



SECTION 05520

HANDRAILS AND RAILINGS

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Handrails and guardrails
- B. Guardrails for hatches and openings.
- C. Safety barriers.
- D. Roof edge protection.

1.2 RELATED SECTIONS

- A. Section 05500 - Metal Fabrications: Associated metal supports.
- B. Section 07400 - Membrane Roofing: Coordination of roof edge protection installation.

1.3 REFERENCES

- A. Americans with Disabilities Act Accessibility Guidelines (ADA).
- B. American National Standards Institute (ANSI) - A21.1 Safety Requirements for Floor and Wall Openings, Railings and Toe Boards.
- C. American National Standards Institute (ANSI) - A58.1 Minimum Design Loads in Buildings and Other Structures.
- D. American National Standards Institute (ANSI) - A17.1 Accessible and Usable Buildings and Facilities.
- E. American Society of Testing and Materials (ASTM) A47 - Standard Specification for Ferritic Malleable Iron Castings.
- F. American Society of Testing and Materials (ASTM) A53 - Standard Specification for

Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

- G. American Society of Testing and Materials (ASTM) A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- H. Occupational Safety & Health Administration (OSHA): 1910.23 - Guarding Floor and Wall Openings and Holes.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- 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: Drawings showing fabrication and installation of handrails and guardrails including plans, elevations, sections, details of components, anchor details, and attachment to adjoining units of work.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Railings Structural Requirements:
 - 1. Handrail, wall rail and guardrail assemblies and attachments shall withstand a minimum concentrated load of 200 pounds (90719 g) applied horizontally or vertically down at any point on the top rail.
 - 2. Infill area of guardrail system capable of withstanding a horizontal concentrated load of 200 pounds (90719 g) applied to one square foot (8165 g/sm) at any point in the system. Load not to act concurrently with loads on top rail of system in determining stress on guardrail.
 - 3. Handrail assemblies and guards shall be designed to resist a load of 50 pounds per linear foot (0.73 kN/m) applied in any direction at the top and to transfer this load through the supports to the structure.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Install in areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship and installation are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Materials to be delivered to the job site in good condition and adequately protected against damage as handrails are a finished product.
- B. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within

limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

- B. Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication; show recorded measurements on final shop drawings.
 - 1. 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.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Kee Safety, Ltd., which is located at: 40 North Rivermede, Units 6-7 Concord, Ontario L4K 2H3; Toll Free Tel: (877) 505-5003; Tel: (905) 669 1494; Fax: (905) 669 4347; Email: info@keesafety.ca; Web: www.keesafety.ca
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 SYSTEMS

- A. Handrails and Guardrails: Provide pipe, fittings, and accessories as indicated or required to match design indicated on the Drawings..
 - 1. Fittings: Aluminum.
 - 2. Fittings: Cast iron.
 - 3. Handrail Pipe Size:
 - a. 1-1/2 inches (38 mm) industry standard - 1.90 inches (48 mm) O D.
 - b. 1-1/2 inches O D (38 mm).
 - 4. Infill Panels: As indicated. Refer to Drawings.
- B. Guardrails for Hatches and Openings: Railing system consisting of a top rail, mid rail, and chain or swinging gate, with the hatch curb acting as the toe plate. Extend railing system to a height of at least 42 inches (1067 mm) from the finished roof deck.
 - 1. Pipe: Galvanized pipe, 1-1/4 inches (32 mm).
 - 2. Pipe: Aluminum pipe 1-1/2 inches (38 mm).
 - 3. Base: Fixed base.
 - 4. Base: Ground socket base.
 - 5. Style: Three sided.
 - 6. Style: Two sided.
 - 7. Style: As indicated. Refer to drawings.
- C. Safety Barriers: Provide Kwik Kit System, including pipe railings, uprights, bases and fittings as indicated or required by drawings to match design indicated.
 - 1. Safety barrier system with 42 inches (1067 mm) height to provide a pedestrian egress barrier to withstand a minimum load of 200 lb (90719 g) in any direction to all components per OSHA Regulation 29 CFR 1910.23.
 - 2. Pipe: Steel, 1.90 inches (48 mm) OD.

3. Rails and Posts: Safety yellow powder coated finish.
 4. Fasteners: 304 or 305 stainless steel.
- D. Roof Edge Protection: Provide freestanding KeeGuard Roof Edge Protection System, including pipe railings, uprights, bases, counterweights and fittings.
1. Freestanding counterweighted guardrail system with 42 inch (1067 mm) minimum height to provide a pedestrian egress barrier on the roof to withstand a minimum load of 200 lb (90719 g) in any direction to all components per OSHA Regulation 29 CFR 1910.23.
 2. Pipe: Steel 1-1/2 inches (38 mm) schedule 40, galvanized.
 3. Rails and Posts: 1-1/2 inches (38 mm) diameter.
 4. Mounting Bases: Steel bases are galvanized and are supplied with a rubber pad on underside of the component.
 5. Counterweights: Steel Counterweights are supplied with a rubber pad on the underside of the component.
 6. Fasteners: Type 304 or 305 stainless steel.
- E. Custom Design: Provide pipe, fittings, and accessories as indicated or required by Drawings to match design indicated.

2.3 MATERIALS

- A. Pipe:
1. Steel Pipe: ASTM A53 Grade B seamed tube.
 2. Aluminum pipe.
- B. Fittings, Including Elbows, Crossovers, Wall flanges, Tees, Couplings:
1. Galvanized Malleable Cast Iron: Kee Klamp structural pipe fittings, ASTM A447 with ASTM A153 galvanizing.
 2. Aluminum Alloy: High grade aluminum silicon magnesium alloy.
- C. Finish: Polyester factory applied spray coating.
- D. Fasteners: Type 304 or 305 stainless steel.

2.4 FABRICATION

- A. Fit and shop assemble components in largest practical sizes for delivery to site.
- B. Upright tops shall be plugged with weather and light resistant material.
- C. Assemble components with joints tightly fitted and secured. Accurately form components to suit installation.

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, 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. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Fit exposed connections accurately together to form tight joints. For all connections with Kee Klamp fittings, each set screw is to be tightened to 29 foot pounds (39 N-m) of torque.
- C. Perform cutting, drilling, and fitting required for installation of handrails. Set handrails and accurately in location, alignment, and elevation, measured from established lines and levels.
- D. Set posts plumb within a tolerance of 1/8 inch (3 mm).

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION