

Product Information Bulletin 301

**Radon Guard
Insulation CCMC
13698-R**

Product Information Bulletin

Radon Guard® Insulation CCMC 13698-R

(5 pages attached)

The Canadian Construction Materials Centre (CCMC) is a part of the National Research Council's Institute for Research in Construction. CCMC provides a national evaluation service for new and innovative materials, products, systems and services that is recognized by provincial and territorial building regulatory bodies.

Evaluation Report CCMC 13698-R confirms **Radon Guard**® Insulation complies with the National Building Code (NBC) of Canada 2010 and 2015 as a sub-slab depressurization panel that allows for soil gas removal, insulation and a capillary break between the ground and the air barrier system when used as a component in a radon gas mitigation system in accordance with the conditions and limitations stated in Section 3 of the report as follows:

- Clause 1.2.1.1.(1)(a), Division A, using the following acceptable solutions from Division B:
 - Clause 9.13.4.3.(1)(a), Gas Permeable Layer (Providing for the Rough-in for a Subfloor Depressurization System).
 - Clause 9.25.2.2.(1)(c), Insulation Materials
- 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 9.13.4.3.(1)(b), Clean Granular Material (Providing for the Rough-in for a Subfloor Depressurization System).

The above CCMC opinion confirms that the interconnected channels on the underside of **Radon Guard** expanded polystyrene (EPS) insulation panels are able to serve as a sub-slab gas permeable layer comparable to the prescriptive clean granular material identified in Article 9.13.4.3. for NBC 2010 and 2015 Part 9 building applications.

Radon mitigation requirements are not prescriptively described in NBC 2010 and 2015 Subsection 5.4.1. for buildings constructed to meet Part 3 requirements but are included as part of the air barrier system design requirements. **Radon Guard** insulation panels can be used as the gas permeable layer within a radon mitigation system designed to minimize the ingress of airborne radon from the ground and allow venting with an aim to controlling indoor radon concentration to an acceptable level.

Refer to the attached copy of CCMC 13698-R for additional detail.



Evaluation Report CCMC 13698-R Radon Guard™

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1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “Radon Guard™,” when used as a component in a sub-slab radon gas mitigation system in accordance with the conditions and limitations stated in Section 3 of this Report, complies with the National Building Code (NBC) of Canada 2010 and 2015:

- Clause 1.2.1.1.(1)(a), Division A, using the following acceptable solutions from Division B:
 - Clause 9.13.4.3.(1)(a), Gas Permeable Layer (Providing for the Rough-in for a Subfloor Depressurization System)
 - Clause 9.25.2.2.(1)(c), Insulation Materials
- 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 9.13.4.3.(1)(b), Clean Granular Material (Providing for the Rough-in for a Subfloor Depressurization System)

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

2. Description

The product is a panelized sub-slab depressurization system that allows for soil gas removal, insulation and a capillary break between the ground and the air barrier system. The soil gas is dissipated through interconnected channels in the moulded expanded polystyrene (EPS) thermal insulation collection and exhaust panels. These panels are laid side by side to provide continuous venting and an insulation layer between the air barrier system (ABS) and the ground. The insulation panels used in the “Radon Guard™” system are PlastiSpan HD (CCMC 12425-L) Type 2 and PlastiSpan 25 (CCMC 12426-L) Type 3, which meet CAN/ULC-S701, “Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.”

The milled panels are a minimum 89 mm (3.5 in.) thick. The legs may be milled or moulded directly in the manufacturing plant. The legs are either square or cylindrical as shown in Figure 2 and Figure 3 respectively. The panels are available in the various sizes.

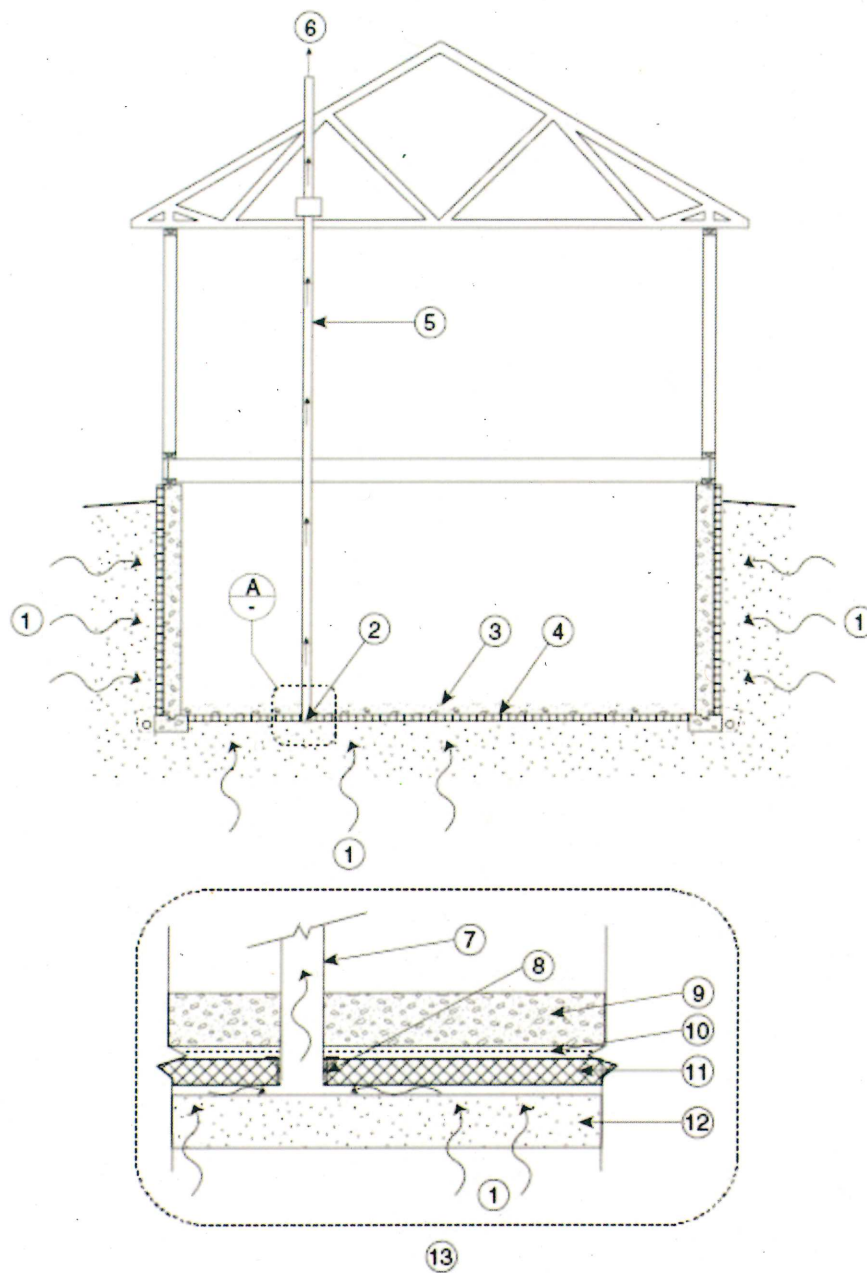


Figure 1. "Radon Guard™" typical assembly

1. radon gas
2. vent collar flange
3. concrete slab
4. air barrier system
5. radon exhaust vent pipe
6. radon exhaust
7. radon exhaust vent pipe
8. vent collar flange
9. concrete slab
10. air barrier system
11. "Radon Guard™" panels
12. undisturbed soil or compacted fill
13. Section A

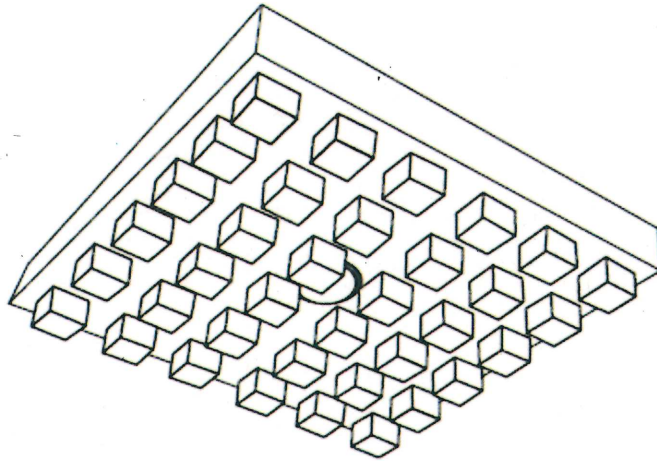


Figure 2. Underside view of square legs on “Radon Guard™”

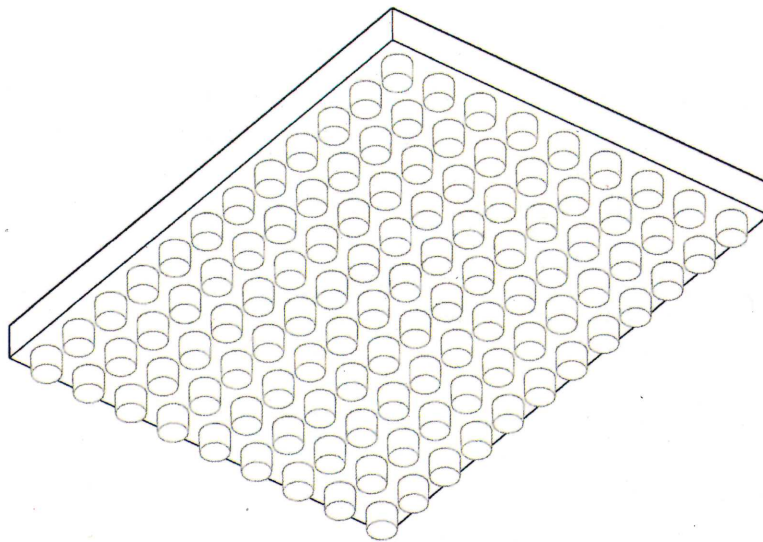


Figure 3. Underside view of cylindrical legs on “Radon Guard™”

3. Conditions and Limitations

The CCMC compliance opinion in Section 1 is bound by “Radon Guard™” being used in accordance with the conditions and limitations set out below:

- The product must be laid on undisturbed soil (no organics), on compacted fill or a sand base.
- The product is intended only as an underground gas permeable layer.
- The product must be installed in accordance with the manufacturer’s installation manual, Radon Guard™ Sub-Slab Radon Gas Mitigation, v. 1.2, April 4, 2014.
- The insulation panels used in the system must be certified to CAN/ULC-S701.
- The product must be used in conjunction with an ABS conforming to Subsection 9.25.3., Air Barrier Systems, of Division B of NBC 2015.
- The ABS, concrete slab, and interior floor finish must all be sealed to the radon extraction piping that is provided by others in accordance with Article 9.25.3.3., Division B of NBC 2010 and 2015 (see Figure 1).

4. Technical Evidence

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

4.1 Material Requirements

The thermal insulation must meet and be certified to CAN/ULC-S701, “Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.” The insulation panels used in the “Radon Guard™” system are PlastiSpan HD Type 2 (CCMC 12425-L) and PlastiSpan 25 Type 3 (CCMC 12426-L).

4.2 Performance Requirements

4.1.1 Radon Infiltration Test

Radon gas (Rn) was introduced to the dosing compartment located under the backfilling sand layer and test samples (either a “Radon Guard™” product or a 100 mm (4 in.) gravel layer). The receiving compartment was located above the varnished wood floor. Rn concentrations were continuously monitored in both the dosing and receiving compartments of the Radon Infiltration through Building Envelope Test System (RIBETS). The seven-day average of Rn concentrations was recorded after the system reached equilibrium (see Table 4.1.1.1).

Table 4.1.1.1 Results of Testing the Comparison of Radon Infiltration through “Radon Guard™” and Prescriptive Gravel

Property	Rn Concentration in Dosing Compartment (kBq/m ³)	Rn Concentration in Receiving Compartment (Bq/m ³)	Result
Floor assembly with Radon Guard™	4.58	48.79	Radon Guard™ is comparable to gravel in terms of radon infiltration under the test conditions.
Floor assembly with gravel	4.27	35.59	

4.1.2 Pressure Communication Test

A radon exhaust fan removed air from under the test samples (either a “Radon Guard™” product or a 100 mm (4 in.) gravel layer). The average flow rates through the radon exhaust fan, and the average pressure readings from under the floor panels and the test samples, in the backfilling sand layers, and in both the dosing and receiving compartments were recorded continuously over a two-hour period. Time averaging results are summarized in Table 4.1.2.1.

Table 4.1.2.1 Results of Testing the Comparison of Pressure Communication through “Radon Guard™” and Gravel

Property	Flow Rate Through Exhaust Fan (cfm)	Pressure Under Floor Panel (Pa)	Pressure Under Radon Guard™ (Pa)	Pressure in Sand Layer (Pa)	Pressure in Dosing Compartment (Pa)	Result
Floor assembly with Radon Guard™	38.4	-1.1	-1.7	-2.1	-28.6	Radon Guard™ is comparable to gravel in terms of sub-slab pressure communication under the test conditions. This result demonstrates that the product is able to serve as a sub-slab gas permeable layer as comparable to prescriptive gravel.
Floor assembly with gravel	38.7	-0.9	-1.4	-2.0	-29.2	

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