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DIVISION 05 - METALS

SECTION 05500

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## SECTION 05500

## MISCELLANEOUS METAL

## 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 36	(1994a) Carbon Structural Steel
ASTM A 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 126	(1984; R 1991) Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A 320	(1992) Alloy Steel Bolting Materials for Low-Temperature Service
ASTM A 653	(1994) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 924	(1994) General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B 32	(1993) Solder Metal

## AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C210	(1984) Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
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## AMERICAN WELDING SOCIETY (AWS)

AWS B2.1	(1992) Welding Procedure and Performance Qualification
AWS D1.1	(1994) Structural Welding Code - Steel

## FEDERAL SPECIFICATIONS (FS)

FS FF-B-575	(Rev C) Bolts, Hexagon and Square
FS FF-N-836	(Rev D; Am 2) Nut, Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding and Single Ball Seat

FS FF-S-325	(Basic; Int Am 3; Notice 1) Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry)
FS QQ-B-750	(Am 2) Bronze, Phosphor; Bar, Plate, Rod Sheet Strip, Flat Wire, and Structural and Special Shaped Sections
FS QQ-F-461	(Rev C; Am 1) Floor Plate, Steel, Rolled
FS QQ-S-763	(Rev E; Am 1) Steel Bars, Wire, Shapes, and Forgings Corrosion Resisting
FS WW-P-401	(Rev F; Am 1) Pipe and Pipe Fittings, Cast-Iron, Soil

## STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)

Standard Specifications July 1997

## 1.2 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.

## 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 the intended use of the item.

## 2.1.2 Structural Steel

Structural steel shall conform to ASTM A 36.

### 2.1.3 Corrosion-Resisting Steel Bolts and Anchor Bolts

Corrosion-bearing 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.

### 2.1.4 Bronze

Bronze shall conform to [FS QQ-B-750](#), hard temper of either composition.

### 2.1.5 Bolts

Bolts shall conform to [FS FF-B-575](#).

### 2.1.6 Nuts

Nuts shall conform to [FS FF-N-836](#).

### 2.1.7 Cast Iron for Drainage Gates

Cast iron for drainage gates shall conform to [ASTM A 126](#), Class B.

### 2.1.8 Cast Iron Pipe and Fittings

Cast iron pipe and fittings shall conform to the applicable requirements of [FS WW-P-401](#).

### 2.1.9 Coal Tar Base Paint

Coal tar base paint shall conform to [AWWA C210](#). A special primer shall be used only if as recommended by the manufacturer of the coating.

### 2.1.10 Expansion Anchors

Expansion anchors shall conform to the applicable requirements of [FS FF-S-325](#). Anchors shall be multiple unit with inside thread.

### 2.1.11 Guide Posts

Guide Posts shall be Class 2 delineators with metal posts and a reflector target plate per Caltran's [Standard Specifications](#) 82-1.01.

### 2.1.12 Gratings and Trash Racks

Gratings and trash racks shall be fabricated of steel conforming to [ASTM A 36](#).

### 2.1.13 Cover Plates

Cover plates shall conform to [FS QQ-F-461](#), Class 1, Pattern No. 7, 10, 12, or 17. Cover plate shall be provided with holes as shown on the drawings or as required. Sharp edges and burrs shall be removed from plates.

### 2.1.14 Automatic Drainage Gates

Frames and covers shall be cast-iron or cast steel. Seating surfaces shall be bronze or ductile iron. Links may be cast-iron or cast steel, or high

strength malleable iron. Bushings shall be bronze. Fasteners shall be galvanized steel, bronze, or corrosion-resistant steel. Gates shall have fully adjustable linkage.

### 3 EXECUTION

#### 3.1 GENERAL 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 WORKMANSHIP

Steel with welds will not be accepted, except where welding is definitely specified or called for on the drawings. All bolts, nuts, and screws shall be tight. All exposed ferrous metalwork (except cast-iron and corrosion-resistant steel and items to be completely embedded in concrete) shall be galvanized unless other protective coatings are specified. Metalwork shall be galvanized after fabrication. Complete shop drawings for fabrication of all miscellaneous metalwork shall be submitted for approval, in accordance with the requirements for shop drawings.

#### 3.3 FINISHING

In general, tolerances for machine-finished surfaces designated by nondecimal dimensions shall be within 1/64 inch. Sufficient machining stock shall be allowed on placing pads to insure true surfaces of solid material. Finished contract of bearing surfaces shall be true and exact to secure full contract. All drilled holes for bolts shall be accurately located and drilled from templates.

#### 3.4 ZINC COATING (GALVANIZING)

Zinc coatings shall be applied in a manner and of a thickness and quality conforming to [ASTM A 123](#). All exposed ferrous metalwork, except cast-iron and corrosion resistant steel and items to be completely embedded in concrete, shall be galvanized unless other protective coatings are specified. Metalwork shall be galvanized after fabrication. In the event that any portion of galvanized metalwork is abraded or otherwise damaged to the extent that the base metal is exposed, such damaged or abraded portions shall be neatly covered with Grade 50B solder conforming to the requirements of [ASTM B 32](#).

#### 3.5 CASTINGS

Each casting shall have the mark number and heat number cast or stamped upon it. Dimensions of casting shown on the approved shop drawings will be the finish dimensions. Before leaving the foundry, all castings shall be thoroughly cleaned and subjected to hammer inspection after which they shall be treated.

### 3.6 PAINTING METALWORK

#### 3.6.1 Cleaning

All oil and grease shall be removed. When required, welds shall be neutralized by the use of ammonia or other suitable agent. All surfaces to be painted shall be cleaned in the shop to remove all rust, scale, dirt, and other foreign matter. "Tight" mill scale, that cannot be lifted by applying a sharp knife to any edge, will be permitted. The cleaning shall be accomplished by scraping, wire brushing, and wiping or other approved methods. The cleaning and painting operations shall be carried on in such a manner that the time between cleaning and the application of the paint will not exceed 24 hours.

#### 3.6.2 Painting

##### 3.6.2.1 Drainage Gates

Drainage gates shall be given 3 coats of cold applied coat tar base paint. The paint shall be applied heavily by brush, at a coverage rate of approximately 100 square feet per gallon to give a total film thickness of 3 coats of 1/32 of an inch. Each additional coat shall be brushed perpendicular to strokes of preceding coat. Drying time between coats shall be as recommended by manufacture of coatings.

### 3.7 WELDING

Welding shall conform to the provisions of AWS D1.1. Welders who have not been certified within 2 years of the date of commencement of work under this contract shall be required to pass successfully the qualification tests as prescribed by AWS B2.1.

### 3.8 BOLTED CONNECTIONS

Bolt holes shall be reamed normal to the member and shall be truly cylindrical throughout. Unless otherwise specified, holes for bolts shall not be more than .02 inch larger than the diameter of the bolt.

### 3.9 AUTOMATIC DRAINAGE GATES

Automatic drainage gates shall be of the size indicated and constructed to withstand a minimum 14 foot seating head. Each gate shall be rigidly secured in place with seating faces inclined from the vertical by approximately 3 degrees. Installation of gates shall be as recommended by the gate manufacturer. Fasteners of the size recommended by the gate manufacturer shall be utilized in assembly of gate and to secure the gates to the headwall. The gates shall be so constructed as to prevent locking in any partially open position.

### 3.10 GRATING, TRASH RACKS, AND COVER PLATES

Gratings, trash racks, and cover plates, shall be of the type and size specified or shown on the drawings and shall be fabricated to accurately fit the supporting member. Openings shall be provided as shown on the drawings or as required. Steel gratings, trash racks, and cover plates shall be galvanized after fabrication. Shop drawings showing installation of these items shall be provided for approval.

### 3.11 TEMPORARY FENCING

Temporary fencing shall be fabricated with structural steel shape and plates to conforming to **ASTM A 36** and anchor bolts, hardware and fittings as indicated or specified herein. Chain link fence fabric and installation shall conform to the applicable requirements of **SECTION: FENCE, CHAIN-LINK**.

-- End of Section --