

SECTION 077213 MANUFACTURED CURBS

DESIGN AND SPECIFICATION CONSIDERATIONS

This section specifies curbs for mechanical equipment specified by Division 23 as well as architectural curbs.

Curbs specified by Division 22, 23, and 26 are not accepted because these curbs normally are not of structural quality sufficient to span supporting members without any additional reinforcement between the supporting members. They also have limitations in accommodating roof slopes, roof insulation thickness, and other architectural concerns leading to compromise of roofing water tightness. Coordinate with plumbing, mechanical, and electrical consultants.

Manufactured curbs are designed, engineered, and fabricated for exact mechanical units selected after bid, and can be designed for compound slopes and difficult roofing conditions.

Manufactured curb systems are engineered and designed to accommodate each type of roofing condition including standing seam metal roofing, membrane roofing, roof slopes, and insulation thicknesses.

These curbs are fabricated as welded single piece (monolithic) units that are structurally designed to span structural framing.

Show as manufactured roof curbs on Drawings.

Show as insulated with semi-rigid insulation with top of curb a minimum 8 inches above finished roofing.

Do not accept field-fabricated curbs except under special conditions.

PART 1 GENERAL

1.1 SUMMARY

****Edit to conform to meet project requirements****

- A. Section Includes:
 - 1. Roof curbs for conventional and pre-engineered metal buildings.
 - 2. Expansion joint curbing.
 - 3. Equipment supports.
 - 4. Adapters
 - 5. Structural Platforms
 - 6. Isolation roof curbs and rails.
 - 7. Skylight safety screens
 - 8. Roof access curbs
- B. Related Sections

****Edit related Sections to those referenced in body of specification section.****

- | | | | |
|----|----------------|---|---------------------------------------|
| 1. | Section 051200 | - | Structural Steel: Steel roof framing. |
| 2. | Section 052119 | - | Open Web Steel Joists |
| 3. | Section 053100 | - | Steel Deck |
| 4. | Section 074113 | - | Metal Roof Panels |
| 5. | Section 075323 | - | EPDM Membrane Roofing System |
| 6. | Section 075419 | - | Thermoplastic Membrane Roofing |
| 7. | Section 075200 | - | Modified Bituminous Membrane Roofing |

8. Section 086310	-	Aluminum Framed Skylights
9. Section 099000	-	Paints and Coatings
10. Division 22	-	Plumbing
11. Division 23	-	Mechanical
12. Division 26	-	Electrical

1.2 REFERENCES

****Edit reference standards to those referenced in body of specification section****

- A. Reference Standards: Most recent edition at time of Bid.
- B. American Society for Testing and Materials (ASTM): ASTM A 653 – Standard Specifications for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron

1.3 SUBMITTALS

- A. Submit under provisions of Section 01330
- B. Shop Drawings: Dimensioned drawings showing overall layout details, jointing, connections, and fasteners. Show adjacent construction including roof deck, roofing system, and equipment.
- C. Product Data: Published data indicating product characteristics.
- D. Structural Calculations: Signed and sealed by structural engineer when required by local codes.
- E. Manufacturer Instructions: Include installation instructions, rough-in dimensions, special procedures, and perimeter conditions requiring special attention.
- F. Overlay Coordination Drawing: Show interface between Architectural, Structural, and Mechanical Drawings with applicable roof curbs.

1.4 QUALITY ASSURANCE

- A. Manufacturer:
 - 1. Design, fabricate, and furnish roof curbs and equipment supports to accurate dimensions, configuration, and structural rigidity to meet requirements for watertight systems, and spanning capacity between structural members at openings in roof deck.

1.5 QUALIFICATIONS

- A. Manufacturer:
 - 1. Able to document minimum 10 years continuous experience designing, manufacturing, and supplying work of this Section.
 - 2. Maintain engineering and design capabilities to furnish customized curbs, expansion joints, and equipment supports.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with provisions of Section 01651 and manufacturer's instructions.
- B. Deliver on pallets or protective packaging with manufacturer's identifying labels legible and intact.
- C. Store on pallets above water, mud, and dirt, protected from soiling and damage.
- D. Handle to prevent permanent warping and racking of frame.

1.7 COORDINATION

****Edit sections to include coordination and sequencing as needed for completion of work****

- A. Conform to Section 013113 for coordination with work of other Sections.
- B. [Section 074113 for roof curbs at metal roofing system.]
- C. [Section 075200 for roof curbs at modified bitumen roofing system.]
- D. [Section 075323 for roof curbs at EPDM roofing systems]
- E. [Section 086310 for roof curb support of aluminum framed skylights.]
- F. [Division 22, Division 23, and Division 26 for roof curb support of plumbing, mechanical, and electrical roof top equipment.]

1.8 WARRANTY

- A. Comply with Warranty provisions specified Section 01778.
- B. Manufacturer: Standard 5 year limited Warranty against defects in labor and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

****Verify contact information****

- A. Roof Products, Inc. (RPI) Chattanooga, TN and Phoenix, AZ
 - 1. Tel 1-800-262-6669, Fax: (423) 892-2107, Email: sales@rpcurbs.com
 - 2. Web Site <http://www.rpcurbs.com> .

2.2 ROOF CURBS AND EQUIPMENT SUPPORTS AND MISC. ROOF CURBS (for conventional buildings)

****Where products are listed, verify with manufacturer to meet project requirements****

- A. Frames:
 - 1. Material: ASTM A 653 G90 hot-dipped Galvanized steel.
 - a. Minimum 18 gauge or as engineered by manufacturer.
 - b. Minimum 18 gauge for curbs supporting HVAC units
 - c. Minimum 20 gauge for expansion joint curbs.
 - 2. Corners: Mitered and welded (welds are micro-sealed and prime painted after fabrication). Bolted connections not accepted.
 - 3. Internally reinforced with Galvanized 1 inch by 1 inch by 12 gauge angles for curbs exceeding 3 feet in length. Reinforce internal bulkhead at equipment curbs to support lateral loads.
 - 4. Wood Nailers: Factory installed, pressure treated. Size and width as suitable for support of items installed on curbs.
- B. Insulation: Factory installed 1-1/2 inch thick three-pound density fiberglass insulation.
- C. Curb Height: Minimum 8 inch above finished roof.
- D. Construct curbs to match roof slope with plumb and level top surface for mounting mechanical equipment.
- E. Gasketing: 1/4 inch thick, 1" wide at roof top units and skylights.
- F. Counter Flashing: 18 gauge Galvanized steel.
- G. Cants: Wood or fiber for built-up or modified bitumen roofing systems

****Cants are not generally required for single ply roofing systems. Verify following systems and edit to project requirements****

1. RPC-1 roof curb / RPES-1 equipment support (raised cant style) installs on top of metal decks with insulation.
 2. RPC-2 roof curb / RPES-2 equipment support (canted style) installs on wood roofs without insulation.
 3. RPC-3 roof curb / RPES-3 equipment support (non-canted style) installs either under or on top of metal decks with insulation.
- H. Expansion Joint Curbs:
1. Fabricate in maximum 10 foot lengths with fully mitered and welded corners at intersections and sloping end sections, except as otherwise accepted by Architect
 2. Provide splice plates and connector clips.
- I. Fabricate platform curbs, adapters, pipe curbs, curb covers, square to round, column and tube counterflashings as necessary for complete watertight systems at roof penetrations.

(Note: All insulated roof curbs are structural and shall include calculations signed and sealed by a registered Structural Engineer. Refer to installation drawings for any additional structural requirements. If curbs do not span a minimum of two bar joists, only two angles will be required. Coordination with Architect's Structural Engineer for mechanical equipment weight loading on the roof structure shall be by the Architect)

2.3 ROOF CURBS (for pre-engineered metal buildings – designed to tie into metal roof panel)

- A. Roof curbs shall be constructed using a minimum of 18 gauge Galvalume steel, (14 gauge Galvalume for HVAC units, or as deemed necessary by manufacturer), with fully mitered and welded corners (welds are micro-sealed and prime painted after fabrication).
- B. Insulated roof curbs, require integral base plates, internally reinforced with Galvanized 1" x 1" x 12 gauge steel angles, and 1 ½" thick three pound density fiberglass insulation.
- C. Non-insulated curbs require no insulation, reinforcing steel angles or base plates.
- D. Minimum height of curb shall be 8" above finished roof. Curb shall be constructed to match slope of roof and provide level top surface for mounting of mechanical equipment. For smoke vents, roof hatches and skylights, curbs shall be parallel to roof plane unless otherwise called for.
- E. ¼" thick by 1" wide gasketing provided for all roof top units and skylight curbs.

2.4 ACCESSORIES (OPTIONAL)

- A. Screws: Fasteners as instructed by manufacturer for pre-engineered metal buildings.
- B. Butyl Tape and Tube Caulk: For sealing roof panel to roof curb for pre-engineered metal buildings.
- C. Framing as required for pre-engineered metal buildings.

2.5 ADAPTERS

- A. Standard features: Heavy gauge Galvanized steel, fully welded one-piece construction, sloped for positive water runoff, welds are micro-sealed and primed painted after fabrication, fully insulated, with internal reinforcing as required to support equipment loads, with insulated pans, and supply/return air transitions as required to mate with existing roof curbs.

2.6 PLATFORM CURBS

- A. Structural Platform curbs
 - 1. Material: ASTM A 653 G90 hot-dipped Galvanized steel.
 - a. Minimum 18 gauge or as engineered by manufacturer.
 - 2. Corners: Mitered and welded. Bolted connections are not accepted.
 - 3. Internally reinforced with Galvanized 1 inch by 1 inch by 12 gauge angles for curbs exceeding 3 feet in length. Reinforce internal bulkhead at wider curbs to support lateral loads.
 - 4. Wood Nailers: Factory installed, pressure treated. Size and width as suitable for support of items installed on curbs.
 - 5. $\frac{3}{4}$ " plywood top with support channels as required.
- B. Insulation: Factory installed 1-1/2 inch thick three-pound density fiberglass insulation.
- C. Curb Height: Minimum 8 inch above finished roof.
- D. Construct curbs to match roof slope with plumb and level top surface for mounting mechanical equipment.
- E. Counter Flashing: 18 gauge Galvanized steel.
- F. Cants: Wood or fiber for built-up or modified bitumen roofing systems

****Cants are not generally required for single ply roofing systems. Verify following systems and edit to project requirements****

- 1. RPPF-1 (raised cant) roof curb installs on top of metal decks with insulation.
- 2. RPPF-2 (canted) roof curb installs on wood roofs without insulation.
- 3. RPPF-3 (non-canted) roof curb installs either under or on top of metal decks with insulation.

(Note: New or existing roof conditions and actual equipment determine platform style, width, length and height. Installer to lag bolt through 18 gauge counterflashing, $\frac{3}{4}$ " plywood top and roof curb wall per equipment manufacturer's installation drawings).

2.7 ISOLATION ROOF CURB

- A. Curb mounted rooftop equipment shall be mounted on 1", 2", or 3" static deflection spring isolation curbs. The lower member shall be a full perimeter base curb with a wood nailer and OSHPD Pre-Approved spring isolators that support the upper floating perimeter frame. The upper frame shall be fully welded and must support the equipment and must be captive so as to resist wind and seismic forces. Steel springs shall be laterally stable and zinc or powder coated. The upper curbs waterproofing shall consist of a continuous Galvanized flashing with a bulb seal. All spring locations shall have access ports with removable waterproof covers for adjusting isolators. Lower curbs shall have provision for optional insulation. Curb shall be type RPIC as manufactured by Roof products, Inc. or approved equal.
- B. Type RPIC: A rooftop isolation curb system that can be seismically rated and is flashed into roofing membrane. Standard unit curb will not be used.
 - 1. Air and watertight upper floating curb shall have a neoprene sponge seal at the top and be rigid enough provide continuous perimeter support for rooftop unit.
 - 2. Type JQ spring isolators welded to a fixed base curb to withstand seismic loading shall support the upper curb.
 - 3. Restrained spring isolators shall be free standing, laterally stable springs with lateral seismic restraint low and close to the base plate to protect anchors. The formed steel housing with cushioned lateral and vertical limit stops shall restrict motion due to earthquakes and wind loads, or when weight is removed. The housing shall be

- Hot-Dipped Galvanized. Hot-Dipped zinc coating shall be not less than 2 ounces per square foot complying with ASTM A123, springs to be zinc or powder coated. A clearance of ¼" maximum shall be maintained so that limit stops shall be out of contact during normal operation. Outside spring diameter not less than 80 percent of the compressed height of the spring at rated load. Minimum additional travel 50 percent of the rated deflection at rated load. Isolator/Restraint shall be type JQ as manufactured by California Dynamics Corporation or approved equal.
4. A flexible bulb seal shall provide an airtight weatherproof seal between the upper and lower curbs.
 5. Weatherproof access doors shall be provided at each isolator to allow isolator adjustment.
 6. Isolation curb shall permit the optional installation of exterior rigid insulation to be installed for thermal insulation and acoustic attenuation, or optional 1" interior insulation.
- C. The floating member of the roof curb shall have provision for optional perimeter angle and cross members to support two layers of gypsum board. The gypsum board provided by the contractor shall surround the duct and be caulked to attenuate the transmission of sound. Curbs shall accommodate roof pitch shown on drawings. Isolation curb shall use minimum 16 gauge Galvanized steel and shall be designed to withstand the greater of seismic forces or wind loading per local building code. Registered professional engineer in the employ of the manufacturer must certify design. Isolation curbs shall be Roof Products, Inc. Type RPIC. Top plate shall have adequate means for fastening to the equipment. The base plate shall incorporate steel stiffeners at all spring locations to transfer supported loads with adequate means for positively attaching to the structure. The fixed base curb height will be designed to match the roofing method and roof pitch. Entire assembly can be rated to exceed the applied seismic load. Seismic isolator shall be Type JQ as supplied by Roof Products, Inc. (1-800-262-6669).

2.8 ISOLATION RAILS

- A. Curb mounted rooftop units shall be isolated with Roof Products, Inc. Type RPIR isolation assembly consisting of a pair of extruded aluminum rails formed to fit curb and equipment with a flexible air and weather seal continuously joining the two rails and incorporating Type SW spring isolators sized for 1", 2" or 3" static deflection.
- B. Flexible weather seals shall be 1/16th inch thick minimum reinforced Neoprene protected from direct sunlight and accidental puncture by an extruded aluminum shield and shall be capable of being replaced completely without disturbing the unit mounting.
- C. Springs shall be stable with a KX/KY (horizontal to vertical spring rate) of 1.0 or greater and be properly sized to support the load.
- D. Isolation assembly shall have Neoprene cushioned wind restraints, which are not engaged in normal operation with sufficient capacity to resist wind load in any direction without distortion or damage to the isolated equipment.

2.9 SKYLIGHT SAFETY SCREENS

- A. Interior mounted OSHA compliant to withstand a load of 200lbs. applied perpendicularly at any one area of the screen.
 1. 3/16" diameter cold rolled Galvanized steel rods.
 2. Welded into the structural roof curbs at top or bottom for new construction.

2.10 ROOF ACCESS CURBS

- A. Special structural roof curbs designed to permit full access through openings for easy install or removal of interior mounted equipment.
- B. Consult Roof Products, Inc. for openings sizes and roof curb design.
- C. Reinforced, insulated removable covers sloped for water run-off.

- 2.11 PLEASE REFER TO HARDBOUND CATALOG OR WEB SITE <http://www.rpicurbs.com> FOR: PIPE CURBS, CURB COVERS, SQUARE TO ROUND, COLUMNS AND TUBE COUNTERFLASHINGS, BURGLAR BARS, AND OTHER APPLICATIONS (additional and special applications available upon request).**

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify conditions ready to receive work of this Section. Do no work until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of existing conditions.

3.2 INSTALLATION

- A. Install in accordance with Contract Document provisions and manufacturer's instructions. Where in conflict, assume requirements that are more stringent, and verify with Architect before beginning work.
- B. Weld, bolt, or screw roof curbs and expansion joint curbs as instructed by manufacturer, as shown on accepted shop drawings, and as accepted by Architect.
- C. Equipment Supports: Span minimum two structural members.
- D. Do not apply load to cantilever exceeding 2 foot length, for equipment supports.
- E. Do not apply load to cantilever exceeding 4 foot lengths for roof curbs.

3.3 ADJUSTING

- A. Replace or repair installations not conforming to specified requirements including installations out of level and out of plumb.

3.4 CLEANING

- A. Leave installation clean, free of debris and residue resulting from work of this Section.

END OF SECTION