**CavityComplete® Wall System for CMU Wall and Masonry Veneer**

**Specification Guide**

This specification guide presents in 3-part format all of the components of the CavityComplete**®** CMU/Masonry Veneer Wall System. The components are presented in two MasterFormat Divisions: **Division 04 Masonry and Division 07 Thermal and Moisture Protection**.

System performance requirements including the optional CavityComplete Wall System /Air Barrier Association of America Quality Assurance Program (CavityComplete / ABAA QAP) are presented in **Division 01 Exterior Enclosure Performance Requirements** where all components are specified as a single system.

The major section headings provided are outlined below. Sections that require editing by the specifier are marked in **[highlighted bold with brackets]. ],** including references to the CavityComplete / ABAA QAP. Notes to the specifier are marked in [orange with brackets.] Please note that edits to all three Divisions are required to ensure complete performance of the system.

**Division 01 General Requirements:**Divisions 04 and 07 provided in this document outline complete 3-part MasterFormat sections for all components of a CMU Wall with masonry veneer wall system.

Each of those sections cross reference back to the Division 01 Exterior Enclosure Performance Requirements to ensure that complete system performance requirements for building code compliance are concisely stated in the construction documents.

Include this section in your Project Manual to establish code compliance and complete system performance requirements.

**SECTION 01 83 16 EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS**

**Division 04 Masonry Accessory Components:**This section includes Heckmann Building Products Hook and Ladder Joint Reinforcement & Wire Ties, Mortar Net Solutions™ TotalFlash® flashing and CompleteFlash® corner boots and end dams, MPE-1 sealant materials, MortarNet™ cavity mortar dropping collection device, and WeepVent™ weep hole/vent inserts. This section outlines those products where they are commonly placed in the unit masonry MasterFormat section:

**SECTION 04 20 00 UNIT MASONRY**

Alternatively, the text for each product may be cut & pasted into their specific MasterFormat Sections if desired:

**SECTION 04 05 19 MASONRY ANCHORS and SECTION 04 05 23 MASONRY ACCESSORIES**

**Division 07 Insulation Components**:   
This section includes Owens Corning® (OC) FOAMULAR® Extruded Polystyrene continuous insulation attached by compression-fit or adhesive. This section outlines those products where they are commonly placed in the thermal insulation MasterFormat section:

**SECTION 07 21 00 THERMAL INSULATION**

Alternatively, the text for each product may be cut & pasted into their specific MasterFormat Sections if desired:

**SECTION 07 21 13 BOARD INSULATION**

**Division 07** **Air and Water Barrier Components:**This section includes PROSOCO R-Guard® Cat-5**®** Vapor-Permeable Air & Weather Barrier Membrane and accessories. They are presented in this document in their specific MasterFormat section:

**SECTION 07 27 00 AIR BARRIERS**

Alternatively, the text provided in the specific sections may be cut & pasted into the general MasterFormat Section sometimes used to cover air barriers and accessories in general:

**SECTION 07 27 26 Fluid-Applied Membrane Air Barriers**

**Division 07 Firestopping Components:**This section includes Owens Corning® Thermafiber® (mineral wool) Safing. This section outlines those products where they are commonly placed in the Firestopping MasterFormat section:

**SECTION 07 84 00 FIRESTOPPING**

Alternatively, for projects where both wall penetration firestopping and building perimeter firestopping are required, the text for each scope of work may be cut and pasted into more specific MasterFormat Sections if desired:

**SECTION 07 84 13 PENETRATION FIRESTOPPING**

**PROJECT ARCHITECT RESPONSIBILITY:** This is a general specification guide, intended to be used by experienced construction professionals, in conjunction with good construction practice and professional judgment. This guide is to aid in the creation of a complete wall system specification that is to be fully reviewed and edited by the Architect of Record. Sections of this guide should be included, or edited, or omitted based on the requirements of a specific project. It is the responsibility of both the specifier and the purchaser to determine if a product or system is suitable for its intended use. Neither Owens Corning®, PROSOCO R-Guard®, Heckmann Building Products, Mortar Net Solutions™, Rodenhouse, Inc, nor any of their subsidiary or affiliated companies, assume any responsibility for the content of this specification guide relative to actual projects, and specifically disclaim any and all liability for any errors or omissions in design, detail, structural capability, attachment details, shop drawings or other construction related details, whether based upon the information provided by the aforementioned companies or otherwise.

**SECTION 01 83 16 EXTERIOR ENCLOSURE PERFORMANCE REQUIRMENTS**

**PART 1 – GENERAL**

* 1. SUMMARY

Tested Wall System Description: Furnish and install specified products that have been tested as the CavityComplete**®** CMU Wall System meeting specified performance requirements for thermal, air, water, and fire resistance.

1. SECTION INCLUDES:
2. The complete wall system shall include the following:
3. **[Brick, Stone, Concrete]** unit masonry over concrete masonry unit cavity wall by other contractors.
4. Concrete Masonry Unit (CMU) exterior wall to resist vertical and transverse structural loading.
5. Hook & ladder joint reinforcement.
6. Continuous fluid-applied air and water resistive barrier system applied to the exterior face of the CMU structural wall installed in an airtight and flexible manner, allowing for the relative movement of systems due to thermal and moisture variations and capable of withstanding positive and negative combined wind, stack, and HVAC pressures on the envelope without damage or displacement.
7. Extruded Polystyrene Foam continuous insulation permanently secured by **[compression-fit between masonry ties & clips, adhesive.]**
8. **[Safing to firestop the perimeter of door and window penetrations through wall.]**
9. Masonry accessories including prefabricated through wall flashing, masonry veneer anchors, and mortar droppings protection.
10. **[The airtight components of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the air-tightness of the building enclosure are called “the air barrier system”. Services include coordination between the trades, the proper scheduling and sequencing of the work, preconstruction meetings, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.]**
11. **[The Contractor shall ensure that the intent of constructing the building enclosure with a continuous air barrier system to control air leakage into, or out of the conditioned space is achieved. The air barrier system shall have the following characteristics:** 
    1. **It must be continuous, with all joints sealed.**
    2. **It must be structurally supported to withstand positive and negative air pressures applied to the building enclosure.**
    3. **Connection shall be made between:**
       1. **Foundation and walls.**
       2. **Walls and windows or doors.**
       3. **Different wall systems.**
       4. **Wall and roof.**
       5. **Wall and roof over unconditioned space.**
       6. **Walls, floor and roof across construction, control and expansion joints.**
       7. **Walls, floors and roof to utility, pipe and duct penetrations.**
12. **Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration / exfiltration shall be sealed.]**
13. **[Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.]**
    1. **Basis of Design: CavityComplete / Air Barrier Association of America Quality Assurance Program (CavityComplete ABAA / QAP)**
14. **[Requirements of this section relate to the coordination between subcontractors required to provide an airtight building enclosure, customized fabrication and installation procedures, not production of standard products.** 
    1. **Continuity of the air barrier materials and products with joints to provide assemblies. Continuity of all the enclosure assemblies with joints and transition materials to provide a whole building air barrier system.**
    2. **Specific quality-control requirements for individual construction activities are specified in the sections of the specifications. Requirements in those sections may also cover production of standard products. It is the Contractor’s responsibility to ensure that each subcontractor is adequately and satisfactorily performing the quality assurance documentation, tests and procedures required by each section.**
    3. **Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.**
    4. **Requirements for Contractor to provide an airtight building enclosure is not limited by quality-control services required by Architect, Owner, or authorities having jurisdiction and are not limited by provisions of this section.]**
    5. RELATED SECTIONS
15. Refer to the following Sections for additional requirements for each component in the assembly
16. **Section 03 45 00 [Project Specific],** Precast Architectural Concrete
17. **Section 04 08 00 [Project Specific],** Commissioning of Masonry
18. **Section 04 20 00 [Project Specific],** Unit Masonry
19. **Section 04 43 00 [Project Specific],** Stone Masonry
20. **Section 05 50 00 [Project Specific],** Metal Fabrication (lintels, shelf angles, and masonry support)
21. **Section 07 10 00 [Project Specific],** Dampproofing and Waterproofing
22. **Section 07 21 00 [Project Specific],** Thermal Insulation
23. **Section 07 27 00 [Project Specific],** Air Barriers
24. **Section 07 50 00 [Project Specific],** Membrane Roofing
25. **Section 07 62 00 [Project Specific],** Sheet Metal Flashing and Trim
26. **Section 07 65 00 [Project Specific],** Flexible Flashings
27. **Section 07 84 00 [Project Specific],** Firestopping
28. **Section 07 92 00 [Project Specific],** Joint Sealants
29. **Section xx xx xx [Project Specific],** LEED Requirements

* 1. ADMINISTRATIVE REQUIREMENTS

1. COORDINATION

Coordinate installation of masonry, masonry accessories, insulation, and firestopping at openings with air barrier membrane and other moisture protection work.

1. **[CONTRACTOR RESPONSIBILITIES  
   Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide coordination of the trades, and the sequence of construction to ensure continuity of the air barrier system joints, junctures and transitions between materials and assemblies of materials and products, from substructure to walls to roof. Provide quality assurance procedures, testing and verification as specified herein. Facilitate inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction or by the Owner. Costs for these services are included in the Contract Sum**

**Organize preconstruction meetings between the trades involved in the whole building’s air barrier system to discuss where each trade begins and ends and the responsibility and sequence of installation of all the air-tight joints, junctures, and transitions between materials, products and assemblies of products specified in the different sections, to be installed by the different trades.**

**Build a mock-up before proceeding with the work, satisfactory to the Architect, of each air-tight joint type, juncture, and transition between products, materials and assemblies.]**

* + - * 1. **[Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:**

**Provide access to the Work.**

**Furnish incidental labor and facilities necessary to facilitate inspections and tests.**

**Take adequate quantities of representative samples of materials that require testing or**

**assist the agency in taking samples.**

**Deliver samples to testing laboratories.**

**Provide security and protection of samples and test equipment at the Project Site.]**

* + - * 1. **[Duties of the Testing and Inspection Agency: The independent agency engaged to perform inspections, sampling, and testing of air barrier materials, components and assemblies specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.**

**The agency shall notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.**

**The agency is not authorized to release, revoke, alter, or enlarge requirements of the  
Contract Documents or approve or accept any portion of the Work.**

**The agency shall not perform any duties of the Contractor.]**

* + - * 1. **[Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.**

**The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.]**

* + - * 1. PREINSTALLATION MEETINGS

Convene a meeting of involved sub-contractors a minimum of two weeks prior to commencing Work described in this Section.

1. Attendance is required by representatives of related trades including Owner’s Representative, Contractor, Architect, Installer, Air Barrier Membrane System Manufacturer, Roofing and Foundation Waterproofing Subcontractor, and all subcontractors who have materials penetrating the air barrier membrane system or finishes covering the membrane system. Manufacturer’s Representative is available upon request with minimum two-week notice.
2. Contractor shall notify **[Architect, Engineer, Consultant]** at least 14 days prior to time for meeting.
3. Contractor shall record minutes of meeting and distribute to attending parties.
4. The agenda shall include at a minimum:
   1. Materials proposed for use.
   2. Verification of eligibility for the CavityComplete**®** CMU Wall Warranty.
   3. Sequence of construction.
   4. Coordination with substrate preparation, condition, and pretreatment.
   5. Compatibility of materials.
   6. Air barrier requirements and installation.
   7. Minimum curing period.
   8. Special details.
   9. Mockups.
   10. Air leakage and adhesion testing and inspection.
   11. Air barrier protection and repair.
   12. Work scheduling that covers air barrier coordination with installation of adjacent and covering materials.
   13. Review and approval of all glazing applications.
   14. SUBMITTALS

Provide the following information in accordance with **Section 01 33 00 [Project Specific]** Submittal Procedures.

1. Product Data:

Submit product data of each component in tested wall assembly as required in Sections 04 20 00 Unit Masonry, 07 21 00 Thermal Insulation, 07 27 00 Air Barriers, and **[07 84 13 Window/ Door/ Opening Penetration Firestopping].**

1. Shop Drawings (project-specific to air barrier assembly)

Submit shop drawings demonstrating tested wall assembly components as specified in Sections 04 20 00 Unit Masonry, 07 21 00 Thermal Insulation, 07 27 00 Air Barriers, and **[07 84 13 Window/ Door/ Opening Penetration Firestopping].**

1. Samples:

Submit product minimum **[three]** samples of each component of the tested wall assembly system as required by this Section.

1. Certificates:

Submit documentation, signed by manufacturers, that products in tested wall assembly meet Quality Assurance Requirements as required in this Section.

1. Test AND EVALUATION Reports:

Submit manufacturer’s verification, test reports, or third-party engineering analysis that the proposed materials assembled as a tested wall system comply with the specified PERFORMANCE/ DESIGN CRITERIA of this Section.

1. MANUFACTURER’S INSTRUCTIONS

Provide installation instructions for all products in tested wall assembly as required in this Section.

1. SUSTAINABLE DESIGN SUBMITTALS:

Provide documentation of required Quality Assurance Sustainability Standards Certifications for all products in tested wall assembly as required in this Section.

1. SPECIAL PROCEDURE SUBMITTALS

Submit documentation of all CavityComplete**®** Components used in the Project as required for CavityComplete**®** CMU Wall System Limited Warranty. CavityComplete**®** Assembly Warranty requires documentation that all components of the assembly are tested together and used on the project. The contractor shall complete and submit CavityComplete**®** Project Profile documentation establishing eligibility for warranty prior to installation.

1. QUALIFICATION STATEMENTS

Provide documentation of required Quality Assurance Qualifications for Manufacturers and Installers for all products in tested wall assembly as required in this Section.

1. WARRANTY DOCUMENTATIOn

Submit sample warranties as required by this Section.

* 1. QUALITY ASSURANCE

1. QUALIFICATIONS
   1. Manufacturers and Installers of specified products in the tested wall assembly shall meet Quality Assurance Qualifications requirements per Sections 04 20 00 Unit Masonry, 07 21 00 Thermal Insulation, 07 27 00 Air Barriers, and **[07 84 13 Window/ Door/ Opening Penetration Firestopping].**
   2. **[Air barrier testing and inspection agencies including independent testing laboratories shall be utilized that are prequalified and that specialize in the types of air barrier system inspections and tests to be performed.]**
2. **[TESTING AND INSPECTION]**
   1. **[The Owner will hire a testing and inspection agency to provide [Continuous] [Occasional] observation and inspection during installation of the air barrier system. The testing and inspection agency will provide the following listed services:**
      1. **Qualitative Testing and Inspection:**
         1. **Review daily work records provided by the Certified installer with copies available to the Owner, Contractor and Architect.**
         2. **Observe the continuity of the air barrier system throughout the building enclosure with no gaps, holes.**
         3. **Confirm the structural support of the air barrier system to withstand design air pressures.**
         4. **Confirm that the masonry and concrete surfaces are smooth, clean and free of cavities, protrusions and mortar droppings.**
         5. **Confirm site conditions for application temperature and dryness of substrates.**
         6. **Determine the maximum length of exposure time of materials to ultra-violet deterioration.**
         7. **Measure and confirm that the installed thickness of liquid-applied materials meets the manufacturer’s requirements for the specific substrate.**
         8. **Review manufacturers letters for materials compatibility.**
         9. **Confirm transitions at changes in direction, and structural support at gaps.**
         10. **Confirm connections between assemblies (membrane and sealants) for cleaning, preparation and priming of surfaces, structural support, integrity and continuity of seal.**
         11. **Confirm that all penetrations have been sealed.**
         12. **Conduct one of the means listed in ASTM E 1186 “Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems.”**
             1. **Infrared scanning with pressurization/depressurization.**
             2. **Smoke pencil with pressurization/depressurization.**
             3. **Pressurization/depressurization with use of anemometer**
             4. **Generated sound with sound detection**
             5. **Tracer gas measurement of decay rate**
             6. **Chamber pressurization/depressurization in conjunction with smoke tracers**
             7. **Chamber depressurization using detection liquids]**
3. **[QUANTITATIVE TESTS]**

**Provide written test reports of all tests performed, with copies to the Owner, Contractor and Architect.**

**Material compliance for maximum air permeance, ASTM E 2178.**

**ASTM E 2357, test pressure and allowable air leakage rate to be determined by design professional for interior design conditions and location of project.**

**CAN/CGSB 1986 Standard 149.10, Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method.**

**CAN/CGSB 1996 Standard 149.15 Determination of the Overall Envelope Airtightness of Office Buildings by the Fan Depressurization Method Using the Building’s Air Handling System.**

**Whole building, floors, or suites, ASTM E779, Determining Airtightness of Buildings Air Leakage Rate by Single Zone Air Pressurization.**

**Windows and connections to adjacent opaque assemblies, ASTM E783 method B**

**Tracer gas testing, ASTM E741**

**Pressure test, ASTM E330**

**Bond to substrate, ASTM D4541]**

1. CERTIFICATIONS
2. Provide Manufacturer’s written certification that tested wall assembly components are compatible and provided as a single-source from the manufacturer.
3. Provide Manufacturer’s written certification that components are compatible with all adjacent materials that come into contact with the materials during construction and throughout the life of the building including insulation and attached membranes.
4. Provide Manufacturer’s written certification that products are for the intended purpose as described in this Section.
5. sustainability standards certifications

Provide documentation that specified products of the tested assembly meet Product Design/ Performance Criteria and Product Materials requirements of this Section and Quality Assurance Sustainability Standards Certifications of Sections04 20 00 Unit Masonry, 07 21 00 Thermal Insulation, 07 27 00 Air Barriers, and **[07 84 13 Window/ Door/ Opening Penetration Firestopping].**

1. mock-ups

Construct a wall system sample panel minimum 8 feet long x 8 feet high that includes CMU Wall, air and water barrier, extruded polystyrene board insulation, insulation fastening method, through-wall flashing, termination bars, drip edge, mortar droppings protection, sealants, weep vent protection, masonry anchors/ties, **[perimeter fire rated joint],** and masonry veneer. The mock-up shall also include a window, storefront, or door frame, and sill opening transition assembly detailed with lintel, head, and sill flashings, and end dams to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

1. Coordinate construction of mockups to permit inspection by Owner's testing agency of air barrier before external insulation and cladding are installed.
2. Include transitions to roofing membrane, building corner condition, and foundation wall.
3. **[Architect, Engineer, Consultant]** approval of mockup is required. If it is determined that mockup does not comply with requirements, affected details must be reconstructed until mockups are approved.
4. Locate as directed and remove upon review and approval.
5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless **[Architect, Engineer, Consultant]** specifically approves such deviations in writing. **[Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.]**
6. **[Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.]**
7. DELIVERY, STORAGE, AND HANDLING

For specified products in the tested wall assembly, follow Delivery, Storage, and Handling requirements per Sections 04 20 00 Unit Masonry, 07 21 00 Thermal Insulation, 07 27 00 Air Barriers, and **[07 84 13 Window/ Door/ Opening Penetration Firestopping].**

1. FIELD CONDITIONS

For specified products in the tested wall assembly, follow Field Conditions requirements per

Sections 04 20 00 Unit Masonry, 07 21 00 Thermal Insulation, 07 27 00 Air Barriers, and **[07 84 13 Window/ Door/ Opening Penetration Firestopping].**

1. WARRANTY
2. PRODUCT WARRANTY

Provide product warranties as required by Sections 04 20 00 Unit Masonry, 07 21 00 Thermal Insulation, 07 27 00 Air Barriers, and **[07 84 13 Window/ Door/ Opening Penetration Firestopping].**

1. SYSTEM WARRANTY

Provide system warranty as required by Section 07 27 00 Air Barriers.

1. INSTALLATION WARRANTY

Provide installation warranty as required by Section 07 27 00 Air Barriers.

1. SPECIAL WARRANTY

Provide CavityComplete**®** CMU Wall System Limited Warranty or approved substitute in accordance with **[Section 01 83 16-2.1.A.1]** to the Owner that jointly covers the products including continuous insulation, air and water-resistive barrier, masonry veneer ties, hook and ladder joint reinforcement, prefabricated through wall flashing and pre-molded end dams and corners, mortar droppings protection, masonry head joint vents, **[and mineral wool safing insulation]** as part of the CavityComplete**®** Wall System, when properly applied and installed in accordance with written specifications, technical data sheets, and application instructions and subject to normal and proper use, will be free from defects in manufacturing that materially affect performance of the Building for a period of 10 years. CavityComplete**®** System Warranty requires documentation that all components of the assembly are tested together and used on the project. The contractor shall complete and submit CavityComplete**®** Project Profile documentation establishing eligibility for warranty prior to installation.

**PART 2 – PRODUCTS**

* 1. TESTED EXTERIOR WALL ASSEMBLY

1. MANUFACTURERS

BASIS-OF-DESIGN: CavityComplete**®** CMU Wall System ([www.cavitycomplete.com](http://www.cavitycomplete.com)).

1. Substitution Limitations

The “Basis of Design” tested wall assembly listed in this Section is tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered:

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third-party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third-party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers offer complete system warranty including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, **Section 01 83 16 [Project Specific].**
6. DESCRIPTION

Provide and install concrete masonry unit exterior wall **[load-bearing, non-load bearing], [fire resistance rated, non-rated]** system, with fluid-applied air and water resistive barrier membrane over the concrete masonry unit surface, with extruded polystyrene foamcontinuous insulation that effectively controls thermal, air, and water performance and provides continuous insulation and continuity of the building envelope.

1. PERFORMANCE/ DESIGN CRITERIA
2. FIRE CONTAINMENT AND RESISTANCE
   1. NFPA 285 Limited Fire Propagation: [If needed, refer to applicable building code for requirements.]   
      Provide products that as a complete wall system pass NFPA 285, Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.
   2. ASTM E119 Fire Resistance: [If needed, refer to applicable building code for requirements.]   
      Provide products that as a system passes ASTM E119, Test Methods for Fire Tests of Building Construction and Materials.
3. ASTM E2357 AIR LEAKAGE RESISTANCE

Provide a continuous air barrier as part of the tested wall system that has an air leakage not exceeding 0.004 cubic feet per square foot per minute under a pressure differential of 0.3 in. water (1.57 pounds per square foot) [0.20 liters per second per square meter at a pressure difference of 75 Pascals (0.20 L/(s·m²) @ 75 Pa)] when tested in accordance with ASTM E2357. Assembly shall accommodate movements of building materials by providing expansion and control joints as required.

1. ASTM E331 WATER PENETRATION

Provide a tested wall system tested in accordance with ICC-ES AC 212, Section 4.5, Acceptance Criteria for Water Resistive Coatings Used as Water Resistive Barriers over Exterior Sheathing, demonstrating that the system, tested in accordance with ASTM E331, shows no visible water penetration for 15 minutes at an air-pressure differential across the wall assembly of 2.86 psf (137 Pa), and 45 minutes at 6.27 psf (300 Pa).

1. ADHESION AND COMPATIBILITY

Provide a tested wall system that has all components that will have intimate contact tested according to ASTM C794, for adhesion and AAMA 713 for compatibility. Adhesion of the components that will be in contact should be greater than 5 pli, with a failure mode that is a minimum 80% Cohesive Failure. All components having contact should also pass AAMA 713.

1. THERMAL RESISTANCE

Provide a tested wall system that meets or exceeds code required R-value for exterior wall assemblies in the jurisdiction of the project. Submit manufacturer product data sheets and test reports prepared by a qualified testing agency to verify properties for insulation including R-value and other physical properties.

1. SOUND TRANSMISSION

Provide a tested wall system that meets or exceeds a Sound Transmission Class (STC) >55, and Outdoor Indoor Transmission Class (OITC) of >45 to >50 depending on wall design. Submit wall system engineering analysis or test reports for the wall assembly performed by qualified acoustical engineer or testing agency documenting STC and OITC classifications. [Include if STC and OITC are important to project performance. Refer to IBC 2015 Section 1207.]

1. INDOOR AIR QUALITY

Provide insulation products extruded polystyrene that carry GREENGUARD Gold Certification for low-emitting materials.

1. RECYCLED CONTENT

Provide insulation products **[mineral wool safing and extruded polystyrene insulation]** whose recycled content is verified via third party certification.

1. THIRD PARTY LISTING, CERTIFICATION, AND ENGINEERING JUDGEMENTS

Provide independent third party verification listings or engineering judgements for the primary code requirements of fire propagation (NFPA 285), air leakage resistance (ASTM E2357), and water penetration (ASTM E331).

1. MATERIALS
2. **[Brick, Stone, Concrete]** unit masonry over concrete masonry unit cavity wall by other contractors.
3. Concrete Masonry Unit (CMU) exterior wall to resist vertical and transverse structural loading.
4. Hook & ladder joint reinforcement.
5. Continuous fluid-applied air and water resistive barrier system applied to the exterior face of the CMU structural wall installed in an airtight and flexible manner, allowing for the relative movement of systems due to thermal and moisture variations and capable of withstanding positive and negative combined wind, stack, and HVAC pressures on the envelope without damage or displacement.
6. Extruded Polystyrene Foam continuous insulation permanently secured by **[compression-fit between masonry ties & clips, adhesive.]**
7. **[Safing to firestop the perimeter of door and window penetrations through wall.]**
8. Masonry accessories including prefabricated through wall flashing, masonry veneer anchors, and mortar droppings protection.

**PART 3 – EXECUTION- NOT USED**

**END OF SECTION 01 83 16**

**SECTION 04 20 00 UNIT MASONRY**

**PART 1 – GENERAL**

* 1. SUMMARY

See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire propagation), ASTM E2357 (air resistance), and ASTM E331 (water resistance). All proposed product substitutions must comply to be considered.

1. SECTION INCLUDES
2. Provide and install concrete masonry unit exterior wall **[load-bearing, non-load bearing], [fire resistance rated, non-rated]** system, with fluid-applied air and water resistive barrier membrane over the concrete masonry unit surface, with extruded polystyrene foamcontinuous insulation that effectively controls thermal, air, and water performance and provides continuous insulation and continuity of the building envelope. Provide labor, materials, tools and equipment necessary to complete the Work of this Section including, but not limited to, the following:
3. **[Brick, Stone, Concrete]** unit masonry over concrete masonry unit cavity wall.
4. Mortar and grout.
5. Hook & ladder joint reinforcement.
6. Embedded unitized flashing (drip edge, termination bar, drainage mat, pre-molded end dams and corner boots, and sealant).
7. Flashing accessories (sealant, one-piece pre-formed corner boots and end dams).
8. Mortar droppings collection devices (open mesh with insect barrier to collect and suspend mortar droppings).
9. Weep hole vents (joint insert for air and water drainage).
10. The complete wall system shall include the following:
11. **[Brick, Stone, Concrete]** unit masonry over concrete masonry unit cavity wall by other contractors.
12. Concrete Masonry Unit (CMU) exterior wall to resist vertical and transverse structural loading.
13. Hook & ladder joint reinforcement.
14. Continuous fluid-applied air and water resistive barrier system applied to the exterior face of the CMU structural wall installed in an airtight and flexible manner, allowing for the relative movement of systems due to thermal and moisture variations and capable of withstanding positive and negative combined wind, stack, and HVAC pressures on the envelope without damage or displacement.
15. Extruded Polystyrene Foam continuous insulation permanently secured by **[compression-fit between masonry ties & clips, adhesive.]**
16. **[Safing to firestop the perimeter of door and window penetrations through wall.]**
17. Masonry accessories including prefabricated through wall flashing, masonry veneer anchors, and mortar droppings protection.
18. All joints, penetrations, and gaps of the air barrier wall system shall be made water and air tight.
19. RELATED SECTIONS

The items listed are not included in this Section, but are specified in the Section listed:

1. **Section 03 45 00 [Project Specific],** Precast Architectural Concrete
2. **Section 04 08 00 [Project Specific],** Commissioning of Masonry
3. **Section 04 43 00 [Project Specific],** Stone Masonry
4. **Section 05 50 00 [Project Specific],** Metal Fabrication (lintels, shelf angles, and masonry support)
5. **Section 07 10 00 [Project Specific],** Dampproofing and Waterproofing
6. **Section 07 21 00 [Project Specific],** Thermal Insulation
7. **Section 07 27 00 [Project Specific],** Air Barriers
8. **Section 07 50 00 [Project Specific],** Membrane Roofing
9. **Section 07 62 00 [Project Specific],** Sheet Metal Flashing and Trim
10. **Section 07 65 00 [Project Specific],** Flexible Flashings
11. **Section 07 84 00 [Project Specific],** Firestopping
12. **Section 07 92 00 [Project Specific],** Joint Sealants
13. **Section xx xx xx [Project Specific],** LEED Requirements

* 1. REFERENCES

1. REFERENCE STANDARDS

Materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use. [Delete references from the list below that are not required by the text of the edited Section.]

1. American Concrete Institute (ACI)
2. ACI 530: Specifications for Masonry Structures
3. American Society of Civil Engineers (ASCE)
4. ASCE 6: Specifications for Masonry Structures
5. American Society for Testing of Materials (ASTM)
6. ASTM C272: Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
7. ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
8. ASTM C578: Standard Specification for Rigid Cellular Polystyrene Thermal Insulation
9. ASTM C665: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
10. ASTM D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
11. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
12. ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials
13. ASTM E119: Standard Test Methods for Fire Tests of Building Constructions and Materials
14. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
15. ASTM E2178: Standard Test Method for Air Permeance of Building Materials
16. ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
17. **International Code Council Evaluation Service (ICC-ES)**
18. **[AC 71: Acceptance Criteria for Foam Plastic Sheathing panels Used as Water Resistive Barriers]**
19. National Fire Protection Association (NFPA)
20. NFPA 285: Standard Fire Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components
21. The Masonry Society (TMS)
22. TMS 402: Specifications for Masonry Structures
    1. ADMINISTRATIVE REQUIREMENTS
23. COORDINATION

Coordinate installation of masonry and masonry accessories with air barrier membrane and other moisture protection work.

1. PREINSTALLATION MEETINGS

Convene a meeting of involved sub-contractors a minimum of two weeks prior to commencing Work described in this Section.

1. Attendance is required by representatives of related trades including Owner’s Representative, Contractor, Architect, Installer, Air Barrier Membrane System Manufacturer, Roofing and Foundation Waterproofing Subcontractor, and all subcontractors who have materials penetrating the air barrier membrane system or finishes covering the membrane system. Manufacturer’s Representative is available upon request with minimum two-week notice.
2. Contractor shall notify **[Architect, Engineer, Consultant]** at least 14 days prior to time for meeting.
3. Contractor shall record minutes of meeting and distribute to attending parties.
4. The agenda shall include at a minimum:
5. Materials proposed for use.
6. Verification of eligibility for the CavityComplete**®** CMU Wall Warranty.
7. Sequence of construction.
8. Coordination with substrate preparation, condition, and pretreatment.
9. Compatibility of materials.
10. Air barrier requirements and installation.
11. Minimum curing period.
12. Special details.
13. Mockups.
14. Air leakage and adhesion testing and inspection.
15. Air barrier protection and repair.
16. Work scheduling that covers air barrier coordination with installation of adjacent and covering materials.
17. Review and approval of all glazing applications.
    1. SUBMITTALS

Provide the following information in accordance with **Section 01 33 00 [Project Specific]** Submittal Procedures.

1. Product Data: Manufacturers’ data on each type of product furnished including:
2. Preparation instructions and recommendations.
3. Technical data and tested physical and performance properties of products.
4. Storage, handling requirements, and recommendations.
5. Shop Drawings (project-specific to air barrier assembly)
6. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, flashing transition assemblies and tie-ins with adjoining construction.
7. Include details of interfaces with other materials that form part of air barrier.
8. Samples: Submit product minimum **[three]** samples of the following:
9. Masonry Ties.
10. Hook & Ladder Joint Reinforcement.
11. Mortar Droppings Collection Device: Showing color, size, insect barrier, and configuration.
12. Weep Vent Insert: Showing density, size, color, and configuration.
13. Embedded Flashing Material: Showing termination bar, drainage mesh layer, drip edge, corner boots, and ends dams.
14. Preformed Corner Drip Edge.
15. Sealant.
16. Preformed Flashing Accessories.
17. Unit masonry: Sample units in straps of 5 or more units showing shape, size, density, texture, color, and specialty units.
18. Mortar: Pigmented made with the same sand and other mortar ingredients to be used on the project. Label samples to indicate types and amounts of pigment used.
19. Certificates:

Submit documentation signed by Manufacturer that products meet Quality Assurance Certification requirements of this Section.

1. Test AND EVALUATION Reports:
2. NFPA 285: Provide documentation from qualified testing agency that the air barrier system as a component of the designed wall assembly has been tested and passed NFPA 285.
3. ASTM E2357: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barrier assembly with specified fasteners, submit certified test report showing compliance with requirements specified for ASTM E2357.
4. ASTM E331: Provide documentation from a qualified testing agency that the air barrier system as a component in the designed wall assembly has been tested and passed ASTM E331.
5. AAMA 713: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barrier components and through wall flashing components, submit certified test report showing compatibility requirements specified in AAMA 713.
6. ASTM C794: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barrier components, submit certified test report demonstrating adhesion requirements specified in ASTM C794.
7. MANUFACTURER’S INSTRUCTIONS

Provide Manufacturer’s installation instructions for each product specified in this Section.

1. SUSTAINABLE DESIGN SUBMITTALS

Submit Health Product Declaration (HPD) and recycled content of each product specified as required in Quality Assurance Sustainability Standards Certification of this Section.

**[LEED: Provide product prerequisite and/or credit summaries for each product specified as applicable including recycled content and Health Product Declaration (HPD).]**

1. SPECIAL PROCEDURE SUBMITTALS

Submit documentation of all CavityComplete**®** Components used in the Project as required for CavityComplete**®** CMU Wall System Limited Warranty. CavityComplete**®** Assembly Warranty requires documentation that all components of the assembly are tested together and used on the project. The contractor shall complete and submit CavityComplete**®** Project Profile documentation establishing eligibility for warranty prior to installation.

1. QUALIFICATION STATEMENTS

Provide documentation of required Quality Assurance Qualifications for Manufacturers and Installers for all products in tested wall assembly as required in this Section.

1. WARRANTY DOCUMENTATIOn

Submit sample warranties as required by this Section.

* 1. QUALITY ASSURANCE

1. QUALIFICATIONS
2. MANUFACTURERS

Masonry joint reinforcement and ties and through wall flashing systems shall be manufactured and marketed by firms with a minimum **[five]** years’ experience in the production and sales of fasteners or flashings. Obtain through wall flashings through one source from a single manufacturer. Obtain hook and ladder joint reinforcement and masonry ties through one source from one source from a single manufacturer.

1. INSTALLERS

The installation work of this section shall be performed by one entity, an experienced contractor that employs installers and supervisors who are trained and authorized by manufacturer, with a minimum **[two]** years’ record of successful installations on projects of similar scope.

1. CERTIFICATIONS
2. Provide Manufacturer’s written certification that masonry joint reinforcement and ties and through wall flashing systems assembly components are compatible and provided as a single-source from the Manufacturer.
3. Provide Manufacturer’s written certification that assembly components are compatible with all adjacent materials that come into contact during construction and throughout the life of the building.
4. Provide Manufacturer’s written certification that products are for the intended purpose as described in this Section.
5. SUSTAINABILITY STANDARDS CERTIFICATIONS
6. MOCK-UPS

Construct a wall system sample panel minimum 8 feet long x 8 feet high that includes CMU Wall, air and water barrier, extruded polystyrene board insulation, insulation fastening method, through-wall flashing, termination bars, drip edge, mortar droppings protection, sealants, weep vent protection, masonry anchors/ties, **[perimeter fire rated joint],** and masonry veneer. The mock-up shall also include a window, storefront, or door frame, and sill opening transition assembly detailed with lintel, head, and sill flashings, and end dams to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

1. Coordinate construction of mockups to permit inspection by Owner's testing agency of air barrier before external insulation and cladding are installed.
2. Include transitions to roofing membrane, building corner condition, and foundation wall.
3. **[Architect, Engineer, Consultant]** approval of mockup is required. If it is determined that mockup does not comply with requirements, affected details must be reconstructed until mockups are approved.
4. Locate as directed and remove upon review and approval.
5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless **[Architect, Engineer, Consultant]** specifically approves such deviations in writing. portion of wall represented by mockup on Drawings or draw mockup as separate element.]
6. **[Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.]**
7. **[Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.]**
   1. DELIVERY, STORAGE, AND HANDLING
8. Deliver and store products in manufacturer’s unopened packaging until ready for installation.
9. Protect stored products from exposure to water and direct sunlight.
   1. FIELD CONDITIONS
10. AMBIENT CONDITIONS

Apply products within the range of ambient and substrate temperatures recommended by manufacturer.

* 1. WARRANTY

1. MANUFACTURER WARRANTY
2. Product Warranty

Provide Manufacturer’s standard product warranty for products specified in this Section.

1. SPECIAL WARRANTY

Provide CavityComplete**®** CMU Wall System Limited Warranty or approved substitute in accordance with **[Section 01 83 16-2.1.A.1]** to the Owner that jointly covers the products including continuous insulation, air and water-resistive barrier, masonry veneer ties, hook and ladder joint reinforcement, prefabricated through wall flashing and pre-molded end dams and corners, mortar droppings protection, masonry head joint vents, **[and mineral wool safing insulation]** as part of the CavityComplete**®** Wall System, when properly applied and installed in accordance with written specifications, technical data sheets, and application instructions and subject to normal and proper use, will be free from defects in manufacturing that materially affect performance of the Building for a period of 10 years. CavityComplete**®** System Warranty requires documentation that all components of the assembly are tested together and used on the project. The contractor shall complete and submit CavityComplete**®** Project Profile documentation establishing eligibility for warranty prior to installation.

**PART 2 – PRODUCTS**

* 1. MASONRY ANCHORS AND JOINT REINFORCEMENT

1. MANUFACTURERS

BASIS-OF-DESIGN: Heckmann Building Products, Inc. ([www.heckmannanchors.com](http://www.heckmannanchors.com)) #1300 Hook and Ladder Joint Reinforcement or approved equal product from one of the following:

1. **[insert acceptable alternate supplier]**
2. **[insert acceptable alternate supplier]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution:

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third-party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third-party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Provide anchors and wire ties that allow vertical adjustment but that resist tension and compression forces perpendicular to the plane of the wall, for attachment into CMU Wall, penetrating through continuous insulation and air and water resistive barrier.

1. PERFORMANCE/ DESIGN CRITERIA
2. Comply with TMS 402/ ACI 530/ASCE 6.
3. Tested per ASTM E331 as part of specified tested wall assembly.
4. Tested per ASTM E2357 as part of specified tested wall assembly.
5. Tested per NFPA 285 as part of specified tested wall assembly.
6. MATERIALS

JOINT REINFORCEMENT: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet.

1. Width: Approximately 2 inches less than nominal width walls and partitions, to provide mortar coverage of not less than 5/8 inch on joint faces exposed to exterior and ½ inch elsewhere.
2. Wire Size for Side Rods: 9 gauge.
3. Wire Size for Cross Rods: 9 gauge.
4. Wire Size for Pintle Wire Ties: 3/16 inch diameter in exterior walls.
5. Configuration:
6. Multi-Wythe Masonry: For cavity or composite masonry walls, provide adjustable wall tie pintle section fitting into eye section of cross ties spaced not more than 16 inches on center.
7. Steel Type: Hotdip Galvanized After Fabrication or Type 304 Stainless Steel.
   1. MORTAR DROPPINGS COLLECTION DEVICES
8. MANUFACTURERS

BASIS-OF-DESIGN: Mortar Net Solutions™ ([www.mortarnet.com](http://www.mortarnet.com)), MortarNet™ with Insect Barrier™ or approved equal product from one of the following:

1. **[insert acceptable alternate supplier]**
2. **[insert acceptable alternate supplier]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution:

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third-party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third-party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Provide trapezoidal shaped open mesh cavity insert to collect and suspend mortar droppings in masonry cavity walls at unequal heights to allow moisture to drain from the cavity and maintain airflow within the cavity wall.

1. PERFORMANCE/ DESIGN CRITERIA

**[0.4 inches thick x 10 inches high, 1 inch thick by 10 inches high, 2 inches thick by 10 inches high]**,

1. MATERIALS
2. Partial recycled content polyester or nylon mesh material
3. 90 percent open weave mesh
4. Compressible to allow for variation in wall cavity widths, in trapezoidal configuration connected by continuous bottom strip 3 inches high.
5. Insect barrier fabric is attached to one face of the trapezoidal material.

[2” air cavity recommended.]  
[Cavity should be no more than 1/4 inch wider than 1 inch or 2 inch thick material.]

[0.4 inch material should touch both the outer wythe and the inner wall of masonry cavity.]

* 1. WEEP VENT INSERTS

1. MANUFACTURERS

BASIS-OF-DESIGN: Mortar Net Solutions™ ([www.mortarnet.com](http://www.mortarnet.com)), WeepVent™ or approved equal product from one of the following:

1. **[insert acceptable alternate supplier]**
2. **[insert acceptable alternate supplier]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution:

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Provide compressible weep vents for insertion into intermittent head joints in masonry veneers to allow moisture to migrate and prevent the entrance of insects into the wall cavity.

1. PERFORMANCE/ DESIGN CRITERIA
2. Does not oxidize.
3. Does not support mold or fungus growth.
4. Does not react with common building materials.
5. Flame-retardant.
6. MATERIALS
7. 90 percent open weave mesh.
8. UV Resistant recycled polyester; rectangular shape.
9. Standard size: 3-1/2 inches high by ½ inch thick by 2-5/8 inches long. [Other sizes available]
10. Provide **[white, brown tan, gray, red, almond]** color from manufacturer’s standard colors to match mortar mix.
    1. EMBEDDED FLASHING MATERIALS
11. MANUFACTURERS

BASIS-OF-DESIGN: Mortar Net Solutions™ ([www.mortarnet.com](http://www.mortarnet.com)), TotalFlash®, CompleteFlash®, and accessory sealant or approved equal products from one of the following:

1. **[insert acceptable alternate supplier]**
2. **[insert acceptable alternate supplier]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution:

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third-party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third-party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Provide panelized, factory fabricated flashing and drainage system for masonry cavity walls consisting of flashing membrane, drip edge, drainage mesh, and weep tabs.

1. PERFORMANCE/ DESIGN CRITERIA
2. Tested per ASTM E331 as part of specified tested wall assembly.
3. Tested per ASTM E2357 as part of specified tested wall assembly.
4. Tested per NFPA 285 as part of specified tested wall assembly.
5. MATERIALS
6. Membrane Material
7. 40 mil elastomeric propylene diene monomer (EPDM).
8. 55 inches long including 6 inch long lap joint for an effective length of 60 inches. [Verify compatibility with adjacent materials including air and water barriers]
9. **[18 inches by 66 inches (standard), 12 inches by 66 inches (available), 24 inches by 66 inches (available).]** [Choose one]
10. Drainage Mesh and Weep Tabs: Provide drainage and weep mesh factory adhered to the flashing membrane to allow moisture in the wall cavity to migrate to the exterior of the building.
11. Recycled polyester material.
12. 3/8 inch thick by 10 inches high by 66 inches long.
13. Woven mortar collection mesh and integrated mesh weep tabs.
14. Drip Edge: Provide drip edge factory adhered to the flashing material and designed to divert water away from the wall.
15. Three inches wide by 60 inches long with hemmed, formed edge.
16. **[26 gauge (0.014 inches) Type 304 stainless steel.]**

**[24 gauge (0.028 inches) 100 percent recyclable cold-rolled copper.]**

**[24 gauge (0.028 inches Kynar-coated galvanized steel with factory painted finish.]**

[Choose one]

1. Provide **[almond, terra cotta, gray, tan]** color from manufacturer’s standard colors.
2. Preformed Corner Drip Edge
3. **[Stainless steel 90 degree preformed outside corner.]**
4. **[Stainless steel adjustable corner.]**
5. **[Copper 90 degree preformed outside corner.]**
6. **[Copper adjustable corner.]**
7. **[Galvanized steel 90 degree preformed outside corner with Kynar-coated factory painted color finish.] [Almond, terra cotta, gray, tan] color finish.**
8. **[Galvanized steel adjustable corner with Kynar-coated factory painted color finish.] [Almond, terra cotta, gray, tan] color finish.**

[Choose all that apply and choose color if applicable]

1. Termination Bar: Provide termination bar factory adhered to the flashing material and designed to secure top of the flashing membrane to the substrate.
2. **[High-strength 1/8 inch thick corrosion resistant plastic, Corrosion resistant 100 percent recyclable 16 gauge stainless steel]** 1-1/4 inch wide by 5 feet long with pre-drilled holes spaced 6 inches on center for attachment.
3. Secured through layers into CMU Wall with self-tapping hex head screws, #14 by 2 inches long with watertight neoprene self-sealing washer.
   1. ACCESSORIES
4. SEALANTS
5. MANUFACTURERS

BASIS-OF-DESIGN: Mortar Net Solutions™ ([www.mortarnet.com](http://www.mortarnet.com)) MPE-1 modified polyether sealant (not for use with TPO membranes) or approved equal product from one of the following:

1. **[insert acceptable alternate supplier]**
2. **[insert acceptable alternate supplier]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution:

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Provide single component, moisture cure with no slump sealant recommended by the manufacturer for lapping panelized sections of embedded flashing.

1. PERFORMANCE/DESIGN CRITERIA
2. Adhesion: Adheres to adjacent air barrier and flashing products per ASTM C794.
3. Compatibility: Compatible with adjacent air barrier and flashing products per AAMA 713.
4. Tested per ASTM E331 as part of specified tested wall assembly.
5. Tested per ASTM E2357 as part of specified tested wall assembly.
6. Tested per NFPA 285 as part of specified tested wall assembly.
7. PREFORMED FLASHING ACCESSORIES
8. MANUFACTURERS

BASIS-OF-DESIGN: Mortar Net Solutions™ ([www.mortarnet.com](http://www.mortarnet.com)) CompleteFlash® corner boots and end dams or approved equal product from one of the following:

1. **[insert acceptable alternate supplier]**
2. **[insert acceptable alternate supplier]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution:

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third-party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third-party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Provide one-piece, puncture resistant preformed corner boots and end dams compatible with the embedded flashing material.

1. PERFORMANCE/DESIGN CRITERIA
2. Adhesion: Adheres to flashing products per ASTM C794.
3. Compatibility: Compatible with adjacent air barrier and flashing products per AAMA 713.
4. Tested per ASTM E331 as part of specified tested wall assembly.
5. Tested per ASTM E2357 as part of specified tested wall assembly.
6. Tested per NFPA 285 as part of specified tested wall assembly.
7. MATERIALS
8. Black thermoplastic vinyl (PVC) with Elvaloy KEE, a non-migratory plasticizer and UV stabilizer.
9. **[14 inches high by six inches long by six inches wide corner boots.]**
10. **[Three inches high by four inches long by six inches wide right and left end dams.]**
11. **[Three inches high by four inches long by four inches wide universal end dams.**

[Project Specific- Choose all that apply]

**PART 3 – EXECUTION**

* 1. EXAMINATION

1. Verify that wall, opening framing, bridging and structural bracing, and other framing support members and anchorage have been installed per requirements of the Project.
2. Verify adjacent materials are dry and ready to receive joint reinforcement, ties, flashing, and accessories.
3. Verify all masonry joints are struck flush to receive proper air barrier installation.
4. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify owner’s agent and **[Architect, Engineer, Consultant]** of unsatisfactory preparation in writing before proceeding. Do not proceed with work until unsatisfactory conditions have been corrected.
5. Installation of products specified in this Section constitutes acceptance of existing conditions and assumption of responsibility for satisfactory performance.
   1. PREPARATION
6. Clean surfaces thoroughly prior to installation.
7. Prepare surfaces using methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   1. INSTALLATION
8. EMBEDDED FLASHING PREFORMED FLASHING ACCESSORIES
9. FLASHING PANELS
10. Install in proper relationship to adjacent construction with factory adhered drip edge.
11. Install using adhesive and fasteners at termination bar and drip edge, end dams and corner boots, and vertically at ends of panels.
12. Apply sealant to the top of termination bars in a tooled continuous bead.
13. Install rigid insulation board over TotalFlash®.
14. PREFORMED CORNERS AND END DAMS
15. Apply sealant MPE-1 to receive ad embed edges or corner boots and end dams.
16. Install in proper relationship to adjacent construction.
17. Install using adhesive applied surrounding the base perimeter of corner boots and end dams, and vertically at ends of panels.
18. Apply sealant to the top of termination bars and under the drip edge in a tooled continuous bead.
19. WEEP OPENINGS
20. Place WeepVent™ in open head joints at the flashing level.
21. Insert WeepVent™ at a maximum of 24 inches on center in open head joints.
22. Align exterior face of WeepVent™ insert with exterior plane of mortar.
23. For head joints taller than height of mesh insert, use custom manufactured product to match head joint.
24. Clean flashing and weep holes free of mortar droppings and debris.
25. MASONRY ANCHORS: Configure wire ties to prevent flow of water to anchor and to transfer lateral loads without excess mechanical play or deformation.
26. MORTAR DROPPINGS COLLECTION DEVICES
27. Verify flashing installation and the completion of first two courses of masonry.
28. Extend flashing from the bottom of the MortarNet™ to at least six inches above the top of the MortarNet™ to prevent mortar bridging between the outer wythe and inner wall.
29. Remove mortar droppings and debris from flashing and weep vents.
30. Install one continuous row of MortarNet™ at base of wall in cavity and over all wall openings directly on flashing with dovetail profile facing upward. For wall cavities that exceed 11 feet in height, place an additional continuous trapezoidal strip on wall reinforcing anchors/ties at every 9 feet to 11 feet of wall height.
31. Face Insect Barrier toward the outside of the building.
32. Butt ends together. Compress slightly if necessary.
    1. REPAIR
33. FILL ERRANT PUNCTURES, PENETRATIONS, AND HOLES
34. If fasteners are removed, the affected area must be detailed with air barrier sealant see **[Section 07 27 00 Air Barriers- Project Specific]** [PROSOCO R-Guard**®** Joint & Seam Filler or PROSOCO R-Guard**®** FastFlash**®**] [Note: Fill of errant punctures, penetrations, and holes may be included in two separate specification sections and therefore the responsibility of two separate trades. Identify the responsible trade according to project specific requirements.]
35. Completely fill the hole with sealant. Fill the hole in the continuous insulation board to full depth making sealant contact with the air and water barrier membrane below the insulation and fully flush with the outer face of the insulation
    1. CLEANING
36. Prior to project closeout, remove all related rubbish, excess material, scaffolding, tools, and equipment from the site. Dispose of waste material in a manner approved by applicable jurisdictions.
    1. PROTECTION
37. Protect installed products until completion and project closeout.
38. Touch-up, repair, or replace damaged products before Substantial Completion

**END OF SECTION 04 20 00**

**SECTION 07 21 00 THERMAL INSULATION**

**PART 1 – GENERAL**

* 1. SUMMARY

See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire propagation), ASTM E2357 (air resistance), and ASTM E331 (water resistance). All proposed product substitutions must comply to be considered.

1. SECTION INCLUDES
2. Provide and install concrete masonry unit exterior wall **[load-bearing, non-load bearing], [fire resistance rated, non-rated]** system, with fluid-applied air and water resistive barrier membrane over the concrete masonry unit surface, with extruded polystyrene foamcontinuous insulation that effectively controls thermal, air, and water performance and provides continuous insulation and continuity of the building envelope. Provide labor, materials, tools and equipment necessary to complete the Work of this Section including, but not limited to, the following:
3. Extruded Polystyrene (XPS) continuous board insulation for cavity wall application.
4. Fasteners and Hardware or adhesive recommended by continuous board insulation manufacturer.
5. The complete wall system shall include the following:
6. **[Brick, Stone, Concrete]** unit masonry over concrete masonry unit cavity wall by other contractors.
7. Concrete Masonry Unit (CMU) exterior wall to resist vertical and transverse structural loading.
8. Hook & ladder joint reinforcement.
9. Continuous fluid-applied air and water resistive barrier system applied to the exterior face of the CMU structural wall installed in an airtight and flexible manner, allowing for the relative movement of systems due to thermal and moisture variations and capable of withstanding positive and negative combined wind, stack, and HVAC pressures on the envelope without damage or displacement.
10. Extruded Polystyrene Foam continuous insulation permanently secured by **[compression-fit between masonry ties & clips, adhesive.]**
11. **[Safing to firestop the perimeter of door and window penetrations through wall.]**
12. Masonry accessories including prefabricated through wall flashing, masonry veneer anchors, and mortar droppings protection.
13. All joints, penetrations, and gaps of the air barrier wall system shall be made water and air tight.
14. RELATED SECTIONS

The items listed are not included in this Section, but are specified in the Section listed:

1. **Section 03 45 00 [Project Specific],** Precast Architectural Concrete
2. **Section 04 08 00 [Project Specific],** Commissioning of Masonry
3. **Section 04 20 00 [Project Specific],** Unit Masonry
4. **Section 04 43 00 [Project Specific],** Stone Masonry
5. **Section 05 50 00 [Project Specific],** Metal Fabrication (lintels, shelf angles, and masonry support)
6. **Section 07 10 00 [Project Specific],** Dampproofing and Waterproofing
7. **Section 07 27 00 [Project Specific],** Air Barriers
8. **Section 07 50 00 [Project Specific],** Membrane Roofing
9. **Section 07 62 00 [Project Specific],** Sheet Metal Flashing and Trim
10. **Section 07 65 00 [Project Specific],** Flexible Flashings
11. **Section 07 84 00 [Project Specific],** Firestopping
12. **Section 07 92 00 [Project Specific],** Joint Sealants
13. **Section xx xx xx [Project Specific],** LEED Requirements

* 1. REFERENCES

1. REFERENCE STANDARDS

Materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use. [Delete references from the list below that are not required by the text of the edited Section.]

1. American Society for Testing of Materials (ASTM)
2. ASTM A272: Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.
3. ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of Heat Flow Meter Apparatus.
4. ASTM C578: Standard Specification for Rigid Cellular Polystyrene Thermal Insulation.
5. ASTM C665: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
6. ASTM D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
7. ASTM D4258: Standard Practice for Surface Cleaning Concrete for Coating
8. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials
9. ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials
10. ASTM E119: Standard Test Methods for Fire Tests of Building Constructions and Materials
11. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
12. ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
13. International Code Council Evaluation Service (ICC-ES)
14. AC 71: Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water Resistive Barriers.
15. National Fire Protection Association (NFPA)
16. NFPA 285: Standard Fire Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

* 1. ADMINISTRATIVE REQUIREMENTS

1. COORDINATION

Coordinate installation of insulation and accessories with air barrier membrane and other moisture protection work.

1. PREINSTALLATION MEETINGS

Convene a meeting of involved sub-contractors a minimum of two weeks prior to commencing Work described in this Section.

1. Attendance is required by representatives of related trades including Owner’s Representative, Contractor, Architect, Installer, Air Barrier Membrane System Manufacturer, Roofing and Foundation Waterproofing Subcontractor, and all subcontractors who have materials penetrating the air barrier membrane system or finishes covering the membrane system. Manufacturer’s Representative is available upon request with minimum two-week notice.
2. Contractor shall notify **[Architect, Engineer, Consultant]** at least 14 days prior to time for meeting.
3. Contractor shall record minutes of meeting and distribute to attending parties.
4. The agenda shall include at a minimum:
5. Materials proposed for use.
6. Verification of eligibility for the CavityComplete**®** CMU Wall Warranty.
7. Sequence of construction.
8. Coordination with substrate preparation, condition, and pretreatment.
9. Compatibility of materials.
10. Air barrier requirements and installation **[including requirement for ABAA QAP**].
11. Minimum curing period.
12. Special details.
13. Mockups.
14. Air leakage and adhesion testing and inspection.
15. Air barrier protection and repair.
16. Work scheduling that covers air barrier coordination with installation of adjacent and covering materials.
17. Review and approval of all glazing applications.
    1. SUBMITTALS

Provide the following information in accordance with **Section 01 33 00 [Project Specific]** Submittal Procedures.

1. Product Data: Manufacturers’ data on each type of product furnished including:
2. Preparation instructions and recommendations.
3. Technical data and tested physical and performance properties of products.
4. Storage, handling requirements, and recommendations.
5. Shop Drawings (project-specific to air barrier assembly)
6. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, flashing transition assemblies and tie-ins with adjoining construction.
7. Include details of interfaces with other materials that form part of air barrier.
8. Samples: Submit product minimum **[three]** samples of the following:
9. Extruded Polystyrene Insulation minimum **[three inches by three inches]**
10. Any fasteners, hardware, and adhesives recommended by manufacturer.
11. Certificates:

Submit documentation signed by Manufacturer that products meet Quality Assurance Certification requirements of this Section.

1. Test AND EVALUATION Reports:
2. NFPA 285: Provide documentation from qualified testing agency that the air barrier system as a component of the designed wall assembly has been tested and passed NFPA 285.
3. ASTM E2357: Provide documentation from a qualified testing agency that the air barrier system as a component in the designed wall assembly has been tested and passed ASTM E2357.
4. ASTM E331: Provide documentation from a qualified testing agency that the air barrier system as a component in the designed wall assembly has been tested and passed ASTM E331.
5. AAMA 713: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barrier components and through wall flashing components, submit certified test report showing compatibility requirements specified in AAMA 713.
6. MANUFACTURER’S INSTRUCTIONS

Provide Manufacturer’s installation instructions for each product specified in this Section.

1. SUSTAINABLE DESIGN SUBMITTALS

Submit Health Product Declaration (HPD) and recycled content of each product specified as required in Quality Assurance Sustainability Standards Certification of this Section.

**[LEED: Provide product prerequisite and/or credit summaries for each product specified as applicable including recycled content and Health Product Declaration (HPD).]**

1. SPECIAL PROCEDURE SUBMITTALS

Submit documentation of all CavityComplete**®** Components used in the Project as required for CavityComplete**®** CMU Wall System Limited Warranty. CavityComplete**®** Assembly Warranty requires documentation that all components of the assembly are tested together and used on the project. The contractor shall complete and submit CavityComplete**®** Project Profile documentation establishing eligibility for warranty prior to installation.

1. QUALIFICATION STATEMENTS

Provide documentation of required Quality Assurance Qualifications for Manufacturers and Installers for all products in tested wall assembly as required in this Section.

1. WARRANTY DOCUMENTATIOn

Submit sample warranties as required by this Section.

* 1. QUALITY ASSURANCE

1. QUALIFICATIONS
2. MANUFACTURERS

Insulation systems shall be manufactured and marketed by a firm with a minimum of **[20]** years’ experience in the production and sales of insulation materials. Obtain continuous insulation material through one source from a single manufacturer. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified and include a list of projects of similar design and complexity completed within the past **[five]** years.

1. INSTALLERS

The installation work of this section shall be performed by one entity, an experienced contractor that employs installers and supervisors who are trained and authorized by manufacturer, with a minimum **[two]** years’ record of successful installations on projects of similar scope.

1. CERTIFICATIONS
2. Provide Manufacturer’s written certification that masonry joint reinforcement and ties and through wall flashing systems assembly components are compatible and provided as a single-source from the Manufacturer.
3. Provide Manufacturer’s written certification that assembly components are compatible with all adjacent materials that come into contact during construction and throughout the life of the building.
4. Provide Manufacturer’s written certification that products are for the intended purpose as described in this Section.
5. SUSTAINABILITY STANDARDS CERTIFICATIONS
6. GREENGUARD Indoor Air Quality Certified by independent third-party testing.
7. GREENGUARD Children and Schools Certified by independent third-party testing.
8. Health Product Declaration (HPD).
9. Minimum 20 percent recycled content Certified by independent third-party testing.
10. Zero ozone depleting blowing agent.
11. MOCK-UPS

Construct a wall system sample panel minimum 8 feet long x 8 feet high that includes CMU Wall, air and water barrier, extruded polystyrene board insulation, insulation fastening method, through-wall flashing, termination bars, drip edge, mortar droppings protection, sealants, weep vent protection, masonry anchors/ties, **[perimeter fire rated joint],** and masonry veneer. The mock-up shall also include a window, storefront, or door frame, and sill opening transition assembly detailed with lintel, head, and sill flashings, and end dams to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

1. Coordinate construction of mockups to permit inspection by Owner's testing agency of air barrier before external insulation and cladding are installed.
2. Include transitions to roofing membrane, building corner condition, and foundation wall.
3. **[Architect, Engineer, Consultant]** approval of mockup is required. If it is determined that mockup does not comply with requirements, affected details must be reconstructed until mockups are approved.
4. Locate as directed and remove upon review and approval.
5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless **[Architect, Engineer, Consultant]** specifically approves such deviations in writing. **[Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.]**
6. **[Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.]**
   1. DELIVERY, STORAGE, AND HANDLING
7. Deliver and store products in manufacturer’s unopened packaging until ready for installation.
8. Store and protect products in accordance with manufacturer’s instructions. Store in a dry area and protect from water, direct sunlight, flame, and ignition sources.
9. Remove and replace materials that are damaged or cannot be applied within their stated shelf life.
10. In the event the extruded polystyrene insulation board becomes wet, wipe dry prior to installation.
11. In the event the batt or blanket insulation becomes wet, remove it from the jobsite. [An exception may be allowed in cases where the contractor is able to demonstrate that wet insulation when fully dried (either before installation or afterward following exposure to system operating temperatures) will provide installed performance that is equivalent to new, completely dry insulation. In such cases, consult insulation Manufacturer for technical assistance.]
    1. FIELD CONDITIONS
12. AMBIENT CONDITIONS
13. Apply products within the range of ambient and substrate temperatures recommended by manufacturer.
14. Protect substrates from environmental conditions that affect insulation performance
    1. WARRANTY
15. MANUFACTURER WARRANTY
16. Product Warranty

Provide limited lifetime warranty covering all ASTM C578 physical properties of insulation products.

1. SPECIAL WARRANTY

Provide CavityComplete**®** CMU Wall System Limited Warranty or approved substitute in accordance with **[Section 01 83 16-2.1.A.1]** to the Owner that jointly covers the products including continuous insulation, air and water-resistive barrier, masonry veneer ties, hook and ladder joint reinforcement, prefabricated through wall flashing and pre-molded end dams and corners, mortar droppings protection, masonry head joint vents, **[and mineral wool safing insulation]** as part of the CavityComplete**®** Wall System, when properly applied and installed in accordance with written specifications, technical data sheets, and application instructions and subject to normal and proper use, will be free from defects in manufacturing that materially affect performance of the Building for a period of 10 years. CavityComplete**®** System Warranty requires documentation that all components of the assembly are tested together and used on the project. The contractor shall complete and submit CavityComplete**®** Project Profile documentation establishing eligibility for warranty prior to installation.

**PART 2 – PRODUCTS**

* 1. EXTRUDED POLYSTYRENE INSULATION

1. MANUFACTURERS

BASIS-OF-DESIGN: Owens Corning® ([www.ocbuildingspec.com](http://www.ocbuildingspec.com)) FOAMULAR® CW25 XPS or equal product from one of the following:

1. **[Insert acceptable alternate supplier.]**
2. **[Insert acceptable alternate supplier.]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution:

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third-party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third-party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Provide continuous extruded polystyrene insulation (sheathing), unfaced. Each insulation board must be labeled with manufacturer's name, product brand name, ASTM material specification reference, and identification of the third-party inspection agency used for building code qualification.

1. PERFORMANCE/ DESIGN CRITERIA
2. Type IV per ASTM C578 certified by independent third-party testing agency.
3. Compressive Strength: 25 psi, minimum per ASTM D1621.
4. Thermal Resistance (180-day real-time aging as mandated by ASTM C578, measured per ASTM C518 at mean temperature of 75F): R-5.0 per inch of thickness, with 90% lifetime limited warranty on thermal resistance.
5. Water Absorption (ASTM C272): Maximum.0.10 percent by volume.
6. Surface Burning Characteristics (ASTM E84): Flame spread less than 25; smoke developed less than 450, certified by independent third-party testing agency.
7. Tested per ASTM E331 as part of specified tested wall assembly.
8. Tested per ASTM E2357 as part of specified tested wall assembly.
9. Tested per NFPA 285 as part of specified tested wall assembly.
10. MATERIALS
11. Blowing Agent Formulation: Zero ozone depleting.
12. Indoor Air Quality: Compliance certified by independent third party such as GREENGUARD Indoor Air Quality Certified® and/or GREENGUARD Children and Schools Certified℠.
13. Recycle Content: Minimum 20%, certified by independent third party such as Scientific Certification Systems.
14. Provide R-5 per inch of thickness; **[3/4”, 1”, 1-1/2”, 2”, 2-1/2”, 3”, 4”]** thick; 16”x96”; square edge.

**PART 3 – EXECUTION**

* 1. EXAMINATION

1. Verify that wall, opening framing, bridging and structural bracing, and other framing support members and anchorage have been installed per requirements of the Project.
2. Verify adjacent materials are dry and ready to receive insulation.
3. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify owner’s agent and **[Architect, Engineer, Consultant]** of unsatisfactory preparation in writing before proceeding. Do not proceed with work until unsatisfactory conditions have been corrected.
4. Installation of products specified in this Section constitutes acceptance of existing conditions and assumption of responsibility for satisfactory performance.
   1. PREPARATION
5. Clean surfaces thoroughly prior to installation.
6. Prepare surfaces using methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   1. INSTALLATION
7. EXTRUDED POLYSTYRENE INSULATION
8. For fluid-applied air & water resistive barrier system, verify manufacturer recommended cure time before installing extruded polystyrene insulation board**.** [Minimum 24 hours if using CavityComplete**®** components.]
9. Install extruded polystyrene (XPS) insulation boards over the CMU Wall and air & water resistive barrier layer in accordance with manufacturers’ written recommendations.
10. Install XPS insulation board in maximum sizes to minimize joints.
11. Stagger joints.
12. Insulation board edges shall be butted together tightly and fit around openings and penetrations. Install square edges to fit square and tight.
13. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
14. Apply single layer of insulation boards to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.
15. [Choose optional installation instructions. Edit, combine, and/or retain as needed. Owens Corning® does not require a particular method of securing FOAMULAR® XPS Insulation, nor does Owens Corning® require joint sealing. Choose one of the 3 methods below.]

**[Method A: Compression-Fit**

**Secure insulation boards with two-piece wall ties designed for this purpose and specified in Division 04, Masonry Anchorage and Reinforcing. Fit courses of 16 inches wide insulation boards horizontally between 16 inches o.c. horizontal continuous joint reinforcing/ adjustable wall tie eyes. Snugly friction fit insulation in place, between the wall tie eyes. Push the insulation back tightly against the back-up wall surface, with edges butted tightly in both directions. Secure insulation in place by inserting the adjustable brick tie pintel into the wall tie eye(s).]**

**[Method B: Edge Adhesion**

**Secure insulation boards with compatible construction adhesive or PROSOCO R-Guard® Joint & Seam Filler or FastFlash®. Place pads of construction adhesive spaced approximately 24 inches (610 mm) o.c. along the edges of the inside face of the insulation board, or as recommended by the adhesive manufacturer. Construction adhesive must be recommended by its manufacturer for use with polystyrene rigid board insulation. Fit courses of insulation horizontally between wall ties and other obstructions, with edges butted tightly in both directions. Press insulation firmly in both directions. Press insulation firmly against CMU substrate wall surface.]**

**[Method C: Corner or Whole Surface Adhesion**

**Spot Method: Apply 4 spots of adhesive per insulation board and set insulation firmly against the inside wythe of masonry substrate wall. Apply spots at each corner. Spread spots to form pads 4 inches (101 mm) in diameter by ¼ inch (6 mm) thick.**

**Serrated-Trowel Method: Apply adhesive or PROSOCO R-Guard® Joint & Seam Filler or FastFlash® to entire surface of each insulation board with a serrated trowel complying with the adhesive manufacturer’s written instructions. Seal joints between foam plastic insulation units by applying adhesive, mastic, or sealant to edges of each board to form a tight seal as units are pressed into place. Fill voids in completed installation with adhesive, mastic, or sealant. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose in [Division 04- Masonry]. ]**

1. Install exterior brick veneer as soon as possible, best within 60 days, to avoid possible discoloration of the foam from UV exposure.
   1. REPAIR
2. FILL ERRANT PUNCTURES, PENETRATIONS, AND HOLES
3. If fasteners are removed, the affected area must be detailed with air barrier sealant see **[Section 07 27 00 Air Barriers- Project Specific]** [PROSOCO R-Guard**®** Joint & Seam Filler or PROSOCO R-Guard**®** FastFlash**®**] [Note: Fill of errant punctures, penetrations, and holes may be included in two separate specification sections and therefore the responsibility of two separate trades. Identify the responsible trade according to project specific requirements.]
4. Completely fill the hole with sealant. Fill the hole in the continuous insulation board to full depth making sealant contact with the air and water barrier membrane below the insulation and fully flush with the outer face of the insulation
   1. CLEANING
5. Prior to project closeout, remove all related rubbish, excess material, scaffolding, tools, and equipment from the site. Dispose of waste material in a manner approved by applicable jurisdictions.
   1. PROTECTION
6. Protect installed products until completion and project closeout.
7. If black tape or coatings are installed over the insulation board, cover the black surfaces as soon as possible to avoid damage due to potential solar heat build-up on the black surface.
8. Do not permit extruded polystyrene insulation board to come in contact with surfaces or temperatures in excess of 165°F.
9. Touch-up, repair, or replace damaged products before Substantial Completion.

**END OF SECTION 07 21 00**

**SECTION 07 27 00 AIR BARRIERS**

**PART 1 – GENERAL**

* 1. SUMMARY

See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire propagation), ASTM E2357 (air resistance), and ASTM E331 (water resistance). All proposed product substitutions must comply to be considered.

1. SECTION INCLUDES
2. Provide and install concrete masonry unit exterior wall **[load-bearing, non-load bearing], [fire resistance rated, non-rated]** system, with fluid-applied air and water resistive barrier membrane over the concrete masonry unit surface, with extruded polystyrene foamcontinuous insulation that effectively controls thermal, air, and water performance and provides continuous insulation and continuity of the building envelope. Provide labor, materials, tools and equipment necessary to complete the Work of this Section including, but not limited to, the following:
3. Continuous Fluid-Applied Air Barrier Membrane Assembly.
4. Flashing materials and sealants as recommended by the primary air barrier membrane manufacturer to create a continuous air and water barrier assembly.
5. The complete wall system shall include the following:
6. **[Brick, Stone, Concrete]** unit masonry over concrete masonry unit cavity wall by other contractors.
7. Concrete Masonry Unit (CMU) exterior wall to resist vertical and transverse structural loading.
8. Hook & ladder joint reinforcement.
9. Continuous fluid-applied air and water resistive barrier system applied to the exterior face of the CMU structural wall installed in an airtight and flexible manner, allowing for the relative movement of systems due to thermal and moisture variations and capable of withstanding positive and negative combined wind, stack, and HVAC pressures on the envelope without damage or displacement.
10. Extruded Polystyrene Foam continuous insulation permanently secured by **[compression-fit between masonry ties & clips, adhesive.]**
11. **[Safing to firestop the perimeter of door and window penetrations through wall.]**
12. Masonry accessories including prefabricated through wall flashing, masonry veneer anchors, and mortar droppings protection.
13. All joints, penetrations, and gaps of the air barrier wall system shall be made water and air tight.
14. RELATED SECTIONS

The items listed are not included in this Section, but are specified in the Section listed:

1. **Section 03 45 00 [Project Specific],** Precast Architectural Concrete
2. **Section 04 08 00 [Project Specific],** Commissioning of Masonry
3. **Section 04 20 00 [Project Specific],** Unit Masonry
4. **Section 04 43 00 [Project Specific],** Stone Masonry
5. **Section 05 50 00 [Project Specific],** Metal Fabrication (lintels, shelf angles, and masonry support)
6. **Section 07 10 00 [Project Specific],** Dampproofing and Waterproofing
7. **Section 07 21 00 [Project Specific],** Thermal Insulation
8. **Section 07 26 00 [Project Specific],** Vapor Retarders
9. **Section 07 50 00 [Project Specific],** Membrane Roofing
10. **Section 07 62 00 [Project Specific],** Sheet Metal Flashing and Trim
11. **Section 07 65 00 [Project Specific],** Flexible Flashings
12. **Section 07 84 00 [Project Specific],** Firestopping
13. **Section 07 92 00 [Project Specific],** Joint Sealants
14. **Section xx xx xx [Project Specific],** LEED Requirements

* 1. REFERENCES

1. ABBREVIATIONS AND ACRONYMS
2. ABAA: Air Barrier Association of America
3. LBC: Living Building Challenge
4. SWRI: Sealant, Waterproofing, and Restoration Institute
5. DEFINITIONS
6. Air Barrier Material: Primary element that provides a continuous barrier to the movement of air
7. Air Barrier Accessory: A transitional component of the air barrier that provides continuity
8. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.
9. REFERENCE STANDARDS

Materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use. [Delete references from the list below that are not required by the text of the edited Section.]

1. American Architectural Manufacturers Association (AAMA)

a. AAMA 713: Voluntary Test Method to Determine Chemical Compatibility of Sealants and Self-Adhered Flexible Flashings

b. AAMA 714: Voluntary Test Method for Liquid Applied Flashing Used to Create a Water-Resistive Seal around Exterior Wall Openings in Buildings

1. American Society for Testing of Materials (ASTM)
2. ASTM A240: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
3. ASTM C920: Standard Specification for Elastomeric Joint Sealants
4. ASTM C1305: Standard Test Method for Crack bridging Ability of Liquid-Applied Waterproofing Membrane
5. ASTM C1518: Standard Specification for Precured Elastomeric Silicone Joint Sealants
6. ASTM C1523: Standard Test Method for Determining Modulus, Tear and Adhesion Properties of Precured Elastomeric Joint Sealants
7. ASTM D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers Tension
8. ASTM D624: Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
9. ASTM D2240: Standard Test Method for Rubber Property- Durometer Hardness
10. ASTM D4258: Standard Practice for Surface Cleaning Concrete for Coating
11. ASTM D4541: Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
12. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials
13. ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials
14. ASTM E119: Standard Test Methods for Fire Tests of Building Constructions and Materials
15. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
16. ASTM E2178: Standard Test Method for Air Permeance of Building Materials
17. ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
18. International Code Council
19. ICC-ES AC 212 Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers Over Exterior Sheathing.
20. National Fire Protection Association (NFPA)
21. NFPA 285: Standard Fire Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

* 1. ADMINISTRATIVE REQUIREMENTS

1. COORDINATION

Coordinate installation of masonry, masonry accessories, and insulation with air barrier membrane and other moisture protection work.

1. SEQUENCING

Roofing systems shall be capped and sealed or top of walls protected in such a way to lessen the ability of water to saturate the wall or interior space both before and after air barrier system installation.

1. PREINSTALLATION MEETINGS

Convene a meeting of involved sub-contractors a minimum of two weeks prior to commencing Work described in this Section.

1. Attendance is required by representatives of related trades including Owner’s Representative, Contractor, Architect, Installer, Air Barrier Membrane System Manufacturer, Roofing and Foundation Waterproofing Subcontractor, and all subcontractors who have materials penetrating the air barrier membrane system or finishes covering the membrane system. Manufacturer’s Representative is available upon request with minimum two-week notice.
2. Contractor shall notify **[Architect, Engineer, Consultant]** at least 14 days prior to time for meeting.
3. Contractor shall record minutes of meeting and distribute to attending parties.
4. The agenda shall include at a minimum:
5. Materials proposed for use.
6. Verification of eligibility for the CavityComplete**®** CMU Wall Warranty.
7. Sequence of construction.
8. Coordination with substrate preparation, condition, and pretreatment.
9. Compatibility of materials.
10. Air barrier requirements and installation **[including requirement for ABAA QAP**].
11. Minimum curing period.
12. Special details.
13. Mockups.
14. Air leakage and adhesion testing and inspection.
15. Air barrier protection and repair.
16. Work scheduling that covers air barrier coordination with installation of adjacent and covering materials.
17. Review and approval of all glazing applications.
    1. SUBMITTALS

Provide the following information in accordance with **Section 01 33 00 [Project Specific]** Submittal Procedures.

1. Product Data: Manufacturers’ data on each type of product furnished including:
2. Preparation instructions and recommendations.
3. Technical data and tested physical and performance properties of products.
4. Storage, handling requirements, and recommendations.
5. **[Confirmation that the air and water resistive barrier material has been evaluated and listed by ABAA.]**
6. Shop Drawings (project-specific to air barrier assembly)
7. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, flashing transition assemblies and tie-ins with adjoining construction.
8. Include details of interfaces with other materials that form part of air barrier.
9. Samples: Submit product samples minimum **[two inch x four inch]** of the following:
10. Fluid-Applied Membrane at recommended thickness.
11. Transition Membrane to be used at openings and joints.
12. Through-Wall Flashing Membrane to be used at masonry ledges and load-bearing applications.
13. Sealant to be used at terminations, penetrations, and transitions.
14. Certificates:

Submit documentation signed by Manufacturer that products meet Quality Assurance Certification requirements of this Section.

1. Test AND EVALUATION Reports:
2. NFPA 285: Provide documentation from qualified testing agency that the air barrier system as a component of the designed wall assembly has been tested and passed NFPA 285.
3. ASTM E2178: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barrier, submit certified test report showing compliance with requirements specified for ASTM E2178.
4. ASTM E2357: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barrier assembly with specified fasteners, submit certified test report showing compliance with requirements specified for ASTM E2357.
5. ASTM E331: Provide documentation from a qualified testing agency that the air barrier system as a component in the designed wall assembly has been tested and passed ASTM E331.
6. AAMA 713: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barrier components and through wall flashing components, submit certified test report showing compatibility requirements specified in AAMA 713.
7. ASTM C794: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barrier components and through wall flashing components, submit certified test report showing adhesion requirements specified in ASTM C794.
8. MANUFACTURER’S INSTRUCTIONS

Provide Manufacturer’s installation instructions for each product specified in this Section.

1. SUSTAINABLE DESIGN SUBMITTALS

Submit Quality Assurance Sustainability Standards Certifications for each product specified as required in this Section.

**[LEED: Provide product prerequisite and/or credit summaries for each product specified as applicable including recycled content, VOC content, and Health Product Declaration (HPD).]**

1. SPECIAL PROCEDURE SUBMITTALS

Submit documentation of all CavityComplete**®** Components used in the Project as required for CavityComplete**®** CMU Wall System Limited Warranty. CavityComplete**®** Assembly Warranty requires documentation that all components of the assembly are tested together and used on the project. The contractor shall complete and submit CavityComplete**®** Project Profile documentation establishing eligibility for warranty prior to installation.

1. QUALIFICATION STATEMENTS

Provide documentation of required Quality Assurance Qualifications for Manufacturers and Installers for all products in tested wall assembly as required in this Section.

1. WARRANTY DOCUMENTATIOn

Submit sample warranties as required by this Section.

* 1. QUALITY ASSURANCE

1. [**QUALITY ASSURANCE PROGRAM: SUBMIT EVIDENCE OF CURENT CONTRACTOR ACCREDITATION AND INSTALLER CERTIFICATION UNDER THE AIR BARRIER ASSOCIATION OF AMERICA’S (ABAA) QUALITY ASSURANCE PROGRAM (QAP). SUBMIT ACCREDITATION NUMBER OF THE CONTRACTOR ND CERTIFICATION NUMBER(S) OF THE ABAA CERTIFIED INSTALLER(S).]**
2. QUALIFICATIONS
3. MANUFACTURERS

Air barrier system shall be manufactured and marketed by a firm with a minimum of **[five]** years’ experience in the production and sales of air and water barriers. Obtain primary air barrier material, flashing, and sealant through one source from a single manufacturer. Should project require a vapor permeable and a vapor impermeable air barrier on same project, obtain vapor permeable and vapor impermeable air barrier, flashing, and sealant from one source from a single manufacturer. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified and include a list of projects of similar design and complexity completed within the past **[five]** years. **[The manufacturer shall provide documentation that the product has been evaluated and listed by the Air Barrier Association of America as a air and water resistive barrier.]**

1. CONTRACTORS

The installation work of this section shall be performed by one entity, an experienced contractor that employs and supervises installers are trained and authorized by the air barrier manufacturer, with a minimum **[two]** years’ record of successful installations on projects of similar scope. Installer shall have completed SWRI’s Validated Air Barrier Training and ABAA’s Fluid-Applied Air Barrier Training at time of bidding.

**[The contractor at the time of bidding and during the complete installation process shall be accredited in accordance with the Air Barrier Association of America (ABAA) Quality Assurance Program. The ABAA Accredited contractor shall follow all of the requirements outlined in the ABAA QAP]**

1. **INSTALLERS**

**All installers of the air and water resistive barrier materials shall be ABAA Certified Installers during the complete installation process. The ABAA Certified Installers shall follow the installation requirements, conduct the daily testing / inspection and complete all documentation required by the ABAA QAP.**

1. CERTIFICATIONS
2. Provide Manufacturer’s written certification that air barrier assembly components are compatible and provided as a single-source from the manufacturer.
3. Provide Manufacturer’s written certification that air barrier assembly components are compatible with all adjacent materials that come into contact with the air barrier materials during construction and throughout the life of the building.
4. Provide Manufacturer’s written certification that air barrier products are for the intended purpose as described in this Section.
5. **[Provide proof of ABAA Accredited Contractor at time of bidding]**
6. **[Provide proof of ABAA Certified Installers that will be used for installation of the air and water resistive barrier.]**
7. SUSTAINABILITY STANDARDS CERTIFICATIONS
8. Provide product prerequisite and/or credit summaries for each product specified as applicable including VOC content and published material ingredient documentation.
9. Documentation indicating that products comply with the testing and product requirements of:
10. California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
11. US Environmental Protection Agency (EPA).
12. California Air Resources Board SCM Districts.
13. South Coast Air Quality Management District.
14. Maricopa County, AZ.
15. Northeast Ozone Transport Commission.
16. MOCK-UPS

Construct a wall system sample panel minimum 8 feet long x 8 feet high that includes CMU Wall, air and water barrier, extruded polystyrene board insulation, insulation fastening method, through-wall flashing, termination bars, drip edge, mortar droppings protection, sealants, weep vent protection, masonry anchors/ties, **[perimeter fire rated joint],** and masonry veneer. The mock-up shall also include a window, storefront, or door frame, and sill opening transition assembly detailed with lintel, head, and sill flashings, and end dams to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

1. Coordinate construction of mockups to permit inspection by Owner's testing agency of air barrier before external insulation and cladding are installed.
2. Include transitions to roofing membrane, building corner condition, and foundation wall.
3. **[Architect, Engineer, Consultant]** approval of mockup is required. If it is determined that mockup does not comply with requirements, affected details must be reconstructed until mockups are approved.
4. Locate as directed and remove upon review and approval.
5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless **[Architect, Engineer, Consultant]** specifically approves such deviations in writing. **[Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.]**
6. **[Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.]**
   1. DELIVERY, STORAGE, AND HANDLING
7. Deliver and store products in manufacturer’s unopened packaging until ready for installation.
8. Store and protect products in accordance with manufacturer’s instructions. Store in a dry area and protect from water, freezing, heat, direct sunlight, flame, and ignition sources.
9. Remove and replace materials that cannot be applied within their stated shelf life.
10. Sequence deliveries to avoid delays and to minimize on-site storage.
    1. FIELD CONDITIONS
11. AMBIENT CONDITIONS
12. Apply air barrier within the range of ambient and substrate temperatures moisture content and other conditions affecting the performance of the air barrier as recommended by Air Barrier Manufacturer.
13. Protect substrates from environmental conditions that affect air barrier performance
14. Apply air barrier only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials used.
15. Do no not apply to frozen substrate. Allow adequate time for substrate to reach recommended temperature if freezing conditions exist before application.
    1. WARRANTY
16. MANUFACTURER WARRANTY
17. Product Warranty
18. The products shall be free from defects in material for a period of **[five, ten]** years after Date of Substantial Completion.
19. The products shall not disintegrate and will maintain their integrity over the life of the Warranty.
20. System Warranty
21. The products have been tested in accordance with national standards for air and water-resistive barriers and passed those tests with effectiveness and durability indicating their suitability for performance as an air and water-resistive barrier system when properly applied
22. Subcontractor Installation Warranty
23. Provide a **[two]** year installation warranty from Date of Substantial Completion, including all accessories and materials of the air barrier assembly, against failures including loss of air tight seal, loss of weather tight seal, loss of attachment, loss of adhesion, and failure to cure properly.
24. SPECIAL WARRANTY

Provide CavityComplete**®** CMU Wall System Limited Warranty or approved substitute in accordance with **[Section 01 83 16-2.1.A.1]** to the Owner that jointly covers the products including continuous insulation, air and water-resistive barrier, masonry veneer ties, hook and ladder joint reinforcement, prefabricated through wall flashing and pre-molded end dams and corners, mortar droppings protection, masonry head joint vents, **[and mineral wool safing insulation]** as part of the CavityComplete**®** Wall System, when properly applied and installed in accordance with written specifications, technical data sheets, and application instructions and subject to normal and proper use, will be free from defects in manufacturing that materially affect performance of the Building for a period of 10 years. CavityComplete**®** System Warranty requires documentation that all components of the assembly are tested together and used on the project. The contractor shall complete and submit CavityComplete**®** Project Profile documentation establishing eligibility for warranty prior to installation.

**PART 2 – PRODUCTS**

* 1. PERMEABLE MEMBRANE AIR BARRIER

1. MANUFACTURERS

BASIS-OF-DESIGN: PROSOCO ([www.prosoco.com](http://www.prosoco.com)) R-Guard® Cat-5**®** or equal product from one of the following:

1. **[Insert acceptable alternate supplier.]**
2. **[Insert acceptable alternate supplier.]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution.

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third-party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third-party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Provide fluid-applied, vapor permeable air and water-resistive barrier membrane that combines silicone and polyurethane properties. Single component, Silyl-Terminated-Polymer (STP) that is roller applied to produce a highly durable and seamless membrane to prevent air and water penetration of the building envelope in weather up to 155 mph winds of a Category 5 hurricane.

1. PERFORMANCE/ DESIGN CRITERIA
2. **[ABAA Listing as an air and water resistive barrier.]**
3. ICC-ES AC 212 Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers Over Exterior Sheathing.
4. Air Permeance: Maximum 0.004 cfm/ sf of surface area at 1.57 lbf/sf (0.02 L/s x sq m of surface area at 75 Pa) pressure difference per ASTM E2178.
5. Air Leakage of Air Barrier Assemblies: Pass maximum 0.04 cfm/sf of surface area at 1.57 lbf.sf (0.2 L/s x sq m of surface area at 75 Pa) pressure difference per ASTM E2357.
6. Vapor Permeance: Minimum 18 perms per ASTM E96/ E96M.
7. Combustion Characteristics: Class A per ASTM E84: Flame Spread not greater than 25 and Smoke Development not greater than 450.
8. Low Temperature Flexibility and Crack Bridging: Pass at -20 degrees Fahrenheit per ASTM C1305.
9. Water Penetration: Passing-no visible water penetration at sheathing joints as viewed from the back of the panel per ASTM E331.
10. Must tolerate rain after application.
11. MATERIALS
12. Total Solids: Minimum 99 percent.
13. ABAA: Air Barrier Association of America Acceptance Criteria for Liquid-Applied Membranes.
14. Comply with national, state, and district AIM VOC regulations.
    1. ACCESSORIES
15. WATER-BASED Primer FOR RAW GYPSUM BOARD EDGES
16. MANUFACTURERS

BASIS-OF-DESIGN: PROSOCO ([www.prosoco.com](http://www.prosoco.com)) R-Guard® PorousPrep**®** or equal product from one of the following:

1. **[insert acceptable alternate supplier]**
2. **[insert acceptable alternate supplier]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution.

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third-party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third-party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Primer to seal the cut edges of gypsum sheathing where they are exposed in rough openings. The sealed edge makes a compatible surface for easy application of liquid applied fiber-reinforced fill coat and seam treatment for through-wall components.

1. PERFORMANCE/DESIGN CRITERIA
2. Tested per ASTM E331 as part of specified tested wall assembly.
3. Tested per ASTM E2357 as part of specified tested wall assembly.
4. Tested per NFPA 285 as part of specified tested wall assembly.
5. MATERIALS
6. Vapor permeable non-aerosol liquid primer.
7. Comply with national, state, and district AIM VOC regulations.

1. LIQUID-APPLIED FILL COAT & SEAM FILLER
2. MANUFACTURERS

BASIS-OF-DESIGN: PROSOCO ([www.prosoco.com](http://www.prosoco.com)) R-Guard® Joint and Seam Filler or approved equal product from one of the following:

1. **[insert acceptable alternate supplier]**
2. **[insert acceptable alternate supplier]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution.

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third-party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third-party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

High modulus, gun-grade, crack and joint filler, adhesive, and detailing compound. Single-component, silyl-terminated polyether (STPe) that prepares open joint, seams, and cracks before installing primary water and air barrier system to prevent the movement of water and air through building envelopes.

1. PERFORMANCE/DESIGN CRITERIA
2. Adhesion: Adheres to flashing products per ASTM C794.
3. Compatibility: Compatible with adjacent air barrier and flashing products per AAMA 713.
4. Tested per ASTM E331 as part of specified tested wall assembly.
5. Tested per ASTM E2357 as part of specified tested wall assembly.
6. Tested per NFPA 285 as part of specified tested wall assembly.
7. MATERIALS
8. Water Vapor Transmission: Minimum 15 perms at recommended application thickness per ASTM E96.
9. Total Solids: Minimum 99 percent.
10. Comply with national, state, and district AIM VOC regulations.
11. LIQUID-APPLIED FLASHING AND DETAILING MEMBRANE
12. MANUFACTURERS

BASIS-OF-DESIGN: PROSOCO ([www.prosoco.com](http://www.prosoco.com)) R-Guard® FastFlash or approved equal product from one of the following:

1. **[insert acceptable alternate supplier]**
2. **[insert acceptable alternate supplier]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution.

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third-party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third-party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Gun-grade air & water-resistive barrier detailing compound. Silyl-terminated polymer (STP) produces a highly durable, seamless, elastomeric transition membrane to treat joints, seams, and cracks and to provide the flashing membrane in rough openings or structural walls and to counter-flash air and water-resistive barrier components.

1. PERFORMANCE/DESIGN CRITERIA
2. Adhesion: Adheres to flashing products per ASTM C794.
3. Compatibility: Compatible with adjacent air barrier and flashing products per AAMA 713.
4. AAMA 714-12 Compliant.
5. Water Vapor Transmission: Minimum 20 perms at recommended application thickness per ASTM E96 Method A.
6. Tested per ASTM E331 as part of specified tested wall assembly.
7. Tested per ASTM E2357 as part of specified tested wall assembly.
8. Tested per NFPA 285 as part of specified tested wall assembly.
9. MATERIALS
10. Total Solids: Minimum 99 percent.
11. Comply with national, state, and district AIM VOC regulations.
12. INTERIOR SEALANT FOR WINDOWS AND DOORS
13. MANUFACTURERS

BASIS-OF-DESIGN: PROSOCO ([www.prosoco.com](http://www.prosoco.com)) R-Guard**®** AirDam**®** or approved equal product from one of the following:

1. **[insert acceptable alternate supplier]**
2. **[insert acceptable alternate supplier]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution.

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

High-performance, gun-grade air and water-resistive barrier sealant. Single-component, Silyl-terminated polymer (STP) that is durable and stops the movement of air and water through cracks surrounding openings.

1. PERFORMANCE/DESIGN CRITERIA
2. Peel Strength; Minimum 5 plf per ASTM C794.
3. Tested per ASTM E331 as part of specified tested wall assembly.
4. Tested per ASTM E2357 as part of specified tested wall assembly.
5. MATERIALS
6. Total Solids: Minimum 98 percent.
7. Comply with national, state, and district AIM VOC regulations.
8. Backer Rod: In deep joints, control sealant depth by installing closed-cell backer rod. Diameter of the soft backer rod should be 25 percent greater than the joint width. Do not puncture backer rod.
9. PREFORMED SILICONE SEALANT EXTRUSION
10. MANUFACTURERS

BASIS-OF-DESIGN: PROSOCO ([www.prosoco.com](http://www.prosoco.com)) R-Guard**®** SureSpan EX**®** or approved equal product from one of the following:

1. **[insert acceptable alternate supplier]**
2. **[insert acceptable alternate supplier]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution.

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third-party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third-party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Manufacturer’s standard system consisting of pre-cured low modulus elastomeric extrusion that provides a continuous transition and bridges **[windows and door frames at curtain wall, storefront, expansion joints, skylights, roof]** to air barrier materials. Provide continuous preformed silicone sealant extrusion system that is flexible, durable, and designed for high dynamic and thermal movement which is resistant to ultraviolet exposure and weathering...

1. PERFORMANCE/DESIGN CRITERIA
2. Joint movement capacity: minim 200 percent elongation and minimum 75 percent compression per ASTM C1518 (ASTM C1523).
3. Tear Strength: Minimum 200 pli per ASTM D624.
4. Tear Propagation: Pass per ASTM C1518 (ASTM C1523). Movement class shall exceed 200 percent elongation and tear class of PT (Knotty Tear).
5. Shore Hardness A: 50-65 per ASTM D2240.
6. MATERIALS
7. UV Resistance: No degradation of material when exposed to UV.
8. STAINLESS STEEL SHEET:
9. DESCRIPTION

Standard stainless-steel flashing to provide transition surface between air and water barrier materials.

1. PERFORMANCE/DESIGN CRITERIA
2. ASTM A240/ A240M Type 304,
3. MATERIALS
4. 0.0187 inch (0.5 mm) thick
5. Series 300 stainless steel fasteners

**PART 3 – EXECUTION**

* 1. EXAMINATION

1. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
2. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants. Surface shall be free of voids, spalled areas, loose aggregate, and sharp protrusions.
3. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify owner’s agent and **[Architect, Engineer, Consultant]** of unsatisfactory preparation in writing before proceeding. Do not proceed with work until unsatisfactory conditions have been corrected.
4. Surfaces to receive primary fluid-applied air and water barrier must be dry or damp, unless approved by air barrier manufacturer. Surfaces to receive STP fluid-applied accessories must be dry, damp, or wet to touch. Brush away any standing water present before application. STP products will tolerate rain immediately after application.
5. Installation of products specified in this Section constitutes acceptance of existing conditions and assumption of responsibility for satisfactory performance.
   1. PREPARATION
6. Clean, prepare, treat, and seal substrate according to manufacturer’s written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
7. Surface must be clean, smooth, firm, and free of release agents, dust, mud, loose mortar wires, fins, metal projections or any other substances that might prevent placement and bonding of a continuous film or cause damage to the membrane.
8. Mask off adjoining surfaces not covered by air barrier to prevent spillage and coverage affecting other construction.
9. At changes in substrate plane, apply joint and seam filler or fluid-applied flashing at sharp corners and edges to form a smooth transition from one plane to another.
10. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
11. Apply air barrier over concrete masonry unit and brick with smooth trowel-cut mortar joints, struck full and flush. Fill or bridge damaged surfaces and all voids, gaps, and holes larger than one inch, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat
12. Fill voids and gaps measuring one inch or less with liquid-applied flashing or joint and seam filler as necessary to ensure continuity.
13. Masonry head and bed joints should be fully filled and tooled.
14. Remove excess mortar fins and mortar accumulations from masonry ties, shelf angles, and other obstructions.
15. Refer to manufacturer’s product data sheets and manufacturer’s installation guidelines for additional information on preparing structural walls to receive the primary air and water-resistive barrier.
16. All penetrations shall be secured and/or sleeved with a metal collar.
17. Roofing systems shall be capped and sealed or top of walls protected in such a way to lessen the ability of water to saturate the wall or interior space both before and after air barrier system installation.
    1. INSTALLATION
18. FIBER REINFORCED FILL JOINT AND SEAM FILLER
19. Comply with air and water barrier manufacturer’s installation instructions.
20. Apply joint and seam filler for seams, joints, cracks, gaps, primed rough gypsum edges [PROSOCO R-Guard**®** PropusPrep**®**] at sheathing, and rough openings per manufacturer’s written instructions.
21. FASTENER HEADS
22. All installed fastener heads must be detailed with sealant [PROSOCO R-Guard**®** Joint & Seam Filler or PROSOCO R-Guard**®** FastFlash**®**] prior to application of the fluid-applied air barrier membrane or accessory materials.
23. JOINT DETAILING
24. Movement joint width should be four times anticipated movement, but not less than 1/4" (6 mm).
25. Construction gaps greater than 1/4" (6 mm) must have backer rod installed prior to sealant. [PROSOCO R-Guard**®** Joint & Seam Filler or PROSOCO R-Guard**®** FastFlash**®**]
26. Ensure that the backer rod is friction fitted properly and any primers have been applied. Backer rod is recommended as joint backing to control sealant depth and to ensure contact of sealant with joint walls when tooling.
27. Fill the joint completely with a proper width-to-depth ratio, and tool to ensure contact of sealant with joint walls.
28. EXPANSION JOINTS
29. The minimum width and depth of any sealant application should be 1/4" x 1/4" (6 mm x 6 mm). The depth (D) of sealant may be equal to the width (W) of joints that are less than 1/2" wide. For joints ranging from 1/2" to 1" (13 mm to 25 mm) wide, the sealant depth should be approximately one-half of the joint width. The maximum depth (D) of any sealant application should be 1/2" (13mm).
30. INSIDE CORNERS
31. All inside corners are required to have a bead of sealant [PROSOCO R-Guard**®** Joint & Seam Filler or PROSOCO R-Guard**®** FastFlash**®**] applied prior to application of the fluid applied air barrier membrane.
32. FLUID-APPLIED FLASHING TRANSITION MEMBRANE
33. Apply fiber-reinforced joint and seam filler and liquid flashing membrane to create an opaque, monolithic membrane at transitions in rough openings and between dissimilar materials.
34. Fill any voids between the top of the flashing leg and the vertical wall with fiber-reinforced joint and seam filler. Spread wet liquid flashing membrane per manufacturer’s written instructions.
35. Apply additional coats per manufacturer’s written instructions to achieve minimum thickness and as needed to achieve a void- and pinhole-free surface.
36. Allow treated surfaces to skin before installing other wall assembly and air and water-resistive barrier components.
37. Allow product to cure and inspect membrane before covering.
38. Repair any punctures or damaged areas by applying additional material.
39. FLUID-APPLIED AIR AND WATER-RESISTIVE BARRIER INSTALLATION
40. Apply membrane [PROSOCO CavityComplete® AWRB / R-Guard**®** Cat-5**®**] to recommended thickness using a minimum 3/4" (19 mm) nap roller to create an opaque, monolithic membrane over the face of the structural wall.
41. Use a wet film mil gauge as well as staging of material to ensure proper application thickness.
42. Back roll as necessary to ensure no pinholes, voids, or gaps in the membrane.
43. Connect the fluid-applied air barrier membrane to the adjacent building envelope systems such as the roof membrane, below-grade wall, window and curtain wall systems, and other portions of the building envelope.
44. Allow product to cure and inspect membrane before covering.
45. Repair any punctures or damaged areas by applying additional material.
46. Apply additional coats per manufacturer’s written instructions to achieve minimum thickness and as needed to achieve a void- and pinhole-free surface.
    1. REPAIR
47. FILL ERRANT PUNCTURES, PENETRATIONS, AND HOLES
48. If fasteners are removed, the affected area must be detailed with air barrier sealant. [PROSOCO R-Guard**®** Joint & Seam Filler or PROSOCO R-Guard**®** FastFlash**®**] [Note: Fill of errant punctures, penetrations, and holes may be included in two separate specification sections and therefore the responsibility of two separate trades. Identify the responsible trade according to project specific requirements.]
49. Completely fill the hole with sealant. Fill the hole in the continuous insulation board to full depth making sealant contact with the air and water barrier membrane below the insulation and fully flush with the outer face of the insulation
    1. FIELD QUALITY CONTROL
50. FIELD TESTS AND INSPECTIONS
51. **[Owner will engage a qualified testing agency to perform tests and inspections.]**
52. **[Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements.]**
53. Fluid-applied air barrier membrane must be allowed to dry for a minimum of 7 days or until fully cured, whichever is longer, prior to testing with portable adhesion testers. [If on-site adhesion testing is required, ASTM D4541 may be used. Additional information about testing can be found at www.cavitycomplete.com in the Technical Bulletin section.]
54. Visually check the surface of the air barrier membrane thoroughly for pinholes, blisters punctures, damaged areas or other voids in the membrane.
55. **[Air barrier installation will be considered defective if they do not pass tests and inspections.]**
56. **[Inspections may include the following:]**
57. **[Continuity of air barrier assembly has been achieved throughout the building envelope with no gaps or holes.]**
58. **[Minimum thickness has been maintained in all areas.]**
59. **[Continuous structural support of air-barrier system has been provided.]**
60. **[Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.]**
61. **[Site conditions for application temperature and dryness of substrates have been maintained.]**
62. **[Maximum exposure time of materials to UV deterioration has not been exceeded.]**
63. **[Surfaces have been primed, if applicable.]**
64. **[Laps in transitions have complied with minimum requirements with no fish mouths.]**
65. **[Compatible materials have been used.]**
66. **[Transitions at changes in direction and structural support at gaps have been provided.]**
67. **[Connections between assemblies (air barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.]**
68. **[All penetrations have been sealed.]**
69. Where deficiencies are detected, reapply fluid membrane until a monolithic coating at the specified minimum thickness is achieved.
70. Repair damage to air barriers caused by testing.
    1. CLEANING
71. Prior to project closeout, remove all related rubbish, excess material, scaffolding, tools, and equipment from the site. Dispose of waste material in a manner approved by applicable jurisdictions.
72. Remove masking materials after installation.
73. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by the manufacturers of affected construction.
    1. PROTECTION
74. Protect air barrier system from damage during application and remainder of construction period according to manufacturer’s written instructions.
75. Other components of the wall system [CavityComplete**®** Wall System, Owens Corning® FOAMULAR® Extruded Polystyrene (XPS) Insulation, Mortar Net Solutions™ TotalFlash® and/or PROSOCO R-Guard® accessory materials] may be installed after the fluid-applied air barrier membrane has fully cured, approximately 24 hours, or is firm and dry to touch.
76. Schedule the construction sequence so that the air barrier system is covered and protected from physical damage as soon as possible. If the air barrier system cannot be covered within 12 months after installation, apply temporary UV protection such as dark plastic sheets or tarpaulins or contact manufacturer technical support for additional recommendations. [844-CAV-COMP]
77. Protect air barrier from contact with incompatible materials and sealants not approved by air barrier manufacturer.
78. Touch-up, repair, or replace damaged products before Substantial Completion.

**END OF SECTION 07 27 00**

**SECTION 07 84 00 FIRESTOPPING**

[Include this Part 1- General section for both window/door/opening firestopping and if required for perimeter fire rated joint systems.]

**PART 1 – GENERAL**

* 1. SUMMARY

See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, **Section 01 83 16 [Project Specific]**, including mandatory wall system compliance with NFPA 285 (fire propagation), ASTM E2357 (air resistance), and ASTM E331 (water resistance). All proposed product substitutions must comply to be considered.

1. SECTION INCLUDES
2. Provide and install concrete masonry unit exterior wall **[load-bearing, non-load bearing], [fire resistance rated, non-rated]** system, with fluid-applied air and water resistive barrier membrane over the concrete masonry unit surface, with extruded polystyrene foamcontinuous insulation that effectively controls thermal, air, and water performance and provides continuous insulation and continuity of the building envelope. Provide labor, materials, tools and equipment necessary to complete the Work of this Section including, but not limited to, the following:
3. Mineral Wool Fire Safing Insulation.
4. Safing Clips and other accessories to create a continuous fire resistance as recommended by the Fire Safing Manufacturer.
5. The complete wall system shall include the following:
6. **[Brick, Stone, Concrete]** unit masonry over concrete masonry unit cavity wall by other contractors.
7. Concrete Masonry Unit (CMU) exterior wall to resist vertical and transverse structural loading.
8. Hook & ladder joint reinforcement.
9. Continuous fluid-applied air and water resistive barrier system applied to the exterior face of the CMU structural wall installed in an airtight and flexible manner, allowing for the relative movement of systems due to thermal and moisture variations and capable of withstanding positive and negative combined wind, stack, and HVAC pressures on the envelope without damage or displacement.
10. Extruded Polystyrene Foam continuous insulation permanently secured by **[compression-fit between masonry ties & clips, adhesive.]**
11. **[Safing to firestop the perimeter of door and window penetrations through wall.]**
12. Masonry accessories including prefabricated through wall flashing, masonry veneer anchors, and mortar droppings protection.
13. All joints, penetrations, and gaps of the air barrier wall system shall be made water and air tight.
14. RELATED SECTIONS

The items listed are not included in this Section, but are specified in the Section listed:

1. **Section 03 45 00 [Project Specific],** Precast Architectural Concrete
2. **Section 04 08 00 [Project Specific],** Commissioning of Masonry
3. **Section 04 20 00 [Project Specific],** Unit Masonry
4. **Section 04 43 00 [Project Specific],** Stone Masonry
5. **Section 05 50 00 [Project Specific],** Metal Fabrication (lintels, shelf angles, and masonry support)
6. **Section 07 10 00 [Project Specific],** Dampproofing and Waterproofing
7. **Section 07 21 00 [Project Specific],** Thermal Insulation
8. **Section 07 27 00 [Project Specific],** Air Barriers
9. **Section 07 50 00 [Project Specific],** Membrane Roofing
10. **Section 07 62 00 [Project Specific],** Sheet Metal Flashing and Trim
11. **Section 07 65 00 [Project Specific],** Flexible Flashings
12. **Section 07 92 00 [Project Specific],** Joint Sealants
13. **Section xx xx xx [Project Specific],** LEED Requirements

* 1. REFERENCES

1. REFERENCE STANDARDS

Materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use. [Delete references from the list below that are not required by the text of the edited Section.]

1. American Society for Testing of Materials (ASTM)
2. ASTM C272: Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
3. ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
4. ASTM C553: Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
5. ASTM C578: Standard Specification for Rigid Cellular Polystyrene Thermal Insulation
6. ASTM C612: Standard Specification for Mineral Fiber Block and Board Thermal Insulation
7. ASTM C665: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
8. ASTM D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
9. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
10. ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials
11. ASTM E119: Standard Test Methods for Fire Tests of Building Constructions and Materials
12. ASTM E136: Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C
13. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
14. ASTM E2307: Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus
15. ASTM E2393: Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers
16. International Code Council
17. ICC-ES AC 71: Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water Resistive Barriers.
18. National Fire Protection Association (NFPA)
19. NFPA 285: Standard Fire Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components
20. NFPA 220: Standard on Types of Building Construction
21. Underwriters Laboratories, Inc. (UL)
22. UL 2079: Tests for Fire Resistance of Building Joint Systems
    1. ADMINISTRATIVE REQUIREMENTS
23. COORDINATION

Coordinate installation of masonry and masonry accessories with air barrier membrane and other moisture protection work.

1. PREINSTALLATION MEETINGS

Convene a meeting of involved sub-contractors a minimum of two weeks prior to commencing Work described in this Section.

1. Attendance is required by representatives of related trades including Owner’s Representative, Contractor, Architect, Installer, Air Barrier Membrane System Manufacturer, Roofing and Foundation Waterproofing Subcontractor, and all subcontractors who have materials penetrating the air barrier membrane system or finishes covering the membrane system. Manufacturer’s Representative is available upon request with minimum two week notice.
2. Contractor shall notify **[Architect, Engineer, Consultant]** at least 14 days prior to time for meeting.
3. Contractor shall record minutes of meeting and distribute to attending parties.
4. The agenda shall include at a minimum:
5. Materials proposed for use.
6. Verification of eligibility for the CavityComplete**®** CMU Wall Warranty.
7. Sequence of construction.
8. Coordination with substrate preparation, condition, and pretreatment.
9. Compatibility of materials.
10. Air barrier requirements and installation.
11. Minimum curing period.
12. Special details.
13. Mockups.
14. Air leakage and adhesion testing and inspection.
15. Air barrier protection and repair.
16. Work scheduling that covers air barrier coordination with installation of adjacent and covering materials.
17. Review and approval of all glazing applications.
    1. SUBMITTALS

Provide the following information in accordance with **Section 01 33 00 [Project Specific]** Submittal Procedures.

1. Product Data: Manufacturers’ data on each type of product furnished including:
2. Preparation instructions and recommendations.
3. Technical data and tested physical and performance properties of products.
4. Storage, handling requirements, and recommendations.
5. Shop Drawings (project-specific to air barrier assembly)
6. Show firestopping and sealant layout, profiles and product components.
7. Include details of interfaces with other materials that form part of air barrier and firestopping.
8. The manufacturer’s engineering judgment drawings must follow requirements set forth by the International Firestop Council.
9. Samples: Submit product samples minimum **[three inch x three inch]** of the following:
10. Mineral wool safing insulation.
11. Any fasteners required to install safing insulation.
12. Certificates:
13. Provide Manufacturer’s written certification that wall assembly components are compatible and provided as a single-source from the manufacturer.
14. Provide Manufacturer’s written certification that wall assembly components are compatible with all adjacent materials that come into contact with the materials during construction and throughout the life of the building.
15. Provide Manufacturer’s written certification that mineral wool safing products are for the intended purpose as described in this Section.
16. Test AND EVALUATION Reports:
17. NFPA 285: Provide documentation from qualified testing agency that the air barrier system as a component of the designed wall assembly has been tested and passed NFPA 285.
18. Submit a UL or similar third party tested assembly number, or, if no such information is available, submit a manufacturer’s engineering judgment derived from similar independently tested system designs. The manufacturer’s engineering judgment drawings must follow requirements set forth by the International Firestop Council.
19. Must be submitted to local authorities having jurisdiction for their review and approval prior to installation.
20. MANUFACTURER’S INSTRUCTIONS

Provide Manufacturer’s installation instructions for each product specified in this Section.

1. SUSTAINABLE DESIGN SUBMITTALS

For each product specified, submit documentation of Quality Assurance Regulatory Agency Sustainability Approvals and Sustainability Standards Certification as required in this Section.

**[LEED: Provide product prerequisite and/or credit summaries for each product specified as applicable including recycled content and Health Product Declaration (HPD).]**

1. SPECIAL PROCEDURE SUBMITTALS

Submit documentation of all CavityComplete**®** Components used in the Project as required for CavityComplete**®** CMU Wall System Limited Warranty. CavityComplete**®** Assembly Warranty requires documentation that all components of the assembly are tested together and used on the project. The contractor shall complete and submit CavityComplete**®** Project Profile documentation establishing eligibility for warranty prior to installation.

1. QUALIFICATION STATEMENTS

Provide documentation of required Quality Assurance Qualifications for Manufacturers and Installers for all products in tested wall assembly as required in this Section.

1. WARRANTY DOCUMENTATIOn

Submit sample warranties as required by this Section.

* 1. QUALITY ASSURANCE

1. REGULATORY AGENCY SUSTAINABILITY APPROVALS

Comply with EPA Preference Program.

1. QUALIFICATIONS
2. MANUFACTURERS

Firestopping shall be manufactured and marketed by a firm with a minimum of **[10]** years’ experience in the production and sales of firestopping materials. Obtain firestop material through one source from a single manufacturer. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified and include a list of projects of similar design and complexity completed within the past **[five]** years.

1. INSTALLERS

The installation work of this section shall be performed by one entity, an experienced contractor that employs installers and supervisors who are trained and authorized by the firestopping manufacturer, with a minimum **[three]** years’ record of successful installations on projects of similar scope. Installer shall designate a single individual as project foreman who shall be on site at all times during installation.

1. CERTIFICATIONS
2. Provide Manufacturer’s written certification that wall assembly components are compatible and provided as a single-source from the manufacturer.
3. Provide Manufacturer’s written certification that wall assembly components are compatible with all adjacent materials that come into contact with the materials during construction and throughout the life of the building.
4. Provide Manufacturer’s written certification that mineral wool safing products are for the intended purpose as described in this Section.
5. SUSTAINABILITY STANDARDS CERTIFICATIONS
6. Health Product Declaration (HPD).
7. Minimum 75 percent recycled content certified by independent third party testing.
8. MOCK-UPS

Construct a wall system sample panel minimum 8 feet long x 8 feet high that includes CMU Wall, air and water barrier, extruded polystyrene board insulation, insulation fastening method, through-wall flashing, termination bars, drip edge, mortar droppings protection, sealants, weep vent protection, masonry anchors/ties, **[perimeter fire rated joint],** and masonry veneer. The mock-up shall also include a window, storefront, or door frame, and sill opening transition assembly detailed with lintel, head, and sill flashings, and end dams to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

1. Coordinate construction of mockups to permit inspection by Owner's testing agency of air barrier before external insulation and cladding are installed.
2. Include transitions to roofing membrane, building corner condition, and foundation wall.
3. **[Architect, Engineer, Consultant]** approval of mockup is required. If it is determined that mockup does not comply with requirements, affected details must be reconstructed until mockups are approved.
4. Locate as directed and remove upon review and approval.
5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless **[Architect, Engineer, Consultant]** specifically approves such deviations in writing. [Add note to indicate if ABAA's Quality Assurance Program is required. Indicate portion of wall represented by mockup on Drawings or draw mockup as separate element.]
6. **[Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.]**
7. **[Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.]**
   1. DELIVERY, STORAGE, AND HANDLING
8. DELIVERY AND ACCEPTANCE REQUIREMENTS
9. Deliver and store products in manufacturer’s unopened packaging bearing brand name, UL classification labels, and other necessary identification with all labels intact and legible until ready for installation.
10. Sequence deliveries to avoid delays and to minimize on-site storage.
11. STORAGE AND HANDLING REQUIREMENTS
12. Store and protect products in accordance with manufacturer’s instructions. Store in a dry area and protect from water, freezing, heat, direct sunlight, flame, and ignition sources. Do not install insulation or sealants that are damaged, wet, or expired.
13. In the event the board insulation becomes wet, wipe dry prior to installation.
14. In the event the batt or blanket insulation becomes wet, remove it from jobsite.

[An exception may be allowed in cases where the contractor is able to demonstrate that wet insulation when fully dried out (either before installation or afterward following exposure to system operating temperatures) will provide installed performance that is equivalent in respects to new, completely dry insulation. In such cases, consult the insulation manufacturer for technical assistance.]

1. When installing or otherwise handling these insulation products, wear a NIOSH approved dust mask or respirator, gloves and long sleeved, loose fitting clothing closed at the neck and wrists. Wear safety glasses when installing.
   1. FIELD CONDITIONS
2. AMBIENT CONDITIONS
3. Apply products within the range of ambient and substrate temperatures recommended by manufacturer.
4. Protect substrates from environmental conditions that affect insulation performance
   1. WARRANTY
5. MANUFACTURER WARRANTY
6. Product Warranty

Provide Manufacturer’s standard warranty.

1. SPECIAL WARRANTY

Provide CavityComplete**®** CMU Wall System Limited Warranty or approved substitute in accordance with **[Section 01 83 16-2.1.A.1]** to the Owner that jointly covers the products including continuous insulation, air and water-resistive barrier, masonry veneer ties, hook and ladder joint reinforcement, prefabricated through wall flashing and pre-molded end dams and corners, mortar droppings protection, masonry head joint vents, **[and mineral wool safing insulation]** as part of the CavityComplete**®** Wall System, when properly applied and installed in accordance with written specifications, technical data sheets, and application instructions and subject to normal and proper use, will be free from defects in manufacturing that materially affect performance of the Building for a period of 10 years. CavityComplete**®** System Warranty requires documentation that all components of the assembly are tested together and used on the project. The contractor shall complete and submit CavityComplete**®** Project Profile documentation establishing eligibility for warranty prior to installation.

**SECTION 07 84 13 WINDOW/DOOR/OPENING PENETRATION FIRESTOPPING**

[Include this section for window/door/opening firestopping if required for NFPA 285 compliance.]

**PART 1 – GENERAL**

[Use the General Section from Section 07 84 00.]

**PART 2 – PRODUCTS**

* 1. SAFING INSULATION

1. MANUFACTURERS

BASIS-OF-DESIGN: Owens Corning® ([www.ocbuildingspec.com](http://www.ocbuildingspec.com)) Thermafiber® Safing Insulation or equal product from one of the following:

1. **[Insert acceptable alternate supplier.]**
2. **[Insert acceptable alternate supplier.]**
3. Substitution Limitations

The “Basis of Design” products listed in this Section are tested and warranted as a system.  The Contractor shall provide the products of the named manufacturers without substitution, unless a written request for an “or equal complete system substitution” has been approved in writing by the **[Architect, Engineer, Consultant]**. Substitution requests must be accompanied by the following to be considered for substitution.

1. Verification that proposed products meet published product performance criteria.
2. Verification from the proposed manufacturers of independent third party listings or engineering judgements that the proposed system substitution meets the NFPA 285 (fire propagation), ASTM E2357 (air leakage), and ASTM E331 (water penetration) requirements.
3. Verification from the proposed manufacturers of independent third party testing that the proposed system substitution meets the ASTM C794 (adhesion) and AAMA 713 (compatibility) requirements.
4. Verification that the proposed manufacturers meet requirements of SPECIAL WARRANTY in this Section including all products proposed for use.
5. Verification from proposed manufacturers that the proposed substitution is tested with the other assembly components to meet Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16.
6. DESCRIPTION

Provide safing insulation for firestopping around the perimeter of window and door opening penetrations as shown in NFPA 285 detail drawings. Each insulation board must be labeled with manufacturer's name, product brand name, ASTM material specification reference, and identification of the third party inspection agency used for building code qualification.

1. PERFORMANCE/ DESIGN CRITERIA
2. Provide mineral wool safing in compliance with ASTM C612, Type IA, IB and II.
3. Surface-Burning Characteristics: Tested in accordance with ASTM E84
4. **[Unfaced: Maximum flame spread 0 and smoke-developed of 0]**
5. **[Foil Faced: Maximum flame spread 25 and smoke-developed of 0]**
6. MATERIALS
7. R-Value: 4.3 per inch
8. Facing: **[Unfaced, Foil Faced]**
9. Density: **[4.0 pcf (actual), 6.0 pcf (actual)]**
10. Fiber Type: Standard fiber; minimum 75% pre-consumer recycled content; complies with EPA Preference Program.
11. Post-Consumer Recycled Content: 0%.

**PART 3 – EXECUTION**

* 1. EXAMINATION

1. Verify that wall, opening framing, bridging and structural bracing, and other framing support members and anchorage have been installed per requirements of the Project.
2. Verify adjacent materials are dry and ready to receive insulation.
3. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
4. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify owner’s agent and **[Architect, Engineer, Consultant]** of unsatisfactory preparation in writing before proceeding. Do not proceed with work until unsatisfactory conditions have been corrected.
5. Installation of products specified in this Section constitutes acceptance of existing conditions and assumption of responsibility for satisfactory performance.
   1. PREPARATION
6. Prepare surfaces using methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   1. INSTALLATION
7. SAFING INSULATION
8. For fluid-applied air & water resistive barrier system, verify manufacturer recommended cure time before installing fire safing insulation**.** [Minimum 24 hours if using CavityComplete**®** components.]
9. Install safing batt in sections a minimum four inch wide, stacked to a thickness that is a minimum of 25 percent greater than the width of the gap between the back of the masonry veneer and the face of the CMU wall to achieve a minimum 25 percent compression and tight friction fit after installation.
10. Install safing insulation compressed in the thickness direction and flush with the edge of the opening.
11. Install safing insulation in maximum sizes to minimize joints.
12. Safing insulation edges shall be butted together tightly and fit around openings and penetrations. Install square edges to fit square and tight.
13. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
14. Safing shall be tightly butted at ends of adjacent pieces to completely close the air space behind the masonry veneer.
15. Install exterior brick veneer as soon as possible, best within 60 days, to avoid possible discoloration of the foam from UV exposure.
    1. REPAIR
16. FILL ERRANT PUNCTURES, PENETRATIONS, AND HOLES
17. If fasteners are removed, the affected area must be detailed with air barrier sealant see **[Section 07 27 00 Air Barriers- Project Specific]** [PROSOCO R-Guard**®** Joint & Seam Filler or PROSOCO R-Guard**®** FastFlash**®**] [Note: Fill of errant punctures, penetrations, and holes may be included in two separate specification sections and therefore the responsibility of two separate trades. Identify the responsible trade according to project specific requirements.]
18. Completely fill the hole with sealant. Fill the hole in the insulation to full depth making sealant contact with the air and water barrier membrane below the insulation and fully flush with the outer face of the insulation
    1. FIELD INSPECTION

Follow criteria outlined in ASTM E2393 Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.

* 1. CLEANING

1. Prior to project closeout, remove all related rubbish, excess material, scaffolding, tools, and equipment from the site. Dispose of waste material in a manner approved by applicable jurisdictions.
   1. PROTECTION
2. Protect installed products until completion and project closeout.
3. Touch-up, repair, or replace damaged products before Substantial Completion.

**END OF SECTION 07 84 13**

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