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## Proposed Change 1964

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<b>Code Reference(s):</b>	<b>NBC20 Div.B 9.25.2.2. (first printing)</b> <b>NBC20 Div.B 9.25.2.5. (first printing)</b>
Subject:	Spray-Applied Polyurethane Insulation
Title:	Introduction of References to New Material and Installation Standards for Light-Density, Open-Cell, Spray-Applied Polyurethane Foam
Description:	This proposed change introduces references to CAN/ULC-S712.1:2021, "Standard for Thermal Insulation – Light Density, Open Cell Spray Applied Semi-Rigid Polyurethane Foam – Material Specification," and CAN/ULC-S712.2:2020, "Standard for Thermal Insulation – Light Density, Open Cell Spray Applied Semi-Rigid Polyurethane Foam – Installation," in Part 9 of the NBC.

This change could potentially affect the following topic areas:

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|--|---|
| <input type="checkbox"/> Division A                                | <input checked="" type="checkbox"/> Division B              |
| <input type="checkbox"/> Division C                                | <input checked="" type="checkbox"/> Design and Construction |
| <input type="checkbox"/> Building operations                       | <input checked="" type="checkbox"/> Housing                 |
| <input checked="" type="checkbox"/> Small Buildings                | <input type="checkbox"/> Large Buildings                    |
| <input type="checkbox"/> Fire Protection                           | <input type="checkbox"/> Occupant safety in use             |
| <input type="checkbox"/> Accessibility                             | <input type="checkbox"/> Structural Requirements            |
| <input checked="" type="checkbox"/> Building Envelope              | <input type="checkbox"/> Energy Efficiency                  |
| <input type="checkbox"/> Heating, Ventilating and Air Conditioning | <input type="checkbox"/> Plumbing                           |
|  | <input type="checkbox"/> Construction and Demolition Sites  |

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### Problem

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There are currently no explicit requirements related to light-density, open-cell, spray-applied, semi-rigid polyurethane foam in Part 9 of Division B of the NBC. Nevertheless, this material is commonly used in practice to provide resistance to heat flow and air movement.

This situation leads to inconsistencies in the design, construction and performance of these materials across Canada. These inconsistencies could result in poor thermal barrier and air barrier performance, which could result in poor indoor air quality, mould growth and a reduced resistance to the deterioration of wall and roof assemblies, which could damage the building and potentially impact the health of people.

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## Justification

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The current practice of using light-density, open-cell, spray-applied, semi-rigid polyurethane foam in Canada is not governed by minimum requirements in the NBC. Therefore, it is very difficult for building officials to enforce minimum performance requirements, which has led to inconsistent design and construction. Therefore, there is a need to introduce references to standards in Part 9 of the NBC that provide the minimum material and installation requirements for light-density, open-cell, spray-applied, semi-rigid polyurethane foam.

References to CAN/ULC-S712.1, "Standard for Thermal Insulation – Light Density, Open Cell Spray Applied Semi-Rigid Polyurethane Foam – Material Specification," and CAN/ULC-S712.2, "Standard for Thermal Insulation – Light Density, Open Cell Spray Applied Semi-Rigid Polyurethane Foam – Installation," are also proposed to be introduced into Part 5 of the NBC 2020 (PCF 1803-2023).

These standards

- reflect the minimum performance level in terms of material and installation,
- are suitable for referencing in the NBC,
- will harmonize the minimum performance of this material across Canada, and
- will support minimizing the risks to the health of Canadians caused by poor thermal and air barrier performance, which could result in poor indoor air quality, mould growth and a reduced resistance to the deterioration of wall and roof assemblies.

It should be noted that the 2017 editions of CAN/ULC-S712.1 and CAN/ULC-S712.2 were reviewed. However, this proposed change recommends referring to the latest editions of these standards (2021 and 2020, respectively).

The revisions in CAN/ULC-S712.1:2021 relative to the 2017 edition, which have no effect on the objectives of the Code provisions and should not warrant further review, include the following:

- added non-building applications to the scope of the standard;
- added a reference to ASTM C1045;
- added tolerances to measurements and dimensions;
- changed the test data period from 90 days to 30 days per "Spray Polyurethane Foam Open-Cell (Low-Density) Thermal Aging Study Report";
- aligned wording with CAN/ULC-S705.1; and
- other editorial changes.

The revisions in CAN/ULC-S712.2:2020 relative to the 2017 edition, which have no effect on the objectives of the Code provisions and should not warrant further review, include the following:

- clarified the warning sign as to when a location can be occupied;
- replaced the term "heater vent" with the more appropriate term "B-vent";
- clarified the isolation of inhabited buildings by deleting C5.5.1; and
- referenced publications updated to the latest editions.

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## PROPOSED CHANGE

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### **[9.25.2.2.] 9.25.2.2. Insulation Materials**

- [1] 1)** Except as required in Sentence (2), thermal insulation shall conform to the requirements of
- [a] a) ASTM C726, "Standard Specification for Mineral Wool Roof Insulation Board",
  - [b] b) CAN/CGSB-51.25-M, "Thermal Insulation, Phenolic, Faced",
  - [c] c) CGSB 51-GP-27M, "Thermal Insulation, Polystyrene, Loose Fill",
  - [d] d) CAN/ULC-S701.1, "Standard for Thermal Insulation, Polystyrene Boards",
  - [e] e) CAN/ULC-S702.1, "Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification",
  - [f] f) CAN/ULC-S703, "Standard for Cellulose Fibre Insulation (CFI) for Buildings",
  - [g] g) CAN/ULC-S704.1, "Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced",
  - [h] h) CAN/ULC-S705.1, "Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Material Specification",  
~~or~~
  - [i] i) CAN/ULC-S706.1, "Standard for Wood Fibre Insulating Boards for Buildings", or
  - [j] --) CAN/ULC-S712.1:2021, "Standard for Thermal Insulation – Light Density, Open Cell Spray Applied Semi-Rigid Polyurethane Foam – Material Specification."
- [2] 2)** The *flame-spread ratings* requirements contained in the standards listed in Sentence (1) shall not apply. (See Note A-9.25.2.2.(2).)
- [3] 3)** Insulation in contact with the ground shall be inert to the action of *soil* and water and shall be such that its insulative properties are not significantly reduced by moisture.

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### **[9.25.2.5.] 9.25.2.5. Installation of Spray-Applied Polyurethane**

- [1] 1)** Spray-applied polyurethane insulation shall be installed in accordance with

- [a] --) [CAN/ULC-S705.2, "Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Application",](#) [or](#)
- [b] --) [CAN/ULC-S712.2:2020, "Standard for Thermal Insulation – Light Density, Open Cell Spray Applied Semi-Rigid Polyurethane Foam – Installation."](#)

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## Impact analysis

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In practice, manufacturers have been expected to meet the material standard (CAN/ULC-S712.1) since it was first published in 2010. Designers and installers have had access to the installation standard (CAN/ULC-S712.2) since it was first published in 2017. However, neither of these standards have ever been included in Part 9 of the NBC and, therefore, designers and authorities having jurisdiction have not been able to enforce minimum requirements when light-density, open-cell, spray-applied, semi-rigid polyurethane foam is used.

Adding references to these two standards would decrease the likelihood of confusion for building officials, designers, specification writers, contractors and manufacturers, as there would be explicit minimum performance requirements within the Code.

Similar to what is involved with closed-cell, spray-applied polyurethane, for which standards are already referenced in both Parts 5 and 9, manufacturers of materials for open-cell foams would be required to train installers and have training programs available in Canada.

Open-cell, spray-applied polyurethane must be installed in accordance with CAN/ULC S712.2 under a site quality assurance program (SQAP). Manufacturers require that only specific, certified installers be authorized to install their proprietary spray-polyurethane insulation in buildings. Currently, there are

- at least four different companies offering open-cell, spray-applied polyurethane foam in Canada, and
- three SQAP providers that are accredited to ISO 17024, "Conformity assessment – General requirements for bodies operating certification of persons," as a personnel certification body and accredited to ISO 17020, "Conformity assessment – Requirements for the operation of various types of bodies performing inspection," as an inspection body.

Both CAN/ULC-S712.1 and CAN/ULC-S712.2 are accessible online to the public at no cost.

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## Enforcement implications

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Building officials would be able to request proof of compliance with the material standard CAN/ULC-S712.1 and the installation standard CAN/ULC-S712.2. Compliance with these standards could be enforced without additional resources, and they are accessible online at no cost.

In addition, the inclusion of references to these standards would provide uniform minimum performance requirements for use by building officials when evaluating design submissions, thus improving the enforcement of the Code.

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## Who is affected

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Designers, specification writers, manufacturers, contractors, building owners and building officials.

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## OBJECTIVE-BASED ANALYSIS OF NEW OR CHANGED PROVISIONS

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[\[9.25.2.2.\]](#) 9.25.2.2. ([1] 1) [F51,F63,F80-OH1.1,OH1.2]

[\[9.25.2.2.\]](#) 9.25.2.2. ([1] 1) [F63,F80-OS2.3]

[\[9.25.2.2.\]](#) 9.25.2.2. ([2] 2) no attributions

[\[9.25.2.2.\]](#) 9.25.2.2. ([3] 3) [F51,F63-OH1.1,OH1.2]

[\[9.25.2.2.\]](#) 9.25.2.2. ([3] 3) [F63-OS2.3]

[\[9.25.2.5.\]](#) 9.25.2.5. ([1] 1) [F51,F41,F63-OH1.1] [F51,F63-OH1.2]

[\[9.25.2.5.\]](#) 9.25.2.5. ([1] 1) [F63-OS2.3]