

## **SECTION 07 27 20 – FLUID-APPLIED VAPOR PERMEABLE MEMBRANE AIR BARRIER SYSTEM ASSEMBLY**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Materials and installation methods supplementing a one-component vapor permeable, liquid applied elastic air and water barrier, vapor retarder materials and assemblies.
- B. Materials and installation to bridge and seal the following air leakage pathways and gaps:
  - 1. Connections of the walls to the roof air barrier.
  - 2. Connections of the walls to the foundations.
  - 3. Expansion joints.
  - 4. Openings and penetrations of window frames, store front, curtain wall.
  - 5. Barrier precast concrete and other envelope assembly.
  - 6. Door frames.
  - 7. Piping, conduit, duct and similar penetrations.
  - 8. Masonry ties, screws, bolts and similar penetrations.
  - 9. All other air leakage pathways in the building envelope.
  - 10. Sealing flashing to wall surface.

#### **1.02 RELATED SECTIONS**

- A. Section 04 20 19 – Veneer Unit Masonry: Flexible through wall flashing membrane. Sealing flashing to wall surface.
- B. Section 04 42 13 – Masonry-Supported Stone Cladding: Flexible through wall flashing membrane. Sealing flashing to wall surface.
- C. Section 04 42 16 – Steel-Stud-Supported Stone Cladding: Flexible through wall flashing membrane. Sealing flashing to wall surface.
- D. Section 06 10 53 – Miscellaneous Carpentry: Covering preservative-treated materials with self-adhering membranes.
- E. Section 06 16 43 – Gypsum Sheathing: Installing air barrier membrane over glass-faced gypsum sheathing and structural roof decking and roof board.
- F. Section 07 24 19 – Water-Drainage Exterior Insulation and Finish System.
- G. Section 07 90 00 – Joint Protection: Sealants.

#### **1.03 PERFORMANCE REFERENCES**

- A. ASTM E 2178-01: Standard Test for Determining the Air Permeability of Building Materials.

- B. ASTM E 2357: Standard Test Method for Determining Air Leakage of Air Barrier Assembly (**Full Scale Wall Testing of the Air Barrier System**). Ensure tests were conducted on steel stud frame walls with penetrations (Specimen 2) as some air barrier assembly are not tested in that critical mode.

“ASTM E 2357 is the only test method that gives the user any information on the performance of an installed air barrier assembly. Every building contains multiple air barrier materials. It is only when a material is selected and combined into an assembly does it actually perform the function of an air barrier. ASTM E 2357 determines the air leakage rate after being conditioned under real world loads which provides the user with a precise air leakage rate and confidence that it will provide this performance when installed. Data from ASTM E 2357 is critical to every design professional.” Mr. Laverne Dalglish, Executive Director of the Air Barrier Association of America

- C. ASTM E283-91: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- D. CODE MANDATED ASTM E331: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- E. ASTM E96: Water Vapor Transmission of Materials, Procedure B.
- F. AATCC 127: Water Resistance.
- G. ASTM D 1970: Self Sealability.
- H. ICC-ES AC212, Freeze Thaw, Crack Bridging.
- I. CODE MANDATED Fire Testing: Air Barrier, as a component of a wall assembly, shall have passed a NFPA 285 complete wall fire test.
- J. ASTM E84: Standard Test Method for Surface Burning.
- K. Listed as an evaluated system by Air Barrier Association of America at [www.airbarriers.org](http://www.airbarriers.org).**

#### 1.04 PERFORMANCE REQUIREMENTS

- A. Provide an air barrier system constructed to perform as a continuous elastic air barrier and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Membrane 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.
  - 1. The air barrier shall have the following characteristics:
    - a. It must be continuous with all joints made air-tight.
    - b. 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 assembly, allowing for the relative movement of assembly 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 assembly.
      - 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.
  - 8) Flashing to wall surface.
2. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made air-tight.
  3. Air Permeability: Maximum 0.04 cfm/sq.ft. @ 10.5 psf per ASTM E283.
  4. Air Permeability: @ delta P of 0.3 inches water...0.002 CFM/ft<sup>2</sup> per ASTM E 2178.
  5. ASTM E 2357: Full Scale Wall Testing of the Air Barrier System.
    - a. System Air Leakage, Requirement – 0.0008 CFM/ft<sup>2</sup> maximum.
    - b. Penetration Check, Requirement – 0.00088 CFM/ft<sup>2</sup> maximum.
  6. ASTM E96: Water Vapor Permeance: 10-20 Perms per Procedure B.
  7. ASTM E331: Standard Test Method for Structural Performance of Exterior Windows, curtain Walls, and Doors by Uniform Static Air Pressure Difference – 10 psf for 2 hours.
  8. Elongation: Minimum 50% per ASTM D412.
  9. AATC 127: Water Resistance – Pass.
  10. ASTM D 1970: Self Sealability – Pass.
  11. ICC-ES AC212: Freeze Thaw, Crack Bridging – Pass.
  12. Fire Testing: Air Barrier, as a component of a wall assembly, shall have passed a NFPA 285 complete wall fire test.
  13. ASTM E84 :Class A Fire Resistant.
  - 14. Listed as an evaluated assembly by the Air Barrier Association at [www.airbarriers.org](http://www.airbarriers.org).**

1.05 SUBMITTALS

- A. Section 01 33 00 – Submittal Procedures
- B. Prior to commencing the work, submit manufacturer's independent Laboratory Report for the Air Barrier Assembly testing on ASTM E 2357 tested on a steel stud frame wall. Results are to be based on Specimen 2 testing only.
- C. Prior to commencing the work, submit documentation certifying that the air barrier system has been tested independently, indicating compliance with the performance requirements of the Air Barrier Association of America.
- D. Prior to commencing the work, submit copies of manufacturer's literature for the system, membrane, primers, sealants, adhesives and associated auxiliary. Materials shall be included as parts of the system that is listed by the Air Barrier Association of America evaluation.
- E. Prior to commencing the work, submit references clearly indicating that the materials proposed have been installed for not less than three years on projects of similar scope and nature.

- F. Prior to commencing the work, submit manufacturer's complete set of standard details for air barrier/vapor retarders. The manufacturer's representative shall review the contract drawings and note any modifications required to make the system air and water tight.

#### 1.06 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Provide primary products, including each component of the air barrier membrane system, which has been commercially available for a minimum of 3 years.
- B. Submit in writing a document stating that the applicator of the primary air barrier membrane specified in this section is recognized by the manufacturer as suitable for the execution of the work.
- C. Perform work in accordance with the printed requirements of the air barrier manufacturer and this specification.
- D. Maintain one copy of manufacturer instructions on site.
- E. At the beginning of the work and at all times during the execution of the work, allow access to work site by the air barrier membrane manufacturer's representative.
- F. Components used in this section shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, tapes and adhesives as listed as an evaluated air barrier assembly by the Air Barrier Association of America.

#### 1.07 MOCK-UP

- A. Construct mock-up in accordance with Section 01 40 00 – Quality Requirements: Requirements for a mock-up.
- B. Provide mock-up of air barrier materials under provisions of Section 04 20 19 – Veneer Unit Masonry.
- C. Items to be incorporated in mock-up include:
  - 1. Where directed by Architect, construct typical exterior wall panel, \_\_\_\_\_ long by \_\_\_\_\_ high, incorporating masonry veneer system, through wall flexible flashing, glass-faced gypsum sheathing, wall ties, board insulation, metal studs, aluminum curtain wall frame, aluminum window frame, showing air barrier membrane application details and transition membranes.
  - 2. Where directed by Architect, construct typical exterior wall panel, \_\_\_\_\_ long by \_\_\_\_\_ high, incorporating masonry veneer system, concrete masonry backup, wall ties, through wall flexible flashing, board insulation, aluminum window frame, showing air barrier membrane application details and transition membranes.
- D. Allow 24 hours for inspection of mock-up by Architect before proceeding with air barrier work.

#### 1.08 PRE-INSTALLATION CONFERENCE

- A. Convene four weeks prior to commencing work of this section under provisions of Section 01 30 00 – Administrative Requirements: Pre-Installation Meeting. Attendance by the manufacturer's representative along with the installer is **mandatory**.

**DO NOT PROCEED WITH THE INSTALLATION OF THE AIR BARRIER MEMBRANE AND THE THROUGH WALL FLASHING MEMBRANE PRIOR TO THE PRE-INSTALLATION CONFERENCE.**

## 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.
- B. All pail goods shall bear the ABAA Evaluated Air Barrier label.
- C. Store roll materials on end in original packaging.
- D. Keep all products stored at above 40° F. Apply to a substrate with a surface temperature of 40° F and rising.  
**DO NOT ALLOW PRODUCT TO FREEZE.**
- E. Protect rolls from direct sunlight until ready for use.
- F. Do not double stack pail goods.

## 1.10 COORDINATION

- A. Ensure continuity of the air seal throughout the scope of this section.

## PART 2 - PRODUCTS

### 2.01 MEMBRANES

- A. Liquid air barrier: One component elastomeric membrane, spray, trowel or brush applied, having the following characteristics and have passed all evaluations by the Air Barrier Association of America (ABAA) and be listed on their website as having passed all the evaluations:
  - 1. Air permeability:
    - a. Air Leakage Thru Cured Films: <0.04 cfm/ft<sup>2</sup> @ 10.5 lbs/ ft<sup>2</sup> or <0.005 L/sm<sup>2</sup> @ 75 Pa to ASTM E283 (Modified) 24 hours, +/- 10%.
    - b. Air Leakage per ASTM E 2178, dry film, delta P of 0.3 inches of water, 0.002 +/- 10%.
  - 2. Air Barrier System Test on Full Scale Wall Assembly, ASTM E 2357.
    - a. System Air Leakage, 0.0008 CFM/ft<sup>2</sup> +/- 10%.
    - b. Penetrations Check, MUST PASS ASTM E 2357 requirements.
  - 3. Water Vapor permeance: (704 ng/Pa.m<sup>2</sup>.s.) 10 to 20 perms, ASTM E96 Method B.  
**NOTE: THE MATERIAL SPECIFIED IS VAPOR PERMEABLE.**
  - 4. Elongation (ASTM D412: >50%).
  - 5. Low temperature flexibility and crack bridging: Pass – ICC-ES AC212.
  - 6. ASTM D 1970, Self Sealability – Pass.
  - 7. AATCC 127 Water Resistance – Pass.

8. ASTM E84, Class A Fire Resistant.

9. Recycle content >20%.

B. Acceptable Manufacturers

1. Masonry Foams and Coatings, Air Smart, 865-588-4465, [www.masonryfoamsandcoatings.com](http://www.masonryfoamsandcoatings.com).

a. Air Barrier System, a non-asphaltic product.

2. Other products/assembly meeting the performance requirements.

C. Transition Membrane, Self-Adhering: Polymer-based, sheet membrane complete with polyester facing, and having the following physical properties:

1. Thickness: 35 mils (0.5 mm) min.

2. Vapor permeance: <0.1.

3. Low temperature flexibility: -20 F to CGSB 37-GP-56M.

4. Elongation: >90% to ASTM D412-modified.

5. ASTM E331, 10 psf for 2 hours.

a. Acceptable material:

1) Air Smart Tape by Masonry Foams and Coatings for use with the Air Barrier System.

2) Others as recommended by manufacturer.

## 2.02 PRIMER

A. Primer for self-adhering membranes: Synthetic polymer-based adhesive type, quick setting, having the following characteristics:

a. Acceptable material: As manufactured and/or recommended by the Air Barrier System manufacturer. **Note: Primer shall be compatible with specified glass-faced gypsum sheathing.**

b. Verify compatibility of self-adhering membranes with preservative treated materials specified in Section 06 10 53. Prime preservative treated materials as required using primer recommended by self-adhering membrane manufacturer or use the non-chemical thermally modified wood known as EcoPrem.

## 2.03 SEALANTS

A. Sealants shall be compatible with air barrier assembly and shall be approved by the air barrier manufacturer.

B. Products:

1. GreatSeal LT-100 Liquid Tape for concealed applications only and GreatSeal LT-100 Liquid Tape for concealed and exposed applications.

C. Primers: As recommended by manufacturer for surfaces to be sealed.

D. Backer Rods: As recommended by sealant manufacturer.

E. Others as recommended by manufacturer.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces and conditions are ready to accept the work of this section. Notify Architect in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrate.

### **3.02 PREPARATION**

- A. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrates to provide an even plane.
- B. Mortar joints in concrete block and form tie holes/voids in poured concrete shall be filled flush and smooth and allowed to be cured for a minimum of 24 hours.
- C. All joints between gypsum sheathing, roof board, masonry and concrete and other substrate joints up to 1/4" wide shall be treated:
  - 1. GreatSeal LT-100 Liquid Tape, [www.masonryfoamsandcoatings.com](http://www.masonryfoamsandcoatings.com).
  - 2. York Manufacturing, US-100, [www.yorkmfg.com](http://www.yorkmfg.com).
  - 3. Others as recommended by manufacturer.
- D. All joints between gypsum sheathing, roof board, masonry and concrete and other substrates wider than 1/4" shall be sealed with:
  - 1. Air Smart Tape overlapping each side of joint a minimum of 3 inches.
  - 2. Others as recommended by manufacturer.
- E. Install backer rod and sealant at the following joints:
  - 1. All expansion/control/erection joints between concrete wall panels.
  - 2. All expansion/control joints in concrete block back-up.
  - 3. All joints between concrete wall panels and concrete block back-up.

### **3.03 PRIMER FOR TRANSITION MEMBRANE (SELF-ADHERING TYPE ONLY)**

- A. Apply primer for self-adhering membranes at rate recommended by manufacturer.
- B. Apply primer to all areas to receive transition sheet membrane as indicated in drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by transition membrane during the same working day must be re-primed.

### **3.04 TRANSITION MEMBRANE (SELF-ADHERING TYPE)**

- A. Align and position self-adhering transition membrane. Remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps unless otherwise noted.
- B. Tie-in to roofing system and at the interface of dissimilar materials as indicated in drawings.
- C. Promptly roll all laps and membrane with a counter top roller to affect seal.
- D. Ensure all preparatory work is complete prior to applying liquid membrane.

3.05 PRIMARY AIR BARRIER

- A. Apply by spray or roller a complete and continuous unbroken film at a temperature of 40°F and rising with less than a 30% chance of rain in the next 18 hours and apply at the same rate as listed in the Air Barrier Association of America evaluation.
  - 1. Exterior Gypsum Sheathing, Plywood or OSB.
    - a. Air Smart Air Barrier System at a minimum of 2.5 gallons per 100 ft<sup>2</sup> (40 ft<sup>2</sup>/gallon) (40 wet mils).
    - b. Others meeting stated requirements.
    - c. Spray around all projections, including masonry veneer anchors, ensuring a complete and continuous air seal.
  - 2. Concrete Masonry Unit (CMU), Concrete.
    - a. Air Smart Air Barrier System at a minimum of 2.5 gallons per 100 ft<sup>2</sup> (40 ft<sup>2</sup>/gallon) (equal to 40 wet mils on a smooth surface).
    - b. Others meeting stated requirements.
    - c. Spray around all projections including masonry veneer anchors ensuring a complete and continuous air seal.

3.06 INSPECTION

- A. Notify Architect when sections of work are complete so as to allow for review prior to installing insulation. The manufacturer's representative shall be on site to review the installation along with the Architect.

3.07 PROTECTION OF FINISHED WORK

- A. Liquid membranes are not designed for permanent exposure. Cover the liquid membrane as recommended by the manufacturer within the following time frames. Contractor shall verify the number of calendar days with the air barrier manufacturer:
  - 1. Cover the Air Smart material within 180 calendar days after installation. The nature of this product is such that some surface weathering may become apparent during exposure. This is a surface effect only and does not impact air barrier system performance.
  - 2. Transition membranes shall be covered within 180 days after installation
- B. Prepare, treat and seal vertical and horizontal surfaces at terminations and penetrations through the air barrier and at protrusions according to air barrier manufacturer's written instructions.

3.08 SCHEDULE

- A. Install liquid membrane system over the entire surface of the glass-faced sheathing in the following area. Seal any masonry anchor penetrations air tight.
  - 1. In the masonry cavity wall.
- B. Install liquid membrane system over the entire surface of the outer surface of the inner wythe of masonry. Seal any masonry anchor penetrations air tight.
- C. Install liquid membrane system over the entire surface of the outer surface of the concrete wall panels. Seal any masonry anchor penetrations air tight.



- D. Install liquid membrane system over the entire surface of the glass-faced gypsum sheathing and/or roof board in the following area:
  - 1. Behind the metal parapet panels.
  - 2. Behind the metal wall and soffit panels.
- E. Hollow Metal Door Frames: Seal door frame to wall surface with transition membrane.
- F. Wall and Roof Junction: Seal wall to roof with transition membrane.
- G. Seal joints in glass-faced sheathing with tape in the following areas:
  - 1. Cement plaster soffit.
- H. Seal the top of sheathing to the underside of the roof assembly with foam or GreatSeal LT-100 Liquid Tape.
- I. Openings: Seal around the perimeter of all openings with transition membrane.
- J. Perimeter wood nailers at wall openings: Cover all exposed surfaces of wood nailers with transition membrane. Extend membrane over sheathing, masonry and metal framing as shown.
- K. Aluminum window frames with nailing flanges: Seal the nailing flanges to the wall surface with transition membrane.
- L. Aluminum window frames without nailing flanges: Seal frames to the wall surface with transition membrane.
- M. Aluminum storefront frames: Seal frames to the wall surface with transition membrane.
- N. Aluminum curtain wall frames: Seal frames to wall surface with transition membrane.

**END OF SECTION**