



SECTION 05520

HANDRAILS AND RAILINGS

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Classic Railings (Picket).
- B. GridGuard Railings (Mesh).
- C. Invisirail Railings (Glass).
- D. Tensiline Railings (Cable).
- E. Stainless Steel Railings.
- F. Metal Fences and Gates.

1.2 RELATED SECTIONS

- A. Section 05510 - Metal Stairs: Metal handrails other than those specified in this section.
- B. Section 05521 - Aluminum Handrails and Railings.
- C. Section 05522 - Glass Railings.
- D. Section 05710 - Decorative Metal Stairs.
- E. Section 05720 – Ornamental Handrails and Railings.

1.3 REFERENCES

- A. Aluminum Association (AA): AA DAF-45 Designation System for Aluminum Finishes.
- B. ASTM B 26/B 26M - Standard Specification for Aluminum-Alloy Sand Castings; 2005.

- C. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2004.
- D. ASTM B 210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2004.
- E. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2005.
- F. ASTM B 247 - Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings; 2000.
- G. ASTM B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2002.
- H. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink); 2002.
- I. ASTM E 488 - Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements; 1996.
- J. American Welding Society (AWS):
 - 1. ANSI/AWS D1.1/D1.1M Structural Welding Code - Steel.
- K. Americans with Disabilities Act (ADA).
- L. International Code Council (ICC): International Building Code.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Handrails and railings shall withstand structural loading as determined by allowable design working stresses of materials.
- B. Structural Performance: Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors and connections:
 - 1. Top Rail of Guards: Shall withstand the following loads:
 - a. Concentrated load of 200 lbf (0.89kN) applied at any point and in any direction.
 - b. Uniform load of 50 lbf-ft. (0.07kN-m) applied horizontally and concurrently with uniform load of 100 lbf-ft. (0.14kN-m) applied vertically downward.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
 - 2. Handrails Not Serving As Top Rails: Shall withstand the following loads:
 - a. Concentrated load of 200 lbf (0.89kN) applied at any point and in any direction
 - b. Uniform load of 50 lbf-ft. (0.07kN-m) applied in any direction
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
 - 3. Guards Infill Area: Shall withstand the following loads:
 - a. Concentrated horizontal load of 200 lbf (0.89 kN) applied to a 1sq. ft. at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area. Loads need not be assumed to act concurrently, with loads on top rails in determining stress on guard.

- C. Thermal Movements: Design handrails and railings to allow for movements resulting from 120 degree F (49 C) changes in ambient and 180 degree F (82 C) surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttimes-sky heat loss.
- D. Corrosion Resistance: Separate incompatible materials to prevent galvanic corrosion.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Submit plan, section, elevation and perspective drawings as necessary to depict the proper configuration, assembly and installation and termination of each product specified in this section.
- D. Verification Samples: For each finish product specified, two samples, representing actual product, color, and finish.

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 five (5) years experience.
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.
- C. Mock-Up: Provide 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 and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
- C. Store products indoors in temperature controlled facility.

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: Staging Concepts, Inc.; 7008 Northland Drive, Suite 150, Brooklyn Park, MN 55428. ASD. Toll Free Tel: (800) 337-5339. Tel: (763) 533-2094. Fax: (763) 533-2096. Email: info@stagingconcepts.com. Web: http://www.stagingconcepts.com.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 PICKET RAILINGS

- A. Classic: Picket railing line designed and constructed using vertical pickets or ornamental balusters.
 - 1. Series: Square Tube.
 - 2. Series: Round Pipe.
 - 3. Series: Flat Bar.
 - 4. Series: Custom: _____.
 - 5. Frame Material: Aluminum.
 - a. Finish: Anodized.
 - b. Finish: Powder Coated.
 - 6. Frame Material: Steel.
 - a. Finish: Powder Coated.
 - b. Finish: Galvanized.
 - 7. Frame Material: Stainless Steel.
 - a. Finish: Brushed.
 - b. Finish: Polished.
 - 8. Handrail Material: To match frame material and finish.
 - 9. Guardrail Height: 30 inches (762mm).
 - 10. Guardrail Height: 36 inches (914mm).
 - 11. Guardrail Height: 42 inches (1067mm).
 - 12. Guardrail Height: __ inches (____mm).

2.3 MESH RAILINGS

- A. Gridguard: Mesh infill railing system.
 - 1. Series: Square Tube.
 - 2. Series: Round Pipe.
 - 3. Series: Flat Bar.
 - 4. Series: Custom: _____.
 - 5. Frame Material: Aluminum.
 - a. Finish: Anodized.
 - b. Finish: Powder Coated.

6. Frame Material: Steel.
 - a. Finish: Powder Coated.
 - b. Finish: Galvanized.
7. Frame Material: Stainless Steel.
 - a. Finish: Brushed.
 - b. Finish: Polished.
8. Infill Material: Square Mesh.
9. Infill Material: Rectangular Mesh.
10. Infill Material: Decorative Mesh.
11. Infill Material: Expanded Metal.
12. Infill Material: Perforated Metal.
13. Infill Material: _____.
14. Handrail Material: To match frame material and finish.
15. Guardrail Height: 30 inches (762mm).
16. Guardrail Height: 36 inches (914mm).
17. Guardrail Height: 42 inches (1067mm).
18. Guardrail Height: __ inches (____mm).

2.4 GLASS RAILINGS

- A. Invisirail: Glass railing system designed and constructed using 1/2 inch (13mm) laminated or fully tempered glass. Where line of sight and safety are required, it may be mounted in combination with other railings.
 1. Series: Cleer.
 2. Series: Dupane.
 3. Series: Ghost.
 4. Series: Despere - Mesh.
 5. Series: Despere - Picket.
 6. Series: Custom: _____.
 7. Frame Material: Aluminum.
 - a. Finish: Anodized.
 - b. Finish: Powder Coated.
 8. Frame Material: Steel.
 - a. Finish: Powder Coated.
 - b. Finish: Galvanized.
 9. Frame Material: Stainless Steel.
 - a. Finish: Brushed.
 - b. Finish: Polished.
 10. Shoe Material: Aluminum.
 11. Shoe Material: Steel.
 12. Shoe Material: Aluminum with Stainless Steel Cladding.
 13. Cap Material: Clear Vinyl.
 14. Cap Material: Aluminum.
 15. Cap Material: Steel.
 16. Cap Material: Stainless Steel.
 17. Glass: 1/2 inch (13mm Laminated / Tempered).
 18. Glass: 1/2 inch (13mm) Tempered.
 19. Handrail Material: To match frame material and finish.
 20. Guardrail Height: 30 inches (762mm).
 21. Guardrail Height: 36 inches (914mm).
 22. Guardrail Height: 42 inches (1067mm).
 23. Guardrail Height: __ inches (____mm).

2.5 CABLE RAILINGS

- A. Tensiline: Stainless steel cable railing system designed and constructed using stainless steel cables and a selection of stainless steel fittings and turnbuckles.
 - 1. Series: Square Tube.
 - 2. Series: Round Pipe.
 - 3. Series: Flat Bar.
 - 4. Series: Custom: _____.
 - 5. Frame Material: Aluminum.
 - a. Finish: Anodized.
 - b. Finish: Powder Coated.
 - 6. Frame Material: Steel.
 - a. Finish: Powder Coated.
 - b. Finish: Galvanized.
 - 7. Frame Material: Stainless Steel.
 - a. Finish: Brushed.
 - b. Finish: Polished.
 - 8. Cable Diameter: 3/16 inch (4.5mm).
 - 9. Cable Diameter: 1/4 inch (6mm).
 - 10. Handrail Material: To match frame material and finish.
 - 11. Guardrail Height: 30 inches (762mm).
 - 12. Guardrail Height: 36 inches (914mm).
 - 13. Guardrail Height: 42 inches (1067mm).
 - 14. Guardrail Height: __ inches (____mm).

2.6 FASTENERS

- A. Handrail Anchors: Select fasteners of type, grade and class required to produce connections suitable for anchoring handrails and railings to other types of construction indicated and capable of withstanding design loads.
- B. Handrail and Railing Component Anchors: Use fasteners fabricated from same basic metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.
 - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are a standard fastening method for handrail and railing indicated.

2.7 GROUT AND ANCHORING CEMENT

- A. Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- B. Interior Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching and grouting compound. Use for interior application only.

2.8 FABRICATION

- A. Assemble handrails and railings in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain

structural value of joined pieces.

- B. Form changes in direction of railing members as shown in the Contract Drawings.
- C. Mechanical Connections: Fabricate handrails and railings by connecting members with railing manufacturer's standard concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- D. 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.
- E. 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.
- F. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.
- G. Cut, reinforce, drill and tap components as indicated on drawings to receive finish hardware, screws and similar items.
- H. Close exposed ends of railing members with prefabricated end fittings.
- I. 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 (6mm) or less.

2.9 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for applying and designating finishes.
- B. Appearance of Finished Work:
 - 1. 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.
 - 2. 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.
- C. Finish Coating: Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with manufacturer's written instructions.
 - 1. Material: AAMA 2604 - Polyester powder coating, 3 mil average film thickness.
 - 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.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION