

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

The School District of Palm Beach County

Project Name

SDPBC Project No.

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.

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3.4 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: $\frac{1}{4}$ " per story, non-cumulative
- B. Maximum Offset From True Alignment: $\frac{1}{4}$ "
- C. Completed installations shall meet FBC tolerance requirements for rise and run.

END OF SECTION