SECTION 05 73 00

ORNAMENTAL ALUMINUM RAILING

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\*\* NOTE TO SPECIFIER \*\* Keylink; Ornamental aluminum railing products.
This section is based on the products of Keylink, which is located at:110 Peters Rd.New Holland, PA 17557Toll Free Tel: 888-704-7130Tel: 717-435-3196Fax: 717-355-7129Email: [request info (jsurovi@keylinkonline.com)](https://arcat.com/rfi?action=email&company=Keylink&message=RE%253A%2520Spec%2520Question%2520(05720key)%253A%2520&coid=48043&spec=05720key&rep=&fax=717-355-7129)
Web: <https://keylinkonline.com>
 [ [Click Here](https://arcat.com/company/keylink-48043) ] for additional information.
Welcome to Keylink, where innovation meets elegance in aluminum railing solutions. Our extensive range of aluminum railing products is designed to ensure safety and security while providing style for both residential and commercial applications.
Keylink proudly offers a variety of railing styles, including traditional designs, as well as vertical and horizontal stainless-steel cable infill options. Our products not only meet the highest standards of durability and performance but also elevate the aesthetic appeal of any space.
We are committed to excellence in every aspect of our production. Keylink utilizes state-of-the-art powder coating technology, certified by the Powder Coating Institute with PCI 4000 certificationone of only five applicators in North America to achieve this prestigious recognition. This ensures that our railings are not only visually striking but also resistant to corrosion and wear, providing long-lasting beauty and safety.
Explore our website and social media channels for the latest product offerings and innovations. At Keylink, we believe that quality and style go hand in hand, making us the ideal choice for your railing needs.

1. GENERAL
	1. SECTION INCLUDES

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

* + 1. Aluminum decorative railings.
		2. Gates.
		3. Gates hardware.
		4. Residential fencing.
		5. Outdoor LED lighting.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 01 74 19 - Construction Waste Management and Disposal.
		2. Section 01 81 13 - Sustainable Design Requirements.
		3. Section 01 91 13 - General Commissioning Requirements.
		4. Section 03 30 00 - Cast-in-Place Concrete.
		5. Section 05 52 13 - Pipe and Tube Railings. For nonornamental railings fabricated from pipes and tubes.
		6. Section 06 10 00 - Rough Carpentry. For wood blocking for anchoring railings.
		7. Section 06 40 13 - Exterior Architectural Woodwork. For wood railings.
		8. Section 06 40 23 - Interior Architectural Woodwork. For wood railings.
		9. Division 26 - Electrical: Electrical service and disconnects, wire routing and connections.

\*\* NOTE TO SPECIFIER \*\* Coordinate the following for the Project requirements.

* 1. PRICE AND PAYMENT PROCEDURES
		1. Allowances.
		2. Unit Prices.
		3. Alternates.
		4. Measurement and Payment.
	2. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American Architectural Manufacturers Association (AAMA):

\*\* NOTE TO SPECIFIER \*\* Coordinate the finishes required in Part Two, 2604 and/or 2605.

* + - 1. AAMA 2604 - Performance Requirements and Test Procedures for High-Performance Organic Coatings on Aluminum Extrusions and Panels.
			2. AAMA 2605 - Performance Requirements and Test Procedures for High-Performance Organic Coatings on Aluminum Extrusions and Panels.
			3. AAMA 609 and AAMA 610.02 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum.
		1. ASTM International (ASTM):
			1. ASTM A492 - Standard Specification for Stainless Steel Rope Wire.
			2. ASTM B26 - Standard Specification for Aluminum-Alloy Sand Castings.
			3. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy.
			4. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
			5. ASTM B247 - Standard Specification for Aluminum and Aluminum Die Forgings, Hand Forgings and rolled Ring Forgings.
			6. ASTM B429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
		2. International Code Council (ICC).
		3. National Association of Home Builders:
			1. NAHB ICC 700-2011 - Practice No. 601.7 No Site-Applied Finishing Materials.
			2. NAHB ICC 700-2011 - Practice No. 604.1 Recycled Content.
		4. U.S. Green Building Council, LEED Building Design & Construction (BD+C) 2009 (Version 3.0) (LEED v2009).
		5. PCI Certification: An extensive audit program that evaluates a manufacturer's business practices, process elements, equipment, maintenance practices and quality control capabilities. Certified coaters can show, through demonstrated audit performance measurement, that they have the capabilities to correctly clean, coat and cure products to meet manufacturer's recommendations. Certification is not a determination of the quality of the powder coated product that is produced. It strictly certifies that the coater has the capabilities and competencies to produce a high-quality powder coated product. For more detailed information go to https://www.powdercoating.org/page/Certification.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product Data:
			1. Manufacturer's product lines of decorative metal railings assembled from standard components.
			2. Illuminated rails.
			3. Stainless steel cable and cable fittings.
			4. Fasteners.
			5. Post-installed anchors.
			6. Handrail brackets.
			7. Wood rails.
			8. Anchoring cement.
			9. Metal finishes.
		3. Sustainable Design Submittals:
			1. Pre and post-consumer recycled content: 75 percent. Credit XXX.
			2. Low VOC Powder Coatings. Credit XXX.
			3. Regional Materials. Credit XXX.
			4. Innovation in design. Credit XXX.
		4. Shop Drawings: Include plans, elevations, sections, and attachment details.
			1. For illuminated railings, include wiring diagrams and roughing-in details.
		5. Samples for Initial Selection: For products involving selection of color, texture, or design, including mechanical finishes.
		6. Samples for Verification: For each type of exposed finish required.

\*\* NOTE TO SPECIFIER \*\* Delete or revise first five subparagraphs below.

* + - 1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
			2. Illuminated railing.
			3. Fittings, end caps, and brackets.
			4. Cable and cable hardware and connections.
			5. Assembled sample of railing system, full height not required, made from full-size components, including:
				1. Top rail.
				2. Post.
				3. Handrail.

\*\* NOTE TO SPECIFIER \*\* Delete illuminated handrail if not required.

* + - * 1. Illuminated handrail.
				2. Guard infill.
				3. Show method of connecting and finishing members at intersections.
		1. Delegated Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
		2. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
		3. Product Test Reports: For tests on railings performed by a qualified testing agency, in accordance with ASTM E894, ASTM E935 and ASTM E985.
		4. Research Reports: For post-installed anchors, from qualified testing agency acceptable to authorities having jurisdiction.
		5. Preconstruction test reports.
		6. Closeout Submittals:
			1. Warranty Documentation.
			2. Record Documentation.
	1. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Minimum 10 years documented experience manufacturing products specified in this section.
		2. Installers Qualifications: Minimum 3 years documented experience installing systems specified in this section.
		3. Source Limitations: Obtain aluminum decorative railing components from single source from single manufacturer.

\*\* 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. When deciding on the extent of the mock-up, consider all the major different types of work on the project. Note that a mockup will represent an additional cost for the project. Delete if not required.

* + 1. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
			1. Finish areas designated by Architect or as shown on Drawings.
			2. Build mockups for each form and finish of railing, consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 24 inches (610 mm) in length.
			3. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
			4. Refinish mock-up area as required to produce acceptable Work.
			5. Accepted mock-ups shall be comparison standard for remaining Work.
			6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

\*\* NOTE TO SPECIFIER \*\* Include a Pre-Installation Meeting if the project size and/or quality warrant taking such a precaution. Delete if not required.

* + 1. 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. DELIVERY, STORAGE, AND HANDLING
		1. Handle and store materials in accordance with manufacturer's instructions and to prevent damage.
		2. Product Storage:
			1. In manufacturer's unopened, properly labeled, original packaging until ready for installation.
			2. Avoid damage from moisture, abrasion, and other construction activities.
			3. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.
	2. SEQUENCING
		1. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
	3. FIELD CONDITIONS
		1. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication.
	4. COORDINATION AND SCHEDULING
		1. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, which are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.
	5. WARRANTY
		1. Manufacturer's limited lifetime warranty.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Keylink, which is located at:110 Peters Rd.New Holland, PA 17557Toll Free Tel: 888-704-7130Tel: 717-435-3196Fax: 717-355-7129Email: [request info (jsurovi@keylinkonline.com)](https://arcat.com/rfi?action=email&company=Keylink&message=RE%253A%2520Spec%2520Question%2520(05720key)%253A%2520&coid=48043&spec=05720key&rep=&fax=717-355-7129);Web: <https://keylinkonline.com>

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

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00 - Product Requirements.
	1. PERFORMANCE AND DESIGN REQUIREMENTS
		1. 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.
		2. 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.
				1. Uniform Load: 50 lbs per ft (74.3 kg/m) applied at the top in any direction.
				2. Concentrated load: 200 lbs (90.7 kg) applied at the top in any direction.
			2. Infill: Infill load and other loads need not be applied simultaneously.
				1. Concentrated Load: 50 lbs (22.7 kg) applied horizontally on any area of 1 sq ft (0.093 sq m).
		3. Thermal Movements: 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.
		4. 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.
		5. 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.
		6. There are various ASTM standards that are referenced in the building code that specify the testing required for the various railing systems (aluminum, steel, PVC, etc.). The common theme throughout all of the standards are the tests that are required to be performed: All tests are performed at the Design Load times a 2.5 safety factor.
			1. Infill Test: Design Load: 50 lbs over 1 sq ft (2.39 kPa).
			2. Test Load: 125 lbs over a 1 sq ft (5.98 kPa) area.
			3. Uniform Load Test; Horizontal and Vertical:
				1. Residential Design Load: 20 lbs per ft (29.76 kg per m) of railing length.
				2. Commercial Design Load: 50 lbs per ft (74.4 kg per m) of railing length.
				3. Test Load: A minimum of 2.5 times the design load.
			4. Concentrated Load Test at Midspan (tested horizontally and vertically):
				1. Design Load: 200 lbs (90.7 kg).
				2. Test Load: 500 lbs (227 kg); 2.5 times Design Load.
			5. Concentrated Load Test at Brackets (tested horizontally and vertically):
				1. Design Load: 200 lbs (90.7 kg) per bracket.
				2. Test Load: 500 lbs (227 kg) per bracket; 2.5 times Design Load.
			6. Posts are also tested with 200 lbs (90.7 kg) concentrated load at the post top.
				1. Test Load: 500 lbs (227 kg).
		7. Structural Performance: Railings, including attachment to building construction, are to withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated: Verify code compliance for each application.
			1. Handrail and Top Rail of Guards.
				1. Uniform Load: 50 lbf/ft. (0.73 kN/m) applied in any direction.
				2. Concentrated Load: 200 lbf (0.89 kN) applied in any direction.
				3. Uniform and concentrated loads need not be assumed to act concurrently.
			2. Infill of Guards:
				1. Concentrated Load: 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
				2. Infill load and other loads need not be assumed to act concurrently.
				3. \*\*SPECIFIER NOTE\*\*Remove thermal movements if only interior railing are used
		8. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior railings by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
			1. Temperature Change: 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C), material surfaces.
	2. METALS, GENERAL
		1. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
		2. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
	3. ALUMINUM DECORATIVE RAILINGS:

\*\* NOTE TO SPECIFIER \*\* Choose one or more products to suit the project, ie: A, B , C or D.

* + 1. American Series: Extruded Bars and Shapes, Including Extruded Tube: Alloy 6063-T6
			1. Flat Top Rail: 1-3/4 x 1-7/8 inches (44 x 48 mm).
			2. Bottom Rail: 1-1/4 x 1-1/2 inches (32 x 38 mm).

\*\* NOTE TO SPECIFIER \*\* Delete railing section height not required.

* + - 1. Railing Section Height: 36 inches (914 mm) rail height.
			2. Railing Section Height: 42 inches (1067 mm) rail height.

\*\* NOTE TO SPECIFIER \*\* Delete section and style options not required.

* + - 1. Railing Section Size: 5 ft (1524 mm).
				1. Style: Aluminum Baluster: Level.
				2. Style: Aluminum Baluster: Stair.
			2. Railing Section Size: 6 ft (1829 mm).
				1. Style: Aluminum Baluster: Level.
				2. Style: Aluminum Baluster: Stair.
				3. Style: Aluminum Rod Rail: Level.
				4. Style: Aluminum Rod Rail: Stair.
				5. Style: Vertical Cable: Level.
				6. Style: Vertical Cable: Stair.
				7. Style: Horizontal Cable: Level.
				8. Style: Horizontal Cable: Stair.
			3. Railing Section Size: 7 ft (2134 mm).
				1. Style: Aluminum Baluster: Level.
				2. Style: Aluminum Baluster: Stair.
			4. Railing Section Size: 8 ft (2438 mm).
				1. Style: Aluminum Baluster: Level.
				2. Style: Aluminum Baluster: Stair.
				3. Style: Aluminum Rod Rail: Level.
				4. Style: Aluminum Rod Rail: Stair.
				5. Style: Vertical Cable: Level.
				6. Style: Vertical Cable: Stair.
				7. Style: Horizontal Cable: Level.
				8. Style: Horizontal Cable: Stair.
			5. Die Cast Forgings: Alloy A380 or Alloy A360.
				1. Level and Stair Brackets: Standard brackets Included with sections.

\*\* NOTE TO SPECIFIER \*\* Include brackets to field assemble sections. Level and stair brackets are included with sections. Additional brackets available are listed below.

* + - * 1. Level: For American Baluster, Vertical Cable, and Horizontal Cable.

45 - degree Bracket.

Horizontal Swivel Bracket.

Horizontal Swivel Wedge 10, 22.5 degrees.

Universal Swivel Bracket.

* + - * 1. Stair: For American Baluster, Vertical Cable, and Horizontal Cable.

Vertical Swivel Bracket.

Universal Bracket.

Vertical Stair Wedge 5 degree.

Universal Swivel Bracket.

\*\* NOTE TO SPECIFIER \*\* Delete infill options not required.

* + - 1. Infills: Aluminum Baluster. Square.
			2. Infills: Aluminum Baluster: Round.
			3. Infills: Aluminum Baluster: Hammered.
			4. Infills: Aluminum Baluster: Twisted.
			5. Infills: Aluminum Baluster: Bowed - 3/4 inch (19 mm).
			6. Infills: Aluminum Rod Rail.
			7. Infills: Vertical Cable: High Strength Stainless Steel Cables: Tensioned between top and bottom rails. Spacing: 3.25 inch (83 mm) centers
				1. Cable Size and Type: 1/8 inch (3 mm)diameter, 7x7 strand, T-316L.

Stainless steel.

Black oxide stainless steel.

* + - * 1. Intermediate Support Balusters: 1/2 inch (13 mm) diameter solid stainless steel rod.

For Rail Section Length of 72 inches (1829 mm): Quantity of 3. Equally spaced.

For Rail Section Length of 92 inches (2337 mm): Quantity of 4. Equally spaced.

* + - * 1. Support Block (HxW): 3-1/2 x 1-7/16 inch (89 x 36 mm) "Y"-shaped die cast aluminum.
			1. Infills: Horizontal High Strength Stainless Steel Cables: Tensioned between end posts. Spacing: 2-7/8 inch centers.
				1. Cable Size and Type: 1/8 inch (3 mm) diameter,1x19 strand, T-316L.

Stainless steel.

Black oxide stainless steel.

* + - * 1. Intermediate Support Balusters: 3/4 inch (19 mm) aluminum center balusters.

For Rail Section Length of 72 inches (1829 mm): Quantity of 1. Equally spaced.

For Rail Section Length of 72 inches (1829 mm): Quantity of 2. Equally spaced.

* + - 1. Posts: Alloy 6063 T6 with affixed welded plate.

\*\* NOTE TO SPECIFIER \*\* Delete post size options not required.

* + - * 1. Size: 2-1/2 inch (64 mm). For aluminum baluster or vertical cable infill options.
				2. Size: 2-1/2 inch (64 mm). For horizontal cable infill option.
				3. Size: 3-1/4 inch (83 mm). For aluminum baluster or vertical cable infill options.
				4. Size: 3-1/4 inch (83 mm). For horizontal cable infill option.
				5. Size: 4 inch (102 mm). For aluminum baluster or vertical cable infill options.
			1. Post Caps and Bases: Alloy A380.

\*\* NOTE TO SPECIFIER \*\* Delete cap and base cover options not required.

* + - * 1. Flat Cap: 2-1/2 inch (64 mm).
				2. Flat Cap: 3-1/4 inch (83 mm).
				3. Flat Cap: 4 inch (102 mm).
				4. Ball Cap: 2-1/2 inch (64 mm).
				5. Ball Cap: 3-1/4 inch (83 mm).
				6. Ball Cap: 4 inch (102 mm).
				7. Post Base Cover, 1 Piece: 2-1/2 inch (64 mm).
				8. Post Base Cover, 1 Piece: 3-1/4 inch (83 mm).
				9. Post Base Cover, 1 Piece: 4 inch (102 mm).
				10. Post Base Cover, 2 Piece: 2-1/2 inch (64 mm).
				11. Post Base Cover, 2 Piece: 3-1/4 inch (83 mm).
				12. Post Base Cover, 2 Piece: 4 inch (102 mm).
			1. Lighting Construction:
				1. Housing: Die-cast aluminum, powder-coated.
				2. Lens: Polycarbonate.
				3. LED Bulbs: High output 3000K. Rated at over 50,000 hours.
				4. LED Light Board: Coated with an Optical Conformal Coating to protect circuitry from normal environmental conditions.
				5. Waterproof connections: Mizu-P25 2.50 mm Pitch

\*\* NOTE TO SPECIFIER \*\* Available lighting options: Delete options not required.

* + - * 1. Post Cap Light: Decorative. 2-1/2 inch (64 mm).
				2. Post Cap Light: Decorative. 3-1/4 inch (83 mm).
				3. Post Cap Light: Decorative. 4 inch (102 mm).
				4. Post Cap Light: Pyramid. 2-1/2 inch (64 mm).
				5. Post Cap Light: Pyramid. 3-1/4 inch (83 mm).
				6. Post Cap Light: Pyramid. 4 inch (102 mm).
				7. Post Cap Down Light: Decorative. 2-1/2 inch (64 mm).
				8. Post Cap Down Light: Decorative. 3-1/4 inch (83 mm).
				9. Post Cap Down Light: Decorative. 4 inch (102 mm).
				10. Post Cap Down Light: Pyramid. 2-1/2 inch (64 mm).
				11. Post Cap Down Light: Pyramid. 3-1/4 inch (83 mm).
				12. Post Cap Down Light: Pyramid. 4 inch (102 mm).
				13. Post Cap - No Lights: Decorative. 2-1/2 inch (64 mm).
				14. Post Cap - No Lights: Decorative. 3-1/4 inch (83 mm).
				15. Post Cap - No Lights: Decorative. 4 inch (102 mm).
				16. Post Cap - No Lights: Pyramid. 2-1/2 inch (64 mm).
				17. Post Cap - No Lights: Pyramid. 3-1/4 inch (83 mm).
				18. Post Cap - No Lights: Pyramid. 4 inch (102 mm).
				19. Post and Stair Accent Lights.

\*\* NOTE TO SPECIFIER \*\* Delete options not required.

* + - 1. Accessories:
				1. Wire Extension: 2 ft (610 mm).
				2. Wire Extension: 5 ft (1524 mm).
				3. Wire Extension: 9 ft (2743 mm).
				4. Post Light Wire Kit:

2-Way Wire Splitter.

Wire Extension: 5 ft (1524 mm).

Wire Extension: 9 ft (2743 mm)

* + - * 1. Splitter: 2-Way Wire.
				2. Splitter: 4-Way Wire: Includes 1 plug cover.
				3. Plug Cover: Packs of 3.
				4. Remote Dimmer: Control brightness of lights remotely.
				5. Photoelectric Timer: Set a timer for lights.

\*\* NOTE TO SPECIFIER \*\* Power supply is suitable for up to 40 fixtures. Verify quantity required for installation as required Delete options not required.

* + - * 1. Power Supply: Mean Well OWA-60U-12 UL8750 constant voltage and constant current LED power supply.

Number of Supported Fixtures: 40.

Input Voltage: 90 to 264 VAC.

C.V. Output Voltage: 12.0 Volts.

C.V. Max Current: 5.000 Amps.

Max Output Power: 60 Watts.

Constant Current: 5.000 Amps.

C.C. Voltage Min: 6.00 VDC

C.C. Voltage Max: 12.00 VDC

\*\* NOTE TO SPECIFIER \*\* Delete railing system option not required.

* + - 1. Barrier Railing Systems: American Series. Barrier Rail System available in pre-determined standard sizes, include American Top and Bottom Rail profiles, 3/4 inch (19 mm) square balusters, end caps and mounting brackets.
				1. Railing Section Size: 36 inch (914 mm).
				2. Railing Section Size: 69 inch (1753 mm).
				3. Railing Section Size: 72 inch (1829 mm).
				4. Railing Section Size: 96 inch (2438 mm).
			2. ADA Railing Systems:
				1. Secondary Handrail: 1-1/2 inch Schedule 40 (38 mm) aluminum pipe with 1.9 inch (48 mm) outside diameter.

End Cap.

"P" Loop Return.

Corner Mounting Bracket 6 inch (152 mm).

Outside Elbow.

Connector.

Universal Elbow: 0 to 90 degrees.

Straight Handrail: 104 inches.

Radius Elbow: 34 degrees.

Elbow Return Bracket: 90 degrees.

Wall Bracket: Straight.

Mounting Bracket: 3 inch (76 mm).

Radius Elbow: 90 degrees.

* + - 1. Aluminum Gates
				1. Aluminum Adjustable Gates: American Series.

Adjustable Gate Size: 36 inch x 36 inch (914 x 914 mm).

Adjustable Gate Size: 36 inch x 42 inch (914 x 1067 mm).

Adjustable Gate Size: 42 inch x 36 inch (1067 x 914 mm).

Adjustable Gate Size: 42 inch x 42 inch (1067 x 1067 mm).

* + - * 1. Infills:

Square baluster.

Rod Rail.

Horizontal Cable.

Vertical Cable.

* + - * 1. Finish: AAMA 2604 Powder Coat: Certification: PCI 4000.

Color: Textured Black.

Color: Textured Bronze.

Color: Textured White.

Color: Matte Black.

Color: Matte White.

Color: Oil Rubbed Bronze

* + - * 1. Hardware:

Gate Hardware:

Manufacturer: D and D Gate Hardware; Solid hinges and latches for gate security.

Finish: Black powder coating.

Finish: White powder coating.

Gate Hinge: TruClose Regular Multi-Adjustable.

Gate Hinge: TruClose Self-Closing.

Gate Latch: MAGNALatch Alert Child Safety.

Gate Latch: MAGNALatch (Non-Alert) Child Safety.

Gate Latch: Lockable.

Gate Latch: Lockable Deluxe. Can be keyed to match house keys.

Gate Latch: Lockable Magnetic.

Gate handle.

\*\* NOTE TO SPECIFIER \*\* Delete finish option, then delete color options not required.

* + - 1. Finish: AAMA 2604 Powder Coat: Certification: PCI 4000.
				1. Color: Textured Black.
				2. Color: Textured Bronze.
				3. Color: Textured White.
				4. Color: Matte Black.
				5. Color: Matte White.
				6. Color: Oil Rubbed Bronze.

\*\* NOTE TO SPECIFIER \*\* The following color are by special order only.

* + - * 1. Color: Satin Driftwood.
				2. Color: Satin Smoke.
				3. Color: Satin Storm.
				4. Color: Satin Willow.
				5. Color: Gloss Black.
				6. Color: Gloss White.
				7. Color: Gloss Bronze.
				8. Color: Beige.
				9. Color: Kona.
				10. Color: Brownstone.
				11. Color: Hunter Green.
				12. Color: Redwood.
				13. Color: Silver.
				14. Color: Speckled Walnut.
			1. Finish: AAMA 2605 Powder Coat Certification: PCI 4000.
				1. Color: Coastal Textured Black.
				2. Color: Coastal Textured Bronze.
				3. Color: Coastal Textured White.
				4. Color: Coastal Matte White.
				5. Color: Coastal Oil Rubbed Bronze.
				6. Color: Coastal Satin Driftwood.
				7. Color: Coastal Satin Smoke.
				8. Color: Coastal Satin Storm.
				9. Color: Coastal Satin Willow.
				10. Color: Coastal Gloss Black.
				11. Color: Coastal Gloss Bronze.
				12. Color: Coastal Gloss White.
		1. Outlook Series: Extruded Bars and Shapes, Including Extruded Tube: Alloy 6063-T6
			1. Profiled Top Rail: 1-5/8 x 1-17/32 inches (41 x 38.9 mm).
			2. Bottom Rail: 1-1/4 x 1 inches (32 x 25 mm).

\*\* NOTE TO SPECIFIER \*\* Delete railing section height not required, then delete Section sizes and styles not required.

* + - 1. Railing Section Height: 36 inches (914 mm) rail height.
				1. Railing Section Size: 5 ft (1524 mm).

Style: Aluminum Baluster: Level.

Style: Aluminum Baluster: Stair.

* + - * 1. Railing Section Size: 6 ft (1829 mm)

Style: Aluminum Baluster: Level.

Style: Aluminum Baluster: Stair.

* + - * 1. Railing Section Size: 7 ft (2134 mm)

Style: Aluminum Baluster: Level.

Style: Aluminum Baluster: Stair.

* + - * 1. Railing Section Size: 8 ft (2438 mm)

Style: Aluminum Baluster: Level.

Style: Aluminum Baluster: Stair.

* + - 1. Railing Section Height: 42 inches (1067 mm) rail height.
				1. Railing Section Size: 4 ft (1219 mm)

Style: Aluminum Baluster: Level.

Style: Aluminum Baluster: Stair.

* + - * 1. Railing Section Size: 5 ft (1524 mm).

Style: Aluminum Baluster: Level.

Style: Aluminum Baluster: Stair.

* + - * 1. Railing Section Size: 6 ft (1829 mm)

Style: Aluminum Baluster: Level.

* + - 1. Die Cast Forgings: Alloy A380 or Alloy A360.

\*\* NOTE TO SPECIFIER \*\* Include brackets to field assemble sections. Level and stair brackets included with sections. Additional brackets available are listed below.

* + - * 1. Additional Brackets: Outlook.

Level Brackets: 45 degrees.

Level Brackets: Horizontal Swivel,

Stair Brackets: Vertical Swivel.

Stair Brackets Bracket: Vertical Stair Wedge 5 degrees.

\*\* NOTE TO SPECIFIER \*\* Delete infills option if not required.

* + - 1. Infills: Aluminum Baluster. Square. 5/8 inch (16 mm)
			2. Posts: Alloy 6063 T6 with affixed welded plate.

\*\* NOTE TO SPECIFIER \*\* Delete post size options not required.

* + - * 1. Size: 2-1/2 inch (64 mm). For aluminum baluster.
				2. Size: 3-1/4 inch (83 mm). For aluminum baluster.
				3. Size: 4 inch (102 mm). For aluminum baluster.
			1. Post Caps and Bases: Alloy A380.

\*\* NOTE TO SPECIFIER \*\* Delete cap and base cover options not required.

* + - * 1. Flat Cap: 2-1/2 inch (64 mm).
				2. Flat Cap: 3-1/4 inch (83 mm).
				3. Flat Cap: 4 inch (102 mm).
				4. Ball Cap: 2-1/2 inch (64 mm).
				5. Ball Cap: 3-1/4 inch (83 mm).
				6. Ball Cap: 4 inch (102 mm).
				7. Post Base Cover, 1 Piece: 2-1/2 inch (64 mm).
				8. Post Base Cover, 1 Piece: 3-1/4 inch (83 mm).
				9. Post Base Cover, 1 Piece: 4 inch (102 mm).
				10. Post Base Cover, 2 Piece: 2-1/2 inch (64 mm).
				11. Post Base Cover, 2 Piece: 3-1/4 inch (83 mm).
				12. Post Base Cover, 2 Piece: 4 inch (102 mm).
			1. Lighting Construction:
				1. Housing: Die-cast aluminum, powder-coated.
				2. Lens: Polycarbonate.
				3. LED Bulbs: High output 3000K. Rated at over 50,000 hours.
				4. LED Light Board: Coated with an Optical Conformal Coating to protect circuitry from normal environmental conditions.
				5. Waterproof connections: Mizu-P25 2.50 mm Pitch.

\*\* NOTE TO SPECIFIER \*\* Available lighting options: Delete options not required.

* + - * 1. Post Cap Light: Decorative. 2-1/2 inch (64 mm).
				2. Post Cap Light: Decorative. 3-1/4 inch (83 mm).
				3. Post Cap Light: Decorative. 4 inch (102 mm).
				4. Post Cap Light: Pyramid. 2-1/2 inch (64 mm).
				5. Post Cap Light: Pyramid. 3-1/4 inch (83 mm).
				6. Post Cap Light: Pyramid. 4 inch (102 mm).
				7. Post Cap Down Light: Decorative. 2-1/2 inch (64 mm).
				8. Post Cap Down Light: Decorative. 3-1/4 inch (83 mm).
				9. Post Cap Down Light: Decorative. 4 inch (102 mm).
				10. Post Cap Down Light: Pyramid. 2-1/2 inch (64 mm).
				11. Post Cap Down Light: Pyramid. 3-1/4 inch (83 mm).
				12. Post Cap Down Light: Pyramid. 4 inch (102 mm).
				13. Post Cap - No Lights: Decorative. 2-1/2 inch (64 mm).
				14. Post Cap - No Lights: Decorative. 3-1/4 inch (83 mm).
				15. Post Cap - No Lights: Decorative. 4 inch (102 mm).
				16. Post Cap - No Lights: Pyramid. 2-1/2 inch (64 mm).
				17. Post Cap - No Lights: Pyramid. 3-1/4 inch (83 mm).
				18. Post Cap - No Lights: Pyramid. 4 inch (102 mm).
				19. Post and Stair Accent Lights.

\*\* NOTE TO SPECIFIER \*\* Delete accessories options not required.

* + - 1. Accessories:
				1. Wire Extension: 2 ft (610 mm)length.
				2. Wire Extension: 5 ft (1524 mm) length.
				3. Wire Extension: 9 ft (2743 mm) length.
				4. Post Light Wire Kit:

2-Way Wire Splitter

Wire Extension: 5 ft (1524 mm)

Wire Extension: 9 ft (2743 mm)

* + - * 1. Splitter: 2-Way Wire.
				2. Splitter: 4-Way Wire: Includes 1 plug cover.
				3. Plug Cover: Packs of 3.
				4. Remote Dimmer: Control brightness of lights remotely.
				5. Photoelectric Timer: Set a timer for lights.
				6. Power Supply: Mean Well NPF-40-12 UL8750 constant voltage and constant current LED power supply.

Number of Supported Fixtures: 40.

Input Voltage: 90 to 305 VAC.

C.V. Output Voltage: 12.0 Volts.

C.V. Max Current: 3.340 Amps.

Max Output Power: 40 Watts.

Constant Current: 3.340 Amps.

C.C. Voltage Min: 7.20 VDC.

C.C. Voltage Max: 12.00 VDC.

* + - 1. ADA Railing Systems:
				1. Secondary Handrail: 1-1/2 inch Schedule 40 (38 mm) aluminum pipe with 1.9 inch (48 mm) outside diameter.

End Cap.

"P" Loop Return.

Corner Mounting Bracket 6 inch (152 mm).

Outside Elbow.

Connector.

Universal Elbow: 0 to 90 degrees.

Straight Handrail: 104 inches (2642 mm).

Radius Elbow: 34 degrees.

Elbow Return Bracket: 90 degrees.

Wall Bracket: Straight.

Mounting Bracket: 3 inch (76 mm).

Radius Elbow: 90 degrees.

* + - 1. Aluminum Gates
				1. Aluminum Adjustable Gates: Outlook Series.

Adjustable Gate Size: 36 inch x 36 inch (914 x 914 mm).

Adjustable Gate Size: 36 inch x 42 inch (914 x 1067 mm).

Adjustable Gate Size: 42 inch x 36 inch (1067 x 914 mm).

Adjustable Gate Size: 42 inch x 42 inch (1067 x 1067 mm).

* + - * 1. Infills:

Square baluster.

* + - * 1. Finish: AAMA 2604 Powder Coat: Certification: PCI 4000.

Color: Textured Black.

Color: Textured Bronze.

Color: Textured White.

Color: Matte Black.

Color: Matte White.

Color: Oil Rubbed Bronze

* + - * 1. Hardware:

Gate Hardware:

Manufacturer: D and D Gate Hardware; Solid hinges and latches for gate security.

Finish: Black powder coating.

Finish: White powder coating.

Gate Hinge: TruClose Regular Multi-Adjustable.

Gate Hinge: TruClose Self-Closing.

Gate Latch: MAGNALatch Alert Child Safety.

Gate Latch: MAGNALatch (Non-Alert) Child Safety.

Gate Latch: Lockable.

Gate Latch: Lockable Deluxe. Can be keyed to match house keys.

Gate Latch: Lockable Magnetic.

Gate Handle:

\*\* NOTE TO SPECIFIER \*\* Delete finish option, then delete color options not required.

* + - 1. Finish: AAMA 2604 Powder Coat: Certification: PCI 4000.
				1. Color: Textured Black.
				2. Color: Textured Bronze.
				3. Color: Textured White.
				4. Color: Matte Black.
				5. Color: Matte White.
				6. Color: Oil Rubbed Bronze.

\*\* NOTE TO SPECIFIER \*\* The following color are by special order only.

* + - * 1. Color: Satin Driftwood.
				2. Color: Satin Smoke.
				3. Color: Satin Storm.
				4. Color: Satin Willow.
				5. Color: Gloss Black.
				6. Color: Gloss White.
				7. Color: Gloss Bronze.
				8. Color: Beige.
				9. Color: Kona.
				10. Color: Brownstone.
				11. Color: Hunter Green.
				12. Color: Redwood.
				13. Color: Silver.
				14. Color: Speckled Walnut.
			1. Finish: AAMA 2605 Powder Coat: Certification: PCI 4000.
				1. Color: Coastal Textured Black.
				2. Color: Coastal Textured Bronze.
				3. Color: Coastal Textured White.
				4. Color: Coastal Matte White.
				5. Color: Coastal Satin Driftwood.
				6. Color: Coastal Satin Smoke.
				7. Color: Coastal Satin Storm.
				8. Color: Coastal Satin Willow.
				9. Color: Coastal Oil Rubbed Bronze.
				10. Color: Coastal Gloss Black.
				11. Color: Coastal Gloss Bronze.
				12. Color: Coastal Gloss White.
		1. Chesapeake Series: Extruded Bars and Shapes, Including Extruded Tube: Alloy 6063-T6.
			1. Top Rail "Drink" Profile: 2-7/8 x 1-1/8 inches (73 x 29 mm).
			2. Bottom Rail: 1-1/4 x 1-1/2 inches (32 x 38 mm).

\*\* NOTE TO SPECIFIER \*\* Delete railing section height not required.

* + - 1. Railing Section Height: 36 inches (914 mm) rail height.
			2. Railing Section Height: 42 inches (1067 mm) rail height.

\*\* NOTE TO SPECIFIER \*\* Delete section and style options not required.

* + - 1. Rail Section Size: 6 ft (1829 mm).
				1. Style: Aluminum Baluster: Level.
				2. Style: Aluminum Baluster: Stair.
				3. Style: Aluminum Rod Rail: Level.
				4. Style: Aluminum Rod Rail: Stair.
				5. Style: Vertical Cable: Level.
				6. Style: Vertical Cable: Stair.
				7. Style: Horizontal Cable: Level.
				8. Style: Horizontal Cable: Stair.
			2. Rail Section Size: 8 ft (2438 mm).
				1. Style: Aluminum Baluster: Level.
				2. Style: Aluminum Baluster: Stair.
				3. Style: Aluminum Rod Rail: Level.
				4. Style: Aluminum Rod Rail: Stair.
				5. Style: Vertical Cable: Level.
				6. Style: Vertical Cable: Stair.
				7. Style: Horizontal Cable: Level.
				8. Style: Horizontal Cable: Stair.
			3. Die Cast Forgings: Alloy A380.
				1. Level and Stair Brackets: Standard brackets Included with sections.

\*\* NOTE TO SPECIFIER \*\* Include brackets to field assemble sections. Level and stair brackets included with sections. Additional brackets available are listed below.

* + - * 1. Additional Brackets: Chesapeake.

Level Brackets: 45 degrees.

Level Brackets: Horizontal Swivel.

Level Brackets: Horizontal Swivel Wedge 10 degrees.

Level Brackets: Horizontal Swivel Wedge 22.5 degrees.

Level Brackets: Horizontal Swivel Wedge 45 degrees.

Stair Brackets: Vertical Swivel.

Stair Brackets: Vertical Stair Wedge 5 degrees.

\*\* NOTE TO SPECIFIER \*\* Delete infill options not required.

* + - 1. Infills: Aluminum Baluster. Square. 3/4 inch (19 mm).
			2. Infills: Aluminum Baluster. Round.
			3. Infills: Aluminum Baluster. Hammered.
			4. Infills: Aluminum Baluster. Twisted.
			5. Infills: Aluminum Baluster. Bowed.
			6. Infills: Aluminum Rod Rail.
			7. Infills: Vertical High Strength Stainless Steel Cables: Tensioned between top and bottom rails. Spacing: 3.25 inch (83 mm) centers.
				1. Cable Size and Type: 1/8 inch (3 mm) diameter, 7x7 strand, T-316L.

Stainless steel.

Black oxide stainless steel.

* + - * 1. Intermediate Support Balusters: 1/2 inch (13 mm) diameter solid stainless steel rod.

Quantity of 2. Equally spaced. Section Length: 72 inches (1829 mm).

Quantity of 3. Equally spaced. Section Length: 96 inches (2438 mm).

* + - * 1. Support Block (HxW): 3-1/2 x 1-7/16 inch (89 x 36 mm) "Y"-shaped die cast aluminum.
			1. Infills: Horizontal High Strength Stainless Steel Cables: Tensioned between end posts. Spacing: 2-7/8 inch (73 mm) centers.
				1. Cable Size and Type: 1/8 inch (3 mm) diameter,1x19 strand, T-316L.

Stainless steel.

Black oxide stainless steel.

* + - * 1. Intermediate Support Balusters: 3/4 inch (19 mm) aluminum center balusters

Quantity of 1. Equally spaced. Section Length: 72 inches (1829 mm).

Quantity of 2. Equally spaced. Section Length: 96 inches (2438 mm).

* + - 1. Posts: Alloy 6063 T6 with affixed welded plate.

\*\* NOTE TO SPECIFIER \*\* Delete post size options not required.

* + - * 1. Size: 2-1/2 inch (64 mm). For aluminum baluster or vertical cable infill options.
				2. Size: 2-1/2 inch (64 mm). For horizontal cable infill option.
				3. Size: 3-1/4 inch (83 mm). For aluminum baluster or vertical cable infill options.
				4. Size: 3-1/4 inch (83 mm). For horizontal cable infill option.
				5. Size: 4 inch (102 mm). For aluminum baluster or vertical cable infill options.
			1. Post Caps and Bases: Alloy A380.

\*\* NOTE TO SPECIFIER \*\* Delete cap and base cover options not required.

* + - * 1. Flat Cap: 2-1/2 inch (64 mm).
				2. Flat Cap: 3-1/4 inch (83 mm).
				3. Flat Cap: 4 inch (102 mm).
				4. Ball Cap: 2-1/2 inch (64 mm).
				5. Ball Cap: 3-1/4 inch (83 mm).
				6. Ball Cap: 4 inch (102 mm).
				7. Post Base Cover, 1 Piece: 2-1/2 inch (64 mm)
				8. Post Base Cover, 1 Piece: 3-1/4 inch (83 mm).
				9. Post Base Cover, 1 Piece: 4 inch (102 mm).
				10. Post Base Cover, 2 Piece: 2-1/2 inch (64 mm).
				11. Post Base Cover, 2 Piece: 3-1/4 inch (83 mm).
				12. Post Base Cover, 2 Piece: 4 inch (102 mm).
			1. Lighting Construction:
				1. Housing: Die-cast aluminum, powder-coated.
				2. Lens: Polycarbonate.
				3. LED Bulbs: High output 3000K. Rated at over 50,000 hours.
				4. LED Light Board: Coated with an Optical Conformal Coating to protect circuitry from normal environmental conditions.
				5. Waterproof Connections: Mizu-P25 2.50 mm Pitch.

\*\* NOTE TO SPECIFIER \*\* Available lighting options: Delete options not required.

* + - * 1. Post Cap Light: Decorative. 2-1/2 inch (64 mm).
				2. Post Cap Light: Decorative. 3-1/4 inch (83 mm).
				3. Post Cap Light: Decorative. 4 inch (102 mm).
				4. Post Cap Light: Pyramid. 2-1/2 inch (64 mm).
				5. Post Cap Light: Pyramid. 3-1/4 inch 83( mm).
				6. Post Cap Light: Pyramid. 4 inch (102 mm).
				7. Post Cap Down Light: Decorative. 2-1/2 inch (64 mm).
				8. Post Cap Down Light: Decorative. 3-1/4 inch (83 mm).
				9. Post Cap Down Light: Decorative. 4 inch (102 mm).
				10. Post Cap Down Light: Pyramid. 2-1/2 inch (64 mm).
				11. Post Cap Down Light: Pyramid. 3-1/4 inch (83 mm).
				12. Post Cap Down Light: Pyramid. 4 inch (102 mm).
				13. Post Cap - No Lights: Decorative. 2-1/2 inch (64 mm).
				14. Post Cap - No Lights: Decorative. 3-1/4 inch (83 mm).
				15. Post Cap - No Lights: Decorative. 4 inch (102 mm).
				16. Post Cap - No Lights: Pyramid. 2-1/2 inch (64 mm).
				17. Post Cap - No Lights: Pyramid. 3-1/4 inch (83 mm).
				18. Post Cap - No Lights: Pyramid. 4 inch (102 mm).
				19. Post and Stair Accent Lights.

\*\* NOTE TO SPECIFIER \*\* Delete accessories options not required.

* + - 1. Accessories:
				1. Wire Extension: 2 ft (610 mm) length.
				2. Wire Extension: 5 ft (1524 mm) length.
				3. Wire Extension: 9 ft (2743 mm) length.
				4. Post Light Wire Kit:

2-Way Wire Splitter

Wire Extension: 5 ft (1524 mm).

Wire Extension: 9 ft (2743 mm)

* + - * 1. Splitter: 2-Way Wire.
				2. Splitter: 4-Way Wire: Includes 1 plug cover.
				3. Plug Cover: Packs of 3.
				4. Remote Dimmer: Control brightness of lights remotely.
				5. Photoelectric Timer: Set a timer for lights.
				6. Power Supply: Mean Well NPF-40-12 UL8750 constant voltage and constant current LED power supply.

Number of Supported Fixtures: 40.

Input Voltage: 90 to 305 VAC.

C.V. Output Voltage: 12.0 Volts.

C.V. Max Current: 3.340 Amps.

Max Output Power: 60 Watts.

Constant Current: 3.340 Amps.

C.C. Voltage Min: 7.20 VDC.

C.C. Voltage Max: 12.00 VDC.

* + - 1. ADA Railing Systems:
				1. Secondary Handrail: 1-1/2 inch Schedule 40 (38 mm) aluminum pipe with 1.9 inch outside diameter.

End Cap.

"P" Loop Return.

Corner Mounting Bracket: 6 inch (152 mm).

Outside Elbow.

Connector.

Universal Elbow: 0 to 90 degrees.

Straight Handrail: 104 inches (2642 mm).

Radius Elbow: 34 degrees

Elbow Return Bracket: 90 degrees.

Wall Bracket: Straight.

Mounting Bracket: 3 inch (76 mm).

Radius Elbow: 90 degrees.

\*\* NOTE TO SPECIFIER \*\* Delete finish option, then delete color options not required.

* + - 1. Finish: AAMA 2604 Powder Coat: Certification: PCI 4000.
				1. Color: Textured Black.
				2. Color: Textured Bronze.
				3. Color: Textured White.
				4. Color: Matte Black.
				5. Color: Matte White.
				6. Color: Oil Rubbed Bronze.

\*\* NOTE TO SPECIFIER \*\* The following color are by special order only.

* + - * 1. Color: Satin Driftwood
				2. Color: Satin Smoke.
				3. Color: Satin Storm.
				4. Color: Satin Willow.
				5. Color: Gloss Black.
				6. Color: Gloss White.
				7. Color: Gloss Bronze.
				8. Color: Beige.
				9. Color: Kona.
				10. Color: Brownstone.
				11. Color: Hunter Green.
				12. Color: Redwood.
				13. Color: Silver.
				14. Color: Speckled Walnut.
			1. Finish: AAMA 2605 Powder Coat: Certification: PCI 4000.
				1. Color: Coastal Textured Black.
				2. Color: Coastal Textured Bronze.
				3. Color: Coastal Textured White.
				4. Color: Coastal Matte White.
				5. Color: Coastal Satin Driftwood.
				6. Color: Coastal Satin Smoke.
				7. Color: Coastal Satin Storm.
				8. Color: Coastal Satin Willow.
				9. Color: Coastal Oil Rubbed Bronze.
				10. Color: Coastal Gloss Black.
				11. Color: Coastal Gloss Bronze.
				12. Color: Coastal Gloss White.
		1. Discovery Series: Extruded Bars and Shapes, Including Extruded Tube: Alloy 6063-T6.
			1. Top Rail: 2 x 1-1/4 inches (51 x 32 mm).
			2. Bottom Rail: 2 x 1-1/4 inches (51 x 32 mm).
			3. Railing Section Height: 36 inches (914 mm) rail height.

\*\* NOTE TO SPECIFIER \*\* Delete Section sizes and styles not required.

* + - 1. Railing Section Size: 6 ft (1829 mm).

Style: Aluminum Baluster: Level.

Style: Aluminum Baluster: Stair.

* + - * 1. Railing Section Size: 8 ft (2438 mm).

Style: Aluminum Baluster: Level.

Style: Aluminum Baluster: Stair.

* + - 1. Die Cast Forgings: Alloy A380 or Alloy A360.

\*\* NOTE TO SPECIFIER \*\* Include brackets with field assemble sections. Level and stair brackets apply to 2-1/2 inch posts.

* + - * 1. Additional Brackets: Discovery:

Level Brackets.

Stair Brackets.

\*\* NOTE TO SPECIFIER \*\* Delete infills option if not required.

* + - 1. Infills: Aluminum Baluster. Square. 5/8 inch (16 mm).
			2. Posts: Alloy 6063 T6 with affixed welded plate.

\*\* NOTE TO SPECIFIER \*\* Delete post size option not required.

* + - * 1. Size: 2-1/2 inch (64 mm) . For aluminum baluster.
				2. Size: 4-1/4 inch (108 mm) Sleeve. For aluminum baluster.
			1. Post Caps and Bases: Alloy A380.

\*\* NOTE TO SPECIFIER \*\* Delete flat cap option not required.

* + - * 1. Flat Cap: 2-1/2 inch (64 mm).
				2. Flat Cap: 4-1/4 inch (108 mm).
				3. Post Base Cover, 2 Piece: 2-1/2 inch (64 mm).
			1. ADA Railing Systems:
				1. Secondary Handrail: 1-1/2 inch Schedule 40 (38 mm) aluminum pipe with 1.9 inch outside diameter.

End Cap.

"P" Loop Return.

Corner Mounting Bracket 6 inch (152 mm).

Outside Elbow.

Connector.

Universal Elbow: 0 to 90 degrees.

Straight Handrail: 104 inches (2642 mm).

Radius Elbow: 34 degrees.

Elbow Return Bracket: 90 degrees.

Wall Bracket: Straight.

Mounting Bracket: 3 inch (76 mm).

Radius Elbow: 90 degrees.

* + - 1. Aluminum Gates
				1. Aluminum Adjustable Gates: Discovery Series.

Adjustable Gate Size: 36 inch x 36 inch (914 x 914 mm).

Adjustable Gate Size: 36 inch x 42 inch (914 x 1067 mm).

Adjustable Gate Size: 42 inch x 36 inch (1067 x 914 mm).

Adjustable Gate Size: 42 inch x 42 inch (1067 x 1067 mm).

* + - * 1. Infills:

Square baluster.

* + - * 1. Finish: AAMA 2604 Powder Coat: Certification: PCI 4000.

Color: Textured Black.

* + - * 1. Hardware:

Gate Hardware:

Manufacturer: D and D Gate Hardware; Solid hinges and latches for gate security.

Finish: Black powder coating.

Finish: White powder coating.

Gate Hinge: TruClose Regular Multi-Adjustable.

Gate Hinge: TruClose Self-Closing.

Gate Latch: MAGNALatch Alert Child Safety.

Gate Latch: MAGNALatch (Non-Alert) Child Safety.

Gate Latch: Lockable.

Gate Latch: Lockable Deluxe. Can be keyed to match house keys.

Gate Latch: Lockable Magnetic.

Gate Handle,

\*\* NOTE TO SPECIFIER \*\* Delete finish option, then delete color options not required.

* + - 1. Finish: AAMA 2604 Powder Coat: Certification: PCI 4000.
				1. Color: Textured Black.
			2. Finish: AAMA 2605 Powder Coat: Certification: PCI 4000.
				1. Color: Coastal Textured Black.
		1. External Cable Fittings: 316L Stainless Steel.
			1. External Cable Fittings: Level.
			2. External Cable Fittings: Stair.
			3. External Cable Fittings: Line Post Cable Channel.
			4. External Cable Fittings: Cable Railing Center Baluster. 39-5/8 inch (1006 mm).
			5. External Cable Fittings: Cable Railing Stair Center Baluster. 39 inch (991 mm).
			6. External Cable Fittings: Cable Railing Stair Center Baluster. 46 inch (1168 mm).
			7. External Cable Fittings: Square Baluster Mount. Level.
			8. External Cable Fittings: Square Baluster Mount. Stair.
	1. FABRICATION
		1. Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
		2. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.
			1. Clearly mark units for reassembly and coordinated installation.
			2. Use connections that maintain structural value of joined pieces.
		3. Cut, drill, and punch metals cleanly and accurately.
			1. Remove burrs and ease edges to a radius of approximately 1/32 inch (0.8 mm) unless otherwise indicated.
			2. Remove sharp or rough areas on exposed surfaces.
		4. Form work true to line and level with accurate angles and surfaces.
		5. Fabricate connections that will be exposed to weather in a manner to exclude water.
			1. Provide weep holes where water may accumulate.
			2. Locate weep holes in inconspicuous locations.
		6. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
		7. Connections: Fabricate railings with mechanical connections unless otherwise indicated.
	2. GENERAL FINISH REQUIREMENTS
		1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.
		2. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

\*\* NOTE TO SPECIFIER \*\* Retain paragraph below if exposed fasteners are allowed, especially with color anodic finish.

* + 1. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
1. EXECUTION

\*\* NOTE TO SPECIFIER \*\* Delete this article if no handrails are attached to plaster or gypsum board assemblies.

* 1. EXAMINATION
		1. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.
	2. INSTALLATION, GENERAL
		1. Perform cutting, drilling, and fitting required for installing railings.
			1. Fit exposed connections together to form tight, hairline joints.
			2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
			3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.

\*\* NOTE TO SPECIFIER \*\* Revise two subparagraphs below if closer tolerances are required. Both are from NAAMM's "Pipe Railing Systems Manual."

* + - 1. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
			2. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (6 mm in 3 m).
		1. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
			1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
		2. Adjust railings before anchoring to ensure matching alignment at abutting joints.
		3. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.
	1. RAILING CONNECTIONS
		1. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws, using plastic cement filler colored to match finish of railings.

\*\* NOTE TO SPECIFIER \*\* Retain "Expansion Joints" Paragraph below if expansion joints are required or revised to suit Project. Indicate locations on Drawings based on temperature changes expected and coefficient of expansion of metals involved.

* + 1. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve, extending 2 inches (50 mm) beyond joint on either side; fasten internal sleeve securely to one side; and locate joint within 6 inches (150 mm) of post.
	1. ANCHORING POSTS
		1. Anchor posts to metal or concrete surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
			1. For aluminum railings, attach posts as indicated, using fittings designed and engineered for this purpose.
	2. ATTACHING RAILINGS

\*\* NOTE TO SPECIFIER \*\* Delete the first two paragraphs below if railing ends are not returned to walls.

* + 1. Anchor railing ends to concrete and masonry with bracket connectors to railing ends and anchored to wall construction with anchors and bolts.
		2. Anchor railing ends to metal surfaces with bracket connectors bolted to metal surfaces.
		3. Attach handrails to walls with wall brackets, except where end flanges are used.
			1. Bracket Clearance: Inside handrail face to finished wall surface: 1-1/2 inch (38 mm).
			2. Bracket Clearance: Inside handrail face to finished wall surface: \_\_\_ inch (\_\_\_ mm).
			3. Bracket Type: Flange tapped for concealed anchorage to threaded hanger bolt.
			4. Bracket Type: Predrilled holes for exposed bolt anchorage.
			5. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
		4. Secure wall brackets and railing end flanges to building construction as follows:
			1. For Concrete and Solid Masonry Anchorage: Use drilled-in expansion shields and hanger or lag bolts.
			2. Hollow Masonry Anchorage: Use toggle bolts.
			3. Wood Stud Partitions: Hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
			4. Steel Framed Partitions:

\*\* NOTE TO SPECIFIER \*\* Retain one of three subparagraphs below if using steel studs.

* + - * 1. Hanger or lag bolts set into fire-retardant-treated wood backing between studs. Coordinate with stud installation to locate backing members.
				2. Fasten brackets directly to steel framing or concealed steel reinforcements using self-tapping screws of size and type required to support structural loads.
				3. Fasten brackets with toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.
	1. REPAIR
		1. Touchup Painting: Immediately after erection, clean bolted connections, and abraded areas of exposed areas with the same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
			1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
	2. FIELD QUALITY CONTROL
		1. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and to prepare test reports.
			1. Payment for Services: Will be made by Owner.
			2. Payment for Services: From the testing and inspecting allowance.
			3. Payment for Services: As authorized by Change Orders.
		2. Extent and Testing Methodology: Testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Test railings in accordance with ASTM E894 and ASTM E935 for compliance with performance requirements.
		3. Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and comply with specified requirements.
		4. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.
	3. CLEANING
		1. Clean aluminum by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry. Do not use chemical cleaners.
		2. Clean Stainless Steel cables and coat with Boeshield T9 Protectant, or approved protectant, as recommended by manufacturer.
	4. PROTECTION
		1. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
		2. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

END OF SECTION