

SECTION 072700 SELF-ADHERING, VAPOR PERMEABLE AIR BARRIER MEMBRANE

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the self-adhering, vapor-permeable air barrier membrane as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
 - 1. Vapor retarder/air barrier applied over sheathing board and cold-formed metal framing.
 - 2. Materials and installation to bridge and seal the following air leakage pathways and gaps:
 - a. Connections of the walls to the roof.
 - b. Connections of the walls to the foundations.
 - c. Seismic and expansion joints.
 - d. Openings and penetrations of window frames, storefront, curtain wall.
 - e. Door frames.
 - f. Piping, conduit, duct and similar penetrations.
 - g. Masonry ties, screws, bolts and similar penetrations.
 - h. All other air leakage pathways in the building envelope.

1.3 RELATED SECTIONS

- A. Cold-Formed Metal Framing, including gypsum and cement board sheathing - Section 054000.

1.4 REFERENCES

- A. The following standards are applicable to this section:
 - 1. ASTM C 920: Standard Specification for Elastomeric Joint Sealants.
 - 2. ASTM C 1193: Standard Guide for Use of Joint Sealants.
 - 3. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 4. ASTM E 96: Water Vapor Transmission of Materials.
 - 5. ASTM E 283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - 6. ASTM E 2112: Standard Practice for Installation of Exterior Windows, Doors and Skylights.
 - 7. ASTM E 2178: Standard Test Method for Air Permeance of Building Materials.
 - 8. ASTM E 2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
 - 9. NFPA: Class A 0 -25 Flame Spread Index 0 -450 Smoke Developed Index.
 - 10. ICC-ES AC-38: Acceptance Criteria for Water-Resistive Barriers.
 - 11. ICC-ES AC188: Acceptance Criteria for Roof Underlayments.
 - 12. ICC-ES AC48: Acceptance Criteria for Roof Underlayment for use in

13. AAMA 2400: Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction.
14. AAMA 711-05: Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products.

B. AATCC – American Association of Textile Chemists and Colorists.

1. Test Method 127 Water Resistance: Hydrostatic Pressure Test.

C. TAPPI

1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area).
2. Test Method T-460; Air Resistance (Gurley Hill Method).

1.5 QUALITY ASSURANCE

A. Installer Qualifications

1. The air barrier contractor shall be, during the bidding period as well as for the duration of the installation, officially recognized as a Licensed Contractor by the Air Barrier Association of America (ABAA). The Contractor shall carry liability insurance and bonding.
2. Each worker who is installing air barriers must be either a Certified Applicator or an installer who is registered with ABAA.
3. Each Lead Certified Applicator can supervise a maximum of five registered installers. The Certified Applicator shall be thoroughly trained and experienced in the installation of air barriers of the types being applied. Lead Certified Applicators shall perform or directly supervise all air/vapor barrier work on the project.

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

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

D. Field-Constructed Mock-Ups: Prior to installation of air/vapor barrier, apply air/vapor barrier as follows to verify details under shop drawing submittals and to demonstrate tie-ins with adjoining construction, and other termination conditions, as well as qualities of materials and execution:

1. Construct typical exterior wall panel, 8 feet long by 8 feet wide (one of CMU and one of sheathed areas, incorporating back-up wall, cladding, window and doorframe and sill, insulation, flashing, building corner condition, and typical penetrations and gaps; illustrating materials interface and seals.

E. Test mock-up in accordance with ASTM E 783 and ASTM E 1105 for air and water infiltration.

F. Manufacturer shall be on-site at least once a week to observe installation and provide written report within 3 days.

G. Manufacturer shall confirm all termination details and compatibility with materials being terminated to.

- H. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be to be evaluated as part of this specific assembly test. The basis of design product listed herein is a component of the design test assembly selected by the Architect.

1.6 SUBMITTALS

- A. Provide evidence to the Architect of licensing and certification under the Air Barrier Association of America's (ABAA's) Quality Assurance Program.
- B. Submit shop drawings showing locations and extent of air/vapor barrier and details of all typical conditions, intersections with other envelope systems and materials, membrane counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated and how miscellaneous penetrations such as conduits, pipes electric boxes and the like are sealed.
- C. Submit manufacturer's product data sheets for each type of membrane, 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.
- D. Submit manufacturer's data showing solids content of fluid applied membranes and coverage rates and wet film thickness upon application in order to achieve minimum dry film thickness required by this specification.
- E. Submit manufacturer's installation instructions.
- F. Submit certification by air/vapor barrier manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- G. Submit certification of compatibility by air/vapor barrier manufacturer, listing all materials on the project that it connects to or that come in contact with it, including sealant as specified in Section 054000 for caulking joints between sheathing panels.
- H. Submit samples, 3 by 4 inch minimum size, of each air/vapor barrier material required for Project.
- I. Test results of air permeability testing of primary air barrier material (ASTM E 2178- 01).
- J. Test results of assembly in accordance with ASTM E 2357.

1.7 PERFORMANCE REQUIREMENTS

- A. Provide air/vapor barrier constructed to perform as a continuous air/vapor 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.

- B. Provide an air barrier assembly that has been tested in accordance with the Air Barrier Association of America's (ABAA's) approved testing protocol to provide air leakage results not to exceed 0.01 cfm/sf @ 1.57 psf.
- C. Connections to Adjacent Materials: Provide connections to adjacent materials at the following locations and show same on shop drawings:
 - 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.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, date of manufacture, and directions for storage.
- B. 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.
- C. Avoid spillage. Immediately notify Owner, Architect if spillage occurs and start clean-up procedures.
- D. Clean spills and leave area as it was prior to spill.

1.9 WARRANTY

- A. System Warranty: Provide the manufacturer's three (3) year system warranty, including the primary air/vapor barrier and installed accessory sealant and membrane materials that fail to achieve airtight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide Blue Skin VP160 by Henry Company, GCP Technologies, Carlisle or approved equal.

2.2 MEMBRANES (BASIS-OF-DESIGN)

- A. Primary water-resistive air barrier membrane shall be BlueskinVP 160 manufactured by Henry or approved equal; a self-adhering air barrier membrane with an engineered film specifically designed to be water resistant and vapor permeable. Membrane shall have the following physical properties:
 - 1. Air Leakage: <0.004 CFM/ft² @ 1.57 lbs/ft² [<0.02L/s/m² @ 75Pa] when tested in accordance with ASTM E 2178.

2. Water Vapor Permeance: 29 perms to ASTM E 96, Method B.
3. Air Leakage of Air Barrier Assemblies: Tested to ASTM E 2357.
4. Resistance to Water Penetration: Pass ICC-ES AC 38.
5. Water Penetration Resistance Around Nails: Pass when tested to AAMA 711-05 and ASTM D 1970 modified.
6. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84: Flame Spread Rating of 0 and Smoke Development Classification of 105.
7. Basis Weight: Minimum 160 gm/m², when tested in accordance with TAPPI Test Method T-410.
8. Tensile Strength: 40 lbF MD and 29 lbF CD per ASTM D828.
9. Average Dry Breaking Force: 127 lbF MD, and 91 lbF CD per ASTM D 5034.
10. Cyclic and Elongation: Pass at 100 cycles, -29 degrees C (-20 degrees F) per ICC- ES AC 48.

- B. Self-adhering membrane for window sill pan flashings shall be Blueskin SA or LT manufactured by Henry or approved equal; an SBS modified bitumen, self-adhering sheet membrane which is integrally laminated to a blue polyethylene film. Membrane shall have the following physical properties:

1. Membrane Thickness: 0.040 inches (40 mils).
2. Low Temperature Flexibility: -30 degrees F to ASTM D 146.
3. Elongation: 200% minimum to ASTM D 412 modified.
4. Minimum Puncture Resistance 40lbF to ASTM E 154.
5. Lap Peel Strength 10 lbF/in width to ASTM D 903 180° bend.
6. Auxiliary tested component of ASTM E 2357 for Air Leakage of Air Barrier Assemblies.

- C. Self-adhering membrane for all window jambs, headers, door openings, inside and outside corners, and other transitions shall be pre-cut Blueskin VP 160 manufactured by Henry or approved equal; a self-adhering sheet air barrier membrane with an engineered film specifically designed to be water resistant and vapor permeable. Membrane shall have the following physical properties:

1. Air Leakage: <0.004 CFM/ft² @ 1.57 lbs/ft² [<0.02L/s/m² @ 75Pa] when tested in accordance with ASTM E 2178.
2. Water Vapor Permeance: 29 perms to ASTM E 96, Method B.
3. Air Leakage of Air Barrier Assemblies: Tested to ASTM E 2357.
4. Resistance to Water Penetration: Pass ICC-ES AC 38.
5. Water Penetration Resistance Around Nails: Pass when tested to AAMA 711-05 and ASTM D 1970 modified.
6. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84: Flame Spread Rating of 0 and Smoke Development Classification of 105.
7. Basis Weight: Minimum 160 gm/m², when tested in accordance with TAPPI Test Method T-410.
8. Tensile Strength: 40 lbF MD and 29 lbF CD per ASTM D 828.
9. Average Dry Breaking Force: 127 lbF MD, and 91 lbF CD per ASTM D 5034.
10. Cyclic and Elongation: Pass at 100 cycles, -29 degrees C (-20 degrees F) per ICC- ES AC 48.

2.3 ADHESIVE PRIMERS

- A. Low VOC adhesive primer for primary self-adhering water resistive air barrier membrane, self-adhering transition membrane and SBS modified bitumen membranes at all temperatures shall

be Blueskin LVC Adhesive as supplied by Henry or approved equal; a low V.O.C. quick setting rubber-based adhesive. Adhesive Primer shall have the following physical properties:

1. Color: Blue.
 2. Weight: 7.68 lbs/gal.
 3. Solids by Weight: 40%.
 4. Max. V.O.C.: <240 grams/liter.
 5. Drying Time (initial set): 30 minutes at 50% RH and 70 degrees F.
- B. Adhesive Primer for primary self-adhering water resistive air barrier membrane, self-adhering transition membrane and SBS modified bitumen membranes in non-regulated VOC areas, at all temperatures shall be Blueskin Adhesive manufactured by Henry, a synthetic rubber-based adhesive, quick setting, having the following physical properties:
1. Color: Blue.
 2. Weight: 6 lbs/gal.
 3. Solids by Weight: 35%.
 4. Drying Time (initial set): 30 minutes.

2.4 PENETRATION AND TERMINATION SEALANT

- A. Termination Sealant shall be HE925 BES Sealant manufactured by Henry or approved equal; a moisture cure, medium modulus polymer modified sealing compound having the following physical properties:
1. Compatible with sheet air barrier, roofing and waterproofing membranes and substrate.
 2. Complies with Fed. Spec. TT-S-00230C, Type II, Class A.
 3. Complies with ASTM C 920, Type S, Grade NS, Class 25.
 4. Elongation: 450 – 550%.
 5. Remains flexible with aging.
 6. Seals construction joints up to 1 inch wide.
 7. Auxiliary tested component of ASTM E 2357 for Air Leakage of Air Barrier Assemblies.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where the vapor-permeable air barrier membrane is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the work.

3.2 SURFACE PREPARATION

- A. Surfaces must be sound, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane.
- B. Ensure all preparatory Work is complete prior to applying primary air barrier membrane.
- C. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

3.3 APPLICATION OF ADHESIVE PRIMER

A. Required Adhesive Primer for SBS Modified Self-adhering Membranes

1. For the application of SBS modified self-adhering window sill pan flashings, through-wall flashings and other applications of SBS modified self-adhering transition membranes, the substrate needs to be conditioned with applicable adhesive primer.
2. Apply adhesive primer at rate recommended by manufacturer to all areas to receive SBS modified self-adhering sheet membrane as indicated on drawings by roller or spray and allow to dry.
3. The primary self-adhered water resistive air barrier membrane, the surface of the primary self-adhered water resistive air barrier membrane must be primed and allowed to cure prior to the placement of the SBS modified self-adhered membrane.

B. Adhesive Primer for Primary Water Resistive Air Barrier Membrane.

1. Apply adhesive primer as required depending on substrate type and condition of substrate
2. Where appropriate surface adhesion cannot be achieved, prime substrate with specified primer at a rate of 200-250 sq ft/gal as per Technical Data Sheet.
3. Apply adhesive primer as required on surface of Blueskin VP160 where subsequent Blueskin VP160 membrane will overlap such as selvage edge and end laps.

3.4 INSTALLTION OF AIR BARRIER SYSTEM

A. Inside and Outside Corners: Seal inside and outside corners of sheathing boards with a strip of self-adhering vapor permeable membrane extending a minimum of 3 inches on either side of the corner detail.

1. For inside corners, pre-treat the corner with a continuous ½ inch bead of termination sealant.

B. Prime surfaces in an intermittent pattern, at a rate of 200-250 sq ft/gal where appropriate to achieve surface adhesion as per manufacturers' instructions and allow to dry.

C. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.

D. Roll all laps and membrane with a countertop roller to ensure seal.

3.5 TRANSITION AREAS

A. Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated in drawings with self-adhering water resistive air barrier transition membrane.

1. Prime surfaces in an intermittent pattern, at a rate of 200-250 sq ft/gal where appropriate to achieve surface adhesion as per manufacturers' instructions and allow to dry.
2. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 3 inch lap to all substrates.
3. Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
4. Roll all laps and membrane with a countertop roller to ensure seal.

3.6 WINDOWS AND ROUGH OPENINGS

- A. Place specified SBS modified self-adhering window sill pan flashing membrane across window sills. Pre-treat inside corners with a bead of termination sealant. Install window sill pan membrane and end dam terminations, seal cuts and terminations with termination sealant.
- B. Wrap jamb of rough openings with specified self-adhering water resistive air barrier transition membrane as detailed.
- C. Extend specified self-adhering water resistive air barrier membrane into rough window openings sufficient to provide a connection to interior vapor retarder.
 - 1. Prime surfaces in an intermittent pattern, at a rate of 200-250 sq ft/gal where appropriate to achieve surface adhesion as per manufacturers' instructions and allow to dry.
 - 2. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
 - 3. Roll all laps and membrane with a countertop roller to ensure seal.

3.7 THROUGH-WALL FLASHING MEMBRANE

- A. Apply through-wall flashing membrane along the base of masonry veneer walls and over shelf angles as detailed.
- B. Prime surfaces and allow to dry, press membrane firmly into place, overlap minimum 2 inches at all end and side laps. Promptly roll all laps and membrane to ensure the seal.
- C. Applications shall form a continuous flashing membrane and shall extend up a minimum of 8 inches up the back-up wall.
- D. Seal the top edge of the membrane where it meets the substrate using termination sealant. Trowel-apply a feathered edge to seal termination to shed water.
- E. Install through-wall flashing membrane 1/2 inch from outside edge of veneer. Provide end-dam flashing as detailed.

3.8 PRIMARY WATER RESISTIVE AIR BARRIER

- A. Apply self-adhering water resistive air barrier membrane complete and continuous to substrate in a sequential overlapping weatherboard method starting at bottom or base of wall and working up in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.
 - 1. Cut to manageable sections, align and position self-adhering membrane to substrate, remove top panel of protective release film and press firmly into place.
 - 2. Ensure alignment, hold membrane in place to avoid wrinkles and sequentially remove remaining panels of protective film and press firmly into place.
 - 3. Ensure minimum 3-inch overlap at all ends and 2 inch side laps of subsequent membrane applications.
 - 4. Pressure roll all membrane surfaces, laps and flashings with a countertop roller or 'J-roller' to ensure appropriate surface adhesion.

5. At the end of each day's work seal the top edge of the membrane where it meets the substrate with termination sealant. Trowel apply a feathered edge to seal termination and shed water.

3.9 APPLICATION OF TERMINATION SEALANT

- A. Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the primary water resistive air barrier membrane and around the perimeter edge of membrane terminations at window and door frames with specified termination sealant.
- B. Seal the leading edge of membrane terminations and reverse laps.

3.10 PROTECTION

- A. Damp substrates must not be inhibited from drying out. Drying time varies depending on temperature and relative humidity. Do not expose the backside of the substrate to moisture or rain.
- B. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed air barrier installations. Protect air barrier membrane from damage and inclement weather during the construction phase.
- C. Water resistive air barrier membrane is not designed for permanent exposure. Good practice calls for covering as soon as possible, not to exceed 90 days.
- D. Regional weather conditions and daytime sunlight temperatures may require the membrane to be protected under the 90-day exposure limit.

3.11 FIELD TESTING

- A. Contractor shall hire testing laboratory to confirm that the system has been tested and passed requirements in accordance ASTM 1186, ASTM E 783 and ASTM E 1105 for air and water infiltration. Submit test results to Architect.
- B. Any failures shall be repaired by Contractor.

END OF SECTION 072700