SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 STIPULATIONS
A. The Specification Sections "General Conditions of Contract", "Special Conditions" and "Division 01 - General Requirements" form a part of this Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

1.2 SUMMARY
A. Section Includes:
   1. Miscellaneous steel framing and supports.
   2. Shelf angles.
   3. Metal ladders, interior and exterior.
   4. Elevator pit sump covers.
   5. Metal bollards
   6. Wire rope loading dock guards.
   7. Abrasive metal nosings.
   8. Loose bearing and leveling plates.
B. Products furnished, but not installed, under this Section include the following:
   1. Loose steel lintels.
   2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.
C. Related Requirements:
   1. Section 033000 - Cast-in-Place Concrete.
   2. Section 099100 - Painting.

1.3 ACTION SUBMITTALS
A. Product Data: For the following:
   1. Metal nosings and treads.
   2. Grout.
B. LEED Submittals:
   1. Product Data for Credit MR4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
C. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS
A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders.
B. Structural Performance of Aluminum Ladders: Aluminum ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
C. Thermal Movements:
   1. Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
   2. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
2.2 METALS
A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L.
D. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
E. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
F. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
G. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
I. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.3 FASTENERS
A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
B. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
   1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
D. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS
A. Shop Primers: Provide primers that comply with Division 09 "Painting" Sections.
B. Galvanizing Repair Paint: High-zinc dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
E. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL
A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.
B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
C. Weld corners and seams continuously to comply with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended.
D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.
E. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
F. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors not less than 8 inches from ends and corners of units and 24 inches o.c.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS
A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
C. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.

2.7 SHELF ANGLES
A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
C. Galvanize shelf angles located in exterior walls.
D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 METAL LADDERS
A. General:
2. For elevator pit ladders, comply with ASME A17.1/CSA B44.

2.9 ELEVATOR PIT SUMP COVERS
A. Fabricate from 3/16-inch abrasive-surface floor plate with four 1-inch- diameter holes for water drainage and for lifting.

2.10 METAL BOLLARDS
A. Fabricate metal bollards from Schedule 40 steel pipe shapes.
1. Cap bollards with 1/4-inch- thick steel plate.
B. Fabricate bollards with 3/8-inch- thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.
C. Prime bollards with zinc-rich primer.

2.11 WIRE ROPE GUARDS
A. Wire Rope Loading Dock Guards: 3/4-inch- diameter, zinc-coated steel wire ropes with wire rope fittings for securing to metal bollards and walls and for tightening wire rope.
2.12 ABRASIVE METAL NOSINGS
   A. Cast-Metal Units: Cast, with an integral-abrasive, as-cast finish consisting of aluminum oxide,
      silicon carbide, or a combination of both.
   B. Provide anchors for embedding units in concrete, either integral or applied to units, as standard
      with manufacturer.
   C. Drill for mechanical anchors and countersink. Locate holes not more than 4 inches from ends
      and not more than 12 inches o.c.
   D. Apply bituminous paint to concealed surfaces of cast-metal units.
   E. Apply clear lacquer to concealed surfaces of extruded units.

2.13 LOOSE BEARING AND LEVELING PLATES
   A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete
      construction. Drill plates to receive anchor bolts and for grouting.

2.14 LOOSE STEEL LINTELS
   A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and
      recesses in masonry walls and partitions at locations indicated.
   B. Galvanize loose steel lintels located in exterior walls.

2.15 STEEL WELD PLATES AND ANGLES
   A. Provide steel weld plates and angles not specified in other Sections, for items supported from
      concrete construction as needed to complete the Work. Provide each unit with no fewer than
      two integrally welded steel strap anchors for embedding in concrete.

2.16 FINISHES, GENERAL
   A. Finish metal fabrications after assembly.

2.17 STEEL AND IRON FINISHES
   A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for
      steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
   B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded
      in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL
   A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing
      metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with
      edges and surfaces level, plumb, true, and free of rack; and measured from established lines and
      levels.
   B. Fit exposed connections accurately together to form hairline joints: Weld connections that are
      not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
      Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after
      fabrication and are for bolted or screwed field connections.
   C. Field Welding: Comply with the following requirements:
      1. Use materials and methods that minimize distortion and develop strength and corrosion
         resistance of base metals.
      2. Obtain fusion without undercut or overlap.
      3. Remove welding flux immediately.
      4. At exposed connections, finish exposed welds and surfaces smooth and blended so no
         roughness shows after finishing and contour of welded surface matches that of adjacent
         surface.
   D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal
      fabrications are required to be fastened to in-place construction.
E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING BEARING AND LEVELING PLATES
B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 ADJUSTING AND CLEANING
A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000