



SECTION 05522

METAL GUARDRAIL AND ROOFTOP FALL PROTECTION

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-Penetrating Mobile Fall Restraint.
- B. Non-Penetrating Enduraline Permanent Visual Warning Line System
- C. Permanent Fall Restraint and Guardrail System.
- D. Permanent Modular Guardrail – AccuFit Express Rail Modular Rail
- E. Non-Penetrating Mobile Fall Arrest and Restraint.
- F. Roof Edge Fall Protection.
- G. Skylight Guards.

1.2 RELATED SECTIONS

- A. Section 05500 – Metal Fabrications: Associated metal supports.
- B. Section 05510 – Metal Stairs and Ladders.
- C. Section 07400 - Membrane Roofing: Coordination of roof edge protection installation.
- D. Section 07411 – Membrane Roof Panels: Coordination of roof edge protection installations.

1.3 REFERENCES

- A. American Welding Society: AWS D1.1 - Structural Welding Code - Steel.
- B. American Welding Society: AWS D1.3 - Structural Welding Code – Sheet Steel.
- C. Occupational Safety & Health Administration (OSHA): 29 CFR 1910.23 - Guarding Floor and Wall Openings and Holes.
- D. Occupational Safety & Health Administration (OSHA): 29 CFR 1910.27 - Fixed Ladders.

- E. Occupational Safety & Health Administration (OSHA): 29 CFR 1926.500 - Scope, Application, and Definitions Applicable to this Subpart.
- F. Occupational Safety & Health Administration (OSHA): 29 CFR 1926.501 - Duty to Have Fall Protection.
- G. Occupational Safety & Health Administration (OSHA): 29 CFR 1926.502 - Fall Protection Systems Criteria and Practices.
- H. Occupational Safety & Health Administration (OSHA): 29 CFR 1926.503 - Training Requirements.
- I. California Occupational Safety & Health Administration (CAL OSHA)

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. Show member sizes and part identification, fasteners, anchors, fittings and evidence of compliance with structural performance requirements.
- 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. Manufacturer's Certificates:
 - 1. Certify that products are made in USA. Provide steel mill and foundry certificates for verification prior to shipment.
 - 2. Manufacturer must be American Welding Society Welding Certified for Welding Standards AWS D1.1 & AWS D1.3. Third party qualification documentation required prior to shipment.

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.
- D. Products to be palletized and labeled by roof level or designated drop zone.

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 manufacturer's limited two year warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: *Edge Fall Protection, LLC*, which is located in Minneapolis, MN 55419. Contact: E-mail: info@edgefallprotection.com Website: www.edgefallprotection.com Toll Free/Fax: 844-314-1374.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 ROOFTOP FALL PROTECTION

- A. Non-Penetrating Mobile Railing System: Provide *EDGE Fall Protection LLC's* EDGE 360 Mobile Safety Rail System. Contact: info@edgefallprotection.com; TF/Fax: 844-314-1374. System is a non-penetrating freestanding pedestrian egress barrier

system on roof, including railing sections, weighted base plates and accessories in the configuration and locations indicated on the Drawings.

1. Product: EDGE 360 Mobile Safety Rail System.
 - a. System top and mid rail provided in accordance with OSHA Standards - 29 CFR 1910.23 (a)(2).
 - b. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
 2. Height: 42 inches (1067 mm), minimum.
 3. Railings: 1-5/8 inch (41 mm) O.D. hot rolled pickled electric weld tubing, free of sharp edges and snag points.
 4. Mounting Bases: 104# Class 30 gray iron material cast. Rubber pads are standard on bottom of bases.
 - a. Receiving posts: option of (2) or (4) receiving posts.
 5. Receiver Posts: Provided with a positive pin locking system into base and rail interface that allow rails to be mounted in any direction. Receiver posts shall have drain holes.
 6. Rail Accessories:
 - a. Toe Board Brackets.
 - b. Finishing Rail: D-shaped railing extension for ladder landings, length of rail section and D-loop as indicated on the Drawings and as required.
 7. Securing Pins: 1010 carbon steel, zinc plated and yellow chromate dipped. Pins shall consist of collared pin and latch that connects to lynch pin.
 8. Roof Accessories:
 - a. Roof Pads: Provide EPDM Roof Pad under each base to protect roof membrane.
 - b. Base Mover: Provide Base Mover, Part #400062 two-wheeled steel cart to transport one base unit.
- B. Non-Penetrating Enduraline Permanent Visual Warning Line System: Provide *EDGE Fall Protection LLC's* Enduraline Visual Warning Line System. Contact: info@edgefallprotection.com; TF/Fax: 844-314-1374. System is a non-penetrating freestanding pedestrian visual warning line barrier system on roof, including railing sections, weighted base plates and accessories in the configuration and locations indicated on the Drawings.
1. Product: Enduraline Visual Warning Line System.
 2. Warning Line: Galvanized aircraft cable with polyurethane coating
 - a. Sag no less than 34", and no higher than 39"
 - b. Powder coated yellow visual warning line spaced every 6' OC
 3. Mounting Bases: 104# Class 30 gray iron material cast. Rubber pads are standard on bottom of bases.
 - a. Receiving posts: option of (2) or (4) receiving posts.

4. Receiver Posts: Provided with a positive pin locking system into base and rail interface that allow rails to be mounted in any direction. Receiver posts shall have drain holes.
5. Rail Accessories:
 - a. Standard connection to EDGE 360 Mobile Safety Rail
6. Securing Pins: 1010 carbon steel, zinc plated and yellow chromate dipped. Pins shall consist of collared pin and latch that connects to lynch pin.
7. Roof Accessories:
 - a. Roof Pads: Provide EPDM Roof Pad under each base to protect roof membrane.
 - b. Base Mover: Provide Base Mover, Part #400062 two-wheeled steel cart to transport one base unit.

- C. Permanent Fall Protection Guardrail System: Provide Permanent Guardrail System by *EDGE Fall Protection LLC*. Contact: info@edgefallprotection.com; TF/Fax: 844-314-1374. System is a removable or fixed pedestrian egress barrier system, including pipe railings, uprights, mounts, accessories and fittings in the configuration and locations indicated on the Drawings.
1. Product: Permanent Guardrail System or Industrial Removable Guardrail System.
 - a. System top and mid rail provided in accordance with OSHA Standards - 29 CFR 1910.23 (a)(2).
 - b. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
 2. Height: 42 inches (1067 mm), and 48 inches (1219 mm).
 3. Railings: 1-5/8 inch (41 mm) O.D. hot rolled pickled electric weld tubing, free of sharp edges and snag points.
 4. Mounting Bases: Available as single and double post mounts.
 - a. Face mount, removable.
 - b. Flush mount, removable.
 - c. Floor mount, removable.
 - d. Floor mount, permanent.
 5. Receiver Posts: Provided with a positive pin locking system securing railing into mounting plates. Receiver posts shall have drain holes.
 6. Rail Accessories:
 - a. Toe Board Brackets.
 7. Securing Pins: 1010 carbon steel, zinc plated and yellow chromate dipped. Pins shall consist of collared pin and latch that connects to lynch pin.

8. Finish: Steel surfaces

a. DUAL FINISH REQUIRED

1) Hot Dip Zinc Galvanized & Factory finished powder coat paint.

- D. Permanent Fall Protection Guardrail System: Provide AccuFit Express Rail Modular Guardrail Kits by *EDGE Fall Protection LLC*. Contact: info@edgefallprotection.com; TF/Fax: 844-314-1374. System is a removable or fixed pedestrian egress barrier system, including pipe railings, uprights, mounts, accessories and fittings in the configuration and locations indicated on the Drawings.
1. Product: AccuFit Express Rail Modular Guardrail
 - a. System top and mid rail provided in accordance with OSHA Standards - 29 CFR 1910.23 (a)(2).
 - b. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
 2. Height: 42 inches (1067 mm).
 - a. Field cutting of pipe may be required
 3. Railings: 1-1/4" or 1-1/2" Schedule 40 galvanized pipe
 - a. Option to finish with a powder coated safety yellow finish
 4. Fittings: Hot dipped Galvanized fittings with stainless steel set screws
 - a. Set Screws to be tightened to 29/lbs torque
- E. Non-Penetrating Mobile Fall Arrest and Restraint: Provide Mobile Fall Restraint Systems by *EDGE Fall Protection LLC*. Contact: info@edgefallprotection.com; TF/Fax: 844-314-1374. Systems are non-penetrating freestanding fall arrest and restraint system systems on roof. System provided in accordance with OSHA Standards - 29 CFR 1926.502 and 1910.23.
1. Product: SRC Mobile Restraint System. System intended as a re-locatable fall restraint system to prevent a worker from reaching a fall hazard.
 - a. Consists of six 108 pound bases with a 5000 lb attachment point.
 - b. Can be broken down for easy transportation.
 - c. Provide Base Mover, Part #400062 two-wheeled steel cart to transport one base unit.
- F. Finish: Steel surfaces
1. Hot Dip Zinc Galvanized

2. Factory finished powder coat paint.
3. Hot Dip Zinc Galvanized & Factory finished powder coat paint.
4. Color:
 - a. None
 - b. Safety Yellow.
 - c. Color Specified by Architect

2.3 ROOF EDGE FALL PROTECTION

- A. Roof Edge Protection: Provide freestanding pedestrian egress barrier system on roof, including railings, bases, and hardware by *EDGE Fall Protection, LLC*. Contact: info@edgefallprotection.com; TF/Fax: 844-314-1374.
1. EDGE ACCU-FIT Traditional Mobile Safety Rail System: ACCU-FIT Designer Mobile Safety Rail System
 - a. System shall have top and mid rail in accordance with OSHA Standards - 29 CFR 1910.23 (a)(2).
 - b. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
 2. Height: 42 inches (1067 mm), nominal.
 3. Pipe Railings: 1-1/4 inch I.D. schedule 40 pipe by 21 foot length, to be assembled free of sharp edges and snag points. Field trim pipes to fit application on corners or terminations.
 - a. Connections; Join pipe railing lengths together with approved splice fittings. Tighten all set screw connections to 29 ft. lbs.
 - b. Modular Pipe Fittings to be cast iron fittings manufactured to the requirements of ASTM A 47-77-32510
 - c. Stanchions:
 - 1) Curved Architectural Stanchions 1-1/4 inch I.D. schedule 40 pipe by 42 inches tall in base.
 - 2) Traditional straight stanchions
 - 3) Designer series stanchions.
 - d. Mounting Bases: Freestanding Class 30 gray iron material cast with receiver posts.
 - 1) Provide rubber pads on bottom of bases.
 - 2) Metal deck mounting plates mechanically fastened to roof for Standing Seam metal roofs.
 - 3) Metal deck mounting plates mechanically fastened to roof for R-Panel panel roofs.

- 4) Metal deck mounting plates mechanically fastened to roof for Corrugated Panel metal roofs.
 - e. Receiver Posts: Stanchion shall be pinned into base plate with 3 inch Z-pin
 - 4. Securing Pins: 1010 carbon steel, zinc plated and yellow chromate dipped. Pins shall consist of collared pin and latch that connects to lynch pin.
 - 5. Rail Accessories:
 - a. Toe Board Brackets: Provide toe board brackets as required
 - b. Finishing Rail: D-shaped railing extension for ladder landings, length of rail section and D-loop as indicated on the Drawings.
 - c. Ladder Spanner Brackets: Provide brackets at ladder transition points as required.
 - 6. Roof Accessories:
 - a. Roof Pads: Provide EPDM Roof Pad under each base to protect roof membrane.
 - b. Base Mover: Provide Base Mover, Part #400062 two-wheeled steel cart to transport one base unit.
- B. Finish: Steel surfaces
- 1. Hot Dip Zinc Galvanized
 - 2. Factory finished powder coat paint.
 - 3. Hot Dip Zinc Galvanized & Factory finished powder coat paint.
 - 4. Color:
 - a. None
 - b. Safety Yellow.
 - c. Color Specified by Architect

2.4 SKYLIGHT GUARDS

- A. Non-Penetrating 360 Mobile Railing Skylight Guard by *EDGE Fall Protection LLC*. Contact: info@edgefallprotection.com; TF/Fax: 844-314-1374. Mobile Safety Rail System is a non-penetrating freestanding barrier system on roof, including railing sections, weighted base plates, accessories and fittings in the configuration and locations indicated on the Drawings.
 - 1. Product: 360 Mobile Safety Rail System.
 - a. System top and mid rail provided in accordance with OSHA Standards - 1910.23 and 1926.500 - 1926.503.

- b. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
 - 2. Height: 42 inches (1067 mm), minimum.
 - 3. Railings: 1-5/8 inch (41 mm) O.D. hot rolled pickled electric weld tubing, free of sharp edges and snag points.
 - 4. Mounting Bases: 104# Class 30 gray iron material cast with four receiver posts. Rubber pads standard on bottom of bases.
 - 5. Receiver Posts: Provided with a positive pin locking system into rail and base interface that allow rails to be mounted in any direction. Receiver posts shall have drain holes.
 - 6. Securing Pins: 1010 carbon steel, zinc plated and yellow chromate dipped. Pins shall consist of collared pin and latch that connects to lynch pin.
 - 7. Roof Accessories:
 - a. Roof Pads: Provide EPDM Roof Pad under each base to protect roof membrane.
 - b. Base Mover: Provide Base Mover, Part #400062 two-wheeled steel cart to transport one base unit.

- B. Non-Penetrating *EDGE Fall Protection LLC* Skylight Guard: Provide Non-Penetrating EDGE Skylight Guard System. Contact: info@edgefallprotection.com; TF/Fax: 844-314-1374. System is a non-penetrating freestanding barrier system on roof, consisting of tubular welded frame and covered with expanded metal shield as indicated on the Drawings.
 - 1. System is placed over the top of the skylight and has four rubber-tipped compression bolts to secure the guard against the curb of the skylight and hold it in place.
 - 2. System meets federal OSHA guidelines that requires a 200 lb load capacity and also complies with CalOSHA guidelines that requires guards capable of supporting a 400 lb. load.

- C. Non-Penetrating *EDGE Fall Protection LLC* Skyview Barrier Skylight Guard: Provide Non-Penetrating Skylight Guard System. Contact: info@edgefallprotection.com; TF/Fax: 844-314-1374. System is a non-penetrating freestanding barrier system on roof, consisting of tubular welded frame at locations indicated on the Drawings.
 - 1. Height: 42 inches (1067 mm).
 - 2. Railings: 1-5/8 inch (41 mm) O.D. hot rolled pickled electric weld tubing, free of sharp edges and snag points.

3. System is placed over the top of the skylight and has compression fit against the skylight curb to hold it in place.
 4. System meets federal OSHA guidelines that requires a 200 lb load capacity and also complies with CalOSHA guidelines that requires guards capable of supporting a 400 lb. load.
- D. Skyview Screens: Provide non-penetrating Skylight Screen System for dome shaped skylights, in the configuration and locations indicated on the Drawings. Contact: info@edgefallprotection.com; TF/Fax: 844-314-1374.
1. System is placed over the top of the skylight and has compression fit against the skylight curb to hold it in place.
 2. System meets federal OSHA guidelines and also complies with CalOSHA guidelines.

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. Clean surfaces thoroughly prior to installation.
- 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.

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