

## SECTION 05730

### ORNAMENTAL ALUMINUM RAILING

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Ornamental Aluminum Railing.

##### 1.2 RELATED SECTIONS

- A. Section 03300 Cast-In-Place Concrete: Placement of sleeves cast in concrete.
- B. Section 05500 - Metal Fabrications: Furnishing of sleeves cast in concrete.
- C. Section 05510 - Metal Stairs
- D. Section 05520 - Aluminum Pipe Railings

##### 1.3 REFERENCES

- A. ANSI A1264.1 - Safety Requirements for Workplace Floor and Wall Openings, Stairs, and Railing Systems.
- B. ASTM B 211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, Wire.

- C. ASTM B 247 - Standard Specification for Aluminum and Aluminum Die Forgings, Hand Forgings and rolled Ring Forgings.
- D. ASTM E 935 - Standard Test Methods for Permanent Metal Railing Systems and Rails for Buildings.

#### 1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Comply with requirements of building authorities having jurisdiction in Project location and the following:
  - 1. Handrail Standard: ANSI A1264.1
  - 2. Occupational Safety and Health Administration - 29 CFR 1910.23 - Guarding floor and wall openings.
- B. Structural Performance: Engineer, fabricate, and install handrails, guardrails, and railing systems to withstand, when tested per ASTM E 935, loadings required by applicable building and safety codes but not less than the following:
- C. Design Loads: Design to the following requirements. Concentrated and uniform loading need not be applied simultaneously.
  - 1. Uniform load: 50 pounds per foot (74.3 kg/m) applied at the top in any direction..
  - 2. Concentrated load: 200 pounds (90.6 kg) applied at the top in any direction.

#### 1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.

2. Details of material and construction.
  3. Storage and handling requirements and recommendations.
  4. Installation methods and requirements.
- C. Shop Drawings: Submit shop drawings for fabrication and installation of ornamental metalwork. Include plans, elevations and detail sections. Indicate materials, methods, finishes and types of joinery, fasteners, anchorages and accessory items.
- D. Load Tests: Submit test results from ASTM E 935 conducted on the manufacturer's supplied system indicating compliance with required structural loading.
- E. Selection Samples: For each finish product specified, two complete sets of color charts representing manufacturer's full range of available colors and patterns.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic cleaning and maintenance of all components.

## 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 3 years documented experience producing systems specified in this section.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Finish areas designated by Architect.
  2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
  3. Refinish mock-up area as required to produce acceptable work.

4. Accepted mock-ups shall be comparison standard for remaining Work

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened, properly labeled, original packaging until ready for installation.
- B. Store components to avoid damage from moisture, abrasion, and other construction activities.

#### 1.8 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

#### 1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Field Measurements: Take measurements of actual dimensions where necessary for fit without gaps. Indicate measurements on shop drawings.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Superior Aluminum Products, Inc.; 555 E. Main St., P. O. Box 430, Russia, OH 45363. Phone: 937-526-4065. Fax: 937-526-3904. Email: info@superioraluminum.com. Web: www.superioraluminum.com.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

## 2.2 ORNAMENTAL ALUMINUM RAILINGS

- A. Guard Rail Series 9000 Heavy-Duty Aluminum Railing: Series 9000 railings run between posts which shall contain machined openings for level applications and mechanical swivel brackets for locations at angles exceeding 10 degrees. Brackets shall not be used to attach railings to posts on level applications utilizing standard components. Pickets shall be 3/4 inch (1.91 cm) square on 4-1/2 inch (11.43 cm) maximum centers, and shall run between the top and bottom rail. Picket fasteners are concealed by a screw cover in matching finish.
  - 1. Series 9000 Design
    - a. Rail Style A: Single top and bottom rail, two-line railing system.
      - 1) Top Rail Size
        - (a) Standard 2 inch (5.08 cm) wide by 1-5/8 inch (4.13 cm) high top rail.
        - (b) 2-1/2 inch (6.35 cm) wide by 1-5/8 inch (4.13 cm) high top rail.
        - (c) 2 inch (5.08 cm) wide by 4 inch (10.16 cm) high top rail.
      - 2) Bottom Rail Size
        - (a) Standard 3/4 inch (1.91 cm) wide by 1-5/8 inch (4.13 cm) high bottom rail.
        - (b) 2 inch (5.08 cm) wide by 4 inch (10.16 cm) high bottom rail.

- b. Rail Style B: Double top rail and single bottom rail, three-line railing system with opening between top rails.
  - 1) Top Rail Size
    - (a) Standard 2 inch (5.08 cm) wide by 1-5/8 inch (4.13 cm) high double top rail.
    - (b) 2-1/2 inch (6.35 cm) wide by 1-5/8 inch (4.13 cm) high double top rail.
    - (c) 2 inch (5.08 cm) wide by 4 inch (10.16 cm) high double top rail.
  - 2) Bottom/Mid Rail Size
    - (a) 3/4 inch (1.91 cm) wide by 1-5/8 inch (4.13 cm) high.
- c. Rail Style C: Double top rail and single bottom rail, three-line railing system with through pickets between top rails.
  - 1) Top Rail Size
    - (a) Standard 2 inch (5.08 cm) wide by 1-5/8 inch (4.13 cm) high double top rail.
    - (b) 2-1/2 inch (6.35 cm) wide by 1-5/8 inch (4.13 cm) double top rail.
    - (c) 2 inch (5.08 cm) wide by 4 inch (10.16 cm) high) double top rail.
- d. Square Posts:
  - 1) 2-1/2 inch (6.35 cm)
  - 2) 4 inch (10.16cm)
- e. Height:
  - 1) Residential: 36 inch (91.44 cm)
  - 2) Commercial: 42 inch (106.68 cm)
  - 3) As indicated on the Drawings
- f. Design
  - 1) Straight Rail Panel Design: As indicated
  - 2) Step Rail Panel Design: As indicated

3) Design: As indicated on the Drawings.

g. Cast Ornamentation:

1) As indicated

2) Cast X Insert

3) 3-3/4 inch (9.5 cm) OD double ring insert

4) 3-3/4 inch (9.5 cm) OD single ring insert

5) 3-3/4 inch (9.5 cm) cast diamond inset

6) 4 inch (10.16 cm) diameter ball cap for 4 inch (10.16 cm) square post

7) 2-1/2 inch (6.35 cm) diameter ball cap for 4 inch (10.16 cm) square post

8) Post ball cap for 2-1/2 inch (6.35 cm) post

9) Other ornamental items as required

B. Guard Rail Series 9900 Heavy-Duty Aluminum Railing: Railings run between posts and contain machined openings for level applications and mechanical swivel brackets for locations at angles exceeding 10 degrees. Brackets shall not be used to attach railings to posts on level applications utilizing standard components. Pickets 1-1/2 inch (3.81 cm) wide by 3/4 inch (1.91 cm) high square on 5-1/4 inch (13.35 cm) maximum centers and run between the top and bottom rail. Picket fasteners are concealed by a crew cover in matching finish.

1. 9900 Design:

a. Rail Style A: Single top and bottom rail, two-line railing system.

1) Top Rail Size

(a) Standard 2 inch (5.08 cm) wide by 1-5/8 inch (4.13 cm) high top rail.

(b) 2-1/2 inch (6.35 cm) wide by 1-5/8 inch (4.13 cm) high top rail.

(c) 2 inch (5.08 cm) wide by 4 inch (10.16 cm) high top rail.

2) Bottom Rail Size

- (a) Standard 3/4 inch (1.91 cm) wide by 1-5/8 inch (4.13 cm) high bottom rail.
  - (b) 2 inch (5.08 cm) wide by 4 inch (10.16 cm) high bottom rail.
- b. Rail Style B: Double top rail and single bottom rail, three-line railing system with opening between top rails.
  - 1) Top Rail Size
    - (a) Standard 2 inch (5.08 cm) wide by 1-5/8 inch (4.13 cm) high top rail.
    - (b) 2-1/2 inch (6.35 cm) wide by 1-5/8 inch (4.13 cm) high top rail.
    - (c) 2 inch (5.08 cm) wide by 4 inch (10.16 cm) high top rail.
  - 2) Bottom Rail Size
    - (a) Standard 3/4 inch (1.91 cm) wide by 1-5/8 inch (4.13 cm) high bottom rail.
- c. Rail Style C: Double top rail and single bottom rail, three-line railing system with through pickets between top rails.
  - 1) Top Rail Size
    - (a) Standard 2 inch (5.08 cm) wide by 1-5/8 inch (4.13 cm) high top rail.
    - (b) 2-1/2 inch (6.35 cm) wide by 1-5/8 inch (4.13 cm) high top rail.
    - (c) 2 inch (5.08 cm) wide by 4 inch (10.16 cm) high top rail.
  - 2) Bottom Rail Size
    - (a) Standard 3/4 inch (1.91 cm) wide by 1-5/8 inch (4.13 cm) high bottom rail.
- d. Square Posts:
  - 1) 2-1/2 inch (6.35 cm).
  - 2) 4 inch (10.16cm).
- e. Height:
  - 1) Residential: 36 inch (91.44 cm).

- 2) Commercial: 42 inch (106.68 cm).
- 3) As indicated on the Drawings.

f. Design

- 1) Straight Rail Panel Design: on the Drawings.
- 2) Step Rail Panel Design: on the Drawings.
- 3) Design: on the Drawings.

g. Cast Ornamentation:

- 1) As indicated
- 2) Cast X Insert
- 3) 3-3/4 inch (9.5 cm) OD double ring insert
- 4) 3-3/4 inch (9.5 cm) OD single ring insert
- 5) 3-3/4 inch (9.5 cm) cast diamond inset
- 6) 4 inch (10.16 cm) diameter ball cap for 4 inch (10.16 cm) square post
- 7) 2-1/2 inch (6.35 cm) diameter ball cap for 4 inch (10.16 cm) square post
- 8) Post ball cap for 2-1/2 inch (6.35 cm) post
- 9) Other ornamental items as required.

C. Wall Mounted Hand Rail System Style D (with mtg. brackets):

1. Top Rail Size

- a. Standard Series 9000 Top Rail: 2 inch (5.08 cm) wide by 1-5/8 inch (4.13 cm) high top rail.

D. Base: Size to fit the posts specified

1. Heavy-Duty Surface Mount Base
2. Cover Flange for Embedded Posts

3. Side-Mount Corner Base
4. Side-Mount Base
5. As indicated on the Drawings.

## 2.3 RAILING MATERIALS

- A. Rail, Post and Pickets: Aluminum extrusions; alloy and temper 6063-T4 or 6063-T6 for rail and posts, and 6063-T5 for square pickets.
  1. Tube: ASTM B 211.
  
- B. Base Flanges, Anchors, and railing accessories: ASTM B 247.
  1. Bases cast from manufacturer's standard A-356-T6, 535, or 713 aluminum alloys or solid extruded 6063 aluminum alloy stock.
  2. Base flanges and railing accessories cast from manufacturer's standard 319, A-356, A-356-T6, 535, or 713 aluminum alloys.
  3. Anchorages: Provide concrete anchorage for fastening and complying with applicable Federal standards. All fasteners used in the system shall be aluminum or stainless steel.
  
- C. Fasteners: Provide concrete anchorage for fastening and complying with applicable Federal standards. All fasteners used in the system shall be aluminum or stainless steel.
  
- D. Grout: Non-shrink Portland cement-based hydraulic grout, mixed and applied in accordance with manufacturer's instructions; gypsum based material are not acceptable. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and recommended by manufacturer for exterior use.

## 2.4 FINISH

A. Baked on Enamel Colors (AAMA 2603):

1. White
2. Black
3. Light Bronze
4. Dark Bronze
5. Sandstone
6. Almond
7. Tan
8. Brown
9. Green
10. Custom colors as selected.

B. Satin Anodized Finish:

1. 15 Minute: Architectural Clear Anodic Coating, AA-M12C22A21

## 2.5 FABRICATION

- A. All components or railing sections shall be fabricated at the manufacturing facility in largest practical site delivery sizes. All components or railing sections shall be fabricated to exact measurements specified through Drawings and field dimensions.
- B. If railing is angled horizontally, machine to proper angle into the post.
- C. Fabricate railing system to meet step railing requirements by providing a rectangular hole in bottom rail.
- D. Fabricate railing system to meet step railing requirements; riser and tread dimensions of the steps.

- E. All posts grouted in concrete to have one nominal 1/4 inch (6.0 mm) nominal diameter weep hole, 1/2 inch (12.0 mm) nominal above post collar, in the plane of the rail
- F. Provide components required for anchorage of framing. Fabricate anchors and related components of material and finish as required, or as specifically noted.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Coordinate railing installation with installation of waterproof membrane or coating Specified in Section 07xxx.
- C. Ensure that adjacent surfaces, structures, and finishes are protected from damage by construction activities of this section.
- D. Use wood blocks and padding to prevent damage to railing members and fittings during erection.

- E. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Keep perimeter lines straight, plumb, and level.
- C. Provide grounds, clips, backing materials, adhesives, brackets, anchors, and accessories necessary for a complete installation.
  - 1. Expansion Bolt Mounting: Anchor through base plates to concrete substrate.
  - 2. Sleeve Mounting:
    - a. Arrange for casting of sleeves or core drill concrete to provide holes for railing uprights.
    - b. After setting, fill holes with hydraulic grout; brace members until grout is cured.
  - 3. Connect railing components in accordance with manufacturer's instructions applicable to the specified system. Tighten all fasteners so that completed railing is rigid and free of play at joints and component attachments.

### 3.4 ERECTION TOLERANCES

- A. Install railings plumb and level, securely fastened, with vertical members plumb.
  - 1. Maximum variation from plumb: 1/4 inch (6.0 mm).
  - 2. Maximum misalignment from true position: 1/4 inch (6.0 mm).
  - 3. Maximum misalignment between adjacent separated members: 1/8 inch (3.0 mm).

### 3.5 CLEANING

- A. Remove dust or other foreign matter from component surfaces; clean finishes in accordance with AAMA 609 and AAMA 610-02.

### 3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION