CavityComplete® Wall System for Steel Stud with Masonry Veneer Exterior Enclosure Specification

Guide Specifications

CavityComplete® Wall System for Steel Stud and Masonry Veneer Specification Guide

The specification guide presents in 3 part format all of the components of the CavityComplete Steel Stud/Masonry Veneer Wall System. They are presented in two MasterFormat Divisions, **04 Masonry, and 07 Thermal and Moisture Protection**.

System performance requirements are presented in Division **01 Exterior Enclosure Performance Requirements**.

The major section headings provided are outlined below. Sections that require editing by the specifier are marked in [blue with brackets].

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

Each of those sections cross reference back to the Division 01 Exterior Enclosure Performance Requirements to insure 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 Pos-I-Tie masonry anchors, Rodenhouse, Inc. Brick Tie Washers, 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 with Rodenhouse, Inc. Grip-Deck Screws and Thermal-Grip ci Prong Washers, and OC EcoTouch fiber glass batt stud cavity insulation. 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, and SECTION 07 21 16, BLANKET INSULATION

Guide Specifications

Division 07, **Air and Water Barrier Components:**
This section includes Tremco, Inc. ExoAir 230 Vapor-Permeable Air & Weather Barrier Membrane and accessories. They are presented in this document in their specific MasterFormat section:

SECTION 07 27 26, FLUID-APPLIED MEMBRANE 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 00, AIR BARRIERS

Division 07, Firestopping Components:
This section includes Owens Corning Thermafiber (mineral wool) Safing and Tremco, Inc TREMStop Acrylic Latex Sealant. 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, WINDOW/DOOR PENETRATION FIRESTOPPING, and

SECTION 07 84 53, BUILDING PERIMETER FIRESTOPPING

SECTION 01 83 16
EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. Wall System Description: Furnish and install specified products that have been tested as the CavityComplete® Steel Stud Wall System meeting specified performance requirements for thermal, air, water, and fire resistance. The system assembly shall include the following products:

1. Cold-formed metal framing
2. Interior gypsum wallboard
3. Insulation batts in the framing cavity, fiber glass or mineral wool, faced or unfaced as required
4. Gypsum sheathing with sealed joints
5. Fluid-applied vapor-permeable air barrier applied to gypsum sheathing
6. Rigid continuous insulation installed with air/water sealing washers outboard of gypsum sheathing
7. Firesafing at jamb and sill openings, and floor lines as required
8. Masonry accessories including prefabricated through wall flashing, masonry veneer anchors, and mortar dropping protection
9. Masonry veneer cladding

B. Related Work: Refer to the following sections for additional requirements for each product in the assembly.

1. Section 03 45 00, Precast Architectural Concrete
2. Section 04 20 00, Unit Masonry
3. Section 04 43 00, Stone Masonry
4. Section 05 41 00, Structural Metal Stud Framing
5. Section 05 50 00, Metal Fabrication (lintels, shelf angles and masonry support)
6. Section 06 16 43, Gypsum Sheathing
7. Section 07 19 00, Water Repellants (masonry wall coatings)
8. Section 07 21 13, Foam Board Insulation
9. Section 07 21 16, Blanket Insulation
10. Section 07 27 26, Fluid Applied Membrane Air Barriers
11. Section 07 62 00, Sheet Metal Flashing and Trim
12. Section 07 60 00, Flashing and Sheet Metal (metal counter flashing installation)
13. Section 07 84 53, Building Perimeter Firestopping
14. Section 07 92 00, Joint Sealants (sealing control and expansion joints in unit masonry)
15. Section 09 29 00, Gypsum Board

1.2 SUBMITTALS

A. System performance verification: Submit manufacturers verification, test reports, or third engineering analysis that the proposed materials assembled as a wall system comply with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance) performance requirements as required by this specification.

B. Product Data: Submit manufacturer's product data sheets, system compatibility statements, LEED® data statements for products which may contribute to Credits, and manufacturer's installation instructions.

C. Test Reports: Submit test reports or engineering judgments/analysis or both, or other approved documentation of the performance requirements listed in Section 1.3.

D. Limited Warranty: Submit manufacturer's "Project Profile" verification establishing project eligibility for a CavityComplete® full Wall System materials defect warranty as described in Section 1.7. No substitutions will be accepted except as described in Section 1.4 D.

1.3 PERFORMANCE REQUIREMENTS

A. Fire Containment and Resistance:
1. NFPA 285 Limited Fire Propagation: [if needed]
Provide products per Section 2.1 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]
Provide products per Section 2.1 that as a system passes ASTM E119, Test Methods for Fire Tests of Building Construction and Materials.
3. ASTM E2307 Perimeter Fire Containment: [if needed]
Provide products per Section 2.1 that as a system passes ASTM E2307, Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multistory Test Apparatus.

B. ASTM E2357 Air Leakage:
Provide a continuous air barrier wall system that has an air leakage not exceeding 0.04 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 E 2357. Assembly shall accommodate movements of building materials by providing expansion and control joints as required.

C. ASTM E331 Water Penetration:
Provide a 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).

D. Adhesion and Compatibility
Provide a 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 at both Level 1 and Level 2.

E. Thermal Resistance:
Provide a 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/or test reports prepared by a qualified testing agency to verify properties for insulation including R-value and other physical properties.

F. Sound Transmission: [include if STC and OITC are important to project performance]
Provide a 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 a qualified acoustical engineer or testing agency documenting STC and OITC classifications.

G. Indoor Air Quality:
Provide insulation products (fiberglass batt and continuous rigid insulation) and vapor permeable air/water barrier that carry GREENGUARD Gold Certification for low-emitting materials.

H. Recycle Content:
Provide insulation products (fiberglass batt, mineral wool batt and safing, and continuous rigid insulation) whose recycled content is verified via third party certification.

I. Third Party Listing/Certification/Engineering Judgments:
Provide independent third party verification listings or engineering judgments for the primary code requirements of fire spread and resistance (Sec. 1.3 A), air leakage (Sec. 1.3 B) and water penetration (Sec. 1.3 C).

1.4 QUALITY ASSURANCE

A. Preconstruction Meeting:
Convene a meeting of involved sub-contractors a minimum of two weeks prior to commencing work described in this section. The agenda shall include at a minimum, materials proposed for use, verification of eligibility for the CavityComplete® Steel Stud warranty, sequence of construction, coordination with substrate preparation, compatibility of materials, coordination with installation of adjacent and covering materials. Attendance is required by representatives of related trades including covering materials, substrate materials and adjacent materials.

B. Sample Panel (Mock-Up):
Construct a wall system sample panel sized 8' long x 6' high that includes framing, sheathing, air/water barrier, rigid insulation, insulation fasteners with air/water sealing washers, through wall flashing/termination bar/drip edge, mortar droppings protection, sealants, weep vent protection, masonry anchors/ties and air/water sealing washers, and masonry veneer. The panel shall also include a mock window opening detailed with lintel, head and sill flashings, and end dams. Locate as directed and remove upon review and approval.

1.5 SYSTEM SUBSTITUTION

A. The 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. Substitution requests must be accompanied by the following in order for the Architect to consider a substitution:

1. Verification that proposed products meet published performance criteria of the specified products.
2. Verification from the proposed manufacturers of independent third party listings or engineering judgments that the proposed system substitution meets the fire resistance, air leakage and water penetration requirements of this section, and as specified in the basis-of-design Underwriters Laboratories Exterior Wall System # EWS0008. (http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?name=FWFO.EWS0008&ccnshorttitle=Exterior+Wall+Systems&objid=1084084707&cfgid=1073741824&version=versionless&parent_id=1082764581&sequence=1)

3. Verification that the proposed manufacturers offer a complete system warranty including all products proposed for use.

1.6 WARRANTY

A. Limited Warranty: Submit the CavityComplete® Steel Stud wall system limited warranty, or a substitute in accordance with paragraph 1.4E, that jointly covers the products including cavity batt and rigid continuous insulation, air/water resistive barrier, masonry veneer anchors/low conductivity head clip/pintle wire ties, prefabricated through wall flashing and premolded end dams/corners, mortar droppings protection, masonry head joint vents, and air/water sealing washers and fasteners.

END OF SECTION 01 83 16

SECTION 04 20 00, UNIT MASONRY

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance), and drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections which are hereby made a part of the specification of this Section. All proposed product substitutions must comply to be considered.

1.1 DESCRIPTION OF WORK

A. This section includes anchors, flashing, drainage and other masonry accessories in the wall system as specified. Provide labor, materials and equipment necessary to complete the work of this Section including but not limited to:

1. **[Brick, Stone, Concrete**] unit masonry over steel stud framing by other contractors.
2. Mortar and grout
3. Masonry anchor and wire tie
4. Brick tie washers (air and water sealing)
5. Embedded unitized flashing (drip edge, term bar, drainage mat, premolded end dams and corner boots, and sealant)
6. Flashing Accessories (sealant, one-piece preformed corner boots and end dams)
7. Mortar dropping collection device (open mesh with insect barrier to collect and suspend mortar droppings)
8. Weep hole vent (joint insert for air and water drainage)

1.3 RELATED SECTIONS

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

1. Section 03 45 00, Precast Architectural Concrete
2. Section 04 08 00, Commissioning of Masonry (inspection, verification, approval)
3. Section 04 20 00, Unit Masonry (products, installation, coordination)
4. Section 04 43 00, Stone Masonry (products, installation, coordination)
5. Section 05 41 00, Structural Metal Stud Framing
6. Section 05 50 00, Metal Fabrication (lintels, shelf angles and masonry support)
7. Section 06 16 43, Gypsum Sheathing
8. Section 07 19 00, Water Repellants (masonry wall coatings)
9. Section 07 21 13, Foam Board Insulation
10. Section 07 21 16, Blanket Insulation
11. Section 07 27 00, Air/Water Barriers (fluid applied membrane)
12. Section 07 60 00, Flashing and Sheet Metal (metal counter flashing installation and coordination requirements.
13. Section 07 84 53, Building Perimeter Firestopping
14. Section 07 92 00, Joint Sealants (sealing control and expansion joints in unit masonry)
15. Section 09 29 00, Gypsum Board

1.4 REFERENCES

A. 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. TMS 402/ACI 530/ASCE 6 – Specifications for Masonry Structures
2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
3. ASTM A580/A580M - Standard Specification for Stainless Steel Wire

1.5 SUBMITTALS

A. System performance verification: Submit manufacturers verification, test reports, or third engineering analysis that the proposed materials assembled as a wall system comply with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance) performance requirements as required by this specification, and as shown in the basis-of-design Underwriters Laboratories Exterior Wall System EWS 0008. (http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?name=FWFO.EWS0008&ccnshorttitle=Exterior+Wall+Systems&objid=1084084707&cfgid=1073741824&version=versionless&parent_id=1082764581&sequence=1)

B. Provide samples and data as listed for verification.

1. Product Data: Manufacturer's data on each type of product furnished including:
   a. Preparation instructions and recommendations.
   b. Storage, handling requirements and recommendations.

2. LEED: Provide product prerequisite and/or credit summaries for each product specified as applicable.

3. Unit masonry: Sample units in straps of 5 or more units showing shape, size, density, texture, color, specialty units.

4. Mortar: Pigmented made with the same sand and other mortar ingredients on be used on the project. Label samples to indicate types and amounts of pigment used.

5. Masonry anchor assembly: Anchor, tie, thermal head clip, brick tie air sealing washer, barrel length, thread tip type and length.

6. Embedded flashing: Sample panel showing termination bar, drainage mesh layer, drip edge, corner boots, end dams

7. Weep hole vent inserts: Sample inserts showing density, size, color and configuration.

8. Drainage accessories: Mortar droppings protection panel showing color, size, insect barrier and configuration.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
The installation work of this section shall be performed by an experienced contractor with a minimum of 2 years experience installing similar assemblies.

B. Masonry unit sourcing:
Obtain exposed masonry units of a uniform texture and color or a uniform blend within the range accepted for these characteristics. Obtain through one source, from a single manufacturer for each product required.

C. Mortar material sourcing:
Obtain mortar ingredients of a uniform quality including color for exposed masonry from a single manufacturer for each component required including aggregate from a single source.

D. Cold weather procedures: [Insert as required]

E. Unit masonry verification: ASTM C 67.

F. Mix designs:
For mortar and grout [Insert mix proportions, in progress construction testing for property verification as required]

G. Preconstruction Meeting:
Convene a meeting of involved sub-contractors a minimum of two weeks prior to commencing work described in this section. The agenda shall include at a minimum, materials proposed for use, verification of eligibility for the CavityComplete® Steel Stud warranty, sequence of construction, coordination with substrate preparation, compatibility of materials, coordination with installation of adjacent and covering materials. Attendance is required by representatives of related trades including covering materials, substrate materials and adjacent materials.

H. Sample Panel (Mock-Up):
Construct a wall system sample panel sized 8' long x 6' high that includes framing, sheathing, air/water barrier, rigid insulation, insulation fasteners with air/water sealing washers, through wall flashing/termination bar/drip edge, mortar droppings protection, sealants, weep vent protection, masonry anchors/ties and air/water sealing washers, and masonry veneer. The panel shall also include a mock window opening detailed with lintel, head and sill flashings, and end dams. Locate as directed and remove upon review and approval.

I. System Substitution:
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. Substitution requests must be accompanied by the following in order for the Architect to consider a substitution:

1. Verification that proposed products meet published performance criteria of the specified products.

2. Verification from the proposed manufacturers of independent third party listings or engineering judgments that the proposed system substitution meets the fire resistance, air leakage and water penetration requirements of this section.

3. Verification that the proposed manufacturers offer a complete system warranty including all products proposed for use.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General:

1. Store products in manufacturer's unopened packaging until ready for installation.
2. Protect products from exposure to direct sunlight.

PART 2 - PRODUCTS

2.1 GENERAL CONDITIONS

A. See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance), and drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections which are hereby made a part of the specification of this Section. All proposed product substitutions must comply to be considered.

2.2 MASONRY ANCHORS

A. Provide anchor/wire tie/low thermal conductivity head clip that allow vertical adjustment but that resist tension and compression forces perpendicular to the plane of the wall, for attachment into steel stud framing, penetrating through continuous insulation and gypsum sheathing. Provide anchoring systems that comply with TMS 402/ ACI 530/ASCE 6.

1. BASIS OF DESIGN

Heckmann Building Products Inc. (www.heckmannanchors.com), No. 75 Pos-I-Tie®, or equal product from one of the following:

a. [insert acceptable alternate supplier]
b. [insert acceptable alternate supplier]

2. BARREL

Provide one-Piece Screw consisting of a 92% Zamac 2 Zinc barrel 3/8” in diameter, washer, flanged head and eye to receive Pos-I-Tie® wire tie; designed to seat barrel directly on structural portion of backup, with flanged head covering fastener hole.

a. Provide barrel shaft length [5/8 inch] [1 inch] [1-1/2 inch] [2 inch] [2-1/2 inch] [3 inch] [3-1/2 inch] [4 inch] [4-1/2 inch] and screw to suit substrate.
b. Anchors to Metal Stud Backup: [No. 75: Heckmann "Pos-I-Tie®" Self-Drilling Screw]
c. Anchors to Structural Steel: [No. 75: Heckmann "Pos-I-Tie®" Dril-It® Screw]

3. AIR/WATER SEALING BRICK-TIE WASHER

Provide one air/water sealing washer for each veneer anchor.

a. BASIS OF DESIGN

Rodenhouse, Inc. Thermal-Grip Brick-Tie washer (www.rodenhouse-inc.com) or equal product from one of the following:

1. [insert acceptable alternate supplier]
2. [insert acceptable alternate supplier]

b. MATERIAL
   1. 2” diameter
   2. Must compress the rigid insulation against the air barrier effectively sealing the anchors air barrier penetration against air and moisture.

4. WIRE TIE

Provide ties extending from anchor head into masonry with a minimum 2 inches (50 mm) embedment in mortar.

a. No. 282-N Pintle Wire Tie [for use with Pos-I-Tie® and ThermalClip®]
[standard Lengths available are 3”, 3-1/2”, 4” and 5”. Custom lengths are available]

b. Stainless Steel:
Type 304. ASTM A 580/A 580M. Wire: 3/16 inch (4.76 mm) diameter x [length]

c. Hot-Dip Galvanized Steel:
Hot-dip galvanized after fabrication in accordance with ASTM A 53/A 153M, Class B-2.
Wire: 3/16 inch (4.76 mm) diameter x [length]

5. LOW CONDUCTIVITY WIRE TIE CLIP

Provide one piece snap-on composite clip to fit the barrel loop of No. 75 Pos-I-Tie® to create a thermal and galvanic break between the wire tie in veneer and the barrel in the backup

a. BASIS OF DESIGN

Heckmann Building Products Inc. (www.heckmannanchors.com), Pos-I-Tie® ThermalClip® or equal product.

2.3 MORTAR DROPPINGS COLLECTION DEVICE

A. Provide open mesh cavity insert to collect and suspend mortar droppings in masonry cavity walls.

1. BASIS OF DESIGN

Mortar Net Solutions (www.mortarnet.com) MortarNet with Insect Barrier:
[choose item a, b or c]
a. MortarNet with Insect Barrier 0.4 inches thick by 10 inches high, partial recycled nylon material.
b. MortarNet with Insect Barrier 1 inch thick by 10 inches high, partial recycled nylon material.
c. MortarNet with Insect Barrier 2 inches thick by 10 inches high, partial recycled polyester material.

or equal product from one of the following:

a. [insert acceptable alternate supplier]
b. [insert acceptable alternate supplier]

2. DROPPINGS COLLECTION MATERIAL
   a. 90 percent open weave mesh,
   b. Compressible to allow for variation in wall cavity widths, in trapezoidal configuration connected by continuous bottom strip 3 inches high.
   c. Insect barrier fabric is attached to one face of the trapezoidal material.

d. [2" air cavity recommended]
e. [cavity should be no more than 1/4 inch wider than 1 inch or 2 inch thick material]
f. [0.4 inch material should touch both the outer wythe and the inner wall of masonry cavity]

2.4 WEEP VENT INSERTS

A. Provide weep vents for insertion into intermittent head joints in masonry veneer.

1. BASIS OF DESIGN

Mortar Net Solutions (www.mortarnet.com) WeepVent or equal product from one of the following:

a. [insert acceptable alternate supplier]
b. [insert acceptable alternate supplier]

2. MATERIAL
a. 90 percent open weave mesh
b. UV-resistant recycled polyester; rectangular shape
c. Standard size: 3 1/2 inches high by 1/2 inches thick by 2 5/8 inches long. [other sizes available]
d. Provide [choose one: white, brown, tan, gray, red, almond] color from manufacturer's standard colors to match mortar mix.

2.5 EMBEDDED FLASHING MATERIAL

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

1. BASIS OF DESIGN

Mortar Net Solutions (www.mortarnet.com) TotalFlash and CompleteFlash and accessory sealant or equal products from one of the following:

a. [insert acceptable alternate supplier]
b. [insert acceptable alternate supplier]

2. MEMBRANE MATERIAL
Provide membrane type and size as specified. 66 inches long including a 6 inch lap joint for an effective length of 60 inches.

a. Type [choose one]
40 mil elastomeric ethylene propylene diene monomer (EPDM)
40 mil Thermoplastic vinyl (PVC) membrane
5 oz. reinforced copper laminate membrane.

b. Size [choose one]
18 inches by 66 inches (Standard)
12 inches by 66 inches (Available)
24 inches by 66 inches (Available)

3. DRAINAGE MESH AND WEEP TABS
Provide drainage/weep mesh factory adhered to the flashing membrane to allow moisture in the wall cavity to migrate to the exterior of the building.

   a. Recycled polyester material

   b. 3/8 inch thick, 10 inches high, 66 inches long

   c. Woven mortar collection mesh and integrated mesh weep tabs

4. DRIP EDGE
Provide drip edge factory adhered to the flashing material and designed to divert moisture away from the wall.

   a. 3 inches" wide, 60 inches long, with hemmed, formed edge

   b. MATERIAL
   [choose one]
   26 gauge (0.014 inches) Type 304 stainless steel
   24 gauge (0.028 inches) cold-rolled copper, 100% recyclable
   24 gauge (0.028 inches) Kynar-coated galvanized steel. Factory painted finish.

   c. Provide [choose one: almond, terra Cotta, gray, tan] color from manufacturer's standard colors.

5. PREFORMED CORNER DRIP EDGE
[choose one]
   a. Stainless steel 90 degree preformed outside corner.
   b. Stainless steel adjustable corner
   c. Copper 90 degree preformed outside corner
   d. Copper adjustable corner
   e. Galvanized steel 90 degree preformed outside corner with Kynar-coated factory painted [choose one: almond, terra cotta, gray, tan] color finish.
   f. Galvanized steel adjustable corner with Kynar-coated factory painted [choose one: almond, terra cotta, gray, tan] color finish.

6. SEALANT
Provide sealant recommended by the manufacturer for the membrane type specified and tested for required adhesion and compatibility.

   a. BASIS OF DESIGN
   Mortar Net Solutions (www.mortarnet.com) MPE-1 modified polyether sealant (not for use with TPO membrane) or equal products.

      1. [insert acceptable alternate supplier]
      2. [insert acceptable alternate supplier]

   b. MATERIAL
   Single component, moisture cure, with no slump, for lapping panelized sections of embedded flashing.

7. TERMINATION BAR
Provide termination bar factory adhered to the flashing material and designed to secure top of the flashing membrane to the substrate.

a. MATERIAL
[choose 1 or 2]
1. High-strength corrosion resistant plastic 1 1/4 inches wide x 1/8 inch thick x 5 feet long, with pre-drilled holes for attachment, hole spaced 6 inches on center for attachment.
2. Corrosion-resistant stainless steel, 1 1/4 inches wide x 16 gauge, 100% recyclable, 5 feet long, with pre-drilled holes 6 inches on center for attachment.

3. Secure through layers into steel stud framing with self-tapping hex head screws, #14 by 2 inches long, with watertight neoprene self-sealing washer.

8. PREFORMED FLASHING ACCESSORIES
Provide one-piece preformed corner boots and end dams compatible with the embedded flashing material.

a. BASIS OF DESIGN
Mortar Net Solutions (www.mortarnet.com) CompleteFlash corner boots and end dams or equal products from one of the following:

1. [insert acceptable alternate supplier]
2. [insert acceptable alternate supplier]

b. MATERIAL

1. Black thermoplastic vinyl (PVC) with Elvaloy KEE, a non-migratory plasticizer and UV-stabilizer.
2. One-piece preformed inside and outside corner boots, 14 inches high.

[choose c and/or d depending on detail conditions]
3. 3 inches high, 4 inches long and 6 inches wide right and left end dams.
4. 3 inches high, 4 inches long and 4 inches wide universal end dams.

PART 3 – EXECUTION

3.1 GENERAL CONDITIONS

A. 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 of unsatisfactory preparation in writing before proceeding. Protect installed products from damage until completion of project. Repair or replace damaged products before covering with construction. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Verify that steel wall studs, opening framing, bridging and structural bracing and other framing support members and anchorage have been installed in accordance with good construction practice and are compliant with this specification.

C. Verify that adjacent materials are ready to receive anchors, flashing and accessories.

D. Installation of products specified in this section constitutes acceptance of existing conditions and assumption of responsibility for satisfactory performance.

3.2 EMBEDDED FLASHING INSTALLATION

A. FLASHING PANEL

1. Install rigid insulation over TotalFlash.
2. Install in proper relationship to adjacent construction with factory adhered drip edge
3. Install using adhesive at termination bar and drip edge, end dams and corner boots, and vertically at ends of panels.
4. Apply sealant to the top of termination bars in a continuous bead

B. PREFORMED CORNERS AND END DAMS

1. Installation MPE-1
2. Install in proper relationship to adjacent construction.
3. Install using adhesive applied surrounding the base perimeter of corner boots and end dams, and vertically at ends of panels.
4. Apply sealant to the top of termination bars and under the drip edge in a continuous bead.

3.3 WEEP OPENING INSTALLATION

A. Place WeepVent in open head joints at the flashing level.
1. Insert a WeepVent at a maximum of 24 inches on center in open head joints.
2. Clean flashing and weep holes free of mortar droppings and debris.
3. Align exterior face of WeepVent insert with exterior plane of mortar.
4. For head joints taller than height of mesh insert, use custom manufactured product to match head joint.
5. Protect installed products from damage until completion of project.

3.4 MASONRY ANCHOR INSTALLATION

A. Pos-I-Tie® Anchor Screws

1. Place a Rodenhouse Thermal-Grip Brick Tie Washer on the head of each Pos-I-Tie prior to installation. If pronged version of the brick-tie washer is used pre-spot the washer on the surface of the insulation for easy on-the-wall anchor assembly.
2. Install anchors in each stud horizontally, and not more than [16, 24] inches on center vertically, not more than 2.67 square feet per anchor.
3. Self-Drilling Screw tip (supplied with Pos-I-Tie anchor): Use a standard drill with a variable clutch adjustment and a Pos-I-Tie® Chuck Adapter. Place the barrel end of the screw in the chuck adapter; drill through the sheathing and into the metal stud until the end of the barrel engages the stud and seats tightly.
4. As needed, rotate the Pos-I-Tie head to a horizontal position with a pair of pliers as per manufacturer's instructions.

B. ThermalClips®

1. From the underside of the barrel loop, insert the tab of the thermal clip into the barrel loop and fold and apply pressure to the edges of the wing tabs until you hear the distinct dual "snap" of the engagement on both sides of the clip. Apply pressure with pliers if necessary to insure closure.

C. Wire Ties

1. Configure ties to prevent flow of water to anchor and to transfer lateral loads without excess

mechanical play or deformation.

3.5 FILL ERRANT PUNCTURES, PENATRATIONS, HOLES

A. If masonry veneer anchors or screws are removed, the affected area must be detailed over with sealant [Dymonic® 100, manufactured by Tremco].

B. Completely fill the errant hole caused by a misplaced fastener and/or removed masonry anchor with sealant. Fill the hole in the rigid insulation board to full depth making sealant contact with the air/water barrier membrane below the insulation and fully flush with the outer face of the rigid insulation.

3.6 MORTAR DROPPINGS COLLECTION DEVICE INSTALLATION

A. Verify installation of flashing and the completion of first two courses of masonry.

B. MortarNet

1. Extend flashing from the bottom of the MortarNet to at least 6 inches above the top of the MortarNet to prevent mortar bridging between the outer wythe and inner wall.
2. Remove mortar droppings and debris from flashing and weep vents.
3. 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.
4. Butt ends together. Compress slightly if necessary.
5. Face Insect Barrier toward the outside of the building.

END OF SECTION 04 20 00

SECTION 07 21 00 THERMAL INSULATION

PART 1 – GENERAL

1.1 GENERAL CONDITIONS

A. See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance), and drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections which are hereby made a part of the specification of this Section. All proposed product substitutions must comply to be considered.

1.1 DESCRIPTION OF WORK

A. This section includes continuous insulation and steel stud cavity insulation in the wall system as specified.

1. Provide and install cold formed steel stud exterior wall framing [load-bearing, non-load bearing], [fire resistance rated, non-rated] system, with exterior gypsum sheathing and fluid applied air and water resistive barrier layer over the exterior gypsum, with rigid foam continuous insulation sheathing and [faced, unfaced] fiberglass batt insulation in the stud cavity that effectively controls thermal, air and water performance and provides continuous insulation and continuity of the building envelope. The system shall include the following:

a. Steel stud framing independently braced to resist vertical and transverse structural loading.
b. Gypsum board sheathing coated with a fluid applied air/water resistive barrier system.
c. Insulating foam plastic sheathing secured to the exterior of the steel stud wall framing.
d. Foam preliminarily secured with screws and air/water sealing washers, and permanently secured with masonry anchors and air/water sealing washers.
e. Fiberglass batt insulation in the steel stud framing cavity.

B. All joints, penetrations and gaps of the insulating [and air barrier] wall system shall be made water [and air] tight.

1.3 RELATED SECTIONS

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

1. Section 03 45 00, Precast Architectural Concrete
2. Section 04 08 00, Commissioning of Masonry (inspection, verification, approval)
3. Section 04 20 00, Unit Masonry (products, installation, coordination)
4. Section 04 43 00, Stone Masonry (products, installation, coordination)
5. Section 05 41 00, Structural Metal Stud Framing
6. Section 05 50 00, Metal Fabrication (lintels, shelf angles and masonry support)
7. Section 06 16 43, Gypsum Sheathing
8. Section 07 19 00, Water Repellants (masonry wall coatings)
9. Section 07 21 13, Foam Board Insulation
10. Section 07 21 16, Blanket Insulation
11. Section 07 27 00, Air/Water Barriers (fluid applied membrane)
12. Section 07 60 00, Flashing and Sheet Metal (metal counter flashing installation and coordination requirements.
13. Section 07 84 53, Building Perimeter Firestopping

14. Section 07 92 00, Joint Sealants (sealing control and expansion joints in unit masonry)
15. Section 09 29 00, Gypsum Board

1.4 REFERENCES

A. 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)

   a. ASTM C 272: Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
   b. ASTM C 518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
   c. ASTM C 578: Standard Specification for Rigid Cellular Polystyrene Thermal Insulation
   d. ASTM C 665: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
   e. ASTM D 1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
   f. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
   g. ASTM E 96: Standard Test Methods for Water Vapor Transmission of Materials
   h. ASTM E 119: Standard Test Methods for Fire Tests of Building Constructions and Materials
   i. ASTM E 331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
   j. ASTM E 2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

2. National Fire Protection Association (NFPA)

   a. NFPA 285: Standard Fire Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

3. International Code Council Evaluation Service (ICC-ES):

   a. AC 71: Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water Resistive Barriers.

1.5 SUBMITTALS

A. System performance verification: Submit manufacturers verification, test reports, or third engineering analysis that the proposed materials assembled as a wall system comply with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance) performance requirements as required by this specification, and as shown in the basis-of-design Underwriters Laboratories Exterior Wall System EWS 0008. (http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?name=FWFO.EWS0008&ccnshorttitle=Exterior+Wall+Systems&objid=1084084707&cfgid=1073741824&version=versionless&parent_id=1082764581&sequence=1)

B. Provide samples and data as listed for verification.

1. Product Data: Manufacturer's data on each type of product furnished including:
   a. Preparation instructions and recommendations.
   b. Storage, handling requirements and recommendations.

2. LEED: Provide product prerequisite and/or credit summaries for each product specified as applicable.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
The installation work of this section shall be performed by an experienced contractor with a minimum of 2 years experience installing similar assemblies.

B. 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.

C. Preconstruction Meeting:
Convene a meeting of involved sub-contractors a minimum of two weeks prior to commencing work described in this section. The agenda shall include at a minimum, materials proposed for use, verification of eligibility for the CavityComplete® Steel Stud warranty, sequence of construction, coordination with substrate preparation, compatibility of materials, coordination with installation of adjacent and covering materials. Attendance is required by representatives of related trades including covering materials, substrate materials and adjacent materials.

D. Sample Panel (Mock-Up):
Construct a wall system sample panel sized 8' long x 6' high that includes framing, sheathing, air/water barrier, rigid insulation, insulation fasteners with air/water sealing washers, through wall flashing/termination bar/drip edge, mortar droppings protection, sealants, weep vent protection, masonry anchors/ties and air/water sealing washers, and masonry veneer. The panel shall also include a mock window opening detailed with lintel, head and sill flashings, and end dams. Locate as directed and remove upon review and approval.

E. System Substitution:
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. Substitution requests must be accompanied by the following in order for the Architect to consider a substitution:

1. Verification that proposed products meet published performance criteria of the specified products.
2. Verification from the proposed manufacturers of independent third party listings or engineering judgments that the proposed system substitution meets the fire resistance, air leakage and water penetration requirements of this section, and as specified in the basis-of-design Underwriters Laboratories Exterior Wall System # EWS0008. (http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?name=FWFO.EWS0008&ccnshorttitle=Exterior+Wall+Systems&objid=1084084707&cfgid=1073741824&version=versionless&parent_id=1082764581&sequence=1)

3. Verification that the proposed manufacturers offer a complete system warranty including all products proposed for use.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging until ready for installation.

B. Protect products from exposure to direct sunlight.

C. 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. Do not install insulation that has been damaged or wet.

1. In the event the board insulation becomes wet, wipe dry prior to installation.
2. In the event the batt or blanket insulation becomes wet, remove it from jobsite.
   a. 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.

PART 2 – PRODUCTS

2.1 GENERAL CONDITIONS

A. See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance), and drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections which are hereby made a part of the specification of this Section. All proposed product substitutions must comply to be considered.

2.2 EXTRUDED POLYSTYRENE INSULATION

A. Provide continuous insulation (sheathing), extruded polystyrene foam plastic insulation, unfaced, complying with ASTM C 578 and meeting the criteria listed.

1. BASIS OF DESIGN
   Owens Corning (www.ocbuildingspec.com) Foamular 250 or equal product from one of the following:

   a. [insert acceptable alternate supplier]
   b. [insert acceptable alternate supplier]

2. MATERIAL

   a. ASTM C 578 type IV, certified by independent third party such as RADCO
   b. Blowing Agent Formulation: Zero ozone depleting
   c. Compressive Strength (ASTM D 1621): 25 psi, minimum
   d. Edge condition: square

e. Thermal Resistance (180 day real-time aging as mandated by ASTM C 578, measured per ASTM C 518 at mean temperature of 75F): R-5.0 per inch of thickness, with 90% lifetime limited warranty on thermal resistance
f. Water Absorption (ASTM C272): Maximum.0.10 percent by volume
g. Surface Burning Characteristics (ASTM E 84): Flame spread less than 25; smoke developed less than 450, certified by independent third party such as Underwriters Laboratories
h. Indoor Air Quality: Compliance certified by independent third party such as GREENGUARD Indoor Air Quality Certified® and/or GREENGUARD Children and Schools Certified℠
i. Recycle Content: Minimum 20%, certified by independent third party such as Scientific Certification Systems.
j. Warranty: Limited lifetime warranty covering all ASTM C578 physical properties.

3. PRODUCT SIZE

a. Provide R-5 per inch of thickness; [3/4”, 1”, 1-1/2”, 2”, 2-1/2”, 3”, 4” thick; [48”x96” or 24”x96”]; square edge.

2.3 FASTENERS FOR EXTRUDED POLYSTYRENE INSULATION

A. Provide preassembled screw/stress plate fasteners recommended by their manufacturer for securing rigid foam plastic continuous insulation sheathing. Polymer or other corrosion-protected, coated steel screw fasteners for anchoring sheathing to metal wall framing. Fastener length and size based on wall sheathing thickness and fastener manufacturer recommendation.

1. BASIS OF DESIGN
Rodenhouse, Inc. (www.rodenhouse-inc.com) Grip-Deck ci Screws with Thermal-Grip ci Prong Washers or equal product from one of the following:

a. [insert acceptable alternate supplier]
b. [insert acceptable alternate supplier]

2. MATERIAL

a. Screws for steel stud framing, meet or exceed ASTM C 954 and premium ceramic coating exceeds 1,000 hours of salt spray testing. [Zinc, Ceramic] coated for corrosion protection.
b. 2” diameter air/water sealing washers, seal tested per ASTM E331 (water) and ASTM E2357 (air), pronged for ease of pre-positioning and easy on-the-wall screw assembly.
c. Bugle head screws ranging from #6 - #10, self-drilling for steel studs, HiLo thread for light gauge steel. Length of screw to be 1” longer than the thickness of the insulation and gypsum sheathing combined for a minimum 4 threads of penetration through the backside of the steel studs.

2.4 FIBER GLASS BATT INSULATION

A. Provide fiber glass batt insulation sized to completely fill the steel stud cavities and meeting the criteria listed.

1. BASIS OF DESIGN
   Owens Corning (www.ocbuildingspec.com) EcoTouch Pink Fiberglas Insulation with PureFiber Technology or equal product from one of the following:

   a. [insert acceptable alternate supplier]
   b. [insert acceptable alternate supplier]

2. MATERIAL
   a. ASTM C 665 type [I (batt without facing), or II Class A (batt with nonreflective facing, flame spread 25 or less), or III Class A (batt with reflective facing, flame spread 25 or less].
   b. Full width batt for use with steel studs spaced **[16", 24"]** on center.
   c. Thermal Resistance: Measured in accordance with ASTM C 518, R-value **[13, 15, 19, 21, 30]**
   d. [Factory-applied facing or Unfaced]: (If faced, choose from the following options):
      1. [FSK (foil-scrim-kraft, Type III Class A, Category 1, facer is a vapor retarder with 0.02 water vapor permeance)]
      2. [PSK (light-reflective white polypropylene-scrim-kraft, Type II Class A, Category 1, facer is a vapor retarder with 0.02 water vapor permeance)]
      3. [Surface burning characteristics, ASTM E 84, flame spread 25 or less]
      4. [Water Vapor Permeance: Permeance of vapor retarding facings measured in accordance with ASTM E 96]
   e. Indoor Air Quality: Verified to be formaldehyde free by independent third party such as GreenGuard Environmental Institute, Indoor Air Quality and/or GreenGuard Children and Schools Certified
   f. Recycle Content: Minimum 50%, certified by independent third party such as Scientific Certification Systems
   g. Sustainable Product Certification: Verified to comply with EcoLogo Certification Criteria Document 016 for Thermal Insulation Materials (CCD-016) for environmentally preferable products
   h. Renewable Materials: Verified to contain renewable ingredients to meet or exceed the biobased content criteria for the USDA Certified Biobased Product Label

3. ACCEPTABLE PRODUCTS
   Subject to compliance with product criteria, the products that may be incorporated into the work include but are not limited to:

   a. [EcoTouch™ Thermal Batt, unfaced; ASTM C 665 Type I; thickness [3-1/2" R-11, 3-1/2" R-13, 6-1/4" R-19]; full width for steel stud framing 16" or 24" on center; 48" or 96" long]
   b. [EcoTouch™ Flame Spread 25, FSK faced; ASTM C 665 Type III, Class A, reflective FSK faced, flame spread 25, 0.02 perm; thickness [3-1/2" R-11, 3-1/2" R-13, 6-1/4" R-19, 9-1/2" R-30]; full width for steel stud framing 16" or 24" on center; 48" or 96" long]
   c. [EcoTouch™ Flame Spread 25, PSK faced; ASTM C 665 Type II, Class A, white PSK faced, flame spread 25, 0.02 perm; thickness [3-1/2" R-11, 3-1/2" R-13, 6-1/4" R-19, 9-1/2" R-30]; full width for steel stud framing 16" or 24" on center; 48" or 96" long]

PART 3 – EXECUTION

3.1 GENERAL CONDITIONS

A. 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 of unsatisfactory preparation in

writing before proceeding. Protect installed products from damage until completion of project. Repair or replace damaged products before covering with construction. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Verify that steel wall studs, opening framing, bridging and structural bracing and other framing support members and anchorage have been installed in accordance with good construction practice and are compliant with this specification.

C. Verify that adjacent materials are dry and ready to receive insulation. Verify mechanical and electrical services within walls have been tested and inspected.

D. Installation of products specified in this section constitutes acceptance of existing conditions and assumption of responsibility for satisfactory performance.

3.2 CONTINUOUS INSULATION INSTALLATION

A. EXTRUDED POLYSTYRENE INSULATION

1. For spray applied air/water resistive barrier material, verify manufacturer recommended cure time before installing extruded polystyrene insulation board**.** [Minimum 24 hours if using CavityComplete components]
2. Install extruded polystyrene (XPS) insulation boards over the exterior gypsum board sheathing and air/weather resistive barrier layer in accordance with manufacturer's recommendations.
3. Install XPS insulation board in maximum sizes to minimize joints. Locate joints square to framing members. Center joints over framing. Provide additional framing as necessary.
4. Stagger joints a minimum of one stud space from adjacent joints.
5. Insulation board edges shall be butted together tightly, and fit around openings and penetrations. Install square edges to fit square and tight.
6. Fasten the insulation board to the exterior face of the steel stud wall framing using screw and ci pronged washer as specified, length as recommended by their manufacturer for securing foam plastic continuous insulation sheathing.
    1. Install with self-drilling screws using a standard drill with a variable clutch adjustment and an EZ-Driver chuck adaptor (contractors option) or Grip-Lok auto-feed fastening system with Bullseye adaptor (contractors option).). Installation tools available www.rodenhouse-inc.com
    2. Screw spacing shall be evenly distributed and the minimum necessary per job site conditions (4 to 6 per board) to hold the continuous insulation in place until masonry anchors/brick tie washers can be installed to permanently secure the insulation board in accordance with Division 04 20 00 requirements.
    [Fastening requirements can be revised to suit job site conditions if the insulation board is being installed at the same time as the masonry anchors/washers that will serve to secure the insulation board to the substrate. Contractor must receive written confirmation from the architect before altering fastener requirements.]
    3. Drive fasteners so the pronged washer is tight and flush with the board surface but do not countersink. Washer is designed to compress and nearly flatten on the surface of the insulation. EZ-Driver chuck adaptor and Grip-Lok auto-feed fastening system from Rodenhouse Inc. help prevent accidental overdrive of the washers through the insulation face.
    4. 2” diameter pronged washers can bridge between adjoining board edges.
    5. Do not fasten more than two board edges with one pronged washer.
7. Verify that the extruded polystyrene continuous insulation is chemically compatible with the air/water barrier over which it is installed. [Not required is using CavityComplete Wall System components]

8. Install exterior brick veneer as soon as possible, best within 60 days, to avoid possible discoloration of the foam from UV exposure. [If black tape or coatings are installed over the insulation board, cover the black surfaces as soon as possible to avoid foam damage due to potential solar heat build-up on the black surface]
9. Do not permit the extruded polystyrene insulation board to come in contact with surfaces or temperatures in excess of 165oF.

3.2 STEEL STUD CAVITY INSULATION INSTALLATION

A. FIBER GLASS BATTS

1. Install fiberglass batt insulation in accordance with manufacturer's recommendations and not before the exterior sheathing has been installed on one side of the stud cavity and sealed to establish complete water resistance.
2. Protect insulation from damage due to weather and physical abuse until protected by permanent construction.
3. Fit batt insulation tightly into exterior wall steel stud cavity spaces and framing voids to create a continuous insulation layer filling all space in the framing cavity without gaps. Trim to fill spaces and voids neatly. Fluff insulation to full thickness for specified R-value before installation. Do not compress insulation after installation.

   [Unfaced and faced batt]: Tightly friction fit full width 16", or full width 24", batt insulation to fill the interior of the cavities between steel studs, and to completely fill the voids inside the steel stud flanges.

   [Factory faced batt insulation]: Support by friction fit, or taping, or adhering the facing flanges to the face of the steel stud. Gypsum board wall finish is applied after the facing is secured. No additional support is required.

   [Unfaced batt insulation, completely filled cavity depth, both sides of the stud cavity closed]: Friction fit is adequate if the insulation completely fills the depth of the stud cavity, and the cavity is enclosed on both sides. No additional support is required

   [Unfaced batt insulation, completely filled cavity depth, one side of the stud cavity open]: Friction fit, supplement with straps or wires, described below, installed starting 4' above the floor and every 2' on center above 4'.

   [Unfaced batt insulation, does not completely fill depth of stud cavity]: Friction fit, supplement with straps or wires, described below, installed starting 4' above the floor and every 2' on center above 4'.

   [Supplemental wire or strap supporting devices]: Multiple types of support devices may be used. Wires can be inserted through the batts extending from stud to stud. The wires may be installed continuously through the punch outs of the steel stud framing. Or, heavy gauge wire may be cut slightly larger than each stud space and wedged into place between studs. When the insulation is less than the depth of the stud cavity, the wires should be positioned to hold the batt against the sheathing (gypsum of foam plastic) on the opposite side of the cavity. Another option is the use of punched metal straps attached to the face of the framing. The punched pronged tabs are bent 90 degrees pointing into the stud cavity and are pushed into the insulation after installation. The punched prongs impale the insulation batt and hold it in place.

4. Within exterior wall framing, install insulation between pipes, mechanical services, electrical boxes, and backside of sheathing. Cut or split insulation material as required to fit around wiring and plumbing.

5. [Install factory applied facing with vapor retarder membrane facing building interior spaces. Facing flanges (tabs) may be left unfolded for friction fit installation, or they may be unfolded and lapped over the face of framing members.]
6. [Maintain vapor retarder integrity by tightly abutting adjacent insulation. Repair punctures or tears in vapor retarder facing by taping with a vapor retarding tape. Follow tape manufacturer's application recommendations.]

END OF SECTION 07 21 00

SECTION 07 27 26, FLUID APPLIED MEMBRANE AIR BARRIER

PART 1 – GENERAL

1.1 GENERAL CONDITIONS

A. See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance), and drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections which are hereby made a part of the specification of this Section. All proposed product substitutions must comply to be considered.

1.2 B. DESCRIPTION OF WORK

This section includes fluid-applied, vapor-permeable membrane air barriers in the wall system as specified.

1. Provide and install cold formed steel stud exterior wall framing **[load-bearing, non-load bearing]**, **[fire resistance rated, non-rated]** system, with exterior gypsum sheathing and fluid applied air and water resistive barrier layer over the exterior gypsum, with rigid foam continuous insulation sheathing and **[faced, unfaced]** fiberglass batt insulation in the stud cavity that effectively controls thermal, air and water performance and provides continuous insulation and continuity of the building envelope. The system shall include the following:

   a. Steel stud framing independently braced to resist vertical and transverse structural loading.
   b. Gypsum board sheathing coated with a fluid applied air/water resistive barrier system.
   c. Insulating foam plastic sheathing secured to the exterior of the steel stud wall framing.
   d. Foam preliminarily secured with screws and air/water sealing washers, and permanently secured with masonry anchors and air/water sealing washers.
   e. Fiberglass batt insulation in the steel stud framing cavity.

2. All joints, penetrations and gaps of the insulating [and air barrier] wall system shall be made water [and air] tight.

1.3 RELATED SECTIONS

[Tremco recommends the use of a flexible, durable air tight transition assembly in deflection joints greater than 1/2" in exterior sheathing applications.]

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

1. Section 05 41 00, Structural Metal Stud Framing
2. Section 06 16 43, Gypsum Sheathing
3. Section 07 low-slope roofing Sections for roof air barriers
4. Section 07 Section "Flexible Flashings" for flashings embedded in wall construction.
5. Section 07 27 00, Air/Water Barriers (fluid applied membrane)
6. Section 07 60 00, Flashing and Sheet Metal (metal counter flashing installation and coordination requirements.
7. Section 07 92 00, Joint Sealants (sealing control and expansion joints in unit masonry)
8. Division 08 exterior openings sections for opening transition assembly providing airtight seal between aluminum-framed entrances and storefronts aluminum windows glazed aluminum curtain walls louvers and vents and membrane air barrier.

[Opening transition assembly below is based on Tremco's Proglaze ETA Engineered Transition Assembly. Tremco recommends use of this assembly or similar material to provide a flexible, durable air-tight transition between the glazing unit and the air barrier installed on the adjacent wall.]

1.4 REFERENCES

A. 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)

   a. ASTM C 272: Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
   b. ASTM C 518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
   c. ASTM C 578: Standard Specification for Rigid Cellular Polystyrene Thermal Insulation
   d. ASTM C 665: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
   e. ASTM D 1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
   f. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
   g. ASTM E 96: Standard Test Methods for Water Vapor Transmission of Materials
   h. ASTM E 119: Standard Test Methods for Fire Tests of Building Constructions and Materials
   i. ASTM E 331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
   j. ASTM E 2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

2. National Fire Protection Association (NFPA)

   a. NFPA 285: Standard Fire Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

3. International Code Council Evaluation Service (ICC-ES):

   a. AC 71: Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water Resistive Barriers.

B. DEFINITIONS

1. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
2. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
3. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.5 SUBMITTALS

A. System performance verification: Submit manufacturers verification, test reports, or third engineering analysis that the proposed materials assembled as a wall system comply with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance) performance requirements as required by this specification, and as shown in the basis-of-design Underwriters Laboratories Exterior Wall System EWS 0008. (http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?name=FWFO.EWS0008&ccnshorttitle=Exterior+Wall+Systems&objid=1084084707&cfgid=1073741824&version=versionless&parent_id=1082764581&sequence=1)

B. Product Data: Manufacturer's data on each type of product furnished including:
   1. Preparation instructions and recommendations for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.
   2. Storage, handling requirements and recommendations.
   3. System Data: Submit test data by qualified testing agency indicating membrane air barrier meets performance requirements, when requested by Architect.

C. LEED: Provide product prerequisite and/or credit summaries for each product specified as applicable including statement of VOC content.

   [Laboratory Test Reports for Credit IEQ 4" Subparagraph below applies to LEED for Schools]
   1. [Laboratory Test Reports for Credit IEQ 4: For air barriers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."]

D. Shop Drawings (for air-barrier assemblies)
   1. 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.
   2. Include details of interfaces with other materials that form part of air barrier.

E. [Qualification Submittals for ABAA Licensed Installer]
   1. [Qualification Data: Installer must provide list of installers and supervisors employed by the installer, who work on Project.]
   2. [Product Certificates: Air-barrier manufacturer must provide certification of compatibility of air barriers and accessory materials with Project materials that connect to or that come into contact with membrane air barriers.]
   3. [Product Test Reports: For each air-barrier assembly provide test data performed by a qualified testing agency.]
   4. [Low-Emitting Product Verification: Submit GREENGUARD Children & Schools certificate (verifiable at http://www.greenguard.org/en/SearchResults.aspx?BrandID=1001).]
   5. [Fire Testing: Provide documentation from a qualified testing agency that the air barrier system as a component of a wall assembly has been tested and passed NFPA 285. Include UL Systems or other independent laboratory system classification number on shop drawings.]

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
The installation work of this section shall be performed by one entity, an experienced contractor that employs installers and supervisors who are trained and approved by manufacturer, with a record of successful installations on projects of similar scope.

B. Preconstruction Meeting:
Convene a meeting of involved sub-contractors a minimum of two weeks prior to commencing work described in this section. The agenda shall include at a minimum, materials proposed for use, verification of eligibility for the CavityComplete® Steel Stud warranty, sequence of construction, coordination with substrate preparation, compatibility of materials, review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers coordination with installation of adjacent and covering materials. Attendance is required by representatives of related trades including covering materials, substrate materials and adjacent materials.

C. Sample Panel (Mock-Up):
Construct a wall system sample panel sized 8' long x 6' high that includes framing, sheathing, air/water barrier, rigid insulation, insulation fasteners with air/water sealing washers, through wall flashing/termination bar/drip edge, mortar droppings protection, sealants, weep vent protection, masonry anchors/ties and air/water sealing washers, and masonry veneer. The panel shall also include a mock window, storefront, 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 junction with roofing membrane, building corner condition, and foundation wall intersection.
3. Architect 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 specifically approves such deviations in writing.

[Add note to indicate if if ABAA's Quality Assurance Program is required. Verify availability of ABAA-licensed contractors before retaining. 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.]

[Retain this sectionfor preconstruction testing. Project-specific preconstruction testing of assemblies can be expensive but may be the best means of proving that performance requirements are met. Mockup testing is usually limited to buildings with complex, unusual, or previously untested exterior envelope construction.]

7. [Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.]

D. System Substitution:
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. Substitution requests must be accompanied by the following in order for the Architect to consider a substitution:

a. Verification that proposed products meet published performance criteria of the specified products.

b. Verification from the proposed manufacturers of independent third party listings or engineering judgments that the proposed system substitution meets the fire resistance, air leakage and water penetration requirements of this section.
c. Verification that the proposed manufacturers offer a complete system warranty including all products proposed for use.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging until ready for installation.
B. Protect stored products from exposure to direct sunlight.
C. 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.
D. Remove and replace liquid materials that cannot be applied within their stated shelf life.

1.8 FIELD CONDITIONS

A. Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.
B. Protect substrates from environmental conditions that affect air-barrier performance.
C. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.9 COORDINATION
Coordinate installation of membrane air barrier with completion of roofing and other moisture protection work.

PART 2 – PRODUCTS

2.1 GENERAL CONDITIONS

A. See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance), and drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections which are hereby made a part of the specification of this Section. All proposed product substitutions must comply to be considered.

B. MATERIALS

1. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

[Retain "VOC Content" Paragraph below if required for LEED-NC and LEED-CS Credit IEQ 4.2, which limits VOC content to 250 g/L for materials used inside the weatherproofing system. Retain below also as default requirement of authorities having jurisdiction.]

2. VOC Content: [250] g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.

[Retain "Low-Emitting Materials" Paragraph below for materials used inside the weatherproofing system if required for LEED for Schools Credit IEQ 4.]

3. Low-Emitting Materials: Air barriers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 PERFORMANCE REQUIREMENTS

A. See the Division 01 specifications, and, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, and drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections which are hereby made a part of the specification of this Section.

1. Air barrier shall be capable of performing as a continuous vapor- permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to embedded flashing, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

2. Air-Barrier Assembly Air Leakage: Maximum [0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa)], when tested according to ASTM E 2357.

3. Fire Testing: Air barrier system as a component of a wall assembly shall have been tested and passed NFPA 285.

2.3 SYNTHETIC VAPOR PERMEABLE MEMBRANE AIR BARRIER

A. Provide fluid applied, vapor permeable membrane air barrier, eastomeric, modified bituminous or synthetic polymer membrane.

1. BASIS OF DESIGN
Tremco, Inc, (www.tremcosealants.com) ExoAir 230 or equal product from one of the following:

a. [insert acceptable alternate supplier]
b. [insert acceptable alternate supplier]

2. MATERIAL

a. Synthetic polymer membrane
b. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference; ASTM E 2178.
c. Vapor Permeance: Minimum 10 perms (580 ng/Pa x s x sq. m); ASTM E 96/E 96M, Method B
d. Ultimate Elongation: Minimum 200 percent; ASTM D 412, Die C.
e. Combustion Characteristics: Flame spread, not greater than 25; smoke development, not greater than 450, ASTM E 84.
f. UV Resistance: minimum 150 daily cycles of UV and water spray with no visible deterioration in QUV-B Weathering Chamber.

2.4 ACCESSORY MATERIALS

A. Provide accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly that is compatible with primary air-barrier material.

1. Primer: Liquid primer recommended for substrate by air-barrier material manufacturer.

2. Counterflashing Strip: Modified bituminous, 40-mil- (1.0-mm-) thick, self-adhering sheet consisting of 32 mils (0.8 mm) of rubberized asphalt laminated to an 8-mil- (0.2-mm-) thick, cross-laminated polyethylene film with release liner backing.

3. Modified Bituminous Strip: Vapor retarding, 40 mils (1.0 mm) thick, smooth surfaced, self-adhering; consisting of 36 mils (0.9 mm) of rubberized asphalt laminated to a 4-mil- (0.1-mm-) thick polyethylene film with release liner backing.

4. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

5. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.

6. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch (0.5 mm) thick, and Series 300 stainless-steel fasteners.

7. Sprayed Polyurethane Foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft (24- to 32-kg/cu. m) density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

[Tremco recommends including opening transition assembly described below in the appropriate Division 08, Openings sections. The specification provided below describes Tremco's Proglaze ETA Engineered Transition Assembly.]

2.5 TRANSITION STRIP

A. Provide cured low-modulus silicone extrusion, with reinforcing ribs, sized to fit opening widths, with aluminum race for insertion into aluminum framing extrusions, with the characteristics specified.

1. BASIS OF DESIGN
Tremco, Inc, (www.tremcosealants.com), Proglaze ETA Engineered Transition Assembly or equal product from one of the following:

a. [insert acceptable alternate supplier]
b. [insert acceptable alternate supplier]

2. MATERIAL

a. Tensile Strength: 1100 psi (7.6 MPa), per ASTM D 412.
b. Ultimate Elongation: 500 percent, per ASTM D 412.
c. Tear Strength: 110 lb/in (19.3 kN/m).
d. Hardness, Type A Durometer: 40, per ASTM D 2240.

2.6 JOINT SEALANT

A. Provide high performance, high movement, polyurethane sealant.

1. BASIS OF DESIGN
   Tremco, Inc, (www.tremcosealants.com), Dymonic 100, or equal product from one of the following:

   a. [insert acceptable alternate supplier]
   b. [insert acceptable alternate supplier]

2. MATERIAL
   a. Comply with ASTM C 920, Type S, Grade NS, Class 50, Use NT, T, M, A, O, I.
   b. Comply with Division 07 Section "Joint Sealants."

3. TERMINATION MASTIC
   a. Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air-barrier application.
B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
C. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
D. 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.

3.3 JOINT AND SCREW HEAD TREATMENT FOR GYPSUM SHEATHING

A. Seal all sheathing joints, gypsum screw fastener heads, construction gaps and movement joints up to 1" (25 mm) detailed and tooled flush with the specified joint sealant.

[Dymonic® 100 is used for detailing the board joints in exterior sheathing and the fastener heads in the CavityComplete® Wall System. It is also used when repairing an errant whole in the insulation resulting from a misplaced or removed Pos-I-Tie® masonry anchor or Grip-Deck screw.]

1. SURFACE PREPARATION
   Surfaces must be sound and clean. All release agents, existing waterproofing, dust, loose mortar, paints, or other finishes must be removed. This can be accomplished with a thorough wire brushing, grinding, sandblasting, or solvent washing, depending on the contamination.

2. [PRIMING]

[Dymonic® 100 typically adheres to common construction substrates without primers. However, It is recommended that the mock-up be tested for field adhesion using the actual materials being used on the job to verify the need for a primer. A description of the field adhesion test is in appendix X1 of ASTM C 1193, Standard Guide for Use of Joint Sealants. Where deemed necessary, use Vulkem Primer #191 Low-VOC on porous substrates and TREMprime Non-Porous Primer for metals or plastics.]

B. APPLICATION TEMPERATURE LIMITS
Surface temperatures must be 40 ˚F (5 ˚C) or above at the time the sealant is applied. If sealant must be applied in temperatures below 40 ˚F, refer to manufacturers instructions. [Tremco Guide for Applying Sealants in Cold Weather, www.tremcosealants.com.]

C. COVERAGE RATES
Do not exceed coverage rates as specified by the manufacturer [for Dymonic 100, 308 ft of joint per gallon for a 1/4" x 1/4" (6 mm x 6 mm) joint. For specific coverage rates that include joint size, and usage efficiencies, use manufacturer usage calculator at www.tremcosealants.com.]

D. SCREW FASTENER HEADS
All installed fastener heads must be detailed with sealant [Dymonic® 100] prior to application of the fluid applied air barrier membrane or accessory materials.

E. JOINT DETAILING

1. All backing must be dry at time of sealant application.
2. Movement joint width should be 4 times anticipated movement, but not less than 1/4" (6 mm).
3. Construction gaps greater than 1/4" (6 mm) must have backer rod installed prior to sealant.
4. Ensure that the backer rod is friction fitted properly and any primers have been applied. Joint backing closed cell or reticulated polyethylene backer rod is recommended as joint backing to control sealant depth and to ensure intimate contact of sealant with joint walls when tooling. Where depth of joint will prevent the use of backer rod, an adhesive backed polyethylene tape (bond breaker tape) should be used to prevent three-sided adhesion.
5. Fill the joint completely with a proper width-to-depth ratio, and tool to ensure intimate contact of sealant with joint walls. Dry tooling is preferred. Compatible wetting agents can be used in limited amounts to slick the spatula if needed after an initial pass.

F. EXPANSION JOINTS
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). Contact manufacturer technical support for joints that are wider than 1" (25 mm).

G. WINDOW PERIMETERS
Fillet beads, or angle beads around windows and doors, the sealant should exhibit a minimum surface contact area (C) of 1/4" (6 mm) onto each substrate, with provisions for release at the heel of the angle using backer rod or bond breaker tape.

H. INSIDE CORNERS
All inside corners are required to have a cant bead of sealant [Dymonic® 100] applied prior to application of the fluid applied air barrier membrane.

I. CURE TIME
Allow the manufacturers recommended cure time prior to covering with the specified fluid applied air barrier membrane.

[Dymonic® 100 generally cures at a rate of 3/32" per day at 75 °F (24 °C) and 50% RH. It will skin in 2 hours and be tack free in 6 to 8 hours. The cure time will increase as temperatures and/or humidity decrease. Allow one additional day for every 10 °F decrease in temperature.]
[Dymonic® 100 may be coated over immediately, but caution should be taken to not compromise the sealant installation.]

J. LIMITATIONS
Use with adequate ventilation and review the product MSDS for information on Personal Protective Equipment (PPE) and health hazards.

3.4 TRANSITION STRIP INSTALLATION

A. Install strips, transition strips, and accessory materials according to air-barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
2. Install modified bituminous strip on roofing membrane or base flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate.
3. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
4. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
5. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
6. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply opening transition assembly so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate. Maintain 3 inches (75 mm) of full contact over firm bearing to perimeter frames with not less than 1 inch (25 mm) of full contact.

Retain "Opening Transition Assembly", "Modified Bituminous Transition Strip," or "Preformed Silicone-Sealant Extrusion," Subparagraph below, depending on option retained in "Wall Openings" Paragraph above.

a. Opening Transition Assembly: Refer to Division 08 Section "Opening Transition Assembly."

7. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.
8. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
9. Seal top of through-wall flashings to air barrier with an additional 6-inch- (150-mm-) wide, modified bituminous strip at nonmetallic flashings or counterflashing strip at metal flashings.
10. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
11. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.5 FLUID AIR BARRIER MEMBRANE INSTALLATION
Apply fluid air barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions.

Guide Specifications

A. GENERAL

1. Store fluid membrane [ExoAir® 230] in original, undamaged packages in a clean, dry, protected location with temperature not exceeding 100 °F (37 °C) and not falling below 40 °F (5 °C). Do not allow material to freeze prior to application.
2. Do not apply to damp or contaminated surfaces
3. Protect membrane from rain and washout prior to drying
4. Prior to beginning fluid air barrier installation, inspect to insure that all substrate fasteners, joints and corners have been sealed as specified.
5. Install only when temperature is minimum 40°F (5°C), or, refer to manufactuers recommendations for cold conditions application [the Tremco® Technical Bulletin — Cold Temperature Recommendations for Air Barrier applications at www.tremcosealants.com or contact Tremco® Technical Services at 886.209.2404]

B. SURFACE PREPARATION

1. Surface must be dry, clean, smooth, firm, 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.
2. All penetrations shall be secured and/or sleeved with a metal collar.
3. 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.

C. MEMBRANE APPLICATION

1. Apply fluid membrane material [ExoAir® 230] [Refer to the Technical Bulletin Spraying Guide at www.tremcosealants.com for more information on spraying ExoAir® 230] at a rate of 70 wet mils (23 ft2/ gal; 2.1 m2/US gal.) using a minimum 3/4" (19 mm) nap roller or spray applied.
2. Use a wet film mil gauge as well as staging of material to ensure proper application thickness.
3. Follow manufacturers details for detailing of outside corners and transitions. [Embed Tremco® 2011 mesh into wet ExoAir® 230 at all outside corners/transitions. Apply a second coat of ExoAir® 230 to fully encapsulate the Tremco® 2011 mesh.]
4. Connect the fluid air barrier membrane [ExoAir® 230] 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.

D. FILL ERRANT PUNCTURES, PENATRATIONS, HOLES

1. If masonry veneer anchors or screws are removed, the affected area should be detailed over with sealant [Dymonic® 100].
2. Fill the errant hole caused by a misplaced fastener and/or removed masonry anchor with sealant [Dymonic® 100]. Allow the sealant [Dymonic® 100] to make contact with the membrane [ExoAir® 230] below the insulation and fill the whole fully and flush to the other surface of the insulation.

E. INSPECTION, TESTING, REPAIR

1. [Optional: Owner will engage a qualified testing agency to perform tests and inspections.]

2. Visually check the surface of the membrane [ExoAir® 230] thoroughly for pinholes, blisters punctures, damaged areas or other voids in the membrane.

   [Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements.]
   [Air barriers will be considered defective if they do not pass tests and inspections.]
   [Inspections may include the following:]

   a. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
   b. Minimum thickness has been maintained in all areas.
   c. Continuous structural support of air-barrier system has been provided.
   d. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
   e. Site conditions for application temperature and dryness of substrates have been maintained.
   f. Maximum exposure time of materials to UV deterioration has not been exceeded.
   g. Surfaces have been primed, if applicable.
   h. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fish mouths.
   i. Termination mastic has been applied on cut edges.
   j. Strips and transition strips have been firmly adhered to substrate.
   k. Compatible materials have been used.
   l. Transitions at changes in direction and structural support at gaps have been provided.
   m. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
   n. All penetrations have been sealed.]

3. Where deficiencies are detected, reapply fluid membrane [ExoAir® 230] until a monolithic coating at the specified minimum thickness is achieved. If the membrane has already been completely cured, repair in accordance with manufacturers instructions. [prepare the surface with a mineral spirit wipe or xylene to clean and soften the surface of the ExoAir® 230 membrane. Reapply at the minimum specified thickness with ExoAir® 230, extending out 4" (10 cm) in all directions If on-site adhesion testing is required, Tremco® recommends ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings.]
   [Repair damage to air barriers caused by testing; follow manufacturer's written instructions.]
4. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

F. CURE TIME AND PROTECTION

1. Membrane [ExoAir® 230] must be allowed to dry for a minimum of 72 hours or until fully cured, whichever is longer, prior to testing [if specified, necessary] with portable adhesion testers. [Additional information about testing can be found at www.tremcosealants.com in the Technical Bulletin section]
2. Other components of the wall system [CavityComplete® Wall System, Owens Corning® FOAMULAR® Extruded Polystyrene (XPS) Insulation, Mortar Net Solutions™ TotalFlash® and/or Tremco® accessory materials] may be installed after the membrane [ExoAir® 230] has fully cured, approximately 16-24 hours, or is firm and dry to touch.
3. 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

365 days after installation, apply temporary UV protection such as dark plastic sheets or tarpaulins or contact manufacturer technical support [844-CAV-COMP] for additional recommendations.

4. Protect the ExoAir® 230 membrane to avoid damage by other trades and construction materials during subsequent operations

3.6 CLEANING AND PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions. Protect air barrier from contact with incompatible materials and sealants not approved by air barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION 07 27 26

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

1.1 GENERAL CONDITIONS

A. See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance), and drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections which are hereby made a part of the specification of this Section. All proposed product substitutions must comply to be considered.

1.2 DESCRIPTION OF WORK

A. This section includes perimeter fire containment systems.

1. Provide and install cold formed steel stud exterior wall framing **[load-bearing, non-load bearing]**, **[fire resistance rated, non-rated]** system, with exterior gypsum sheathing and fluid applied air and water resistive barrier layer over the exterior gypsum, with rigid foam continuous insulation sheathing and **[faced, unfaced]** fiberglass batt insulation in the stud cavity that effectively controls thermal, air and water performance and provides continuous insulation and continuity of the building envelope. The system shall include the following:

a. Steel stud framing independently braced to resist vertical and transverse structural loading.
b. Gypsum board sheathing coated with a fluid applied air/water resistive barrier system.
c. Insulating foam plastic sheathing secured to the exterior of the steel stud wall framing.
d. Foam preliminarily secured with screws and air/water sealing washers, and permanently secured with masonry anchors and air/water sealing washers.
e. Fiberglass batt insulation in the steel stud framing cavity.
f. Safing to firestop the perimeter of door and window penetrations through wall.
g. [Safing and sealant for sealing gaps between exterior wall and floor edge, perimeter fire containment system]

1.3 RELATED SECTIONS

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

1. Section 03 45 00, Precast Architectural Concrete
2. Section 04 08 00, Commissioning of Masonry (inspection, verification, approval)
3. Section 04 20 00, Unit Masonry (products, installation, coordination)
4. Section 04 43 00, Stone Masonry (products, installation, coordination)
5. Section 05 41 00, Structural Metal Stud Framing
6. Section 05 50 00, Metal Fabrication (lintels, shelf angles and masonry support)
7. Section 06 16 43, Gypsum Sheathing
8. Section 07 19 00, Water Repellants (masonry wall coatings)
9. Section 07 21 13, Foam Board Insulation
10. Section 07 21 16, Blanket Insulation
11. Section 07 27 00, Air/Water Barriers (fluid applied membrane)
12. Section 07 60 00, Flashing and Sheet Metal (metal counter flashing installation and coordination requirements

13. Section 07 84 13, Window Penetration Firestopping
14. Section 07 84 53, Building Perimeter Firestopping
15. Section 07 92 00, Joint Sealants (sealing control and expansion joints in unit masonry)
16. Section 09 29 00, Gypsum Board

1.4 REFERENCES

A. Materials shall meet the property requirements of one or more of the following specifications as applicableto 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 and Materials (ASTM)

   a. ASTM C 272: Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
   b. ASTM C 518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
   c. ASTM C 553: Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
   d. ASTM C 578: Standard Specification for Rigid Cellular Polystyrene Thermal Insulation
   e. ASTM C 612: Standard Specification for Mineral Fiber Block and Board Thermal Insulation
   f. ASTM C 665: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
   g. ASTM D 1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
   h. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
   i. ASTM E 96: Standard Test Methods for Water Vapor Transmission of Materials
   j. ASTM E 119: Standard Test Methods for Fire Tests of Building Constructions and Materials
   k. ASTM E136: Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C
   l. ASTM E 331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
   m. ASTM E 2307: Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus
   o. ASTM E 2393: Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers

2. National Fire Protection Association (NFPA)

   a. NFPA 285: Standard Fire Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components
   b. NFPA 220: Standard on Types of Building Construction

3. International Code Council Evaluation Service (ICC-ES):

   a. AC 71: Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water Resistive Barriers.

4. Underwriters Laboratories, Inc. (UL):

   a. UL 2079: Tests for Fire Resistance of Building Joint Systems.

1.5 SUBMITTALS

A. System performance verification: Submit manufacturers verification, test reports, or third engineering analysis that the proposed materials assembled as a wall system comply with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance) performance requirements as required by this specification, and as shown in the basis-of-design Underwriters Laboratories Exterior Wall System EWS 0008. (http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?name=FWFO.EWS0008&ccnshorttitle=Exterior+Wall+Systems&objid=1084084707&cfgid=1073741824&version=versionless&parent_id=1082764581&sequence=1)

B. Provide samples and data as listed for verification.

1. Product Data: Manufacturer's data on each type of product furnished including:

a. Physical properties
b. Preparation instructions and recommendations.
c. Storage, handling requirements and recommendations.
d. Installation instructions

2. LEED: Provide product prerequisite and/or credit summaries for each product specified as applicable.
3. Provide shop drawings showing firestopping/sealant layout, profiles and product components.
4. Provide written documentation of applicator's qualifications, including reference projects of similar scope and complexity, with current phone contacts of architects and owners for verification.

1.6 QUALITY ASSURANCE

A. Obtain firestop materials from a single manufacturer for each different product required.

B. Installer Qualifications:
1. The installation work of this section shall be performed by one entity, an experienced contractor that employs installers and supervisors who are trained and approved by manufacturer, with a minimum 3 years experience and a record of successful installations on projects of similar scope and complexity.

C. 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.

D. Installer shall designate a single individual as project foreman who shall be on site at all times during installation.

E. 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. Must be submitted to local authorities having jurisdiction for their review and approval prior to installation. The manufacturer's engineering judgment drawings must follow requirements set forth by the International Firestop Council

F. Preconstruction Meeting:
Convene a meeting of involved sub-contractors a minimum of two weeks prior to commencing work described in this section. The agenda shall include at a minimum, materials proposed for use, verification of eligibility for the CavityComplete® Steel Stud warranty, sequence of construction, coordination with substrate preparation, compatibility of materials, coordination with installation of adjacent and covering materials. Attendance is required by representatives of related trades including covering materials, substrate materials and adjacent materials.
[If the installation of the curtain wall and the perimeter fire rated joints are the responsibility of a different installers, coordinate specified installations prior to commencement of work to ensure the complete system meets the specified ratings.]

G. Sample Panel (Mock-Up):
Construct a wall system sample panel sized 8' long x 6' high that includes framing, sheathing, air/water barrier, rigid insulation, insulation fasteners with air/water sealing washers, through wall flashing/termination bar/drip edge, mortar droppings protection, sealants, weep vent protection, masonry anchors/ties and air/water sealing washers, [perimeter fire rated joint] and masonry veneer. The panel shall also include a mock window opening detailed with lintel, head and sill flashings, and end dams. Locate as directed and remove upon review and approval.

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

I. System Substitution:
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. Substitution requests must be accompanied by the following in order for the Architect to consider a substitution:

1. Verification that proposed products meet published performance criteria of the specified products.
2. Verification from the proposed manufacturers of independent third party listings or engineering judgments that the proposed system substitution meets the fire resistance, air leakage and water penetration requirements of this section.
3. Verification that the proposed manufacturers offer a complete system warranty including all products proposed for use.

1.7 DELIVERY, STORAGE, AND HANDLING

A. 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.

B. Protect products from exposure to direct sunlight.

C. Handle materials to avoid damage.

D. 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.

E. 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. Do not install products such as insulation or sealants that are damaged, wet or expired.

1. In the event the board insulation becomes wet, wipe dry prior to installation.
2. In the event the batt or blanket insulation becomes wet, remove it from jobsite.
   a. 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.

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 07 84 00]

PART 2- PRODUCTS

2.1 GENERAL CONDITIONS

A. See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance), and drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections which are hereby made a part of the specification of this Section. All proposed product substitutions must comply to be considered.

2.2 SAFING INSULATION

A. Provide safing insulation for firestopping around the perimeter of window and door opening penetrations as shown in drawings.

1. BASIS OF DESIGN
   Owens Corning (www.thermafiber.com) Thermafiber Safing Insulation or equal product from one of the following:

   a. [insert acceptable alternate supplier]
   b. [insert acceptable alternate supplier]

B. MATERIAL

1. Provide mineral wool safing in compliance with ASTM C 612, Type IA, IB and II.
2. Thermafiber Safing Insulation
3. R-Value: 4.2 per inch
4. Facing: [Unfaced] [Foil faced]
5. Density: [4.0 pcf (actual)] [6.0 pcf (actual)]
6. Surface-Burning Characteristics: Tested in accordance with ASTM E84
   [Unfaced: Maximum flame spread 0 and smoke-developed of 0]
   [Foil Faced: Maximum flame spread 25 and smoke-developed of 0]
7. Fiber Type: Standard fiber; minimum 75% pre-consumer recycled content; complies with EPA Preference Program.
8. Post-Consumer Recycled Content: 0%.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that substrates and the masonry veneer are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SAFING MATERIAL PREPARATION

A. Provide fire protection safing at perimeter of wall penetrations.

1. Install Safing batt in sections a minimum 4" wide, stacked to a thickness that is a minimum of 25% greater than the width of the gap between the back of the masonry veneer and the face of the gypsum sheathing to achieve a minimum 25% compression and tight friction fit after installation.
2. Install Safing insulation compressed in the thickness direction and flush with the edge of the opening.
3. Safing shall be tightly butted at ends of adjacent pieces to completely close the air space behind the masonry veneer.

END OF SECTION 07 84 13

SECTION 07 84 53, BUILDING PERIMETER FIRESTOPPING

[Include this section for perimeter fire rated joint systems if required by the building code]

PART 1 – GENERAL
[Use the General Section from 07 84 00]

PART 2 – PRODUCTS

2.1 GENERAL CONDITIONS

A. See Division 01, EXTERIOR ENCLOSURE PERFORMANCE REQUIREMENTS, Section 01 83 16, including mandatory wall system compliance with NFPA 285 (fire spread), ASTM E 2357 (air resistance) and ASTM E 331 (water resistance), and drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections which are hereby made a part of this specification of this Section. All proposed product substitutions must comply to be considered.

B. PERIMETER FIRE CONTAINMENT

Provide a perimeter fire containment system (insulation and related materials) for gaps between the perimeter edge of the fire resistance rated floor assembly and the non-fire resistance rated exterior wall system.

1. Fire containment system to possess the fire test response characteristics indicated as determined by testing the products/system in accordance with ASTM E2307,
2. Locate perimeter fire containment only where indicated in construction drawings
3. System testing shall be by Underwriters Laboratories (UL), Intertek (OPL) or another testing and inspecting agency acceptable to authorities having jurisdiction.
4. Fire resistance rating shall be as determined by testing identical systems. If no tested system exists, an engineering judgment as specified by the International Firestop Council must accompany the design.
5. Identify materials with appropriate markings of applicable testing and inspecting agency.
6. Provide materials that are rated non-combustible as defined by NFPA 220 when tested in accordance with ASTM E136.

C. WALL INSULATION

1. BASIS OF DESIGN
Owens Corning (www.thermafiber.com) Thermafiber FireSpan 40 or 90 mineral wool insulation or equal product from one of the following:

a. [insert acceptable alternate supplier]
b. [insert acceptable alternate supplier]

2. MATERIAL

a. Provide mineral wool insulation in compliance with ASTM C 665, Type I and III, Class A, Category 1.
b. [Thermafiber FireSpan 90 Insulation; density of 8 pcf, nominal] [Thermafiber FireSpan 40 Insulation; density of 4.0 pcf, nominal]
c. Facing: [Unfaced] [Foil faced]
d. Minimum Thickness as noted in tested and listed design
e. R-Value: 4.2 per inch
f. Surface-Burning Characteristics: Tested in accordance with ASTM E84
[Unfaced: Maximum flame spread 0 and smoke-developed of 0]
[Foil Faced: Maximum flame spread 25 and smoke-developed of 0]
g. Fiber Type: Standard fiber; minimum 75% pre-consumer recycled content; complies with EPA Preference Program.
h. Post-Consumer Recycled Content: 0%.

D. SAFING INSULATION, BUILDING PERIMETER

1. BASIS OF DESIGN
Owens Corning (www.thermafiber.com) Thermafiber Safing Insulation or equal product from one of the following:

a. [insert acceptable alternate supplier]
b. [insert acceptable alternate supplier]

2. MATERIAL

a. Provide mineral wool safing in compliance with ASTM C 612, Type IA, IB and II.
b. Thermafiber Safing Insulation
c. R-Value: 4.2 per inch
d. Facing: [Unfaced] [Foil faced]
e. Density: [4.0 pcf (actual)] [6.0 pcf (actual)]
f. Surface-Burning Characteristics: Tested in accordance with ASTM E84

g [Unfaced: Maximum flame spread 0 and smoke-developed of 0]
[Foil Faced: Maximum flame spread 25 and smoke-developed of 0]
h. Fiber Type: Standard fiber; minimum 75% pre-consumer recycled content; complies with EPA Preference Program.
i. Post-Consumer Recycled Content: 0%.

E. SAFING CLIPS

1. Provide Z-Shaped galvanized steel clips formed from 1 inch (25mm) wide strips of 20 gauge galvanized steel; 3 inches (76mm) high with 2 inch (51mm) and 3 inch (76mm) upper and lower horizontal legs. Use where required by specific UL or Intertek (OPL) system specifications.

F. HARDWARE

1. Provide hardware and mechanical fasteners for attaching curtain wall insulation as approved by the architect and manufacturer.

2. BASIS OF DESIGN
Owens Corning (www.thermafiber.com) Thermafiber Impasse hardware or equal product from one of the following:

a. [insert acceptable alternate supplier]
b. [insert acceptable alternate supplier]

G. MULLION COVERS

1. Provide fire resistant thermal insulation for protection of mullions.

2. BASIS OF DESIGN
Owens Corning (www.thermafiber.com) Thermafiber FireSpan 90 or equal product from one of the following:

a. [insert acceptable alternate supplier]
b. [insert acceptable alternate supplier]

3. MATERIAL
a. Provide 1” thick mineral wool safing in compliance with ASTM C 612, Type IA, IB and II.
b. Thermafiber Safing Insulation
b. R-Value: 4.2 per inch
c. Facing: [Unfaced] [Foil faced]
d. Density: [4.0 pcf (actual)] [6.0 pcf (actual)]
e. Surface-Burning Characteristics: Tested in accordance with ASTM E84
[Unfaced: Maximum flame spread 0 and smoke-developed of 0]
[Foil Faced: Maximum flame spread 25 and smoke-developed of 0]
f. Fiber Type: Standard fiber; minimum 75% pre-consumer recycled content; complies with EPA Preference Program.
g. Post-Consumer Recycled Content: 0%.

H. BACKER / REINFORCEMENT MEMBER

1. Provide light gauge steel channel or angle approved for this application by the primary manufacturer.

2. BASIS OF DESIGN
   Owens Corning (www.thermafiber.com) Thermafiber Impasse T-Bar or equal product from one of the following:

   a. [insert acceptable alternate supplier]
   b. [insert acceptable alternate supplier]

I. SMOKE BARRIER

1. Provide smoke sealant as specified in the appropriate fire tested assembly and approved by the architect and manufacturer.

2. BASIS OF DESIGN
   Tremco, Inc. (www.tremcosealants.com) TREMstop Acrylic – SP or equal product from one of the following:

   a. [insert acceptable alternate supplier]
   b. [insert acceptable alternate supplier]

3. Obtain firestop system from a single system source.
4. System shall be testing or verified via engineering judgement analysis.
5. No substitutions permitted without complete system documentation.
6. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

J. VAPOR RETARDING TAPE

1. Provide vapor retarding tape that is compatible with specified facer and with a comparable perm rating, used for taping insulation joints and repairing tears.

PART 3 – EXECUTION

3.1. FIELD CONDITIONS

A. Protect adjacent work of other trades from damage. Clean substrates of substances harmful to insulation or vapor retarders, including removal of projections which might puncture vapor retarders. In cold weather, during installation of smoke sealant material, temperatures within the building shall be maintained above 55°F. Provide adequate ventilation to carry off excess moisture.

B. EXAMINATION
   Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Clean surfaces thoroughly prior to installation.
2. Do not begin installation until substrates have been properly prepared.
3. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 BACKER REINFORCEMENT MEMBERS FOR PERIMETER FIRE CONTAINMENT SYSTEM

A. Install [Thermafiber Impasse T-Bar] approved light steel angle or channels, placed horizontally at the safing line, attached to the vertical mullions either within the insulation at a horizontal splice, or behind the insulation and mechanically attached to vertical mullions. This detail prevents the bowing of the curtain wall insulation due to the compression fit of the safing insulation.

B. Place horizontally at the safe-off line to support the curtain wall insulation to prevent bowing of curtain wall insulation caused by compression fitting of the Safing insulation. See specific UL design for system requirements.

3.3 WALL INSULATION

A. Install wall insulation in accordance with the Underwriters Laboratories or Intertek (OPL) Laboratories listed system and manufacturer's instructions.

B. Protect insulation from damage due to weather and physical abuse until protected by permanent construction.

C. Do not install wall insulation before the exterior sheathing has been installed on one side of the stud cavity and sealed to be water resistant.

D. Friction fit insulation tightly into exterior wall steel stud cavity spaces and framing voids to create a continuous insulation layer with adjoining lengths of batt tightly butted without gaps. Trim to fill spaces and voids neatly.

E. Within exterior wall framing, install insulation between pipes, electrical boxes, and backside of sheathing. Cut or split insulation material as required to fit around wiring and plumbing

F. Install backer bar assembly in accordance with the tested design. [Not applicable when the Thermafiber No Backer Bar™ system is specified.]

G. Fasten insulation in place with mechanical fasteners within the mullions and transoms (spandrel area), spaced at intervals recommended by tested assembly to hold insulation securely in place without touching the exterior wall. [Thermafiber Impasse hardware] or mechanical fasteners as approved by architect and manufacturer. See specific tested assemblies for mechanical fastener requirements. Maintain cavity width of dimension indicated between insulation and exterior wall.

3.4 SAFING INSULATION, BUILDING PERIMETER

A. Cut safing batt into sections 4" wide minimum.

B. Install safing insulation in accordance with manufacturer's instructions and of proper size and density in the safe off area between the backside of the exterior gypsum sheathing and the edge of the floor slab as shown in the construction details.

C. NOTE: Correct installation is to install safing compressed in the batt thickness direction, not the batt width direction.

D. Install cut sections, layered together, in a thickness that is a minimum of 25% greater than the width of the linear gap between the edge of the concrete floor and the interior surface of the exterior gypsum sheathing. The purpose of layered thickness greater than the opening width is to achieve a tight compression friction fit after installation.

E. The stacked safing insulation is rotated, compressed in the thickness direction, and inserted cut edge first into the gap between the edge of floor slab and exterior sheathing material such that its top surface is flush with the top surface of the floor assembly.

F. The length of safing Insulation, if being fit in between steel stud framing, needs to be equal to the on-center spacing of the steel studs so that it is friction-fitted on its ends between studs and mounting angles without seams.

3.5 SMOKE BARRIER INSTALLATION

A. Verify that substrate conditions which have been previously installed under other sections are acceptable for product installation in accordance with manufacturer's instructions.
   1. Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper and timely completion.

B. Surface Preparation: Prepare surface to receive firestop system products in accordance with manufacturer's instructions for surface preparation.

   1. Verify that penetrations and joints are properly sized.
   2. Secure all pipe, conduit, cable and other items which penetrate firestop materials.
   3. Comply with manufacturer's instructions relative to temperature and humidity conditions, before, during and after installation of firestopping materials.
   4. Do not proceed until unsatisfactory conditions have been corrected.

C. Install approved smoke sealant in accordance with manufacturer's instructions.

D. Seal all joints, holes or voids made by penetrations to ensure an air and water resistant seal capable to withstand compression and extension due to thermal, wind or seismic joint movement.

E. Keep areas of work accessible and unconcealed until inspection for proper installation by applicable code authorities.

3.6 VAPOR RETARDER INSTALLATION

A. Seal all joints in curtain wall insulation or exterior wall insulation with vapor retarder tape. Apply vapor retarder tape at intersection of insulation with framing, adjacent pieces and similar intersections to insure a vapor tight seal. Repair all tears in insulation foil facing with vapor retarder tape.

3.7 PROTECTION

A. Protect installed products from damage during construction until completion and project closeout. Touch-up, repair or replace damaged products before Substantial Completion.

3.8 CLEAN-UP

A. 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.

END OF SECTION 07 84 53