

SECTION 05 52 00

METAL RAILINGS

04/08

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 within the text by the basic designation only.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2008) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 467/A 467M (2007) Standard Specification for Machine Coil and Chain

ASTM B 26/B 26M (2005) Standard Specification for Aluminum-Alloy Sand Castings

ASTM B 429/B 429M (2006) Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Submit fabrication drawings for the following items in accordance with the paragraph entitled, "General Requirements," of this section. Shop drawings and structural calculations shall be stamped and signed by a registered Civil or Structural Engineer currently licensed in the State of California.

Aluminum Railings, Handrails and Hardware; A/E

SD-03 Product Data

Submit manufacturer's catalog data including two copies of manufacturers specifications, load tables, dimension diagrams, and anchor details for the following items:

Aluminum Railings, Handrails and Hardware; A/E

SD-07 Certificates

Submit **Welding Procedures; A/E** in accordance with **AWS D1.1/D1.1M**.

Submit certificates for [Welder Qualification](#); A/E in accordance with the paragraph entitled, "Qualifications for Welding Work," of this section.

[SD-08 Manufacturer's Instructions](#)

Submit manufacturer's installation instructions for the following products to be used in the fabrication of steel stair work.

[Aluminum Railings, Handrails and Hardware](#); A/E

1.3 QUALIFICATIONS FOR WELDING WORK

Section [05 05 23](#) WELDING, STRUCTURAL applies to work specified in this section.

Provide [Welding Procedures](#) and certified [Welder Qualification](#) by tests in accordance with [AWS D1.1/D1.1M](#), or under an equivalent approved qualification test. In addition be performed on test pieces in positions and with clearances equivalent to those actually encountered. If a test weld fails to meet requirements, make an immediate retest of two test welds and each test weld must pass. Failure in the immediate retest will require that the welder be retested after further practice or training and make a complete set of test welds.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

Provide complete and detailed fabrication drawings for all [Aluminum Railings, Handrails and Hardware](#).

Preassemble items in the shop to the greatest extent possible. Disassemble units only to the extent necessary for shipping and handling. Clearly mark units for reassembly and coordinated installation.

For the fabrication of work exposed to view, use only materials that are smooth and free of surface blemishes, including pitting, seam marks, roller marks, rolled trade names, and roughness. Remove blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and application of surface finishes, including zinc coatings.

Refer to Section [05 50 13](#), MISCELLANEOUS METAL FABRICATIONS for design criteria.

2.2 GENERAL FABRICATION

Provide Railings and Handrails detail plans, sections, details and elevations. Also detail setting drawings, diagrams, templates for installation of anchorages, including concrete inserts, anchor bolts, and miscellaneous metal items having integral anchors.

Use materials of size and thicknesses indicated or, if not indicated, of required size and thickness to produce adequate strength and durability in finished product for intended use. Work materials to dimensions indicated on approved detail drawings, using proven details of fabrication and support. Use type of materials indicated or specified for the various components of work.

Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Exposed edges must be eased to a radius of approximately $1/32$ inch. Bend metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.

Weld corners and seams continuously and in accordance with the recommendations of AWS D1.1/D1.1M. Grid exposed welds smooth and flush to match and blend with adjoining surfaces.

Form exposed connections with hairline joints that are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of the type indicated or, if not indicated, use Phillips flathead (countersunk) screws or bolts.

Provide anchorage of the type indicated and coordinated with the supporting structure. Fabricate anchoring devices and space as indicated and as required to provide adequate support for the intended use of the work.

Use hot-rolled steel bars for work fabricated from bar stock unless work is indicated or specified to be fabricated from cold-finished or cold-rolled stock.

2.3 ALUMINUM RAILINGS, HANDRAILS AND HARDWARE

Consists of $1\ 1/2$ inch nominal schedule 40 pipe ASTM B 429/B 429M, Railings to be mill finish aluminum. All fasteners must be Series 300 stainless steel.

a. Fabrication: Provide jointing by one of the following methods:

(1) Flush-type rail fittings, welded and ground smooth with splice locks secured with $3/8$ inch recessed head set screws.

(2) Mitered and welded joints made by fitting post to top rail, intermediate rail to post, and corners, must be groove welded and ground smooth. Provide butted splices, where allowed by the Contracting Officer, and reinforced by a tight fitting dowel or sleeve not less than 6 inches in length. Tack weld or epoxy cement dowel or sleeve to one side of the splice.

(3) Assemble railings using slip-on aluminum-magnesium alloy fittings for joints. Fasten fittings to pipe or tube with $1/4$ or $3/8$ inch stainless steel recessed head setscrews. Provide assembled railings with fittings only at vertical supports or at rail terminations attached to walls. Provide expansion joints at the midpoint of panels. Provide a setscrew in only one side of the slip-on sleeve. Provide alloy fittings to conform to ASTM B 26/B 26M.

b. Removable railing sections: Provide removable railing sections as indicated. Provide toe-boards and brackets where indicated, using flange castings as appropriate.

2.4 SAFETY CHAINS AND GUARDRAILS

Construct safety chains of galvanized steel, straight link type, $3/16$ inch diameter, with at least twelve links per foot, and with snap hooks on each end. Test safety chain in accordance with ASTM A 467/A 467M, Class CS.

Provide snap hooks of boat type. Provide galvanized 3/8 inch bolt with 3/4 inch eye diameter for attachment of chain, anchored as indicated. Supply two chains, 4 inches longer than the anchorage spacing, for each guarded area.

PART 3 EXECUTION

3.1 RAILINGS AND HANDRAILS

Adjust railings prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length. Plumb posts in each direction. Secure posts and rail ends to building construction as shown on the drawings:

3.2 FIELD WELDING

Procedures of manual shielded metal arc welding, appearance and quality of welds made, and methods used in correcting welding work must comply with AWS D1.1/D1.1M.

-- End of Section --