100% PROJECT MANUAL

COMMERCE 2.0 MGD GROVE CREEK WPCP

COMMERCE, GEORGIA

for

CITY OF COMMERCE

BID DOCUMENTS

March 2025

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GMC PROJECT NUMBER: CATL230033

STATE OF GEORGIA
GOODWYN MILLS CAWOOD, LLC
No.PEF007898
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CERTIFICATE OF AUTHORIZATION

GEORGIA
REGISTERED
No. PE051452
PROFESSIONAL
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03.19.2025
ENGINEER
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COMMERCE 2.0 MGD GROVE CREEK
WATER POLLUTION CONTROL PLANT

FOR

CITY OF COMMERCE

COMMERCE, GEORGIA

GMC PROJECT NO. CATL230033

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SECTION 07 21 00 - 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. Batt insulation.
2. Rigid foam board cavity wall insulation.

B. Related Sections include the following:

1. Division 5 Section - Cold-Formed Metal Framing.
2. Division 9 Section - Gypsum Board Assemblies.
3. Division 23 Section - HVAC Insulation.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of insulation required, including installation instructions. Include data substantiating that the materials comply with specified requirements.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for insulation products.

C. Research/Evaluation Reports: For foam-plastic insulation complying with requirements of the International Building Code.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source and from a single manufacturer.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by 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 insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 BATT INSULATION

A. Acceptable Manufacturers; subject to compliance with specified requirements:

1. CertainTeed Corporation.
2. Guardian Fiberglass Inc.
3. Johns Manville Corporation/Building Insulation Division.
4. Knauf Insulation.
5. Owens-Corning Fiberglas Corporation.

B. Type: Unfaced, fiberglass blanket insulation meeting ASTM C665, Type I.

1. Surface Burning Characteristics: Meeting Class A flame spread and smoke developed indexes specified when tested according to ASTM E84.

   a. Flame Spread Index: Not more than 25.
   b. Smoke Developed Index: Not more than 50.

2. Combustibility: Noncombustible when tested per ASTM E136.
3. Thermal Resistance and Thickness:

   a. Walls: R-13 (13 deg F × h × sq. ft./Btu at 75 deg F) thermal resistance, 3-1/2-inch thickness; unless otherwise indicated.
   b. Soffits: R-19 (19 deg F × h × sq. ft./Btu at 75 deg F) thermal resistance, 6-1/2-inch thickness; unless otherwise indicated.

4. Size: Manufacturer's standard width equal to spacing of framing members.

2.2 RIGID FOAM BOARD CAVITY WALL INSULATION

A. Acceptable Products; subject to compliance with specified requirements:

1. Diversifoam Products; CertiFoam 25 SE.

2. Dow Chemical Company, Styrofoam Scoreboard or Square Edge.
3. Owens-Corning, Foamular 250.
4. Kingspan Insulation, LLC; GreenGuard Type IV XPS Insulation Board.

B. Type: Extruded, closed cell polystyrene boards meeting ASTM C578, Type IV.

1. Compressive strength: 25 psi minimum, tested in accord with ASTM D1621.
2. Density: 1.6 pcf, minimum, tested in accord with ASTM C303.
3. Thermal Resistance: R-5.0 per inch (5.0 deg F x h x sq. ft./Btu at 75 deg F) when tested in accord with ASTM C518.
4. Surface Burning Characteristics: Meeting flame spread and smoke developed index specified when tested in accord with ASTM E84.

    a. Flame Spread Index: Not more than 25.
    b. Smoke Developed Index: Not more than 200.

5. Thickness: As indicated on Drawings.
6. Sizes: Manufacturer's standard.
7. Edges: Square.

2.3 AUXILIARY MATERIALS

A. Fasteners and Supports: Type as recommended by insulation manufacturer for installation conditions encountered.

B. Adhesive for Bonding Foam Board Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates. Adhesives used with plastic foam insulation for installation in masonry cavity wall construction shall be type compatible with specified fluid-applied air barrier membrane.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.

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

3.2 PREPARATION

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

B. Cut and fit insulation to maintain thermal integrity over areas indicated to be insulated.

3.3 GENERAL INSTALLATION REQUIREMENTS:

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

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

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.4 BATT INSULATION INSTALLATION:

A. Install specified batt insulation to exterior framed walls and other areas as indicated, with vapor barrier facing to building interior.

1. Install batt insulation in uninterrupted continuous full height lengths.
2. Friction fit batt insulation snug and tight between framing members.
3. Install batt insulation with butted end joints as required and taped using specified foil-faced tape.
4. Seal tears and holes in vapor barrier facing with foil-faced tape.

B. Insulate small areas between closely spaced framing members. Cut and fit insulation around pipes, conduits and other obstruction.

C. Where pipes or conduit are located in stud spaces, place insulation between exterior wall and pipe, compressing insulation where necessary.

D. Do not install insulation compressed in excess of 10-percent.

E. Provide supplemental support using wire ties fastened 24-inches on center, maximum to prevent sagging of insulation.

3.5 RIGID FOAM BOARD CAVITY WALL INSULATION INSTALLATION:

A. Install rigid foam insulation to sheathed metal framed wall construction erected to support masonry veneer only after Architect has inspected and approved application of fluid-applied air barrier membrane to substrates.

B. Install insulation in cavity air space over sheathing sealed with air barrier membrane of metal framed wall construction. Coordinate installation with attachment of anchors and ties.

C. Secure insulation to air barrier sealed gypsum sheathing attached to metal framed back-up wall construction using compatible adhesive as recommended by manufacturer.

1. Place small dabs of adhesive, spaced approximately 12-inches on center in each direction, horizontal and vertical, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose.
2. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions.
3. Press units firmly against supporting substrates indicated.
4. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and air barrier membrane applied over gypsum sheathing.

3.6 PROTECTION:

A. Protect installed insulation material from damage due to harmful weather exposures, physical abuse, and other causes.

B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Remove and dispose of excess materials, litter and debris; leaving work areas in a clean condition.

END OF SECTION 07 21 00

SECTION 07 41 13 - STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Standing-seam metal roof panels.

B. Related Sections:

1. Section 07 42 93 - Soffit Panels for metal panels used in horizontal soffit applications.
2. Section 07 92 00 – Joint Sealants

1.2 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 panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim, and anchorage systems.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

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

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.4 CLOSEOUT SUBMITTALS

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

1.5 QUALITY ASSURANCE

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

1.6 DELIVERY, STORAGE, AND HANDLING

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

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

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

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

1.7 FIELD CONDITIONS

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

1.8 COORDINATION

A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

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

1.9 WARRANTY

A. Roofing Panel Warranty: Furnish the roofing system manufacturer’s written warranty, covering failure of the metal roof system within the warranty period.

1. Warranty Periods (from date of Substantial Completion)

a. Weather-tightness: 20 years
b. Finishes: 10 years
c. Materials and Workmanship: 3 years

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers Vertical Rib, Machine-Seamed Joint, Standing Seam Metal Roof Panels; Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports

using concealed clips located under one side of panels and engaging opposite edge of adjacent panels, and mechanically seaming panels together. Roofing panels, closures, and all exposed trim, gutters, downspouts, and similar items shall be factory prefinished.

1. AEP Span.
2. American Buildings Company.
3. Architectural Building Components.
4. Architectural Roofing and Siding, Inc.
5. ATAS International, Inc.
6. Butler Manufacturing Co.
7. CENTRIA Architectural Systems.
8. Copper Sales Inc.
9. Fabral, Inc.
10. McElroy Metal, Inc.
11. Merchant & Evans, Inc.
12. Metal Fab Manufacturing, LLC.
13. Metal Sales Manufacturing Corporation.
14. Steelox Systems Inc.

2.2 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide certified test results by a recognized testing laboratory or agency in accordance with specified test methods for each system.

B. Air Infiltration: Provide roof panel system with no air leakage when tested in accordance with ASTM E 283 at pressure differentials up to 1.57 psf.

C. Water Penetration: Provide panel systems with no water penetration as defined in the test method, when tested in accordance with ASTM E 331 at an inward static air pressure differential of not less than 6.24 psf and not more than 12.0 psf.

2.3 MATERIALS

A. Prefinished Panels and Trim: Fabricate of minimum 24-gage metal, with minimum 50,000 p.s.i. yield, with prefinished roofing panels and closures, and 3-coat full strength (70-percent) Kynar 500 resin (20-year) finish for all roofing panels, exposed trim, gutters, downspouts, and similar items; Provide 2-coat finish on underside of panels where exposed to view in the finished work. Provide one of the following base metals:

1. ASTM A 792 aluminum-zinc allow coated steel sheet (“Galvalume”), or
2. ASTM A 653, G-90 (galvanized) zinc-coated steel sheet.
3. Panels shall be formed full length, without laps in a given run.
4. Where indicated with standing seams, all roof panels shall be formed with a 2-inch high vertical seam and finished width of 16 inches, with two intermediate stiffening ribs. All roof panels shall be roll formed in a single length from panel-break to plane-break.

B. Vertical Seams: Fabricate panel vertical seams of the same material, finish and length as the panels. Vertical seams shall contain factory applied sealant and shall be designed so that neither the paint finish nor metal are damaged by the required machine seaming.

C. Clips: Clips shall be 300-series SS (ASTM A-167) which shall provide for unlimited, unimpeded panel movement.

D. Ridge Caps, Flashing and Trim: All flashings and cover over all curbs, roof penetrations, etc., shall be of the same material, gauge and finish as the panels with which they are used, unless heavier gauge is required by project conditions.

E. Fasteners: All fasteners in the plane of the roof deck shall be covered. No exposed fasteners which would penetrate the panels, flashings, etc., will be permitted. Penetrating type fasteners will be allowed only in the vertical plane (i.e. fastening of ridge caps, hip covers, etc., and then only if neoprene washers are used externally). Materials used in all fasteners shall be non-magnetic stainless steel. All exposed fasteners shall match adjacent material, finish and/or color. Length and diameter of screws shall be sufficient to meet design criteria.

F. Closures: Precut closures from gray cross-linked closed-cell polyethylene composition foam to the exact profile of the members with which they are to function.

G. Sealants: Non-skinning, non-hardening, non-oxidizing butyl sealant, designed for metal-to-metal concealed joints. Field applied adhesive tape sealants shall be extruded polymeric butyl tape, non-skinning. Use no exposed sealants.

H. Bituminous Coating: Cold-Applied asphalt mastic, SSPC-12, compounded for 15-mil dry film thickness per coat, and approved for the intended use by both the mastic and roofing manufacturers.

2.4 METAL FINISHES

A. General: Apply coatings either before or after forming and fabricating panels, as required by coating process and as required for maximum coating performance capability. Protect coating either by application of strippable film or by packing plastic film or other suitable material between panels in a manner to properly protect the finish. Furnish air drying spray finish in matching color for touch up, in the event touch-up is allowed by the Engineer; However, it is probable that the Engineer will require replacement of any materials which exhibit any damage to finishes.

B. Roof Panels, Closures, Exposed Trim, Gutters, Downspouts, and Similar Items - Fluoropolymer Coating: Manufacturer's standard "Premium 70" three-coat (i.e.: primer, color coat and clear top coat), thermo-cured, full-strength 70 percent resin "Kynar 500" coating and 30 percent reflective gloss when tested in accordance with ASTM D 523; Provide 2-coat finish on underside of panels where exposed to view in the finished work.

1. Durability: Provide coating that has been field tested under normal range of weathering conditions for minimum of 20 years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of No. 8 in accordance with ASTM D 659; and without fading in excess of 5 NBS units; and as otherwise indicated.
2. Colors: As selected by Engineer after Bid Date, from manufacturer's "standard" non-metallic colors; Minimum 15 colors to select from.

2.5 PANEL FABRICATION

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

B. Apply bituminous coating or other permanent separation materials on concealed panel surfaces where panels would otherwise be in direct contact with substrate materials that are non-compatible or could result in corrosion or deterioration of either material or finishes.

C. Fabricate panel joints with captive gaskets or separator strips, which provide a tight seal and prevent metal to metal contact in a manner that will minimize noise from movements within panel system.

D. Roll Forming: Field forming of panels is not acceptable.

PART 3 - EXECUTION

3.1 GENERAL

A. Installer shall examine all substrates and verify that they are acceptable, which will be acknowledged and accepted by his beginning work. Installer shall verify that all penetrations, expansion joints, blocking, etc., are securely anchored into place, and that substrate is clean and free of all debris or other substance detrimental to the roofing work.

1. Notify the Contractor in writing of conditions requiring corrections, for proper completion of the Work. Do not proceed until unsatisfactory conditions have been satisfactorily completed.

B. The use of square head nails, staples, and pneumatic or electric nail guns are strictly prohibited.

3.2 PANEL SUPPORTS AND ANCHORAGE

A. When installed by the roofing contractor, all girts, purlin, and other secondary structural panel support members and anchorage (if any) shall be installed in accordance with AISC Manual of Steel Construction "Code of Standard Practice." When installed by others, compliance shall be field verified prior to proceeding with installation.

3.3 PANEL INSTALLATION

A. General: Comply with manufacturer's written instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the work securely in place, with provisions for thermal and structural movement and insulation system.

1. Field cutting of exterior panels by torch is not permitted.

2. Install panels with concealed fasteners.
3. Install insulation support system, insulation, thermal spacer blocks, and other internal components as the work progresses.
4. Use only non-magnetic stainless steel roofing nails and fasteners.

B. Accessories: Install components required for a complete roof panel system, including in part, trim, copings, fascias, stops, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items.

1. Provide and install counterflashing to match roofing over flashing at vent stacks, flues, curbs, and other penetrations, except those indicated to be field painted.

C. Joint Seals: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of panel systems and accessories. Provide types of gaskets, sealants, and fillers indicated or, if not otherwise indicated, types recommended by panel manufacturer.

1. Flash and seal roof panels at eave and rake with rubber, neoprene, or other closures to exclude weather.
2. Counter-flash over otherwise exposed flashings with metal and finish to match adjacent roof metal.
3. Refer to other sections of these specifications for product and installation requirements applicable to indicated joint sealers.

D. Joint Sealers: Refer to other sections of these specifications for post installation requirements on joint sealers; not work of this section.

E. Lap Seams: Provide sealant tape at lapped joints of ribbed or fluted roof sheets and between roof sheets and protruding equipment, vents, and accessories.

F. Standing Seam Roof Panel Systems: Fasten roof panels to supports with concealed clip in accordance with the manufacturer's current written instructions and recommendations, and as required to meet site wind load conditions.

1. Install clips at each support with self-drilling/self-tapping fasteners.
2. At end laps of panels, install tape caulk between panels.
3. Install factory-caulked cleats at standing-seam joints.
4. Seaming: Complete seaming of panel joints by operation of portable power-driven equipment of type recommended by panel manufacturer to provide a weather-tight joint.

G. Apply a continuous ribbon of sealant tape to clean, dry surface of the weather side of fastenings on end laps, and on side laps of corrugated nesting type, ribbed, or fluted panels and elsewhere as needed to make roof sheets weatherproof to driving rains.

H. Installation Tolerances: Shim and align panel units within installed tolerance of 1/4-inch in 20' 0" on level/plumb/slope and location/line as indicated, and within 1/8 inch offset of adjoining faces and of alignment of matching profiles.

I. Roofer shall install curbs supplied by other trades for roof mounted equipment and other items, and cover with metal to match roofing.

3.4 CLEANING AND PROTECTION

A. Damaged Units: Replace panels and other components of the work that have been damaged or have deteriorated beyond successful repair by means of finish touch up or similar minor repair procedures, as determined solely by the Engineer.

B. Cleaning: Remove temporary protective coverings and strippable films (if any) as soon as each panel is installed. Upon completion of panel installation, clean finished surfaces as recommended by panel manufacturer, and maintain in a clean condition during construction.

END OF SECTION 07 41 13

SECTION 07 42 93 - SOFFIT PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Metal soffit panels.

B. Related Sections:

1. Section 07 41 13 - Standing-Seam Metal Roof Panels

1.2 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 panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

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

1. 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 Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

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

C. Sample Warranties: For special warranties.

1.4 CLOSEOUT SUBMITTALS

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

1.5 QUALITY ASSURANCE

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

B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

C. 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 roof eave, including fascia, and soffit as shown on Drawings; approximately four panels wide by full eave width, including attachments and accessories.
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.

1.6 DELIVERY, STORAGE, AND HANDLING

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

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

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

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

E. Copper Panels: Wear gloves when handling to prevent fingerprints and soiling of surface.

1.7 FIELD CONDITIONS

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

1.8 COORDINATION

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

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show 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: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

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:

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

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.

2.2 METAL SOFFIT PANELS

A. General: Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation. Aluminum soffit complying with AAMA 1402, fabricated from aluminum sheet in alloy recommended in writing by soffit / fascia / siding system manufacturer, and as follows:

1. Pattern: 12-inch (305 mm) exposure in double 6-inch (152 mm) style.
2. Ventilation: None.
3. Thickness: 0.024 inch (0.6 mm), minimum.
4. Finish: Manufacturer's standard primer and baked on acrylic topcoat; Two colors may be selected.
5. Provide manufacturer's standard metal channel supports, trim, and accessories, complete, with hold-down clips at 24-inches o.c. maximum, and as otherwise required to prevent wind blow-out of soffit material.

2.3 MISCELLANEOUS MATERIALS

A. Soffit / Fascia Trim and Accessories: Provide starter strips, edge trim, window head flashing, corner cap, hold-down clips, and other items as recommended by manufacturer for building configuration; match type of siding.

B. Decorative Accessories: Provide the following types of decorative accessories, as indicated:

1. Corner trim.
2. Door and window casings (if any indicated).
3. Fascia.
4. Moldings and trim.

C. Fasteners: Noncorrosive aluminum siding nails, in sufficient length to penetrate a minimum of 1 inch (25 mm) into substrate. Provide prefinished fasteners in color to match soffit, fascia and siding finishes where face nailing is unavoidable.

2.4 FABRICATION

A. General: Fabricate and finish metal 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. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same

profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Fabricate metal 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.

E. 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 nonexpansion, 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 soffit panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Where manufacturer’s standard products are indicated, provide soffit / fascia system and accessories complying with the following requirements:

1. Provide Architect’s selections from manufacturer’s full range of colors and textures for soffit, fascia and any siding and accessories, of type indicated. Accessories may be required to match soffits or to be of a different color or texture to match metal roofing or as otherwise selected by Architect.
2. Fascia, Soffit, Trim and Related Work: Two colors may be required, unless specifically indicated otherwise.
3. Finishes: As selected by Architect from manufacturer’s standard non-metallic finishes, and otherwise as indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for substrates, flashings, vapor/moisture barrier completion, water-tightness, installation tolerances, completed painting of framing and decking above any perforated soffits, and other conditions affecting performance of soffit / fascia / siding systems and accessories.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

3.3 INSTALLATION

A. General: Comply with soffit / fascia / siding system manufacturer's current written installation instructions applicable to products and applications indicated, unless more stringent requirements apply. Center nails in elongated nailing slots without binding soffits, trim and siding to allow for thermal movement. Overlap joints to shed water away from direction of prevailing wind.

B. Install aluminum fascia, soffit, and accessories according to AAMA 1402.

C. Where any perforations in soffit material allow viewing through perforations, install with that side of perforations toward building wall.

D. Isolate dissimilar metals by separating from soffit, fascia and aluminum siding with rubber gaskets, elastomeric sealant, or rubber washers where fasteners penetrate soffits, fascia and siding. Dissimilar metals behind soffit and fascia systems may be isolated by covering with polyethylene film, except where use of plastic film would restrict air flow of any ventilated soffit systems.

3.4 ADJUSTING AND CLEANING

A. Remove and replace damaged, improperly installed, or otherwise defective soffit / fascia / siding materials with new materials complying with specified requirements.

B. Clean finished surfaces according to soffit / fascia / siding manufacturer's current written instructions and maintain in a clean condition during construction.

END OF SECTION 07 42 93

SECTION 07 54 23 - THERMOPLASTIC-POLYOLEFIN (TPO) ROOFING

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. Adhered thermoplastic polyolefin (TPO) roofing system.
2. Substrate board.
3. Vapor retarder.
4. Roof insulation.
5. Cover board.
6. Walkways.

B. Related Requirements:

1. Section 06 10 53 - Miscellaneous Rough Carpentry for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
2. Section 07 62 00 - Sheet Metal Flashing and Trim for metal roof flashings and counterflashings.
3. Section 07 92 00 - Joint Sealants for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to Work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Engineer, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier 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.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.
2. Base flashings and membrane termination details.
3. Flashing details at penetrations.
4. Tapered insulation layout, thickness, and slopes.
5. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
7. Tie-in with adjoining air barrier.

C. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and testing agency.

B. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

a. Submit evidence of compliance with performance requirements.

2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

C. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

D. Evaluation Reports: For components of roofing system, from ICC-ES.

E. Field Test Reports:

1. Concrete internal relative humidity test reports.
2. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

F. Field quality-control reports.

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

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

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

D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, substrate board**,** and other components of roofing system.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing system and flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.

1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): 48 lbf/sq. ft.
2. Zone 2 (Roof Area Perimeter): 57 lbf/sq. ft.
3. Zone 3 (Roof Area Corners): 57 lbf/sq. ft.

a. Location: 3 feet in each direction from each building corner.

D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class B; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

A. TPO Sheet: ASTM D 6878, internally fabric- or scrim-reinforced, TPO sheet.

1. Manufacturer:

   a. Firestone Ultraply TPO
   b. GAF Everguard TPO
   c. Or approved equal

2. Source Limitations: Obtain components for roofing system from roof membrane manufacturer.
3. Thickness: 60 mils, nominal.
4. Exposed Face Color: White.

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils thick, minimum, of same color as TPO sheet.

C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

D. Bonding Adhesive: Manufacturer's standard.

E. Slip Sheet: ASTM D 2178, Type IV; glass fiber; asphalt-impregnated felt.

F. Slip Sheet: Manufacturer's standard, of thickness required for application.

G. Metal Termination Bars and battens: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8-inch-thick; with anchors.

H. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.

I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.4 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured **or** approved by TPO roof membrane manufacturer.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

1. Thickness:

a. Base Layer: 1-1/2 inches.
b. Upper Layer: greater than 1 inch.

C. Tapered Insulation: Provide factory-tapered insulation boards.

1. Material: Match roof insulation.
2. Minimum Thickness: 1/4 inch.
3. Slope:

a. Roof Field: 1/4 inch per foot unless otherwise indicated on Drawings.
b. Saddles and Crickets: 1/2 inch per foot unless otherwise indicated on Drawings.

2.5 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.

B. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

1. Modified asphaltic, asbestos-free, cold-applied adhesive.
2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
3. Full-spread, spray-applied, low-rise, two-component urethane adhesive.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

3. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
4. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer, when tested according to ASTM F 2170.
5. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
6. Verify that joints in precast concrete roof decks have been grouted flush with top of concrete.
7. Verify that minimum curing period recommended by roofing system manufacturer for lightweight insulating concrete roof decks has passed.
8. Verify any damaged sections of cementitious wood-fiber decks have been repaired or replaced.

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

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Perform fastener-pullout tests according to roof system manufacturer's written instructions.

1. Submit test result within 24 hours after performing tests.

a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

D. Install sound-absorbing insulation strips according to acoustical roof deck manufacturer's written instructions.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.

3.4 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.

B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.

3.5 ADHERED ROOFING INSTALLATION

A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roof membrane and allow to relax before installing.

C. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.

F. Hot Roofing Asphalt: Apply a solid mopping of hot roofing asphalt to substrate at temperature and rate required by manufacturer, and install fabric-backed roof membrane. Do not apply to splice area of roof membrane.

G. Fabric-Backed Roof Membrane Adhesive: Apply to substrate at rate required by manufacturer, and install fabric-backed roof membrane.

H. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.

I. Apply roof membrane with side laps shingled with slope of roof deck where possible.

J. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

K. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.6 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.

B. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.8 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 54 23

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manufactured through-wall flashing.
2. Manufactured reglets.
3. Formed roof-drainage sheet metal fabrications.
4. Formed wall sheet metal fabrications.
5. Formed equipment support flashing.

1.2 RELATED DOCUMENTS

A. Section 07 92 00 - Joint Sealers

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 leak proof, secure, and noncorrosive installation.

1.4 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.

C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

D. 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.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested.

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

D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

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

1.7 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.

1.8 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.

PART 2 - PRODUCTS

2.1 SHEET METAL, TRIM UNITS, FLASHING, COPING, GUTTERS AND DOWNSPOUTS, AND TRIM MATERIALS

A. Fabricate of minimum 0.063 inch aluminum clear satin anodized finished.

B. Prefinished Fascia System: Provide prefinished aluminum fascia system, including chairs, “drainable gutters” at joints, clips, trim and all necessary accessories for a complete and properly installed water-tight system.

1. Product/Manufacturer: Manufactured or brake-metal system, equivalent to “AP Standard Fascia” system, as manufactured by Architectural Products Co.; Covington, Kentucky; Phone: 1-606-341-1171 or ATAS International Rapid-Lok Fascia as manufacturer by ATAS International, Allentown, PA.

2. At Contractor’s option, provide similar profile, but from brake-metal coping system, with continuous clip across top of and length of parapets (full secondary concealed wall cap), with 1-inch high standing seam joints - filled with sealant, double-folded, and corners turned down at 45-degrees.

2.2 ELASTIC VINYL SHEET FLASHING

A. Flexible sheet flashings especially formulated from virgin polyvinyl chloride with plasticizers and other modifiers, to remain flexible and waterproof in concealed masonry applications, black in color and of thickness indicated below.

1. Thickness: 30 mils; Smooth finish at both sides (not grained, textured, etc.).

B. Product/Manufacturer: “Nervastral 300”, or pre-approved equivalent submitted at least 10-days prior to original Bid Date and subsequently approved, including mastic, and where required companion surface conditioner product, and all other materials and components required.

C. Application: Use where flashing is fully concealed, including in part, over roof curbs, wall flashing, through-wall flashing at exterior masonry walls, below any exterior caps and sills, at perimeter of all openings in exterior walls (i.e.: doors, windows, louvers, etc.), and elsewhere as indicated and/or required by project conditions.

1. At heads and sills of openings, and similar locations, turn ends up to form a dam, and to direct water / moisture to weeps and out of walls.

D. Adhesive for Flashings: Type recommended by manufacturer of flashing material, for each use indicated; All joints shall be sealed.

2.3 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Solder:
1. For use with steel or copper: Provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.
2. For use with stainless steel: Provide 60 - 40 tin/lead solder (ASTM B 32), with acid-chloride type flux, except use rosin flux over tinned surfaces.

B. Fasteners: Same metal as flashing/sheet metal or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

C. Bituminous Coating: SSPC - Paint 12, solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

D. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non-drying, nonmigrating sealant.

E. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Section 07 92 00 - “Joint Sealants.”

F. Paper Slip Sheet: 5-lb. rosin-sized building paper.

G. Counterflashing and Reglets: Metal units of type and profile indicated, or if not indicated, as required for the intended use, compatible with flashing indicated, noncorrosive.

1. At surface-mounted parapet and wall flashing conditions, equivalent to 2-piece “Springlok” Flashing Systems, as manufactured by Fry Reglet; Norcross, Georgia; Phone: 1-770-441-2337, except where brake-formed metal is specifically indicated.

H. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.

I. Fibered Aluminum Roof Coating: ASTM D 2824, Type II; FS TT-C-1079. Equivalent to Perma-Seal coating No. 3910; Brush applied only.

2.4 FABRICATED UNITS

A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

B. Seams: Fabricate nonmoving seams in sheet metal with standing seam at exposed tops and lapped side or edge seams. For metal other than aluminum, tin edges to be seamed, form seams, and solder. Form aluminum seams with epoxy seam sealer. Pop-rivet joints for additional strength where required and at vertical faces.

C. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIRMENTS

A. General: Except as otherwise indicated, comply with manufacturer's current written installation instructions and recommendations, with SMACNA "Architectural Sheet Metal Manual," and reviewed submittals and shop drawings.

1. Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. Underlayment: Where stainless steel or aluminum is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.

C. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

D. Install reglets to receive counterflashing in manner and by methods indicated, in a straight line and single elevation.

E. Install counterflashing in reglets, by snap-in seal arrangement for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure, or if not indicated, as recommended by referenced standards, flashing and roofing manufacturers, and otherwise as required for the intended application.

F. Nail or anchor flanges of expansion joint units to curb nailers, at maximum spacing of 6 inches o.c. Fabricate seams at joints between units with minimum 3-inch overlap, to form a continuous, waterproof system.

G. Flashing:

1. Comply with manufacturer's current written instructions and recommendations for installation of all systems components in all applications indicated on the Drawings, and as otherwise required by project conditions.
2. At any parapet wall and roof curbs applications, extend flashing continuous, over top of wall or curb, and turn down one inch (1") minimum on exterior side of wall and mechanically anchor in place at side of top of wall, below and concealed by continuous metal clip anchor (acting as termination bar) and metal cap flashing or coping, and down over top edge of roofing flashing material at roof side.

3.2 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

1. After cleaning, repair and restore damaged metal and metal finishes with prefinished paint manufacturer's special air-drying touch-up paint, in manner such that touch-up is not apparent.
2. Replace damaged flashing and sheet metal work which cannot be repaired and when finish repair and restoration is not acceptable to Architect/Engineer.

B. Protection: Advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of Substantial Completion.

END OF SECTION 07 62 00

SECTION 07 84 00 - FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
2. Fire-resistive joint systems.

1.3 PERFORMANCE REQUIREMENTS

A. General Requirements:

1. For penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
2. Provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed.

B. Through-Penetration Firestop System Ratings: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 or UL 1479:

1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:

a. Penetrations located outside wall cavities.
b. Penetrations located outside fire-resistance-rated shaft enclosures.

C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
2. For floor penetrations with annular spaces exceeding 4-inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.
3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

D. Joint Systems in and between Fire-Resistance-Rated Constructions: Provide systems with assembly ratings equaling or exceeding the fire-resistance ratings of construction that they join, with movement capabilities and L-ratings as determined by UL 2079 and complying with requirements of governing building code referenced.

1.4 SUBMITTALS

A. Product Data: Submit for each type of product indicated.

B. Shop Drawings: Submit drawing details for each through-penetration firestop system and fire-resistive joint system.

1. Show each type of construction condition penetrated and which joints are installed, relationships to adjoining construction, and type of penetrating item.
2. Include through-penetration firestop and fire-resistive joint system design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.
3. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system and fire-resistive joint system configuration for construction and penetrating items.
4. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular through-penetration firestop or fire-resistive joint condition, submit illustration, with modifications marked, approved by through-penetration firestop system or fire-resistive joint system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

C. Through-Penetration Firestop System and Fire-Resistive Joint System Schedule: Indicate locations of each through-penetration firestop system and fire-resistive joint system, along with the following information:

1. Types of penetrating items.
2. Types of joints to be installed to fire-rated construction.
3. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
4. Types of constructions where joints to be protected occur.
5. Through-penetration firestop systems and fire-resistive joint system for each location identified by assembly design designation of qualified testing and inspecting agency.

D. Qualification Data: For installer to demonstrate their capabilities and experience; include documentation indicating compliance with specified qualification requirements. Submit for Architect's information only.

E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system and fire-resistive joint system complies with requirements, based on comprehensive testing of current products. Submit for Architect's information only.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing through-penetration firestop systems and fire-resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance.

1. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements.
2. Manufacturer's willingness to sell its through-penetration firestop system and fire-resistive joint system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

B. Regulatory Requirements: Comply with requirements of the International Building Code, 2012 edition for firestopping penetrations and for fire-resistant joint protection.

C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems and fire-resistive joint systems that comply with the following requirements and those specified in this section:

1. Firestopping systems and fire resistive joint systems tests are performed by a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
2. Through-penetration firestop systems and fire-resistive joint systems are identical to those tested per referenced testing standard. Provide rated systems complying with the following requirements:

a. Through-penetration firestop system and fire-resistive joint system products shall bear classification marking of qualified testing and inspecting agency.
b. Through-penetration firestop systems and fire-resistive joint systems shall correspond to those indicated by reference to through-penetration firestop system and fire-resistive joint system designations listed of the qualified testing and inspecting agency.
c. Classification markings on penetration firestopping systems and fire-resistive joint systems shall correspond to designations listed by the following:

1) UL in its "Fire Resistance Directory."
2) Intertek Group, plc in its "Building Products Directory."
3) FM G in its "Building Materials Approval Guide."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system and fire-resistive joint systems products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

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

B. Ventilate through-penetration firestop systems and fire-resistive joint systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of openings, joints and penetrating items to ensure that through-penetration firestop systems and fire-resistive joint systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems. Coordinate sizing of joints to accommodate fire-resistive joint systems.

C. Do not cover up through-penetration firestop system and fire-resistive joint systems installations that will become concealed behind other construction until each installation has been examined by building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers; subject to compliance with requirements:

1. A/D Fire Protection Systems Inc.
2. W. R. Grace & Co. - Conn.
3. Hilti, Inc.
4. Johns Manville.
5. Nelson Firestop Products.
6. RectorSeal Corporation.

7. Specified Technologies Inc.
8. 3M; Fire Protection Products Division.
9. Tremco, Inc.; Sealant/Weatherproofing Division.
10. USG Corporation.

2.2 THROUGH-PENETRATION FIRESTOP SYSTEMS

A. Through-Penetration Firestop Systems: Field-constructed firestopping for penetrations through fire-rated walls and floors composed of materials and accessories assembled in accord with Through-Penetration Firestopping System designs meeting specified performance requirements.

B. Firestop Devices: Factory-assembled, self-contained firestopping devices for penetrations through fire-rated walls and floors meeting specified through-penetration firestop system performance requirements.

1. Cast-in-Place Devices: Designed for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
2. Collar Devices: Collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

C. Compatibility: Provide through-penetration firestop systems and devices that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

D. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include the following items:

1. Permanent forming/damming/backing materials, including the following:

    a. Slag-/rock-wool-fiber insulation.
    b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    c. Fire-rated form board.
    d. Fillers for sealants.

2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FIRE-RESISTIVE JOINT SYSTEMS

A. Fire-Resistive Joint Systems: Fire-resistant joint construction designed to prevent the spread of fire through wall and floor assemblies, including floor to wall joints at perimeter spandrel conditions, composed of materials and accessories assembled in accord with joint system designs meeting specified performance requirements.

1. Fire-resistive joint systems used in construction other than masonry, precast or concrete wall construction may be of any product of the manufacturers specified complying with specification requirements.
2. Fire-resistive joints systems used in masonry, precast concrete and cast-in-place concrete wall construction shall be limited only to systems using sealant products specified in the article of this specification section indicated for such use.

B. Compatibility: Provide fire-resistive joint systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.

C. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to comply with specified performance requirements. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.

2.4 FILL MATERIALS

A. General: Provide through-penetration firestop systems and fire-resistive joint systems containing the types of fill materials indicated in the Through-Penetration Firestop System and Fire-Resistive Joint System designs. Fill materials are those referred to in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.

B. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

C. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

D. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

F. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

G. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives.

H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

I. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.5 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system and fire-resistive joint systems manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, joint configurations, penetrating items, substrates, and other conditions affecting performance of work.

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

3.2 PREPARATION

A. Surface Cleaning: Clean out openings and joints immediately before installing through-penetration firestop systems or fire-resistive joint systems to comply with system manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
2. Clean opening and joint substrates including penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping and joint system materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system and fire-resistive joint 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.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems or fire-resistive joint systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestopping or joint system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration firestop systems to comply with specified performance requirements and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

C. Install fill materials for firestop systems by proven techniques to produce the following results:

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

3.4 FIRE-RESISTIVE JOINT SYSTEM INSTALLATION

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

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

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

1. Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.
2. Apply fill materials so they contact and adhere to substrates formed by joints.

3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.5 IDENTIFICATION

A. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6-inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems.

1. Use mechanical fasteners for metal labels.
2. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted.
3. Include the following information on labels:

    a. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
    b. Contractor's name, address, and phone number.
    c. Through-penetration firestop system designation of applicable testing and inspecting agency.
    d. Date of installation.
    e. Through-penetration firestop system manufacturer's name.
    f. Installer's name.

B. Identify fire-resistive joint systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6-inches of joint edge so labels will be visible to anyone seeking to remove or penetrate joint system.

1. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed.
2. Include the following information on labels:

    a. The words "Warning - Fire-Resistive Joint System - Do Not Disturb. Notify Building Management of Any Damage."
    b. Contractor's name, address, and phone number.
    c. Designation of applicable testing agency.
    d. Date of installation.
    e. Manufacturer's name.
    f. Installer's name.

3.6 CLEANING AND PROTECTING

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems and fire-resistive joint systems are without damage or

deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping and joint systems immediately and install new materials to produce systems complying with specified requirements.

END OF SECTION 07 84 00

SECTION 07 92 00 – JOINT SEALANTS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work described in this section includes joint sealer systems.

1.2 RELATED DOCUMENTS

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

B. Related work specified elsewhere includes:

1. Section 03 30 00 – Cast-In-Place Concrete
2. Section 09 96 00 – High-Performance Coatings

1.3 SYSTEM PERFORMANCES

A. Provide joint sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product specifications, handling, installation, curing instructions, color charts and performance tested data sheets for each product required.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an Installer who has successfully completed within the last three years at least three (3) joint sealer applications similar in type and size to that of this project and who will assign installers from these earlier applications to this project, of which one will serve as lead installer.

B. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each different product required.

1.6 DELIVER, STORAGE AND HANDLING

A. Deliver materials to project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multi-component materials.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturer or below 40ºF.
2. When joint substrates are wet due to rain, frost, condensation or other causes.

B. Joint Width Conditions: Do not proceed with installation of joint sealers when joint widths are less than allowed by joint sealer manufacturer for application indicated.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealers, polysulfide sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.

B. Colors: Provide color of exposed joint sealers indicated or, if not otherwise indicated, as selected by from manufacturer's standard colors.

2.2 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C920 requirements, including those for Type, Grade, Class and Uses.

B. Multi-Part Nonsag Urethane Sealant: Type M; Grade NS; Class 25; Uses T, NT, I and; as applicable to joint substrates indicated, O.

1. Products: Subject to compliance with requirements, provide one of the following:

a. "Dynatrol 11"' Pecora Corp.
b. "Sonolastic NP-2"; Sonneborn.
c. "Dymeric 511"; Tremco Inc.
d. "Vulkem 922"; Mameco International, Inc.
e. "SikaFlex 2c NS Ex Mix", Sika Corp

2. Locations for Use: Exterior joints and penetrations in vertical surfaces of stucco, concrete, and between metal and concrete, mortar of stone; overhead or ceiling joints; perimeters of metal frames in exterior walls; vertical expansion and control joints in masonry and concrete; and at all miscellaneous locations requiring a joint sealant.

3. Equivalent one-part sealants will be acceptable, by one of the above-named manufacturers.

C. Two-Part Pourable Urethane Sealant: Type M; Grade P; Class 25; Uses T, NT, I and; as applicable to joint substrates indicated, O.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. "Chem-Calk 550"; Bostik Construction Product Div.
   b. "Vulkem 245"; Mameco International, Inc.
   c. "Pourthane"; W. R. Meadows, Inc.
   d. "NR-200 Urexpan"; Pecora Corp.
   e. "Sonolastic Paving Joint Sealant"; Sonneborn Building Products Div.,
   f. "Rexnord Chem. Prod. Inc.
   g. "THC-900/901"; Tremco Corp.
   h. "SikaFlex NP-2"; Sika Corp.

2. Locations for Use: Exterior and interior expansion, control and construction joints in horizontal surfaces; and joints subject to pedestrian and light vehicular traffic.
3. Equivalent 1-part sealants will be acceptable, by one of the above named manufacturers.

D. One-Part Mildew-Resistant Silicone Sealant: Type S; Grade NS; Class 25; Uses NT, T, I and; as applicable to nonporous joint substrates indicated, O; formulated with fungicide for sealing interior joints with nonporous substrates around ceramic tile, showers, sinks and plumbing fixtures.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. "Dow-Corning 786"; Dow Corning Corp.
   b. "SCS 1702"; General Electric.
   c. "863 #345 White"; Pecora Corp.
   d. "Proglaze White"; Tremco Corp.
   e. "SikaSil-GP"; Sika Corp

2. Locations for Use: Interior joints in vertical surfaces and terminal edges of tile; and joints at damp areas, such as around sinks and plumbing fixtures and pipe penetrations; and exposed terminal edges of vinyl flooring, such as around door frames and terminations at concrete.

2.3 LATEX JOINT SEALERS

A. Acrylic-Emulsion Sealant: Manufacturer's standard, one-part nonsag, acrylic, mildew resistant, acrylic emulsion sealant complying with ASTM C834, formulated to be paintable and recommended for exposed applications on interior and on protected exterior exposures involving joint movement of not more than + 7.5%.

1. Products: Subject to compliance with requirements, provide with one of the following:

   a. "Chem-Calk 600"; Bostik Construction Products Div.
   b. "AC-20"; Pecora Corp.

c. "Sonolac"; Sonneborn Building Products Div; Rexnord Chemical Prod., Inc.
d. "Tremco Acrylic Latex Caulk"; Tremco Inc.

2. Locations for Use: Interior joints in field-painted vertical and overhead surfaces at perimeter of metal door frames, gypsum drywall, plaster and concrete or concrete masonry; and all other interior locations not indicated otherwise.

2.4 POLYSULFIDE SEALANT

A. Polysulfide Sealant: Type M, ASTM C920, two-part, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging or self-leveling (depending on application).

1. Products:

a. "Synthacalk GC2+"; Pecora Corporation.
b. "Duoflex NS"; Sika Corporation
c. Approved Equivalent

2. Locations for Use: Interior expansion, control, and construction joints subject to continuous immersion in water or wastewater.

2.5 JOINT SEALANT BACKING

A. General: Provide sealant backings of material and type which are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint-Fillers:

1. Preformed, compressible, resilient, non-waxing, non-extruding strips of plastic foam of material indicated below, and of size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
2. Backer Rod: Premium grade, closed cell polyethylene foam rod; Sealtight Backer Rod, as manufactured by W.R. Meadows, Inc., or approved equal.
3. Joint Filler: "Ceramar" flexible foam expansion joint filler, as manufactured by W.R. Meadows, Inc., or approved equal.

C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing bond between sealant and joint filler or other materials at back (3rd) surface of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

A. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated.

B. Cleaners for Nonporous Surfaces: Provide non-staining, chemical cleaner of type acceptable to manufacturer of sealant and sealant backing materials which are not harmful to substrates and

adjacent nonporous materials, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Provide non-staining, non-absorbent type compatible with joint sealants and to surface adjacent to joints.

PART 3 - EXECUTION

3.1 INSPECTION

A. Installer to inspect joints indicated to receive joint sealers for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance. Obtain Installer's written report listing any conditions detrimental to performance of joint sealer work. Do not allow joint sealer work to proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:

1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; 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.

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 indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply

primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which 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 SEALERS

A. General: Comply with joint sealer manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

1. Elastomeric Sealant Installation Standard: Comply with recommendations of ASTM C1193 for use of joint sealants as applicable to materials, applications and conditions indicated.
2. Latex Sealant Installation Standard: Comply with requirements of ASTM C790 for use of latex sealants.
3. Polysulfide Sealant Installation Standard: Comply with requirements of ASTM C920 for use of polysulfide sealants.

B. Joint Design:

1. The minimum width of the joint should not be less than 1/4” (6 mm).
2. Maximum depth should be 1/2” (12 mm).

C. Surface Preparation:

1. Joint interface must be clean, dry, and free from oils, loose mortar, laitance, waterproofing’s, and other contaminants. A thorough grinding, sandblasting, or solvent cleaning may be required to expose clean, sound surfaces.

D. Priming:

1. Primer must be applied before adding sealants

E. Installation of Sealant Backings:

1. Install sealant backing of type indicated or recommended by sealant manufacturer 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.

    a. Do not leave gaps between ends of joint-fillers.
    b. Do not stretch, twist, puncture or tear joint-fillers.
    c. Remove absorbent joint-fillers which have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants and joint-fillers, compression seals or back of joints where required to prevent third-side adhesion of sealant to back of joint.

F. Installation of Sealants:

1. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants:

1. Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
2. Concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

3.4 PROTECTION AND CLEANING

A. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of substantial completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

B. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

1. Sound sealant shall not be visible on exposed surfaces.

END OF SECTION 07 92 00