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DIVISION 05 - METALS

SECTION 05500

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SECTION 05500

MISCELLANEOUS METAL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 53	(1996) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 467	(1993) Machine and Coil Chain
ASTM A 500	(1993) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 653	(1996) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 924	(1996a) Steel Sheet, Metallic-Coated by the Hot-Dip Process

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1994) Structural Welding Code - Steel
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1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Miscellaneous Metal Items; GA.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation

instructions, and templates. Detail drawings for the following items: Pipe safely railing

SD-14 Samples

1.3 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123, ASTM A 653, or ASTM A 924, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.4 DISSIMILAR MATERIALS

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint or asphalt varnish.

1.5 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.6 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

1.7 SHOP PAINTING

Surfaces of ferrous metal except galvanized surfaces, shall be cleaned and shop coated with the manufacturer's standard protective coating unless otherwise specified. Surfaces of items to be embedded in concrete shall not be painted. Items to be finish painted shall be prepared according to manufacturer's recommendations or as specified.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

Materials indicated on the drawings or required in the work and not covered elsewhere by detailed requirements shall conform to the requirements of this section. In all cases not specifically covered in these specifications, the Contractor shall furnish approved highest grade commercial materials or products which are suitable for intended use of the item.

2.1.2 Structural Shapes and Plates

Steel bars, shapes and plates shall conform to ASTM A 36. Galvanized coatings where required, shall conform to ASTM A 123.

2.1.3 Steel Pipes

Steel pipe shall be zinc-coated steel pipe conforming to the requirements of ASTM A 120, Standard Weight, Schedule 40.

2.1.4 Corrosion-Resisting Steel Bolts and Anchor Bolts

Corrosion-resisting steel bolts and anchor bolts shall conform to FS QQ-S-763, Class 304, Condition A, or the applicable requirements of ASTM A 320, Grade B8.

2.1.5 Bolts

Bolts shall conform to FS FF-B-575. Bolts and anchor bolts shall conform to FS QQ-S 763, Class 304, Condition A, or the applicable requirements of ASTM A 320, Grade B8.

2.1.6 Nuts

Nuts shall conform to FS FF-N-836. Nuts shall be galvanized

2.1.7 Expansion Anchors

Expansion anchors shall conform to the applicable requirements of FF-S-325. Anchors shall be multiple unit with inside thread.

2.1.8 Concrete, Mortar and Grout

Concrete, mortar and grout shall conform to the requirements of Section

03301 CAST-IN-PLACE STRUCTURAL CONCRETE

2.1.9 Steel Safety Railing, Including Carbon Steel Inserts

Steel safety railing, including inserts in concrete, shall be steel pipe conforming to ASTM A 53 or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Steel railings shall be 50 mm nominal size. Railings shall be hot-dip galvanized. Pipe collars shall be hot-dip galvanized steel.

- a. Joint posts, rail, and corners shall be fabricated by one of the following methods:

(1) Flush type rail fittings of commercial standard, welded and ground smooth with railing splice locks secured with 10 mm hexagonal recessed-head setscrews.

(2) Mitered and welded joints by fitting post to top rail and intermediate rail to post, mitering corners, groove welding joints, and grinding smooth. Railing splices shall be butted and reinforced by a tight fitting interior sleeve not less than 150 mm long.

(3) Railings may be bent at corners in lieu of jointing, provided bends are made in suitable jigs and the pipe is not crushed.

2.1.10 Chain Safety Gate

Safety chains shall be galvanized welded steel, proof coil chain tested in accordance with ASTM A 467, Class CS. Safety chains shall be straight link style, 5 mm diameter, minimum 39 links per meter (12 links per foot) and with bolt type snap hooks on one end. Eye bolts for attachment of chains shall be galvanized 10 mm bolt with 19 mm eye, anchored as indicated. The safety chain shall accommodate a eye bolt snap as indicated on the drawings.

2.1.11 Wall ladder Rungs

Wall ladder rungs shall be galvanized steel. Steel bars, shapes and plates shall conform to ASTM A 36. Galvanized coatings shall conform to ASTM A 123.

2.2 MISCELLANEOUS

Miscellaneous plates and shapes for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings, and frames, shall be provided to complete the work.

2.3 TRENCH COVERS, FRAMES, AND LINERS

Trench covers shall be designed to meet the indicated load requirements. Trench frames and anchors shall be all welded steel construction designed to match cover. Covers shall [be secured to frame] [have flush drop handles formed of 6 mm round stock], and shall be [raised-tread, or steel floor plate] [cast-iron grating]. Grating opening widths shall not exceed

25 mm. Trench liners shall be cast iron with integral frame for cover.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations. Items listed below require additional procedures as specified.

3.2 INSTALLATION OF PIPE GUARDS

Pipe guards shall be set vertically in concrete piers. Piers shall be constructed of, and the hollow cores of the pipe filled with, concrete specified in SECTION 03300 CAST-IN-PLACE STRUCTURAL CONCRETE.

3.3 PIPE SAFETY RAILING AND GATES

Pipe Safety Railing and gates shall be galvanized after fabrication in the shop. Care shall be taken to deform pipe without "breaking" the steel. Any pipe deformations that demonstrate visible cracking or weakening may be cause for rejection. The pipe gate components shall be galvanized. Welded, cut, damaged, and deformed area of galvanizing metal shall be neatly coated with Grade 50B solder conforming to ASTM B 32. The Contractor shall grease pipe thoroughly with grease conforming to FS VV-G-632 immediately after installation of chains at each gate opening. The Contractor shall examine and certify the operation of all safety pipe railing not sooner than 30 days after installation.

3.3.1 Attachment of Handrails

Splices, where required, shall be made at expansion joints. Removable sections shall be installed as indicated.

3.3.1.1 Installation of Steel Handrails

Installation shall be in pipe sleeves embedded in concrete and filled with molten lead or sulphur with anchorage covered with standard pipe collar pinned to post. Rail ends shall be secured by steel pipe flanges.

3.3.1.2 Mounting of Safety Chains

Safety chains shall be mounted 1070 mm and 610 mm above the floor.

-- End of Section --