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This MANU-SPEC® utilizes the Construction Specifications Institute (CSI) *Project Resource Manual* (PRM), including *MasterFormat*™, *SectionFormat*™ and *PageFormat*™. A MANU-SPEC is a manufacturer-specific proprietary product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by brackets [ ]; delete optional text in final copy of specification. Specifier Notes precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate product model numbers, styles and types are used in Specifier Notes and in the specification text Article titled "Acceptable Material." Metric conversion, where used, is soft metric conversion.

This MANU-SPEC specifies prefabricated metal stairs, in either stock or custom configurations and with railings, anchors, supports and accessories, as manufactured by Sharon Stairs. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

**SECTION 05 51 00**  
**METAL STAIRS**

**PART 1 GENERAL**

1.01 SUMMARY

- A. Section Includes: This Section specifies prefabricated metal stairs and railings.

Specifier Note: Revise Paragraph below to suit project requirements. Add section numbers and titles per CSI *MasterFormat* and specifier's practice.

- B. Related Requirements:

Specifier Note: Include in this Paragraph only those sections and documents that directly affect the work of this section. If a reader of this section could reasonably expect to find a product or component specified in this section, but it is actually specified elsewhere, then the related section number(s) should be listed in the Subparagraph below. Do not include Division 00 documents or Division 01 sections since it is assumed that all technical sections are related to all project Division 00 documents and Division 01 sections to some degree. Refer to other documents with caution since referencing them may cause them to be considered part of the Contract.

- 1. Section [03 30 00 - Cast-in-Place Concrete].

1.02 REFERENCES

Specifier Note: Paragraph below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain References Paragraph when specifying products and installation by an industry reference standard. List retained standard(s) referenced in this section alphabetically. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Contract Conditions Section 01 42 00 - References may establish the edition date of standards. This Paragraph does not require compliance with standard(s). It is a listing of all references used in this section. Only include here standards that are referenced in the body of the specification in PARTS 1, 2 and/or 3. Do not include references to building codes at any level.

- A. Reference Standards:

- 1. ASTM International (ASTM):
  - a. ASTM A36 Standard Specification for Carbon Structural Steel.
  - b. ASTM A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - c. ASTM A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

- d. ASTM A513 Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
- e. ASTM A786 Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
- f. ASTM A1008 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.
- g. ASTM A1011 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
2. American Welding Society (AWS):
  - a. AWS D1.1 Structural Welding Code - Steel.
  - b. AWS D1.3 Structural Welding Code - Sheet Steel.
3. American National Standards Institute (ANSI):
  - a. ANSI A117.1 Accessible and Usable Buildings and Facilities Standards.
4. New York City Building Code Reference Standard:
  - a. RS 6-1 Photoluminescent Exit Path Markings.
  - b. RS 6-1A Additional Standards as Required by Reference Standard RS 6-1 for Photoluminescent Exit Path Markings.
5. The Society for Protective Coatings (SSPC):
  - a. SSPC-SP3 Power Tool Cleaning.

### 1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate work of this Section with work of other trades for proper time and sequence to avoid construction delays. Comply with Section [01 31 00 - Project Management and Coordination].

Specifier Note: Add additional text to specify unusual or detailed coordination requirements affecting the work results of this Section.

1. [\_\_\_\_\_].

- B. Sequencing: Sequence work of this section in accordance with Section [01 12 16 - Work Sequence] [and manufacturer's written recommendations for sequencing construction operations].

Specifier Note: Specify additional text as required to describe the particular sequence of events required to coordinate work that must be done in sequence with, or at the same time as, work in another section.

1. [\_\_\_\_\_].

- C. Scheduling: Schedule work of this Section in accordance with Section [01 32 13 - Scheduling of Work].

Specifier Note: Include additional text to specify requirements for coordinating work that requires unusual scheduling with work of other sections.

1. [\_\_\_\_\_].

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Contract Conditions and Section 01 33 00 - Submittal Procedures.

### 1.04 ACTION SUBMITTALS

- A. General: Submit listed submittals in accordance with Contract Conditions and Section [01 33 00 - Submittal Procedures].
- B. Product Data: Submit specified products as follows:
  1. Manufacturer's product data.
  2. Manufacturer's installation instructions.
- C. Shop Drawings: Indicate information on shop drawings as follows:
  1. Stair plans, elevations, details, methods of installation and anchoring.

- a. Show members, sizes and thickness, anchorage locations and accessory items.
- b. Furnish setting diagrams for anchorage installation as required.
- c. Include calculations stamped by a structural engineer registered in the jurisdiction in which the project is located.

Specifier Note: Samples are full size actual products intended to illustrate the products to be incorporated into the project. Sample submittals are commonly necessary for such characteristics as colors, textures and other appearance issues.

- D. Samples: Submit as follows:
  - 1. Two samples, minimum size 6 inches (152 mm) square, representing actual product, finish and patterns for each finished tread product specified.

#### 1.05 INFORMATION SUBMITTALS

- A. General: Submit listed submittals in accordance with Contract Conditions and Section [01 33 00 - Submittal Procedures].

Specifier Note: Specify submittals intended to document manufacturer installation, storage and other instructions.

- B. Manufacturer's Instructions: Submit manufacturer's storage and installation instructions.
- C. Source Quality Control: Submit documentation verifying that components and materials specified in this Section are from single manufacturer.
- D. Qualification Statements:
  - 1. Submit letter of verification for Manufacturer's Qualifications.
  - 2. Submit letter of verification for Installer's Qualifications.

#### 1.06 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturer:
    - a. Having 10 years experience manufacturing components similar to or exceeding requirements of project.
    - b. Having sufficient capacity to produce and deliver required materials without causing delay in work.
  - 2. Installer: Acceptable to manufacturer.

#### 1.07 DELIVERY, STORAGE & HANDLING

- A. Delivery and Acceptance Requirements:
  - 1. Deliver material in accordance with Section [01 61 00 - Common Product Requirements] and in accordance with manufacturer's written instructions.
  - 2. Deliver materials in manufacturer's original packaging with identification labels intact and in sizes to suit project.
- B. Storage and Handling Requirements:
  - 1. Store materials protected from exposure to harmful weather conditions and at temperatures recommended by manufacturer.
- C. Packaging Waste Management:

Specifier Note: The disposal of packaging waste into landfill sites demonstrates an inefficient use of natural resources and consumes valuable landfill space. Specifying appropriate packaging and construction waste management and disposal procedures may contribute to points required for USGBC's LEED® construction project certification.

Specifier Note: Include the following Subparagraphs to specify information that will provide direction to the Contractor for the disposal of construction waste materials using environmentally responsible methodology other than landfill resources.

- 1. Separate waste materials for [reuse] [and] [recycling] in accordance with [Section 01 74 19 - Construction Waste Management and Disposal].

Specifier Note: USGBC's LEED® certification includes credits for the diversion of construction waste from landfill. Diversion can be tracked by either weight or volume but must be consistent for all materials. Manufacturer may reclaim packaging and delivery materials for recycling.

2. Remove packaging materials from site and dispose of at appropriate recycling facilities.
3. Collect and separate for disposal [paper] [plastic] [polystyrene] [corrugated cardboard] packaging material [in appropriate onsite bins] for recycling.
4. Fold metal and plastic banding; flatten and place in designated area for recycling.

Specifier Note: Add additional Subparagraphs to specify pallets, crates, padding and other packing materials that are typically associated with the specified products.

5. Remove:
  - a. Pallets from site [and return to supplier or manufacturer].
  - b. [\_\_\_\_\_].

**PART 2 PRODUCTS**

Specifier Note: Retain Article below for proprietary method specification. Add product attributes, performance characteristics, material standards and descriptions as applicable. Use of such phrases as “or equal,” “or approved equal” or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining “or equal” products.

2.01 METAL STAIRS

A. Manufacturer: Sharon Stairs.

1. Contact: 1481 Exeter Road, Akron, OH 44306; Telephone: (330) 777-5377; Fax: (330) 777-5350; E-mail: [sales@sharonstair.com](mailto:sales@sharonstair.com); website: [www.sharonstair.com](http://www.sharonstair.com).

Specifier Note: Substitution procedures must be either in the Contract Conditions or in Section 01 25 00 - Substitution Procedures. Do not include substitution procedures here.

2. Single Source Responsibility: Provide components and materials specified in this section from a single manufacturer.
3. Substitution Limitations:
  - a. Substitutions: [In accordance with [Contract Conditions] [Section 01 25 00 - Substitution Procedures]] [No substitutions permitted].

Specifier Note: Include an overall description of the system, assembly, product or material. Include required properties or characteristics that do not obviously belong under other titles. Examples: Configuration, size and color.

B. Description:

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Contract Conditions and Section 01 41 00 - Regulatory Requirements. Repetitive statements should be avoided.

1. Regulatory Requirements:
  - a. In accordance with Section [01 41 00 - Regulatory Requirements].
  - b. [\_\_\_\_\_].
2. Sustainability Characteristics:
  - a. [\_\_\_\_\_].
3. Compatibility:
  - a. Ensure components and materials are compatible with specified accessories and adjacent materials.

Specifier Note: Performance characteristics are usually stated with some form of evaluation or verification. Performance usually, but not universally, applies to systems and assemblies. Performance criteria can include structural, safety, fire resistance, vapor retardancy, acoustical, thermal, operational capacity and durability.

Specifier Note: The term “Design Criteria” is used when describing the intended characteristics of a product for which the Contractor is

assigned design responsibility.

C. Design Criteria:

1. Structural Performance of Stairs: Stairs shall withstand the following structural loads without exceeding the allowable design working stress of materials, including anchors and connections. Apply each load to produce the maximum stress in each component:
  - a. Treads and Platforms of Metal Stairs: Capable of withstanding a uniform load of 100 psf (4.8 kN/m<sup>2</sup>) and concentrated load of 300 lbf (1.33 kN) applied on an area of 4 square inches (2581 square mm). Concentrated and uniform loads need not be assumed to act concurrently.
  - b. Stair Framing: Capable of withstanding stresses resulting from loads specified, in addition to stresses resulting from railing system loads.
  - c. Limit Deflection of Treads, Platforms and Framing Members: To L/240.
2. Structural Performance of Handrails and Railings: Handrails and railings shall withstand the following structural loads without exceeding the allowable design working stress of materials, including handrails, railings, anchors and connections.
  - a. Top Rail of Guardrail: Capable of withstanding a concentrated load of 200 lbf (0.89 kN) applied in any direction and a uniform load of 50 psf (2.39 kN/m<sup>2</sup>) applied in any direction. Concentrated and uniform loads need not be assumed to act concurrently.

D. Standard Stair and Rail System:

1. Manufacturer's standard prefabricated, pre-engineered straight run stair and landing system, consisting of hot rolled steel sheet stringers, risers, treads, landings, fasteners/supports and railings.
  - a. Stringers:
    - 1) Steel plate or channel with side mounted prefabricated railings.
    - 2) Minimum thickness or gage as determined by structural design calculations, structural grade steel plate or channel.
2. Risers: Closed riser, minimum 14 gage (1.9 mm) hot rolled mild steel sheet, sloped maximum 1 1/2 inches (38.1 mm) and conforming to Americans with Disabilities Act (ADA) nosing requirements.
3. Treads: Manufacturer's standard concrete pan system, field poured. Tread pans to be minimum of 14 gage (1.9 mm), or as determined by design calculations. Pan depth 1 1/2 inches (38.1 mm). Exposed welds from the bottom side of flight assemblies will not be allowed. All welds to be from topside of tread pans as recommended by manufacturer.
4. Mid Landings: Minimum of 12 gage (2.7 mm) hot-rolled mild steel sheets, formed for a minimum 2 1/2 inches (64 mm) concrete fill, with 11 gage channel supports and bracing welded to perimeter frame at 12 inches (305 mm) on center.
5. Fasteners and Supports: Sized by the manufacturer to meet structural design criteria. If hanger rod connections are applicable to any of the landing connections, they shall be a minimum of 5/8 inch (15.9 mm) diameter steel rod, with actual size based on stair load.
6. Manufacturer's standard welded steel tube railing system complying with the following requirements:
  - a. Rails: 1 1/2 inches (38.1 mm) diameter x 13 gage (2.3 mm) minimum round steel tube, continuous multi-strand type, equally spaced with not more than 3 15/16 inches (100 mm) clearance between strands and with a minimum extension per code at top and bottom risers. Wrap rail continuously past space between flights to form guardrail as required by building code. Terminate rail ends with radiused returns, newel posts or safety terminations approved by local code. Provide not less than 1 1/2 inches (38.1 mm) clearing between rail and wall.
  - b. Rail Posts: 1 1/2 inches (38.1 mm) square x 11 gage (3 mm) tubing. Rail posts to fasten to side of plate stringers per manufacturer's shop drawings. Manufacturer to pre-weld erection aid to rail post for proper height to aid stair erector. Erection aid (setting block) to be removed and weld-ground smooth after installation.
  - c. Fabrication:
    - 1) Use preformed or prefabricated bends.
    - 2) Butt weld tee and cross intersections in tubing. Cope and weld intersections in pipe. Miter elbows.
    - 3) Mechanically fasten internal sleeves and fittings.
    - 4) Provide minimum 12 gage (2.7 mm) welded steel plate closures or hemispherical closure fittings on all

exposed rail ends.

E. Custom Stair and Rail System:

1. Support System: Provide landing support with manufacturer's standard system. Comply with details indicated on Drawings.

Specifier Note: Retain the landing support type needed to conform to project requirements.

- a. Hanger rod landing supports.
- b. Tube strut landing supports.
- c. Shelf angle landing supports.
- d. Knockdown (KD) landing supports.

2. Rail System: Provide rail system. Comply with details indicated on Drawings.

Specifier Note: Rail systems are identified by size. Each system has a choice of 4 rail types, indicated by bracketed text. Retain the rail system and type as needed to conform to project requirements.

- a. Standard 34 inch (864 mm) height handrail system with 42 inch (1067 mm) guardrails at landings and openings.
  - 1) Rail Type: [Full mesh panel rail] [Picket style rail] [5-Line sweep rail] [Perforated panel rail].
- b. Standard 36 inch (914 mm) height handrail system with 42 inch (1067 mm) guardrails at landings and openings.
  - 1) Rail Type: [Full mesh panel rail] [Picket style rail] [6-Line sweep rail] [Perforated panel rail].
- c. Standard 42 inch (1067 mm) height guard rail system with 34 inch (864 mm) ADA Grab and with 42 inch (1067 mm) guardrails at landings and openings.
  - 1) Rail Type: [Full mesh panel guard rail with hand rail] [Picket style guard rail with handrail] [7-Line sweep guard rail with handrail] [Perforated panel guard rail with handrail].

3. Wall Handrails: Match stair handrails. Provide manufacturer's standard pressed steel wall brackets with anchors suitable for supporting construction.

4. Tread Construction: Comply with details indicated on Drawings.

Specifier Note: Retain structural stair tread type as needed to conform to project requirements.

- a. Tread with factory applied abrasive filled epoxy, 3/8 inch (9.5 mm) thick, 8000 psi (55,158 kPa) compressive strength.
  - 1) Acceptable Material: [Tuff-Tread as manufactured by Sharon Stairs] [\_\_\_\_\_].
- b. Factory applied slip- and wear-resistant abrasive epoxy coating applied directly to flat steel treads.
  - 1) Acceptable Material: [Tuff-Coat as manufactured by Sharon Stairs] [\_\_\_\_\_].
- c. Slip-resistant checkered floor plate treads.
  - 1) Acceptable Material: [Checkered Floor Plate Treads as manufactured by Sharon Stairs] [\_\_\_\_\_].
- d. Tread with 1 1/2 inch (38.1 mm) thick, 5000 psi (34,474 kPa) compressive strength, natural concrete color with broom finish.
  - 1) Acceptable Material: [Drop-In Precast Treads as manufactured by Sharon Stairs] [\_\_\_\_\_].
- e. 1 1/2 inch (38.1 mm) pan type treads for field-poured concrete.
  - 1) Acceptable Material: [Field-Poured Concrete Treads as manufactured by Sharon Stairs] [\_\_\_\_\_].

F. Materials:

1. Steel Shapes and Plates: To ASTM A36.
2. Steel Pipe: To ASTM A53 Type E or S, Grade B.
3. Steel Tubing:

- a. Structural Use: To ASTM A500, Grade B or C.
- b. Non-Structural Use: To ASTM A513, hot rolled or coiled rolled (mill option).
- 4. Steel Sheet:
  - a. Structural Use: To ASTM A1011 (hot rolled).
  - b. Non-Structural Use: To ASTM A786, ASTM A1008.
- 5. Fasteners: As recommended by manufacturer.
- 6. Welding Rods: In accordance with AWS code and AWS filler metal specifications for material being welded.
- 7. Primer: HAPS-free, solvent-based, rust inhibitive primer containing less than 3.5 lb/gal (1.6 kg/L) Volatile Organic Compounds (VOC) and compatible with conventional alkyds topcoats.
- G. Fabrication:
  - 1. Use same material and finish as parts being joined. Use stainless steel between dissimilar metals and non-corrosive fasteners at exterior connections or joints.
  - 2. Provide fasteners of sufficient strength to support connected members and loads, and to develop full strength of parts fastened or connected.
  - 3. Construct stairs and rails with all components necessary for support and anchorage, and for a complete installation.
- H. Finishes
  - 1. Rails and Stair Components: Completely remove oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter from steel surface in accordance with SSPC SP3.
  - 2. Shop Primer: Immediately after fabrication and cleaning, spray apply primer to dry film thickness recommended by the primer manufacturer, but not less than 2.0 mil thickness. Apply one coat High Solids Red Oxide Anticorrosive primer meeting SSPC-15 Paint.

2.02 ACCESSORIES

Specifier Note: Retain Paragraph below in accordance with project requirements to specify nosing insert for use with Tuff Tread.

- A. Nosing Insert: Manufacturer's factory filled pan with integral self-illuminating nosing meeting NYC Reference Standards RS 6-1 and RS-1A.
  - 1. Acceptable Material: [Tread Glow as manufactured by Sharon Stairs] [\_\_\_\_\_].
- B. Anchor bolts, clip angles, hanger rods, hardware and incidental materials required for complete installation, as recommended by the manufacturer.

**PART 3 EXECUTION**

3.01 EXAMINATION

- A. Verification of Conditions: Verify that conditions of substrates previously installed under other sections or contracts are acceptable for product installation in accordance with manufacturer's instructions prior to metal stair and railing installation.
  - 1. Inform [Owner] [Architect] [Consultant] of unacceptable conditions immediately upon discovery.
  - 2. Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval from [Owner] [Architect] [Consultant]].
  - 3. [\_\_\_\_\_].

Specifier Note: Specify actions required to prepare the surface, area or site for incorporation of the section's primary products. Describe requirements for exposure or removal of existing assemblies, components, products or materials.

3.02 PREPARATION

Specifier Note: Specify preparatory work required prior to installation/application/erection of primary products.

- A. Ensure structure or substrate is adequate to support metal stairs and railings.

Specifier Note: Specify preparatory work, such as selective removal of existing work, required prior to execution of new work. Specify requirements for exposure or removal of existing assemblies, components, products or materials.

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**B. Demolition/Removal:**

1. [\_\_\_\_\_].

**3.03 INSTALLATION**

- A. Coordinate installation of metal stairs and railings in accordance with Section [01 73 19 - Installation].
- B. Coordinate metal stairs and railings work with work of other trades for proper time and sequence to avoid construction delays.
- C. Install stairs, landings and handrails in accordance with manufacturer's instructions. Install square, plumb, straight and true to line and level, with neatly fitted joints and intersections.
  1. Do not cut or alter structural components without written authorization.
  2. Field welding and joining shall conform to AWS D1.1 and AWS D1.3.
  3. Grind all exposed welds smooth and touch-up shop-primed areas with same primer as used by manufacturer.

**3.04 ADJUSTING**

- A. Adjust components and systems for correct function and operation in accordance with manufacturer's written instructions. Coordinate with Section [01 75 00 - Starting and Adjusting].

**3.05 CLEANING**

- A. Perform cleanup in accordance with Section [01 74 00 - Cleaning and Waste Management] and Section [01 74 13 - Progress Cleaning].
- B. Upon completion, remove surplus materials, rubbish, tools and equipment in accordance with Section [01 74 23 - Final Cleaning].

Specifier Note: Specify special measures needed to minimize waste, collect recyclable waste and dispose of or recycle field-generated construction waste created during demolition, construction or final cleaning.

**C. Waste Management:**

1. Coordinate recycling of waste materials with Section [01 74 19 - Construction Waste Management and Disposal].
2. Collect recyclable waste and dispose of or recycle field generated construction waste created during demolition, construction or final cleaning.
3. Remove recycling containers and bins from site.

**END OF SECTION**