SECTION 072110 – INSULATING AIR BARRIER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Materials and installation methods for a spray polyurethane foam building insulation and air/vapor barrier system located in the non-accessible part of the wall.
2. SRAB (sheet rubberized-asphalt barrier) self-adhered air/vapor barrier membrane in roof assemblies.
3. Materials and installation to bridge and seal the following air leakage pathways and gaps:

    a. Connections of the walls to the roof air barrier.
    b. Connections of the walls to the foundations.
    c. Seismic and expansion joints.
    d. Openings and penetrations of window frames, store front, curtain wall.
    e. Barrier precast concrete and other envelope systems.
    f. Door frames.
    g. Piping, conduit, duct and similar penetrations
    h. Masonry ties, screws, bolts and similar penetrations.
    i. All other air leakage pathways in the building envelope.

4. Materials to act as flashings and counterflashings.

B. RELATED SECTIONS

1. Section 03300 - Cast-In-Place Concretes for Concrete back-up walls and underslab vapor retarder.
2. Section 04200 - Unit Masonry Masonry for backup walls and Masonry veneer cavity walls.
3. Section 07131 - Self-Adhering Sheet Waterproofing: Below grade waterproofing.
4. Section 07160 - Bituminous Dampproofing: Below grade dampproofing.
5. Section 07210 - Building Insulation: Insulation with integral vapor retarder facing.
6. Section 07620 - Sheet Metal Flashing and Trim: Sheet metal flashings.

1.2 PERFORMANCE REQUIREMENTS

A. Provide air/vapor barrier system constructed to perform as a continuous air/vapor barrier system, as building thermal insulation, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. System 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.

1.3 SUBMITTALS

A. Provide submittals in accordance with Section 01330.

1. At bid submission, provide evidence to the Architect of licensing and certification under the Air Barrier Association of America's (ABAA's) Quality Assurance Program.
2. 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

flashings and 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.

3. Submit manufacturer's product data sheets for each type of material, 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.
4. Submit manufacturer's installation instructions.
5. Provide evidence of testing by an accredited laboratory confirming material has been tested and conforms to the requirements of ASTM E2178, Standard for Air Barrier Materials.
6. Certification by air/vapor barrier manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
7. 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.
8. Submit two samples, 12 by 12 inch (300 by 300 mm) minimum size, of each air/vapor barrier material required for Project.
9. Submit test results of air permeability testing of primary air barrier material (ASTM E 2178-01)
10. Submit test results of assembly in accordance with ABAA test protocol.

1.4 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. Air/vapor barrier installers must be trained and certified by ABAA/NECA (National Energy Conservation Association) and PSDI (Professional Skills Development Institute for energy conservation) in accordance with the training requirements outlined in the ULC S705.2-02 Installation Standard. Installers shall have their photo-identification certification cards in their possession and available on the project site, for inspection upon request.

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. Preconstruction Meeting: Convene week prior to commencing Work of this section, in accordance with Section - Project Meetings.

E. 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. Apply air/vapor barrier in field-constructed mock-ups of assemblies specified in Section 04200 and Section 09253.
2. Apply air/vapor barrier in field-constructed mock-ups of assemblies specified in Section 01452, "Mock-Ups".

3. Construct typical exterior wall panel, 8 feet long by 8 feet wide, incorporating back-up wall, partial cladding, window and doorframe and sill, insulation, flashing, building corner condition, junction with roof system foundation wall and typical penetrations and gaps; illustrating materials interface and seals. All transition membranes and seals shall be installed per the manufacturer's system requirements.

F. Test mock-up for air and water infiltration to conform with Section 01400 - Quality Control, in accordance with ASTM E 783 and ASTM E1105.

G. Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed air and vapor barrier unless it has been inspected, tested and approved.

H. Protect people and materials from over-spray and contact with chemicals and gases.

1.5 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, expiration date, 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] [Consultant] if spillage occurs and start clean up procedures.

D. Clean spills and leave area as it was prior to spill.

E. Separate and recycle waste materials in accordance with Section [01355 - Waste Management and Disposal], and with the Waste Reduction Workplan.

F. Place materials defined as hazardous or toxic waste in designated containers.

G. Ensure emptied containers are sealed and stored safely for disposal away from children.

1.6 PROJECT CONDITIONS

A. Environmental Conditions: Apply air/vapor barrier within range of ambient and substrate temperatures recommended by air/vapor barrier manufacturer. Do not apply air/vapor barrier to a damp or wet substrate, unless the manufacturer specifically permits that for the product.

1. Do not apply air/vapor barrier in snow, rain, fog, or mist.
2. Do not apply air/vapor barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer.
3. The product shall not be installed after the expiry date printed on the label of each container. The product has a shelf life of 6 months from the date of manufacture.

1.7 WARRANTY

A. For sealant and membrane materials provide a 24 month warranty period.

B. Material Warranty: Provide the manufacturer's three year air/vapor barrier material warranty under provisions of Section.

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

PART 2 - PRODUCTS

2.1 MATERIALS & MANUFACTURERS

A. Sprayed polyurethane foam air barrier wall systems are manufactured on the jobsite by trained, certified contractor manufacturers. The Contractor, Manufacturer must be certified by the Air Barrier Association of America (ABAA) and provide trained certified mechanics with a demonstrated ability to manufacture air barrier system on project of similar size, scope and complexity.

Bob McFadden
Bel Air Foamed Insulation, Inc.
2133 N. Fountain Green Road
Bel Air, MD 21015
(410)838-5900
FAX (410)879-0287

Landon Royals
Royals Insulation
212-A Najoles Road
Millersville, MD 21108
(410) 729-0405
Fax (410) 729-0825

Temple Chappell
Procoat Applicators
PO Box 4366
Annapolis, MD 21403
(410)626-1546
Fax (410)295-6576
spfspec@aol.com

Bonnie Strickler
PUFF Inc.
1851 Gleco Mills Lane
Charlottesville, VA 22903
(434)977-0427
(434)977-0428
suzie@puffinc.com

1. Sprayed polyurethane foam material, when tested, shall meet the requirements of ULC S705.1-01 Standard for Thermal Insulation-Spray Applied Rigid Polyurethane Foam, Medium Density, Material- Specification.
2. A copy of an Evaluation Report (such as the CCMC Evaluation Report) or copies of the test reports from an accredited testing laboratory, for each physical property, indicating that the product meets the requirements of ULC S705.1-01 shall be made available upon request. A copy of either the evaluation report or the test reports shall be on file at the ABAA office.
3. Material containers shall be labeled with the Evaluation Report number of the evaluation agency.
4. Design R value as indicated in test report; minimum R6/inch.
5. Density as indicated in test report: 1.9 pounds per cubic foot.
6. Smoke development as indicated in test report ASTM E84-04; Flame spread index 25, Smoke Developed 400 orless tested at 3" thickness
7. Products that meet the preceding requirements:

   a. BASF Walltite® performance properties are used as the design standard or equal

B. AUXILIARY MATERIALS

1. Furnish auxiliary materials recommended by air/vapor barrier manufacturer for intended use and compatible with the air/vapor barrier.

2. Self-adhering modified asphalt/polyethylene flashing to counterflash metal flashings:

a. Bakor Blueskin® TWF.

3. Primer: Water based liquid primer for concrete, masonry, gypsum sheathing, wood, metal, and painted substrates;

   a. Aquatac® as manufactured by Bakor Inc.

4. Primer: Solvent based, VOC compliant primer for concrete, masonry, gypsum sheathing, wood, metal, and painted substrates;

   a. Blueskin® Primer by Bakor, Inc.

5. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes by SRAB air/vapor barrier manufacturer.

6. Stainless-Steel Sheet Flashing: ASTM A167, Type 304, soft annealed, with No. 2D finish; minimum, 0.0156 inch (0.4 mm) thick.

7. Transition Strip:. Self-adhering, smooth surfaced SBS modified bitumen membrane, nominal 40 mil thickness, width as required.

   a. Blueskin® SA as manufactured by Bakor Inc

8. Transition Strip Primer:

   a. Blueskin® Primer as manufactured by Bakor Inc.

9. Sheet Membrane Transition Strip Termination Sealant:

   a. Polybitume 570-05 by Bakor Inc.

10. Sheet Membrane Air Barrier Perimeter Seal to Windows, Doors, Curtainwall and Storefront systems: Non-reinforced, cured chloroprene polymer sheet (neoprene) complying with ASTM D2000 Designation 2BC415 to 3BC620, 50 to 65 mils (1.3 to 1.6 mm) thick.

    a. Adhesive: Typical contact-type adhesive used for fully-adhered membranes.
    b. Lap Sealant: Typical urethane or silicone lap and termination sealant used for membrane edges recommended by manufacturer.
    c. Termination bars and fasteners:
       1) Stainless steel, Aluminum bars, and stainless fasteners Galvanized steel.

11. Sheet Membrane Sheet Membrane Air Barrier Perimeter Seal to Windows, Doors, Curtainwall and Storefront systems: Low modulus silicone sheet; provide manufacturer's standard system consisting of precured low-modulus silicone extrusion, in sizes to fit widths indicated, combined with a neutral-curing low modulus silicone sealant for bonding extrusions to substrates.

    1. Pecora Sil-Span.
    2. Dow 1-2-3 or equal.

12. Provide sealants in accordance with Section 07900 - Joint Sealers. Comply with ASTM C920 and ASTM C920 classifications for type, grade, class, and uses

a. Silicone Sealant Type A: natural cure, low modulus, to seal sheet membrane flashing to polyethylene face of sheet rubberized-asphalt barrier and to seal between and to non-bituminous sheet systems.

1) Acceptable materials:
   a) Dow 790
   b) Pecora 864

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. Acceptable materials:
      - Zerodraft Foam Sealant.
      - Zerodraft Insulating Air Sealant
      Zerodraft (Division of Canam Building Envelope Specialists Inc.), 125 Traders Blvd. E., Unit # 4, Mississauga, ON, L4Z 2H3 Tel. 1-877-272-2626

3. Substrate Cleaner: Non-corrosive type recommended by sealant manufacturer compatible with adjacent materials.

C. EQUIPMENT

1. The equipment used to spray the polyurethane foam material shall be in accordance with ULC S705.2-02 and the equipment manufacturer's recommendations for specific type of application.
2. Equipment settings are to be recorded on the Daily Work Record as required by the ULC S705.2-02 Installation standard.
3. Each proportioner unit to supply only one spray gun.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions under which air/vapor barrier systems will be applied, with Installer present, for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

1. Do not proceed with installation until after minimum concrete curing period recommended by air/vapor barrier manufacturer.

2. Ensure that:

a. surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants
b. concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
c. masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.

3. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.
4. Notify Architect in writing of anticipated problems using air/vapor barrier over substrate.

3.2 SURFACE PREPARATION

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

B. Prime masonry, concrete substrates with conditioning primer when installing modified asphalt membrane transition membranes.

C. Prime glass-fiber surfaced gypsum sheathing an adequate number of coats to achieve required bond to transition membranes, with adequate drying time between coats.

D. Prime wood, metal, and painted substrates with primer recommended by membrane manufacturer.

E. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air/vapor barrier and at protrusions according to air/vapor barrier manufacturer's written instructions and approved tested system in accordance with ABAA air barrier testing protocol.

1. Verify that surfaces and conditions are suitable to accept work as outlined in this section.
2. Prior to commencement of work report in writing to the architect [consultant] any defects in surfaces or conditions that may adversely affect the performance of products installed under this section.
3. Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.
4. Examine joints before sealing to ensure configurations, surfaces and widths are suitable for spray polyurethane foam. Report in writing all defects stating the locations of joints deemed unacceptable for the application of the spray polyurethane foam.

3.3 PREPARATION

A. Protection:

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

B. Surface Preparation

1. Surfaces to receive foam insulation shall be clean, dry and properly fastened to ensure adhesion of the polyurethane foam to the substrate.
2. Ensure that all work by other trades that may penetrate through the air barrier system is in place and complete.
3. Ensure that surface preparation and any primers required conform to the manufacturers instructions.
4. Prepare surfaces by brushing, scrubbing. Scraping, or grinding to remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants which will affect adhesion

and integrity of the spray polyurethane foam. Wipe down metal surfaces to remove release agents or other non-compatible coatings, using clean sponges or rags soaked in a solvent compatible with the spray polyurethane foam. Ensure surfaces are dry before proceeding.

5. Install transition membranes to all applicable surfaces and ensure proper adhesion of the transition membranes to the substrate, capable of having spray polyurethane foam insulation.

6. Install counter-flashings"
   a. Metal: Mechanically fasten metal counter-flashings with screws at 8" (200 mm) o.c.
   b. Membrane: Cut into and uncover only 3" of siliconized release paper along one edge of the counter-flashing membrane. Adhere membrane flashing to the pre-primed substrate a minimum of 3" and roll firmly in place.

7. Ensure veneer anchors are in place.

C. APPLICATION:

1. Spray-application of polyurethane foam shall be installed in accordance with ULC S705.2-02 and the manufacturer's instructions.
2. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer and the ULC S705.2 Installation standard.
3. Apply in consecutive passes as recommended by manufacturer to thickness as indicated on drawings. Passes shall be not less than ½ inch and not greater than 2 inches.
4. Do not install spray polyurethane foam within 3 inches of heat emitting devices such as light fixtures and chimneys.
5. Finished surface of foam insulation to be free of voids and embedded foreign objects.
6. Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.
7. Trim, as required, any excess thickness that would interfere with the application of cladding/covering system by other trades.
8. Clean and restore surfaces soiled or damaged by work of the section. Consult with section of work soiled before cleaning to ensure methods used will not damage the work.
9. Do not permit adjacent work to be damaged by work of this section. Damage to work of this section caused by other sections shall be repaired by this section at the expense of the subcontractor causing the damage.
10. Complete connections to other components or repair any gaps, holes or other damage using material which conforms to ULC S710.1 Polyurethane Sealant Foam – One Component – Material or ULC S711.1 Polyurethane Sealant Foam – Two Components – Material and shall be installed in accordance with ULC S710.2 Polyurethane Sealant Foam – One component – Installation or ULC S711.2 Polyurethane Sealant Foam – Two Component – Installation, whichever is appropriate.

D. FIELD QUALITY CONTROL

1. Site Tests
   a. The Licensed Installer shall conduct daily visual inspection, adhesion/cohesion testing and density measurements as outlined by the ULC S705.2-02 Installation standard.
   b. The Licensed Installer shall complete the Daily Work Record and record all information required including the results of the testing. The Daily Work Record shall be kept on site for routine inspection. Copies of the Daily Work Record shall be forwarded to the owner or owner's representative upon request. Copies of the

Daily Work Record or monthly summaries shall be sent to the ABAA office on a monthly basis as required by the Quality Assurance Program.

c. Transition membranes shall be pull tested in accordance with the ABAA Quality Assurance Program requirements before installing the spray polyurethane air barrier material.

d. The costs incurred for daily testing and inspection by the Licensed Installer and the completion of the Daily Work Record shall be borne by the Licensed Contractor.

2. Inspection

a. Arrange for site inspections by ABAA. The cost of inspections shall be included in the bid provided by the Licensed Contractor.

b. The ABAA site-inspections shall verify conformance with the manufacturers instructions, the standard ULC S705.2-02 Installation standard, the ABAA Quality Assurance Program, and this section of the project specification.

c. Inspections and testing shall be carried out at 5%, 50% and 95% of completion. A written inspection report shall be forwarded to the architect, the owner's representative, the Contractor, and the ABAA-licensed installer within 3 working days of the inspection and test being performed. In the case of any deficiencies, the ABAA-licensed inspector may verbally advise the licensed installer at the time of the inspection.

d. If the inspection reveals any defects, the Licensed Contractor shall immediately rectify all such defects at his cost.

E. TOLERANCES

1. Maximum variation from indicated thickness: minus (-) ¼ inch; plus (+) ½ inch.

F. PROTECTION

1. Protect the spray polyurethane foam from ultraviolet radiation when installed on the exterior of a building.
2. Cover the spray polyurethane foam with a thermal barrier when installed on the interior of the building.

END OF SECTION 072110