



Changes in the 2020 National Model Codes.

ABEC South - January 25, 2023

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Introductory Comments

The 2020 version of the National Model Codes were late to publish, as there were more code changes considered than usual, and the meeting schedule was stretched out due to COVID. They finally dropped in late March of 2022.

Provincial and territorial governments have legislative authority on building design and construction within their jurisdictions and adopt or adapt the National Model Codes.

Current provincial and territorial building, fire, plumbing and energy regulations will remain in effect until these latest editions of the National Model Codes are adopted, with or without modifications, by the provincial or territorial authority having jurisdiction.

The 2020 National Model Codes are available for free, in electronic format, through the NRC's Publications Archive:

<https://nrc-publications.canada.ca/eng/search/?q=nbc+2020&m=1>



Topics:

1. **Code Harmonization across Canada**
2. **Combustible window frames and sashes in noncombustible construction**
3. **Safety Glazing changes**
4. **Child fall prevention changes**
5. **Fenestration energy performance**
6. **Encapsulated Mass Timber Construction**
7. **Accessibility changes**
8. **Changes in the wording of 5.9.2.3 affecting the qualification of products covered under the scope of NAFS.**



1. Code harmonization across Canada

Construction Codes Reconciliation Agreement:

The Government of Canada and the Provinces and Territories signed on to an agreement to harmonize Federal, Provincial and Territorial construction codes as much as possible, in order to address barriers to trade and investment within Canada. The parties committed to:

- a) Reduce or eliminate Differences and Variations in the Technical Provisions of Construction Codes
- b) Timely adoption of new Construction Codes (within 24 months of publication of a new NBC)
- c) A transformed National Code Development System to meet the needs of the parties.
- d) Making codes freely available in electronic format.

After January 1, 2025, a province or territory will not adopt a new Variation or Exception unless:

- a) The purpose is to achieve a legitimate objective
- b) It is necessary to achieve that legitimate objective
- c) It is not applied in a manner that would constitute a means of arbitrary or unjustifiable discrimination between Provinces or Territories where the same conditions prevail
- d) It is not applied in a manner that would constitute a disguised restriction on trade or investment.



How harmonized are we at this stage?

Significant harmonization is expected for the current (NBC 2020) code cycle, as the Provinces and Territories committed to identify and report Variations and Exceptions by Sept. 1 2020, and work to reduce or eliminate them.

For the NBC 2025 code cycle harmonization is expected to be complete on all major matters.

All Provinces except ON, BC and QC are expected to adopt the Tiered Energy approach in Part 9, and the NECB for large buildings, except:

- BC will retain its Energy Step Code approach for all buildings
- ON will mostly harmonize, but already had more stringent requirements than the NBC and will continue to have a more stringent minimum performance level than the NBC.



2. Combustible window sashes and frames in non-combustible construction:

- Canada is the only advanced western country that still limits the use of combustible window sashes and frames in buildings that are required to be of noncombustible construction.
- Proposed change 1355 was submitted by a consortium of Canadian companies in 2018, based on full-scale fire testing of commonly used window elements under the standard CAN/ULC-S134 “Standard Method of Fire Test of Exterior Wall Assemblies”, by the NRC.



Combustible windows in non-combustible construction:

Under the code, what determines whether a window is considered combustible or non-combustible?

3.1.5. Noncombustible Construction

3.1.5.1. Noncombustible Materials

(See Note A-3.1.4.1.(1).)

1) Except as permitted by Sentences (2) to (4) and Articles 3.1.5.2. to 3.1.5.24., 3.1.13.4. and 3.2.2.16., a *building* or part of a *building* required to be of *noncombustible construction* shall be constructed with *noncombustible* materials. (See also Subsection 3.1.13. for the requirements regarding the *flame-spread rating* of interior finishes.)

Noncombustible means that a material meets the acceptance criteria of CAN/ULC-S114, “Test for Determination of Non-Combustibility in Building Materials.”



Combustible windows in non-combustible construction:

Noncombustible means that a material meets the acceptance criteria of CAN/ULC-S114, “Test for Determination of Non-Combustibility in Building Materials.”

SUMMARY OF TEST PROCEDURE

A specimen of known mass, measuring 51 mm long, 38 mm wide and 38 mm thick, is placed inside an electrically heated tube furnace stabilized at 750 °C. A material is considered to be non-combustible if it meets all the following criteria:

- A) The mean of the maximum temperature rise for the three (or more) specimens of the sample during the test does not exceed 36 C deg; and
- B) There is no flaming of any of the three (or more) specimens during the last 14 minutes and 30 seconds of the test; and

Note: Any surface flash, transitory flaming or sustained flaming constitutes flaming for the purposes of this requirement.

- C) The maximum weight loss of any of the three (or more) specimens during the test does not exceed 20 percent.



Combustible windows in non-combustible construction:

From Part 3, section 3.1.5.4 (5):

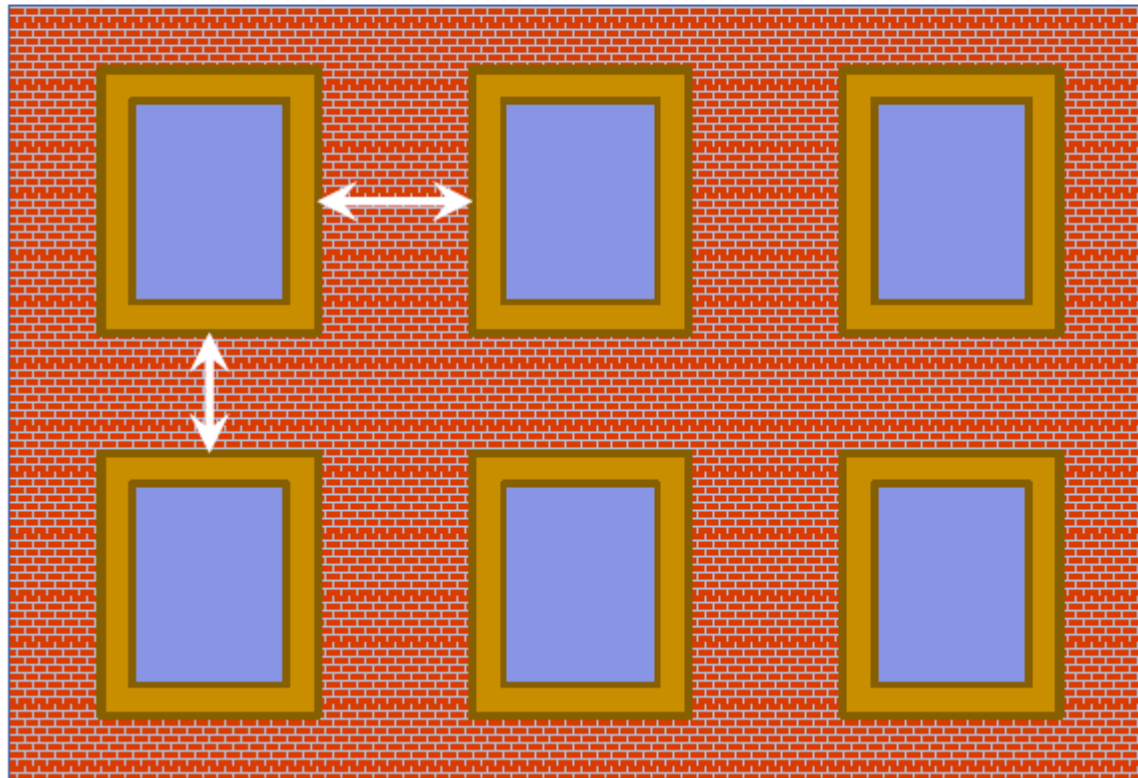
- 5)** *Combustible* window sashes and frames are permitted in a *building* required to be of *noncombustible construction* provided
- a) each window in an exterior wall face is an individual unit separated by *noncombustible* wall construction from every other opening in the wall,
 - b) windows in exterior walls in contiguous *storeys* are separated by not less than 1 m of *noncombustible construction*, and
 - c) the aggregate area of openings in an exterior wall face of a *fire compartment* is not more than 40% of the area of the wall face.



Combustible windows in non-combustible construction:

Limitation (a): Individual Unit

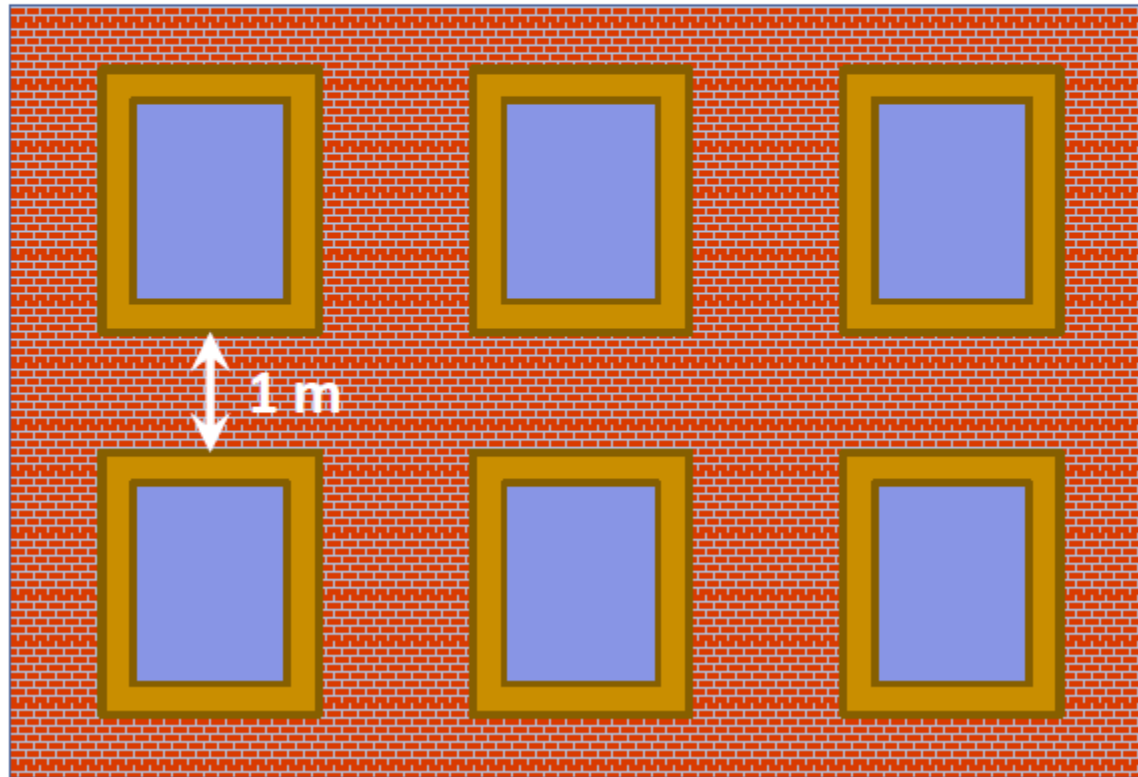
- a) each window in an exterior wall face is an individual unit separated by *noncombustible* wall construction from every other opening in the wall,



Combustible windows in non-combustible construction:

Limitation (b): Storey Separation

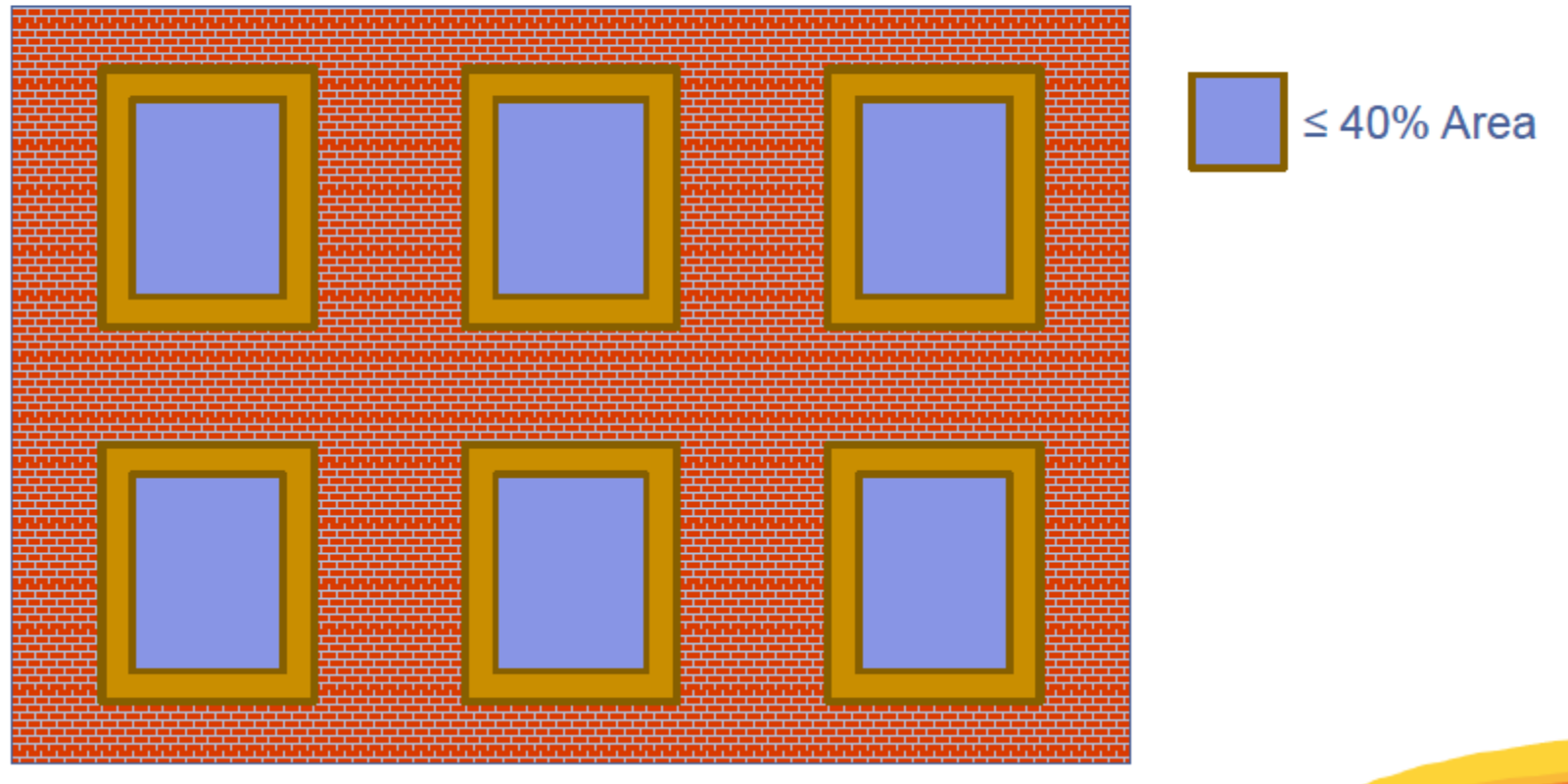
- b) windows in exterior walls in contiguous *storeys* are separated by not less than 1 m of *noncombustible construction*, and



Combustible windows in non-combustible construction:

Limitation (c): Aggregate Area

- c) the aggregate area of openings in an exterior wall face of a *fire compartment* is not more than 40% of the area of the wall face.



Combustible windows in non-combustible construction:



Combustible windows in non-combustible construction:

Proposed Change 1355

Code Reference(s): NBC15 Div.B 3.1.5.4.
Subject: Building Fire Safety
Title: Combustible Window Frames in Noncombustible Construction
Description: This change proposes to remove the restrictions that limit the use of combustible window sashes and frames in exterior walls of a building required to be noncombustible construction
Related Code Change Request(s): CCR 1068

PROPOSED CHANGE

- [5] 5) Combustible window sashes and frames are permitted in a building required to be of noncombustible construction, provided
- ~~[a] a) each window in an exterior wall face is an individual unit separated by noncombustible wall construction from every other opening in the wall;~~
 - ~~[b] b) windows in exterior walls in contiguous storeys are separated by not less than 1 m of noncombustible construction; and~~
 - ~~[c] c) the aggregate area of openings in an exterior wall face of a fire compartment is not more than 40% of the area of the wall face.~~



Justification - Explanation

Some of the more energy-efficient fenestration products in Canada today are wholly framed of materials such as PVC and fiberglass. When clad with metal on both sides, they are visually indistinguishable from "ordinary" metal windows.

The current Code provision leads to higher construction costs under new energy codes as building designers must seek to achieve the energy performance of opaque assemblies to make up for the poor energy performance of metal-framed window assemblies.

Since 1990, the Code has addressed the fire performance of combustible claddings used on noncombustible buildings by regulating their flammability primarily on the basis of a standard fire test, CAN/ULC-S134, "Standard Method of Fire Test of Exterior Wall Assemblies". Representatives of the window manufacturing industry have recently conducted standard fire testing⁽¹⁾ using CAN/ULC-S134 on a number of commonly used window elements that are classified as having "combustible" framing. This research has shown that the types of windows available for use in the market would not be expected to propagate fire or add significant amounts of fuel to the fire on the exterior of a building.

Also, since the 1990s, the use of automatic sprinklers in larger and taller buildings has reduced the fire risk, particularly in limiting the propensity for interior fires to spread outside and across or up the exterior facade. It is suggested that, in light of these earlier changes, the restrictions on windows with combustible sashes and frames is no longer warranted / justified, as the fire hazard of these combustible sashes and frames in windows is not seen as representing an unacceptable risk of injury or damage.

(1) Combustible Windows in Non-Combustible Construction-Interim Report; Alex Bwalya, Cecilia Lam and Eric Gibbs, National Research Council of Canada, May 2018.

Combustible windows in non-combustible construction: PCF 1355 final wording

- 5) Combustible window sashes and frames are permitted in a building required to be of noncombustible construction **provided**
- ~~a) each window in an exterior wall face is an individual unit separated by noncombustible wall construction from every other opening in the wall,~~
 - ~~b) windows in exterior walls in contiguous storeys are separated by not less than 1 m of noncombustible construction, and~~
 - ~~c) the aggregate area of openings in an exterior wall face of a fire compartment is not more than 40% of the area of the wall face.~~
- they are vertically non-contiguous between storeys.**

Restrictions on window size and area have been removed, but continuous fenestration such as curtain wall or window wall *made entirely of combustible material* would need to follow the alternative solution path on a building-by-building basis.



3. Safety Glazing Changes

Problems with Wired Glass

- Wired glass helps to stop the spread of fire because it won't break and fall apart when exposed to intense heat. At one point there was no other glass on the market suitable for this purpose.
- However it is **not** suitable from a safety standpoint. It is about half as strong as the same glass without wire, and when broken it shatters like regular glass but the shards are held in place by the wires.
- This can cause severe injuries and lawsuits.





Between 2001 and 2015 the Ontario School Board's Insurance Exchange (OSBIE) incurred a cost of more than \$5.8 million for 114 claims arising from wired-glass injuries.



3. Safety Glazing Changes

- On November 17, 2016 the Canadian General Standards Board (CGSB) withdrew the 1990 National Standard for “Wired Safety Glass” CAN/CGSB 12.11-M90.
- CAN/CGSB-12.1-M90 “Tempered or Laminated Safety Glass” has been replaced with a new standard CAN/CGSB 12.1-2017 “Safety Glazing”. Wired glass cannot pass this standard.
- The Canadian Glass Association issued an Advisory on November 2015 with an update July 2017. From the Summary:
 - Do not install wired glass in human impact locations.
 - Ensure all replacement glazing is factory labeled for impact-safety.
 - For fire-rated locations, such as fire doors, the replacement glazing must also be marked with a third-party fire-rated certification label, such as a UL label.



3. Glass and Glazing Changes

But . . . wired glass continues to be allowed ...

Unfortunately, CAN/CGSB-12.11-M90, Wired Safety Glass is still in the code, and is permitted in guards, doors, and sidelites

Table 1.3.1.2. Documents Referenced in the National Building Code of Canada 2020 ⁽¹⁾⁽²⁾ Forming Part of Sentence 1.3.1.2.(1)			
Issuing Agency	Document Number ⁽³⁾	Title of Document	Code Reference
CGSB	CAN/CGSB-12.11-M90	Wired Safety Glass	3.3.1.20.(3) 3.4.6.15.(1) 3.4.6.15.(3) 9.6.1.2.(1) 9.6.1.4.(1) 9.8.8.7.(1)



Where is wired glass permitted in NBC 2020?

3.3.1.20. Transparent Doors and Panels

1) Except as permitted by Sentence (5), a glass or transparent door shall be designed and constructed so that the existence and position of the door is readily apparent, by attaching visually contrasting hardware, bars or other permanent fixtures to it.

2) The visibility of fully glazed transparent doors, sidelights and panels shall be enhanced through the inclusion of mullions, markings or other elements that

- a) are visually contrasting,
- b) are at least 50 mm high.

3) A glass door shall be constructed of

- a) laminated or tempered safety glazing conforming to CAN/CGSB-12.1, "Safety Glazing," or
- b) wired glass conforming to CAN/CGSB-12.11-M, "Wired Safety Glass."

that, because of their physical configuration or design, could be mistaken as a *means of egress* shall be made inaccessible by barriers or railings.

5) Sliding glass *partitions* that separate a *public corridor* from an adjacent *occupancy* and that are open during normal working hours need not conform to Sentences (1) and (4), provided the *partitions* are suitably marked in conformance with Sentence (2) to indicate their existence and position.

7) Glass in doors and in sidelights that could be mistaken for doors, within or at the entrances to dwelling units and in public areas, shall conform to the requirements of Article 9.6.1.4.

8) A window in a public area that extends to less than 1 000 mm above the floor and is located above the second storey in a building of residential occupancy, shall be protected by a barrier or railing to not less than 1 070 mm above the floor, or the window shall be non-openable and designed to withstand the lateral design loads for balcony *guards* required by Article 4.1.5.14.



Where is wired glass permitted in NBC 2020?

9.6.1.4. Types of Glazing and Protection of Glazing

1) Glass sidelights greater than 500 mm wide that could be mistaken for doors, glass in storm doors and glass in sliding doors within or at every entrance to a *dwelling unit* and in public areas shall be

1) Glass sidelights greater than 500 mm wide that could be mistaken for doors, glass in storm doors and glass in sliding doors within or at every entrance to a *dwelling unit* and in public areas shall be

- a) safety glazing of the tempered or laminated type conforming to CAN/CGSB-12.1, "Safety Glazing," or
- b) wired glass conforming to CAN/CGSB-12.11-M, "Wired Safety Glass."

as a means of egress shall be protected by barriers or railings.

4) Sliding glass *partitions* that separate a *public corridor* from an adjacent occupancy

2) Except as provided in Sentence (4), glass in entrance doors to *dwelling units* and in public areas, other than the entrance doors described in Sentence (1), shall be safety glazing or wired glass of the type described in Sentence (1) where the glass area exceeds 0.5 m² and extends to less than 900 mm from the bottom of the door.

6) Glazing used for a shower or bathtub enclosure shall conform to Class A of CAN/CGSB-12.1, "Safety Glazing."



Where is wired glass permitted in NBC 2020?

9.8.8.7. Glass in Guards

9.8.8.7. Glass in Guards

- 1) Glass in *guards* shall be
 - a) safety glazing of the laminated or tempered type conforming to CAN/CGSB-12.1, "Safety Glazing," or
 - b) wired glass conforming to CAN/CGSB-12.11-M, "Wired Safety Glass."



NBC 2020 recognizes latest safety glazing standard

- The recently updated CAN/CGSB-12.1-2017, Safety Glazing is now recognized in the NBC
- The code now uses the term **safety glazing** instead of safety glass
- Annealed **wired glass cannot satisfy the safety glass testing criteria** of this standard!

Table 1.3.1.2.
Documents Referenced in the National Building Code of Canada 2020⁽¹⁾⁽²⁾
Forming Part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number ⁽³⁾	Title of Document	Code Reference
CGSB	CAN/CGSB-12.1-2017	Safety Glazing	3.3.1.20.(3) 3.3.2.17.(1) 3.3.2.17.(2)



Where is wired glass excluded in NBC 2020?

Because wired glass **cannot satisfy the safety glass testing criteria** of CAN/CGSB-**12.1-2017**, the 2020 code **does not allow it to be used in bath or shower enclosures**, and **limits its use in Assembly Occupancies**



Glass in bath and shower enclosures



2015 NBC

3.7.2.5. Safety Glass

- 1)** Glass, other than safety glass, shall not be used for a shower or bathtub enclosure.

2020 NBC

3.7.2.4. Safety Glazing

- 1)** Glazing used for a shower or bathtub enclosure shall conform to Class A of CAN/CGSB-12.1, "Safety Glazing."

9.6.1.4. Types of Glazing and Protection of Glazing

- 6)** Glazing used for a shower or bathtub enclosure shall conform to Class A of CAN/CGSB-12.1, "Safety Glazing."



Assembly Occupancies

In a new Subsection within Part 3, **3.3.2 Assembly Occupancy**

Assembly occupancy (Group A) means the *occupancy* or the use of a *building* or part thereof by a gathering of persons for civic, political, travel, religious, social, educational, recreational or like purposes, or for the consumption of food or drink.

Because large numbers of people may be present in Assembly Occupancies, a higher level of safety was deemed necessary. Proposed change 1444 proposed that **only safety glazing conforming to CAN/CGSB-12.1-2017 could be used where the risk of human impact with the glass was greater** and described the rationale for the types of human impact this code requirement anticipates



3.3.2 Assembly Occupancy

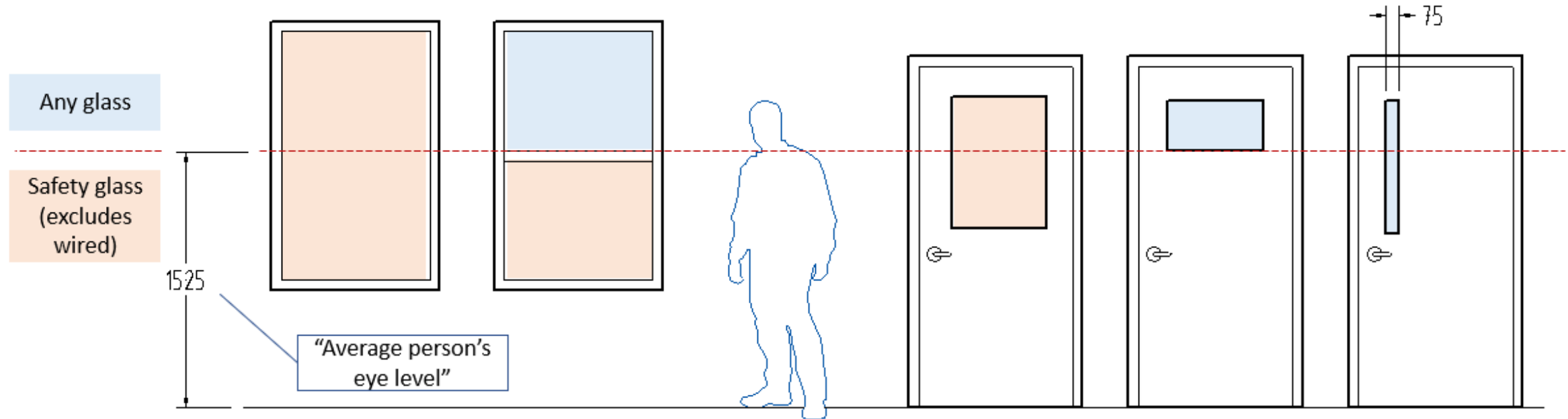
3.3.2.17. Safety Glazing

- 1)** Except as permitted in Sentence (3), glazing in all fixed and operable panels of doors shall conform to Class A of CAN/CGSB-12.1, "Safety Glazing."
- 2)** Except as permitted in Sentence (4), glazing in all fixed and operable panels of windows shall conform to Class A of CAN/CGSB-12.1, "Safety Glazing."
- 3)** Glazing in individual fixed or operable panels of a door need not comply with Sentence (1), where
 - a) the bottom exposed edge of the glazing is located more than 1 525 mm above the walking surface on each side of the door, or
 - b) the glazed opening in the door does not permit the passage of a sphere whose diameter is more than 75 mm.
- 4)** Glazing in individual fixed or operable panels of a window need not comply with Sentence (2), where
 - a) the bottom exposed edge of the glazing is located more than 1 525 mm above the walking surface on each side of the window, or
 - b) the glazing is located more than 915 mm away from the walking surface on each side of the window measured perpendicular to the plane of the glazing.



Safety glazing in assembly occupancies is not required where:

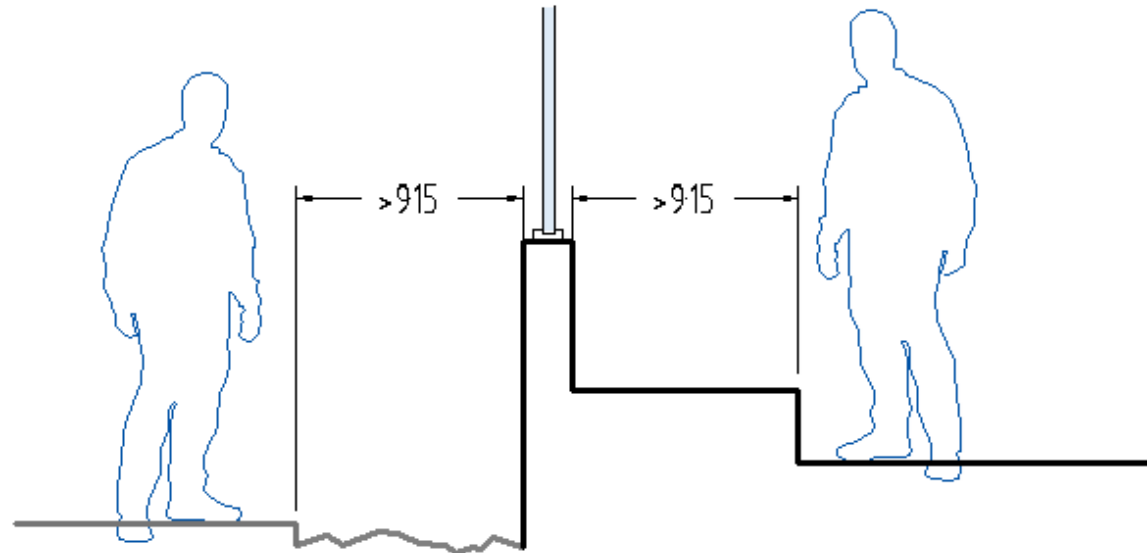
1. The bottom exposed edge of the glass is above 1525 mm from the walking surface
2. The glazed opening in the door is not wider than 75 mm
3. The glazing is located more than 915 mm horizontally from the walking surface, measured perpendicular to the glass
4. The horizontal distance from the walking surface to the glazing on either side is 915 or greater



Safety glazing in assembly occupancies is not required where:

1. The bottom exposed edge of the glass is above 1525 mm from the walking surface
2. The glazed opening in the door is not wider than 75 mm
3. The glazing is located more than 915 mm horizontally from the walking surface, measured perpendicular to the glass
4. The horizontal distance from the walking surface to the glazing on either side is 915mm or greater

Any glass OK



Do these safety glass requirements make sense?

Wired glass can be used in guards, doors and door sidelites.

Wired glass cannot be used at tubs and showers, or below 1525 mm in Part 3 Assembly Occupancies

Does this make sense?

Should industry participants consider submitting a Proposed Change for the next edition of the NBC to remove wired glass from all areas of the code except where it is specifically required for fire safety?

What do **you** think?



4. Child fall prevention changes

- PCF 1238: Protection of Windows in Part 9 Residential Buildings
 - The previous NBC code language exempted windows from needing a guard or sash restrictor if “the window serves a dwelling unit that is not located above another suite.”
 - This exempted second storey windows in the vast majority of Part 9 buildings.
 - The City of Calgary and Alberta medical advocates lobbied to close this loophole.



- PCF 1238: Protection of Windows in Part 9 Residential Buildings

Building code changes will prevent kids from falling out windows, city says



15% of major trauma patients at Alberta Children's Hospital in 2016 were children who fell out windows

CBC News · Posted: Apr 10, 2019 12:42 PM MT | Last Updated: April 10



The City of Calgary has been working with the National Research Council (NRC) and medical advocates to get changes made to the National Building Code to reduce the risk of children falling out of residential windows. (City of Calgary)

City officials say years of advocating for changes to the National Building Code to make second-storey windows safer for children seem to have finally paid off.

"Every year across Canada, over 420 young children are treated in emergency departments because they have fallen out of second-storey windows in their homes," said City of Calgary Chief Building Official Marco Civitarese in a release.

The city has been working with the National Research Council (NRC) and emergency pediatrician Dr. Michelle Simonelli to make changes to the National Building Code make windows safer for children.

Every year about 50 children are treated in Alberta ERs after falling from windows, says Simonelli, who is the Medical Director of Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) at Alberta Children's Hospital.

At the Alberta Children's Hospital in 2016, 15 per cent of major trauma patients were children who fell out of the windows in their own homes.

Simonelli says children who fall out windows often suffer severe injuries, such as traumatic brain injuries, skull and spine fractures, and internal injuries such as liver lacerations.

- PCF 1238: Protection of Windows in Part 9 Residential Buildings



Emergency crews care for a young patient who fell out of a second-storey window at a Calgary house. (City of Calgary)

"These children were too young to understand the risks of playing by an unprotected window or pushing against window screens, which are not designed to keep them from falling through," Simonelli said.

As it stands, the building code has no restrictions on how wide a second-storey window in a house can be opened, how far from the floor can be, or any mandatory safety devices to restrict opening a window.

The proposed changes include a new rule stating that the portion of a second storey window that is able to open must be at least three feet from the finished floor, or the window must have a device in place to permanently restrict the opening to no more than four inches.

Officials say they're confident the new rules will be added to the revised National Building Code that comes into force next year.

It will apply only to new homes, so officials recommend parents consider installing child locks or opening-limiters as part of baby-proofing their home.

- Previous Code language:

4) Except as provided in Sentence (5), openable windows in *buildings of residential occupancy* shall be protected by

- a) a *guard*, or
- b) a mechanism capable of controlling the free swinging or sliding of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm measured either vertically or horizontally where the other dimension is greater than 380 mm.

(See Note A-9.8.8.1.(4).)

5) Windows need not be protected in accordance with Sentence (4), where

- a) ~~the window serves a *dwelling unit* that is not located above another *suite*,~~
- b) ~~the window serves a house with a *secondary suite*,~~
- c) the only opening greater than 100 mm by 380 mm is a horizontal opening at the top of the window,
- d) the window sill is located more than 450 mm above the finished floor on one side of the window, or
- e) the window is located in a room or space with the finished floor described in Clause (d) located less than 1 800 mm above the floor or ground on the other side of the window.

(See Note A-9.8.8.1.(4).)



- New NBC 2020 Code Language from the Proposed Change Request

- [4] 4) Except as provided in Sentence (5), openable windows in *buildings of residential occupancy* shall be protected by
- [a] a) a *guard*, or
 - [b] b) a mechanism that can only be modified with the use of tools or special knowledge~~capable of to controlling~~ the free swinging or sliding operation of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm measured either vertically or horizontally. ~~where the other dimension is greater than 380 mm.~~
- [5] 5) Windows need not be protected in accordance with Sentence (4), where the bottom edge of the openable portion of the window is located
- [a] a) ~~the bottom edge of the openable portion of the window is more than 900 mm above the finished floor, or the window serves a dwelling unit that is not located above another suite,~~
 - [b] --) less than 1 800 mm above the floor or ground on the other side of the window.
 - [c] b) ~~the window serves a house with a secondary suite,~~
 - [d] c) ~~the only opening greater than 100 mm by 380 mm is a horizontal opening at the top of the window,~~
 - [e] d) ~~the window sill is located more than 450 mm above the finished floor on one side of the window, or~~
 - [f] e) ~~the window is located in a room or space with the finished floor described in Clause (d)~~a) located less than 1 800 mm above the floor or ground on the other side of the window.



- New NBC 2020 Code Language from the Proposed Change Request
-
- 4) Except as provided in Sentence (5), openable windows in *buildings of residential occupancy* shall be protected by
 - a) a guard, or
 - b) a mechanism that can only be modified with the use of tools or special knowledge to control the free swinging or sliding operation of the openable part of the window so as to limit any clear unobstructed opening to not more than 100mm measured either vertically or horizontally.
 - 5) Windows need not be protected in accordance with Sentence (4), where the bottom edge of the operable portion of the window is located
 - a) more than 900mm above the finished floor, or
 - b) less than 1800mm above the floor or ground on the other side.



- PCF 1238: Protection of Windows in Part 9 Residential Buildings

4) Except as provided in Sentence (5), openable windows in *buildings of residential occupancy* shall be protected by

- a) a guard, or
- b) a mechanism that can only be modified with the use of tools or special knowledge to control the free swinging or sliding operation of the openable part of the window so as to limit any clear unobstructed opening to not more than 100mm measured either vertically or horizontally.

9.9.10.1 Egress Windows or Doors for Bedrooms

- 1) Except where the suite is sprinklered, each bedroom or combination bedroom shall have at least one outside window or exterior door openable from the inside without the use of keys, tools or special knowledge and without the removal of sashes or hardware.



Fenestration Canada proposed the following changes to the wording of the code:

b) a mechanism which conforms to one of the following standards :

i) ASTM F2006, « Window Fall Prevention Devices for Non-Emergency Escape (Egress) and Rescue (Ingress) Windows »; or

ii) ASTM F2090, « Window Fall Prevention Devices With Emergency Escape (Egress) Release Mechanisms »;

which is capable of controlling the free swinging or sliding of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm measured either vertically or horizontally.

The request was rejected as having been made too late in the process which would have risked pushing this code change request out to the 2025 cycle.



A-9.8.8.1.(4) Window Fall Prevention. The primary intent of the requirement is to minimize the likelihood of small children falling significant heights from open windows. Reflecting reported cases, the requirement applies to openable windows in dwelling units and generally those located on the second floor or higher of residential or mixed use buildings.

Once cracked open, some openable windows can be opened further by simply pushing on the openable part of the window. Care must be taken in selecting windows, as some with special operating hardware can still be opened further by simply pushing on the window or by deactivating a spring-loaded button or other mechanism that is not considered a window opening control device (WOCD) that could be inadvertently operated by a young child. A technical description of WOCDs can be found in ASTM F2090, "Standard Specification for Window Fall Prevention Devices With Emergency Escape (Egress) Release Mechanisms."

- b) a mechanism that can only be modified with the use of tools or special knowledge to control the free swinging or sliding operation of the openable part of the window so as to limit any clear unobstructed opening to not more than 100mm measured either vertically or horizontally.





Designation: F2090 – 10

Standard Specification for Window Fall Prevention Devices With Emergency Escape (Egress) Release Mechanisms¹

4.5 Window fall prevention screens or fall prevention window guard devices shall be designed with release mechanisms to allow for emergency escape (egress) without the need for special tools or special knowledge.

4.5.1 Operation of emergency escape (egress) mechanisms shall be accomplished with a minimum amount of effort from the inside of the building, whether the window fall prevention screen and fall prevention window guard device is mounted inside or outside the building.

4.5.2 Release of the emergency escape (egress) mechanism shall require no more than 15 lbf (66 N) of force.¹⁴

4.5.3 To protect against inadvertent operation by a young child, the emergency escape (egress) release mechanism(s) shall require two distinct actions to operate.¹⁵ Opening the window fall prevention screen or fall prevention window guard shall not count as one of these actions.



- PCF 1238: Protection of Windows in Part 9 Residential Buildings

5) Windows need not be protected in accordance with Sentence (4), where the bottom edge of the operable portion of the window is located

- a) more than 900mm above the finished floor, or
- b) less than 1800mm above the floor or ground on the other side.



- PCF 1238: Protection of Windows in Part 9 Residential Buildings
 - So where does this leave us?
 - Parents with small children are not going to be allowed to protect their second storey bedroom windows with sash restrictors, as they are required to meet egress requirements – unless the building is sprinklered.
 - In BC, window opening heights will need to increase from > 450mm to > 900mm in order to not require sash restrictors. In other provinces, openings will now need to be protected at 900mm and below.
 - As there is no height limit on an egress window (in fact an out-of-reach basement bedroom window can be required to meet egress), one solution for child fall protection is to place the opening so high that it is not possible for a child to climb up to it. So we will expect to see a lot of operators over fixed lite combinations to address this, when the window sills are required to be below 900mm.
 - We are going to keep seeing deactivated or removed sash restrictors after final inspection on projects where the homeowners don't have small children and want to open the windows fully for ventilation, and these homes will often be sold on to homeowners who have children.



- PCF 1238: Protection of Windows in Part 9 Residential Buildings



Fenestration Canada has a working group on this.

RE: Operable Guards Language NBC 2020 Meeting Minutes



terry@fenestrationcanada.ca

To ○ 'Lauren Hartley'; ○ 'Brad Fevold'; ✓ Dave Goldsmith, P.Eng; ○ davidmc@marvin.com; ○ 'Hayden, Joe'; ○ 'Mikkelson, Mark';
○ 'Jutras, Robert'; ○ 'Scott Stephenson'

Thu 1/12/2023 11:24 AM

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Follow up. Start by Thursday, January 12, 2023. Due by Thursday, January 12, 2023.

Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

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Good day all and Happy New Year,

I would like to share the text that was included in the Quebec updates to their 2015 code w/amendments.

This specifically references F2090 devices allowing their use, contrary to the language in 2020NBC.

Additionally, there is no reference to F2090 WOCDs in the 9.8.8.1 Annex notes.

I am trying to get information from other provinces on their intent regarding fall protection and the 2020NBC language.

We will be reaching out to call another meeting of our group to continue on this item.



9.8.8.1

4) Except as provided in Sentence (5), openable windows in *buildings of residential occupancy* shall be protected

a) where the window is not required as a *means of egress* in accordance with Sentence 9.9.10.1.(1), by

i) a *guard*, or

ii) a mechanism capable of controlling the free swinging or sliding of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm measured either vertically or horizontally where the other dimension is greater than 380 mm,

b) where the window is required as a *means of egress* in accordance with Sentence 9.9.10.1.(1), by a mechanism

i) capable of controlling the free swinging or sliding of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm measured either vertically or horizontally where the other dimension is greater than 380 mm,

ii) openable from inside the room without requiring keys, special devices or specialized knowledge, and

iii) conforming to ASTM F 2090, "Window Fall Prevention Devices With Emergency Escape (Egress) Release Mechanisms."



5. Fenestration Energy Performance – Part 9

Base Code fenestration U-factors/ER unchanged in 9.36.2

No change to prescriptive levels for U-factors or ER, since 2010

Prescriptive U-factors now based on values that treat A440.2 and NFRC derived ratings the same by reporting in three significant digits and accounting for conversion and rounding in NFRC.

2015 NBC

Table 9.36.2.7.-A
Required Thermal Characteristics of Fenestration and Doors
Forming Part of Sentence 9.36.2.7.(1)

Components	Thermal Characteristics ⁽¹⁾	Heating Degree-Days of <i>Building Location</i> , ⁽²⁾ in Celsius Degree-Days					
		Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
Fenestration ⁽³⁾ and doors	Max. U-value, W/(m ² ·K)	1.80	1.80	1.60	1.60	1.40	1.40
	Min. Energy Rating	21	21	25	25	29	29

2020 NBC

Components	Thermal Characteristics ⁽¹⁾	Heating Degree-Days of <i>Building Location</i> , ⁽²⁾ in Celsius Degree-Days					
		Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
Fenestration ⁽³⁾ and doors	Max. U-value, W/(m ² ·K)	1.84 0.32	1.84 0.32	1.61 0.28	1.61 0.28	1.44 0.25	1.44 0.25
	Min. Energy Rating	21	21	25	25	29	29



5. Fenestration Energy Performance – Part 9

New – Tiered Energy Performance Compliance – Sec. 9.36.7 and 9.36.8

9.36.	Energy Efficiency	
9.36.1.	General	9-236
9.36.2.	Building Envelope	9-237
9.36.3.	HVAC Requirements	9-249
9.36.4.	Service Water Heating Systems ..	9-255
9.36.5.	Energy Performance Compliance	9-258
9.36.6.	Airtightness of Building Envelope	9-270
9.36.7.	Tiered Energy Performance Compliance: Performance Path ..	9-272
9.36.8.	Tiered Energy Performance Compliance: Prescriptive Path ...	9-274



5. Fenestration Energy Performance – Part 9

- The **higher-than-base-code** Tiered energy performance levels are intended to be triggered by local Authorities Having Jurisdiction (AHJs = Provinces and Municipalities)
- Only base code is in effect until a higher Tier is implemented by code adoption or building bylaw
- In BC, Step Code levels are sometimes in effect in only a portion of a jurisdiction, or for buildings heated with a more or less efficient fuel type
- It remains to be seen how AHJs across Canada will implement the Tiers
- Some BC municipalities have declared “climate emergencies” and gone straight to the higher tiers



Tiered Performance Path 9.36.7

- Tiers 2 to 5 aim at reducing a building's overall heat loss by 5 to 40%

Table 9.36.7.2.
Energy Performance Tiers for Buildings and Houses
 Forming Part of Sentence 9.36.7.2.(1)

Total Volume of Conditioned Space Within the Building or House	Energy Performance Metrics	Target Energy Performance				
		Applicable Energy Performance Tier				
		1	2	3	4	5
> 1300 sft home > 300 m ³ and where volume is not determined	Percent heat loss reduction ⁽¹⁾	n/a	≥ 5%	≥ 10%	≥ 20%	≥ 40%
	Percent improvement ⁽²⁾ OR Percent house energy target ⁽³⁾	≥ 0%	≥ 10%	≥ 20%	≥ 40%	≥ 70%
		≤ 100%	≤ 90%	≤ 80%	≤ 60%	≤ 30%
≤ 1300 sft home ≤ 300 m ³	Percent heat loss reduction ⁽¹⁾	n/a	≥ 0%	≥ 5%	≥ 15%	≥ 25%
	Percent improvement ⁽²⁾ OR Percent house energy target ⁽³⁾	≥ 0%	≥ 0%	≥ 10%	≥ 30%	≥ 60%
		≤ 100%	≤ 100%	≤ 90%	≤ 70%	≤ 40%



Tiered *Performance* Path 9.36.7

- The Tiered Performance path is achieved by whole-building energy modeling to demonstrate that the energy performance of the proposed house is a percentage better than that of a reference house that meets all the prescriptive requirements.
- There were concerns expressed by the industry that building energy modeling that credits passive solar heat gain during the heating season (the ER path) can result in summertime overheating problems, as has been reported in buildings designed to Energy Step Codes in BC (BCBC 2018 Part 10)
- The Standing Committee appears to have taken this into account in the National Codes by requiring that peak cooling loads be taken into account, even when the proposed house does not have a cooling system.



Tiered Performance Path 9.36.7

9.36.7.3. Energy Performance Improvement Compliance Calculations

- 1)** Except where otherwise stated in this Article, the proposed and reference houses shall be modeled in accordance with Subsection 9.36.5. to determine
 - a) the annual energy consumption of the proposed house and the house energy target of the reference house,
 - b) the annual gross space heat loss of the proposed and reference houses calculated in accordance with Sentence (5), and
 - c) the peak cooling load of the proposed and reference houses (see Sentence (4)).(See Note A-9.36.7.3.(1).)
- 2)** The peak cooling load for the proposed house shall not be greater than the peak cooling load for the reference house. (See Sentence (4).)
- 4)** Where cooling systems are not installed in the proposed house, both the proposed and reference houses shall have additional models using appropriately sized space-cooling equipment serving all *conditioned spaces* to determine the peak cooling load. (See Note A-9.36.7.3.(4).)



Tiered *Prescriptive* Path 9.36.8 (except BC and ON)

The tiered prescriptive path is in Subsection 9.36.8, where currently only one Tier is defined: **Tier 2**, (**5% heat loss reduction**) which requires 10 points

Table 9.36.8.2.
Energy Performance Tiers
Forming Part of Clause 9.36.8.2.(1)(a)

Energy Performance Tier	Minimum Sum of Energy Conservation Points
1	(1)
2	10
3	Reserved
4	Reserved
5	Reserved

The prescriptive **tiers are defined with points**, and builders can choose from a variety of energy conservation measures, as long as they add up to the required number of points: 10



Tiered *Prescriptive* Path 9.36.8 (except BC and ON)

ENERGY STAR rated windows can get between 3.4 and 7.0 points, depending on the climate zone of the building location.

Table 9.36.8.6.
Energy Conservation Measures and Points for Fenestration and Doors
Forming Part of Article 9.36.8.6.

Energy Conservation Measures for Fenestration and Doors ⁽¹⁾		Heating Degree-Days of <i>Building</i> Location, in Celsius Degree-Days					
Maximum U-values, W/(m ² ×K)	Minimum Energy Ratings ⁽²⁾	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
		Energy Conservation Points					
1.61	25	1.9	1.8	–	–	–	–
1.44	29	3.8	3.6	1.6	1.8	–	–
1.22	34	6.9	7.0	4.6	5.5	3.2	3.4

This may change the value proposition of high-performance windows for builders.



Table 9.36.8.5.
Energy Conservation Measures and Points for Above-Ground Walls⁽¹⁾
 Forming Part of Sentences 9.36.8.5.(2), (6) and (7)

Energy Conservation Measures for Above-Ground Walls – Minimum Effective RSI Values, (m ² ×K)/W	Heating Degree-Days of <i>Building</i> Location, in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Energy Conservation Points					
2.97	2.0	–	–	–		
3.08	3.2 ES 6.9	1.4	1.6	2.1		
3.69	7.4	5.4 ES 7.0	6.2 ES 4.6	6.7 ES 5.5	5.4	5.2
3.85	8.2	6.0	6.9	7.4	6.2	6.0
3.96	8.9	6.8	7.7	8.2	7.0 ES 3.2	6.8 ES 3.4
4.29	10.2	8.1	9.2	9.7	8.6	8.4
4.40	10.8	8.7	9.9	10.3	9.3	9.1
4.57	11.4	9.3	10.6	11.1	10.1	9.9
4.73	11.9	9.7	11.1	11.5	10.6	10.4
4.84	12.3	10.2	11.6	12.1	11.2	10.9
5.01	12.9	10.7	12.2	12.7	11.8	11.6
5.45	14.0	11.9	13.6	14.0	13.3	13.1

Maximum points available from windows for each zone

6. Encapsulated Mass Timber Construction

- A new construction type in Part 3.1.6 of the code
- Is not “combustible construction”, not “heavy timber construction”, not “noncombustible construction”
- It allows wood-framed structural beams, columns, solid-wood floor slabs and wall panels that are “encapsulated” with material having an “encapsulation rating” determined using the ULC S146 test method
- Limited to 12 storeys



Encapsulated Mass Timber Construction – Arbora, Montreal



Images: Nordic Structures



Confidential. For internal use only.

The removal of restrictions on combustible window sashes and frames does not apply to windows in Encapsulated Mass Timber Construction

3.1.6.8. Combustible Window Sashes and Frames

1) *Combustible* window sashes and frames are permitted in a *building* or part of a *building* permitted to be of *encapsulated mass timber construction*, provided

- a) each window in an exterior wall face is an individual unit separated from every other opening in the wall by *noncombustible* wall construction or mass timber wall construction conforming to the dimensions stated in Table 3.1.6.3.,
- b) windows in exterior walls in contiguous *storeys* are separated by not less than 1 m of *noncombustible* wall construction or mass timber wall construction conforming to the dimensions stated in Table 3.1.6.3., and
- c) the aggregate area of openings in an exterior wall face of a *fire compartment* is not more than 40% of the area of the wall face.

- PCF 1355 had not yet been approved while PCF 1024 was still being reviewed
- **OR**
- PCF 1024 (Encapsulated Mass Timber Construction)—a large and complex change adding a new Subsection to the Code—was being discussed concurrently with PCF 1355 on Combustible Window Frames at the SCFP.



7. Accessibility Changes – 3.3.1.13 Doors and Door Hardware

Minimum clear opening of **access to exit doors** increased from 800 mm to 850mm per door leaf

- (1) Except as required by Article 3.3.3.4., a door that opens into or is located within a public corridor or other facility that provides *access to exit* from a *suite*, **shall**
- (a) **shall** provide a clear opening of not less than ~~800~~**850 mm**, if there is only one door leaf,
 - (b) **shall**, in a doorway with multiple leaves, have the active leaf providing a clear opening of not less than ~~800~~**850mm**,

Access to exit means that part of a *means of egress* within a *floor area* that provides access to an *exit* serving the *floor area*.

Means of egress means a continuous path of travel provided for the escape of persons from any point in a *building* or contained open space to a separate *building*, an open public thoroughfare, or an exterior open space protected from fire exposure from the *building* and having access to an open public thoroughfare. *Means of egress* includes *exits* and *access to exits*.

3.3.3.4. Doorway Width

1) Except as provided in Sentence (2) and within individual *suites of care occupancy*, the minimum clear width of a doorway shall be 850 mm where it opens into or is located within a *public corridor* or other facility that provides *access to exit* for patients or residents in *floor areas* containing *care* or *treatment occupancies*.

2) The minimum clear width of doorways through which it is necessary to move patients in bed shall be 1 050 mm. (See Note A-3.3.3.4.(2).)



7. Accessibility Changes – 3.8.2

2015

3.8.2. Application

3.8.2.1. Exceptions

(See Note A-3.8.2.1.)

- 1) The requirements of this Section apply to all *buildings* except
 - a) detached houses, semi-detached houses, houses with a *secondary suite*, duplexes, triplexes, townhouses, row houses and boarding houses (see Note A-1.4.1.2.(1) of Division A, Secondary Suite),
 - b) *buildings* of Group F, Division 1 *major occupancy*, and
 - c) *buildings* that are not intended to be occupied on a daily or full-time basis, including automatic telephone exchanges, pumphouses and substations.

3.8.2.2. Entrances

(See Note A-3.8.2.2.)

1) In addition to the *barrier-free* entrances required by Sentence (2), not less than 50% of the pedestrian entrances of a *building* referred to in Sentence 3.8.2.1.(1) shall be *barrier-free* and shall lead from

- a) the outdoors at sidewalk level, or
- b) a ramp that complies with Subsection 3.8.3. and leads from a sidewalk.

2) A *suite of assembly occupancy, business and personal services occupancy or mercantile occupancy* that is located in the *first storey* of a *building*, or in a *storey* to which a *barrier-free* path of travel is provided, and that is completely separated from the remainder of the *building* so that there is no access to the remainder of the *building*, shall have at least one *barrier-free* entrance.

3) A *barrier-free* entrance required by Sentence (1) or (2) shall be designed in accordance with Subsection 3.8.3.

4) At a *barrier-free* entrance that includes more than one doorway, only one of the doorways is required to be designed in accordance with Subsection 3.8.3.

5) If a *walkway* or pedestrian bridge connects two *barrier-free storeys* in different *buildings*, the path of travel from one *storey* to the other *storey* by means of the *walkway* or bridge shall be *barrier-free*.

2020

3.8.2. Application MURBS, all buildings accessible to the general public

3.8.2.1. Exceptions

(See Note A-3.8.2.1.)

- 1) The requirements of this Section apply to all *buildings* except
 - a) detached houses, semi-detached houses, houses with a *secondary suite*, duplexes, triplexes, townhouses, row houses and boarding houses (see Note A-1.4.1.2.(1) of Division A, Secondary Suite),
 - b) *buildings* of Group F, Division 1 *major occupancy*, and
 - c) *buildings* that are not intended to be occupied on a daily or full-time basis, including automatic telephone exchanges, pumphouses and substations.

3.8.2.2. Entrances

(See Note A-3.8.2.2.)

1) Except for service entrances and entrances to *suites* described in Clause 3.8.2.3.(2)(l), all pedestrian entrances to a *barrier-free storey* of a *building* referred to in Sentence 3.8.2.1.(1) shall be *barrier-free* and shall connect to a *barrier-free* exterior path of travel complying with Sentence 3.8.2.5.(1).

2) A *barrier-free* entrance required by Sentence (1) shall be designed in accordance with Subsection 3.8.3.

3) At a *barrier-free* entrance that includes more than one doorway, only one of the doorways is required to be designed in accordance with Subsection 3.8.3.

4) If a *walkway* or pedestrian bridge connects two *barrier-free storeys* in different *buildings*, the path of travel from one *storey* to the other *storey* by means of the *walkway* or bridge shall be *barrier-free*.

Also barrier-free paths of travel within buildings . . .



7. Accessibility Changes – 3.8.2.2

3.8.2.2. Entrances

(See Note A-3.8.2.2.)

1) In addition to the *barrier-free* entrances required by Sentence (2) not less than 50% of the pedestrian entrances of a *building* referred to in Sentence 3.8.2.1.(1) shall be *barrier-free* and shall lead from

- a) the outdoors at sidewalk level, or
- b) a ramp that complies with Subsection 3.8.3. and leads from a sidewalk.

2) A *suite of assembly occupancy, business and personal services occupancy or mercantile occupancy* that is located in the *first storey* of a *building*, or in a *storey* to which a *barrier-free* path of travel is provided, and that is completely separated from the remainder of the *building* so that there is no access to the remainder of the *building*, shall have at least one *barrier-free* entrance.

2015

3.8.2.2. Entrances

(See Note A-3.8.2.2.)

1) Except for service entrances and entrances to *suites* described in Clause 3.8.2.3.(2)(1), all pedestrian entrances to a *barrier-free storey* of a *building* referred to in Sentence 3.8.2.1.(1) shall be *barrier-free* and shall connect to a *barrier-free* exterior path of travel complying with Sentence 3.8.2.5.(1).

2020



8. Changes in the wording of 5.9.2.3. NBC 2015:

5.9.2.3. Structural and Environmental Loads, Air Leakage and Water Penetration

- 1)** Windows, doors, skylights and their components shall be designed and constructed in accordance with
- a) Article 5.1.4.1., Section 5.4. and Section 5.6., or
 - b) Article 5.9.2.2., where they are covered in the scope of the standards listed in Sentence 5.9.2.2.(1).
- (See Note A-5.9.2.3.(1).)

5.1.4. Resistance to Loads and Deterioration

5.3. Heat Transfer

5.4. Air Leakage

5.6. Precipitation



BCBC 2018 wording:

5.9.2.2. Design and Construction

(See Note A-5.9.2.2.)

- 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 Note A-5.9.2.2.(1))

- 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 Note A-5.9.2.2.(2).)

A-5.9.2.2.(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 5.9.2.2.(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.



NBC 2020 wording:

5.9.2.3. Structural and Environmental Loads, Air Leakage and Water Penetration

- 1)** Windows, doors, skylights and their components shall be designed and constructed in accordance with
- a) Article 5.1.4.1., Section 5.4. and Section 5.6., where they are not covered in the scope of the standards listed in Sentence 5.9.2.2.(1), or
 - b) Article 5.9.2.2., where they are covered in the scope of the standards listed in Sentence 5.9.2.2.(1).
- (See Note A-5.9.2.3.(1).)





Thank You!

