S&S MANUFACTURING
Manufacturers of Railings & Architectural Metal

SECTION 057010 – ORNAMENTAL ALUMINUM AND GLASS GUARD RAIL SYSTEM

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Perform the work of this Section in accordance with the General Conditions, AIA Document A201/Current Edition, Supplementary Conditions, and all other requirements of the Contract Documents.

1.2 SUMMARY

A. This Section includes the following:
   1. Aluminum and glass handrails and guard rails.
      a. Aluminum railing system to be fabricated with a single monolithic fully tempered or laminated glass panel in an inline, outboard or inboard glass construction

1.3 PERFORMANCE REQUIREMENTS

A. General: In engineering handrail and guard railing systems to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
   1. Aluminum: AA "Specifications for Aluminum Structures".

B. Structural Performance of Handrails and Guard Railing Systems: Engineer, fabricate, and install handrails and railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials for handrails, railings systems, anchors, and connections. Apply each load to produce the maximum stress in each of the respective components comprising handrails and railing systems.
   1. Top Rail of Guardrail Systems & Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:
      a. Concentrated load of 200 lb. applied at any point and in any direction.
      b. Uniform load of 50 lb. per linear ft. applied in any direction.
      c. Concentrated load need not to be assumed to act concurrently with uniform loads.
   2. Infill Area of Guardrail Systems: Capable of withstanding the following loads applied as indicated:
      a. Horizontal normal load of 50 lb. applied over one sq. ft. at any point in the system.
      b. Vertical downward load of 50 lb. per linear ft.
      c. Concentrated upward load of 50 lb. at the most critical location.
      d. Above loads need not to be assumed to act concurrently with one another, and are not required to be superimposed with the loads specified in the preceding paragraph.
   3. Railing system designed to meet wind loading requirements as per ASCE7 and applicable local building codes

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 SUBMITTALS

A. Product Data for each type of product specified.

B. Shop drawings showing Welding, Fabrication and Installation of handrails including all plans, typical elevations, sections, details of components, and attachment to other units of work.

1. Where installed products are indicated to comply with certain design loadings, include structural computations, material properties and other information needed for structural analysis review by the design architect and/or engineer of record.

C. Samples for initial selection purposes in the form of S&S Manufacturing standard color chart showing full range of colors available. Or for custom color request minimum 2" x 2" color chip from the customer for color matching purposes. Then submit at least two chips of color match for approval by architect or owner.

D. Submit at least two 6" long samples of the top rail when its shape is other than standard rounds, squares or rectangles and when specifically requested by architects.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain handrails and railing systems of each type and material from:

S&S Manufacturing
17 Timber Lane
Marlboro, New Jersey 07746
Phone: (732) 698-2400
Fax: (732) 662-5046
www.handrails.com
jesse@handrails.com
steven@handrails.com

1.6 STORAGE

A. Store handrails and railing inside a well-ventilated area, away from uncured concrete and masonry and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

B. Glass storage when in crates must be protected from rain, snow, sleet and hail which will cause acid staining.

1.7 PROJECT CONDITIONS

A. 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. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Where field measurements cannot be made without delaying the work, obtain guaranteed dimensions in writing and proceed with fabrication of products without field measurements if specifically requested to do so by architects, owner or contractor.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturer: Products specified as a standard of quality are to be fabricated by:

S&S Manufacturing
17 Timber Lane
Marlboro, New Jersey 07746
Phone: (732) 698-2400
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2.2 METALS

A. General: Provide metal free from surface blemishes where exposed to view in the finished unit. Exposed-to-view surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable.

B. Aluminum: Provide alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties of the alloy and temper designated below for each aluminum form required.
   1. Extruded Bar and Shapes: ASTM B 221, 6063-T6.
   2. Extruded Pipe and Tube: ASTM B 429, 6063-T6.
   3. Plate and Sheet: ASTM B 209, 6061-T6.
   4. Die and Hand Forgings: ASTM B 247, 6061-T6.
   5. Castings: ASTM B 26, 356.0-T6.

2.3 MISCELLANEOUS MATERIALS

A. Filler Metal and Electrodes: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded or brazed and as required for color match, strength, corrosion resistance, and compatibility in fabricated items.

2.4 GLASS PRODUCTS AND GLAZING MATERIALS

A. Safety Glass Standard: Provide safety glass complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.
   1. Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or another certification agency acceptable to authorities having jurisdiction.

B. Monolithic Tempered Glass: Provide fully tempered safety glass complying with ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type 1 (transparent glass, flat), Quality q3 (glazing select), class, thickness, and manufacturing process as indicated below:
   1. Clear Glass: Class 1 (clear), unless otherwise selected by the Architect.
   2. Nominal Thickness: As required to support structural loads.
   3. Manufacturing Process: Manufacture fully tempered glass as follows:
      a. By horizontal (roller hearth) process with roll wave distortion parallel with bottom edge of glass as installed, unless otherwise indicated.

C. Glazing Cement, Dry Glaze components and Accessories: Provide glazing cement or glaze

components and related accessories recommended or supplied by railing manufacturer for bonding glass to metal subrails.

D. Tempered Laminated Glass: Provide heat strengthened laminated safety glass complying with ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type 1 (transparent glass, flat), Quality q3 (glazing select), class, thickness, and manufacturing process as indicated below:
    1. Glass: Glass to be selected by the Architect.
    2. Nominal Thickness: As required to support structural loads.
    3. Laminated Glass: Comply with ASTM C 1172 for kinds of laminated glass indicated and other requirements specified.
    4. Interlayer: Interlayer material as indicated below, clear or in colors, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
        a. Interlayer Material: SentryGlas Interlayer as manufactured by DuPont or equal.
    5. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets as follows:
        a. Laminate lites with polyvinyl butyral interlayer in autoclave with heat plus pressure.

E. All exposed edges of glass railing members shall be polished.

2.5 FASTENERS

A. Fasteners for Anchoring Railings to Other Construction: Select fasteners of the type, grade, and class required to produce connections that are suitable for anchoring railing to other types of construction indicated and capable of withstanding design loadings.
    1. For aluminum railings, provide fasteners fabricated from type 304 or type 316 stainless steel.

B. Fasteners for Interconnecting Railing Components: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.
    1. Provide concealed fasteners for interconnecting handrail and railing components and for attaching them to other work, except where otherwise indicated.

C. Cast-in-Place and Post Installed Anchors: Provide anchors of type indicated below, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to four items the load imposed when installed in concrete, as determined by testing per ASTM E488 conducted by a qualified independent testing agency.
    1. Cast-in-place anchors.
    2. Chemical anchors.
    3. Expansion anchors.
    4. Screw anchors.

2.6 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Erosion-Resistant Anchoring Cement: Factory-prepackaged, non-shrink, non-staining, high strength cement formulation for mixing with water at project site to create pourable, anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure or provide a sealer or waterproof coating recommended for the exterior use by the manufacturer to be applied by the installer or the other qualified contractor or subcontractor.

2.7 FABRICATION

A. General: Fabricate handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of hollow members, post spacings, and anchorage, but not less than that required to support structural loads.

B. Assemble railing systems in shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping, hoisting and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Form changes in direction of railing members as follows:
    1. As detailed.

D. Welded Connections: Fabricate railing systems and handrails for connecting members by welding. For connections made during fabrication, weld corners and seams continuously to comply with the following:
    1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    2. Obtain fusion without undercut or overlap.
    3. Remove welding flux immediately.
    4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

E. Nonwelded Connections: Fabricate railing systems and handrails 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.
    1. All splices shall be accomplished by butting one Top Rail to the next with a structural sleeve insert extending from one Top Rail to the next and further secured by means of Stainless Steel, Aluminum, or other proper screw or pop-rivet. Note: Butt splices to be either hairline fitted or properly gapped to provide for proper.

F. Flanges, Fittings, and Anchors: Provide manufacturer's standard flanges, miscellaneous fittings, and anchors to connect handrail and railing members to other construction.

G. Provide inserts and other anchorage devices to connect handrails and railing systems to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railing systems. Coordinate anchorage devices with supporting structure.

H. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.

I. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing work.

J. Cut, reinforce, drill, and tap components, as indicated, to receive finish hardware, screws, and similar items.

K. Close exposed ends of handrail and railing members with prefabricated end fittings.

L. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of the railing and wall is 1/4 inch (6 mm) or less.

M. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses. Size fillers to produce adequate bearing to prevent bracket rotation and overstressing of substrate.

2.8 GLAZING PANEL FABRICATION

A. Glass Panels: Cut tempered glass to final size and shape prior to heat treatment; provide for proper edge clearance and bite on glass. Provide thickness indicated but not less than that required to support structural loads.

2.9 FINISHES, GENERAL

A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering prior to shipment.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one half of the range of approved samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and they are assembled or installed to minimize contrast.

2.10 ALUMINUM FINISHES

A. All aluminum railings to receive an electrostatically applied baked on powdered coat finish over a full pretreatment except when specified to be natural or mill finish or when anodizing is specified.

B. Pretreatment Process: A multi-stage pretreatment process is required prior to powder coating.

1. The railing shall be dipped or sprayed in a concentrated alkaline cleaner then rinsed in clear water. This process provides cleaning, degreasing and deep etching on the surface.
2. The product shall then be dipped or sprayed in a concentrated acidic treatment to deoxidize, desmut and neutralize the surface then rinsed in clear water.
3. The product then shall be dipped or sprayed in an acidic conversion coating to act as a bonding coating for paint adhesion.
4. The product must be completely dried before painting.

C. Painting: Electrostatically applied thermosetting polyester powder paint over pretreatment bond coating. Baking process shall comply with coating manufacturer's written instructions. Color to be selected by the architect from manufacturer’s standard colors. Custom color matching available upon request.

1. Baked on polyester powder coat meeting AAMA 2603 requirements.
2. Super-durable powder coat meeting AAMA 2604
3. Kynar baked enamel meeting AAMA 2605 requirements.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installing anchorages, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors, that are to be embedded in concrete as masonry construction. Coordinate delivery of such items to Project site.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections accurately together to form tight, hairline joints.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing handrails and railings. Set handrails and railings accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.

1. Do not weld, cut, or abrade surfaces of handrails and railing components that have been coated or finished after fabrication and are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/4 inch in 12 feet (2 mm in 1 m).
3. Align rails so that variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (2 mm in 1 m).

C. Corrosion Protection: Coat concealed surfaces of the following, that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

D. Adjust handrails and railing systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated but not less than that required by structural loads.

E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing handrails and railings systems and for properly transferring loads to in-place construction.

F. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing handrails and for properly transferring loads to in-place construction. Follow anchor manufacturer’s instructions for installation.

G. Anchoring posts in concrete by means of preset Styrofoam or Steel sleeves into concrete. After posts have been inserted into sleeves, fill space between post and sleeve solid with non-shrink, nonmetallic, cementitious or epoxy grout mixed and placed to comply with anchoring material manufacturer's directions.

H. Anchor posts in concrete by core drilling holes not less than 5" deep and 1" greater than outside diameter of posts. Clean holes of all loose material, insert posts, and fill space between post and concrete with non-shrink, nonmetallic, cementitious or epoxy grout mixed and placed to comply with anchoring material manufacturer's directions.

I. Adjust handrails and railings before anchoring to ensure alignment abutting joint's space posts at interval indicated, but not less than required to achieve structural loads.

J. Glass-Supported Railing Systems: Install assembly to comply with railing manufacturer's instructions to listed tolerances, beginning with attachment of posts to building structure, followed by insertion and connection of factory-fabricated and -assembled glass panels.

3.4 PROTECTION

A. Protect finishes of railing systems and handrails from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at the time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 057300