

CCMC 14030-R

CCMC Canadian code compliance evaluation

CCMC number:	14030-R
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Evaluation holder:	<p>Elastochem Specialty Chemicals Inc. 37 Easton Road Brantford ON N3P 1J4 Canada Website: www.elastochem-ca.com Telephone: 519-754-1678 Email: info@elastochem-ca.com</p>
Product name:	Insulthane® Extreme Air Barrier System
Compliance:	NBC 2010, OBC
Criteria:	CCMC-TG-072709.01-10, "CCMC Technical Guide for Air Barrier Systems for Exterior Walls of Low-Rise Buildings"

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Compliance opinion

It is the opinion of the Canadian Construction Materials Centre that the evaluated product, when used as an air barrier system for exterior walls of buildings in accordance with the conditions and limitations stated in this evaluation, complies with the following code:

National Building Code of Canada 2010

Code provision	Solution type
9.25.3. Air Barrier Systems	Alternative

Ontario Building Code

Ruling No. 17-06-343 (14030-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 2017-06-26 pursuant to s.29 of the Building Code Act, 1992 (see Ruling for terms and conditions). This Ruling is subject to periodic revisions and updates.

The above opinion(s) is/are based on the evaluation by the CCMC of technical evidence provided by the evaluation holder, and is bound by the stated conditions and limitations. For the benefit of the user, a summary of the technical information that forms the basis of this evaluation has been included.

Product information

Product name

Insulthane® Extreme Air Barrier System

Product description

This Evaluation Report addresses the performance of the product as an air barrier system as specified by Elastochem Specialty Chemicals. The product consists of the following components and accessories:

- principal material in the plane of airtightness: Insulthane® Extreme medium density, spray-applied polyurethane foam;
- accessories for continuity:
 - Blue Skin SA®, a modified bituminous membrane (i.e., peel-and-stick or thermally fused) manufactured by Henry® Company for use as a transition membrane over construction, control and expansion joints, at junctions between different assemblies and at penetrations;
 - backer rod, a closed cell foam weather stripping manufactured by Tago® for use as a gap filler around penetrations (gaps are limited to 1 in. in width), adhered and sealed with BES 925 flexible polymeric moisture-cured sealant, manufactured by Henry® Company; and
 - specified sealants that conform to CAN/CGSB-37.29-M89, “Rubber-Asphalt Sealing Compound,” for use at membrane-to-foundation junctions and conforming to CAN/CGSB-19.0-M77, “Methods of Testing Putty, Caulking and Sealing Compounds,” for use on the interior side around window and door openings; and
- component for strength: structural substrate, such as concrete block, exterior gypsum sheathing, oriented strandboard (OSB), or plywood sheathing, within a wall designed to withstand the anticipated loads.

If installed as part of the designated air barrier system, Insulthane® Extreme medium density, spray-applied polyurethane foam serves a dual function in the wall assembly: as the principal plane of airtightness of the designated air barrier system and as exterior insulation. The use of the product as insulation is covered under CCMC 13697-L.

The foam insulation consists of two components: a polyisocyanate (A-side) and a polyurethane resin (B-side). The 2 components are mixed on site by an installer approved by Elastochem Specialty Products to install the product. The resulting product is a Type 2 medium density, spray-applied polyurethane foam with an assigned long-term thermal resistance value of 2.1 m² •°C/W per 50 mm of thickness. If the foam insulation serves as the principal component in the Insulthane® Extreme Air Barrier System, it must be installed at a minimum thickness and density, which are specified in the conditions and limitations section of this Report. As per CCMC 13697-L, the colour of the finished product is burnt sienna.

Manufacturing plant

This evaluation is valid only for products produced at the following plant:

Product name	Manufacturing plant
Insulthane® Extreme Air Barrier System	Brantford, ON, CA Ⓢ

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☑ Indicates that the product from this manufacturing facility has been evaluated by the CCMC

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Conditions and limitations

The CCMC's compliance opinion is bound by this product being used in accordance with the conditions and limitations set out below.

Air barrier system

The air barrier system has demonstrated sufficiently low air permeance when it has a thickness of 25.4 mm and a minimum field density of 39.1 kg/m³, which meets the intent of Section 5.4., Air Leakage, and Subsection 9.25.3. of Division B of the NBC 2010 for buildings with an indoor relative humidity (RH) of 35% or less. For buildings with a higher RH (e.g., swimming pools and museums), additional assessment is required in accordance with Part 5 of the NBC.

The structural wind loading conducted qualifies the air barrier system for use in low-rise buildings in geographical locations where the Q₅₀ value does not exceed 0.60 kPa (the Q₅₀ value is the hourly wind pressure for a 1-in-50 year return period, which can be found in Appendix C of the NBC 2010).

To control condensation where the air barrier system's insulation material has low air and vapour permeance and is installed on the cold side of the wall assembly, the interior vapour barrier must comply with Article 9.25.4.2., Vapour Barrier Materials, of Division B of the NBC 2010. The insulation material must be installed at a 25.4-mm or greater thickness to comply with Article 9.25.5.2., Position of Low Permeance Materials, of Division B of the NBC 2010 for the respective geographical location.

To control air leakage, the proposed air barrier system must be a minimum 25.4 mm thick and installed as exterior insulation over exterior sheathing or a masonry back-up wall.

The product must be installed on-site by Elastochem Specialty Chemicals trained installers following the Elastochem Specialty Chemicals specified product installation manual, which contains detailed construction drawings which must be followed (see [Appendix A](#) of this Report for examples). In addition, Urethane Foam Consultants (UFC) carries out follow-up inspections of the installations on a periodic basis.

Air barrier system – field quality assurance

When the Insulthane® Extreme medium density, spray-applied polyurethane foam is applied as the designated air barrier system, Elastochem Specialty Chemicals requires that the installer be trained and that UFC conduct audits to ensure:

1. that the approved accessories are being used;
2. proper installation of the transition membrane by conducting periodic tension testing as part of the Elastochem Specialty Chemicals specified quality control;
3. proper continuity details and substrate conformance as part of the quality control procedure for the product;
4. proper application of the Insulthane® Extreme spray foam; and
5. that daily work records are maintained for the air barrier system installation.

Insulation – field quality assurance

When the proposed medium density, spray-applied polyurethane foam is applied as spray-foam insulation, the material must be manufactured on-site by qualified installers licensed by Elastochem Specialty Chemicals with field inspections carried out by UFC. UFC certifies the Elastochem Specialty Chemicals training program and provides follow-up

inspections to ensure installations are in accordance with CAN/ULC-S705.2-98, “Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density, Installer’s Responsibilities – Specification.”

The product must be installed in accordance with the manufacturer’s installation manual. A copy of this manual must be available on the job site at all times during the installation. All installers must present their UFC licensing card and specific site worksheet upon request by the building official.

Note: The Elastochem Specialty Chemicals 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 Elastochem Specialty Chemicals at (519) 754-1678 to request an inspection for a specific job site, if they deem it necessary. In cases where the installation is deemed non-conforming by UFC or Elastochem Specialty Chemicals and is not remedied by the installer, UFC will inform the owner/architect/building official and the CCMC of the non-conforming installation.

See CCMC 13697-L for additional limitations on the installation of the Insulthane® Extreme medium density, spray-applied polyurethane foam product.

The polyisocyanate and polyurethane resin components of Insulthane® Extreme must have their containers (i.e., drums) identified by the phrases “CCMC 14030-R” and “CCMC 13697-L,” respectively.

Technical information

This evaluation is based on demonstrated conformance with the following criteria:

Criteria number	Criteria name
CCMC-TG-072709.01-10	CCMC Technical Guide for Air Barrier Systems for Exterior Walls of Low-Rise Buildings

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

Performance requirements

Testing the product was conducted on 4 representative specimens. The results are summarized in the Tables below. The performance resulting from these tests has been deemed applicable to Insulthane® Extreme Air Barrier System based on equivalency testing.

The performance of the product has been tested in accordance with the CCMC Technical Guide for qualification for use as an air barrier system.

To qualify, a conforming air barrier system must:

- i. have an acceptable low air leakage rate;
- ii. be continuous;
- iii. be durable;
- iv. have sufficient strength to resist the anticipated air pressure load; and
- v. be buildable in the field.

Air leakage rate

Table 1. Results of testing the air Leakage rate of the product

Type of wall tested	Maximum air leakage rate, ⁽¹⁾ (L/(s·m ²) @ 75 Pa ΔP	Result
Masonry walls (see Figure "Exterior steel stud wall (no penetrations)" and Figure "Exterior concrete wall (no penetration)" in Appendix A of this Report)	≤ 0.05 ⁽²⁾	0.0088 L/(s·m ²) ⁽²⁾
Exterior gypsum/metal stud walls (see Figure "Exterior steel stud wall with penetrations" and Figure "Exterior concrete wall with penetrations" in Appendix A of this Report)		0.0096 L/(s·m ²) ⁽²⁾

Notes

- 1 The air leakage rate of the specimens is determined after the structural wind loading ($Q_{50} = 0.6$ kPa) in order to represent structural aging of the air barrier system. The air barrier system was subjected to a loading schedule involving 1-hour sustained positive and negative pressure set at 0.60 kPa, 2 000 cycles of positive and negative pressure set at 0.80 kPa, and a wind gust of positive and negative pressure set at 1.2 kPa.
- 2 The air leakage rate requirement is based on the following Table for Rate of Permissible Air Leakage developed by the CCMC/NRC with input from an industry consortium. The following table is deemed to meet the intent of the NBC 2010 with regard to air barrier system performance.

Table for rate of permissible air leakage

Water vapour permeance (WVP) of outermost layer of wall assembly ($\text{ng/Pa}\cdot\text{s}\cdot\text{m}^2$)	Maximum permissible air leakage rate ($\text{L/s}\cdot\text{m}^2$) @ 75 Pa ΔP
15 < WVP \leq 60	0.05
60 < WVP \leq 170	0.10
170 < WVP \leq 800	0.15
> 800	0.20

For more information on the CCMC Technical Guide requirements and how they relate to the NBC 2010 requirements, please see the IRC Publication, "Air Barrier Systems for Walls of Low-Rise Buildings: Performance and Assessment."

Durability of air barrier system components

Table 2. Results of testing of durability of components in the product

Component	Requirement	Result
Insulthane® Extreme polyurethane insulation	Air permeance before and after aging (ASTM D 726-84): < 10% increase	Accepted (1)
	Thermal resistance after heat aging and weathering: 90% retention	Passed
Transition membrane: Blue Skin SA® by Henry® Company	Physical properties before and after aging: 85% retention	Passed
Sealant at membrane/foundation junctions: BES 925 sealant by Henry® Company	Complies with CAN/CGSB-37.29-M89	Passed
Sealant around warm side of window and door frames: backer rod foam and BES 925 sealant	Complies with CAN/CGSB-19.0-M77	Passed

Note

- 1 The air leakage of the product increased from 0.0004 L/s·m² to 0.0012 L/s·m² after aging (an increase of 162%). However, this was deemed acceptable as the final air leakage value is still well below the maximum allowable air leakage of 0.05 L/s·m².

Appendix A

Specimens tested for qualifying system details

The following figures outline the original full-scale specimens tested, which represent typical construction details to be reproduced in the field as part of the installation of Elastochem Specialty Chemical's current proprietary Insulthane[®] Extreme Air Barrier System. The representative specimens tested also contained defects (e.g., mortar missing, missing primer gap, etc.) to verify the sensitivity of the air barrier system to these possible field defects and allow for tolerances.

Exterior steel stud wall (no penetrations)

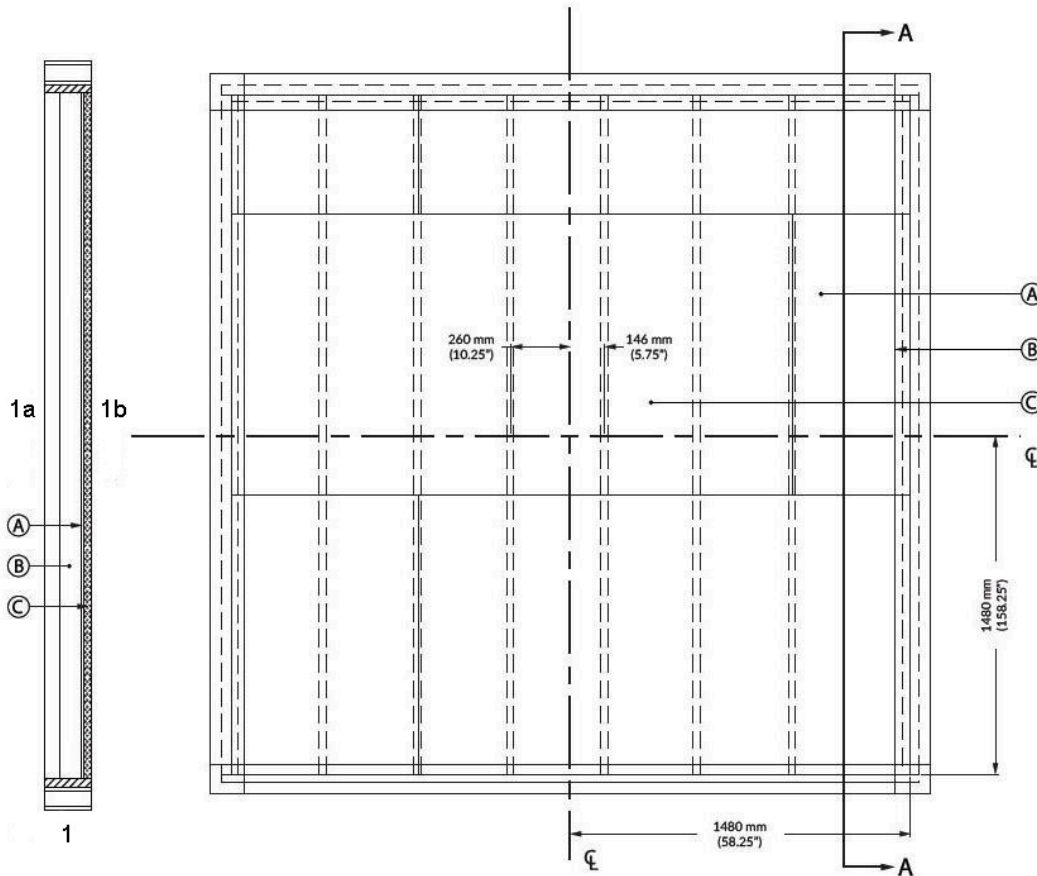


Figure 1. Exterior steel stud wall (no penetrations)

- A. Exterior sheathing 13-mm (1/2-in.) thickness fastened to steel studs with 32-mm (1-1/4-in.) SF steel drill screws (corrosion resistant) installed 102 mm (8 in.) apart
 - B. 92-mm (3-5/8-in.) 20 ga. steel studs installed 406 mm (16 in.) on centre (o.c.)
 - C. Insulthane[®] Extreme spray foam air barrier material
1. Section A-A
 - a. Interior side
 - b. Exterior side

Exterior concrete wall (no penetrations)

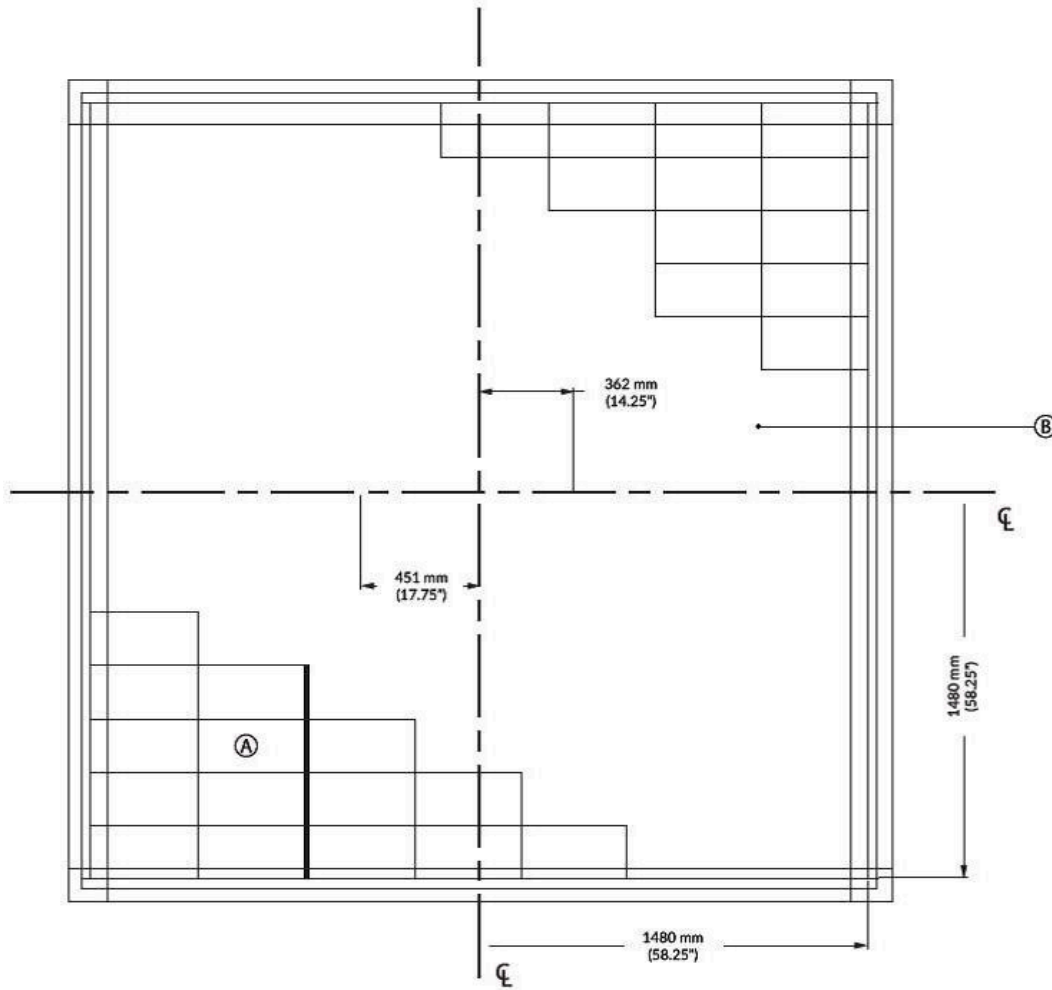


Figure 2. Exterior concrete wall (no penetrations)

- A. 200-mm × 400-mm × 150-mm (8-in. × 16-in. × 6-in.) CMU block
- B. Elastochem Insulthane[®] Extreme SPF application; target thickness 38 mm (1.5 in.)

Exterior steel stud wall with penetrations

All construction, control, expansion joints or penetrations in an exterior wall assembly must be bridged by a transition membrane as part of the Insulthane[®] Extreme Air Barrier System.

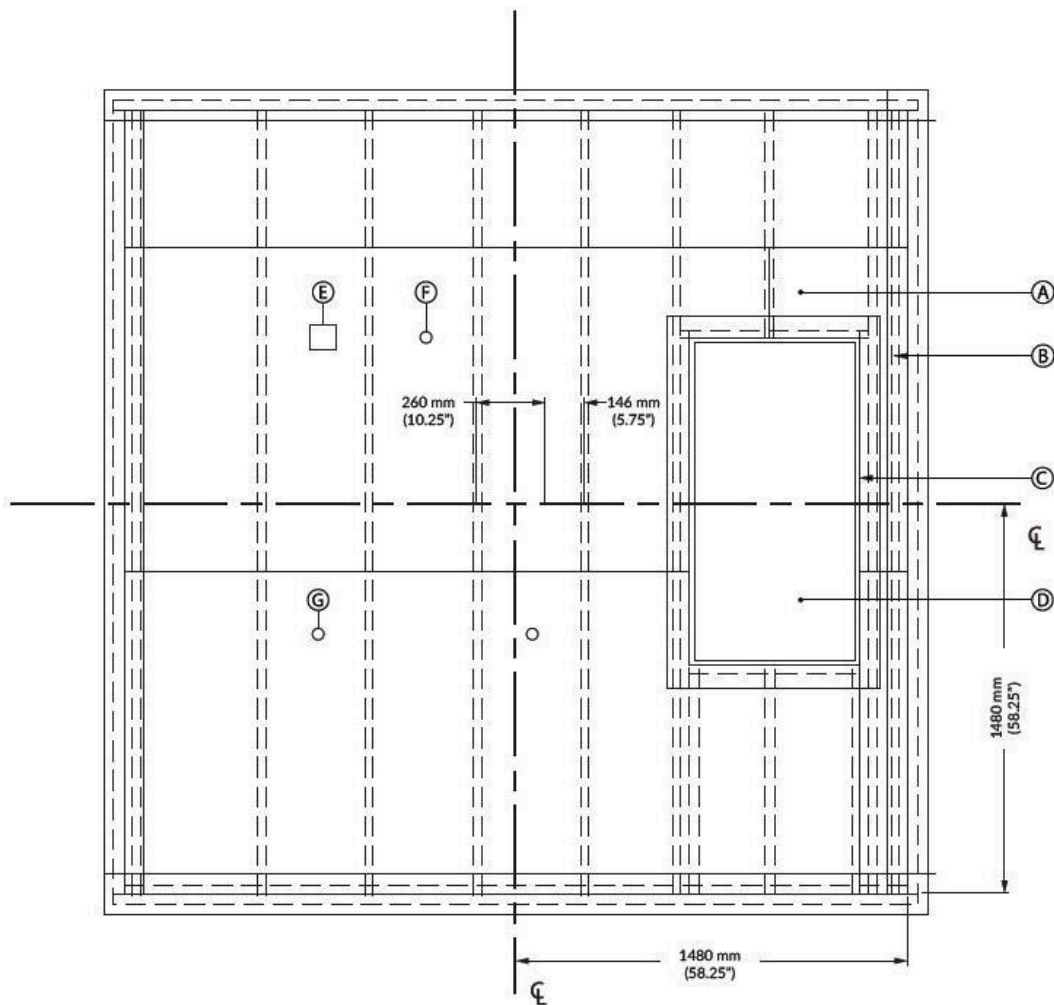


Figure 3. Exterior steel stud wall with penetrations

- A. Exterior sheathing 13-mm (1/2-in.) thickness fastened to steel studs with 32-mm (1-1/4-in.) SF steel drill screws (corrosion resistant) installed 102 mm (8 in.) apart
- B. 92-mm (3-5/8-in.) 20 ga. steel studs installed 406 mm o.c.
- C. Window rough opening perimeter sealed with Blue Skin SA[®] peel-and-stick membrane, gap between window and rough opening sealed with backer rod and Henry BES 925 sealant
- D. Plywood window sealed with backer rod and Henry BES 925 sealant prior to primary air barrier material (SPF) application
- E. 102-mm (4-in.) duct
- F. Ø 38-mm (1.5-in.) PVC pipe
- G. Ø 51-mm (2-in.) electrical conduit

Note: PVC pipe, square duct and electrical junction boxes sealed around perimeter prior to SPF application with Henry Blue Skin SA[®] peel-and-stick membrane.

Exterior concrete wall with penetrations

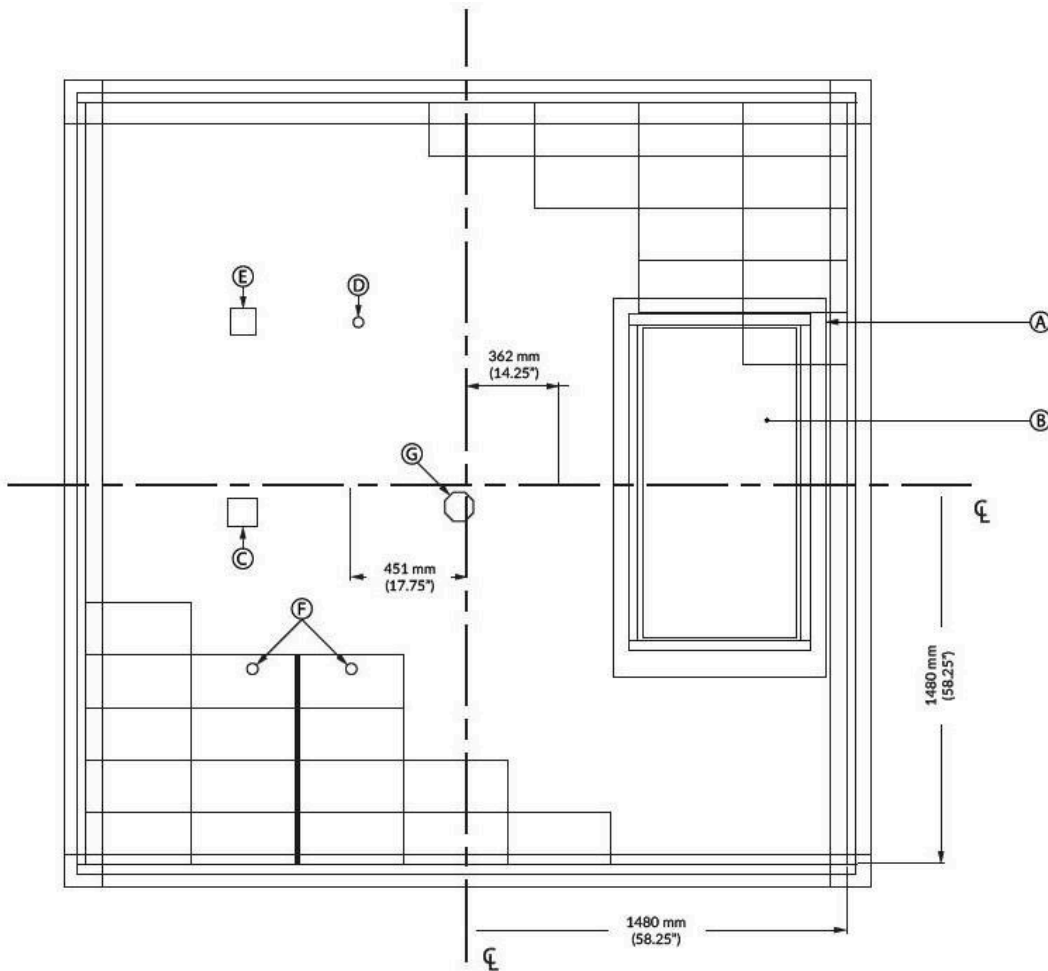


Figure 4. Exterior concrete wall with penetrations

- A. Window rough opening perimeter sealed with Blue Skin SA[®] peel-and-stick membrane, gap between window and rough opening sealed with backer rod and Henry BES 925 sealant
- B. Plywood window sealed with backer rod and Henry BES 925 sealant prior to primary air barrier material (SPF) application
- C. 102-mm (4-in.) duct
- D. Ø 38-mm (1.5-in.) PVC pipe
- E. rectangular junction box
- F. Ø 38-mm (1.5-in.) conduit pipe
- G. hexagonal junction box

Note: PVC pipe, square duct and electrical junction boxes are sealed around the perimeter prior to SPF application with Henry Blue Skin SA[®] peel-and-stick membrane.

Exterior stud wall with foundation

As the foundation wall is designated as part of the air barrier system in this case, a transition membrane with sealant (see cross-section details) must be sealed to the foundation wall to maintain the continuity of the plane of airtightness. In addition, note that mechanical fasteners for brick veneer and penetrations from electrical wiring, pipes or ducts must be sealed through the use of a transition membrane.

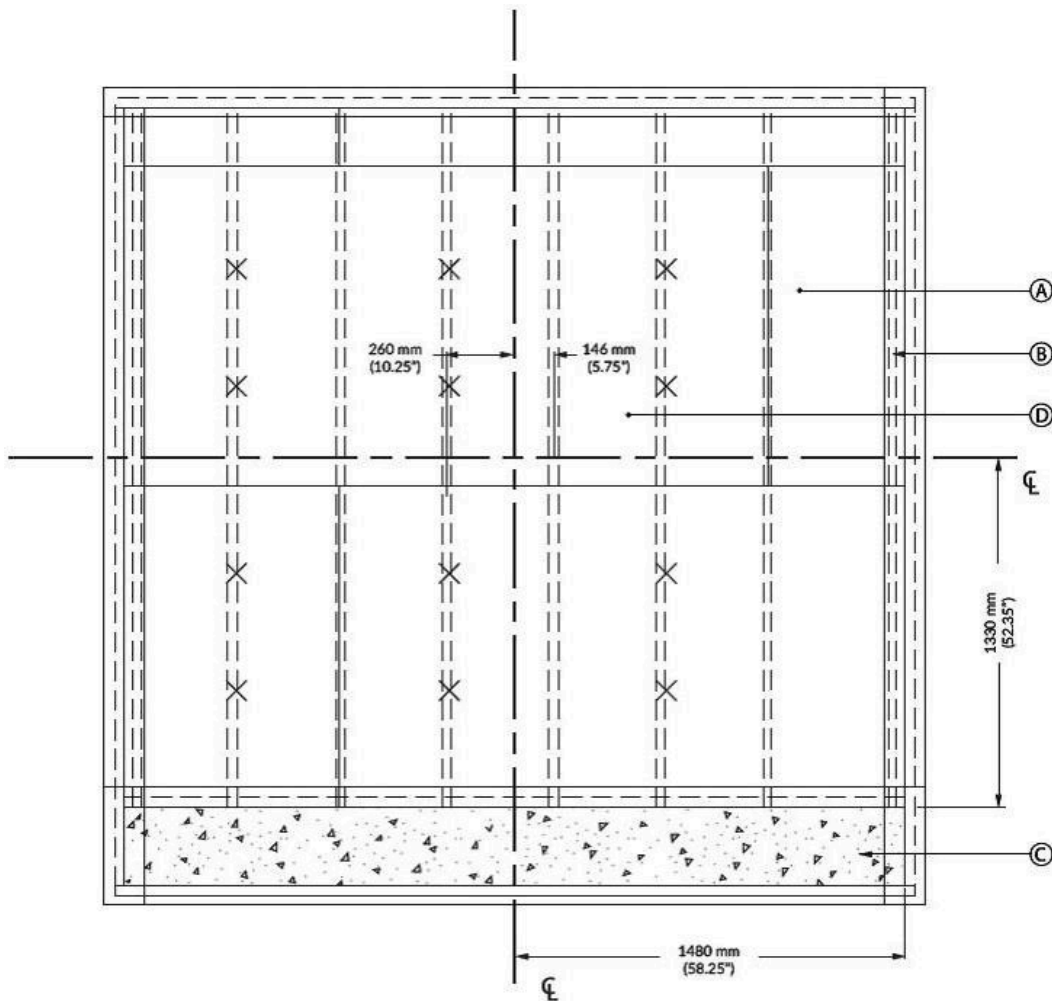


Figure 5. Exterior stud wall with foundation

- A. Exterior sheathing 13-mm (1/2-in.) thickness fastened to steel studs with 32-mm (1-1/4-in.) SF steel drill screws (corrosion resistant) installed 102 mm (8 in.) apart
- B. 92-mm (3-5/8-in.) 20 ga. steel studs installed 406 mm (16 in.) o.c.
- C. Concrete foundation interface sealed on exterior with Blue Skin SA[®] peel-and-stick membrane to exterior sheathing
- D. Elastochem Insulthane[®] Extreme SPF application; target thickness 38 mm (1.5 in.)
- X. Block-Lok BL-607 brick ties sealed around perimeter prior to SPF application with Henry BES 925 sealant

Exterior concrete wall with foundation

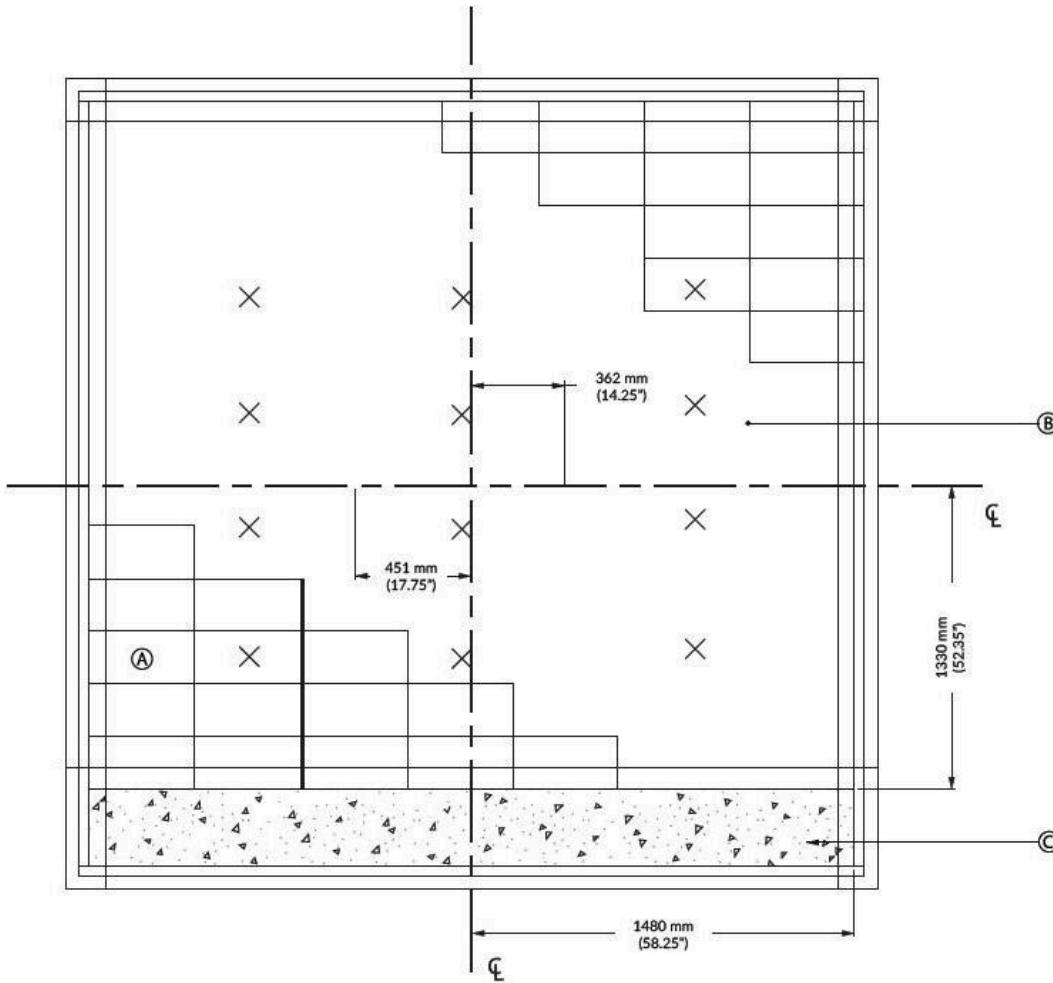


Figure 6. Exterior concrete wall with foundation

- A. 200-mm × 400-mm × 150-mm (8-in. × 16-in. × 6-in.) CMU block
- B. Elastochem Insulthane[®] Extreme SPF application; target thickness 38 mm (1.5 in.)
- C. Concrete foundation interface sealed on exterior with Blue Skin SA[®] peel-and-stick membrane to exterior sheathing
- X. Block-Lok BL-607 brick ties sealed around perimeter prior to SPF application with Henry BES 925 sealant

Penetration details

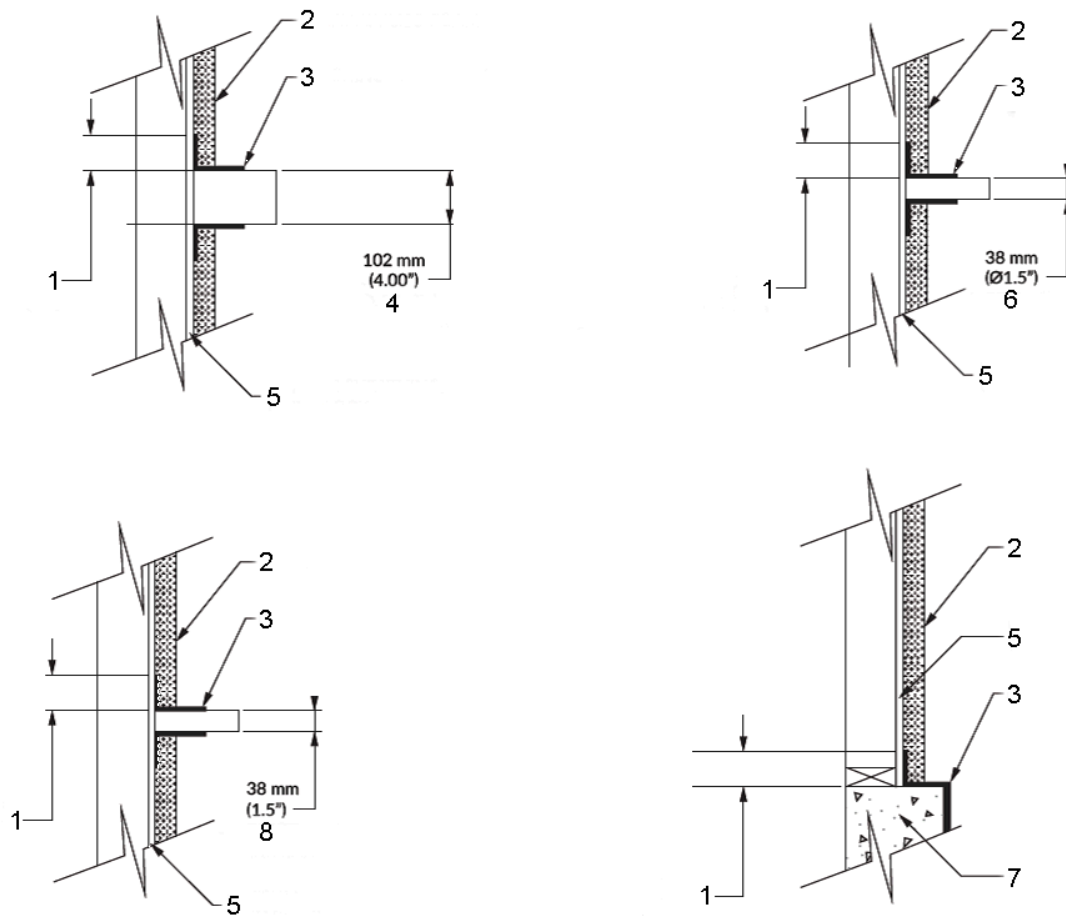


Figure 7. Penetration details

1. 76 mm (3.00") typical
2. Spray applied foam
3. Flashing membrane
4. Sq. duct/Sq. junction box/Hex junction box
5. Gypsum sheathing/CMU block
6. Pipe (PVC)
7. Concrete slab
8. Electrical conduit

Window sealing details

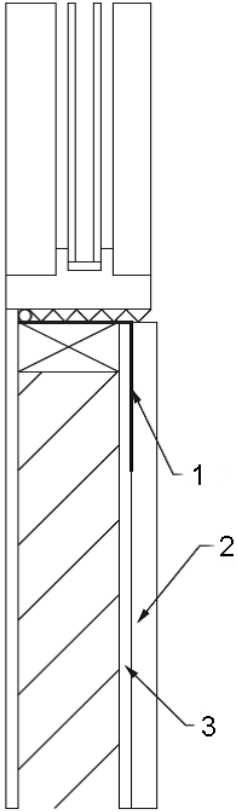


Figure 8. Window sealing details

1. Flashing membrane
2. Spray applied foam
3. Gypsum sheathing/CMU block

Administrative information

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(Alliance of Canadian Building Official Associations (ACBOA))

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(Canadian Home Builders' Association (CHBA))

Alberta Building Officials Association (ABOA)



(Alberta Building Officials Associations (ABOA))

Saskatchewan Building Officials Association (SBOA)



(Saskatchewan Building Officials Association (SBOA))

Manitoba Building Officials Association (MBOA)



(Manitoba Building Officials Association (MBOA))

Ontario Building Officials Association (OBOA)



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For more information, contact the CCMC by phone at (613) 993-6189 or by email at ccmc@nrc-cnrc.gc.ca

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Code compliance as an acceptable solution

Code Compliance via Acceptable Solutions

If a building design (e.g. material, component, assembly or system) can be shown to meet all provisions of the applicable **acceptable solutions** in Division B (e.g. it complies with the applicable provisions of a referenced standard), it is deemed to have satisfied the objectives and functional statements linked to those provisions and thus to have complied with that part of the Code.

— National Building Code of Canada, Sentence A-1.2.1.1.(1)(a)

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Acceptable Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

CCMC's code compliance opinions

All CCMC evaluation reports are opinions of code compliance established in accordance with the National Building Code of Canada, Subsection 1.2.1. "Compliance with this Code," which requires compliance to be achieved by:

- complying with the applicable acceptable solutions in Division B, or
- using an alternative solution that will achieve at least the minimum level of performance required by Division B in the areas defined by the objective and functional statements attributed to the applicable acceptable solutions.

The CCMC assesses compliance with Canadian building, energy and safety codes, and is trusted by over 6,000 regulators across Canada.

Code compliance as an alternative solution

Code Compliance via Alternative Solutions

Where a design differs from the acceptable solutions in Division B, then it should be treated as an **"alternative solution."** A proponent of an alternative solution must demonstrate that the alternative solution addresses the same issues as the applicable acceptable solutions in Division B and their attributed objectives and functional statements. However, because the objectives and functional statements are entirely qualitative, demonstrating compliance with them in isolation is not possible. Therefore, Clause 1.2.1.1.(1)(b) identifies the principle that Division B establishes the quantitative performance targets that alternative solutions must meet. In many cases, these targets are not defined very precisely by the acceptable solutions [...] Nevertheless, Clause 1.2.1.1.(1)(b) makes it clear that an effort must be made to demonstrate that an alternative solution will perform as well as a design that would satisfy the applicable acceptable solutions in Division B—not “well enough” but “as well as.”

— National Building Code of Canada, Sentence A-1.2.1.1.(1)(b)

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Alternative Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

CCMC's code compliance opinions

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