



COMMERCIAL PRODUCTS

SECTION 05 73 00 DECORATIVE METAL RAILINGS TREX COMMERCIAL PRODUCTS **LED Lit Railing System**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. LED Lit Railing System components.
 - 1. Single Color Strip Light.
 - 2. Single Color POD Light.
 - 3. Color Changing Strip Light.
 - 4. Applications:
 - a. Handrail.
 - b. Guardrail Top Rail.
 - c. Glass Top Cap.

1.2 RELATED SECTIONS

- A. Section 05 51 00 - Metal Stairs.
- B. Section 05 52 00 - Metal Railings.
- C. Section 05 70 00 - Decorative Metal.
- D. Section 08 80 00 - Glazing.
- E. Section 26 50 00 - Lighting.
- F. Section 26 51 13 - Lighting Fixtures.

1.3 REFERENCES

- A. American National Standards Institute (ANSI)
 - 1. A17.1 Accessible and Usable Buildings and Facilities.
 - 2. A21.1 Safety Requirements for Floor and Wall Openings, Railings and Toe Boards.

3. A58.I Minimum Design Loads in Buildings and Other Structures.
 4. Z97.I Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings.
- B. American Society for Testing and Materials (ASTM)
1. A240/A240M – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 2. A555 - Standard Specification for General Requirements for Stainless Steel Wire and Wire Rods.
 3. A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing.
 4. A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 5. B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings.
 6. B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 7. B210 – Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
 8. B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 9. B247 - Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings.
 10. B429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
 11. C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT, Coated and Uncoated Glass.
 12. E488 - Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements.
 13. E894 - Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings.
 14. C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).
 15. E2358 – Standard Specification for the Performance in Permanent Glass Railings, Guards and Balustrades.
 16. E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
- C. National Association of Architectural Metal Manufacturers (NAAMM):
1. AMP 500-505 – Metal Finishes Manual.
 2. AMP 521 – Pipe Railing Systems.
- D. Aluminum Association (AA):

1. ASD-1 Aluminum Standards and Data.
 2. DAF-45 Designation System for Aluminum Finishes.
 3. SAA-46 Standards for Anodized Architectural Aluminum.
 4. ADM-2015 Aluminum Design Manual
- E. American Welding Society (AWS):
1. ANSI/AWS D1.1/D1.1M Structural Welding Code - Steel.
 2. ANSI/AWS D1.2/D1.2M Structural Welding Code - Aluminum.
 3. ANSI/AWS D1.6/D1.6M Structural Welding Code – Stainless Steel.
- F. Americans with Disabilities Act (ADA).
- G. Americans with Disabilities Act Accessibility Guidelines (ADAAG).
- H. International Code Council (ICC): International Building Code (IBC).
- I. National Fire Protection Association (NFPA)
1. 101 Life Safety Code
- J. Electrical Code Compliance: NEC and applicable local code requirements.
- K. NEMA Compliance.
- L. IES Compliance.
- M. UL Compliance.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Handrails and railings shall withstand structural loading as determined by allowable design working stresses of materials.
- B. Structural Performance: Provide handrails and railings capable of withstanding effects of gravity loads and the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors and connections:
1. Top of Guards & Handrails:
 - a. Concentrated load of 200 lbf (0.89kN) applied at any point and in any direction.
 - b. Uniform load of 50 lbf/ft. (0.7kN/m) applied in any direction.
 - c. Concentrated and uniform loads need not be assumed to act concurrently.
 2. Guards Infill Area:
 - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally to a 1 sq. ft. (0.09 sq. m) at any point in system. Including panels, intermediate rails, balusters, or other elements composing infill area.
 - b. Infill load need not be assumed to act concurrently with other loads in determining stress on

guard.

3. Thermal Movements: Design handrails and railings to allow for movements resulting from 120 degree F (49 C) changes in ambient as required for exterior rail applications only.
4. Corrosion Resistance: Separate incompatible materials to prevent galvanic corrosion.
5. Wind Load: Provide handrails and railings capable of withstanding the project specific wind loads without exceeding allowable design working stress of materials for handrails, railings, anchors, and connections.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
- C. Shop Drawings: Submit plan and typical section detail to depict the proper configuration, assembly, installation, and termination of each product specified in this section. Including: Section details, Mounting methods, Typical Elevations, and Key plan layout.
- D. Verification Samples: For each finish product specified, two samples, representing actual product, color, and finish.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of five (5) years' experience.
 1. Trex Commercial Products, 7008 Northland Drive North, Suite 150; Minneapolis, MN 55428; Toll Free Tel: 877-215-RAIL(7245); Email: info@trexcommercial.com.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 1. Finish areas designated by Architect.
 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 3. Refinish mock-up area as required to produce acceptable work.
- C. Railing System:
 1. System components: Pre-engineered by registered Professional Engineer licensed in the State in which project is located.
 2. Attachments to building structure: Pre-engineered by registered Professional Engineer licensed in State in which project is located.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
- C. Store products indoors in temperature-controlled facility.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication.
- B. Where field measurements cannot be made without delaying the railing fabrication and delivery, obtain guaranteed dimensions in writing by the Contractor and proceed with fabrication of products to not delay fabrication, delivery and installation.
- C. Coordinate fabrication and delivery schedule of handrails with construction progress and sequence to avoid delay of railing installation
- D. 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.

1.9 WARRANTY

- A. At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.
- B. Electrical components: 5 year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Trex Commercial Products, 7008 Northland Drive North, Suite 150; Minneapolis, MN 55428; Toll Free Tel: 877-215-RAIL(7245); Email: info@trexcommercial.com.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MATERIALS

- A. Aluminum:
 - 1. Extruded Pipe: Alloy 6061-T6 or similar.
 - 2. Extruded Bars, Shapes and Moldings: Alloy 6061-T6 or similar.
- B. Stainless Steel:
 - 1. Tubing: ASTM A 554, Type 304 or 316.

2. Pipe: ASTM A 312/A 312M, Type 304 or 316.
3. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20 or CF 8M or CF 3M.
4. Sheet, Strip, Plate, and Flat Bar: ASTM A 666 or ASTM A 240/A 240M, [Type 304 or 316].
5. Bars and Shapes: ASTM A 276, Type 304 or 316.

2.3 LED Strip Light (Single Color) Components:

- A. Nominal Power Output:
 1. **[3.0 watts/FT (317 max lumens/FT)]**
 2. **[4.0 watts/FT (389 max lumens/FT)]**
 3. **[5.0 watts/FT (468 max lumens/FT)]**
- B. Color:
 1. **[2700K]**
 2. **[3000K]**
 3. **[3500K]**
 4. **[4000K]**
 5. **[Amber (590-595nm)]**
- C. Input Voltage: 24VDC
- D. Beam Angle: 110 degrees
- E. Mounting Method: Adhesive backing
- F. Dimmable: Yes
- G. CRI: 95+
- H. Lifespan: up to 70,000 hrs (LM70)
- I. Suitable Uses: IP67 (dry, damp or wet locations)
- J. Housing:
 1. Material: Natural PVC
 2. Direction: **[Asymmetric (45 degree)] [Symmetric]**
- K. Lens:
 1. Material: Impact resistant acrylic
 2. Color: **[Frosted] [Opaque] [Clear]**

2.4 LED POD Light Components:

- A. Output:
 1. **[2700K Color: 130 lumens/POD]**
 2. **[3000K Color: 145 lumens/POD]**
 3. **[4000K Color: 154 lumens/POD]**
- B. Nominal Power Consumption: 2.0 watts/POD
- C. Color:
 1. **[Warm – 2700K]**
 2. **[Warm White – 3000K]**
 3. **[Neutral White – 4000K]**
 4. **[Amber]**
- D. Input Voltage: 24VDC
- E. Beam Angle: 110 degrees
- F. Mounting Method: Snap Clip
- G. Dimmable: Yes
- H. CRI: 80-85+
- I. Lifespan: up to 50,000 hrs
- J. Suitable Uses: IP65 dry or damp locations
- K. Housing:
 1. Material: Aluminum
 2. Direction: **[Asymmetric] [Symmetric]**

- L. Lens:
 - 1. Material: Impact resistant acrylic
 - 2. Color: **[Clear] [Frosted] [Diffused]**

2.5 LED Strip Light (Color Changing):

- A. Nominal Power Output:
 - 1. **[RGB – 6.0 watts/FT (338 max TOTAL lumens/FT)]**
 - 2. **[RGBW - 6.0 watts/FT (292 max TOTAL lumens/FT)]**
- B. White Color for RGBW:
 - 1. **[2700K]**
 - 2. **[3000K]**
- C. Input Voltage: 24VDC
- D. Beam Angle: 110 degrees
- E. Mounting Method: Adhesive backing
- F. Dimmable: Yes
- G. CRI: 93+
- H. Lifespan: up to RGB = 50,000 hrs (L70), RGBW = 30,000 hrs (L70)
- I. Suitable Uses: IP67 (dry, damp or wet locations)
- J. Housing:
 - 1. Material: Natural PVC
 - 2. Direction: **[Asymmetric (45 degree)] [Symmetric]**
- K. Lens:
 - 1. Material: Impact resistant acrylic
 - 2. Color: **[Clear] [Opaque]**
- L. Decoder:
 - 1. Input Voltage: 24VDC
 - 2. Input DMX Signal: DMX512 (RJ45) / 1990 Digital
 - 3. Output Power: 192-384 watts
 - 4. Output Signal: 4 channels @ 4A
 - 5. Operating Temperatures: -4 to 122 degrees F
 - 6. Built into power supply housing.
- M. Controller:
 - 1. Input Voltage: Dedicated 5VDC Power Supply
 - 2. Input DMX Signal: DMX512 (RJ45) / 1990 Digital
 - 3. Output Power: 0-400 watts (pass through)
 - 4. Output Signal: DMX over Ethernet or RJ45
 - 5. Suitable Uses: Dry locations only
 - 6. Operating Temperatures: 0 to 50 degrees F
 - 7. Wall mounted
 - 8. Fully Programmable via miniUSB or ethernet

2.6 Remote Mounted Power Supply (Driver):

- A. Remote Mounted Power Supply:
 - 1. Input Voltage: 110-277VAC
 - 2. Output Voltage: 24VDC
 - 3. Output Wattage (max): **[96 watts] [2 x 96 watts] [3 x 96 watts]**
 - 4. Output Current (max): 4 amps per channel
 - 5. Input Hz: 50-60
 - 6. Class Rating: Class 2
 - 7. Dimmable: Yes, (0-10V, Forward Phase, MLV, ELV, Triac)
 - 8. Suitable Uses: IP67 (dry, damp or wet locations)
 - 9. Operating Temperatures: -40 to 140 degrees F
 - 10. Integrated wiring compartment.

B. Vault In-Ground Remote Power Supply System:

1. Power Supply(s) Mounted in 16.5 inch x 9.5 inch x 12 inch enclosure
2. Removable Stainless steel access cover and lawn guard/concrete pour ring
3. Suitable Uses: IP68 (dry, damp, or wet locations)
4. Input Voltage: 120-277VAC
5. Output Voltage: 24VDC
6. Output Wattage (max): **[100 watts] [2 x 100 watts]**
7. Output Current (max): 4.1 amps per channel
8. Input Hz: 50-60
9. Class Rating: Class 2
10. Dimmable: Yes (0-10V)
11. Operating Temperatures: -4 to 104 degrees F

C. Remote Power Supply with DMX:

1. Power Supply(s) Mounted in 15.4 inch (391 mm) x 9.22 inch (234 mm) x 4.9 inch (124.5 mm) enclosure
2. Suitable Uses: IP68 (dry, damp, or wet locations)
3. Input Voltage: 120-277VAC
4. Output Voltage: 24VDC
5. Output Wattage (max): **[100 watts] [2 x 100 watts] [3x 100 watts]**
6. Output Current (max): 2.0 amps per channel (RGB), 1.5 amps per channel (RGBW),
7. Input Hz: 50-60
8. Class Rating: Class 2
9. DMX modules built into enclosure (3x max – 1 for each 100 watt power supply. \
10. DMX dimming down to 0%
11. Operating Temperatures: -4 to 122 degrees F

2.7 Railing Components

A. Guardrail Top rail:

1. Material: **[Type 304] [Type 316] [stainless steel] -OR- [6061-T6 aluminum]** round tube/pipe.
2. Diameter: **[1.5 inch (38.1 mm)] [1.66 inch (42.2 mm)] [1.9 inch (48.3 mm)] [Custom]**.
3. Height: 43 inch (1092.2 mm) min.

B. Glass Top Cap:

1. Material: **[Type 304] [Type 316] [stainless steel] -OR- [6061-T6 aluminum]**.
2. Size (for 1/2" laminated glass):
 - a. Round Stainless: **[1.5 inch (38.1 mm)] [1.66 inch (42.2 mm)] [1.9 inch (48.3 mm)] [3.0 inch (76.2 mm)] [Custom]**.
 - b. Flat Stainless: **[1.31 inch (33.3 mm) sharp corner] [1 inch (25.4 mm) hemmed] [Custom]**.
 - c. Round Aluminum: **[1.5 inch (38.1 mm)] [1.66 inch (42.2 mm)] [1.9 inch (48.3 mm)] [3.0 inch (76.2 mm)] [Custom]**.
 - d. Flat Aluminum: **[1.5 inch (38.1 mm) square] [1.13 inch (28.7 mm) hemmed] [Custom]**.
3. Size (for 3/4" laminated glass):
 - a. Round Stainless: **[2 inch (50.8 mm)] [3.0 inch (76.2 mm)] [Custom]**.
 - b. Flat Stainless: **[1.31 inch (33.3 mm) sharp corner] [1 inch (25.4 mm) hemmed] [Custom]**.
 - c. Round Aluminum: **[3.0 inch (76.2 mm)] [Custom]**.
 - d. Flat Aluminum: **[1.13 inch (28.7 mm) hemmed] [Custom]**.
4. Height: 43 inch (1092.2 mm) min.

C. Handrails:

1. Material: **[Type 304] [Type 316] [stainless steel] -OR- [6061-T6 aluminum]** round tube/pipe.
2. Diameter: **[1.5 inch (38.1 mm)] [1.66 inch (42.2 mm)] [1.9 inch (48.3 mm)] [Custom]**.
3. Height: 36 inch (914.4 mm).

D. Handrail Posts:

1. Material: Match handrail material.
2. Diameter: Match handrail diameter or as required by engineering.
3. Spacing: As required by engineering.

E. Handrail Brackets/Standoffs:

1. Rod & saddle type bracket – mechanically attached to handrail.
2. Material: Match handrail material
3. Style: **[Bent Rod] [Adjustable Rod (stainless only)] [Custom]**.

F. Mounting method:

1. **[Wall/glass mount]**
2. **[Baseplate]**
3. **[Core]**

2.8 FASTENERS

- A. Anchors: Select fasteners of type, grade and class required to produce connections suitable for anchoring handrails and railings to other types of construction indicated and capable of withstanding design loads.
- B. Component Hardware: Type best suited to application, stainless steel.

2.9 GROUT AND ANCHORING CEMENT

- A. Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.10 FABRICATION

- A. All mitered and welded corners shall be ground smooth to match finish.
- B. Make exposed joints butt tight and flush.
- C. Interior sleeves shall be used for typical splices.
- D. Fabricate railings in accordance with approved Shop Drawings.
- E. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.
- F. Cut, reinforce, drill and tap components as indicated on drawings to receive finish hardware, screws and similar items.
- G. Fabricate railings with joints tightly fitted and secured. Furnish fittings to accommodate site assembly and installation.

- H. Provide mounted handrails wall returns at wall ends unless otherwise indicated. Close ends of returns, unless clearance between end of railing and wall is 1/4 inch (6mm) or less.
- I. Accommodate for expansion and contraction of members and building movement without damage to connections or members.

2.11 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for applying and designating finishes.
 - 1. Aluminum: AA DAF-45
 - 2. Stainless Steel: NAAMM AMP 503
- B. Appearance of Finished Work:
 - 1. Variations in appearance of abutting or adjacent units are acceptable if they are within one-half of the range of approved samples. Noticeable variations in the same unit are not acceptable.
 - 2. 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.
- C. Finish Coating: Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with manufacturer's written instructions.
 - 1. Anodize: Clear Anodize AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker unless indicated otherwise.
 - 2. No 4 Brushed (stainless steel)
 - a. Circumferential on all round pipe and tube.
 - b. Linear running the length of the rail on all other materials.
 - 3. Powdercoat:
 - a. Material: AAMA 2604 - Polyester powder coating, 3 mil average film thickness
 - b. **[Color _____]**

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. Coordinate post setting drawings, diagrams, templates, instructions, and directions for installation of anchorages. These include items such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete and masonry construction.
 - 1. Coordinate delivery of anchorages to project site.

2. Coordinate that blocking is in place for all mounting fasteners.
- B. Clean debris and dust from surfaces and embed holes thoroughly prior to installation.
- C. Clean surfaces thoroughly prior to installation.
- D. 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 railing system in accordance with manufacturer's approved Shop Drawings and instructions.
- B. Install components plumb and level, accurately fitted, free from distortion and defects.
- C. Provide anchors for connecting railings to supporting construction.
- D. Perform cutting, drilling, and fitting required for installation of handrails. Accurately set handrails in location, alignment, and elevation, measured from established lines and levels.
- E. Fit exposed connections accurately together to form tight joints except as necessary for expansion.

3.4 PROTECTION

- A. After installation, General Contractor or Owner shall be responsible for protection of railings during the balance of construction.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. When cleaning stainless steel surfaces use plain water containing a mild soap or detergent. No abrasive agents or harsh chemicals shall be used.

END OF SECTION