



Evaluation Report CCMC 13565-R Excel Air Barrier

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Re-evaluation in progress	

1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “Excel Air Barrier”, when used as an air barrier 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:
 - Sentence 5.4.1.2.(1) Air Barrier System Properties
 - Sentence 9.25.3.2.(1) Air Barrier System Properties

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

2. Description

This Report addresses the performance of the product as an air barrier material within the Building Products of Canada Corp.'s “Excel III” air barrier system. This air barrier system has not been evaluated, but is presented in Appendix A as additional information for the convenience of building officials and designers.

The product's material, if installed as part of the designated air barrier system, will serve a dual function in the wall assembly. Use of the product as a sheathing membrane to control incidental water infiltration behind cladding is covered under a separate CCMC Evaluation Report (see CCMC 13584-R).

The product is a fiberboard insulation panel conforming to CAN/ULC-S706-09, “Wood Fibre Insulating Boards for Buildings,” Type II, Class 3, Grade 1. The panels are 12.4 mm thick and are plant-laminated to a polypropylene-based, non-woven sheathing membrane with a hot melt adhesive. The panels are usually 1200 mm x 2438 mm.

3. Conditions and Limitations

CCMC's compliance opinion in Section 1 is bound by the “Excel Air Barrier” being used in accordance with the conditions and limitations set out below.

- The product's material is capable of being the principal plane of airtightness in an air barrier system having demonstrated a sufficiently low air permeance equivalent to the materials outlined in Appendix A-9.25.5.1.(1), Air and Vapour Permeance Values, and Sentence 5.4.1.2.(1), Air Barrier System Properties, of Division B of the NBC 2010.
- When the material is installed as part of the airtight element of the designated air barrier system, the vapour barrier must generally comply with Sentences 9.25.4.2.(1), (2), (5) and (6), Vapour Barrier Materials, of Division B of the NBC 2010. In cases where an alternative low water vapour permeance element has been installed in the wall assembly, Sentences 9.25.4.2.(3) and (4) apply.
- A conforming installation must be:
 - installed with the printed side facing outward and protected from exposure to ultraviolet (UV) radiation from the sun within 60 days;

- installed with a minimum 10-mm air space between the sheathing membrane and the cladding, unless the cladding has been deemed to not require an air space (e.g. deemed by CCMC or deemed by building officials based on past cladding performance); and
 - installed according to the most recent update of Building Products of Canada Corp.'s "Excel III" Installation Manual (examples of the installation details are presented as Additional Information in Appendix A).
- It should be noted that a concealed air space exceeding 25 mm in width must contain proper fire stopping in accordance with Sub-section 9.10.16., Fire Blocks, of Division B of the NBC 2010.
 - CCMC-evaluated sheathing tape must be used to seal all joints.

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.

The durability assessment of the product is covered under CCMC 13584-R.

4.1 Performance Requirements

Table 4.1.1 Results of testing the product to the CCMC Technical Guide for Air Barrier Materials

Test	Requirement	Result
Five 1 m ² membrane specimens were tested and measured for air permeance at a minimum of six air pressure differentials (DP) between 0 and 250 Pa.	Air leakage rate at 75 Pa ΔP (based on linear regression of 30 data points) ≤ 0.02 L/(s·m ²)	0.0015 L/(s·m ²)

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Appendix A - Additional Information

An air barrier material as part of an air barrier system

CCMC has not evaluated the performance of the “Excel” air barrier system in conformance with Article 9.25.3.2., Air Barrier System Properties, of Division B of the NBC 2010. However, CCMC’s opinion is that an air barrier system using this material and installed in conformance with the details outlined below and in Building Products of Canada Corp.’s Installation Manual should satisfy the requirements for continuity of the air barrier system in Articles 9.25.3.1., Required Barrier to Air Leakage, and 9.25.3.3., Continuity of the Air Barrier System, of Division B of the NBC 2010.

Discussion

Authorities having jurisdiction (AHJ) should be aware that this system differs from the typical air barrier approach, which uses a flexible membrane as the principal plane of airtightness. In the typical approach, the membrane (i.e. polyethylene sheet) is normally sandwiched between two other materials so that it is not required to resist, on its own, the full force of indoor/outdoor pressure differences induced by stack effect, mechanical systems and, most importantly, wind.

In a system in which a composite of insulation board and membrane is applied to the outer surface of the wall, such as the proposed air barrier system, that composite board must have adequate strength and attachment to resist the anticipated wind pressures. CCMC’s evaluation of the proposed material does not include the evaluation of this strength or the strength of the continuity details. The AHJ must therefore determine whether the proposed air barrier system, described herein, meets the intent of Sentence 9.25.3.2.(1) of Division B of the NBC 2010 as being an effective barrier for the proposed construction in the proposed geographical/climate area. For example, based on their experience, the AHJ may deem the proposed air barrier system adequate for buildings in urban areas, sheltered sites or areas of low wind, but inadequate in areas of high wind and exposed sites in rural or coastal areas.

An air barrier system checklist for the AHJ to consider is the following:

An 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.

Installation details

The “Excel” material is applied over the structural framing complying with the NBC 2010. It does not contribute to an air barrier system until it is joined to the other components that make up the air barrier system of the building. Building Products of Canada Corp.’s Installation Manual outlines how the proposed material must be joined to the foundation wall, windows and doors, penetrations in the wall and the ceiling air barrier, thus forming the system.

A successful air barrier system installation is predicated on sequencing during construction. Coordination is required during erection of framing and after completion of the air barrier system to ensure that no other trade breaches the integrity of the installed air barrier system.

The proposed air barrier system is defined as possessing the following features:

- i. “Excel” material as the principal plane of airtightness;
- ii. accessories including: sealants and CCMC-evaluated sheathing tape to maintain continuity at junctions with penetrations in the wall assembly (i.e. windows, doors, pipes, ducts, electrical outlets, etc.) and in accordance with continuity details in Building Products of Canada Corp.’s Installation Manual;
- iii. durable, meeting UV and heat-aging requirements;
- iv. exterior sheathing with specified fasteners and fastening schedule of the product for structural support against anticipated pressure loads; and
- v. buildable in the field by builders following Building Products of Canada Corp.’s Installation Manual and reviewed by building officials.

Figures 1 to 5 outline typical construction details of the installation of the proposed air barrier system in the field. See Building Products of Canada Corp.’s “Excel” Installation Manual for additional details.

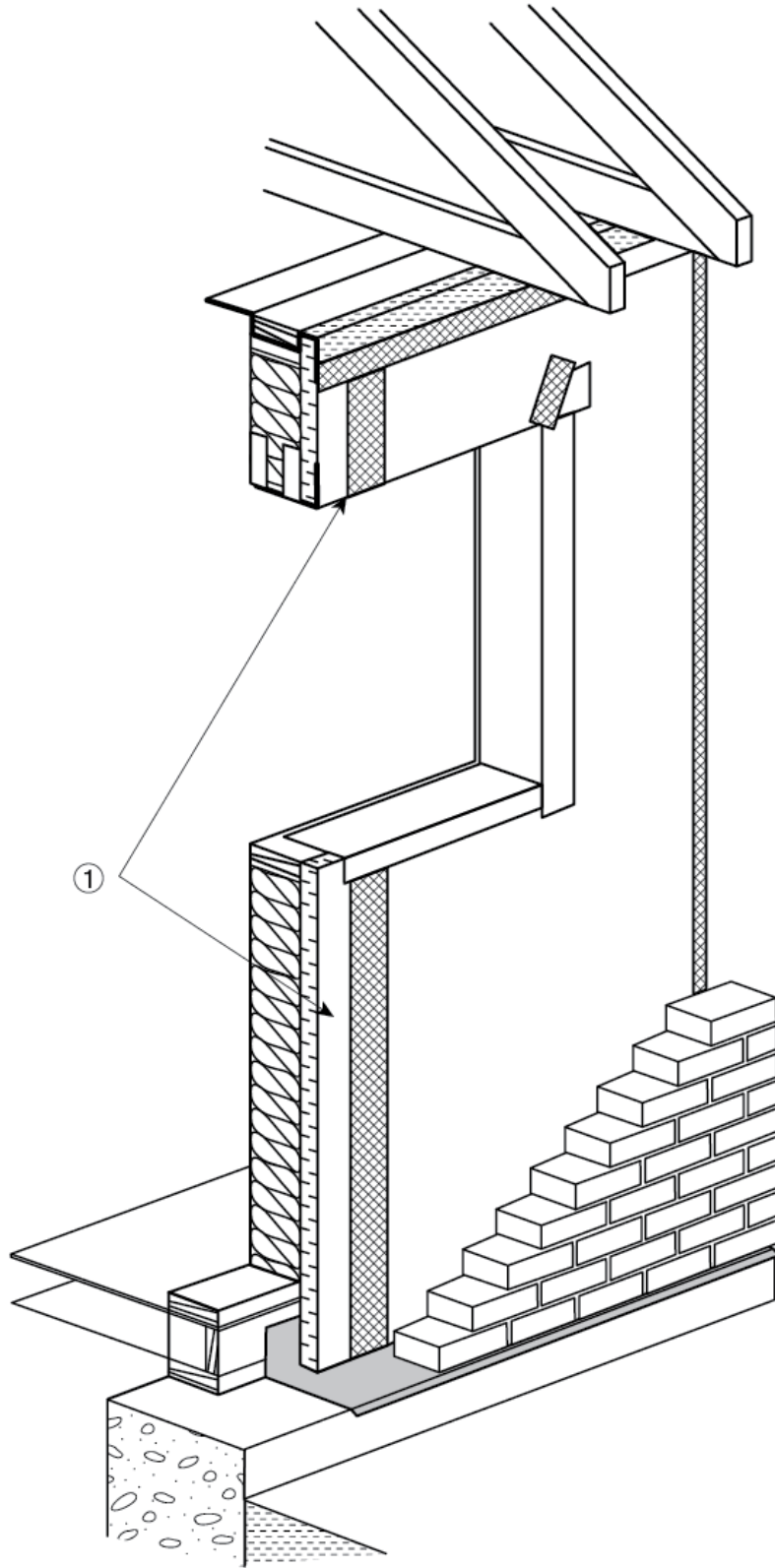


Figure 1a. Exterior wall:

1. sheathing tape

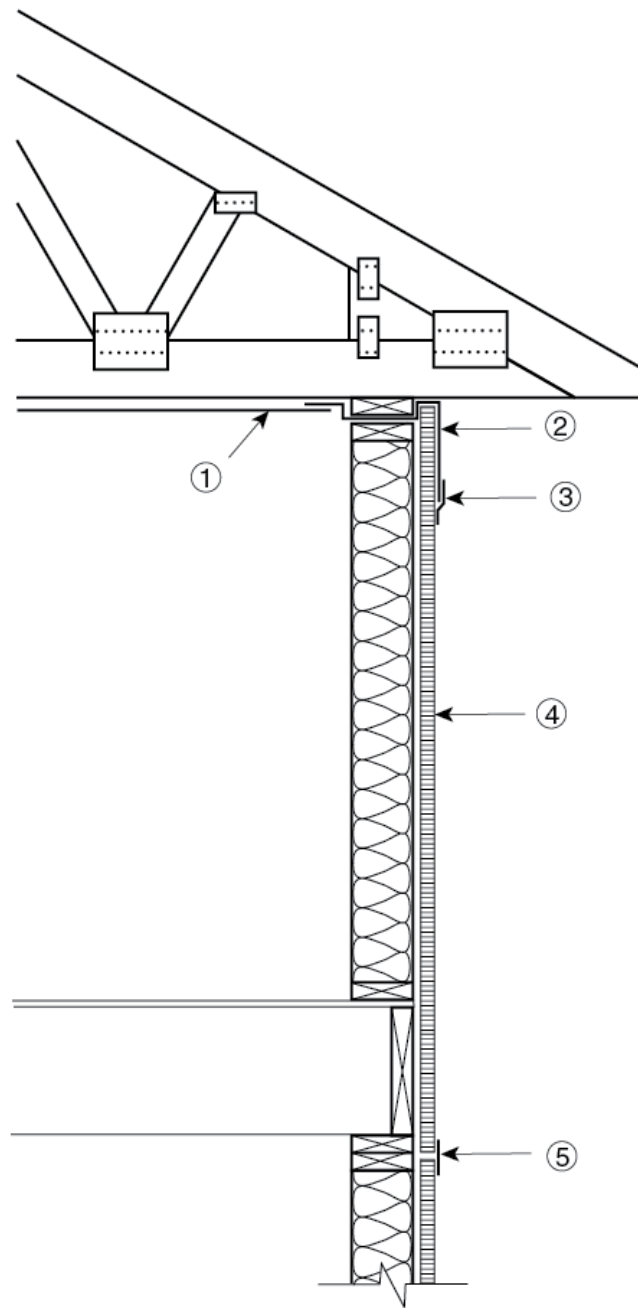


Figure 1b. Exterior wall:

1. ceiling air/vapour barrier
2. air barrier strip
3. CCMC-evaluated sheathing tape
4. "Excel"
5. CCMC-evaluated sheathing tape

All joints between the panels must be sealed with CCMC-evaluated sheathing tape. To maintain continuity, the wall membrane must be extended over the top plates and taped to the ceiling membrane.

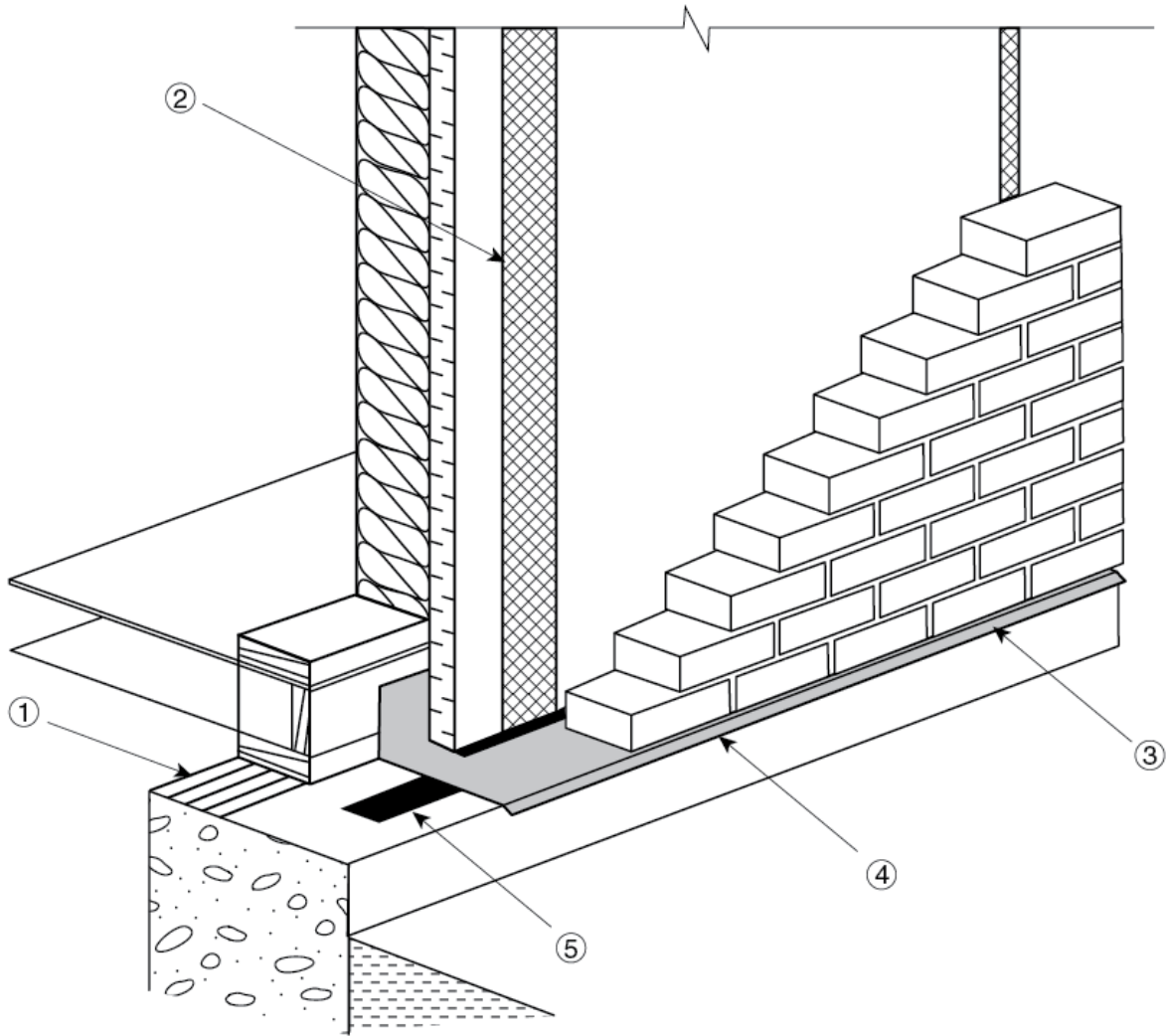


Figure 2a. Foundation/exterior wall detail:

1. sill plate gasket
2. sheathing tape
3. flashing
4. seal the joint between the “Excel” board and the flashing
5. the flashing must be sealed on the foundation wall

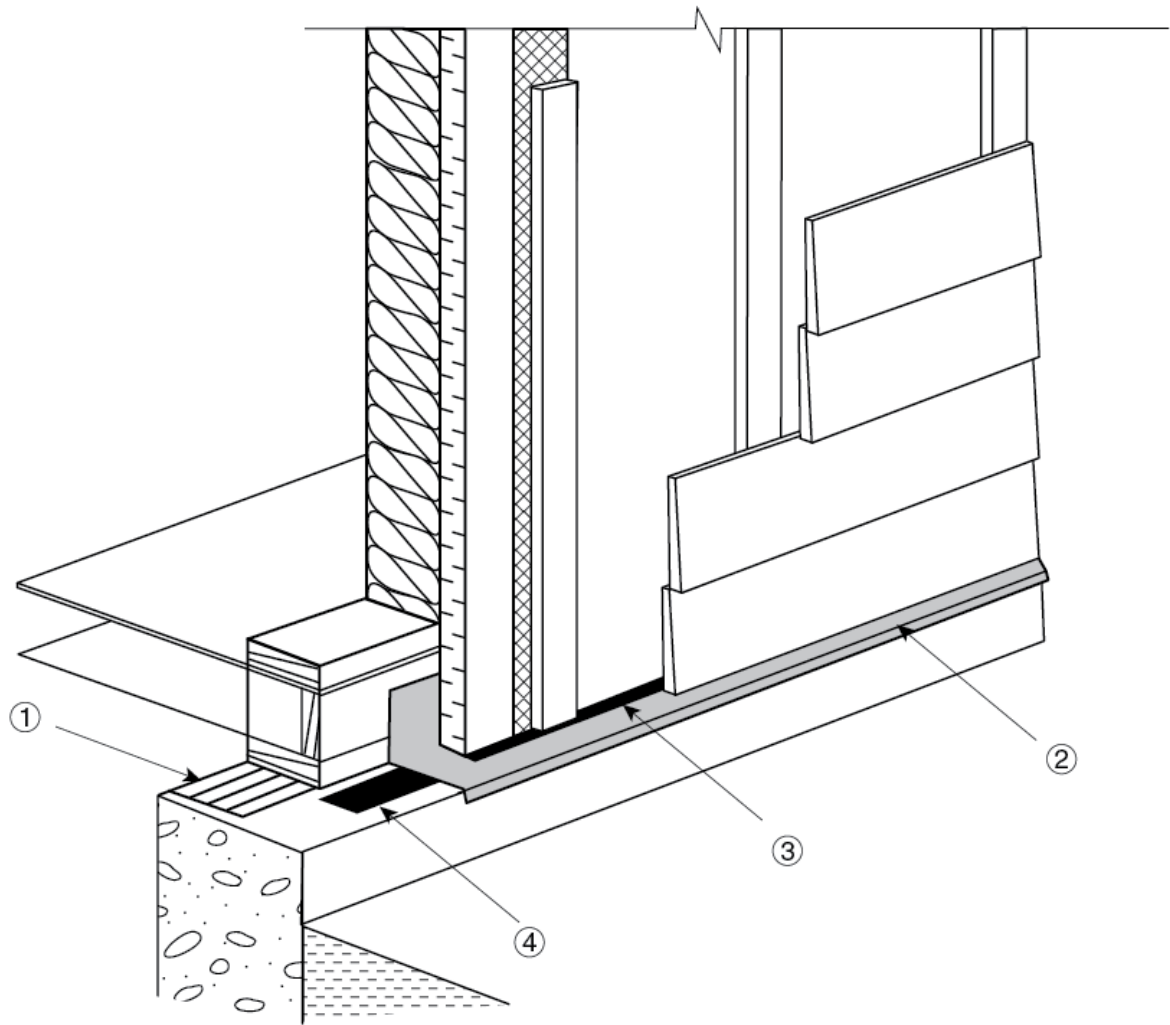


Figure 2b. Foundation/interior wall detail:

- 1. sill plate gasket**
- 2. flashing**
- 3. seal the joint between the “Excel” board and the flashing**
- 4. the flashing must be sealed on the foundation wall**

The foundation wall forms part of the air barrier system; the proposed membrane must therefore be sealed to the foundation wall to maintain continuity. The sealants used must be compatible with “Excel”. Silicone-based sealants must not be used. To maintain continuity to prevent water infiltration, a seal at the sill must be provided to direct water towards the exterior.

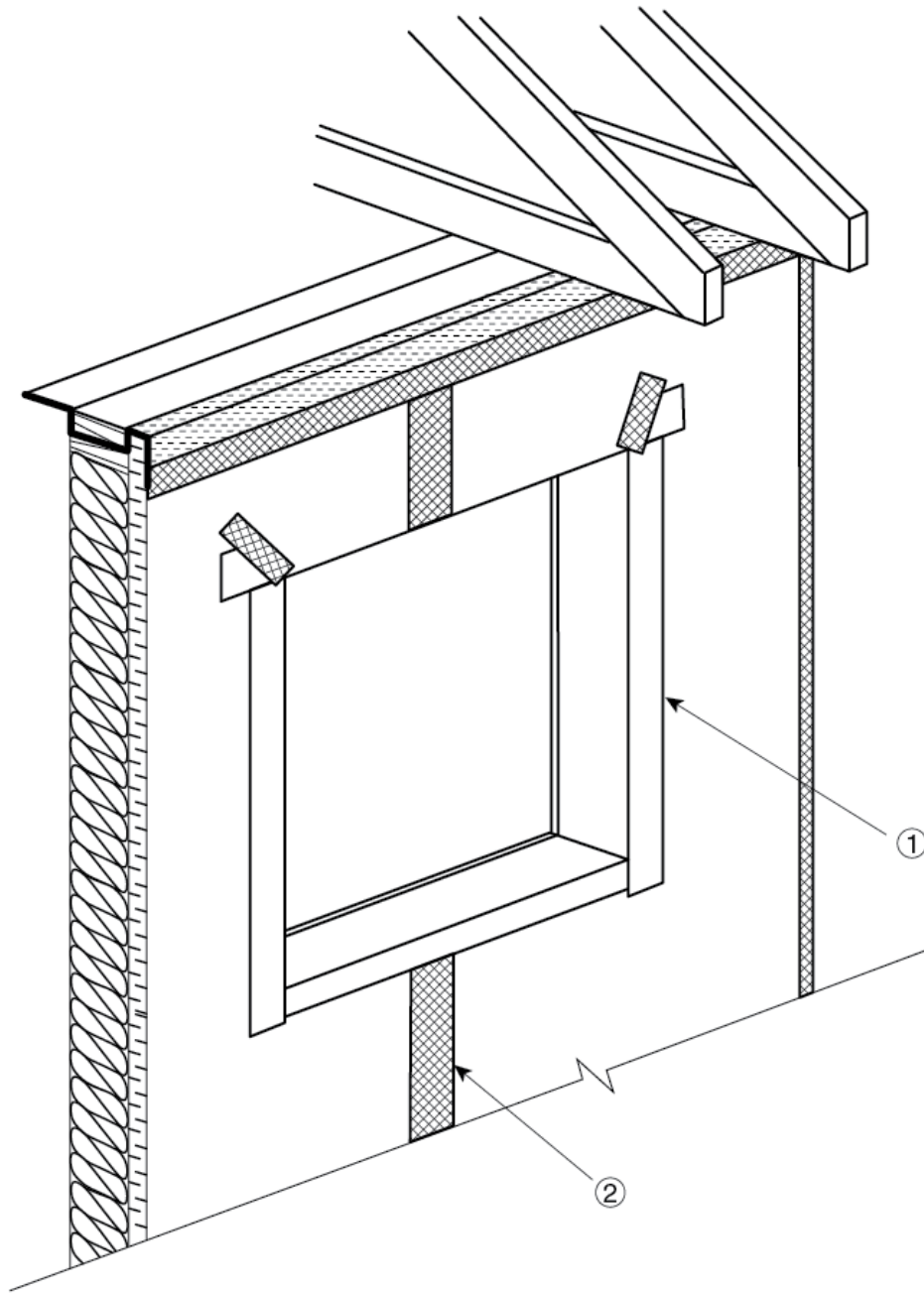


Figure 3. Continuity at window penetrations:

- 1. window flashing tape**
- 2. sheathing tape**

The continuity of the proposed membrane must be maintained by sealing the membrane to windows and doors. This may be accomplished by adding a membrane to the frame around the window openings and then sealing it to the windows with either a foam sealant or elastomeric sealant/backer rod. These sealants must be compatible with the surfaces being joined.

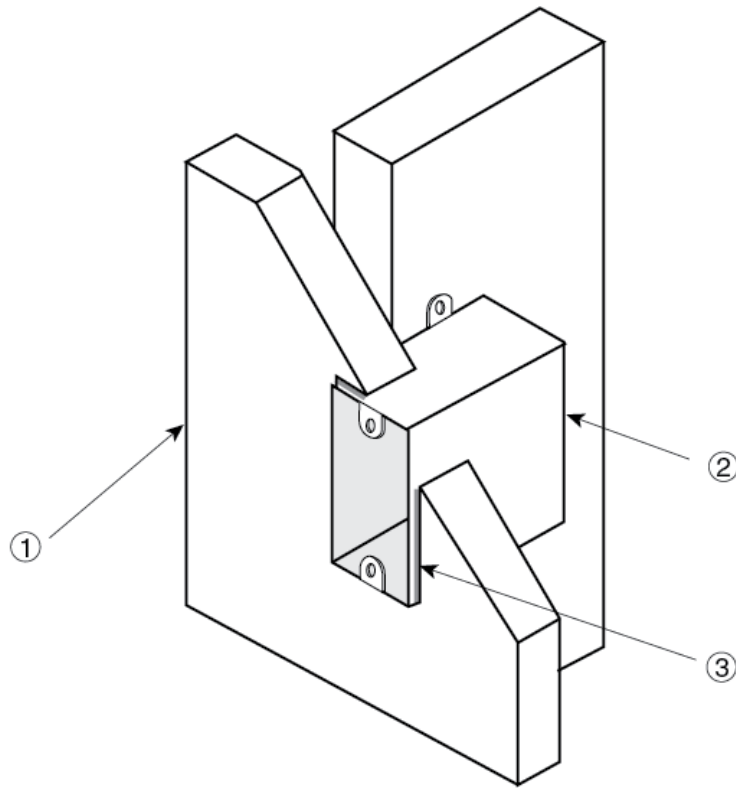


Figure 4. Exterior electrical junction boxes and receptacles:

1. “Excel”
2. airtight plastic electrical box
3. snap-on cover plate

All exterior electrical boxes and receptacles that penetrate the proposed air barrier material must be airtight boxes. Otherwise, electrical boxes must be wrapped and sealed to the proposed air barrier material to maintain continuity at these locations.

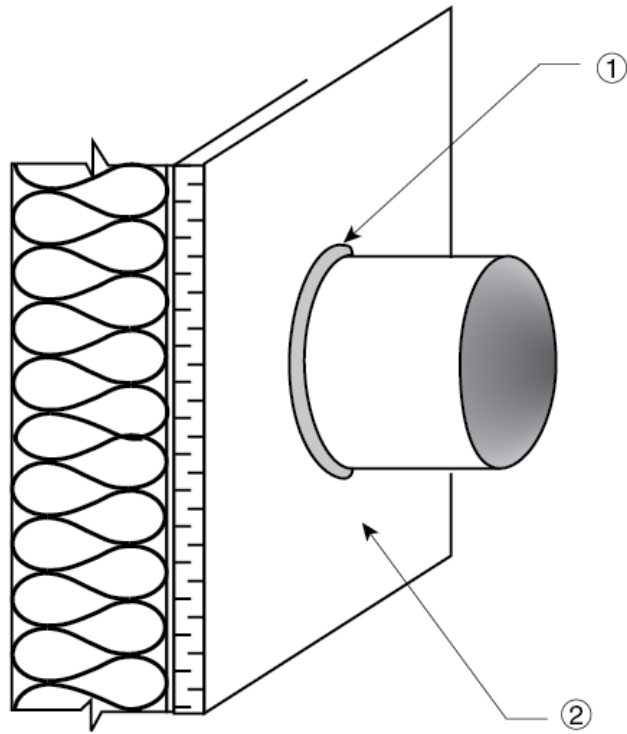


Figure 5. Sealing at penetrations through exterior wall:

- 1. seal the gap around penetrations**
- 2. cut “Excel” to fit around penetrations**

When a pipe, duct or other element penetrates the exterior wall and the proposed air barrier material, it must be sealed. Use sealant or CCMC-evaluated sheathing tape, whichever is more appropriate for the element to which it is being sealed.

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