

**SECTION 072270**

**FALL RESTRAINT SYSTEM**

**PART 1 GENERAL**

**1.01 RELATED SECTIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section Includes: This Section specifies design, supply and installation of Fall Protection systems

**1.03 REFERENCES**

- A. American Institute of Steel Construction (AISC).
  - 1. AISC S342L [1993], Load and Resistance Factor Design Specification for Structural Steel Buildings (including Supplement No.1).
- B. Aluminum Association (AA).
  - 1. AA DAF 45, Designation System for Aluminum Finishes.
  - 2. AA ADM-1 [2000], Aluminum Design Manual.
- C. American Welding Society (AWS).
  - 1. AWS D1.2/D1.2M [2003], Structural Welding Code - Aluminum.
  - 2. AWS D1.1/D1.1M [2006], Structural Welding Code—Steel.
- D. ASTM International (ASTM).
  - 1. ASTM A123/A123M [2002], Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 2. ASTM A167 [1999 (2004)], Specification for Stainless and Heat Resisting Chromium Nickel Steel Plate, Sheet and Strip.
  - 3. ASTM A276 [2006], Standard Specification for Stainless Steel Bars and Shapes.
  - 4. ASTM A492 [1995 (2004)] Standard Specification for Stainless Steel Rope.
  - 5. ASTM B221 [2006], Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- E. International Code Council (ICC).
  - 1. International Building Code.
- F. Occupational Safety and Health Administration (OSHA).
  - 1. OSHA 1910, Subpart D, Walking and Work Surfaces.
  - 2. OSHA 1910, Subpart F, Appendix C, Personal Fall Arrest Systems.
- G. National Roofing Contractor's Association (NRCA)
  - 1. The NRCA Roofing and Waterproofing Manual, Fifth Edition.

**1.04 ACTION SUBMITTALS**

- A. General: Submit listed action submittals in accordance with Contract Conditions and Section [01 33 00 - Submittal Procedures].
- B. Shop Drawings: Indicate information on shop drawings as follows:
  - 1. Submit shop drawings showing complete layout and configuration of fall protection equipment including components and accessories.
  - 2. Indicate design and fabrication details, hardware, and installation details.
  - 3. Include installation and rigging instructions and:
    - a. Required restrictive working usage and general safety notes.
    - b. Non-restrictive working usage and general safety notes.
  - 4. Ensure Shop Drawings are reviewed by Engineer licensed in State of [\_\_\_\_\_] and submit [calculations] [and] [test reports] to [Architect] [Consultant] [Owner].
- C. Submit product data, including manufacturer's technical data sheet, for specified products.

#### 1.05 INFORMATION SUBMITTALS

- A. Quality Assurance:
  - 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
  - 2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
  - 3. Manufacturer's installation instructions.
- B. Manufacturer's field reports specified.

#### 1.06 CLOSEOUT SUBMITTALS

- A. Submit 1-year standard manufacturer warranty documents specified.
- B. Operation and Maintenance Data: Submit Operation and Maintenance data for installed products in accordance with Section Closeout Submittals.
  - 1. Include:
    - a. Manufacturer's instructions covering maintenance requirements and parts catalog giving complete list of repair and replacement parts with cuts and identifying numbers.
    - b. [1] copy of system Equipment Manual & Inspection Log Book, with "Initial Inspection - Certification for Use" and "Inspection Sign-Off" forms completed.
    - c. [2] copies of reduced, "as-built shop drawing" showing equipment locations and details. Ensure drawing is posted adjacent exits to roof.

#### 1.07 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
  - 2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction and approving application method.
- B. Regulatory Requirements.
  - 1. Comply with all applicable codes including those enumerated on the General information Sheets (G).
  - 2. Comply with OSHA regulations as follows:

- a. 1910, Subpart D, Walking and Working Surfaces.
- b. Appendix C to 1910 Subpart F, Personal Fall Arrest Systems.

- C. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

#### 1.08 DELIVERY, STORAGE AND HANDLING

- A. General: Comply with applicable Division 01 Section requirements.
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery:
  - 1. Deliver materials in manufacturer's original packaging with identification labels intact and in sizes to suit project.
- D. Storage and Protection:
  - 1. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
- E. Packaging Waste Management:
  - 1. Separate waste materials in accordance with Section Construction Waste Management and Disposal.
  - 2. Remove from site and dispose of packaging materials at appropriate recycling facilities.

#### 1.09 PROJECT AMBIENT CONDITIONS

- A. Installation Location: Assemble and erect components only when temperatures are above 40 degrees F.

#### 1.10 SEQUENCING

- A. Sequence with other Work and Comply with fall protection equipment manufacturer's written recommendations for sequencing construction operations.

#### 1.11 WARRANTY

- A. Project Warranty: Refer to Contract Conditions for additional project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.
- C. Warranty: Commencing on date of substantial completion set by Owner.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Ensure manufacturer has minimum [10] years experience in manufacturing fall protection and suspended maintenance system components similar to or exceeding requirements of project.

- B. Manufacturer's Insurance: Ensure manufacturer carries liability insurance to protect against product and system failure in amount of Ten million dollars US (\$10,000,000) minimum.
- C. Manufacturer's Insurance: Ensure manufacturer carries errors & omission professional liability insurance in the amount of Two million dollars US (\$2,000,000) minimum.

## 2.02 PROPRIETARY PRODUCTS AND SYSTEMS

- A. Manufacturer: Pro-Bel Group of Companies, Phone: (905) 427-0616, USA Toll Free: (800) 461-0575, Fax: (905) 427-2545, E-mail: [info@pro-belgroup.com](mailto:info@pro-belgroup.com), Internet URL: <http://www.pro-belgroup.com>

## 2.03 DESIGN PERFORMANCE REQUIREMENTS

- A. Design fall protection system to suit project requirements to AISC S342L and other applicable requirements.
- B. Design anchor components for fall protection to:
  - 1. Ensure compatibility with industry standard equipment.
  - 2. Anchorage and anchor components: Designed by Engineer qualified in design of fall protection equipment and licensed in State of Illinois.
- C. Design system fall arrest safety anchors and equipment supports to AISC S342L including supplement No.1 and as follows:
  - 1. Comply with OSHA 1910, Subpart F, Appendix C.
  - 2. Fall Arrest Safety Anchors:
    - a. Fall arresting force safety factor of 2 to 1 without permanent deformation: 1800 lbs minimum.
    - b. Fall arrest force against fracture or detachment: 5,000 lbs minimum.

## 2.04 EQUIPMENT

- A. Anchors, fasteners and associated hardware and accessory items.
- B. Double Lanyard Horizontal Lifeline Systems complete.

## 2.05 ANCHORS

- A. Safety U-bars: Stainless steel to ASTM A276, Type 304 with 35 Ksi minimum yield strength.
  - 1. U-bar: 0.75 inches minimum diameter material with 1.5 inches eye opening.
- B. Hollow Steel Section (HSS) Piers: Type 300W with 50 Ksi minimum yield strength.
  - 1. Wall thickness to suit application.
- C. Plate and other sections: Type 300W with 44 Ksi minimum yield strength
  - 1. Wall thickness to suit application
- D. Miscellaneous Bolts, Nuts and Washers: Type 300W with 44 Ksi minimum yield strength, stainless steel to ASTM A276, Type 304 with 35 Ksi minimum yield strength.

## 2.06 DOUBLE LANYARD HORIZONTAL LIFELINE SYSTEM

- A. Galvanized steel, 5/16" inches (8mm) minimum diameter cable, 9127 lbs minimum breaking strength with permanently or mechanically swaged cable ends.

- B. Data plate: Ensure non-corrosive data plate stating Maximum Service Capacity of cable, Manufacturer's Name, Serial No., Manufacturing Date, rated load and other pertinent information is prominently displayed at cable system entry points.
- C. Tensioner: Stainless steel turnbuckle to ASTM A167, Type 316.
- D. Harness: Manufacturer's standard full body harness with double shock absorber lanyard.
- E. Acceptable Material: Pro-Bel Group, Double Lanyard Horizontal Lifeline System.

#### 2.07 SOURCE QUALITY CONTROL

- A. Ensure Fall Protection equipment components and materials are from single manufacturer.

#### 2.08 PRODUCT SUBSTITUTIONS

- A. Substitutions: In accordance with Section 01 2500 - Substitution Procedures.

### PART 3 EXECUTION

#### 3.01 INSTALLERS

- A. Provide experienced and qualified technicians to carry out erection, assembly and installation of fall protection and suspended maintenance equipment system.
- B. Do steel welding to AWS D1.2/D1.2M.
- C. Do aluminum welding to AWS D1.1/D1.1M.

#### 3.02 MANUFACTURERS INSTRUCTIONS

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions and Pro-Bel Group technical data sheets.

#### 3.03 EXAMINATION

- A. Site Verification of Conditions:
  - 1. Verify that substrate conditions which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of fall protection equipment.
  - 2. Inform Contractor, Owner and Architect of unacceptable conditions immediately upon discovery.
  - 3. Proceed with installation only after unacceptable conditions have been remedied.

#### 3.04 PREPARATION

- A. Ensure structure or substrate is adequate to support complete window washing equipment system.
- B. Ensure structural steel to receive safety anchors [has adequate bearing surface as indicated on shop drawings] [and] [has 100% welds between anchors and structural steel].

#### 3.05 INSTALLATION

- A. Coordinate fall protection work with work of other trades, for proper time and sequence to avoid construction delays.
- B. Install fall protection equipment plumb and level in accordance with manufacturer's written instructions.
- C. Mechanically fasten anchors in accordance with manufacturer's recommendations.
- D. Accurately fit and align, securely fasten and install free from distortion or defects.
- E. Deform threads of tail end of anchor studs after nuts have been tightened to prevent accidental removal and vandalism.

3.06 FIELD QUALITY CONTROL

- A. When necessary have the manufacture assist in installation.

3.07 ADJUSTMENT

- A. Lubricate moving parts to operate smoothly and fit accurately.

3.08 FINAL CLEANING

- A. Do cleanup in accordance with applicable Sections of Division 01 Specifications.
- B. Upon completion, remove surplus and excess materials, rubbish, tools and equipment.

3.09 PROTECTION

- A. Protect installed product from damage during construction. Make good damage to adjacent materials caused by fall protection equipment installation.

3.10 MAINTENANCE

- A. Repair or replace parts of fall protection equipment whenever required due to defect and normal wear and tear.
- B. Use only standard parts of product line of manufacturer of fall protection equipment.
- C. Perform work during regular trade working hours satisfactory to Owner.
- D. Ensure that maintenance personnel register with designated building personnel at time of inspections and maintenance.

END OF SECTION