

ENERGY EFFICIENCY OF MANUFACTURED WINDOWS FOR BUILDINGS OF RESIDENTIAL OCCUPANCY

ONTARIO BUILDING CODE

12.2.1.1. Energy Efficiency Design before January 1, 2017

(1) Except as provided in Sentence (4), the energy efficiency of a building or part of a building of residential occupancy that is within the scope of Part 9 and is intended for occupancy on a continuing basis during the winter months shall,

- (a) meet the performance level that is equal to a rating of 80 or more when evaluated in accordance with NRCan, "EnerGuide for New Houses: Administrative and Technical Procedures", or
- (b) conform to Chapters 1 and 2 of MMAH Supplementary Standard SB-12, "Energy Efficiency for Housing".

SB-12- 1.1.1.2. Compliance Options Before January 1, 2017

The energy efficiency of a building or part of a building of residential occupancy that is within the scope of Part 9 of Division B of the Building Code and is intended for occupancy on a continuing basis during the winter months shall comply with

- (a) Subsection 2.1.1. of Chapter 2,
- (b) Subsection 2.1.2. of Chapter 2, or
- (c) Subsection 2.1.3. of Chapter 2

SB-12- 2.1.1.8. Thermal Performance of Windows, Skylights and Sliding Doors

- (1) Except as provided in Sentence (3), and except for sidelights to main entrance doors, windows, skylights and sliding glass doors shall meet,
- (a) The required overall coefficient of heat transfer in Tables 2.1.1.2 A, 2.1.1.2. B and 2.1.1.2. C and Tables 2.1.1.3 A, 2.1.1.3 B and 2.1.1.3. C and Table 2.1.1.10., or
 - (b) the corresponding energy rating in Table 2.1.1.8..
- (2) the energy rating and the overall coefficient of heat transfer required for windows and sliding glass doors in a residential occupancy shall be determined in conformance with,

- (a) CAN/CSA-A440.2, "Fenestration Energy Performance", or
- (b) NFRC 100, "Procedure for Determining Fenestration Product U-factors" and NFRC 200, "Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence".

9.7.3.2. Heat Transfer Performance

- (1) Windows, doors and skylights described in Clause 9.7.1.1.(1)(a) and their components shall be designed, constructed and installed to,
- (a) Minimize surface condensation on the warm side of the component, and
 - (b) Ensure comfortable conditions for the occupants.
- (2) Compliance with the heat transfer performance described in Sentence (1) shall be demonstrated by,
- (a) Compliance with the requirements in Article 9.7.3.3., or
 - (b) Design and construction conforming to Part 5.

9.7.3.3. Thermal Characteristics of Windows, Doors and Skylights

- (1) Except as permitted in Sentence (2), metal frames and sash 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 are installed as,
- (a) Vehicular access doors,
 - (b) Storm windows and doors, or
 - (c) Windows and doors that are required to have a fire-resistance rating.
- (3) Windows, doors and skylights, with or without storm doors or sash, that are installed in buildings where the intended use of the interior space will not result in high moisture generation shall have a maximum thermal transmittance U-value or minimum temperature index (1) in accordance with Table 9.7.3.3.

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- (4) Windows, doors and skylights, with or without storm doors or sash, that are installed in portions of buildings where the intended use of the interior space will result in high moisture generation shall be designed in conformance with Subsection 5.3.

9.7.4. Manufactured Windows, Doors and Skylights

9.7.4.1. Application

- (1) This Subsection applies to windows, doors and skylights that are within the scope of AAMA/WDMA/CSA 101/I.S.2/A440, "NAFS-North American Fenestration Standard/Specification for Windows, Doors, and Skylight".

9.7.4.2. General

- (1) Manufactured and pre-assembled windows, doors and skylights and their installation shall conform to,
- (a) AAMA/WDMA/CSA 101/I.S.2/A440, "NAFS--North American Fenestration Standard/Specification for Windows, Doors, and Skylights".
 - (b) CSA A440SI, "Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, "NAFS--North American Fenestration Standard/Specification for Windows, Doors, and Skylights".
 - (c) this Subsection, and
 - (d) the applicable requirements in Subsection 9.7.6.

9.7.4.3. Performance Requirements

- (1) Performance grades for windows, doors and skylights shall be selected according to CSA A440Si, "Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, "NAFS--North American Fenestration Standard/Specification for Windows, Doors, and Skylights" so as to be appropriate for the conditions and geographic location in which the window, door or skylight will be installed.
- (2) Windows, doors and skylights shall conform to the performance grades selected under Sentence (1) when tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440, "NAFS—North American Fenestration Standard/Specification for Windows, Doors, and Skylights".

- (3) The minimum level of performance required for windows, doors and skylights shall be that of the performance Class R.

OBJECTIVE

The minimal thermal resistance of insulation combined with that of energy efficiency of windows and doors must conform to the requirements set out by Subsection 12.3. of Division B of the Building Code. The intent is to limit the amount of heat transfer through assemblies which could lead to excessively low temperatures of interior surfaces, door and window surfaces, within wall, ceiling or floor assemblies which could lead to condensation. Specifically, increasing the resistance to heat transfer through assemblies will limit the probability of:

- An inadequate control of the temperature of interior spaces or relative humidity,
- The generation of pollutants from biological growth or from materials that become unstable on wetting, or
- Deterioration, which could lead to compromised integrity of assemblies acting as environmental separators.

As a result this will also increase the probability of:

- Good air quality of indoor spaces, and
- The comfort level of the occupants

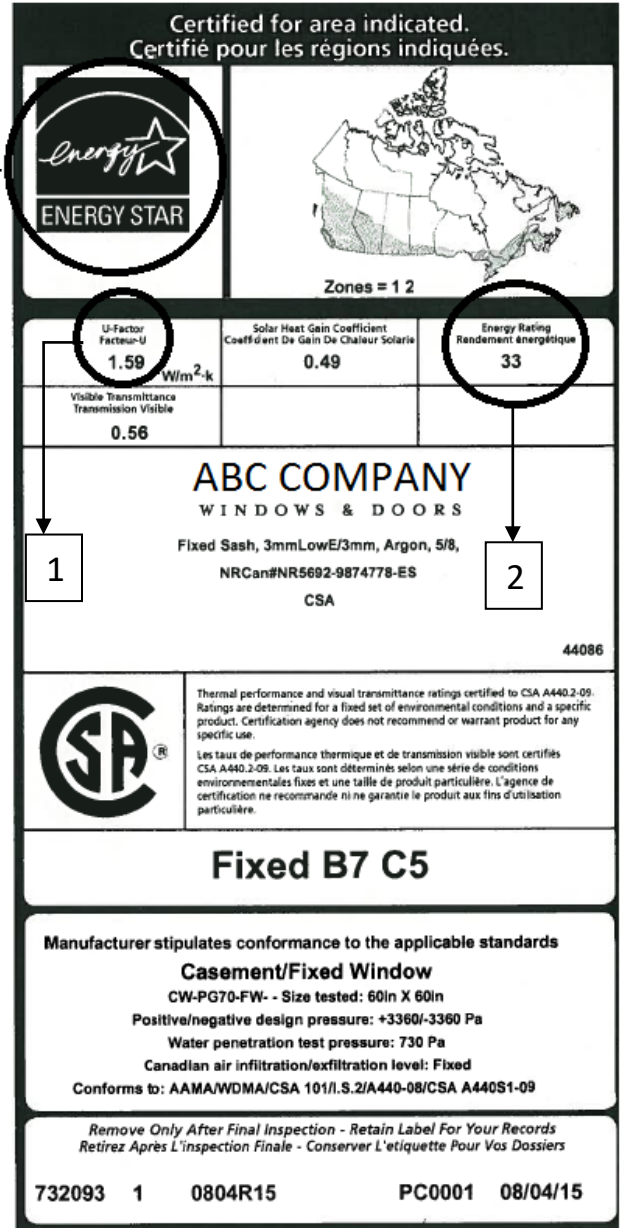
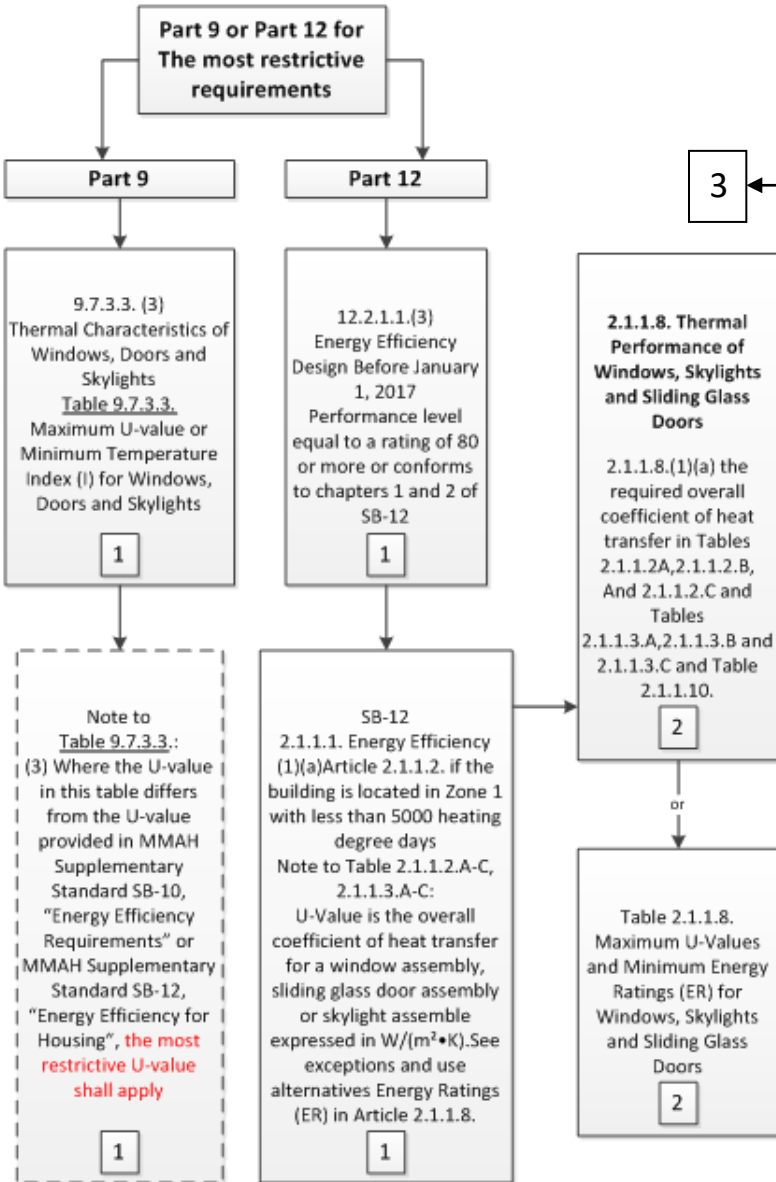
The Building Code requirements for the energy efficiency of manufactured windows can be obtained by either the Prescriptive or the Performance Method. The Prescriptive Method can be achieved using the U-values, energy rating, or temperature index from Part 9 or from the Tables listed in Supplementary Standard SB-12.

The Performance Method can be achieved by using a window with an energy efficient rating of 80 or more. This is achieved by evaluating the dwelling in accordance with NRCAN, "EnerGuide for New Houses: Administrative and Technical Procedures". Evaluation is performed by an energy advisor who uses a simulation program.

In addition, achieving an Energy Star rating for the dwelling's construction, including the windows, is another acceptable compliance method using either the prescriptive path or performance path required by NRCAN, "Energy Star for New Homes: Technical Specifications – Ontario".

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This flow chart depicts the available options on selecting energy efficiency of manufactured windows for a dwelling.



- 1** Part 9 Table 9.7.3.3., SB-12 Table 2.1.1.8.,
- 2** SB-12 Table 2.1.1.8. or,
- 3** Energy Star Qualified for zone 2 or B for the Greater Toronto Area (GTA). Proof of Energy Star qualification by a Certified Energy Advisor is required for compliance with the Building Code