SPECIFICATION FOR
MEDIUM-DENSITY CLOSED-CELL SPRAY POLYURETHANE FOAM AIR
BARRIER SECTION 07263

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This Section specifies a spray polyurethane foam air barrier in exterior wall assemblies.

SPEC NOTE: COORDINATE RELATED WORK REQUIREMENTS WITH CONTENTS OF REFERENCED SPECIFICATION SECTIONS.

B. Related Work in other Sections include the following:

1. Section 01400 - Quality Requirements; coordination with Owner’s independent testing and inspection agency.
2. Section 01450 - Mock-Ups; exterior wall mock-ups.
3. Section 01500 - Temporary Facilities and Controls; requirement to schedule work to prevent sunlight and weather exposure of materials beyond limits established by manufacturer; requirement to protect materials from damage after installation and prior to installation of enclosing work.
4. Section 03300 – Cast-In-Place Concrete; requirement that backup concrete be free of fins, protrusions and large holes.
5. Section 04200 – Unit Masonry; requirement that backup masonry joints are flush and completely filled with mortar, and that excess mortar on brick ties will be removed; requirement for gap at deflection joints and fillers; coordination with sequencing of through-wall flashing.
7. Section 07263 - Spray Polyurethane Foam Air and Vapor Barrier.
8. Section 07264 - Self-Adhering Vapor-Permeable Air Barrier.
10. Section 07266 - Mechanically-Fastened Boardstock Air Barrier.
11. Section 07267 - Mechanically-Fastened Membrane Air Barrier.
12. Section 07500 - Membrane Roofing; requirement for coordination with sequencing of membrane roofing; requirement to seal roof membrane to wall air barrier.
13. Section 09253 – Sheathing; requirement that backup gypsum sheathing has been installed with damaged corners repaired, joints filled and surface flush with compatible material as acceptable to the air barrier manufacturer; requirement for gap at deflection joints and fillers.
1.2 PERFORMANCE REQUIREMENTS

A. Material Performance: Provide materials which have an air permeance 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/sm @ 75 Pa.) when tested according to ASTM E 2178.

B. Spray Polyurethane Foam: Material shall meet requirements of ULC S705.1, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material - Specification. CCMC Evaluation Report or reports from accredited testing laboratory shall be made available upon request. Materials shall meet or exceed the following performance requirements as indicated in the test reports.

1. Design R value minimum R 6 per inch.
2. Density of 2.0 pounds per cubic foot.
3. Smoke development not greater than 450 and flame spread not greater than 25 when tested in accordance with ASTM E 84.

C. Assembly Performance: Provide a continuous air barrier assembly that has an air leakage rate not to exceed 0.040 cubic feet per square foot per minute under a pressure differential of 0.3 in. water (1.57 psf) (0.20 L/sm @ 75 Pa.) when tested in accordance with ASTM E 2357. Assembly shall perform as a liquid drainage plane flashed to discharge condensation or water penetration to the exterior. Assembly shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air and vapor seal materials at such locations, changes in substrate and perimeter conditions.

1. Assembly 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.
2. Assembly shall not displace adjacent materials under full load.
3. Assembly shall be joined in an airtight and flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of assemblies due to thermal and moisture variations and creep, and anticipated seismic movement.

D. Connections to Adjacent Materials: Provide connections to prevent air leakage at the following locations:

1. Foundation and walls, including penetrations, ties and anchors.
2. Walls, windows, curtain walls, storefronts, louvers or doors.
3. Different wall assemblies, and fixed openings within those assemblies.
4. Wall and roof connections.
5. Floors 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.
8. Seismic and expansion joints.
9. All other leakage pathways in the building envelope.
A. Submittals: Submit in accordance with Division 1 requirements.

B. Quality Assurance Program: Submit evidence of current accreditation of the subcontractor and certification of the installers under the Air Barrier Association of America’s (ABAA) Quality Assurance Program. Submit accreditation number of subcontractor and certification number of installers.

C. Product Data: Submit manufacturer’s product data, 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.
   1. Submit letter from primary materials manufacturer indicating approval of products not manufactured by primary manufacturer.
   2. Include statement that materials are compatible with adjacent materials proposed for use.
   3. Submit reports indicating that field peel-adhesion test on all materials to which sealants are adhered have been performed and the changes made, if required, to other approved materials, in order to achieve successful adhesion.

D. Samples: Submit clearly labeled samples, 3 by 4 inch (75 mm by 100 mm) minimum size of each material specified.

E. Shop Drawings of Mock-Up: Submit shop drawings of proposed mock-ups showing plans, elevations, large-scale details, and connections to the test apparatus.

F. Field Test Results of Mock-Up: Submit test results of air leakage test and water leakage test of mock-up in accordance with specified standards, including retesting if initial results are not satisfactory.

G. Shop Drawings: Submit shop drawings showing locations and extent of air barrier assemblies and details of all typical conditions, intersections with other envelope assemblies and materials, membrane counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated, how materials that cover the air barrier are secured with air-tight condition maintained, and how miscellaneous penetrations such as conduits, pipes electric boxes and similar items are sealed.
   1. Include statement that materials are compatible with adjacent materials proposed for use.
   2. Include recommended values for field adhesion test on each substrate.

H. Compatibility: Submit letter from manufacturer stating that materials proposed for use are permanently chemically compatible and adhesively compatible with adjacent materials proposed for use. Submit letter from manufacturer stating that cleaning materials used during installation are chemically compatible with adjacent materials proposed for use.
1.4 QUALITY ASSURANCE

A. Air Barrier Subcontractor Qualifications: Subcontractor shall be currently accredited by the Air Barrier Association of America (ABAA) whose installers are certified in accordance with the ABAA Quality Assurance Program.

1. Installers shall also be certified by ABAA/BPQI (Building Performance Quality Institute) in accordance with the training requirements outlined in the ULC S705.2-05 Installation Standard. Installers shall have their photo-identification certification cards in their possession and available on the project site, for inspection upon request.

B. Manufacturer: Obtain primary materials from a single manufacturer regularly engaged in manufacturing air barrier membranes. Obtain secondary materials from a source acceptable to the primary materials manufacturer.

C. Accredited Laboratory Testing for Materials: Laboratory accredited by International Accreditation Service Inc. (IAS), American Association for Laboratory Accreditation (A2LA), or the Standards Council of Canada (SCC).

D. VOC Regulations: Provide products which comply with applicable regulations controlling the use of volatile organic compounds.

E. Preconstruction Meeting: Convene a minimum of two weeks prior to commencing Work of this Section. Agenda shall include, at a minimum, construction and testing of mock-up, sequence of construction, coordination with substrate preparation, materials approved for use, compatibility of materials, coordination with installation of adjacent and covering materials, and details of construction. Attendance is required by representatives of related trades including covering materials, substrate materials and adjacent materials.

F. Field Quality Assurance: Implement the ABAA Quality Assurance Program requirements. Cooperate with ABAA inspectors and independent testing and inspection agencies engaged by the Owner. Do not cover air barrier until it has been inspected, tested and accepted.

G. Mock-Ups: Build mock-up representative of primary exterior wall assemblies and glazing assemblies including backup wall and typical penetrations as acceptable to the Architect. Mock-up shall be approximately 8 feet long by 8 feet high and include all components in the exterior wall assembly.

H. Mock-Up Tests for Air and Water Infiltration: Test mock-up for air and water infiltration in accordance with ASTM E 1186 (air leakage location) or ASTM E 783 (air leakage quantification), and ASTM E 1105 (water penetration). Use smoke tracer to locate sources of air leakage. If deficiencies are found, reconstruct mock-up and retest until satisfactory results are obtained. Deficiencies include air leakage beyond values specified, uncontrolled water leakage, unsatisfactory workmanship.

1. Perform the air leakage tests and water penetration test of mock-up prior to installation of cladding and trim but after installation of all fasteners for cladding and trim and after installation of other penetrating elements.
I. Mock-Up Tests for Adhesion: Test mock-up of materials for adhesion in accordance with manufacturer’s recommendations. Perform test after curing period recommended by the manufacturer. Record mode of failure and area which failed in accordance with ASTM D 4541. When the air barrier material manufacturer has established a minimum adhesion level for the product on the particular substrate, the inspection report shall indicate whether this requirement has been met. Where the manufacturer has not declared a minimum adhesion value for their product/substrate combination, then the inspector shall simply record the value.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original packages or containers with seals unbroken, labeled with manufacturer’s name, product, date of manufacture, and directions for storage.

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

C. Handle materials in accordance with manufacturer’s recommendations.

1.6 PROJECT CONDITIONS

A. Temperature: Install air barrier within range of ambient and substrate temperatures recommended by air barrier manufacturer. Do not apply air barrier to a damp or wet substrate.

B. Field Conditions: Do not install air barrier in snow, rain, fog, or mist. Do not install air barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer.

1.7 WARRANTY

A. Material Warranty: Provide manufacturer’s standard product warranty, for a minimum 2 years from date of Substantial Completion.

B. Installation Warranty: Provide air barrier subcontractor’s 2 year warranty from date of Substantial Completion, including all components of the air barrier assembly, against failures including loss of air tight seal, loss of watertight seal, loss of adhesion, loss of cohesion, failure to cure properly.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Spray Polyurethane Foam Air Barrier: Spray-applied proprietary materials as specified. Subject to compliance with requirements of Lapolla Industries, Inc.,
2.2 AUXILIARY MATERIALS

A. Transition Membrane Between Air Barrier Membrane and Roofing and Other Adjacent Materials: Comply with both air barrier manufacturer’s recommendations and material manufacturer’s recommendations.

B. Counterflashing for Masonry Through-Wall Flashing: One of the following and as acceptable to the spray polyurethane foam air barrier manufacturer:

1. CCW-705 TWF by Carlisle Coatings and Waterproofing.
4. Poly-Wall Crack Guard by Protective Coatings Technology, Inc.
5. ExoAir TWF by Tremco, Inc.
6. Detail Strip by W. R. Meadows, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions under which air barrier assemblies will be applied, with installer present, for compliance with requirements.

1. 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.
2. Do not proceed with installation until after minimum concrete curing period recommended by air barrier manufacturer.
3. Ensure that the following conditions are met:
   a. Surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants
   b. Concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
   c. Masonry joints are flush, and all excess mortar sitting on masonry ties has been removed.
4. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263 and take suitable measures until substrate passes moisture test.
5. Verify sealants used in sheathing are compatible with membrane proposed for use. Perform field peel-adhesion test on materials to which sealants are adhered.

3.2 SURFACE PREPARATION

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

1. Ensure that penetrating work by other trades is in place and complete.
2. Prepare surfaces by brushing, scrubbing, scraping, or grinding to remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants which will affect adhesion of the spray polyurethane foam.
3. Wipe down metal surfaces to remove release agents or other non-compatible coatings, using clean sponges or rags soaked in a solvent compatible with the spray polyurethane foam.
4. Ensure veneer anchors are in place.

B. Prime substrate for application of sheet membrane transition strips as recommended by manufacturer and as follows:

1. Prime masonry, concrete substrates with conditioning primers.
2. Prime glass-fiber surfaced gypsum sheathing an adequate number of coats to achieve required bond, with adequate drying time between coats.
3. Prime wood, metal, and painted substrates with primer.
4. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air barrier and at protrusions.

C. Protection from Spray Applied Materials:

1. Mask and cover adjacent areas to protect from over spray.
2. Ensure any required foam stop or back up material are in place to prevent over spray and achieve complete seal.
3. Seal off existing ventilation equipment. Install temporary ducting and fans to ensure exhaust fumes. Provide for make-up air.
4. Erect barriers, isolate area and post warning signs to advise non-protected personnel to avoid the spray area.

3.3 INSTALLATION

A. Transition Strip Installation: Install transition strip materials to provide continuity throughout the building envelope. Install materials in accordance with manufacturer’s recommendations and the following:

1. Apply primer for transition strips at rate recommended by manufacturer. Allow primer to dry completely before transition strip application. Apply as many coats as necessary for proper adhesion.
2. Position subsequent sheets of transition strips applied above so that membrane overlaps the membrane sheet below by a minimum of 2 inches (50 mm), unless greater overlap is recommended by manufacturer. Roll into place with roller.
3. Overlap horizontally adjacent pieces of transition strips a minimum of 2 inches (50 mm), unless greater overlap is recommended by manufacturer. Roll seams with roller.
4. Seal around all penetrations with a transition strip or other procedure in accordance with manufacturer’s recommendations.
5. Connect air barrier in exterior wall assembly continuously to the air barrier of the roof, to concrete below-grade structures, to windows, curtain wall, storefront, louvers, exterior doors, penetrations, and other intersection conditions using transition membranes and in accordance with the manufacturer’s recommendations.
6. At changes in substrate plane, provide transition material recommended by manufacturer to make a smooth transition from one plane to another.
7. Provide mechanically fastened non-corrosive metal sheet to span gaps in substrate plane and to make a smooth transition from one plane to the other. Membrane shall be continuously supported by substrate.

8. At through-wall flashings, provide an additional 6 inch wide strip of manufacturer’s recommended membrane counterflashing to seal top of through-wall flashing to membrane. Seal exposed top edge of strip with bead of mastic as recommended by manufacturer.

9. At deflection and control joints, provide backup for the membrane to accommodate anticipated movement.

10. At expansion and seismic joints provide transition to the joint assemblies.

11. Apply a bead or trowel coat of mastic along membrane seams at reverse lapped seams, rough cuts, and as recommended by the manufacturer when membrane will be exposed to the elements.

12. At end of each working day, seal top edge of self-adhered membrane to substrate with termination mastic if exposed.

13. Do not allow materials to come in contact with chemically incompatible materials.

14. Do not expose transition membrane to sunlight longer than as recommended by the manufacturer.

15. Inspect installation prior to enclosing assembly and repair damaged areas with spray polyurethane foam as recommended by manufacturer.

B. Spray Application of Polyurethane: Install materials in accordance with manufacturer’s recommendations, ULC S705.2 and the following:

1. Equipment used to spray polyurethane foam shall comply with ULC S705.2 and the manufacturer’s recommendations for the specific type of application. Record equipment settings on the Daily Work Record as required by the ULC S705.2 installation standard. Each proportioner unit shall supply only one spray gun.

2. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer and the ULC S705.2 Installation standard.

3. Apply in consecutive passes as recommended by manufacturer to thickness as indicated on drawings. Passes shall be not less than 1/2 inch and not greater than 2 inches. An additional pass of 2 inches shall only be done after the first pass has had time to cool down. At no time shall more than 4 inches be installed in a single day.

4. Install within manufacturer’s tolerances, but not more than minus 1/4 inch or plus 1/2 inch.

5. Do not install spray polyurethane foam within 3 inches of heat emitting devices such as light fixtures and chimneys.

6. Finished surface of foam insulation to be free of voids and embedded foreign objects.

7. 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.

8. Trim, as required, any excess thickness that would interfere with the application of cladding/covering system by other trades.

9. Clean and restore surfaces soiled or damaged by work of the section. Consult with section of work soiled before cleaning to ensure methods used will not damage the work.

10. Complete connections to other components and repair any gaps, holes or other damage using material which conforms to ULC S710.1 or ULC S711.1 and installed in accordance with ULC S710.2 or ULC S711.2 as applicable.
3.4 FIELD QUALITY CONTROL

A. Owner’s Inspection and Testing: Cooperate with Owner’s testing agency. Allow access to work areas and staging. Notify Owner’s testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection. Daily inspection and testing may be required. Do not cover Work of this Section until testing and inspection is accepted.

B. ABAA Site Inspections: Arrange and pay for site inspections by ABAA to verify conformance with the manufacturer’s instructions, the ULC S705.2 Installation standard, the ABAA Quality Assurance Program, and this section of the project specification.

1. Inspections and testing shall be carried out at 5, 50 and 95 percent of completion. Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.
2. If the inspections reveal any defects, promptly remove and replace defective work at no additional expense to the Owner.

3.5 PROTECTING AND CLEANING

A. Protect air barrier assemblies from damage during application and remainder of construction period, according to manufacturer’s written instructions.

1. Coordinate with installation of materials which cover air barrier, to ensure exposure period does not exceed that recommended by the air barrier manufacturer.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction and acceptable to the primary material manufacturer.

END OF SECTION