



SECTION 05720

ORNAMENTAL HANDRAILS AND RAILINGS
Marlin #3891,#4563,#5136LA #5312, #5319,#5425, #5942, #5970

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Stainless steel and stainless/wood combination handrails.
- B. Stainless steel guardrails or other ornamental 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 05700 - Ornamental Metal: Adjacent or adjoining handrails and railings fabricated from steel pipe and tube components.
- D. Section 06410 – Interior Architectural Woodwork

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) C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink); 2002.
- F. American Society for Testing and Materials (ASTM) E 488 Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements.
- G. American Society for Testing and Materials (ASTM) E894 - Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings.
- H. American Society for Testing and Materials (ASTM) E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.



- I. American Society for Testing and Materials (ASTM) E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.
- J. 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: Single manufacturer with a minimum of ten (10) years experience manufacturing and fabricating Architectural aluminum building components shall provide all primary products specified in this section.
- B. Installer Qualifications: Installer shall have a minimum of five (5) years experience installing systems of similar type and scope as those specified in this section.
- 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 STAINLESS STEEL RAILING SYSTEMS

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

- B. Marlin - #5319, #5312, #4563, #5942, #5970, #5136LA, #3891

- 1. Stainless steel grade UNS 1.4301 & 1.4305, type 303 & 304

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

- 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. 3" O.D. x .109" wall stainless steel tube
- d. 1/2" x 2" steel flat bar

- 4. Post Material:

- a. 1/2" x 3" stainless steel flat bar
- b. 1/2" x 2" steel flat bar
- c. 1/4" x 2" stainless steel flat bar
- d. 3/8" thick stainless steel plate
- e. 3/8" x 2" x 2" steel angle
- f. 2" x 2" x .120" wall stainless steel tube
- g. 1-1/2" x 1-1/2" x .120" wall stainless steel tube

- 5. Infill Material:

- a. 1" O.D. x .065" wall stainless steel tube
- b. 1" O.D. x .065" wall steel tube
- c. 3/4" O.D. x .065" wall stainless steel tube
- d. 3/4" O.D. x .049" wall stainless steel tube
- e. 7/8" x 1" stainless steel flat bar
- f. 1/2" x 1" steel flat bar
- g. 1/2" x 1/2" stainless steel flat bar
- h. 3/4" dia. solid stainless steel bar
- i. 5/8" dia. solid stainless steel bar

- 6. Brackets & Base Plates:

- a. 1/2" thick stainless steel plate
- b. 3/8" thick stainless steel plate

- 7. Finish: Surface to be #4 finish (240 grain/grit)/ #8 Mirror



a. GROUT AND ANCHORING CEMENT

- i. 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

b. FABRICATION

- i. Provide square stainless steel tubing without burrs and where exposed, rounded to produce smooth rigid and hairline joints.
- ii. Design components to allow for expansion and contraction without causing buckling, excessive opening of joints, or overstressing of welds and fasteners.
- iii. 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.
- iv. Form changes in direction of railing members as shown on Contract Drawings.
- v. Unless otherwise indicated, fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- vi. 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.
- vii. 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.
- viii. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.
- ix. Cut, reinforce, drill and tap components as indicated on drawings to receive finish hardware, screws and similar items.
- x. Close exposed ends of railing members with prefabricated end fittings.
- xi. 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.

c. FINISHES

- i. 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.



8. EXECUTION

a. EXAMINATION

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

b. PREPARATION

- i. 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.
- ii. Clean surfaces thoroughly prior to installation.
- iii. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

c. INSTALLATION

- i. Comply with manufacturer's recommendations.
- ii. Install in accordance with applicable standard or non-standard instructions included on shop drawings provided by manufacturer.
- iii. 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.
- iv. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry, or similar construction.
- v. Provide anchorage devices and fasteners including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.
- vi. 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.
- vii. Perform all field welding by a certified welder.
- viii. Provide access for anchors that require through bolting either vertically or horizontally.
- ix. Set post within a maximum tolerance of ¼ inch (6 mm).
- x. Set railing within a maximum non-accumulative offset of ¼ inch (6 mm) from true alignment for every 50 –foot of railing.



d.

PROTECTION

- i. 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.
- ii. Protect installed products until completion of project.
- iii. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION