



SECTION 05 73 00

ORNAMENTAL ALUMINUM RAILING

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Ornamental Aluminum Railing.
- B. Outdoor LED Lighting.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 05 50 00 - Metal Fabrications.
- C. Section 05 51 33 - Metal Ladders.
- D. Section 05 73 13 - Glazed Decorative Metal Railings
- E. Section 06 10 00 - Rough Carpentry.
- F. Division 16 - Electrical: Electrical service and disconnects, wire routing and connections.

1.3 REFERENCES

- A. AAMA 2604 - Performance Requirements and Test Procedures for High-Performance Organic Coatings on Aluminum Extrusions and Panels

- B. AAMA 609 and AAMA 610.02 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum
- C. ASTM A 492 - Standard Specification for Stainless Steel Rope Wire
- D. ASTM B 26 - Standard Specification for Aluminum-Alloy Sand Castings.
- E. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy
- F. ASTM B 210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes
- G. ASTM B 247 - Standard Specification for Aluminum and Aluminum Die Forgings, Hand Forgings and rolled Ring Forgings.
- H. ASTM B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
- I. NAHB ICC 700-2011 - Practice #601.7 No Site-Applied Finishing Materials
- J. NAHB ICC 700-2011 - Practice #604.1 Recycled Content.
- K. U.S. Green Building Council, LEED Building Design & Construction (BD+C) 2009 (Version 3.0) (LEED v2009).

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.
 - 3. Railings at stairs with more than 3 risers shall be designed with an ADA-compliant handrail.
- B. Design Loads: Design, fabricate, and install handrails, guardrails, and railing systems to the following requirements.
 - 1. Handrail and Top Rails: Concentrated and uniform loading need not be applied simultaneously.
 - a. Uniform load: 50 pounds per foot (74.3 kg/m) applied at the top in any direction..
 - b. Concentrated load: 200 pounds (90.6 kg) applied at the top in any direction.
 - 2. Infill: Infill load and other loads need not be applied simultaneously.
 - a. Concentrated load: 50 pounds (90.6 kg) applied horizontally on any area of 1 sf (0.093 sm).
- C. Thermal Movement: Provide for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
- D. Corrosion Control: Prevent electrolytic reaction between dissimilar metals and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- E. Provide ADA-compliant handrail, including mounting brackets, elbows, transitions,

wall brackets and other appurtenances necessary for a complete installation complying with requirements of authorities having jurisdiction.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- 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. Provide structural calculations prepared and certified by a qualified structural engineer licensed to practice in the project jurisdiction.
- E. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
 - 1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
 - 2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
- F. NAHB ICC 700-2011:
 - 1. Practice #601.7 No Site-Applied Finishing Materials.
 - 2. Practice #604.1 Recycled Content.
- G. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- H. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm), representing actual product, color, and patterns.
- I. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- J. 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 10 years documented experience manufacturing products specified in this section.
- B. Installers Qualifications: Minimum 3 years documented experience installing systems specified in this section.
- C. 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
- D. Pre-Installation Meeting: Convene a meeting at the project site prior to scheduled commencement of the Work of this Section. Attendees to include the Architect the Manufacturer's representative, the Contractor, the Installer, and related trades. Review the following.
1. Project conditions.
 2. Status of other trades.
 3. Project duration.
 4. Field-constructed mock-ups.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Handle and store materials in accordance with manufacturers instructions and to prevent damage.
 - B. Store products in manufacturer's unopened, properly labeled, original packaging until ready for installation.
 - C. 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.
- 1.10 WARRANTY
- A. Provide with manufacturer's limited lifetime warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Superior Plastic Products, Inc., which is located at: 260 Jalyn Dr.; New Holland, PA 17557; Toll Free Tel: 800-633-7093; Fax: 717-355-7129; Email: [request info \(tgifford@superiorplasticproducts.com\)](mailto:request_info@superiorplasticproducts.com); Web: www.superiorplasticproducts.com | www.KeyLinkOnline.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 RAILING MATERIALS

- A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability

properties of alloy and temper designated below for each aluminum form required.

1. Extruded Bar and Tube: ASTM B 221 (ASTM B 221 M), alloy 6063T5/ T52.
 2. Extruded Structural Pipe and Tube: ASTM B 429, alloy 6063T832.
 3. Drawn Seamless Tube: ASTM B 210 (ASTM B 210M), alloy 6063T832.
 4. Plate and Sheet: ASTM B 209 (ASTM B 209M), alloy 6061T6.
 5. Die and Hand Forgings: ASTM 8247 (ASTM B 247 M), alloy 6061T6.
 6. Castings: ASTM B 26/B 26M, alloy A 356T6.
- B. Tempered Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type 1 (transparent glass, flat). Quality q3 (glazing select) Provide products complying with requirements indicate below for class, thickness, and manufacturing process that have been tested for surface and edge compression according to ASTM C 1048 and for impact strength according to 16 CFR, Part 1201 for Category II materials.
1. Clear Glass: Class 1 (clear)
 2. Thickness: 5/16" unless otherwise noted.
 3. Glass with visual distortions shall not be used and will not be accepted.
 4. Provide safety glass permanently marked with certification label of Safety Glazing Certification Council or another certification agency, acceptable to authorities having jurisdiction.

2.3 DECORATIVE ALUMINUM RAILING

- A. Series: Arabian with ball post caps and contoured top rail.
1. Rails:
 - a. Contoured Top rail: 1-3/4 inches by 1-7/8 inches
 - b. Bottom rail: 1-1/4 inches by 1-1/2 inches
 2. Railing Section Length: Provide straight sections unless indicated to be curved.
 - a. 6 feet.
 - b. 8 feet.
 3. Railing Height:
 - a. 36 inches.
 - b. 42 inches.
 4. Picket (Baluster) Style:
 - a. Somerset: 3/4 inch by 3/4 inch square
 - b. Richmond: 3/4 inch diameter round
 - c. Trenton: 3/4 inch by 3/4 inch square, twisted
 - d. Hampton: 3/4 inch by 3/4 inch square, hammered
 - e. Dayton: 3/4 inch diameter round, turned.
 - f. Easton: 3/4 inch by 3/4 inch square, hammered and twisted
 - g. Buffalo: 1/4 inch by 3/4 inch square, with 6 inch belly
 - h. Potomac: 3/4 inch by 3/4 inch square, hammered with belly
 - i. Medford: 3/4 inch by 3/4 inch square with 4 inch belly
 - j. Altoona: 3/4 inch by 3/4" square, hammered with 4 inch belly
 - k. Glass panel: 5/16 inch by 4 feet.
 5. Picket Spacing: 3.5 inches to 3.7 inches
 6. Posts: 2.5 inches square with a wall thickness of 0.125 inch.
 7. Third Rail and Trim:
 - a. Plain.
 - b. With Rings.
 - c. With Butterfly Centerpiece.
 8. Secondary Handrail: 1-1/2 inch Schedule 40 (3.81 cm) aluminum pipe with 1.9 inch outside diameter.
 - a. End Cap
 - b. "P" Loop Return

- c. 6 inch Corner Mounting Bracket
- d. Outside Elbow
- e. Connector
- f. 0 To 90 degree Universal Elbow
- g. 104 inch Straight Handrail
- h. 34 degree Radius Elbow
- i. 90 degree Elbow Return Bracket
- j. Straight Wall Bracket
- k. 3 inch Mounting Bracket
- l. 90 degree Radius Elbow

B. Series: Keystone with flat post caps and flat top rail.

1. Rails:
 - a. Flat Top rail: 1-3/4 inches by 1-7/8 inches
 - b. Bottom rail: 1-1/4 inches by 1-1/2 inches
2. Railing Section Length: Provide straight sections unless indicated to be curved.
 - a. 6 feet.
 - b. 8 feet.
3. Railing Height:
 - a. 36 inches.
 - b. 42 inches.
4. Picket (Baluster) Style:
 - a. Somerset: 3/4 inch by 3/4 inch square
 - b. Richmond: 3/4 inch diameter round
 - c. Trenton: 3/4 inch by 3/4 inch square, twisted
 - d. Hampton: 3/4 inch by 3/4 inch square, hammered
 - e. Dayton: 3/4 inch diameter round, turned.
 - f. Easton: 3/4 inch by 3/4 inch square, hammered and twisted
 - g. Buffalo: 1/4 inch by 3/4 inch square, with 6 inch belly
 - h. Potomac: 3/4 inch by 3/4 inch square, hammered with belly
 - i. Medford: 3/4 inch by 3/4 inch square with 4 inch belly
 - j. Altoona: 3/4 inch by 3/4" square, hammered with 4 inch belly
 - k. Glass panel: 5/16 inch by 4 feet.
5. Picket Spacing: 3.5 inches to 3.7 inches
6. Posts: 2.5 inches square with a wall thickness of 0.125 inch.
7. Third Rail and Trim:
 - a. Plain.
 - b. With Rings.
 - c. With Butterfly Centerpiece.
8. Secondary Handrail: 1-1/2 inch Schedule 40 (3.81 cm) aluminum pipe with 1.9 inch outside diameter.
 - a. End Cap
 - b. "P" Loop Return
 - c. 6 inch Corner Mounting Bracket
 - d. Outside Elbow
 - e. Connector
 - f. 0 To 90 degree Universal Elbow
 - g. 104 inch Straight Handrail
 - h. 34 degree Radius Elbow
 - i. 90 degree Elbow Return Bracket
 - j. Straight Wall Bracket
 - k. 3 inch Mounting Bracket
 - l. 90 degree Radius Elbow

C. Series: American with ball post caps and flat top rail.

1. Rails:
 - a. Flat Top rail: 1-3/4 inches by 1-7/8 inches
 - b. Bottom rail: 1-1/4 inches by 1-1/2 inches
 2. Railing Section Length: Provide straight sections unless indicated to be curved.
 - a. 6 feet.
 - b. 8 feet.
 3. Railing Height:
 - a. 36 inches.
 - b. 42 inches.
 4. Picket (Baluster) Style:
 - a. Somerset: 3/4 inch by 3/4 inch square
 - b. Richmond: 3/4 inch diameter round
 - c. Trenton: 3/4 inch by 3/4 inch square, twisted
 - d. Hampton: 3/4 inch by 3/4 inch square, hammered
 - e. Dayton: 3/4 inch diameter round, turned.
 - f. Easton: 3/4 inch by 3/4 inch square, hammered and twisted
 - g. Buffalo: 1/4 inch by 3/4 inch square, with 6 inch belly
 - h. Potomac: 3/4 inch by 3/4 inch square, hammered with belly
 - i. Medford: 3/4 inch by 3/4 inch square with 4 inch belly
 - j. Altoona: 3/4 inch by 3/4" square, hammered with 4 inch belly
 - k. Glass panel: 5/16 inch by 4 feet.
 5. Picket Spacing: 3.5 inches to 3.7 inches
 6. Posts: 4 inch square hollow, recessed aluminum extrusion with 0.135 in wall thickness.
 7. Third Rail and Trim:
 - a. Plain.
 - b. With Rings.
 - c. With Butterfly Centerpiece.
 8. Secondary Handrail: 1-1/2 inch Schedule 40 (3.81 cm) aluminum pipe with 1.9 inch outside diameter.
 - a. End Cap
 - b. "P" Loop Return
 - c. 6 inch Corner Mounting Bracket
 - d. Outside Elbow
 - e. Connector
 - f. 0 To 90 degree Universal Elbow
 - g. 104 inch Straight Handrail
 - h. 34 degree Radius Elbow
 - i. 90 degree Elbow Return Bracket
 - j. Straight Wall Bracket
 - k. 3 inch Mounting Bracket
 - l. 90 degree Radius Elbow
- D. Series: American with vertical cable rail. Railings run between posts that contain openings for cables. Both end and crossover posts are single posts manufactured utilizing aluminum and capable of withstanding maximum tension levels.
1. Rails:
 - a. Flat Top rail: 1-3/4 inches by 1-7/8 inches
 - b. Bottom rail: 1-1/4 inches by 1-1/2 inches
 2. Railing Section Length: Provide straight sections unless indicated to be curved.
 - a. 6 feet.
 - b. 8 feet.
 3. Railing Height:
 - a. 36 inches.

- b. 42 inches.
 - 4. Brackets: A360 die cast aluminum socket brackets.
 - 5. Cable: High strength stainless steel cables spaced at 3.25 inch centers and tensioned between end posts.
 - a. Infill: 1/8 in diameter, 7x7, T-316 stainless steel cable attached to the rail.
 - b. Intermediate Support Balusters: 1/2 inch diameter solid stainless steel rod (three per 96 in rail, equally spaced).
 - c. Support Block: 3-1/2 inch high by 1-7/16 inch wide "Y"-shaped die cast aluminum.
 - 6. Posts: 3-1/4 inch square by 0.12 inch wall 6105-T6 hollow aluminum extrusions with 1-5/8 inch wide grooves on all four sides.
- E. Series: American with horizontal cable rail. Railings run between posts that contain openings for cables. Both end and crossover posts are single posts manufactured utilizing aluminum and capable of withstanding maximum tension levels.
- 1. Rails:
 - a. Flat Top rail: 1-3/4 inches by 1-7/8 inches
 - b. Bottom rail: 1-1/4 inches by 1-1/2 inches
 - 2. Railing Section Length: Provide straight sections unless indicated to be curved.
 - a. 6 feet.
 - b. 8 feet.
 - 3. Railing Height:
 - a. 36 inches.
 - b. 42 inches.
 - 4. Brackets: A360 die cast aluminum socket brackets.
 - 5. Cable: High strength stainless steel cables spaced at 3.25 inch centers and tensioned between end posts.
 - a. Infill: 1/8 in diameter, 7x7, T-316 stainless steel cable attached to the rail.
 - b. Intermediate Support Balusters: 1/2 inch diameter solid stainless steel rod (three per 96 in rail, equally spaced).
 - c. Support Block: 3-1/2 inch high by 1-7/16 inch wide "Y"-shaped die cast aluminum.
 - 6. Posts: 3-1/4 inch square by 0.12 inch wall 6105-T6 hollow aluminum extrusions with 1-5/8 inch wide grooves on all four sides.
- F. Series: Lancaster with flat post caps and contoured top rail.
- 1. Rails:
 - a. Contoured Top rail: 2.8 inches by 3-1/4 inches
 - b. Bottom rail: 1-1/2 inches by 3-1/4 inches
 - 2. Railing Section Length: Provide straight sections unless indicated to be curved.
 - a. 6 feet.
 - b. 8 feet.
 - 3. Railing Height:
 - a. 36 inches.
 - b. 42 inches.
 - 4. Picket (Baluster) Style:
 - a. Strasburg: 1 inch square
 - b. Topeka: 1 inch square, twisted
 - c. Harrisburg: 1 inch square, hammered
 - d. 1 inch square, with 4 inch belly
 - e. Albany: 1 inch square. hammered, with 4 inch belly
 - 5. Picket Spacing: 3.5 inches to 3.7 inches

6. Posts: 3-1/4 inch square by 0.12 inch wall 6105-T6 hollow aluminum extrusions with 1-9/16 inch wide grooves on all four sides.
 7. Third Rail and Trim:
 - a. Plain.
 - b. With Rings.
 - c. With Butterfly Centerpiece.
 8. Secondary Handrail: 1-1/2 inch Schedule 40 (3.81 cm) aluminum pipe with 1.9 inch outside diameter.
 - a. End Cap
 - b. "P" Loop Return
 - c. 6 inch Corner Mounting Bracket
 - d. Outside Elbow
 - e. Connector
 - f. 0 To 90 degree Universal Elbow
 - g. 104 inch Straight Handrail
 - h. 34 degree Radius Elbow
 - i. 90 degree Elbow Return Bracket
 - j. Straight Wall Bracket
 - k. 3 inch Mounting Bracket
 - l. 90 degree Radius Elbow
- G. Series: Outlook with flat post caps and flat top rail.
1. Rails:
 - a. Flat Top rail: 1-1/2 inches by 1.530 inches
 - b. Bottom rail: 1-1/4 inches by 1 inch
 2. Railing Section Length: Provide straight sections unless indicated to be curved.
 - a. 5 feet.
 - b. 6 feet.
 - c. 7 feet.
 - d. 8 feet.
 3. Railing Height:
 - a. 36 inches.
 - b. 42 inches.
 4. Picket (Baluster) Style: 5/8 inch
 - a. Strasburg: 5/8 inch square
 - b. Topeka: 5/8 inch square, twisted
 - c. Harrisburg: 5/8 inch square, hammered
 - d. 5/8 inch square, with 4 inch belly
 - e. Albany: 5/8 inch square. hammered, with 4 inch belly
 5. Picket Spacing: 3.5 inches to 3.7 inches
 6. Posts: 3-1/4 inch square by 0.12 inch wall 6105-T6 hollow aluminum extrusions with 1-9/16 inch wide grooves on all four sides.
 7. Third Rail and Trim:
 - a. Plain.
 - b. With Rings.
 - c. With Butterfly Centerpiece.
 8. Secondary Handrail: 1-1/2 inch Schedule 40 (3.81 cm) aluminum pipe with 1.9 inch outside diameter.
 - a. End Cap
 - b. "P" Loop Return
 - c. 6 inch Corner Mounting Bracket
 - d. Outside Elbow
 - e. Connector
 - f. 0 To 90 degree Universal Elbow
 - g. 104 inch Straight Handrail

- h. 34 degree Radius Elbow
 - i. 90 degree Elbow Return Bracket
 - j. Straight Wall Bracket
 - k. 3 inch Mounting Bracket
 - l. 90 degree Radius Elbow
- H. Structural Porch Posts: Hollow aluminum extrusion with structural aluminum pipe insert
- 1. 3-1/4 inches by 3-1/4 inches, 7500 lbs maximum load, 1170 lbs uplift resistance.
 - 2. 4 inches by 4 inches 26000 lbs maximum load, 1400 lbs uplift resistance.
- I. Standard Porch Posts: Hollow aluminum extrusion
- 1. 3-1/4 inches by 3-1/4 inches, 5000 lbs maximum load, 1365 lbs uplift resistance.
 - 2. 4 inches by 4 inches 21000 lbs maximum load, 1400 lbs uplift resistance.
- J. Round Porch Posts: Aluminum tubing, 6 inch diameter.
- K. Newel Posts: Hollow aluminum extrusion
- 1. 2-1/2 inches by 2-1/2 inches.
 - 2. 3-1/4 inches by 3-1/4 inches.
 - 3. 4 inches by 4 inches
- L. Accessories:
- 1. Post Caps and Trim: Cap all hollow extrusions with aluminum caps and trim as selected by the Architect from the manufacturer's available selections. Provide colors and textures matching railing types selected.
 - 2. Fasteners, Inserts, and Sleeves: Provide non-corrosive fasteners as provided by the manufacturer for applications indicated.
 - 3. Brackets and Wedges: Provide brackets and wedges as recommended by the manufacturer for each type of condition indicated.
- M. Finish: Finish railing system components after fabrication as follows:
- 1. Standard Colors complying with AAMA 2604 powder coatings formulated with super durable or modified polyester resins with colors as selected by the Architect.
 - 2. Special Colors complying with AAMA 2605 high-performance exterior specifications that are resistant to moisture, weathering, ozone and UV radiation with colors as selected by the Architect.

2.4 OUTDOOR LED LIGHTING

- A. Construction:
- 1. Die-Cast and Powder-Coated Aluminum Housing
 - 2. Acrylic Lens.
 - 3. High output 3000K LED bulbs. Rated at over 50,000 hours.
 - 4. LED light board coated with an Optical Conformal Coating to protect circuitry from normal environmental conditions.
 - 5. Mizu-P25 2.50mm Pitch Waterproof connections.
 - 6. UL / CSA approved.
- B. Fixture Style:
- 1. Pyramid Style Post Cap Light: Light shines outward on all sides.
 - a. Size: Fits post size:
 - 1) 2-1/2 inch
 - 2) 3-1/4 inch

- 3) 4 inch
- b. Low Power Draw: 0.4 Watts per Cap.
- c. Matching Post Caps: Provide none lighted caps where indicated.
- 2. Decorative Style Post Cap Light: Light shines outward on all sides.
 - a. Size: Fits post size:
 - 1) 2-1/2 inch
 - 2) 3-1/4 inch
 - 3) 4 inch
 - b. Low Power Draw: 0.4 Watts per Cap.
 - c. Matching Post Caps: Provide none lighted caps where indicated.
- 3. Pyramid Style Post Cap Downlight: Light shines downward on all sides.
 - a. Size: Fits post size:
 - 1) 2-1/2 inch
 - 2) 3-1/4 inch
 - 3) 4 inch
 - b. Low Power Draw: 1.6 Watts per Cap.
 - c. Matching Post Caps: Provide none lighted caps where indicated.
- 4. Decorative Style Post Cap Downlight: Light shines downward on all sides.
 - a. Size: Fits post size:
 - 1) 2-1/2 inch
 - 2) 3-1/4 inch
 - 3) 4 inch
 - b. Low Power Draw: 1.6 Watts per Cap.
- 5. Post and Stair Accent Light: Mounts to posts, stair risers or deck fascia. Low profile light shines downward.
 - a. Size: 2 inches W by 1 inch H.

- C. Fixture Color:
- 1. Gloss White
 - 2. Textured White
 - 3. Silver
 - 4. Gloss Bronze
 - 5. Textured Bronze
 - 6. Kona
 - 7. Gloss Black
 - 8. Textured Black
 - 9. Gloss Beige
 - 10. Brownstone
 - 11. Speckled Walnut
 - 12. Redwood
 - 13. Hunter Green
 - 14. White
 - 15. Almond
 - 16. Clay
 - 17. Black

- D. Accessories: Provide with the following accessories as required for the installation indicated on the Drawings.
- a. Wire Extension
 - b. Post Light Wire Kit
 - c. 2-Way Wire Splitter
 - d. 4-Way Wire Splitter
 - e. Plug Cover
 - f. Remote Dimmer: Control the brightness of lights remotely.
 - g. Photoelectric Timer: Set a timer for lights.
 - h. Power Supply: Mean Well NPF-40-12 UL8750 constant voltage and

constant current LED power supply.

- 1) Input Voltage: 90~305Vac
- 2) C.V. Output Voltage: 12.0 Volts
- 3) C.V. Max Current: 3.340 Amps
- 4) Max Output Power: 40 Watts
- 5) Constant Current: 3.340 Amps
- 6) C.C. Voltage Min: 7.20 VDC
- 7) C.C. Voltage Max: 12.00 VDC

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 insitu 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.
 4. Do not tension the cables completely until all the cables have been installed between the end posts.
 5. Provide intermediate support posts between end posts and tension cables to maintain a 3 inch (7.62 cm) maximum center to center spacing between cables.
 6. Expansion Joints: Provide expansion joints for continuous spans in excess of 40 feet (12.0 m). Construct joints by deleting structural adhesive from one end

of the spliced joint so that it is free to move in or out of the pipe. If a joint is provided every 30 feet (9.0 m), the width of the gap should allow 1/8 inch (3.0 mm) expansion for each 40 degrees F (22 degrees C) of expected temperature rise.

- D. Install LED lighting in accordance with the manufacturer's recommendations. Coordinate with Division 16 - Electrical: Electrical service and disconnects, wire routing and connections.

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.

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