

ULTRALOX ALUMINUM RAILING

SECTION 05721 ORNAMENTAL ALUMINUM HANDRAILS AND RAILINGS

****NOTE TO SPECIFIER**** UltraLox, provides aluminum railing and fencing through a nationwide dealer network. Railing and Fence products are produced by the patented UltraLox Interlocking machine.

This section is based on Aluminum Handrails and Railings manufactured by the UltraLox Interlocking machine, which has dealers located at the following addresses:

UltraLox
2910 Waters Rd.
Eagan, MN 55121
Tel: (855) 742-7245
E-Mail: info@ultralox.com
URL: www.ultralox.com

Pro Deck Supply
Mpls, MN 55413
www.prodecksupply.com

Capital Aluminum & Vinyl Solutions
Halethorpe, MD
www.capitalrailing.com

Phoenix Manufacturing, Inc.
Ocean Twp, NJ 07712
www.pvcrails.com

Railing Pro, Inc.
Exeter, RI 02822
www.railingpro.com

Vision Outdoor Products
Woodridge, ON L4H0S7
www.visionoutdoorproducts.com

Rolling Ridge Deck & Home, Inc.
Evergreen, CO 80439
www.rollingridgedeck.com

UltraLox aluminum railing systems are pre-engineered for use on new construction and remodeling, residential or commercial projects. The systems' infill areas accommodate balusters (pickets) or tempered safety glass. Components are versatile and interchangeable for varying site conditions. Aluminum components are coated with a durable powder-coated finish and are available in the manufactures standard and custom colors. Custom fabrication is also available. UltraLox products are pre-engineered to meet rigid North American building code requirements.

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UltraLox markets aluminum railings and railing related products relating to:

- [05} Metals**
- [05500] Metal Fabrication**
- [05520] Handrails and Railings**
- [05521] Aluminum handrails and Railings**
- [05522] Glass Railings**
- [05700] Ornamental Metals**
- [05720] Ornamental Handrails and railings**
- [05730] Ornamental Formed Metal**

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Component type ornamental aluminum handrails, guardrails, and railing systems, including connectors, fasteners, and required accessories.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Handrails and railings shall withstand structural loading as determined by allowable design working stresses of material based on following standards.
 1. As per ICC-ES AC 273 with reference to the 2012 International building code, Section 1607.7.7.1, Handrails and Guards

B. Structural Performance: Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stress of material for the handrails, railings, anchors and connections.

C. IN-FILL LOAD TEST

1. A load consisting of 200 lbf over a 1 sq. ft. normal to the infill in a worst case scenario.

D. UNIFORM LOAD TEST

1. The top rail of the system subjected to a single test where a maximum uniform load of 125 lbf/ft applied vertical and in an outward direction at a 45° angle from the horizontal plane.

E. CONCENTRATED LOAD TEST

1. The top rail and the structural supported post subjected to a concentrated load of 500 lbf applied at the following locations:

- Horizontal at the center of the guardrail
- Horizontal at the top of support post (42" above surface of deck)

1.3 REFERENCES

- A. ANSI/CABO A117.1 – American National Standard for Building and Facilities; Providing Accessible and Usable Buildings and Facilities, Council of American Building Officials.
- B. ASTM B 221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- C. ASTM E 935 – Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for buildings.
- D. ASTM E 985 – Specification for Permanent Metal Railing and Rails for Buildings.
- E. ASTM E 894 – Anchorage of Permanent Metal Railing Systems and Rails for buildings.
- F. ANSI Z 97.1 – Glazing Materials used in Building Safety Performance Specifications and Method of Test.
- G. ICC-ES AC273 “Acceptance Criteria for Handrails and Guards” (AC273 February 2008)
- H. IBC – International Building Code – 2012, 2009 & 2006, Section 1607.7
- I. AAMA 2604-98 Voluntary, Performance Requirements and test procedures for high performance organic coatings on aluminum extrusions and panels
- J. AAMA 2605-98 Voluntary, Performance Requirements and test procedures for high performance organic coating on aluminum extrusions and panels
- K. Florida Building Code (FBC) Including High Velocity Hurricane Zone (HVHZ) for Colonial and Victorian Series; Excluding High Velocity Hurricane Zone (HVHZ) for Mission Series

1.4 **DESIGN REQUIREMENTS**

****NOTE TO SPECIFIER**** Delete items below not required for project.

- a. Design, fabricate and install handrail and railing systems in accordance with ASTM E 985 for structural performance based on testing performed in accordance with ASTM E 894 and E 935.
- b. Railing assembly and attachments shall be capable of resisting the following loads:

1. Top Rail

- a. Concentrated load of 200 lbs. at any point in any direction in accordance with 1607.7.1.1 of IBC. Concentrated load of 200 lbs. applied at any point in any direction.
- b. Concentrated load need not be assumed to act concurrently with uniform loads.

2. Handrails not serving as top rails

- a. Concentrated load of 200 lbs. applied in any direction in accordance with 1607.7.1.1 of IBC

- b. Uniform load of 50 lbs. per linear foot applied in any direction in accordance with 1607.7.1.1 of IBC.
- c. Concentrated load need not be assumed to act concurrently with uniform loads.
- d. Other _____

3. Infill area of guardrail system

- a. Capable of withstanding a horizontal load of 50 lbs. applied to one square foot at any point in the system in accordance with 1607.7.1.2 of IBC.
- b. Load is not to be assumed to act concurrently with loads on top rails of railing systems in determining stress on guards.
- c. The required safety factor for glass used in handrails and guards is 4 in accordance with 2407.11 of IBC.
- d. The required safety factor for assemblies is 2.5 in accordance with 1714.3.1 of IBC.
- e. Other _____

1.5 SUBMITTALS

****NOTE TO SPECIFIER** Delete items below not required for project.**

- a. Submit under provisions of Section 01300.
- b. Product Data: Submit manufacturer's product data for each product required, including installation requirements.
- c. Shop Drawings: Provide complete details of entire railing system showing layout, components, fasteners and anchors.
- d. Selection samples: Color charts consisting of two complete sets of color chips representing manufacturer's full range of available finishes, and colors for initial color selection.
- e. Verification Samples:
 - 1. 12" long baluster (picket) railing assembly in color specified
 - 2. 12" long glass railing assembly in color specified
 - 3. Other: _____
- f. Provide independent test reports supporting load test requirements.
- g. Other _____

1.6 QUALITY ASSURANCE

****NOTE TO SPECIFIER** Include a mock-up if the project size and / or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified.**

- A. Mock-Up: Provide mock-up using acceptable products and manufacturer approved installation methods. Verify owner and architect's acceptance of finish color and workmanship standard.
 - 1. Install one railing section of each type required: Location and quantity of mock-up shall be approved by the Architect.
 - 2. Maintenance: Maintain mock-up during construction for workmanship comparison.

****NOTE TO SPECIFIER** Delete one of the following two choices for final disposition of mock-up. Incorporation requires.**

- 3. Removal: Remove and legally dispose of mock-up when no longer needed.
- 4. Incorporation: Incorporate mock-up into final construction

1.7 STORAGE AND PROTECTION

- a. Store material protected from exposure in a dry, clean location away from uncured concrete, masonry, mortar, stucco and painting operations.

1.8 PROJECT CONDITIONS

- a. Verify actual dimensions by field measurement before fabrication.

****NOTE TO SPECIFIER:** CAUTION! Where field measurements cannot be made without delaying work, the manufacturer will require guaranteed dimensions from the contractor in writing prior to proceeding with fabrication.**
- b. Coordinate field measurements and fabrication schedules with construction progress to avoid delays.

PART 2 PRODUCTS

2.1 MANUFACTURERS

a. Acceptable Manufacturer UltraLox, 2910 Waters Rd., Eagan, MN 55121, Tel. (855) 742-7245; E-Mail: info@ultralox.com web site: www.ultralox.com

****NOTE TO SPECIFIER**** Delete one of the following two paragraphs; coordinate with requirements of Division 1, the section on product option and substitutions.

b. Substitutions: Not Permitted.

c. Requests for substitutions will be considered in accordance with provisions of Section 01600.

****NOTE TO SPECIFIER**** Two basic aluminum rail systems, one with balusters (pickets) and one with tempered safety glass infill are available. Multiple options are available for the guardrail infill types, as well as custom guardrail fabrication. Select system required and delete those not required. Contact UltraLox for additional choices and for technical support.

2.2 MATERIALS

A. Aluminum Baluster (Picket) Guardrail System: Components fabricated of extruded aluminum in accordance with ASTM B 221. Assembled by the patented UltraLox Interlocking machine.

1. **Top Rail Style:** Alloy 6063-T5

a. 2" x 2" Square Mission top rail profile

b. 2 1/4" x 2 1/4" Colonial top rail profile

c. 2 1/2" x 2 1/4" Victorian top rail profile

d. Other: _____

2. **Baluster (picket) pressed to top and bottom rail by the UltraLox Interlocking machine, Alloy 6063-T5 style**

a. Rectangle 1/2" by 3/4"

b. Other: _____

3. **Bottom Rail: Alloy 6063-T5**

a. U-Channel 1 1/2" high 1 1/2" inches wide

b. Other: _____

4. **Posts: Alloy 6005-T5**

a. 1 3/4" plain posts with field installed mechanically fastened connections (standard).

b. 3" posts with field installed mechanically fastened at end / corner / post locations (optional)

c. other: _____

****NOTE TO SPECIFIER**** Identify mounting system or systems. If more than one system is required, show the location on the drawings.

5. **Mounting System:** Anchoring system capable of withstanding structural design load stated.

a. Posts surface-mounted to substrate with bottom plates. Base plate detail to be specified on final shop drawings (standard).

b. Post fascia-mounted to outer deck surface (optional).

c. Posts core mounted to substrate using non-corrosive non-shrink grout recommended by grout manufacturer for interior and exterior applications (optional).

6. **Post Spans:**

****NOTE TO SPECIFIER**** Maximum post spans will vary depending on job site conditions. Never span more than 6'0" on center between railing posts. Railings longer than 12' in length will require reduced spans consult a design professional, professional engineer or your UltraLox Products representative for additional information.

a. _____ " maximum post spans

7. **Guardrail termination at wall columns:**

a. Connect to building walls or support columns at top and bottom locations (and applications mid-rail locations) using top and bottom wall mount connectors.

b. 3" Post to be used at railing termination points such as building walls or support columns in addition to top mount connectors to the building and / or columns to reduce guardrail deflection.

c. Other: _____

8. **Fasteners:**
 - a. Rail frame assembled using standard stainless steel fasteners to assemble rail frame.
 - b. Other: _____
9. **Anchors**
 - a. Rail base anchor to be stainless steel as recommended by the manufacturer
 - b. Other: _____

B. Aluminum Tempered Glass Guardrail System: Components fabricated of extruded aluminum in accordance with ASTM B 221

1. **Top Rail Style: Alloy 6063-T5**
 - a. 2" x 2" Square Mission top rail profile
 - b. 2 1/4" x 2 1/4" Colonial top rail profile
 - c. 2 1/2" x 2 1/4" Victorian top rail profile
 - b. Other: _____
2. **Clear Infill Barrier**
 - a. Tempered Glass: Clear 1/4" (6mm) thick conforming to ANSI Z 97.1
 - b. Tempered Glass: Tinted color, 1/4" (6mm) thick conformation to ANSI Z 97.1
 - c. Other: _____
3. **Bottom Rail: Alloy 6063-T5**
 - a. U-Channel 1 1/2" high 1 1/2" inches wide
4. **Posts: Alloy 6005-T5**
 - a. 1 3/4" plain posts with field installed mechanically fastened connections (standard).
 - b. 3" posts with field installed mechanically fastened at end / corner / post locations (optional)
 - c. Other: _____

****NOTE TO SPECIFIER** Identify mounting system or systems. If more than one system is required, show the location on the drawings.**
5. **Mounting System:** Anchoring system capable of withstanding structural design load stated.
 - a. Posts surface-mounted to substrate with bottom plates. Base plate detail to be specified on final shop drawings (standard).
 - b. Post fascia-mounted to outer deck surface (optional).
 - c. Posts core mounted to substrate using non-corrosive non-shrink grout recommended by grout manufacturer for interior and exterior applications (optional).
6. **Post Spans:**

****NOTE TO SPECIFIER** Maximum post spans will vary depending on job site conditions. Never span more than 6'0" on center between railing posts. Railings longer than 12' in length will require reduced spans consult a design professional, professional engineer or your UltraLox Products representative for additional information.**

 - a. _____" maximum post spans
7. **Guardrail termination at wall columns:**
 - a. Connect to building walls or support columns at top and bottom locations (and applications mid-rail locations) using top and bottom wall mount connectors.
 - b. 3" Post to be used at railing termination points such as building walls or support columns in addition to top wall mount connectors to the building and / or columns to reduce guardrail deflection.
 - c. Other: _____
8. **Fasteners:**
 - a. Rail frame assembled using standard stainless steel fasteners to assemble rail frame.
9. **Anchors**
 - a. Rail base anchor to be stainless steel as recommended by the manufacturer
 - b. Other: _____

2.3 **FABRICATION**

****NOTE TO SPECIFIER** Select assembly method required from the following two paragraphs. Delete the paragraph not required**

- a. 3" Posts for aluminum guardrail system with baluster (pickets) shall not exceed 96 inches O.C.
- b. 3" Posts for aluminum tempered glass guardrail systems shall not exceed 60 inches O.C.
- c. 1 3/4" Posts for aluminum guardrail system with baluster (pickets) shall not exceed 72 inches O.C.
- d. 1 3/4" Posts for aluminum tempered glass guardrail systems shall not exceed 60 inches O.C.
- e. Assembly Methods
 - 1. Posts to be mechanically connected to railing components in the field in accordance with the manufacturer's instructions.
 - 2. Posts to be mechanically connected railing components in the factory in accordance with the approved shop drawings. Fit and shop assemble components in largest practical sizes for delivery to site.
- f. Supply components required for anchorage of fabrications. Fabricate anchors and related components of stainless steel.
- e. There should be no exposed mechanical fasteners: Pan-head screws and anchor bolts; consistent with design of components, assembled as per manufacture's recommended installation methods except where specifically noted otherwise.
- f. There should be no external sleeves and fittings at transitional connections.
- g. Typical top rail splices shall be butt spliced with factored finished edges mating. .
- i. Accurately form components to suit field conditions.

2.4 **FINISH**

****NOTE TO SPECIFIER** Select one of the coating system required below. Standard finish is Akzo Nobel (Interpon) D-2000 Ultra-Durable powder coated finish to comply with AAMA-2604 specifications. Alternative powder coated finishes and custom colors are available. Optional high performance coating meeting AAMA-2605 is optional and is usually recommended in high UV, extreme environmental and coastal conditions.**

- 1. Akzo Nobel (Interpon) D-2000 Ultra-Durable powder finishes to comply with AAMA-2604 specification. Coating to be applied by Akzo Nobel "Approved Applicator" only with proof of valid applicator's certificate. No substitutes permitted.

****NOTE TO SPECIFIER** Select one of the following selections**

- a. Color to be selected from manufactures standard color selections:
 - i. White YA0117
 - ii. Black YN0157
 - iii. Bronze YK1057
 - vi. Other _____
 - b. Custom Color to be selected from manufactures full range of colors and gloss
- 2. Powder coated finish to comply with AAMA-2604 specification. Color to be specified by owner's representative or architect from manufactures full range for color and gloss including custom colors.

****NOTE TO SPECIFIER** Optional High performance finish are available for high UV, extreme environmental and coastal conditions select one of the following selections:**

3. High performance finish – Akzo Nobel (Interpon) D-3000 Fluoramax – Fluorocarbon powder coated finish to comply with AAMA 2605 specifications. Coating to be applied by an Akzo-Nobel “Approved Applicator” only with proof of valid applicator’s certificate. No substitutes permitted.
4. High performance finish – Trinar® 70% PVDF (polyvinylidene fluoride) Coating: Kynar® 500/ Hylar® 5000® fluoropolymer to comply with AAMA 2605-05. Superior UV resistance, color fastness and gloss retention.
5. Other _____

PART 3 Execution

3.1 Examination

- a. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.
- b. Verify that surfaces are properly prepared to receive installation of guardrails.

3.2 Installation

- a. Install handrail and railings to systems in accordance with the approved shop drawings and the manufacturer’s installation instructions. Maintain 42” rail height and follow surface slope unless otherwise noted.
- b. Provide anchors, plates, angles required for mounting railings.
- c. Install components plumb and level, accurately fitted, free from distortion or defects
- d. Prevent galvanic action by insulating metals and other materials from direct contact with incompatible materials. Coat concealed surfaces of aluminum alloys that will be in contact with grout, concrete, masonry, wood or dissimilar metals with a heavy coat of bituminous paint or neoprene gaskets.
- e. Anchor railings securely to structure. Conceal bolts and screws whenever possible.

3.3 Adjusting and Cleaning

- a. Verify that guardrail is plumb and rigidly secured to substrate; make any adjustments required.
- b. Clean areas of installation and handrail components, using materials and methods recommended by manufacturer. Remove from project site packaging and debris caused by installation.

END OF SECTION