

**SECTION 05 50 00**  
**METAL FABRICATIONS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies items and assemblies fabricated from structural steel and other materials as shown and specified.
- B. Items specified.
  - 1. Exterior pipe supports.

**1.2 RELATED WORK**

Prime and finish painting: Section 09 91 00, PAINTING.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings:
  - 1. Each item specified, showing complete detail, location in the project, material and size of components, method of joining various components and assemblies, finish, and location, size and type of anchors.
  - 2. Mark items requiring field assembly for erection identification and furnish erection drawings and instructions.
  - 3. Provide templates and rough-in measurements as required.
- C. Furnish setting drawings and instructions for installation of anchors to be preset into concrete and masonry work, and for the positioning of items having anchors to be built into concrete or masonry construction.

**1.4 QUALITY ASSURANCE**

- A. Each manufactured product shall meet, as a minimum, the requirements specified, and shall be a standard commercial product of a manufacturer regularly presently manufacturing items of type specified.
- B. Each product type shall be the same and be made by the same manufacturer.
- C. Assemble product to the greatest extent possible before delivery to the site.
- D. Include additional features, which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product.

**1.5 APPLICABLE PUBLICATIONS**

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

- B. American Society of Mechanical Engineers (ASME):
  - B18.2.2-87(R2005).....Square and Hex Nuts (Concrete Anchor Bolts)
- C. American Society for Testing and Materials (ASTM):
  - A36/A36M-05.....Structural Steel
  - A53-06.....Pipe, Steel, Black and Hot-Dipped, Zinc-Coated  
Welded and Seamless
  - A123-02.....Zinc (Hot-Dip Galvanized) Coatings on Iron and  
Steel Products
  - A307-07.....Carbon Steel Bolts and Studs, 60,000 PSI Tensile  
Strength
  - F436-07.....Hardened Steel Washers
  - F593-02.....Stainless Steel Bolts, Hex Cap Screws, and Studs
- D. American Welding Society (AWS):
  - D1.1-04.....Structural Welding Code Steel
  - D1.3-98.....Structural Welding Code Sheet Steel
- E. Structural Steel Painting Council (SSPC):
  - SP 1-05.....No. 1, Solvent Cleaning

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Structural Steel: ASTM A36.
- B. Steel Pipe: ASTM A53.
  - 1. Galvanized for exterior locations.
- C. Primer Paint: As specified in Section 09 91 00, PAINTING.

**2.2 HARDWARE**

- A. Rough Hardware:
  - 1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electro-galvanizing process. Galvanized G-90 where specified.
  - 2. Use G90 galvanized coating on ferrous metal for exterior work unless stainless is used.
- B. Fasteners:
  - 1. Bolts with Nuts:
    - a. ASME B18.2.2.
    - b. ASTM A307 for 415 MPa (60,000 psi) tensile strength bolts.
    - c. ASTM F593 for stainless steel.
  - 2. Screws: ASME B18.6.1.
  - 3. Washers: ASTM F436, type to suit material and anchorage.

### 2.3 FABRICATION GENERAL

#### A. Material

1. Use material as specified. Use material of commercial quality and suitable for intended purpose for material that is not named or its standard of quality not specified.
2. Use material free of defects which could affect the appearance or service ability of the finished product.

#### B. Size:

1. Size and thickness of members as shown.
2. When size and thickness is not specified or shown for an individual part, use size and thickness not less than that used for the same component on similar standard commercial items or in accordance with established shop methods.

#### C. Connections

1. Except as otherwise specified, connections may be made by welding bolting.
2. Riveting will not be approved.
3. Design size, number and placement of fasteners, to develop a joint strength of not less than the design value.
4. Holes, for bolts: Accurately punched or drilled and burrs removed.
5. Size and shape welds to develop the full design strength of the parts connected by welds and to transmit imposed stresses without permanent deformation or failure when subject to service loadings.
6. Use stainless steel connectors for removable bolts and hardware.

#### D. Fasteners and Anchors

1. Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
2. Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
3. Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
4. Fasteners for securing metal fabrications to new construction only, shall be by use of "J" bolt anchors for installation before the concrete is placed or as masonry is laid.

E. Workmanship

1. General:

- a. Fabricate items to design shown.
- b. Furnish members in longest lengths commercially available within the limits shown and specified.
- c. Fabricate straight, true, free from warp and twist, and where applicable square and in same plane.
- d. Provide holes, sinkages and reinforcement shown and required for fasteners and anchorage items.
- e. Provide openings, cut-outs, and tapped holes for attachment and clearances required for work of other trades.
- f. Prepare members for the installation and fitting of hardware.
- g. Fabricate surfaces and edges free from sharp edges, burrs and projections which may cause injury.

2. Welding:

- a. Weld in accordance with AWS.
- b. Welds shall show good fusion, be free from cracks and porosity and accomplish secure and rigid joints in proper alignment.
- c. Where exposed in the finished work, continuous weld for the full length of the members joined and have depressed areas filled and protruding welds finished smooth and flush with adjacent surfaces.
- d. Finish welded joints to match finish of adjacent surface.

3. Joining:

- a. Miter or butt members at corners.
- b. Where frames members are butted at corners, cut leg of frame member perpendicular to surface, as required for clearance.

4. Anchors: Provide per plans.

5. Cutting and Fitting:

- a. Accurately cut, machine and fit joints, corners, copes, and miters.
- b. Fit removable members to be easily removed.
- c. Design and construct field connections in the most practical place for appearance and ease of installation.
- d. Fit pieces together as required.
- e. Fabricate connections for ease of assembly and disassembly without use of special tools.
- f. Joints firm when assembled.
- g. Conceal joining, fitting and welding on exposed work as far as practical.
- h. Do not show screws prominently on the exposed face.

- i. The fit of components and the alignment of holes shall eliminate the need to modify component or to use exceptional force in the assembly of item and eliminate the need to use other than common tools.

F. Finish:

1. Steel and Iron: NAAMM AMP 504.
  - a. Zinc coated (Galvanized): ASTM A123, G90 unless noted otherwise.
  - b. Paint all exposed steel structures and piping (in addition to underlying galvanizing, if applicable) in accordance with Section 09 91 00, PAINTING.

**2.4 SUPPORTS**

A. General:

1. Fabricate ASTM A36 structural steel shapes as shown.
2. Use clip angles or make provisions for welding hangers and braces to overhead construction.
3. Field connections shall be welded or bolted, as indicated on the drawings.

**PART 3 - EXECUTION**

**3.1 INSTALLATION, GENERAL**

- A. Set work accurately, in alignment and where shown, plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Field weld in accordance with AWS.
  1. Design and finish as specified for shop welding.
  2. Use continuous weld unless specified otherwise.
- C. Install anchoring devices and fasteners as shown and as necessary for securing metal fabrications to piers as specified. Power actuated drive pins may not be used.
- D. Spot prime all abraded and damaged areas of zinc coating as specified and all abraded and damaged areas of shop prime coat with same kind of paint used for shop priming.

**3.2 INSTALLATION OF SUPPORTS**

- A. Anchorage to structure.
  1. Secure angles or channels and clips to overhead structural steel by continuous welding unless bolting is shown.
  2. Secure supports to concrete inserts by bolting or continuous welding as shown.
  3. Secure piping supports to concrete with "J" bolts as indicated on the drawings. Expansion bolts are not permitted.

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