

SECTION 077200**ROOF ACCESSORIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Provide the work of this Section in accordance with requirements of the Contract Documents.
- B. Section Includes:
 - 1. Roof curbs.
 - 2. Equipment supports.
 - 3. Roof hatches.
 - 4. Preformed Flashings
- C. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for wood cants, and wood nailers.
 - 2. Division 07 Section "Roofing Work".
 - 3. Division 07 Section "Flashing" for shop- and field-fabricated metal flashing and counterflashing, and miscellaneous sheet metal trim and accessories.

1.2 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. Loading Criteria: Design, fabricate and install roof accessories to withstand the inward and outward wind loads, live loads, building movement, and wind uplift loads .
 - 1. Roof Hatch: Unless otherwise indicated, fabricate and install roof hatches to withstand a minimum 10-lbf/ ft.² external live load and 30-lbf/ ft.² uplift.
 - 2. FM Approvals' Listing: Manufacture and install copings, roof-edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with FM Approvals' markings.
- C. Temperature Requirements: Design, fabricate and install component parts to provide for expansion and contraction over an ambient temperature range of (120 deg. F.) and a surface temperature range of (180 deg. F.) without buckling, sealed joint failure, undue stress on members or anchors, and other detrimental effects.
- D. Watertightness: Provide tight joints and effectively seal roofing specialties and accessories against water leakage and air infiltration. Water leakage is defined as the appearance of uncontrolled water, other than condensation, on any inboard part of a roof specialty or roof accessory.
- E. Design Modifications: Make design modifications of work shown only as may be necessary to meet performance requirements and coordinate the work. Variations in details and materials which do not adversely affect appearance, durability or strength shall be submitted to the Architect for review.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each type of exposed factory-applied color finish required and for each type of roof accessory indicated, prepared on Samples of size to adequately show color.

1.4 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.
- B. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Reference Standards: Except as modified by Building Codes, provide roof accessories in compliance with requirements of the following reference standards:
 - 1. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
 - 2. National Roofing Contractors Association (NRCA)
 - a. "Roofing and Waterproofing Manual"
 - b. "Handbook of Accepted Roofing Practices"
- B. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from authorities having jurisdiction.
 - 1. Comply with the label requirements of NFPA and UL. Fabricate units in accordance with requirements of NFPA Standard No. 252, and ASTM E152 corresponding to the hourly rating shown. Provide required labels permanently fastened on each hatch assembly.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
 - 1. With Architect's approval, adjust location of roof accessories that would interrupt roof drainage routes, and roof expansion joints.

1.9 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish 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: 15 years from date of Substantial Completion.
- B. Special Roof Hatch Warranty: Furnish five (5) year written warranty signed by the Contractor and Installer, agreeing to repair or replace Roof Hatch Work which has failed to operate properly, leaked or otherwise failed as a result of defects in materials or workmanship. Upon notification of such defects, within the warranty period, make necessary repairs or replacement at the convenience of the Owner.

PART 2 - PRODUCTS**2.1 METAL MATERIALS**

- A. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792, AZ50 coated.
- B. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by hot-dip process and prepainted by coil-coating process to comply with ASTM A 755.
 - 1. Galvanized Steel Sheet: ASTM A 653, G90 coated.
 - 2. Exposed Finishes: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight.
 - a. Color and Gloss: to match adjacent metal colors.

- C. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for type of use and mill finish. Coil-coat finish as follows:
 - 1. Standard 2-coat thermocured system consisting of corrosion inhibitive primer, fluoropolymer color coat and clear fluorocarbon topcoat, complying with AAMA 2605 and AA-C12C42R1x, containing not less than 70 percent PVDF resin by weight in color coat, in not less than 1.2 mils dry film thickness. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Color and Gloss: to match adjacent metal colors.
 - 2. Concealed Surface: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mils.
- D. Stainless-Steel Shapes or Sheet: ASTM A 240 or ASTM A 666, Type 304 or Type 316, No. 2D finish.

2.2 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 as indicated.
- C. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- D. Underlayment:
 - 1. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- E. 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:
 - 1. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 2. 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 silicone 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, asbestos free, of consistency required for application.

2.3 ROOF CURBS

- A. Roof Curbs (RC-02): Provide metal roof curbs, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Fabricate with welded or sealed mechanical corner joints, with stepped integral metal cant raised the thickness of roof insulation and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
1. Basis of Design: "18 in. tall Seismic Curb (Curb Technologies, LLC) has been selected as the standard of quality for the project. Equivalent products fabricated by one of the following will be considered provided they comply with performance requirements of the basis of design:
 - a. Colony Custom Curbs.
 - b. Curbs Plus Inc.
 - c. Custom Curb, Inc.
 - d. LM Curbs.
 - e. Metallic Products Corporation.
 - f. Pate Company (The).
 - g. Roof Products & Systems Corporation.
 - h. ThyCurb; Div. of Thybar Corporation.
 2. Load Requirements: As specified.
 3. Material: Aluminum sheet, 0.090 inch thick.
 - a. Finish: Baked enamel.
 4. Liner: Same material as curb, of manufacturer's standard thickness and finish.
 5. Factory insulate curbs with 1-1/2-inch-thick, fiber board insulation.
 6. Curb height may be determined by adding thickness of roof insulation and minimum base flashing height recommended by roofing membrane manufacturer. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
 7. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

2.4 EQUIPMENT SUPPORTS

- A. Equipment Supports: Provide metal equipment supports, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Fabricate with welded or sealed mechanical corner joints, with stepped integral metal cant raised the thickness of roof insulation and integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.
1. Manufacturers:
 - a. Custom Curb, Inc.
 - b. Roof Products & Systems Corporation.
 - c. ThyCurb; Div. of Thybar Corporation.
 2. Load Requirements: As specified.
 3. Material: Stainless steel sheet, 0.060 inch thick.
 - a. Finish: 2D finish
 4. Metal Counterflashing: Manufacturer's standard removable counterflashing, fabricated of same metal and finish as equipment support.

5. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
6. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
7. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

2.5 ROOF HATCHES

- A. Roof Hatches (RH-01): Provide prefabricated roof hatches, UL labeled.
1. Covers shall be 14 ga. paint bond galvanized steel of lockforming quality per ASTM A 525, with G90 coating, with 4 in. beaded welded flange, covering 1 in. thick rigid 0.75 lb density fiberglass insulation with a 22 ga. galvanized steel interior liner, reinforced with 11 gage steel channels.
 2. Provide extruded rubber gasket within a 20 gage formed steel track securely attached to liner to make the unit weathertight.
 3. Curb shall be 14 ga. galvanized steel, of lockforming quality per ASTM A525, with G-90 coating; 12 in. high covering 1 in. thick fiberboard insulation.
 4. Provide 4 inch wide integral 14 ga. galvanized steel exterior flange for securing to roof..
 5. Provide a 5 deg. pitch on curb to deck to allow water and snow runoff.
 6. Entire vent shall have 14 ga. galvanized steel cap flashing fully welded.
 7. Provide cadmium plated hardware including a positive hold/release mechanism, heavy pintle hinges, compression spring operators, heavy-duty shock absorbers, pull rings for inside and outside operation and neoprene draft seal. Provide a one point cab lock with built-in inside handle on units. Exterior of cover shall be devoid of hardware with the exception of the outside handle (vinyl located steel T).
 8. Provide automatic hold open device formed from 3/16 inch steel flat bar and 1/2 inch diameter steel round stock with vinyl grip.
 9. Unless otherwise indicated, fabricate and install hatches to withstand a loads specified in Performance Criteria Paragraphs.
 10. Provide safety handrail to facilitate getting on and off roof mounted to corner of hatch curb, or retractable post to facilitate getting on or off roof (mounted to ladder)
 11. Single Leaf Basis of Design: "Super Simplex Disappearing Stairway with Roof Hatch and Guard Rail", Precision Ladders LLC or approved equal from one of the following:
 - a. The Bilco Co.
 - b. Nystrom.
 - c. Babcock-Davis.

2.6 PIPE SUPPORTS

- A. Pipe Supports: Adjustable-height, extruded-aluminum tube, filled with urethane insulation; 2 inches in diameter; with aluminum baseplate, EPDM base seal, manufacturer's recommended hardware for mounting to structure or structural roof deck as indicated, and extruded-aluminum carrier assemblies; suitable for quantity of pipe runs and sizes.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Thaler Metal USA Inc, or approved equal.
 2. Pipe Support Height: As indicated on Drawings.

3. Pipe Support Flashing: Manufacturer's standard insulated sleeve flashing with integral base flange; stainless steel sheet, 0.060 inch thick.
4. Finish: 2D.

2.7 PREFORMED FLASHINGS

- A. Exhaust Vent Flashings (FL-04): Double-wall metal flashing sleeve, urethane insulation filled, with integral deck flange, 12 inches high, with removable metal hood and slotted metal collar, and as follows:
 1. Manufacturers:
 - a. Custom Solution Roof and Metal Products.
 - b. Thaler Metal Industries Ltd.
 2. Metal: Stainless Steel sheet, 0.050 inch thick, 2D finished.
 3. Diameter: As indicated.
 4. Finish: Manufacturer's standard.
- B. Vent Stack Flashing (FL-05): Metal flashing sleeve, with integral deck flange, uninsulated, and as follows:
 1. Manufacturers:
 - a. Thaler Metal Industries Ltd, or approved equal.
 2. Metal: Aluminum sheet, 0.050 inch thick, 5D finished.
 3. Height: 13 inches, unless otherwise shown.
 4. Diameter: As indicated.
 5. Finish: Manufacturer's standard.

2.8 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 work.
 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
 2. Verify dimensions of roof openings for roof accessories.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners,

separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.

- B. Install roof accessories to fit substrates and to result in watertight performance.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Coat concealed side of uncoated aluminum and stainless-steel roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing exposed-to-view components of roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene underlayment.
 - 3. Bed flanges in thick coat of asphalt roofing cement where required by roof accessory manufacturers for waterproof performance.
- D. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
- E. Roof Curb Installation:
 - 1. Set roof curb so top surface of roof curb is level.
- F. Equipment Support Installation:
 - 1. Set equipment support so top surface of equipment support is level.
- G. Roof Hatches: Locate, install, and test according to manufacturer's recommendations for conditions of use. Check hatch for proper operation. Adjust operating mechanism as required
- H. Preformed Flashing Installation:
 - 1. Secure to roof membrane according to vent and stack flashing manufacturer's written instructions.
- I. Seal joints with elastomeric sealant as required by manufacturer of roof accessories.

3.3 TOUCH UP

- A. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Division 09 painting Sections.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.4 CLEANING

- A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION