

SECTION 05 51 00- METAL STAIRS

PART 1 – GENERAL

1.1 SCOPE OF WORK

Fabricate and install metal stair landing and support structure assemblies in accordance with the requirements set forth in this section.

This specification applies to landings of industrial egress and commercial egress type stairs.

1.2 ADDITIONAL WORK INCLUDED IN THIS SECTION

Some items of work are usually specified in sections other than section 05 51 00, If they are to be part of the metal 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 stair installation sites, and verification of vertical drop between floors.
 - B. _____.

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. Cutting, grouting and patching of fillers.
- E. Temporary wood filler for steel pans.
- F. Concrete supports for steel.
- G. Cutting; preparation of pockets; setting of plates, inserts, adapters, or other hardware of built in items.
- H. Placement of wire mesh and re-bar for concrete fill
- I. Concrete or other fill for pans or platforms.
- J. Temporary lights or electricity.
- K. Temporary safety rails.
- L. Protection after erection.
- M. Wood trim or moldings, for treads or stringers.
- N. Rubber treads or carpets.
- O. Slip resistant concrete treatments.
- P. Field painting other than touch up of damaged surfaces.
- Q. Final surface cleaning, passivation, or application of surface protectant after installation.

1.4 RELATED DOCUMENTS:

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

1.5 SUMMARY:

- A. Provide all material, labor, equipment and services and perform all operations necessary or required for the work of this section, in accordance with the Drawings and Specifications, and including fabrication and installation of Metal Stairs, Landings and support structure.

- B. Related work specified in other section may include but is not limited to: **
 - a. Section 03 30 00 - Cast in place Concrete: _____
 - b. Section 03 33 00 – Architectural Concrete: _____
 - c. Section 03 48 00 - Pre-cast Concrete Specialties: _____
 - d. Section 04 20 00 – Unit Masonry: _____
 - e. Section 04 40 00 – Stone: _____
 - f. Section 05 05 23 – Welding: _____
 - g. Section 05 12 00 – Structural Steel: _____
 - h. Section 05 50 00 - Metal Fabrications: _____
 - i. Section 05 51 00 – Metal Stairs: _____
 - j. Section 05 52 00 – Handrails & Railings: _____
 - k. Section 05 52 13 – Pipe & Tube Railings: _____
 - l. Section 05 53 00 – Grating: _____
 - m. Section 05 54 00 – Floor Plates: _____
 - n. Section 05 55 00 – Stair Treads & Nosing: _____
 - o. Section 05 56 00 – Metal Castings: _____
 - p. Section 05 73 00 – Decorative Railings: _____
 - q. Section 05 59 00 – Metal Specialties: _____
 - r. Section 06 43 00 – Wood Stairs & Railings: _____
 - s. Section 07 72 00 – Roof Accessories: _____
 - t. Section 09 22 00 – Plaster and Gypsum Board: _____
 - u. Section 09 66 00 – Terrazzo: _____
 - v. Section 09 65 00 – Resilient Flooring: _____
 - w. Section 09 68 00 – Carpeting: _____
 - x. Section 09 90 00 - Paints and Coatings: _____
 - y. Section 10 22 00 – Partitions: _____

Landing support: Bearing and anchorage points shall be structurally adequate to support the stair landing. Inserts, anchors, connectors, backup support, and pockets to be installed by others shall be verified to be in accordance with architect approved drawings prior to the start of erection.

1.6 REFERENCES

American Institute of Steel Construction (AISC)

- A. Manual of Steel Construction
- B. Code of Standard Practice

American National Standards Institute (ANSI)

- A. ANSI/NAAMM MBG 531-00 Metal Bar Grating Manual- 6th edition

American Society for Testing and Materials (ASTM)

- A. ASTM A108 Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality
- 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 Service
- 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 A276 - Standard Specification for Stainless Steel Bars and Shapes
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- G. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

- H. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
- I. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
- J. ASTM A568/A568M – Specification for Steel Sheet, Carbon and High Strength, Low Alloy, Hot Rolled and Cold Rolled – General Requirements for.
- K. ASTM A780 - Standard Practice for Repair of Damaged and Un-coated Areas of Hot-Dip Galvanized Coatings
- L. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates
- 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
- N. ASTM F436 Standard Specification for Hardened Steel Washers
- O. ASTM F844 Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use

International Code Council

- A. International Building Code (IBC), 2000, 2003 and 2006 editions

National Association of Architectural Metal Manufacturers (NAAM)

- A. NAAMM STANDARD AMP 510-92 Metal Stairs Manual 5th Edition
- B. NAAMM STANDARD MBG 531-00 Metal Bar Grating Manual

Society of Automotive Engineers

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

References are latest edition unless otherwise noted.

1.7 PERFORMANCE REQUIREMENTS:

- A. Platform Surface: shall be capable of withstanding 100 pounds per square foot or a 300 pound load on an area of 4 square inches without exceeding the allowable working stress of the material; or a single concentrated 1000 pound load without permanent deformation. The platform surface shall also be designed to withstand all required design loads (i.e. wind, snow, seismic, etc.) in accordance with the required codes of the applicable project.

- B. Platform structural support system: shall be capable of withstanding a uniform live loading of 100 pounds per square foot applied in a downward direction to all installed platform surfaces, or a 300 pound load on an area of 4 square inches without exceeding the allowable working stress of the material; or a single concentrated load of 1000 pounds at any point on the platform surface without permanent deformation. The platform surface shall also be designed to withstand all required design loads (i.e. wind, snow, seismic, etc.) in accordance with the required codes of the applicable project.

- C. Guard and 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 design working stress of the materials.

1.8 CONSTRUCTION REQUIREMENTS:

- A. Platform diamond plate: shall be single part units cut, formed, and punched using break and shearing equipment. Diamond plate shall be bolted to Cross Channel Mounts.
- B. Platform Concrete Pan: shall be formed from single piece material with mounting flanges welded at each end. Concrete pans shall be attached to Cross Channel Mounts by bolting.
- C. Platform Bar Grating: shall be constructed in accordance with NAAMM MBG 531. Bar grating shall be attached to Cross Channel Mounts by bolting.
- D. Platform Grip Strut: Shall be as supplied by PCP North America or equivalent. Grip strut shall be attached to Cross Channel Mounts by bolting.
- E. Platform Main Support Beams and Cross Channel Mounts: shall be cut and formed from single piece material for its' full length. Welded splicing along beam or channel mount length shall not be permitted.
- F. Platform Guards and Handrails: shall be attached to platform structure by bolting, and shall be capped with a solid cap at each end or by a press punch closure method. No tubes having open ends shall be permitted. All closed tubes for hot dip galvanizing will have drain holes.
- G. Platform Support Legs: Platform support legs shall be attached to the platform main support beams by bolting. Platform support legs shall be anchored to concrete or other approved surface with anchor bolts or other approved detail.
- H. Platform Toe Plate: Toe plate is created by platform design in which the platform surface is 4" lower than the top flange of the main support beams. Thus the webs of the main support beams act as "toe plates".

1.9 DIMENSIONS:

- A. Vertical Drop: the change in elevation, as shown in the drawings, between the upper finished floor surface where the stair will be attached and the lower finished floor surface where the base of the stair will be secured.
- B. Stair Width: The distance transverse to the walking direction available for use as a walking surface, as shown in the drawings. Also, the length of the tread.
- C. Platform: as specified in the drawings but in no case with a width less than the width of the connecting stair and with a length of at least 30" in the direction of travel.
- D. Platform Legs: height as specified on the drawings.
- E. Handrails: 34 to 38 inch nominal vertical height from upper surface of top rail to top surface of landing platform.
- F. Guards: 42 inch nominal vertical height from upper surface of top of guard to top surface of landing platform.
- G. Toe Plate (if applicable): 4" nominal vertical height from its' top edge to top surface of platform.

1.10 SUBMITTALS:

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Provide manufacturer's installation instructions.

- C. Shop Drawings: Submit dimensioned prints showing critical dimensions, jointing and connections, and fasteners provided by manufacturer.
- D. Dimensional Prints: shall be submitted for approval prior to fabrication.

1.11 DELIVERY, STORAGE AND HANDLING

Reference AISC Code of Standard Practice, Sections 6 and 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 platform components. Lay out components on firm foundation material such that bending can not 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 platform 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. Provide pre-engineered stair systems fabricated by

Lapeyre Stair, Inc.
 5117 Toler Street
 Harahan, LA. 70123;
 Phone# 1-(800)-535-7631 or 1-(504)-733-6009
 Fax# 1-(504)-733-4393
 LS.SALES@LAPEYRESTAIR.COM
 WEB: HTTP://WWW.LAPEYRESTAIR.COM

- B. Substitutions will not be considered.

2.2 MATERIALS:

- A. Carbon Steel Platforms

1. Platform Deck: Diamond Safety Plate: ASTM A786 CS, 1/4"
 Bar Grating: A1011, 1-1/4" x 3/16 bearing bars; 19W4 or equivalent
 Grip Strut: A1011, 14 Gauge x 1-1/2" channel depth or equivalent
 Concrete Pan: 11 Gauge, A1011 grade 36 or higher
2. Platform Main Support Beams: 1" x 2.75" x 12" x 2.75" x 11 gauge formed zee-section of carbon steel HRPO per ASTM A1011. Minimum 36 ksi yield stress
3. Platform Front Support Beam: 1/4" thick L section as shown on drawings, ASTM A1011. Minimum 36 ksi yield stress
4. Platform Cross Channel Mounts: Inverted U shape 3" x 1-3/4" x 11 Gauge, AISI 1010/15 per ASTM A1011 grade 36 or higher.

5. Guard Balusters: 1-1/2" OD x 0.095", Minimum 42 ksi yield stress, AISI 1010/15 CS per ASTM A1011 cold drawn, fully annealed tube per ASTM A500 grade B or A513 grade 1008 or higher as-welded tubing
6. Handrails and Guard top rail: 1-1/2" OD x 0.095", Minimum 42 ksi yield stress, AISI 1010/15 CS per ASTM A1011 cold drawn, fully annealed tube per ASTM A500 grade B or A513 grade 1008 or higher as-welded tubing.
7. Support Legs: TS 3 x 3 x 1/4 or TS 4 x 4 x 1/4; Minimum 42 ksi yield stress, ASTM A500 Grade B or ASTM A513 grade 1008 or higher as-welded tubing.
8. Support Leg Mounting Plates: 3/8" thick flat plate as shown on drawings, Minimum 36 ksi yield stress, ASTM A1011
9. Support Leg Cross Bracing (if required): 1-1/2" OD x 0.095; Minimum 42 ksi yield stress, AISI 1010/15 CS per ASTM A1011 cold drawn, fully annealed tube per ASTM A500 grade B or A513 grade 1008 or higher as-welded tubing.
10. Handrail Joiners: 5" x 1" x 1/4" slotted flat bar w/3/8" x 1" set screws, AISI 304 SS
11. Rail tabs: Nominal .1875" thick carbon steel HRPO per ASTM A1011.
12. Rail end caps:
 - a. Standard: .75" spherical radius, finned, universal tube closure cap, molded from low density polyethylene.
 - b. Optional: .75" spherical radius closure cap, machined from UNS-G12144 or SAE/AISI 12L14 carbon steel per SAE J403 or equivalent cold drawn round per ASTM A108
13. Rail end connectors: 1.5" Φ connector machined from UNS-G12144 or SAE/AISI 12L14 carbon steel per SAE J403 or equivalent cold drawn round per ASTM A108
14. Baluster clamp plate: Nominal .1875" thick 304L (UNS-S30403) stainless steel per ASTM A240.
15. Baluster end spacers: 1" external Φ , 0.4375" internal Φ x 1" long XXS type 304 (UNS-S30400) stainless steel pipe per ASTM A999.
16. Handrail brackets:
 - a. Wall mount: Wagner Companies Type B – 2-1/2" or equal
 - b. Baluster mount: 1-1/4" W x 2-3/4" L x 2-1/2" H x 1/4" L-shape, ASTM A1011
17. Fasteners:
 - a. Bolts: Hex Head SAE J429 Grade 5, 1/2" Φ x 13 TPI or Carriage head A307 as shown on the Installation Instructions
 - b. Nuts: ASTM A563 Grade A, B, C, D or O
 - c. Washers: ASTM F844 or F436

B. Miscellaneous Material:

1. Stair rail to platform rail Clamp: Cast Aluminum Alloy ANSI 356.0F

2.3 FINISHES:

A. Carbon Steel:

1. Gray Primer: Powder Coat Baked Enamel or

2. Safety Yellow Paint: Powder Coat Baked Enamel or
3. Hot-Dip Galvanized: per ASTM A123

2.4 FABRICATION:

General: Fabricate metal stair landing components to conform with performance and construction requirements, and in accordance with approved shop drawings or dimensional prints.

- A. Carbon Steel: gas metal arc weld beam mounting flanges to beam ends; platform support leg mounting plates to platform support legs; and rail mounting tabs to rails using the specified materials; permanently mark stringers for association with the aforementioned documentation.

2.5 PACKING & PACKAGING

Package stairs in a way to minimize the potential for damage during shipping and handling.

PART 3- EXECUTION:

3.1 PREPARATIONS:

- A. Coordination: Coordinate start and installation of steel stairs and landing platforms 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 stair and platform installation.
- B. Verification: Verify that dimensions and angle are correct and that substrate is in proper condition for stairs and landing platforms installation. Do not proceed to install until all necessary corrections have been made.

3.2 INSTALLATION:

Install stair and landing platform assembly in accordance with the following sections as applicable and the Installation Instructions LS-101-STRPFM provided by the manufacturer.

- A. Field Check and verify that all components of the structure required for installation are in place per the approved shop drawings. Report any discrepancies to the Architect or contractor for corrective action by responsible parties prior to erection of stair and platform.
- B. Insure that stair-well or mounting location is clear of obstructions.
- C. Unload and handle material in a manner that will not strain, bend, deform or otherwise damage it.
- D. Inspect platform main support beams and platform cross channel mounts for damage during shipment. If any are pierced, creased, bent or permanently deformed, do not erect the stair/platform until replacements are obtained. Slight bowing or crowning is acceptable if it is corrected by the assembly process.
- E. Inspect rails and balusters for damage during shipment. Rails that are damaged, bent, defaced, or deformed, that are still functional, (or can be made to be functional) and can be assembled, may be utilized on a temporary basis until replacement components are obtained. If any rail components are found to be damaged beyond the ability to function per the rail requirements, the stair and platform may be erected but must be roped off or otherwise protected from use until such components are replaced.

- F. Where possible retain cardboard packing material or obtain other suitable material and use it to cover any rough concrete floor surface that might damage the platform surface during pre-assembly; or it may be used to protect any soft floor surface that might be damaged during the platform pre-assembly process.
- G. Pre-assemble all cross channel mounts to main support beams, utilizing the fasteners shipped with the unit. Keep fasteners loose prior to tightening any single cross channel mount so as to maintain assembly clearance until all are placed.
- H. All carriage bolt heads should be installed such that heads are visible and appear on the outside/outboard sides, except the baluster clamp bolts whose heads should appear on the top surface of the beams.
- I. All fasteners should be tightened to a torque value of 25 to 35 foot-pounds.
- J. Pre-assemble landing platform rail components, utilizing the fasteners shipped with the unit. Place all carriage bolts for baluster clamps in the rectangular slots next to each baluster hole in the beams, from the top surface, prior to inserting balusters in the holes.
- K. Prepare mounting holes.
- L. Position landing platform at same elevation with the stair top landing tread.
- M. Erect landing platform square, plumb, straight, true to line and level.
- N. Secure landing platform assembly with the required hardware as shown on the drawings.
- O. Install and fasten any cross bracing components. Insure the installation is secure and rigid.
- P. Touch up with matching paint any chipped or abraded damage to factory finish or
- Q. 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 05 51 00