

**HUNTSMAN**

BUILDING SOLUTIONS



# Radon Protection

How It Works

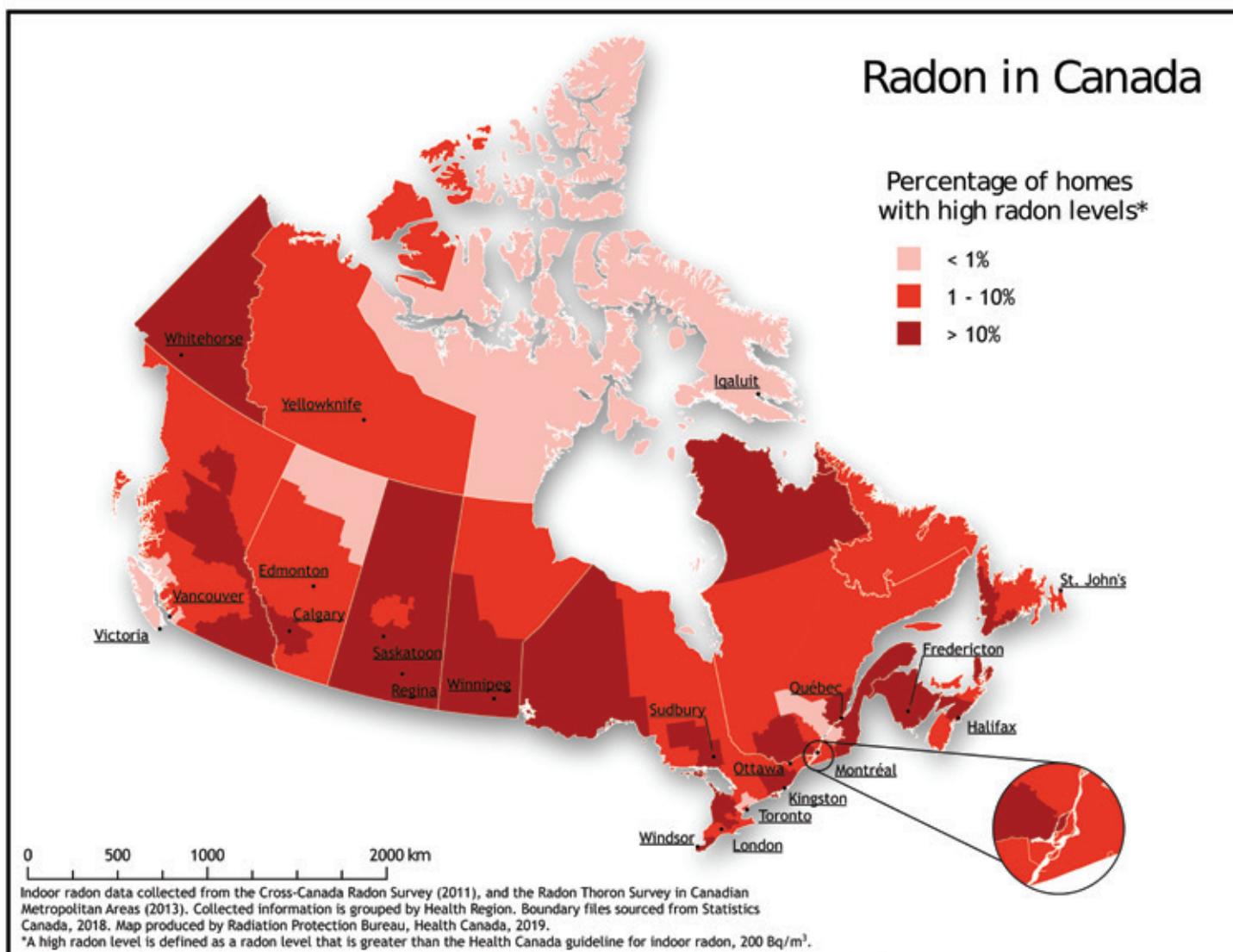
**Radon Protection with the  
World's Leading Spray Foam**

**Heatlok Soya HFO is Produced in Canada and consists of  
22% of recycled and renewable content**

# What is Radon?

Radon, a colorless, odorless, radioactive gas, is the second leading cause of lung cancer. Heavier than air, radon can accumulate in basements, increasing the risk of exposure to the homeowner.

Radon can infiltrate through several places, especially cracks or openings in the floor slab, cracks in the foundation wall, or sumps. The Environmental Protection Agency (EPA) and The Canadian Lung Association recommend testing for radon in your home.



This map was created using data collected from the Cross-Canada Radon Survey (2011) and the Radon Thoron Survey in Canadian Metropolitan Areas (2013). Collected information is grouped by Health Region. Boundary files are sourced from Statistics Canada, 2018.

## Here are Health Canada's recommendations for reducing radon infiltration in basements:

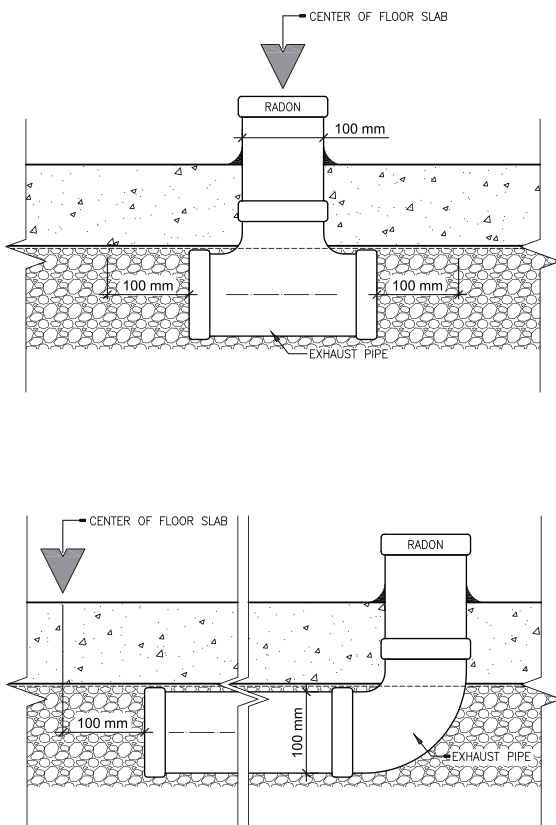
- Install a membrane or sealing product under the floor slab
- Seal the joint between the foundation wall and the floor slab
- Seal all openings in the foundation wall and floor slab
- Seal all posts and load-bearing walls to the floor slab and membrane
- Install floor drains that prevent gas infiltration
- Install sealed lid on sumps

# How to Build a Radon-Free Basement

These are the 6 steps to build a radon-proof basement in a new building:

## 1. Install A Depressurization Pipe

A perforated 4 inch diameter pipe must be installed in 3/4 inch gravel net and run to the center of the surface of the floor slab. This pipe is installed preventatively and will be connected to an exhaust fan if, after the work is completed, a test shows a radon concentration over 200 Bq/m<sup>3</sup>.





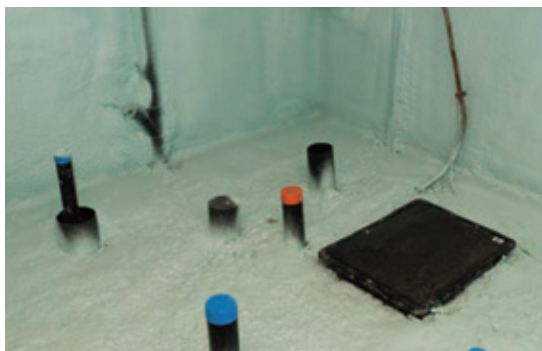
## 2. Install An Air Barrier

Heatlok Soya HFO is a CCMC and NBC compliant air barrier product, in accordance with standard ASTM 2178, and provides perfect air-tightness under the foundation slab, as well as being insulating. Heatlok Soya HFO is radon gas resistant, as demonstrated by K124/02/95 (method C of ISO/TS 11665-13) and is 65 times more effective than a 6-mil polyethylene membrane at 1.25" (32mm). The minimum thickness to apply is 1.25" (32mm) to meet insulation, airtightness and vapor barrier requirements.



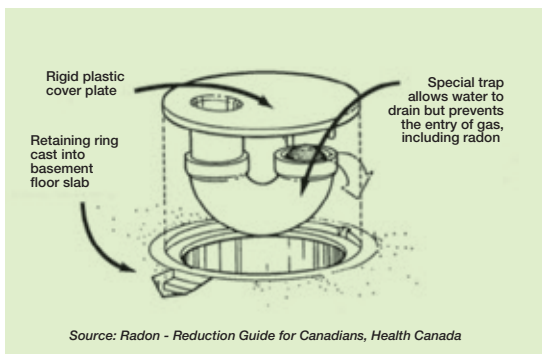
## 3. Seal The Joints

The perfect continuity of insulation achieved with Heatlok Soya HFO seals all joints, providing seamless insulation from the slab to the foundation wall all the way up to the rim joist. The product is sprayed on-site and molds perfectly to the building structure. The continuity between the airtight slab and the wall is perfect. The installation of Heatlok Soya HFO requires no sealant, tape or cutting of materials, so there are no compatibility issues between materials.



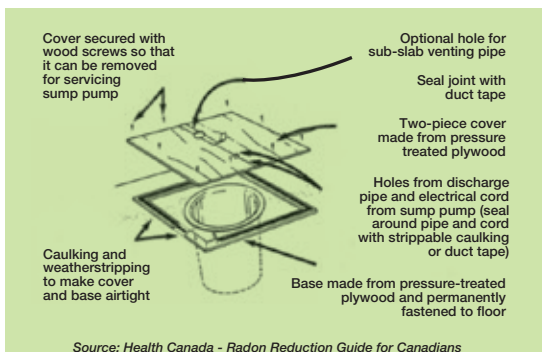
## 4. Seal All Openings

Heatlok Soya HFO seals openings and posts, leaving no room for error. The product seals and expands 30 times its initial volume in 5 seconds.



## 5. Install Floor Drains

Radon can use water as a vehicle for infiltration. It is, therefore, important to install floor drains that are specifically designed to prevent gas infiltration.



## 6. Install A Sealed Lid on Sumps

Sumps can communicate directly with the gravel. It is therefore important to use specifically designed sealed lids.

# Protection Requirements

The basement can often be a high risk area: high humidity, floods, mold, etc. With the new energy requirements of The National Building Code of Canada (NBCC), its is recommended to insulate under the basement concrete slab. The insulation must have a minimum value of R-5 full surface or R-7.5 for 4 feet (1.2 metre) around the perimeter. In addition, NBCC requires the installation of protection against soil gases (sub-section 9.13.4 of the NBCC), mainly radon. Heatlok Soya HFO provides superior insulation, a perfect air barrier system, and a vapour barrier all in one single application. It also prevents soil gases, mainly radon, from entering the building. In short, the occupants are warm, comfortable and protected from radon.

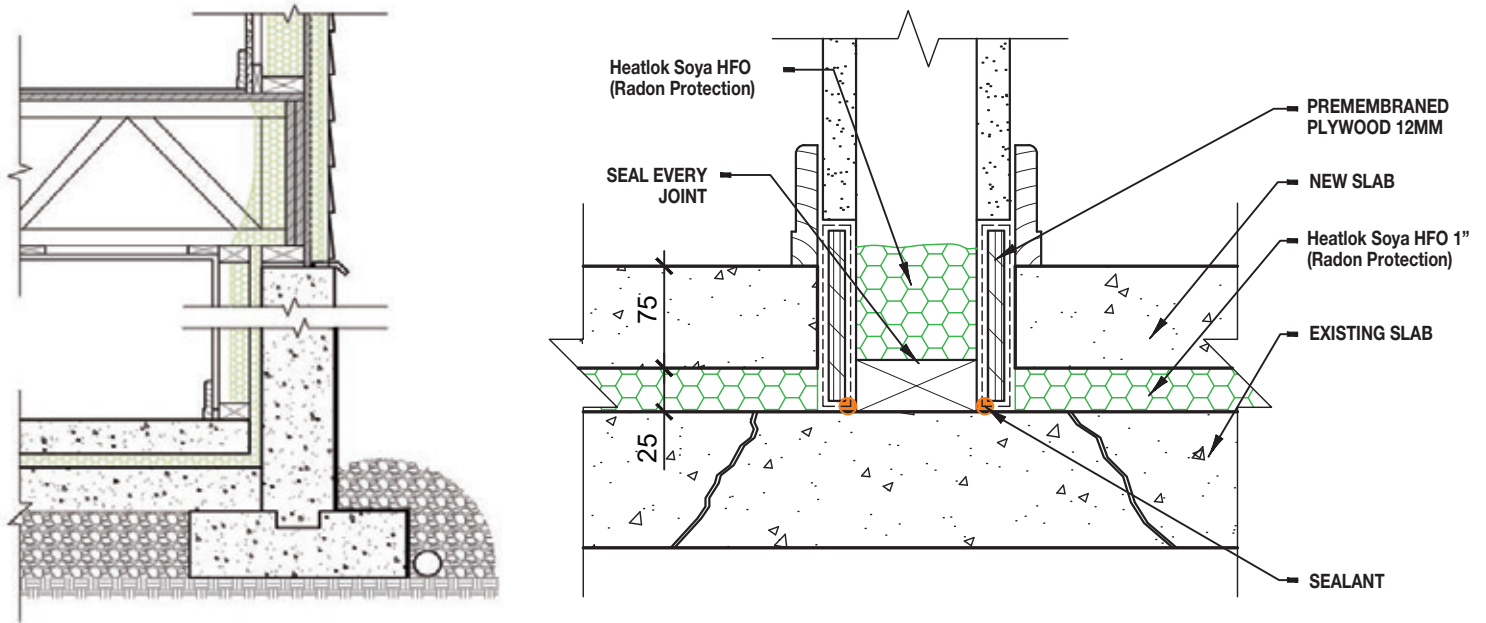
With an R value of R-6/inch, Heatlok Soya HFO, applied 2" (50 mm) thick, provides R-12 insulation under the entire surface of the slab, exceeding Building Code requirements. The product is sprayed directly on the crushed stone and provides continuous insulation, with no joints. Heatlok Soya HFO has very good compressive strength (24.8 psi).

During construction, workers can move with wheelbarrows and equipment without damaging Heatlok Soya HFO; it will not crack or break. The entire basement can be sprayed in a single step. Application is very quick and generates no waste. No scraps, no wasted materials. The Canadian government has changed the safe threshold for Radon gas in buildings. The new requirements of the National Building Code of Canada, 2010 (Sub-Section 9.13.4) stipulate the installation of an air barrier system in basements to block infiltration of radon gas. In addition to its high insulation factor, Heatlok Soya HFO acts as an air and vapor barrier. 25 mm (1") of product exceeds the air barrier material requirements of the code by 500 times, creating an air barrier system. The product is tested in accordance with Standard ASTM 2178. When applied, the product adheres and expands 30 times its initial volume in 5 seconds.

MINIMUM INSULATION VALUES REQUIRED FOR BASEMENT				
ONTARIO SB-12				
	Full Surface Below Grade Slab	Edge of Below Grade Slab	Heated Slab or ≤ 600mm Below Grade	Basement Wall
Zone 1 (<5000 HDD)	-----	R-10	R-10	R-12 R-20 <sup>2</sup>
Zone 2 (<5000 HDD)	R-5 <sup>1</sup>	R-10	R-10	R-12 R-20 R-22 <sup>2</sup>
Addition	-----	R-10	R-10	R-20
QUÉBEC PART 11				
(<6000 HDD)	R-5	R-4	R-10	R-17 <sup>3</sup>
BRITISH COLUMBIA PART 10				
Residential (<5 Stories)	R-5	R-4	R-10	R-17 <sup>3</sup>
<small>1 - Zone 2 table 2.1.1.3.A AFUE ≥ 90% compliance package B,C,E,F,G,I,J,K,L,M = R-0            2 - Depend on applicable compliance package            3 - Total R-17 with a minimum R-4 insulation thermal break structure 1RSI=5,678R            For more information see Typical Heatlok Soya Detail Wood Fraing Construction</small>				

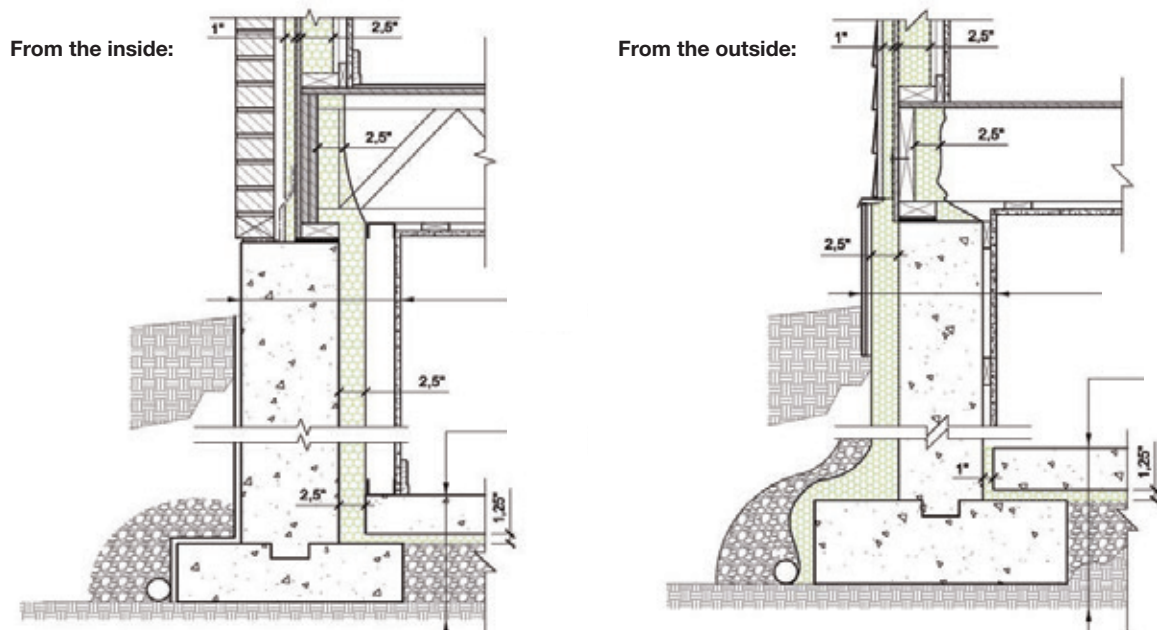
# Renovation

A simple solution to prevent radon infiltration in existing buildings. Spray Heatlok Soya HFO on the existing slab, the foundation wall, and the rim joist, and then pour a new slab. It is important to verify the floor/ceiling height, since this will add approximately 4" to the floor thickness.



# New Construction

Preventing radon gas infiltration in new construction is even simpler.





## The Solution For Lasting Comfort

A basement is a high-humidity area prone to mold and mildew development. According to independent laboratory testing (ASTM C 1338), mold will not grow in Heatlok Soya HFO, as it is not a nutrient source for bacteria. The product is water and humidity resistant. Numerous studies have shown that it is the ideal insulation for Class 1 flood zones as it has the highest rating (Class 5) for flood resistant materials. The spray polyurethane foam may remain in place even after a flood. The foam does not degrade and, once dry, Heatlok Soya HFO recovers all of its physical properties.

In short, the installation of Heatlok Soya HFO under the slab and on foundation walls saves time and materials, while providing lasting superior-quality insulation and airtightness at a competitive price. Heatlok Soya HFO is suitable for application on all building types and its installation generates no waste or job site trash. The product is sold in liquid form in returnable or recycled containers, therefore there is no excess packaging.

To see the Radon performance test video, [click here](#).

### References

1. CMHC. (July 2004). Performance of sprayed polyurethane foam on indoor foundation walls. Research highlights. Technical series 04-118
2. Bodycote Materials Testing. (December 2005). Fungal Resistance Testing of Airmetic. Report 05-00342
3. Honeywell. Closed-cell spray foam: A better building technology. Severe Weather FEMA. (August 2008). Flood damage – Resistant Materials Requirements. Technical Bulletin #2. FEMA. (December 2010). Home Builder's Guide to Coastal Construction. Technical factsheet series. FEMA P-499 SCHL. (1999). Basement walls that dry quickly. Research Highlights. Technical series 99-109
4. Test Report No 124047/2018, Radon diffusion coefficient of the polyurethane foam insulation Heatlok Soya HFO in accordance with the method K124/02/95.
5. Radon - Reduction Guide for Canadians, Health Canada.

Swinton, M.C.; Bomberg, M.T.; Maref, W.; Normandin, N.; Marchand, R.G. In-Situ Performance Evaluation of Exterior Insulation Basement System (EIBS) Spray Polyurethane Foam. Institute for Research in Construction, NRCC, Ottawa, 2000 (A-3132.3)

National Building Code of Canada 2010 and 2015, National Research Council Canada