

SECTION 112429.13 - HORIZONTAL FALL PROTECTION - UNIRAIL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Provide horizontal fall protection system, including attachment carriage, attachment plates, joints, corners, system stops, rail, carriage stops and specialty components for exposed and concealed conditions as required.

1.2 REFERENCE STANDARDS

- A. ANSI A10.32, "Personal Fall Protection Used in Construction and Demolition Operations."
- B. ANSI Z359.1, "Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components."
- C. ASTM A747/A747M, "Standard Specification for Steel Castings, Stainless, Precipitation Hardening."
- D. ASTM A36, "Standard Specification for Carbon Structural Steel."
- E. ASTM A666, "Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar."
- F. ASTM A500, "Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes."
- G. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 1. Welding rods and bare electrodes: Select according to AWS specifications for metal alloy welded.
- H. CSA Z259.16, "Design of Active Fall Protection Systems."
- I. OSHA 1926.502, "Fall Prevention Systems and Criteria and Practices."

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the installation of horizontal cable fall protection system with structural supports and finish materials.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data and product information indicating the sizes, descriptions, capacities, test certifications, and other descriptive data showing in sufficient detail that the product complies with the contract requirements.
- B. Shop Drawings: For fabrication showing the complete fall protection system. Layout drawings of each system in relation to the supporting structure indicating the locations of properly labeled components.
- C. Furnish proof of installer's certification approval by manufacturer in the form of the installer's current certificate issued by the manufacture.
- D. Designer's Qualifications Statement.
- E. Systems Manual:
 - 1. Maintenance Procedures: Including parts list and maintenance requirements for all equipment.
 - 2. Operation Procedures: Indicating proper use of equipment for safe operation of the systems.
 - 3. Manufacturer's catalog data indicating the sizes, descriptions, capacities, test certifications, and other descriptive data showing sufficient detail that the product complies with the contract requirements.
- F. Record Documents: Include a copy of Record Drawings in the systems manual.
- G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- H. Delegated-Design Submittal: For fall protection system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 QUALITY ASSURANCE

- A. Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the **[State] [Commonwealth] [Province]** of **<insert name of state, commonwealth, or province>**.
- B. Install fall protection system by manufacturer's authorized, trained, and certified personnel.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original unopened packaging.
- B. Store materials in original protective packaging.
- C. Prevent soiling, physical damage, or moisture.

1.7 PROJECT CONDITIONS

- A. Coordinate layout and installation of framing and reinforcements for fall protection system anchors.

1.8 WARRANTY

- A. Correct defective Work within a one year period after Date of Substantial Completion.
- B. Provide lifetime manufacturer warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Product: Subject to compliance with requirements, provide 3M Fall Protection; DBI-SALA® UniRail™ System.
- B. Substitutions: Not Permitted.
- C. Source Limitation: Obtain fall protection system and components from a single manufacturer.

2.2 SYSTEM DESCRIPTION

- A. Allow users to walk uninterrupted the entire length of the system and provide secure anchorage to arrest a fall. Rails form basis of anchoring system and allow carriages to run unhindered along it.

2.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design fall protection system.
- B. Structural Performance: Fall protection systems shall withstand the effects of loads and stresses within limits and under conditions required by [CSA Z259.16,] [ANSI A10.32,] [ANSI Z359.1,] [and] [OSHA 1926.502].
 - 1. Allow for multiple users, based on required system calculations.
 - 2. System designed for <insert maximum number of individuals> simultaneous users maximum.
 - 3. Maximum allowable force on anchors: 2698 lbs. (12 kN).

2.4 COMPONENTS

- A. Rail: Low profile, 1.25 inches by 1.25 inches (32 mm by 32 mm), aluminum extrusion in [9'-10" (3000 mm)] [or] [20'-0" (6096 mm)] lengths. .

- B. Rail Joint: Low profile, aluminum extrusion to connect to rail sections.
 - 1. Concealed: Low profile, 2.11 inches by 6.06 inches (53.5mm by 154mm), aluminum extrusion, must be supported within 7.87 inches (200mm) by fixing back to the structure.
 - 2. Fixed: Low profile, 5.31 inches by 6.06 inches (135mm by 154mm), aluminum extrusion, also serves as anchor and is not required to have additional supports.
- C. Corners: Additional bends and forms available to a radius of 7.87 inches (200 mm).
 - 1. 90°
 - 2. 90° external
 - 3. 90° internal
 - 4. 45°
 - 5. 45° external
 - 6. 45° internal
- D. System Stops: Manufacturer's standard stops which prevent rails from coming out of end anchorage bracket.
- E. Molded Ends: Manufacturer's standard molded ends which protect exposed edge of end rails.
- F. Tamper-Proof Carriage Stops: Manufacturer's standard tamper-proof, carriage stops which prevent carriages from coming off the end of the system.
- G. Removable Carriage Stops: Manufacturer's standard tamper-proof, carriage stops which prevent carriages from coming off the end of the system but can be removed to allow the carriages to be taken off.
- H. Attachment Carriages: Manufacturer's standard aluminum attachment carriage with aluminum, nylon coated wheels. A stainless steel shackle with carabiner hook which pivots for any angle connection.
 - 1. Minimum tensile strength: 3372 lbs. (15 kN).
- I. Rail Fixing Components: [Aluminum] [or] [Stainless steel] connections as follows:
 - 1. End Anchors: Manufacturer's standard anchors which secure end of the rail to structure and controls rail movement in the event of a fall.
 - 2. Intermediate Anchors: Manufacturer's standard anchors which secure rail to structure at intervals to suit work site and structure.
 - 3. Concealed End Anchors: Manufacturer's standard anchors which secure end of the rail to structure and controls rail movement in the event of a fall.
 - 4. Concealed Intermediate Anchors: Manufacturer's standard anchors which secure rail to structure at intervals to suit work site and structure. (Tapped versions available.).
- J. Fabricated supports: Carbon steel with corrosion resistant finish.
 - 1. Steel Plates, Shapes, and Bars: ASTM A36.
 - 2. Steel Tubing: ASTM A500, cold formed.
 - 3. Welding rods and bare electrodes: Select according to AWS specifications for metal alloy welded.

2.5 MATERIALS

- A. Stainless steel: ASTM A666, Type 316.
- B. Aluminum: **[6061]** **[or]** **[6082]** aluminum alloy.
- C. Connectors: Comply with OSHA regulation 1926.502.

2.6 FABRICATION

- A. Fabricate anchoring devices as recommended by the manufacturer to provide adequate support for intended use. Shop fabricate required anchorage posts using structural steel with material test certificates for full material traceability.
- B. Welding: AWS structural specification D1.1 by certified welders.
- C. Fabricate joints in a manner to discourage water accumulation.
- D. Finishes:
 - 1. Stainless Steel: Electropolished for corrosion resistance.
 - 2. Structural Steel: Zinc Galvanized for corrosion resistance.
 - 3. Aluminum: **[Anodized]** **[Powder coated]**.

2.7 ACCESSORIES

- A. Fasteners: Designed to support a load on the system of 2 times the maximum design load without failure.
- B. Signage: Provide signs and system identification tags.
- C. Flashing: Comply with requirements of Section **[076200 "Sheet Metal Flashing and Trim."]** **[077100 "Roof Specialties."]** **[077200 "Roof Accessories."]** **<insert roofing section number and roofing section title>**
- D. Sealant: Comply with requirements of Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fall protection equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate location of fall protection equipment indicated to be attached to structural substrate or surface of roofing system, and furnish anchoring devices with templates and diagrams.

3.3 INSTALLATION

- A. Install according to approved shop drawings and manufacturer's instructions.
- B. Install anchorage and fasteners in accordance with manufacturer's recommendations to obtain the allowable working loads published in the product literature and in accordance with this specification.
- C. Exposed work shall be true to line and level with accurate angles, surfaces and with straight square edges. Coordinate anchorage system with supporting structure.
- D. Do not load or stress system until materials and fasteners are properly installed and ready for service.
- E. Do not use until trained in the use of the system.

3.4 FIELD QUALITY CONTROL

- A. Provide manufacturer's certified installer to inspect installed fall protection system.
- B. Test fall protection system for compliance with the following requirements:
 - 1. Ensure that system components operate as specified.

3.5 ADJUSTING

- A. Adjust fall protection components to function smoothly and safely.

3.6 CLEANING

- A. Clean components of any deleterious coatings or compounds.
- B. Remove loose materials, crating, and packing materials from site.

3.7 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate operation of system to Owner's personnel.
 - 1. Briefly describe function, operation, and maintenance of each component.
- B. Training: Train Owner's personnel on operation and maintenance of system.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
2. Provide minimum of two hours of training.
3. Provide training at the lifeline installation site.
4. Training to take place at the completion of the installation.

END OF SECTION