SECTION 071352 - MODIFIED BITUMINOUS SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Plaza Deck Waterproofing Membrane Application

B. Flashing Application

C. Incorporation of Sheet Metal Flashing Components and Accessories into the Plaza Deck Waterproofing System

D. Overburden Installation over Plaza Deck Membrane

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Sheet Metal Flashing and Trim

B. Sheet Metal Specialties

C. Termination Bars for Flashing Attachement to Wall Substrates

1.3 RELATED SECTIONS

A. Section 061000 - Rough Carpentry

B. Section 035200 – Lightweight Concrete Roof Insulation

C. Section 076200 - Sheet Metal Flashing and Trim

1.4 REFERENCE STANDARDS

References in these specifications to standards, test methods, codes etc., are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.

ASTM	American Society for Testing and Materials Philadelphia, PA
FM	Factory Mutual Engineering Research Corp. Norwood, MA
NRCA	National Roofing Contractors Association Rosemont, IL
OSHA	Occupational Safety and Health Administration Washington, DC
SMACNA	Sheet Metal and Air Conditioning Contractors National Association Chantilly, VA

UL Underwriters Laboratories
Northbrook, IL

1.5 DESCRIPTION OF WORK

The basic work descriptions required in this specification are referenced below.

Deck: Concrete Slope: Less than 1/8 inch

Substrate: NVS Lightweight Insulating Concrete System. See Specification Section 035200.

Base Sheet: Parabase FS, mechanically attached.

Plaza Deck System: Paradiene 20 TG, torch applied;
Teranap 1M GS, torch applied.

Flashing System: Veral Aluminum, torch applied.

Supplemental Flashing: Parapro 123 Flashing System

1.6 SUBMITTALS

All submittals which do not conform to the following requirements will be rejected.

A. Submittals Prior to Contract Award:

1. Letter from the proposed primary waterproofing system manufacturer confirming that the bidder is an acceptable Contractor authorized to install the proposed system.

2. Letter from the primary waterproofing system manufacturer stating that the proposed application will comply with the manufacturer's requirements in order to qualify the project for the specified guarantee.

3. Shop drawings and product submittals.

B. Submittals Prior to Project Close-out:

1. In addition to the guarantee, furnish to the Owner the manufacturer's printed recommendations for proper maintenance of the specified plaza deck waterproofing system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.

1.7 QUALITY ASSURANCE

A. Acceptable Products: Primary waterproofing products, including each type of sheet, shall be supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than 5 years. The primary waterproofing products shall have maintained a consistent composition for a minimum of five years.

B. Acceptable Contractor: Have a minimum of 2 years experience in successfully installing the same or similar materials and be certified in writing by the waterproofing materials manufacturer to install the primary plaza deck waterproofing products.

C. Project Acceptance: Submit a completed manufacturer's application for plaza deck guarantee form along with shop drawings of the decks showing all dimensions, penetrations, and details. The form shall contain all the technical information applicable to the project including deck types, slopes, and manufacturer's membrane assembly proposed for installation. The form shall also contain accurate and complete information requested including proper names, addresses, zip codes, and telephone numbers. The project must receive approval, through this process, prior to shipment of materials to the project site.

D. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: attend necessary job meetings and furnish competent and full time supervision, experienced mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the membrane installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary waterproofing products.

E. Local Regulations: Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.

F. Manufacturer Requirements: The primary membrane materials manufacturer shall provide trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conduct a final inspection upon successful completion of the project.

G. Pre-installation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

5. Review structural loading limitations of roof deck during and after roofing.

1.8 PRODUCT DELIVERY STORAGE AND HANDLING

A. Delivery: Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.

B. Storage: Store materials out of direct exposure to the elements. Store roll goods on a clean, flat and dry surface. All material stored on the deck overnight shall be stored on pallets. Rolls must be stored on ends. Store materials in a manner so as to preclude overloading of deck and building structure. Store materials such as solvents, adhesives and asphalt cutback products away from open flames, sparks or excessive heat. Cover all material using a breathable cover such as a canvas. Polyethylene or other non-breathable plastic coverings are not acceptable.

C. Handling: Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.

D. Damaged Material: Any materials that are found to be damaged or stored in any manner other than that stated above will be automatically rejected, removed, and replaced at the Contractor's expense.

1.9 PROJECT/SITE CONDITIONS

A. Requirements Prior to Job Start

1. Notification: Give a minimum of 5 days notice to the Owner and manufacturer prior to commencing any work and notify both parties on a daily basis of any change in work schedule.

2. Permits: Obtain all permits required by local agencies and pay all fees which may be required for the performance of the work.

3. Safety: Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA, and other industry or local governmental groups.

B. Environmental Requirements

1. Precipitation: Do not apply plaza deck waterproofing materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure that materials, applied membrane, and building interiors are protected from possible moisture damage or contamination.

C. Protection Requirements

1. Membrane Protection: Provide protection against staining and mechanical damage for newly applied waterproofing and adjacent surfaces throughout this project.

2. Torch Safety: Crew members handling torches shall be trained by an Authorized Certified Roofing Torch Applicator (CERTA) Trainer, be certified according to CERTA torch safety guidelines as published by the National Roofing Contractor's Association (NRCA), and follow torch safety practices as required by the contractor's insurance carrier. Designate one person on each crew to perform a daily fire watch. The designated crew member shall watch for fires or smoldering materials on all areas during roof construction activity, and for the minimum period required by CERTA guidelines after roofing material application has been suspended for the day.

3. Limited Access: Prevent access by the public to materials, tools, and equipment during the course of the project.

4. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.

5. Site Condition: Complete, to the Owner's satisfaction, all job site clean-up including building interior, exterior, and landscaping where affected by the construction.

1.10 GUARANTEE/WARRANTY

A. Guarantee: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with the roof system manufacturer's 20 year labor and materials roof system guarantee. The roof system guarantee shall include both the roofing and flashing membranes, and the specified new lightweight insulating concrete system consisting of aggregate fill, patented-pre-formed polystyrene panels, and base sheet fasteners. All repair or replacement costs covered under the guarantee shall be borne by the roofing membrane manufacturer. The guarantee shall be a term type, without deductibles or limitations on coverage amount, and be issued at no additional cost to the Owner. Specific items covered under the roof system guarantee include:

1. The actual resistance to heat flow through the roof insulation will be at least 80% of the design thermal resistance, provided that the roofing membrane is free of leaks;

2. Should a roof leak occur, the insulating performance of the roof insulation will be at least 80% of the design thermal resistance within a 2 year period following repair of the leak.

3. The roof insulation will remain in a reroofable condition should the roof membrane require replacement (excluding damage caused by fastener pullout during removal of the old membrane.)

4. The roof insulation material will not cause structural damage to the building as a result of expansion from thermal or chemical action.

> Siplast 20-year Waterproofing System Guarantee to be dated within 30 days of the date of final completion.
> Minimum 2 year roofer/installer warranty to include all sheet metal flashings associated with the new waterproofing system. Installer warranty to be dated the date of substantial completion.

PART 2 – PRODUCTS

2.1 ROOFING SYSTEM ASSEMBLY/PRODUCTS

A. NVS Lightweight Insulating Concrete System. See Specification Section 035200.

B. Base Sheet

1. Base Sheet: A fiberglass reinforced, asphalt coated sheet with a polyolefin film backing, having a minimum weight of 20 lb/sq. The sheet shall conform to ASTM D 4601, Type II requirements.

> Siplast Parabase FS

2.2 DESCRIPTION OF SYSTEMS

A. Plaza Deck Waterproofing Membrane Assembly: A plaza deck waterproofing membrane assembly consisting of 2 plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane, applied over a prepared substrate. The assembly shall possess waterproofing capability, such that a phased application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire waterproofing system. The modified bitumen finish ply shall be fully adhered to the modified bitumen base ply. Each sheet of the assembly shall meet the following physical requirements as a minimum.

> Siplast Paradiene 20 TG / Teranap Plaza Deck Waterproofing System

1. Modified Bitumen Base and Stripping Ply

a) Thickness (avg): 114 mils (2.9 mm) (ASTM D 5147)
b) Thickness (min): 110 mils (2.8 mm) (ASTM D 5147)
c) Weight (min per 100 ft² of coverage): 76 lb (3.7 kg/m²)
d) Maximum filler content in elastomeric blend: 35% by weight
e) Low temperature flexibility @ -15° F (-26° C) - PASS (ASTM D 5147)
f) Maximum Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
g) Maximum Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
h) Elongation @ 5% Maximum Load (avg.) @ 73°F (23°C): 50% (ASTM D 5147)

i) Dimensional Stability (max): 0.1% (ASTM D 5147)
j) High Temperature Stability (min): 250ºF (121ºC) (ASTM D 5147)
k) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
l) Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria

> Paradiene 20 TG

2. Cant Backing Sheet and Flashing Reinforcing Ply

a) Thickness (avg): 102 mils (2.6 mm) (ASTM D 5147)
b) Thickness (min): 98 mils (2.5 mm) (ASTM D 5147)
c) Weight (min per 100 ft² of coverage): 72 lb (3.5 kg/m²)
d) Maximum filler content in elastomeric blend: 35% by weight
e) Low temperature flexibility @ -15º F (-26º C) - PASS (ASTM D 5147)
f) Peak Load (avg) @ 73ºF (23ºC): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
g) Peak Load (avg) @ 0ºF (-18ºC): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
h) Ultimate Elongation (avg.) @ 73ºF (23ºC): 50% (ASTM D 5147)
i) Dimensional Stability (max): 0.1% (ASTM D 5147)
j) Compound Stability (min - sheet): 250ºF (121ºC) (ASTM D 5147)
k) Compound Stability (min – adhesive coating): 212ºF (100ºC) (ASTM D 5147)
l) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
m) Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria
n) Back Surfacing: polyolefin film

> Siplast Paradiene 20 SA

3. Modified Bitumen Finish Ply

a) Thickness (avg): 157 mils (4.0 mm) (ASTM D 5147)
b) Thickness (min): 154 mils (3.9 mm) (ASTM D 5147)
c) Weight (min per 100 ft² of coverage): 141 lb (6.9 kg/m²)
d) Maximum filler content in elastomeric blend: 35% by weight
e) Low temperature flexibility @ -4º F (-20º C) - PASS (ASTM D 5147)
f) Peak Load (avg) @ 73ºF (23ºC): 60 lbf/inch (10.5 kN/m) (ASTM D 5147)
g) Peak Load (avg) @ 0ºF (-18ºC): 115 lbf/inch (20.1 kN/m) (ASTM D 5147)
h) Elongation @ 5% Maximum Load (avg.) @ 73ºF (23ºC): 95% (ASTM D 5147)
i) Dimensional Stability (max): <0.5% (ASTM D 5147)
j) High Temperature Stability (min): 250ºF (121ºC) (ASTM D 5147)
k) Reinforcement - non-woven polyester geotextile
l) Surfacing – ceramic granules

> Siplast Teranap 1 M GS

B. Flashing Membrane Assembly: A flashing membrane assembly consisting of a prefabricated, reinforced, Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane with a continuous, channel-embossed metal-foil surfacing. The finish ply shall conform to ASTM D 6298 and the following physical and mechanical property requirements.

> Siplast Veral flashing system, aluminum finish

1. Cant Backing Sheet and Flashing Reinforcing Ply

a) Thickness (avg): 102 mils (2.6 mm) (ASTM D 5147)
b) Thickness (min): 98 mils (2.5 mm) (ASTM D 5147)
c) Weight (min per 100 ft² of coverage): 72 lb (3.5 kg/m²)

d) Maximum filler content in elastomeric blend: 35% by weight
e) Low temperature flexibility @ -15° F (-26° C) - PASS (ASTM D 5147)
f) Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
g) Peak Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
h) Ultimate Elongation (avg.) @ 73°F (23°C): 50% (ASTM D 5147)
i) Dimensional Stability (max): 0.1% (ASTM D 5147)
j) Compound Stability (min - sheet): 250°F (121°C) (ASTM D 5147)
j) Compound Stability (min – adhesive coating): 212°F (100°C) (ASTM D 5147)
k) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
l) Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria
m) Back Surfacing: polyolefin film

> Siplast Paradiene 20 SA

2. Metal-Clad Modified Bitumen Flashing Sheet

a) Thickness (avg): 150 mils (3.8 mm) (ASTM D 5147)
b) Thickness (min): 146 mils (3.7 mm) (ASTM D 5147)
c) Weight (min per 100 ft² of coverage): 96 lb (4.6 kg/m²)
d) Coating Thickness – back surface (min): 40 mils (1 mm) (ASTM D 5147)
e) Low temperature flexibility @ 0° F (-18° C): PASS (ASTM D 5147)
f) Peak Load (avg) @ 73°F (23°C): 85 lbf/inch (15 kN/m) (ASTM D 5147)
g) Peak Load (avg) @ 0°F (-18°C): 180 lbf/inch (31.7 kN/m) (ASTM D 5147)
h) Ultimate Elongation (avg) @ 73°F (23°C): 45% (ASTM D 5147)
i) Tear-Strength (avg): 120 lbf (0.54 kN) (ASTM D 5147)
j) Dimensional Stability (max): 0.2% (ASTM D 5147)
k) Compound Stability (min): 225°F (107°C) (ASTM D 5147)
l) Cyclic Thermal Shock Stability (maximum): 0.2% (ASTM D 7051)
m) Approvals: UL Approved, FM Approved (products shall bear seals of approval)
n) Reinforcement: fiberglass scrim mat or other meeting the performance and dimensional stability criteria
o) Surfacing: aluminum metal foil

> Siplast Veral Aluminum

C. Catalyzed Acrylic Resin Flashing System: A specialty flashing system consisting of a PMMA-based, fully reinforced membrane installed over a prepared or primed substrate. The flashing system consists of a catalyzed acrylic resin primer, basecoat and topcoat, combined with a non-woven polyester fleece. The use of the specialty flashing system shall be specifically approved in advance by the membrane manufacturer for each application.

> Parapro 123 Flashing System by Siplast; Irving, TX

2.3 ROOFING ACCESSORIES

A. Bituminous Cutback Materials

1. Primer: An asphalt, solvent blend conforming to ASTM D 41 requirements.

> Siplast PA-1125 Asphalt Primer by Siplast; Irving, TX

2. Mastics: An asphalt cutback mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges conforming to ASTM D 4586 Type II requirements.

> Siplast PA-1021 Plastic Cement by Siplast; Irving, TX

B. Sealant (horizontal applications): A moisture-curing, self-leveling elastomeric sealant designed for roofing applications. The sealant shall be approved by the roof membrane manufacturer for use in conjunction with the roof membrane materials. Acceptable types are as follows:

> Siplast PS-209 Elastomeric Sealant by Siplast; Irving, TX

C. Sealant (vertical and sloped applications): A moisture-curing, non-slump elastomeric sealant designed for roofing applications. The sealant shall be approved by the roof membrane manufacturer for use in conjunction with the roof membrane materials. Acceptable types are as follows:

> Siplast PS-715 NS Elastomeric Sealant by Siplast; Irving, TX

D. Fasteners

1. Base Sheet Fasteners: Base sheet fasteners shall be approved by the manufacturer of the primary roofing products. Acceptable base sheet fasteners for specific substrate types are listed below.

a) Lightweight Concrete Substrates

- A single unit, precision formed, electro zinc coated steel fastener having a 2.7 inch diameter rib reinforced cap and 1 inch long rectangular legs, designed to expand when fully driven into the lightweight concrete. Fasteners for lightweight concrete shall meet FM Standard 4470 requirements for corrosion resistance.

> NVS Fasteners by Siplast; Irving, TX

PART 3 EXECUTION

3.1 PREPARATION

A. General: Sweep or vacuum all surfaces, removing all loose aggregate, soil, and foreign substances prior to commencement of waterproofing.

3.2 SUBSTRATE PREPARATION

A. NVS Lightweight Insulating Concrete System. See Specification Section 035200.

B. Base Sheet Securement to Prepared Substrate: Lay the base sheet over the entire area to be roofed, lapping sides 3 inches and ends 6 inches. Using the specified fasteners, fasten each sheet every 7 1/2 inches through laps and stagger fasten the remainder of the sheet in 2 rows on nominal 12 inch centers with fasteners in each row on 10 inch centers. Increase the fastening pattern by 70% at the perimeter of the roof and 160% in the corners.

3.3 PLAZA DECK MEMBRANE INSTALLATION

A. Membrane Application: Apply plaza deck waterproofing in accordance with system manufacturer's instructions and the following requirements.

B. Priming: Prime metal, concrete and masonry surfaces with a uniform coating of the specified asphalt primer.

C. Plaza Deck Membrane Application. Apply all layers of membrane free of wrinkles, creases or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets.

1. Apply all layers of membrane perpendicular to the slope of the deck.

2. Fully bond the base ply to the prepared substrate, utilizing a minimum 3 inch side and end laps. Apply each sheet directly behind the torch applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps a minimum of 3 feet.

3. Fully bond the finish ply to the base ply, utilizing a minimum of 4-inch side and end laps. Apply each sheet directly behind the torch applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps a minimum of 3 feet.

D. Catalyzed Acrylic Resin Flashing System: Install the liquid-applied primer and flashing system in accordance with the membrane system manufacturer's printed installer's guidelines and other applicable written recommendations as provided by the manufacturer.

E. Water Cut-Off: At end of the day's work, or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using plastic cement or pieces of the field membrane constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to the resumption of roofing.

3.4 SYSTEM INTERFACE WITH RELATED COMPONENTS

A. Lead Pipe Flashings: Completely prime the lead flanges and allow to dry prior to installation. After the base ply has been applied, set the flange in mastic and strip-in the flange using the stripping-ply material, extending a minimum of 4 inches beyond the edge of the flange. Terminate the finish ply at the flange-sleeve juncture of the pipe flashing. SEE ITEM: SEALANT for finish of this detail.

B. Lead Drain Flashings (30" x 30" minimum): Completely prime the lead drain flashing and allow to dry prior to installation. After the base ply has been applied, set the lead flashing sheet in mastic and form to turn down inside of the drain bowl. Ply-in the perimeter of the lead flashing using an additional layer of the base ply material, overlapping the perimeter of the lead a minimum of 4 inches. Terminate the finish ply to extend beneath the clamping ring seal. Install the clamping ring with all bolts in place.

C. Roof Moisture Relief Vents – non-vented lightweight insulating concrete substrates: Completely prime the metal flanges and allow to dry prior to installation. After the base ply has been applied, mark the venting designations. Cut a 2 diameter core from the roof assembly down to the top surface of the embedded Insulperm expanded polystyrene panels. Fill the resulting void with fiberglass insulation. Set the vent flange in mastic, centered over the core cut. Strip-in the flange using the stripping-ply material, extending a minimum of 4 inches beyond the edge of the flange. Terminate the finish ply at the flange-throat juncture of the vent. SEE ITEM: SEALANT for finish of this detail.

D. Sealant: Apply a smooth continuous bead of the specified sealant at the exposed finish ply edge transition to metal flashings incorporated into the roof system.

3.5 FIELD QUALITY CONTROL AND INSPECTIONS

A. Site Condition. All areas around job site shall be free of debris, waterproofing materials, equipment, and related items after completion of job.

B. Notification Of Completion: Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.

C. Water Test: Prior to the application of the overburden plug the drains and scuppers, and flood the waterproofing surface with water a minimum of 1 to 2 inches deep. Leave the water for a minimum of 24 hours to ensure the system is leak free.

* NOTE:	Precautions must be taken to determine if the structure can hold the weight of the water for the duration of the test.

D. Final Inspection:

1. Post-Installation Meeting: Hold a meeting at the completion of the membrane application (prior to the application of the drainage layer and soil) attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.

2. Drain Verification: At final inspection of all work, verify that all drains, scuppers, etc., are functioning properly. Drains shall have adequate strainers.

E. Issuance Of The Guarantee. Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board.
2. Polyisocyanurate foam-plastic board.
3. Glass-fiber blanket.
4. Glass-fiber board.

B. Related Requirements:

1. Section 042000 "Unit Masonry" for insulation installed in masonry cells.
2. Section 075216 "Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing" for insulation specified as part of roofing construction.
3. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.

3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

A. Extruded polystyrene boards in this article are also called "XPS boards." Roman numeral designators in ASTM C 578 are assigned in a fixed random sequence, and their numeric order does not reflect increasing strength or other characteristics.

B. Extruded Polystyrene Board, Type X: ASTM C 578, Type X, 15-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. DiversiFoam Products.
   b. Dow Chemical Company (The).
   c. Owens Corning.

2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

C. Extruded Polystyrene Board, Type IV: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. DiversiFoam Products.
   b. Dow Chemical Company (The).
   c. Owens Corning.

2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

D. Extruded Polystyrene Board, Type IV, Drainage Panels: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. DiversiFoam Products.
   b. Dow Chemical Company (The).
   c. Owens Corning.

2.2 POLYISOCYANURATE FOAM-PLASTIC BOARD

A. Polyisocyanurate Board, Glass-Fiber-Mat Faced: ASTM C 1289, glass-fiber-mat faced, Type II, Class 2.

1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.3 GLASS-FIBER BOARD

A. Glass-Fiber Board, Unfaced: ASTM C 612, Type IA; unfaced, with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84, passing ASTM E 136 for combustion characteristics. Nominal density of 2.25 lb/cu. ft, thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. CertainTeed Corporation.
b. Johns Manville; a Berkshire Hathaway company.
c. Owens Corning.

2.4 GLASS-FIBER BLANKET

A. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. CertainTeed Corporation.
b. Knauf Insulation.
c. Owens Corning.

B. Glass-Fiber Blanket, Kraft Faced: ASTM C 665, Type II (nonreflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier).

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. CertainTeed Corporation.
b. Knauf Insulation.
c. Owens Corning.

2.5 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. AGM Industries, Inc.
   b. Gemco.

2. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.

B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Gemco.

2. Angle: Formed from 0.030-inch-thick, perforated, galvanized carbon-steel sheet with each leg 2 inches square.
3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.

C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. AGM Industries, Inc.
   b. Gemco.

D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. AGM Industries, Inc.
   b. Gemco.

2.6 ACCESSORIES

A. Insulation for Miscellaneous Voids:
1. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1. If not otherwise indicated, extend insulation a minimum of 48 inches in from exterior walls.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to

insulation manufacturer's written instructions for insulation type, thickness, and application.

2. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
3. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.5 INSTALLATION OF CAVITY-WALL INSULATION

A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.

1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

B. Cellular-Glass Board Insulation: Install with closely fitting joints using adhesive pad attachment method according to manufacturer's written instructions.

3.6 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
5. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:

    a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

6. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

    a. Exterior Walls: Set units with facing placed toward interior of construction.
    b. Interior Walls: Set units with facing placed toward areas of high humidity.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.7 INSTALLATION OF CURTAIN-WALL INSULATION

A. Install board insulation in curtain-wall construction according to curtain-wall manufacturer's written instructions.

1. Hold insulation in place by securing metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated on Drawings between insulation and glass.
2. Install insulation to fit snugly without bowing.

3.8 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 072140 - FOAMED-IN-PLACE MASONRY WALL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Extent of insulation work is shown on drawings and indicated by provisions of this section.

B. Applications of insulation specified in this section include the following:

1. Foamed-in-Place masonry insulation for thermal, sound and fire resistance values

1.2 SUBMITTALS

A. Product and technical presentation as provided by the manufacturer.

B. Certified Test Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including R-values, fire performance and sound abatement characteristics.

C. Material Safety Data Sheet: Submit Material Safety Data Sheet complying with OSHA Hazard Communication Standard, 29 CRF 1910 1200.

1.3 QUALITY ASSURANCE

A. Manufacturing Standards: Provide insulation produced by a single and approved manufacturer. The product must come from the manufacturer pre-mixed to ensure consistency.

B. Installer Qualifications for Foamed-In-Place Masonry Insulation: Engage an experienced dealer/applicator who has been trained and licensed by the product manufacturer and which has not less than ten years direct experience in the installation of the product used.

C. Warranty: Upon request, a one year product and installation warranty will be issued by both the manufacturer and installer.

D. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by a testing agency acceptable to authorities having jurisdiction.

E. Insurance: Insulation Subcontractor shall carry Products and Completed Operations Insurance with minimum liability limits of $ 5,000,000.

F. Product must be classified by Underwriters Laboratory ® ("UL") as to Surface Burning Characteristics

1. Fire Resistance Ratings: ASTM E-119
2. Surface Burning Characteristics: ASTM E-84
3. Combustion Characteristics: ASTM E-136

PART 2 - PRODUCTS

2.1 ACCEPTABLE MAUNFACTYRERS

A. Manufacturers of Foamed-in-Place Masonry Insulation: Subject to compliance with requirements, provide products from the following:

1. "Core-Fill 500™"- Tailored Chemical Products, P.O. Drawer 4186, Hickory, N.C. 28663, (800) 627-1687
2. Air Krete, Inc
   P.O. Box 380
   Weedsport, NY 13166
3. CP Chemical Co. (Tripolymer)
   White Plains, NY.

2.2 INSULATING MATERIALS

A. General: Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics. I

B. Foamed-in-Place Masonry Insulation: Two component thermal insulation produced by combining a plastic resin and catalyst foaming agent surfactant which, when properly ratioed and mixed, together with compressed air produce a cold-setting foam insulation in the hollow cores of hollow unit masonry walls.

1. Fire-Resistance Ratings: Minimum four (4) hour fire resistance wall rating (ASTM E-1 19) for 8" and 12" concrete masonry units when used in standard two (2) hour rated CMUs.
2. Surface Burning Characteristics: Maximum flame spread, smoke developed and fuel contributed of 0, 5 and 0 respectively.
3. Combustion Characteristics: Must be noncombustible, Class A building material.
4. Thermal Values: "R" Value of 4.91/inch @ 32 degrees F mean; ASTM C-177
5. Sound Abatement: Minimum Sound Transmission Class ("STC") rating of 53 and a minimum Outdoor Indoor Transmission Class (“OITC”) rating of 44 for 8” wall assembly (ASTM E 90-90)

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

A. Application Assemblies:

1. Block Walls: 6", 8", 10" or 12" concrete masonry units
2. Cavity Walls: 2" cavity or greater

3.2 INSTALLATION OF FOAMED-IN-PLACE INSULATION

A. General: Install foamed-in-place insulation from interior, or as specified, prior to installation of interior finish work and after all masonry and structural concrete work is in place; comply with manufacturer's instructions.

B. Installation: Fill all open cells and voids in hollow concrete masonry walls where shown on drawings. The foam insulation shall be pressure injected through a series of 5/8” to 7/8” holes drilled into every vertical column of block cells (every 8” on center) beginning at an approximate height of four (4) feet from finished floor level. Repeat this procedure at an approximate height of ten (10) feet above the first horizontal row of holes (or as needed) until the void is completely filled. Patch holes with mortar and score to resemble existing surface.

END OF SECTION 072140

SECTION 072726.02– FLUID-APPLIED MEMBRANE AIR BARRIERS, VAPOR PERMEABLE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fluid-applied, vapor-permeable membrane air barriers.

1.2 RELATED REQUIREMENTS

1. Section 042000 "Unit Masonry" for air barrier substrates and compatibility with flashing components.
2. Section 042113 "Brick Masonry" for compatibility with flashing components.
3. Section 061600 "Sheathing" for air barrier substrates and joint treatments.
4. Division 07 roofing Sections for roof assembly air barriers and interface coordination.
5. Division 08 exterior openings sections for framing for aluminum-framed entrances and storefronts glazed aluminum curtain walls louvers and vents receiving air barrier transition assembly specified in this Section.

1.3 REFERENCES

A. References, General: Versions of the cited standards current as of the date of issue of the project apply to the Work of this Section.

B. Air Barrier Association of America (ABAA): www.airbarrier.org:

1. ABAA Quality Assurance Program

C. ASTM International (ASTM): www.astm.org:

1. ASTM A 240/A 240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
2. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
3. ASTM C 1193 - Guide for Use of Joint Sealants
4. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
5. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials
6. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials
7. ASTM E 162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source
8. ASTM E 783 - Standard Test Method for Field Measurement of Air Leakage through Installed Exterior Windows and Doors
9. ASTM E 1186 - Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
10. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials
11. ASTM E 2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

D. National Fire Protection Association (NFPA): www.nfpa.org:

1. NFPA 285 - Standard Fire Test Method For Evaluation Of Fire Propagation Characteristics Of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate installation of joint sealants with cleaning of joint sealant substrates and other operations that may impact installation or finished joint sealant work.

B. Preinstallation Conference: Conduct conference at Project Site.

1. Review requirements for air barrier products and installation, project and manufacturer's details, mockups, testing and inspection requirements, and coordination and sequencing of air barrier work with work of other Sections.
2. Review manufacturer's instructions for air barrier application meeting Project requirements for substrates specified, including three-dimensional video model demonstrating proper application of components at wall openings.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of air barrier product specified, including:

1. Technical data indicating compliance with requirements.
2. Substrate preparation instructions and recommendations.

B. Shop Drawings: Show locations for air barrier. Show details for each type of substrate, joints, and edge conditions, including flashings, counterflashings, penetrations, transitions, and terminations.

1. Show location of transition and accessory materials providing connectivity throughout the assemblies.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, manufacturer.

1. Certification of manufacturer's approval of Installer.
2. Certification of ABAA accreditation of Installer firm and list of Installer's ABAA-certified installers and supervisors on Project.

B. Manufacturer's Product Compatibility Certificate: Certify compatibility of air barrier products with adjacent materials.

C. Fire Propagation Characteristics Certificate: From a qualified testing agency, documentation that air barrier system as a component of a wall assembly has been tested and passed NFPA 285. Include system classification number of testing agency on shop drawings.

D. Product Test Reports: Test data for air barrier products and air barrier assembly, by qualified testing agency, indicating proposed membrane air barrier meets performance requirements, when requested by Architect.

E. Warranty: Sample of unexecuted manufacturer and installer special warranties.

F. Field quality control reports.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A firm with minimum three years experience in installation of specified products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum of three years experience installing similar work, able to communicate verbally with Contractor, Architect, and employees.

B. Manufacturer Qualifications: A qualified manufacturer with minimum five years experience in manufacture of air barrier membrane as one of its principal products.

1. Manufacturer's product submitted has been in satisfactory operation on five similar installations for at least five years.
2. Manufacturer is accredited by the Air Barrier Association of America.
3. Approval of Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

    a. Completed and signed Substitution Request form.
    b. Product data, including certified independent test data indicating compliance with requirements.
    c. Sample shop drawings from similar project.
    d. Project references: Minimum of five installations of similar system not less than five years old, with Owner and Architect contact information.
    e. Certificate of ABAA accreditation if required for Project.
    f. Sample warranty.

C. Air Barrier Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified air barrier system, qualified to perform observation and inspection specified in Field Quality Control Article, to determine Installer’s compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Inspector shall be one of the following:

1. An authorized full-time technical employee of the manufacturer.
2. A independent party certified as an air barrier inspector by the ABAA or other certifying organization acceptable to Architect, retained by the Contractor.

D. Mockups: Provide air barrier mockup application within mockups required in other sections, or if not specified, in an area of not less than 150 sq. ft. of wall surface where directed by Architect for each type of backup wall construction. Include examples of surface preparation, crack and joint treatment, air barrier application, and flashing, transition, and termination conditions, to set quality standards for execution.

1. Include intersection of wall air barrier with roof air barrier and with foundation wall intersection.

1.8 DELIVERY, STORAGE AND HANDLING

A. Accept materials on site in manufacturer's unopened original packaging.

B. Store products in weather protected environment, clear of ground and moisture, within temperature ranges recommended by air barrier manufacturer.

C. Construction Waste: Store and dispose of packaging materials and construction waste in accordance with requirements of Division 01 Section "Construction Waste Management"

1.9 ENVIRONMENTAL REQUIREMENTS

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

1. Protect substrates from environmental conditions that affect air-barrier performance.
2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.10 SCHEDULING

A. Coordinate installation of membrane air barrier with completion of roofing and other work requiring interface with air barrier.

B. Schedule work so air barrier applications may be inspected prior to concealment.

C. Ensure air barrier materials are cured before covering with other materials.

1.11 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which air barrier manufacturer agrees to furnish and install air barrier material to repair or replace those materials installed according to manufacturer's written instructions that exhibit material defects or otherwise fail to perform as specified under normal use within warranty period specified.

1. Access for Repair: Owner shall provide unimpeded access to the Project and the air barrier system for purposes of testing, leak investigation, and repair, and shall reinstall removed cladding materials upon completion of repair.
2. Cost Limitation: Manufacturer's obligation for repair or replacement shall be limited to the original installed cost of the work.
3. Warranty Period: 20 years date of Substantial Completion.

B. Special warranties specified in this article exclude deterioration or failure of air barrier materials from the following:

1. Movement of the structure caused by structural settlement or stresses on the air barrier exceeding manufacturer's written specifications for elongation.
2. Mechanical damage caused by outside agents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: Provide air barrier products manufactured by **Tremco, Inc., Commercial Sealants and Waterproofing Division, An RPM Company**, Beachwood OH; (866) 321-6357; email: techresources@tremcoinc.com; www.tremcosealants.com, or comparable products of other manufacturer approved by Architect in accordance with Instructions to Bidders and Division 01 General Requirements.

2.2 MATERIALS, GENERAL

A. Source Limitations: Obtain air-barrier materials from single source from single manufacturer.

B. Compatibility: Provide membrane air barrier materials that are compatible with one another and with adjacent materials under conditions of service and application required, as demonstrated by membrane air barrier manufacturer based on testing and field experience.

2.3 PERFORMANCE REQUIREMENTS

A. General: Membrane air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the building exterior. Membrane air barriers shall accommodate substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without moisture deterioration and air leakage exceeding performance requirements.

B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 2357.

C. Fire Propagation Characteristics: Provide air barrier system qualified as a component of a comparable wall assembly that has been tested and passed NFPA 285.

2.4 MEMBRANE AIR BARRIER

A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: Elastomeric, polymer-modified bituminous membrane, formulated for application no less than 40 mils (dry).

1. Basis of Design Product: **Tremco, Inc., ExoAir 220**.
2. Air Permeance, ASTM E 2178: 0.004 cfm/sq. ft of surface area at 1.57-lbf/sq. ft. pressure difference.
3. Vapor Permeance, ASTM E 96/E96M: Minimum 12 perms.
4. Elongation, Ultimate, ASTM D 412, Die C: 800 percent, minimum.
5. VOC Content: Less than XX

2.5 ACCESSORY MATERIALS

A. General: Accessory materials as described in manufacturer's written installation instructions, recommended to produce complete air barrier assembly meeting performance requirements, and compatible with air barrier membrane material and adjacent materials.

B. Primer: Liquid primer meeting VOC limitations, recommended for substrate by membrane air barrier manufacturer, when installing modified bituminous self-adhered membranes

1. Basis of Design Product: Tremco, Inc., ExoAir Primer

C. Transitions:

1. Counterflashing Strip: Modified bituminous, 40 mils thick self-adhering composite sheet consisting of 32 mils of SBS rubberized asphalt laminated to an 8 mils high-density, cross-laminated polyethylene film, for counterflashing of metal flashings and for substrate

transitions and for termination of air barrier to bituminous roof membranes and to air barrier terminations at openings.

a. Basis of Design Product: Tremco, Inc., ExoAir TWF Thru-Wall Flashing.

2. High Temperature Flashing Strip and Underlayment: Butyl, 24 milthick self-adhering composite sheet consisting of 20 mils of butyl laminated to 4 mil polyethylene film; thermally stable under intermittent, non-continuous exposure up to 240 deg F.
Basis of Design Product: **Tremco, Inc., ExoAir 111**.
3. Foil Flashing Strip: Butyl, 24 milthick self-adhering composite sheet consisting of 20 mils of butyl laminated to 4 mil polyethylene film; thermally stable under intermittent, non-continuous exposure up to 240 deg F

a. Basis of Design Product: **Tremco, Inc., ExoAir 111.**

4. Butyl Strip: Butyl, 24 milthick self-adhering composite sheet consisting of 20 mils of butyl laminated to 4 mil polyethylene film; thermally stable under intermittent, non-continuous exposure up to 240 deg F, for termination of air barrier to EPDM or TPO roof membranes.

a. Basis of Design Product: Tremco, Inc**., ExoAir 111**

5. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

6. Opening Transition Assembly: Cured low-modulus silicone extrusion, with reinforcing ribs, sized to fit opening widths, [with aluminum race for insertion into aluminum framing extrusions,] with the following characteristics:

a. Basis of Design Product: Tremco, Inc., Proglaze ETA Engineered Transition Assembly. Tear Strength: 110 lb/in (19.3 kN/m)

7. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with manufacturer's recommended silicone sealant for bonding extrusions to substrates.

a. Basis of Design Product: Tremco, Inc.; Spectrem SimpleSeal.

D. Liquid Joint Sealants:

1. ASTM C 920, single-component polyurethane, approved by air barrier manufacturer for adhesion and chemical compatibility with membrane air barrier and accessories.

a. Basis of Design Product: **Tremco, Inc., Dymonic 100**.
b. ASTM C 920, single-component, neutral-curing silicone, approved by air barrier manufacturer for adhesion and compatibility with membrane air barrier and accessories post installation of the membrane.Basis of Design Product: **Tremco, Inc., Spectrem 1**.

E. Sprayed Polyurethane Foam Sealant: Sprayed Polyurethane Foam Sealant: Foamed-in-place, 1.5- to 2.0-lb/cu. ft. (24- to 32-kg/cu. m) density, with flame-spread index of 25 or less per ASTM E 162, for filling of gaps at openings and penetrations.

1. Basis of Design; **Tremco Inc., Flexible Low Expanding Foam (LEF)**.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Surface Condition: Before applying air barrier materials, examine substrate and conditions to ensure substrates are fully cured, smooth, clean, dry, and free from high spots, depressions, loose and foreign particles and other deterrents to adhesion, and conditions comply with manufacturer's written recommendations.

1. Verify concrete and masonry surfaces are visibly dry, have cured for time period recommended by membrane air barrier manufacturer, and are free from release agents, curing agents, and other contaminates.
2. Test for capillary moisture by method recommended in writing by air barrier manufacturer.
3. Verify masonry joints are filled with mortar and struck flush.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INTERFACE WITH OTHER WORK

A. Commencement of Work: Commence work once air barrier substrates are adequately protected from weather and will remain protected during remainder of construction.

B. Sequencing of Work: Coordinate sequencing of air barrier work with work of other sections that form portions of building envelope air barrier to ensure that flashings and transition materials can be properly installed and inspected. Roofing systems shall be capped and sealed, or top of walls protected, in such a way as to eliminate the ability of water to saturate the wall or interior space, both before and after, air barrier system installation. Coordinate installation of EXOAIR® 220 with the roofing trade to ensure compatibility and continuity with the roofing system.

C. Subsequent Work: Coordinate air barrier work with work of other sections installed subsequent to air barrier to ensure complete inspection of installed air barrier and sealing of air barrier penetrations necessitated by subsequent work.

3.3 PREPARATION

A. Clean, prepare, and treat substrate in accordance with air barrier manufacturer's written instructions.

1. Mask adjacent finished surfaces.
2. Remove contaminants and film-forming coatings from substrates.
3. Remove projections and excess materials and fill voids with substrate patching material.
4. Prepare and treat joints and cracks in substrate per ASTM C 1193 and membrane air barrier manufacturer's written instructions.

3.4 APPLICATION OF ACCESSORY MATERIALS

A. General: Install strips, transition strips, and accessory materials according to air-barrier manufacturer's written instructions. Install transition material and other accessories to form connect and seal membrane air barrier material to adjacent components of building air barrier

system, including, but not limited to, roofing system air barrier, exterior fenestration systems, door framing, and other openings.

B. Primer: Apply primer to substrates when recommended by air barrier manufacturer at required rate for those substrates that will be receiving a modified bituminous self-adhered membrane. Reprime areas not covered within 24 hours.

C. Assembly Transitions: 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.

1. Opening Transitions: Fill gaps at perimeter of openings with foam sealant and apply approved transition or accessory material.
2. Penetrations: Fill gaps at perimeter of penetrations with foam sealant and level with approved sealantor seal transition strips around penetrating objects and terminate with approved sealant.
3. Joints: Bridge and cover isolation joints, expansion joints, and discontinuous joints between separate assemblies utilizing approved transition or accessory materials.
4. Changes in Plane: Apply approved sealant beads at corners and edges to form smooth transition.
5. Substrate Gaps: Cover gaps with stainless steel sheet mechanically attached to substrate and providing continuous support for air barrier.

D. Flashings: Seal top of through-wall flashings to membrane air barrier with a continuous bead of approved sealant recommended by air barrier manufacturer.

E. Seal punctures, voids, and seams. Patch with approved transition and accessory materials following air barrier manufacturer’s recommendations and extend repair beyond repaired areas to maintain continuity.

3.5 FLUID AIR-BARRIER MEMBRANE INSTALLATION

A. General: Apply fluid air-barrier material to form a seal with transition materials and accessories to achieve a continuous air barrier according to air-barrier manufacturer's written instructions. Apply fluid air-barrier material within manufacturer's recommended application temperature ranges.

B. Membrane Air Barrier: Apply fluid air barrier material in full contact with substrate to produce a continuous seal with transition strips according to membrane air barrier manufacturers written instructions.

1. Vapor-Permeable Membrane Air Barrier: Total dry film thickness as recommended in writing by manufacturer to meet performance requirements, but not less than 40-mil dry film thickness, applied in one or more equal coats, roller-or spray- applied.

C. Connect and seal exterior wall air-barrier membrane continuously to subsequently-instaleed 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, wall openings, and other construction used in exterior wall openings, using approved transitions and accessory materials.

D. Wall Openings: Apply approved sealant to adhere silicone extrusion to perimeter of windows, curtain walls, storefronts, doors, and louvers. Apply [opening transition assembly] [preformed silicone sealant extrusion] according to air barrier transition manufacturer's written instructions.

E. Seal punctures, voids, and seams. Patch with approved transition and accessory materials following air barrier manufacturer's recommendations and extend repair beyond repaired areas to maintain continuity.

F. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.

G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections.

B. ABAA Audit: Provide Installer audit by ABAA. Coordinate scheduling of work and associated audit inspections. Arrange and pay for site inspections by ABAA to verify conformance with the manufacturer's instructions, ABAA QAP, and requirements of this Section.

C. Coordination of Testing: Cooperate with testing agency. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.

1. Do not cover Work until testing and inspection is completed and accepted.

D. Reporting: Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.

E. Correction: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

3.7 CLEANING AND PROTECTING

A. Clean spills, stains, and overspray resulting application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.

B. Protect membrane air barrier from damage from subsequent work. Protect membrane materials from exposure to UV light for period in excess of that acceptable to membrane air barrier manufacturer; replace overexposed materials and retest.

END OF SECTION

SECTION 074213 - METAL WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Exposed fastener metal wall panels as part of the assembly described below.

1. **Metal Wall Panels over Multi-Component Framed Wall System**: Single-skin exposed fastener metal wall panels applied as exterior cladding over wall framing specified in Division 05 Section "Cold-Formed Metal Framing" with exterior sheathing specified in Division 06 Section "Sheathing", and an applied membrane that provides moisture control specified in Division 07 Section "Air Barriers".

1.2 RELATED REQUIREMENTS

A. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal copings, flashings, reglets and roof drainage items.

B. Division 07 Section "Joint Sealants" for field-applied joint sealants.

1.3 REFERENCES

A. American Architectural Manufacturer's Association (AAMA):

1. AAMA 501.1 - Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure.
2. AAMA 621 - Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates.

B. American Society of Civil Engineers (ASCE):

1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

C. ASTM International (ASTM):

1. ASTM A 653/A 653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM C 754 - Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products.
3. ASTM C 920 - Specification for Elastomeric Joint Sealants.
4. ASTM C 1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
5. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

D. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA):

1. Architectural Sheet Metal Manual.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide metal wall panel assemblies meeting performance requirements as determined by application of specified tests by a qualified testing agency on manufacturer's standard assemblies.

B. Structural Performance: Provide metal wall panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, per ASTM E 72:

1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
2. Limits of Deflection: Metal wall panel assembly shall withstand scheduled wind pressure with the following allowable deflection:

a. Maximum allowable deflection

1) All Exposed Fastener Series panels specified with Liner Panels: Limited to L/180 deflection of panel perimeter normal to plane of wall.

3. Secondary Metal Framing: Design secondary metal framing for metal wall panel assembly according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."

C. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction.

1.5 QUALITY ASSURANCE

A. Manufacturer/Source: Provide metal wall panel and panel accessories from a single manufacturer.

B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum 10 years experience in manufacture of similar products in successful use in similar applications.

1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

a. Product data, including certified independent test data indicating compliance with requirements.
b. Samples of each component.
c. Project references: Minimum of 5 installations not less than 5 years old, with Owner and Architect contact information.
d. Sample warranty.

2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
3. Approved manufacturers must meet separate requirements of Submittals Article.

C. Installer Qualifications: Experienced Installer with minimum of 5 years experience with successfully completed projects of a similar nature and scope.

1.6 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct preinstallation meeting at site attended by Owner, Architect, manufacturer's representative, and other trade contractors.

1. Coordinate building framing in relation to metal wall panel assembly.
2. Coordinate installation of building air and water barrier behind metal wall panel assembly.
3. Coordinate window, door and louver, and other openings and penetrations of metal wall panel assembly.

1.7 ACTION SUBMITTALS

A. Product Data: Manufacturer’s data sheets, for specified products.

1. Include data indicating compliance with performance requirements.

B. Shop Drawings: Provide shop drawings prepared by manufacturer or manufacturer's authorized Installer. Include full elevations showing openings and penetrations. Include details of each condition of installation and attachment. Provide details at a minimum scale 1-1/2-inch per foot (1:8) of all required trim and extrusions needed for a complete installation.

1. Indicate points of supporting structure that must coordinate with metal wall panel assembly installation.

C. Samples for Initial Selection: For each product specified. Provide representative color charts of manufacturer's full range of colors.

D. Samples for Verification: Provide 12-inch (300 mm) section of panel(s) showing finishes. Provide 12-inch (300 mm) long pieces of trim pieces and other exposed components.

1.8 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Indicating compliance of products with requirements, from a qualified independent testing agency.

B. Qualification Information: For Installer firm.

C. Manufacturer's warranty: Submit sample warranty.

1.9 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect metal wall panel products during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage.

1. Deliver, unload, store, and erect metal wall panel products and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.

1.11 WARRANTY

A. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace components of metal wall panel assemblies that fail in materials and workmanship within two years from date of Substantial Completion.

B. Special Panel Finish Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal wall panels that evidence deterioration of finish within the following periods from the date of substantial completion:

1. Warranty Period: 20 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: **CENTRIA, Exposed Fastener Series Metal Wall Panels**. Provide basis of design product, or comparable product approved by Architect prior to bid.

1. CENTRIA Architectural Systems; Moon Township, PA 15108-2944. Tel: (800)759-7474. Tel: (412)299-8000. Fax: (412)299-8317. Email: info@CENTRIA.com. Web: www.CENTRIA.com.

2.2 METAL WALL PANEL MATERIALS

A. Metallic-Coated Steel Face Sheet: Coil-coated, ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Class Z275), structural steel quality.
2. Face Sheet: Minimum 0.030 inch/22 gage (0.76 mm) nominal uncoated thickness.
3. Surface: Smooth.

2.3 EXPOSED FASTENER PROFILE METAL WALL PANELS

A. Metal Wall Panels, General: Factory-formed, Exposed fastener panels with interconnecting side joints, fastened to supports with exposed fasteners, with field-applied sealants in side laps when required to meet performance requirements.

B. Ribbed profile with lap joint:

1. Basis of Design Product: **CENTRIA, BR5-36**.
2. Panel Coverage: 36 inches (914 mm).
3. Panel Height: 1.50 inches (38 mm).
4. Rib Spacing: 5 at 7.20 inches (183 mm) o.c.

2.4 METAL WALL PANEL ACCESSORIES

A. Metal Wall Panel Accessories, General: Provide complete metal wall panel assembly incorporating trim, copings, fasciae, parapet caps, soffits, sills, inside and outside corners, and miscellaneous flashings. Fabricate accessories in accordance with SMACNA Manual. Provide manufacturer's factory-formed clips, shims, flashings, gaskets, lap strips, closure strips, and caps for a complete installation as required for the following:

1. Single-skin application over sheathed frame wall with water resistant barrier.

B. Extruded Trim: Manufacturer's complementary aluminum extrusions for head, jamb, sill, base, flush, reveal, inside and outside corner, end wall, and expansion joint details. Finish matching metal wall panels.

1. Basis of Design: **CENTRIA, Microline Extrusions**.

C. Mitered Corners: Structurally-bonded horizontal interior and exterior trimless corners matching metal wall panel material, profile, and factory-applied finish, fabricated and finished by metal wall panel manufacturer.

1. Welded, riveted, fastened, or field- fabricated corners do not meet the requirements of this specification.
2. Basis of Design: **CENTRIA, MicroSeam Corners**.

D. Formed Flashing and Trim: Match material, thickness, and color of metal wall panel face sheets.

E. Sealants: Type recommended by metal wall panel manufacturer for application, meeting requirements of Division 07 Section "Joint Sealants."

F. Flashing Tape: 4-inch wide self-adhering butyl flashing tape.

G. Fasteners: Self-tapping screws, bolts, nuts, and other acceptable fasteners recommended by panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal wall panels by means factory-applied coating.

2.5 SECONDARY METAL FRAMING

A. Miscellaneous Framing Components, General: Cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z180).

1. Hat Channels: 0.053 inch/16 ga. (1.34 mm) minimum.
2. Sill Channels: 0.053 inch/16 ga. (1.34 mm) minimum.

2.6 METAL WALL PANEL FINISHES

A. Exposed Coil-Coated Finish System:

1. Fluoropolymer Two-Coat Mica System: 0.25-mil primer with 0.8-mil 70 percent PVDF fluoropolymer color coat providing a pearlescent appearance, AAMA 621.

a. Basis of Design: **CENTRIA Sundance Mica**.

B. Color:

1. Exterior Surface: Platinum #9989 by Centria.
2. Interior Surface: Fluorofinish backside finish of 0.2 mil primer with 0.3 mil backer coat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine metal wall panel substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal wall panels.

B. Wall Substrate: Confirm that wall substrate is within tolerances acceptable to metal wall panel system manufacturer.

1. Maximum substrate and framing deviations from flat plane acceptable:

a. 1/4-inch in 20 feet vertically or horizontally.
b. 1/2-inch across building elevation.
c. 1/8-inch in 5 feet.

C. **Framing**: Inspect framing that will support metal wall panels to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal wall panels.

D. **Openings**: Verify that window, door, louver and other penetrations match layout on shop drawings.

E. Correct out-of-tolerance work and other deficient conditions prior to proceeding with metal wall panel system installation.

3.2 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels in accordance with approved shop drawings and manufacturer's recommendations. Install metal wall panels in orientation, sizes, and locations indicated. Anchor metal wall panels and other components securely in place.

B. Attach panels to metal framing using recommended screws, fasteners, sealants, and adhesives indicated on approved shop drawings.

1. Fasteners for Steel Wall Panels: Stainless-steel for exterior locations and locations exposed to moisture; carbon steel for interior use only.
2. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
3. Dissimilar Materials: Where elements of metal wall panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

C. Joint Sealers: Install joint sealants where indicated on approved shop drawings.

3.3 ACCESSORY INSTALLATION

A. General: Install metal wall panel accessories with positive anchorage to building. Coordinate installation with flashings and other components.

1. Install related flashings and sheet metal trim per requirements of Division 07 Section "Sheet Metal Flashing and Trim."
2. Install components required for a complete metal wall panel assembly, including trim, copings, corners, lap strips, flashings, sealants, fillers, closure strips, and similar items.
3. Comply with performance requirements and manufacturer's written installation instructions.
4. Set units true to line and level as indicated.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a service representative authorized by metal wall panel manufacturer to inspect completed installation. Submit written report.

B. Correct deficiencies noted in manufacturer's report.

3.5 CLEANING AND PROTECTION

A. Remove temporary protective films. Clean finished surfaces as recommended by metal wall panel manufacturer. Clear weep holes and drainage channels of obstructions, dirt, and sealant. Maintain in a clean condition during construction.

B. Replace damaged panels and accessories that cannot be repaired by finish touch-up or minor repair.

END OF SECTION

SECTION 074213.23 - METAL COMPOSITE MATERIAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Related Sections:

1. Section 051000 - Structural Metal Framing
2. Section 061000 - Rough Carpentry
3. Section 072000 - Thermal Protection
4. Section 076000 - Flashing And Sheet Metal
5. Section 079000 - Joint Protection
6. Section 088000 - Glazing
7. Section 084000 - Entrances, Storefronts, And Curtain Walls

1.2 SUMMARY

A. Section includes metal composite material wall panels.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal composite material panel Installer, metal composite material panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal composite material panels, including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal composite material panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal composite material panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal composite material panel assembly during and after installation.
8. Review procedures for repair of panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 SYSTEM DESCRIPTION

A. Design Requirements:

1. Rainscreen (Cavity Wall) System:
   a. Wall panel assembly shall be designed in accordance with manufacturer's guidelines to allow air movement behind the panels as well as providing weep holes and channel through which any incidental moisture that enters the system can escape, thus providing a rainscreen (cavity wall) system.
2. Expansion And Contraction:
   a. Wall panel assembly shall be designed with provisions for thermal expansion and contraction of the component parts to prevent buckling, failure of joint seals, undue stress on fasteners or other detrimental effects due to accumulation of dead loads and various live loads.
3. Windload:
   a. Wall panel assembly shall be designed to withstand a positive and negative windload pressure acting inward and outward normal to the plane of the wall to meet the requirements of the latest adopted Local Building Code.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.

C. Samples for Initial Selection: For each type of metal composite material panel indicated with factory-applied color finishes.

1. Submit two (2) samples 3" x 5" of each product specified.
2. Submit two (2) samples 3" x 5" of each finish specified.
3. Include similar Samples of trim and accessories involving color selection.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Metal Composite Material Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal composite material panel accessories.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each product, tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal composite material panels to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical metal composite material panel assembly, including corner, soffits, supports, attachments, and accessories.
2. Water-Spray Test: Conduct water-spray test of mockup of metal composite material panel assembly, testing for water penetration according to AAMA 501.2.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal composite material panels, and other manufactured items so as not to be damaged or deformed. Package metal composite material panels for protection during transportation and handling.

B. Unload, store, and erect metal composite material panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal composite material panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal composite material panels to ensure dryness, with positive slope for drainage of water. Do not store metal composite material panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal composite material panels during installation.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal composite material panels to be performed according to manufacturers' written instructions and warranty requirements.

1.11 COORDINATION

A. Coordinate metal composite material panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.12 WARRANTY

A. Metal Composite Material (MCM):

1. Panel: The integrity of the panel bond will remain intact for a minimum of five (5) years from the Date Of Substantial Completion.
2. Finish:

a. Polyvinylidene Fluoride (PVDF):

1) The finish will not have a Fade Differential of greater than 5E units.
2) Testing shall be in accordance with ASTM D2244.
3) The finish will not have a Chalk Rating of less than 8.
4) Testing shall be in accordance with ASTM D4214.
5) The finish will not check, peel, lose adhesion or fracture (other than minute fractures which may develop due to fabrication and which are acceptable by industry standards on the Date Of Substantial Completion).
6) Warranty period shall be thirty (30) years from the Date of
7) Substantial Completion.

b. Anodized:

1) The finish will not check, peel, lose adhesion or fracture (other than minute fractures which may develop due to fabrication and which are acceptable by industry standards on the Date Of Substantial Completion).
2) Warranty period shall be twenty (20) years from the Date Of Substantial Completion.

B. Installation System:

1. Fabricator and/or installer standard form in which they agree to repair or replace components of metal-faced composite wall panel assemblies that fail in materials or workmanship within specified warranty period.
2. Weathertight warranties or other such guarantees regarding installation shall be the responsibility of the installing contractor.

C. Accessories:

1. Warranties or other such guarantees regarding accessories used during installation shall be the responsibility of the installing contractor.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:

1. Test-Pressure Difference: 1.57 lbf/sq. ft..

C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:

1. Test-Pressure Difference: 2.86 lbf/sq. ft..

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

F. Fire Propagation Characteristics: Metal composite material wall panel system passes NFPA 285 testing.

2.2 METAL COMPOSITE MATERIAL WALL PANELS

A. Metal Composite Material Wall Panel Systems: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment assembly components, and accessories required for weathertight system.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Abrams Architectural Products.
b. CENTRIA Architectural Systems.
c. Citadel Architectural Products, Inc.
d. SAF (Southern Aluminum Finishing Company, Inc.).

2. Panel: Envelope 2000 RS as manufactured by Citadel Architectural Products, Inc.

a. Composition:

1) Face: .024" (min) prefinished smooth aluminum
2) Core: .105" thermoset phenolic resin
3) Back: .010" primed smooth aluminum

b. Thickness: 4mm (nominal)
c. Weight: 1.25 lbs/ft²
d. Tolerance:

1) Thickness: ±1/32"
2) Length / Width: +0, -1/8"
3) Squareness: 1/64" per lineal ft

e. Performance:

1) Surface Burning Characteristics:

a) Panel shall have a Class A rating with a Flame Spread Index less than 25, and a Smoke Developed Index less than 450. Testing shall be in accordance with ASTM E84.
b) Bond Integrity: Panel shall have a minimum peel strength of 34.5 lb-in/lb.
c) Testing shall be in accordance with ASTM D1781.

2) Ignition Temperature:

a) Panel shall have a minimum self-ignition temperature of 900° F.
b) Testing shall be in accordance with ASTM D1929.

3) Impact Resistance:

a) Panel shall not have a deformation measuring larger than 0.186" in diameter or 0.007" in depth after being struck by a falling ball at 24 in-lb.
b) Testing shall be in accordance with ASTM D5420.

4) Rate Of Burning:

a) Panel shall have a CC1 Classification indicating a burning extent of 1" (25.4mm) or less when tested at a nominal thickness of .060" (1.5mm) or thickness of intended use.
b) Testing shall be in accordance with ASTM D635.

5) Tensile Strength:

a) Panel shall have a mean value of 1650 lbs.
b) Testing shall be in accordance with ASTM C297.

B. Attachment Assembly Components: Formed from extruded aluminum.

C. Attachment Assembly: Rainscreen principle system.

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal composite material panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal composite material panels unless otherwise indicated.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. Panel Sealants: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal composite material panels and remain weathertight; and as recommended in writing by metal composite material panel manufacturer.

2.4 FABRICATION

A. General: Fabricate and finish metal composite material panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate metal composite material panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.

    a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Polyvinylidene Fluoride (PVDF):

1. Type: Kynar 500® coating using 70% resin. Finish shall be in conformance with AAMA 2605.

    a. Color:

        1) As selected by Architect from manufacturer's color guide.
        2) Custom color to match Architect's standard.

    b. Composition:

        1) Two-Coat Colors:
        2-mil primer coat, 0.8-mil color coat
        2) Three-Coat Colors:
        2-mil primer coat, 0.8-mil color coat, 0.7-mil clear coat

    c. Performance:

        1) Gloss: Finish shall have a gloss value of 20-35 at 60°.
        Testing shall be in accordance with ASTM D523.

            a) Solar Reflectance: Finish shall have a value of >25% initial, >15% after 3 years for Steep Slope and a value of >65% initial, >50% after 3 years for Low Slope. Testing shall be in accordance with ASTM E903.
            b) Emissivity: Finish shall have a value of 0.80 (80%) min.
            Testing shall be in accordance with ASTM C1371.
            c) Pencil Hardness: Finish shall have a value of F-2H. Testing shall be in accordance with ASTM D3363.
            d) Flexibility: Finish shall have a value of 0-2 T-bend, no pick off.
            Testing shall be in accordance with ASTM D4145.
            e) Adhesion: Finish shall have a value of No Adhesion Loss. Testing shall be in accordance with ASTM D3359.

f) Reverse Impact: Finish shall have a value of No Cracking Or Adhesion Loss. Testing shall be in accordance with ASTM D2794.
g) Abrasion: Finish shall have a value of 65-85 l/mil. Testing shall be in accordance with ASTM D968.
h) Mortar Resistance: Finish shall have a value of No Effect. Testing shall be in accordance with ASTM C267.
i) Detergent Resistance: Finish shall have a value of No Effect using 3% detergent @ 100 F° (72 hrs). Testing shall be in accordance with ASTM D2248.
j) Acid Resistance: Finish shall have a value of No Effect using 10% muriatic acid (24 hrs) and No Effect using 20% sulfuric acid (18 hrs). Testing shall be in accordance with ASTM D1308.
k) Acid Rain: Finish shall have a value of No Objectionable Color Change after 15 cycle min. Testing shall be in accordance with Kesternich SO2, DIN 50018.
l) Alkalai Resistance: Finish shall have a value of No Effect using 10%, 25% NaOH (1 hr). Testing shall be in accordance with ASTM D1308.
m) Salt Spray Resistance: Finish shall have a value of No Face Blistering; Max average 1/16" scribe creep, passes 4000 hrs using 5% salt fog @ 95° F. Testing shall be in accordance with ASTM B117.
n) Humidity Resistance: Finish shall have a value of Passes 4000 hrs, No #8 blisters using 100% relative humidity @ 95° F. Testing shall be in accordance with ASTM D714, ASTM D2247.
o) Exterior Exposure: Finish shall have a value of Max 5 fade and Max 8 chalk at 10 yrs @ 45°, south Florida. Testing shall be in accordance with ASTM D2244, ASTM D4214.

D. Anodized:

1. Type:

a. AA-C22-A21 (clear)
b. AA-C22-A23 (colored)

2. Color: As selected by Architect from manufacturer's color guide.
3. Composition:

a. Anodized (clear): barrier, aluminum oxide, nickel/hydrate seal
b. Anodized (colored): barrier, aluminum oxide, colorant, nickel/hydrate seal

4. Performance:

a. Salt Spray Resistance: Testing shall be in accordance with ASTM B117.
b. Acid Dissolution: Testing shall be in accordance with ASTM B680.
c. Gloss: Testing shall be in accordance with ASTM D523.
d. Coating Mass: Testing shall be in accordance with ASTM B137.

2.6 Installation System:

A. RainScreen (RS) System:

1. Description: Shop-fabricated installation system consisting of routed and formed metal composite material (MCM), mounting extrusions, mechanical fasteners,

and accessories to provide a rainscreen (cavity wall) system. Proper allowance shall be made for expansion and contraction of the wall panel assembly. No systems that restrict proper thermal movement, such as those utilizing single 'L' clips on all four sides, shall be permitted.

a. Performance:

1) Air Infiltration:

a) Installation system shall not allow air infiltration in excess of 0.06 cfm/ft² at 1.57 psf. Testing shall be in accordance with ASTM E283.
b) Structural Performance: Installation system shall have a design load of 35.0 psf applied in the positive and negative direction. There shall be no deflection in excess of L/175 of the span of any support member nor shall there be any failure of the system. At a structural test load equal to 1.5 times the specified design load, no support member shall have permanent deformation in excess of 1/1000 of its span nor shall there be any failure of the system. Testing shall be in accordance with ASTM E330.
c) Water Penetration: Installation system shall not have uncontrolled water penetration to the room side at a static air pressure differential of 15.0 psf. Testing shall be in accordance with ASTM E331.
d) Fire Performance: Installation system shall have a value of pass, and comply with the criteria set forth in the standard. Testing shall be in accordance with NFPA 285 (UBC 26-9 equivalent).

2. Accessories:

a. Extrusions:

1) Shall conform with ASTM B211 and the manufacturer's recommendations.
2) Shall be applied in accordance with the panel manufacturer's installation guidelines.

b. Sealants:

1) Selected from the panel manufacturer's approved list of sealants.
2) Shall be applied in accordance with both the panel manufacturer's installation guidelines and the sealant manufacturer's recommendations.

c. Fasteners:

1) Selected by contractor to suit project requirements.
2) Shall be applied using the recommended fastener schedule in accordance with panel manufacturer's installation guidelines.
3) Shall be coated to prevent corrosion and/or reaction with other materials.
4) Shall be concealed except where unavoidable. Exposed fasteners shall be finished to match adjoining metal.

d. Flashing:

1) Selected by contractor to suit project requirements.
2) Shall be installed in such a manner to maintain the integrity of the wall system against moisture intrusion.

e. Stiffeners:

1) Selected by contractor to suit project requirements.
2) Shall be applied in accordance with the panel manufacturer's installation guidelines.
3) Shall be applied to all panels 36" x 36" or larger.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal composite material panel supports, and other conditions affecting performance of the Work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal composite material wall panel manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal composite material wall panel manufacturer.

a. Substrate to receive panels shall be in vertical and horizontal alignment with no more deviation than 1/4" in 20'.
b. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and assemblies penetrating metal composite material panels to verify actual locations of penetrations relative to seam locations of metal composite material panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal composite material panel manufacturer's written recommendations.

3.3 METAL COMPOSITE MATERIAL PANEL INSTALLATION

A. General: Install metal composite material panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal composite material panels.
2. Flash and seal metal composite material panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal composite material panels are installed.

3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal composite material panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal composite material panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal composite material panel manufacturer.

D. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.

1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.

E. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.

1. Rainscreen Systems: Do not apply sealants to joints unless otherwise indicated.
2. Wall panel assembly shall be installed in accordance with the manufacturer's written installation guidelines and the approved set of shop drawings.
3. Erect wall panel assembly level and true to the intended plane.
4. Maximum deviation from vertical and horizontal alignment of erected wall panel assembly shall be no more than 1/4" in 20'-0".
5. Maximum deviation in panel flatness shall be 0.6% of the assembled units.
6. Seal all joints as required using methods and materials as recommended by the panel manufacturer

F. Rainscreen-Principle Installation: Install using manufacturer's standard assembly with vertical channel that provides support and secondary drainage assembly, draining at base of wall. Notch vertical channel to receive support pins. Install vertical channels supported by channel brackets or adjuster angles and at locations, spacings, and with fasteners recommended by manufacturer. Attach metal composite material wall panels by inserting horizontal support pins into notches in vertical channels and into flanges of panels. Leave horizontal and vertical joints with open reveal.

1. Install wall panels to allow individual panels to be installed and removed without disturbing adjacent panels.
2. Do not apply sealants to joints unless otherwise indicated.

G. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal composite material panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal composite material panel manufacturer; or, if not indicated, provide types recommended in writing by metal composite material panel manufacturer.

H. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal composite material wall panel units within installed tolerance of 1/4 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing agency to perform field tests and inspections.

B. Water-Spray Test: After installation, test area of assembly as directed by Architect for water penetration according to AAMA 501.2.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal composite material wall panel installation, including accessories.

D. Metal composite material wall panels will be considered defective if they do not pass test and inspections.

E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.

B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal composite material panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213.23

SECTION 075200 - MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Preparation of Substrate to Receive Roofing Materials

B. Roof Insulation Application to Prepared Substrate

C. Roof Membrane Application

D. Roof Flashing Application

E. Incorporation of Sheet Metal Flashing Components and Roofing Accessories into the Roof System

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Sheet Metal Flashing and Trim

B. Sheet Metal Roofing Specialties

C. Termination Bars for Flashing Attachement to Wall Substrates

1.3 RELATED SECTIONS

A. Section 061000 - Rough Carpentry

B. Section 053100 - Roof Decks

C. Section 076200 - Sheet Metal Flashing and Trim

1.4 REFERENCE STANDARDS

References in these specifications to standards, test methods and codes, are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout this specification section.

ASTM	American Society for Testing and Materials Philadelphia, PA
FM	Factory Mutual Engineering and Research Norwood, MA
NRCA	National Roofing Contractors Association Rosemont, IL
OSHA	Occupational Safety and Health Administration Washington, DC

SMACNA Sheet Metal and Air Conditioning Contractors National Association
Chantilly, VA

UL Underwriters Laboratories
Northbrook, IL

1.5 DESCRIPTION OF WORK

Project Type: New construction

Deck: Metal Slope: Less than 1/8 inch

Insulation - base layers: Two layers of Paratherm, each having a thickness of 2.5 inches, mechanically attached simultaneously with the top layer of insulation.

Insulation - top layer: DEXcell® FA Glass Mat Roof Board, having a thickness of 1/2 inch, mechanically attached.

Roof System: Paradiene 20, applied in PA 311 R Adhesive;
Paradiene 30 FR, applied in PA-311 R Adhesive.

Flashing System: Veral Aluminum, applied in SFT Cement

Supplemental Flashing System: Parapro 123 Flashing System.

1.6 SUBMITTALS

All submittals which do not conform to the following requirements will be rejected.

A. Submittals Prior to Contract Award:

1. Letter from the proposed primary roofing manufacturer confirming that the bidder is an acceptable Contractor authorized to install the proposed system.

2. Letter from the primary roofing manufacturer stating that the proposed application will comply with the manufacturer's requirements in order to qualify the project for the specified guarantee.

3. Shop drawings and product submittals.

B. Submittals Prior to Project Close-out:

1. Certificate Of Analysis from the testing laboratory of the primary roofing materials manufacturer, confirming the physical and mechanical properties of the roofing membrane components. Testing shall be in accordance with the parameters published in ASTM D 5147 and ASTM D 7051 and indicate Quality Assurance/Quality Control data as required to meet the specified properties. A separate Certificate Of Analysis for each production run of material shall indicate the following information:

a) Material type
b) Lot number
c) Production date
d) Dimensions and Mass (indicate the lowest values recorded during the production run);
- Roll length

- Roll width
- Selvage width
- Total thickness
- Thickness at selvage (coating thickness)
- Weight

e) Physical and Mechanical Properties;

- Low temperature flexibility
- Peak load
- Ultimate Elongation
- Dimensional stability
- Compound Stability
- Granule embedment
- Resistance to thermal shock (foil faced products)

2. Manufacturer's printed recommendations for proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.

1.7 QUALITY ASSURANCE

A. Acceptable Products: Primary roofing products, including each type of sheet, all manufactured in the United States, shall be supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than 10 years. The primary roofing products shall have maintained a consistent composition for a minimum of five years.

B. Product Quality Assurance Program: Primary roofing materials shall be manufactured under a quality management system that is monitored regularly by a third party auditor under the ISO 9001 audit process. A certificate of analysis for reporting/confirming the tested values of the actual material being supplied for the project will be required prior to project close-out.

C. Acceptable Contractor: Contractor shall have a minimum of 2 years experience in successfully installing the same or similar roofing materials and be certified in writing by the roofing materials manufacturer to install the primary roofing products.

D. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractor's Association, amended to include the acceptance of a phased roof system installation.

E. Local Regulations: Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.

F. Manufacturer Requirements: Ensure that the primary roofing materials manufacturer provides direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conducts a final inspection upon successful completion of the project.

G. Pre-installation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

5. Review structural loading limitations of roof deck during and after roofing.

1.8 PRODUCT DELIVERY STORAGE AND HANDLING

A. Delivery: Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.

B. Storage: Store materials out of direct exposure to the elements on pallets placed over clean, flat and dry surfaces. Storage of pallets over dirt, grass-covered ground or newly placed concrete may result in upward moisture transpiration and contamination of product. Store rolls of roofing on end. For roof-top storage, avoid overloading of deck and building structure. Factory packaging is not intended for job site protection. Slit factory packaging immediately upon arrival at the job site to prevent build-up of condensation and cover materials using a breathable cover such as a canvas. Polyethylene or other non-breathable plastic coverings shall not be used. Store flammable or temperature sensitive materials away from open flame, ignition sources or excessive heat.

C. Handling: Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.

D. Damaged Material: Any materials that are found to be damaged or stored in any manner other than stated above will be automatically rejected, and will require removal and replacement at the Contractor's expense.

1.9 PROJECT/SITE CONDITIONS

A. Requirements Prior to Job Start

1. Notification: Give a minimum of 5 days notice to the Owner and manufacturer prior to commencing any work and notify both parties on a daily basis of any change in work schedule.

2. Permits: Obtain all permits required by local agencies and pay all fees which may be required for the performance of the work.

3. Safety: Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA and other industry or local governmental groups.

B. Environmental Requirements

1. Precipitation: Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure that materials, applied roofing, and building interiors are protected from possible moisture damage or contamination.

2. Temperature Restrictions - cold adhesive: At low temperatures, the specified cold adhesive becomes more viscous, making even distribution more difficult. The optimal temperature of the adhesive at point of application is 70° - 100°F (21° - 38°C). To facilitate application when ambient temperatures are below 50°F (10°C), store the adhesive and roll goods in a warm place immediately prior to use. Bulk warmers, inline heaters, or other pre-heating equipment should be used to maintain the proper viscosity of the adhesive when using mechanical application equipment. Consider "flying in" the pre-cut roofing sheets in by placing them into the adhesive rather than rolling them into position. Roll or broom the sheets to ensure contact with the underlying adhesive. Suspend application in situations where the adhesive cannot be kept at temperatures allowing for even distribution.

C. Protection Requirements

1. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.

2. Torch Safety: Crew members handling torches shall be trained by an Authorized Certified Roofing Torch Applicator (CERTA) Trainer, be certified according to CERTA torch safety guidelines as published by the National Roofing Contractor's Association (NRCA), and follow torch safety practices as required by the contractor's insurance carrier. Designate one person on each crew to perform a daily fire watch. The designated crew member shall watch for fires or smoldering materials on all areas during roof construction activity, and for the minimum period required by CERTA guidelines after roofing material application has been suspended for the day.

3. Limited Access: Prevent access by the public to materials, tools and equipment during the course of the project.

4. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.

5. Site Condition: Complete, to the owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.

1.10 GUARANTEE/WARRANTY

A. Roof Membrane/System Guarantee: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with the manufacturer's 20 year labor and materials guarantee covering the rigid insulation, insulation fasteners/plates and roof membrane/flashing system. The guarantee shall be a term type, without deductibles or limitations on coverage amount, and shall be issued at no additional cost to the Owner.

> Siplast 20 year Roof Membrane/System Guarantee
> Minimum 2 year roofer/installer warranty to include all sheet metal flashings associated with the new waterproofing system. Installer warranty to be dated the date of substantial completion.

PART 2 - PRODUCTS

2.1 ROOFING SYSTEM ASSEMBLY/PRODUCTS

A. Rigid Roof Insulation: Roof insulation shall be UL and FM approved. Insulation shall be approved in writing by the insulation manufacturer for intended use and for use with the specified roof assembly.

1. Polyisocyanurate: A closed cell, rigid polyisocyanurate foam core material, integrally laminated between glass fiber reinforced organic facers, in full compliance with ASTM C 1289, Type II, Class 1, Grade 2 (20 psi). Panels shall have a nominal thickness of 2.5 inches. Acceptable types are as follows:

> Paratherm by Siplast; Irving, TX

2. Gypsum Sheathing Panel: A panel composed of a gypsum based, non-structural water resistant core material integrally bonded with fiberglass mats on both sides having a nominal thickness of 1/2 inch. The panel surface shall be factory primed with a non-asphaltic primer. Acceptable types are as follows:

> DEXcell® FA Glass Mat Roof Board by National Gypsum, Charlotte, NC

2.2 DESCRIPTION OF SYSTEMS

A. Roofing Membrane Assembly: A roof membrane assembly consisting of two plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane, applied over a prepared substrate. Reinforcement mats shall be impregnated/saturated and coated each side with SBS modified bitumen blend. The cross sectional area of the sheet material shall contain no oxidized or non-SBS modified bitumen. The roof system shall pass 500 cycles of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14°F (-10°C). Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles. The roof system shall pass 200 cycles of ASTM D 5849 after heat conditioning performed in accordance with ASTM D 5147. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system.

Siplast Paradiene 20/30 FR roof system

1. Modified Bitumen Base, Stripping Ply and Flashing Reinforcing Ply

a) Thickness (avg): 91 mils (2.3 mm) (ASTM D 5147)
b) Thickness (min): 87 mils (2.2 mm) (ASTM D 5147)
c) Weight (min per 100 ft² of coverage): 62 lb (3.0 kg/m²)
d) Peak filler content in elastomeric blend - 35% by weight
e) Low temperature flexibility @ -15°F (-26°C): PASS (ASTM D 5147)
f) Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
g) Peak Load (avg) @ 0°F (-18°C): 70 lbf/inch (12.3 kN/m) (ASTM D 5147)
h) Ultimate Elongation (avg.) @ 73°F (23°C): 50% (ASTM D 5147)
i) Compound Stability (max): 0.1% (ASTM D 5147)
j) High Temperature Stability (min): 250°F (121°C) (ASTM D 5147)
k) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
l) Reinforcement: fiberglass mat or other meeting the performance and Compound stability criteria

> Siplast Paradiene 20

2. Modified Bitumen Finish Ply

   a) Thickness (avg): 130 mils (3.3 mm) (ASTM D 5147)
   b) Thickness at selvage (coating thickness) (avg): 98 mils (2.5 mm) (ASTM D 5147)
   c) Thickness at selvage (coating thickness) (min): 94 mils (2.4 mm) (ASTM D 5147)
   d) Weight (min per 100 ft² of coverage): 90 lb (4.4 kg/m²)
   e) Peak filler content in elastomeric blend: 35% by weight
   f) Low temperature flexibility @ -15° F (-26° C): PASS (ASTM D 5147)
   g) Peak Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)
   h) Peak Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)
   i) Ultimate Elongation (avg.) @ 73°F (23°C): 55% (ASTM D 5147)
   j) Compound Stability (max): 0.1% (ASTM D 5147)
   k) High Temperature Stability (min): 250°F (121° C) (ASTM D 5147)
   l) Granule Embedment (max loss): 2.0 grams per sample (ASTM D 5147)
   m) Approvals: UL Class listed, FM Approved (products shall bear seals of approval)
   n) Reinforcement: fiberglass mat or other meeting the performance and Compound stability criteria
   o) Surfacing: ceramic granules

      > Siplast Paradiene 30 FR

B. Flashing Membrane Assembly: A flashing membrane assembly consisting of a prefabricated, reinforced, Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane with a continuous, channel-embossed metal-foil surfacing. The finish ply shall conform to ASTM D 6298 and the following physical and mechanical property requirements.

   Siplast Veral flashing system, aluminum finish

   1. Metal-Clad Modified Bitumen Flashing Sheet

      a) Thickness (avg): 150 mils (3.8 mm) (ASTM D 5147)
      b) Thickness (min): 146 mils (3.7 mm) (ASTM D 5147)
      c) Weight (min per 100 ft² of coverage): 96 lb (4.6 kg/m²)
      d) Coating Thickness – back surface (min): 40 mils (1 mm) (ASTM D 5147)
      e) Low temperature flexibility @ 0° F (-18° C): PASS (ASTM D 5147)
      f) Peak Load (avg) @ 73°F (23°C): 85 lbf/inch (15 kN/m) (ASTM D 5147)
      g) Peak Load (avg) @ 0°F (-18°C): 180 lbf/inch (31.7 kN/m) (ASTM D 5147)
      h) Ultimate Elongation (avg) @ 73°F (23°C): 45% (ASTM D 5147)
      i) Tear-Strength (avg): 120 lbf (0.54 kN) (ASTM D 5147)
      j) Dimensional Stability (max): 0.2% (ASTM D 5147)
      k) Compound Stability (min): 225°F (107°C) (ASTM D 5147)
      l) Cyclic Thermal Shock Stability (maximum): 0.2% (ASTM D 7051)
      m) Approvals: UL Approved, FM Approved (products shall bear seals of approval)
      n) Reinforcement: fiberglass scrim mat or other meeting the performance and dimensional stability criteria
      o) Surfacing: aluminum metal foil

         > Siplast Veral Aluminum

C. Catalyzed Acrylic Resin Flashing System: A specialty flashing system consisting of a PMMA-based, fully reinforced membrane installed over a prepared or primed substrate. The flashing system consists of a catalyzed acrylic resin primer, basecoat and topcoat, combined with a non-woven polyester fleece. The use of the specialty flashing system shall be specifically approved in advance by the membrane manufacturer for each application.

> Parapro 123 Flashing System by Siplast; Irving, TX

D. SUBSTITUTE ROOF SYSTEMS. The following substitute roof systems are approved for use in lieu of the specified roof system.

Manufacturer
Tremco
Cleveland, OH

Base Ply – Power Ply Smooth
Finish Ply - Power Ply Premium FR
Flashing Sheet - Therm MB 4PFR
Stripping Ply and Flashing Reinforcing Sheet - Power Ply Smooth

Manufacturer
Garland
Cleveland, OH

Base Ply – Stressply IV
Finish Ply - Stressply FR Mineral
Flashing Sheet - Stressply FR Mineral
Stripping Ply and Flashing Reinforcing Sheet – Stressply

2.3 ROOFING ACCESSORIES

A. Roofing Adhesives

1. Membrane Cold Adhesive: An asphalt, solvent blend conforming to ASTM D 4479, Type II requirements.

> Siplast PA-311 R Adhesive by Siplast; Irving, TX

2. Mastic: An asphalt cutback mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges conforming to ASTM D 4586 Type II requirements.

> Siplast PA-1021 Plastic Cement by Siplast; Irving, TX

3. Solvent-Free Flashing Adhesive: A single-component, solvent-free modified adhesive. The adhesive blend shall be formulated in a grade for application of flashing materials.

> Siplast SFT Cement by Siplast; Irving, TX

B. Primers

1. Primer: An asphalt, solvent blend conforming to ASTM D 41 requirements.

> Siplast PA-1125 Asphalt Primer by Siplast; Irving, TX

C. Sealant (horizontal applications): A moisture-curing, self-leveling elastomeric sealant designed for roofing applications. The sealant shall be approved by the roof membrane manufacturer for use in conjunction with the roof membrane materials. Acceptable types are as follows:

> Siplast PS-209 Elastomeric Sealant by Siplast; Irving, TX

D. Sealant (vertical and sloped applications): A moisture-curing, non-slump elastomeric sealant designed for roofing applications. The sealant shall be approved by the roof membrane manufacturer for use in conjunction with the roof membrane materials. Acceptable types are as follows:

> Siplast PS-715 NS Elastomeric Sealant by Siplast; Irving, TX

E. Ceramic Granules: No. 11 grade specification ceramic granules of color scheme matching the granule surfacing of the finish ply.

F. Perlite Cant Strips: A cant strip composed of expanded volcanic minerals combined with waterproofing binders. The top surface shall be pre-treated with an asphalt based coating. The face of the cant shall have a nominal 4 inch dimension.

G. Fasteners

1. Insulation Fasteners: Insulation fasteners and plates shall be FM Approved, and/or approved by the manufacturer of the primary roofing products. The insulation fasteners shall provide attachment required to meet the specified uplift performance and to restrain the insulation panels against the potential for ridging. The fastening pattern for each insulation panel to be used shall be as recommended by the insulation manufacturer and approved by the manufacturer of the primary roofing products. Acceptable insulation fastener manufacturers for specific deck types are listed below.

a) Metal Decks: Insulation mechanical fasteners for metal decks shall be factory coated for corrosion resistance. The fastener shall conform meet or exceed Factory Mutual Standard 4470 and when subjected to 30 Kesternich cycles, show less than 15% red rust. Acceptable insulation fastener types for metal decks are listed below.

- A fluorocarbon coated screw type roofing fastener having a minimum 0.220 inch thread diameter. Plates used in conjunction with the fastener shall be a metal type having a minimum 3 inch diameter, as supplied by the fastener manufacturer.

> Parafast Fastener by Siplast; Irving, TX
> Standard RoofGrip Drill Point Fastener by OMG; Agawam, MA

2. Flashing Reinforcing Sheet Fasteners for Wood/Plywood Substrates to Receive Flashing Coverage: Fasteners shall be approved by the manufacturer of the primary roofing products. Acceptable fasteners for specific substrate types are listed below.

a) Wood/Plywood Substrates

- A 12 gauge, spiral or annular threaded shank, zinc coated steel roofing fastener having a minimum 1 inch head.

> Square Cap by Maze Nails; Peru, IL
> Simplex Cap Nail by Simplex Nails, Inc., Americus, GA

H. Walktread: A prefabricated, puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic-coated granule wearing surface.

1. Thickness: 0.217 in (5.5 mm)
2. Weight: 1.8 lb/ft² (8.8 kg/m²)
3. Width: 30 in (76.2 cm)

> Paratread by Siplast; Irving, TX

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Sweep or vacuum all surfaces, removing all loose aggregate and foreign substances prior to commencement of roofing.

3.2 SUBSTRATE PREPARATION

A. Insulation: Install insulation panels with end joints offset; edges of the panels shall be in moderate contact without forcing applied in strict accordance with the insulation manufacturer's requirements and the following instructions. Where insulation is installed in two or more layers, stagger joints between layers. Install only as much insulation as can be made watertight within the same work day.

1. Insulation - multiple layer: Mechanically attach the insulation layers simultaneously to the substrate, using the specified fasteners, at a rate of 1 fastener per 2.7 square feet of panel area (12 per 4' x 8' panel). Increase the fastening frequency by 50% and fasten the corners at a rate of 1 fastener per 1 square foot of panel area (32 per 4’ x 8’ panel). Stagger the panel joints between insulation layers.
2. Fully adhere cover board to insulation.

3.3 ROOF MEMBRANE INSTALLATION

A. Membrane Application: Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements. Application of roofing membrane components shall immediately follow application of base sheet and/or insulation as a continuous operation.

B. Aesthetic Considerations: Construction of an aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply the specified materials including granules, and exercise care in ensuring that the finished application is acceptable to the Owner.

C. Membrane Adhesive Application: Membrane adhesive can be applied by roller, squeegee or spray unit. Apply cold adhesive in a smooth, even, continuous layer without breaks or voids. Utilize an application rate of 2 to 2 1/2 gal/sq (0.6 to 1.0 l/m²) over irregular or porous substrates. Utilize an application rate of 1 1/2 to 2 gal/sq (0.6 to 0.8 kg/m²) for interply applications. Double the adhesive application rate at the end laps of granule surfaced sheets. Refer to the manufacturer’s inter-ply flashing detail at the locations that are to receive the specified catalyzed acrylic resin primer/flashing system.

D. Bitumen Consistency: Cutting or alterations of bitumen, primer, and sealants will not be permitted.

E. Roofing Application: Apply all layers of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets.

1. Apply all layers of roofing perpendicular to the slope of the deck.

2. Fully bond the base ply to the prepared substrate, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the cold adhesive applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps a minimum of 3 feet.

3. Fully bond the finish ply to the base ply, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the cold adhesive applicator. Stagger end laps of the finish ply a minimum 3 feet. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger side laps of the finish ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the finish ply a minimum 3 feet from end laps in the underlying base ply.

4. Maximum sheet lengths and special fastening of the specified roof membrane system may be required at various slope increments where the roof deck slope exceeds 1/2 inch per foot. The manufacturer shall provide acceptable sheet lengths and the required fastening schedule for all roofing sheet applications to applicable roof slopes.

F. Granule Embedment: Broadcast mineral granules over all bitumen overruns on the finish ply surface, while the bitumen is still hot or the adhesive is soft, to ensure a monolithic surface color.

G. Flashing Application - masonry surfaces: Flash masonry parapet walls and curbs using the reinforcing sheet and the metal foil flashing membrane. Fully adhere the reinforcing sheet using the specified adhesive, extending a minimum of 3 inches onto the base ply surface beyond the toe of the cant and 3 inches up the parapet wall above the cant. Utilize 3 inch side laps when applying the flashing reinforcing sheet. Install the finish ply to extend to the top of the cant. Cut the flashing material into the desired lengths off the end of roll in three foot widths. Apply a uniform coat of the specified flashing cement to the back of the flashing sheet as well as the area to receive flashing coverage, including the exposed selvage edge of the adjacent flashing sheet. Set the flashing sheet in place and exert pressure on the sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Stagger the laps of the flashing sheet layer from the lap seams in the reinforcing ply. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation).

H. Flashing Application – wood/plywood surfaces: Flash wood/plywood parapet walls and curbs using the reinforcing sheet and the metal foil flashing membrane. The reinforcing sheet shall have minimum 3 inch side laps and extend a minimum of 3 inches onto the base ply surface and to the top of the parapet wall or curb. Nail the reinforcing sheet through the field of the sheet to the vertical wood surface on 12 inch centers from the top of the cant to top of the wall or curb. Fully adhere the remainder of the flashing reinforcing sheet that extends over the cant and roof level. Install the finish ply to extend to the top of the cant. Cut the flashing material into the desired lengths off the end of roll in three foot widths. Apply a uniform coat of the specified flashing cement to the back of the flashing sheet as well as the area to receive flashing coverage, including the exposed selvage edge of the adjacent flashing sheet. Set the flashing sheet in place and exert pressure on the sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Stagger the laps of the flashing sheet layer from the lap seams in the reinforcing ply. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation).

I. Catalyzed Acrylic Resin Flashing System: Install the liquid-applied primer and flashing system in accordance with the membrane system manufacturer’s printed installer’s guidelines and other applicable written recommendations as provided by the manufacturer.

J. Water Cut-Off: At end of day's work, or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to the resumption of roofing.

3.4 ROOF SYSTEM INTERFACE WITH RELATED COMPONENTS

A. Walktread: Cut the walktread into maximum 5 foot lengths and allow to relax until flat. Adhere the sheet using the specified plastic cement. Apply the specified cement in a 3/8 inch thickness to the back of the product in 5 inch by 5 inch spots in accordance with the pattern as supplied by the walktread manufacturer. Walk-in each sheet after application to ensure proper adhesion. Use a minimum spacing of 2 inches between sheets to allow for proper drainage.

B. Sealant: Apply a smooth continuous bead of the specified sealant at the exposed finish ply edge transition to metal flashings incorporated into the roof system.

3.5 FIELD QUALITY CONTROL AND INSPECTIONS

A. Site Condition: Leave all areas around job site free of debris, roofing materials, equipment and related items after completion of job.

B. Notification Of Completion: Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.

C. Final Inspection

1. Post-Installation Meeting: Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.

D. Issuance Of The Guarantee: Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Formed low-slope roof sheet metal fabrications.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Section 077200 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches.

C. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For each type of coping and roof edge flashing that is FM Approvals approved.

C. Product Test Reports: For each product, for tests performed by a qualified testing agency.

D. Sample Warranty:

1. 5 year installer warranty to cover all sheet metal work.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

B. All sheet metal work shall meet SMACNA requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.10 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

B. 5 year installer warranty to cover all sheet metal work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. FM Approvals Listing: Manufacture and install copings and roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with name of fabricator and design approved by FM Approvals.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A 755/A 755M.

1. Surface: Smooth, flat.
2. Exposed Coil-Coated Finish:

    a. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Color: Match Architects sample and adjacent metal wall panel color and finish.
4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.3 UNDERLAYMENT MATERIALS

A. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F; and complying with physical requirements of ASTM D 226/D 226M for Type I and Type II felts.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Atlas Roofing Corporation.
    b. Engineered Coated Products.
    c. Kirsch Building Products, LLC.
    d. SDP Advanced Polymer Products Inc.

B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft.minimum.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Zinc-Coated (Galvanized) and Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Solder:

1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead with maximum lead content of 0.2 percent.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

E. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal unless indicated on drawings otherwise.

G. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

I. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

J. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch-long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

1. Expansion Joints: Butt type with cover plate.
2. Gutters with Girth up to 15 Inches: Fabricate from the following materials:
   a. Pre-Finished Galvalume Steel: 24 gauge thick.

B. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

1. Fabricate from the following materials:

   a. Pre-Finished Galvalume Steel: 24 gauge thick.

C. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fabricate from the following materials:

1. Pre-Finished Galvalume Steel: 24 gauge thick.

D. Splash Pans: Fabricate to dimensions and shape required and from the following materials:

1. Aluminum: 0.040 inch thick.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Copings: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.

1. Joint Style: Butted with expansion space and 6-inch-wide, concealed backup plate.
2. Fabricate from the Following Materials:

a. Pre-Finished Galvalume Steel: 24 gauge thick.

B. Roof and Roof-to-Wall Transition Expansion-Joint Cover: Fabricate from the following materials: Shop fabricate interior and exterior corners.

1. Pre-Finished Galvalume Steel: 24 gauge thick.

C. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
1. Pre-Finished Galvalume Steel: 24 gauge thick.

D. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
1. Pre-Finished Galvalume Steel: 24 gauge thick.

E. Flashing Receivers: Fabricate from the following materials:

1. Pre-Finished Galvalume Steel: 24 gauge thick.

F. Roof-Penetration Flashing: Fabricate from the following materials:

1. Pre-Finished Galvalume Steel: 24 gauge thick.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

D. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners. Coordinate specific requirements with drawings as indicated.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel and aluminum sheet.
2. Do not pre-tin zinc-tin alloy-coated stainless steel and zinc-tin alloy-coated copper.
3. Do not use torches for soldering.
4. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
5. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

3.4 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters: Join sections with joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.

1. Fasten gutter hangers at 30” o.c. max to front and back of gutter.
2. Anchor back edge of gutter to sub-fascia.
3. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.

C. Downspouts: Join sections with 1-1/2-inch telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c.

D. Splash Pans: Install where downspouts discharge on low-slope roofs. Set in asphalt roofing cement or elastomeric sealant compatible with the substrate.

E. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

1. Anchor scupper closure trim flange to exterior wall and seal with elastomeric sealant to scupper.
2. Loosely lock front edge of scupper with conductor head.
3. seal with elastomeric sealant exterior wall scupper flanges into back of conductor head.

F. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches in direction of water flow.

3.5 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

C. Copings: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches. Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant unless otherwise indicated.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

3.6 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 042000 "Unit Masonry." Section 044200 "Exterior Stone Cladding."

C. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.7 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

B. Overhead-Piping Safety Pans: Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

3.8 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: All sheet metal work shall meet SMACNA requirements.

C. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

D. Clean and neutralize flux materials. Clean off excess solder.

E. Clean off excess sealants.

F. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

G. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Roof hatches.

B. Related Sections:

   1. Section 055000 "Metal Fabrications" for metal vertical ladders, ships' ladders, and stairs for access to roof hatches.
   2. Section 077100 "Roof Specialties" for manufactured fasciae, copings, gravel stops, gutters and downspouts, and counterflashing.

1.3 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory.

   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For roof accessories.

   1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:

1. Size and location of roof accessories specified in this Section.
2. Method of attaching roof accessories to roof or building structure.
3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
4. Required clearances.

B. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.7 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

2.2 ROOF HATCH

A. Roof Hatches: Metal roof-hatch units with lids and insulated single-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, straight sides, and integrally formed deck-mounting flange at perimeter bottom.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Bilco Company (The).

B. Type and Size: Single-leaf lid, 30 by 36 inches.

C. Loads: Minimum 40-lbf/sq. ft. external live load and 20-lbf/sq. ft. internal uplift load.

D. Hatch Material: Aluminum sheet.

1. Thickness: Manufacturer's standard thickness for hatch size indicated.
2. Finish: Two-coat fluoropolymer.
3. Color: As selected by Architect from manufacturer's full range.

E. Construction:

1. Insulation: Cellulosic-fiber board.

a. R-Value: 12.0 according to ASTM C 1363.

2. Nailer: Factory-installed wood nailer continuous around hatch perimeter.
3. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
4. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
5. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
6. Fabricate curbs to minimum height of 12 inches above roofing surface unless otherwise indicated.
7. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate curb with perimeter curb height that is constant. Equip hatch with water diverter or cricket on side that obstructs water flow.

F. Hardware: Spring operators, hold-open arm, galvanized-steel spring latch with turn handles, galvanized-steel butt- or pintle-type hinge system, and padlock hasps inside and outside.

G. Safety Railing System: Roof-hatch manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.

1. Height: 42 inches above finished roof deck.
2. Posts and Rails: Galvanized-steel pipe, 1-1/4 inches in diameter or galvanized-steel tube, 1-5/8 inches in diameter.
3. Flat Bar: Galvanized steel, 2 inches high by 3/8 inch thick.
4. Maximum Opening Size: System constructed to prevent passage of a sphere 21 inches in diameter.
5. Chain Passway Barrier: Galvanized proof coil chain with quick link on fixed end.
6. Self-Latching Gate: Fabricated of same materials and rail spacing as safety railing system. Provide manufacturer's standard hinges and self-latching mechanism.
7. Post and Rail Tops and Ends: Weather resistant, closed or plugged with prefabricated end fittings.
8. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members.
9. Fabricate joints exposed to weather to be watertight.
10. Fasteners: Manufacturer's standard, finished to match railing system.
11. Finish: Manufacturer's standard.

a. Color: As selected by Architect from manufacturer's full range.

H. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder.

1. Operation: Post locks in place on full extension; release mechanism returns post to closed position.
2. Height: 42 inches above finished roof deck.
3. Material: Steel tube.
4. Post: 1-5/8-inch- diameter pipe.
5. Finish: Manufacturer's standard baked enamel or powder coat.

a. Color: As selected by Architect from manufacturer's full range.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Polyisocyanurate Board Insulation: ASTM C 1289, thickness and thermal resistivity as indicated.

C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, and complying with AWPA C2; not less than 1-1/2 inches thick.

D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

E. Underlayment:
1. Polyethylene Sheet: 6-mil-thick polyethylene sheet complying with ASTM D 4397.
2. Slip Sheet: Building paper, 3 lb/100 sq. ft. minimum, rosin sized.
3. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
4. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
5. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
6. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

F. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.

G. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.

H. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

I. Asphalt Roofing Cement: ASTM D 4586/D 4586M, asbestos free, of consistency required for application.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

C. Verify dimensions of roof openings for roof accessories.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions.

1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

C. Roof Curb Installation: Install each roof curb so top surface is level.

D. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.

E. Roof-Hatch Installation:

1. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
2. Attach safety railing system to roof-hatch curb.
3. Attach ladder-assist post according to manufacturer's written instructions.

F. Preformed Flashing-Sleeve and Flashing Pipe Portal Installation: Secure flashing sleeve to roof membrane according to flashing-sleeve manufacturer's written instructions; flash sleeve flange to surrounding roof membrane according to roof membrane manufacturer's instructions.

G. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.

B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting."

C. Clean exposed surfaces according to manufacturer's written instructions.

D. Clean off excess sealants.

E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

SECTION 078443 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated constructions.
2. Joints in smoke barriers.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers and for wall identification.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:

a. Joint firestopping systems shall bear classification marking of a qualified testing agency.

1) UL in its "Fire Resistance Directory."
2) Intertek Group in its "Directory of Listed Building Products."

2.2 JOINT FIRESTOPPING SYSTEMS

A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. 3M Fire Protection Products.
   b. NUCO Inc.
   c. Tremco, Inc.

2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.

C. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. 3M Fire Protection Products.
   b. NUCO Inc.
   c. Tremco, Inc.

2. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.

D. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

E. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

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

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:

1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.

3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

C. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:

1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.

B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.

C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.

B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

END OF SECTION 078443

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Immersible joint sealants.
5. Mildew-resistant joint sealants.
6. Polysulfide joint sealants.
7. Butyl joint sealants.
8. Latex joint sealants.

B. Related Requirements:
1. Section 079219 "Acoustical Joint Sealants" for sealing joints in sound-rated construction.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.

C. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:

1. Joint-sealant location and designation.
2. Manufacturer and product name.
3. Type of substrate material.
4. Proposed test.
5. Number of samples required.

D. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

E. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

F. Field-Adhesion-Test Reports: For each sealant application tested.

G. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with stone or masonry substrates.
4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.

7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: Match Architect's samples or as selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. GE Construction Sealants; Momentive Performance Materials Inc.
b. Sika Corporation; Joint Sealants.

B. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Dow Corning Corporation.
b. GE Construction Sealants; Momentive Performance Materials Inc.
c. Pecora Corporation.

C. Silicone, S, NS, 50, T, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Dow Corning Corporation.
    b. Soudal USA.

2.3 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. May National Associates, Inc.; a subsidiary of Sika Corporation.
    b. Pecora Corporation.
    c. Tremco Incorporated.

C. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Dow Corning Corporation.
    b. GE Construction Sealants; Momentive Performance Materials Inc.
    c. Tremco Incorporated.

2.4 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. BASF Corporation; Construction Systems.
    b. Sherwin-Williams Company (The).
    c. Sika Corporation; Joint Sealants.
    d. Tremco Incorporated.

B. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Sika Corporation; Joint Sealants.

C. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. BASF Corporation; Construction Systems.
    b. Pecora Corporation.
    c. Sherwin-Williams Company (The).

D. Urethane, M, NS, 50, T, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 50, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Tremco Incorporated.

E. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 50, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. LymTal International Inc.

2.5 IMMERSIBLE JOINT SEALANTS

A. Immersible Joint Sealants. Suitable for immersion in liquids; ASTM C 1247, Class 1; tested in deionized water unless otherwise indicated

B. Urethane, Immersible, S, NS, 100/50, NT, I: Immersible, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses NT, and I.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Tremco Incorporated.

C. Urethane, Immersible, S, NS, 50, T, NT, I: Immersible, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Uses T, NT, and I.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Tremco Incorporated.

D. Urethane, Immersible, S, P, 50, T, NT, I: Immersible, single-component, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 50, Uses T, NT, and I.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Tremco Incorporated.

2.6 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Dow Corning Corporation.
b. GE Construction Sealants; Momentive Performance Materials Inc.
c. Tremco Incorporated.

2.7 POLYSULFIDE JOINT SEALANTS

A. Polysulfide, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, polysulfide joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. W. R. Meadows, Inc.

B. Polysulfide, M, NS, 25, T, NT: Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, polysulfide joint sealant; ASTM C 920, Type M, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. W. R. Meadows, Inc.

C. Polysulfide, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, polysulfide joint sealant; ASTM C 920, Type M, Grade P, Class 25, Uses T and NT.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. W. R. Meadows, Inc.

2.8 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Bostik, Inc.
   b. Pecora Corporation.

2.9 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. BASF Corporation; Construction Systems.
   b. Sherwin-Williams Company (The).
   c. Tremco Incorporated.

2.10 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Alcot Plastics Ltd.
   b. BASF Corporation; Construction Systems.
   c. Construction Foam Products; a division of Nomaco, Inc.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type O (open-cell material) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.11 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.

c. Unglazed surfaces of ceramic tile.
d. Exterior insulation and finish systems.
e. Stone.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

a. Metal.
b. Glass.
c. Porcelain enamel.
d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form

smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
4. Provide flush joint profile at locations indicated on Drawings according to Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
    a. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

    a. Whether sealants filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:

   a. Control and expansion joints in brick pavers.
   b. Isolation and contraction joints in cast-in-place concrete slabs.
   c. Joints between plant-precast architectural concrete paving units.
   d. Joints in stone paving units, including steps.
   e. Tile control and expansion joints.
   f. Joints between different materials listed above.
   g. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, M, P, 50, T, NT.
3. Joint-Sealant Color: Match Architect's sample.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

   a. Construction joints in cast-in-place concrete.
   b. Joints between plant-precast architectural concrete units.
   c. Control and expansion joints in unit masonry.
   d. Joints in dimension stone cladding.
   e. Joints in exterior insulation and finish systems.
   f. Joints between metal panels.
   g. Joints between different materials listed above.
   h. Perimeter joints between materials listed above and frames of doors windows and louvers.
   i. Control and expansion joints in ceilings and other overhead surfaces.
   j. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
3. Joint-Sealant Color: Match Architect's sample.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation joints in cast-in-place concrete slabs.
b. Control and expansion joints in stone flooring.
c. Control and expansion joints in brick flooring.
d. Control and expansion joints in tile flooring.
e. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, P, 25, T, NT.
3. Joint-Sealant Color: Match Architect's sample.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Control and expansion joints on exposed interior surfaces of exterior walls.
b. Tile control and expansion joints.
c. Vertical joints on exposed surfaces of unit masonry concrete walls and partitions.
d. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:

a. Control joints on exposed interior surfaces of exterior walls.
b. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints where indicated.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

G. Joint-Sealant Application: Concealed mastics.

1. Joint Locations:

a. Aluminum thresholds.
b. Sill plates.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Butyl-rubber based.

3. Joint-Sealant Color: Match Architect's sample.

END OF SECTION 079200

SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes acoustical joint sealants.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for elastomeric, latex, and butyl-rubber-based joint sealants for nonacoustical applications.

1.3 ACTION SUBMITTALS

A. Product Data: For each acoustical joint sealant.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of acoustical joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Acoustical-Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each kind of acoustical joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.

B. Sample Warranties: For special warranties.

1.5 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.

2.2 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C 834.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Franklin International.
b. Tremco Incorporated.
c. United States Gypsum Company.

2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nonsag, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber acoustical sealant.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Pecora Corporation.
b. Serious Energy Inc.

2.3 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079219

SECTION 079513.13 - INTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes interior expansion joint cover assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.

B. Shop Drawings: For each expansion joint cover assembly.

1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

C. Samples: For each expansion joint cover assembly and for each color and texture specified, full width by 6 inches long in size.

D. Samples for Initial Selection: For each type of exposed finish.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric-seal material.

E. Samples for Verification: For each type of expansion joint cover assembly, full width by 6 inches long in size.

F. Expansion Joint Cover Assembly Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion joint cover assembly.
2. Expansion joint cover assembly location cross-referenced to Drawings.
3. Nominal, minimum, and maximum joint width.
4. Movement direction.
5. Materials, colors, and finishes.
6. Product options.
7. Fire-resistance ratings.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockup of typical expansion joint cover assembly as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Furnish units in longest practicable lengths to minimize field splicing.

B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Expansion joint cover assemblies shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Fire-Resistance Ratings: Provide expansion joint cover assemblies with fire barriers identical to those of systems tested for fire resistance according to UL 2079 or ASTM E 1966 by a qualified testing agency.

1. Hose Stream Test: Wall-to-wall and wall-to-ceiling assemblies shall be subjected to hose stream testing.

C. Expansion Joint Design Criteria:

1. Type of Movement: Thermal.

a. Nominal Joint Width: As indicated on Drawings.
b. Minimum Joint Width: As indicated on Drawings.
c. Maximum Joint Width: As indicated on Drawings.

2. Type of Movement: Seismic.

a. Joint Movement: As indicated on Drawings.

2.3 FLOOR EXPANSION JOINT COVERS

A. Metal-Plate Floor Joint Cover: Metal cover plate fixed on one side of joint gap and free to slide on other.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Balco, Inc.

2. Application: Floor to wall.
3. Installation: Surface mounted.
4. Load Capacity:

a. Uniform Load: 50 lb/sq. ft..
b. Concentrated Load: 300 lb.
c. Maximum Deflection: 0.0625 inch.

5. Fire-Resistance Rating: Not less than that indicated on Drawings.
6. Cover-Plate Design: Plain.
7. Exposed Metal:

a. Aluminum: Clear anodic, Class I.

b. Stainless steel: No. 4.

B. Glide-Plate Floor Joint Cover: Assembly consisting of center plate that slides in and out of slots in metal frames fixed to sides of joint gap.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Balco, Inc; or a comparable product by one of the following:

a. Architectural Art Manufacturing Inc.; a division of Pittcon Architectural Metals, LLC.
b. BASF Corp. - Watson Bowman Acme Corp.
c. InPro Corporation (IPC).

2. Application: Floor to floor.
3. Installation: Recessed.
4. Load Capacity:

a. Uniform Load: 50 lb/sq. ft..
b. Concentrated Load: 300 lb.
c. Maximum Deflection: 0.0625 inch.

5. Fire-Resistance Rating: Not less than that of adjacent construction.
6. Exposed Metal:

a. Aluminum: Match Architects Sample.

b. Stainless steel: Match Architects Sample.

2.4 WALL EXPANSION JOINT COVERS

A. Metal-Plate Wall Joint Cover: Metal cover plate fixed on one side of joint gap and free to slide on other.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Balco, Inc. or comparable product by one of the following:

   a. Architectural Art Manufacturing Inc.; a division of Pittcon Architectural Metals, LLC.
   b. BASF Corp. - Watson Bowman Acme Corp.

2. Application: Wall to wall .
3. Fire-Resistance Rating: Not less than that of adjacent construction.
4. Exposed Metal:

   a. Aluminum: Match Architects Sample.

   b. Stainless steel: Match Architects Sample.

2.5 MATERIALS

A. Aluminum: ASTM B 221, Alloy 6063-T5 for extrusions; ASTM B 209, Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304 for plates, sheet, and strips.

C. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.

D. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to comply with performance criteria for required fire-resistance rating.

E. Moisture Barrier: Manufacturer's standard, flexible elastomeric material.

F. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 ALUMINUM FINISHES

A. Mill finish.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

C. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

2.7 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
3. Directional Satin Finish: No. 4.

2.8 ACCESSORIES

A. Moisture Barriers: Manufacturer's standard continuous, waterproof membrane within joint and attached to substrate on sides of joint.

1. Provide where indicated on Drawings.

B. Manufacturer's stainless-steel attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.

B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.

1. Repair or grout block out as required for continuous frame support using nonmetallic, shrinkage-resistant grout.
2. Install frames in continuous contact with adjacent surfaces.

    a. Shimming is not permitted.

3. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
4. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
5. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.

C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.
2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.

E. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.

F. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

G. Moisture Barrier Drainage: If indicated, provide drainage fittings and connect to drains.

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion joint cover assemblies. Reinstall cover plates or seals prior to Substantial Completion.

END OF SECTION 079513.13

SECTION 079513.16 - EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes exterior building expansion joint cover assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.

B. Shop Drawings: For each expansion joint cover assembly.

1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

C. Samples: For each exposed expansion joint cover assembly and for each color and texture specified, full width by 6 inches long in size.

D. Samples for Initial Selection: For each type of exposed finish.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.

E. Samples for Verification: For each type of expansion joint cover assembly, full width by 6 inches long in size.

F. Expansion Joint Cover Assembly Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion joint cover assembly.
2. Expansion joint cover assembly location cross-referenced to Drawings.
3. Nominal, minimum, and maximum joint width.
4. Movement direction.
5. Materials, colors, and finishes.
6. Product options.
7. Fire-resistance ratings.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for tests performed by a qualified testing agency.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockup of typical expansion joint cover assembly as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Furnish units in longest practicable lengths to minimize field splicing.

B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Provide expansion joint cover assemblies with fire barriers identical to those of systems tested for fire resistance according to UL 2079 or ASTM E 1966 by a qualified testing agency.

1. Hose Stream Test: Wall-to-wall and wall-to-soffit assemblies shall be subjected to hose stream testing.

B. Expansion Joint Design Criteria <**Insert drawing designation**>:

1. Type of Movement: Thermal.

a. Nominal Joint Width: As indicated on Drawings.
b. Minimum Joint Width: As indicated on Drawings.
c. Maximum Joint Width: As indicated on Drawings.

2.3 EXTERIOR EXPANSION JOINT COVERS

A. Exterior Metal-Plate Joint Cover: Assembly consisting of sliding metal cover plate in continuous contact with gaskets mounted on metal frames fixed to sides of joint gap.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Balco, Inc; or a comparable product by one of the following:

    a. Architectural Art Manufacturing Inc.; a division of Pittcon Architectural Metals, LLC.
    b. BASF Corp. - Watson Bowman Acme Corp.
    c. Construction Specialties, Inc.

2. Application: Wall to wall, Wall to soffit, and Soffit to soffit.
3. Installation: Surface mounted.
4. Fire-Resistance Rating: Not less than that of adjacent construction.
5. Exposed Metal:

    a. Aluminum: Color anodic, Class I.

        1) Color: Match Architect's sample.

B. Exterior Elastomeric-Seal Joint Cover: Assembly consisting of elastomeric seal anchored to surface-mounted frames fixed to sides of joint gap.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Balco, Inc; or a comparable product by one of the following:

    a. Architectural Art Manufacturing Inc.; a division of Pittcon Architectural Metals, LLC.
    b. BASF Corp. - Watson Bowman Acme Corp.
    c. Construction Specialties, Inc.

2. Application: Wall to wall, Wall to soffit, and Soffit to soffit.
3. Installation: Recessed.
4. Fire-Resistance Rating: Not less than that of adjacent construction.
5. Exposed Metal:

    a. Aluminum: Color anodic, Class I.

        1) Color: Match Architect's sample.

6. Seal: Preformed elastomeric membrane or extrusion.

    a. Color: As selected by Architect from manufacturer's full range.

2.4 MATERIALS

A. Aluminum: ASTM B 221, Alloy 6063-T5 for extrusions; ASTM B 209, Alloy 6061-T6 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.

C. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to comply with performance criteria for required fire-resistance rating.

D. Moisture Barrier: Manufacturer's standard, flexible elastomeric material.

2.5 ALUMINUM FINISHES

A. Mill finish.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

C. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

2.6 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
3. Directional Satin Finish: No. 4.

C. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

2.7 ACCESSORIES

A. Moisture Barriers: Manufacturer's standard continuous, waterproof membrane within joint and attached to substrate on sides of joint.

1. Provide where indicated on Drawings.

B. Manufacturer's stainless-steel attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.

B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.

1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
4. Install frames in continuous contact with adjacent surfaces.

    a. Shimming is not permitted.

5. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.

C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.

1. Provide in continuous lengths for straight sections.
2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.

E. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.

F. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

G. Moisture Barrier Drainage: If indicated, provide drainage fitting and connect to drains.

3.4 CONNECTIONS

A. Transition to Roof Expansion Joint Covers: Coordinate installation of exterior wall and soffit expansion joint covers with roof expansion joint covers specified in Section 077129 "Manufactured Roof Expansion Joints." Install factory-fabricated units at transition between exterior walls and soffits and roof expansion joint cover assemblies.

3.5 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections.

END OF SECTION 079513.16