



SECTION 07720

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof edge protection.
- B. Collapsible guard rails.
- C. Permanent warning line system.
- D. Leading edge fall protection.
- E. Roof hatch/skylight systems.
- F. Grab bars.
- G. Self-closing safety gate.
- H. Modular railing system.
- I. Portable warning/barrier system.
- J. Portable guard rail system.
- K. Pipe fittings.

1.2 RELATED SECTIONS

- A. Section 05500 - Metal Fabrications: Associated metal supports.
- B. Section 07411 - Metal Roof Panels: Coordination of roof edge protection installation.
- C. Section 07500 - Membrane Roofing: Coordination of roof edge protection installation.

1.3 REFERENCES

- A. British Standard BS 970 - Specification for wrought steels for mechanical and allied engineering purposes. General inspection and testing procedures and specific requirements for carbon, carbon manganese, alloy and stainless steels.
- B. British Standard BS EN 1562 - Founding. Malleable Cast Irons.
- C. British Standard BS 3100 - Specification for Steel Castings for General Engineering Purposes.

- D. California Occupational Safety & Health Administration (CAL OSHA): 1620 - Design of Temporary Railing.
- E. California Occupational Safety & Health Administration (CAL OSHA): 1621 - Railings and Toe Boards.
- F. California Occupational Safety & Health Administration (CAL OSHA): 1633 - Elevator Shafts to be Guarded.
- G. California Occupational Safety & Health Administration (CAL OSHA): 3209 - Standard Guardrails.
- H. California Occupational Safety & Health Administration (CAL OSHA): 3210 - Guardrails at Elevated Locations.
- I. California Occupational Safety & Health Administration (CAL OSHA): 3211 - Wall Openings.
- J. California Occupational Safety & Health Administration (CAL OSHA): 3212 - Floor Openings, Floor Holes and Roofs.
- K. California Occupational Safety & Health Administration (CAL OSHA): 3213 - Service Pits and Yard Surface Openings.
- L. California Occupational Safety & Health Administration (CAL OSHA): 3214 - Stair Rails and Handrails.
- M. Occupational Safety & Health Administration (OSHA): 29 CFR 1910.23 - Guarding Floor and Wall Openings and Holes.
- N. Occupational Safety & Health Administration (OSHA): 29 CFR 1910.27 - Fixed Ladders.
- O. Occupational Safety & Health Administration (OSHA): 29 CFR 1926.500 - Scope, Application, And Definitions Applicable to this Subpart.
- P. Occupational Safety & Health Administration (OSHA): 29 CFR 1926.501 - Duty to Have Fall Protection.
- Q. Occupational Safety & Health Administration (OSHA): 29 CFR 1926.502 - Fall Protection Systems Criteria and Practices.
- R. Occupational Safety & Health Administration (OSHA): 29 CFR 1926.503 - Training Requirements.
- S. Occupational Safety & Health Administration (OSHA): Warning Line Interpretations dated May 12, 2000, November 15, 2002, and January 3, 2005.

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 plans, elevations, sections and details of

components.

- 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 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the job site in good condition and adequately protected against damage as handrails are a finished product.
- B. Inspect rail sections for damage before signing the receipt from the trucking company. Truck driver must note damaged goods on the bill of lading if damaged product is found.
- C. Store products in manufacturer's unopened packaging until ready for installation.

1.6 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.

1.7 WARRANTY

- A. Warranty: Provide manufacture's two (2) year warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: BlueWater Mfg., Inc., which is located at: 4064 Peavey Rd. ; Chaska, MN 55318; Toll Free Tel: 866-933-2935; Tel: 952-448-2935; Fax: 952-448-3685; Email: [request info](#); Web: www.bluewater-mfg.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 SYSTEMS

- A. Roof Edge Protection: Provide freestanding pedestrian egress barrier system on roof, including pipe railings, uprights, bases, and fittings.
 - 1. Approved Product: SafetyRail 2000.
 - 2. Standards: System shall have top and mid rail in accordance with OSHA Standards - 29 CFR 1910.23 (a)(2).
 - 3. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
 - 4. Height: 42 inches (1067 mm), minimum.
 - 5. Railings: 1-5/8 inch (41 mm) O.D. hot rolled pickled electric weld tubing, free of sharp edges and snag points.
 - 6. Mounting Bases: Class 30 gray iron material cast with four receiver posts. Provide rubber pads on bottom of bases.
 - 7. Receiver Posts: Shall have a positive locking system into slots that allow rails to be mounted in any direction. Friction locking systems are not allowed.

- Receiver posts shall have drain holes.
8. Accessories:
 - a. Toe Board Brackets: Provide brackets and friction knobs as manufactured by BlueWater Mfg. 1nc.
 - b. Step-Rail: Variable height railing enables a continuous run of SafetyRail 2000 when the roof steps up or down.
 - c. Raised Mid-Rail: Railing to fit over duct work for continuous run of SafetyRail2000.
 - d. LP Outrigger: Supports placed under ducting or conduit to continue run of SafetyRail 2000 when rail section cannot be used.
 - e. SG2000: Sliding gate.
 - f. Finishing Rail: D-shaped railing extension for ladder landings, length of rail section and D-loop as indicated on the Drawings.
 9. Hardware: Securing pins shall be 1010 carbon steel, zinc plated and yellow chromate dipped. Pins shall consist of collared pin and lanyard that connects to lynch pin.
- B. Collapsible Guard Rails: Provide collapsible portable guard rail section with one-way pivot assembly that allows guardrail to fold down to horizontal surface for clean sightlines; requires no penetrations in substrates for installation. Rails shall be compatible with SafetyRail 2000 Guardrail System.
1. Approved Product: Stealth Rail.
 2. Standards: Guard rail system shall meet or exceed OSHA (Standards - 29 CFR) 1926.501 and 1926.502.
 3. Hardware: Detent pin on each pivot assembly shall lock rail in upright position.
- C. Permanent Warning Line System: Provide non-penetrating, permanent, highly visible warning line system for roof edge fall protection. System shall not be used as a motion stopping device.
1. Approved Product: Perma-Line.
 2. Standards: Warning line system shall meet or exceed the requirements in OSHA Standards - 29 CFR 1926.502(f)(2).
- D. Leading Edge Fall Protection: Provide non-penetrating, self-supporting leading edge roof top safety and fall protection system that allows full access to leading edge of flat roof or parapet.
1. Approved Product: ParaRail.
 2. System Description: Portable.
 3. System Description: Permanent.
 4. Standards: System shall meet or exceed the requirements in OSHA Standards - 29 CFR 1910.23 and 1926.502.
 5. Size: Custom, as indicated on Drawings.
- E. Roof Hatch/Skylight Systems: Provide non-penetrating railing system with top rail, mid rail, and OSHA approved swinging gate, with the hatch curb acting as toe plate. System shall be capable of being dismantled for roof repair.
1. Approved Product: SR2K.
 2. Standards: System shall meet or exceed the requirements in OSHA Standards - 29 CFR 1910.23, including 1910.23 (a)(3)(i); 1910.27.
 3. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1910.23 (e) (3) (iv).
 4. Height: 42 inches (1067 mm), minimum.
 5. Width: As indicated on Drawings.
 6. Side Rail Length: As indicated on Drawings.
 7. Railings: 1-5/8 inch (41 mm) O.D. hot rolled pickled electric weld tubing, free

- of sharp edges and snag points.
 - 8. Mounting Bases: Class 30 gray iron material cast with four receiver posts. Provide rubber pads on bottom of bases.
 - 9. Receiver Posts: Shall have a positive locking system into slots that allow rails to be mounted in any direction. Friction locking systems are not allowed. Receiver posts shall have drain holes.
 - 10. Railing Hardware: Securing pins shall be 1010 carbon steel, zinc plated and yellow chromate dipped. Pins shall consist of collared pin and lanyard that connects to a lynch pin.
 - 11. Gate Hardware: Bolts and washers shall be 3/8 inch by 3-1/2 inch (9.5 mm by 89 mm) and 3/8 inch by 3 inch (9.5 mm by 76 mm) grade 5, zinc plated.
 - 12. Gate Opener: Latch pole.
 - 13. Gate Opener: Latch.
 - 14. Installation: Locate within 6 inches of open roof hatch or roof opening.
- F. Grab Bar: Mounts to an open receiver on the SafetyRail 2000 base. Width of bars shall adjust to ladder width inside hatch.
- 1. Approved Product: Grab Bar.
 - 2. Mount Pad: Adjustable; shall enable bars to be used with curbs or on uneven surfaces.
 - 3. Hardware: Bars lock into place with securing pin and friction collar.
- G. Self-Closing Safety Gate: Fully assembled gate shall be capable of swinging in either direction by inverting installation position. Gate size shall be laterally adjusted from minus 1-1/4 inch (32 mm) to plus 2-1/2 inch (64 mm).
- 1. Approved Product: Self-Closing Safety Gate.
 - 2. Standards: System shall have top and mid rail in accordance with OSHA Standards - 29 CFR 1910.23 (a)(2).
 - 3. Width: As indicated on Drawings.
 - 4. Height:
 - a. Top Rail: 42 inches (1067 mm), minimum.
 - b. Bottom Rail: 21 inches (533 mm).
 - 5. Hardware: Provide the following:
 - a. Gate Hardware: U-Bolts.
 - b. Universal Hinge Assembly: Fits railing types up to 2 inches (51 mm) O.D. or flat surface mounting.
 - c. Railing adapter kit.
 - d. Self-Closing Springs: Two stainless steel torsion springs.
 - 6. Material: Mild steel, powder coated.
 - 7. Material: Mild steel, hot-dip galvanized.
 - 8. Material: Mild steel, hot-dip galvanized with powder-coated finish.
 - 9. Material: Stainless steel.
- H. Modular Railing System: Provide metal handrail system utilizing handrail brackets, handrail fittings and hex key for assembly.
- 1. Approved Product: Kwik-Rail; provide the following kit:
 - a. Kit: 6 Foot Rail Only; Part No. 500136.XX.
 - b. Kit: 12 Foot Straight Run; Part No. 500137.XX.
 - c. Kit: 6 ft. by 6 ft. Corner Section; Part No. 500138.XX.
 - d. Kit: 6 Foot Extension; Part No. 500139.XX.
 - e. Kit: 6 Foot 90 Degree Extension; Part No. 500140.XX.
 - 2. Standards: System shall have top and mid rail in accordance with OSHA Standards - 29 CFR 1910.23 (a)(2).
 - 3. Height: 42 inches (1067 mm), minimum.
 - 4. Railings: 1-1/2 inch pipe (1.90 inch (48 mm) OD).
 - 5. Railings: 1-1/4 inch pipe (1.66 inch (42 mm) OD).

6. Gate: Custom, as indicated on Drawings.
 7. Hardware: Anchor bolts.
 8. Material: Mild steel, powder coated.
 9. Material: Mild steel, hot-dip galvanized.
 10. Material: Mild steel, hot-dip galvanized with powder-coated finish.
 11. Material: Aluminum.
- I. Portable Warning/Barrier System: Provide self-contained, hand carried visual warning system with spindle mount and handle for transporting and hoisting.
1. Approved Product: Kwik-Stand
 2. Standards: System shall meet or exceed the requirements in OSHA Standards - 29 CFR 1926.502 (f).
 3. Height: 39 inches (991 mm) tall.
 4. Area, Foot Print: 39 inches by 32 inches (991 mm by 813 mm) in use.
 5. Weight: 34 lbs. (15.4 kg), each stand.
 6. Support Bars: Hole at each end for accessories.
 7. Accessories:
 - a. Extender Feet: For metal roofs.
 - b. Stakes: For gravel or asphalt roofs.
 - c. Rubber Pads: For feet of stands.
 8. Flags: Bright yellow; OSHA rated.
 9. Hardware: Securing pin attached to stanchion with lanyard.
- J. Portable Guard Rail System: Provide C-clamp locking guard rail system with off-set compression plates and compression rods.
1. Approved Product: Versa-Clamp.
 2. Height: Adjustable, to comply with OSHA guardrail heights.
 3. Clamps: Expand from 1 inch (25 mm) to 12 inches (305 mm).
 4. Accessories:
 - a. Toe Board Brackets: Provide brackets and friction knobs as manufactured by BlueWater Mfg. Inc. for deck applications.
 - b. Adaptors: As manufactured by BlueWater Mfg. Inc., for permanent placement of Versa-Clamp.

2.3 FITTINGS

- A. Pipe Fittings:
1. Approved Product: Kwik-Fit.
 2. Type: Provide fittings required for a complete operational system that meets OSHA requirements.
 3. Type: Provide the following:
 - a. Series 1047 - 90 Degree Elbow.
 - b. Series 1048 - Short Tee.
 - c. Series 1049 - Long Tee.
 - d. Series 1050 - Railing Base Flange.
 - e. Series 1051 - 3-Way Blind Corner.
 - f. Series 1052 - 3 Way Open Corner
 - g. Series 1053 - Short Cross.
 - h. Series 1054 - Straight Sleeve.
 - i. Series 1055 - Expanding Connector.
 - j. Series 1056 - Internal Swivel Tee.
 - k. Series 1057 - Swivel Base.
 - l. Series 1058 - Base Flange.
 - m. Series 1060 - Wall Flange.
 - n. Series 1061 - Rail Bracket.
 - o. Series 1062 - Side Outlet Tee.

- p. Series 1063 - 4 Way with Center Pipe.
 - q. Series 1064 - Short Tee Swivel.
 - r. Series 1065 - Adjustable 2 Socket Cross.
 - s. Series 1067 - Variable Angle Tee.
 - t. Series 1068 - Collar.
 - u. Series 1069 - Gate Eye.
 - v. Series 1070 - Gate Hinge.
 - w. Series 1071 - Hook.
 - x. Series 1072 - Fixing Pad.
 - y. Series 1073 - Single Male Swivel.
 - z. Series 1074 - Single Female Swivel.
 - aa. Series 1075 - Alternate Male Swivel.
 - bb. Series 1076 - Double Male Swivel.
 - cc. Series 1077 - 90 Degree Corner Male Swivel.
 - dd. Series 1078 - Cross Over.
 - ee. Series 1079 - Clamp On Tee.
 - ff. Series 1080 - Single Swivel Kit.
 - gg. Series 1081 - Base Swivel Kit.
 - hh. Series 1082 - Double Swivel Kit.
 - ii. Series 1083 - 90 Degree Corner.
 - jj. Series 1084 - Spare Screws.
 - kk. Series 1085 - End Cap.
 - ll. Series 1086 - Extended Straight Sleeve.
4. Material, Structural Pipe Fittings: Malleable iron, in accordance with BS EN 1562.
 5. Material, Fitting Types 26, 27 and 90: Weldable cast steel, in accordance with BS 3100.
 6. Finish: Pipe fittings shall be galvanized in accordance with BS EN ISO 1461.
 7. Fitting, Inside Diameter:
 - a. 1.38 inch (35 mm).
 - b. 1.73 inch (44 mm).
 - c. 1.97 inch (50mm).
 8. Hardware: Stainless steel set screws, in accordance with BS 970 Grade 420. Each set screw shall support axial load of 900 kg when tightened to torque of 40Nm.

2.4 ACCESSORIES

- A. Safety/Caution Signage: Cushioned foam strip with self adhesive backing; UL- rated for indoor/outdoor use.
 1. Approved Product: Safety Strip.
 2. Thickness: 3/8 inch (9.5 mm).
 3. Length: 36 inches (914 mm).
 4. Width: 2 inches (51 mm).
 5. Width: 4 inches (102 mm).
 6. Color: Safety yellow.
 7. Color: Safety yellow with black stripes.
- B. Roof Pads: Provide the following pad under each base to protect roof membrane.
 1. Approved Product: BUR Pad.
 2. Approved Product: EPDM Roof Pad.
- C. Rolling Storage Cart: Provide four-wheeled cart for storage and movement of SafetyRail 2000 components.
 1. Approved Product: RTC-2000.
 2. Capacity: 120 lineal feet (36.6 m) of various size railings (70 feet (21 m)

- usable); 12 individual rail sections.
- 3. Lockable Storage Box: For storage of toe board brackets and securing pins.
- 4. Lifting Rings: For hoisting to elevated areas.

- D. Base Mover: Provide two-wheeled steel cart to transport one base unit.
 - 1. Approved Product: EZ Mover.

2.5 FINISHES

- A. Finish: Factory finished powder coat paint.
- B. Finish: Hot dipped galvanized.
- C. Color: Safety yellow.
- D. Color: Match Architect's sample.

2.6 FABRICATION

- A. 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. 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.

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

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