

SECTION 05521
ALUMINUM HANDRAILS AND RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for aluminum handrails, railings, and accessories.

1.2 DEFINITIONS

- A. Guardrail (OSHA): A barrier secured to uprights and erected along the exposed sides and ends of platforms to prevent falling of persons.
- B. Handrail: A single bar or pipe supported on brackets from a wall or partition, as on a stairway or ramp, to mish persons a handhold in case of tripping.
- C. Railing (OSHA): A vertical barrier erected along exposed sides or stairways and platforms to prevent falls of persons. The top member of railing usually serves as a handrail.
- D. Stair Railing (OSHA): A vertical barrier erected along exposed sides of a stairway to prevent falls of persons.
- E. Toeboard (OSHA):
- F. A vertical barrier at floor level erected along exposed edges of a floor opening, wall opening, platform, runway, or ramp to prevent falls of materials.

1.3 SYSTEM DESCRIPTION

- A. General: Furnish and install aluminum handrail, railings, and appurtenances as shown on the Drawings and specified in this Section.
- B. Type: Two rail system permitted by SBC, Group F, Industrial Occupancy, inaccessible to the public.

1.4 SUBMITTALS

- A. Submit the following prior to handrail and railing fabrication:

1. Shop drawings and product data.
2. Detailed layout of handrail and railing system with sufficient plans, sections, and elevations for the complete field installation.
3. Dimensions and details demonstrating compliance with OSHA and Life Safety requirements.
4. Note stating design load standard.
5. Physical characteristics of handrail and railing, joints, and anchors.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements

1. Design and construction of guardrails and stair handrails shall comply with SBC Code, OSHA Standards, and NFPA 101, Life Safety Code.
2. Plant structures and buildings shall be considered Group F, Industrial Occupancy, inaccessible to the public.
3. Workmanship: Aluminum railing fabrication shall be performed by craftsmen experienced in the fabrication of architectural metal work.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Moultrie Manufacturing Co., Wesrail;
- B. Thompson Fabricating Co., Thompson Railing Systems;
- C. Or approved equal.

2.2 ALUMINUM RAILING SYSTEM FOR INDUSTRIAL OCCUPANCY

- A. Type: Mechanically jointed, pipe rail.
- B. Configuration: Two pipe rails and one toeboard.
- C. Fittings
 1. Type

- a. Mechanically fastened, component.
 - b. Components that are glued or epoxied will be rejected.
- 2. Fastener Material: Stainless steel.

- D. Design Load
 - 1. Standard: Building Code or OSHA, whichever is more restrictive.
 - 2. Vertical Post Minimum Spacing: Five feet.

- E. Railing and Posts
 - 1. Material: Aluminum alloy 6061-T6.
 - 2. Rail and Post Size
 - a. Nominal Diameter: 1 - 1/2"
 - b. Minimum Wall Thickness
 - (1) Rails: Schedule 40.
 - (2) Posts: Schedule 80.
 - 3. Post Reinforcement: As required to meet design load standards.

- F. Toeboards
 - 1. Requirement: Provide on railing along exposed edges of floor openings, wall openings, platforms, runways, and ramps.
 - 2. Material: Aluminum alloy 6061-T6.
 - 3. Minimum Thickness: 1/4"
 - 4. Maximum Projection into Walkway Area: 1-1/4"
 - 5. Gap Between Walkway Surface and Toeboard
 - a. Minimum: 1/8"
 - b. Maximum: 1/4"
 - 6. Vertical Height from Top Surface of Walkway to Top of Toeboard

- a. Minimum: 4"
 - b. Maximum: 6"
7. Connection to Vertical Posts
- a. If Detailed on Drawings: As shown on Drawings.
 - b. If Not Detailed on Drawings: As shown on approved shop drawings.
- G. Wall Brackets
- 1. Material: Aluminum alloy, or AISI 316 stainless steel.
 - 2. Design
 - a. Manufacturer's standard design as shown on approved shop drawings.
 - b. End wall mounted handrail at line of first nosing.
- H. Vertical Post Supports
- 1. Material: Aluminum alloy, or AISI 316 stainless steel.
 - 2. Type
 - a. Top surface mount or side mount as indicated on the Drawings.
 - b. Posts that are grouted or epoxied in sleeves or cored openings will be rejected.
- I. Mounting Bolts
- 1. Material: AISI 316 stainless steel
 - 2. Type: Wedge bolts furnished by railing manufacturer.
- J. Aluminum Finish
- 1. Type: Clear anodized.
 - 2. Standard: Aluminum Association M10-C22-A41 (215-R1).

2.3 PROTECTION

- A. Type: Plastic wrap.
- B. Maintenance
 - 1. Remove plastic wrap only as required to cut and connect rails and posts
 - 2. Maintain plastic wrap until substantial completion.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Field Measurement and Coordination
 - 1. Take field measurements prior to preparation of shop drawings.
 - 2. Coordinate and furnish setting drawings, diagrams, templates, instructions, and directions for installation of railing.
- B. Mounting Surfaces
 - 1. Inspect mounting surfaces.
 - 2. Correct defects prior to installation of railing.
- C. Railing Components
 - 1. Check railing components prior to installation.
 - 2. Check railing components for damage and fit.

3.2 INSTALLATION

- A. Install guardrails and handrails in accordance with applicable requirements of SBC, OSHA, and NFPA 101.
- B. Provide anchors and plates required for mounting railing.
- C. Perform cutting and fitting required for installation of railing.
 - 1. Cut and fit railing as shown on shop drawings.

2. Do not make alterations not shown on shop drawings without approval of Design Engineer.
- D. Install rails level and vertical posts plumb, accurately fitted, and free from distortion or defects.
 1. Precision fit joints, junctions, miters, and butting sections
 2. Provide tight, hairline joints.
- E. Install corrosion barriers between aluminum and concrete and between aluminum and dissimilar metals.
 1. Isolate surface mounted aluminum with one of the following systems:
 - a. Coat bottom of surface mounted aluminum railing posts and aluminum clip angles as specified in Section 09961 Protective Coating for Embedments.
 - b. Install vinyl or neoprene barrier pad between bottom of surface mounted aluminum railing post, or angle clip, and concrete. Area of pad shall equal area of aluminum surface.
 2. Coat aluminum embedded in concrete or grout as specified in Section 09961 Protective Coating for Embedments.

3.3 EXPANSION BOLTS

- A. Space anchor bolts ten diameters apart and five diameters edge distance for no reduction in pullout strength.
- B. Provide a safety factor of four on expansion bolt pullout and shear values published by the manufacturer.

3.4 CLEANING

- A. Clean installed railing.
- B. Remove paint, adhesives, concrete slobbers, grease, oil, and other substances from railing and exposed fasteners.
- C. Exposed surfaces of railing shall be free from burrs.
- D. Exposed surfaces of railing shall be free from gouges, scratches, grazes, or other blemishes.

END OF SECTION