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- (1) Products specified by product name, or a specific manufacturing processes and/or specific to "No Substitutions Allowed" are proprietary, sole source and unique to Mullet's Aluminum Products, Inc. and will be hereafter referred to as Proprietary Mullet's Aluminum Products.
- a) You are expressly forbidden from using any substituting products along with any Proprietary Mullet's Aluminum Products without the express written consent of Mullet's Aluminum Products, Inc.
  - b) Any use of Proprietary Mullet's Aluminum Products without the express written consent of Mullet's Aluminum Products, Inc. is strictly prohibited.
  - c) Mullet's Aluminum Products, Inc. shall pursue all legal remedies available to enforce all unauthorized use of Proprietary Mullet's Aluminum Products.
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# SECTION 05 73 10 – CABLE RAIL SYSTEMS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. Section Includes:

- 1. Mullet's Aluminum Products, Inc. Cable Rail System "CBRS-100".
- 2. Mullet's Aluminum Products, Inc. Cable Rail System "CBRS-200".

- B. Related Sections:

- 1. Division 05 Sections for aluminum tube railings included with metal stairs or ornamental metals.
- 2. Division 05 Section 05 73 10 for Cable Rail System.

### 1.3 DEFINITIONS

- A. Aluminum guardrail with stainless-steel, wire-rope infill assembly.

### 1.4 PERFORMANCE REQUIREMENTS

- A. General: Engineer, fabricate and install guardrails and cable assembly to withstand structural loads required by applicable codes.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

### 1.5 SUBMITTALS

(Specifier Note: Revise or delete reference to submittals requirement as determined by Project Requirements.)

- A. Submit under provisions of Division 1 – General Requirements for Submittals.

B. Product Data:

1. Manufacturer's specifications and installation instructions for standard components for each product type specified.
2. Include sealed drawings by Registered Engineer responsible for structural design of guardrail and cable rail assembly.
3. Grout, anchoring cement, and paint products.

C. LEED Submittals:

1. Product Data for Credit MR 4.1[ and Credit MR 4.2]: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating costs for each product having recycled content.

D. Shop Drawings: Include profiles, sizes, plans, elevations, sections, anchorage, details, type of fasteners, finishes, accessories and connection attachments to other work.

E. No substitutions permitted.

F. Samples: For products involving selection of color and texture.

G. Welding certificates.

H. Mill Certificates: Signed by manufacturers of stainless-steel and aluminum products certifying that products comply with requirements.

(Specifier Note: Delete paragraph below if verification sample submittal not required.)

I. Verification Samples: For connections and terminations used, one full sized sample of each. For type of cable used, 12 inches (304mm) long sample, representing actual product.

## 1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

B. Railing Installer: Experienced in performing work of this section and specialized in installation of similar work required for this project.

1. Qualifications: As approved in writing by railing manufacturer.

C. Pre-Installation Meetings: Conduct pre-installation meetings to verify project requirements, substrate conditions, installation instructions and warranty requirements.

## 1.7 REFERENCE STANDARDS

A. American Architectural and Manufacturers Association (AAMA):

1. AAMA 2604-02 – Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings and Aluminum Extrusions and Panels.
2. AAMA 2604 – Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings and Aluminum Extrusions and Panels.



3. AAMA 2605 – Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings and Aluminum Extrusions and Panels.

B. American Society for Testing and Materials (ASTM):

1. ASTM A492 – Standard Specification for Stainless Steel Rope Wire.
2. ASTM A555/A555M – Standards Specification for General Requirements for Stainless Steel Wire and Wire Rods.
3. ASTM A666 – Standard Specifications for Annealed or Cold-Worked Authentic Stainless Steel Sheet, Strip and Flat Bar.
4. ASTM E985 – Standard Specification for Permanent Metal Railing Systems and Rails Systems and Rails for Buildings.
5. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
6. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.

### 1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate typical measurements on Shop Drawings.

### 1.9 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings, cable, trim ends and posts. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not suit structural performance requirements.

### 1.10 WARRANTY

- A. Manufacturer's Warranty: Furnish railing and cable assembly manufacturer's standard limited warranty document executed by an authorized company official. Manufacturer's warranty is in addition to and not a limitation of other rights Owner may have under the contract documents.

(Specifier Note: Select Warranty years as determined by AAMA Standard selected)

- B. Railing and Cable Assembly Warranty: One (1), Three (3) or Five (5) years commencing on Date of substantial completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

- A. Drawings and Specifications based on products manufactured:

1. Mullet's Aluminum Products, Inc.  
905 Ponder Ave.  
Sarasota, FL 34232  
1.877.685.5387  
www.mulletsaluminum.com

## 2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

## 2.3 ALUMINUM

- A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
- B. Extruded Bars and Shapes, Including Extruded Tubing: ASTM B 221 (ASTM B 221M), Alloy 6063-T52, 6061-T6 or 6005-T5.
- C. Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6 or 5052-H32 or 3003-H14.
- D. Die Sand Cast: ASTM B 247 (ASTM B 247M). Alloy 356/Marine Grade Alloy 535 or 514.
- E. Hand Forgings: ASTM B 209 (ASTM B 209M), Alloy 6063-T52

## 2.4 CABLE AND CABLE ASSEMBLIES

- A. Stainless Steel Wire Rope and Fittings: ASTM A 492, Type 316.
- B. Cable Materials:
  - 1. Wire Strand: 7-by-19.
    - a. 3/16 inch (5mm) diameter, 3,450 psi (23,786 kPa) minimum breaking strength, unless noted otherwise.
  - 2. Wire-Rope Fittings: Connectors of types indicated, fabricated from stainless steel, and with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.
  - 3. Stud Tensioning Internal Adjuster: stainless-steel, 1/4-28 UNF thread (b), open length 2.500, closed length 1.750, 3/16 inch stainless-steel wire.
- C. Top Cap: Aluminum, fully welded 2 inches wide by approximately 1-1/2 inches with 1/2-inch radius top.

(Specifier Note: Custom top cap profiles available from manufacturer.)

## 2.5 ALUMINUM FINISH

(Specifier Note: Select high performance coating below to suit project requirements.)

- A. Modified Polyester Powder Coat Finish meeting AAMA 2604 with minimum dry film thickness of 1.5 mils (0.059 inch). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying baking finish. Applicator may use chrome or non-chrome chemical conversion coating pretreatment process complying with AAMA 2604. (5 year finish warranty)
- B. Seventy percent Fluoropolymer Thermosetting Resin Powder Coat Finish meeting AAMA 2605 with minimum dry film thickness of 1.5 mils (0.059 inch). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying baked finish. Applicator may use chrome or non-chrome chemical conversion coating pretreatment process complying with AAMA 2605. (10 year finish warranty)



- C. One-hundred percent Fluoropolymer Thermosetting Resin Powder Coat Finish meeting AAMA 2605 with minimum dry film thickness of 1.5 mils (0.059 inch). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying baked finish. Applicator must use chrome chemical conversion coating pretreatment process complying with AAMA 2605. (15 year finish warranty)
- D. Seventy percent Duranar XL Coating System - Kynar Finish meeting AAMA 2605 and minimum dry film thickness of 1.5 mils (0.059 inch) Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying baked finish. Applicator must use chrome chemical conversion coating pretreatment process in complying with AAMA 2605. (15 year finish warranty)
- E. Color and Gloss: As indicated by manufacturer's designations.
- F. No substitution will be considered.
- G. Finish Warranty:
  - 1. Five (5), Ten (10), Fifteen (15) years.

## **2.6 ALUMINUM WELDING**

- A. TIG: (Tungsten Inert Gas) Process.
- B. Exposed welds finish matching frame color where practical.
- C. Weld Type: Tight, clean, no slag or splatter weld.
- D. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- E. Completely sanded joint, if requested, some undercutting and pinholes okay.

## **2.7 FASTENERS**

- A. Fastener Materials: Unless otherwise indicated, provide the following:
  - 1. Aluminum Components: Stainless-steel fasteners.
  - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).
- B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

## **2.8 MISCELLANEOUS MATERIALS**

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

## **2.9 FABRICATION**

- A. General: Fabricate railings and cable assemblies complying with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

- B. Assemble railings and cable assemblies 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.
- C. Make up wire-robe for cable supported railing assemblies in shop to field-measured dimensions with fittings machine swaged. Minimize amount of turnbuckle take-up used for dimensional adjustment so maximum amount available for tensioning wire ropes. Tag wire-robe assemblies and fittings to identify installation locations and orientations for coordinated installation.
- D. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- E. Form work true to line and level with accurate angles and surfaces.
- F. Fabricate connections exposed to weather in manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- G. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- H. Connections: Fabricate railings with welded connections unless otherwise indicated.
- I. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld around all connections, including at fittings.
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
- J. Bend members in jigs to produce uniform curvature for each configuration required.
- K. Close exposed ends of hollow 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 rail and wall is 1/2 inch (12 mm) or less.
- M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
  - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
  - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
  - 2. Set posts plumb within a tolerance of 1/8 inch in 3 feet (3 mm in 1 m).
  - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).
- B. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.
- E. Tension cables as recommended by cable fittings manufacturer.

### 3.2 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches (50 mm) beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches (150 mm) of post.

### 3.3 ANCHORING POSTS

- A. Form or core-drill holes not less than 3 inches (75 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Leave anchorage joint exposed with 1/8-inch (3-mm) buildup, sloped away from post.
  - 1. For aluminum railings, attach posts as indicated using fittings designed and engineered for this purpose.

### 3.4 ATTACHING RAILINGS

- A. Anchor railing ends to concrete and masonry with brackets on underside of rails connected to railing ends and anchored to wall construction with anchors and bolts.
- B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends.
- C. Attach handrails to walls with wall brackets except where end flanges are used. Provide brackets with minimum 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
  - 1. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

D. Secure wall brackets and railing end flanges to building construction as approved by Engineer.

### **3.5 CLEANING AND TOUCH-UP PAINTING**

A. Clean aluminum with mild, non-abrasive soap and water, using a soft sponge. Rinse with fresh water to remove residual soap.

1. Avoid using dry sponge which may scratch the surface.
2. Remove contaminants as soon as possible, as sun exposure and heat makes it more difficult to remove.
3. Do not use certain household cleaners, abrasive agents, harsh chemicals, strong solvents, acids, steel wool and industrial cleaners which can cause damage and discoloration to finish.
4. Always test a small, inconspicuous area before applying any product to aluminum products.

B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material used for shop painting complying with manufacturer's recommendations for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

### **3.6 PROTECTION**

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

B. Restore finishes damaged during installation and construction period so 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 05 73 10**