



## Evaluation Report CCMC 13698-R Radon Guard™

<b>MASTERFORMAT:</b>	31 21 13 15
<b>Evaluation issued:</b>	2014-06-13
<b>Re-evaluation due:</b>	2017-06-13

### 1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “Radon Guard™”, when used as 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 2010:

- 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 CCMC's evaluation of the technical evidence in Section 4 provided by the Report Holder.

### 2. Description

Radon Guard™ 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 molded 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 panels are milled and/or molded directly in the manufacturing plant. The panels are 63.5 mm (2.5") thick with 50 mm x 50 mm x 38 mm deep (2"x2"x1.5") legs (See fig. 2). The total panel thickness is 100 mm (4") and are available in the following sizes:

- 610 mm x 610 mm (2' x 2')
- 1219 mm x 1219 mm (4' x 4')
- 610 mm x 1219 mm (2' x 4')
- 1219 mm x 2438 mm (4' x 8')

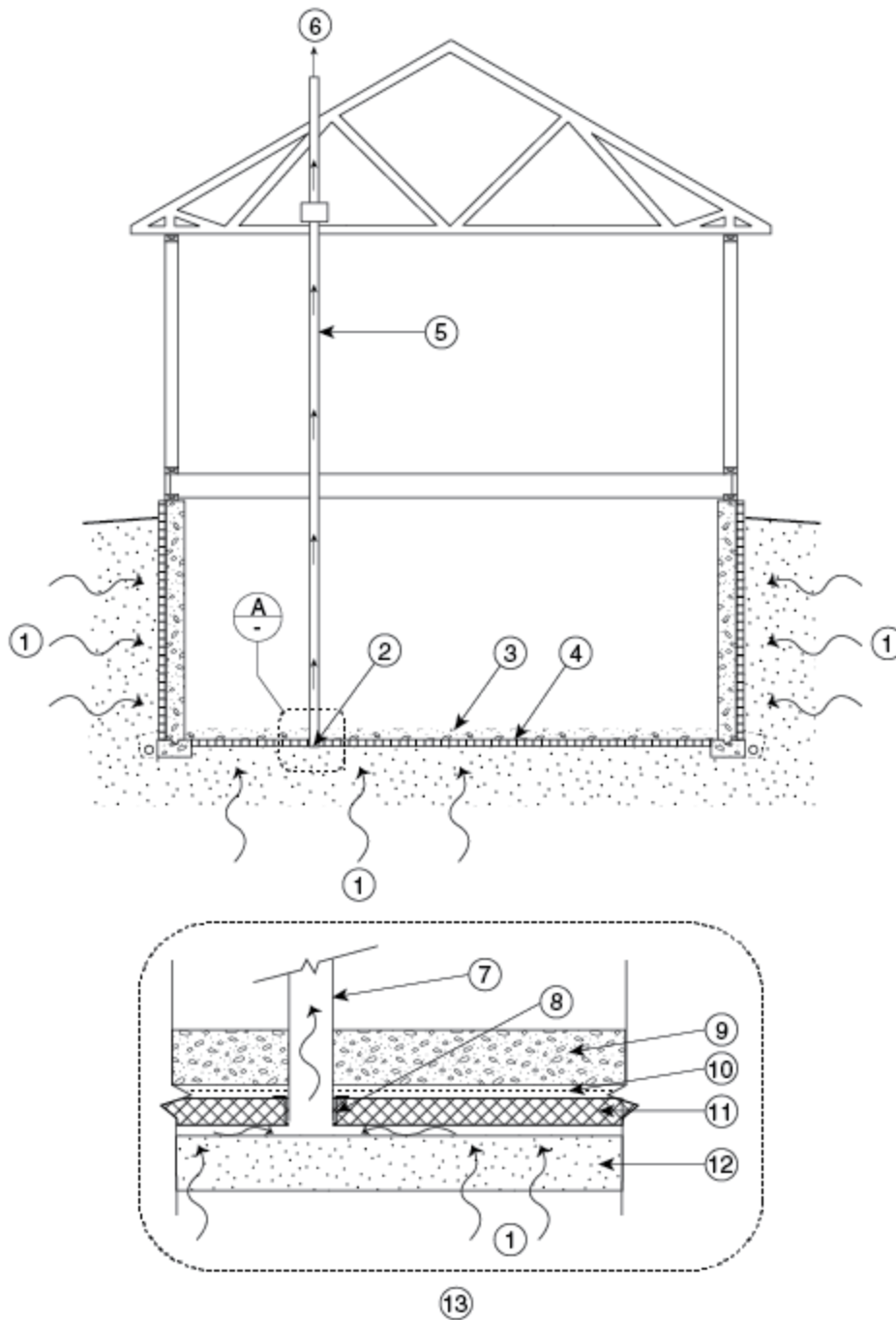


Figure 1. Radon Guard™ typical assembly

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

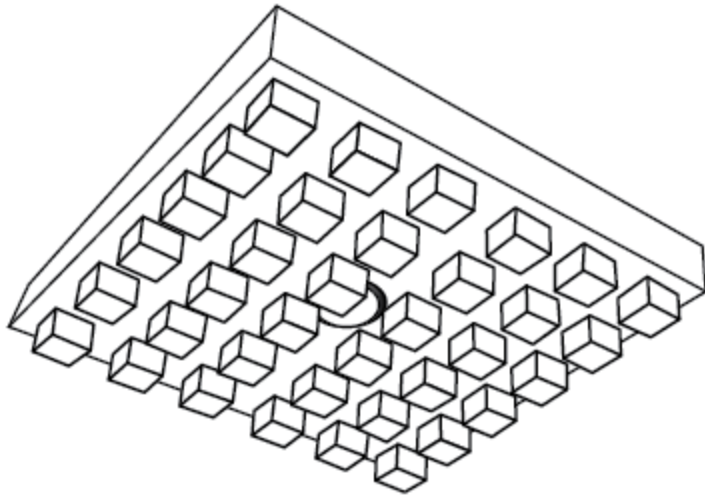


Figure 2. Underside view of Radon Guard™

### 3. Conditions and Limitations

CCMC's compliance opinion in Section 1 is bound by the "Radon Guard™" being used in accordance with the conditions and limitations set out below.

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

### 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.

#### 4.1 Material Requirements

The thermal insulation shall 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).

**Table 4.1.1 Test Results for Comparison of Radon Infiltration through Radon Guard™ and Prescriptive Gravel**

Property	Rn Concentration in Dosing Compartment (kBq/m <sup>3</sup> )	Rn Concentration in Receiving Compartment (Bq/m <sup>3</sup> )	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.

**Table 4.1.2 Test Results for 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 Radon Guard™ 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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**Date modified:**

2014-06-25