

Evaluation Report CCMC 13489-R

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Enertite® 1-2-1

1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “Enertite® 1-2-1” when used as a thermal insulation in accordance with the conditions and limitations stated in Section 3 of this Report, complies with the National Building Code 2005:

- 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:
 - Sentence 9.25.2.2.(1) Insulation Materials

This opinion is based on CCMC's evaluation of the technical evidence in Section 4.1 provided by the Report Holder.

2. Description

“Enertite® 1-2-1” is a Type 1, spray-in-place, low-density, semi-flexible plastic foam that has an open-cell structure. “Enertite® 1-2-1” consists of: Elastospray® 8000A, isocyanate, and Enertite® resin, which are mixed on-site by a qualified installer using positive displacement equipment in a 1:1 fixed-ratio.

The final cured product is a cream colour and has a density of 8.08 kg/m³. At a 25.4-mm thickness the thermal resistance is 0.61 m²·C/W.

3. Conditions and Limitations

CCMC's compliance opinion in Section 1 is bound by the “Enertite® 1-2-1” being used in accordance with the conditions and limitations set out below.

- “Enertite® 1-2-1” must be applied on-site by qualified installers trained and approved by BASF Canada Inc.
- As specified by the manufacturer, “Enertite® 1-2-1” insulation must be manufactured on-site by qualified installers trained and approved by BASF Canada Inc. with subsequent field auditing of installers by Morrison Hershfield (MH) Limited.⁽¹⁾ MH is the third-party certification organization specified by BASF Canada to certify the training program and provide follow-up inspections of qualified installers who are licensed to spray semi-flexible urethane-based foam insulation in accordance with the “Enertite® 1-2-1” Installer's Manual.

(1) The BASF Canada field quality assurance program calls for periodic audits of the installers, usually random inspections with some mandatory inspections of larger projects. Building officials may contact BASF Canada (1-866-474-3538) and require an inspection for a specific job site if the building official deems it necessary. In cases where the installation is deemed non-conforming by MH/BASF Canada and is not being remedied by the installer, MH/BASF Canada will inform the owner/architect/building official of the non-conforming installation.

- 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 in a wood-frame construction that meets the requirements of the NBC 2005:
 - exterior walls including perimeter joists;
 - cathedral ceilings with a vented air space as required by the NBC 2005;
 - floors separating living spaces from a garage;
 - cantilever overhang floors; and
 - interior below-grade foundation walls.

The application locations are illustrated in Figure 1.

- The building envelope where the product is installed must conform to the requirements of the NBC 2005 for vapour barriers, air barriers, and dampproofing (interior below-grade walls).
- For retrofit applications, whereby there may be occupants in the unaltered part of a building, the qualified installer 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 2005, 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 2005.
- The insulation must 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.
- The product must not be used where it may come in contact with water and must not be installed after its expiry date of six (6) months from the date of manufacture.
- The isocyanate and resin components must have their respective containers (i.e. drums) identified by the phrase “CCMC 13489-R.”
- The installation procedure must follow the manufacturer's instruction manual. A copy of the manual must be available at the job site at all times during the installation for review by the building official.

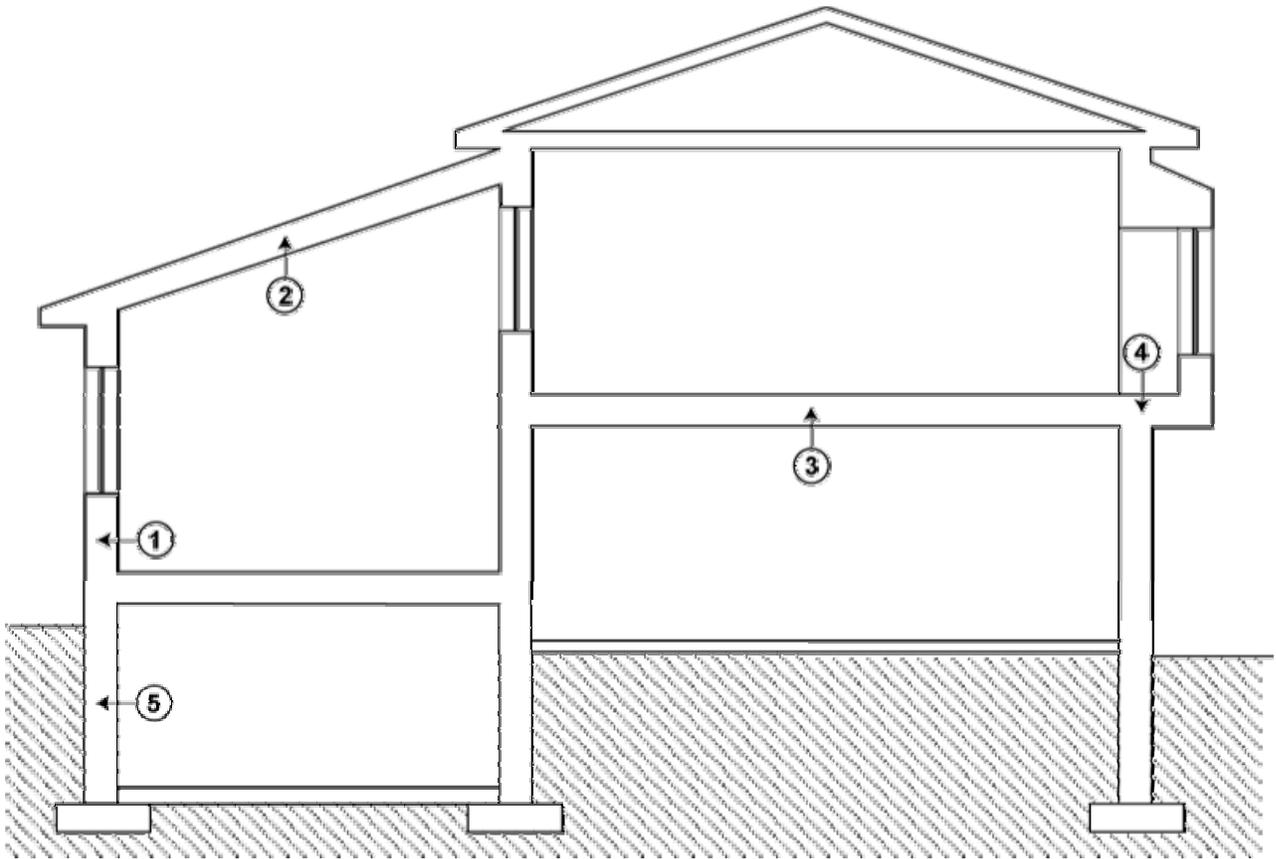


Figure 1. Application locations in a wood-frame construction in open cavities:

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

4. Technical Evidence

CCMC's Technical Guide for "Enertite[®] 1-2-1" sets out the nature of the technical evidence required by CCMC to enable it to evaluate a product as an acceptable or alternative solution in compliance with the NBC 2005. The Report Holder has submitted test results for CCMC's evaluation. Testing was conducted at independent laboratories recognized by CCMC. The corresponding test results for "Enertite[®] 1-2-1" are summarized below.

4.1 NBC 2005 Compliance Data for “Enertite® 1-2-1” on which CCMC Based its Opinion in Section 1

4.1.1 Performance Requirements

4.1.1.1 Test Results

Table 4.1.1.1 Test results for “Enertite® 1-2-1, type 1 open-cell urethane”

Property	Requirement		Result
Density (kg/m ³)	> 6.8		8.08
Thermal resistance at 25-mm thickness (m ² ·C/W)	Report value		0.60
Water vapour transmission for 50-mm thickness (ng/Pa·s·m ²)	> 1400		1449 (average of 3 tests)
Water absorption (%)	Report value		74.0 (average of 3 tests)
Dimensional changes (% volumetric) when exposed to: <ul style="list-style-type: none"> • 80°C and ambient R.H. • 70°C and 97±3% R.H. • -29°C and ambient R.H. 	Min.	Max.	—
	-15 -15 -1	+ 10 + 14 —	-6.0 (average of 4 tests) -2.3 (average of 4 tests) -0.8 (average of 4 tests)
Emissions - time to occupancy	Note (1)		Pass

Note to Table 4.1.1.1:

(1) The Volatile Organic Compound (VOC) emissions under consideration were measured with an assumed room ventilation rate of 0.3 air changes per hour as per the NBC requirements for new constructions. The determination of emissions and room concentration calculations were done by the Saskatchewan Research Council. An independent toxicological report recommends a residential time-to-occupancy of one (1) day. 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.

4.2 Additional Performance Data Requested by the Report Holder

Data in this section does not form part of CCMC's opinion in Section 1.

4.2.1 Fire Test Results

Table 4.2.1 Fire test results conducted on “Enertite® 1-2-1”⁽¹⁾⁽²⁾

Property	Requirement	Result
Flame-spread rating ⁽³⁾ (CAN/ULC-S102 and CAN/ULC-S127)	Report value	418
Smoke development	Report value	300

Notes to Table 4.2.1:

- (1) The thickness tested was 152 mm.
- (2) The samples tested were not cut as per Sentence 9.10.3.2.(2). of Division B of the NBC 2005.
- (3) Contact BASF Canada for a flame-spread rating when required for code-compliance.

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