

SPEC WRITERS NOTE: This specification includes materials and installation procedures for **WrapShield® IT** Integrated Tape Water-Resistive Vapor Permeable Air Barrier (AB) Water Resistive Barrier (WRB) Sheet Membrane meeting ASTM E2357 for air barrier assemblies. **WrapShield® IT** Integrated Tape sheet membrane is used behind ventilated Rainscreen cladding systems. With a vapor permeance rating of greater than 66.9 perms (3828 ng/Pa.s.m²) **WrapShield® IT** Integrated Tape Water-Resistive Vapor Permeable Air Barrier Sheet membrane prevents air leakage and allows the wall assembly to breathe or 'dry-out' as necessary to meet the conditions of seasonal changes for each climate zone. This guide specification should be adapted to suit the requirements of individual projects. It is prepared in CSI Master Format and should be included as a separate section under Division 7 - Thermal and Moisture Protection.

SECTION 072729

MECHANICALLY ATTACHED WATER-RESISTIVE AIR BARRIER MEMBRANE

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. This specification is applicable to all trades involved with substrates, preparation, application of water-resistive vapor permeable air barrier membrane and subsequent connections to surrounding construction materials. It is the [Contractors] [Construction Managers] responsibility to inform all trades the extent of their work associated with the membrane system and overlapping Work.
- B. Examine all Drawings and all Sections of the Specifications for requirements and provisions affecting the work of this Section.

1.2 DESCRIPTION OF WORK

- A. The work of this Section includes furnishing and installation of mechanically attached water-resistive vapor permeable air barrier membrane at exterior wall assemblies, at locations indicated on Drawings and elsewhere as noted and as required by code.
- B. The work of this Section also includes furnishing and installation of flashing membranes to bridge gaps, for transition areas around windows, curtain wall, louvers, roof to wall interface and elsewhere as indicated or required by code to provide a continuous air barrier assembly. Locations include, but are not limited to, the following:
 - 1. Connection of the walls to the roof membrane
 - 2. Connections of the walls to the foundations
 - 3. Seismic and expansion joints
 - 4. Openings and penetrations of window and door frames, store front, curtain wall
 - 5. Piping, conduit, duct and similar penetrations
 - 6. Masonry ties, screws, bolts and similar penetrations
 - 7. All other air leakage pathways in the building envelope
- C. Provide material and work of this Section required to complete mock-up panel(s). Refer to exterior elevations for extent of mock-up panels.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Carefully examine all of the Contract Documents for requirements which affect the work of this section.
- B. Other specifications sections which directly relate to the work of this section include, but are not limited to, the following:
 - 1. Section 042000 - Unit Masonry: Masonry units used as non-load bearing walls or partitions, veneer, and cavity unit masonry construction, including related accessories.
 - 2. Section 061600 - Sheathing
 - 3. Section 072100 - Building Insulation and Vapor Barriers
 - 4. Section 074263 - Composite Metal Panels
 - 5. Section 075300 - Thermoplastic Membrane Roofing System
 - 6. Section 078100 - Spray Applied and Board Fireproofing
 - 7. Section 078400 - Firestopping
 - 8. Section 079200 - Joint Sealants
 - 9. Section 082630 - Aluminum-Clad Sliding Doors
 - 10. Section 084100 - Aluminum Entrances and Storefront System.
 - 11. Section 089116 - Louvers and Grilles
 - 12. Section 092116 - Gypsum Board Assemblies

1.4 REFERENCE STANDARDS

- A. The American Association of Textile Chemists and Colorists (AATCC) - Test Method for Water Resistance: Hydrostatic Pressure Test.
- B. American Society of Civil Engineers: ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International (ASTM):
 - 1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
 - 2. ASTM D828 – Standard Test Method for Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus.
 - 3. ASTM D5034 – Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test).
 - 4. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 5. ASTM E96/96M – Standard Test Methods for Water Vapor Transmission of Materials.
 - 6. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - 7. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
 - 8. ASTM E398 - Standard Test Method for Water Vapor Transmission Rate of Sheet Materials Using Dynamic Relative Humidity Measurement.
 - 9. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
 - 10. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

- D. International Code Council Evaluation Service, Inc. (ICC-ES): ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers.
- E. CDPH/EHLB Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers Version 1.2.
- F. National Fire Protection Association (NFPA) 285: Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components.

1.5 SUBMITTALS

- A. Submit manufacturers' current product data sheets, details and installation instructions for the water-resistive vapor permeable air barrier membrane components and accessories.
 - 1. Manufacturer's sample warranty.
- B. Submit samples of the following:
 - 1. Manufacturer's sample warranty.
 - 2. Water-resistive vapor permeable air barrier sheet, minimum 8 by 10 inches (203 by 254 mm).
 - 3. Accessory components.
 - 4. Membrane flashing products.
 - 5. Cladding and window system flashing components which interface with air barrier system (i.e. rigid metal head flashing above windows) minimum 10" length.
 - 6. Fasteners, clips, strapping, cladding attachment fasteners and masonry ties.
 - 7. Sealants (included by others) required to provide a complete air barrier membrane system.

Delete section C if not pursuing LEED certification.

- C. LEED Submittals:
 - 1. Integrative process [IP] has a 1 pt. potential. VaproShield encourages this through preconstruction planning, for 'building envelope attributes'.
 - 2. Energy and Atmosphere [EA].
 - a. Minimum Energy requirement prerequisite and performance points – by providing a complete air barrier system: up to 18 pts.
 - b. Commissioning (i.e. BECx): Energy load reductions, Indoor Environmental Quality, and longevity of building components which are required to satisfy the prerequisite if commissioning / verification for building envelope is chosen as a path prior to DD. Envelope Commissioning may qualify for additional 2 pts, on top of the 4 pts via building energy simulation (enhanced commissioning), or complying with the prescriptive paths in ASHRAE 90.1-2010
 - 3. Indoor Environmental Quality [IEQ/EQ]].

- a. As part of IAQ Management plan for construction phase which protects building from moisture infiltration, WrapShield IT can help provide an additional 1 pt.
 - b. Low-emitting Material Credits: up to 3 pts. WrapShield IT complies with exterior product (emission req. exempt) requirements and VOC limits per SCAQMD Rule #1168 (as published Sept. 2017).
 - 1) All window sealant and flashing materials to interior pass CDPH/EHLB/Standard Method V1.2 (Sect. 01350) for VOC's after 14 days cure time.
4. Awareness and Education [AE] and/or Innovation [IN/ID]
- a. Applies to projects which offer both a case study and educational outreach program, which use the project as an example. 1 pt. available.

1.6 QUALITY ASSURANCE

- A. Single Source: Obtain self-adhered water-resistive vapor permeable air barrier membrane components and accessories from a single-source membrane system manufacturer to ensure total system compatibility and integrity.
- B. Manufacturer Qualifications:
1. Company specializing in manufacturing and supply of highly vapor permeable water resistive air barrier products specified in this Section with minimum [10] ten years' experience and successful installations in similar project applications.
 2. Provide manufacturer's experienced in-house technical and field observation personal qualified to provide technical support.
- C. Applicator:
1. Company specializing in performing Work of this Section with minimum [3] three years' experience.
- D. Fire Performance Characteristics: Provide water-resistive barrier meeting the following fire-test characteristics.
1. Surface-Burning Characteristics: ASTM E84
 - a. Flame spread index: 0 or less
 - b. Smoke developed index: 55 or less

1.7 MOCK-UP

- A. Construct mock-up in accordance with Section 01 43 39 - Mock-up, or as specified under General Requirements Section 01 10 00.
- B. Provide mock-up of specified water-resistive vapor permeable air barrier materials under provisions of Section 01 33 23 - Shop Drawings, Product Data and Samples.

Generally, retain first subparagraph below if requiring preconstruction testing.

1. Coordinate construction of mockups to permit inspection and testing of air barrier and drainage place along with interfacing window, flashing and cladding system components, before external insulation and cladding are installed.

1.8 PRE-INSTALLATION CONFERENCE

- A. Provide a pre-installation conference [two] week prior to commencing work of this section, under provisions of Section 01 31 19 - Project Meetings or as specified under General Requirements Section 01 10 00.
- B. Ensure all contractors responsible for creating a continuous plane of water and air tightness are present.
- C. Agenda includes the following:
 - 1. Review of approved submittals.
 - 2. Review of mock-ups.
 - 3. Coordination with sequence of installation with adjacent materials.
 - 4. Schedule for subsequent work covering air barrier.
 - 5. Procedures for quality assurance.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Refer to current Product Data Sheet, Installation Instructions and Safety Data Sheets (SDS) at www.vaproshield.com for proper storage and handling.
- B. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.
- C. Store roll materials on end in original packaging. Protect rolls from direct sunlight and inclement weather until ready for use.
- D. Waste Management and Disposal
 - 1. Separate and repurpose or recycle waste materials in accordance with Section [01 74 19 Construction Waste Management and Disposal], and with the Waste Reduction Work Plan.

1.10 COORDINATION

- A. Ensure shingled lapping and continuity of the fully self-adhered water-resistive vapor permeable air barrier system throughout the scope of this section.
 - 1. Provide WrapShield IT Integrated Tape membrane including transition membranes, WrapFlashing SA self-adhered flashing and sealants at penetrations. Provide flashing which includes WrapFlashing SA™ and VaproLiqui-Flash™ by VaproShield, a liquid-applied vapor permeable air barrier flashing material.
 - 2. At locations indicated provide unimpeded vertical drainage plane that include ventilated drainage cavity, mechanically attached air and water barrier and flashings to the exterior.
 - 3. Coordinate for optimal sequencing with all related or interfaced building components and trades to facilitate best practices including: shingle-fashion, drainage, water-tightness, and air barrier continuity.

1.11 WARRANTY

- A. Provide manufacturer's standard material warranty in which manufacturer agrees to provide replacement material for the fully self-adhered water-resistive vapor permeable air barrier sheets installed in accordance with manufacturer's instructions that fail due to material defects within [20] twenty years from the date of substantial completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide a mechanically attached water-resistive vapor permeable air barrier membrane components and accessories obtained from a single-source manufacture to ensure total system compatibility and integrity.
- B. Water-Resistive Vapor Permeable Mechanically Attached Air Barrier Materials.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide air barrier sheet membrane WrapShield IT Water-Resistive Vapor Permeable Air Barrier Sheet as manufactured by VaproShield, a zero VOC vapor permeable air barrier sheet membrane consisting of a multiple layers of spunbonded polypropylene with integrated tape strips. Provide sheet membrane tested in accordance with ICC-ES AC 308 criteria to meet IBC and IRC requirements for weather resistive barriers having the following properties:

- a. Color: Orange with allowable UV exposure for 180 days, prior to coverage.
- b. Dry Tensile strength and Elongation tested to ASTM D828: 38.6 lbf/in (6.76 N/mm), machine direction; 23.2 lbf/in (4.08 N/mm), cross-machine direction.
- c. Dry Tensile Strength tested to ASTM D882: Control 50.8 lbf/in (9.89 N/mm), UV exposure 46.6 lbf/in (8.16 N/mm), UV + heat exposure 46.6 lbf/in (8.16 N/mm).
- d. Dry Breaking strength and Elongation tested to ASTM D5034: 129.8 lbf (577.2 N), machine direction; 429.1 lbf (96.47 N), cross-machine direction.
- e. Water Vapor Permeance tested to ASTM E96 water method, procedure B: minimum of 66.9 perms (3828 ng/Pa•s•m²).
- f. Water Vapor Permeance tested to ASTM E398: minimum of 71.91 perms (4114 ng/Pa•s•m²).
- g. Air Leakage: 0.0001 cfm/ft² @ 1.57 psf (0.0004 L/s m² @ 75 Pa) when tested in accordance with ASTM E2178.
- h. Air Leakage: <0.01 cfm/ft² @ 1.57 psf (<0.01 L/s•m² @ 75 Pa) when tested in accordance to ASTM E2357.
- i. Water Resistance tested to AATCC 127, 550 mm hydrostatic head for 5 hours: No leakage.
- j. Air Leakage Rate, Classification A1-PASS when tested in accordance to CAN/CGSB 51.32.
- k. Application Temperature: Ambient temperature must be above 20 °F (minus 6 °C).
- l. Surface Burning Characteristics tested to ASTM E84: Class A, Flame-Spread index of less than 0, Smoke-Developed index of less than 55.
- m. Physical Dimensions: WrapShield IT: 22 mil (0.56 mm) thick, 59 inches (1.5 m) wide, 164 feet (50 m). 190.7 g/m² (5.62 oz/yd²) membrane weight.

C. Water-Resistive Vapor Permeable Transition and Flashing Membrane

- 1. Provide self-adhered air barrier transition and flashing membrane for all window jambs, headers, door openings and other transitions. Provide pre-cut WrapFlashing SA by VaproShield. WrapFlashing SA is a zero VOC fully self-adhered water-resistive vapor permeable sheet membrane having the following properties:

- a. Color: Orange with allowable UV exposure for 180 days, prior to coverage.
- b. Dry Tensile Strength tested to ASTM D828: MD - 6.1 N/mm (34.8 lbf/in).
- c. Breaking strength and Elongation tested to ASTM D5034: 88 lbf (391 N), machine direction; 83 lbf (369 N), cross-machine direction.
- d. Water Vapor Permeance tested to ASTM E96 water method, procedure B: minimum of 50 perms (2861 ng/Pa•s•m²).
- e. Water Vapor Permeance tested to ASTM E398: minimum of 52.57 perms (3008 ng/Pa•s•m²).
- f. Air Leakage: ≤0.00002 cfm/ft² @ 1.57 psf (≤0.0001 L/s m² @ 75 Pa) when tested in accordance with ASTM E2178 and <0.01 cfm/ft² @ 1.57 psf (<0.01 L/s m² @ 75 Pa) when tested in accordance with ASTM E2357. Meets Air Barrier Association of America (ABAA) requirements.
- g. Water Resistance tested to AATCC 127, 550 mm hydrostatic head for 5 hours: No leakage.
- h. Application Temperature: Ambient temperature must be above 20 °F (minus 6 °C).
- i. Surface Burning Characteristics tested to ASTM E84: Class A, Flame-Spread index of less than 5, Smoke-Developed index of less than 15.
- j. Physical Dimensions: WrapShield SA: 23 mil (0.57 mm) thick, 59 inches (1.5 m) wide, 102 feet (31.1 m). 250 g/m² (7.37 oz/yd²) membrane weight.

SPEC WRITERS NOTE: Best practice guidelines are the horizontal application of WrapShield IT on surfaces clean of oil, or other contaminants, fastened above the upper Integrated Tape area using stainless-steel staples or/and additional field fastening using VaproCaps™ with the appropriate fastener into structural members to ensure water/air tight seal. VaproBond is used to seal the vertical overlaps to insure water and air tightness. If VaproCaps are used for field fastening spacing should decrease at higher elevations and in areas with high winds.

Rough opening flashing system includes: WrapFlashing SA and VaproLiqui-Flash™ or as alternates, VaproBond™ or Vapro-SS Flashing™. A single component alternative can be BlockFlashing™.

- D. VaproLiqui-Flash and WrapFlashing SA Vapor Permeable Water Resistive Flashing For Rough Openings
1. Window and door pre-cut WrapFlashing SA includes VaproLiqui-Flash by VaproShield, a liquid-applied vapor permeable air barrier flashing material with vapor permeance and resistance to air leakage properties compatible with the primary air barrier membrane.
 - a. Pass: CDPH/EHLB/Standard Method V1.2 (Sect. 01350) VOC test.

SPEC WRITERS NOTE: Best construction practice for wood frame construction is to protect the jamb of rough openings with the two-part system of WrapFlashing SA and vapor permeable VaproLiqui-Flash to allow vapor diffusive drying, reducing the risk of wood deterioration. Alternatively, for steel stud frame construction with gypsum sheathing surfaces VaproBond, Vapro-SS Flashing or the single component BlockFlashing may be used to protect the head, jamb and sill of rough openings.

VaproShield's self-adhered membranes incorporate a pressure sensitive adhesive (PSA) that requires pressure rolling to activate the adhesion.

E. Alternate Flashing Products

1. VaproBond flashing: water impermeable low vapor permeance flashing for rough openings.
 - a. Include VaproBond by VaproShield, a modified silicone sealant, at window and door locations.
 - 1) VaproBond: 20-ounce (592 ml) sausage.
 - 2) Elongation: 1,500 % when tested in accordance with ASTM D412.
 2. Vapro-SS Flashing water and vapor impermeable flashing for rough openings.
 - a. Include Vapro-SS Flashing by VaproShield, a flexible 10.2 mil (0.05 mm) stainless steel sheet with an 8 mil (0.20 mm) butyl adhesive backing at window and door locations.
 - b. Vapro-SS Flashing: 6, 12, or 18 inches (15.2, 30.5, 45.7 cm) x 50 feet (15.24 m) long.
 - 1) Tensile Strength/Puncture: 100,000 psi when tested in accordance with ASTM D882 and 2,500 psi when tested in accordance with ASTM E154.
 3. BlockFlashing™ a self-adhered, water and vapor barrier flashing single component for rough openings: 6 ½", 11 ¾", 14 ¾" (16.5 cm, 30 cm, 37.5 cm).
 - a. Include BlockFlashing by VaproShield, a flexible 2 mil (0.26 mm) polypropylene sheet with an acrylic adhesive backing at window and door locations.
- F. Through-Wall Flashing
1. Through-Wall flashing includes Vapro-SS Flashing by VaproShield, a flexible 2 mil (0.05 mm) stainless steel sheet with an 8 mil (0.20 mm) butyl adhesive backing which includes a VaproTermination Bar™ when the top section of the Vapro-SS Flashing is exposed.
 - a. Vapro-SS Flashing: 6, 12, or 18 inches (15.2, 30.5, 45.7 cm) x 50 feet (15.24 m) long.
 - b. Tensile Strength/Puncture: 100,000 psi when tested in accordance with ASTM D882 and 2,500 psi when tested in accordance with ASTM E154
 - c. VaproTermination Bar: 8 feet (2.4 m) long x 1 inch (25 mm) wide x 1/8th inch (3 mm) thickness, UV-resistance rigid thermoplastic extrusion, prepunched with elongated nail/screw penetrations on 1-inch centers as required for installation.
- G. Transition Flashing
1. Transition flashing includes VaproSilicone Transition™ Sheet by VaproShield, a flexible 80 mil (2 mm) extruded silicone sheet.

- a. VaproSilicone Transition Sheet: 4, 6 or 9 inches (10.2, 15, 23 cm) x 50 feet (15.24 m) long.
- b. Dynamic Movement Capability: +200 / -50 % when tested in accordance to ASTM C1523.
- c. Elongation: 400 % when tested in accordance to ASTM D412.
- d. Tensile Strength: 295 psi (2.03 MPa) when tested in accordance with ASTM D412.
- e. Tear Strength: 20 ppi (3.5 N/mm) when tested in accordance to ASTM D624.

2.2 PENETRATION SEALANT

- A. Provide sealant for penetrations as recommended by manufacturer and as specified under Division 07 Section: Sealants. Appropriate sealants shall be VaproBond or VaproLiqui-Flash.

PART 3 - EXECUTION

3.1 GENERAL

- A. Verify that surfaces and conditions are ready to accept the work of this section. Notify [Envelope Consultant] [Engineer] [Architect] [Construction Manager] in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrates.
- B. All surfaces must be free of oil, grease, excess mortar or other contaminants detrimental to the application of the water resistive air barrier membrane and flashings. Fill voids and gaps in substrate greater than $\frac{7}{8}$ inch (22 mm) in width to provide an even surface. Strike masonry joints full-flush. Tool sheathing joints filled with sealant materials so that no sealant is spread onto the exterior surface of the sheathing. Remove any sealant products from sheathing surface prior to installation of air barrier membrane.
- C. Ensure all preparatory work is complete prior to applying the vapor permeable air barrier sheet membrane.
- D. Set flush with sheathing, any mechanical fasteners used to secure sheathing surfaces or that penetrate sheathing surfaces. Provide fasteners secured into solid backing and covered with the upper overlapping membrane. If VaproCaps are not used and alternative fasteners are exposed on the surface of the membrane, cover and seal with VaproLiqui-Flash or VaproBond.
 - 1. Seal the vertical overlaps with VaproBond to insure air and water tight seams.
- E. If exposed fasteners are required, use VaproCaps™ with the appropriate fastener into structural members to ensure water/air tight seal.

3.2 COORDINATION OF SELF-ADHERED VAPOR PERMEABLE AIR BARRIER MEMBRANE INSTALLATION

- A. Download Installation Instructions at <http://vaproshield.com/public-documents/installation-instructions>.

B. Installation Summary:

1. Mechanically attached vapor permeable air barrier sheets is installed horizontally over the outside wall face of exterior sheathing board or other approved substrates.
2. Complete detail work at; wall openings, building transitions and penetrations prior to field applications allowing for shingle laps with release film temporarily left in place as needed.
3. Install mechanically attached vapor permeable air barrier sheet over the outside face of exterior sheathing board or substrate, measure and pre-cut into manageable sized sheets to suit the application conditions.
4. Install mechanically attached vapor permeable air barrier sheet complete and continuous to substrate in a sequential minimal 6 inches (15.2 cm) horizontal overlapping weatherboard and 12 inches (30.48 cm) minimum vertical overlaps.
5. Stagger all end lap seams a minimum of 12 inches (30.48 cm) and seal the overlaps with VaproBond.

3.3 BUILDING TRANSITION CONDITIONS

- A. Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials with self-adhering air barrier transition and flashing membrane.
- B. Align and position mechanically attached air barrier transition and flashing membrane. Provide minimum 12 inches (30.48 cm) lap on to substrates.
- C. Ensure minimum 12 inch (30.48 cm) overlap at side and end laps of membrane and 6 inch (15.2 cm) at inside and outside corners, if joints occur at corner locations.

3.4 MECHANICAL EQUIPMENT PENETRATIONS

- A. Mechanical pipe, electrical conduit and/or duct work must be secured solid into position prior to installation of mechanically attached vapor permeable air barrier membrane.
- B. Electrical services penetrating the wall assembly and mechanically attached vapor permeable air barrier membrane must be placed in appropriate conduit and secured solid into position.
- C. Install manufactured flanged penetration sleeves as recommended by sleeve manufacturer.
- D. For straight sided penetrations, cut and fit mechanically attached vapor permeable air barrier to accommodate sleeve, install VaproLiqui-Flash or VaproBond to seal the air barrier membrane to ductwork or preformed flange sleeve.
- E. For pipe penetrations, refer to manufacturer's standard details.

3.5 WINDOW, DOOR AND OTHER WALL OPENINGS

- A. Two-part flashing system; WrapFlashing SA and VaproLiqui-Flash, or as alternate, VaproBond, Vapro-SS Flashing or BlockFlashing by VaproShield around window or wall rough openings subject to the opening size and installation of window, door or louver type.

1. WrapFlashing SA transition and flashing membrane installed 2¾ inch (70 mm) into rough wall openings for the sill, jambs and head.
 2. Remove release film, align flashing membrane and apply pressure to ensure positive contact. Roll lap seams to ensure adhesion. For the sill installation, leave the release film on the section that will overlap the field membrane. Provide lap seams in singled fashion, to shed water.
 3. VaproLiqui-Flash Vapor Permeable Water Resistive Flashing For Rough Openings:
 - a. Liquid-applied window and door flashing shall be VaproLiqui-Flash by VaproShield, a liquid-applied vapor permeable air barrier flashing material with resistance to moisture and air leakage properties compatible with the primary weather resistant air barrier membrane.
 - b. Apply a 12-15 wet mil (0.030-0.038 mm) coating onto the installed WrapFlashing SA, 1-inch (25.4 mm) onto the face continuing into the rough opening, covering the 2 ¾ inch (70 mm) WrapFlashing SA and the exposed rough opening surface.
- B. Through-Wall Flashing membrane
1. Apply through-wall self-adhered flashing membrane along the base of masonry veneer walls and over shelf angles as detailed by designer.
 - a. Press membrane firmly into place, overlap minimum 3 inches (76 mm) at all laps. Promptly roll all surfaces using a hand roller to ensure good adhesion.
 - b. Applications shall form a continuous flashing membrane and shall extend up a minimum of 8 inches (20 cm) up the back-up wall.
 - c. Seal the top edge of the membrane where it meets the substrate using VaproBond. Trowel-apply a feathered edge to seal termination to shed water or install VaproTermination Bar and VaproBond sealant at the top edge.
 - d. Install through-wall flashing membrane ½ inch (13 mm) from outside edge of veneer. Provide “end dam” flashing as detailed by designer.

SPEC WRITERS NOTE: Rough opening flashing system includes two components. WrapFlashing SA Self-Adhered flashing and VaproLiqui-Flash or as Alternates, VaproBond Flashing or Vapro-SS Flashing. VaproBond Flashing, Vapro-SS Flashing and BlockFlashing™ are optional replacements for flashing system or in addition to VaproLiqui-Flash.

- C. Optional VaproBond flashing water impermeable low vapor permeance flashing for rough openings
1. Fluid applied membrane for window and door flashing shall be VaproBond by VaproShield, a low vapor permeable, air and water barrier flashing material, replaces VaproLiqui-Flash. (Not recommended for wood framing.)
 2. Apply VaproBond Flashing, 30-50 wet mil (0.76 - 1.27 mm) coating, 1-inch (25 mm) onto the face continuing into the rough opening, covering the 2¾ inch (70 mm) PanelFlashing and the exposed rough opening surface.
- D. Optional Vapro-SS Flashing Vapor Impermeable flashing for rough openings
1. Self-Adhered stainless-steel membrane for window and door flashing shall be Vapro-SS Flashing by VaproShield, an impermeable air and water barrier

- flashing material, replaces VaproLiqui-Flash. Not recommended for wood framing.
2. Apply Vapro-SS Flashing, 1-inch (25 mm) onto the face continuing into the rough opening, covering the 2 ¾ inch (70 mm) PanelFlashing and the exposed rough opening surface.
- E. Optional BlockFlashing Impermeable flashing for rough openings.
1. Self-adhered, water and vapor barrier flashing for rough openings: 6½ inch (17 cm), 11 ¾ inches (30 cm), or 14¾ inches (37 cm) wide x 100 feet (30.5 m) long.
 2. Include BlockFlashing by VaproShield, a flexible 2 mil (0.26 mm) polypropylene sheet with an acrylic adhesive backing at window and door locations.

3.6 HORIZONTAL APPLICATIONS

- A. For horizontal applications, align sheets and begin installation of water-resistive weather barrier at bottom or lowest point of wall for proper lapping to shed water.
- B. To avoid wrinkles and misalignment of subsequent applications, it is recommended to pre-mark or "Snap" a level line to work from.
- C. Measure and pre-cut into manageable sized sheets to suit the application conditions.
- D. Allow for excess material at bottom of wall to accommodate tie-ins and connections to adjacent surfaces.
- E. Align and position mechanically attached membrane and fasten at above the upper integrate tape. Provide minimum 12 inches (30.48 cm) overlap at all side and end laps of membrane. Place additional VaproCaps in the exposed field as needed.
- F. Install subsequent sheets of mechanically attached vapor permeable air barrier sheets in a "shingle fashion" with the upper courses lapped on top of the courses below, use the dotted line provided at 6" below the top edge. Ensure sheets lay smooth and flat to surfaces. Remove the release film and immediately roll the integrated tape horizontal seams with floor roller to ensure full contact to prevent moisture and air infiltration.
- G. Refer to <http://vaprosshield.com/installation/instructions> for the most current and complete installation instructions.

3.7 FASTENING CLIPS AND MASONRY TIES

- A. Install clips and masonry ties over primary mechanically attached vapor permeable air barrier membrane.
- B. Secure clips and masonry ties with corrosion-resistant, or stainless-steel screws with gasketed fasteners.
- C. Consult VaproShield Technical Services for recommendations on fastener treatments for rainscreen screen cladding attachment components by others.

3.9 FIELD QUALITY CONTROL

- A. Make notification when sections of work are complete to allow review prior to covering mechanically attached water-resistive vapor permeable air barrier system.
- B. Owner to engage independent consultant to observe substrate and membrane installation prior to placement of cladding system(s) and provide written documentation of observations.

3.10 PROTECTION

- A. Protect wall areas covered with mechanically attached water-resistive vapor permeable air barrier from damage due to construction activities, high wind conditions, and up to 6 months extended exposure to inclement weather.
- B. Review condition of mechanically attached water-resistive vapor permeable air barrier prior to installation of cladding. Repair, or remove and replace damaged sections with new membrane.
- C. Recommend to cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed mechanically attached water-resistive vapor permeable air barrier installations.
- D. Remove and replace water-resistive weather barrier membrane affected by chemical spills or surfactants.

END OF SECTION