

SECTION 112429.19 - HORIZONTAL FALL PROTECTION - ROOFTOP CABLE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Provide rooftop horizontal cable fall protection system for rooftop maintenance including end anchors, intermediate cable supports, variable cable supports, traveler and corner cable supports 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 A123 / A123M, "Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products."
- D. ASTM A747/A747M, "Standard Specification for Steel Castings, Stainless, Precipitation Hardening."
- E. ASTM A36, "Standard Specification for Carbon Structural Steel."
- F. ASTM A666, "Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar."
- G. ASTM A500, "Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes."
- H. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 1. Welding rods and bare electrodes: Select according to AWS specifications for metal alloy welded.
- I. CSA Z259.16, "Design of Active Fall Protection Systems."
- J. 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® RoofSafe™ Cable 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. System to allow attachment at any point along the cable and enables freedom of movement along the cable as it passes by intermediate anchors.
- B. Maximum span of **39 feet (12 m)** between anchors and provides continuous hands free access for the user of the roof fall protection system.
- C. System must not be used as a tieback anchor for façade maintenance.

2.3 PREFORMANCE 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 2 simultaneous users maximum.
 - 3. System capable of spanning **39 feet (12 m)** between intermediate supports.
 - 4. Maximum allowable force on anchors: **1348 lbs. (6 kN)**.

2.4 COMPONENTS

- A. Cable: 7x7, 5/16 inch (8 mm) 316 Stainless Steel Wire, Breaking Strength 8542 lbs. (38 kN).
- B. End Anchorage Connector: 316 Stainless Steel, electropolished and Serial Numbered.
- C. Tensioner: 180 lbs. (0.8 kN) 316 Stainless Steel.
- D. Intermediate Guide: 316 Stainless Steel, electropolished.
- E. 90 and 45 Degree Corners: 316 Stainless Steel, electropolished. Other angles are achieved using Variable Guide.
- F. Variable Guide: 316 Stainless Steel, electropolished.
- G. Swage Toggles: 316 Stainless Steel.
- H. UniGrab Attachment Device with Carabiner: ASTM A747/A747M Precipitation Hardening Stainless Steel Casting, electropolished and numbered.
- I. Modular Anchors, with RoofSafe™ Eye and Pin:
 - 1. SpiraTech™ Anchor.
 - 2. Tip Over Anchor.
- J. Anchorage Plates: Anodized aluminum plates designed and tested to work with the SpiraTech™ and Tip Over Anchor.

2.5 MATERIALS

- A. Primary cable assembly components: 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. Swaging: Swage cable in-line with the anchor point.
- E. 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