

## SECTION 077200 - ROOF ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:

1. Roof curbs.
2. Equipment supports.
3. Replacement Roof hatches.
4. Pipe and duct supports.
5. Preformed flashing sleeves.
6. Pre-Manufactured Parapet Coping Cap

- B. Related Sections:

1. Section 072200 – Roof Insulation
2. Section 07550 – Modified Bituminous Roofing
3. Section 076200 "Sheet Metal Flashing and Trim" for shop- and field-formed metal flashing, roof-drainage systems, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.

#### 1.3 COORDINATION

- A. Coordinate layout and installation of roof accessories with Modified Bituminous Roofing System, base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory.
  1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof accessories.

1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.
- C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.
- D. Delegated-Design Submittal: For **[roof curbs]** **[equipment supports]** **[and]** **[walkways]** indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  1. Detail mounting, securing, and flashing of roof-mounted items to roof structure. Indicate coordinating requirements with roof membrane system.
  2. Wind-Restraint Details: Detail fabrication and attachment of wind restraints. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
  1. Size and location of roof accessories specified in this Section.
  2. Method of attaching roof accessories to roof or building structure.
  3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
  4. Required clearances.
- B. Sample Warranties: For manufacturer's special warranties.

#### 1.6 CLOSEOUT SUBMITTALS

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

#### 1.7 WARRANTY

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

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Wind-Restraint Performance: Provide materials and installation required to meet Building Code requirements for the location and type of installation specified and shown on the construction documents.

### 2.2 ROOF CURBS

- A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings, bearing continuously on roof structure, and capable of meeting performance requirements; with welded or mechanically fastened and sealed corner joints, **straight sides**, and integrally formed deck-mounting flange at perimeter bottom.
  - 1. Manufacturers: Subject to compliance with requirements, **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:**
    - a. AES Industries, Inc.
    - b. Curbs Plus, Inc.
    - c. Custom Solution Roof and Metal Products.
    - d. Greenheck Fan Corporation.
    - e. LM Curbs.
    - f. Metallic Products Corp.
    - g. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
    - h. Pate Company (The).
    - i. Roof Products, Inc.
    - j. Safe Air of Illinois.
    - k. Thybar Corporation.
    - l. Vent Products Co., Inc.
- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.
- C. Supported Load Capacity: 150% of the capacity required to support the equipment indicated.
- D. Material: **Zinc-coated (galvanized) 0.064 inch**
  - 1. Finish: **Mill phosphatized**
  - 2. Color: MFGR Standard

E. Construction:

1. Curb Profile: **Manufacturer's standard**
2. Fabricate curbs to minimum height of: Match Existing
3. Top Surface: Level top of curb, with roof slope
4. Insulation: Factory insulated with **1-1/2-inch Rigid Insulation Board**
5. Liner: Same material as curb, of manufacturer's standard thickness and finish.
6. Nailer: Factory-installed wood nailer continuous around curb perimeter.
7. Platform Cap: Where portion of roof curb is not covered by equipment, provide weathertight platform cap formed from 3/4-inch thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
8. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as curb.

2.3 EQUIPMENT SUPPORTS

A. Equipment Supports: **Rail-type** metal equipment supports capable of supporting superimposed live and dead loads between structural supports, including equipment loads and other construction indicated on Drawings, spanning between structural supports; capable of meeting performance requirements; with welded **or mechanically fastened and sealed** corner joints, **integral metal cant**, and integrally formed structure-mounting flange at bottom.

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

- a. Adaptable Air Products
- b. AES Industries, Inc.
- c. Air Balance Inc.; a division of Mestek, Inc.
- d. Conn-Fab Sales, Inc.
- e. Curbs Plus, Inc.
- f. Custom Solution Roof and Metal Products.
- g. Greenheck Fan Corporation.
- h. KCC International, Inc.
- i. Lloyd Industries.
- j. LMCurbs.
- k. Louvers & Dampers, Inc.; a division of Mestek, Inc.
- l. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
- m. Pate Company (The).
- n. Plenums Incorporated.
- o. Roof Curb Systems.
- p. Roof Products and Systems (RPS); a division of Hart & Cooley, Inc.
- q. Roof Products, Inc.
- r. Thybar Corporation.
- s. Vent Products Co., Inc.

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

C. Supported Load Capacity: 150% of the load required to support

- D. Material: **Zinc-coated (galvanized)** steel sheet, [**0.064 inch** thick].
  - 1. Finish: **Mill phosphatized**
  - 2. Color: **Manufacturer's standard**
  
- E. Construction:
  - 1. Curb Profile: **Manufacturer's standard** compatible with roofing system.
  - 2. Nailer: Factory-installed continuous wood nailers **5-1/2 inches** continuous around support perimeter.
  - 3. Platform Cap: Where portion of equipment support is not covered by equipment, provide weathertight platform cap formed from 3/4-inch thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
  - 4. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as equipment support.
  - 5. Fabricate equipment supports to match the height of existing supports.

#### 2.4 REPLACEMENT ROOF HATCH

- A. Roof Hatches: Metal roof-hatch units with lids and insulated **double**-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide **VERSAMOUNT Replacement Hatch (Type VM)** manufactured by The Bilco Company or comparable product by one of the following:
    - a. Babcock-Davis.
    - b. Bristolite Daylighting Systems, Inc.
    - c. Pate Company (The).
  
- B. Safety Railing System: Roof-hatch manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.
  - 1. Height: **42 inches** above finished roof deck.
  - 2. Posts and Rails: Galvanized-steel pipe, 1-1/4 inches in diameter or galvanized-steel tube.
  - 3. Maximum Opening Size: System constructed to prevent passage of a sphere 21 inches (533 mm) in diameter.
  - 4. Post and Rail Tops and Ends: Weather resistant, closed or plugged with prefabricated end fittings.
  - 5. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members.
  - 6. Fabricate joints exposed to weather to be watertight.
  - 7. Fasteners: Manufacturer's standard, finished to match railing system.
  - 8. Finish: **Manufacturer's standard**
    - a. Color: **Safety Yellow**

- C. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to EXISTING roof-access ladder.
  - 1. Operation: Post locks in place on full extension; release mechanism returns post to closed position.
  - 2. Height: **42 inches** above finished roof deck.
  - 3. Material: **Steel tube**
  - 4. Post: **1-5/8-inch** diameter pipe.
  - 5. Finish: **Manufacturer's standard powder coat finish**
    - a. Color: **Safety Yellow**

## 2.5 PIPE AND DUCT SUPPORTS

- A. Fixed-Height Cradle-Type Pipe Supports: Polycarbonate pipe stand accommodating up to **1-1/2-inch** diameter pipe or conduit; with provision for pipe retainer and with manufacturer's support pad or deck plate as recommended for penetration-free installation over roof membrane type; as required for quantity of pipe runs and sizes.
  - 1. Manufacturers: Subject to compliance with requirements, **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:**
    - a. MIRO Industries, Inc.
    - b. Pate Company (The).
    - c. PHP SystemsDesign
    - d. Thaler Metal Industries Ltd.
- B. Duct Supports: Extruded-aluminum, urethane-insulated supports, **2 inches** in diameter; with manufacturer's recommended hardware for mounting to structure or structural roof deck.
  - 1. Manufacturers: Subject to compliance with requirements, **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:**
    - a. Eberl Iron Works, Inc.
    - b. Thaler Metal Industries, Ltd.
  - 2. Finish: **Manufacturer's standard**

## 2.6 PREFORMED FLASHING SLEEVES

- A. Vent Stack Flashing: Metal flashing sleeve, uninsulated, with integral deck flange.
  - 1. Manufacturers: Subject to compliance with requirements, **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:**
    - a. Custom Solution Roof and Metal Products.
    - b. Lifetime Tool & Building Products, LLC.

- c. Milcor; Commercial Products Group of Hart & Cooley, Inc.
  - d. Thaler Metal Industries, Ltd.
2. Metal: **Aluminum sheet, 0.063 inch**
  3. Height: As required for penetration
  4. Diameter: As required for penetration
  5. Finish: **Manufacturer's standard**

## 2.7 PRE-MANUFACTURED PARAPET COPING CAP

- A. Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet, concealed anchorage; corner units, end cap units, and concealed splice plates with same finish as coping caps.
  1. Manufacturers: Subject to compliance with requirements, provide Pre-Manufactured Parapet Coping Cap "SopraCAP" manufactured by Soprema US, or approved products by one of the following:
    - a. Architectural Products Company.
    - b. ATAS International, Inc.
    - c. Hickman Company, W. P.
    - d. Metal-Fab Manufacturing, LLC.
    - e. MM Systems Corporation.
    - f. National Sheet Metal Systems, Inc.
    - g. Perimeter Systems; a division of Southern Aluminum Finishing Company, Inc.
    - h. Petersen Aluminum Corporation.
  2. Coping-Cap Material: Extruded aluminum, 0.080 inch thick, or thickness as required to meet performance requirements.
    - a. Finish: Three-coat fluoropolymer.
    - b. Color: Selected by Owner from Manufacturer's Full Range of Color Options
  3. Corners: Factory mitered and mechanically clinched and sealed watertight.
  4. Coping-Cap Attachment Method: Snap-on, fabricated from coping-cap material.
  5. Snap-on-Coping Anchor Plates: Concealed, galvanized-steel sheet, 12 inches wide, with integral cleats.

## 2.8 METAL MATERIALS

- A. Aluminum Sheet: ASTM B 209, manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.
- B.
  1. Exposed Coil-Coated Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

- a. Two-Coat Fluoropolymer Finish: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
- C. Aluminum Extrusions and Tubes: ASTM B 221 (ASTM B 221M), manufacturer's standard alloy and temper for type of use, finished to match assembly where used; otherwise mill finished.
- D. Stainless-Steel Sheet and Shapes: ASTM A 240/A 240M or ASTM A 666, Type 304.
- E. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized according to ASTM A 123/A 123M unless otherwise indicated.
- F. Steel Tube: ASTM A 500/A 500M, round tube.
- G. Galvanized-Steel Tube: ASTM A 500/A 500M, round tube, hot-dip galvanized according to ASTM A 123/A 123M.
- H. Steel Pipe: ASTM A 53/A 53M, galvanized.

## 2.9 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, thickness and thermal resistivity as indicated.
- C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, **containing no arsenic or chromium**, and complying with AWPA C2; not less than 1-1/2 inches thick.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- E. Underlayment:
  - 1. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
  - 2. Slip Sheet: Building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m) minimum, rosin sized.
  - 3. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
    - 4. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
    - 5. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- F. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.



- G. Elastomeric Sealant: ASTM C 920, elastomeric **polyurethane** polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
- H. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.
- I. Asphalt Roofing Cement: ASTM D 4586/D 4586M, asbestos free, of consistency required for application.

## 2.10 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
  - 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
  - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
  - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
  - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of **uncoated aluminum** roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
  3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.
- C. Roof Curb Installation: Install each roof curb so top surface is level.
- D. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.
- E. Replacement Roof-Hatch Installation:
1. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
  2. Attach safety railing system to roof-hatch curb.
  3. Attach ladder-assist post according to manufacturer's written instructions.
- F. Pipe Support Installation: Comply with MSS SP-58 and MSS SP-89. Install supports and attachments as required to properly support piping. Arrange for grouping of parallel runs of horizontal piping, and support together.
1. Pipes of Various Sizes: Space supports for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
- G. Preformed Flashing-Sleeve Installation: Secure flashing sleeve to roof membrane according to flashing-sleeve manufacturer's written instructions; flash sleeve flange to surrounding roof membrane according to roof membrane manufacturer's instructions.
- H. Seal joints with [**elastomeric**] [**or**] [**butyl**] sealant as required by roof accessory manufacturer.
- 3.3 REPAIR AND CLEANING
- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.
  - B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting."
  - C. Clean exposed surfaces according to manufacturer's written instructions.
  - D. Clean off excess sealants.
  - E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200