

SECTION 07264

SPRAY POLURETHANE FOAM INSULATION AND AIR/VAPOR BARRIER SYSTEM

PART 1 - GENERAL

SECTION INCLUDES

This section includes the following:

1. Materials and installation methods for a spray polyurethane foam building insulation and air/vapor barrier system located in the non-accessible part of the wall.
2. Materials and installation to bridge and seal connection and air leakage pathways and gaps.

RELATED SECTIONS

Section 03300 - Cast-In-Place Concrete:

3. Concrete back-up walls
4. Underslab vapor retarder.

Section 04200 - Unit Masonry:

5. Masonry backup walls
6. Masonry veneer cavity walls.

Section 07131 - Self-Adhering Sheet Waterproofing: Below grade waterproofing.

Section 07160 - Bituminous Dampproofing: Below grade dampproofing.

Section 07210 - Building Insulation: Insulation with integral vapor retarder facing.

Section 07620 - Sheet Metal Flashing and Trim: Sheet metal flashings.

Section 07900 - Joint Sealers: Joint sealant materials and installation.

PERFORMANCE REQUIREMENTS

Provide air/vapor barrier system constructed to perform as a continuous air/vapor barrier system, as building thermal insulation, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. System shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.

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Commonwealth of Massachusetts Building Code Requirements: The intent of this specification is to require compliance with 780 CMR 13, including all the insulation requirements of Chapter 13, Section 1304.1.2 Moisture Control and 1304.3 Air Leakage.

7. Code 780 CMR 1304.1.2 Moisture Control:
 - a. A vapor barrier having a maximum permeability of one perm or less shall be installed on the winter warm side of walls, ceilings and floors enclosing a conditioned space.
 - 1) Exception 3: Envelope systems that maintain the moisture content of all building materials that comprise the assembly, below the equilibrium moisture content the materials would achieve when exposed to relative humidity of 80%. For calculation purposes use Chapter 22 in 1997 ASHRAE Fundamentals Handbook, "Mathematical Models". Assume interior air temperature and humidity specified in 1303.3.
8. Code 780 CMR 1304.3.1 Air Barriers: "The building envelope shall be...constructed with a continuous air barrier to control air leakage into, or out of the conditioned space." "The air barrier shall have the following characteristics:
 - a. It must be continuous, with all joints made air-tight.
 - b. It (the material used) shall have an air permeability not to exceed 0.004 cubic feet per minute per square foot under a pressure differential of 0.3 in. water (1.57 psf) (0.02 L/s.m² @ 75 Pa.) when tested in accordance with ASTM E2178-01
 - c. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load." "The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
 - 1) Foundation and walls.
 - 2) Walls and windows or doors.
 - 3) Different wall systems.
 - 4) Wall and roof.
 - 5) Wall and roof over unconditioned space.
 - 6) Walls, floor and roof across construction, control and expansion joints.
 - 7) Walls, floors and roof to utility, pipe and duct penetrations. "
9. Code 780 CMR 1304.3.2, Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration / exfiltration shall be made air-tight.

Provide tested material with air leakage results not to exceed:

1. 0.01 cfm/sf @ 1.57 psf (0.05 L/s/M² @ 75 Pa)

SUBMITTALS

Provide submittals in accordance with Section 01300.

1. Certification of the Air Barrier Association, Spray foam association or Sprayfoam supplier.
2. Submit manufacturer's product data sheets for each type of material, including manufacturer's printed instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, technical data, and tested physical and performance properties.
3. Submit manufacturer's installation instructions.
4. Provide evidence of testing by an accredited laboratory confirming material has been tested and conforms to the requirements of ASTM E2178, Standard for Air Barrier Materials.
5. Certification by air/vapor barrier manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
6. Submit test results of air permeability testing of primary air barrier material (ASTM E 2178-01)

QUALITY ASSURANCE

Installer Qualifications:

The air barrier contractor shall be Licensed or Certified by the prospective Spray foam manufacture or supplier. The contractor shall carry liability insurance.

Single-Source Responsibility: Obtain air/vapor barrier materials from a single manufacturer regularly engaged in manufacturing the product.

Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

Preconstruction Meeting: Shall convene prior to installation

Protect people and materials from over-spray and contact with chemicals and gases.

DELIVERY, STORAGE, AND HANDLING

Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air/vapor barrier manufacturer. Protect stored materials from direct sunlight.

PROJECT CONDITIONS

Environmental Conditions: Apply air/vapor barrier within range of ambient and substrate temperatures recommended by air/vapor barrier manufacturer. Do not apply air/vapor barrier to wet substrate, unless the manufacturer specifically permits that for the product.

1. Do not apply air/vapor barrier in snow, rain, fog, or mist.
2. Do not apply air/vapor barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer.
3. The product shall not be installed after the expiry date printed on the label of each container. The product has a shelf life of 6 months from the date of manufacture.

WARRANTY

For [sealant] [and] [membrane materials] the 12 months warranty period prescribed in 00700 - General Conditions is extended to [24] months.

Material Warranty: Provide the manufacturer's three year air/vapor barrier material warranty under provisions of Section [01700 – Contract Closeout] [and requirements of 00700 - General Conditions and 00800 – Supplementary Conditions].

System Warranty: Provide the manufacturer's three year system warranty, including the primary air/vapor barrier and installed accessory sealant and membrane materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

MATERIALS & MANUFACTURERS

1. Sprayed polyurethane foam material, when tested, shall meet the requirements of ULC S705.1-01 Standard for Thermal Insulation-Spray Applied Rigid Polyurethane Foam, Medium Density, Material-Specification.
2. A copy of an Evaluation Report (such as the CCMC Evaluation Report) or copies of the test reports from an accredited testing laboratory, for each physical property, indicating that the product meets the requirements of ULC S705.1-01 shall be made available upon request.
3. Design R value aged at 75 degrees as indicated in test report; minimum R6.3 inch.
4. Density as indicated in test report: 1.7 pounds per cubic foot.
5. Smoke development as indicated in test report; less than 500 when tested under ULC S102.
6. Products that meet the preceding requirements:
 - a. Caviseal 1-866-542-0816

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- b. Gaco Western 1-800-331-0196
- c. NCFI 1-800-346-8229

AUXILIARY MATERIALS

Furnish auxiliary materials recommended by air/vapor barrier manufacturer for intended use and compatible with the air/vapor barrier.

Liquid air vapor barrier membrane for use at transition points. Prosoco R-Guard

Butyl-based peel and stick membrane: Transition between air/vapor barrier membrane and TPO or EPDM membranes:

Primer: Water based liquid primer for concrete, masonry, gypsum sheathing, wood, metal, and painted substrates;

Primer: Solvent based, VOC compliant primer for concrete, masonry, gypsum sheathing, wood, metal, and painted substrates;

Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes.

Transition Strip: Self-adhering, smooth surfaced SBS modified bitumen membrane, nominal 40 mil thickness, width as required. Provide primer per manufacturer's requirement

Sheet Membrane Air Barrier Perimeter Seal to Windows, Doors, Curtainwall and Storefront systems: Non-reinforced, cured chloroprene polymer sheet (neoprene) complying with ASTM D2000 Designation 2BC415 to 3BC620, **50 to 65 mils (1.3 to 1.6 mm)** thick.

1. Adhesive: Typical contact-type adhesive used for fully-adhered membranes.
2. Lap Sealant: Typical urethane or silicone lap and termination sealant used for membrane edges recommended by manufacturer.
3. Termination bars and fasteners: [Stainless steel] [Aluminum bars and stainless fasteners] [Galvanized steel].

Sheet Membrane Sheet Membrane Air Barrier Perimeter Seal to Windows, Doors, Curtainwall and Storefront systems: Low modulus silicone sheet; provide manufacturer's standard system consisting of precured low-modulus silicone extrusion, in sizes to fit widths indicated, combined with a neutral-curing low modulus silicone sealant for bonding extrusions to substrates.

Provide sealants in accordance with Section 07900 - Joint Sealers. Comply with ASTM C920 and ASTM C920 classifications for type, grade, class, and uses

1. Silicone Sealant [Type A]:, natural cure, low modulus, to seal sheet membrane flashing to polyethylene face of sheet rubberized-asphalt barrier and to seal between and to non-bituminous sheet systems.
 - a. Acceptable materials:

- b. SPF (Sprayed Polyurethane Foam) Sealant: Provide one- or two-component, foamed-in-place, polyurethane foam sealant with the following characteristics:
 - 1) Density: 1.5 to 2.0 PCF.
 - 2) Flame Spread (ASTM E162): 25 or less.
Initial R-Value (at 1 inch): Not less than 6.3.
2. Substrate Cleaner: Non-corrosive [type recommended by sealant manufacturer] [compatible with adjacent materials].

EQUIPMENT

1. The equipment used to spray the polyurethane foam material shall be in accordance with ULC S705.2-02 and the equipment manufacturer's recommendations for specific type of application.
2. Each proportioner unit to supply only one spray gun.

PART 3 - EXECUTION

EXAMINATION

Examine substrates, areas, and conditions under which air/vapor barrier systems will be applied, with Installer present, for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

1. Do not proceed with installation until after minimum concrete curing period recommended by air/vapor barrier manufacturer.
2. Ensure that surfaces are sound, dry and free of contaminants.
3. Masonry ties are cleaned of from excess mortar.

FLASHING APPLICATIONS (Where applicable)

Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air/vapor barrier application.

Prime masonry, concrete substrates with conditioning primer when installing rubberized flashing membranes

Prime wood, metal, and painted substrates with primer recommended by membrane manufacturer.

Install air/vapor barrier so as to provide continuity throughout the building envelope. Sheet or liquid seal materials should be placed over a firm backup to achieve structural support in order to accomplish an effective and permanent air/vapor barrier. In the following paragraphs, "adhesive" is usually used with sheet butyl, neoprene or sheet steel materials.

4. Verify that surfaces and conditions are suitable to accept work as outlined in this section.
5. Report any defects in surfaces or conditions that may adversely affect the performance of products installed under this section.
6. Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.
7. Examine joints before sealing to ensure configurations, surfaces and widths are suitable for spray polyurethane foam.

PREPARATION

Protection:

8. Mask and cover adjacent areas to protect from over spray.
9. Ensure any required foam stop or back up material are in place to prevent over spray and achieve complete seal.

Surface Preparation

10. Surfaces to receive foam insulation shall be clean, dry and properly fastened to ensure adhesion of the polyurethane foam to the substrate.
11. Ensure that all work by other trades that may penetrate through the air barrier system is in place and complete.
12. Ensure that surface preparation and any primers required conform to the manufacturers instructions.
13. Install transition membranes to all applicable surfaces and ensure proper adhesion of the transition membranes to the substrate, capable of having spray polyurethane foam insulation.
14. Ensure veneer anchors are in place.

APPLICATION:

15. Spray-application of polyurethane foam shall be installed in accordance with the manufacturers instructions.
16. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer.
17. Apply in consecutive passes as recommended by manufacturer to thickness as indicated on drawings. Passes shall be not less than ½ inch and not greater than 2 inches.
18. Do not install spray polyurethane foam within 3 inches of heat emitting devices such as light fixtures and chimneys.
19. Finished surface of foam insulation to be free of voids and embedded foreign objects.
20. Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.

21. Trim, as required, any excess thickness that would interfere with the application of cladding/covering system by other trades.
22. Damage to work of this section caused by other sections shall be repaired by this section at the expense of the subcontractor causing the damage.
23. Complete connections to other components or repair any gaps, holes or other damage using material which conforms to ULC S710.1 Polyurethane Sealant Foam – One Component – Material or ULC S711.1 Polyurethane Sealant Foam – Two Components – Material and shall be installed in accordance with ULC S710.2 Polyurethane Sealant Foam – One component – Installation or ULC S711.2 Polyurethane Sealant Foam – Two Component – Installation, whichever is appropriate.

TOLERANCES

24. Maximum variation from indicated thickness: minus (-) ¼ inch; plus (+) ½ inch.

PROTECTION

25. If spray polyurethane foam is to be exposed for longer than six months, protect from ultraviolet radiation when installed on the exterior of a building.
26. Cover the spray polyurethane foam with a thermal barrier when installed on the interior of the building.

END OF SECTION