

This guide specification section is intended for editing where the basis of design product is the **3M™ Air and Vapor Barrier 3015NP and 3M™ Air Barrier with Permeable Backing 3015VP** by 3M Company.

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Whether it's new construction, renovation, demolition, or clean-up, 3M™ has a wide range of innovative solutions for the building and construction industry to improve safety, productivity, and efficiencies through each stage of the project. Our high performing products utilizing 3M's advanced acrylic adhesive technology can be used for a variety of applications and are all backed by expert support.

Climate control is about more than personal comfort. Leaks, mold, high energy consumption, low air quality: the flow of air, moisture, and heat can have a costly impact on the health of the building and its components. We offer building envelope solutions that are tough on the job and easy on the applicator. Learn how we can help protect your products and your profits.

Air barriers are essential elements of new building construction. Air naturally moves from warm to cold areas, and moisture moves from humid to dry areas. In walls without air barriers, uncontrolled movement can result in condensation of moisture on cold surfaces. Uncontrolled flow of air and moisture can harm the long-term performance and durability of your building materials, decrease indoor air quality, lower energy efficiency, and affect the health of your building and its occupants.

## SECTION 072700 - AIR BARRIERS

### 1. GENERAL

#### 1. SUMMARY

##### A. Section Includes:

1. Self-adhering [**vapor permeable**][**vapor retarding**] air barrier membrane.

#### 2. PREINSTALLATION MEETING

- ##### A. Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>.

Retain and edit subparagraphs below for large or complex projects. Retain and add only those subparagraphs that are project specific. Delete these subparagraphs if this information is covered in Section 013100 "Project Management and Coordination."

1. Meet with Owner, Architect, Installer, air barrier membrane manufacturer's representative, and installers whose work interfaces with or affects air barrier.

2. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.
3. Additional Attendees:
  - a. Air barrier assembly installer.
  - b. Representatives of related trades including exterior cladding, air barrier substrate, penetrating work and systems, and adjacent material.
  - c. General Contractor.
  - d. Architect/Engineer.
  - e. Air barrier system manufacturer's field representative.
  - f. Owner's representative.
  - g. Third-party observer.
  - h. Field testing agency.
4. Additional Agenda Items:
  - a. Construction of the mock-up.
  - b. Sequence of construction and protection of installed air barrier assembly.
  - c. Substrate condition and preparation.
  - d. Materials approved for use.
  - e. Compatibility of materials.
  - f. Transition details between the various different types of barrier systems specified.
  - g. Coordination with installation of adjacent and cladding materials.
  - h. Project-specific details of construction.
  - i. Field observation and testing.
  - j. Repair of test and damaged areas.

### 3. ACTION SUBMITTALS

#### A. Product Data:

1. Air barrier membrane.
2. Primers.

3. Accessories.

Delete LEED if not required.

B. LEED Submittals:

1. Product Data for Credit IEQ 4.2: For air-barrier products, documentation including printed statement of VOC content.

C. Shop Drawings:

1. Location and extent of air barriers.
2. Termination conditions.
3. Gap [**and expansion joint**] bridging.
4. Interface and other assemblies and materials.
5. Outside [**and inside**] corners.
6. Penetration sealing.

4. INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Manufacturer's Certificates: Certify air barrier membrane chemical and adhesive compatibility with adjacent and contacted materials.
- C. Sample Warranty: For manufacturer's warranty.

5. CLOSEOUT SUBMITTALS

- A. Warranty Documentation: For air barrier.

6. QUALITY ASSURANCE

Include in this Article prerequisites, standards, limitations, and criteria that establish an overall level of quality for products and workmanship. Include only those quality-assurance provisions that affect all Work of this Section.

Quality assurance measures that take place only in the factory or shop should be specified in Part 2 – Products.

Quality assurance measures that take place only on the project site should be specified in Part 3 – Execution.

- A. Single Source Responsibility: Provide primary air barrier materials from a single manufacturer. Secondary and accessory materials by other manufacturers shall be approved for compatibility by the primary manufacturer.
- B. Manufacturer Qualifications: Minimum 10 years of experience manufacturing similar products.
- C. Installer Qualifications: Minimum 5 years of experience installing similar products and approved by the manufacturer.
- D. Testing Laboratory Qualifications: Accredited by the International Accreditation Service (IAS), American Association for Laboratory Accreditation (A2LA), or Standards Council of Canada (SCC).

Include a mock-up if the project size or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

E. Mockups:

Verify that Drawings indicate exactly what portion of the building is to be part of the mockup or that the exact size and configuration of the mockup is indicated on the Drawings.

1. Build mockups of air barrier assembly including backup wall, typical penetrations, and glazing assemblies 8 sq. ft. (24 sq. m) minimum size. Demonstrate product interfaces, intersections, and terminations.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

Retain subparagraph below if the intention is to make an exception to the default requirement in Section 014000 "Quality Requirements" for demolishing and removing mockups.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

7. DELIVERY, STORAGE, AND HANDLING

Delete appropriate paragraphs below or the entire "Delivery, Storage, and Handling" Article if the requirements are adequately covered in Section 016000 "Product Requirements."

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
  1. Store and handle materials in accordance with manufacturer's instructions.
  2. Keep materials in manufacturer's original, unopened containers and packaging until installation.

3. Store materials in clean, dry area.
4. Keep materials dry.
5. Protect materials during storage, handling, and installation to prevent damage.

## 8. FIELD CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.

1. Protect substrates from environmental conditions that affect air-barrier performance.
  - a. Substrate surfaces must be free of grease, oil, un-bonded paint, corrosion or other substances that would adversely affect the adhesive bond between the membrane and substrate.
  - b. Substrate surface must be dry to the touch for optimum performance.
  - c. Substrate surface temperature must be between 0°F and 150°F (-18°C and 66°C).
  - d. Rolls must be stored at a temperature at or above 0°F (-18°C) to ensure initial bond performance.

## 9. WARRANTY

Verify with Owner's counsel that warranties stated in this Article are not less than remedies available to Owner under prevailing local laws.

A. Installer Warranty:

1. Air Barrier Assembly: Warranty Warrant against installation failure.
  - a. Failures including loss of airtight seal, loss of watertight seal, loss of attachment, loss of adhesion, and failure to cure properly.
  - b. Warranty Period: [2][5][10] years.

## 2.PRODUCTS

### 1. PERFORMANCE REQUIREMENTS

- A. General: Continuous weather-resistive assembly acting in conjunction with adjacent materials to resist air and water leakage into the building and to function as a drainage plane for incidental moisture.
- B. Air Infiltration:

Verify ASTM test in manufacturer's product literature.

1. Material: 0.004 cfm/sf at a pressure differential of 1.57 lb/sq ft per [ASTM E2357][ASTM E2178].
2. Assembly: Assembly: 0.04 cfm/sf at 1.57 lb/sq ft per ASTM E2357.

Select option that applies to the project. First option is for vapor retarding. Second option is for vapor permeable.

- C. Vapor Permeance: [0.1 perm maximum][10 perms, minimum]; ASTM E96 Desiccant Method.
  - D. Fire Resistance: Tested as a component of assembly passing NFPA 285.
2. VAPOR PERMEABLE SHEET MEMBRANE AIR BARRIER
- A. Membrane: Self-adhering, air and water barrier membrane.
    1. Manufacturer and Product:
      - a. 3M™ Air Barrier with Permeable Backing 3015VP.
    2. Description: 15 mil (0.38 mm) thick proprietary film with acrylic adhesive, elastomeric coated, nonwoven backing, and 3 mils (0.078 mm) polyester liner.
    3. Color: White.
    4. Physical and Performance Properties:
      - a. Elongation at Break: 40 percent, ASTM D882.
      - b. Tensile Strength: 1177 psi (8.1 MPa) <Insert value>; ASTM D882.
      - c. Lap Adhesion: 50 oz/inch (0.44 N/mm) <Insert value>; ASTM D3330.
      - d. Nail Sealability: 5 inches (127 mm) <Insert value>; of water head after 3 days, dry and passes per ASTM D1970.
      - e. Surface Burning Characteristics: ASTM E84
        - 1) Flame Spread Index: Less than 5.
        - 2) Smoke Developed Index: Less than 0.

3. VAPOR RETARDING SHEET MEMBRANE AIR BARRIER

- A. Membrane: Self-adhering, air and water barrier membrane.
  1. Manufacturer and Product:

- a. 3M™ Air and Vapor Barrier 3015NP.
2. Description: **10 mil (0.254 mm)** thick, non-permeable multilayer proprietary film with acrylic adhesive and silicone coated release liner. Comply with ASTM E2178 and CAN/ULC S741-8.
3. Color: White.
4. Performance Requirements:
  - a. Elongation at Break: 700 percent per ASTM D882.
  - b. Tensile Strength: **2153 psi (12 MPa)** <Insert value>; ASTM D882.
  - c. Lap Adhesion: **6.74 lbf/in (1.18 N/mm)** <Insert value>; ASTM D1876.
  - d. Low Temperature Flexibility: At **-22 degrees F (-30 degrees C)** <Insert value> passes bend test and no leakage during water head test ASTM D1970, Section 7.9.
  - e. Nail Sealability: **5 inches (0.127 mm)** <Insert value> of water head after 3 days, dry and passes ASTM D1970, Section 7.9.
  - f. Water Resistance: **21.6 inches (55 cm)** <Insert value> of water for 5 hours; no leakage per AATCC-127.
  - g. Surface Burning Characteristics: ASTM E84
    - 1) Flame Spread Index: Less than 0.
    - 2) Smoke Developed Index: Less than 10.

#### 4. ACCESSORIES

- A. General: Accessory materials recommended by air-barrier manufacturer and compatible with primary air-barrier membrane.

3M Products specified does not require primer. Consult manufacture for compatible primer when required.

- B. Primer: Liquid primer recommended for substrate by air-barrier material manufacturer.
  1. Test adhesion before application for difficult to stick surfaces.
  2. When required, provide the following aerosol or cylinder spray adhesive:
    - a. 3M™ Hi-Strength 90: Fast-drying high strength spray contact adhesive, synthetic elastomer as base product.
    - b. 3M™ Hi-Strength 94 ET Spray Adhesive: High performance adhesive with low VOC.

- c. 3M™ Scotch-Weld Holdfast 70: Fast tacking industrial grade spray adhesive, synthetic elastomer as base product.
- d. 3M™ Fastbond Contact Adhesive 30NF: Low-odor, water-based contact spray adhesive, polychloroprene as base product.

C. Flashing Tapes:

1. Non-Permeable Flashing Tapes: 10 mil (0.25 mm) thick, non-permeable multilayer proprietary film with acrylic adhesive and silicone coated release liner. Comply with ASTM E2178 and CAN/ULC S741-8.
  - a. Basis of Design Product: 3M™ Air and Vapor Barrier 3015NP.
  - b. Color: White.
  - c. Performance Requirements:
    - 1) Elongation at Break: 700 percent per ASTM D882.
    - 2) Tensile Strength: 2153 psi (12 MPa) <Insert value>; ASTM D882.
    - 3) Lap Adhesion: 6.74 lbf/in (1.18 N/mm) <Insert value>; ASTM D1876.
    - 4) Low Temperature Flexibility: At -22°F (-30°C) <Insert value> passes bend test and no leakage during water head test ASTM D1970, Section 7.9.
    - 5) Nail Sealability: 5 inches (0.127 mm) <Insert value> of water head after 3 days, dry and passes ASTM D1970, Section 7.9.
    - 6) Water Resistance: 21.6 inches (55 cm) <Insert value> of water for 5 hours; no leakage per AATCC-127.
    - 7) Surface Burning Characteristics: ASTM E84
    - 8) Flame Spread Index: Less than 0.
    - 9) Smoke Developed Index: Less than 10.
2. Through Wall Flashing Tapes: 15.5 mil (0.40 mm) thick, self-adhering non-permeable membrane with acrylic adhesive, 7.5 mil (0.19 mm) polyethylene backing film, and polycoated kraft liner.
  - a. Basis of Design Product: 3M™ Through Wall Flashing Tape 3015TWF.
  - b. Performance Requirements:
    - 1) Elongation at Break: 600 percent, minimum per ASTM D412, Die C.
    - 2) Tensile Strength: **1000 psi (7.0 MPa)** <Insert value>; minimum, ASTM D412, Die C.



- 3) Lap Adhesion: **0.37 lbf/in (4.2 N/cm)** <Insert value> minimum, ASTM D1876.
  - 4) Low Temperature Flexibility: At **22°F (30°C)** <Insert value> passes bend test and no leakage during water head test ASTM D1970, Section 7.9.
  - 5) Nail Sealability: **5 inches (127 mm)** <Insert value> of water head after 3 days, dry and passes ASTM D1970, Section 7.9.
  - 6) Water Vapor Permeance: 0.05 Perm, maximum per ASTM E96, Water method.
  - 7) Puncture Resistance: **38 lbf (170 N)**, minimum per ASTM E154.
3. Adhesive Flashing Tape: 38 mil (0.97 mm) thick translucent acrylic adhesive tape.
- a. Basis of Design Product: 3M™ Ultra Conformable Flashing Tape 3015UC.
  - b. Performance Requirements:
    - 1) Elongation at Break:  $\geq 300$  percent, minimum per ASTM D412, Die C.
    - 2) Tensile Stress at Break: **4.2 psi (0.840 N/sq.mm)** <Insert value>, minimum per ASTM D412.
- D. Joint Sealant: Manufacturers approved sealants from most recent 3M Compatibility Listing Technical Bulletin.
1. Products:
    - a. 3M™ Polyurethane Adhesive Sealant 540.
      - 1) Tack free: 60-90 minutes at 73 degrees F at 50 percent relative humidity.
      - 2) Elongation at Break (ASTM D412): 600 percent, maximum.
      - 3) Tensile Strength (ASTM D412): 300 psi (2.1 MPa).
    - b. 3M™ Adhesive Sealant 740 UV.
      - 1) Tack free: 40-60 minutes at 73 degrees F at 50 percent relative humidity.
      - 2) Elongation at Break (ASTM D412): 300 percent, maximum.
      - 3) Tensile Strength (ASTM D412): 145 psi (1.0 MPa).

### 3.EXECUTION

#### 1. EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Substrate surfaces shall be free of grease, oil, unbonded paint, corrosion or other substances.
- C. Verify that substrate construction is complete, clean, dry, and ready to receive barrier system with no damaged or unsupported areas; or sharp protrusions or voids. Substrate must meet the following requirements:

Retain substrate that applies to the project.

- 1. Exterior gypsum sheathing: Moisture content below 19 percent; no open joints or cracks wider than **1/4 inch (6 mm)**.
  - 2. Plywood: Moisture content below 16 percent; no open joints or cracks wider than **1/4 inch (6 mm)**.
  - 3. Concrete surfaces: Cured minimum 7 days, fins and extrusions ground flush and void areas filled and cured.
  - 4. Masonry: Mortar joints tooled or struck flush.
  - 5. Metal: Wipe down to remove any release agents or coatings.
- D. If substrate preparation is the responsibility of another installer, notify Architect and General Contractor of unsatisfactory preparation before proceeding.
  - E. Proceed with installation only after unsatisfactory conditions have been corrected.

## 2. PREPARATION

### A. Connection to Difficult Substrates and Other Systems:

- 1. Test adhesion by installing **6 inch (150 mm)** square test patch of barrier product over difficult substrate or other system. Removal of the test patch should not be possible without permanent damage to either the test patch or substrate material.
- 2. Repeat test with manufacturer's recommended primer.
- 3. Consult manufacturer for detailing connections that fail this test.

### B. Substrate Gaps or Cracks:

- 1. Fill gap or crack with adhesive sealant in substrate exceeding **1/4 inch (6 mm)** width between substrate penetrations of air barrier assembly. Tool surface flush and smooth.
- 2. Fill gap or crack in substrate exceeding **1/2 inch (12 mm)** width with closed-cell backer rod or spray foam. Shave flush to adjoining substrate once spray foam is cured.

### 3. INSTALLATION

- A. General: Comply with manufacturer's written installation instructions.
- B. Coordinate the installation of air barrier membrane with other building elements.
  - 1. Connect air barrier to roofing and below grade waterproofing and roofing systems.
  - 2. Connect and seal air barrier materials to exterior [door][louver][storefront][curtainwall] system.
- C. Adhere sheet membrane to substrate; ensure continuous air barrier configured to direct moisture to exterior.
- D. Window and Louver Openings:

As an alternate to 3M™ 3015 NP detailing tape, use 3M™ Ultra Conforming Tape 3015UC in the corners to reduce overlapping section allowing for a cleaner ease of installation. These flashing materials can be mixed and matched depending on the project needs and designer and/or contractor preferences.

- 1. Wrap rough openings as shown on drawings with either flashing or membrane material in widths shown.
- 2. Install sealant at each inside corner of window sill, jamb, and head.
- 3. Apply strips of membrane at each inside corner extending full depth of sill and vertical side of frame with minimum **2 inch (50 mm)** overlap in all directions. Apply pressure with J-roller.
- 4. Install strips at sill, jambs, and head in lengths beyond window opening extending full depth of sill.
- 5. Install membrane in "weatherboard" or "shingle fashion" with minimum **2 inch (50 mm)** overlap at all detail strips.

#### E. Penetrations:

As an alternate to 3M™ 3015 NP detailing tape, use 3M™ Ultra Conforming Tape 3015UC around wall penetration to reduce overlapping section allowing for a cleaner ease of installation. These flashing materials can be mixed and matched depending on the project needs and designer and/or contractor preferences.

- 1. Seal all penetrations with sealant. Install flashing or membrane material cut to length to allow installation around the circumference of penetration.
- 2. Masonry Ties or Anchors:
  - a. Post-Applied: Install back plate of tie or anchor over air barrier with self-tapping screws. Apply sealant over the screw heads.

- b. Knife Plate: Cut one piece membrane to overlap minimum 2 inches (50 mm) in each direction. Apply membrane to slot of knife plate. Apply sealant at knife plate penetration perimeter.
  3. Utilities, Pipes, Conduit, and Duct Penetrations:
    - a. Apply sealant between penetration and exterior wall.
    - b. Apply membrane to allow continuous 2 inch (50 mm) overlap onto vent/pipe penetration.
    - c. Apply sealant along top half of tape edge and tool smooth.
  4. Substrate Transitions and Building Joints: See Drawings for project specific detailing with backer rod, sealant, and membrane.
  5. Repairs: Apply membrane 2 inch (51 mm) larger than test or damage area. Seal leading cut edges of membrane with sealant.
4. FIELD QUALITY CONTROL
- A. Coordinate with Owner's testing agency to inspect installation areas with the manufacturer's authorized technical representative and the Architect. Do not cover weather barriers until accepted.

Fill in quantities of tests to suit project. Delete any tests not required.

- B. Test:
  1. Qualitative air leakage: ASTM E1186. Conduct \_\_\_\_ at the mock-up and \_\_\_\_ at select locations of the Work.
  2. Quantitative air leakage: ASTM E783, at 1.57 psf (75 Pa). Conduct \_\_\_\_ at the mock-up and \_\_\_\_ at select locations of the Work.
  3. Water penetration: ASTM E1105). Conduct \_\_\_\_ at the mock-up and \_\_\_\_ at select locations of the Work.
  4. Membrane adhesion: ASTM D4541, modified. Use a Type II Pull Tester. Cut through the membrane at the perimeter of the disc.
  5. Conduct \_\_\_\_ sets at the mock-up and \_\_\_\_ sets at select locations 24 hours after installation. Each set includes three adhesion tests.
  6. Record the mode of failure and area where material failed.
  7. Record the adhesion level from the gauge at the end of the test.
  8. Repair all test areas to conform to the project specifications.

9. Repair or take corrective action all non-conforming work to meet the project specifications.

5. CLEANING

A. Clean spillage from adjacent construction.

6. PROTECTION

A. Protect air barrier materials from damage until material is covered by permanent construction.

END OF SECTION