SECTION 05720 ALUMINUM HANDRAILS AND RAILINGS: SAMPLE SPECIFICATION

1.00 GENERAL

1.01 RELATED DOCUMENTS

A. Architectural Drawings, Site Plans, Landscape Drawings and/or Interior Design Drawings.

1.02 Summary

A. This section includes furnishing and installing all Aluminum Handrails and Guardrails as indicated on drawings and includes Miscellaneous Aluminum Handrails and Guardrails not included in other sections of these specifications, such as Aluminum Pipe Railing Systems, Ornamental Railing Systems, Glass Railing Systems.

1.03 System performance requirements

A. General: In engineering handrail and railing systems to withstand structural loads indicated determine allowable design working stresses of railing materials based on the following:

1. For Aluminum: The Aluminum Association's specification for Aluminum Structures

B. Structural Performance of Handrails and 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, railing 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: 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 horizontally and concurrently with uniform load of 100 lb per linear ft. applied vertically downward.

c. Concentrated load need not be assumed to act concurrently with uniform loads.

2. 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 and uniform loads need not be assumed to act concurrently.

3. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 lb applied to one sq. ft. at any point in the system.

a. Above load need not be assumed to act concurrently with loads on top rails of railing systems in determining stress on guard.

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

contact with incompatible materials.

D. Thermal Movements: Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of handrails and railings to prevent buckling, opening up of joints, overstressing of components, connections and other detrimental effects. Base design calculation on actual surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

1. Temperature Change (Range): 100 deg F ambient; 150 deg F material surfaces.

1.04 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.

2. Submit 6 prints of all shop drawing product data. Also submit calculations if specifically requested by architect.

C. Samples for initial selection purposes in the form of manufacturers color chart showing full range of colors available

from factories standards: Or for custom color request minimum

2" x 2" color chip from customer for color matching purposes.

Then submit at least 2 chips of color match for approval by

architect or owner.

D. Submit at least 2 - 6" long samples of the top rail when its

shape is other than standard rounds, squares or rectangles and

when specifically requested by architect.

1.05 Quality assurance

A. Single Source Responsibility: Obtain handrails and railing

systems from a single fabricator/manufacturer.

B. Engineering Responsibility: Engineer handrailing and railing

systems by the fabricator/manufacturer unless sizes and

configurations are specifically called out on architectural/engineering. drawings.

1.06 Storage

A. Store handrails and railing systems in clean, dry location, away

from uncured concrete and masonry, protected against damage.

1.07 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 delay of 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 architect, owner or contractor.

2.00 Products

2.01 Manufacturers/fabricators

A. Acceptable Manufacturers: Products specified as a standard of quality are fabricated by

White Aluminum Fabrication, Inc.

3195 SE Lionel Terrace

Stuart, FL 34997

Telephone 772-219-3245

2.02 Metals

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, with not less than the strength and durability properties of the alloy and temper designated below for each aluminum form required:

1. Structural extrusions such as posts shall be 6061-T6 or 6005-T5 Alloy/Temper.

2. All other extrusions such as Caps, Pickets, Mid and Bottom Rails shall be at least 6063-T5.

3. Castings: To be high quality prime material or materials remelted from prime extrusion

2.03 Grout and anchoring cement

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged,

nonstaining, noncorrosive, nongaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this Section.

B. Erosion-Resistant Anchoring Cement: Factory-prepackaged, nonshrink, nonstaining, 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 exterior use by manufacturer to be applied by the installer or other qualified contractor or subcontractor.

2.04 WELDING MATERIALS, FASTENERS, AND ANCHORS

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

B. 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 in coastal environments provide fasteners fabricated from stainless steel or aluminum only.

C. 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.

2.05 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 those required to support structural loads.

B. Preassemble railing systems 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 field assembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Assembly shall be in a neat workmanlike manner using M.I.G. or T.I.G. Welding Processes as required. Horizontal Channels shall be punched to receive pickets and welds in this application shall be concealed from view.

1. Channels to receive a snap cover only when specifically required and noted on drawings.

2. All Posts shall be structurally welded to Top Rail and Mid and Lower Horizontal Members to assure fixed fastening for the life of the rail.

3. Corners shall be hairline fitted by mitre and further welded as required to obtain maximum assurance of strength

through the railing's useful life.

4. 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 a 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 expansion and contraction movement. For expansion joints be sure that only one side of the sleeve insert is fastened to the top rail.

5. End connections required to fasten to the building structure require either a welded end clip or a separate slide clip.

6. Provide weep holes when necessary to drain closed sections from pretreatment immersion and sprays also for moisture from condensation to escape.

2.06 Aluminum finishes

A. All aluminum railings to receive a baked-on painted finish over full pretreatment except when specified to be natural or mill finish or when anodizing is specified. Note: Anodizing is not recommended for welded railings due to the likelihood of discoloration from: 1. Dissimilar alloys 2. Dissimilar tempers 3. Oxidation 4. Welding Filler Metals 5. Weld heat zones 6. Marring caused during fabrication and handling

B. Pretreatment Process: A multi-stage pretreatment process is required prior to shop painting.

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 shall then 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

E.S.P. applied thermosetting T.G.I.C. polyester powder paint over pretreatment bond coating. Paint to be 1.5 to 2.0 mills. D.F.T. Paint shall be baked on at approx. 400° F for a minimum of 10 minutes duration.

Specification.

3.00 Execution

3.01 Preparation

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of 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.

3.02 Installation general

A. Fit exposed connections accurately together to form tight, hairline joints, except as required for expansion.

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

1. Set posts plumb within a tolerance of 1/16" to 12".

2. 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 1/32" in 12".

C. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of paint or epoxy.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing handrails and railings to in-place construction.

3.03 Anchoring posts

A. Anchor post in concrete by means of preset sleeves into concrete. After posts have been inserted into sleeves, fill space between post and sleeve solid with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.

B. Anchor posts in concrete by core drilling holes not less that 3"

deep and 1" greater than outside diameter of post. Clean holes of all loose material, insert posts, and fill space between post and concrete with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.

1. Nonshrink, nonmetallic grout.

2. Nonshrink, nonmetallic grout or anchoring cement.

C. Leave anchoring material down approximately 1/2" to allow for final topping with a waterproof material matching the surrounding areas by others. Whenever possible fill hole with waterproof topping slightly higher than the adjacent surfaces and taper and taperaway from the post.

3.04 Cleaning, protection and touch-up painting

A. On delivery all railing will have protective cover over cap only. Immediately upon completion of installation of railing installer shall remove cap cover and clean all work for inspection and approval.

B. After installation the General Contractor or Owner shall be responsible for protecting the railings during the balance of construction.

C. Painted aluminum surfaces shall be cleaned with plain water containing a mild soap or detergent. No abrasive agents or harsh chemicals are to be used.

Note: All railings require periodic maintenance. All railing surfaces require periodic washing especially those subject to ocean salt air

or harmful chemical environments. Waxing after washing is recommended.

END OF SECTION