buildings,” or

b) ASTM E1300, “Standard Practice for Determining Load Resistance of Glass in Buildings.”

2) Individual panes of glass conforming to Table 9.6.1.3. that are used in doors need not comply with Sentence (1).

Part 9 Changes

The following Appendix Notes are added:

A-9.7. Windows, Doors and Skylights. This section applies only to windows, doors and skylights as defined in the scope of the standards referenced in Article 9.7.4.2. Other glazed products, such as site-built windows, curtain walls or sloped glazing, are required to conform to Part 5.

It is also permitted for fenestration products within the scope of the NAFS standard to conform to Part 5. This option is typically used for windows and doors that are impractical to subject to the testing requirements of NAFS due to their size or for custom configurations.

Part 9 Changes

9.7.1.1.(3)

3) For the purpose of this Section, the term “doors” includes glazing in doors and sidelights for doors but does not include vehicular access doors.

Part 9 Changes

Article 9.7.3.1. is repealed and the following substituted:

9.7.3.1. General

1) Reserved.

2) Skylights and their components shall be designed, constructed and installed so that they resist snow loads.

Part 9 Changes

9.7.3.3.

1) Except as permitted in Sentence (2), metal frames, and metal sashes, of windows, doors and skylights shall incorporate a thermal break.

2) Windows and doors described in Sentence (1) do not require a thermal break where they

a) are installed as storm windows and doors, or

b) are required to have a fire-protection rating.

Part 9 Changes

9.7.4. Design and Construction

(See Appendix A.)

9.7.4.1. General

1) Except as provided by Sentence (2), windows, doors, skylights and their components shall be designed and constructed in accordance with

a) Article 9.7.4.2., or

b) Part 5.

2) Windows, doors, skylights and their components that are required to have a fire-protection rating need not conform to this Subsection.

(See Appendix A.)

Part 9 Changes

A-9.7.4. Design and Construction. Garage doors, sloped glazing, curtain walls, storefronts, commercial entrance systems, site-built or site-glazed products, revolving doors, interior windows and doors, storm windows, storm doors, sunrooms and commercial steel doors are not in the scope of NAFS.

All windows, doors and skylights installed to separate conditioned space from unconditioned space or the exterior must also conform to Section 9.36.

Part 9 Changes

9.7.4.2. Standards

1) Except as permitted by Sentence (2) and Article 9.7.4.3., windows, doors, skylights and their components shall conform to

a) AAMA/WDMA/CSA 101/I.S.2/A440, “NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights” (Harmonized Standard), and

b) A440S1, “Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights.”

(See Appendix A.)

Part 9 Changes

2) A door designated as a “Limited Water” door in accordance with the standard referenced in Clause (1)(a) shall not be used unless the door

a) separates a dwelling unit from an unconditioned storage garage or a carport,

b) conforms to Clauses 3.3.1.13.(1)(a), (b) and (c) and Sentences 3.3.1.13.(5) and (10), or

c) is not required by Sentence 9.27.3.8.(3) to have flashing installed.

Part 9 Changes

9.7.4.3. Performance Requirements

1) For the purposes of compliance with the standard referenced in Clause 9.7.4.2.(1)(b), windows, doors and their components in a building of no more than 10 m in height, measured from grade, may conform to the design pressure, performance grade and water resistance values in Table C-4 of Appendix C instead of the values calculated in the Canadian Supplement.

2) For buildings described in Sentence 1.3.3.3.(1) of Division A, where design pressure, performance grade and water resistance values are calculated in accordance with the standard referenced in Clause 9.7.4.2.(1)(b), the driving rain wind pressure (DRWP) values in Table A.1 of CSA A440S1, “Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights,” shall be used. (See Appendix A.)

Part 9 Changes

- **A-9.7.4.3.(2) Performance Requirements.** If the option of calculating design pressure performance grade and water resistance values using the Canadian Supplement is chosen, the DRWP values in Table A.1 of that standard must be used for all buildings within the scope of Part 9 of the BC Building Code. This requirement applies whether the windows, doors and skylights are designed to conform to Article 9.7.4.2., or to Part 5.

Part 9 Changes

Table C-4
Required Performance of Windows and Doors in Part 9 Buildings
Forming Part of Appendix C

Location	Climatic Data		Specified Loads			NAFS		
	1/5 DRWP	1/50 HWP	DRWP	Wind Load		Required Fenestration Performance		
	Pa	kPa	Pa	Pa	(psf)	DP	PG	Water Resist.
100 Mile House	60	0.35	60	709	14.80	720	15	140
Abbotsford	160	0.44	160	891	18.61	960	20	180
Agassiz	160	0.47	160	952	19.88	960	20	180
Alberni	220	0.32	220	648	13.53	720	15	220
Ashcroft	80	0.38	80	770	16.07	960	20	150

Part 9 Changes

9.7.5.1. Resistance to Forced Entry for Sliding Doors

1) This Article applies to sliding doors serving dwelling units, other than exterior doors to garages and to other ancillary spaces.

2) Sliding doors shall not permit the removal of the sliding panel when in the locked position.

3) Exterior doors shall

a) have a pin type locking mechanism, with a minimum 9 mm throw into the frame, or an equivalent locking mechanism, operable from the interior without the use of keys, special devices or specialized knowledge of the locking mechanism, or

b) conform to at least Grade 10 in ASTM F842, “Standard Test Methods for Measuring the Forced Entry Resistance of Sliding Door Assemblies, Excluding Glazing Impact.”

Part 9 Changes

9.7.5.2. Resistance to Forced Entry for Swinging Doors

2) Doors, frames and hardware that conform to AAMA 1304, “Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems,” are not required to conform to Sentences (3) to (7).

3) Wood doors described in Sentence (1) shall

a) be solid core or stile-and-rail type,

b) be not less than 45 mm thick, and

c) if of the stile-and-rail type, have a panel thickness of not less than 19 mm, with a total panel area not more than half of the door area.

4) Doors described in Sentence (1) shall be provided with

a) a deadbolt lock with a cylinder having no fewer than 5 pins, and

b) a bolt throw not less than 25 mm long, protected with a solid or hardened free-turning ring or bevelled cylinder housing.

(See Article 9.9.6.7.)

5) An inactive leaf in double doors used in locations specified in Sentence (1) shall be provided with heavy-duty bolts top and bottom having an engagement of not less than 15 mm.

6) Hinges for doors described in Sentence (1) shall be fastened

a) to wood doors with wood screws not less than 25 mm long and to wood frames with wood screws so that at least 2 screws per hinge penetrate not less than 30 mm into solid wood, or

b) to metal doors and metal frames with machine screws not smaller than No. 10 and not less than 10 mm long.

(See Appendix A.)

Part 9 Changes

9.7.6.1. Installation of Windows, Doors and Skylights

1) Except as provided by Sentence (2), the installation of manufactured and pre-assembled windows, doors and skylights and the field assembly of manufactured window and door combination units shall conform to the instructions, if any, provided by the manufacturer.

2) In case of conflict between the provisions of this Code and instructions referred to in Sentence (1), the provisions of this Code shall govern.

Proposed Changes to Energy Efficiency Requirements

- Energy efficiency requirements for doors included in the BC Building Code changes announced in April 2013
  - Effective December 2014
- Doors must achieve USI of 1.4 to 1.8 $W/m^{2 \cdot}K$
- Thermal transmittance allowance for one door, to USI of 2.6 $W/m^{2 \cdot}K$

Proposed Changes to Energy Efficiency Requirements

- Thermal transmittance allowance to USI-2.6 $W/m^{2 \cdot}K$ for the one door was generous
- Undertook energy modelling exercise to determine potential to spread out allowance
- Proposed solution was developed to distribute thermal transmittance amongst other doors

Proposed New Door Requirements

Climate Zones	Standard Option	New Proposed Option (Dec 2015)				
	Prescriptive USI values ($W/m^2 \cdot K$)	Number of doors permitted with corresponding USI values ($W/m^2 \cdot K$)				
		1st	2nd	3rd	4th	≥5
4 and 5 (e.g., Lower Mainland, Vancouver Island, Southern Interior, West Kootenays, Central and North Coast, and Haida Gwaii)	All doors at 1.8 with allowance for one door at 2.6	2.1	2.1	2.1	2.1*	1.8
6 and 7A (e.g., Central Interior, East Kootenays, Whistler, Terrace, Peace Region, Rocky Mountains, Inland Northwestern BC)	All doors at 1.6 with allowance for one door at 2.6	2.1	2.1	2.1*	1.6	1.6
7B and 8 (e.g., Northern Rockies and extreme north of BC)	All doors at 1.4 with allowance for one door at 2.6	2.0	2.0	1.4	1.4	1.4

* with additional attic insulation, above the minimum for that climate zone, of RSI 0.88 (i.e., R-5)

Conclusion

- Next webinar on other changes
- www.gov.bc.ca/buildingcodes for recorded webinar

Additional Questions?

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Certificate of Attendance (for CPD)

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