SECTION 07 72 73
ROOF EDGE PROTECTION SYSTEMS

PART 1 GENERAL

1.1 SUMMARY: Section includes non-penetrating roof edge fall protection systems.

A. Non-penetrating passive railing systems for roof edge fall protection:

1. RailGuard GC safety railing system
2. RailGuard 200 safety railing system
3. RailGuard Fit-Rite safety railing system
4. TurboRail clamp railing system
5. TurboCable clamp railing system
6. Perimeter Clamp parapet railing system
7. Slab Grabber perimeter clamp system
8. HatchProtector roof hatch safety system
9. LadderGuard rooftop access safety system

1.2 RELATED SECTIONS

A. Section 05 52 17 - Safety Railings

B. Section 07 72 76 - Fall Restraint Systems

C. Section 08 67 13 - Roof Opening Protection and Screens

D. Section 11 13 33 - Loading Dock Fall Protection

E. Section 13 44 13 - Mezzanine and Rack System Safety Gates

1.3 REFERENCES

A. Occupational Safety and Health Administration (OSHA) 9 CFR 1926 - Safety and Health Regulations for Construction, Subpart M-Fall Protection.

B. Occupational Safety and Health Administration (OSHA) 29 CFR 1910.29 - Subpart D, Walking-Working Surfaces; Fall Protection Systems and Falling Object Protection.

C. ASTM Standard E985 Standard Specification for Permanent Metal Railing Systems and Rails for Buildings (withdrawn 2005).

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

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. Certification: Provide manufacturer's certifications that the ultimate strength of the fall protection system is equal to or greater than those specified.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: minimum of 15 years experience manufacturing portable railing systems.

B. Installer Qualifications: Minimum 2 person crew capable of positioning and installing portable roof fall protection system according to manufacturers instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store and maintain products in accordance with the manufacturer's printed recommendations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Provide products as manufactured by Garlock Safety Systems, Plymouth, MN, www.garlocksafety.com, Email: sales@garlockequip.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Comply with requirements of applicable local, state, and federal codes.
   1. OSHA: 29 CFR 1926.502 - Safety and Health Regulations for Construction, Subpart M-Fall Protection.
   2. 29 CFR 1910.29 - Occupational Health and Safety Standards for General Industry, Subpart D Fall Protection Systems and Falling Object Protection.
   3. ASTM Standard E985 Standard Specification for Permanent Metal Railing Systems and Rails for Buildings (withdrawn 2005) Maximum Allowable Deflection under test conditions specified in section 7.1 and 7.2.

B. Structural performance of cable and stanchion supports:
   1. Capable of withstanding a concentrated load of 200 pounds (90.6 kg), applied to the top rail at any point and in any direction.
   2. Capable of withstanding a uniform load of 50 pounds per linear foot (74.3 kg/m) applied to the top rail horizontally with a simultaneous load of 100 pounds per linear foot (148.6 kg/m) applied vertically downward.
   3. Design need not provide for both concentrated and uniform loads to be applied concurrently.

C. Structural performance of railing infill:
   1. Capable of withstanding a horizontal concentrated load of 200 pounds (90.6 kg), applied to one foot (30.5mm) square area at any point on the infill.
   2. Infill includes cable, intermediate posts and other elements.

3. Design need not provide for infill loads to be applied concurrently with top rail loading.

2.3 EQUIPMENT

A. RailGuard GC General Construction Safety Railings: OHSA compliant passive fall protection for use during construction of high-rises, elevator shafts, and other fall hazards.
   1. Description:
      a. One anchor required per bracket.
      b. 16 gauge, 1-5/8 inch O.D. welded steel rail sections.
      c. Length: **[5] [7-1/2] [10]** feet
      d. Top Rail Height: 42 inches.
      e. Mid-Rail Height: 20 inches.
      f. Toe Board: Integrated welded steel.
      g. Finish: Powder coated high visibility yellow.
      h. Base with Rail Posts and Pins: **[Dual] [and] [Quad]** base mount.

B. RailGuard 200: Customizable, non-penetrating safety guardrail system with weighted base.
   1. Description:
      a. Standard rail section 16 gauge welded steel.
      b. Rails: 1.625 inch (41.275 mm) O.D. 16 gage wall HREW tubing.
      c. Length: **[5 feet (1524mm)] [6 feet (1829 mm)] [7 feet (2286mm)] [10 feet** (3048 mm)].
      d. Height: 42 inches (1067 mm).
      e. Mid-rail: 20 inches (508 mm).
      f. Finish: **[Epoxy powder coated safety yellow] [Epoxy powder coated color as selected] [Hot-dipped galvanized]**.
   2. Gate System; 1-5/8 inch (41 mm) O.D. by 0.120 inch (2.7 mm) wall HREW tubing.
      a. Length: **[4 feet (1219 mm)] [5 feet (1524 mm)] [10 feet (3048 mm)]**.
      b. Height: 42 inches (1067 mm).
      c. Mid-rail: 20 inches (508 mm).
      d. Finish: **[Epoxy powder coated safety yellow] [Epoxy powder coated color as selected] [Hot-dipped galvanized].**
      e. Support wheel: positive locking mechanism with ability to swing right or left.
   3. Base Plates.
      a. Material: Cast iron class 20B.
      b. Size: 1 foot 9-1/2 inches by 1 foot 9-1/2 inches (546 by 546 mm).
      c. Carrying handles: built in with a center carrying hook for base transporter.
      d. Toeboard receptacles: two, built in.
      e. Capacity: two railing sections and be able to accommodate adapter to support three or four intersecting rails on the same base.
      f. Holes: Holes for permanent mounting and round holes for pins securing base to rail.
      g. Bottom of base must have a concave recess no less than 125 sq. inches (806 sq.cm) to reduce rocking on uneven surfaces.
      h. Base plate must provide no less than 5 inches (127 mm) of leading edge substrate contact as concentrated load is applied to base.
      i. Finish: **[Epoxy powder coated safety yellow] [Epoxy powder coated color as selected] [Hot-dipped galvanized].**
      j. Four adhesive pads with directional non-skid resistant ridge pattern and minimum 28 sq. inches (180 sq.cm) of substrate contact each shall be adhered to the bottom of base plate to resist slippage on hard surfaces.
   4. Base Transporter.
      a. Cart shall be able to carry individual base plates easily.
   5. Centurion Cart.
      a. Centurion 4 Wheel cart.
      b. Cart shall be able to carry eight base plates and seven rail sections.

c. Cart shall have a manual winch to raise and lower base plates.

6. Goliath Mega Cart.
   a. Goliath 4 Wheel Cart.
   b. Carries 190-feet of railing sections along with a 5 foot swing gate, base transporter and steel toeboards.
   c. Included with Goliath cart are 3 base plate storage racks. Each rack holds 8 base plates. Integrated fork pockets for transport.
7. Speed Boards.
   a. Material: 4 inches (102 mm) wide, zinc plated steel.
   b. Attachment: Boards shall telescope to fit into toe board brackets on base plate and pinned to the base toe board brackets.

C. RailGuard 200 Fit-Rite Safety Rail: Configurable and customizable safety guardrail system
1. Description
   a. Rails: Nominal 1.25 inch (1.25 inch diameter) schedule 40 galvanized steel pipe.
   b. Length: Shipped in 21 foot (1524 mm) sections for fitting on-site.
   c. Height: 42 inches (1067 mm).
   d. Mid-rail: 20 inches (508 mm).
   e. Finish: **[Epoxy powder coated safety yellow] [Epoxy powder coated color as selected] [Hot-dipped galvanized].**
2. Stanchions
   a. Kit: [Straight] [Curved] [Inclined] stanchion kit.
   b. Finish: **[Epoxy powder coated safety yellow] [Epoxy powder coated color as selected] [Hot-dipped galvanized].**
3. Rail Fittings: Provide in configurations and quantity for a complete custom layout.
4. Base Style
   a. [Permanent mount fitting] [Standing seam base] [Weighted base]
   b. Four adhesive pads with directional non-skid resistant ridge pattern and minimum 28 sq. inches (180 sq.cm) of substrate contact each: shall be adhered to the bottom of base plate to resist slippage on hard surfaces.
5. Gate System; Self-closing adjustable gate
   a. Width: **[24-30 inches (610-762 mm)] [30-36 inches (762-914 mm)] [36-42 inches (914-1067 mm)] [42-48 inches (1067-1219 mm)]**
   b. Finish: **[Epoxy powder coated safety yellow] [Epoxy powder coated color as selected] [Hot-dipped galvanized].**

D. TurboRail System: No-tool clamp and stanchion rail system that accommodates variable roof conditions and railing material options.
1. Description:
   a. Meets OSHA Requirement: OSHA 1926.502(b)(1)
   b. Clamps: Heavy duty, 7 gauge, 2 piece steel, clamp on or bolt down
   c. Stanchions: 16 gauge, 48 in. long
   d. Railings: accommodates 2 by 4 lumber or steel pipe

E. TurboCable System: Clamp-on cable perimeter system allowing an OSHA compliant work zone all the way to the roof edge.
1. Description:
   a. Meets OSHA Requirement: OSHA 1926.502(b)(1)
   b. Clamps: Heavy duty, 7 gauge, 2 piece steel, clamp on or bolt down
   c. Stanchions: 16 gauge, 42 in. adjustable height, available as corner, mid-brace, and end, configurations.
   d. Cable Retainers: TurboClip tool-free connection to stanchions.

F. Perimeter Clamp System: Tool-free leading edge clamp and stanchion system designed for use with 2 by 4 lumber, used on flat edge and parapet walls.

1. Description:
    a. Meets OSHA Requirement: OSHA 1926.501(b)(1)
    b. Adjustable clamp 8 - 24 inches.
    c. Adjustable stanchion: 42 in.
    d. Recommended spacing: 6 - 8 ft.

G. Slab Grabber General Construction Perimeter Clamp System: Fall protection for new construction slab or deck applications.
1. Description:
    a. Meets OSHA Requirement: OSHA 1926.502(b)
    b. Heavy Duty Design
    c. Overall Dimensions: 4 inches by 8.5 inches by 54 inches.
    d. Spacing: 6 foot to a maximum 8 feet.
    e. Includes 1 intergrated clamp, 1 stanchion
    f. Clamping Range: Adjustable from 2 inches to 24 inches.
    g. Weight: 24 lbs.
    h. Tires: 18x8.50 Flat-free
    i. Deck Space 25 inches by 40 inches.

H. HatchProtector: Adjustable compression fit design mounts directly to the roof hatch, non-penetrating.
1. Meets OSHA Requirements: 1910.23(a) (4) and 1926.501(b) (4).
2. Frame: Galvanized steel corner frame and base.
3. Rails: Telescoping 1-5/8-inch (41mm) O.D. by 0.065 in. (2.7 mm) wall HREW galvanized tubing for outer tubes.
4. Self-closing steel gate
5. Top rail height: 42 in.
6. Mid rail height: 20 in.
7. Grab Bars: **[Mini stairway- 1 or 2 required] [Deluxe Stairway- 1 or 2 required] [Ladder- 2 required]**
8. Size: **[30 in. by 36 in.] 36 in. by 36 in.] [30 in. by 54 in.] [30 in. by 96 in.] [36 in. by 54 in.] [36 in. by 96 in.] [42 in. by 42 in.] [48 in. by 48 in.] [48 in. by 60 in.]**
9. Finish: **[galvanized] [Epoxy powder coated safety yellow] [Epoxy powder coated color as selected by Architect].**

I. LadderGuard: System attaches to both flat or round rails and works on parapet or flat roofs or surfaces. Creates a safety egress and ingress zone to guard roof top ladder access starting 6 feet from leading edge.
1. Meets OSHA Requirements: 1910.23(a) (2).
2. Rails: Galvanized 1-5/8 inch (41 mm) O.D. by 0.065 inch (2.7 mm) wall HREW tubing.
3. Size: 5 foot by 42 inches with 48 inch opening on inboard side.
4. Top Rail: 42 inches (1067 mm).
5. Mid Rail: 20 inches (508 mm).
6. Base Plate: 21.5 inches (546 mm) by 21.5 inches (546 mm).
7. Self closing steel gate.
8. Finish: [galvanized] [Epoxy powder coated safety yellow] [Epoxy powder coated color as selected by Architect].
9. Grab bar adapters: For **[2 inch] [3 inch]** ladder rails.

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.

B. Before installation, inspect all parts to insure no damaged parts are used.

C. [**Install diagonal braces on corner stanchions and at terminations of cable runs.**]

D. [**Where there is a danger of falling materials onto someone below insert a steel Speed Board into the toeboard bracket on the base plate and secure with securing pins to base**.]

E. [**Use a Railguard 200 outrigger at any interruption in continuous railing sections. Outrigger assembly consists of a 5 foot railing (1.52 m) with base plate pinned to railing and placed 90 degrees away from danger side of continuous railing.**]

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