SECTION 07 6110 - STANDING SEAM METAL ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide the work of this Section as indicated and specified. Extent of metal roofing and siding is indicated. Types of metal panels required include, but are not limited to:
   1. Factory formed standing seam roofing panels with manufacturer's standard snap-on seam caps.
   2. Fascia, trim, and associated metal flashing at perimeters, penetrations, and roof curbs.
   3. Gutters integral with metal roofing system.
   4. Prefabricated metal roof curbs for all roof penetrations including but not limited to HVAC units, skylights, duct openings, and exhaust fans.

B. Related Sections:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
   2. Section 01 3560: High performance criteria summary.
   3. Section 07 7210: Polyisocyanurate insulation board.
   4. Section 07 6200: Sheet metal flashing and trim.
   5. Section 07 9210: Sealants and caulking.

1.2 PERFORMANCE REQUIREMENTS

A. Provide metal roofing system which has been tested and certified by the manufacturer to furnish the following resistance after metal roofing installation:
   1. UL Class 90; UL 580.
   2. ASTM E1592-95 for negative loading. Capacity for gage, span, or loading other than those tested may be determined by interpolating between test values only.
   3. UL Class 4; UL 2218.
   4. Metal roof panel systems shall have a maximum air infiltration rate of 0.007 cfm/ft2 at a pressure differential of 6.24 psf. when tested in accordance with ASTM E1680-95.
   5. Metal roof panel systems shall have no uncontrollable water leakage at a pressure differential of 2.86 psf. when tested in accordance with ASTM E1646-95.
   6. Class 'A' UL Fire Classification, Per ASTM E-108.

B. Solar Reflective Index: Minimum SRI of 75; or minimum solar reflectance of 0.63 and minimum thermal emmitance of 75.

1.3 DESIGN REQUIREMENTS

A. Design, manufacture, and install metal roof system to meet the requirements of this Section using the following loads:
   1. Wind Pressure: 50 psf uplift in field (Zone 1), and 65 psf uplift at eaves and overhangs (Zone 2).

B. Accessories and Fasteners:
   1. Shall be capable of resisting specified design wind uplift forces and allow for thermal movement of metal roof system.
   2. Exposed fasteners shall not restrict free movement of metal roof system resulting from thermal forces, except at designed points of roof panel fixity.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 3300.
   1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
   2. Installation Procedures: Submit manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
   3. Shop Drawings: Indicate typical layout including dimensions. Submit detailed drawings of all profiles, joints, connections, edge conditions, valleys, roof curbs, vents, supports, anchorages, trim, flashings, closures, and interfaces with other materials. Submit detailed drawings of special accessory components not included in manufacturer's product data and provisions for expansion and contraction.
   4. Calculations: Submit calculations indicating compliance with the requirements of this section.
   5. Test Reports: Submit copies of test reports indicating compliance with ASTM E1592, UL 2218 Class 4 hail rating, and UL 580 Class 90.
   5. Samples: Submit 3 samples, each approximately 12" square, in colors specified.
   6. Certification: Submit letter from manufacturer certifying installer as the Manufacturer's Certified Installer.
   7. Roofing installer shall provide evidence of a minimum of 5 roofing installations of similar size and complexity with similar material. Provide references including project name and location, telephone number and name of Owner and General Contractor, size of project, and date of completion. Failure to provide the above information shall be reason for rejection of this subcontractor. The General Contractor shall thereby provide another subcontractor with approved experience at no additional cost to the owner.

1.5 QUALITY ASSURANCE

A. Applicable Standards:
   1. ASTM E1592 Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
   2. UL 580 Tests for Uplift Resistance of Roof Assemblies.
   3. UL 2218 Impact Resistance of Prepared Roof Covering Materials.
   4. ASCE 7 Minimum Design Loads for Buildings and Other Structures.

B. Installer Qualifications:
   1. A single installer (roofer) shall perform the work of this section; and shall be a firm with not less than 5 years of successful experience in installation of preformed metal roofing/siding similar to those in size and complexity for this project and which is acceptable to or licensed by manufacturer of the primary roofing materials.
   2. Installer shall have received training and licensing from the manufacturer for installation of the specified metal roofing system.
   3. Panels and flashings specified in this section shall be radius formed by a manufacturer authorized contractor using only manufacturer authorized and inspected equipment.

C. Colors: Provide finish selections indicated in the Finish Schedule.
   1. Acceptable Manufacturers: The products and manufacturers specified in the Finish Schedule are for purposes of establishing color and quality. Refer to each Specification Section for additional manufacturers and Section 01 2500 for substitution requirements.
   2. Manufacturer's Standard Colors and Finishes: Where the Finish Schedule specifies a manufacturer's standard color or finish, the Architect makes no guarantee that matching colors or finishes are available as other manufacturer's "standard colors" from the listing of acceptable manufacturers. The Contractor shall be responsible for providing colors matching those indicated on the Drawings.
   3. Custom Colors: Where the Finish Schedule indicates a specific manufacturer's colors, other acceptable manufacturers shall provide matching custom colors where a standard color is not acceptable.

D. Roofing Manufacturer's Representative: Roofing manufacturer's representative (field engineer) shall:
1. Attend preconstruction conference.
2. Attend preroofing conference.
3. Make periodic inspections, during roof system installation, for compliance with the Contract.
4. Inspect roof when complete.
5. Inspect roof prior to the end of the 3-Year special project warranty called for in 1.7.C.

1.6 PRE-ROOFING MEETING

A. Not less than three nor more than 10 calendar days prior to scheduled start of roofing installation, conduct a roofing substrata inspection and pre-roofing meeting at the job site. Review methods and procedures related to roofing system including, but not limited to, the following:
1. Meet with Owner, Architect, Inspector, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
2. Discuss proposed schedule for installation of the roofing, and reach agreement as to dates of start and finish of installation of the roofing.
3. Discuss product submittals and warranties.
4. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
5. Discuss interface with the work of other trades.
6. Discuss proposed methods for installation of the roofing, and equipment and personnel to be used.
7. Discuss inspection methods to be used.
8. Visually inspect all substrata upon which roofing is scheduled to be applied for compliance with requirements, including flatness and fastening.
a. Determine general acceptability, and determine areas requiring further preparation.
b. Determine acceptable remedies for unacceptable areas.
9. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.

1.7 SPECIAL **WARRANTY**

A. PVDF (Polyvinylidene Fluoride) Coating Warranty: In addition to the warranty requirements of the Contract Documents, submit 2 original copies of coating applicator's **20-year** extended warranty. Warrant coating against peeling, blistering, chipping, checking, chalking in excess of a numerical rating of 8 when measured in accordance with ASTM D659, and fading and color change in excess of 5 NBS units when measured in accordance with ASTM D2244.

B. Installer's Warranty: In addition to the warranty requirements of the Contract Documents, submit 2 original copies of the roofing installer's **3-year** extended warranty covering roof system installation and water-tightness.
1. Warranty shall include repair or replacement of damaged finishes, furnishings and equipment due to defective roof materials or workmanship and return building to its original condition.
2. Installer shall make repairs without reference to or consideration of the cause or nature of such leaks or defects within 24 hours after receipt of notice from the Owner by telephone, telegram, or letter.
3. Repairs required within the warranty period shall be provided without cost to the Owner; except that repairs required consequent to an act of God, abuse, alterations, or failure of the substrata or the supporting structure (other than caused by defects in the work of this Section) will be paid for by the Owner promptly upon completion of the repair in each instance.
4. Repairs completed at Owner's cost shall be invoiced to the Owner at prevailing rates, and shall include an itemized breakdown of quantities plus unit cost for labor and materials, and shall include not more than 15% markup for overhead and profit.

5. This warranty shall be in addition to the warranty requirements of the Contract Documents and the enforcement of its provisions shall not deprive the Owner of any action, right, or remedy otherwise available to him.

C. Roof Manufacturer's Warranty: In addition to the warranty requirements of the Contract Documents, roof system manufacturer shall execute two copies of a single warranty covering of the following criteria. Multiple-source warranties are not acceptable.
1. Manufacturer's **20-year** "No Dollar Limit" watertightness warranty, including coverage for all trim, flashings, and penetrations associated with the roof area.
2. The metal roof panel system shall not allow intrusion of water from the exterior of the roof system into the building envelope, when exposed to ordinary weather conditions and ordinary wear and usage.
3. Warranty shall commence on date of Notice of Completion.

1.8 MANUFACTURER'S INSPECTIONS

A. When the project is in progress, the roofing system manufacturer will inspect the work not less than 3 days per week. In addition, the manufacturer will:
1. Keep the Architect or Owner informed as to the progress and quality of the work as observed.
2. Report to the Architect in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
3. Confirm after completion that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01620.

B. Galvalume(R): ASTMA 792; Bethlehem Steel Corporation cold-rolled steel sheet to which corrosion-resistant aluminum-zinc alloy coating is factory-applied.

C. Factory Finish PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; 70% Kynar 500 resin or Hylar 5000 resin.
1. 2-Coat Finish: Dry Film Thickness, ASTM D1400; 0.15 mil primer coat plus 0.70 mil color coat, 0.85 mil total minimum thickness.
2. Color: As indicated on the Finish Schedule.

2.2 METAL ROOFING PANELS

A. Acceptable Products - Straight Panels:
1. LokSeam by MBCI.
2. Snap Seam by AEP-SPAN.
3. Permaseam by McElroy Metal, Inc.
4. Vertical Seam by Metal Sales Manufacturing Corporation.
5. UC-14RS by Firestone Building Products Inc.
6. Thin Seam by Fabral.

B. Configuration: Integral self-locking standing seams with concealed clips, 1-3/4" high nominal, nominal spacing of 16" or 18" on center, with panel factory-corrective leveled, with factory applied high-grade elastomeric sealant within the confines of the female seam flange, for watertight seal of seam.

2.4 ACCESSORIES

A. Concealed Clip/Fastener Assembly:
1. Clip: 18 gage minimum thickness, Class 90 (UL-90) rated for the substrates specified, minimum G-60 galvanized per ASTM A525. Structurally embossed outstanding legs fabricated to raise underside of panels above substrate to create positive ventilation and eliminate underside condensation and corrosion.
2. Metal substrate fasteners: Manufacturer's standard #10-16 x 1" long self-drilling, self-tapping pancake head Phillips drive screws for metal, corrosion resistant.
3. Wood substrate fasteners: Manufacturer's standard #10-12 x 1" long A-point fastener, pancake head Phillips drive screws for plywood, corrosion resistant.

B. Exposed Fasteners: EPDM gasketed heads with color to match exterior panel color.

C. Closures: Manufacturer's standard, weatherproof, tightly fitted to panel configuration.

D. Sealant:
1. Concealed sealants: Manufacturer's recommended sealant.
2. Tape sealants: Butyl.
3. In-seam sealant: Factory applied, non-shrinking, non-drying synthetic butyl elastomer.

E. Bituminous Coating: Cold-applied asphalt mastic, SSPC paint 12, compounded for 15 mil dry film thickness per coat.

F. Flashings and Trim: Material, thickness, and finish to match roof panels.

2.5 UNDERLAYMENT

A. Membrane Underlayment: SlopeShield Plus SA by VaproShield, 20 mils thickness, or approved equal.
1. Air Permeance: 0.00086 cfm/sf at 1.57 lbs/sf; ASTM E2178.
2. Water Vapor Permeance: 30 perms; ASTM E96.
3. Surface Burning Characteristics: Class A, ASTM E84; flame spread rating of 5 and smoke development classification of 45.
4. Tensile Strength: 16 lbF/in MD and 8 lbF/in XMD; ASTM D2523.

2.6 PREMANUFACTURED ROOF CURBS

A. Prefabricated Metal Roof Curbs by LMCurbs, 800-284-1412, or approved equal.

B. Construction: Minimum thickness of 0.080" aluminum; 3003H14. Provide heavier thickness where needed to support the load of the equipment, fully mitered and heli-arc welded watertight corners and seams, integral base plates, with integral water diverter cricket, and factory installed insulation.

C. Roof Curb Fabrication:
1. 8" minimum height above finished roof surface at high side.
2. Construct curbs to match slope of roof and provide a level top surface for mounting equipment.
3. Construct curb flange to match configuration of roof panel. Extend side flange to the next natural seam in the roof panels conform to seam configurations.
4. Provide interior partitions as needed for HVAC equipment.

D. Coordination: Coordinate between the curb manufacturer, the general contractor, and the mechanical contractor prior to curb fabrication.

2.7 FABRICATION

A. Roof Panel Fabrication:
1. Fabricate panels in continuous 1-piece lengths and flashings in longest practical lengths.
2. Factory form panels and flashings. Field formed panels and flashings will not be acceptable.
3. Engineer and fabricate panels to use concealed clips and fasteners that permit expansion and contraction.

B. Flashing Fabrication:
1. Fabricate in accordance with the SMACNA Architectural Sheet Metal Manual.
a. Form sheet metal accurately and to the dimensions and shapes required, finishing molded and broken surfaces with true, sharp, and straight lines and angles and, where intercepting other members, coping to an accurate fit and soldering securely.
b. Unless otherwise specifically permitted by the Architect, turn exposed edges back 1/2".
c. Shop fabricate work to the greatest extent possible.
2. Fabricate, and form work to fit substrates. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
3. Fabricate to shapes indicated in 10'-0" lengths except where shorter lengths are required by construction or sheet size.
4. Corners: Shop prefabricate interior and exterior turns, and other changes in direction using epoxy seam sealer and rivets to rigidly secure the assembly and render watertight.
5. Fabricate curved flashings to radius indicated on the drawings by means of a curving mill provided by the metal roofing manufacturer. Other means of curving roof panels will not be acceptable.

2.8 REQUIRED MATERIALS

A. As part of the work of this Section, provide all materials required by the roofing manufacturer for the specified special warranties specified.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas 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. Verify that substrate is sound, dry, properly sloped for drainage, and completely secured in position.

C. Verify that provision has been made for roof drains, scuppers, flashings, and all other interface items attaching to or penetrating through the work of this Section.

D. Beginning installation constitutes acceptance of the substrate and responsibility for proper performance.

3.2 INSTALLATION, GENERAL

A. Do not allow the installed work of this Section to be used as a storage space for other materials.

B. Do not permit unnecessary walking on the finished roof. Require all personnel to wear clean, soft-soled work shoes that will not pick up stones or other abrasive material which could cause damage and/or discoloration when installing or walking on the finished roof.

C. Remove and replace all damaged material.

3.3 UNDERLAYMENT INSTALLATION

A. Membrane Underlayment: Install shingle fashion in strict accordance with the manufacturer's written instructions in valleys, continuous at roof ridge and eaves, at all roof penetrations (HVAC, plumbing, electrical), and other locations indicated. Install per manufacturers recommendations

3.4 ROOF CURB INSTALLATION

A. Comply with roof curb manufacturer's written instructions, providing watertight seal between curb flanges and metal roofing panels.

3.5 ROOF PANEL INSTALLATION

A. Install the work of this Section in strict accordance with the manufacturer's recommendations as approved by the Architect, anchoring all components firmly into position as a completely watertight and weather-tight installation. Install all work with concealed fasteners, clips, and cleats typically.

B. Roof Panels: Follow roof panel manufacturer's written instructions. Install panel seams vertically.
1. Lap panels away from prevailing wind direction.
2. Do not stretch or compress panel side-lap interlocks.
3. Secure panel without warp or deflection.
4. Fully engage battens.
5. Remove strippable protective film, if used, **immediately preceding** panel installation.
6. Space and anchor seam fastener clips in accordance with the manufacturer's recommendations for the performance and design requirements specified, 24" maximum spacing.

C. Allowable Erection Tolerance: Maximum alignment variation shall not exceed 1/4" in 40'-0".

D. Flashing: Follow manufacturer's directions and approved shop drawings. Install flashings to allow for thermal movement.

E. Cutting and Fitting: Neat, square and true. Torch cutting is prohibited. Openings 6" and larger in any direction: Shop fabricate and reinforce to maintain original load capacity. Where necessary to saw panels, debur and treat with galvanic paint.

F. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of panel system. Provide types of gaskets, sealants, and fillers indicated or, if not otherwise indicated, types recommended by panel manufacturer.
1. Provide weatherseal under ridge cap. Flash and seal roof panels at eave and rake with rubber, neoprene, or other closures to exclude weather.

G. Sealant: Field apply sealant to penetrations, transitions, and other locations necessary for an waterproof installation.

H. Conduit and pipe supports: Acceptable Manufacture **"DURA-BLOK"** B Line Series. Support to be installed every 10' at all electrical, plumbing, or pipes on roof.

3.6 SEAMING

A. Interlock panel seams entire length of seam.

B. Complete seaming of roof panel joints as recommended by roof panel manufacturer to furnish weathertight joint.

3.7 FLASHING INSTALLATION

A. Formed Copings: Fabricate profile as indicated. Install 8" long concealed back-up plate, formed to exact profile of coping, at joints and secure plate in place prior to coping installation. Install a continuous bead of sealant each side of joint and set coping in place leaving 1/4" space between sections. Secure front edge with continuous cleat secured at 18" on center maximum. Minimum thickness as follows:
1. 24 gage minimum for 12" maximum top width.
2. 22 gage minimum for 13" to 18" top width.

B. Exposed Gutters: Fabricate profile as indicted. Provide expansion joints with watertight joints. Seal all joints with sealant. Minimum thickness 24 gage.

C. Exposed Downspouts: Fabricate profile as indicated. Provide strainers with outlet tubes. 24 gage minimum thickness.

D. Continuous Cleats: Form from same material as the unit which the cleat anchors. 20 gage minimum thickness.

3.8 CLEAN UP

A. Touch up damaged paint surfaces with air dry touch up paint provided by manufacturer. Follow directions carefully to minimize color irregularities. Small brush application only - **do not spray touch up paint.**

B. At completion of each day's work and at Work Completion, sweep panels, flashing and gutters clean. Do not allow fasteners, cuttings, filings or scraps to accumulate. Remove debris from project site upon completion of each phase/building of work.

END OF SECTION 07 6110

SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Provide flashing and sheet metal not specifically described in other Sections of these Specifications but required to prevent penetration of water through the exterior shell of the building.

B. Types of flashing and sheet metal work include, but are not limited to:
1. Metal copings.
2. Metal wall and counter-flashings.
3. Gutters, downspouts, and scuppers.
4. Metal trim/fascia units.
5. Miscellaneous sheet metal accessories.
6. Sheet metal expansion joint systems.

C. Related Sections:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
2. Section 07 5400: Thermoplastic membrane roofing.
3. Section 07 6100: Standing seam metal roofing.

1.2 SUBMITTALS

A. General: Submit in accordance with Section 01 3300.
1. Shop Drawings: Submit detailed drawings of layout, joining, profiles, terminations, and anchorages of fabricated work. Submit detailed drawings of special accessory components.
2. Samples: Submit 3 samples, each approximately 12" square, in colors specified.

1.3 QUALITY ASSURANCE

A. In addition to complying with pertinent codes and regulations, comply with pertinent recommendations contained in current edition of "Architectural Sheet Metal Manual" published by the Sheet Metal and Air-Conditioning Contractors National Association (SMACNA).

B. Standard commercial items may be used for flashing, trim, reglets and similar purposes provided such items meet or exceed the quality standards specified.

C. Colors: Provide finish selections indicated in the Finish Schedule.
1. Acceptable Manufacturers: The products and manufacturers specified in the Finish Schedule are for purposes of establishing color and quality. Refer to each Specification Section for additional manufacturers and Section 01 2500 for substitution requirements.
2. Manufacturer's Standard Colors and Finishes: Where the Finish Schedule specifies a manufacturer's standard color or finish, the Architect makes no guarantee that matching colors or finishes are available as other manufacturer's "standard colors" from the listing of acceptable manufacturers. The Contractor shall be responsible for providing colors matching those indicated on the Drawings.
3. Custom Colors: Where the Finish Schedule indicates a specific manufacturer's colors, other acceptable manufacturers shall provide matching custom colors where a standard color is not acceptable.

1.4 SPECIAL WARRANTY

A. PVDF (Polyvinylidene Fluoride) Coating Warranty: In addition to the warranty requirements of the Contract Documents, submit 2 original copies of coating applicator's 20-Year warranty. Warrant coating against peeling, blistering, chipping, checking, chalking in excess of a numerical rating of 8 when measured in accordance with ASTM D659, and fading and color change in excess of 5 NBS units when measured in accordance with ASTM D2244.2.

B. Special Project Warranty: Upon completion of the Work and as a condition of its acceptance, deliver to the Architect two original copies of the following Special Warranty, signed by the Contractor and the roofing subcontractor:
1. The undersigned hereby propose, and upon execution of this document by the Owner, agree for a period of 2 years after Substantial Completion of the Work to make immediate repairs as required to stop leaks or correct defects in the work of this Section, within 24 hours after receipt of notice from the Owner by telephone, telegram, or letter; and further agree to make such repairs without reference to or consideration of the cause or nature of such leaks or defects.
2. As a further condition of this 2-year Special Warranty, the undersigned hereby agree to repair or replace any other damaged products and finishes, to return the building to its original condition, and to notify the roof system manufacturer in writing within 30 days that such repairs were made.
3. Repairs required within the stated period will be provided without cost to the Owner; except that repairs required consequent to an act of God, abuse, alterations, or failure of the substrata or the supporting structure (other than caused by defects in the work of this Section) will be paid for by the Owner promptly upon completion of the repair in each instance.
4. Repairs completed at Owner's cost shall be invoiced to the Owner at prevailing rates, and shall include an itemized breakdown of quantities plus unit cost for labor and materials, and shall include not more than 15% markup for overhead and profit.
5. This Special Warranty shall be in addition to the warranty requirements of the Contract Documents and the enforcement of its provisions shall not deprive the Owner of any action, right, or remedy otherwise available to him.

PART 2 - PRODUCTS

2.1 FLASHING MATERIALS

A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

B. Materials and Gauges: Where sheet metal is required, and no material or gauge is indicated on the Drawings, provide highest quality and gauge commensurate with the referenced standards. In no case shall sheet metal be less than 24 gauge.

C. Galvanized Steel Sheet Materials: ASTM A653, with G90 zinc coating; minimum 24 gauge except as otherwise indicated.

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

2.2 PREMANUFACTURED PARAPET COPING ASSEMBLIES

A. Coping Manufacturer: Subject to compliance with requirements, provide products by:
1. R-Mer Edge Coping by Garland, 1-800-321-9336.

2. Perma-Tite Coping by Metal-Era, 1-800-558-2162.
3. Permasnap Coping by Hickman Engineered Systems, 1-828-676-1700.
4. Presto Lock Coping by Johns Manville, 1-800-445-1500.
5. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01620.

B. Performance Characteristics:
1. Pull-Off Resistance: Tested in accordance with SPRI ES-1 RE-3 to positive and negative design wind pressure as defined by CBC Section 1504.5.
2. Coping sections shall expand and contract freely while mechanically locked in place on anchor cleats.
3. Coping sections shall lock to anchor cleats by mechanical pressure from support chairs.
4. All coping cover joints shall be underlayed with gutter/support chairs capable of draining water.

C. Materials:
1. Coping: Formed steel sheet, galvanized, 24 gauge thick, minimum; factory finish PVDF coating
2. Anchor Cleat: 20 gauge galvanized steel, 12" wide, with coping support; cleat spaced at 5'-0"on center minimum, mechanically fastened as indicated.
3. Concealed Splice Plates: Material and finish to match coping, 8 inch" wide, with factory applied dual non-curing sealant strips or formed water channels.
4. Fasteners: Stainless steel screw type with a minimum pull-out resistance of 240 #; no exposed fasteners permitted.

D. Fabrication:
1. Factory fabricated to sizes required.
2. Factory fabricated mitered and welded corners, end caps, and wall terminations.
3. Factory formed to radius and arch where indicated.

2.3 PREMANUFACTURED REGLET ASSEMBLIES

A. Reglet Manufacturer: Subject to compliance with requirements, provide products by:
1. Springlock Flashing and Reglets by Fry Reglet Corp.
2. Snap-Tite System by Mm Systems Corp.
3. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01620.

B. Materials:
1. Reglet: 24 gauge galavanized steel; ASTM A653 with G90 zinc coating.
2. Counter Flashing: 24 gauge galavanized steel; ASTM A653 with G90 zinc coating; factory prefinished.
3. Provide prefabricated prefinished inside and outside corners, sealed watertight.

2.4 FABRICATED FLASHINGS

A. Fascia: Fabricate profile as indicated, 24 gauge minimum thickness.
1. 6" wide concealed back-up plate, formed to exact profile of fascia and secure plate in place prior to installation.
2. Install continuous bead of sealant each side of joint and set fascia in place leaving 1/4" space between sections.

B. Exposed Gutters: Fabricate profile as indicted, 24 gauge minimum thickness.
1. Provide expansion joints with watertight joints.
2. Seal all joints with sealant.

C. Exposed Downspouts: Fabricate profile as indicted, 24 gauge minimum thickness.
   1. Provide strainers with outlet tubes.

D. Stepped Flashing: 24 gauge minimum thickness.
   1. Fabricate as indicated similar to SMACNA Figure 4-22A.

E. Crickets: 22 gauge minimum thickness.
   1. Fabricate as indicated similar to SMACNA Figure 4-18, Detail 2.

F. Drip Edges: Fabricate as indicated, 24gauge minimum thickness.

G. Continuous Cleats: Form from same material as the unit which the cleat anchors, 20 gauge minimum thickness.

2.5 FINISHES

A. Factory Finish PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; 70% Kynar 500 resin or Hylar 5000 resin.
   1. 2-Coat Finish: Dry Film Thickness, ASTM D1400; 0.15 mil primer coat plus 0.70 mil color coat, 0.85 mil total minimum thickness.
   2. Color: As indicated on the Finish Schedule.
   3. Provide factory applied strippable plastic film for protection during fabrication and installation.

B. Field Painted Finish: Mill phosphate for painting in the field as specified in Section 09 9100.

2.6 MISCELLANEOUS MATERIALS

A. Nails, Rivets, and Fasteners: Same metal as flashing/sheet metal or other noncorrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

B. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

C. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application offlashing sheet

D. Roofing Cement: ASTM D 2822, asphaltic.

E. Epoxy Seam Sealer: 2-part noncorrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior non-moving joints including riveted joints.

F. Solder: For use with steel provide 50-50 tin/lead solder (ASTM 832), with rosin flux.

G. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.7 FABRICATION

A. General: Fabricate in accordance with the SMACNA Architectural Sheet Metal Manual.
   1. Form sheet metal accurately and to the dimensions and shapes required, finishing molded and broken surfaces with true, sharp, and straight lines and angles and, where intercepting other members, coping to an accurate fit and soldering securely.
   2. Unless otherwise specifically permitted by the Architect, turn exposed edges back 1/2".

3. Shop fabricate work to the greatest extent possible.

B. Fabricate and form work to fit substrates. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

C. Fabricate to shapes indicated in 10'-0" lengths except where shorter lengths are required by construction or sheet size.

D. Corners: Shop prefabricate interior and exterior turns, and other changes in direction using epoxy seam sealer and rivets to rigidly secure the assembly and render watertight.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas 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.

3.2 WORKMANSHIP

A. General: Comply with manufacturer's written instructions and with SMACNA Architectural Sheet Metal Manual, 2003 Edition. Anchor units securely in place by methods indicated, providing for expansion of metal units; conceal fasteners where possible; and set units true to line and level. Install work with laps, joints, and seams which will be permanently watertight and weatherproof.
1. Where lap seams are indicated, lap according to pitch, but not less than 3".
2. Make flat and lap seams in the direction of flow.

B. Joints:
1. Join parts with rivets or sheet metal screws where necessary for strength and stiffness.
2. Provide suitable watertight expansion joints for runs of more than 40'-0", except where closer spacing is indicated on the Drawings or required for proper installation.

C. Separations:
1. Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
2. Where sheet metal work will be in contact with masonry, concrete, or stone, evenly coat contact surfaces with non-sagging mastic. Where sheet metal work will be embedded in mortar joints, evenly coat both sides with non-sagging mastic.

D. Embedment: Embed metal in connection with roofs in a solid bed of sealant, using materials and methods described in Section 07 9210 of these Specifications or other materials and methods approved by the Architect.

3.4 COPING INSTALLATION

A. Snap-On Coping Cap Detail:
1. Install miters first.
2. Position base flashing of the roofing membrane over the wall edge covering nailers completely, fastening 8" on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.

3. Install minimum 16 gauge, 16" long anchor chair at a maximum of 60" on center.
4. Install 6" wide splice plate by centering over 16" long by specified width anchor chair. Apply two beads of sealant to either side of the splice plate's center, approximately 2" from the coping cap joint. Install coping cap by hooking outside hem of coping on outside face of anchor chair. Press downward on inside edge of coping until "snap" occurs and hem is engaged on the entire chair.

B. Installing contractor shall check as-built conditions and verify the manufacturer's coping details for accuracy to fit the wall assembly prior to fabrication. The installer shall comply with the coping manufacturer's installation guide when setting copings.

C. Installer shall use mechanical fasteners with minimum 240 # (109 kg) pull-out resistance suitable for parapet substrates.

3.5 CLEANUP

A. After completion, clean all exposed work of scraps, stains, and dirt. After cleaning, wash with clean water and wipe dry.

END OF SECTION 07 6200

SECTION 07 7200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Provide roof accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation. Roof accessories include, but are not limited to the following:
   1. Roof hatches.
   2. Roof curbs.

B. Related Sections:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
   2. Section 07 5400: Thermoplastic membrane roofing.
   3. Section 07 6100: Standing seam metal roofing.

1.2 SUBMITTALS

A. General: Submit in accordance with Section 01 3300.
   1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
   2. Installation Procedures: Submit manufacturers recommended installation procedures.

B. Contract Closeout Submittals: Comply with requirements of Section 01 7700.
   1. Operation and Maintenance manuals in accordance with requirements of Section 01 7820.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 ROOF ACCESS HATCH

A. Roof Hatch:
   1. Construction: 14 gage galvanized sheet metal.
   2. Finish: Factory prime coated for finish painting at the job site.
   3. Insulation: 1-1/2" rigid glass fiber, located on outside face of curb.
   4. Mounting: Provide frames and curbs suitable for mounting conditions indicated on the Drawings.
   5. Curb Height: 8" from finished surface of roof, minimum.
   6. Ladder Safety Post: At ladder access hatches; galvanized steel telescoping tubular section secured to ladder rungs that locks automatically when fully extended. Upward and downward movement controlled by a stainless steel spring balancing mechanism; Bilco Model LU-2 or approved equal.

B. Acceptable Ladder Access Products:
   1. J.L. Industries, Model RGH-1.
   2. Dur-Red, Model No. LH, 30" x 36".
   3. Nystrom, Model RHG, 30" x 36".
   4. Lane-Aire, Standard Rood Hatch, 30" x 36".

5. Bilco, Type S, 30" x 36".

D. Personal Fall Arrest/Restraint Anchorage: Required at all roof hatches and rooftop equipment when located within 10 feet of a roof edge or open side of a walking surface and when such edge or open side is located more than 30 inches above the floor, roof or grade below. In accordance with ANSI/ASSE Z359.1; OSHA 1926.502 compliant.
   1. At built-up and thermoplastic membrane roofing. Single point anchor post that fastens through membrane, insulation and into metal sheathing, wood blocking or concrete. Acceptable Products:
      a. Miller Fusion Roof Anchor Post Permanent Roof Anchor. SKU X10030 or X10031 and all related accessories as required.

E. Hatch Rail System: Fiberglass reinforced polymer fixed safety railing system mounted to roof hatch flashing without penetrating roof membrane; OSHA 29 CFR 1910.23 compliant.
   1. Acceptable Products: Bilco Bil-Guard Hatch Rail System.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas 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.

3.2 INSTALLATION

A. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Install the work of this Section in strict accordance with the manufacturers' recommendations as approved by the Architect, anchoring all items firmly into position for long life under hard use.

C. Put operating components through at least five complete operating cycles, adjusting as required, and achieving optimum ease of operation.

END OF SECTION 07 7200

SECTION 07 5400 -THERMOPLASTIC MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide a fully adhered thermoplastic membrane roofing system where shown on Drawings/job walk, as specified herein, and as needed for a complete and proper installation. Roofing system includes, but is not limited to:
   1. Thermoplastic roofing membrane and related flashings.
   2. Substrate board.
   3. Fasteners, walk pads, and other accessories.

B. Related Sections:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

C. Commencement of work by Contractor constitutes acknowledgment by Contractor that this specification can be satisfactorily executed, under project conditions and with all necessary prerequisites for warranty acceptance by roofing membrane manufacturer. No modification of Contract Sum will be made for failure to adequately examine Contract Documents or project conditions.

1.2 SUBMITTALS

A. Submit in accordance with Section 01 3300.
   1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with specified requirements.
   2. Where UL or FM requirements are specified, provide documentation that shows that roofing system to be installed is UL-Classified or FM-approved, as applicable; include data itemizing components of the classified or approved system.
   3. Installation Procedures: Submit manufacturers recommended installation procedures.
   4. Shop Drawings: Submit detailed drawings of special joints or termination conditions, and conditions of interface with other materials. Submit detailed drawings of special accessory components not included in manufacturer's product data and manufacturer's standard flashing and attachment details proposed for use on this project.
   5. Samples: Submit samples of each product to be used.
   6. Specimen Warranty: Submit prior to starting work.
   7. Installer Qualifications: Letter from manufacturer attesting that the roofing installer meets the specified qualifications.
   8. Pre-Installation Notice: Copy to show that manufacturer's required Pre Installation Notice (PIN) has been accepted and approved by the manufacturer.

1.3 SYSTEM DESIGN

A. Wind Uplift: Meet or exceed the product and securement requirements of Factory Mutual Approval Guide and Loss Prevention Data 1-28, 1-29 and 1-48. Meet wind uplift securement requirements for **1-60** windstorm rating.

B. Solar Reflective Index: Minimum SRI of 75; or minimum solar reflectance of 0.63 and minimum thermal emmitance of 75.

C. Wind Load Resistance: Roofing system is to meet the requirements of CBC 1504 including having been tested in accordance with FM 4474, UL 580, or UL 1897.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:
   1. A single installer shall perform the work of this section; and shall be a firm with not less than 5 years of successful experience in installation of thermoplastic membrane roofing systems similar to those required for this project and which is acceptable to or licensed by manufacturer of primary roofing materials.
   2. Installer's Field Supervision: Installer must maintain full-time supervisor/foreman on job site during times that roofing work is in progress. Supervisor must have minimum of five year's experience in roofing work similar to nature and scope to specified roofing.

B. UL Listing: Provide thermoplastic membrane roofing system and component materials which have been tested for application and slopes indicated and are listed by Underwriters' Laboratories, Inc. (UL) for **Class A** external fire exposure.

1.5 PRE-ROOFING MEETING

A. Not less than three nor more than ten calendar days prior to scheduled start of roofing installation, conduct a roofing substrata inspection and pre-roofing meeting at job site.
   1. Visually inspect all substrata upon which roofing is scheduled to be applied.
      a. Determine general acceptability, and determine areas requiring further preparation.
      b. Determine acceptable remedies for unacceptable areas.
   2. Discuss proposed schedule for installation of the roofing, and reach agreement as to dates of start and finish of installation of the roofing.
   3. Discuss product submittals and warranties.
   4. Discuss interface with the work of other trades.
   5. Discuss proposed methods for installation of the roofing, and equipment and personnel to be used.
   6. Discuss inspection methods to be used.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 6600.

B. Storage of Materials:
   1. Deliver all materials to job site in their original, tightly-sealed containers or unopened packages.
   2. All materials shall be clearly labeled with manufacturer's name and product identification.
   3. All materials must be protected from damage during transit, handling, storage and installation.
   4. Maintain storage conditions in accordance with manufacturers written requirements.
   5. Damaged materials are to be replaced with new materials.

C. Job Conditions: Comply with all provisions recommended by material manufacturer to obtain final warranties required.

1.7 SPECIAL WARRANTY

A. Manufacturer's Single-Source Warranty: Submit executed copy of roofing manufacturer's standard "No Dollar Limit" agreement including flashing endorsement, signed by an authorized representative of thermoplastic membrane roofing system manufacturer, on form which was published with product literature as of date of contract documents, for **15 years after date of substantial completion.**
   1. Warranty includes roofing membrane, flashings, roofing membrane accessories, roof insulation, fasteners, substrate board, walkway products, manufacturer's expansion joints, manufacturer's edge metal products, and other single-source components of roofing system marketed by manufacturer.

B. Special Project Warranty: Upon completion of the Work and as a condition of its acceptance, deliver to the Architect two original copies of the following "Warranty and Maintenance Agreement", signed by the Contractor and the roofing subcontractor:

1. The undersigned hereby propose, and upon execution of this document by Owner, agree for a period of 2 years after Substantial Completion of the Work to make immediate repairs as required to stop leaks or correct defects in the work of this Section, within 24 hours after receipt of notice from Owner by telephone, telegram, or letter; and further agree to make such repairs without reference to or consideration of cause or nature of such leaks or defects.
2. As a further condition of this 5-year Warranty and Maintenance Agreement, undersigned hereby agree to repair or replace any other damaged products and finishes damaged as a result of water penetration, to return the building to its original condition, and to notify roof system manufacturer in writing within 30 days that such repairs were made.
3. Conditions including open seams, buckles, curled edges, fishmouths, splits, wrinkles, etc., will be considered as evidence of poor and/or defective workmanship and products.
4. Repairs required within stated period will be provided without cost to Owner; except that repairs required consequent to an act of God, abuse, alterations, or failure of the substrata or supporting structure (other than caused by defects in work of this Section) will be paid for by Owner promptly upon completion of the repair in each instance.
5. Repairs completed at Owner's cost shall be invoiced to Owner at prevailing rates, and shall include an itemized breakdown of quantities plus unit cost for labor and materials, and shall include not more than 10% markup for overhead and profit.
6. This Warranty and Maintenance Agreement shall be in addition to warranty requirements of Contract Documents and enforcement of its provisions shall not deprive the Owner of any action, right, or remedy otherwise available to him.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC MEMBRANE ROOFING SYSTEM

A. As part of work of this Section, provide all materials required by roofing manufacturer for specified special warranties, and UL and Factory Mutual requirements specified.

B. All roofing, except sheet metal work, required for the roof system to be provided shall be manufactured by or approved in writing by manufacturer of the roof system and such approved roofing shall be included in roofing manufacturer's warranty.

2.2 THERMOPLASTIC MEMBRANE

A. Provide a fully-adhered fastened single-ply roofing system **and components required for UL Class A rating.**

B. Accepted PVC Systems:

1. Membrane S327, 60 mils nominal thickness, by Sarnafil.
2. Fully-adhered membrane, Sureflex 60 mils nominal thickness, by Carlisle.
3. Fully-adhered membrane, 60 mils nominal thickness, by Dura-last.
4. Series 500 membrane, 60 mils nominal thickness, by Bondcote.
5. Ultra Ply 78 PVC membrane, 60 mils nominal thickness, by Firestone.
6. EverGuard PVC membrane, 60 mils nominal thickness, by GAF.
7. VersiFlex PVC, white, 60 mils nominal thickness, by Versico.
8. Products specified are for establishing type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided request for substitution is submitted in accordance with Section 01 2500.

C. Accepted TPO Systems:
1. Ultra Ply TPO membrane, 60 mils nominal thickness, by Firestone.
2. Fully-adhered membrane, Sure-Weld 60 mils nominal thickness, by Carlisle.
3. JM TP0-60 membrane, 60 mils nominal thickness, by Johnsmanville.
4. Everguard TPO membrane, 60 mils nominal thickness, by GAF.
5. VersiWeld, white, 60 mils nominal thickness, by Versico.
6. Products specified are for establishing type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided request for substitution is submitted in accordance with Section 01 2500.

D. Fasteners:
1. Types as required and approved by the membrane manufacturer for the specific application with membrane manufacturer's standard metal in-seam disk, listed by UL, and approved by Factory Mutual for securing roof system.
2. Minimum Penetration of Fasteners:
a. Plywood deck: 1" into or through plywood.
b. Insulating concrete on metal deck: 3/4" through metal deck.
c. Metal deck: 3/4" through metal steel deck.
3. Fasteners and In-seam Plates: Corrosion resistant; Factory Mutual Standard 4470.

2.3 SUBSTRATE BOARD

A. Substrate Board: Glass-mat faced, moisture resistant, treated gypsum core panels, ASTM C 1177, fire resistant type.
1. 1/2" thick where laid over wood sheathing or metal decking.
2. 5/8" thick where applied without sheathing at parapet walls over vertical wood or metal studs.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening substrate panel to roof deck.

C. 12" wide by 1.5" tall tapered perlite board, ASTM C 728, Type 1.

2.4 OTHER MATERIALS

A. Walkway Pads: Manufacturer's standard heavy-duty walkway pads. Locations per site plan. **400'** linear feet of walkway pads. Locations are to be identified at job walk and per the maintenance department.

B. Roofing Accessories: Provide membrane manufacturers premanufactured pipe boots, premolded inside/outside corners, termination bars, adhesives, sealants and other materials needed for a complete and watertight roofing system.

C. Membrane Flashing: Membrane manufacturers reinforced membrane flashing, thickness not less than roofing membrane thickness.

D. Nailers: No. 2 or better lumber.
1. Pressure treated rot resistance; AWPA Ul-07, Use Category UC2, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
2. Kiln dry lumber after treatment to maximum moisture content of 19 percent.

E. Conduit and pipe supports: Acceptable Manufacture "DURA-BLOK" B Line Series. Support to be installed every 10' at all electrical, plumbing, or pipes on roof.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas 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. Any dryrot plywood is to be replaced please notify owner prior to commencing work. Work to be completed on a Time and Material basis.

3.2 INSTALLATION, GENERAL

A. **Mandatory Pre-roofing Inspection: Before starting application,** the Roofing Contractor shall inspect roof decks, accompanied by General Contractor, Project Inspector, Architect's Representative and Representative of Roof Manufacturer. Any defects shall be noted and corrected. All decks shall be smooth, dry and broom clean. Starting work by roofing contractor constitutes acceptance of roof deck.

B. Drainage connections, metal edgings and all items affected by the roofing shall be on the job ready to be installed.

C. Install the work of this Section in strict accordance with manufacturers recommended installation procedures as approved by Architect.

D. Protect drain outlets from roof debris and verify that they are in working order at project completion.

E. Construct temporary water cutoffs at the end of each working day and in event of rain or other inclement weather to protect work, including interior and exterior construction, from damage. Protect completed work and materials intended for incorporation in the Work from damage due to wind, water, or moisture penetration.

3.3 SUBSTRATE BOARD

A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Substrate boards shall be installed with 1/16" gap between boards.
   1. Stagger joints of barrier board from insulation joints minimum of 6".
   2. Mechanically secure substrate board to resist uplift pressure at corners, perimeter, and field of roof according to the following:
      a. For full size (4'x8') substrate boards, use (12) #10 x 1-1/4" corrosion-resistant wood screws.
         Spacing along short length shall be at 12" from corners, 12" from edges & 12" o.c. in field.
         Spacing along long sides shall be at 12" from edges & 24" o.c. in field.
      b. For non-full sheets of substrate board, use #10 x 1-1/4" corrosion resistant wood screws
         Spacing along short length shall be at 12" from corners, 12" from edges & 24" in field.
         Spacing along long sides shall be at 12" from edges & 24" o.c. in field.
   3. Install tapered perlite board at all horizontal to vertical transitions, sloping with the roof slope, over the substrate board. Fasteners spaced at 12" from edges & 12" o.c. in field.

3.4 ROOF MEMBRANE

A. Installation:
   1. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
   2. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Shingle joints on sloped substrate in direction of drainage; stagger end laps.
   3. At intersections with vertical surfaces:
      a. Extend membrane up a minimum of 6 inches onto vertical surfaces.
      b. Fully adhere flexible flashing over membrane and up to reglets.
      c. Secure flashing to nailing strips at 4 inches on center.
      d. Insert flashing into reglets and secure.
   4. At gravel stops, extend membrane under gravel stop and to the outside face of the wall.

5. Around roof penetrations, seal flanges and flashings with flexible flashing.
6. Install roofing expansion joints where indicated. Make joints watertight.
7. Coordinate installation of roof drains and sumps and related flashings.

B. Fully Adhered System: Install and fully adhere roofing membrane to insulation substrate in strict accordance with membrane manufacturer's written instructions as required by Factory Mutual Loss Prevention Data 1-29 and 1-48 for specified windstorm rating.

C. 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. Remove and repair any unsatisfactory sections before proceeding with Work.

3.5 MEMBRANE FLASHING

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

B. Flash penetrations and field-formed inside and outside corners with sheet flashing.

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

3.6 WALKWAY PADS

A. Install 400'lf walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.7 FIELD QUALITY CONTROL

A. During progress of the work of this Section, make visual inspections as necessary, and verify that:
1. All materials used comply with the specified requirements;
2. All materials are properly stored and handled;

B. During the progress of this work, the roofing manufacturer shall provide a representative to insure compliance with manufacturer's specification and acceptability of installation. The representative will be mandatorily required at following times:
1. Pre-Roofing Meeting.
2. At least first full day of membrane installation. Additional days as required to certify acceptability of installers.
3. Prior to final acceptance of the roofing system, representative shall visually observe each roof for acceptance. 3rd party inspector shall fully inspect roofing install.

3.8 CLEAN-UP

A. General Cleanup: This contractor shall at end of each working day remove excess debris from work site and properly dispose of such. Secure all materials and equipment in a manner to discourage vandalism and promote safe working conditions. Contractor to provide trash bins for debri disposal.

B. Closeout: After all work and trades are completed on roof and prior to final acceptance of roof, this contractor shall clean roof of all miscellaneous debris, foreign materials, nails, wire, plaster, metal etc. and water test roof by thorough wash down. Remove all debris and repair any leaks.

END OF SECTION 07 5400

SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Provide flashing and sheet metal not specifically described in other Sections of these Specifications but required to prevent penetration of water through the exterior shell of the building.
   1. The work includes patching of existing work.
   2. The work includes tying in of new work to existing work.

B. Types of flashing and sheet metal work include, but are not limited to:
   1. Metal copings.
   2. Metal wall and counter-flashings.
   3. Gutters, downspouts, and scuppers.
   4. Metal trim/fascia units.
   5. Miscellaneous sheet metal accessories.
   6. Sheet metal expansion joint systems.
   7. Termite shields.

C. Related Sections:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
   2. Section 07 5400: Thermoplastic membrane roofing.
   3. Section 07 6100: Standing seam metal roofing.
   4. Section 07 9510: Premanufactured expansion joint covers.

1.2 SUBMITTALS

A. General: Submit in accordance with Section 01 3300.
   1. Shop Drawings: Submit detailed drawings of layout, joining, profiles, terminations, and anchorages of fabricated work. Submit detailed drawings of special accessory components.
   2. Samples: Submit 3 samples, each approximately 12" square, in colors specified.

1.3 QUALITY ASSURANCE

A. In addition to complying with pertinent codes and regulations, comply with pertinent recommendations contained in current edition of "Architectural Sheet Metal Manual" published by the Sheet Metal and Air-Conditioning Contractors National Association (SMACNA).

B. Standard commercial items may be used for flashing, trim, reglets and similar purposes provided such items meet or exceed the quality standards specified.

C. Colors: Provide finish selections indicated in the Finish Schedule.
   1. Acceptable Manufacturers: The products and manufacturers specified in the Finish Schedule are for purposes of establishing color and quality. Refer to each Specification Section for additional manufacturers and Section 01 2500 for substitution requirements.
   2. Manufacturer's Standard Colors and Finishes: Where the Finish Schedule specifies a manufacturer's standard color or finish, the Architect makes no guarantee that matching colors or finishes are available as other manufacturer's "standard colors" from the listing of acceptable manufacturers. The Contractor shall be responsible for providing colors matching those indicated on the Drawings.

3. Custom Colors: Where the Finish Schedule indicates a specific manufacturer's colors, other acceptable manufacturers shall provide matching custom colors where a standard color is not acceptable.

1.4 SPECIAL **WARRANTY**

A. PVDF (Polyvinylidene Fluoride) Coating Warranty: In addition to the warranty requirements of the Contract Documents, submit 2 original copies of coating applicator's 20-Year warranty. Warrant coating against peeling, blistering, chipping, checking, chalking in excess of a numerical rating of 8 when measured in accordance with ASTM D659, and fading and color change in excess of 5 NBS units when measured in accordance with ASTM D2244.2.

B. Special Project Warranty: Upon completion of the Work and as a condition of its acceptance, deliver to the Architect two original copies of the following Special Warranty, signed by the Contractor and the roofing subcontractor:
1. The undersigned hereby propose, and upon execution of this document by the Owner, agree for a period of 2 years after Substantial Completion of the Work to make immediate repairs as required to stop leaks or correct defects in the work of this Section, within 24 hours after receipt of notice from the Owner by telephone, telegram, or letter; and further agree to make such repairs without reference to or consideration of the cause or nature of such leaks or defects.
2. As a further condition of this 2-year Special Warranty, the undersigned hereby agree to repair or replace any other damaged products and finishes, to return the building to its original condition, and to notify the roof system manufacturer in writing within 30 days that such repairs were made.
3. Repairs required within the stated period will be provided without cost to the Owner; except that repairs required consequent to an act of God, abuse, alterations, or failure of the substrata or the supporting structure (other than caused by defects in the work of this Section) will be paid for by the Owner promptly upon completion of the repair in each instance.
4. Repairs completed at Owner's cost shall be invoiced to the Owner at prevailing rates, and shall include an itemized breakdown of quantities plus unit cost for labor and materials, and shall include not more than 15% markup for overhead and profit.
5. This Special Warranty shall be in addition to the warranty requirements of the Contract Documents and the enforcement of its provisions shall not deprive the Owner of any action, right, or remedy otherwise available to him.

PART 2 - PRODUCTS

2.1 FLASHING MATERIALS

A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

B. Materials and Gauges: Where sheet metal is required, and no material or gauge is indicated on the Drawings, provide highest quality and gauge commensurate with the referenced standards. In no case shall sheet metal be less than 24 gauge.

C. Galvanized Steel Sheet Materials: ASTM A653, with G90 zinc coating; minimum 24 gauge except as otherwise indicated.

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

2.2 PREMANUFACTURED PARAPET COPING ASSEMBLIES

A. Coping Manufacturer: Subject to compliance with requirements, provide products by:
1. R-Mer Edge Coping by Garland, 1-800-321-9336.
2. Perma-Tite Coping by Metal-Era, 1-800-558-2162.
3. Permasnap Coping by Hickman Engineered Systems, 1-828-676-1700.
4. Presto Lock Coping by Johns Manville, 1-800-445-1500.
5. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01620.

B. Performance Characteristics:
1. Pull-Off Resistance: Tested in accordance with SPRI ES-1 RE-3 to positive and negative design wind pressure as defined by CBC Section 1504.5.
2. Coping sections shall expand and contract freely while mechanically locked in place on anchor cleats.
3. Coping sections shall lock to anchor cleats by mechanical pressure from support chairs.
4. All coping cover joints shall be underlayed with gutter/support chairs capable of draining water.

C. Materials:
1. Coping: Formed steel sheet, galvanized, 24 gauge thick, minimum; factory finish PVDF coating. Color to be selected by owner at a later date.
2. Anchor Cleat: 20 gauge galvanized steel, 12" wide, with coping support; cleat spaced at 5'-0"on center minimum, mechanically fastened as indicated.
3. Concealed Splice Plates: Material and finish to match coping, 8 inch" wide, with factory applied dual non-curing sealant strips or formed water channels.
4. Fasteners: Stainless steel screw type with a minimum pull-out resistance of 240 #; no exposed fasteners permitted.

D. Fabrication:
1. Factory fabricated to sizes required.
2. Factory fabricated mitered and welded corners, end caps, and wall terminations.
3. Factory formed to radius and arch where indicated.

2.3 PREMANUFACTURED REGLET ASSEMBLIES

A. Reglet Manufacturer: Subject to compliance with requirements, provide products by:
1. Springlock Flashing and Reglets by Fry Reglet Corp.
2. Snap-Tite System by Mm Systems Corp.
3. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01620.

B. Materials:
1. Reglet: 24 gauge galavanized steel; ASTM A653 with G90 zinc coating.
2. Counter Flashing: 24 gauge galavanized steel; ASTM A653 with G90 zinc coating; factory prefinished.
3. Provide prefabricated prefinished inside and outside corners, sealed watertight.

2.4 FABRICATED FLASHINGS

A. Fascia: Fabricate profile as indicated, 24 gauge minimum thickness.
1. 6" wide concealed back-up plate, formed to exact profile of fascia and secure plate in place prior to installation.
2. Install continuous bead of sealant each side of joint and set fascia in place leaving 1/4" space between sections.

B. Exposed Gutters: Fabricate profile as indicted, 24 gauge minimum thickness.
   1. Provide expansion joints with watertight joints.
   2. Seal all joints with sealant.

C. Exposed Downspouts: Fabricate profile as indicted, 24 gauge minimum thickness.
   1. Provide strainers with outlet tubes.

D. Stepped Flashing: 24 gauge minimum thickness.
   1. Fabricate as indicated similar to SMACNA Figure 4-22A.

E. Crickets: 22 gauge minimum thickness.
   1. Fabricate as indicated similar to SMACNA Figure 4-18, Detail 2.

F. Drip Edges: Fabricate as indicated, 24gauge minimum thickness.

G. Valley Flashing: 24 gauge minimum thickness.
   1. Fabricate as indicated similar to SMACNA Figure 4-10.

H. Continuous Cleats: Form from same material as the unit which the cleat anchors, 20 gauge minimum thickness.

I. Termite Shields:
   1. Fabricate as indicated similar to SMACNA Figure 4-24.
   2. Install as detailed and set in continuous bead of liquid nails to concrete or masonry.
   3. Lap joints shall be a minimum of 6" with a double row of continuous sealant.

2.5 FINISHES

A. Factory Finish PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; 70% Kynar 500 resin or Hylar 5000 resin.
   1. 2-Coat Finish: Dry Film Thickness, ASTM D1400; 0.15 mil primer coat plus 0.70 mil color coat, 0.85 mil total minimum thickness.
   2. Color: As indicated on the Finish Schedule.
   3. Provide factory applied strippable plastic film for protection during fabrication and installation.

A. Field Painted Finish: Mill phosphate for painting in the field as specified in Section 09 9100.

2.6 MISCELLANEOUS MATERIALS

A. Nails, Rivets, and Fasteners: Same metal as flashing/sheet metal or other noncorrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

B. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

C. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application offlashing sheet

D. Roofing Cement: ASTM D 2822, asphaltic.

E. Epoxy Seam Sealer: 2-part noncorrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior non-moving joints including riveted joints.

F. Solder: For use with steel provide 50-50 tin/lead solder (ASTM B32), with rosin flux.

G. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.7 FABRICATION

A. General: Fabricate in accordance with the SMACNA Architectural Sheet Metal Manual.
1. Form sheet metal accurately and to the dimensions and shapes required, finishing molded and broken surfaces with true, sharp, and straight lines and angles and, where intercepting other members, coping to an accurate fit and soldering securely.
2. Unless otherwise specifically permitted by the Architect, turn exposed edges back 1/2".
3. Shop fabricate work to the greatest extent possible.

B. Fabricate and form work to fit substrates. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

C. Fabricate to shapes indicated in 10'-0" lengths except where shorter lengths are required by construction or sheet size.

D. Corners: Shop prefabricate interior and exterior turns, and other changes in direction using epoxy seam sealer and rivets to rigidly secure the assembly and render watertight.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas 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.

3.2 WORKMANSHIP

A. General: Comply with manufacturer's written instructions and with SMACNA Architectural Sheet Metal Manual, 2003 Edition. Anchor units securely in place by methods indicated, providing for expansion of metal units; conceal fasteners where possible; and set units true to line and level. Install work with laps, joints, and seams which will be permanently watertight and weatherproof.
1. Where lap seams are indicated, lap according to pitch, but not less than 3".
2. Make flat and lap seams in the direction of flow.

B. Joints:
1. Join parts with rivets or sheet metal screws where necessary for strength and stiffness.
2. Provide suitable watertight expansion joints for runs of more than 40'-0", except where closer spacing is indicated on the Drawings or required for proper installation.

C. Separations:
1. Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
2. Where sheet metal work will be in contact with masonry, concrete, or stone, evenly coat contact surfaces with non-sagging mastic. Where sheet metal work will be embedded in mortar joints, evenly coat both sides with non-sagging mastic.

D. Embedment: Embed metal in connection with roofs in a solid bed of sealant, using materials and methods described in Section 07 9210 of these Specifications or other materials and methods approved by the Architect.

3.3 COPING INSTALLATION

A. Snap-On Coping Cap Detail:
1. Install miters first.
2. Position base flashing of the roofing membrane over the wall edge covering nailers completely, fastening 8" on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
3. Install minimum 16 gauge, 16" long anchor chair at a maximum of 60" on center.
4. Install 6" wide splice plate by centering over 16" long by specified width anchor chair. Apply two beads of sealant to either side of the splice plate's center, approximately 2" from the coping cap joint. Install coping cap by hooking outside hem of coping on outside face of anchor chair. Press downward on inside edge of coping until "snap" occurs and hem is engaged on the entire chair.

B. Installing contractor shall check as-built conditions and verify the manufacturer's coping details for accuracy to fit the wall assembly prior to fabrication. The installer shall comply with the coping manufacturer's installation guide when setting copings.

C. Installer shall use mechanical fasteners with minimum 240 # (109 kg) pull-out resistance suitable for parapet substrates.

3.4 CLEANUP

A. After completion, clean all exposed work of scraps, stains, and dirt. After cleaning, wash with clean water and wipe dry.

END OF SECTION 07 6200

SECTION 07 7220 - ROOF CURBS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide roof curbs where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related Sections: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.2 SUBMITTALS

A. General: Submit in accordance with Section 01 3300.
1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
2. Installation Procedures: Submit manufacturers recommended installation procedures.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

2.2 ROOF CURBS

A. Manufactured Curbs, Equipment Rails, Roof Mounting Assemblies: Factory-assembled hollow sheet metal construction with fully mitered and welded corners, integral counter-flashing, internal reinforcing, and top side and edges formed to shed water; as manufactured by The Pate Company, ThyBar Corporation, or Vent Products Inc.
1. Construction: 14 gage galvanized sheet metal.
2. Finish: Factory prime coated for finish painting at the job site.
3. Insulation: 1-1/2" rigid glass fiber, located on outside face of curb.
4. Wood Nailer: Preservative treated wood nailer along top of curb.
5. Mounting: Manufacture curb bottom and mounting flanges for installation directly on roof deck, not on insulation; match slope and configuration of roof deck.
6. Curb Height: 8" from finished surface of roof, minimum.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Install the work of this Section in strict accordance with the manufacturers' recommendations as approved by the Architect, anchoring all items firmly into position for long life under hard use.

END OF SECTION 07 7220

SECTION 07 8400 - FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide firestopping where shown on the Drawings, in all penetrations through fire rated walls, floors, and ceiling, and as specified herein, and as needed for a complete and proper installation. The Work of this Section includes, but is not limited to:
   1. Through penetration firestops and smoke stops for all fire-rated bearing and non-bearing wall and floor assemblies, both blank (empty) and those accommodating penetrating items such as cables, conduits, pipes, ducts, etc.
   2. Membrane penetration for fire-rated walls.
   3. Architectural/construction joint firestops within walls, floors, or the intersections of floors to exterior walls, or the intersection of top of walls to ceilings.
   4. Top of wall firestopping in all fire-rated partitions.

B. Related Sections:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
   2. Section 07 9210: Sealants and caulking.
   3. Section 22 0000: Plumbing.
   4. Section 23 0000: General Mechanical Provisions.
   5. Section 26 6000: General Conditions for Electrical Work.
   6. Section 27 0000: Communication Systems General.

C. Completely coordinate with work of all other trades.

D. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure and complete installation.

1.2 SUBMITTALS

A. Submit in accordance with Section 01 3300.
   1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
   2. Installation Procedures: Submit manufacturers recommended installation procedures.
   3. UL Tested Systems: Submit drawings showing typical installation details for the methods of installation. Indicate which firestop materials will be used and thickness for different hourly ratings. Indicate construction of wall or floor assemblies, size, F-rating, T-rating, and remarks.
   4. Engineering Judgements: Submit manufacturer's drawings for all non-standard applications where no UL tested system exists. Indicate the "tested" UL system upon which the judgement is based so as to assess the relevance of the judgement to some known performance.

1.3 PERFORMANCE REQUIREMENTS

A. Firestopping Systems (Materials and Design):
   1. Conform to both Flame (Fl and Temperature (Tl ratings as determined by tests conducted in accordance with ASTM E814 in a configuration that is representative of field conditions.
   2. F ratings shall be a minimum of 1-hour but not less than the fire resistive rating of the assembly being penetrated.
   3. T ratings shall be based on measurement of the temperature rise on penetrating item(s).

B. Firestopping materials and systems shall be capable of closing or filling through-openings created by:
   1. The burning or melting of combustible pipes; cable jacketing, or pipe insulation materials, or;
   2. Deflection of sheet metal due to thermal expansion (electrical and mechanical ductwork).

C. Firestopping shall be flexible, allowing for normal pipe movement and shall not shrink upon drying as evidenced by cracking or pulling away from contact surfaces.

D. Firestopping shall be moisture resistant and shall not dissolve in water after curing.

E. Penetrations containing loose electrical, data, or communications cabling shall be protected using firestopping systems that allow unrestricted cable changes without damage to seal.

F. Materials shall not require ampacity derating in power cable installations.

PART 2 - PRODUCTS

2.1 FIRESTOPPING MATERIALS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
   1. 3M Ceramic Materials
   2. Tremco
   3. Morgan Thermal Ceramics
   4. USG
   5. RectorSeal Corp.
   6. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

B. Wall, Floor, and Ceiling Penetrations: ASTM E814.
   1. Provide systems designed specifically for the penetration condition, materials, and required fire rating.
   2. Through-penetration fire stops may be used for membrane penetrations.
   3. The F rating shall apply to all through-penetrations and shall not be less than the required fire-resistance rating of the assembly penetrated.
   4. The T rating shall apply to those through-penetration location required to have T ratings as specified in CBC Sections 714 and shall not be less than the required fire-resistance rating of the assembly penetrated.

2.2 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas 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. Verify that all pipe, conduit, cable, and other items which penetrate fire-rated construction have been permanently installed prior to installation of firestops.

3.2 INSTALLATION

A. Install the work of this Section in strict accordance with the original design, requirements of governmental agencies having jurisdiction, and the manufacturers recommended installation procedures to comply with the designated and required firestop rating.

B. Conditions Requiring Firestopping:
1. General: Provide firestopping for conditions specified whether or not firestopping is indicated, and if indicated, whether such material is designed as insulation, sating, or otherwise.
2. Through-Penetrations: Install firestopping in all penetrations and in the annular space in all penetrations in any bearing or non-bearing fire-rated barrier.
3. Membrane-Penetrations: Where required by CBC Section 714, protect all membrane-penetrations in rated walls with firestopping.
4. Construction Joints/Gaps: Provide firestopping:
   a. Between the edges of floor slabs and exterior walls.
   b. Between the tops of walls and the underside of floors.
   c. In the control joints in masonry walls and floors.
   d. In expansion joints.

C. Dam Construction: When required to properly contain firestopping materials within openings, damming or packing materials may be utilized. Combustible damming material shall be removed after appropriate curing. Noncombustible damming materials may be left as a permanent component of the firestop system.

END OF SECTION 07 8400

SECTION 07 9210 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Throughout the Work, seal and caulk joints where shown on the Drawings and elsewhere as needed to provide a positive barrier against passage of moisture and air.

B. Related Sections:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.
2. Section 03 3000: Cast-In-Place Concrete.
3. Section 04 2900: Reinforced unit masonry.
4. Section 07 8400: Firestopping of penetrations in fire-rated walls.
5. Section 09 9100: Painting.

1.2 SUBMITTALS

A. Submit in accordance with Section 01 3300.
1. Product Data: Submit manufacturer's descriptive literature and product specifications for each product. Include data to indicate compliance with the specified requirements.
2. Installation Procedures: Submit manufacturers recommended installation procedures.
3. Samples: Submit samples of each sealant, each backing material, each primer, and each bond breaker proposed to be used. Provide minimum of 4 samples of each manufacturers standard color for each application. Provide sample of each installation type for Architect approval prior to beginning installation. Repeat samples until acceptable installation is approved by the Architect.

1.3 QUALITY ASSURANCE

A. Rejection of Installed Caulking and Sealants: Indication of lack of skill on the part of installers shall be sufficient grounds for rejection of installed caulking and to require its immediate removal and complete re-caulking at no additional cost to the Owner.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 6600.

B. Do not retain at the job site material which has exceeded the shelf life recommended by its manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Products specified are for establishing the type, design, and quality required. Products of equal or better type, design, and quality produced by other manufacturers will be considered provided the request for substitution is submitted in accordance with Section 01 2500.

B. Comply with VOC requirements of California Green Building Standards Code, Sections 5.504.4.1 and 5.504.4.2.

2.2 SEALANTS AND CAULKING

A. Silicone Sealant:
1. White Mildew Resistant: 786 White by Dow Corning, Sanitary 1700 White by General Electric, 863 White by Pecora.
2. General Exterior: 791 by Dow Corning, Silpruf by General Electric, 864 by Pecora, Spectrum 2 by Tremco.

B. Polyurethane Sealant:
1. General Use: DynaTrol II by Pecora, Dymeric by Tremco, Sikaflex-2c,NS/SL by SIKA.
2. Self-leveling Type: NR-201 by Pecora, Sonalastic SLl by Sonneborn, Sikaflex lcSL by Sika.

C. Acrylic Latex Sealant: AC-20+ Silicone by Pecora, Sonolac by Sonneborn.

D. Colors: Colors for each sealant installation will be selected by the Architect from standard colors normally available from the specified manufacturer.
1. In concealed installations use standard gray or black sealant.
2. Provide black sealant at glazing pockets.

2.3 ACCESSORY MATERIALS

A. Primers: Non-staining type, recommended by manufacturer to suit application.

B. Back-up Materials: Non-absorbent, non-staining, and specifically recommended for application by sealant manufacturer.

C. Bond Preventative Materials: Pressure sensitive tape recommended by sealant manufacturer to suit application.

D. Masking Materials: Appropriate masking tape which will effectively prevent application of sealant on surfaces not scheduled to receive it, removable without damage to substrate or staining.

E. Joint Cleaner: Non-corrosive, non-staining type recommended by sealant manufacturer; compatible with joint forming materials.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work will be performed. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Prepare all surfaces to receive sealants and caulking in strict accordance with the manufacturer's written requirements. Use solvents and primers where recommended by the manufacturer.

B. Clean all concrete joints, full depth free of debris and dust.

3.3 INSTALLATION

A. Install joint backing to achieve a neck dimension of no greater than 1/3 the joint width. Install in strict accordance with the manufacturer's written instructions.

B. Install bond breaker where joint backing is not used.

C. Mask adjacent surfaces to prevent contact of sealant with adjoining surfaces which would be stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape after tooling without disturbing joint seal.

D. Install sealant to manufacturer's instructions.

E. Measure joint dimensions and size materials to achieve required width/depth ratios.

3.4 PRODUCT USAGE BY LOCATION

A. Where more than 1 type of sealant is listed, the Contractor may use either listed product that is best suited in accordance with the sealant manufacturer's written recommendations for the joint location and type and the surfaces to be sealed with particular attention given to prevent staining. Provide sealants and caulking as follows:
   1. Exterior, general use: Polyurethane or Silicone.
   2. Interior, wet areas: Mildew Resistant Silicone.
   3. Interior, general use and painting: Acrylic latex.
   4. Expansion and control joints, vertical and overhead surfaces: Polyurethane or Silicone.
   5. Expansion and control joints, horizontal surfaces: Self-leveling Polyurethane.
   6. Interior concrete slab (where slab is finished floor, fill all crack control joints): Polyurethane.
   7. Exterior concrete walks and courts (where indicated on the plans): Polyurethane.
   8. Horizontal surfaces, traffic: Self-leveling Polyurethane.
   9. Glazed tile and/or masonry: Polyurethane or Silicone.
   10. Plumbing fixtures: Mildew Resistant Silicone.
   11. Glazing to metal frame: Black Silicone.

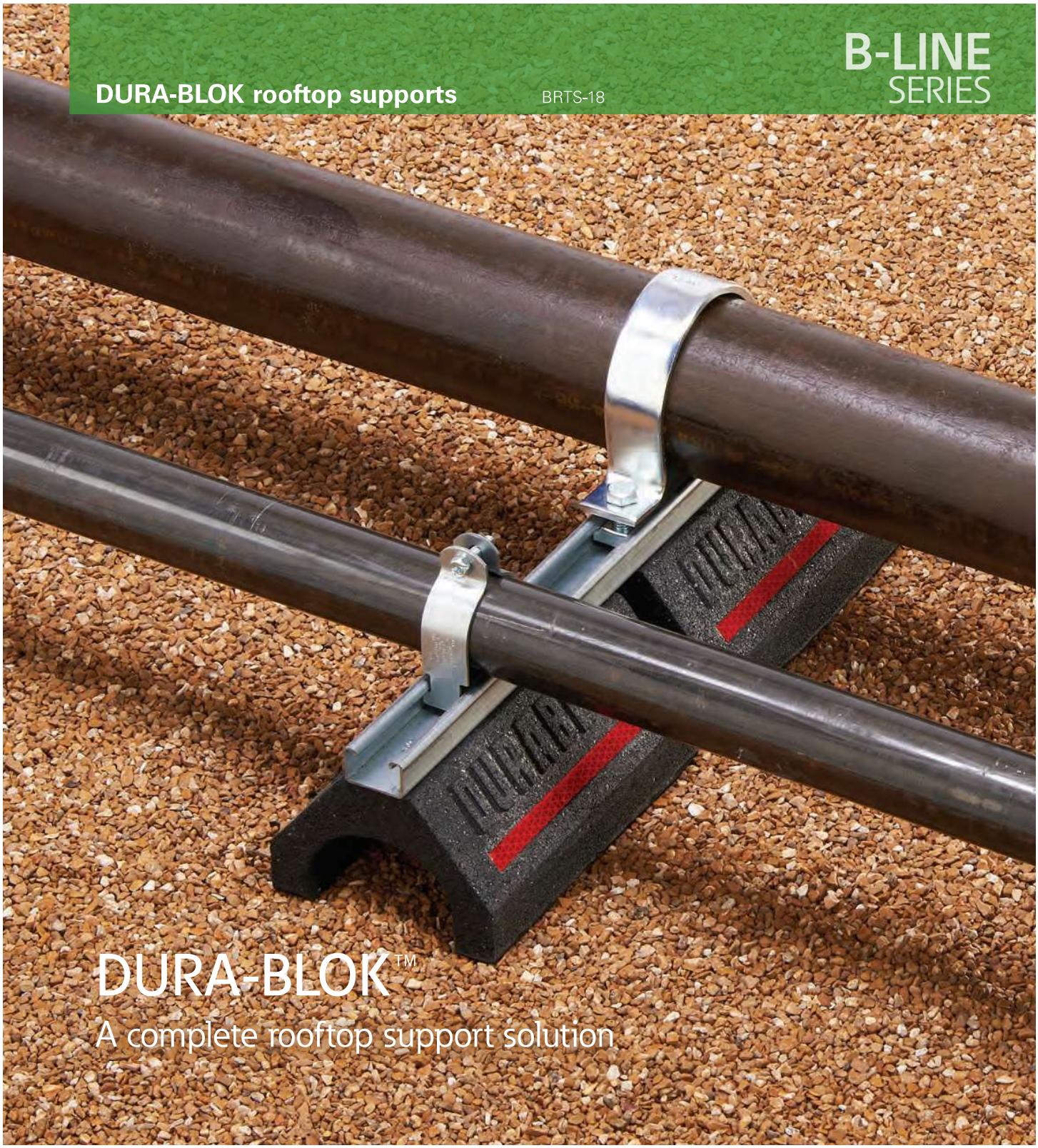
3.5 CLEANING AND REPAIRING

A. Clean adjacent soiled surfaces.

B. Repair or replace defaced or disfigured finishes caused by sealant work.

END OF SECTION 07 9210

B-LINE SERIES



DURA-BLOK™

A complete rooftop support solution

Powering Business Worldwide

DURA-BLOK rooftop solutions support

DURA-BLOK™ supports are made of 100% recycled rubber and are designed to provide an economical way to support pipes, HVAC systems, rooftop walkway systems, ducting, conduit, cable tray, and more.

FEATURES & BENEFITS

- Made from 100% recycled rubber
- Qualifies for LEED credits
- Reflective strip on both sides allow for easy product visibility
- Channel is through bolted on all sizes for added strength
- 1" gap between blocks allows water to flow freely around longer assemblies
- No roof penetration required
- Product composition is not sharp or abrasive; helping to extend the roof life
- Resistant to freeze/thaw
- Dampens vibration
- No need for supplemental rubber pad
- Will not float or blow away
- UV resistant
- Suitable for any type roofing material or other flat surface
- For sloped roofs see adjustable hinge fitting (B634)
- Open ends allows for easier adjustments to DBE, DBR, and DBM series
- Drainage channel through center of block

Components & accessories

CLDP10 Load Distribution Plate

Material - steel

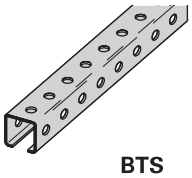
Increases ultimate uniform load capacity on DBE & DBR Series supports to 500 lbs. (2.22kN)

UPC/Part #	Cat. #	Thickness	Width	Length	Weight Each
782051 36110	**CLDP10**	11 Ga. (3.0mm)	1⅝" (41mm)	9.5" (241mm)	0.53 (0.24kg)

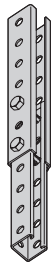
Loosen hex nuts and slide plate under the flat washers

Retighten the hex nuts with plate in place

Compatible components

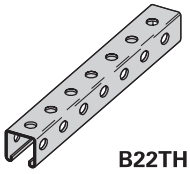


BTS



TN Nuts

HHCS



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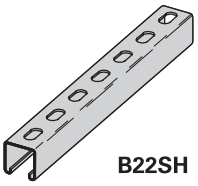

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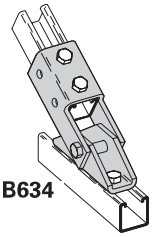

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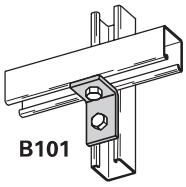

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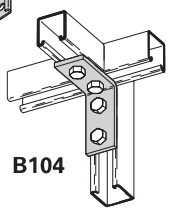

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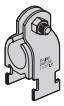
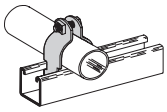


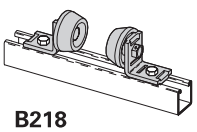
BVT Series



B2000 Series

B2400 Series

B3124 Series



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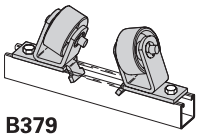

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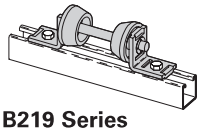
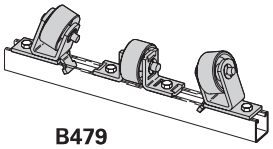


B219 Series



B479

B3126 Series

See Eaton's B-Line series Strut Systems Catalog for more information.

Rooftop applications

DB10

DB Series

Base with Galv. Channel - 1" (25mm) high
Dimensions - 5" (127mm) High x 6" (152mm) Wide x Length (overall length)
Ultimate Load Capacity - (uniform load) *

DB5 = 200 lbs. (0.89kN)
DB10 = 500 lbs. (2.22kN)
DB20 = 1,000 lbs. (4.45kN)
DB30 = 1,500 lbs. (6,67kN)
DB40 = 2,000 lbs. (8.89kN)
DB48 = 2,500 lbs. (11.12kN)

UPC/Part #	Cat. #	Height	Width	Overall Length	Weight Each
782051 50035	**DB5**	5" (127mm)	6" (152mm)	4.8" (122mm)	2.75 (1.25kg)
782051 49972	**DB10**	5" (127mm)	6" (152mm)	9.6" (244mm)	5.28 (2.39kg)
782051 49974	**DB20**	5" (127mm)	6" (152mm)	20.2" (513mm)	10.63 (4.82kg)
782051 50021	**DB30**	5" (127mm)	6" (152mm)	30.8" (782mm)	15.99 (7.25kg)
782051 50022	**DB40**	5" (127mm)	6" (152mm)	41.4" (1052mm)	21.34 (9.68kg)
782051 50023	**DB48**	5" (127mm)	6" (152mm)	52.0" (1321mm)	26.70 (12.4kg)

DB630

DB6 Series

Base with 12 ga. (2.6mm) Galv. Channel - 2 7/16" (62mm) high
Dimensions - 6 7/16" (163mm) High x 6" (152mm) Wide x Length (overall length)
Ultimate Load Capacity - (uniform load) *

DB610 = 500 lbs. (2.22kN)
DB620 = 1,000 lbs. (4.45kN)
DB630 = 1,500 lbs. (6.67kN)
DB640 = 2,000 lbs. (8.89kN)
DB648 = 2,500 lbs. (11.12kN)

UPC/Part #	Cat. #	Height	Width	Overall Length	Weight Each
782051 50024	**DB610**	6 7/16" (163mm)	6" (152mm)	9.6" (244mm)	6.36 (2.88kg)
782051 50025	**DB620**	6 7/16" (163mm)	6" (152mm)	20.2" (513mm)	12.90 (5.85kg)
782051 50026	**DB630**	6 7/16" (163mm)	6" (152mm)	30.8" (782mm)	19.45 (8.82kg)
782051 50027	**DB640**	6 7/16" (163mm)	6" (152mm)	41.4" (1052mm)	26.00 (11.79kg)
782051 50028	**DB648**	6 7/16" (163mm)	6" (152mm)	52.0" (1321mm)	32.55 (14.76kg)

DB10-36

DB10 Series

Two (2) Bases with 12 ga. (2.6mm) Galv. Channel - 1 5/8" (41mm) high
Dimensions - 6 7/16" (143mm) High x 6" (152mm) Wide x Length (bridge length - see below)
Ultimate Load Capacity - 1,000 lbs. (4.45kN) (uniform load) *

UPC/Part #	Cat. #	Height	Individual Base Length	Bridge Length	Weight Each
782051 50029	**DB10-28**	5 5/8" (143mm)	9.6" (244mm)	28" (711mm)	2.75 (1.25kg)
782051 50031	**DB10-36**	5 5/8" (143mm)	9.6" (244mm)	36" (914mm)	5.28 (2.39kg)
782051 50032	**DB10-42**	5 5/8" (143mm)	9.6" (244mm)	42" (1067mm)	10.63 (4.82kg)
782051 50033	**DB10-50**	5 5/8" (143mm)	9.6" (244mm)	50" (1270mm)	15.99 (7.25kg)
782051 50034	**DB10-60**	5 5/8" (143mm)	9.6" (244mm)	60" (1524mm)	21.34 (9.68kg)

* **For Roof Loading, Consult Roofing Manufacturer or Engineer. As with most commercial roofs, the weakest point may be the insulation board beneath the rubber membrane.**

Duct supports

DB2318DS

DB_DS Series

Two (2) Base Supports with Galv. Channel - 1" (25mm) high
Dimensions - Height (overall) x Width (overall) x Length (overall) See table
Riser Channels (SH Style) - 1⅝" (41mm) x 1⅝" (41mm) x 12 ga. (2.6mm)
Fittings & Hardware - Electro-Plated Steel
Ultimate Load Capacity - 1,000 lbs. (4.45kN) (uniform load)*

UPC/Part #	Cat. #	A (Minimum)	A (Maximum)	B	Weight Each
782051 50717	**DB2318DS**	10.56" (268mm)	20.75" (527mm)	13.50" (343mm)	33.31 (15.11kg)
782051 50718	**DB2918DS**	10.56" (268mm)	26.75" (679mm)	13.50" (343mm)	35.00 (15.88kg)
782051 50719	**DB4118DS**	10.56" (268mm)	38.75" (984mm)	13.50" (343mm)	38.40 (17.42kg)
782051 50720	**DB5318DS**	10.56" (268mm)	50.75" (1289mm)	13.50" (343mm)	41.80 (18.96kg)
782051 50721	**DB2324DS**	10.56" (268mm)	20.75" (527mm)	19.50" (495mm)	34.15 (15.49kg)
782051 50722	**DB2924DS**	10.56" (268mm)	26.75" (679mm)	19.50" (495mm)	35.84 (16.26kg)
782051 50723	**DB4124DS**	10.56" (268mm)	38.75" (984mm)	19.50" (495mm)	39.25 (17.80kg)
782051 50724	**DB5324DS**	10.56" (268mm)	50.75" (1289mm)	19.50" (495mm)	42.65 (19.34kg)
782051 50725	**DB2336DS**	10.56" (268mm)	20.75" (527mm)	31.50" (800mm)	35.84 (16.26kg)
782051 50726	**DB2936DS**	10.56" (268mm)	26.75" (679mm)	31.50" (800mm)	37.55 (17.03kg)
782051 50727	**DB4136DS**	10.56" (268mm)	38.75" (984mm)	31.50" (800mm)	40.95 (18.57kg)
782051 50728	**DB5336DS**	10.56" (268mm)	50.75" (1289mm)	31.50" (800mm)	44.34 (20.11kg)
782051 50729	**DB2348DS**	10.56" (268mm)	20.75" (527mm)	43.50" (1105mm)	37.55 (17.03kg)
782051 50730	**DB2948DS**	10.56" (268mm)	26.75" (679mm)	43.50" (1105mm)	39.25 (17.80kg)
782051 50731	**DB4148DS**	10.56" (268mm)	38.75" (984mm)	43.50" (1105mm)	42.65 (19.34kg)
782051 50732	**DB5348DS**	10.56" (268mm)	50.75" (1289mm)	43.50" (1105mm)	46.03 (20.88kg)

Cat. #	Height (overall)	Width (overall)	Length (Overall)
DB2318DS	23" (584mm)	25⅝" (651mm)	20.2" (513mm)
DB2918DS	29" (736mm)	25⅝" (651mm)	20.2" (513mm)
DB4118DS	41" (1041mm)	25⅝" (651mm)	20.2" (513mm)
DB5318DS	53" (1346mm)	25⅝" (651mm)	20.2" (513mm)
DB2324DS	23" (584mm)	31⅝" (803mm)	20.2" (513mm)
DB2924DS	29" (736mm)	31⅝" (803mm)	20.2" (513mm)
DB4124DS	41" (1041mm)	31⅝" (803mm)	20.2" (513mm)
DB5324DS	53" (1346mm)	31⅝" (803mm)	20.2" (513mm)
DB2336DS	23" (584mm)	43⅝" (1108mm)	20.2" (513mm)
DB2936DS	29" (736mm)	43⅝" (1108mm)	20.2" (513mm)
DB4136DS	41" (1041mm)	43⅝" (1108mm)	20.2" (513mm)
DB5336DS	53" (1346mm)	43⅝" (1108mm)	20.2" (513mm)
DB2348DS	23" (584mm)	55⅝" (1415mm)	20.2" (513mm)
DB2948DS	29" (736mm)	55⅝" (1415mm)	20.2" (513mm)
DB4148DS	41" (1041mm)	55⅝" (1415mm)	20.2" (513mm)
DB5348DS	53" (1346mm)	55⅝" (1415mm)	20.2" (513mm)

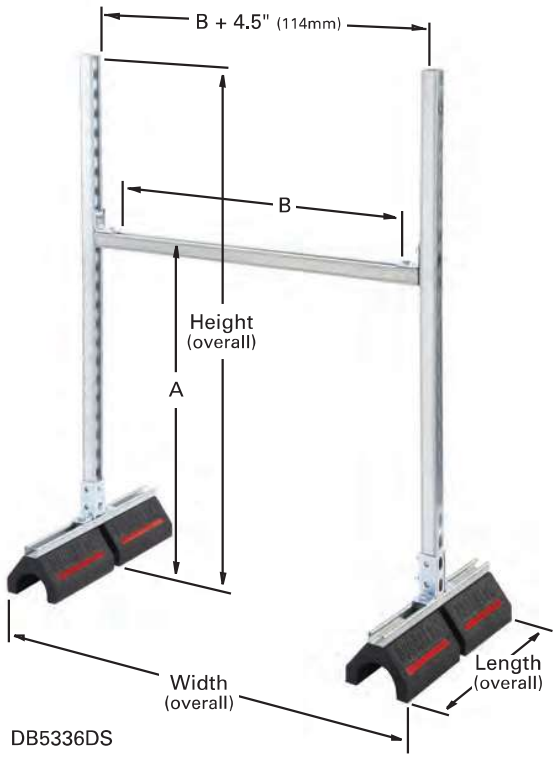
A = Adjustable height from bottom of DURA-BLOK™ to top of horizontal channel.

B = Space between fittings that support horizontal channel.

Height (overall) = Distance from bottom of DURA-BLOK to top of upright channel.

Width (overall) = Distance from outside-to-outside of DURA-BLOK supports.

Length (overall) = Distance from end-to-end of DURA-BLOK supports.



DB5336DS

Product is shipped unassembled.

* **For Roof Loading, Consult Roofing Manufacturer or Engineer. As with most commercial roofs, the weakest point may be the insulation board beneath the rubber membrane.**

Pipe supports

DBR4-6

DBR Series Fixed Height

Base with Galv. Channel - 1" (25mm) high and Pipe Roller Assembly

Dimensions - Height to Bottom of Pipe x 6" (152mm) Wide x Long (length) - See Below

Pipe Roller Material - Cast Iron - Electro-Plated

Brackets, Axle & Hardware - Electro-Plated Steel

Ultimate Load Capacity - (uniform load) *

DBR2-31/2 = 500 lbs. (2.22kN)
DBR4-6 = 500 lbs. (2.22kN)
DBR8-10 = 1000 lbs. (4.44kN)
DBR12-14 = 1000 lbs. (4.44kN)
DBR16-20 = 1000 lbs. (4.44kN)

UPC/Part #	Cat. #	Roller Part No.†	Height**	Width	Length	Weight Each
782051 50745	**DBR2-3½**	B3126-2 to 3½	7.09" (180mm)	6" (152mm)	9.6" (244mm)	5.28 (2.39kg)
782051 50746	**DBR4-6**	B3126-4 to 6	7.09" (180mm)	6" (152mm)	9.6" (244mm)	10.63 (4.82kg)
782051 50747	**DBR8-10**	B3126-8 to 10	8.34" (212mm)	6" (152mm)	20.2" (513mm)	15.99 (7.25kg)
782051 50748	**DBR12-14**	B3126-12 to 14	8.34" (212mm)	6" (152mm)	20.2" (513mm)	21.34 (9.68kg)
782051 50749	**DBR16-20**	B3126-16 to 20	8.34" (212mm)	6" (152mm)	20.2" (513mm)	26.70 (12.11kg)

DBR10-12

DBR Series Adjustable Height

Base with two (2) ½"-13" Electro Zinc All Threaded Rod Risers and a B3114-3½" Pipe Roll with Sockets

Dimensions - Overall Height as Specified Base - 4" High (101mm) x 6" (152mm) Wide x 9.6" (244mm) Length (base length)

Ultimate Load Capacity - 200 lbs. (0.89kN) *

To increase load capacity use CLDP10 load distribution plate.

UPC/Part #	Cat. #	Adjustable Height	Width	Length	Weight Each
782051 50750	**DBR10-12**	up to 12" (305mm)	6" (152mm)	9.6" (244mm)	6.46 (2.93kg)

DBE10-12

DBE Series Elevated

Base with two (2) ½"-13 Electro Zinc All Threaded Rod Risers and Galv. Slotted Channel - 1" (25mm) high

Dimensions - Overall Height as Specified Base - 4" High (101mm) x 6" (152mm) Wide x 9.6" (244mm) Length (base length)

Ultimate Load Capacity - 200 lbs. (0.89kN) *

To increase load capacity use CLDP10 load distribution plate.

For pipe straps/clamps, rollers and roller supports that can be used with these DURA-BLOK supports, see other components on page 2.

UPC/Part #	Cat. #	Adjustable Height	Width	Channel Length	Weight Each
782051 50036	**DBE10-8**	5½" - 8" (140 - 203mm)	6" (152mm)	9.35" (161mm)	5.68 (2.58kg)
782051 50037	**DBE10-12**	5½" - 12" (140 - 305mm)	6" (152mm)	9.35" (161mm)	5.72 (2.59kg)
782051 50038	**DBE10-16**	5½" - 16" (140 - 406mm)	6" (152mm)	9.35" (161mm)	5.76 (2.61kg)

Longer base lengths available.

Note: At heights above 12" (305mm), we suggest using the DB_DS Series Channel Support with Risers for additional stability to piping system.

† *See Eaton B-Line series Pipe Hanger Catalog for dimensions and specifications.*

** *From bottom of DURA-BLOK™ to bottom of pipe/tubing.*

* **For Roof Loading, Consult Roofing Manufacturer or Engineer. As with most commercial roofs, the weakest point may be the insulation board beneath the rubber membrane.**

Rooftop pipe supports

DBM Series

Base with one (1) ⅜"-16 Electro Zinc All Threaded Rod and Hinged Pipe Clamp

Dimensions - Height to Pipe Center x 6" (152mm) Wide x 4.8" (122mm) Long (overall length)
Pipe Clamp Material - Malleable Iron
Threaded Rod / Hardware - Electro-Plated Steel
Ultimate Load Capacity - 50 lbs. (022kN) (uniform load) *

DBM-2CT

Copper Tubing Supports

UPC/Part #	Cat. #	Clamp Part No.†	Height (Min.)**	Height (Max)**	Width	Length	Weight Each
782051 50733	**DBM-½CT**	B3198HCT-½	9.69" (246mm)	11.19" (284mm)	6" (152mm)	4.80" (122mm)	2.75 (1.25kg)
782051 50734	**DBM-¾CT**	B3198HCT-¾	9.84" (250mm)	11.34" (288mm)	6" (152mm)	4.80" (122mm)	2.76 (1.25kg)
782051 50735	**DBM-1CT**	B3198HCT-1	9.95" (253mm)	11.45" (291mm)	6" (152mm)	4.80" (122mm)	2.84 (1.29kg)
782051 50736	**DBM-1¼CT**	B3198HCT-1¼	10.13" (257mm)	11.63" (295mm)	6" (152mm)	4.80" (122mm)	2.95 (1.34kg)
782051 50737	**DBM-1½CT**	B3198HCT-1½	10.28" (261mm)	11.78" (299mm)	6" (152mm)	4.80" (122mm)	2.96 (1.34kg)
782051 50738	**DBM-2CT**	B3198HCT-2	10.53" (267mm)	12.03" (305mm)	6" (152mm)	4.80" (122mm)	3.03 (1.37kg)

DBM-1

Steel Pipe Supports

UPC/Part #	Cat. #	Clamp Part No.†	Height (Min.)**	Height (Max)**	Width	Length	Weight Each
782051 50739	**DBM-½**	B3198H-½	9.86" (250mm)	11.36" (288mm)	6" (152mm)	4.80" (122mm)	2.78 (1.26kg)
782051 50740	**DBM-¾**	B3198H-¾	10.06" (255mm)	11.56" (293mm)	6" (152mm)	4.80" (122mm)	2.84 (1.29kg)
782051 50741	**DBM-1**	B3198H-1	10.14" (257mm)	11.64" (296mm)	6" (152mm)	4.80" (122mm)	2.86 (1.30kg)
782051 50742	**DBM-1¼**	B3198H-1¼	10.25" (260mm)	11.75" (298mm)	6" (152mm)	4.80" (122mm)	2.93 (1.33kg)
782051 50743	**DBM-1½**	B3198H-1½	10.42" (265mm)	11.92" (303mm)	6" (152mm)	4.80" (122mm)	2.99 (1.36kg)
782051 50744	**DBM-2**	B3198H-2	10.66" (271mm)	12.16" (309mm)	6" (152mm)	4.80" (122mm)	3.10 (1.41kg)

Base only

DURA-BLOK™ channel support is designed as an economical support for piping systems, cable tray, HVAC equipment and many other applications.

Dimensions - 4" (101mm) High x 6" (152mm) Wide x 9.6" (244mm) Long (base length)
Ultimate Load Capacity - (uniform load) *
DBP - 500 lbs. (2.22kN) DBM - 200 lbs. (0.89kN)

DBP

DBM

UPC/Part #	Cat. #	Height	Width	Length	Weight Each
782051 49691	**DBP**	4" (101mm)	6" (152mm)	9.6" (244mm)	4.48 (2.03kg)
782051 50005	**DBM**	4" (101mm)	6" (152mm)	4.8" (122mm)	2.35 (1.07kg)

† *See Eaton B-Line series Pipe Hanger Catalog for dimensions and specifications.*

** *From bottom of DURA-BLOK™ to bottom of pipe/tubing.*

* **For Roof Loading, Consult Roofing Manufacturer or Engineer. As with most commercial roofs, the weakest point may be the insulation board beneath the rubber membrane.**

Specifications

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work covered by this specification consists of furnishing all labor, equipment, materials and accessories, and performing all operations required for the correct installation of recycled rubber pipe [conduit] supports for mechanical piping [electrical conduit] systems.

1.02 REFERENCES

A. ASTM A653 G90 SS Gr. 33 - Specification for Steel Sheet, Zinc Coated (Galvanized) by the Hot Dipped Process

B. ASTM B633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel

C. ASTM C531 – Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical Resistant Mortars, Grouts, Monolithic Surfaces, and Polymer Concretes

D. ASTM C642 – Test Method for Specific Gravity, Absorption, and Voids in Hardened Concrete

E. ASTM C672 – Test Methods for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals

F. ASTM D412 – Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension

G. ASTM D395 – Standard Test Methods for Rubber Property – Compression Set

H. ASTM D573 – Test Method for Rubber – Deterioration in an Air Oven

I. ASTM D746 – Test Method for Brittleness Temperature of Plastics and Elastomers by Impact

J. ASTM D2240 – Test Method for Rubber Property – Durometer Hardness

K. NFPA 70 – National Electrical Code

1.03 QUALITY ASSURANCE

A. Rubber / steel pipe supports shall be manufactured under a strict quality control program assuring quality product delivered to the jobsite. Pipe supports that are damaged shall not be installed.

B. Workmanship: All pipe [conduit] supports to be installed by a qualified piping [electrical] contractor and installed in accordance with manufacturer's recommendations.
   1. All work shall comply with all applicable federal, state, and local codes and laws having jurisdiction.
   2. All work shall conform to accepted industry and trade standards for pipe support [conduit] installations.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Subject to compliance with these specifications, pipe support systems shall be DURA-BLOK™ design as supplied by Eaton [or engineer approved equal].

2.02 MATERIALS

A. Curb base must be made of 100% recycled rubber and polyurethane prepolymer with a uniform load capacity of 500 pounds per linear foot of support.* In addition, each base to have a reflective red stripe. (*See 3.01(C))

B. Dimensions: 6-inches wide by [4] [5.0] [6.75] inches tall by [9.6] [20.2] [30.8] [41.4] [52.0] inches long.

C. Steel frame: Steel, strut galvanized per ASTM A653 or strut galvanized per ASTM A653 for bridge series.

D. Attaching hardware: Zinc-plated threaded rod, nuts and attaching hardware per ASTM B633.

E. Any products claiming to be a similar, like, or equal must demonstrate (meet or exceed) the same physical and performance characteristics as specified below:
   1. Density: 0.52 oz/cu in ASTM D575
   2. Durometer Hardness: 67.2A ± 1 ASTM D575
   3. Tensile Strength: 231 psi minimum ASTM D575
   4. Compression Deformation: 5% at 70psi and 72ºF ASTM D575
   5. Brittleness at Low Temp: -50ºF ASTM D746
   6. Weathering: 70 hours at 120ºF ASTM D573
      a. Hardness retained: 100% (±5%)
      b. Compressive strength: 100% (±5%)
      c. Tensile strength: 100% (±5%)
      d. Elongation retained: 100% (±5%)

2.03 TYPE OF ROOFTOP SUPPORTS

A. Rubber block supports – DURA-BLOK™ model # [DBP] [DMB] base dimensions: 6-inch wide by 4-inch tall by [9.6] [4.8]-inch length. Accessories are fastened directly into rubber material with weather resistant type 12 lag screws.

B. Continuous block channel supports – DURA-BLOK DB Series or DB6 Series: Dimensions 6-inch wide bt [5.0] [6.5]-inch tall bt [9.6] [20.2] [30.8] [41.4] [52.0]-inch length. Assembly has 1" gaps between blocks for free flow of water. Standard strut accessories can be used for attachment.

C. Bridge channel supports – DURA-BLOK DB10 Series; Dimensions 6-inch wide by 5⅝ -inch tall by [28.0] [36.0] [42.0] [50.0] [60.0]-inch length. Standard strut accessories can be used for attachment.

D. Extendible height support – DURA-BLOK model DBE 10-[8][12][16], height to suit application: 8-inch, 12-inch or 16-inch (200 pound maximum load). Base to be 9.6 inches in length or otherwise specified sizes available. Heavier loads, may require CLDP load distribution plate.

E. Roller supports– DURA-BLOK DBR10 Series & DBR Series: DBR10 Series is sized for pipe up to 3½ inches, with vertical adjustment up to 12 inches. DBR Series is sized for [2-3½] [4-6] [8-10] [12-14] [16-20]-inch pipe sizes.

F. Elevated single pipe supports– DURA-BLOK DBM Series: [Copper] or [Steel] pipe sizes [½] [¾] [1] [1¼] [1½] [2]-inch.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations.

B. If gravel top roof, gravel must be removed around and under pipe support.

C. Always consult roofing manufacturer for roof membrane compression capacities. If necessary, a compatible sheet of roofing material (rubber pad) may be installed under rooftop support to disperse concentrated loads and add further membrane protection.

D. Gas pipe spacing subject to local gas authorities.

E. Use properly sized clamps to suit pipe [conduit] sizes.

For more information, visit
cooperbline.com/dura-blok

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