

SECTION 05 73 11

ALUMINUM RAILINGS

******* Ametco Manufacturing Corporation manufactures several types of aluminum railings. This guide specification can be used to specify Ametco's Apollo, Blade, Falcon, Galaxy, Sedona, and Venus Aluminum Railings. These extruded aluminum railing systems are functional, decorative, and lightweight with a smooth finish and durable polyester powder coating. Other railing system manufactured by Ametco Manufacturing Corporation can be specified with the following guide specification:**

SECTION 05 73 10 - OPEN GRILLE STEEL RAILING SYSTEM

The specifier will need to edit this guide specification for a specific project to reflect the options and applications being used. The guide specification has been written so that most editing can be accomplished by deleting unnecessary requirements. Options are indicated by []. Notes to assist the specifier in selecting options and editing the guide specification are printed in bold and indicated with *********. For final editing, all brackets and notes will need to be deleted from the guide.

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Aluminum railings fabricated from extruded aluminum sections, including aluminum railing posts.
- B. Related sections:

******* List other specification sections dealing with work directly related to this section such as the following. *******

- 1. Section 03 30 00 - Cast-in-Place Concrete: Concrete footings for support of railing posts.

1.2 REFERENCES

****** List by number and full title reference standards referred to in remainder of specification section. Delete non-applicable references. ******

- A. ASTM International (ASTM):
 - 1. ASTM B117 - Operating Salt Spray (Fog) Apparatus.

2. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
3. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
1. ASTM D822 - Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
2. ASTM D2794 - Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
3. ASTM D3363 - Test Method for Film Hardness by Pencil Test.
7. ASTM E894 - Anchorage of Permanent Metal Railing Systems and Rails for Buildings.
8. ASTM E935 - Permanent Metal Railing Systems and Rails for Buildings.

1.3 DESIGN REQUIREMENTS

- A. Railing assemblies and attachments shall be designed, fabricated, and installed in accordance with ASTM E894 and ASTM E935 to support:
 1. 200 pounds concentrated loading applied at any point in any direction.
 2. 50 pounds per linear foot uniform load applied horizontally to top of rail.

1.4 SUBMITTALS

- A. Provide in accordance with Section 01 33 00 - Submittal Procedures:
 1. Product data for components and accessories.
 2. Shop drawings showing layout, dimensions, profiles, spacing of components, and anchorage and installation details.
 3. Copy of warranty specified in Paragraph 1.5 for review by Architect.

1.5 WARRANTY

- A. Provide in accordance with Section 01 77 00 - Closeout Procedures:
 1. 20-year warranty for factory finish against cracking, peeling, and blistering under normal use.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Ametco Manufacturing Corporation, 4326 Hamann Parkway, P.O. Box 1210, Willoughby, Ohio 44096; 800-362-1360.
- B. Requests to use equivalent products of other manufacturers shall be submitted in accordance with Section 01 25 13 - Product Substitution Procedures.

2.2 MATERIALS

- A. Extruded aluminum: ASTM B221, Alloy 6061, Temper T-6.
- B. Sheet aluminum: ASTM B209, Alloy 6061, Temper T-6.
- C. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, and water-reducing and plasticizing additives.

2.3 RAILING SYSTEM

***** Ametco Manufacturing Corporation provides six types of aluminum railings.

Apollo: 1/2 by 2 inch (13 by 52 mm) extruded aluminum tubular blades spaced vertically on 2 inch (102 mm) centers. Railing weighs 2.75 psf (13.43 kg/sq m).

Blade: 1/2 by 4 inch (13 by 52 mm) extruded aluminum tubular blades spaced vertically or horizontally on 4 inch (102 mm) centers. Railing weighs 1.75 psf (8.54 kg/sq m).

Falcon: 1 inch (26 mm) extruded aluminum tube spaced horizontally 4 inch (102 mm) on center. Railing weight 0.085 psf [0.415 kg/sq m].

Galaxy: 1/2 by 4 inch (13 by 51 mm) extruded aluminum tubular blades spaced vertically on 3-1/2 inch (89 mm) centers. Railing weighs 1.75 psf (8.54 kg/sq m).

Sedona: 1/2 by 2 inch (13 by 51 mm) and 1/2 by 4 inch (913 by 102 mm) extruded aluminum tubular alternating blades spaced either vertically or horizontally. Opening between blades can range from 1 to 4 inches (25 to 102 mm). Railing weight with 1 inch (25 mm) opening space is 2 psf (9.76 kg/sq/m).

Venus: 1/2 by 2 inch (13 by 51 mm) extruded aluminum tubular blades spaced either vertically or horizontally. Opening between blades can range from 1 to 4 inches (25 to 102 mm). Railing weight with 1 inch (25 mm) opening space is 1.75 psf (8.54 kg/sq m)

***** Include the following to specify **Apollo Aluminum Railing**. *****

- A. Type: System of extruded aluminum tubular vertical blades attached to aluminum extruded framing bars and aluminum posts; Apollo Aluminum Railing as manufactured by Ametco Manufacturing Corporation.

******* Apollo Aluminum Railing is provided with [1/2 inch by 2 inch] [13 by 52 mm] tubular aluminum blades on 2 inch (51 mm) centers. *******

1. Blades : Ridged, tubular aluminum sections equally spaced vertically on 2 inch centers.
 - a. Size: [1/2 by 2 inch] [13 by 51 mm].
 - b. Material thickness: [0.09 inch] [2 mm].

******* Apollo Aluminum Railing can be provided in heights up to 42 inches (1071 mm). *******

2. Railing height: [[_____] [inches] [mm].] [As indicated on Drawings.]

******* Railing posts for aluminum railing are extruded aluminum tubular shapes. *******

- B. Posts: [2 inches by 2 inches] [51 mm by 51 mm] extruded aluminum tubular shapes.

******* Post length will be determined by railing height and foundation design. *******

1. Length: [[_____] [inches] [mm].] [As indicated on Drawings.]

******* Include the following to specify Blade Aluminum Railing. *******

- C. Type: System of modular railing panels fabricated from extruded aluminum tubular blades and top and bottom aluminum rails field attached to aluminum posts; Blade Aluminum Railing as manufactured by Ametco Manufacturing Corporation.

1. Blades: Ridged, tubular aluminum sections spaced [vertically] [horizontally] with [4 inch] [102 mm] opening between blades.
 - a. Size: [1/2 by 4 inch] [13 by 102 mm].
 - b. Material thickness: [0.09 inch] [2 mm].
2. Rails: [1/2 by 4 inch] [13 by 51 mm] extruded aluminum channels.

******* Blade Aluminum Railing can be provided in heights up to 42 inches (1,071 mm). *******

3. Panel height: [[_____] [inches] [mm].] [As indicated on Drawings.]

******* Include the following to specify Falcon Picket Aluminum Railing. *******

D. Type: System of modular railing panels fabricated from aluminum swaged tubular blades and top and bottom aluminum rails field attached to aluminum posts; Falcon Picket Aluminum Railing as manufactured by Ametco Manufacturing Corporation.

1. Tubes: Ridged, swaged round aluminum sections spaced horizontally [4 inch] [102 mm] on centers.
 - a. Size: [1 inch] [26 mm].
 - b. Material thickness: [0.083 inch] [2 mm].
2. Top and bottom Rails: [1-1/2 by 3/4 inch] [39 by 20 mm] aluminum channels.

******* Falcon Aluminum Railing can be provided in heights up to 42 inches (1,071 mm).***********

3. Panel height: [[_____] [inches] [mm].] [As indicated on Drawings.]

******* Railing posts for aluminum railing are extruded swaged aluminum tubular shapes.***********

E. Posts: [2-1/2 inch] [65 mm] with [0.125 inch] [3.25 mm] wall aluminum tube shapes.

******* Post length will be determined by railing height and foundation design. *******

1. Length: [[_____] [inches] [mm].] [As indicated on Drawings.]

******* Include the following to specify Galaxy Aluminum Railing. *******

F. Type: System of extruded aluminum vertical blades with extruded aluminum frame to be field attached to aluminum posts; Galaxy Aluminum Railing as manufactured by Ametco Manufacturing Corporation.

******* Galaxy Aluminum Railing is provided with vertical blades *******

1. Blades: Ridged, tubular aluminum sections equally spaced on [3-1/2 inch] centers.
 - a. Size: [1/2 by 2 inch] [13 by 52 mm].
 - b. Material thickness: [0.09 inch] [2 mm].

******* Galaxy Aluminum Railing can be provided in heights up to 42 inches (1,071 mm).**

2. Railing height: [[_____] [inches] [mm].] [As indicated on Drawings.]

***** **Railing posts for aluminum railing are extruded aluminum tubular shapes.** *****

G. Posts: [2 by 2 inch] [51 mm by 51 mm] extruded aluminum tubular shapes.

***** **Post length will be determined by railing height and foundation design.** *****

1. Length: [[_____] [inches] [mm].] [As indicated on Drawings.]

***** **Include the following to specify Venus Aluminum Railing.** *****

H. Type: System of extruded aluminum [horizontal] [vertical] tubes with extruded aluminum framing to be field attached to aluminum posts; Venus Aluminum Railing as manufactured by Ametco Manufacturing Corporation.

***** **Venus Aluminum Railing can be provided with either vertical or aluminum blades. Opening between blades can range from 1 to 4 inches (25 to 102 mm). Edit the following paragraphs to reflect required railing configuration.** *****

1. Blades: Ridged, tubular aluminum sections equally spaced [vertically] [horizontally].

a. Size: [1/2 by 2 inch] [13 by 52 mm].

b. Material thickness: [0.09 inch] [2 mm].

c. Opening between blades: [_____] [inch] [mm].

***** **Venus Aluminum Railing can be provided in heights up to 42 inches (1,071 mm).**

2. Railing height: [[_____] [inches] [mm].] [As indicated on Drawings.]

***** **Railing posts for aluminum railing are extruded aluminum tubular shapes.** *****

3. Posts: [2 by 2 inches] [51 by 51 mm] extruded aluminum tubular shapes.

***** **Post length will be determined by railing height and foundation design.** *****

4. Length: [[_____] [inches] [mm].] [As indicated on Drawings.]

***** **Include the following to specify Sedona Aluminum Railing.** *****

- I. Type: System of extruded aluminum [vertical] [horizontal] blades with extruded aluminum framing to be field attached to aluminum posts. Sedona Aluminum Railing as manufactured by Ametco Manufacturing Corporation.

******* Sedona Aluminum Railing is provided with two widths of blades which are installed either vertically or horizontally in an alternating pattern. Opening between blades can range from 1 to 4 inches (25 to 102 mm). Edit the following paragraphs to reflect required railing configuration. *******

1. Blades: Two widths of rigid, tubular aluminum section installed [vertically] [horizontally] in an alternating pattern:
 - a. Size: [1/2 by 2 inch] [13 by 52 mm] and [1/2 by 4 inch] [13 by 102 mm].
 - b. Material thickness: [0.09 inch] [2 mm].
 - c. Opening between blades: [_____] [inch] [mm].

******* Sedona Aluminum Railing can be provided in heights up to 42 inches (1,071 mm). *******

2. Railing height: [[_____] [inches] [mm].] [As indicated on Drawings.]

******* Railing posts for aluminum railing are extruded aluminum tubular shapes. *******

- J. Posts: [2 by 2 inches] [51 by 51 mm] extruded aluminum tubular shapes.

******* Post length will be determined by railing height and foundation design. *******

1. Length: [[_____] [inches] [mm].] [As indicated on Drawings.]
2. Spacing: [[_____] [inches] [mm].] [As indicated on Drawings.]

2.4 ACCESSORIES

- A. Fasteners: Stainless steel bolts of type, size, and spacing as recommended by manufacturer for specific conditions.
- B. End caps: Provide aluminum caps for exposed open extruded aluminum sections and for attachment of components to posts.

2.5 FACTORY FINISH

******* Factory applied finish for aluminum railing is a polyester powder coating. *******

- A. Aluminum railing panels and posts shall receive polyester powder coating.

- B. Polyester powder coating: Electrostatically applied colored polyester powder coating heat cured to chemically bond finish to metal substrate.
1. Minimum hardness measured in accordance with ASTM D3363: 2H.
 2. Direct impact resistance tested in accordance with ASTM D2794. Withstand 160 inch-pounds.
 3. Salt spray resistance tested in accordance with ASTM B117: No undercutting, rusting, or blistering after 500 hours in 5 percent salt spray at 95 degrees F and 95 percent relative humidity and after 1000 hours less than [3/16 inch] [5 mm] undercutting.
 4. Weatherability tested in accordance with ASTM D822: No film failure and 88 percent gloss retention after 1 year exposure in South Florida with test panels tilted at 45 degrees.

******* Ametco Manufacturing Company provides 15 standard colors. Custom colors are available for minimum size orders. Contact Ametco Manufacturing Company for information on custom colors. *******

- C. Color: [[Red Baron] [Black Velvet] [Blue Streak] [Bronze Mat] [Cal Gray] [Charlie Brown] [Cream] [Light Blue] [Light Ivory] [Moss Green] [Pale Green] [Safety Orange] [Safety Yellow] [Silver with weather-resistant clear coating] [White] as manufactured by Ametco Manufacturing Company.] [Selected by Architect from manufacturer's standard range.] [Custom color as selected by Architect.]

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prior to fabrication, field verify required dimensions.

******* Size of concrete railing footings will depend on railing height, post spacing, and other project conditions. Footing dimensions may be indicated on Drawings or in this section, but not both locations in order to eliminate potential conflicts. Edit the following paragraphs to reflect specific project conditions. *******

- B. Cast concrete footings in accordance with Section 03 30 00 - Cast-in-Place Concrete as detailed on Drawings and approved shop drawings.
1. Minimum footing diameter:
 - a. Terminal posts: [12 inches.] [305 mm.]

- b. Intermediate line posts: [10 inches.] [254 mm.]
- 2. Allow [8 inches] [203 mm] [_____] minimum embedment of posts.
- 3. Allow [6 inches] [152 mm] [_____] minimum concrete beneath post bottom.
- C. [Provide setting holes for embedment of railing posts.] [Core drill existing concrete footings for embedment of railing posts.] Hole shall be [2 inches] [51 mm] minimum greater than post width.

3.2 INSTALLATION

- A. Install railing in accordance with manufacturer's installation instructions and approved shop drawings.
- B. Install railing posts plumb and level [by setting post in hole [cast] [drilled] in concrete and grouting solid.] [by embedding post directly in concrete footing.] Temporarily brace railing posts with wood supports until [concrete] [grout] is set.
- C. Do not install bent, bowed, or otherwise damaged components. Remove damaged components from site and replace.
- D. Secure railing [panels] [rails] with [standard stainless steel bolts] [stainless steel anti-intruder bolts] to railing posts [prior to setting posts in footings.] [after posts have been set in footings.]
- E. Touch-up damaged finish with paint supplied by manufacturer and matching original coating.

END OF SECTION