SECTION 05 50 00 - RAILINGS

Part 1 - General:

1.1 Section Includes

a. Pre-engineered Optik glass and stainless steel Railing System. All drawings, general and supplementary conditions including division one specifications apply to this section.

1.2 Related Sections

a. Division 5: Ornamental Handrails and Railings.

1.3 References and Design Requirements

1.3.1 Principle items specified is this section are:

a. Stainless steel or Stainless/wood combination handrails.
b. Stainless steel mounting hardware.
c. Tempered glass structural infill panels.

1.3.2 Design requirements are based on IBC and ADA standards:

1.3.2.1 Guardrails and handrails shall meet or exceed all applicable building codes.
1.3.2.2 Railings shall have high strength stainless steel to comply with structural requirements with an appropriate safety margin.
1.3.2.3 ½" thick structural glass panels shall be fully tempered with a required attached handrail or cap rail, unless local code otherwise allows.
1.3.2.4 ¾" structural glass panels shall be fully tempered with an attached handrail or cap rail.
1.3.2.5 All internal members shall be stainless steel or aluminum to eliminate the possibilty of rust.
1.3.2.6 Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3.3 Work Included

Provide all materials, labor and equipment necessary to fabricate and completely install handrails, guardrails, infill panels, and other railing options as shows on drawings or specific herin.

1.4 System Performance Requirements

1.4.1 Railings shall meet or exceed the requirements of all applicable building codes.

1.4.2 Railings shall have high strength stainless steel in order to comply with 1.41 with adequate safety margin.

1.4.3 All internal members shall be stainless steel, nylon or wood to eliminate the possibility of rust.

1.4.4 Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.5 Submittals

1.5.1 Shop Drawings for architectural approval, showing fabrication and installation of handrails and railings including plans, elevations, sections, details of components and attachments to other units of work.

1.5.2 Product data for stainless steel/wood products to be supplied by the manufacturer.

1.5.3 Structural computations or test data/evaluations, material properties, PE (professional engineering) calculations signed/sealed in the State of the project, and other information needed to ensure satisfactory structural compliance to applicable building codes to be supplied by the manufacture, based on final fabrication drawings and documents.

1.5.4 Maintenance instructions: Provide manufacturer's maintenance and cleaning instructions.

1.5.5 Warranty: Provide manufacturer's warranty effective from completion of work.

1.5.6 Initial selection
Provide 6" long handrail samples complete with supports and rosette covers to demonstrate stainless steel grade and finish. Nylon components to be included if specified, color as indicated.

1.5.7 Final verification
Qualification data for authorized installers specified in Quality Assurance is to demonstrate their capabilities and experience. Include list of completed projects with project and architect names.

1.6 Quality Assurance

1.6.1 Single Source Responsibility.

1.6.2 Execution tolerance plus/minus 5/64" (2 mm).

1.7 Storage

1.7.1 Store handrails and railing systems in clean, dry location, away from uncured concrete and masonry, protected against damage of any kind.

1.6.2 Materials must be kept in original packing until installation.

1.6.3 Materials to be stored at not lower than -40°C (-104°F) or higher than 100°C (212°F).

1.8 Project Conditions

1.8.1 All measurements for handrails and railings should be taken from construction site elements to which railings are to fasten. This information to be recorded on final shop drawings.

1.8.2 Coordinate fabrication schedule with construction progress to avoid delay of work

Part 2 - Product:

2.1 Manufacturer

2.1.1 Manufacturer shall be HDI Railing Systems, a U.S. manufacturer of a custom pre-engineered, mechanically fastened guardrail and handrail system, in strict compliance with all technical requirements of the drawings and specifications. Miscellaneous metal fabricators/suppliers will not be acceptable. This standard is based on HDI Railing Systems, 3905 Continental Drive, Columbia PA 17512 (Tel. 717.285.4088 Fax. 717.285.5083).

2.1.2 Alternate qualified manufacturers may be presented.

2.2 Materials: Guardrails and Handrail System

2.2.1 All rails and other tubular components shall be constructed using the following:

a. Handrails to be Stainless steel grade UNS 1.4305, type 304; surface to be 240 grain/grit finish; tubes 1-1/2" (38mm) outside diameter by 5/64" (2 mm) wall thickness.
b. Handrail supports to be Stainless steel grade UNS 1.4305, type 304;finish to match handrail.

c. Metal Cap to be stainless steel satin finish (architect to select type and size)
Square section, 1" by 1-5/16", 1-1/2" or 2" square

Round section, diameters 1-1/2“, 1.66“, 2“, 2-1/2“ or 3“

b. Optik Disc lock™ system includes plastic inserts to isolate glass from metals and a stainless Disc lock™ mechanism to secure glass in the aluminum shoe base.

c. Shoe Base:

i. Profile: Rectangular cross-section.2-3/4 inches (63.5 mm) wide by 4-1/8 inches (104.7 mm) high
ii. Material: Aluminum 6063 – T52
iii. Finish: Mill finish
iv. Base Cladding: Brushed finish sheet metal cladding added to exposed shoe base sections. Adhere with double-sided tape and/or silicone adhesive. Provide end caps where ends of shoe base sections are exposed.

d. Optional natural wood handrails and top rails to be connected to stainless steel true bar secured to posts using stainless steel T-connectors on top of posts: Mitered joints required by changes in direction require stainless steel true bar to be inserted into the underside of the wood. Standard wood types are available in natural beech, birch or maple, other wood types available upon request. All custom stains are subject to customer approval and require customer samples. Wood to be continuous throughout. Returns to wall or floor that require stainless steel bends should have transitions that are smooth and without burrs.

2.2.3 Fastening for shoe mounting method structural glass to be as specified in Glass products section (2.4) base to be Aluminum alloy 6063 - T52.

2.2.3 Fastening bolts to be stainless steel or other high strength material as determined by engineering requirements.

2.2.4 Neoprene gasket material to be used at all through bolt connections to ensure seperation between metal and glass.

2.3 Glass products, glazing and infill materials.

2.3.3 Tempered glass: Provide fully tempered safety glass with polished edges and dubbed (blunt) corners complying with ASTM C1048. Kind FT (fully tempered), condition A (un-coated). Types I (transparent glass, flat), quality Q3 (glazing select), class, thickness and manufacturing process as indicated below. Tempered, laminated glass infill panels are required in railings where there is access to areas below the railing (check local codes).

2.3.2 Clear glass: Class 1 clear

2.3.3 Tinted glass: Class 2 (tinted heat absorbing and light reducing). Manufacturer’s standard tint color indicated below:

a. Bronze, Gray, or other as indicated
b. Low iron
c. Custom pattern, art glass, etch, edges or surface, laminate or embeds, as specified herein.

2.3.4 Allowable thickness either:

2.3.4.1 ½“ thick structural glass panels shall be fully tempered with a required attached handrail or cap rail to be noted on final shop drawings, unless local code otherwise allows.
2.3.4.2 ¾“ structural glass panels shall be fully tempered with an attached handrail or cap rail to be noted on final shop drawings.

2.3.5 Manufacturing process: Manufacture fully tempered glass by horizontal (roller hearth) process with roll wave distortion parallel with bottom edge of glass as installed.

2.3.6 Structural glass railing to be designed for compliance with appropriate building codes. Structural computations showing material properties and other information needed to ensure satisfactory structural compliance to applicable building codes to be supplied by the manufacturer – based on final fabrication drawings and documents, anchoring type, spacing and glass thickness.

2.5 Fasteners

Types and sizes indicated in shop drawings.

- **A.** For concrete attachment, hole size in base shoe is to be 9/16" (14.3 mm), counter bore 7/8" (22.2 mm) x depth ½" (12.7 mm), center-to-center spacing of holes is 12" (304.8mm). Use Power Fasteners 3/8" x 4" Wedge-Bolts Part # WBA38X4 with Wedge-Bolt Washer Part # WBAW38.
- **B.** For steel attachment, hole size in base shoe is to be 9/16" (14.3 mm), counter bore 7/8" (22.2 mm) x depth ½" (12.7 mm), center-to-center spacing of holes is 12" (304.8mm). Use ½" – 13 x 1 stainless steel socket head cap screw Part # SHCS12X1.
- **C.** Sill Angles for Tempered Glass Railing Assemblies: Steel angle profiles conforming to ASTM A 36, with anchoring devices, sizes indicated in shop drawing of section 05522, drilled and tapped for fastener types, sizes, and spacing indicated.

2.5.1 Anchors shall be fabricated from stainless steel or other materials as determined by engineering requirements with capability to sustain, without failure, load imposed within a safety factor of 4, as determined by testing per ASTM E488.

2.6 Fabrication

2.6.1 Fabricate railing system for compliance with structural requirements of applicable codes.

2.6.2 Pre-assemble railings prior to shipping to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and for coordination with shop drawings.

2.6.3 Stainless steel tubing cuts shall be square, without burrs and where exposed, rounded to produce smooth rigid and hairline joints.

Part 3 – Execution:

3.1 Examination

3.1.1 Do not begin installation until substrates have been properly prepared.

3.1.2 Verify that reinforcement and anchoring devices are the correct type, have been located correctly, and have been installed properly.

3.1.3 If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 Preparation

Provide information on fastening point locations for anchors or posts where necessary to relevant parties.

3.3 Installation

Installation shall be by a qualified, authorized representative of the manufacturer.

3.3.1 Installation must be in accordance with standard or non-standard, yet applicable details (instructions) included on installation/shop drawings provided by manufacturer.

3.3.2 Install components plumb and in-line, accurately fitted, free from distortion or defects and securely anchored to structure.

3.3.3 Provide anchors, plates, angles, etc., necessary for connecting railings to structure.

3.3.4 Any and all field welding shall be by a certified welder.

3.3.5 Access for anchors that require through bolting either vertically or horizontally to be made available through General Contractor.

3.3.6 Maximum variation from plumb shall be 1/4".

3.3.7 Maximum offset from true alignment for every 50-foot of railing shall be 1/4", non-accumulative.

3.4 Cleaning and Protection

3.4.1 Remove manufacturer's protective coverings from exposed surfaces after installation.

3.4.2 Railings shall be cleaned, including infill panels, by contractor to the satisfaction of the owner.

3.4.3 Wipe with moistened cloth only. Do not use cleaning agents with abrasive or acid/alkaline content.

3.4.4 General contractor to provide protective covering on handrails and guardrails if construction is not yet finished in the area where the railings are installed.

3.4.5 Railings shall be cleaned, including infill panels, by contractor to the satisfaction of the owner.

3.4.6 Wipe with moistened cloth only. Do not use cleaning agents with abrasive or acid/alkaline content.

3.5 Correction of deficiencies

All deficiencies in work and/or items not meeting specified requirements shall be corrected in order to meet specification requirements at no additional cost to owner.

End of Section