



## SECTION 05 7353

### PERFORATED PANEL RAILING SYSTEM

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Mullet's Aluminum Products Inc. "PRS-200" Perforated Panel Railing System.
- B. Description:
  - 1 Perforated Panel Railing Assembly System: Typical allowable vertical aluminum posts meets the structural span design supported with rectangular support posts, perforated panel infill system arranged in pattern shown, centered on posts glazed in perimeter channel, multiple choice of top caps, rectangular top horizontal rail attached to perforated pattern, bottom rail space of 2 inches above grade. Anchor railing posts assembly at base in concrete block-out filled with hard rok grout, or anchor assembly with base plate attached concrete, seal around posts with urethane sealant.
  - 2 Additional railing information described on Mullet's Aluminum Products, Inc. web page for Shop Drawings <http://www.mulletsaluminum.com/mullets-divisions/railing-gates>

##### 1.02 RELATED REQUIREMENTS

- A. Drawings and General Provisions of the Contract, including General Requirements and Supplementary Conditions and Division 01, Specifications Sections apply to this Section.

##### 1.03 RELATED REQUIREMENTS

- A. Division 05 - Sections for Aluminum tube railings including railing connected with metal stairs and ornamental metals.
- B. Section 05 7313 - Aluminum Vertical Picket Railing System "VRS - 100".
- C. Section 05 7314 - Aluminum Vertical Picket Railing System "VRS - 200".
- D. Section 05 7315 - Aluminum Vertical Picket Railing System "VRS - 300".
- E. Section 05 7320 - Aluminum Horizontal Picket Guardrail System "HRS - 100".
- F. Section 05 7321 - Aluminum Horizontal Picket Guardrail System "HRS - 200".
- G. Section 05 7322 - Aluminum Horizontal Picket Guardrail System "HRS - 300".
- H. Section 05 7323 - Aluminum Horizontal Picket Guardrail System "HRS - 400".
- I. Section 05 7324 - Aluminum Horizontal Picket Guardrail System "HRS - 500".
- J. Section 05 7325 - Glass Supported Railing System "GRS - 100".
- K. Section 05 7326 - Glass Supported Railing System "GRS - 200".
- L. Section 05 7327 - Glass Supported Railing System "GRS - 300".
- M. Section 05 7328 - Glass Supported Railing System "GRS - 400".
- N. Section 05 7330 - Cable Railing System "CBRS - 100".
- O. Section 05 7331 - Cable Railing System "CBRS - 200".
- P. Section 05 7332 - Cable Railing System "CBRS - 300".
- Q. Section 05 7340 - Decorative Railing System "DRS - 100".
- R. Section 05 7341 - Decorative Railing System "DRS - 200".
- S. Section 05 7350 - Mesh Railing Assembly "MRS - 100".
- T. Section 05 7351 - Mesh Railing Assembly "MRS - 200".
- U. Section 05 7352 - Perforated Panel Railing System "PRS - 100".

#### 1.04 DEFINITIONS

- A. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas, pedestrian guidance and support, visual separation, or wall protection.

#### 1.05 PERFORMANCE REQUIREMENTS

- A. General: Engineer, fabricate and install handrails, guardrails and railing systems 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.
- D. Structural Performance: Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors, and connections:
  - 1. Railing: Conform to local and state codes requirements including the following:
    - a. IBC - International Building Code.
    - b. ADAAG.
    - c. FBC – Florida Building Code.
    - d. ASCE – American Society of Civil Engineers.
- E. Loads on handrails, guards, grab bars, seats and vehicle barriers:
  - 1. Handrails, guards, grab bars, accessible seats, accessible benches and vehicle barriers
    - a. designed and constructed for the structural loading conditions set forth in this section according to 1607.8.1 Handrails and guards.
  - 2. Design handrails and guards to resist linear load of 50 pounds per linear foot:
    - a. (plf) (0.73 kN/m) in accordance with Section 4.5.1 of ASCE 7. Glass handrail assemblies and guards comply with Section 2407.
  - 3. Exceptions:
    - a. For one - and two-family dwellings, only the single concentrated load required by Section 1607.8.1.1 applied.
    - b. In Group I-3, F, H and S occupancies, for areas not accessible to the general public and that have an occupant load less than 50, minimum load of 20 pounds per foot (0.29 kN/m).1607.8.1.1 Concentrated load.
  - 4. Handrails and guards designed to resist concentrated load of 200 pounds (0.89kN) in accordance with Section 4.5.1 of ASCE 7.1607.8.1.2 Intermediate rails
  - 5. Intermediate rails (all those except the handrail), balusters and panel fillers designed to resist concentrated load of 50 pounds (0.22 kN) in accordance with Section 4.5.1. of ASCE-7.

#### 1.06 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- E. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

- G. ASTM C247, Alloy 6063-T52, 6061-T6 or 6005-T5, Die and Hand Forgings.

### **1.07 SUBMITTALS**

- A. Product Data for the following:
  - 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 system for state, local and other approved regulatory certifications.
  - 3. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, and accessories.
  - 1. Show actual field measurements on shop drawings.
  - 2. Differentiate between shop and field fabrication.
  - 3. Indicate substrates and adjacent work with which the fabrications must be coordinated.
  - 4. Include large-scale details of anchorages and connecting elements.
- C. Verification Samples: For each finish product specified, minimum size 12 inches (305 mm) square, representing actual product in color and texture.
- D. Installer's Qualification Statement.
- E. No substitutions permitted.
- F. Maintenance Data: Care of finishes and warranty requirements.
- G. Welding certifications.

### **1.08 QUALITY ASSURANCE**

- A. Welding qualifications: Qualify procedures and personnel according to AWS D1.2/D1.2M Structural Welding Code - Aluminum.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section.
  - 1. With minimum 5 years of documented experience.
  - 2. Approved by fabricator.
  - 3. Submit contact names and phone numbers for at least three references connected with successful past projects.
- C. Mock-Up: Provide a mock-up for evaluation of fabrication workmanship.
  - 1. Locate where directed.
  - 2. Provide products finished as specified.
  - 3. Mock-up may remain as part of the Work.
- D. Pre-Installation Meetings: Conduct pre-installation meetings to verify project requirements, substrate conditions, installation instructions and warranty requirements.

### **1.09 FIELD 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

### **1.10 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
  - 1. Protect finishes by applying heavy duty removable plastic film during production.
  - 2. Package for protection against transportation damage.
  - 3. Provide markings to identify components consistently with drawings.
  - 4. Exercise care in unloading, storing and installing panels to prevent bending, warping, twisting and surface damage.

- B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
  - 1. Store in well ventilated space out of direct sunlight.
  - 2. Protect from moisture and condensation with tarpaulins or other suitable weather tight covering installed to provide ventilation.
  - 3. Store at a slope to ensure positive drainage of any accumulated water.
  - 4. Do not store in any enclosed space where ambient temperature can exceed 120 degrees F (49 degrees C).
  - 5. Avoid contact with any other materials that might cause staining, denting, or other surface damage.

### **1.11 WARRANTY**

- A. Manufacturer's Warranty: Furnish railing 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.
- B. Railings Warranty: One (1), Three (3) and Five (5) years commencing on Date of substantial completion. Longer durations may be applicable, contact manufacturer for more information.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURER**

- A. Drawings and Specifications based on products manufactured.
  - 1. Mullet's Aluminum Products, Inc.
  - 2. 6345 McIntosh Road.
  - 3. Sarasota, FL 34238.
  - 4. 1.877.685.5387.
    - a. [www.mulletsaluminum.com](http://www.mulletsaluminum.com).
- B. Reference Documents: Manufacturers detail drawings available on website.

### **2.02 GENERAL**

- A. Aluminum 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.
  - 1. Provide extruded-aluminum brackets with interlocking pieces that conceal anchorage. Locate set screws on bottom of bracket.

### **2.03 ALUMINUM**

- A. Aluminum, General: Provide alloy and temper required by aluminum evaluating engineer 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 specified.
- B. Extruded Bars and Shapes, Including Extruded Tubing: ASTM B 221 (ASTM B 221M), Alloy 6063-T52, 6061-T6 or 6005-T5
- C. Plate, Bar and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6063-T52, 6061-T6 or 6005-T5 6063-T5, 3003-H-14, and 5052-H32.
- D. Die and Hand Forgings: ASTM B 247 (ASTM B 247M), Alloy 6063-T52, 6063-T5, 6061-T6 or 6005-T5. and 6061 T6511.
- E. Color and Gloss: As indicated by finish applicators designations.
- F. No substitutions considered.

### **2.04 FABRICATIONS - GENERAL**

- A. Shop Assembly: Preassemble items to greatest extent possible. Minimize field splices and field assembly. Disassemble only as necessary for transportation and handling. Mark items clearly for assembly and installation.
- B. Coordination: Match dimensions and attachment of items to adjacent construction. Produce integrated assemblies. Closely fit joints; align edges and flat surfaces unless indicated otherwise.

- C. Supports: Miscellaneous framing, mounting, clips, sleeves, fasteners and accessories required for installation.
- D. Welding and Brazing: Weld or braze joints continuously. Grind, fill or dress to produce smooth, flush, exposed surfaces. Do not discolor metal. Grind smooth, polish, and restore damaged finishes to required condition.
- E. Performance Requirements:
  - 1. Thermal Movements:
    - a. Allow for thermal movements in exterior metal fabrications due to temperature changes. Prevent buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
    - b. Temperature Change Range: 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C), on material surfaces.
  - 2. Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

## 2.05 MATERIALS

- A. General: Provide sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections exposed to view on finished units.
- B. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15 mil (0.4 mm) dry film thickness per coat.

## 2.06 FINISHES

- 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. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 50 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- 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. (10 year finish warranty).
- E. Color and Gloss: As indicated by manufacturer's designations.
  - 1. Class II: Color Anodized Finish: AAMA 611 AA-M12C22A32 Integrally colored anodic coating not less than 0.4 mils (0.01 mm) thick.
  - 2. Color: As selected by Architect.
- F. No substitution will be considered.
- G. Finish Warranty:
  - 1. Five (5) or (10) years.
  - 2. Manufacturer's Finish Warranty: Provide manufacturer's written warranty stating that the finish will perform as follows for minimum of 5 years:
    - a. Chalking: No more than that represented by a No. 8 rating based on ASTM D4214.
    - b. Color Retention: No fading or color change in excess of 5 Hunter color difference units, calculated in accordance with ASTM D2244
    - c. Gloss Retention: Minimum of 30 percent gloss retention, when tested in accordance with ASTM D523.
  - 3. "MAPI" "Cleaning and Maintenance Guide" available on request .

## **2.07 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. Weld Size: As determined by AWS Standards.
- E. Welding Rods and Bare Electrodes: Select according to AWS specifications for aluminum alloy welded.
- F. Some undercutting and pin holes okay.

## **2.08 FASTENERS**

- A. Fastener Materials: Unless otherwise indicated, provide the following:
  - 1. Aluminum Components: Stainless-steel fasteners.
- 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.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action with permanent separation as recommended by railing manufacturer

## **2.09 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.

## **2.10 FABRICATION**

- A. General: Fabricate railings to comply 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 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. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated."
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at 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.
  - 3. Remove flux immediately.
- I. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- J. Close exposed ends of hollow railing members with prefabricated end fittings.
- K. 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 1/4 inch (6 mm) or less.

- L. 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.
- M. 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**

### **3.01 EXAMINATION**

- A. Verify dimensions, tolerances, and interfaces with other work.
- B. Verify substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed with erection until unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Protect adjacent work areas and finish surfaces from damage during installation.
- B. Deliver anchorage items to be cast into concrete or built into masonry to appropriate installer(s) together with setting templates.
- C. Coat concrete and masonry surfaces that will be in contact with metal surfaces with bituminous coating or Architect approved coating .

### **3.03 INSTALLATION - GENERAL**

- A. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
  - 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 with other means without further cutting or fitting.
  - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 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. Adjust railings before anchoring to ensure matching alignment at abutting joints
- C. Use concealed anchorages where possible. Provide washers where needed on bolts or screws to protect metal surfaces and make weathertight connection.
- 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. Corrosion Protection: Apply permanent separation materials on concealed surfaces where metals would otherwise be in direct contact with incompatible substrate materials. Prevent corrosion damage to material and finish.

### **3.04 RAILING CONNECTIONS**

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections as specified in this paragraph "Fabrication" Article 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.
- C. Replace damaged products.

### **3.05 ANCHORING POSTS**

- A. Form or core-drill holes not less than 3 inches (75 mm) deep and 3/4 inch (20 mm) larger than O.D. 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.
- C. For Aluminum Horizontal Picket Railings, attach posts as indicated using fittings designed and engineered for this purpose

### **3.06 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 2-1/4-inch (38-mm) clearance from inside face of handrail and finished wall surface.
  - 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 designed by Engineer.

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

- A. Clean aluminum with mild, non-abrasive soap and water, using soft sponge. Rinse with fresh water to remove residual soap.
  - 1. Avoid using dry sponge which may scratch the surface.
    - a. Remove contaminates as soon as possible, as sun exposure and heat make it more difficult to remove.
    - b. 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.
    - c. Always test a small, inconspicuous area before applying any product to Aluminum products.
  - 2. In coastal areas where finish exposed to salt spray or areas containing heavy industrial pollutants, cleaning place minimum six times per year. Give added attention to recessed and sheltered area that usually become more heavily soiled due to lack of maintenance.
- B. Touchup Coatings: Immediately after installation, clean field welds, bolted connections, and abraded areas of shop coating, and exposed areas with the same material as used for shop coating to comply with manufacturer's recommendations for touching up shop-applied to surfaces.
  - 1. Apply by brush or spray to provide minimum 2.0-mil (0.05-mm) dry film thickness. as recommended by coating manufacturer.
- C. Restore finishes damaged during installation and construction period. Return items that cannot be refinished in the field to manufacturer or fabricator. Refinish entire unit or provide new units

### **3.08 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.

**END OF SECTION 05 7352**