SECTION 05 51 00
METAL STAIRS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Steel stair frame of structural sections with closed risers.
B. Steel pan to receive concrete-fill stair treads and landings.
C. Integral balusters and aluminum hand railing.
D. Aluminum hand railing on walls.

1.2 REFERENCES

A. ANSI A202.1 - Metal Bar Grating Manual for Steel and Aluminum Gratings and Stair Treads.
B. ASCE 7 - American Society of Civil Engineers, Minimum Design Loads of Buildings and Other Structures
C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel
D. ASTM A53/A53M - Standard Specification for Pipe, Black, and Hot-Dipped, Zinc-coated Welded and Seamless
E. ASTM A123/123M - Standard Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products
F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
G. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
H. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
I. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
J. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
K. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
L. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
M. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra High Strength.
N. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
O. ASTM E935 – Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings
P. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
Q. AWS A2.4 - Standard Symbols Welding, Brazing, Nondestructive Examination
R. AWS D1.1/D1.1M - Structural Welding Code Steel Bundled Set B
S. NAAMM AMP 510 - Metal Stairs Manual
T. NAAMM MBG 531 - Metal Bar Grating Manual

U. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual

1.3 DESIGN REQUIREMENTS

A. Florida Building Code (FBC)
B. Design stair assembly in accordance with ASCE 7

1.4 SUBMITTALS FOR REVIEW

A. Section 01 33 00 - Submittals Procedures
B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size, and type of fasteners, and accessories.
C. Indicate welded connections using standard AWS A2.4 welding symbols show net weld lengths.

1.5 QUALITY ASSURANCE

A. Prepare work in accordance with ASTM E985.
B. Prepare and submit signed & sealed Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Florida.
C. Welders' Certificates: Submit under provisions of Section 01 33 00, certifying welders employed on the Work, verifying AWS qualification within the previous 12-months.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel Sections: ASTM A36/A36M
B. Steel Tubing: ASTM A500/A500M, Grade B
C. Plates: ASTM A283/A283M
D. Pipe: ASTM A53/A53M, Grade B Schedule 40
E. Sheet Steel: ASTM A653/A653M, Grade B Structural Quality with G90, 0.90 oz/sq ft galvanized coating
F. Bolts, Nuts, and Washers: ASTM A325 or A307 galvanized to ASTM A153/A153M for galvanized components
G. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; consistent with design of stair structure
H. Welding Materials: AWS D1.1/D1.1M; type required for welded materials
I. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide
J. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type-I Inorganic zinc rich

2.2 COMPONENTS

A. Gratings: ANSI A202.1
B. Concrete for Treads and Landings: Portland Cement Type I, 3000 psi 28 day strength, with a 2" to 3" slump

2.3 FABRICATION - GENERAL

A. Fit and shop assemble components in largest practical sections for delivery to site.
B. Fabricate components with joints tightly fitted and secured.
C. Continuously seal jointed pieces by continuous welds.
D. Grind exposed joints flush and smooth with adjacent finish surface.
    1. Make exposed joints butt tight, flush, and hairline.
    2. Ease exposed edges to small uniform radius.
E. Exposed Mechanical Fastenings shall be flush countersunk screws or bolts unobtrusively located consistent with design of component except as noted otherwise.

F. Supply components required for anchorage of fabrications of same material and finish as fabrication, except as noted otherwise.
G. Accurately form components required for anchorage of stairs, landings, and railings to each other and to building structure.
H. Separate dissimilar metals with paint or permanent tape.

2.4 FABRICATION - PAN STAIRS AND LANDINGS
A. Fabricate stairs and landings with closed risers and treads of metal pan construction, ready to receive concrete.
B. Prime paint components.

2.5 FABRICATION - UNIT STAIR TOWERS
A. Fabricate self-supporting steel stair towers with formed treads and risers; steel channel stringers; landing platforms; sectioned for transport; corner structural support members designed to support full weight of complete stair tower plus design live load; with aluminum railings, newel posts, and balusters.
B. Fabricate stair towers to height not exceeding 40' for transportation purposes; designed for stacking to height of building as a self-supporting structure.

2.6 FINISHES
A. Prepare surfaces to be primed in accordance with SSPC SP 2.
B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
C. Do not prime surfaces where field welding is required.
D. Prime paint items with one coat.
E. Galvanize items to minimum 1.25-oz/sq ft zinc coating in accordance with ASTM A123/A123M, where specified or indicated and at all exterior locations.
1. Use un-galvanized steel sheet to fabricate interior stairs.

PART 3 EXECUTION

3.1 EXAMINATION
A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION
A. Clean and strip primed steel items to bare metal where site welding is required.
B. Supply items required to be casted into concrete and embedded in masonry with setting templates.

3.3 INSTALLATION
A. Install items 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. Field weld components as indicated on shop drawings in accordance with AWS D1.1/D1.1M.
1. Grind welds smooth and flush.
E. Field bolt and weld to match shop bolting and welding.
1. Conceal bolts and screws whenever possible.
2. Where not concealed, use flush countersunk fastenings.
F. Mechanically fasten joints butted tight, flush, and hairline.
G. Obtain approval prior to site cutting or making adjustments not scheduled.
H. After erection, clean and remove any rust before priming any field welds, abrasions, and surfaces not shop primed or galvanized.

3.4 ERECTION TOLERANCES

A. Maximum Variation From Plumb: ¼" per story, non-cumulative
B. Maximum Offset From True Alignment: ¼"
C. Completed installations shall meet FBC tolerance requirements for rise and run.

END OF SECTION