SECTION 05 51 00
METAL STAIRS

SPEC WRITER NOTE:

1. Delete between // ______// if not applicable to project.
2. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.
3. Occupational Safety and Health Administration (OSHA) requires a stair to areas where a mechanic must go up or down different levels to service equipment.
4. Use either open riser or industrial stair to roof where not accessible, to other than building service personnel.
5. See OSHA Section 1910.24, Fixed Industrial stair.
6. Design industrial stair or open riser stairs for maximum angle 50 degrees or less to horizontal when used to service equipment.
7. Consider open riser stairs with grate treads on exterior service areas.
8. Do not use "ships Ladders" or spiral 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: Closed // and open // riser stairs.

1.2 RELATED WORK
A. Concrete fill for treads and platforms: Section 03 30 00, CAST-IN-PLACE CONCRETE.
B. Wall handrails and railings for other than steel stairs: Section 05 50 00, METAL FABRICATIONS.
C. 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-08 .......... Structural Steel
   A47-99 (R2009) .......... Ferritic Malleable Iron Castings
   A48-03 (R2008) .......... Gray Iron Castings
   A53-10 ............ Pipe, Steel, Black and Hot-Dipped Zinc-Coated
                      Welded and Seamless
   A307-10 ............ Carbon Steel Bolts and Studs, 60000 psi Tensile
                      Strength
   A653/653M-10 .......... Steel Sheet, Zinc Coated (Galvanized) or Zinc
                        Alloy Coated (Galvannealed) by the Hot-Dip
                        Process
   A563-07 ............. Carbon and Alloy Steel Nuts
   A1008-10 ............ Steel, Sheet, Cold-Rolled, Carbon, Structural,
                        High-Strength, Low-Alloy
   A786/A786M-09 ......... Rolled Steel Floor Plates
   A1011-10 ............. Steel, Sheet and Strip, Strip, Hot-Rolled
                        Carbon, Structural, High-Strength, Low-Alloy

C. American Welding Society (AWS):
   D1.1-10 ............. Structural Welding Code-Steel
   D1.3-08 ............. Structural Welding Code-Sheet Steel

D. The National Association of Architectural Metal Manufactures (NAAMM)
   Manuals:
   Metal Bar Gratings (ANSI/NAAMM MBG 531-09)
   AMP521-01 .......... Pipe Railing Manual, Including Round Tube

E. American Iron and Steel Institute (AISI):
   2001 .............. Design of Cold-Formed Steel Structural Members

   SPEC WRITER NOTE:
   1. Detail of stairs required.
   2. Straight stairs, parallel, without newel post are preferred without stair
      well exceeding 100 mm (4-inches) in width.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

A. Design stairs to support a live load of 500 kg/m² (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 for 900 N (200 pounds) in any direction at any point.

SPEC WRITER NOTE: Update material requirements to agree with applicable requirements (Types, grades, classes, and other related items) specified in the referenced Applicable Publications.

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. Structural Steel: ASTM A36.
E. Steel Floor Plate: ASTM 786.
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.
I. Malleable Iron Castings: ASTM A47.

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.

SPEC WRITER NOTE:
   1. Provide guard railings not less than 1060 mm (42-inches) high.
   2. Use not less than two railings on industrial stairs.

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.
2. Wall handrails are provided under Section 05 50 00, METAL FABRICATIONS.
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 / or newel post //.
E. Fabricate handrail brackets from cast malleable iron.
F. Provide standard terminal fittings at ends of post and rails.

SPEC WRITER NOTE:
1. Use closed riser stairs accessible to public and patients.
2. Design treads to receive rubber treads with riser sloped to meet tread nosing.

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 //
   Fabricate pans for platforms from steel decking where shown //.
C. Form risers with sanitary cove.
D. Fabricate stringers, headers, and other supporting members from structural steel.
E. Construct newel posts of steel tubing having wall thickness not less than 5 mm (3/16-inch), with forged steel caps and drops.

SPEC WRITER NOTE:
1. Show Platform and tread type at risers when required.
2. Do not exceed 50 degrees slope to floor per OSHA 1610.24. Preferred 175 mm (7-inch) maximum riser and 280 mm (11-inch) minimum tread.

2.6 INDUSTRIAL STAIRS
A. Provide treads, platforms, railings, stringers and other supporting members as shown.
B. Treads and platforms of checkered steel floor plate:
   1. Turn floor plate down to form nosing on treads and edge of platform at head of stairs.
   2. Support tread and platforms with angles welded to plate.
   3. Do not leave exposed fasteners on top of treads or platform surfaces.
   //4. Provide flat sheet steel risers for stairs with steel plate treads where shown //.
C. 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 zinc rich paint as specified in section 09 91 00, PAINTING.