



SECTION 05720

ORNAMENTAL HANDRAILS AND RAILINGS

Sandpiper - #4918,#5107FM, # 5107-TM,#5326, #5353,#5710,#5712,#5790,#5939,#6188,#6255

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Stainless/Steel handrails, guardrails or ornamental Cable barrier railings.

1.2 RELATED SECTIONS

- A. Section 03300 – Cast-in-Place Concrete: coordination with substrate
- B. Section 05500 – Metal Fabrications: Associated metal supports
- C. Section 06410 – Interior Architectural Woodwork
- D. Section 05120 - Structural Steel
- E. Section 09900 - Paints and Coatings; field-applied finishes.

1.3 REFERENCES

- A. American National Standards Institute (ANSI) - A21.1 Safety Requirements for Floor and Wall Openings, Railings and Toe Boards.
- B. American National Standards Institute (ANSI) - A58.1 Minimum Design Loads in Buildings and Other Structures.
- C. Americans with Disabilities Act Accessibility Guidelines (ADA).
- D. American Society for Testing and Materials (ASTM) A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- E. American Society for Testing and Materials (ASTM) E 894 - Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings.
- F. American Society for Testing and Materials (ASTM) E 935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
- G. American Society for Testing and Materials (ASTM) E 985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.
- H. American Society for Testing and Materials (ASTM) E 488 Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements.
- I. American Society for Testing and Materials (ASTM) A36 - Standard Specification for Carbon Structural Steel.



- J. American Society for Testing and Materials (ASTM) A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- K. American Society for Testing and Materials (ASTM) A366 - Standard Specification for Commercial Steel (CS) Sheet, Carbon (0.15 Maximum Percent) Cold-Rolled.
- L. American Society for Testing and Materials (ASTM) A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- M. American Society for Testing and Materials (ASTM) A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
- N. American Society for Testing and Materials (ASTM) A570 - Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled.
- O. American Society for Testing and Materials (ASTM) A569 - Standard Specification for Commercial Steel (CS), Sheet and Strip, Carbon (0.16 Maximum to 0.25 Maximum Percent), Hot-Rolled.
- P. American Welding Society (AWS) D1.1 - Structural Welding Code - Steel.
- Q. American Welding Society (AWS) D1.6 - Structural Welding Code - Stainless
- R. American Welding Society (AWS) D1.2 - Structural Welding Code - Aluminum
- S. SSPC - Steel Structures Painting Council.
- T. NAAMM Metal Finishes Manual; national Association of Architectural Metal Manufacturers.

1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Comply with ASTM E 985, based on testing per ASTM E 894 and ASTM E 935.
 - 2. Comply with all requirements of the ADA and OSHA regulations.
 - 3. Provide metals free from surface blemishes where exposed to view in finished unit. Exposed-to-view surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable.
 - 4. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- B. Structural Requirements:
 - 1. Handrail and railing assemblies and attachments shall resist a minimum concentrated load of 200 pounds (91 kg) applied in any direction at any point on the top rail and a vertical and horizontal thrust of 50 lb/lf (0.73 kN/m) applied to the top railing without permanent set or damage. The two loads are not cumulative.
 - 2. Infill area of railing system capable of resisting a horizontal concentrated load of 200 pounds applied to one square foot (8165 g/sq. m) at any point in the



system. This loading shall not be applied simultaneously with other loading conditions.

3. Handrail assemblies and guards shall be designed to resist a load of 50 pounds per linear foot (0.73 kN/m) applied in any direction at the top and to transfer this load through the supports to the structure.
- C. Corrosion Resistance: Separate incompatible materials to prevent galvanic corrosion.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Submit Manufacturer's technical product data for railing components and accessories.
- C. Manufacturer to supply submittal drawings for approval to include the following:
 1. Section-thru details.
 2. Mounting methods.
 3. Typical Elevations.
 4. Key plan layout
- D. Shop Drawings: Shop drawing showing actual field conditions and true elevation and location supplied after field verification.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Not less than 10 years experience in the actual production of specified products.
 1. Components shall be factory fabricated and engineered by single entity.
- B. Installer Qualifications: Firm with 3 years experience in installation of systems similar in complexity to those required for this Project, plus the following:
 1. Trained and authorized by manufacturer to engineer and install the specified railing system.
- C. Mock-Up: Provide, if required by Architect, a mock-up for evaluation of surface preparation techniques and application workmanship.
 1. Finish areas designated by Architect.
 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 3. Refinish mock-up area as required to produce acceptable work.



1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store on site in a location and manner to avoid damage. Stacking should be done in a manner that will prevent bending. Store material in a clean, dry location away from uncured concrete and masonry. Any protection on the railings during transportation should remain until installed.
- C. Keep handling on site to a minimum. Exercise caution to avoid damage to factory applied mechanical and painted finishes.
- D. Store materials at not lower than -58°F (-50°C) or higher than 212°F (100°C).

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication; show recorded measurements on final shop drawings.
 - 1. Where field measurements cannot be made without delaying the railing fabrication and delivery, obtain guaranteed dimensions in writing by the Contractor and proceed with fabrication of products to not delay fabrication, delivery and installation.
- C. Coordinate fabrication and delivery schedule of handrails with construction progress and sequence to avoid delay of railing installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Stainless Fabricators, Inc. (SFI), which is located at 1834 Gunn Highway, Building C, Odessa, Florida, 33556; Phone: 1-813-926-7113; Fax: 1-813-926-7114.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 STEEL AND STAINLESS STEEL RAILING SYSTEMS

- 1. Stainless Steel Components: Conforming to ASTM A240/A 666, Type 304 & 316



- B. Sandpiper - #5107FM, # 5107-TM, #4918, #5326, #5353
1. Stainless steel grade UNS 1.4301 & 1.4305, type 303 & 304/316
 2. ASTM A36 Steel
 3. Top Cap & Handrail Material:
 - a. 1-1/2" O.D. x .109" wall stainless steel tube
 - b. 1.90" O.D. x .109" wall stainless steel tube
 - c. 2-1/2" O.D. x .109" wall stainless steel tube
 - d. 1/2" x 2" steel flat bar
 - e. 1/2" x 3" stainless steel flat bar
 4. Post Material:
 - a. 1/2" x 2" stainless steel flat bar
 - b. 3/8" or 1/2" custom laser cut
 - c. 1.90" O.D. x .109" wall stainless steel tube
 - d. 1/2" x 2" steel flat bar
 - e. 1/4" x 2" x 2" steel tee
 5. Infill Material:
 - a. 3/16" dia. 1 x 19 wire stainless steel cable
 - b. 3/16" dia. 7 x 7 wire stainless steel cable
 6. Clamps, Brackets, Base Plates & Fittings
 - a. 1/2" thick stainless steel plate
 - b. 3/8" thick stainless steel plate
 - c. 1/2" thick steel plate
 - d. 3/8" thick steel plate
 - e. Swage
 - f. Invisiware
 - g. Turnbuckles
 7. Welding Materials: Conform to AWS code and AWS filler metal specifications for material being welded.
 8. Primer for steel components: Acrylic Latex rust-inhibitive primer containing less than 1.0 lb/gal volatile organic compounds (VOC), certified to be compatible with finish coats specified in section 09900.
 9. Steel Finish: Powder coat
 10. Stainless Steel Finish: Satin #4 Polish #8

2.3 GROUT AND ANCHORING CEMENT

- A. Non-shrink, Nonmetallic: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous cement. Provide anchoring cement specifically recommended for anchoring rods/bolts/rebar/railings and posts in concrete, brick, stone and other substrates by manufacturer for interior and exterior applications



2.4 FABRICATION

- A. Provide square stainless steel tubing without burrs and where exposed, rounded to produce smooth rigid and hairline joints.
- B. Design components to allow for expansion and contraction without causing buckling, excessive opening of joints, or overstressing of welds and fasteners.
- C. Shop fabricate and assemble handrails and railings to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for transport to site. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- D. Form changes in direction of railing members as shown on Contract Drawings.
- E. Unless otherwise indicated, fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- F. Brackets, Flanges, Fittings and Anchors: Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings and anchors to connect handrail and railing members to other construction.
- G. Provide inserts and other anchorage devices to connect handrails and railings to concrete or masonry. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railings. Coordinate anchorage devices with supporting structure.
- H. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.
- I. Cut, reinforce, drill and tap components as indicated on drawings to receive finish hardware, screws and similar items.
- J. Close exposed ends of railing members with prefabricated end fittings.
- K. Provide mounted handrails wall returns at wall ends unless otherwise indicated. Close ends of returns, unless clearance between end of railing and wall is 1/4 inch (6 mm) or less.

2.5 FINISHES

- A. General
 - 1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 2. Appearance of Finished Work:
 - a. Variations in appearance of abutting or adjacent units are acceptable if they are within one-half of the range of approved samples. Noticeable variations in the same unit are not acceptable.
 - b. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.



PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Surface Preparation: Coordinate and furnish anchorages and setting drawings, diagrams, templates, instructions, and directions for the installation of items having integral anchors which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the Project Site.
- B. Clean surfaces thoroughly prior to installation.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Comply with manufacturer's recommendations.
- B. Install in accordance with applicable standard or non-standard instructions included on shop drawings provided by manufacturer.
- C. Perform cutting, drilling, and fitting required for installation. Set accurately in location, alignment and elevation, plumb, level, and true, measured from established lines and levels.
- D. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry, or similar construction.
- E. Provide anchorage devices and fasteners including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.
- F. Adjust handrails and railings before anchoring to ensure alignment at abutting joint's space posts at interval indicated, but not less than required to achieve structural loads.
- G. Perform all field welding by a certified welder.
- H. Provide access for anchors that require through bolting either vertically or horizontally.
- I. Set post within a maximum tolerance of ¼ inch (6 mm).
- J. Set railing within a maximum non-accumulative offset of ¼ inch (6 mm) from true alignment for every 50 –foot of railing.



3.4 PROTECTION

- A. Protect finishes of handrails and railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at the time of Substantial Completion.
- B. Protect installed products until completion of project.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION