

TECHNICAL SPECIFICATIONS

DIVISION 00 – BIDDING REQUIREMENTS & CONTRACT FORMS

000003 TABLE OF CONTENTS
000004 BID FORM

DIVISION 01 - GENERAL REQUIREMENTS

DIVISION 01 PROVIDED BY CITY OF BROOKHAVEN

DIVISION 02 – EXISTING CONDITIONS

024116 SELECTIVE DEMOLITION

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

074113 METAL ROOF PANELS
075400 THERMOPLASTIC MEMBRANE ROOFING
076200 SHEET METAL FLASHING AND TRIM
077100 ROOF SPECIALTIES
079200 JOINT SEALANT

PROJECT DRAWINGS

GENERAL

A0.0 COVER SHEET

ARCHITECTURAL

A1.1 DEMOLITION PLANS
A2.1 NEW CONSTRUCTION PLANS
A3.1 EXISTING CONDITIONS & DEMOLITION – ROOF DETAILS
A3.2 EXISTING CONDITIONS & DEMOLITION – ROOF DETAILS
A4.1 NEW CONSTRUCTION – ROOF DETAILS
A4.2 NEW CONSTRUCTION – ROOF DETAILS
A4.3 ALTERNATE No.2 – NEW CONSTRUCTION – ROOF DETAILS

END OF TABLE OF CONTENTS

LA# 19015P

LYNWOOD PARK – BUILDING RE-ROOFING

BROOKHAVEN, GA

THIS PAGE IS LEFT BLANK

SECTION 02 41 19 - SELECTIVE DEMOLITION**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Work included: Furnish all labor, materials and equipment and related services required to complete the demolition work. Carefully demolish and remove from the site those items to be demolished and removed as indicated on the Drawings, specified herein or as required for the complete and safe removal of existing construction, including the following:
1. Removal of existing construction as noted.
 2. Provision and maintenance of proper safety barricades, and dust and weatherproof barriers.
 3. Cutting and patching of existing concrete and masonry work as indicated and as required.
 4. Coordination of all phases of demolition work in conjunction with new construction, remodeling work and any demolition by others.
 5. All work shall be performed with minimal disruption to the continuing operation of the existing project facilities.
- B. Related work:
1. AIA Document A201, General Conditions of the Contract for Construction, 1997 edition (by reference, not bound herein), Supplementary Conditions, and Sections in Division 1 of these Specifications.
 2. Section 01 73 29 : Cutting and patching.
 3. Disconnection, abandonment and/or removal of plumbing, mechanical, fire protection and electrical services, as necessary, indicated and/or as required due to new and/or remodeling construction work.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. The Contractor shall consult public and service company records to fully inform himself of the location and extent of utilities and shall provide all services and care required and assume all responsibilities and pay all costs for which the Owner may be liable.
- C. Provide barricades, lights, signals and protections, which may be required by Federal, state and municipal laws or ordinances and maintain same for the full period of the operation; removing same when directed.
- D. Comply with pertinent codes, ordinances and requirements of governmental agencies having jurisdiction.
- E. Comply with pertinent health and safety regulations of governmental agencies having jurisdiction.

1.3 PRODUCT HANDLING

- A. Comply with pertinent provisions of Section 01 66 00.

PART 2 - PRODUCTS

(No products are required in this Section; see Drawings and other Sections of these Specifications for additional requirements.)

PART 3 - EXECUTION**3.1 SITE CONDITIONS**

- A. Examine the area(s) and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Obtain approval of demolition procedures which might affect the operation of any occupied space.

3.2 DEMOLITION

- A. Carefully study the Contract Documents, and determine the location and extent of the selective demolition to be performed. Details of existing construction to be removed, altered, revised, etc., are furnished for Contractor's convenience; field verify actual conditions and notify the Architect in writing of details or conditions contrary to the Documents prior to commencing the work.
- B. During the bid period, visit the site and verify the extent and location of selective demolition required.
 - 1. Carefully identify limits of selective demolition.
 - 2. Notify Architect in writing of details or conditions contrary to Documents prior to submittal of bid.
- C. Before commencing work, mark interface surfaces as required to enable workmen to identify items to be removed and items to be left in place intact.
- D. Perform demolition in a neat and workmanlike manner, carefully terminating demolition at work to remain in place. Take special precautions not to damage or deface work to remain in place.
 - 1. Repair demolition performed in excess of that required and repair any new or existing areas that were damaged or defaced during demolition operations at no cost to the Owner, to Owner's satisfaction.
 - 2. Where masonry walls are removed, and new walls are indicated to be intercourses, provide clean sawtooth edge; where doors, windows or other openings are indicated, cut openings a minimum of eight (8) inches beyond indicated jamb and/or head lines and provide sawtooth jambs to accept new jamb and head masonry.
- E. Prepare an organized schedule and plan for demolition and removal of items.
 - 1. Shut off, cap, and otherwise protect existing public utility lines in accordance with the requirements of the public agency or utility having jurisdiction.
 - 2. No utilities shall be interrupted without first notifying the Owner and having his concurrence with the interruption. Provide temporary support for utilities whose support is disturbed by removal work. Coordinate with mechanical and electrical trades in the disconnecting and rerouting of existing services.
 - 3. Completely remove items to be demolished, leaving surfaces clean, solid, and ready to receive new materials as specified elsewhere.
 - 4. In all activities, comply with pertinent regulations of governmental agencies having jurisdiction.

5. The contractor shall not begin demolition work until receipt of notice to proceed from the Owner.
 6. Perform demolition work in accordance with ANSI/NFPA 241-1975, "Building Construction and Demolition Operations".
- F. Unless noted otherwise, demolished material shall be considered to be the property of the Contractor and shall be completely removed from the job site, and legally disposed of.
- G. Use whatever means necessary to prevent dust and debris from becoming a hazard and/or a nuisance to the adjacent areas of the existing facilities, to the public, neighbors, workers and to other work being performed on or near the project site.
- H. Provide and maintain temporary weathertight and/or construction-tight protection as approved by the Owner for openings which expose the existing and new construction, equipment, interior area, etc.
1. Temporary protection shall be of noncombustible or fire retardant treated wood construction. If tarpaulins are used, the fabric shall be flame retarded in accordance with requirements of Underwriters Laboratories, Inc.
 2. Where applicable, protection may be removed for working purposes and then replaced at end of each day's work.
 3. Temporary protection in the construction area shall remain in place until removal of such protection is authorized by the Owner.
- I. Temporary construction shall provide for secure afterwork conditions. Cooperate with Owner in arranging for installation of detection devices by Owner at openings in temporary construction requiring afterwork security.
- J. Demolition shall be performed in such manner as to avoid hazards to workers, public and property, and interference with adjacent areas or interruption of free passage to and from such areas.
- K. Execute demolition and removal work in a careful and orderly manner. Accumulation of rubbish will not be permitted; remove debris promptly and often. Burning of any debris is expressly prohibited.
- L. Sprinkle and dampen materials with water to lay dust, where permitted by Owner. Take care to prevent the spread of dust and flying particles.

3.3 EXISTING STRUCTURE

- A. Prevent movement or settlement of existing structure(s); provide bracing or shoring as necessary or required to perform the demolition work without impact to adjacent existing structure(s). Contractor shall be responsible for safety and support of the structure, and shall assume liability for such movement, settlement, damage or injury.
- B. No cutting shall be done to any structural members, unless otherwise indicated.
- C. Cease operations and notify the Owner and Architect immediately if safety of structure appears to be endangered. Do not resume operations until structure is restored to a safe condition.

3.4 FIRE PROTECTION

- A. Protect combustible materials against ignition during cutting operations. Keep stairways and fire lanes unobstructed during the Contract term. Instruct employees on the following:
 - 1. Location of fire alarm box and telephone; also the manner of summoning Fire Department without delay in the event of fire.
 - 2. Use of hand pumps, hose, water buckets and other fire extinguishing equipment.
 - 3. Maintenance of fire protection equipment in serviceable condition properly located and identified so that it will be available for immediate use.

3.5 REPLACEMENTS

- A. In the event of demolition of items not so scheduled to be demolished, promptly replace such items to the approval of the Owner and at no additional cost to the Owner.

3.6 CLEAN-UP

- A. The areas of demolition and debris storage, both inside and outside the project facility, shall be left in a safe and clean condition, acceptable for the installation of new work.
- B. Contractor's tools and equipment shall be removed from project site upon completion of this work.

END OF SECTION 02 41 19

SECTION 074113 - METAL ROOF PANELS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. Scope: Provide all of the labor, materials, equipment and services required to furnish and install the prefabricated metal roofing.
- B. This Section includes Standing-Seam Metal Roof Panels.
- C. Related Sections include the following:
 - 1. Division 06 Section "Sheathing".
 - 2. Division 07 Section "Sheet Metal Flashing and Trim".
 - 3. Division 07 Section "Roof Accessories".

1.3 SUBMITTALS

- A. Prior to fabrication, submit to the Architect for review the following:
 - 1. Complete and fully descriptive manufacturer's literature which shall include, but not be limited to, naming all materials and components and the proper method of installation for this Project.
 - 2. Detailed Computer-generated drawings showing layout of panels, anchoring details, joint details, trim, flashing, and accessories. Show details of weatherproofing, terminations, and penetrations of metal work. Drawings shall indicate dimensions, all methods of securing. Detailed drawing shall be submitted to the Metal Panel Manufacturers for approval complying with specified warranty.
 - 3. Physical sample for color selection: All colors and textures available for the Architect.

1.4 PERFORMANCE REQUIREMENTS

- 1. Air Infiltration ASTM E-1680-95
- 2. Water Infiltration ASTM E-1646-95
- 3. Wind Uplift - U.L.90
- 4. Uplift Resistance for Roof Assembly – UL 580 (up to 120 mph wind speed).

1.5 QUALITY ASSURANCE

- A. Wind uplift: Provide roof panel system including supports meeting requirements of Underwriters Laboratories, Inc. for Class 90 wind uplift resistance.
- B. Field measurements: Where possible, prior to fabrication of panels, take field measurements of structure or substrates to receive panel system. Allow for trimming panel units where final dimensions cannot be established prior to fabrication.

1.6 DELIVER, STORAGE AND HANDLING

- A. Deliver panels and other components so they will not be damaged or deformed. Package wall and roof panels for protection against transportation damage.

- B. Handling: Exercise care in unloading, storing, and erecting wall and roof covering panels to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight ventilated covering. Store metal panels so that they will not accumulate water. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.

1.7 WARRANTY

- A. Provide manufacturer's standard 20-years warranty stating the finish will be:
 - 1. Free of fading or color change in excess of 5 NBS units as measured per ASTM D2244;
 - 2. Will not chalk in excess of numerical rating of 7 when measured in accordance with standard procedures specified in ASTM D659;
 - 3. Will not peel, crack, chip, or delaminate.
- B. Provide written warranty signed by applicator for 2-years period from Date of Substantial Completion of building covering repairs required to maintain roof and flashings in a watertight condition.
- C. Watertightness/weathertightness Warranty for concealed fastener panel system: Provide manufacturer's written 20-years warranty for watertightness test.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified. Acceptable product shall be a comparable product with the basis-of-design product.

2.2 METAL ROOF PANEL

- A. Product: The basis-of-design are "Cee-Lock" for non-structural panel and "Multi-rib R-Panel" for structural panel, both as manufactured by Berridge Manufacturing Co. Refer to drawings for specific application locations.
 - 1. Acceptable Manufacturers:
 - a. Berridge Manufacturing Co.
 - b. MBCI
 - c. Metal Sales Manufacturing Corporation.
 - d. Pac-Clad Petersen Aluminum.
 - 2. Characteristics:
 - a. Cee-Lock: Standing seam panel, 1-1/2" high, 16-1/2" o.c. Snap-on seams shall contain an extruded vinyl weather seal insert as an integral part of the seam. Manufacturer's recommended roof slope of 1 on 12 or greater.
 - b. R-Panel: 36-inches coverage structural panel with or without striation. Capable to span up to 5-feet o.c. without solid sheathing. Manufacturer's recommended roof slope of 3 on 12 or greater.

3. Material: Prefinished metal shall be Aluminum-Zinc Alloy Coated (AZ-55 Galvalume®) Steel Sheet, 24-Gauge, ASTM 792-08, Grade 40, yield strength 40 ksi min.
 4. Finish: Kynar 500® fluoropolymer coating applied by the manufacturer on a continuous coil coating line, with a top side dry film thickness of 0.75 ± 0.05 mil over 0.20 ± 0.05 mil prime coat, to provide a total top side dry film thickness of 0.95 ± 0.10 mil. Bottom side shall be coated with a primer and beige urethane coating with a total dry film thickness of 0.35 ± 0.05 mil. Finish shall conform to all tests for adhesion, flexibility, and longevity as specified by the Kynar 500® finish supplier
 5. Color: As selected by the Architect from Manufacturer standard/premium colors.
- B. Separation barrier: Provide materials approved by the Metal Roof Manufacturer.
1. Roof Underlayment Material: 30# roofing felt to be installed over decking.
 2. High temperature Protection Self-adhering Roofing Underlayment to be installed on curved roof, low-slope roof and critical details as recommended by Metal Roof Manufacturer. Critical details included but not limited to valley, ridge and all flashing condition.
 - a. Carlisle WIP 300HT (40 mil).
 - b. Grace Ice and Water Shield (40 mil) or Grace Ultra (30 mil)
 - c. Tamko Tile and Metal Underlayment (75 mil) or Tamko TW Underlayment (40 mil)
 3. Sealant: Low-modulus Single Component Silicone: ASTM C 920, Type S, Grade NS, Class 100/50. Uses NT, M, G, A and O: single component, moisture curing, nonstaining, nonbleeding, color to match roof panel.
 - a. Tremco Spectrum One.
 - b. Dow 790.
 - c. Pecora 890-NST
- C. Accessories:
1. Flashings and accessories: Provided by the Metal Roof Manufacturer.
 - a. Provide all caps, trims, copings, fascias, corner units, flashings, closures and clips.
 - b. Provide manufacturer's standard ridge cap.
 - c. Fabricate of the same material as that of the roofing panel. Finish to match panel.
 2. Gutters and downspouts:
 - a. Size and profiles as indicated on the Drawings.
 - b. Refer to Division 07 "Sheet Metal Flashing and Trim" for gutter and downspout.
 - c. Finish: As indicated in drawings.
 3. Ridge vent: V600TE as manufactured by Cor-A-Vent or equivalent product approved by roof manufacturer.
 4. Static Roof Vent: Model 750-GS as manufactured by Lomanco.
 - a. Size: 16-inches wide to fit between roof panel seams. Size to allow for not less than 40 sq.in. of net free area of ventilation.
 - b. Material: Galvanized Steel.
 - c. Finish: Prefinish to match roof panel color.

2.3 OTHER MATERIALS

- A. All other materials, not specifically described but required for a complete and proper installation that is secure, shall be as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION**3.1 GENERAL**

- A. Installation shall be in accordance with the Contract Documents, the approved submittals and the manufacturer's instructions. Additionally conform to the standards set forth in the Architectural Sheet Metal Manual published by SMACNA, in order to achieve a watertight installation.
- B. Fabricate and finish panels and accessories at the factory to greatest extent possible, 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.
 - 1. Field cutting of panels by torch is not permitted.

3.2 PREPARATION

- A. Inspect the roof deck to verify that the deck is clean and smooth, free of depressions, waves or projections, level to $\pm 1/4"$ in 20', and properly sloped to valleys and eaves.
- B. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
- C. Verify deck is dry and free of snow or ice. Verify that deck joints are solidly supported.

3.3 INSTALLATION

- A. Install separation barriers prior to application of the metal roofing:
 - 1. At critical areas (gutters, ridge, valley, hip, rake) cover the deck with ice/water shield.
 - 2. Over the remaining roof deck, cover the entire deck area with a layer of felt. Overlap the felt onto the ice/water shield. Lap each ply 2" with the slope and nail with large flathead nails. Install felt horizontally, starting at eave to ridge with a 6" minimum overlap and 18" endlaps. Ensure that all nail heads are totally flush with the substrate. Nails shall be galvanized roofing nails with coated felt caps.
- B. Install panels in such a manner that horizontal lines are true and level and vertical lines are plumb.
- C. Install starter and edge trim before installing roof panels.
- D. Remove protective strippable film prior to installation of roof panels.
- E. Attach panels using manufacturer's standard clips and fasteners, spaced in accordance with approved submittals.
- F. Install sealants for preformed roofing panels as approved on submittals.
- G. Do not allow panels or trim to come into contact with dissimilar materials.
- H. Do not allow traffic on completed roof. If required, provide cushioned walk boards.

- I. Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.
- J. Remove and replace any panels or components which are damaged beyond successful repair.

3.4 CLEANING AND PROTECTION

- A. 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.
- B. 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.
- C. Clean any grease, finger marks or stains from the panels per manufacturer's recommendations.
- D. Remove all scrap and construction debris from the site.

END OF SECTION

THIS PAGE IS LEFT BLANK

SECTION 07 54 00 - THERMOPLASTIC MEMBRANE 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. This Section includes the following:
 - 1. Fully-adhered membrane roofing system.
 - 2. Vapor retarder.
 - 3. Roof insulation.
 - 4. Cover board.
- B. This Section includes the installation of acoustical roof deck rib insulation strips furnished under Division 05 Section "Steel Decking."
- C. Related Sections include the following:
 - 1. Division 01 Section "Construction Waste Management and Disposal"
 - 2. Division 01 Section "Sustainable Design Requirements" for additional LEED requirements.
 - 3. Division 05 Section "Steel Decking" for furnishing acoustical deck rib insulation.
 - 4. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 5. Division 07 Section "Thermal Insulation" for insulation beneath the roof deck.
 - 6. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counter-flashings.
 - 7. Division 07 Section "Manufactured Roof Expansion Joints."
 - 8. Division 07 Section "Joint Sealants."
 - 9. Division 22 Section "Storm Drainage Piping Specialties" for roof drains.
- D. Unit Prices: Refer to Division 01 Section "Unit Prices" for description of Work in this Section affected by unit prices.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.
- C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.
 - 1. Fire/Windstorm Classification: Class 1A-90.
 - 2. Hail Resistance: MH.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
 - 1. Base flashings and membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Insulation fastening patterns.
- C. Samples for Verification: For the following products:
 - 1. 12-by-12-inch (300-by-300-mm) square of sheet roofing, of color specified, including T-shaped side and end lap seam.
 - 2. 12-by-12-inch (300-by-300-mm) square of roof insulation.
 - 3. 12-by-12-inch (300-by-300-mm) square of walkway pads or rolls.
 - 4. 12-inch (300-mm) length of metal termination bars.
 - 5. 12-inch (300-mm) length of battens.
- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of meeting performance requirements.
- F. Qualification Data: For Installer and manufacturer.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
 - I. Research/Evaluation Reports: For components of membrane roofing system.
- H. Maintenance Data: For roofing system to include in maintenance manuals.
- I. Warranties: Special warranties specified in this Section.

- J. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.6 QUALITY ASSURANCE

- A. 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 warranty.
- B. Manufacturer Qualifications: A qualified manufacturer that has UL listing for membrane roofing system identical to that used for this Project.
- C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain components for membrane roofing system from or approved by roofing membrane manufacturer.
- E. Pre-installation Conference: Conduct conference at Project site. Comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 5. Review structural loading limitations of roof deck during and after roofing.
 - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect 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.

1.7 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, 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.

1.8 PROJECT 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.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, cover boards, substrate board, vapor retarder, walkway products and other components of membrane roofing system.
 - 2. Warranty Period:
 - a. 25 years from date of Substantial Completion for 60 mil
 - 3. Provide manufacturers standard no dollar limit membrane puncture warranty.
 - 4. All roofing system metal edging material to be covered and included in the manufacturer's standard total roofing system warranty.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC POLYOLEFIN ROOFING MEMBRANE

- A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: Uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced, and as follows:
 - 1. Basis of Design: Carlisle 060 TPO with dens deck & ISO insulation.
 - 2. Thickness (this does not include the fleece-backed product):
 - a. 60 mils, nominal.
 - 3. Exposed Face Color: White, refer to drawings for placement.
 - 4. Physical Properties:
 - a. Breaking Strength: 540 lbf (2491 N); ASTM D 751, grab method.
 - b. Elongation at Break: 30 percent; ASTM D 751.
 - c. Tearing Strength: 108 lbf (480 N) minimum; ASTM D 751, Procedure B.

- d. Brittleness Point: Minus -50 deg F (-46 deg C).
- e. Ozone Resistance: No cracks after sample, wrapped around a 3-inch- (75-mm-) diameter mandrel, is exposed for 166 hours to a temperature of 104 deg F (40 deg C) and an ozone level of 100 pphm (100 mPa); ASTM D 1149.
- f. Resistance to Heat Aging: 90 percent minimum retention of breaking strength, elongation at break, and tearing strength after 166 hours at 240 deg F (116 deg C); ASTM D 573.
- g. Water Absorption: Less than 4 percent mass change after 166 hours' immersion at 158 deg F (70 deg C); ASTM D 471.
- h. Linear Dimension Change: Plus or minus 2 percent; ASTM D 1204.
- i. Provide manufacturers standard walk pads to service roof-top mechanical equipment.

2.2 THERMOPLASTIC POLYOLEFIN ROOFING MEMBRANE WITH FLEECEBACK

2.3 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
 - 1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.
- C. Bonding Adhesive: Manufacturer's standard bonding adhesive for membrane, and solventbased bonding adhesive for base flashings.
- D. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.
- E. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- F. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch (25 mm) wide by 0.05 inch (1.3 mm) thick, prepunched.
- G. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosionresistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

2.4 COVER BOARDS

- A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch (13 mm) thick.
 - 1. Product: Subject to compliance with requirements, provide "Dens-Deck" by GeorgiaPacific Corporation.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosionresistance provisions in FMG 4470, designed for fastening substrate panel to roof deck.

2.5 VAPOR RETARDER

- A. Polyethylene Vapor Retarder: ASTM D 4397, 6 mils (0.15 mm) thick, minimum, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
 - 1. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
 - 2. Adhesive: Manufacturer's standard lap adhesive, FMG approved for vapor-retarder application.

2.6 ROOF INSULATION

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.
 - 1. Basis of Design: Carlisle Syntec Systems, ISO 95+, flat and tapered
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.7 SURE-WELD TPO CONTOUR RIB PROFILE

- A. General: Used to obtain the appearance of standing seam metal roofing with the performance of a TPO single-ply membrane. The Contour Rib Profile measures 1-1/4" tall and 2-1/8" wide, including the welding flanges, while the vertical profile is a substantial 3/8" thick. The profile has a continuous 1/8" diameter alignment hole, for use with fiberglass connecting pins, as well as a 1/8" fiberglass reinforcing cord for added strength. The Contour Rib Profile is available in white, gray and tan, 10' lengths and packaged 20 per carton.
- B. Basis of Design:
 - 1. Carlisle Synted Systems: Sure-Weld TPO Contour Rib Profile

2.8 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- C. Cold Fluid-Applied Adhesive: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate.
- D. Cover Board: ASTM C 208, Type II, Grade 2, cellulosic-fiber insulation board, 1/2 inch (13 mm) thick.

- E. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric mat, water permeable and resistant to ultraviolet degradation, type and weight as recommended by roofing system manufacturer for application.
- F. Metal Securement System: Perimeter securement flashing and strapping fabricated from stainless steel, a minimum of 0.031 inch (0.8 mm) thick. Provide fasteners as recommended by mortar-faced insulation manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and set and braced and that roof drains 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 surface plane flatness and fastening of steel roof deck comply with requirements in Division 05 Section "Steel Decking."
 - 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
 - 5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 6. Verify that concrete curing compounds that will impair adhesion of roofing components to roof deck have been removed.
 - 7. 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 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. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Install acoustical roof deck rib insulation strips, specified in Division 05 Section "Steel Decking," according to acoustical roof deck manufacturer's written instructions.

3.3 SUBSTRATE BOARD INSTALLATION

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to top flanges of steel deck according to recommendations in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
2. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturer's written instructions.

3.4 VAPOR-RETARDER INSTALLATION

- A. Loosely lay polyethylene-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches (50 mm) and 6 inches (150 mm), respectively.
 1. Seal side and end laps with adhesive.
- B. Install laminated-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 inches (50 mm) and 6 inches (150 mm), respectively. Bond vapor retarder to deck as follows:
 1. Apply adhesive at rate recommended by vapor-retarder manufacturer. Seal laps with adhesive.
 2. Apply ribbons of hot roofing asphalt at spacing, temperature, and rate recommended by vapor-retarder manufacturer. Seal laps with hot roofing asphalt.
- C. Install 2 glass-fiber felt plies lapping each sheet 19 inches (483 mm) over preceding sheet. Embed each sheet in a solid mopping of hot roofing asphalt. Glaze-coat completed surface with hot roofing asphalt. Apply hot roofing asphalt at a rate of 20 lb/100 sq. ft. (1 kg/sq. m), plus or minus 25 percent.
- D. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

3.5 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 1-1/2 inches (38 mm) or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:

1. Prime surface of concrete deck with asphalt primer at a rate of 3/4 gal./100 sq. ft. (0.3 L/sq. m) and allow primer to dry.
 2. Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.
 3. Set each layer of insulation in a cold fluid-applied adhesive.
- H. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
1. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
- I. Mechanically Fastened and Adhered Insulation: Install each layer of insulation and secure first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
1. Fasten first layer of insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 2. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
 3. Install subsequent layers of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.
 4. Install subsequent layers of insulation in a cold fluid-applied adhesive.
- J. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Stagger joints from joints in insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together and fasten to roof deck.
1. Fasten according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 2. Fasten to resist uplift pressure at corners, perimeter, and field of roof.

3.6 ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
1. Install sheet according to ASTM D 5036.
- B. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply water-based bonding adhesive to substrate at rate required by manufacturer and immediately install roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.
- E. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.
- F. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

- G. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions 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 roofing membrane.
 - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.
- H. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- I. Install roofing membrane and auxiliary materials to tie in to existing roofing.

3.7 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with sheet flashing.
- D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. 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.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing 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 membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane 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.

3.10 ROOFING INSTALLER'S WARRANTY

- A. Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- B. This Warranty is made subject to the following terms and conditions:
 - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 100 mph (m/sec);
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing;
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 - 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 - 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
 - 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
 - 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

END OF SECTION 07 54 00

SECTION 076200 - SHEET METAL FLASHING AND TRIM**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. Scope: Provide all of the labor, materials, equipment and services required to furnish and install the sheet metal flashing and trim.
- B. This Section includes the following:
 - 1. Formed roof drainage system.
 - 2. Formed low-slope roof flashing and trim.
 - 3. Formed steep-slope roof flashing and trim.
 - 4. Formed wall flashing and trim.
 - 5. Formed equipment support flashing.
 - 6. Formed overhead-piping safety pans.
- C. Related Sections include the following:
 - 1. Division 03 Section "Cast-in-Place Concrete".
 - 2. Division 04 Section "Architectural Concrete Masonry".
 - 3. Division 06 Section "General Carpentry".
 - 4. Division 07 Section "Mineral Fiber Cement Board".
 - 5. Division 07 Section "Metal Roof Panels".
 - 6. Division 07 Section "Roof Accessories".
 - 7. Division 07 Section "Joint Sealant".

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identify material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 - 4. Details of expansion-joint covers, including showing direction of expansion and contraction.
- C. Samples for Initial Selection: For each type of sheet metal flashing and trim 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. Sheet Metal Flashing: 12 inches (300 mm) long. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim: 12 inches (300 mm) long. Include fasteners and other exposed accessories.
3. Accessories: Full-size Sample.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install roof edge flashing capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:
 1. Wind Zone 3: For velocity pressures of 46 to 104 lbf/sq. ft. (2.20 to 4.98 kPa): 208lbf/sq. ft. (9.96-kPa) perimeter uplift force, 312-lbf/sq. ft. (14.94-kPa) corner uplift force, and 104-lbf/sq. ft. (4.98-kPa) outward force.
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base on engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.5 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
 1. Copper Standard: Comply with CDA's "Copper in Architecture Handbook."
- B. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 1. Build mockup of typical roof eave, including built-in gutter, fascia, fascia trim, apron flashing, at location as part of the completed work when approved, including supporting construction cleats, seams, attachments, underlayment, and accessories.
 2. Approval of mockups is for other material and construction qualities specifically approved by Architect in writing.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management Coordination."

1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 SHEET METALS

- A. Copper Sheet: ASTM B 370, H00 or H01 temper, cold-rolled copper sheet.
- B. Aluminum Sheet: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:
 1. Factory Prime Coating: Where painting after installation is indicated, provide pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat; with a minimum dry film thickness of 0.2 mil (0.005 mm).
 2. Siliconized-Polyester Coating: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.
 - a. Color: As selected by Architect from manufacturer's full range.
 3. Anodized Finish: Apply the following coil-anodized finish:

- a. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.
- C. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755.
1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 (Z275) coating designation; structural quality.
 2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
 3. Exposed Finishes: Apply the following coil coating:
 - a. Factory Prime Coating: Where painting after installation is indicated, provide pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat; with a minimum dry film thickness of 0.2 mil (0.005 mm).
 - b. Siliconized-Polyester Coating: Epoxy primer and silicone-modified, polyester enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.
 - 1) Color: As selected by Architect from manufacturer's full range.
- D. Stainless-Steel Sheet: ASTM A 240, Type 304.
1. Finish: No. 3 (reflective, polished directional satin)

2.3 UNDERLAYMENT MATERIALS

- A. Polyethylene Sheet: 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D 4397.
- B. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- C. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft. (0.16 kg/sq. m).

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 1. Nails for Copper Sheet: Copper, hardware bronze, or Series 300 stainless steel, 0.109 inch (2.8 mm) minimum and not less than 7/8 inch (22 mm) long, barbed with large head.
 2. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
 3. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
 4. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
 5. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
- C. Solder:

1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 2. For Zinc-Tin Alloy-Coated Stainless Steel: ASTM B 32, 100 percent tin.
 3. For Zinc: ASTM B 32, 60 percent lead and 40 percent tin with low antimony, as recommended by manufacturer.
- D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flatlock seams. Tin edges to be seamed, form seams, and solder.
- D. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with elastomeric sealant concealed within joints.
- F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.6 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

- A. General: Refer to Division 07 for material provided by the Roof System Manufacturer. Provide prepainted Metallic-Coated Steel Sheet items not provided by the Roof System Manufacturer, includes but not limited to the followings:
1. Apron, Step, Cricket, and Backer Flashing.
 2. Valley Flashing.
 3. Drip Edges.
 4. Eave, Rake, Ridge, and Hip Flashing.
 5. Base Flashing.
 6. Counterflashing.
 7. Flashing Receivers.
 8. Roof-Penetration Flashing.

2.7 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- (2400-mm-) long, but not exceeding 12 foot (3.6 m) long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches (150 mm) beyond each side of wall openings. Form with 2-inch- (50-mm-) high end dams. Fabricate from the following material:
1. Prepainted Metallic-Coated Steel Sheet.
- B. Openings Flashing in Frame Construction: Fabricate head, sill, and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high end dams. Fabricate from the following material:
1. Prepainted Metallic-Coated Steel Sheet.
- C. Through-Wall Ribbed Sheet Metal Flashing: Manufacture through-wall sheet metal flashing for embedment in masonry with ribs at 3-inch (75-mm) intervals along length of flashing to provide an integral mortar bond.[Manufacture through-wall flashing with snaplock receiver on exterior face to receive counterflashing.
1. Copper: 10 oz. (0.34 mm thick) minimum for fully concealed flashing; 16 oz. (0.55 mm thick) elsewhere.
 - a. Available Products:
 - 1) Advanced Building Products Inc.; Cop-R-Loc Interlocking Flashing.
 - 2) Cheney Flashing Company, Inc.; Cheney Flashing (Dovetail).
 - 3) Cheney Flashing Company, Inc.; Cheney Flashing (Sawtooth).
 - 4) Dur-O-Wal, Dayton Superior Corporation; Polytite Copper Flashing.
 - 5) Keystone Flashing Company, Inc.; Keystone Three-Way Interlocking Thruwall Flashing.
 - 6) Sandell Manufacturing Company, Inc.; Three-Way Saw Tooth Flashing. 7) York Manufacturing, Inc.; Cop-R-Loc Interlocking Flashing.

2. Stainless Steel: 0.0156 inch (0.4 mm) thick.
 - a. Available Products:
 - 1) Cheney Flashing Company, Inc.; Cheney Flashing (Dovetail).
 - 2) Cheney Flashing Company, Inc.; Cheney Flashing (Sawtooth).
 - 3) Keystone Flashing Company, Inc.; Keystone Three-Way Interlocking Thruwall Flashing.
- D. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory- mitered and -welded corners and junctions.
 1. Available Manufacturers:
 - a. Cheney Flashing Company, Inc.
 - b. Fry Reglet Corporation.
 - c. Heckmann Building Products Inc.
 - d. Hickman, W. P. Company.
 - e. Keystone Flashing Company, Inc.
 - f. Sandell Manufacturing Company, Inc.
 2. Material: Aluminum, 0.024 inch (0.6 mm) thick.
 3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 4. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
 5. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
 6. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
 7. Flexible Flashing Retainer Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
 8. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.8 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, straps and other accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.
 1. Gutter Style: A.
 2. Expansion Joints: Lap type.
 3. Gutters with Girth up to 15 Inches (380 mm): Fabricate from the following material:
 - a. Aluminum: 0.0320 inch (0.8 mm) thick.

4. Gutters with Girth 16 to 20 Inches (410 to 510 mm): Fabricate from the following material:
 - a. Aluminum: 0.040 inch (1.0 mm) thick.
- B. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
 1. Manufactured Hanger Style: Standard.
 2. Fabricate downspouts from the following material:
 - a. Aluminum: 0.024 inch (0.6 mm) thick.

2.9 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
 1. Coat side of uncoated aluminum sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.

3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.
- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 1. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with elastomeric sealant concealed within joints.
- G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
 1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
 2. Aluminum: Use aluminum or stainless-steel fasteners.
 3. Copper: Use copper, hardware bronze, or stainless-steel fasteners.
 4. Stainless Steel: Use stainless-steel fasteners.
- H. Seal joints with elastomeric sealant as required for watertight construction.
 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealant."
- I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm) except where pretinned surface would show in finished Work.
 1. Do not solder prepainted sheet.
 2. Pretinning is not required for zinc-tin alloy-coated stainless steel.
 3. Stainless-Steel Soldering: Pretin edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.
 4. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.
- J. Aluminum Flashing: Rivet or weld joints in uncoated aluminum where necessary for strength.

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
 - 1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 24-inch (600-mm) centers.
- C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with elastomeric sealant.
 - 1. Secure in a waterproof manner by means of interlocking folded seam or blind rivets and sealant.
- D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
 - 1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing.
 - 2. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

3.4 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of formed through-wall flashing is specified in Division 04 Section "Architectural Concrete Masonry".
- C. Reglets: Installation of reglets is specified in Division 03 Section "Cast-in-Place Concrete".
- D. Openings Flashing in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.5 MISCELLANEOUS FLASHING INSTALLATION

- A. Overhead-Piping Safety Pans: Suspend pans from pipe and install drain line to plumbing waste or drain line.
- B. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

THIS PAGE IS LEFT BLANK

SECTION 07 71 00 - ROOF SPECIALTIES**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. This Section includes the following manufactured roof specialties:
 - 1. Copings.
 - 2. Roof edge flashings.
 - 3. Roof edge drainage systems.
 - 4. Counter-flashings and reglets.
- B. Related Sections include the following:
 - 1. Division 01 Section "Construction Waste Management and Disposal"
 - 2. Division 01 Section "Sustainable Design Requirements" for additional LEED requirements.
 - 3. Division 03 Section "Cast-in-Place Concrete" for installing reglets.
 - 4. Division 04 Section "Unit Masonry" for installing reglets.
 - 5. Division 05 Section "Expansion Control" for manufactured sheet metal expansion joint covers.
 - 6. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 7. Division 07 Section "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
 - 8. Division 07 Section "Manufactured Roof Expansion Joints" for manufactured roof expansion-joint cover assemblies.
 - 9. Division 07 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
 - 10. Division 07 Section "Joint Sealants" for field-applied sealants.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Manufacture and install manufactured roof specialties to resist thermally induced movement and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. FMG Listing: Manufacture and install copings and roof edge flashings that are listed in FMG's "Approval Guide" and approved for Windstorm Classification, Class 1- 100. Identify materials with FMG markings.
- C. Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:
 - 1. Design Pressure: 100 mph.

- D. Thermal Movements: Provide manufactured roof specialties that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- E. Water Infiltration: Provide manufactured roof specialties that do not allow water infiltration to building interior.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. LEED Submittals:
 - 1. Environmental Data; LEED CI.
 - 2. Refer to LEED Scorecard for cumulative total Material and Resources credits requirements.
- C. Samples for Initial Selection: For each type of manufactured roof specialty indicated with factory-applied color finishes.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, verifying compliance of copings and roof edge flashings with performance requirements.
- E. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.6 COORDINATION

- A. Coordinate installation of manufactured roof specialties with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

1.7 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace manufactured roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

2.2 EXPOSED METALS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
1. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2604.
 2. Color: As selected by Architect from Manufacturer's full color range.

2.3 CONCEALED METALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by manufacturer for use and structural performance indicated, mill finished.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished. C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.
- C. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.
 - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
- C. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- F. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
- H. Polyethylene Sheet: 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D 4397.
- I. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
 - 1. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft. (0.16 kg/sq. m).

2.5 COPINGS

- A. Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet (3.6 m), concealed anchorage, concealed splice plates with same finish as coping caps, mitered corner units, and end cap units.
 - 1. Manufacturers:
 - a. Architectural Products Co.
 - b. ATAS International, Inc.
 - c. Castle Metal Products.
 - d. Cheney Flashing Company.
 - e. Hickman, W. P. Company.
 - f. Merchant & Evans, Inc.
 - g. Metal-Era, Inc.
 - h. Metal-Fab Manufacturing LLC.
 - i. MM Systems Corporation.
 - j. Perimeter Systems, a division of Southern Aluminum Finishing Co.
 - k. Petersen Aluminum Corp.

2. Coping Caps: Face leg hooked to continuous cleat with back leg fastener exposed, fabricated from the following exposed metal:
 - a. Aluminum: 0.050 inch (1.2 mm) thick.
3. Coping Cap Color: As selected by Architect from Manufacturer's full color range.
4. Corners: Continuously welded.
5. Snap-on Coping Anchor Plates: Concealed, galvanized steel sheet, 12 inches (300 mm) wide, 0.028 inch (0.7 mm) thick, with integral cleats.
6. Face Leg Cleats: Concealed, continuous galvanized steel sheet.

2.6 ROOF EDGE FLASHINGS

- A. Canted Roof Edge Fascia: Manufactured, two-piece, roof edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet (3.6 m) and a continuous formed galvanized steel sheet cant dam, 0.028 inch (0.7 mm) thick, minimum, with integral drip edge cleat. Provide matching mitered and welded corner units.
 1. Manufacturers:
 - a. Architectural Products Co.
 - b. Castle Metal Products.
 - c. Cheney Flashing Company.
 - d. Hickman, W. P. Company.
 - e. Merchant & Evans, Inc.
 - f. Metal-Era, Inc.
 - g. Metal-Fab Manufacturing LLC.
 - h. MM Systems Corporation.
 - i. Perimeter Systems, a division of Southern Aluminum Finishing Co.
 - j. Petersen Aluminum Corp.
 2. Fascia Cover: Fabricated from the following exposed metal:
 - a. Formed Aluminum: 0.050 inch (1.2 mm) thick.
 3. Fascia Cover Color: Bronze
 4. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.
 5. Fascia Accessories: Soffit trim, Overflow scuppers, Downspout scuppers with conductor head and downspout adapters.
- B. Roof Edge Fascia: Manufactured, two-piece, roof edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet (3.6 m) and a continuous formed- or extruded-aluminum anchor bar with integral drip edge cleat to engage fascia cover. Provide matching mitered and welded corner units.
 1. Manufacturers:
 - a. Hickman, W. P. Company.
 - b. Metal-Era, Inc.
 - c. MM Systems Corporation.
 2. Fascia Cover: Fabricated from the following exposed metal:
 - a. Formed Aluminum: 0.050 inch (1.2 mm) thick.

3. Fascia Cover Color: As selected by Architect from Manufacturer's full color range.
 4. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.
 5. Fascia Accessories: Soffit trim, Overflow scuppers, Spillout scuppers, Downspout scuppers with integral conductor head and downspout adapters.
- C. Gravel Stops: Manufactured, one-piece, formed-metal gravel stop in section lengths not exceeding 12 feet (3.6 m), with a horizontal flange and vertical leg fascia terminating in a drip edge, continuous hold-down cleat, and concealed splice plates of same material, finish, and shape as gravel stop. Provide mitered and welded or soldered corner units.
1. Products:
 - a. Material coordinated through Firestone to be used with the TPO roofing in a rake edge condition.
 2. Fabricate from the following exposed metal:
 - a. Aluminum: 0.050 inch (1.2 mm) thick.
 3. Color: As selected by Architect from Manufacturer's full color range.

2.7 ROOF EDGE DRAINAGE SYSTEMS

1. Manufacturers:
 - a. Architectural Products Co.
 - b. ATAS International, Inc.
 - c. Berger Bros. Co.
 - d. Castle Metal Products.
 - e. Cheney Flashing Company.
 - f. Hickman, W. P. Company.
 - g. Merchant & Evans, Inc.
 - h. Metal-Era, Inc.
 - i. Metal-Fab Manufacturing LLC.
 - j. MM Systems Corporation.
 - k. Obdyke, Benjamin Incorporated.
 - l. Perimeter Systems, a division of Southern Aluminum Finishing Co.
 - m. Petersen Aluminum Corp.
- B. Gutters and Downspouts: Manufactured formed gutter in uniform section lengths not exceeding 12 feet (3.6 m), with mitered and welded or soldered corner units, end caps, outlet tubes, and other accessories. Elevate back edge at least 1 inch (25 mm) above front gutter rim. Furnish with flat-stock gutter straps and gutter support brackets and expansion joints and expansion-joint covers fabricated from same metal as gutters.
 1. Fabricate gutter from the following exposed metal:
 - a. Aluminum: 0.050 inch (1.2 mm) thick.
 2. Color: As selected by Architect from Manufacturer's full color range.
 3. Gutter Style: A, according to SMACNA's "Architectural Sheet Metal Manual."
 4. Applied Fascia Cover: Exposed, formed aluminum, 0.040 inch (1.0 mm) thick, with mitered corners, end caps, and concealed splice joints.

5. Downspouts: Rectangular closed-face with mitered elbows, manufactured from the following exposed metal. Furnish wall brackets, from same material and finish as downspouts, with anchors.
 - a. Formed Aluminum: 0.050 inch (1.2 mm) thick.
- C. Parapet and Overflow Scuppers: Manufactured scuppers with closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof.
 1. Manufacture parapet scuppers from the following exposed metal:
 - a. Aluminum: 0.0320 inch (0.8 mm) thick.
 2. Color: As selected by Architect from Manufacturer's full color range.

2.8 PREFORMED FLASHING SLEEVES

- A. Vent Stack Flashing: Metal flashing sleeve, uninsulated, with integral deck flange.
 1. Metal: Aluminum sheet, 0.063 inch thick.
 2. Height: As indicated on Drawings
 3. Diameter: As indicated on Drawings
 4. Anodized Finish: Apply the following coil-anodized finish:
 - a. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

2.9 COUNTERFLASHINGS AND REGLETS

- A. Manufacturers:
 1. Castle Metal Products.
 2. Cheney Flashing Company.
 3. Fry Reglet Corporation.
 4. Hickman, W. P. Company.
 5. Keystone Flashing Company.
 6. Merchant & Evans, Inc.
 7. Metal-Era, Inc.
 8. MM Systems Corporation.
- B. Counterflashings: Manufactured units in lengths not exceeding 12 feet (3.6 m) designed to snap into reglets and compress against base flashings with joints lapped, from the following exposed metal in thickness indicated:
 1. Aluminum: 0.032 inch (0.8 mm) thick.
- C. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashings indicated, from the following exposed metal in thickness indicated:
 1. Aluminum: 0.050 inch (1.2 mm) thick.
 2. Type: Surface-mounted with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.

3. Type: For stucco application, with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
4. Type: For concrete application with temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
5. Type: For masonry application, with offset top flange for embedment in masonry mortar joint.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
 1. Examine walls, roof edges, and parapets for suitable conditions for manufactured roof specialties.
 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install manufactured roof specialties according to manufacturer's written instructions. Anchor manufactured roof specialties securely in place and capable of resisting forces specified in performance requirements. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.
 1. Install manufactured roof specialties with provisions for thermal and structural movement.
 2. Torch cutting of manufactured roof specialties is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 1. Coat concealed side of uncoated aluminum manufactured roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing exposed-to-view components of manufactured roof specialties directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
 3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Install manufactured roof specialties level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil-canning, buckling, or tool marks.
- D. Install manufactured roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
- E. Expansion Provisions: Provide for thermal expansion of exposed manufactured roof specialties. Space movement joints at a maximum of 12 feet (3.6 m) with no unplanned joints within 18 inches (450 mm) of corners or intersections.

- F. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
- G. Seal joints with elastomeric sealant as required by manufacturer of roofing specialties.

3.3 COPING INSTALLATION

- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings to resist uplift and outward forces according to performance requirements.
 - 1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's recommended spacing.
 - 2. Interlock face leg drip edge into continuous cleat anchored to substrate at manufacturer's recommended spacing. Anchor back leg of coping with screw fasteners and elastomeric washers at manufacturer's recommended spacing.

3.4 ROOF EDGE FLASHING INSTALLATION

- A. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
- B. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 24-inch (600-mm) centers.
- C. Install cleats, cant dams, and other anchoring and attachment accessories and devices with concealed fasteners.

3.5 ROOF EDGE DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with elastomeric sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored straps spaced not more than 36 inches (900 mm) apart. Provide end closures and seal watertight with sealant. Slope to downspouts.
 - 1. Fasten gutter spacers to front and back of gutter.
 - 2. Loosely lock straps to front gutter bead and anchor to roof deck.
 - 3. Anchor and loosely lock back edge of gutter to continuous cleat.
 - 4. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches (600 mm) apart.
 - 5. Anchor gutter with spikes and ferrules spaced not more than 24 inches (600 mm) apart.
 - 6. Install gutter with expansion joints at locations indicated but not exceeding 50 feet (15.24 m) apart. Install expansion joint caps.
- C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide fasteners

designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c. in between.

1. Provide elbows at base of downspout to direct water away from building.
 2. Connect downspouts to underground drainage system indicated.
- D. Parapet Scuppers: Install scuppers where indicated through parapet. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
1. Anchor scupper closure trim flange to exterior wall and seal or solder to scupper.
 2. Loosely lock front edge of scupper with conductor head.
 3. Seal or solder exterior wall scupper flanges into back of conductor head.
- E. Conductor Heads: Anchor securely to wall with elevation of conductor head rim 1 inch (25 mm) below scupper, gutter discharge.
- F. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints a minimum of 4 inches (100 mm) in direction of water flow.
- G. Splash Pans: Install where downspouts discharge on low-sloped roofs. Set in elastomeric sealant compatible with roofing membrane.

3.6 COUNTERFLASHING AND REGLET INSTALLATION

- A. Counterflashings: Coordinate installation of counterflashings with installation of base flashings. Insert counterflashings in reglets or receivers and fit tightly to base flashings. Extend counterflashings 4 inches (100 mm) over base flashings. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with elastomeric sealant.
- B. Reglets: Installation of reglets is specified in Division 04 Section " Unit Masonry."

3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as manufactured roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace manufactured roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 71 00

SECTION 07 92 00 - JOINT SEALANT**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. Scope: Provide all of the labor, materials, equipment, and services required to furnish and install the sealant.
- B. The purpose of sealant in this Work is to provide a positive barrier against penetration of air and moisture at joints between items where sealant is essential to continued integrity of the barrier.
- C. This Section includes joint sealants for the following applications:
 - 1. General: Apply sealant at all exposed to view and exposed to weather gaps.
 - 2. Exterior joints in the following vertical surfaces and horizontal non-traffic surfaces:
 - a. Construction joints in cast-in-place concrete.
 - b. Joints between plant-precaster architectural concrete units.
 - c. Control and expansion joints in unit masonry.
 - d. Joints in glass unit masonry assemblies.
 - e. Joints between siding and soffit panel.
 - f. Joints between trim board.
 - g. Joints between different materials listed above.
 - h. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
 - i. Control and expansion joints in, ceilings, and other overhead surfaces.
 - j. All joints that produce gap.
 - 3. Exterior joints in the following horizontal traffic surfaces:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. All joints that produce gap.
 - 4. Interior joints in the following vertical surfaces and horizontal non-traffic surfaces:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior wall openings, apply on both interior and exterior side.
 - c. Tile control and expansion joints.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors and windows
 - e. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - f. Fire-resistive joint system
 - g. All joints that produce gap.

5. Interior joints in the following horizontal traffic surfaces:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints as indicated.

D. Related Sections include the following:

1. Division 04 Section "Glass Unit Masonry".
2. Division 06 Section "Millwork".
3. Division 07 Section "Sheet Metal Flashing and Trim".
4. Division 08 Section "Hollow Metal Doors and Frames".
5. Division 08 Section "Aluminum Windows".
6. Division 09 Section "Painting".
7. Division 22 Section "Plumbing Fixtures".

1.3 SUBMITTALS

A. Prior to installation, submit to the Architect for review the following:

1. Complete and fully descriptive manufacturer's literature for each type of sealant used naming product formulation and giving product limitations.
2. Data proving the product meets or exceeds the Fed. Spec. referenced.
3. Physical sample of all colors for the Architect's selection.
4. Submit statements by the manufacturers and installers of their acceptance of these documents and conditions and/or any modification proposed to the use of the products. Include a statement from the manufacturer that the proposed use of the product for the conditions encountered is proper.
5. Submit warranty documents as stated under warranty of this section.

1.4 QUALITY ASSURANCE

A. Compatibility and adhesion testing: Submit to joint sealant manufacturers samples of materials that will contact or affect joint sealants for compatibility and adhesion testing as indicated below:

1. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - a. Perform tests under normal environmental conditions that will exist during actual installation.
2. Submit not less than 9 pieces of each type of material, including joint substrates, shims, joint sealant backings, secondary seals, and miscellaneous materials.
3. Schedule sufficient time for testing and analysis of results to prevent delay in the progress of the Work.
4. Investigate materials failing compatibility or adhesion tests and obtain joint sealant manufacturer's written recommendations for corrective measures, including use of specially formulated primers.
5. Testing will not be required when joint sealant manufacturer is able to submit joint preparation data required that are acceptable to Architect and are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

- B. Product testing: Provide comprehensive test data for each type of joint sealant based on tests conducted by a qualified independent testing laboratory on current product formulations with in a 24 month period preceding date of Contractor's submittal of test results to Architect.
 - 1. Test elastomeric sealants for compliance with requirements specified by reference to ASTM C920. Include test results for hardness, stain resistance, adhesion and cohesion under cyclic movement (per ASTM C719), low-temperature flexibility, modulus of elasticity at 100% strain, effects of heat aging, and effects of accelerated weathering.
- C. Engage an experienced installer who has completed joint sealant applications similar in material, design, and extent required herein. His work shall have resulted in construction with a record of successful in-service performance and shall be able to show proof of successful similar projects completed over the past 7 years.
- D. Obtain joint sealant materials from a single manufacturer for each different product required.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in original unopened containers or bundles with labels indicating manufacturer product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 JOB CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions.
 - 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than allowed by joint sealant manufacturer for application indicated.
 - 4. Until contaminants capable of interfering with their adhesion are removed from joint substrates.
- B. Note: Typical joint width shall be 3/8" unless otherwise advised by the joint manufacturer for the joint type involved or indicated differently on the Drawings.

1.7 WARRANTY

- A. Submit the following documents at the accountability of the manufacturer and installer:
 - 1. A guarantee warranting All defects of material and/or application for a period of five (5) years from Date of Substantial Completion. Any failure that may occur within this warranty period, due to defective application and/or materials shall, upon written notification of such failure, be repaired or replaced with proper materials and/or labor as approved by the Architect, at no additional cost to the Owner.

PART 2 - PRODUCTS**2.1 SEALANT - EXPANSION JOINTS, CONTROL JOINTS, AND PERIMETER OF DOOR AND WINDOW FRAMES**

- A. Product/manufacturer:
 - 1. Dynatrol II as manufactured by Pecora Corp.
 - 2. Dymeric as manufactured by Tremco.
 - 3. Sonloastic NP2 as manufactured by Sonneborn
 - 4. Or approved alternate.
- B. Type: Two-part, non-sag, low-modulus polyurethane rubber sealant.
 - 1. FS TT-S-00227E, Class A, Type II.
 - 2. ASTM C-920, Type M, Grade NS, Class 25, use NT, MA, A, G, and O.
- C. Joint Backing: Closed-cell polyethylene.
- D. Where joint depth does not permit use of joint backing, a release paper or bond breaker shall be used.
- E. On horizontal joints, surface must be cleaned and primed using primer as recommended by the sealant manufacturer.
- F. In all cases at aluminum storefront, curtain wall and windows, ensure and verify that specified sealant is compatible with aluminum finish.
 - 1. If not, notify the Architect immediately in order that a new product may be selected.
 - 2. Submit the aluminum storefront, curtain wall and window manufacturer's recommendation as to the type of product that should be substituted.

2.2 SEALANT - GENERAL PERIMETER SEALING AT TOILET FIXTURES, ACCESS DOORS, DOOR FRAMES, VANITIES, ETC. IN WET AREAS

- A. Product/manufacturer:
 - 1. 898 Sanitary Silicone Sealant as manufactured by Pecora Corp.
 - 2. Tremsil 200 as manufactured by Tremco.
 - 3. Or approved alternate.
- B. Type: One-part, neutral-curing silicone.
 - 1. FS TT-S-001543A.
 - 2. FS TT-S-00230C, Class A.
 - 3. ASTM C920, Class 25.
- C. Install after completion of all painting.

2.3 SETTING THRESHOLDS; FLASHING; AND GENERAL SEALING NOT OTHERWISE DELEGATED

A. Product/manufacturer:

1. AC-20 + Silicone as manufactured by Pecora Corp.
2. Tremflex 834 as manufactured by Tremco.
3. Sonolastic Sonolac as manufactured by Sonneborn.
4. Or approved alternate.

B. Type: Siliconized one-part, non-sag, acrylic latex caulk.

1. ASTM C-834.

C. Joint Backing: Round closed-cell polyethylene.

2.4 FIRE-RESISTIVE JOINT SYSTEM

A. Designation System for Joints in or between Fire-Resistance-Rated Constructions: Alphanumeric systems listed in UL's "Fire Resistance Directory" under Product Category XHBN.

B. Designation System for Joints at the Intersection of Fire-Resistance-Rated Floor or Floor/Ceiling Assembly: Alphanumeric systems listed in UL's "Fire Resistance Directory" under Product Category XHDG.

2.5 PRIMERS

A. As recommended by the sealant manufacturer for use in conjunction with the sealant for application onto the various types of materials to which the sealant applied, and complying with the requirements above. When the manufacturer's instructions make reference to use of primers and/or the construction condition requires special surface preparation, these instructions shall be complied with.

2.6 CLEANERS:

A. Where required by manufacturer's instructions in lieu of primers, shall be of the type and kind recommended by the sealant manufacturer.

PART 3 - EXECUTION**3.1 PREPARATION:**

A. Surface cleaning of joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings, tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean concrete, masonry, unglazed surfaces of ceramic tile, similar porous joint substrate surfaces by brushing, grinding, blast cleaning, 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 from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form release agents from concrete and masonry.

4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other non-porous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Prime joint substrates where indicated and also where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 CHOICE OF CAULKING MATERIAL:

- A. Use only that caulking material which is best suited to the installation and is so recommended by the caulking material manufacturer.

3.3 BACK-UP MATERIALS:

- A. Verify the compatibility of filler material with caulking before installation.
- B. Use filler about 1/3 to 1/2 wider than width of joint so sufficient pressure is exerted by filler to provide substantial resistance to displacement.
- C. All filler materials shall be non-oily, non-staining, back-up filler such as polyethylene foam rod, expanded polyurethane, neoprene or other filler completely compatible with the caulking material.

3.4 APPLICATION OF CAULKING:

- A. Do not caulk under weather conditions or sun conditions potentially harmful to the set and curing of the caulking material.
- B. Deliver materials to the job or place of application in original unopened containers bearing manufacturer's name and product designation.
- C. Install caulking in strict accordance with the manufacturer's recommendations, taking care to produce beads of proper width and depth, to tool as recommended by the manufacturer, and to immediately remove all surplus caulking.

3.5 CAULKING SCHEDULE:

- A. Carefully study the Drawings and furnish and install the proper caulking at each point where called for on the Drawings plus at all other points, whether specifically designated or not, where caulking is essential in maintaining the continued integrity of the intended watertight barrier.

END OF SECTION