SECTION 07721 MANUFACTURED CURBS
ROOF CURBS, EXPANSION JOINT CURBS, AND EQUIPMENT SUPPORTS

PART 1 GENERAL

1.1 SUMMARY

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. Ice Deflectors
7. Isolation roof curbs and rails.
8. Skylight safety screens
9. Roof access curbs

B. Related Sections

1.	*Section 05120*	–	*Structural Steel: Steel roof framing.*
2.	*Section 05213*	–	*Open Web Steel Joists*
3.	*Section 05310*	–	*Steel Deck*
4.	*Section 07411*	–	*Metal Roof Panels*
5.	*Section 07540*	–	*Thermoplastic Membrane Roofing*
6.	*Section 07550*	–	*Modified Bituminous Membrane Roofing*
7.	*Section 07610*	–	*Metal Roofing.*
8.	*Section 09900*	–	*Paints and Coatings*
9.	*Division 15*	–	*Mechanical*
10.	*Division 16*	–	*Electrical*

1.2 DESIGN AND SPECIFICATION CONSIDERATIONS

A. This section specifies curbs for mechanical equipment specified by Division 15 as well as architectural curbs. These curbs are designed and fabricated as welded single piece units that are structurally designed to span structural framing. They require structural calculations from manufacturer.

B. **Curbs specified by Division 15 are not accepted** because these curbs normally are not of structural quality sufficient to span roofing decks with large equipment openings. They also have limitations in accommodating roof slopes, roof insulation thickness, and other architectural concerns leading to compromise of roofing watertightness.

C. 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. There are designs to accommodate each type of roofing condition including standing seam metal roofing.

D. Show as manufactured roof curbs on Drawings. Show as semi-rigid insulation with top of curb minimum 8 inch above roofing. Do not accept field fabricated curbs except under special conditions.

1.3 REFERENCES

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

1.4 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 licensed in State of Washington.

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, Mechanical, and Electrical Drawings with applicable roof curbs.

1.5 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.
2. Accommodate loading capacity and connections of roof equipment, configuration of and watertight connections to roofing system, and configuration and spanning capacity between structural members at openings in roof deck.

1.6 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.

1.7 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.

1.8 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

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

2.2 ROOF CURBS AND EQUIPMENT SUPPORTS (for conventional buildings)

A. Frames:
1. Material: ASTM A 653 G90 hot-dipped galvanized steel.
   a. Minimum 18 gauge, and 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. Base Plates: Integral to frame and welded.
4. Internally reinforced with galvanized 1 inch by 1 inch by 12 gauge angles for curbs exceeding 3 foot length. Reinforce internal bulkhead at equipment curbs to support lateral loads.
5. 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 modified bitumen roofing systems [not required for single ply roofing]
1. RPC-1 / RPES-1 (raised cant style) installs on top of metal decks with insulation.
2. RPC-2 / RPES-2 (canted style) installs on wood roofs without insulation.
3. RPC-3 / RPES-3 (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 platforms, 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.
   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". 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: Fablock fasteners and as instructed by manufacturer, for pre-engineered metal buildings.
   B. Butyl Tape and Tube Caulk: As instructed by manufacturer for sealing roof panel to roof curb frame base plate 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 to support equipment loads, modified for existing roof curbs.

2.6 PLEASE REFER TO HARDBOUND CATALOG FOR:
   PLATFORMS, PIPE CURBS, CURSB COVERS, SQUARE TO ROUND, COLUMNS AND TUBE COUNTERFLASHINGS, (other applications available upon request).
   A. Structural Platforms
      1. Material: ASTM A 653 G90 hot-dipped galvanized steel.
         a. Minimum 18 gauge, minimum or as engineered by manufacturer.
      2. Corners: Mitered and welded. Bolted connections not accepted.
      3. Base Plates: Integral to frame and welded.
      4. Internally reinforced with galvanized 1 inch by 1 inch by 12 gauge angles for curbs exceeding 3 foot length. Reinforce internal bulkhead at wider curbs to support lateral loads.

5. Wood Nailers: Factory installed, pressure treated. Size and width as suitable for support of items installed on curbs.
6. ¾" 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 modified bitumen roofing systems [not required for single ply roofing]
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, ¾" plywood top and roof curb wall per equipment manufacturer's installation drawings).

2.7 ICE DEFLECTORS

A. Ice deflectors shall be constructed using structural galvanized steel angles and hot dipped galvanized. Diamond patterned, expanded metal, gauge as deemed necessary by ice deflector manufacturer, with fully welded corners and designed to accommodate 100 mph wind loads and ice impact loads as required by project conditions.
B. Minimum clear height above the top of the protected equipment to be determined by ice deflector manufacturer.
C. Job site consultation available by Roof Products (Installation by others).

2.8 ISOLATION ROOF CURB

A. Type RPIC: Seismically rated rooftop isolation curb system that is flashed into roofing membrane. Standard unit curb will not be used. Air and watertight upper curb shall have a neoprene sponge seal at the top and be rigid enough provide continuous perimeter support for rooftop unit. The upper curb shall be supported by Type CTEC isolators bolted to concrete deck, bolted to the structure, or welded to the structure to withstand seismic loading. An EPDM nylon reinforced airtight weatherproof seal shall consolidate the upper and lower curbs. Weatherproof access doors shall be provided at each isolator to allow isolator adjustment. Isolation curb shall provide a means by which contractor supplied insulation may be installed for thermal insulation and acoustic attenuation. The floating member of the roof curb shall have 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 gage galvanized steel and shall be designed to withstand the greater of seismic forces or wind loading per local building code. Design must be certified by registered professional engineer in the employ of the manufacturer. Isolation curbs shall be Roof Products, Inc. Type RPIC.

B. Type CTEC isolator: a unitized adjustable, stable, open spring isolator and seismic restraint housing. The spring package shall be isolated from the housing by an internal

elastomeric pad for sound absorption. Nuts, adjusting bolts and washers shall be zinc-electroplated to prevent corrosion. The spring assembly shall be removable with equipment in place and shall fit within a welded steel enclosure consisting of a top plate and rigid lower housing. Isolated seismic restraint bolts shall connect top plate to lower housing to resist seismic forces in all directions. Surfaces engaging under seismic motion shall be cushioned with a resilient elastomer, neoprene or equal, to protect equipment. Top plate shall have adequate means for fastening to the equipment. The base plate shall incorporate a structural steel stanchion with adequate means for positively attaching to the structure. The stanchion height will be designed to match the roofing method and roof pitch. Provide elastomeric pad for high frequency absorption at base of spring. Entire assembly shall be rated to exceed the applied seismic load. Seismic isolator shall be Type CTEC as supplied by Roof Products, Inc. (1-800-262-6669)

2.9 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.

2.10 SKYLIGHT SAFETY SCREENS

A. Interior mounted OSHA compliant to withstand a load of 200lbs. applied perpendicularly at any one area of the screen.
    1. Available in 2" x 4" or 6" x 6", 3/16" diameter cold rolled Galvanized steel rods.
B. Installation options
    1. Welded into the structural roof curbs at top or bottom for new construction.
    2. Welded into 14ga. Galvanized steel channel for top drop-in install at new or existing roof curbs.
    3. Welded into 14ga. Galvanized steel angle for inside install at new or existing roof curbs, at top or bottom.

2.11 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.

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