

SECTION 05 73 00

DECORATIVE METAL RAILINGS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Tempered glass railing assemblies.
 - 2. Stainless steel railing assemblies.
 - 3. Stair railings and guardrails.
 - 4. Free-standing railings at steps.
 - 5. Wire rope guardrails.
- B. Related Sections
 - 1. Section 05 50 00 – Metal Fabrications: Supports.
 - 2. Section 05 51 00 - Metal Stairs: Handrails other than those specified in this section.
 - 3. Section 05 71 00 – Metal Stairs.
 - 4. Section 05 73 10 – Wire Rope Railings: Railings other than those specified in this section.
 - 5. Section 06 20 00 - Finish Carpentry: Wood handrail.
 - 6. Section 09 21 16 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

1.02 REFERENCES

- A. 16 CRF 1201 – Safety Standard for Architectural Glazing Materials, current edition.
- B. ANSI Z97.1 – American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2004.
- C. ASTM A 666 – Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.
- D. ASTM B 248 – Standard Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar; 2007.
- E. ASTM B 248M – Standard Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar (Metric); 2007.
- F. ASTM C 920 – Standard Specification for Elastomeric Joint Sealants, 2005.
- G. ASTM C 1036 – Standard Specification for Flat Glass; 2006.
- H. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 2004.
- I. ASTM C 1172 - Standard Specification for Laminated Architectural Flat Glass; 2003.
- J. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2005a.
- K. ASTM E 935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).
- L. ASTM E 985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).
- M. AWS D 1.1/D 1.1M – Structural Welding Code - Steel; 2008.
- N. AWS D 1.6 – Structural Welding Code – Stainless Steel; 2007.
- O. AWS C 3.4/3.4M – Specification for Torch Brazing; 2007.
- P. AWS C 3.5/3.5M – Specification for Induction Brazing; 2007.

Q. AWS C 3.9/C 3.9M – Specification for Resistance Brazing; 2007.

1.03 SYSTEM DESCRIPTION

- A. Design Requirements: Design, fabricate, and test railing assemblies in accordance with ASTM E 985 and requirements of governing authorities.
 - 1. Movement: Accommodate movement between railing system components and between railing system components and other work, without damage to components and connections.
- B. Performance Requirements: Railings shall meet the following loading requirements:
 - 1. Lateral Force: 75 lb (333 N) at any point without damage or permanent set; tested in accordance with ASTM E 935.
 - 2. Distributed Load: 50 lb per lineal foot (0.73 kN per m), applied in any direction at the top of the handrail; tested in accordance with ASTM E 935.
 - 3. Concentrated Loads on Intermediate Rails: 50 lb per square foot (0.22 kN per 0.093 square m).
 - 4. Concentrated Load: 200 lb (888 N), applied in any direction at any point along the handrail system; tested in accordance with ASTM E 935.
 - 5. Loads do not need to be applied simultaneously.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit J. M. Gruca, Inc now doing business as Global Glass Railings product data for railing system and accessories including description of materials, components, finishes, fabrication details.
 - 1. Metal components.
 - 2. Glass.
 - 3. Anchors and accessories.
- C. Shop Drawings: Indicate railing system elevations and sections, details of profile, dimensions, sizes, connection attachments, anchorage, size and type of fasteners, and accessories. Indicate anchor and joint locations, brazed connections, transitions, and terminations.
- D. Test Reports: Submit test reports from an independent testing agency that show compliance with specified design and performance requirements.
- E. Manufacturer's Instructions: Submit J. M. Gruca, Inc now doing business as Global Glass Railings instructions for special requirements for installation, and cleaning and maintenance.
- F. LEED Submittals: Submit applicable LEED Submittal Form for each different product or component which contains recycled content, for inclusion in documentation for LEED MR Credit 4.1 - Recycled Content (10%) when required.
- G. LEED Submittals: Submit applicable LEED Submittal Form for each different product or component which contains recycled content, for inclusion in documentation for LEED MR Credit 4.2 - Recycled Content (20%) when required.
- H. LEED Submittals: Submit applicable LEED Submittal Form for each different product or component which has been extracted, recovered, or manufactured within 500 miles of the project site, for inclusion in documentation for LEED Credit 5.1 – Regional Materials (10%) when required.
- I. LEED Submittals: Submit applicable LEED Submittal Form for each different product or component which has been extracted, recovered, or manufactured within 500 miles of the project site, for inclusion in documentation for LEED Credit 5.2 – Regional Materials (20%) when required.

1.05 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Installer Qualifications: Company specializing in installing glazed railing systems, acceptable to J. M. Gruca, Inc now doing business as Global Glass Railings
- B. Mock-ups:
 - 1. Construct a railing of each type specified
 - 2. Locate mock-ups where directed.
 - 3. Mock-ups may remain as part of the Work.
- C. Pre-Installation Meeting:
 - 1. Schedule and conduct a preinstallation meeting one week before starting work of this section.
 - 2. Attendees shall include, but are not limited to:
 - a. Contractor
 - b. J. M. Gruca, Inc now doing business as Global Glass Railings representative
 - c. Architect or Owner's representative
 - d. Other subcontractors of adjacent work

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver railing materials in factory provided protective coverings and packaging.
- B. Protect railing materials against damage during transit, delivery, storage, and installation at site.
- C. Acceptance at Site: Inspect railing materials upon delivery for damage. Repair damage to be indistinguishable from undamaged areas; if damage cannot be repaired to be indistinguishable from undamaged parts and finishes, replace damaged items.
- D. Storage and Protection: Prior to installation, store materials and components under cover, in a dry location.

1.07 PROJECT CONDITIONS

- A. Do not install railings until project is enclosed and ambient temperature of space is minimum 65 degrees F (18.3 degrees C) and maximum 95 degrees F (35 degrees C).
- B. Maintain ambient temperature of space at minimum 65 degrees F (18.3 degrees C) and maximum 95 degrees F (35 degrees C) for 24 hours before, during, and after railing installation.

1.08 WARRANTY

- A. Warranty: Furnish railing manufacturer's standard one year warranty against defects in materials, fabrication, finishes, and installation commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Handrails and Railings:
 - 1. J. M. Gruca, Inc now doing business as Global Glass Railings: 5309 Palmero Court, Buford, GA 30518; 877-682-1601: www.architecturalglassrailings.com

2.02 MATERIALS

- A. Stainless Steel Components: Conforming to ASTM B 221/ASTM B 221M, Type 304 or 316.
 - 1. Stainless Steel Tubing: 16 ga., 1-1/2 inch (38 mm) diameter.
- B. Brass Components: Conforming to ASTM B 248 and ASTM B 248M, No. 26 Yellow Brass or No. 464 Bronze.
- C. Bronze Components: Alloy 280 muntz metal; color similar to alloy 385.
- D. Bronze Components: Architectural extruded bronze; color similar to alloy 280.

- E. Glass: Fully tempered, laminated safety glass – Kind FT, Quality Q3, ASTM C 1048, Condition A, Type 1, transparent glass.
 - 1. Plastic Interlayer: Minimum 0.060 inch (1.52 mm) thick.
 - 2. Impact Strength: Category II, tested in accordance with 16 CFR 1201.
 - 3. Thickness: ½ inch (13 mm)
 - 4. Configuration: Flat.
 - 5. Color:
 - a. Clear.
 - b. _____ tint.

- F. Glass: Fully tempered – Kind FT, Quality Q3, ASTM C 1048, Condition A, Type 1, transparent glass.
 - 1. Surface and Edge Compression: Test in accordance with ASTM C 1048.
 - 2. Impact Strength: Category II, tested in accordance with 16 CFR 1201.
 - 3. Thickness:
 - a. ½ inch (13 mm).
 - b. ¾ inch (19 mm).
 - 4. Configuration: Flat, bent, spiral.
 - 5. Edges: Ground smooth and polished
 - 6. Color:
 - a. Clear.
 - b. Frosted
 - c. _____ tint.

2.03 BASE MOUNT RAILING SYSTEM

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“HERCULES”

- A. Description: Engineered, base supported railing system with glass infill.
- B. Top Cap: 1 x 1-1/2 inch (25 x 38 mm) stainless steel; No. 4 satin finish.
 Top Cap: 1 x 1-1/2 inch (25 x 38 mm) stainless steel; No. 8 mirror finish.
 Top Cap: 2 inch (52 mm) diameter stainless steel; No. 4 satin finish.
 Top Cap: 2 inch (52 mm) diameter stainless steel; No. 8 mirror finish.
 Top Cap: 2-1/2 inch (65 mm) diameter stainless steel; No. 4 satin finish.
 Top Cap: 2-1/2 inch (65 mm) diameter stainless steel; No. 8 mirror finish.
 Top Cap: 3 inch (76 mm) diameter stainless steel; No. 4 satin finish.
 Top Cap: 3 inch (76 mm) diameter stainless steel; No. 8 mirror finish.
 Top Cap: 3-1/2 inch (81 mm) diameter stainless steel; No. 4 satin finish.
 Top Cap: 3-1/2 inch (81 mm) diameter stainless steel; No. 8 mirror finish.
 Top Cap: 4 inch (102 mm) diameter stainless steel; No. 8 mirror finish.
 Top Cap: 4-3/8 inch (111 mm) ellipse stainless steel; No. 4 satin finish.
 Top Cap: 3-1/4 inch (52 mm) ellipse stainless steel; No. 4 satin finish.
 Top Cap: 3-1/4 inch (52 mm) ellipse stainless steel; No. 8 mirror finish.
 Top Cap: 4 inch (102 mm) diameter stainless steel; No. 4 satin finish.
 Top Cap: 4-3/8 inch (111 mm) ellipse stainless steel; No. 8 mirror finish.
 Top Cap: _____ specify type and size of wood.
- C. Base Shoe: Aluminum, 6063 T5 alloy; 2-1/2 inch (64 mm) wide by 4-1/8 inch (105 mm) high, rectangular profile, mill finish.

- D. Base Cladding:
 - 1. Material: 18 ga. stainless steel; No. 4 satin finish, Type 304 or 316.
 - 1. Material: 18 ga. stainless steel; No. 8 mirror finish, Type 304 or 316.
 - 1. Material: ___ ga. _____ brass.
 - 1. Material: ___ ga. _____ bronze.
- E. Glass: As specified in Materials section, E& F
- F. Fasteners:
 - 1. Attachment to Concrete:
 - a. Provide anchors capable of sustaining, without failure, a load equal to four times the load imposed when installed in concrete, tested in accordance with ASTM E 488.
 - b. Provide 12 inch (305 mm) center-to-center hole spacing; ½ inch (13 mm) by 4 inch (102 mm) concrete anchors.
 - 2. Attachment to Steel: Provide 24 inch (610 mm) center-to-center hole spacing; ½ inch (13 mm) – 13, stainless steel, socket head cap screws for drilled and tapped or drilled and bolted attachment.

2.05 POST RAILING SYSTEM -

“ATLAS”

- A. Description: Engineered, post supported railing system with glass infill panels.
- B. Top Cap: 1-1/2 inch (38 mm) diameter stainless steel; No. 4 satin finish.
 Top Cap: 1-1/2 inch (38 mm) diameter stainless steel; No. 8 mirror finish.
 Top Cap: 2 inch (52 mm) diameter stainless steel; No. 4 satin finish.
 Top Cap: 2 inch (52 mm) diameter stainless steel; No. 8 mirror finish.
- C. Posts:
 - 2 inch (52 mm) diameter stainless steel post, 11 gauge, .120" wall thickness
 - ½ x 2 inch (13 x 52 mm) stainless steel flat bar, paired
- D. Mounting:
 - Set into core drilled holes and grouted in place.
 - Surface mounted by bolting through base plate.
 - Surface mounted by welding to steel supports.
 - Internal support sleeves secured with set screws.
- E. Fins:
 - Configuration: _____.
 - Material: _____.
 - Finish: _____.
 - Mounting: _____.
- F. Glass: As specified in Materials section, E& F
- G. Glass Mounts: Stainless steel, pressure clamps/infill mounts.
- H. Handrail Brackets: Stainless steel
- I. Stainless Steel Finish, Exposed Surfaces: No. 4 satin.
- J. Stainless Steel Finish, Exposed Surfaces: No. 8 mirror.

2.06 BUTTON RAILING SYSTEM

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“DELTA”

- A. Description: Engineered, base and point supported railing system with glass infill.
- B. Mounting: ½ inch (13 mm) stainless steel, 4 by 10 inch (102 x 254 mm) mounting plate bolted to minimum ½ inch (13 mm) thick, embedded steel support.

Mounting: ½ inch (13 mm) stainless steel, 4 by 10 inch (102 x 254 mm) mounting plate welded to minimum ½ inch (13 mm) thick, embedded steel support.

Mounting: 2 inch (51 mm) diameter, machined, solid stainless steel, type 304, rod standoffs, drilled and tapped ½ inch (13 mm) x 13.

Mounting: 2-1/2 inch (64 mm) diameter, machined, solid stainless steel, type 304, rod standoffs, drilled and tapped ½ inch (13 mm) x 13.

Mounting: Concealed fasteners; 2 inch (51 mm) diameter, ¾ inch (19 mm) thick stainless steel buttons.

- C. Spacer Grommets: washers.
- D. Glass: As specified in Materials section, E& F

2.07 POINT SUPPORTED RAILING SYSTEM - "ISIS"

A. Description: Engineered post and glazing mount supported railing system with tempered glass panels supported by machines standoff fittings with a top rail

B. Top Rail:

1. 2 "(52mm) diameter 304 stainless steel; 16 gauge No. 4 satin finish, No. 8 mirror finish
2. 2 ½" (65mm) diameter 304 stainless steel; 14 gauge No. 4 satin finish, No. 8 mirror finish
3. 1 ½" (38mm) diameter stainless steel: 16 gauge No. 4 satin finish, No. 8 mirror finish

C. Posts: _____ 3/8" x 2" Stainless steel (304) paired flat bar
_____ 3/4" x 2" Stainless steel (304) flat bar
_____ 2" Diameter stainless steel post, 11 gauge

D. Standoffs: Machined, Type 304 stainless steel post mounted supports with nylon and rubber isolators

E. Glass Infill Panels: As specified in previous Materials section

F. Handrail Brackets: Stainless steel wall or glass mounted per Section 2.09

G. Mounting: Set into core drilled holes and grouted in place.
Surface mounted by bolting through base plate.
Surface mounted by welding to steel supports.
Internal support sleeves secured with set screws

H. Fasteners and anchors are designed for attachment to concrete or steel

2.08 SMOKE BAFFLE SYSTEM

A. Configuration: Two inch wide by four inch tall aluminum base channel

B. Channel: Stainless steel Clad; no. 4 satin finish.

Channel: Stainless steel Clad; no. 8 mirror finish.

C. Anchors: Stainless steel bolts with plastic isolator sleeves.

- D. Glass: ½ inch (13 mm) clear tempered glass panels with polished edges and holes 12 inches (305 mm) o.c. for suspension.
- E. Glass: 3/8 inch (9.5 mm) clear tempered glass panels with polished edges.

2.09 HANDRAIL

- A. Handrail: 1-1/2 inch (38 mm) diameter stainless steel; No. 4 satin finish.
Handrail: 1-1/2 inch (38 mm) diameter stainless steel; No. 8 mirror finish.
Handrail: _____, please specify
- B. Internal Connection Sleeves: Sleeve, material compatible with handrail and, top rail and top cap material.
- C. Handrail Brackets: J. M. Gruca, Inc now doing business as Global Glass Railings standard, stainless steel brackets.
 - 1. Mounting: Glass.
Mounting: Wall.
 - 2. Finish: No. 4 satin finish.
Finish: No. 8 mirror finish.

2.10 CABLE RAILING SYSTEM

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“ZEUS”

- A. Description: Post and cable railing system.
- B. Stainless Steel Tube: Type 304 or 316 stainless steel.
 - 1. Guardrail Post: 2 inch (52 mm) o.d.
 - 2. Handrail: 1-1/2 inch (38 mm) o.d.
 - 3. Top Rail: 1-1/2 inch (38 mm) o.d.
 - 3. Top Rail: 2 inch (38 mm) o.d.
- C. Cable: Type 304 or 316 stainless steel, 3/16” diameter.
- D. Fittings: Type 304 or 316 stainless steel, non-swedge.
- E. Fasteners: Stainless steel.
- F. Finishes:
 - 1. Exposed Stainless Steel Pipe and Tubing: No. 4 satin finish.
 - 1. Exposed Stainless Steel Pipe and Tubing: No. 8 mirror finish.
 - 2. Exposed, Machined Stainless Steel Fittings: No. 4 satin finish.
 - 2. Exposed, Machined Stainless Steel Fittings: No. 8 mirror finish.
- G. Fabrication:
 - 1. Corners: Mitered and welded; grind smooth to match adjacent finish.
 - 2. Exposed Joints: Butt tight and flush.
 - 3. Splices: Provide interior sleeves; fasteners allowed at splice connections.

2.11 ACCESSORIES

- A. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- B. Welding Fittings: Factory- or shop-welded from matching pipe or tube; joints and seams ground smooth.
- C. Exposed Fasteners: No exposed bolts or screws.
- D. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
- E. Hydraulic Expansion Cement: Hartline Products Co., Inc.; Rockite Cement: www.rockite.com.

- F. Bituminous Coating: Fully tempered – Kind FT, Quality Q3, ASTM C 1048, Condition A, Type 1, transparent glass.
- G. Caulk: Silicone; black color.
- H. Provide anchors and other materials as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 - 1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.
 - 2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.
 - 3. For anchorage to stud walls, provide backing plates, for bolting anchors.
 - 4. Posts: Provide adjustable flanged brackets.
- I. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.12 FABRICATION

- A. Accurately form materials to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate materials with joints tightly fitted and secured.
- D. Machine joint edges smooth and plan to produce hairline seams when site assembled; supply concealed sleeve connectors for joints.
- E. Provide sleeves to accommodate site assembly and installation.
- F. Welded/brazed Joints:
 - 1. Weld/braze, grind smooth, and polish miter joints to required finish.
 - 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

2.13 FINISHES

- A. Provide finishes as noted below, unless indicated otherwise.
- B. Stainless Steel Finish: No. 4 satin.
- C. Stainless Steel Finish: No.6 semi mirror
- D. Stainless Steel Finish: No. 8 mirror polished.
- E. Stainless Steel Finish: bead blasted
- F. Brass Finish: U.S. No. 3 polished.
- G. Brass Finish: U.S. No. 4 180 grit satin.
- H. Bronze Finish: U.S. No. 5 mirror polished.
- I. Bronze Finish: U.S. No. 10 180 grit satin.
- J. Bronze Finish: U.S. No. 10B 180 grit satin, hand rubbed antique.
- K. Bronze Finish: Alloy 280 muntz metal.
- L. Brass/bronze Finish: Lemon oil seal.
- M. Brass/bronze Coating: Thermoset; clear enamel or acrylic.
- N. Brass/bronze Coating: Acrylic based, clear gloss brass lacquer.

- O. Touch-Up Materials: As recommended by manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions of location to receive railings.
- B. Blocking and supports for attachment of anchors will be required.
- C. Site conditions must be acceptable and ready to receive work.
- D. Notify Customer immediately of conditions that are not acceptable for installation of work.

3.02 PREPARATION

- A. Clean surfaces to receive metal railing of materials and substances that are detrimental to the installation.

3.03 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- B. Anchor railings securely to structure.
- C. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, noncumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

3.05 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: J. M. Gruca, Inc, now doing business as Global Glass Railings shall provide field observation of installation of their systems.
- B. Notify Customer immediately of any issues during railing installation.

3.06 CLEANING INSTRUCTIONS

- A. Remove protective film from exposed metal surfaces.
- B. Clean exposed metal finishes with potable water and mild detergent, in accordance with Global Glass Railings recommendations. Do not use abrasive materials or chemicals, detergents or other substances that may damage the material or finish.
- C. Clean glazing surfaces; remove excess glazing sealant compounds, dirt, and other substances.
- D. Repair damage to exposed finishes to be indistinguishable from undamaged areas.
- E. If damage to finishes and components cannot be repaired to be indistinguishable from undamaged finishes and components, replace damaged items.

3.07 PROTECTION

- A. Protect installed railing systems and finishes from damage, after installation.

3.08 SCHEDULES

- A. Location _____:

END OF SECTION