

**SECTION 05500  
MISCELLANEOUS METALS**

1.0 GENERAL

A. Description

Miscellaneous metals shall include, but not necessarily be limited to, furnishing and installing anchors, fasteners, hardware, castings, utility specialties, and other miscellaneous metal items in accordance with the Contract Documents or as directed by the Commission.

B. Related Work Included Elsewhere

1. Boring and/or Jacking Pipe: Section 02300
2. Tunneling: Section 02400
3. Water Main Installation and Chlorination: Section 02551
4. Water Valves and Appurtenances: Section 02552
5. Water Services, Water Meter Settings, and Vaults: Section 02553
6. Fire Hydrants: Section 02554
7. Sanitary Sewer Manholes: Section 02562

C. Quality Assurance

1. The Commission will inspect all materials before, during, and after installation to ensure compliance with the Contract Documents.
2. All miscellaneous metal items and fabrications shall be anchored firm and tight, in true alignment with neat fits, and without distortions, unsightly fastenings, raw edges, or protrusions.

2.0 MATERIALS

A. General

1. Materials shall be furnished in accordance with the Contract Documents.

B. Materials Furnished by the Commission

The Commission will not furnish any miscellaneous metals.

C. Contractor's Options

None.

D. Detailed Material Requirements

1. Whenever practicable, items shall be standard products, meeting the requirements specified herein, of a manufacturer regularly engaged in production of such items.
2. All fasteners, hangers, or other miscellaneous connections or accessories shall be of the same material or compatible with the item being fastened or hung.
3. Shapes and Bars

- a. Mild steel shall conform to requirements of ASTM A 36.
  - b. Stainless steel shall conform to requirements of ASTM A 276, Type 304.
  - c. Aluminum shall conform to requirements of ASTM B 221, Alloy 6061-T6.
4. Plate, Sheet, Strip
- a. Mild steel shall conform to requirements of ASTM A 36, or A 283, Grade C.
  - b. High strength steel shall conform to requirements of ASTM A 242.
  - c. Corrosion resistant steel shall conform to requirements ASTM A 242; 0.25 to 0.75 percent copper.
  - d. Stainless steel shall conform to requirements of ASTM A 240, Type 304.
  - e. Aluminum shall conform to requirements of ASTM B 209, Alloy 6061-T6.
5. Mild steel forgings shall conform to requirements of ASTM A 668, Class F.
6. Castings
- a. Unless noted otherwise, gray iron shall conform to requirements of ASTM A48, and AASHTO Designation M306, Class 30 B.
  - b. Malleable iron shall conform to requirements of ASTM A 47, Grade 35018.
  - c. Ductile iron shall conform to requirements of ASTM A 536, Grade 60-40-18.
  - d. Nodular iron shall conform to requirements of ASTM A 220, Grade 45008.
  - e. Steel shall conform to requirements of ASTM A 27, Grade 65-35. The supplementary requirements of ASTM A 27 for tolerances and deviations shall also apply.
  - f. Chromium alloy-steel castings shall conform to the requirements of ASTM A 743, A 744, and A 297. The grade shall be as specified in the "Special Provisions" for the particular use requirement of the casting.
  - g. Aluminum shall conform to requirements of ASTM B 108, Alloy ANSI 356.0, T6.
7. Bolts, nuts, washers
- a. General
    - 1) Provide galvanized for use with galvanized material.
    - 2) Provide stainless for use with corrosion resistant metals.
  - b. Stainless
    - 1) Bolts shall conform to requirements of ASTM A 320, Type 316.
    - 2) Nuts shall conform to requirements of ASTM A 194, Grade 8.
    - 3) Washers shall be Type 316.
  - c. Expansion bolts shall be the metal shield type.
  - d. Steel drive bolts shall be the split shank type.

- e. Headed steel anchors shall be fabricated from cold finished carbon steel conforming to requirements of ASTM A 108.
  - f. Cast washers, ogee washers and special cast washers shall meet the requirements of ASTM A 47. Cast washers shall be mechanically or hot-dip galvanized. The coating shall meet the thickness, adherence, and quality requirement of ASTM A 153.
  - g. Bronze bolts, nuts, and washer shall meet the requirements of ASTM B 21, UNS No. C46400.
8. Hardware
- Spikes, wood screws, staples, brads, lag screws, carriage bolts, and other parts coming under the general heading of "Hardware" shall be composed of carbon steel and shall meet the requirements of FSS FF-N-105.
9. Checkered safety plate
10. Aluminum shall conform to requirements of ASTM B 221, Alloy 6063, T6.
- E. Material Storage Note: Materials shall be stored in order to insure the preservation of their quantity, quality and fitness for Work. The Contractor shall place materials on wooden platforms, or other hard, clean surfaces, not on the ground, and the materials shall be placed under cover when directed by the Owner. Stored materials shall be located in order to facilitate prompt inspection by the Owner. Lawns, grass plots, or other private or public property shall not be used for storage purposes without written permission of the owner or lessee. Unless directed or noted otherwise in the Contract documents, there will be no payment for stored materials.

### 3.0 EXECUTION

#### A. Fabrication

##### 1. General

- a. Fabricate all work true to shape, size and tolerances as indicated in the Contract Documents and on approved Shop Drawings; with straight lines, square corners, or smooth bends; free from twists, kinks, warps, dents, and other imperfections.
- b. Thickness of the metal and details of assembly and support shall provide sufficient strength and stiffness to resist distortion during shipment, handling, installation, and under severe service conditions. Dress exposed edges and ends of metal smooth, with no sharp edges and with corners slightly rounded. Construct connections and joints exposed to weather to exclude water.
- c. Provide sufficient quantity and size of anchors for the proper fastening of the work.

##### 2. Fabricated Products

- a. Pipe wall sleeves in concrete construction shall be standard weight, black steel pipe, with anchors welded to exterior, size as required to accommodate passage of conduits, pipes, ducts, and similar items with proper clearance.
- b. Hatch Doors
 

Provide hatch doors that meet the requirements noted in the standard details and/or Contract Documents.
- c. Connections

- 1) Shop connections in weldable materials, not designed for service removal, shall be welded. All welding shall conform to AWS D1.1 requirements.  
  
Grind all exposed welds smooth. Remove weld, brazing, and solder spatter, flux, slag, and oxides from finished surfaces. Use sheet metal lock seams only when indicated on the Plans or approved shop drawings.
- 2) Complete all provisions for bolted field connections in the shop unless otherwise indicated.
- 3) Match exposed work to produce continuity of line and design. Fabricate and fasten metal work so that the work will not be distorted, the finish impaired, nor the fasteners overstressed from the expansion and contraction of the metal. Conceal fastenings whenever practicable.

d. Castings and Forgings

- 1) Fabricate castings and forgings to the sizes and shapes indicated. Castings and forgings shall be uniform quality, true to pattern; strong, tough, of even grain; sound; smooth; without cold sheets, scabs, blisters and sand holes, cracks or other defects. Plugs, filled holes, and welding will not be allowed.  
  
Castings shall be of thickness and configurations shown on the Standard Details. Abrasive blast as required to remove scale and to achieve a uniform smooth clean surface. Paint with asphaltum or coal tar paint meeting requirements of AWWA C 203, where indicated. Provide raised letters where indicated.
- 2) Valve boxes shall be Class 30B, round head, screw type consisting of snug fitting top, bottom sections, and screw type extension. Lid shall be removable only by lifting straight up from the shaft shoulder.
- 3) Meter setting fittings, yokes, and appurtenances for 3/4 through 2-inch metered water supplies, and meter pit frames, lids, and covers shall be as specified on the Standard Details.
- 4) Manhole frames and covers shall be cast from material meeting the requirements of ASTM A48, Class 30B. Weights, configuration, and lettering shall be as shown on the Standard Details.

- e. Miscellaneous anchors, strap anchors, clip angles, and plates, hangers, etc., and other items, together with all miscellaneous structural shapes required for construction of the work shown on the Plans, shall be furnished in accordance with the requirements of the Contract Documents.

B. Painting and Coatings

1. Where indicated, shop and/or field paint miscellaneous metal items according to the paint systems specified in the Contract Documents.
2. Galvanized touch up shall be zinc dust coating conforming to requirements of Military Specification P-26915.
3. Bituminous corrosion protection shall conform to requirements of Military Specification C-18480.
4. Coat aluminum accessories and items embedded in concrete with an inert compound capable of effecting isolation of the deleterious effect of the aluminum on the concrete.

C. Delivery, Handling, and Storage

1. Identify, and match mark if applicable, all materials, items, and fabrications; for installation and field assembly.
2. Wherever practicable, deliver items to job site as complete units, ready for installation or erection, with all anchors, hangers, fasteners, and miscellaneous metal items required for installation.
3. Provide adequate storage facilities at the job site for the protection and storage of all delivered materials. Handle and store in such a manner as to not damage factory finishes. The Contractor shall repair damaged finishes at no cost to the Commission.

D. Erection and Installation

1. Erection and installation of miscellaneous metal items shall be in accordance with requirements specified elsewhere in the Contract Documents.
2. Miscellaneous metal items and fabrication shall be installed in their proper locations as Shown or directed and shall be anchored, rigid and secure, plumb and level unless otherwise shown, and in true alignment with related and adjoining work.
3. The Contractor shall provide shims, washers, anchors, and such additional work as necessary to achieve a satisfactory installation.

4.0 METHOD OF MEASUREMENT

Miscellaneous metals will not be measured.

5.0 BASIS OF PAYMENT

Miscellaneous metals will not be paid for as separate items. The materials and their installation are considered incidental to the work required in the construction of specific structures that will be paid for under various items indicated in the Contract Documents. Payment will constitute full compensation for all labor, equipment, tools, and incidentals necessary to complete the required work.

**\*\*END OF SECTION 05500\*\***