SECTION 05 51 00 – STEEL STAIRS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Steel stairs with galvanized anti-slip steel bar treads.

B. Related Sections:
   1. Section 05 52 13 – Pipe and Tube Railings: Steel railings connected to steel stairs.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design metal stairs, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance of Stairs: Provide metal stairs capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Uniform Load: 100 lbf/sq. ft.
   2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
   3. Uniform and concentrated loads need not be assumed to act concurrently.
   4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
   5. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.

C. Seismic Performance: Provide metal stairs capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."
   1. Component Importance Factor: 1.0.

1.3 SUBMITTALS

A. Product Data: Manufacturers data for the following:
   1. Metal stairs.
   2. Paint products.
   3. Grout.

B. Shop Drawings: Include plans, elevations, sections, details of installation, and attachments to other Work.
   1. Include structural analysis data indicating compliance with structural load requirements.
   2. Shop Drawings and structural design analysis shall be wet sealed and signed by a qualified engineer, licensed in the state where the project is located, who is responsible for their design.

C. Samples: For each material and exposed finish as requested.

D. Qualification Data: For professional engineer.

E. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 QUALITY ASSURANCE

A. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.

B. Engineer Qualification: A qualified engineer who is registered in the State of Florida and who is experienced in providing engineering services of the kind indicated for metal handrails and railing similar to those of this Project in material, design, and extent.

C. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.1, "Structural Welding Code--Steel."
   2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.5 COORDINATION

A. Furnish Setting Drawings, templates, and directions for installing anchorages, including concrete inserts. Deliver built-in anchorages, including concrete inserts, to Project site as needed to make progress and avoid delays.

B. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

PART 2 - PRODUCTS

2.1 PREASSEMBLED STAIRS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. American Stair Corp., Inc.
   2. Sharon Companies, Ltd. (The).

B. Contractors Option: Provide prefabricated or field-fabricated stairs conforming to requirements.

2.2 MATERIALS

A. General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Ferrous Metals:
   1. Steel Plates, Shapes, and Bars: ASTM A 36.
   2. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.
   3. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless otherwise indicated.
   4. Rolled-Steel Floor Plate: ASTM A 786.
   5. Wire Rod for Grating Crossbars: ASTM A 510.
   6. Cold-Rolled Steel Sheet: ASTM A 366, commercial quality.
   7. Hot-Rolled Steel Sheet: ASTM A 569, commercial quality.

C. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coating, either commercial steel, Type B, or structural steel, Grade 33, unless another grade is required by design loads.

2.3 GALVANIZED ANTI-SLIP STEEL BAR TREADS

A. Pre manufactured open galvanized steel stair treads.

2.4 FASTENERS

A. General: Provide zinc-plated fasteners with coating fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.
   1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts for exterior stairs, stairs indicated to be galvanized and stairs indicated to be shop primed with zinc-rich primer.

D. Machine Screws: ASME B18.6.3.

E. Lag Bolts: ASME B18.2.1.

F. Plain Washers: Round, ASME B18.22.1.

G. Lock Washers: Helical, spring type, ASME B18.21.1.

H. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
   1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
   2. Material for Anchors in Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

2.5 ACCESSORIES

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Shop Primer for Ferrous Metal: 2-component, moisture-cured zinc-rich primer conforming to SSPC-PS12.01.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Corothane I Galvapac B65G10/B69D210; Sherwin Williams
      b. Tneme-Zinc 90-97; Tnemec Company, Inc.

C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior applications.

D. Shop Primer:
   1. 2-part epoxy primer, compatible with finish paint systems indicated in Section 09 91 00 - Painting.
      a. Acceptable Products:
         1) Series 66; Tnemec.
         2) SW Macropoxy 646, B58 Series; Sherwin Williams.
         3) Carboguard 890 Cycloaliphatic Amine Epoxy; Carboline
         4) Amerlock II 400; Ameron

E. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.6 FABRICATION

A. General: Provide complete stair assemblies, including metal framing, hangers, struts, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms.
   1. Shear and punch metals cleanly and accurately. Remove sharp or rough areas and ease exposed edges. Form bent-metal corners to smallest radius possible without impairing work.
   2. Join components by welding, unless otherwise indicated.
   3. Weld exposed corners and seams continuously, unless otherwise indicated.
   4. Weld connections using materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds and surfaces smooth and blended.
   5. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.
   6. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
   7. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

B. Shop fabricate metal stairs to designs and configurations indicated on Drawings and to comply with Service Class of the “Recommended Voluntary Standards for Fixed Metal Stairs” of NAAMM (National Association of Architectural Metal Manufacturers) Standard AMP 510 “Metal Stairs Manual” for Commercial classification of stairs, except where more stringent requirements are specified.

C. Steel-Framed Stairs: Fabricate stringers of structural-steel channels, plates, or a combination of both. Construct platforms of structural-steel channel headers and miscellaneous framing members.
   1. Fabricate and join so bolts are not exposed on finished surfaces.

D. Handrails and Railings: Comply with applicable requirements in Section 05 52 13 – Pipe and Tube and Railings.

2.7 FINISHES

A. Shop Priming: Comply with NAAMM'S "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish metal stairs after assembly.
   1. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting. Shop

prime steel surfaces, except the following:
   a. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
   b. Surfaces to be field welded.
2. Surface Preparation: Remove loose rust, loose mill scale, and spatter, slag, or flux deposits before shop coat of paint is applied. Remove oil, grease and similar contaminants in accordance with SSPC SP-1. Clean surfaces as required by primer manufacturer and in accordance with SSPC SP-6.
3. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions and to provide a uniform dry film thickness required by manufacturer. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
4. Stripe paint corners, crevices, bolts, welds, and sharp edges.
5. Apply 2 coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.
6. Paint erection marks on painted surfaces. Touch-up surfaces where welding, grinding of welds, joints, etc. are done in the field.
7. Paint shall be thoroughly dry before members are handled.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, and free from rack.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded. Do not weld, cut, or abrade surfaces of galvanized units that are for bolted or screwed field connections.

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

3.3 INSTALLING METAL STAIRS WITH GROUTED BASEPLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of baseplates.

B. Set steel stair baseplates on wedges, shims, or leveling nuts. After stairs have been positioned and aligned, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
   1. Use nonmetallic, nonshrink grout, unless otherwise indicated.
   2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
   1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

3.5 PROTECTION

A. Protect exposed stair finishes from damage during construction period with temporary protective coverings. Remove protective coverings at the time of Substantial Completion.

END OF SECTION 05 51 00