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BELOW GRADE GAS RETARDER

SECTION 07 26 23

Foamed-in-Place Insulation

**HEATLOK SOYA HFO**

This specification utilizes the Construction Specifications Institute’s (CSI) and CSC 3-Part formatting. The specification is a manufacturer-specific product specification to be used by design professionals as a guide specification. Editing notes are indicated in *red italics* and precede specification text. Delete editing notes in final specification.

This specification specifies medium density spray foam insulation by HUNTSMAN BUILDING SOLUTIONS. Revise section number and title below to suit project requirements.

The specified product may contribute to the following credits/points for the respective rating system:

LEED V.4.1

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## PART 1 - GENERAL

**1.1. GENERAL**

1. Conform to sections of Division *01 xx xx* as applicable.

**1.2. WORK INCLUDED**

1. Spray application of polyurethane foam to provide insulation, air barrier, vapour barrier and Radon barrier.

**1.3 . INCLUDED SECTIONS**

1. Spray in place polyurethane foam insulation Section 07 21 19

**1.4 . RELATED SECTIONS** *Note: Amend to suit project*

1. Cast-in-place Concrete Section 03 30 00
2. Concrete Curing Section 03 39 00
3. Rough Carpentry Section 06 10 00
4. Bituminous Damp proofing Section 07 11 13
5. Modified Bituminous Sheet Waterproofing Section 07 13 52
6. Vapour Retarders Section 07 26 00
7. Air Barrier Section 07 27 00
8. Air Barrier System Section 07 27 09
9. Backfilling Section 31 23 23

**1.5. REFERENCES**

1. CAN/ULC-S705.1-15, Standard for Thermal Insulation Spray Applied Rigid Polyurethane Foam, Medium Density, **Material Specification**.
2. CAN/ULC-S705.2 Standard for Thermal Insulation Spray Applied Rigid Polyurethane Foam, Medium Density, - Application.
3. CALIBER Quality Assurance Program.
4. CCMC 14078-L Spray Polyurethane Foam Insulation Heatlok Soya HFO.
5. CCMC 14280-R Radon Protection System
6. UL. Report AS-01480-A1 Water Vapour Transmission. (ASTM E 96-Wet Cup)
7. UL Report AS-01480 – Air Barrier Material Performance Evaluation in

 Accordance with CAN/ULC S741.

1. UL GREENGUARD GOLD Interior Air Quality certification.
2. CAN/ULC-S770-09 Standard Test Method For Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams.
3. ISO/TS 11665-13 (K124/02/95) Measurement of radioactivity in the environment –

 Air: radon-222-Part 10: Determination of diffusion coefficient in waterproof materials

 using activity concentration measurement.

1. ISO 15148-2002 Water Absorption
2. CCMC Technical Guide 07 26 23.01-2020- Soil Gas resistance, radon

**1.6 PERFORMANCE REQUIREMENT**

1. Capable of containing and, if applicable, venting Radon gas to the exterior via collectors and sealed pipe stack above roof.
2. Capable of containing and, if applicable, venting methane gas to the exterior via collectors and sealed pipe stack above roof.
3. Spray foam : Capable of preventing moisture migration to the interior.
4. Spray foam : Capable of preventing Radon gas diffusion to the interior

**1.7 SUBMITTALS AND SAMPLES**

1. Before starting work, submit in accordance with sections *01 33 00,* result of independent laboratory test reports, data sheets, physical proprieties, Site Quality Assurance Program meeting or exceeding requirements of the standard in reference to this specification.
2. Current Contractor and Applicator license under Caliber for SPF CAN/ULC S 705.2 application and Radon protection System to be submitted prior to the beginning of work.
3. Manufacturer to submit a NBC certification of conformity of the polyurethane foam system.
4. Submit independent SCC recognized laboratory test results for water vapour transmission rate (ASTM E96-Dry Cup and Wet cup).
5. Submit test results by independent SCC recognized laboratory for air barrier material performance, conducted in accordance with CAN/ULC S741.
6. Submit independent SCC recognized laboratory test results for LTTR values according to CAN/ULC-S770-09. Other test methods will not be accepted.
7. Submit test results by independent SCC recognized laboratory for Radon gas diffusion in accordance with ISO/TS 11665-13 (K124/02/95).
8. Submit test results of CCMC soil Gas (Radon) Control technical Guide 07 26 23.01-2020
9. Submit test results by independent SCC recognized laboratory for impact resistance in accordance with ASTM D5420-10
10. Submit Sustainable Design credentials, LEED documents
11. Submit product specific UL type III EPD, Environmental Product Declaration, EPD

**1.8 QUALITY ASSURANCES**

1. Contractor performing work under this section must be certified by Caliber for a minimum of 3 years.
2. Upon request, submit a copy of the contractor quality control report as requested in CAN/ULC-S705.2.
3. Upon request, submit manufacturer field applied product quality control report.

**1.9 MOCK-UP**

1. Provide mock-up of insulation air barrier in accordance with section 01 43 39.
2. Provide mock-up of insulation that includes perimeter foundation walls, footings, columns and a corner of the building in junction with the prepared depressurization zone.
3. Acceptance of mock-up sample may form part of the completed work.
4. Do not commence work until sample installation has been accepted.
5. Acceptance of sample preparation will be a reference for minimum acceptance of the work. Any need for deviation of the mock-up acceptance shall be reported in writing.
6. Upon consultant request, provide in writing manufacturer acceptance of the mock-up quality.

**1.10 DELIVERY, STORAGE AND HANDLING**

1. Materials shall be delivered in manufacturers original sealed containers clearly labeled with the manufacturer’s name, product identification, safety information, net weight of contents, and expiring date in accordance with CAN/ULC – S705.1.
2. Material is to be stored in a safe manner and where the temperatures are within the limits specified by the material manufacturer.
3. Empty containers have to be removed from site on a daily basis in accordance with CAN/ULC-S705.2.

**1.11 APPLICATION CONDITIONS**

1. At the beginning and during the work, allow access on the job site to HUNTSMAN BUILDING SOLUTIONS representatives for technical support and assistance.
2. Execute the work of this section when ambient and substrate temperatures are within the limits of the material technical data sheet supplied by the manufacturer.
3. Apply HUNTSMAN BUILDING SOLUTIONS Heatlok only when the relative humidity is below 80%.
4. Prepare all surfaces in accordance with HUNTSMAN BUILDING SOLUTIONS recommendations and CAN/ULC-S705.2 Standard.

**1.12 PROTECTION**

1. Designate, separate and ventilate work area receiving insulation to maintain safe working conditions.
2. Ensure the safety of workers within the designated work area is in conformity with local regulations, industry standards, best practices and HUNTSMAN BUILDING SOLUTIONS recommendations.
3. For the spraying inside buildings:
4. Designate, and separate the workspace (with a polyethylene if required).
5. All ventilation intake ducts must be sealed before the spraying.
6. Provide supply air to the designated work area from outside of the building.
7. Provide exhaust ventilation at a rate to produce a negative pressure within the work area, at a minimum exfiltration rate of 0.3 air changes per hour.
8. The work area, must be under ventilation for a minimum of 24 hrs.
9. Confirm everyone in the workspace has appropriate protective respiratory equipment and personal protective equipment in conformity with provincial regulations and the CAN/ULC-S705.2 standard.
10. Protect adjacent surfaces, windows, equipment, and site areas from damage of over spray.

**1.13 WARRANTY**

1. Section 01 78 10: Warranties
2. Warrant work of this section against defects and deficiencies for a period of two years from date work completion.
3. Provide manufacturer’s warranty for the field-applied product.

**PART 2 - PRODUCTS**

##  ENVIRONNEMENTAL REQUIREMENTS

1. The product shall not contain CFC, HCFC, HFC or substances affecting the Ozone layer.
2. The Spray Polyurethane Foam Insulation shall contain a minimum of 18% recycled content from post-consummation and post-industrial source. The % shall be calculated by weight.
3. The SPF shall contain a minimum of 4% of rapidly renewable resources.
4. Product shall conform to GREENGUARD Gold certification.
5. The product shall have a UL Type III product specific Environmental Product Declaration (EPD).

##  MATERIALS

1. Spray Applied Polyurethane Foam Insulation system in accordance with CAN/ULC S705.1-15 Standard for Thermal Insulation Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
2. Product: HEATLOK SOYA HFO / POLARFOAM SOYA HFO
3. The product shall meet NRC / CCMC 14280-R

* 1. **PHYSICAL PROPERTIES**

|  |  |  |  |
| --- | --- | --- | --- |
| Density | ASTM D1622 | 2.21 lb/ft3 | 35.49 Kg/m³ |
| Long Term ThermalResistance(LTTR) Design value | CAN/ULC S770-03CAN/ULCS705.1-01  | 100 mm / R-2575 mm / R-1950 mm / R-12 | 100 mm / 4.24 RSI75 mm / 3.26 RSI50 mm / 2.03 RSI |
| Long Term ThermalResistance(LTTR) Design value | CAN/ULC S770 -09CAN/ULC S705.1-15 | 100 mm / R-2475 mm / R-1750 mm / R-11 | 100 mm / 4.14 RSI75 mm / 3.00 RSI50 mm / 1.94 RSI |
| Dimensional stability | ASTM D-2126(% of change in volume at 28 days)-20°C70°C H.R. ˃ 97 +/- 3%80°C | -0.1 %+8.5 %-0.3 % |
| Flame Spread Index | CAN/ULC S102-S127 | 235 |
| Compressive strength | ASTM D1621 | 24.8 lb/in2 | 171 KPa |
| Tensile strength | ASTM D1623 | 58.16 lb/in2 | 401 KPa |
| Open cells | ASTM D2856 | 5 % |
| Water absorption | ASTM D2842 | 0.64 % |
| Air Permeance | ASTM E 2178-13(30.7mm, top skin removed) |  0.0021 L/s· m²@75 Pa |
| Air Barrier Material | CAN/ULC S 741-20 | 0,0005 L/s·m² / 28mm |
| Fungi Resistance | ASTM C1338 | No Fungal Growth |
| VOC | CAN/ULC S774 | 25 hours  |
| VOC | GREENGUARD Certification | Gold |
| Water vapour permeance | ASTM E96 A Dry (50 mm core) | 0.23 perm | 13 ng/Pa s.m² |
| ASTM E96-B WET35mm | 1.0 perm  | 59 ng/Pa s.m² |
| Radon Diffusion Coefficient | ISO/TS 11665-13 (method C K124/02/95) | 1,3 x 10-10 m2/S |
| Radon Resistance Coefficient50mm | ISO/TS 11665-13 (method C K124/02/95) | 17410 x 106 s/m |
| CCMC Technical Guide (Large Scale Test) | 07 26 23.01-2020 | Maximum 3.0% |

* 1. **PRIMERS**
1. Use primers per manufacturer recommendations and CAN / ULC-S705.2 for surface conditions.
2. For oily metal surface apply ADBOND 8388-1 adhesive primer, color: red in accordance with manufacturer installation guidelines before applying polyurethane foam.

**2.5 EQUIPMENT**

1. Equipment shall be as recommended in CAN/ULC-S705.2 and approved by foam manufacturer.

**PART 3 – EXECUTION**

*Note: Check the adhesion and compatibility for: flashing, membranes, coatings, and follow HUNTSMAN BUILDING SOLUTIONS typical details drawing.*

**3.1 EXAMINATION**

1. Verify substrate conditions are suitable for the application of spray foam.
2. Verify substrate conditions are in accordance with CAN/ULC-S705.2.
3. Surfaces to be covered with spray foam shall be free of an excess of moisture, frost, oil, rust, and any other foreign material able to have a negative effect on the adhesion of the product. In doubt, apply a primer.
4. Allow time for the complete cure of substrates: concrete, mortar, fillers, membranes, primers, coatings or other surfaces, before applying spray foam.
5. Verify adhesion of membranes and coatings to different substrates is acceptable, considering climatic conditions for the application of membranes, coatings and spray foam.
6. All oily metal substrates shall be primed as referenced in CAN / ULC S705.2 art: A 1.7.
7. Confirm substrate moisture content is below 19% in wood and 80% in gravel before the application of spray foam.
8. Report in writing any defects in substrate or conditions that may adversely affect the performance of products installed.
9. Confirm all requirements in Article 1.12 are in place.
10. Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.
11. Ensure any/all work which needs to be performed prior to the application of spray foam insulation is completed. Including but not limited to:
12. Backfilling
13. Structure, columns
14. Mechanical and electrical works;
15. Vent stack piping
16. Coatings, membranes, flashings, mechanical fastening
17. Radon exhaust pipe

**3.2 APPLICATION**

1. Spray application of polyurethane foam shall be performed in accordance with CAN/ULC-S705.2. Standard for Thermal Insulation Spray Applied Rigid Polyurethane Foam, Medium Density, Installer’s Responsibilities.
2. Apply spray foam on dry, solid and clean surfaces when the climatic conditions are in accordance with the CAN/ULC S705.2 standard and HUNTSMAN BUILDING SOLUTIONS recommendations.
3. Apply only when surfaces and environmental conditions are above -20 C. Refer to technical data sheets.
4. Apply in consecutive passes (min. 15 mm (5/8’’), max. 50 mm (2’’))
5. Apply to obtain the thickness as indicated on drawings and to achieve the required thermal insulation value of *XX*. Use only the Long Term Thermal Resistance (LTTR) CAN/ULC S 770-09 test method to calculated design R value.
6. Apply to obtain the thickness as indicated on drawings and to achieve the required thickness for Radon protection System.
7. Do not spray closer than 3” (75 mm) of chimneys, recess spotlight or other source of heat.

**3.3 TOLERANCE**

1. Apply the product to achieve an average thickness tolerance of ± 6 mm (1/4”), of the thickness requirements as stated in the drawings. Conduct thickness measurements at a minimum of 1 M2 readings for each 150 m2 surface sprayed.
2. Apply the insulation uniform in accordance to NBC article 9.25.2.3. 1).

**3.4 ON-SITE QUALITY CONTROL**

1. Upon request, a site inspection will be conducted by HUNTSMAN BUILDING SOLUTIONS.
2. Daily work reports and quality control measures to comply with CAN/ULC S-705.2 and the manufacturers Site Quality Assurance Plan.

END OF SECTION 07 26 23