



SECTION 05520

HANDRAILS AND RAILINGS

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum or Steel Reinforced Vinyl Railing Systems.
- B. ADAAG Compliant Handrails.

1.2 RELATED SECTIONS

- A. Section 05720 – Architectural Railings
- B. Section 06630 – Plastic Railings
- C. Section 06810 – Composite Railings

1.3 REFERENCES

- A. ADAAG - Americans with Disabilities Act Accessibility Guidelines.
- B. ASTM B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
- C. ASTM A 53 – Standard Specification for Seamless Steel Pipe.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM D 256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
- F. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.
- G. ASTM D 648 - Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
- H. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics.
- I. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating materials.
- J. ASTM D 792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
- K. ASTM D 870 - Standard Practice for Testing Water Resistance of Coatings Using Water Immersion; 1992.

- L. ASTM F 1083 - Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded for Fence Structures
- M. ASTM D 2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Humidity; 1994.
- N. ASTM D 2794 - Standard Test Method for Resistance of Organic Coatings to the Effect of Rapid Deformation (Impact); 1993.

1.4 SYSTEM DESCRIPTION

- A. Railing must conform to apply to pertinent sections of the following codes:
 - 1. OSHA.
 - 2. Applicable state and local building codes.
 - 3. ADAAG - Americans with Disabilities Act Accessibility Guidelines.
- B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails:
 - a. Uniform load of 50 lbs/ linear foot applied in any direction.
 - b. Concentrated load of 200 lbs applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Top Rails of Guards:
 - a. Uniform load of 50 lbs/ linear foot applied in any direction.
 - b. Concentrated load of 200 lbs applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 3. Infill Area of Guards:
 - a. Horizontal concentrated load of 50 lbs/ linear ft applied to 1 sq. ft. at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area. Load on infill area need not be assumed to act concurrently with loads on top rails.
- C. ADAAG and Stair Requirements: Handrails for ADA applications or stairs must conform to the following:
 - 1. Ramps that have a drop off of 30 inches or more on the side require guardrail, per above spec. Ramps with a rise greater than 6 inches must have handrails on both sides.
 - 2. Stairways must have handrails on both sides.
 - 3. Handrails must return to a wall, guard or walking surface.
- D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used.
- C. Shop Drawings: Prior to fabrication, detailed drawings showing dimensions, elevations, components, connections and anchoring systems.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten (5) years of experience.
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of three (3) years demonstrated experience in installing products of the same type and scope as specified.

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 or damage to finish.

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.

1.9 WARRANTY

- A. At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: SAFTRON MANUFACTURING, LLC, which is located at: 6012 333rd St. East, Bradenton, FL 34203. Tel: 305-233-5511; Web: www.saftron.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 SCOPE / APPLICATION

- A. Provide SAFTRON railing systems at all locations specified in the Contract Documents.
- B. Provide ADA Handrail systems at all locations specified in the Contract Documents.

2.3 COMMERCIAL RAILINGS

- A. Rails and Posts:
 - 1. Rails: 1.90 inch diameter vinyl pipe with nominal wall thickness of .120 inches, reinforced with 1.66 inch diameter aluminum pipe Type 6061 alloy with nominal wall thickness of .140 inch.
 - 2. Posts: 1.90 inch diameter vinyl pipe with nominal wall thickness of .050 inches, reinforced with 1.80 inch diameter aluminum tube, Type 6061, with nominal wall thickness of .210 inches.
 - 3. Posts: 1.90 inch diameter vinyl pipe with nominal wall thickness of .120

inches, reinforced with 1 1/4" Schedule 40 galvanized pipe.

- B. Infill Type:
 - 1. Pickets: 1 inch Schedule 80 polymer pipe with a clear opening of less than 4 inches. Pickets are steel reinforced on single top / single bottom railing at 42" and higher
 - 2. Glass: As selected by Architect from manufacturer's available designs.
 - 3. Cable: As selected by Architect from manufacturer's available designs.
 - 4. Other: As selected by Architect from manufacturer's available designs.
- C. Post Mounting:
 - 1. Welded plate: Aluminum or Galvanized Steel as selected by Architect from manufacturers available options.
 - 2. Core mount.
 - 3. Side mount.

2.4 MATERIALS

- A. Thermoplastic Components: High impact, weather resistant rigid polymer formulated with specific stabilizers and modifiers for strength, durability, and ultraviolet light protection, with inhibitors for expansion and contraction. Physical properties as follows, when tested per standards referenced:
 - 1. Flame Spread, Class A 1 when tested in conformance with ASTM E 84.
 - 2. Specific Gravity: 1.44 per ASTM D792.
 - 3. Compressive Strength: 8,100 psi (56 MPa) per ASTM D695.
 - 4. Flexural Strength: 11,100 psi (76 MPa) per ASTM D790.
 - 5. Tensile Strength: 6,000 psi (41 MPa) per ASTM D638.
 - 6. Flexural Modulus: 406,000 psi (2799 MPa) per ASTM D790.
 - 7. Tensile Modulus: 355,000 psi (2448 MPa) per ASTM D638.
 - 8. IZOD Impact - Notched: 17 pound-force per inch per ASTM D256.
 - 9. Heat Deflection: 264 psi (2 MPa) per ASTM D648.
- B. Pipe and Tube Reinforcement:
 - 1. Extruded Aluminum: Type 6061 T-6 aluminum alloy.
 - 2. Steel: Galvanized Steel Pipe, per ASTM F 1083.
- C. Fasteners:
 - 1. Type 304 Stainless Steel

2.5 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Form work true to line and level with accurate angles and surfaces.
- C. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- D. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- E. Connections: Connect members with manufacturer's fittings using a structural adhesive if this is manufacturer's standard connection method..
- F. Form simple and compound curves by bending members to produce uniform

curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

- G. Close exposed ends of railing members with prefabricated end fittings.
- H. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.
- J. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.6 FINISHES

- A. Finish and Color
 - 1. Color: Selected by Architect from manufacturer's standard color selections.
 - 2. Color: _____

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. Clean surfaces thoroughly prior to installation.
- B. 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. Install in accordance with manufacturer's instructions.
- B. Once installed, all handrails must be in compliance with the requirements of the all federal, state and local building codes.

3.4 CLEANING / PROTECTION

- A. Protect installed products until completion of project.
- B. Remove all stains, dirt, grease, or other substances by washing all railings thoroughly using clean water and soap; rinse with clean water. For best results clean railing with original Soft Scrub®
- C. Do not use acid solutions, steel wool, and other harsh abrasives.

D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION