SECTION 055200 – Metal railings, secton 057360 – decorative metal railings, OR

SECTION 265000- LIGHTING

Interna-LIGHT illuminated railing

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
			2. SUMMARY
				1. This Section includes the following:

Illuminated Railing, Aluminum, Stainless Steel

* + - 1. PERFORMANCE REQUIREMENTS
				1. All railings shall be supplied to conform to applicable sections of the following codes:

International Building Code

ADAAG

OSHA in certain jurisdictions

* + - * 1. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

Handrails:

Uniform load of 50 lbf/ft. applied in any direction.

Concentrated load of 200 lbf. applied in any direction.

Uniform and concentrated loads need not be assumed to act concurrently.

* + - * 1. Thermal Movements: Provide exterior railings that allow 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.

Temperature Change (Range): 120°F, ambient; 180°F, material surfaces.

* + - 1. SUBMITTALS
				1. Product Data: For the following:

Manufacturer's product lines of mechanically connected railings.

Grout, anchoring cement, and paint products.

* + - * 1. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

* + - * 1. Samples for Initial Selection: For products involving selection of color, texture, or design.
				2. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
				3. Product Test Reports: Supplier shall submit calculations and test reports for complete system.

If required, supplier shall provide PE stamped calculations and / or drawings.

* + - * 1. QUALITY ASSURANCE
				2. Source Limitations: Obtain each type of handrail through one source from a single manufacturer.
			1. PROJECT CONDITIONS
				1. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
			2. COORDINATION AND SCHEDULING
				1. Schedule installation so wall attachments are made only to completed walls. Do not support railing temporarily by any means that do not satisfy structural performance requirements.
1. PRODUCTS
	* + 1. MANUFACTURERS
				1. Post Mounted Railing
				2. Basis-of-Design Railing Product: Subject to compliance with requirements, provide Hollaender Interna-Light Illuminated Railing System.
			2. Lighting/LED specifications
				1. Lighting provided by KLIK LED- Pods inserted into top rail of railing system.
				2. Source: Selected high brightness LED
				3. Life (L70/ 70% brightness): 50,000 hours
				4. Light Output: Standard Output, 3000K, 4000K, 5000K; Low Output, 3000K, 4000K, 5000K; Others as required
				5. Beam Angle: Symmetric; Asymmetric
				6. Housing: Machined and hard coat anodized aluminum
				7. Mounting: Clip System
				8. Listings: ETL Listed for wet or dry locations
				9. Length: As required by railing layout
				10. Quantity: As required by railing layout
				11. Power Requirement: 24V
				12. Power Consumption: 2 W / LED unit
				13. Power Supply: 24V/100W
				14. Input Voltage to Power Supply: [120-277] [347]
				15. Temperature Range: -40°C through +60°C
				16. Product Rating: Interior and Exterior Applications, ETL Class 2 circuit.
				17. If Stainless Steel Railing is selected:

Basis of Design Railing Product – Interna-Rail® SS Handrail to be constructed of non-welded 304 SS component railing as manufactured and assembled by Hollaender® Manufacturing or an approved equivalent. Single source manufacturer is required.

Posts will be SS 304, 1 ½ in IPS nominal (1.90 in. OD), .120 in wall thickness. Rail and handrail will be SS 304, 1 ½ in IPS nominal (1.90 in. OD), .080 in wall thickness

Handrail will be attached to the post sections using one of the following non welded tees:

Hollaender model 655-8 non welded SS 304 tees for level section, and Hollaender model 673-8 SS 304 angled tee fittings

Hollaender model 655S-8 two piece adjustable tees

If 316 SS is desired ( in corrosive exterior applications), one of the following non welded tees will be used, in 316 SS:

Hollaender model 755-8 SS 316 for level, and 773-8 SS 316 for sloping.

Hollaender model 755S-8 SS 316 two piece adjustable tees

* + - * 1. If Aluminum selected:

Basis-of-Design Railing Product: Interna-Rail® Handrail aluminum component railing as manufactured and assembled by Hollaender® Manufacturing or an approved equivalent. Single source manufacturer is required. Welded railing will not be accepted.

Posts will be anodized aluminum 6005 Sch 80, 1 ½ in IPS nominal (1.90 in. OD). Rail and handrail will be Sch 40. Where necessary, lengths of the handrail will be spliced using Hollaender Model 70ES-8 internal locking splices.

Handrail will be attached to the post sections using Hollaender model 173 and 174 angles tee fittings and 5/16” – 18 anodized aluminum rivet nuts.

In conditions where railing is top mounted to the ramp, flanges shall be Hollaender 45 SBCS angled flanges.

In conditions where handrail is mounted to stair tread or stringer, Hollaender mounting flanges appropriate to the size and angle of the mounting surface shall be used

When conditions dictate core mounting, drill core holes 6 in deep x 3 in OD, fill with non- shrink grout.

End loops, upper and lower, shall extend horizontally beyond the post and be attached to the handrail using 70 ES-8 locking splices.

In conditions where handrail is mounted to stair tread or stringer, Hollaender mounting flanges appropriate to the size and angle of the mounting surface shall be used

When conditions dictate core mounting, drill core holes 6 in deep x 3 in OD, fill with non- shrink grout.

End loops, upper and lower, shall extend horizontally beyond the post

* + - * 1. Infill Panel Materials - Use if railing is to be a guard with infill panels, as opposed to 1 line handrail
			1. Supported Glass: Tempered Glass per ASTM C 1048: Fully Tempered, Condition A, Type 1 (Transparent Flat Glass), Quality Q3.

Comply with properties indicated for class, thickness, and manufacturing process that have been tested for surface and edge compression according to ASTM C1048 and for impact strength according to 16 CFR 1201 for category 2 materials.

\*\* NOTE TO SPECIFIER \*\* Delete glass type not required.

Glass Type: 3/8 inch (10 mm) tempered.

Glass Type: 7/16 inch (11 mm) tempered and laminated.

\*\* NOTE TO SPECIFIER \*\* Delete lamination material not required.

Lamination: PVG interlayer; for interior work.

Lamination: SGP interlayer; for exterior work.

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

Color: Clear.

Color: Architect to specify if not clear.

Color and Pattern: As scheduled in the Contract Documents.

Coordinate glazing for infill panel with Section 08810 - Glazing.

Attachment: Glass panels secured to top and bottom rails using Hollaender 144-8 two piece glass panel clips. 144-8 clips will be secured to rails using anodized aluminum tubular rivet nuts, and 5/16-18 UNC stainless steel socket head cap screws.

* + - 1. Metal Wire Mesh Infill Panels:
				1. Railing Attachment: Hollaender model 145 panel retainers and 1/4-20 UNC screws, with appropriate slot width for panel thickness, and set screw for final tightening of panel within retainer slot.

Panel retainer: 6061 - T6 aluminum alloy.

\*\* NOTE TO SPECIFIER \*\* Delete wire mesh type not required.

* + - * 1. Welded Steel Wire Mesh: 0.118 inch (3 mm) diameter steel wire.

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

Pattern: 2 inch (51 mm) by 2 inch (51 mm) square.

Pattern: 4 inch (102 mm) by 4 inch (102 mm) square.

Pattern: 1 inch (25 mm) by 4 inch (102 mm) rectangle.

Pattern: 2 inch (51 mm) by 1 inch (25 mm) rectangle.

Pattern: 2 inch (51 mm) by 2 inch (51 mm) diamond.

Pattern: Custom pattern as specified in Contract Documents.

Frame: Steel U-channel, 11 gage (2.29 mm), x 1 inch (25 mm), welded corners, ground smooth.

Bottom Frame Channel: Open channel to ensure water evacuation

* + - * 1. Aluminum Wire Mesh.

.250 inch (6 mm) diameter woven aluminum mesh.

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

Pattern: 2 inch (51 mm) by 2 inch (51 mm) square.

Pattern: 4 inch (102 mm) by 4 inch (102 mm) square.

Pattern: 1 inch (25 mm) by 4 inch (102 mm) rectangle.

Pattern: 2 inch (51 mm) by 1 inch (25 mm) rectangle.

Pattern: 2 inch (51 mm) by 2 inch (51 mm) diamond.

Pattern: Custom pattern as specified in Contract Documents.

Frame: Aluminum U-channel, 11 gage (2.29 mm), x 1 inch (25 mm), welded corners, ground smooth.

Bottom Frame Channel: Open channel to ensure water evacuation

* + - * 1. Woven Wire Mesh: 0.162 inch (3 mm) diameter carbon steel wire.

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

Pattern: Techna 3150.

Pattern: 2 inch (51 mm) Lockcrimp.

Frame: steel U-channel, minimum 11 ga (2.29 mm), x 1 inch (25 mm), welded corners, ground smooth.

Bottom Frame Channel:

Open channel to ensure water evacuation

Woven Wire Mesh: 0.162 inch (3 mm) diameter stainless steel wire.

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

Pattern: Techna 3150.

Pattern: 2 inch (51 mm) Lockcrimp.

Frame: steel U-channel, minimum 11 ga (2.29 mm), x 1 inch (25 mm), welded corners, ground smooth.

Bottom Frame Channel

Open channel to ensure water evacuation

* + - 1. Perforated Metal Infill Panels:

 Minimum 1 inch (25 mm) margins on all edges.

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

* + - * 1. Material: Steel, gauge as necessary to withstand loads indicated, but in no case less than 14 gauge (1.90 mm), ASTM A1008.
				2. Material: Stainless Steel, gauge as necessary to withstand loads indicated, but in no case less than 14 gauge (1.90 mm), ASTM A1008. Grade 304 for interior applications. Grade 316 for exterior applications.
				3. Material: Aluminum sheet of gage required to withstand loads indicated, minimum 0.125 inch (3 mm), aluminum alloy 3003-H14.

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

* + - * 1. Pattern: 1/2 inch (13 mm) round holes, spaced on 11/16 inch (17 mm) staggered centers.
				2. Pattern: 1/4 inch (6 mm) round holes, spaced on 11/16 inch (17 mm) staggered centers.
				3. Pattern: 3/4 inch (19 mm) round holes, spaced on 1 inch (25 mm) staggered centers.
				4. Pattern: 1/2 inch (13 mm) square holes, spaced on 11/16 inch (17 mm) straight centers.
				5. Frame: U-channel in same material as infilll, minimum 11 ga (2.29 mm). thick, x 1 inch (25 mm), welded corners, ground smooth.

Bottom Frame Channel: Open to maximize water drainage assuring minimum maintenance and maximum corrosion protection.

* + - 1. 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: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.
			2. STAINLESS STEEL
				1. Type – 304 standard, 316 is higher cost alternative (for coastal, highly corrosive environments, difficult exterior applications in general)
				2. Stainless and heat resisting Chromium-Nickel steel plate, sheet and strip – ASTM A 167
				3. Seamless and welded austenitic stainless steel tubing for general service – ASTM A 269
				4. Seamless and welded austenitic stainless steel pipe – ASTM A312
			3. ALUMINUM
				1. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.
				2. Extruded Bars and Tubing: ASTM B 221, Alloy 6063-T5/T52, 6005-T5

Provide 1 ½ in IPS, (1.90 in OD) Standard Weight (Schedule 40) pipe for rails, Schedule 80 for posts, Schedule 10 for pickets, unless otherwise indicated

* + - * 1. Extruded Structural Pipe and Round Tubing: ASTM B 429, Alloy 6061-T6.

Provide 1 ½ in IPS, (1.90 in OD) Standard Weight (Schedule 40) pipe for rails, Schedule 80 for posts, unless otherwise indicated

* + - * 1. Drawn Seamless Tubing: ASTM B 210, Alloy 6063-T832
				2. Plate and Sheet: ASTM B 209, Alloy 6061-T6
				3. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6
				4. Base Flange Castings: ASTM B 26/B 26M, Alloy Almag 535
				5. Panel Clips and Structural Fasteners: Alloy 6063-T6.
			1. FASTENERS
				1. General: Provide the following:

Type 304 stainless-steel fasteners

* + - * 1. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
			1. MISCELLANEOUS MATERIALS
				1. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
			2. FABRICATION
				1. General: 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. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
				3. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. 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. Provide weep holes where water may accumulate.
				6. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items. Welding will not be accepted.
				7. Connections: Fabricate railings with non-welded connections, unless otherwise indicated. Welding will not be accepted.
				8. Non-welded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
				9. Form changes in direction as follows:

By flush bends or by inserting prefabricated flush-elbow fittings.

* + - * 1. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
				2. Close exposed ends of railing members with prefabricated end fittings.
				3. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
				4. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated. Flanges to be sand cast from aluminum alloy 535 with anodized finish and fastened directly to the post by means of two reverse knurl cup point set screws.
				5. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
			1. FINISHES, GENERAL
				1. Finish of Stainless steel – ornamental directional finish , #4 ( Satin finish) standard , #7 (mirror finish) - optional
				2. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
				3. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

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1. EXECUTION
	* + 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. Fit exposed connections together to form tight, hairline joints.

Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

Set posts plumb within a tolerance of 1/16 inch in 3 feet.

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.

* + - * 1. 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. Non-welded Connections: Use mechanical joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings.
				2. 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 beyond joint on either side, fasten internal sleeve securely to 1 side, and locate joint within 6 inches of post.
			2. ATTACHING HANDRAILS TO WALLS
				1. Attach handrails to wall with wall brackets. Provide brackets with 1-1/2 inch clearance from inside face of handrail and finished wall surface.
				2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
				3. Secure wall brackets to building construction as indicated, or if not indicated, as follows:

For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.

For hollow masonry anchorage, use toggle bolts.

Provide blocking between studs in stud wall construction.

* + - 1. ADJUSTING AND CLEANING
				1. Clean aluminum and stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.
			2. 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 metal handrail section