
SECTION 05500 - MISCELLANEOUS METALS

All Marine/Water Components work and materials shall conform to the Drawings and the provisions of SECTION 504 – STRUCTURAL STEEL and SECTION 507 – RAILINGS with the following modifications:

MODIFICATIONS:

Section 504.58 – Add the following: All Support Structures deposited weld metal shall have a minimum Charpy impact resistance of 20 ft-lbs. at negative 20-degrees F. Weld metal shall also have chemistry similar to the base metal.

All other project work and materials shall conform to the Drawings and Specifications, with the following additions:

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide miscellaneous metals, sections, shapes and sheets, fittings, fasteners, wirework, angles and channel sections, supports, hangers, connections, anchors and other fabrications which are principally of metal composition, not specified elsewhere in these Specifications and as shown on the Drawings or required to complete the Work.

1.02 RELATED WORK

- A. Section 05120 - Structural Steel

1.03 SUBMITTALS

- A. Submit shop drawings indicating fabrication, assembly and erection details, sizes of members, profiles, fastenings, supports and anchors, patterns, clearances and connection to other work, before fabrication begins.
- B. Submit complete materials list of all items proposed to be provided under this Section.

1.04 QUALITY ASSURANCE

- A. Reference Standards - Comply with the following:
 - 1. BOCA Building Code, latest Edition.
 - 3. AISC - Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings.
 - 4. AISC - Code of Standard Practice for Steel Buildings and Bridges.
 - 5. AISC - Specification for the Design of Cold Formed Steel Structural Members.
 - 6. American Welding Society Code AWS D1.1, D1.2 and D1.3.
 - 7. OSHA Standards.
 - 8. Local codes and regulations.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General: Provide material that is free from defects impairing strength, durability or appearance, that is of best commercial quality for purposes specified, and that has structural properties to safely sustain or withstand strains and stresses to which normally subjected. Throughout the facility, provide materials having the same inherent texture and color of exposed surfaces for like locations. Insofar as practicable, provide non-corrosive, non-staining and concealed fastenings. Where fastenings must be exposed, match materials, color and finish as material to which applied, countersink and finish flush. Grind exposed welds smooth to form a neat uniform fillet without weakening base metal. Remove all slag from welds before applying shop coating. Form molded bent or shaped members with clean, sharp arises, without dents, scratches, cracks or other defects. Provide all anchors, bolts, shims and accessory items as required for building into or fastening to adjacent work. Unless otherwise specified, use only galvanized ferrous metals.
- B. Steel: Provide miscellaneous steel plates, shapes, bars and connections conforming to the requirements of ASTM A36.
1. Primer for Steel: Comply with surface preparation recommendations of the primer manufacturer, using SSPC methods. Use lead free, rust inhibitive materials compatible with finish coatings, if such are specified.
 - a. Comply with VOC emissions requirements.
 - b. Minimum solids content: 47%.
 - c. Vehicle: Alkyd resins, oil, or oleoresinous mixtures.
 - d. Minimum Dry Film Thickness: 3 mils.
 2. Galvanized: Hot-dip method, ASTM A123, after fabrication.
 - a. When size or other reasons preclude galvanizing in one piece after fabrication, approval may be granted to fabricate in sections as large as possible to keep welds and connections to a minimum compatible with the size of galvanizing tanks.
 3. Galvanizing Repair Paint: Comply with Military Specifications MIL-21035 (Ships). Galvicon and ZRC coatings are also acceptable.
 4. Prime exposed surfaces, except when galvanized or intended to be embedded in concrete, with one shop coat of rust inhibiting primer.
- C. Steel Pipe: Provide steel pipe for miscellaneous members and connections that conforms to the requirements of ASTM A 53, Type E, Grade B, Schedule 40, galvanized, unless otherwise indicated.

- D. Anchor Bolts And Fasteners: Use adhesive anchors consisting of self contained vinylester adhesive cartridges and Type 304 stainless steel anchor rods equal to HVA adhesive anchoring system, as manufactured by Hilti, or equal, of the size and at the locations shown on the Drawings. Provide all other fastenings, bolts, nuts, washers and anchors as shown in the Drawings. Zinc coated fastenings will not be approved except at wood nailers, or when other types of corrosion resistant materials are not available and approval is granted in writing by the Resident. Use fasteners of adequate strength for purpose intended. When steel anchors are indicated, use a one-piece design with expander ring consisting of steel zinc-coated and chrome plated, as manufactured by McCullough Industries, Inc., Kwick Bolt, Hilti, or equal.
- E. Welding Electrodes: Provide welding electrodes for structural steel conforming to AWS A5.5, E70XX.
- F. Expansion Joint Covers: Use expansion joint covers equal to Balco XH4FS-2m for joints in floors and equal to Balco XH4FVS-2m for joints in walls. Use covers of extruded aluminum, 6063-T5 alloy, standard mill finish, equipped with dual locked-in filler strips and vinyl water seals as shown or noted on the Drawings. Apply a factory coating of zinc chromate primer to all aluminum surfaces to be in contact with concrete or masonry. Provide covers complete with metal anchoring devices, non-corrosive, electrolytically inert concrete anchor bolts, masonry and cover screws, lead fiber masonry anchors, filler strips, seals and other accessories as required for installation per the manufacturer's instructions. Use filler strips of PVC or SBR, gray in color, manufacturer's option for performance required.
- G. Steel Ladders: Provide steel ladders, having welded joints, hot-dipped galvanized after fabrication and complying with OSHA Standards, as detailed on Drawings. To secure ladders to concrete substrate, use 1/2-inch diameter red heads by Hilti or approved equal.
- H. Safety Nosings: 3-inches wide safety groove treads complete with anchors for concrete stairs, equal to Type 231 Supergrit as manufactured by Wooster Products, Inc., or as manufactured by American Abrasive Metals Co., Safety-T-Metal Co., Inc., or Andeo Industries.
- I. Steel Stairs: Construct steel stairs as indicated on the Drawings, to support dead loads and additional live working stresses permitted for materials in the BOCA Building Code. Connect stair to the appropriate structural members. Size of various members and number of parts indicated on the Drawings are minimum. Increase as necessary to meet requirements. Construct stairs to comply with OSHA Standards.
- J. Steel Pipe Guards: Provide galvanized steel pipe guards as detailed on the Drawings, including pipe sleeves, concrete fill, crushed fill and grouting to secure parts. Use schedule 40 steel pipe conforming to ASTM A53.

- K. Aluminum: Shapes and dimensions shown on the Drawings.
1. Finish for exposed surfaces (unless otherwise noted): Electrostatically applied acrylic or polyester enamel (ESP), minimum 1.0 mil dry thickness, specular gloss value approximately 20, applied over a buffed and etched surface (AAMA M22C22), color to be selected. Comply with AAMA 603.8-85 standards. Coordinate shade of selected color to match finish on other items specified elsewhere. Submit color samples for approval.
- L. Stainless Steel: Chromium-nickel alloy, type 302 unless another type is approved by Resident in writing. Do not use sheet materials with gage smaller than 16.
1. Finish: Unless otherwise noted, give exposed surfaces a #4 (satin) finish.
 2. Welded Connections: Made in the shop, ground and finished to match the adjacent surfaces and to present a smooth, invisible seam.

2.02 FABRICATION

- A. Insofar as possible, fit and shop assemble fabricated material ready for erection. Provide welding equipment and perform welding in compliance with American Welding Society's Code for Welding in Building Construction, latest edition. Construct all work to be square, plumb and true, accurately fitted with tight joints and intersections. Finish exposed work smooth with welds ground smooth.
- B. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.
- C. Painting and Protective Coating:
1. Except for stainless steel and galvanized surfaces, properly clean all ferrous metal and coat surfaces with one shop coat of primer compatible with coating system specified in Section 09900, Painting. Coat anchors that are built into masonry with asphalt paint unless specified to be galvanized. Do not coat metal work to be encased in concrete unless specified or noted otherwise. Clean castings that are to be left unpainted and coat with Galvacon or approved equal.
 2. Provide products fabricated from rolled, pressed or forged steel shapes, plates, bars and strips with hot-dip galvanizing or zinc coatings in compliance with ASTM A 123. Provide assembled steel products with hot-dip galvanizing or zinc coatings in compliance with ASTM A 386. Provide weight of coatings as designated in Table 1 for the class and thickness of material to be coated. Except for bolts and nuts, perform all galvanizing after fabrication.
 3. Provide shop coating of galvanized or zinc coated surfaces only where specifically specified or shown on the Drawings. Chemically treat such surfaces prior to applying the coating to provide a bond for the paint.

PART 3 EXECUTION
3.01 ERECTION

- A. Where the contact of dissimilar metals may cause electrolysis and where aluminum will contact other non-compatible metals, concrete, mortar or plaster, separate the contact surfaces of the metals using non-reactive materials or not less than one coat of zinc chromate primer and one heavy coat of aluminum pigmented asphalt paint on each surface; or where deemed necessary by the Resident, use not less than one course of asphalt saturated cotton fabric cemented to both metals with flashing cement. Clean finished works and remove excess cement.
- B. Adequately anchor all work in place at proper elevations, planes and locations. Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction including threaded fasteners for concrete inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- C. Cutting, Fitting and Placement:
1. Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications.
 2. Set work accurately in location, alignment, and elevation, and make plumb, level, true, and free from rack, measured from established lines and levels.
 3. Provide temporary anchors in form work for items which are to be built into concrete or similar construction.
 4. Fit exposed connections accurately together to form tight hairline joints.
 5. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations.
 6. Grind exposed joints smooth, and touch up shop paint coat. Do not weld, cut, or abrade the surface of exterior units which have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
 7. Conceal fasteners and anchoring devices in locations exposed to view in finished spaces. Obtain Resident's approval for locations where concealment is not practical.
- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of weld made, and methods in correcting welding work.
- E. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded area of shop paint and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide minimum dry film thickness of 2.0 mils.
1. Touch-up galvanized surfaces where the galvanizing is abraded, welded, scratched, etc., with two coats of galvanized repair paint.

END OF SECTION