SECTION  – vapour permeable air barrier membrane

1. General
   1. summary
      1. Supply labour, materials, plant, tools, and equipment to complete the Work as shown on the Drawings and as specified herein, including, but not limited to the following:
         1. Materials and installation methods of vapour permeable air barrier membrane system.
         2. Materials and installation methods to bridge and seal the following air leakage pathways and gaps:
            1. Connections of the walls to the roof air barrier. Connections of the walls to the foundations, seismic and expansion points, openings and penetrations of window frames, store front, and other envelope systems, door frames, piping, conduit, duct and similar penetrations, masonry ties, screws, bolts, and similar penetrations. All other leakage pathways in the building envelope.
      2. Related Requirements:
         1. Section 04 20 00 – Unit Masonry.
         2. Section 07 21 13 – Board Insulation.
         3. Section 07 21 16 – Blanket Insulation.
         4. Section 07 92 00 – Joint Sealants.
         5. Section 08 11 13.16 – Exterior Hollow Metal Doors and Frames.
         6. Section 08 36 13.13 – Metal Sectional Doors.
         7. Section 08 41 13 – Aluminum-Framed Entrances and Storefronts.
         8. Section 08 42 29 – Aluminum Entrance Sliding Doors.
         9. Section 08 44 13 – Glazed Aluminum Curtain Walls.
         10. Section 09 29 00 – Gypsum Board.
         11. Contractor shall be responsible for co-ordinating this Section with all related Sections.
   2. PERFORMANCE REQUIREMENTS
      1. Provide a vapour permeable air barrier constructed to perform as a continuous air and vapour barrier, and as liquid water drainage plane flashed to discharge any incidental condensation or water penetration.
      2. The building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, or out of the conditioned space.
      3. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
         1. Foundations and walls.
         2. Walls and windows or doors.
         3. Different wall systems.
         4. Wall and roof.
         5. Wall and roof over unconditioned space.
         6. Walls, floor and roof across construction, control, and expansion joints.
         7. Walls, floors and roof to utility, pipe, and duct penetrations.
         8. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.
   3. QUALITY ASSURANCE
      1. Work in this Section is to be carried out by a skilled applicator approved by manufacturer and in strict accordance with manufacturer's printed instructions. Upon request, provide written confirmation or certification from the vapour permeable air barrier manufacturer that the installer has been trained and is recognized by the manufacturer as suitable for the execution of the work.
      2. Perform Work in accordance with the manufacturer's written instructions of the air barrier membrane and this specification.
      3. Maintain one (1) copy of the manufacturer's written instructions on site.
      4. Compounds used in this Section shall be sourced from one (1) manufacturer, including sheet membrane, air barrier sealants, primers, mastics, and adhesives.
      5. Pre-Installation Conference:
         1. Convene a pre-installation conference two (2) weeks prior to commencing Work of this Section. Require attendance of parties directly affecting Work of this Section, including, but not limited to, the Owner's representative, Consultant, General Contractor, vapour permeable air barrier membrane contractor, vapour permeable air barrier membrane manufacturer's representative and substrate installer.
         2. Contact Consultant two (2) weeks prior to pre-installation conference to confirm schedule.
         3. Review preparation and installation procedures and co-ordinating and scheduling required with related work.
         4. Record discussions of conference and decisions and agreements (or disagreements) reached and furnish copy of record to each party attending. Review foreseeable methods and procedures related to the vapour permeable air barrier membrane, including the following:
            1. Tour, inspect and discuss condition of substrate, penetrations and preparatory work performed by other trades.
            2. Review surface preparation, minimum curing period and installation procedures.
            3. Review special details and flashings.
            4. Review required submittals, both completed and yet to be completed.
            5. Review and finalize construction schedule related to work and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
            6. Review required inspections, testing, protection, and repair procedures.
            7. Review weather and forecasted weather conditions, and procedures for coping with unfavourable conditions.
      6. Arrange for a Manufacturer's Representative to:
         1. Visit the site and discuss any special requirements, procedures, and unique conditions, prior to commencement of work.
         2. Inspect substrate surfaces and recommend solutions to accommodate adverse conditions.
         3. Periodically visit and inspect the installation and report unsatisfactory conditions to the Contractor.
         4. Attend final inspection and to submit written certification that the products, systems, and assemblies have been installed in accordance with the manufacturer's requirements.
      7. Inspection and Testing:
         1. Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed vapour permeable air barrier membrane until any required inspections, testing approvals have been completed.
   4. submittals
      1. Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
      2. Documentation:
         1. Prior to commencing the Work, submit documentation from an approved independent testing laboratory certifying that the air leakage and vapour permeance rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the NBC.
         2. Prior to commencing the Work submit copies of manufacturer's current ISO certification. Membrane, primers, sealants, adhesives and associated auxiliary materials shall be included.
         3. Prior to commencing the Work submit references clearly indicating that the membrane manufacturer/installer has successfully completed projects on an annual basis of similar scope and nature for a minimum of fifteen (15) years. Submit references for a minimum of ten (10) projects.
         4. Prior to commencing the Work submit manufacturer's complete set of standard details for the air barrier membrane system showing a continuous plane of air tightness throughout the building envelope.
         5. Prior to commencing work provide a material checklist, complete with application rates and minimum thickness of primary membranes.
      3. Shop Drawings:
         1. Show the locations and extent of the vapour permeable air barrier system including details of typical conditions, intersections with other envelope systems and materials, membrane counter-flashings and details showing how gaps in construction will be bridged and how miscellaneous penetrations such as conduits, pipes, etc. are sealed.
      4. Samples:
         1. Submit to Consultant for approval, samples of materials and components to be used in vapour permeable air barrier system, prior to fabrication of work together with name of manufacturer and technical literature. Submit 305mm x 305mm (12" x 12") samples of vapour permeable air barrier membrane.
      5. Safety Data Sheets:
         1. Submit WHMIS safety data sheets for inclusion with project record documents. Keep one copy of WHMIS safety data sheets on site for reference by workers.
   5. ENVIRONMENTAL CONDITIONS
      1. Vapour permeable air barrier membrane is not to be applied to surfaces that are either wet, oily, frosted, dirty or contaminated in any way.
      2. Maintain surface of substrates and ambient temperatures constantly between 38 degree C and 5 degree C during application and curing of primers and adhesives for flexible vapour permeable air barrier membrane flashings, except as permitted otherwise by Consultant in writing.
   6. DELIVERY, STORAGE, HANDLING AND PROTECTION
      1. Coordinate deliveries with construction schedule and arrange for proper storage areas.
      2. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.
      3. Store materials in a clean, dry, and protected area, off the floor or ground, in their original containers, sealed and undamaged. Manufacturer's labels are to be easily visible and undamaged. Store rolled materials on end.
      4. Store liquid membrane materials, adhesives, and primers at minimum 5 deg C, and store away from open flames, sparks and excessive heat as liquid membrane materials and primers are flammable because of solvent content.
      5. Care and precaution are to be exercised by the applicator so as not to damage the work of other trades. Applicator is responsible to take all necessary precautions to protect work of other trades during application.
      6. In addition to the above, store modified bituminous sheet type flexible vapour permeable air barrier membrane flashings as follows:
         1. Store rolls of membrane tape in accordance with manufacturers written instructions.
         2. Store materials away from direct heat or open flame.
         3. Store rolls away from direct sunlight until ready for use.
         4. For installation in cold weather, store rolls of membrane in heated storage trailer for minimum of 24-hours with the temperature kept at 21 deg C and remove for application with as little exposure as possible to low ambient temperatures.
      7. The vapour permeable air barrier membrane is not designed for permanent exposure but can be left exposed for up to a maximum of thirty (30) days. As soon as possible after the membrane has cured, protect vapour permeable air barrier membrane from damage by work of other Sections.
   7. WARRANTY
      1. Warrant the work of this Section against defects in materials and workmanship in accordance with the General Conditions, but for a period of two (2) years and agree to repair and replace faulty materials or work which becomes evident during the warranty period, without cost to the Owner. Provide the Owner with a written warranty to this effect.
2. Products
   1. materials
      1. Flexible Vapour Permeable Air Barrier Membrane:
         1. Type A or B may be used.
         2. Type A: Fluid applied, one component, elastomeric, water based, liquid polymer modified, asphaltic vapour permeable, membrane containing less than 100 g/l VOC.
            1. Basis of Design Product: AirBloc 31 by Henry Company Inc., or approved alternates by Tremco or Carlisle Coatings and Waterproofing.
         3. Type B: Sheet-applied, self-adhering vapour permeable membrane bonded with permeable adhesive layer and split-back poly-release film.
            1. Basis of Design Product: Blueskin VP160 by Henry Company Inc.
      2. Flexible Air Barrier Membrane Flashing Primer:
         1. Type A or Type B, as recommended by manufacturer to suit conditions.
         2. Type A: Solvent based, synthetic rubber adhesive type, quick setting, solvent based, roller consistency type primer.
            1. Basis of Design Product: Blueskin Primer by Henry Company Inc.
         3. Type B: Water based, polymer emulsion type.
            1. Basis of Design Product: Blueskin Aquaprime by Henry Company Inc.
      3. Flexible Air Barrier Membrane Flashings (Transition Flashings):
         1. 40 mils (1mm) thick x width to suit, strips of self-adhering, SBS rubberized asphalt laminated to a cross-laminated, high density polyethylene film with a siliconized release liner.
            1. Basis of Design Product: Blueskin TWF by Henry Company Inc.
         2. Supply additional flexible air barrier membrane flashings in sufficient quantities for steel lintels in masonry to Section 04 20 00 "Masonry."
      4. Reinforcing Fabric (Joint Treatment Mesh):
         1. 150mm (6") wide, open weave 20/10 mesh, glass fibre yarn saturated with synthetic resins, reinforcing fabric weighing minimum of 2.5 oz/sq.yd., and conforming to CGSB 37-GP-63M
            1. Basis of Design Product: Yellow Jacket 990-06 by Henry Company Inc.
      5. Air Barrier Sealant:
         1. High solids, high flexibility, polymer modified, rubberized asphalt type sealant, compatible to vapour permeable air barrier membrane and conforming to CAN/CGSB-37.29-M.
            1. Basis of Design Product: Polybitume Sealing Compound by Henry Company Inc.
      6. Substrate Cleaners:
         1. Petroleum spirits thinner or low flash petroleum spirits (mineral spirits) conforming to CAN/CGSB-1.4-2000, or xylene thinner (xylol) conforming to CAN/CGSB-1.49-M.
      7. Packing Insulation:
         1. Loose, glass fibre or mineral fibre insulation, 1.0 lbs./cu.ft. density, and conforming to CAN/CGSB-51.11.
3. Execution
   1. examination
      1. The installer shall examine conditions of substrates, areas, and other conditions under which the vapour permeable air barrier system will be applied for compliance with requirements.
      2. Verify that surfaces and conditions are ready to accept the Work of this Section. Surfaces shall be sound, dry, even, and free of oil, grease, dirt, excess mortar, or other contaminants. Concrete surfaces shall be cured and dry, smooth without large voids, spalled areas or sharp protrusions. Masonry joints shall be flush and completely filled with mortar, and all excess mortar sitting on masonry ties shall have been removed. Verify substrate is visibly dry and free of moisture.
      3. Notify the Consultant in writing of any discrepancies. Commencement of work or any parts thereof shall mean acceptance of the prepared substrate.
      4. Do not proceed with application of vapour permeable air barrier membrane when rain is expected within 16-hours.
   2. general
      1. Ensure continuity of the air seal throughout the scope of this Section.
      2. Components and membrane materials must be obtained as a single source from the membrane manufacturer to ensure total system compatibility and integrity.
      3. Install all materials in accordance with the manufacturer's written directions, unless otherwise specified herein.
   3. surface preparation
      1. Clean, prepare and treat substrates according to manufacturer's written instructions. Surfaces to be coated must be smooth, clean, dry, firm to the touch and free from oil, grease, dirt, excess mortar and other contaminants. Brushing and/or scraping of substrates may be required to adequately prepare surface. Thoroughly wash metal surfaces with mineral spirits or xylol and wipe dry with clean rags.
      2. Vapour permeable air barrier membrane is not to be applied over lightweight, cast-in-place concrete containing high moisture or certain curing compounds. Cast-in-place concrete should be cured for a minimum of two (2) weeks prior to application of vapour permeable air barrier membrane.
      3. Concrete surfaces shall be free of large voids and spalled areas. Fill all spalled concrete areas, form-tie holes/voids, and open mortar joints in concrete block with mortar to produce a smooth, even surface. Allow to cure properly before proceeding.
   4. JOINT AND PROTRUSION TREATMENTS
      1. Prepare only enough vapour permeable air barrier membrane compound as required for joint and protrusion treatments and can be used within compound's usable pot life. Mix vapour permeable air barrier membrane with a double blade agitator attached to a 13mm (1/2") drill in strict accordance with the manufacturer's written instructions.
      2. Exterior sheathing board inside/outside corners: Embed minimum 305mm (12") wide, continuous strip of reinforcing fabric in vapour permeable air barrier membrane, centred over corner.
      3. Fill joints up to 6mm (1/4") wide in exterior grade sheathing board and joints in between panels of exterior grade plywood with trowel application of vapour permeable membrane or mastic as recommended by manufacturer ensuring that joints are completely filled.
      4. Where joints in exterior grade sheathing board are over 6mm (1/4") wide, ensure joints are completely filled with a vapour permeable membrane or mastic and apply continuous flexible air barrier membrane flashing or mesh as specified herein, lapped a minimum of 75mm (3") and fully adhered to both sides of substrate.
      5. Where joints/cracks up to 6mm (1/4") wide occur in concrete or masonry, fill joints/cracks with a thick trowel application of vapour permeable air barrier membrane or mastic, ensuring that joints are completely filled.
      6. Where joints/cracks in concrete or masonry are over 6mm (1/4") wide, apply a vapour permeable membrane or mastic as recommended by manufacturer ensuring that joints are completely filled.
      7. Ensure continuity of air barrier membrane by working air barrier membrane over all exterior sheathing board fasteners and around all masonry ties and anchors and other items.
   5. APPLICATION - FLEXIBLE AIR BARRIER MEMBRANE FLASHINGS
      1. Apply primer to all substrate areas where flexible air barrier membrane flashings are to be applied. Apply primer using lambs wool roller at rate 100 sq.ft. to 300 sq.ft./gallon (2.044 to 6.131 sq.m./gallon) depending on porosity of substrates. Allow primer to "tack up" for approximately 30-minutes prior to application of flexible air barrier membrane flashings.
      2. Do not use solvent-based primer where it may be in contact with polystyrene insulation.
      3. Install flexible air barrier membrane flashings in strict accordance with the manufacturer's written instructions unless otherwise specified herein.
      4. Ensure a uniform, continuous air barrier effect. Where air barrier membranes are to be provided under other Sections, co-ordinate the work such that air barrier membrane continuity is achieved.
      5. Provide airtight seals at penetrations in flexible air barrier membrane flashings.
      6. Apply flexible air barrier membrane flashings to extend air barrier membrane at peripheries of the installation as required to facilitate joining and sealing of the air barrier provided in adjacent construction, lapping joints minimum of 75mm (3"), extending membrane onto adjacent concrete/metal substrates not less than 150mm (6"), centred over joints.
      7. Apply continuous flexible air barrier membrane flashings at expansion and deflection joints within framing members, lapping joints minimum of 75mm (3"), extending membrane onto adjacent concrete/metal substrates which have no applied air barrier not less than 150mm (6"), centred over joints.
      8. Flexible Weather Barriers:
         1. Provide continuous 457mm (18") side flexible weather barrier membrane in exterior masonry cavity walls at expansion joints.
         2. Install flexible weather barrier membrane to substrate with adhesive, in strict accordance with manufacturer's instructions.
         3. Loop down flexible weather barrier into expansion/control joints approximately two (2) times the width. Lap joints minimum 150mm (6") and seal. Ensure that flexible weather barrier lap joints which are looped into expansion /control joints are sealed with adhesive. Seal tops and bottoms of membrane barrier at change in construction to present continuous, uninterrupted flexible weather barrier.
         4. Pack joint with loose batt insulation with face of insulation down two (2) times the width of expansion from face interior wythe.
   6. APPLICATION - VAPOUR PERMEABLE AIR BARRIER MEMBRANE - LIQUID APPLIED
      1. Areas to receive vapour permeable air barrier membrane are as follows:
         1. Behind metal siding (exterior face of exterior wallboard).
         2. Prepare only enough vapour permeable air barrier membrane compound as can be used within compound's usable pot life. Mix vapour permeable air barrier membrane with a double blade agitator attached to a 13mm (1/2") drill in strict accordance with the manufacturer's written instructions.
         3. Apply vapour permeable air barrier membrane to substrates in a continuous coating at a rate of 27 to 45 litres/9.29 sq.m. (6 to 10 gal./100 sq.ft.) by roller, spray or trowel methods, producing a minimum wet film thickness of 70 wet mils (1.5mm).
         4. Ensure that application of vapour permeable air barrier membrane overlaps all flexible air barrier membrane flashings, dampproof course/thru-wall flashings a minimum of 75mm (3").
         5. Where masonry anchors pass through the air barrier membrane, ensure continuity of air barrier by applying vapour permeable air barrier membrane all around/over masonry anchors.
         6. Prior to masonry being installed by Section 04 20 00 – Unit Masonry, inspect vapour permeable air barrier membrane for punctures, voids, fish mouths and the like. Apply air barrier membrane sealant over damaged/affected areas, extending sealant minimum of 75mm (3") beyond damage in all directions.
   7. APPLICATION - VAPOUR PERMEABLE AIR BARRIER MEMBRANE - SHEET APPLIED
      1. Apply self-adhering water resistive air barrier membrane complete and continuous to substrate in an overlapping shingle fashion and in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.
         1. 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 75mm (3") overlap at all end and 50mm (2") side laps of subsequent membrane applications.
         4. Apply pressure to all membrane surfaces, laps and flashings using an appropriate roller to provide best possible surface adhesion.
   8. PROTECTION AND CLEAN-UP
      1. Protect membrane to avoid damage from other trades, and construction materials during subsequent operations.
      2. If the vapour permeable air barrier cannot be covered within thirty (30) days after installation, apply temporary UV protection such as dark plastic sheet or tarpaulins. Contact material manufacturer for further recommendations.
      3. Clean spillage and soiling on adjacent construction that will be exposed in the finished work using cleaning agents and procedures recommended by the manufacturer of the affected construction.
      4. Remove any masking materials after installation.
      5. Applicator is responsible for the removal of surplus and waste material incurred during application.
      6. Equipment and tools can be cleaned using mineral spirits or xylol.

END OF SECTION