

SECTION 07227 - FALL PROTECTION DEVICES

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes: Roof tie-down system of fall restraint and fall arrest for worker safety.
- B. Related Sections:
 - a. Section 03300 – Cast-In-Place Concrete
 - b. Section 03400 – Pre-Cast Concrete
 - c. Section 05100 – Structural Metal Framing
 - d. Section 05400 – Cold Formed Metal Framing
 - e. Section 05310 – Metal Decking
 - f. Section 06100 – Rough Carpentry
 - g. Section 07510 – Built-Up Roofing
 - h. Section 07700 – Roof Specialties and Accessories

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
- B. American National Standard Institute (ANSI)
 - a. ANSI Z359.1-2007 – Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
 - b. ANSI Z359.6-2009 – Specifications and Design Requirements for Active Fall Protection Systems
- C. Occupational Health And Safety Administration (OSHA)
 - a. OSHA 1926.502 – Fall Prevention Systems Criteria and Practices

1.03 SYSTEM DESCRIPTION

- A. General: Provide structural fall restraint and fall arrest system capable of withstanding loads and stresses within limits and under conditions specified in OSHA and other applicable safety codes. Provide fall protection system permanently attached to roof structure. Provide cable lifeline system to allow continuous travel between anchor points.
- B. Design Requirements: Anchors and accessories comprising system of following types:
 - a. Guardian CB Anchors, spaced as indicated by manufacturer, for safety snap connection by individual workers capable of withstanding a 5,000 pound load or safety factor of 2 meeting the requirements of OSHA 1926.502(d)(8).
 - b. Cable lifeline to pass through intermediate anchor attachment points, restrained at either end by steel shackle and cable fist grips; detaching and reattaching to the system at intermediate anchors required.
 - c. In-line shock absorber; 1 each for total lifeline span length up to 60' and 2 each for total lifeline span length greater than 60' and up to 100'.
- C. Performance Requirements: System and components tested for the resistance of the following loads:
 - a. Fall Restraint: 4 Users
 - b. Fall Arrest: 2 Users
 - c. Design fall protection anchors to resist a 5,000 pound load applied in any direction at maximum anchor height or provide engineered system designed meeting the requirements of OSHA 1926.502(d)(8).
 - d. Design system to limit loads on horizontal lifeline anchors to 2,500 pounds.

1.04 SUBMITTALS

- A. Product Data: For each type of device specified, including manufacturer's standard fabrication details and installation instructions.
- B. Shop Drawings: Show layout, profiles, and anchorage details. Shop drawings & calculations to be stamped by a Professional Engineer registered in the State in which the project is located.
- C. Maintenance Data: Written instructions for maintenance of fall prevention safety devices to be included in the operation and maintenance manual.
- D. In-house Test Reports: Indicate anchor fabrication compliance with performance requirements.
- E. Signage: Provide laminated sign showing system layout and usage notes, to be installed at roof access locations.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm having at least 10 years continuous experience in manufacturing fall safety equipment similar to systems specified and exhibiting records of successful in-service acceptability and performance. Firm must employ personnel dedicated to provide regularly scheduled Authorized and Competent Person Training courses as mandated by OSHA 1926 and 1910 for owner's authorized safety personnel.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where the Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of roof anchors that are similar to those indicated for this Project in material, design and extent.
- C. OSHA Standards: Comply with Occupational Safety and Health Administration Standards for the Construction Industry 29 CFR § 1926.500 Subpart M (Fall Protection), and with applicable State Administrative Code safety standards for Fall Restraint and Fall Arrest.
- D. Source Limitations: Obtain all roof anchors through one source from a single manufacturer.
- E. Testing: Perform quality control tests for each system per manufacturer's requirements.

1.06 COORDINATION

- A. Contractor to coordinate installation of structural deck to meet requirements of roof anchor manufacturer.
 - a. Concrete Deck: Minimum concrete strength, $F_c = 2,000$ psi. Minimum 6" thickness for adhesive anchor connection; minimum 4" thickness for mechanical anchor connection.
 - b. Metal Deck: Minimum 18 gauge thickness, or provided with additional deck reinforcing per manufacturer's instructions.
 - c. Wood Deck: Minimum 3/4" CDX plywood, or provided with additional deck reinforcing per manufacturer's instructions.
 - d. Structural beam for weld-on or backer plate connection: structure must be capable of supporting a 5,000 pound ultimate load.
 - e. Concrete or composite metal deck for backer plate or toggle anchor connection: Deck must be capable of supporting a 5,000 pound ultimate load.
 - f. Other structural decks not listed above shall be approved by a Qualified Person.
- B. Contractor to coordinate installation of structural deck reinforcements and anchorages to receive fall protection anchors.
- C. Contractor to coordinate placement of roofing system, insulation and flashing to ensure water-tight integrity to roof.

1.07 WARRANTY

- A. Provide manufacturer's standard warranty to guarantee products will be free from defects for a period of 12 months. Warranty period shall become effective on date of substantial completion.

PART 2 – PRODUCTS

2.01 MANUFACTURER

- A. Provide fall protection system manufactured by Guardian Fall Protection Inc., 6305 South 231st Street Kent, WA, phone 800-466-6385, fax 800-670-7892, or equal.

2.02 MATERIALS

- A. CB anchor post: 2-1/2" schedule 80 pipe, galvanized steel (size as necessary for height).
- B. CB anchor U-bar: 5/8" diameter U-bar, galvanized steel.
- C. CB anchor base plate: galvanized steel.
- D. Absorbinator Kit: galvanized steel.
- E. Lifeline cable: 3/8" diameter, galvanized steel.

2.03 MANUFACTURED ASSEMBLIES

- A. Guardian CB-12 or CB-18 Galvanized Roof Anchors.
- B. Guardian Absorbinator Horizontal Lifeline kit: Each kit consisting of 1 or 2 shock absorbers, 1 turnbuckle, 2 or 3 shackles, 6 cable fist grips, 2 thimbles, and 2 O-rings. Provide additional O-rings as recommended by manufacturer.
- C. Lifeline: Continuous wire rope as tested by fall protection device manufacturer to permit worker mobility and safety.

2.04 FABRICATION

- A. Fabricate work true to dimension, square, plumb, level, and free from distortions or defects detrimental to appearance and performance.
- B. Prepare, treat and coat galvanized metal to comply with manufacturer's written instructions. Prepare galvanized metal by removing grease, dirt, oil, flux, and other foreign matter.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine framing and substrate and verify conditions comply with structural requirements for proper system performance.
- B. Proceed with installation of roof anchors only after verifying conditions are satisfactory.

3.02 INSTALLATION

- A. General: Installation of Anchor Posts and Absorbinator Lifeline system to be performed by contractor according to manufacturer's instructions and recommendations.

3.03 FIELD QUALITY CONTROL

- A. Testing: Test on site 100% of anchors relying upon chemical adhesive fasteners using load cell test apparatus in accordance with manufacturer's written recommendations.

3.04 ADJUSTMENT AND INSPECTION

- A. Ensure all manufactured anchors have been installed in accordance with fall protection manufacturer's engineering documentation and specifications.
- B. Provide plan drawings with any deviations in anchor locations as installed.