

**SECTION 05 51 00**  
**METAL STAIRS**

**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Section specifies steel stairs with railings.
- B. Types:
  - 1. Closed riser stairs with concrete filled treads and platforms.
  - 2. Industrial stairs: open riser stairs.
  - 3. Guardrails

**1.2 RELATED WORK**

- A. Concrete fill for treads and platforms: Section 03 30 00, CAST-IN-PLACE CONCRETE.
- B. Requirements for shop 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: Show design, fabrication details, installation, connections, material, and size of members.

**1.4 APPLICATION PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation.
- B. American Society for Testing and Materials (ASTM):
  - A36/A36M-05.....Rolled steel plates, bars, angles, C and MC shapes
  - A992..... Rolled steel W-Shapes
  - A47-99 (R2004).....Ferritic Malleable Iron Castings
  - A48-03.....Gray Iron Castings
  - A53-06.....Pipe, Steel, Black and Hot-Dipped Zinc-Coated Welded and Seamless
  - A325-07.....High-strength bolts
  - A653/653M-07.....Steel Sheet, Zinc Coated (Galvanized) or Zinc Alloy Coated (Galvannealed) by the Hot-Dip Process
  - A563-07.....Carbon and Alloy Steel Nuts
  - A1008-07.....Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low-Alloy
  - A786/A786M-00.....Rolled Steel Floor Plates

- A1011-04.....Steel, Sheet and Strip, Strip, Hot-Rolled  
Carbon, Structural, High-Strength, Low-Alloy
- C. American Welding Society (AWS):  
D1.1-04.....Structural Welding Code-Steel  
D1.3-98.....Structural Welding Code-Sheet Steel
- D. The National Association of Architectural Metal Manufacturers (NAAMM)  
Manuals:  
Metal Bar Gratings (ANSI/NAAMM MBG 531-00)  
AMP521-01.....Pipe Railing Manual, Including Round Tube
- E. American Iron and Steel Institute (AISI):  
2001.....Design of Cold-Formed Steel Structural Members

## **PART 2 - PRODUCTS**

### **2.1 DESIGN CRITERIA**

- A. Design stairs to support a live load of 500 kg/m<sup>2</sup> (100 pounds per square foot).
- B. Structural design, fabrication and assembly in accordance with requirements of NAAMM Metal Stairs Manual, except as otherwise specified or shown.
- C. Design Grating treads in accordance with NAAMM Metal Bar Grating Manual.
- D. Design pipe railings in accordance with NAAMM Pipe Railing Manual to resist a load of 50 pounds per foot or a concentrated load of 200 pounds (whichever produces the maximum load effects) applied at the top in any direction at any point.
- E. Recycled Content of Steel Products: Structural steel sections shall contain minimum recycled content as follows (post-consumer plus 1/2 preconsumer recycled content):
1. Bars, Angles, Pipe, and Channels: 94 percent recycled content.
  2. Plates: 85 percent recycled content.
  3. Rolled steel W-Shapes: 85 percent recycled content.

### **2.2 MATERIALS**

- A. Steel Pipe: ASTM A53, Standard Weight, zinc coated.
- B. Steel Grating: Metal bar type grating NAAMM BG.
- C. Sheet Steel: ASTM A1008.
- D. Rolled steel plates, bars, angles, C and MC shapes: ASTM A36.
- E. Rolled steel W-Shapes: ASTM A992
- F. Steel Decking: Form from zinc coated steel conforming to ASTM A446, with properties conforming to AISI Specification for the Design of Cold-Formed Steel Structural Members.
- G. Steel Plate: ASTM A1011.

### 2.3 FABRICATION GENERAL

#### A. Fasteners:

1. Conceal bolts and screws wherever possible.
2. Use countersunk heads on exposed bolts and screws with ends of bolts and screws dressed flush after nuts are set.

#### B. Welding:

1. Structural steel, AWS D1.1 and sheet steel, AWS D1.3.
2. Where possible, locate welds on unexposed side.
3. Grind exposed welds smooth and true to contour of welded member.
4. Remove welding splatter.

#### C. Remove sharp edges and burrs.

#### D. Fit stringers to head channel and close ends with steel plates welded in place where shown.

#### E. Fit face stringer to newel post by tenoning into newel post, or by notching and fitting face stringer to side of newel where shown.

#### F. Shop Prime Painting: Prepare surface and apply primer as specified for ferrous metals in Section 09 91 00, PAINTING.

#### G. Galvanizing: Hot-dip galvanize all exterior items to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

### 2.4 RAILINGS

#### A. Fabricate railings, including handrails, from steel pipe with flush.

1. Connections may be standard fittings designed for welding, or coped or mitered pipe with full welds.

#### B. Return ends of handrail to wall and close free end.

#### C. Provide standard terminal castings where fastened to newel.

#### D. Space intermediate posts not over six feet on center between end post.

#### E. Fabricate handrail brackets from cast malleable iron.

#### F. Provide standard terminal fittings at ends of post and rails.

### 2.5 CLOSED RISER STAIRS

#### A. Provide treads, risers, platforms, railings, stringers, headers and other supporting members.

#### B. Fabricate pans for treads and platforms, and risers from sheet steel.

#### C. Form risers with sanitary cove.

#### D. Fabricate stringers, headers, and other supporting members from structural steel.

**2.6 INDUSTRIAL STAIRS**

- A. Provide treads, platforms, railings, stringers and other supporting members as shown.
- B. Treads and platforms of steel grating:
  - 1. Fabricate steel grating treads and platforms in accordance with requirements of NAAMM Metal Bar Grating Manuals.
  - 2. Provide end banding bars, except where carrier angle are used at tread ends.
  - 3. Support treads by use of carrier plates or carrier angle. Use carrier plate end banding bars on exterior stairs.
  - 4. Provide abrasive nosing on treads and edge of platforms at head of stairs.
  - 5. Provide toe plates on platforms where shown.

**PART 3 - EXECUTION****3.1 STAIR INSTALLATION**

- A. Provide hangers and struts required to support the loads imposed.
- B. Perform job site welding and bolting as specified for shop fabrication.
- C. Set stairs and other members in position and secure to structure as shown.
- D. Install stairs plumb, level and true to line.
- E. Provide steel closure plate to fill any gap between the stringer and surrounding shaft wall. Weld and finish with prime and paint finish of adjoining steel.

**3.2 RAILING INSTALLATION**

- A. Install standard terminal fittings at ends of posts and rails.
- B. Secure brackets, posts and rails to steel by welds, and to masonry or concrete with expansion sleeves and bolts, except secure posts at concrete by setting in sleeves filled with commercial non-shrink grout.
- C. Set rails horizontal or parallel to rake of stairs to within 3 mm in 3650 mm (1/8-inch in 12 feet).
- D. Set posts plumb and aligned to within 3 mm in 3650 mm (1/8-inch in 12 feet).

**3.3 FIELD PRIME PAINTING**

- A. When installation is complete, clean field welds and surrounding areas to bright metal, and coat with same primer paint used for shop priming.
- B. Touch-up abraded areas with same primer paint used for shop priming.
- C. Touch up abraded galvanized areas with cold-galvanizing paint as specified in section 05 12 00, STRUCTURAL STEEL.

- - - E N D - - -