

Canadian Code Compliance Advisory for Imported Windows, Doors and Skylights

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EXECUTIVE SUMMARY

This document is provided as a public service to Canadian architects, home builders, building officials, and suppliers of fenestration products¹ manufactured in countries outside of Canada.

It identifies the performance and testing requirements that apply to manufactured window, door and skylight products installed in Canadian buildings. Imported products are ordinarily qualified to the requirements of the countries or larger economic communities in which they are manufactured.

However, the regulatory regimes for window, door and skylight products manufactured outside of North America are not compatible with Canadian building code requirements. *Performance qualifications and certifications determined according to European norms or the norms of countries outside North America are not recognized for conformance to Canadian building codes and building regulations.*

This document also aims to inform fenestration product importers and overseas product manufacturers about Canadian physical testing and energy performance simulation requirements, and to make it clear that there is no easy way to qualify imported products without testing them in North America to the standards and test methods identified in Canadian building codes and regulations.

While every effort has been made to identify the primary building code requirements for window, door and skylight products installed in Canadian buildings, this document is not a comprehensive list of all the regulatory requirements that could apply to these products at the local, municipal level at which building regulations are enforced. Therefore, it is imperative that the parties selecting, specifying or procuring fenestration products consult with local authorities to be aware of all applicable building code requirements at the building location.

Architects, specifiers, home builders and the general public should not assume that imported products offered for sale in Canada have been tested, labeled and properly qualified to comply with Canadian code requirements. Untested, unlabeled, or improperly labeled products do not conform with codes and local authorities may require their removal.

This document is provided as information only to the fenestration industry regarding Canadian legal requirements for the distribution and sale of fenestration products in Canada. Statements in this document about compliance with applicable Canadian federal, provincial, or local laws are recommended best practices, and industry participants should independently determine the legal requirements for the distribution and sale of fenestration products in Canada.

¹ In this document, the term fenestration is used to refer to windows, doors and skylights collectively. These are products within the scope of the standards referenced in NBC Subsections 5.9.2 and 9.7.4.



1. Introduction

Performance and testing requirements in Canadian building codes apply to windows, doors and skylights installed in both new buildings and in existing buildings when they are altered or renovated². Window, door and skylight products imported from outside Canada are required to conform to Canadian performance and testing requirements in the same way as products manufactured in Canada. Canadian performance requirements can be more stringent than those in European Union (EU) countries, Britain, or in the United States (US).

Additional code requirements may apply to the selection of products for specific buildings, such as accessibility and operation provisions for persons with disabilities, egress (emergency escape) in the event of fire, window fall protection for children, locations where safety glass is required, the structural design of glass to resist wind pressures at the building location, and the structural design of window frames and glass to resist specified loads where windows or glazed doors are required to act as guards. With the exception of resistance to wind pressure, these additional requirements are not discussed in this paper.

2. Canadian Building Codes

The government of Canada publishes a national model code that is updated every five years by the Canadian Commission on Building and Fire Codes. The current edition of the National Building Code (NBC) is the 2015 Edition.

Building construction is regulated by the provinces and territories which adopt the National Building Code in whole or in part, or publish their own building codes based on the NBC, as British Columbia, Alberta, Ontario and Québec have done. (Only one Canadian city has its own building code, Vancouver, which is published as the Vancouver Building Bylaw.) Importers of fenestration products need to be aware of the specific code requirements in effect in each province/territory/city in which they sell products. Provincial building codes may also be supplemented by provincial regulations for matters such as fenestration energy performance. Building codes are enforced by local municipal authorities, also known as Authorities Having Jurisdiction (AHJ).

At the publication date of this document, most provinces have adopted the 2015 NBC or incorporated its provisions into provincial building codes, while Manitoba and Québec continue to use the 2010 edition. Provinces and territories will not begin to adopt the 2020 NBC before January 2022, and those that publish their own code may not incorporate the 2020 NBC requirements until several years later.

Because building codes are enforced at the level of the municipality in which a building is located, it is possible that there are regulatory differences between municipalities within a province. It is vitally important for users of this document to make themselves aware of the requirements of local Authorities Having Jurisdiction for the geographic areas in which they wish to do business.

² 2015 National Building Code of Canada, Sentence 1.1.1.1.(1).



The NBC is organized into nine parts³. Part 9 is devoted to housing and small buildings up to three storeys in height and up to 600 m² in area. For other buildings, the remaining parts of the code apply as well as portions of Part 9. The principal performance and testing requirements for windows, doors and skylights in small buildings are found in Section 9.7, and in large buildings they are found in Subsection 5.9.2.

While building code enforcement is not always consistent, and some regulated performance attributes are of greater concern to building officials than others, suppliers of imported products have a legal responsibility to ensure that the fenestration products they sell conform to the applicable code requirements. Local building officials have the authority to require removal of improperly labeled, unlabeled, or otherwise non-conforming products.

3. Status of European and Other Foreign Certifications for Code-regulated Fenestration Product Performance Attributes

Only standards identified in the NBC are recognized for evaluating the performance of fenestration products and their components such as frame profiles, painted coatings, operating hardware, and insulating glass units. Certificates of conformance to other standards are not recognized for code compliance in Canada, and there is no recognized process for establishing equivalency between standards referenced in the NBC with the standards of other countries and jurisdictions.

3.1 Fenestration in Passive House Buildings

Some municipalities recognize windows, doors and skylights installed in certified Passive House buildings to be compliant with the energy performance requirements of the applicable building code. This recognition does not exempt these products from having to comply with the other performance and testing standards identified in this document. It is the policy of the Passive House Institute (PHI) that fenestration products qualified for use in certified Passive House buildings are required to comply fully with the other, non-energy performance requirements of local building codes.

4. Product Markings to Indicate Conformance with Regulated Performance Attributes

Regulated performance attributes are evaluated on the basis of laboratory testing and in the case of energy performance, by simulation or testing. Performance ratings are required to be reported on permanent or removable product markings (labels) that must be present on the products at time of delivery to the building site. Removable product labels must be left in place until local authorities allow them to be removed.

The manufacturer's identity must be indicated by a permanent marking on the fenestration product that is visible after installation.

³ Provincial codes may have additional Parts that follow Part 9.



Markings indicating conformance to structural-air-water performance and energy performance are ordinarily indicated on removable product labels applied to the products before they are delivered to the building location.

Markings indicating conformance to the Canadian safety glass standard are required to be permanently marked on the glass.

Conformance to insulating glass durability and gas retention standards are ordinarily indicated by means of permanent markings applied to the insulating glass spacers or etched into the glass of insulating glass units. Alternatively, certificates and attestations may be used for imported products as described in Section 5.6.

5. Regulated Performance and Quality Attributes

There are seven categories of regulated attributes discussed below, together with the applicable test standards. The edition dates of the named standards are those referenced in the 2015 NBC. Table 4 on page 9 provides the edition dates of standards referenced in the 2010, 2015 and 2020 editions of the NBC.

5.1. Structural-Air-Water Performance

NBC Article 5.9.2.3 is titled “Structural and Environmental Loads, Air Leakage and Water Penetration” and requires fenestration products to protect the building and its occupants from wind loads, from wind-driven rainwater penetration, and to resist air leakage. Skylights must also resist snow loads. Article 5.9.2.3 allows the standards in Article 5.9.2.2 to be used to determine the structural-air-water performance of windows, doors and skylights. These standards are presented in Table 1. NBC Subsection 9.7.4 refers to these same standards for testing manufactured fenestration products in Part 9 buildings.

The required level of performance for windows, doors and skylights in Part 9 buildings is determined on the basis of a building’s location (municipality), terrain (rough or open terrain), and height of the fenestration product above grade using the methods in CSA A440S1-17, the Canadian Supplement to NAFS. This standard contains environmental data and simplified calculation methods for determining the required resistance to wind pressure and the required level of water penetration resistance for fenestration in municipalities across Canada. It is acceptable to determine these values using the online performance calculator at <https://www.fenestrationcanada.ca/calculator> provided users of this online tool have verified that local officials allow the use of the NBC environmental data for their municipality.⁴

Products that are successfully tested to NAFS-11 and the Canadian Supplement to NAFS-11 satisfy the minimum air tightness requirements of NBC 2015.

⁴ The NBC allows local building officials to require use of environmental data in their jurisdiction that differs from the NBC in recognition that they have more precise knowledge of the local climate.



TABLE 1: STRUCTURAL-AIR-WATER TEST STANDARDS FOR WINDOWS, DOORS AND SKYLIGHTS

SHORT NAME	STANDARD DESIGNATION AND NAME
NAFS-11	AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS 2011—North American Fenestration Standard/Specification for windows, doors and skylights
Canadian Supplement to NAFS-11	CSA A440S1-17, Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS—North American Fenestration Standard/Specification for windows, doors and skylights

The structural performance is defined with respect to the minimum required Performance Grade and its required positive and negative design pressure. The water penetration resistance is defined with respect to the minimum level of water penetration resistance when tested to NAFS-11 using the test pressure and water penetration failure criteria in the Canadian Supplement to NAFS-11. (The water penetration failure criteria in this standard are more strict than in US or EU test standards.)

Testing to the standards in Table 1 encompasses additional attributes to structural-air-water performance, and the test results are expressed according to the categories in Table 2. The Canadian Supplement to NAFS-11 requires the tested properties in Table 2 to be reported on non-permanent product labels.

TABLE 2: REPORTED TEST RATINGS (CANADIAN SUPPLEMENT TO NAFS-11)

ATTRIBUTE	REPORTABLE VALUES
Performance Class	R, LC, CW, AW
Performance Grade	PG15 – PG100+ in increments of 5
Size tested	Specimen width x height
Design pressure (positive)	Tested deflection pressure inward (Pa)
Design pressure (negative)	Tested deflection pressure outward (Pa)
Water penetration resistance test pressure	Tested resistance between 140 – 730 Pa in specified increments
Air infiltration-exfiltration level	A2, A3, Fixed

NOTE: Structural-air-water testing is more rigorous in Canada than it is in other countries. The required wind load resistance performance levels are generally higher than in the EU. The maximum allowable air leakage rates are lower in Canada than in the US or the EU. The water penetration failure criteria in the Canadian Supplement to NAFS-11 are more stringent than in the US or the EU. Test reports to European, British and ISO standards do not qualify products for use in Canada. NAFS-11 test reports conducted in the US that do not include the requirements of the Canadian Supplement to NAFS-11 do not qualify products for use in Canada.

While structural-air-water properties can also be evaluated by engineers using other test and engineering methods, the engineering option is expensive, time-consuming, and limited to the



fenestration products installed at a specific building. On Part 9 buildings the engineering option is only used where authorized by local building officials.

Products tested to NAFS-11 alone for the US market are not qualified for use in Canada unless they have also been tested to the additional requirements in the Canadian Supplement to NAFS-11. The Canadian Supplement adds additional testing and reporting requirements to those in NAFS-11, has more stringent water penetration failure criteria than those in NAFS, EU, and British standards, and defines the required Canadian product labeling requirements. *Conformance to both standards in Table 1 is required for conformance to Canadian building codes.*

NAFS-11 requires the structural-air-water performance of fenestration products to be tested at the greatest width and height in which they are sold, and labeled ratings apply to sizes no greater than were tested. For Muller Assemblies testing of individual unit products is not sufficient: the structural-air-water performance of intermediate vertical and horizontal framing members, including the mullion created when two or more fenestration products are joined together, must also be qualified by testing. These testing requirements are more stringent than is the case in EU countries and Britain.

5.2. Energy Performance

Canadian codes recognize two energy performance rating systems, one Canadian, the other American. The Canadian system has been harmonized to use the methods and simulation tools developed by the US-based National Fenestration Rating Council (NFRC). Canadian building codes regulate two energy performance properties: U-value (U-factor) and Energy Rating (ER).

Imported products are required to be evaluated under the CSA or NFRC standards in Table 3 by laboratories accredited by NFRC or the Standards Council of Canada, and to be labeled according to the requirements of NFRC 700 or CSA A440.2.

NOTE: Importers of fenestration products need to be aware that metric window, door and skylight U-values determined according to EN ISO 10077 are not recognized for energy performance compliance in Canada. EN 673 g-values are not recognized for reporting of solar heat gain through windows, doors and skylights and cannot be used to calculate the Energy Rating. EN energy performance ratings are not equivalent to CSA or NFRC ratings and cannot be compared or converted to North American equivalents.

Some Canadian jurisdictions recognize certified Passive House buildings as compliant with the energy performance requirements of the code. In these cases, the jurisdictions choose to recognize the qualifications of accredited Passive House certifiers of such buildings to ensure that windows, doors and skylights with suitable energy performance characteristics are used. In the case of non-certified Passive House buildings, Passive House certification documents cannot be used to demonstrate compliance with Canadian U-value requirements as the certifications apply only to the energy performance of the window, door and skylight frames and not the overall U-value of the products with the specific glass options used at a given building.



TABLE 3: ENERGY PERFORMANCE STANDARDS

STANDARD	PROPERTIES EVALUATED	COMMENTS
CSA A440.2-14/A440.3-14, Fenestration Energy Performance/User's Guide to CSA A440.2-14, Fenestration Energy Performance	U-factor (W/m ² ·K) Solar Heat Gain Coefficient (SHGC) Visible Transmittance (VT) Energy Rating (ER) *	U-factors are determined and reported in SI metric units Uses NFRC 100 and 200 methods Specifies product labeling requirements
NFRC 100-2010, Procedure for Determining Fenestration Product U-factors	U-factor (BTU/hr-ft ² -°F)	U-factors are determined in inch-pound (IP) units and are converted to SI metric units for reporting in Canada. NFRC product labeling requirements are specified in NFRC 700.
NFRC 200-2010, Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence	Solar Heat Gain Coefficient (SHGC) Visible Transmittance (VT)	
NFRC 500-2010, Procedure for Determining Fenestration Product Condensation Resistance Values	Condensation Resistance (CR)	
NFRC 700-2010, Product Certification Program		Specifies product labeling requirements

* The Energy Rating is calculated using the U-factor in SI metric units, the SHGC and the tested air leakage rate at 75 Pa.

5.3. Forced Entry Resistance of Windows and Doors

NBC 2015 Clause 9.7.3.1.(e) requires windows and doors to resist forced entry. All windows and doors that have laboratory tested NAFS ratings have successfully passed the minimum forced entry resistance requirements of the standard. Windows and doors that fail the forced entry test cannot obtain a Performance Grade or be labeled as conforming to the NAFS-11 standard.

Forced entry resistance evaluated to European or British standards does not qualify the forced entry resistance of the products to the requirements of the NAFS-11 standard referenced in NBC 2015.

5.4. Ease of Operation

NBC 2015 Clause 9.7.3.1.(f) requires operable windows and doors to be easily operable. Operable windows and doors that have laboratory tested NAFS ratings have successfully passed ease of operation tests. Windows and doors that do not meet ease of operations requirements cannot obtain a Performance Grade or be labeled as conforming to the NAFS-11 standard.

5.5. Glass Strength to Resist Wind, Snow and Guard Loads

The glass in windows, doors and skylights must have adequate strength to resist the wind load conditions at the building location where the products will be installed. NAFS-11 clause 10.2.3.1 states: "The glazing for projects shall be the glazing required by the building code having jurisdiction, using the reference Standard specified in the building code."



NBC 2015 requires each individual glazing unit contained in windows and glass doors to meet the heat treatment, type and thickness requirements required to resist wind loads using either the Canadian standard CAN/CGSB-12.20 or the American standard ASTM E1300 (NBC 2015 Sentence 4.3.6.1.(1) and Sentence 9.6.1.3.(1)).

The design wind pressures for such calculations are determined using NBC 2015 Subsection 4.1.7. (Glass calculations using ASTM E1300 are subject to a different Adjustment Factor than calculations using CAN/CGSB-12.20.) For windows and glass doors in Part 9 buildings the NBC also recognizes use of the glass type and thickness tables in NBC article 9.6.1.3 which do not require calculations.

Imported windows, doors and skylights are required to have glass with the strength characteristics appropriate for the Canadian locations in which the products are installed. Compliance for windows and glass doors may be demonstrated by use of glass conforming with the tables in NBC Article 9.6.1.3 or by calculations performed by a registered professional engineer authorized to practise in the province where the products are installed.

5.6. Durability of Insulating Glass

Canadian codes require insulating glass in windows, doors and skylights to conform to the quality and durability standards that are referenced in NBC 2015 that are found in articles 5.9.1.1 and 9.6.1.2. To ensure that insulating glass units do not fail prematurely due to obstruction of the vision area or loss of insulating inert gas fill, they must be constructed correctly using durable spacer-sealant systems.

NBC 2015 recognizes two standards for testing the quality, durability and inert gas retention of insulating glass units: the Canadian standard CAN/CGSB-12.8, Insulating Glass Units; or the American standard ASTM E2190, Insulating Glass Unit Performance and Evaluation.

Manufacturers and importers of window, door, and skylight products sold in Canada are required to have documentation to demonstrate that the insulating glass units in their products conform to one of these insulating glass durability standards.

The fenestration product importer must be prepared to present documentation acceptable to the AHJ showing the spacer system, sealants, and assembly method have been successfully tested to CAN/CGSB-12.8 or ASTM E2190 for both durability and inert gas retention. Acceptable forms of compliance documentation are a recent test report from a laboratory accredited by the Standards Council of Canada and issued within the previous 5 years, or a current certificate from the IGMA or IGMAC certification organizations confirming satisfactory testing of the specific spacer-sealant system utilized in the insulating glass. To establish the admissibility of the test report or certificate, it needs to be accompanied by a signed and dated attestation by the fenestration product importer that the glass in the fenestration product supplied to a specific building or project site conforms to the test report or certification document submitted with the attestation.

5.7. Qualification of Safety Glass

Canadian codes require safety glass to be tested according to the requirements of CAN/CGSB-12.1. Safety glass may be either tempered or laminated and must be permanently marked in locations visible



to building officials to identify the Class and Category to which it has been qualified. Products manufactured outside Canada do not ordinarily have safety glass markings that are recognized in Canada.

Safety glass is qualified by testing at laboratories accredited by the Standards Council of Canada.

6. Referenced Standard Editions

Table 4 summarizes the standards applicable to window, door and skylight products in Canada, with the edition dates that correspond to the 2010, 2015 and 2020 editions of the NBC. Consult local Authorities Having Jurisdiction (AHJ) about which edition of the NBC is in use.

TABLE 4: EDITION DATES OF REFERENCED STANDARDS

STANDARD	EDITION DATE SUFFIX		
	NBC 2010 INCLUDING ERRATA 2013	NBC 2015 INCLUDING ERRATA 2018	NBC 2020
ASTM E2190	-10	-10	-19*
ASTM F476	-84	-14	-14*
CGSB 12.1	-M90	-M90	-2017*
CGSB 12.2	-M91	-M91	-M91*
CGSB 12.3	-M91	-M91	-M91*
CGSB 12.4	-M91	-M91	-M91*
CGSB 12.8	-M97	-M97	-M97*
CGSB 12.10	-M76	-M76	-M76*
CGSB 12.11	-M90	-M90	-M90*
CGSB 12.20	-M89	-M89	-M89*
NAFS**	-11	-11	-17*
A440S1	-09	-17	-19*
A440.2/.3	-09	-14	-19*
A440.4	-07	-07	-19*
A440.6	N/A	N/A	-20*

* To be verified after publication of the 2020 NBC.

** NAFS is the concise designation for AAMA/WDMA/CSA 101/I.S.2/A440-, NAFS—North American Fenestration Standard/ Specification for windows, doors and skylights.

7. For More Information

Fenestration product importers and manufacturers located outside of Canada are encouraged to contact testing organizations accredited by the Standards Council of Canada for assistance in qualifying products to the standards required by the National Building Code and which are discussed in this document.

It is strongly advised that glass design for wind load be performed by competent professional engineers registered to practice in the provinces or territories in which the products will be supplied, using the glass design methods recognized in Part 4 of the National Building Code, or using the prescriptive tables in NBC Section 9.6.