



Evaluation Report CCMC 13684-R Icynene Classic Plus™ (LD-C-70)

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Re-evaluation in progress	

1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “Icynene Classic Plus™ (LD-C-70)”, when used as an insulation material in accordance with the conditions and limitations stated in Section 3 of this Report, complies with the National Building Code 2010:

- Clause 1.2.1.1.(1)(b), Division A, as an alternative solution that achieves at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the following applicable acceptable solutions:
 - Clause 9.25.2.2.(1)(g), Insulation Materials

This opinion is based on CCMC's evaluation of the technical evidence in Section 4 provided by the Report Holder.

2. Description

The product is a spray-in-place, low-density, semi-flexible plastic foam that has an open-cell structure. The foaming system consists of two components, “Base Seal®” isocyanate and “Icynene Classic Plus™ (LD-C-70)” resin, which are mixed on-site by a qualified installer with fixed-ratio positive displacement equipment.

After the product has expanded, the open cells contain air. The chemical reaction occurs within seconds while the product is being installed, with less than 15 minutes needed for curing. After curing, the product remains semi-flexible.

The final cured product is yellow and has a density of 11.2 kg/m³. At 25.4 mm thick, the design thermal resistance is 0.72 (m²·K)/W.

3. Conditions and Limitations

CCMC's compliance opinion in Section 1 is bound by the “Icynene Classic Plus™ (LD-C-70)” being used in accordance with the conditions and limitations set out below.

- As specified by the manufacturer, the product must be manufactured on-site by qualified installers trained and approved by Icynene Inc. Morrison Hershfield is the third-party certification organization specified by Icynene Inc. to conduct random follow-up field inspections of qualified installers who are trained to spray semi-flexible, urethane-based foam insulation in accordance with the installation manual of the product. Morrison Hershfield can be contacted at (800) 796-5792.
- The product can be installed in new or retrofit constructions. In either case, the product must be installed in open cavities in the following locations of a wood-frame construction that meets the requirements of the NBC 2010 (see Figure 1):
 - exterior walls including perimeter joists;
 - cathedral ceilings with a vented air space as required by the NBC 2010;
 - floors separating living spaces from a garage;
 - cantilever overhang floors; and
 - interior below-grade foundation walls.
- The building envelope in which this product is installed must conform to the requirements of the NBC 2010 for vapour barrier, air barrier and dampproofing (interior below-grade walls).

- For retrofit applications, the qualified installers must ensure that the spraying area is isolated and negatively pressurized by using an exfiltration rate of 0.3 air changes per hour for at least one (1) day. An independent toxicological assessment determined that this ventilation rate must also be in effect for one (1) day before occupancy is permitted in the newly insulated suite.
- The sprayed material should completely cover the surfaces between the studs, joists and other framing members. The surfaces to be covered should be clean, dry, and not covered in frost, oil, grease, dust or other unsuitable material. As required in Article 9.25.2.3., Installation of Thermal Insulation, of Division B of the NBC 2010, the insulation must be installed so that there is a reasonably uniform insulating value over the entire face of the insulated area.
- The interior side of the applied semi-flexible polyurethane insulation must be covered with an approved thermal barrier as per Article 9.10.17.10., Protection of Foamed Plastics, of Division B of the NBC 2010.
- The insulation should be kept away from heat-emitting devices, such as recessed light fixtures and chimneys, at the minimum distance required by building regulations and safety codes.
- The maximum in-service temperature of the insulation must not exceed 70°C.
- This product cannot be used where it may come in contact with water and must not be installed after its expiry date of one (1) year from the date of manufacture.
- The components, “Base Seal®” isocyanate and “Icynene Classic Plus™ (LD-C-70)” resin, must have their respective containers (i.e., drums) identified by the phrase “CCMC 13684-R.”
- The installation must be done in accordance with the manufacturer’s instruction manual, which must be available at the job site at all times during the installation for review by the building official.

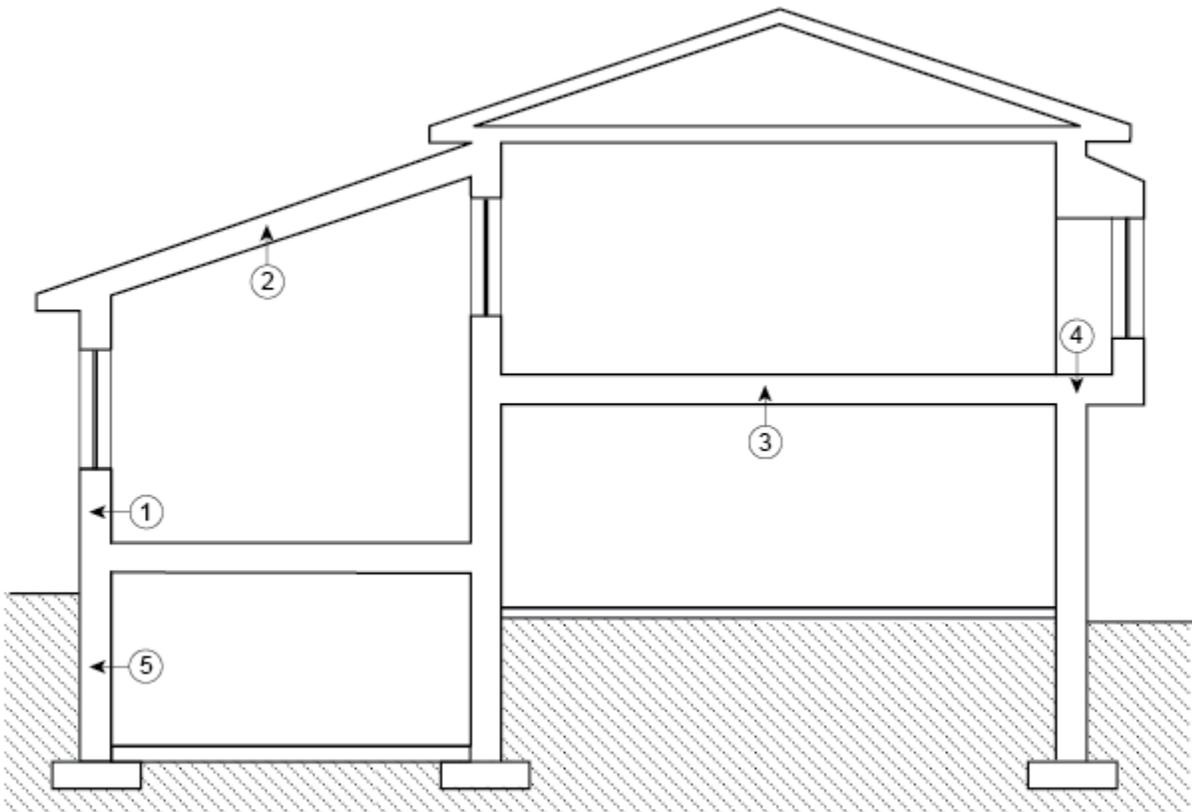


Figure 1. Application locations in open cavities of wood-frame construction:

- 1. above-grade wall**
- 2. cathedral ceiling (vented)**
- 3. floor above garage**
- 4. cantilever floor**
- 5. interior foundation wall**

4. Technical Evidence

The Report Holder has submitted technical documentation for CCMC’s evaluation. Testing was conducted at laboratories recognized by CCMC. The corresponding technical evidence for this product is summarized below.

4.1 Material Requirements

Table 4.1 Density Test Result for the Product

Property	Unit	Requirement	Result
Density	kg/m ³	≥ 6.8	11.2

4.2 Performance Requirements

Table 4.2 Performance Test Results for the Product

Property	Unit	Requirement	Result
Thermal resistance for 25-mm-thickness	(m ² ·K)/W	Report value	0.71 ¹
Water vapour permeance for 25-mm-thickness	ng/(Pa·s·m ²)	≥ 800	1 626
Water absorption by volume	%	< 5	4.99
Dimensional changes:	28 d at 80°C and ambient RH	≥ -15 ≤ +10	-3.5
	28 d at 70°C and 95% RH	≥ -15 ≤ +14	-0.8
	28 d at -29°C and ambient RH	≥ -1 n/a ²	-0.2
Emissions (time-to-occupancy)	—	³	Pass ³

Notes to Table 4.2:

- ¹ At 25.4 mm thick, the design thermal resistance is 0.72 (m²·K)/W.
- ² n/a means not applicable
- ³ The Volatile Organic Compound (VOC) emissions were measured with an assumed room ventilation rate of 0.3 air changes per hour as per the NBC 2010 requirements for new construction. The determination of emissions and room concentration calculations were done by Exova. An independent toxicologist's report recommends a residential time-to-occupancy of one (1) day. Reported results from emission tests indicate that the product would be unlikely to cause major adverse health problems. While the testing and evaluation represent the current state-of-the-art in toxicological evaluation, such tests and their results do not purport to be conclusive with respect to the impact on health.

5. Other Technical Evidence

5.1 Additional Performance Data Requested by the Report Holder

5.1.1 Fire Protection Requirements

Table 5.1.1 Test Results for Fire Protection Requirements¹

Property	Requirement	Result
Surface flame-spread rating ²	Report value	415
Smoke-development rating	Report value	110

Notes to Table 5.1.1:

- 1 The samples tested were not cut as per Sentence 9.10.3.2.(2) of Division B of the NBC 2010.
 - 2 Contact Icynene Inc. for a flame-spread rating when required for Code compliance.
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Report Holder

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