SECTION 05.51.00
METAL STAIRS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Stairs with concrete treads.
B. Structural steel stair framing and supports.

1.02 RELATED REQUIREMENTS
A. Section 03.30.00 - Cast-in-Place Concrete: Concrete fill in stair pans.
B. Section 03.30.00 - Cast-in-Place Concrete: Placement of metal anchors in concrete.
C. Section 04.20.00 - Unit Masonry: Placement of metal fabrications in masonry.
D. Section 05.12.00 - Structural Steel Framing: Supports and anchorages for steel stair framing.
E. Section 05.50.00 - Metal Fabrications.
F. Section 05.52.13 - Pipe and Tube Railings: Metal handrails for the stairs specified in this section.
G. Section 05.52.13 - Pipe and Tube Railings: Metal handrails and balusters other than specified in this section.
H. Section 09.91.13 - EXTERIOR PAINTING: Paint finish.
I. Section 09.91.23 - Interior Painting: Paint finish.

1.03 REFERENCE STANDARDS
J. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2014.
K. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.


O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2012.

P. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2011 w/Errata.


R. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; The Society for Protective Coatings; 1999 (Ed. 2004).


T. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).


1.04 SUBMITTALS

A. See Section 01.30.00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
   2. Include the design engineer's stamp or seal on each sheet of shop drawings.

C. Delegated Design Data: As required by authorities having jurisdiction.

D. Welders' Certificates.

E. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is certified under AISC 201.

F. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.05 QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in Tennessee, or personnel under direct supervision of such an engineer.

B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

C. Fabricator Qualifications:
   1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.
   2. A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel (AC172).
   3. A company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.
PART 2 PRODUCTS

2.01 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
   1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
   2. Handrails: Comply with applicable accessibility requirements of ADA Standards.
   3. Structural Design: Provide complete stair and railing assemblies complying with the applicable local code.
   4. At exit stairwells, provide unit stair towers designed for stacking to height of building as a self-supporting structure.
   5. Photoluminescent Stair Accessories: Comply with applicable building code.
   6. Dimensions: As indicated on drawings.
   7. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
   8. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
   9. Separate dissimilar metals using paint or permanent tape.

B. Metal Jointing and Finish Quality Levels:
   1. Commercial: Exposed joints as inconspicuous as possible, whether welded or mechanical; underside of stair not covered by soffit IS considered exposed to view.
      a. Welded Joints: Intermittently welded on back side, filled with body putty, and sanded smooth and flush.
      b. Welds Exposed to View: Ground smooth and flush.
      c. Mechanical Joints: Butted tight, flush, and hairline.
      d. Bolts Exposed to View: Countersunk flat or oval head bolts; no exposed nuts.
      e. Exposed Edges and Corners: Eased to small uniform radius.
      f. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for satin or matte finish.

C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.02 METAL STAIRS WITH CONCRETE TREADS

A. Jointing and Finish Quality Level: Architectural, as defined above.

B. Risers: Closed.

C. Treads: Metal pan with field-installed concrete fill.
   1. Concrete Depth: 1-1/2 inches, minimum.
   2. Tread Pan Material: Steel sheet.
   3. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch minimum.
   4. Pan Anchorage to Stringers: Continuously welded, from top or bottom.
   5. Concrete Reinforcement: None.

D. Risers: Same material and thickness as tread pans.
   1. Riser/Nosing Profile: Vertical riser with underside of nosing sloped up from bottom of tread pan at not less than 60 degrees from horizontal, with rounded top of nosing of minimum radius.
2. Nosing Depth: Not more than 1-1/2 inch overhang.
3. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.

E. Stringers: Rolled steel channels.
   1. Stringer Depth: 12 inches.
   2. End Closure: Sheet steel of same thickness as risers welded across ends.

F. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

G. Finish: Shop- or factory-prime painted.

H. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces.

2.03 MATERIALS

A. Steel Sections: ASTM A36/A36M.
B. Steel Tubing: ASTM A500/A500M or ASTM A501/A501M structural tubing, round and shapes as indicated.
C. Steel Plates: ASTM A6/A6M or ASTM A283/A283M.
E. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
   1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).
   2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).
F. Concrete Fill: Type specified in Section 03.30.00.
G. Concrete Reinforcement: Mesh type as detailed, galvanized.

2.04 ACCESSORIES

A. Steel Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, and galvanized to ASTM A153/A153M where connecting galvanized components.
B. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
C. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.05 SHOP FINISHING

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
B. Do not prime surfaces in direct contact with concrete or where field welding is required.
C. Prime Painting: Use specified shop- and touch-up primer.
   1. Preparation of Steel: In accordance with SSPC-SP 2, Hand Tool Cleaning.
   2. Number of Coats: One.
D. Galvanizing: Hot-dip galvanize to minimum requirements of ASTM A123/A123M.
   1. Touch up abraded areas after fabrication using specified touch-up primer for galvanized surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.
3.02 PREPARATION
A. When field welding is required, clean and strip primed steel items to bare metal.
B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.03 INSTALLATION
A. Install components plumb and level, accurately fitted, free from distortion or defects.
B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
F. Obtain approval prior to site cutting or creating adjustments not scheduled.
G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 TOLERANCES
A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION