HUNTSMAN
BUILDING SOLUTIONS

December 19th 2022

Object : Under Slab Insulation / Radon Protection System – Heatlok Soya HFO

Energy efficiency requirements are constantly increasing in all types of buildings. Many states now require insulation below the basement slab or slab on grade. There are now also requirements to protect the occupant from soil gas like radon in National and Provincial Codes.

It is often very complicated and costly to get a perfectly sealed under slab system. Heatlok Soya HFO can provide a quick and simple solution for any under slab insulation. A solution that can be adapted easily to any shape or details of all types of construction. Heatlok Soya HFO can be sprayed directly on crushed stones to provide a perfectly sealed under slab insulation system. The concrete slab can then be poured directly on the product.

Insulation, Air Barrier and Vapour Barrier Properties

Heatlok Soya HFO is one of the most effective insulation products on the market with an average R-Value of R-6 per inch. It can be applied to any thickness desired to meet the energy requirements. Due to its continuity and the fact that it is seamless, it also provides a continuous air barrier assembly under the slab and seals any penetration, like plumbing pipes or others without the use of tape or sealant. It has been tested in accordance with ASTM E2178 and CAN/ULC S741 test methods with an air permeance result of less than 0.02 l/s-m^2 @ a 75 Pa pressure difference. It also provides a vapour barrier with a result of less than 60 ng at only 1 ¼ ''. No other vapour barrier is required, as 1 ½'' of Heatlok Soya HFO will provide sufficient resistance to vapour.

Heatlok Soya HFO provides all three necessary components for a high-performance assembly: an air barrier, a vapour barrier and insulation. This would require 3 or 4 products with other systems. Not only that, the quality of the product and its installation are superior to other systems.

* Note, if a 6-mil polyethylene is requested, it can be installed on top of the foam before pouring the concrete slab. It should not be installed prior to the spray foam installation.

Radon Barrier

Heatlok Soya HFO has been tested for radon diffusion. Radon protection is usually provided by an air barrier material, since radon travels primarily through air. However, there can be radon diffusion through some air barrier materials. That is the reason why our product has been tested in accordance with K124/02/95 (method C of ISO/TS 11665-13) for radon diffusion. At only 1'', Heatlok Soya HFO performs 35 times better than 6 mil polyethylene for radon protection. Furthermore, the product is often installed at a thickness of 1 ½ '' to 2'' and is therefore much harder to puncture than 6 mil polyethylene when workers are walking on it during construction.

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Heatlok Soya HFO's Radon protection System is also evaluated by NRC which produced the report CCMC 14280-R. At 38 mm the product acts as an Air Barrier System applied directly on the gravel before pouring the concrete slab.

The Heatlok product has also been evaluated by a CNRPP (Radon Specialist) officer in Canada and has been characterized to outperform a poly for this application.

Compressive Strength/Durability

As mentioned before, Heatlok Soya HFO can be sprayed directly to gravel or dirt to act as insulation, air barrier, vapour barrier/vapour retarder, < 60 ng, and radon protection. To add to all of this, the product also has an excellent compressive strength for this type of application.

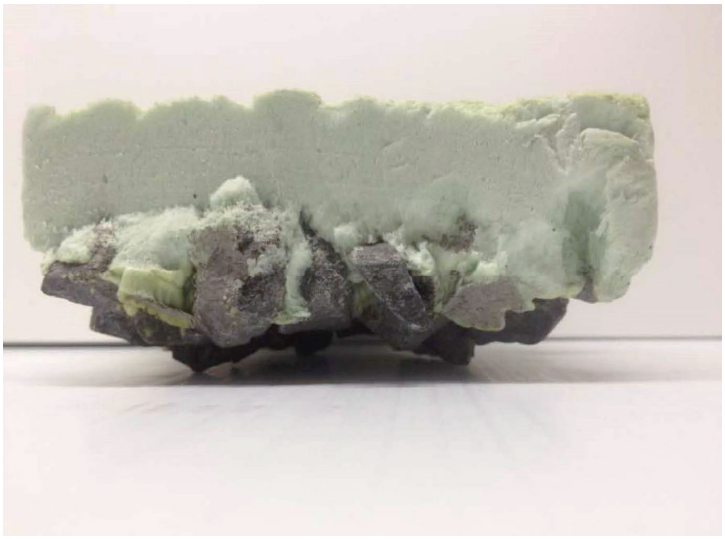
The test method used for compressive strength, ASTM D 1621 ''*Standard Test Method for Compressive Properties of Rigid Cellular Plastics",* is the same for all plastic insulation products on the market.

On the other hand, what is specific to spray polyurethane foams is that they are tested in the core of the foam only. The skin is not included and the reported density is therefore lower. The parameters of the test give conservative results, as these are laboratory conditions. Therefore, the actual overall density on site is always higher than in test conditions, which results in higher compressive performance.

The compressive strength of Heatlok Soya HFO is 24.8 PSI. As mentioned, the test results are lower than the actual installed density. This compressive strength is in the range of commonly installed products for under slab application.

ASTM D 1621 measures how much force must be exerted to compress the material by 10%. With a compressive strength of 24.8 PSI (± 3500 lbs per square foot) and considering that the average weight of concrete is 150 lbs per cubic foot, a typical 6" slab of concrete would weigh approximately 75 lbs per square foot. This is well below the structural capability of the foam.

Another advantage of this application is the fact that spray foam will penetrate the crushed stone sub-base for about ½''. The foam when applied is liquid and will penetrate the gravel (see pictures below) to seal everything. At certain areas, there will be more foam and the insulation value will therefore be increased. It makes the assembly very compact without leaving any air space between the insulation and the crushed stone subbase, thus preventing the foam from cracking when walked upon. This is one of the problems of other systems that make them weak and often break or tear with the traffic of workers during construction.



Heatlok Soya HFO is 100% in contact with its substrate making it very solid to walk on. Different thickness can be applied depending on the required R-value. 2'' as demonstrated above is a common application.

Flood Resistance

Many studies and articles have described the exceptional performance of spray foam insulation in coastal areas or hurricane and flood zones. For example, due to its excellent water-resistant properties, closed cell spray foam has received the highest rank (Class 5) by FEMA and NFIP (National Flood Insurance Program) for flood damage-resistant materials. It is also the only product accepted by FEMA for use as insulation in flood zones. It is very resistant to ground water as demonstrated by its very low water absorption characteristics and its rapid drying capability.

The Heatlok product was also studied by NRC in Canada for a period of 2 years in a below grade exterior foundation walls application without additional water proofing and it remained completely dry.

To demonstrate this, during the spring of 2017, there was a major flood in many areas of the Quebec province in Canada. Demilec was involved in a case study with one flooded home where our closed cell spray foam product had been installed years prior. There was about 4 feet of dirty water filling the entire basement. After the water was removed, only the gyprock was taken off and the basement was cleaned with power washers. After the basement was dried for about 5 days, Demilec officials inspected and tested the humidity content of the wall. Only a few small areas still showed a humidity level of more than 15%. In the end, the basement completely dried out and the foam remained in place and only the gyprock needed to be replaced. This saved a lot of time and money for the complete restoration.

Code Compliance Considerations:

2015 National Building Code Section 5.4.1., Section 9.13.4. and Section 9.25.4.2.
In addition to the depressurization system, an air barrier is also requested under slab to provide soil gas resistance. A vapour barrier is also required to provide resistance to moisture.

Under Slab Air Barrier Requirements:

As well as in Part 5, Section 9.13.4 requires an air barrier system below the slab. Heatlok Soya HFO is not only tested as an air barrier product but also as a system. CCMC 14280-R report qualify the product as an under slab Air Barrier System.

Under Slab Vapour Barrier Requirements:

In Section 9.25.4.2. a vapour barrier is defined as a materiel that has less than 60ng when tested in accordance with ASTM E96. Heatlok Soya HFO, at a thickness of 1.25” or greater, provides a vapour barrier of less than 60ng. Typical thickness of Heatlok Soya HFO when used as a radon barrier under slabs is 1.25” or greater.

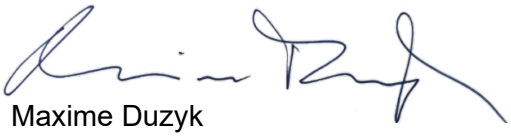
Additionally, the section requires that the vapour barrier be lapped. For a polyethylene vapour retarder this is important to ensure continuity of both the vapour retarder and the air barrier. Heatlok Soya HFO provides a monolithic continuous air and vapour retarder. Continuity of the air barrier is important because radon enters the space primarily through air gaps or cracks in the slab and around penetrations.

Under Slab Insulation Requirements:

The building code in section 9.36, requires various insulation values for slabs on grade or basement slabs. The requirements depend on your location and sometimes the heating system that you are using. The product can achieve any type of insulation requirement while protecting from radon.

For any further information, please don’t hesitate to contact us.

Thank you,



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