

**SECTION 05 51 33.23 - ALTERNATING TREAD STEEL STAIRS****PART 1 - GENERAL****1.1 SCOPE OF WORK**

Fabricate and install carbon steel or stainless steel alternating tread stair assemblies in accordance with the requirements set forth in this section.

(Note: Terminology used for the component covered by this specification varies among the codes or standards that address the component. This specification uses the term alternating tread stair. MasterFormat uses the term alternating tread ladder. The International Building Code and NFPA-101, Life Safety Code use the term alternating tread device.)

**1.2 ADDITIONAL WORK INCLUDED IN THIS SECTION**

*Some items of work are usually specified in sections other than 05 51 33.23. If they are to be part of the metal alternating tread stair contractor's work, they must be specified here.*

*\*NOTE: Delete any sections below not relevant to this project; add others as required.*

- \*\*A. Field measurements of alternating tread stair installation sites and verification of vertical distance between floors.
- B. Other as required \_\_\_\_\_

**1.3 WORK SPECIFICALLY EXCLUDED IN THIS SECTION**

*The items in this section are not to be included in the metal stair contractor's work:*

- A. Temporary shoring or bracing.
- B. Demolition and removal of existing work.
- C. Clean up of site prior to installation.
- D. Concrete supports or other concrete work
- E. Cutting; preparation of pockets; setting of plates, inserts, adapters, or other hardware of built in items.
- F. Placement of wire mesh or re-bar for concrete fill
- G. Temporary lights or electricity.
- H. Temporary safety rails.
- I. Protection after erection.
- J. Wood trim or moldings, for treads or stringers.
- K. Rubber treads or carpets.
- L. Slip resistant concrete treatments.
- M. Field painting other than touch up of damaged surfaces.
- N. Final surface cleaning, passivation, or application of surface protectant after installation.

**1.4 RELATED DOCUMENTS:**

Project drawings and specifications and general provisions of Contract; including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

Crossover and Landing platforms used with alternating tread stairs are addressed in Section 05 51 36.

#### 1.5 SUMMARY:

- A. Provide all material, labor, equipment and services and perform all operations required for the work of this section in accordance with the Drawings and Specifications; including fabrication and installation of alternating tread steel stairs.
- B. Related work specified elsewhere includes but is not limited to:
  - 1. Metal Stairs per other Division 5 sections
  - 2. Metal Fabrications per other Division 5 sections
  - 3. Crossover and Landing platforms used with alternating tread stairs are addressed in Section 05 51 36.
  - 4. Painting in Division 9

#### 1.6 REFERENCES

##### *American Institute of Steel Construction (AISC)*

- A. Manual of Steel Construction (AISC-360)
- B. Code of Standard Practice (AISC-303)

##### *American Iron and Steel Institute*

- A. Type 304 Stainless Steel (UNS S30400)
- B. Type 1010 Stainless Steel (UNS G10100)

##### *American Society for Testing and Materials (ASTM)*

- A. ASTM A108 Standard Specification for Steel Bars, Carbon, Cold-Finished
- B. ASTM A123 - Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature or High Pressure Service and Other Special Purpose Applications
- D. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
- E. ASTM A269 Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
- F. ASTM A276 Standard Specification for Stainless Steel Bars and Shapes
- G. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
- H. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- I. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
- J. ASTM A554 – Standard Specification for Welded Stainless Steel Mechanical Tubing
- K. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
- L. ASTM A568/568M – Specification for Steel Sheet, Carbon, Structural, and High Strength, Low Alloy, Hot Rolled and Cold Rolled General Requirements for

- M. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- N. ASTM A786/A786M Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates
- O. ASTM A1011/A1011M 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
- P. ASTM F844 Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use

Note: Editions specified in the applicable building code apply. If the editions is not specified in the applicable building code, then the latest edition of the References shall apply.

*National Association of Architectural Metal Manufacturers (NAAMM)*

- A. NAAMM STANDARD AMP 510-92 Metal Stairs Manual 5<sup>th</sup> Edition

*Society of Automotive Engineers*

- A. SAE J403 Chemical Compositions of SAE Carbon Steels
- B. SAE J429 Mechanical and Material Requirements for Externally Threaded Fasteners

**1.7 PERFORMANCE REQUIREMENTS:**

- A. Alternating Tread Stair Treads: shall be capable of withstanding a single concentrated 1000 pound load without permanent deformation; or 100 pounds per square foot or 300 pounds on an area of 4 square inches without exceeding the allowable working stress of the material.
- B. Alternating Tread Stair Guard/Handrail: shall be capable of withstanding a single concentrated load of 200 pounds or a uniform load of 50 pounds per linear foot applied in any direction at any point on the rail without exceeding the allowable working stress of the material.
- C. Alternating Tread Stair Stringers: shall be capable of withstanding a single concentrated load of 1000 pounds at any point on the stair without permanent deformation; or a uniform live loading of 100 pounds per square foot applied in a downward direction to all tread surfaces or a 300 pound load on an area of 4 square inches without exceeding the allowable working stress of the material.

**1.8 CONSTRUCTION REQUIREMENTS:**

- A. Landings, Treads, and Mounting Base: shall be stamped and formed from single piece material. Stock shapes, hand forming, or welded remnants shall not be permitted. All stamped parts shall have integrally formed rigidizing bends and shall be spot welded to stringers of like material.
- B. Welds: shall be a minimum of 6 welds per tread, and 12 welds each on the landing and mounting base. Each weld shall be quality controlled and be capable of withstanding a minimum of 2800 lbs. in shear.
- C. Landing and Tread Surfaces: shall be punched through with upset non-skid openings.

- D. Riser Spacing: shall be equally spaced to within 3/16" for adjacent risers and to within 3/8" for any two non-adjacent risers on a stair.
- E. Guards and Handrails: shall be contoured for body guidance and underarm support and shall be attached to the outside stringers and landings by bolting.
- F. Landing Reinforcement: shall be with 1/4" steel angle notched and punched and factory welded to the landing at the points of a guard or handrail attachment.
- G. Rubber Bumper: shall be affixed to the central portion of the landing. A rubber bumper strip shall be attached or will be provided for field attaching to the central stringer.

#### 1.9 DIMENSIONS:

- A. Alternating Tread Stair Angle: 56 or 68 degrees from horizontal as specified in the drawings.
- B. Vertical Drop: the change in elevation, as shown on the drawings, between the upper finished floor surface where the top landing will be attached and the lower finished floor surface where the base of the alternating tread stair will be secured.

#### 1.10 SUBMITTALS:

Dimensional Prints: shall be submitted for approval prior to fabrication.

#### 1.11 DELIVERY STORAGE AND HANDLING

*Reference: AISC Code of Standard Practice, sections 6 & 7*

- A. Deliver materials to the job-site in good condition and properly protected against damage to finished surfaces.
- B. Store material in a location and manner to avoid damage. Do not stack components. Lay out components on firm foundation material such that bending cannot occur.
- C. Store metal components in a clean dry location, away from uncured concrete, cement, or masonry products, acids, oxidizers, rain water, or any other chemical or substance that might damage the material or finish.
- D. Plan work and storage locations to keep on-site handling to a minimum.
- E. Exercise particular care to avoid damage to material finishes or unprotected surfaces when handling.

**PART 2- PRODUCTS****2.1 ACCEPTABLE MANUFACTURER:**

- A. Lapeyre Stair, Inc.  
5117 Toler St.  
Harahan, LA. 70123  
1-(800)-535-7631 or 1-(504)-733-6009  
Fax 1-(504)-733-4393  
LS.SALES@LAPEYRESTAIR.COM  
WWW.LAPEYRESTAIR.COM
- B. Substitutions will not be considered.

**2.2 MATERIALS:**

- A. Carbon Steel:
  - 1. Treads: 13 Gauge; Minimum 36 ksi yield stress; AISI 1010/15 HRPO or ASTM A1011 structural steel (SS) type grade 36 (or higher).
  - 2. Landing & Foot Stampings: 11 Gauge; Minimum 36 ksi yield stress; AISI 1010/15 or ASTM A1011 structural steel (SS) type grade 36 (or higher).
  - 3. Top Landing Support Clips: Formed L2 x 2 x ¼" x 4" lg. with 5/8" Φ round holes and 5/8" x 1" slot holes, ASTM A1011 structural steel (SS) Type, grade 36 (or higher)
  - 4. Stringers:
    - a. 2" x 1 3/4" x 11 Gauge U section; minimum 36 ksi yield stress; AISI 1010/15 or ASTM A1011 structural steel (SS) Type, grade 36 (or higher) for 56 degree stairs 10 vertical feet or less and for 68 degree stairs 12 vertical feet or less.
    - b. 3" x 1 3/4" x 11 Gauge U section; minimum 36 ksi yield stress AISI 1010/15 or ASTM A1011 structural steel (SS) Type, grade 36 or higher for 56 degree stairs over 10 vertical feet and for 68 degree stairs over 12 vertical feet.
  - 5. Handrails: 1 1/2" OD x 0.095"; Minimum 42 ksi yield stress; AISI 1010/15 CS or ASTM A1011 cold drawn, fully annealed tube per ASTM A513 grade 1026 or higher As-welded tubing or ASTM A500 Grade B.
- B. Stainless Steel:
  - 1. Treads: 13 Gauge AISI 304 SS
  - 2. Landing & Foot Stampings: 11 Gauge AISI 304 SS
  - 3. Stringers:
    - a. 2" x 1 3/4" x 11 Gauge U section; Minimum 36 ksi yield stress, AISI 304 SS for 56 degree stairs 10 vertical feet or less and for 68 degree stairs 12 vertical feet or less.

- b. 3" x 1 3/4" x 11 Gauge U section; Minimum 36 ksi yield stress, AISI 304 SS 56 degree for stairs over 10 vertical feet and for 68 degree stairs over 12 vertical feet.
- 4. Handrails: 1 1/2" OD x 0.065" 304 SS cold drawn, Minimum 42 ksi yield stress, fully annealed tube per ASTM A269 seamless or ASTM A554 welded.

C. Fasteners

- a. Bolts: handrail to stringer; Hex Head A307 or SAE J429 Grade 5, 1/2" Φ x 13 TPI  
Landing to structure; Carriage Head A307 or Hex Head SAE J429 Grade 5, 1/2" Φ x 13 TPI;  
dimensions per ANSI/ASME B18.2.1
- b. Nuts: ASTM A563 Grade A, B, C, D or O; dimensions per ANSI/ASME B18.2.2.
- c. Washers ASTM F436 or F844, dimensions per ANSI/ASME B18.22.1

D. Miscellaneous Material:

- 1. Rubber Spine: Hollow neoprene
- 2. Rubber Foot Divider: Solid Santoprene

2.3 FINISHES:

- A. Carbon Steel:
  - 1. Gray Primer: Epoxy Powder Coat or
  - 2. Safety Yellow Paint: Polyester TGIC\* Powder Coat or
  - 3. Iron Gray: TGIC\*
  - 4. Typical RAL selections: Polyester Powder Coat
  - 5. Hot-Dip Galvanized: per ASTM A123

\* Triglycidyl Isocyanate

- B. Stainless Steel:
  - Natural finish

2.4 FABRICATION:

General: Fabricate alternating tread steel stairs to conform to performance and construction requirements, in accordance with approved shop drawings or dimensional prints. Fabricate and shop-assemble to greatest extent possible.

- A. Carbon Steel: gas metal arc welded (GMAW/MIG) with E70 electrodes (or other approved welding wire) with treads spot welded to stringers and bolt-on handrails (with bolts included).
- B. Stainless Steel: gas tungsten arc welded (GTAW/TIG) and/or gas metal arc welded (GMAW/MIG) with approved welding wire and with treads spot welded to stringers and bolt-on handrails (with bolts included).

**PART 3- EXECUTION:****3.1 PREPARATIONS:**

- A. Coordination: Coordinate start and installation of steel alternating tread stair with all other related and adjacent work. Installation shall not start until the construction has progressed to the point that weather conditions and remaining construction operations will not damage alternating tread stair installation.
- B. Verification: Verify that dimensions and angle are correct and that substrate is in proper condition for alternating tread stair installation. Do not proceed with installation until all necessary corrections have been made.

**3.2 INSTALLATION:**

- A. If bumper has not been installed at the factory, install the bumper in accordance with the manufacturer's instructions (peel and stick).
- B. Prepare mounting holes.
- C. Position alternating tread stair with top tread at same elevation as upper finished floor or roof surface.
- D. Secure alternating tread stair with not less than 2 bolts or studs at top and with not less than 2 at bottom of stair.
- E. Touch up with matching paint any chipped or abraded damage to factory finish or
- F. Touch up any damage to galvanized surfaces using galvanized repair paint in accordance with ASTM A780.

**3.3 CLEAN-UP:**

Leave work area clean and free of debris.

**END OF SECTION**