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CCMC 12380-R



*EVALUATION
REPORT*

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Re-Evaluation
in process

Airmetic® 0223/Heatlok® 0240/ Polar Foam 7300/Burnaby Air Barrier

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1. Purpose of Evaluation

The proponent sought confirmation from the Canadian Construction Materials Centre (CCMC) that "Airmetic® 0223/Heatlok® 0240/Polar Foam 7300/Burnaby Air Barrier" can serve as an insulation material in compliance with the intent of the National Building Code of Canada (NBC) 1995.

2. Opinion

Subject to the limitations and conditions stated in this report, test results and assessments provided by the proponent show that "Airmetic® 0223/Heatlok® 0240/Polar Foam 7300/Burnaby Air Barrier" complies with CCMC's Technical Guide for Spray-In-Place Urethane Foam Insulation, MasterFormat number 07216.3, dated 99-10-29, and provides a level of performance equivalent to that required in:

- NBC 1995, Article 9.25.2.2. and Sentence 5.3.1.2.(2);

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- CAN/ULC-S705.1-98, "Thermal insulation – Spray Applied Rigid Polyurethane Foam, Medium Density, Material – Specification Insulation".

Canada Mortgage and Housing Corporation permits the use of this product in construction financed or insured under the National Housing Act.

Ruling No. 94-09-09-(12380-R) authorizing the use of this product in Ontario, subject to the terms and conditions contained in the Ruling, was made by the Minister of Municipal Affairs and Housing on 28 September 1994 pursuant to s.29 of the Building Code Act, 1992 (see Ruling for terms and conditions).

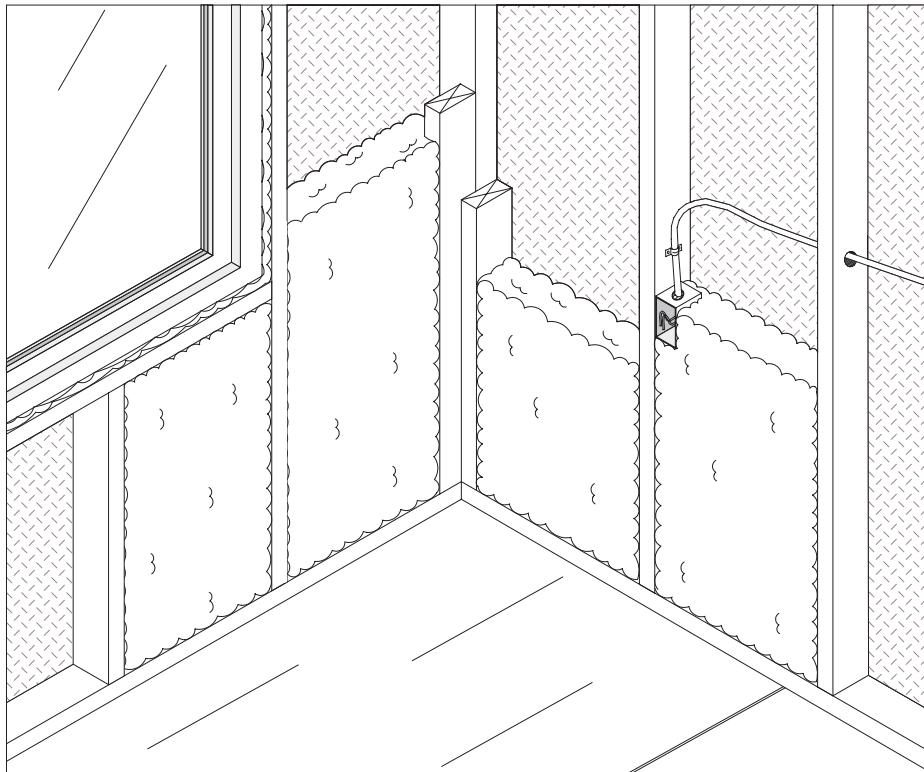


Figure 1. Installation in open wall cavity

3. Description

The foam system "Airmetic® 0223/Heatlok® 0240/Polar Foam 7300/Burnaby Air Barrier" consists of two components: "A100" isocyanate and a polyurethane resin identified as "B0223/B0240/ PF7300/ PF7300B" respectively for the four brand names. The two components are mixed on-site by a qualified installer with a fixed-ratio 1:1 positive displacement equipment. The "Airmetic® 0223/Heatlok® 0240" finished product is light green, whereas the "Polar Foam 7300"

finished product is peach and the "Burnaby Air Barrier" finished product is dark grey.

The final cured product in the field shall have a density between 31.3 kg/m^3 and 35.2 kg/m^3 , and an assigned design thermal resistance of $1.05 \text{ m}^2 \cdot ^\circ\text{C/W}$ per 25 mm (R6 per inch).

4. Usage and Limitations

The material shall be manufactured on-site by qualified installers licensed by a recognized third-party organization. The third-party organization shall be recognized for its training program and follow-up inspection of installers trained to spray urethane foam insulation in accordance with CAN/ULC-S705.2-98, "Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density, Installer's Responsibilities – Specification."

The third-party licensing and follow-up inspection agency for the "Airmetic® 0223/Heatlok® 0240/Polar Foam 7300/Burnaby Air Barrier" product specified by the manufacturer is CUFCA (Canadian Urethane Foam Contractors' Association). The installation procedure shall follow the installer's instruction manual. A copy of those instructions shall be available at the job site at all times during the installation.

This product shall be used in construction in open wall cavities or as an exterior insulating sheathing application conforming to the NBC 1995. It is subject to the following conditions:

- The product can be installed above-grade and protected from weather where any other foam insulation specified in the NBC 1995 is permitted. The product can also be installed in below-grade wall cavities (interior side only). A typical application is illustrated in Figure 1.
- Based on emission testing, at least two (2) days must pass before occupancy is permitted within the newly insulated suite(s), where a ventilation must be ensured by the installer for the two-day period. A ventilation rate of 0.3 air changes per hour shall be provided within the suite(s) by either the installer or the building ventilation system.
- These are the vapour barrier requirements, as per Part 9 of the NBC 1995, when the foam is installed as:
 - *a wall cavity insulation* – The product is not exempt from the requirements for vapour barrier as stated in Subsection 9.25.4.
 - *an insulating sheathing (over a substrate such as concrete blocks) and as the sole wall insulation* – It may qualify as the designated vapour barrier if the installed thickness meets the requirements of Sentence 9.25.4.2.(1) and the foam installation meets those of Article 9.25.4.3.
 - *an insulating sheathing over an insulated wall* – The foam has low water vapour and low air permeance when installed with a 25.4-mm thickness or greater on a substrate (see CCMC report 12893-R). Consequently, the thickness of the foam must be chosen carefully to reduce the risk of condensation. Therefore, as permitted in Article 9.25.1.2., the wall assembly of such application must conform to Table 9.25.1.2. and the vapour barrier must conform to Sentence 9.25.4.2.(2). and to Article 9.25.4.3 of the NBC 1995.
- The performance of the foam as an air barrier material is specified in CCMC report 12893-R. The foam must be installed within the Demilec's specified air barrier system which must be approved by the building official. Otherwise, the product application is not exempt from the requirements for air barrier as stated in Subsection 9.25.3. of the NBC 1995.
- The product is not exempt from the requirements for dampproofing (interior below-grade walls) as stated in Article 9.13.3.3. of the NBC 1995.
- The sprayed material shall completely cover the surfaces, and the product must be applied in passes of between 15 mm and 50 mm thick.
- For proper adhesion, the substrate surface must be clean and dry and not damp or covered in frost, oil, grease, dust, loose scale, rust or other unsuitable material.
- As required in Article 9.25.2.1. of the NBC 1995, the insulation shall 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 rigid polyurethane cellular plastic shall be covered

with an approved thermal barrier as per applicable Article 3.1.4.2., 3.1.5.11. or 9.10.16.10 of the NBC 1995. The exterior surface of an exterior wall containing this insulation must be protected in accordance with Sentence 3.2.3.7.(3) when applicable. The product shall not be used in exposed interior or exterior locations.

- The insulation shall be kept at least 75 mm, or as required in building regulations and safety codes, from heat-emitting devices such as recessed light fixtures and chimneys.
- The 2001 draft edition of CAN/ULC-705.2, "Spray Applied Rigid Polyurethane Foam, Medium Density, Application," no longer limits that the insulation covers electrical wiring by no more than 20 mm.
- This product shall not be used where it may be in continuous contact with water.

- The product shall not be installed after the expiry date printed on the label of each container. The product has a shelf life of 6 months from the date of manufacture.
- The insulation shall not be used when the continuous service temperature of the substrate is outside the range of -60°C to 80°C.
- The B0223, B0240, PF7300 and Burnaby Air Barrier polyurethane resins, and A100 isocyanate, must have their respective containers (i.e. drums) identified by the phrase "CCMC 12380-R."

5. Performance

Testing was conducted by laboratories recognized by the Canadian Construction Materials Centre. The results of testing are summarized in Table 1.

Table 1. Test Results for "Airmetic® 0223/Heatlok® 0240/Polar Foam 7300/Burnaby Air Barrier"

Property	Unit	CAN/ULC-S705.1-98 Requirements	Results
Core Density	kg/m ³	≥ 28	31.3*
Compressive Strength	kPa	≥ 170	174
Tensile Strength	kPa	≥ 200	212
Water Vapour Permeance	ng/Pa·s·m ²	≤ 170	86.6**
Thermal Resistance	m ² ·°C/W	≥ 1.25	1.38***
2 d @ 23°C		≥ 1.05	1.11***
90 d @ 23°C			
Dimensional Stability (% Volume Change)			
@ -20°C	%	≥ -1	0.47
@ 100°C	%	≤ +10	5.89
@ 70°C, 90±3%	%	≤ +14	2.58

Table 1. Test Results for “Airmetic® 0223/Heatlok® 0240/Polar Foam 7300/Burnaby Air Barrier”
(cont’d)

Property	Unit	CAN/ULC-S705.1-98 Requirements	Results
Water Absorption by Volume	%	≤ 4	0.62
Open Cell Content	%	≤ 8	6.02
Flame-Spread Rating		≤ 500	335****
Emissions during Aging			Passed ⁽¹⁾

* This value is the minimum density value recommended by the manufacturer. The maximum value recommended by the manufacturer is 35.2 kg/m³ and, within this density range, the product meets the standard requirements.

** For a 25-mm specimen without the surface skin and the one adjacent to the substrate.

*** The 90-d aged thermal resistance is used for comparative purposes and does not yield a design value for long-term thermal performance. The assigned design thermal resistance is 1.05 RSI per 25 mm or R6 per inch.

**** For a 63.5 mm maximum thickness.

⁽¹⁾ The Volatile Organic Emissions (VOC) under consideration were below the detection limit after two (2) days. The determination of emissions and room concentration calculations were done by the Saskatchewan Research Council. Reported results from emission tests indicate that the product would be unlikely to cause a major adverse health problem. 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.

For additional information, contact:

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Note: Readers are asked to refer to limitations imposed by NRC on the interpretation and use of this report. These limitations are included in the introduction to CCMC’s Registry of Product Evaluations, of which this report is part.

Readers are advised to confirm that this report has not been withdrawn or superseded by a later issue by referring to <http://irc.nrc.gc.ca/ccmc>, or by contacting the Canadian Construction Materials Centre, Institute for Research in Construction, National Research Council of Canada, Montreal Road, Ottawa, Ontario, K1A 0R6; Telephone (613) 993-6189, Fax (613) 952-0268.

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