



**SECTION 05 7351  
MESH RAILING SYSTEM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Mullet's Aluminum Products Inc. "MRS-200" Mesh Railing System.
- B. Description:
  - 1 Mesh Railing Assembly System: Typical allowable vertical aluminum posts meets the structural span design supported with rectangular support posts, square mesh panel infill system arranged in pattern shown, centered on posts glazed in mesh channel, multiple choice of top caps, 3-3/4 inch space above rectangular top horizontal rail attached to mesh pattern , bottom rail space of 2 inches above grade. Anchor railing posts assembly at base in concrete block-out filled with hard rock grout, or anchor assembly with base plate to 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 DOCUMENTS**

- 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 REFERENCE 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 System "MRS - 100".
- T. Section 05 7352 - Perforated Panel Railing System "PRS - 100".
- U. Section 05 7353 - Perforated Panel Railing System “PRS - 200”.

#### **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 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ASTM A276/A276M - Standard Specification for Aluminum Bars and Shapes; 2017.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014, with Editorial Revision (2017).
- E. ASTM A554 - Standard Specification for Welded Aluminum Mechanical Tubing; 2016.
- F. ASTM A555/A555M - Standard Specification for General Requirements for Aluminum Wire and Wire Rods; 2016.

- G. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Aluminum Sheet, Strip, Plate, and Flat Bar; 2015.
- H. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- K. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013, with Editorial Revision.
- L. AWS D1.2/D1.2M - Structural Welding Code - Aluminum ; 2014.

#### **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 PROJECT CONDITIONS**

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

## **1.10 COORDINATION AND SCHEDULING**

- A. Coordinate installation of anchorages for railings. Furnish shop drawings, and templates ( as necessary), for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, 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

## **1.11 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in factory provided protective coverings and packaging.
- B. Protect materials against damage during transit, delivery, storage, and installation at site.
- C. Inspect 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. Prior to installation, store materials and components under cover, in a dry location.

## **1.12 WARRANTY**

- A. Warranty: 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. 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.mulleisaluminum.com](http://www.mulleisaluminum.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.

## **RAILING SYSTEMS**

- A. Railing Systems - General: Factory- or shop-fabricated in design indicated, to suit specific project conditions, and for proper connection to building structure, and in largest practical sizes for delivery to site.
  - 1. Performance Requirements: Design and fabricate railings and anchorages to resist the following loads without failure, unless more stringent required by local and state authorities, damage or permanent set; loads do not need to be applied simultaneously.
    - a. Lateral Force: 75 lb (333 N) minimum, at any point, when tested in accordance with ASTM E935.
    - b. Distributed Load: 50 lb/ft (0.73 kN per m) minimum, applied in any direction at the top of the handrail, when tested in accordance with ASTM E935.
    - c. Concentrated Loads on Intermediate Rails: 50 psf (0.22 kgs per sq m), minimum.
    - d. Concentrated Load: 200 lbs (888 N) minimum, applied in any direction at any point along the handrail system, when tested in accordance with ASTM E935.
    - e. Handrails: Comply with applicable accessibility requirements of ADA Standards.
  - 2. Assembly: Join lengths, seal open ends, and conceal exposed mounting bolts and nuts using slip-on non-weld mechanical fittings, flanges, escutcheons, and wall brackets.
  - 3. Joints: Tightly fitted and secured, machined smooth with hairline seams.

4. Field Connections: Provide sleeves to accommodate site assembly and installation.
5. Welded and Brazed Joints: Make exposed joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.
  - a. Ease exposed edges to small uniform radius.
  - b. Welded Joints:
    - 1) Aluminum: Perform welding in accordance with AWS D1.6/D1.6M.
- B. Structural Railing System: Registered Engineer point-supported railing system.
  1. Configuration: Guardrail with separate top cap and top horizontal railing.
  2. Top and Bottom Horizontal Rail: 2 inch (51 mm) x 1 inch (25mm) radius edges.

### **2.03 MATERIALS**

- A. Aluminum Components: ASTM B221 or ASTM B221M.
  1. Square Tubes: Schedule 40 pipe, unless noted otherwise.

### **2.04 ACCESSORIES**

- A. Non-Weld Mechanical Fittings for Aluminum Railings: 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. Non-Weld Mechanical Fittings for Aluminum Railings: In-line aluminum fittings, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; joints and seams ground smooth.
- D. Anchors and Fasteners: 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.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate and site conditions acceptable and ready to receive work.
- B. Verify field dimensions of locations and areas to receive work.
- C. Notify fabricator immediately of conditions that would prevent satisfactory installation.
- D. Do not proceed with work until detrimental conditions have been corrected.
- E. Furnish components to be installed in other work to installer of that other work, including but not limited to blocking, sleeves, inserts, anchor bolts, embedded plates and supports for attachment of anchors.

### **3.02 PREPARATION**

- A. Review installation drawings before beginning installation. Coordinate diagrams, templates, instructions and directions for installation of anchorages and fasteners.
- B. Clean surfaces to receive units. Remove materials and substances detrimental to the installation.

### **3.03 INSTALLATION**

- A. Comply with manufacturer's drawings and written instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects and with tight joints, except where necessary for expansion.
- C. Anchor securely to structure.
- D. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- E. Weld connections that cannot be shop welded due to size limitations.
  1. Weld in accordance with AWS D1.1/D1.1M.
  2. Match shop welding and bolting.
  3. Clean welds, bolted connections and abraded areas.

4. Touch up shop primer and factory applied finishes.
  5. Repair galvanizing with galvanizing repair paint per ASTM A780/A780M.
- F. Isolate dissimilar materials with bituminous coating, bushings, grommets or washers to prevent electrolytic corrosion.

#### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.
- 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. Field Services: Provide the services of the manufacturer for field observation of installation of railings.

#### **3.06 CLEANING**

- A. Remove protective film from exposed metal surfaces.
- B. Clean exposed aluminum finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents or other substances that may damage the material or finish.

#### **3.07 PROTECTION**

- A. Protect installed components and finishes from damage after installation.
- B. Repair damage to exposed finishes to be indistinguishable from undamaged areas.
  1. If damage to finishes and components cannot be repaired to be indistinguishable from undamaged finishes and components, replace damaged items.

**END OF SECTION 05 7350**