SECTION 072726 - FLUID-APPLIED AIR BARRIER WATERPROOFING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. A fluid-applied vapor permeable air barrier waterproofing system applied of the entire building exterior over gypsum sheathing and masonry block.
   2. Installation of transition membrane over window flange and tying into air barrier system.

B. Related Sections include the following:
   1. Division 04 Section "Unit Masonry Assemblies" for masonry to receive air barrier system.
   2. Division 05 Section "Cold Formed Metal Framing" for weather-resistant gypsum wall sheathing.
   3. Division 06 Section "Finish Carpentry" for Z-flashing over windows and doors to be sealed to the air barrier waterproofing.
   4. Division 07 Section "Weather Barriers" for weather barrier system over fire retardant plywood wall sheathing.

1.3 PERFORMANCE REQUIREMENTS

A. Air Barrier: Shall be designed and constructed as a continuous air barrier to control air leakage into, or out of the conditioned space, and to act as a watertight barrier to discharge to the outside any incidental condensation or water penetration. Air barrier membrane shall accommodate movements of building materials by providing expansion and control joints as required, with appropriate air seal materials at such locations, changes in substrate and perimeter conditions. Barrier shall be continuous with all joints made air-tight and watertight, and shall have the following characteristics:
   1. Air Permeability: Membrane material shall not exceed 0.004 cubic feet per minute per square foot under a pressure differential of 0.3-inch water when tested in accordance with ASTM E 283.
   2. Water Penetration Resistance: joint treatment and primary air barrier material, comply with ICC ES AC 212, par 4.8.3, no water penetration after 5 hours hydrostatic pressure.
   3. Nail Sealability: ASTM D 1970, 7.9.1, primary air barrier and vapor barrier passes.
   4. Elongation: ASTM D 412, primary air barrier and vapor barrier material, > 500% at 7 days.
   5. Adhesion: joint treatment and primary air barrier and vapor barrier material, ASTM D 4541, >30 psi, or exceeds strength of glass mat facing on glass mat gypsum substrates.
   6. Surface Burning: ASTM E 84, joint treatment and primary air barrier and vapor barrier material flame spread less than 25, smoke developed less than 450, Class A building material.
   7. Fire Resistance: ASTM E 119, Meets criteria for 1 hour resistance rating installed over 1 hour fire resistance rated sheathing.

8. Water Vapor Permeance: Less than 0.1 perms grams/ft²/hr in Hg when tested in accordance with ASTM E 96.
9. Assembly Air Leakage: ASTM E 2357, < 0.04 cfm/ft2 air leakage after conditioning protocol.
10. Building Envelope Air Leakage: ASTM E 779 or 1827, < 0.4 cfm/ft2.
11. Field adhesion testing: ASTM D 4541, > 30 psi or exceeds strength of glass mat facing on glass mat gypsum substrates.
12. Volatile Organic Compounds: SCAQMD Rule 1113, joint treatment and primary air barrier and vapor barrier material < 100 g/L.
13. Shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on envelope without damage or displacement; shall transfer load to structure; and shall not displace adjacent materials under full load.
14. Shall be joined in an airtight, flexible manner to the air barrier surface/material of adjacent systems, allowing for relative movement of systems due to thermal and moisture variations or creep. Air barrier shall be connected to the following system components:
    a. Foundation and walls.
    b. Doors and windows penetrating exterior walls.
    c. Aluminum-framed entrances, storefronts.
    d. Different wall systems.
    e. Roof assemblies.
    f. Wall and roof intersections.
    g. Wall penetrations by pipes, ducts and conduits.

B. Air Barrier Penetrations: Penetrations of the air barrier and paths of air infiltration or exfiltration shall be made airtight to not less than the assembly leakage rating of the air barrier, and shall prevent the passage of water.

1.4 SUBMITTALS

A. General: Submit in accordance with Division 01 Section "Submittal Procedures."

B. Complete Shop Drawings and Product Data shall be submitted to the Architect at least 21 days before the Preinstallation Conference. No Preinstallation Conference will be held and no material shall be applied until submittals are complete and released for construction.

C. Product Data: For each type of product indicated. Include technical data; certified test results; manufacturer's printed instructions for evaluating, preparing and treating substrate; and installation instructions, including temperature and other limitations of installation.

D. Shop Drawings: Show locations and extent of air barrier and details of intersections with other envelope systems and materials; details of membrane counter-flashings; details for construction of inside and outside corners; and details showing how expansion and control joints will be bridged. Identify materials, primers, sealers, support materials and other items detailed, including manufacturer's product names, application thickness requirements, and measurements for minimum material sizes, overlaps, and application. Show relationship to adjacent materials, sequence of installation and materials, and methods for sealing penetrations. Shop drawing shall include connection details between the air barrier and for the following exterior envelope components as applicable to the project:
1. Foundations and walls.
2. Vinyl windows.
3. Aluminum-framed entrances.

4. Flashing tie in over window and door trim.
5. Wall and roof assemblies.
6. Wall penetrations by pipes, ducts and conduits.
7. Typical gypsum based sheathing joint treatment, outside corner, inside corner.
8. Square tube, steel angle, channels, knife plates, structural WF beam and tube shape penetration sealing as applicable.
9. Detailing a penetration where gypsum sheathing has a wide gap at the penetration.
10. Horizontal deflection joint and vertical control joint details in gypsum based sheathing and in CMU as applicable.
11. Corner and edge damage preparation of gypsum based sheathing (sheet metal cover plate adhered to board) to receive air barrier membrane.
12. Hollow metal door frames, mechanical louvers and vent penetrations.

E. Product Certificates: For air barrier system, certifying compatibility of air barrier system and accessory materials with Project materials that connect to or that come in contact with the air barrier system; signed by product manufacturer.

F. Qualification Data: For Installer signed by manufacturer certifying that Installers comply with requirements. Submit list of similar type projects along with the Architect and Owner contact information for each project.

G. Product Test Reports: From a qualified independent testing agency indicating and interpreting test results of air barrier system for compliance with requirements, based on comprehensive testing of current air barrier system in accordance with ASTM E 2178.

H. Daily Reports: Installer shall maintain daily reports at the Project site. Copies of reports shall be submitted weekly.

I. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Shall be factory trained and approved in writing by air barrier membrane manufacturer.
   1. The installer shal have successfully completed three projects of similar size and complexity as this project.
      a. Each worker who is installing air barrier system shall be either a Certified Applicator or an applicator who is registered with ABAA and has installed the specified air barrier system.

B. Source Limitations: Obtain air barrier membrane materials through one source from a single manufacturer.

C. Mockups: Apply air barrier membrane mockup on building where directed by Architect. Mockup of air barrier membrane shall include connections between wall and foundation, wall and window systems, and wall and door system showing relationship of materials with air barrier membrane and quality of workmanship. Mockup shall demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane. Provide separate mock-ups for masonry wall substrate and for gypsum based sheathing.

1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
2. Complete mockup for review at preinstallation conference.
3. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
4. Approved mockup may remain as part of the work.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to air barrier membrane installation.
1. Complete Shop Drawings and Product Data shall be submitted to the Architect at least 21 days before the Preinstallation Conference.
2. Meet with Owner, Architect, air barrier membrane Installer, air barrier membrane system manufacturer's representative, testing agency representative, and installers whose work interfaces with or affects air barrier membrane including, but not limited to, installers of exterior sheathing, exterior wall assemblies, door and window assemblies, roofing assemblies, and flashings and trim.
3. Review air barrier requirements including surface preparation, substrate condition and pretreatment, forecasted weather conditions, special details and flashings, mockups, installation procedures, sequence of installation, testing and inspecting procedures, and protection and repairs.
4. Review approved submittals.
5. Review mock-up.
6. Review methods and procedures related to air barrier membrane installation, including manufacturer's written instructions, surface preparation and substrate condition and pretreatment, if applicable.
7. Review horizontal deflection joints for structure deflection and vertical control joint details in gypsum based sheathing.
8. Review how mil thickness of applied material will be measured during application, to maintain specified thickness.
9. Review compatibility of air barrier materials with building envelope materials.
10. Review interface of flashings and trim with air barrier system. Review sealing of Z-flashing over windows and doors to the air barrier waterproofing.
11. Review and coordinate sequence of installation with adjacent materials.
12. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
13. Review procedures for quality assurance, testing, and corrective procedures.
14. Review daily report requirements.
15. Review schedule for subsequent work covering air barrier membrane.
16. Review coordination of inspection of exterior air barrier before covering.
17. Review coordination of inspection of interior side of sheathing for holes before interior finishes are applied.
18. Review procedures for correcting holes made by screws missing framing during application of rigid insulation, and other applicable wall attachments.
19. Review requirements for exterior insulation being in place before heating of building interior.
20. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.
21. Provide 7 business days minimum advance notice to participants prior to convening preinstallation conference.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Protect materials from damage from weather, freezing, excessive temperatures, and construction operations. Remove damaged material from site and replace at no additional cost to Owner.

C. Remove and replace liquid materials that cannot be applied within their stated shelf life.

D. Comply with the manufacturer's written instructions for proper material storage and handling.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted temperature and humidity conditions permit air barrier membrane to be installed according to manufacturers' written instructions and requirements.
   1. Do not apply air barrier system in snow, rain, fog, or mist.

B. Environmental Conditions: Apply air barrier materials and allow to cure within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Do not apply air barrier system to a damp or wet substrate.

C. Maintain adequate ventilation during preparation and application of air barrier materials.

1.8 DAILY REPORTS

A. Installer shall maintain daily reports of all air barrier installation activity. As a minimum, report shall contain the following:
   1. Weather conditions, temperature.
   2. Substrate condition, defects and corrective action.
   3. Identify area of building where application took place.
   4. List of certified installers at the site.
   5. Identify applicators operating the spray gun.
   6. Results of wet film thickness checks.
   7. Temperature at time of application and cure time of applied materials.
   8. Temperature at time of spray application of air membrane.
   9. Photo of installed area. Document daily, identifying, date, time, and location.

1.9 CONTRACTOR FIELD TESTING

A. Membrane Thickness: Applicator shall continually monitor application thickness of air barrier membrane with wet film gage and record as part of the daily reports.

1.10 COORDINATION

A. Coordinate installation of air barrier system with the schedule of temporary heating of the building. Air barrier system shall be fully covered by exterior insulation before heat is turned on within building.

PART 2 - PRODUCTS

2.1 FLUID-APPLIED AIR BARRIER SYSTEM MATERIALS

A. Liquid Air Barrier Membrane:
1. StoGuard - ready-mixed flexible spray or roller applied waterproof vapor permeable air barrier membrane material.

B. Joint and Rough Opening Treatments:
1. Joint Treatment: Sto Gold Fill with StoGuard Mesh: ready mixed flexible trowel or spray applied air barrier material.
2. Joint Reinforcement: StoGuard Mesh: nominal 4.2 oz/yd2 (142 g/m2) self-adhesive, flexible, symmetrical, interlaced glass fiber reinforcing mesh, with alkaline resistant coating for compatibility with Sto materials.

C. Transition Membrane:
1. Transition Membrane: Sto Gold Fill with StoGuard Mesh: ready mixed flexible trowel or spray applied air barrier material.
2. Elastomeric Transition Membrane: StoGuard Rapid Seal moisture cure reinforced elastomeric waterproof air barrier material.

D. Auxiliary Materials
1. Silicone Sealant: Single component, neutral curing, low modulus.
a. Location: To seal sheet membrane flashing to polyethylene face of sheet rubberized-asphalt barrier and to seal between and to non-bituminous sheet systems.
b. Products:
1) Dow Corning Corporation; Dow 790.
2) Tremco Inc.; Spectrum 1 or 2.
3) Pecora Corporation; 864 Silicone Sealant.
2. SPF (Sprayed Polyurethane Foam) Sealant: Provide one- or two-component, foamed-in-place, polyurethane foam sealant with the following characteristics:
a. Density: 1.5 to 2.0 PCF.
b. Flame Spread (ASTM E162): 25 or less.
c. Initial R-Value (at 1 inch): Not less than 7.
d. Products: Zerodraft or Flexible Products.
3. Pre-Cured Sealant Tape: Dow 123.
4. Spray Adhesive: 3M Super 77 Spray Adhesive.
5. Detailing Metal: 0.032 inch thick aluminum sheet.

2.2 EQUIPMENT

A. Sprayer: Airless spray equipment approved by air barrier manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions as each area is completed for air barrier system application, with Installer present, to verify that surfaces are sound, dry, even, and free of oil, grease, dirt,

excess mortar or other contaminants that are detrimental to the adhesion of air barrier system materials.

1. Masonry Surfaces: Verify that masonry joints are completely filled with mortar, and all excess mortar on masonry surface has been removed.
2. Gypsum Sheathing: Verify that boards are sufficiently stabilized with corners, edges, and field of the board fastened with appropriate screws at proper spacing and that all penetrations through sheathing have been properly sealed.
3. If unacceptable conditions are encountered, prepare written report, endorsed by Applicator, listing conditions detrimental to performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION FOR AIR BARRIER SYSTEM

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

B. Mask off adjoining surfaces not covered by air barrier system to prevent spillage and overspray affecting other construction.

C. Concrete Substrates:
1. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids with knife grade air barrier material.

D. Masonry Substrates:
1. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout.
2. Remove excess mortar from masonry and obstructions.

E. Gypsum Sheathing Panels:
1. Remove and replace damaged sheathing.
2. Spot surface defects such as over-driven fasteners, or other voids in sheathing with knife grade joint treatment material.
3. Fill oversized sheathing joints with spray foam and trim flush with sheathing face.
4. Spot fasteners with knife grade air barrier material.

F. Fill gaps between different substrate systems to form a smooth transition from one plane to another; fill gaps at miscellaneous penetrations.
1. Apply foam sealant in gaps.
2. Cover large gaps with aluminum sheet metal or other substrate material approved by the air barrier manufacturer, providing a permanent air barrier transition attachment.
3. Apply foam sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Bridge and cover control joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints.

H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air barrier system and at protrusions according to air barrier system manufacturer's written instructions, specified requirements and approved shop drawings.

3.3 INSTALLATION, GENERAL

A. Strictly comply with air barrier membrane manufacturer's printed instructions, approved submittals and the following:
   1. Apply materials within manufacturer's requirements for temperature and weather conditions.
   2. Do not apply to wet or frozen substrates.
   3. Do not allow contamination with dust or dirt.
   4. Seal completely at edges, perimeter and penetrations.
   5. Wrap membrane around perimeter of window and door openings, so the openings can be caulked around the interior perimeter of the opening, sealing between edge of opening and air barrier membrane. In addition, wrap perimeter blocking and apply transition membrane to make head and jambs of windows watertight.
   6. Dry film thickness shall be not less than specified.

B. Treat construction joints, screws, and install flashings as recommended by manufacturer and specified requirements.

C. Spray apply air membrane using airless spray equipment. To ensure complete coverage of substrate and transition strips and even thickness of air barrier, apply the membrane in two coats, applying the first coat horizontally, and the second coat vertically to provide a total dry film thickness of 40 mils. Seal to penetrations to achieve an airtight envelope.

3.4 FLUID-APPLIED AIR BARRIER SYSTEM INSTALLATION

A. Window and Door Rough Openings: Apply reinforcing mesh diagonally to opening corners. Apply reinforcing mesh to sheathing joints. Wrap sill, then jambs with mesh. Coat mesh with Gold Fill material, providing a smooth uniform surface to receive air barrier membrane.

B. Sheathing Joints: Apply reinforcing mesh to prepared sheathing joints, inside corners, and outside corners. Coat mesh with Gold Fill material, providing a smooth uniform surface to receive air barrier membrane.

C. Foundation: Fill gaps between edge of sheathing and foundation. Apply reinforcing mesh over joint and coat mesh with Gold Fill material, providing a smooth uniform surface to receive air barrier membrane.

D. Vertical and Horizontal Expansion and Control Joints: Prepare joint to be of uniform width. Install pre-cured silicone sealant tape to joints and seal to air barrier membrane.

E. Penetrations: Fill voids around penetrations with foam and trim flush with sheathing face. Seal around perimeter of penetration with reinforcing mesh and RApidSeal elastomeric transition membrane.

F. After openings, joints and penetrations are completed, apply air barrier in a continuous, uniform film. To ensure complete coverage of substrate and transition strips and even thickness of air barrier, apply the membrane in two coats, applying the first coat horizontally, and the second coat vertically to provide a total dry film thickness of 40 mils.

G. Vinyl Windows: After windows are installed, strip in around window head and jambs with reinforcing mesh, lapping on to nailing fins and on to the air barrier membrane to provide a water tight and air tight seal. Coat mesh with Gold Fill material.
   1. If Anderson windows are provided, apply transition membrane system on to face of window nailing fins.
   2. If Marvin windows are provided, apply transition membrane system over face of window nailing fins and lap on to window frame not less than 1/4 inch, providing a watertight seal at the intersection of the nailing fin and window frame.

3.5 FIELD QUALITY CONTROL FOR AIR BARRIER SYSTEM

A. Third Party Testing Agency: Owner will engage a qualified, independent testing and inspecting agency to perform field tests and inspections, and to prepare test reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections and tests.
   1. Air barrier system shall be tested for air infiltration and bond adhesion in compliance with requirements.
   2. Cooperate and coordinate with the Owner's inspection and testing agency.

B. Remove and replace applications of air barrier membrane where test results indicate that it does not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

D. Do not cover air barrier membrane until field quality control testing has been completed.

3.6 CLEANING, PROTECTING, AND REPAIR

A. Cleaning: Immediately after completing spraying operations, remove material overspray and fallout from surfaces of other construction not to be coated and clean exposed surfaces to remove evidence of soiling.
   1. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

B. Repair damage to air barrier membrane caused by construction activities or subsequent work prior to covering membrane.

C. Coordinate installation of exterior rigid insulation with application of air barrier membrane.

D. Schedule work to ensure that the air barrier system is covered as soon as possible after application and inspection. Protect air barrier system from damage during subsequent operations.

END OF SECTION 072726