

## SECTION 072700

### AIR BARRIERS

(Part of Work of Section 070001 - Waterproofing, Dampproofing and Caulking,  
Filed Sub-Bid Required)

#### PART 1 - GENERAL

##### 1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.

##### 1.2 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
  - 1. Fluid-applied, UV stable, vapor-permeable membrane air barrier.
  - 2. Transition strips to adjacent and penetrating materials.
  - 3. Sill sealer gaskets.
- B. Sustainable Design Intent: Refer to Section 018113 - SUSTAINABLE DESIGN REQUIREMENTS for certification level and certification requirements.
- C. Related Work: The following items are not included in this Section and are specified under the designated Sections:
  - 1. Section 061600 - SHEATHING for sheathing substrate for air and vapor barrier system.
  - 2. Section 075300 - EPDM ROOFING for roof air and vapor barrier.
  - 3. Section 079200 - JOINT SEALANTS for joint sealant requirements.

##### 1.3 DEFINITIONS

- A. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall or soffit, including joints and junctions to abutting construction, to control air movement through the wall.

##### 1.4 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor-retarding air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Air Barrier Assembly Air Leakage: Not to exceed 0.03 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., ASTM E 2357.

- C. Fire Test Performance: Passes NFPA 285, Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

#### 1.5 PRECONSTRUCTION TESTING

- A. Mockup Testing: Air barrier assemblies shall comply with performance requirements indicated, as evidenced by reports based on mockup testing by a qualified testing agency.
  - 1. The Owner may engage a qualified testing agency.
  - 2. Quantitative Air Leakage Testing: Testing of the mockup for air leakage will be conducted not to exceed the test pressure differential, positive and negative, indicated in "Performance Requirements" Article for air barrier assembly air leakage when tested according to ASTM E 783.
  - 3. Notify Architect and the Owner a minimum of seven days in advance of the dates and times when mockup testing will take place.

#### 1.6 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.
- B. LEED Submittals:
  - 1. Building Product Disclosure and Optimization, Material Ingredients:
    - a. Option 1, Material Ingredient Reporting: For air barriers, submit Declare product labels.
- C. Shop Drawings: Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
  - 1. Include details of interfaces with other materials that form part of air barrier.
  - 2. Include details of mockups.
- D. Product Certificates: For air barriers, certifying compatibility of air barrier and accessory materials with Project materials that connect to or that come in contact with air barrier; signed by product manufacturer.
- E. Air Barrier Certification: Submit manufacturer's certification that air barrier, as designed in the assemblies indicated on the Drawings, has been tested to meet the requirements of NFPA 285 and passed.
- F. Qualification Data: For Applicator.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers.

## 1.7 QUALITY ASSURANCE

- A. **Applicator Qualifications:** A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. **Mockups:** Before beginning installation of air barrier, build mockups of exterior wall assembly 150 sq. ft., incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.
  - 1. Coordinate construction of mockup to permit inspection by Owner's testing agency of air barrier before external insulation and cladding is installed.
  - 2. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
  - 3. If the Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
  - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- C. **Preinstallation Conference:** Conduct conference at Project site.
  - 1. Include installers of other construction connecting to air barrier, such as roofing, waterproofing, architectural precast concrete, masonry, joint sealants, windows, glazed curtain walls, and door frames.
  - 2. Review air barrier requirements including surface preparation, substrate condition and pretreatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, mockups, installation procedures, sequence of installation, testing and inspecting procedures, and protection and repairs.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air barrier manufacturer.
- B. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- C. Store rolls according to manufacturer's written instructions.
- D. Protect stored materials from direct sunlight.

## 1.9 PROJECT CONDITIONS

- A. **Environmental Limitations:** Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Protect substrates from environmental conditions that affect performance of air barrier. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

## PRODUCTS

### 1.10 FLUID-APPLIED MEMBRANE AIR BARRIERS

- A. Fluid-Applied, UV Stable Vapor-Permeable Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane, appropriate for use at open-joint rain screen systems.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. WR Meadows Inc.; Air Shield LMP “Black”
    - b. GCP Applied Technologies (formerly W.R. Grace); Perm-A-Barrier VPL 50RS.
    - c. Henry Co. LLC; Air Block 33 or All Weather STPE.
  - 2. Physical and Performance Properties:
    - a. Membrane Air Permeance: Not to exceed 0.004 cfm/ sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
    - b. Membrane Vapor Permeance: Not less than 10 perms; ASTM E 96.

### 1.11 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid waterborne or solvent-borne primer recommended for substrate by manufacturer of air barrier material.
- C. Counterflashing Strip: Modified bituminous 40-mil-thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil-thick, crosslaminated polyethylene film with release liner backing.
- D. Butyl Strip at Termination with EPDM or TPO Roofing Membrane: Vapor-retarding, 30- to 40-mil-thick, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive, with release liner backing.
- E. Modified Bituminous Strip To Cover Cracks and Joints and Terminate Air Barrier to Compatible Roofing Membrane: Vapor-retarding, 40-mil-thick, smooth-surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- polyethylene film with release liner backing.
- F. Termination Mastic: Cold fluid-applied elastomeric liquid; trowel grade.
- G. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- H. Adhesive and Tape: Air barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- I. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

- J. Sprayed Polyurethane Foam Sealant to Fill Gaps at Penetrations and Openings: one- or two-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft. density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- K. Modified Bituminous Transition Strip to Seal Air Barrier Terminations with Glazing Systems: Vapor-retarding, 40-mil-thick, smooth-surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil-thick polyethylene or aluminum film with release liner backing.
- L. Preformed Silicone-Sealant Extrusion to Seal Air Barrier Terminations with Glazing Systems: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Dow Corning Corporation; 123 Silicone Seal.
    - b. Elbex Corp: Transition Silicone Sheeting.
    - c. GE Silicone; UltraSpan US1100.
    - d. Tremco; approved equal.
- M. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Section 079200 - JOINT SEALANTS.
- N. Sill Sealer Gaskets: Double bulb flat gasket shape, selected from manufacturer's standard widths to match width of bottom track or rim track members.
  - 1. Basis of Design: Conservation Technology.
  - 2. Material: EPDM rubber. Do not use neoprene or closed cell foam.

## PART 2 - EXECUTION

### 2.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
  - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
  - 2. Verify that concrete has cured and aged for minimum time period recommended by air barrier manufacturer.
  - 3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
  - 4. Verify that masonry joints are flush and completely filled with mortar.
  - 5. Proceed with installation only after unsatisfactory conditions have been corrected.

### 2.2 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.

- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
  - 1. Install modified bituminous strips and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.
- G. Bridge and cover isolation joints expansion joints and discontinuous deck-to-wall and deck-to-deck joints with overlapping modified bituminous strips.
- H. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- I. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

### 2.3 SILL SEALER GASKET INSTALLATION

- A. Attach gasket to underside of sill plate or bottom track. Use staples for wood sill plate. Flip over and lay on top of foundation wall.

2.4 JOINT TREATMENT IN PREPARATION FOR INSTALLATION OF FLUID-APPLIED MEMBRANE

- A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.
  - 1. Prime substrate and apply a single thickness of preparation coat strip extending a minimum of 3 inches along each side of joints and cracks. Apply a double thickness of air barrier membrane and embed a joint reinforcing strip in preparation coat.
- B. Gypsum Sheathing: Fill joints greater than 1/4 inch with sealant according to ASTM C 1193 and with air barrier manufacturer's written instructions. Apply first layer of fluid air barrier membrane at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air barrier membrane over joint reinforcing strip.

2.5 TRANSITION STRIP INSTALLATION

- A. Install strips, transition strips, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
  - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
  - 2. Install butyl or modified bituminous strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over both substrates.
- B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
  - 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- E. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over both substrates. Maintain 3 inches of full contact over firm bearing to perimeter frames with not less than 1 inch of full contact.
  - 1. Transition Strip: Roll firmly to enhance adhesion.
  - 2. Elastomeric Flashing Sheet: Apply adhesive to wall, frame, and flashing sheet. Install flashing sheet and termination bars, fastened at 6 inches o.c. Apply lap sealant over

- exposed edges and on cavity side of flashing sheet.
3. Preformed Silicone-Sealant Extrusion: Set in full bed of silicone sealant applied to walls, frame, and membrane.
- G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.
  - H. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
  - I. Seal top of through-wall flashings to air barrier with an additional 6-inch-wide, modified bituminous strip.
  - J. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
  - K. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.
- 2.6 INSTALLATION OF SELF-ADHERING SHEET MEMBRANE
- A. Install modified bituminous sheets according to air barrier manufacturer's written instructions and according to recommendations in ASTM D 6135.
    1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous air barrier sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.
  - B. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
    1. Install modified bituminous strips centered over vertical inside corners. Install 3/4-inch fillets of termination mastic on horizontal inside corners.
  - C. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations with termination mastic and according to ASTM D 6135.
  - D. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
    1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
  - E. Apply and firmly adhere modified bituminous sheets horizontally or vertically over area to receive air barrier sheets. Accurately align sheets and maintain a uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams and stagger end laps to ensure airtight installation.
    1. Apply sheets in a shingled manner to shed water without interception by any exposed sheet edges.
    2. Roll sheets firmly to enhance adhesion to substrate.
    3. Apply termination mastic on any horizontal, field-cut or non-factory edges.



- F. Apply continuous modified bituminous sheets over modified bituminous strips bridging substrate cracks, construction, and contraction joints.
- G. Seal top of non-metallic through-wall flashings to air barrier sheet with an additional 6-inch- wide strip.
- H. Seal exposed edges of metallic sheets at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- I. Install air barrier sheets and auxiliary materials to form a seal with adjacent construction and to maintain a continuous air barrier.
  - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
  - 2. Install compatible strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over both substrates.
- J. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings using accessory materials.
- K. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply membrane specified below so that a minimum of 3 inches of coverage is achieved over both substrates. Maintain 3 inches of full contact over firm bearing to perimeter frames with not less than 1 inch of full contact.
  - 1. Modified Bituminous Transition Strip: Roll firmly to enhance adhesion.
  - 2. Elastomeric Flashing Sheet: Apply adhesive to wall, frame, and flashing sheet. Install flashing sheet and termination bars, fastened at 6 inches o.c. Apply lap sealant over exposed edges and on cavity side of flashing sheet.
  - 3. Preformed Silicone-Sealant Extrusion: Set in full bed of silicone sealant applied to walls, frame, and membrane.
- L. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air barrier membrane with foam sealant.
- M. At end or each working day, seal top edge of membrane to substrate with termination mastic.
- N. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- O. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air barrier sheet extending 6 inches beyond repaired areas in all directions.
- P. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- Q. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

## 2.7 INSTALLATION OF FLUID-APPLIED MEMBRANE AIR BARRIER

- A. Apply air barrier membrane to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions.
- B. Apply air barrier membrane within manufacturer's recommended application temperature ranges.
- C. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
  - 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- D. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.
  - 1. Vapor-Retarding Membrane Air Barrier: 60-mil dry film thickness.
  - 2. Vapor-Permeable Membrane Air Barrier: 120-mil wet film thickness.
- E. Apply strip and transition strip a minimum of 1 inch onto cured air membrane or strip and transition strip over cured air membrane overlapping 3 inches onto each surface according to air barrier manufacturer's written instructions.
- F. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

## 2.8 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:
  - 1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.
  - 2. Continuous structural support of air barrier system has been provided.
  - 3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
  - 4. Site conditions for application temperature and dryness of substrates have been maintained.
  - 5. Maximum exposure time of materials to UV deterioration has not been exceeded.
  - 6. Surfaces have been primed.
  - 7. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction (or mastic applied on exposed edges), with no fishmouths.
  - 8. Termination mastic has been applied on cut edges.
  - 9. Air barrier has been firmly adhered to substrate.
  - 10. Compatible materials have been used.
  - 11. Transitions at changes in direction and structural support at gaps have been provided.
  - 12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation, and priming of surfaces, structural support, integrity, and continuity of seal.

13. All penetrations have been sealed.

C. Tests:

1. Qualitative Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186.
2. Quantitative Air Leakage Testing: Testing not to exceed the test pressure differential, positive and negative, indicated in "Performance Requirements" Article for air barrier assembly air leakage according to ASTM E 783.

D. Remove and replace deficient air barrier components and retest as specified above.

2.9 CLEANING AND PROTECTION

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

1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed to these conditions for more than 30 days.
2. Protect air barrier from contact with creosote, uncured coal-tar products, TPO, EPDM, flexible PVC membranes, and sealants not approved by air barrier manufacturer.

B. Clean spills, stains, and soiling from adjacent construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION