

This guide specification was prepared utilizing 3-part format recommended by the Construction Specifications Institute (CSI), and generally incorporates recommendations from their SectionFormat™/Page Format™, and MasterFormat®, latest Editions, insofar as practicable.

Carefully review and edit the text to meet the Project requirements and coordinate this Section with the remainder of the Specifications and the Drawings.

Where bracketed text is indicated, e.g. [text], make appropriate selection and delete the remainder of text within additional brackets, highlighting, and bold face type, if any.

Consult the manufacturer for assistance in editing this guide specification for specific Project applications where necessary. This guide specification includes both the Walltite US spray applied closed cell polyurethane foam air barrier system and the Enershield-I transition membrane, which are both BASF products.

This Specification was current at the time of publication but is subject to change. Please confirm the accuracy of these specifications with the manufacturer prior to use.



## SECTION 07 27 36 SPRAYED FOAM INSULATING AIR BARRIER SYSTEM

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Walltite® US spray-applied closed cell polyurethane foam (ccSPF) air barrier system for exterior wall assemblies.

B. Related Requirements:

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

*SPECIFIER: Revise section numbers and titles in subparagraphs below per CSI MasterFormat and Project requirements.*

1. Section 01 22 00 - Unit Prices (REVIEW w/paragraph 2.4.H) as there is a separate material reference in Section 2.4.H that will need to be addressed with unit pricing if it is used.

2. Section 01 33 00 - Submittal Procedures: For administrative and procedural requirements for processing of submittals during the construction phase.
3. Section 01 40 00 - Quality Requirements: For coordination with Owner's independent testing and inspection agency.
4. Section 01 45 00 - Quality Control: For mock-up requirements.
5. Section 01 50 00 - Temporary Facilities and Controls: For requirement to schedule work to prevent sunlight and weather exposure of materials beyond limits established by manufacturer, and; requirement to protect materials from damage after installation and prior to installation of enclosing work.
6. Section 01 74 19 - Construction Waste Management
7. Section 01 77 00 - Closeout Procedures: For administrative and procedural requirements for completion of the Work.
8. Section 03 30 00 - Cast-In-Place Concrete: For requirement that backup concrete be free of fins, protrusions and large holes.
9. Section 04 20 00 - Unit Masonry: For requirement that backup masonry joints are flush and completely filled with mortar; excess mortar on brick ties will be removed; requirement for gap at deflection joints and fillers, and; coordination with sequencing of through-wall flashing.
10. Section 06 16 00 - Sheathing: For requirement that backup sheathing or other substrate has been installed with significantly damaged areas repaired, and; requirement for gap at deflection joints and fillers.
11. Section 07 21 19 - Foamed-In-Place Insulation
12. Section 07 26 00 - Vapor Retarders: For requirement for coordination with vapor retarders in exterior wall.
13. Section 07 50 00 - Membrane Roofing: For requirement for coordination with sequencing of membrane roofing; requirement to seal roof membrane to wall air and vapor barrier.

## 1.2 REFERENCES

*SPECIFIER: Use care when indicating the edition date of the referenced standards; these standards are subject to regular review, and updated accordingly.*

### A. Reference Standards:

1. Air Barrier Association of America (ABAA):
  - a. ABAA Quality Assurance Program
2. ASTM International (ASTM):
  - a. ASTM C518-10, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
  - b. ASTM C1029-13, Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation
  - c. ASTM C1177/C1177M-13, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  - d. ASTM C1325-08b, Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units
  - e. ASTM C1338-14, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
  - f. ASTM D1621-10, Standard Test Method of Compressive Properties of Rigid Cellular Plastics
  - g. ASTM D1622-08, Standard Test Method for Apparent Density of Rigid Cellular Plastics
  - h. ASTM D1623-09, Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics

- i. ASTM D4541-09e1, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
  - j. ASTM D6226-10, Standard Test Method for Open Cell Content of Rigid Cellular Plastics
  - k. ASTM E84-13a, Standard Test Method for Surface Burning Characteristics of Building Materials
  - l. ASTM E96/E96M-13, Standard Test Method for Water Vapor Transmission of Materials
  - m. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials
  - n. ASTM E2178-13, Standard Test Method for Air Permeance of Building Materials
  - o. ASTM E2357-11, Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
3. Center for Polyurethane Insulation (CPI):
    - a. Health & Safety Training Course
  4. International Code Council-Evaluation Service (ICC-ES):
    - a. ICC-ES AC 377 Acceptance Criteria for Spray-Applied Foam Plastic Insulation
    - b. ICC-ES AC 71 Acceptance Criteria for [Foam Plastic Sheathing Panels Used as Weather-resistive Barriers](#)
    - c. ICC-ES AC 148 Acceptance Criteria for Flexible Flashing Materials
  5. National Fire Protection Association (NFPA):
    - a. NFPA 285 (2012), Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.
    - b. NFPA 259 (2013), Standard Test Method for Potential Heat of Building Materials
  6. Occupational Safety and Health Administration, U.S. Department of Labor (OSHA):
    - a. Health and Safety Practices for SPF Applications
  7. Spray Foam Coalition, of the Center for the Polyurethanes Industry (SFC):
    - a. Guidance on Best Practices for the Installation of Spray Polyurethane Foam
    - b. Ventilation Considerations for Spray Polyurethane Foam
  8. United States Environmental Protection Agency (EPA):
    - a. Ventilation Guidance for Spray Polyurethane Foam Application
  9. Underwriters Laboratories, Inc. (UL):
    - a. UL 263 - Fire Tests of Building Construction and Materials
    - b. UL 1715 - Fire Tests of Interior Finish Material
- B. Other Organizations:
1. American Association for Laboratory Accreditation (AALA)
  2. International Accreditation Service Inc. (IAS)
  3. International Standards Organization (ISO)

### 1.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-application Conference: Organize and convene a pre-application conference not less than 2 weeks prior to commencing Work of this Section.
  1. Required Attendance: Contractor, installer, and representatives of related trades including covering materials, substrate materials and adjacent materials.

2. Agenda:
  - a. Construction site safety relating to potential hazards or fire risks during application;
  - b. materials approved for use and their compatibility;
  - c. details of air barrier construction;
  - d. coordination with substrate preparation;
  - e. coordination with installation of adjacent and covering materials;
  - f. sequence of air barrier construction;
  - g. construction and testing of mock-up, and;
  - h. protection of completed air barrier installation.

#### 1.4 ACTION SUBMITTALS

*SPECIFIER: Revise Section number in the paragraph below to match that used in the Project Manual.*

- A. Submit in accordance with Section **[01 33 00]** **[other]**:
  1. Product Data: For each component of the air barrier system.
    - a. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; temperature and other limitations of installation conditions, and; tested physical and performance properties of products.
    - b. Installation instructions for each component of the air barrier system.
  2. Shop Drawings:
    - a. Submit shop drawings showing locations and extent of air barrier assemblies and details of all typical conditions; intersections with other envelope assemblies and materials; membrane counter-flashings; details showing how gaps in the construction will be bridged; how inside and outside corners are negotiated; how materials that cover the air barrier are secured with air-tight condition maintained, and; how miscellaneous penetrations such as conduits, pipes, electric boxes and similar items are sealed.
    - b. Submit shop drawings of proposed mock-ups showing plans, elevations, large-scale details, and connections to the test apparatus.
  3. Samples: Submit a clearly labeled sample prepared by the installer, of spray-applied polyurethane foam specified, 12 inches by 12 inches (300 mm by 300 mm) minimum size and approximately 3 inches (75 mm) thick, applied with a minimum of 2 passes and to a rigid back-up material such as plywood.
  4. Certificates:
    - a. Copy of the SPF applicators ABAA certification
    - b. Include a statement that materials are compatible with adjacent material proposed for use.
    - c. Submit documentation from primary materials manufacturer indicating compatibility of products not manufactured by primary manufacturer.
  5. Tests and Evaluation Reports:
    - a. Submit the manufacturers Corporate Sustainability Report (e.g. Global Reporting Initiative).
    - b. Submit research/evaluation report for foam plastic insulation from ICC-ES or equivalent.
    - c. Submit reports indicating that field peel-adhesion test on all materials to which sealants are adhered have been performed and the changes made, if required, to other approved materials, in order to achieve successful adhesion.
      - 1) Include recommended values for field adhesion test on each substrate.
  6. Sample Warranty: Submit manufacturer's specimen warranty.

## 1.5 INFORMATIONAL SUBMITTALS

*SPECIFIER: Revise Section number in the paragraph below to match that used in the Project Manual.*

- A. Submit in accordance with Section **[01 33 00] [other]**:
  - 1. Contractor Qualifications: Submit certificates of completion for all workers for CPI's Health And Safety Training Course.
  - 2. Quality Assurance Program:
    - a. Submit evidence of current accreditation and installer certification numbers for those assigned to this Project under ABAA's Quality Assurance Program, at time of bidding.
    - b. Submit evidence of closed cell spray foam air barrier manufacturer's current approval as an ABAA evaluated material and assembly.

## 1.6 CLOSEOUT SUBMITTALS

*SPECIFIER: Revise Section number in the paragraph below to match that used in the Project Manual.*

- A. Submit in accordance with Section **[01 33 00] [other]**:
  - 1. Warranty:
    - a. Submit manufacturer's executed written warranty against material defects.
    - b. Submit installer's executed written warranty against installation defects.

## 1.7 QUALITY ASSURANCE

- A. Comply with standards referenced in Article 1.2 - REFERENCES.
- B. Manufacturer:
  - 1. Obtain primary materials from a single manufacturer regularly engaged in manufacturing air barrier membranes and with a minimum of 10 years of experience manufacturing air barrier and insulation products utilized in non-residential building projects.
  - 2. Spray Foam System Compounder shall be a member of CPI and ISO 9001 Certified.
  - 3. Provide foam products which comply with applicable regulations controlling the use of volatile organic compounds (VOC), with a maximum VOC content less than 50 g/L.
- C. Installer Qualifications:
  - 1. Currently accredited by ABAA and whose applicators are certified in accordance with the ABAA Quality Assurance Program.
  - 2. Completion of manufacturer's training program for installation of specified air barrier, and not less than 5 installations similar in size and complexity in the past 3 years, of which 3 have been completed by the crew assigned to the Project.
  - 3. Installers shall have their photo identification certification cards in their possession and available on the Project site, for inspection upon request.
- D. Accredited Laboratory Testing for Materials: Engage laboratory accredited by AALA or IAS for in-field mock-up testing, performance standards, and assembly tests listed in Article 2.2 – PERFORMANCE REQUIREMENTS and 2.3 CLOSED CELL SPRAY FOAM AIR BARRIER SYSTEM.

*SPECIFIER: Clearly specify the requirements for the number of mock-ups and sizes required for the Project; the design of building fenestration and transitions in building materials should influence your decisions regarding the number of mock-ups and their size.*

- E. Mock-Ups: General Contractor is responsible for coordinating the construction of the mock-up

in accordance with Division 01 requirements, and as specified herein. Mock-ups shall be representative of primary exterior wall assemblies and acceptable to the Architect.

1. Size: Approximately **[8 feet long by 8 feet high (2.4 m long by 2.4 m high)] [insert other size(s)]**, including air barrier system components, back-up wall construction, glazing, and typical penetrations which make up the exterior wall assembly(ies).
2. Testing:
  - a. Mock-Up Tests for Air and Water Infiltration: Test mock-up for air and water infiltration as prescribed by the Project requirements.
    - 1) Sequence: Perform the air leakage and water penetration tests of mock-up prior to installation of cladding and trim but after installation of all fasteners for cladding and trim and after installation of other penetrating elements.
    - 2) Deficiencies: If deficiencies are observed, reconstruct mock-up and retest until satisfactory results are obtained. Deficiencies include air leakage beyond limits specified for project requirements, uncontrolled water leakage, and unsatisfactory workmanship.
  - b. Mock-Up Tests for Adhesion: Test mock-up of materials for adhesion and material compatibility in accordance with manufacturers' recommendations. Perform test after curing period recommended by the manufacturer. Record mode of failure and the area(s) which failed to meet the Project requirements of 16 psi when tested in accordance with the ASTM D4541 standard. When the air barrier material manufacturer has established a minimum adhesion level for the product on the particular substrate, the inspection report shall indicate whether this requirement has been met.
3. Approval of mock-up(s) does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, manufactured 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 barrier membrane manufacturer. Protect stored materials from direct sunlight.
- C. Handle materials in accordance with manufacturer's recommendations and applicable regulatory requirements.
- D. Remove empty containers, excess materials and debris from site as soon as possible for recycling or disposal in accordance with applicable local, state, and federal regulations.

*SPECIFIER: Select first option in subparagraph below for Division 01 reference, or second option for basic regulatory requirements.*

1. **[Follow recycling and disposal requirements specified in Section 01 74 19.] [Follow applicable regulatory requirements for recycling and disposal of waste materials.]**

## 1.9 FIELD CONDITIONS

- A. Ambient Conditions:
  1. Temperature: Install air barrier and auxiliary materials to within range of ambient and substrate temperatures recommended by the air barrier system manufacturer.

- a. Do not install spray foam when temperature is within 5 deg F (-15 deg C) of the dew point.
2. Moisture: Do not apply air barrier to damp or wet substrates, including areas exposed to or contaminated by, snow, rain, fog, or mist.
3. Ventilation: Provide adequate ventilation during application of air barrier in enclosed spaces. Maintain ventilation until foam products have cured.
  - a. Comply with OSHA, CPI/SFC, and EPA requirements specified in Article 1.02 - REFERENCES.
  - b. CPI/SFC Guidance document for ventilation considerations for SPF Application.
4. Substrate: Substrates to receive the Spray foam air barrier material and other auxiliary materials are required to be clean, sound, and secure.

## 1.10 WARRANTY

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

- A. General: The Contractor shall warrant the sprayed foam air barrier to be free of defects in accordance with the General Conditions. This warranty shall be extended by the following manufacturer and installer warranties:
  1. Material Warranty: Provide manufacturer's warranty that all components of the sprayed foam air barrier system are free of defects in materials.

*SPECIFIER: Select BASF's standard 3-year manufacturer's material warranty in the paragraph below, or; select the 5-year manufacturer's material warranty which is available ONLY if "Walltite® US" and "ENERSHIELD®" transition membrane are both used in conjunction, to complete the air barrier assembly.*

- a. Warranty Period: [3] [5] years from Date of Substantial Completion of spray foam air barrier installation.
2. Installation Warranty: Provide installer's warranty that the sprayed foam air barrier installation is free of defects in workmanship, including all components of the sprayed foam air barrier manufacturer's air barrier assembly.

*SPECIFIER: Review the following subparagraph carefully, as such statements may cause extensive financial burden to those responsible for construction in-place, however, the Owner should not participate in such costs under the warranty provisions; edit accordingly.*

- a. Warranty Period: 3 years from Date of Substantial Completion of spray foam air barrier installation.

## PART 2 - PRODUCTS

### 2.1 AIR BARRIER MANUFACTURERS

- A. Acceptable Manufacturers:
  1. Spray Foam: BASF Corporation, 1703 Crosspoint Ave, Houston, TX 77054, Toll Free Tel: 1(800)706-0712, Email: [spfinfo@basf.com](mailto:spfinfo@basf.com), Web Site: [www.spf.basf.com](http://www.spf.basf.com)
  2. Transition Membrane: BASF Corporation, 3550 St. Johns Bluff Road South, Jacksonville, FL 32224, Toll Free Tel: 1(800)221-9255, Web Site: [www.enershield.basf.com](http://www.enershield.basf.com), Online inquires: <http://www.wallsystems.basf.com/en/Pages/contact.aspx>

- B. Substitutions: Manufacturers seeking approval of their products are required to comply with the Owner's Instructions to Bidders, generally contained in the Project Manual.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Material Performance: Provide materials which have an air permeance not to exceed 0.04 cfm/sq.ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa) when tested in accordance with ASTM E2178.
- B. System Performance: Substantiate that air barrier material used as or in a system assembly, will have an air permeance not to exceed 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa) when tested in accordance with ASTM E 2357.
- C. Wall Assembly:
1. Exterior wall assembly shall comply with NFPA 285.
  2. The wall must have a potential heat of 1961 BTU/ft<sup>2</sup> (22.3 MJ/m<sup>2</sup>) or less (per inch of thickness) when tested in accordance with NFPA 259.
- D. Connections to Adjacent Materials and Assemblies: Provide connections to prevent air leakage at the following locations:
1. Foundation and walls, including penetrations, ties and anchors;
  2. walls and building fenestration e.g. doors, storefronts, windows, curtain walls, and louvers;
  3. dissimilar wall assemblies and fixed openings within those assemblies;
  4. wall and roof connections;
  5. floors over unconditioned space;
  6. walls, floor and roof across construction, control and expansion joints;
  7. utility, pipe, and duct penetrations;
  8. seismic and expansion and control joints, and;
  9. leakage pathways in the building envelope.

## 2.3 CLOSED CELL SPRAY FOAM AIR BARRIER SYSTEM

- A. Closed Cell Spray Polyurethane Foam Air Barrier System: "Walltite ® US", spray-applied air barrier system, incorporating materials complying with ASTM C1029, Type II, and the following properties:
1. Properties:
 

a. Density (ASTM D1622):	Nominal 2.0-lb/cu.ft. (32-kg/cu. m).
b. Closed-cell Content (ASTM D6226):	90 percent (minimum).
c. Design R-Values (ASTM C518):	R-6.7 per inch (25 mm) thickness. R-28 at 4 inches (102 mm) thick.
d. Flame Spread (ASTM E84):	25 or less.
e. Smoke Developed (ASTM E84):	350 or less.
f. Compressive Strength (ASTM D1621):	26 psi (0.18 MPa) minimum.
g. Tensile Strength (ASTM D1623, Type C):	62.4 psi (0.43 MPa) minimum.
h. Water Vapor Transmission (ASTM E96):	1.39 perm-inch (79.6 ng/Pa•s•m <sup>2</sup> at 25 mm) thick.
  - i. Blowing Agent: EPA-approved, zero ozone-depleting blowing agent.

*SPECIFIER: Review the following paragraph as it may not apply if your wall assembly is not required to be a fire-resistant assembly.*

- B. Fire Resistant Assemblies: If a fire-resistance rating is required for the wall assembly, then the wall must be tested in accordance with ASTM E 119 or UL 263 **or based on results from tests**



**of similar assemblies.**

## **2.4 AUXILIARY MATERIALS**

- A. Sealant at Transitions in Substrate and Connections to Adjacent Elements: One-component, high-performance, very low-modulus, high-movement, non sag, fast-curing, hybrid sealant, "MasterSeal® NP 150™" (BASF Construction Systems); or approved substitution.
- B. Transition Membrane: For use between spray polyurethane foam air barrier and roofing and other adjacent materials, and for use to flash around building fenestration, wall penetrations, and similar conditions, in accordance with local building codes.
  - 1. General: Comply with both general recommendations for air barriers and with air barrier material manufacturer's recommendations.
  - 2. "ENERSHIELD®-I" fluid-applied air/water-resistive barrier membrane including:
    - a. Sheathing Joint Fabric: Air barrier manufacturer's reinforced, nonwoven, polyester fabric and preformed corners.
      - 1) Provide "Quick Corner™ 6", pre manufactured corner reinforcement for use with sheathing joint fabric specified.
    - b. Transition Membrane: "TF MEMBRANE" polyester-faced, 30-mil (0.76-mm) thick, self-sealing, rubberized asphalt membrane.
    - c. Flashing Primer: "WS FLASHING PRIMER" water-based primer.
- C. Counter flashing for Masonry Through-Wall Flashing: "ENERSHIELD®-TWF"; or approved substitution.
- D. Foam Stop Angle: Metal or plastic angle used for foam stop.
  - 1. Metal: Cold rolled galvanized steel, aluminum, or stainless steel angle, or;
  - 2. Plastic: Extruded thermoplastic angle, 60 mils (1.52 mm) thick, "Jam-Ex" (EXO-TEC Manufacturing, Inc.); or approved substitution.
- E. Primers: Air barrier manufacturer's recommended primers to enhance foam adhesion to certain substrates, including penetrating water-based epoxy primer/sealer, "FE Coat 1601", or elastomeric acrylic primer, "Spraycoat 1800".
- F. Portable SPF Application Units: "Kit" foam containers with closed cell SPF, Class 1, nominal 2 lb per cubic foot (907 grams per 0.028 cubic meter) density, for incidental use; one of the following:
  - 1. "Touch n' Seal" (Convenience Products).
  - 2. "Versi-Foam" (RHH Foam Systems, Inc.).
- G. One-Component Foams (OCF): Air barrier manufacturer's suggested open cell, one component product for use around windows and doors; one of the following:
  - 1. "Touch n' Seal" (Convenience Products).
  - 2. "Versi-Tite Window & Door Foam Sealant" (RHH Foam Systems, Inc.).

*SPECIFIER: Carefully consider the use of a block filler in the paragraph below prior to including.*

*The need for a block filler over porous concrete masonry units (CMU) may be consistent with the block type or Region where the block is manufactured, e.g. lightweight block, in which case, the material and application of a block filler may be specified in the masonry specification. If however, there is an inconsistency in standard or heavyweight block that would require block filler on only some of the block prior to the application of the air barrier, then this product and its application requirements should be specified as part of the air barrier specification, and be included in a Unit Price proposal submitted at the time of bidding; this would also affect Division 00 and Division 01, as well as PARTS 1 and 2 of this Section 07 27 36.*

- H. Block Filler: Heavy-bodied, copolymer-based block filler, "ENERSHIELD®-FIL" (BASF Wall Systems).

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions under which the air barrier system will be installed, with installer present, for compliance with requirements.
  - 1. General: Verify that surfaces and conditions are suitable prior to commencing work of this Section. Notify Architect or designated representative in writing of anticipated problems using air barrier over substrate prior to proceeding. Do not proceed with installation until unsatisfactory conditions have been corrected.
  - 2. Verify that concrete is visibly dry, and has cured and aged for minimum time period recommended in writing by concrete design engineer and producer.
    - a. General contractor is responsible for ensuring that the surface to receive spray foam is dry enough for proper foam adhesion.
  - 3. Ensure that the following conditions are met:
    - 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 and sharp protrusions;
    - c. masonry surfaces are smooth or have been suitably prepared by others, unless preparation is performed under this Section of the Work;
    - d. masonry joints are flush and completely filled with mortar, and all excess mortar on masonry ties has been removed, and;
    - e. substrate areas meet the requirements of the transition membrane manufacturer.

### **3.2 SURFACE PREPARATION**

- A. Clean, prepare, and treat substrate in accordance with manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
  - 1. Ensure that penetrating work is in place and clean-up by other trades is complete.
  - 2. Prepare surfaces by air blast, vacuum, 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.
  - 3. Metal: Wipe down metal surfaces to remove release agents and other non-compatible coatings, using clean sponges or rags soaked in a cleaning material compatible with the spray polyurethane foam. If necessary, prime metal to receive spray polyurethane foam to ensure adhesion.
  - 4. Ensure masonry veneer anchors are in place and compatible with the spray foam.
- B. Prime substrate for application of TF MEMBRANE strips as recommended by manufacturer and as follows:
  - 1. Prime masonry and concrete substrates with appropriate conditioning primers;
  - 2. prime glass-mat-faced gypsum sheathing with an adequate number of coats to achieve required bond, and adequate drying time between coats;
  - 3. prime wood, metal, and painted substrates;
  - 4. prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air barrier and at protrusions. Provide termination bar and sealant if necessary;
  - 5. read all material safety data sheets (if applicable) for materials being installed and

- coordinate requirements with other trades, and;
  6. discuss the spray areas and plans for safely protecting workers performing the application and keeping others out of that area during the application (spraying).
- C. Protect adjacent construction and materials from spray-applied materials as follows:
1. Mask and cover adjacent areas to protect from over spray;
  2. ensure that required foam stop or back-up material are in place to prevent over spray and achieve complete seal;
  3. shut down and seal off existing ventilation equipment. Install temporary ducting and fans to ensure adequate ventilation of work area. Consult EPA's "Ventilation Guidance for Spray Polyurethane Foam Application" document available at the following link:  
<http://www.epa.gov/dfe/pubs/projects/spf/ventilation-guidance.html>  
Additional guidance on ventilation can be found in the Spray Foam Coalition, of the Center for the Polyurethanes Industry, "Ventilation Considerations for Spray Polyurethane Foam" document available at the following link:  
<http://polyurethane.americanchemistry.com/Spray-Foam-Coalition/Guidance-on-Ventilation-During-Installation-of-Interior-Applications-of-High-Pressure-SPF.pdf>
  4. Erect barriers, isolate and restrict access to work area and post warning signs to advise non protected personnel to avoid the spray area.

### 3.3 TRANSITION MEMBRANE INSTALLATION

*SPECIFIER: Refer to BASF Wall Systems ENERSHIELD® Air/Water-Resistive/Vapor Barrier Application Guidelines and relevant product technical bulletins for further information.*

- A. Transition Detail Strip Installation (ENERSHIELD®-I, SHEATHING FABRIC, and TF MEMBRANE): Install transition strip materials including, but not limited to the air/water-resistive barrier, transition membrane material, and through-wall flashing material, to provide continuity throughout the building envelope. Apply products in accordance with manufacturer's current application procedures and Project requirements.

*SPECIFIER: PARAGRAPH B IS AN OPTIONAL STEP, BECAUSE IT CANNOT BE COMPLETED UNLESS AN NFPA 285 ASSEMBLY HAS BEEN APPROVED FOR THE USE OF A LIQUID APPLIED AIR BARRIER WITH THE SPRAY FOAM INSULATION.*

- B. Air/Water-Resistive Barrier (ENERSHIELD®-I):
1. Substrate shall be dry, clean, sound and free of release agents, paint or other residue or coatings. Verify substrate is flat, free of fins or planar irregularities greater than 1/4 inch in 10 feet (6 mm in 3.048 m).
  2. Sheathing Preparation:
    - a. Joints, Terminations, Corners, and Minor Sheathing Deficiencies: Immediately place and center sheathing joint fabric over wet ENERSHIELD®-I at sheathing joints, terminations, inside and outside corners, and at knot holes and check cracks in plywood. Ensure sheathing joint fabric extends evenly on both sides of the sheathing joint.
      - 1) Lap SHEATHING FABRIC 2-1/2 inches (63.5 mm) minimum at intersections.
      - 2) Allow to dry to the touch before applying ENERSHIELD®-I to entire wall surface. If spraying, wet-on-wet application is acceptable.
      - 3) Precoat sheathing joints, terminations, and inside and outside corners with air/water-resistive barrier coating using a 4-inch wide by 3/4-inch (101-mm wide by 20-mm) nap roller, or by brush or spray.
    - b. Wrap openings with QUICK CORNERS or SHEATHING FABRIC by applying mixed ENERSHIELD®-I to contact surfaces and immediately embedding QUICK

CORNERS or SHEATHING FABRIC. If necessary, apply a second coat of ENERSHIELD®-I over the QUICK CORNERS or SHEATHING FABRIC ensuring a continuous, void-, pinhole- and wrinkle-free membrane application (wet-on-wet spray application is acceptable).

**Note: Refer to Spray Application technical bulletin for spray application equipment and application instructions.**

3. Weather Exposure:
  - a. Limit the weather exposure of ENERSHIELD®-I to a maximum of 180 days.
  - b. Verify surfaces are free of dirt, contaminants, and other deleterious conditions before installation of subsequent work. Report and correct such conditions prior to the performance of that work.
  
- C. Transition Membrane:
  1. Install ENERSHIELD®-I / SHEATHING FABRIC and/or TF MEMBRANE and sealant in accordance with the Drawings and Specifications to form a seal with adjacent construction and maintain a continuous air/water-resistive barrier.
    - a. General Contractor:
      - 1) Make provisions to coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane, and;
      - 2) to install strip on roofing membrane or base flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates.
  
  2. Primer and Self-Adhering Membrane Flashing:
    - a. Primer: Apply WS FLASHING PRIMER to substrates scheduled to receive TF MEMBRANE and at required amount. Limit priming to areas that will be covered with TF MEMBRANE on the same day. Re prime areas exposed for more than 24 hours.
    - b. Membrane: Apply TF MEMBRANE as soon as possible after WS FLASHING PRIMER is dry and tacky. Using a wallpaper roller, extension-handled counter top roller, or weighted hand roller, firmly roll the TF MEMBRANE to the area being sealed. As the TF MEMBRANE is applied, pull more of the release film from the TF MEMBRANE, exposing the adhesive surface, pressing down on the TF MEMBRANE with a roller and keeping the TF MEMBRANE smooth.
    - c. Spray Foam Over Membrane: The polyester face of the TF Membrane is not required to be coated with the ENERSHIELD®-I liquid applied material if the Walltite product will be directly applied over it. If the TF membrane will be exposed such as at a window opening, coat the polyester face of the TF Membrane with the ENERSHIELD®-I liquid applied material to provide a surface suitable to receive sealants, etc.
  
  3. General Contractor:
    - a. Make provisions to connect and seal exterior wall air/water-resistive barrier membrane continuously to roofing membrane, concrete below-grade structures, floor-to floor construction, exterior door framing, storefront systems, glazed curtain wall systems, window systems, louvers, and other construction interfaces used in exterior walls, using accessory materials;
    - b. apply joint sealants forming part of air/water-resistive barrier assembly within sealant manufacturer's recommended application procedures, and;
    - c. fill gaps in perimeter frame surfaces of exterior door framing, storefront systems, glazed curtain wall systems, window systems, louvers, and miscellaneous penetrations of air/water-resistive barrier membrane with foam sealant.

4. Flashing Membranes:
  - a. Primer: Apply WS FLASHING PRIMER to perimeter frame surfaces of exterior door framing, storefront systems, glazed curtain wall systems, window systems, louvers, and other construction interfaces used in exterior walls.
  - b. Apply WS FLASHING PRIMER and TF MEMBRANE transition strip so that a minimum of 3 inches (75 mm) of coverage is achieved over both.
5. Repair: Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fish mouths and blisters. Patch with transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

D. Through-Wall Flashing Installation:

1. Primer: Apply WS FLASHING primer to wall substrates that will receive ENERSHIELD®-TWF membrane. Limit priming to areas that will be covered with ENERSHIELD®-TWF on the same day. Reprime areas exposed for more than 24 hours.
2. Preformed Corners at Building Corners when Applicable: Install appropriate preformed inside and outside corners, and end dams; embedded in MasterSeal NP 150 sealant.
3. Ensure that wall substrates that will receive ENERSHIELD®-TWF membrane have been primed, and that the primer is tacky. If time and other factors have caused the primer to lose tackiness, apply a second coat.
4. Membrane: Cut ENERSHIELD®-TWF membrane into workable lengths.
  - a. Remove half of the release paper lengthwise and fold it along the membrane.
  - b. Install the membrane onto the primed substrate, smoothing it to avoid formation of fish mouths.
  - c. Remove the second half of the release paper and complete the installation in the same manner, ensuring fish mouth-free application. Repair fish mouths that may form by slitting them and applying MasterSeal NP 150 sealant to seal the repair.
  - d. Provide a minimum 2-inch (51-mm) lap onto preformed corners.
  - e. Firmly post-roll the adhered membrane with a hard roller. Apply MasterSeal NP 150 sealant to terminating edges and laps.
4. Drip Edge:
  - a. Membrane Drip Edge:
    - 1) In order to use the intrinsic drip edge feature, position the membrane so the adhesive-free side extends a minimum 1/4 inch (7mm) through the outer wall to form a drip.
    - 2) Apply a bead of MasterSeal NP 150 sealant under the drip edge to seal the bottom.
  - b. Metal Drip Edge: If using a metal drip edge, position the membrane so the adhesive-treated side laps onto the metal drip edge.
5. Membrane Securement Methods:

*SPECIFIER: Select one of the methods below for securing the top of the through-wall flashing to the substrate.*

- a. TF MEMBRANE:
  - 1) Apply WS FLASHING PRIMER to the backup wall above ENERSHIELD®-TWF membrane. Once tacky, apply a strip of TF MEMBRANE 4 inches (102 mm) wide across the top of the ENERSHIELD®-TWF membrane, centering the TF MEMBRANE so that half the TF MEMBRANE extends onto the primed backup wall.

- 2) Post roll TF MEMBRANE and saturate with ENERSHIELD® to create a seamless transition.
  - b. Termination Bar:
    - 1) Adhere ENERSHIELD®-TWF membrane to the backup wall.
    - 2) Attach the termination bar to the top horizontal edge of the ENERSHIELD®-TWF membrane and to the backup wall.
    - 3) Apply MasterSeal NP 150 to the top edge of ENERSHIELD®-TWF membrane to create a uniform seal.
  - c. Masonry Joint: Build ENERSHIELD®-TWF membrane directly into a course of block to secure flashing between CMU courses.
- E. Install materials in accordance with BASF recommendations, and the following:
1. Seal around penetrations with termination mastic, MasterSeal NP 150 sealant, membrane counter flashing or other procedure in accordance with manufacturer's recommendations.
  2. Connect air barrier in exterior wall assembly continuously to the air barrier of the roof, to concrete below-grade structures, to exterior doors, storefront, curtain wall, windows, louvers, and other intersection conditions, and perform sealing of penetrations, using accessory materials and in accordance with the manufacturer's recommendations.
  3. At changes in substrate plane, provide transition material (bead of polyurethane sealant, mastic, MasterSeal NP 150 sealant, membrane counter flashing or other material recommended by manufacturer) under membrane to eliminate sharp 90-degree inside corners and to make a smooth transition from one plane to another.
  4. Provide mechanically fastened noncorrosive metal sheet to span gaps in substrate plane and to make a smooth transition from one plane to the other. Ensure substrate continuously supports membrane.
  5. At through-wall flashings, seal exposed top edge of strip with bead of mastic or MasterSeal NP 150 sealant as recommended by manufacturer.
  6. At deflection and control joints, provide backup for the membrane to accommodate anticipated movement.
  7. At expansion and seismic joints provide transition to the joint assemblies.
  8. Apply a bead of MasterSeal NP 150 sealant or trowel coat of mastic along membrane seams at reverse-lapped seams, rough cuts, and as recommended by the manufacturer.
  9. At end of each working day, seal top edge of membrane to substrate with termination mastic or MasterSeal NP 150 sealant.
  10. Do not allow materials to come in contact with chemically incompatible materials.
  11. Do not expose membrane to sunlight longer than 180 days.

### 3.4 SPRAYED FOAM AIR BARRIER SYSTEM APPLICATION

- A. General: Spray-apply polyurethane foam materials in accordance with manufacturer's recommendations.
1. Health and Safety: Follow industry health and safety practices as outlined on [www.spraypolyurethane.org](http://www.spraypolyurethane.org)
  2. Equipment: Use equipment to spray polyurethane foam complying with the manufacturer's recommendations for the specific type of application.
    - a. Record equipment settings on the Daily Work Record in accordance with the ABAA Quality Assurance Program.
    - b. Each proportioner unit shall supply only one spray gun.
  3. Ambient Conditions: Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer.
  4. Install the spray foam using a "picture frame technique" against studs or brackets. Use a

"flash coat" of WALLTITE installed over low melting asphalt or plastic based materials to avoid high exotherm temperatures. Allow the foam to cool down to the recommended temperature before adding successive lifts per design requirements.

5. Apply in consecutive passes as recommended by manufacturer to thickness as indicated on Drawings, but not less than 1/2 inch (12.70 mm) unless feathering for tying in to existing installed SPF, and not greater than 2 inches (50.80 mm). Detail work/thickness, shall be performed in accordance with manufacturer's recommendations.
6. When applying to flexible plastic flashings and self-adhering flashings and membranes, the first application of SPF should be a flash coat of material.
7. Install to specified thickness tolerances, but not more than plus 1/2 inch (12.70 mm) as long as it does not occlude the air cavity. Consideration must be given to designed air space; verify tolerances with design professional.
8. Do not install spray polyurethane foam within 3 inches (76.20 mm) of heat-emitting devices such as light fixtures and chimneys.
9. Finished surface of foam insulation shall be free of voids.
10. Remove masking materials and overspray from adjacent areas as soon as reasonable. Ensure cleaning methods do not damage work performed by others.
11. Trim excess thicknesses that would interfere with the application of cladding/covering system by other trades.
12. Clean and restore surfaces soiled by work of this Section. Consult with manufacturers of the work soiled before cleaning to ensure methods used will not damage the work.
13. Complete connections to other components and repair gaps, holes and other damage using material as recommended by the manufacturer.
14. Use care to avoid installations that result in non restrained edges of the SPF when applied over other construction materials that are not permanently and firmly bonded to the substrate, especially at openings.

### **3.5 FIELD QUALITY CONTROL**

- A. Field Quality Assurance: Implement the ABAA Quality Assurance Program requirements. Cooperate with ABAA auditors and independent testing and inspection agencies engaged by the Owner. Do not cover air barrier until it has been inspected, tested and accepted.
- B. Installer Self-Inspection: Conduct daily inspections and record the results of these inspections on a Daily Work Record in accordance with the ABAA Quality Assurance Program. Make Daily Work Records available for review upon request.
- C. Owner's Inspection and Testing: Cooperate with Owner's testing agency, if utilized. Allow access to work areas and staging. Notify Owner's testing agency in writing, of schedule for Work of this Section to allow sufficient time for testing and inspection. Daily inspection and testing may be required. Do not cover Work of this Section until testing and inspection is accepted.
- D. ABAA Site Inspections: Arrange and pay for site audits by ABAA to verify conformance with the manufacturer's instructions, the ABAA Quality Assurance Program, and this Section of the Project Specifications.
  1. Perform audits in accordance with ABAA protocol. Forward written inspection reports to the Architect within 3 working days of the receipt of the audit report.
  2. If the inspections reveal defects, promptly remove and replace defective work at no additional expense to the Owner.

### **3.6 PROTECTING AND CLEANING**

- A. Protect air barrier assemblies from damage during application and remainder of construction period, in accordance with manufacturer's written instructions.
  1. Coordinate with installers and installation of materials which cover the SPF air barrier system, to ensure exposure period does not exceed that recommended by the air barrier

manufacturer.

- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction and acceptable to the primary material manufacturer of the affected material.

END OF SECTION

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