UL Solutions Evaluation Report

ULC ER41037-01

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Sub Level: 07 26 23 Below-Grade Gas Retarders

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1. Subject:

WALLTITE v.5 Radon Control

2. Scope of evaluation

2015 National Building Code of Canada, NBCC (September 28, 2018)
2020 National Building Code of Canada, NBCC (July 15, 2019)

NBCC Division A, Part 1 - Compliance
Clause 1.2.1.1.(1)(a) Compliance with this Code

NBCC Division B, Part 5 – Environmental Separation
Clause 5.4.1.1.(1)(e) Required Resistance to Air Leakage / minimize the ingress of airborne radon from the ground
Clause 5.4.1.2.(4) Below-grade Air Barrier Assemblies

NBCC Division B, Part 9 – Housing and Small Buildings
Sentence 9.13.4.2.(1) Protection from Soil Gas Ingress – Air Barrier System
Article 9.13.4.3 Providing for the Rough-in for a Subfloor Depressurization System

NBCC Division A, Part 1 - Compliance
Clause 1.2.1.1.(1)(b) Compliance with this Code (Alternante Solutions)

NBCC Division B, Part 9 – Housing and Small Buildings
Sentence 9.25.3.6.(1) Air Barrier Systems in Floors-on-ground (6-mil polyethylene)

The system was evaluated for the following properties:

- Air Permeance (ASTM E2178 – with deviations)
- Compression Strength (ASTM D1621)
- Radon Resistance (ISO 11665)
- Spray Foam (CAN/ULC-S705.1 and CAN/ULC-S705.2)

3. Referenced documents

ASTM D1621	Standard Test Method for Compressive Properties of Rigid Cellular Plastics
ASTM E2178	Standard Test Method for Air Permeance of Building Materials
CAN/CGSB-51.34-M	Vapour Barrier, Polyethylene Sheet for Use in Building Construction
CAN/ULC-S705.1	Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Material Specification
CAN/ULC-S705.2	Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Application
ISO 11665	Measurement of Radioactivity in the Environment – Air : Radon 222 Part 13: Determination of the Diffusion Coefficient in Waterproof Materials: Membrane Two-Side Activity Concentration Test Method

4. Uses

The BASF Canada Inc. **WALLTITE v.5 Radon Control** system is utilized as a soil radon barrier. Spray applied polyurethane foam insulation (WALLTITE v.5 SPUF) is installed prior to the installation of concrete slabs on ground and applied to foundation walls to form a continues barrier. A rough-in subfloor depressurization system completes the system.

This Evaluation Report does not cover the WALLTITE v.5 Radon Control system for areas of high-water tables, exposed combustible material, thermal insulation, waterproofing performance or rodent infestation. Additional evaluations and testing are required to meet these and other applications.

5. Product description

The WALLTITE v.5 Radon Control utilizes a medium density, closed cell, spray-in-place, rigid polyurethane foam (WALLTITE v.5 SPUF) to form a continuous below grade soil gas / radon control barrier in conjunction with a rough-in subfloor depressurization system. The WALLTITE v.5 SPUF is applied at a design density of 32.5 kg/m^3 (2.03 pcf). The SPUF when installed at a minimum thickness of 50mm and extended above grade, on the interior surface of foundation walls, in conjunction with a minimum 100mm gravel base, and roughed-in radon sub slab depressurization system, combine to comply with the code requirements of controlling and minimizing soil gas and radon ingress. The WALLTITE v.5 Radon Control utilizes WALLTITE v.5 SPUF installed by trained and certified installers following the BASF field quality assurance procedures.

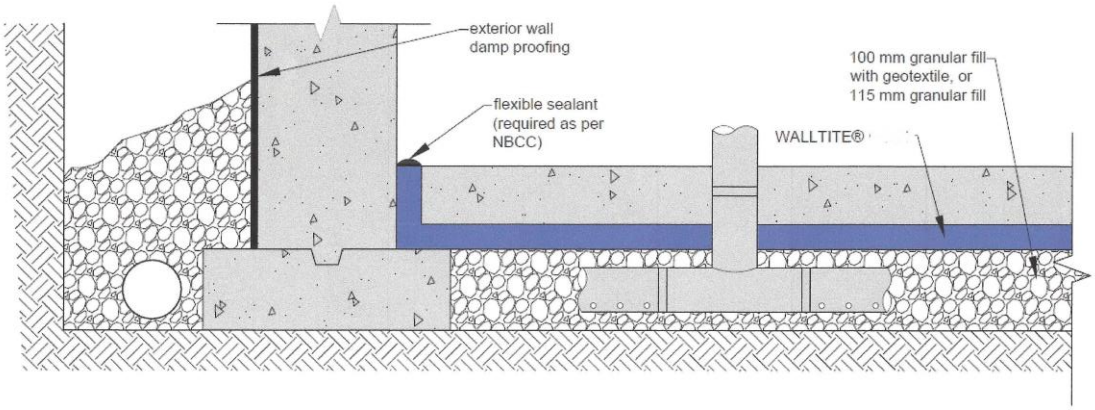

Figure 1:
Installation of WALLTITE v.5 Radon Control for radon control below grade with 100mm gravel bed and roughed-in sub slab radon depressurization system.

The code provision (Article 9.13.4.3) for a rough-in subfloor depressurization system completes the WALLTITE v.5 Radon Control system, providing a method of depressurization of the gas-permeable layer below the WALLTITE v.5 SPUF.

The WALLTITE v.5 Radon Control elements are under a UL Solutions quality audit program where UL/ULC Field Engineering staff audit material manufacturing facilities, installer certification and the system design criteria. Details of the product and system are on file at ULC.

6. Performance characteristics

6.1 Spray foam

The WALLTITE v.5 SPUF material was evaluated for the performance characteristics as reported below in Table 1 Performance Characteristics:

Table 1: Performance Characteristics

Properties	Requirement	Results
SPUF (WALLTITE v.5)	CAN/ULC-S705.1	Compliant
SPUF Radon Resistance	≤ 6-mil polyethylene sheet	Compliant
Compression Strength	≥ 140 kPa	203 kPa

6.2 Radon resistance

The WALLTITE v.5 SPUF material was evaluated as a barrier to radon along with the NBCC acceptable solution of an overlapped 6-mil polyethylene sheet (CGSB 51.34-M Vapour Barrier, Polyethylene Sheet for Use in Building Construction), as reported in Table 2 Material Radon Performance. The WALLTITE v.5 demonstrated increased resistance to radon than the 6-mil polyethylene sheet. Testing indicated that WALLTITE v5 exceeded the performance of 6 mil poly for any thickness above 15 mm.

Table 2: Material Radon Performance (ISO 11665)

Material	Radon Resistance
6-mil polyethylene	13.6 Ms/m
SPUF (WALLTITE v.5 @ 50mm thickness)	838 Ms/m

6.3 Material performance

The WALLTITE v.5 SPUF material was evaluated for air barrier performance to meet NBCC acceptable solution, as reported in Table 3 Air Barrier System Properties. The WALLTITE v.5 Radon Control design provides a continuous air/vapour barrier layer which is extended above grade. Additionally, the WALLTITE v.5 SPUF material demonstrated the continuity of the air barrier performance around common pipe penetration of various materials (PVC, ABS, and copper) without the need for a primer or sealants.

Table 3: Air Barrier System Properties (ASTM E2178 – with deviations)

NBCC Requirement	≤ 0.02 L/(s·m^2)
SPUF (WALLTITE @50mm thickness)	Compliant
Continuous air leakage performance at pipe penetrations (PVC, ABS, copper)	≤ 0.02 L/(s·m^2)

The SPUF compression property exceeds the NBCC acceptable solution of polystyrene or polyurethane boards, providing durability of the air barrier during installation of the concrete slab.

6.4 Training and qualified Installers

WALLTITE v.5 Radon Control installers are specifically trained in accordance with the WALLTITE v.5 Radon Control Training and Installation Manual and are subject to audits following the Caliber Quality Solutions Inc. (Caliber) Field Quality Assurance Program (FQAP). The WALLTITE v.5 Radon Control training and certification is in addition to the NBCC requirement of CAN/ULC-S705.2 for certification of SPUF installers. Qualified installers are provided with WALLTITE v.5 Radon Control identification cards indicating the level of certification, insulation application (CAN/ULC S705.2) and air/radon barrier. Caliber is IAS accredited as a Personnel Certification Body (PCB-103) and an Inspection Agency (AA-755 Type A).

7. Installation

Installation of the BASF WALLTITE v.5 Radon Control SPUF must comply with this report and the association published installation instructions. The published installation instructions are to be available at the jobsite at all times during installation.

- The SPUF (WALLTITE v.5) to be applied on-site by qualified installers trained and certified by Caliber Quality Solutions Inc.
- The minimum design thickness of 50mm SPUF must be maintained continuously over gravel beds. As per the 2015 and 2020 NBCC Sentence 9.16.2.1.(1), the specified gravel shall consist of course, clean granular material containing not more than 10% of material that will pass through a 4mm sieve.

- Roughed-in radon subfloor depressurization system to be in-place prior to SPUF installation, see Article 9.13.4.3 Providing for the Rough-in for a Subfloor Depressurization Systems
- A minimum of 25-hrs shall pass prior to the pouring of the concrete floor slab.
- Penetrations of the SPUF, other than PVC, ABS, and copper, to be made airtight with compatible sealant application system.
- Care shall be taken as to not damage the SPUF during concrete slab installation.
- Exterior below grade foundation walls not sprayed with WALLTITE v.5 to be sealed against radon in accordance with compliant code requirements, air barrier continuity at floor / wall intersection to be maintained.

8. Conditions of Use

The WALLTITE v.5 Radon Control material described in this Report has been evaluated in accordance with code sections listed in Section 2.0, subject to the following conditions:

- Materials and methods of installation must comply with this report and the manufacturer's published installation instructions. In the event of a conflict between the manufacturer's published installation instructions and this report, the manufacturer shall be consulted.
- SPUF used must be WALLTITE v.5 meeting CAN/ULC S705.1-15 Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Material Specification
- The WALLTITE v.5 Radon Control must be site installed by BASF trained and certified installers who are issued a unique BASF WALLTITE v.5 Radon Control identification card, the card shall be available on-site to authorities having jurisdiction (AHJ).
- The WALLTITE v.5 Radon Control Training and Installation Manual shall be available on-site to authorities having jurisdiction (AHJ).
- This system must be used in conjunction with the requirements specified in Subsection 9.13.4, Soil Gas Control of the 2015 and 2020 NBCC.
- The SPUF is a combustible material requiring fire protection in accordance with the NBCC and provincial codes.
- An engineer to be consulted for system application under structurally loaded floors.

9. Supporting evidence

BASF has submitted technical documentation for ULC's review. The test and evaluation data submitted for this product is summarized below.

- Test data in accordance with CAN/ULC-S705.1-15 with compliance statement for the WALLTITE v.5 polyurethane foam insulation, compliant test reports from an ISO/IEC 17025 accredited test laboratory, see ULC ER41037 on UL Product iQ.
- Radon resistance test data in accordance ISO 11665 for the WALLTITE v.5 and code reference 6-mil polyethylene sheet, test reports from an ISO/IEC 17025 accredited test laboratory.
- Test data in accordance with ASTM E2178 (modified) with compliance statement for the WALLTITE v.5 pipe penetrations, compliant test reports from an ISO/IEC 17025 accredited test laboratory.
- BASF WALLTITE v.5 Radon Control Training / Installation Manual including Daily Work Record and Jobsite Label.

10. Identification

WALLTITE v.5 Radon Control described in this evaluation report is identified by a marking bearing the report holder's name (BASF) and the evaluation report number ULC ER41037-01. The validity of the evaluation report is contingent upon this identification appearing on the product drums and literature. Caliber trained and

approved installers of the WALLTITE v.5 to be provided with individually unique identification cards and made available by the installer upon an AHJ's request.

11. Client location / contact

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12. Use of ULC Evaluation Report

12.1 The approval of the installation and use of building products, materials or systems is under the responsibility of the applicable authorities having jurisdiction.

12.2 ULC Evaluation Reports shall not be used in any manner that implies an endorsement of the product, material or system by UL Solutions.

12.3 The current status of this report, as well as a complete directory of UL Evaluation Reports may be found at UL.com via our Product iQ® database.

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