

**SECTION 11 8123 WINDOW CLEANING SYSTEM**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section

1.2 SECTION INCLUDES

- A. Design, supply and installation of window cleaning systems and suspended maintenance equipment including:
  - 1. Outrigger systems.
  - 2. Catenary lifelines.
  - 3. Tie-back anchors.
  - 4. Tie-down anchors.

1.3 RELATED SECTIONS

- A. Section 05 12 00 – Structure Steel Framing.
- B. Section 05 50 00 - Metal Fabrications

1.4 SUBMITTALS

- A. General: Submit in accordance with 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 window cleaning and suspended maintenance system, including components and accessories.
  - 2. Indicate design and fabrication details, window "drops", hardware, and installation details.
  - 3. Ensure Shop Drawings are reviewed by Engineer licensed in State of Project location and submit calculations and test reports to Architect.
- C. 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.
- D. 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.
- E. Operating Procedures Outline Sheet (OPOS):

1. Submit an Operating Procedures Outline System (OPOS) including necessary elements in both pictorial and written form, to instruct employees in safe use of roof supported building maintenance equipment or window cleaning procedures not covered by OSHA standards. Ensure that OPOS contains as a minimum, elements as follows:
  - a. Isometric or plan view pictorial drawing of building's roof, including building's name, address, and date OPOS was prepared. Ensure drawing is legible and kept with building's written assurance.
  - b. Identification of drop zones, recommended drop sequences, scaffold configurations, and specific building maintenance procedures including equipment to be used.
  - c. Identification of anchorage points for personal fall arrest systems and building maintenance equipment.
  - d. Identification of personal fall protection requirements and procedures for securing equipment.
  - e. Identification of dangerous areas on roof by highlighting of "Danger Zone" on pictorial drawing.
  - f. Description of means and methods to be used to transfer equipment from drop location or between building levels.
  - g. Identification of equipment limitations, load ratings, and special use conditions.
  - h. Provisions for pre-operational, operation and maintenance inspections.
  - i. Identification of access and egress to work locations and storage area(s) for permanent or transportable building maintenance equipment.
  - j. Indication of location and method of stabilization provided for suspended equipment.
  - k. Emergency and rescue procedures and means of communications to be used during such procedures.
  - l. Method to be used to control employee exposure to falls while in "Danger Zone."

**1.5 CLOSEOUT SUBMITTALS**

Submit extended (greater than 1-year) manufacturer warranty documents as specified.

- A. Operation and Maintenance Data: Submit Operation and Maintenance data for installed products in accordance with Section 01 70 00 - Execution and Closeout Requirements.
  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. One copy of system Equipment Manual & Inspection Log Book, with "Initial Inspection - Certification for Use" and "Inspection Sign-Off" forms completed.
    - c. Two copies of reduced, "as-built shop drawing" showing equipment locations and details. Ensure drawing is posted adjacent exits to roof.

**1.6 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 with minimum 10 years of experience in the engineering, design, and manufacturing of systems similar to those required for this project and capable of providing field service representation during construction and approving application method.
    - a. Additional Turnkey Services:
      - 1) Installation.
      - 2) Inspection and testing.
      - 3) Certification.
      - 4) Training.
      - 5) Retrofitting: Bring existing exterior building maintenance systems into compliance with OSHA safety standards listed in the "Regulatory Requirements"
  - B. Provide window cleaning equipment components and materials from single manufacturer to the greatest extent practical.
  - C. Regulatory Requirements.
    1. Comply with applicable code of local jurisdiction.
    2. Comply with OSHA regulations as follows:
      - a. OSHA 1910, Subpart D, Walking and Working Surfaces.
        - 1) OSHA 1910.23 - Guarding floor and wall openings and holes.
        - 2) OSHA 1910.27 - Scaffolds and rope descent systems.
      - b. OSHA 1910, Subpart F, Appendix C, Personal Fall Arrest Systems.
        - 1) OSHA 1910.66 - Powered Platforms for Building Maintenance
        - 2) OSHA 1910.66 - Guidelines (Advisory)
        - 3) OSHA 1910.66 - Exhibits (Advisory)
      - c. OSHA Ruling on Window Cleaning by Bosun's Chair.
      - d. OSHA 1926 Subpart L - Scaffolds.
      - e. OSHA 1926 Subpart M, Fall Protection.
  - D. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01 43 39 - Mockups.
- 1.7 DELIVERY, STORAGE AND HANDLING
- A. General: Comply with 01600 - Product Requirements.
  - B. Delivery: Deliver materials in manufacturer's original packaging with identification labels intact and in sizes to suit project.
  - C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

**1.8 PROJECT AMBIENT CONDITIONS**

- A. Installation Location: Assemble and erect components only when temperatures are above 40 degrees F (4 degrees C).

**1.9 SEQUENCING**

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

**1.10 WARRANTY**

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's extended warranty document executed by authorized company official.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Acceptable Manufacturer: Lynn Safety, Inc., which is located at: 110 Mason Circle Suite A; Concord, CA 94520; Toll Free Tel: 800-436-6201; Tel: 925-609-7646; Fax: 925-609-6446; Email: request info (Jr@lynnsafety.com); Web: <http://www.lynnsafety.com> or approved equal.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

**2.2 DESIGN PERFORMANCE REQUIREMENTS**

- A. Provide complete engineering design of all unique components as well as engineering of the system as a whole.
- B. Verify all components are properly configured to access all windows for maintenance.
- C. Design window cleaning and suspended maintenance system to suit project requirements to AISC S342L and as specified.
- D. Locate anchorages to suit suspension equipment specified.
- E. Design anchor components for cleaning and suspended maintenance equipment to ASME A120.1.
  - 1. Ensure compatibility with industry standard equipment.
  - 2. Anchorage and anchor components: Designed by Engineer qualified in design of window cleaning and suspended maintenance equipment and licensed in State of Project location.
- F. Design system fall arrest safety anchors and equipment supports to AISC S342L (including supplement No.1) and ANSI/IWCA I-14.1, 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 (8.0 kN) minimum.
- b. Fall arrest force against fracture or detachment: 5,000 lbs (22.4 kN) minimum.

## 2.3 OUTRIGGER BEAMS

- A. Outrigger Beam Type: Engineered length and size to suit application as indicated designed to carry 1000 lbs (4.5 kN) vertical service load, minimum.
  1. Load Safety Factor: 4:1.
  2. Designed to meet all applicable safety codes, regulations, and standards which govern the design, implementation, and use of the safety devices.
  3. Aluminum "I" beam.
  4. Galvanized steel "I" beam.
  5. Galvanized hollow steel section.
  6. Equipped with shackle on outboard end.
  7. Equipped with friction U-bar on outboard end.
  8. Equipped with trolley on outboard end.
  9. Provide non-corrosive UV Resistant data plate stating Maximum Service Capacity of boom, Manufacturer's Name, Serial No., Manufacturing Date, rated load and other pertinent information prominently displayed.
  10. Provide outrigger beams equipped with rolling or friction trolleys with stops to prevent detachment from beam.
  11. Wall thickness to suit application or as indicated.
  12. Hot dipped galvanized to ASTM A123/A123M.

## 2.4 CATENARY LIFELINES

- A. Fall Arrest Capacity:
  1. Rated Capacity: 1,250 pounds in any direction.
  2. Ultimate Capacity: 5,000 pounds in any direction.
- B. Wire Rope: 3/8 inch diameter, 6x19 IWRC stainless steel wire rope.
  1. Minimum 12,000 pound break strength.
  2. Sag: TBD by engineer.
- C. Weldless Link: Crosby 7/8 x 4 inch C-340 hot dipped galvanized.
  1. Rated Capacity: 12,000 pounds.
- D. Anchor Spacing: TBD by engineer.
- E. Termination: 3/8 inch zinc/copper sleeves with efficiency rating of 100 percent.
  1. Connect wire ropes to Crosby 5/8 inch G-2130 hot-dipped galvanized bolt- type shackle. Shackle rated capacity: 3.25 tons.
  2. Termination Rated Load: 2,500 pounds.
  3. Termination Ultimate Load: 5,000 pounds.

**2.5 TIE-BACK ANCHORS**

- A. Tie-Back Anchor: Rated for 1,250 lbs. service load in all directions without permanent deformation.
  - 1. Ultimate Load: 5,000 lbs. in all directions without permanent deformation.
  - 2. Material: Stainless steel to ASTM A276, Type 304 with 35 Ksi (240 MPa) minimum yield strength.
  - 3. Material: Mild steel, Type 300W with 44 Ksi (300 MPa) minimum yield strength, hot-dip galvanized to ASTM A123/A123M.
  - 4. Label: Durable weatherproof label attached to anchor that states "Safety Tie- Back Anchor. See OPOS for usage."

**2.6 TIE-DOWN ANCHORS**

- A. Tie-Down Anchor: Rated load is per project. in upward direction only without permanent deformation.
  - 1. Ultimate Uplift Tension Load: 2,000 pounds depending on project requirements.
  - 2. Material: Stainless steel to ASTM A276, Type 304 with 35 Ksi (240 MPa) minimum yield strength.
  - 3. Material: Mild steel, Type 300W with 44 Ksi (300 MPa) minimum yield strength, hot-dip galvanized to ASTM A123/A123M.
  - 4. Label: Durable weatherproof label attached to anchor that states "Tie-Down Anchor. See OPOS for usage."

**2.7 ACCESSORIES**

- A. Tethers: Secure pins and loose pieces with 0.125 inch (3 mm) stainless steel cable with easily inserted lead connectors.
- B. Harness: Manufacturer's standard full body harness with shock absorber lanyard.

**PART 3 - EXECUTION**

**3.1 INSTALLERS**

- A. Provide experienced and qualified technicians to carry out erection, assembly and installation of window cleaning and suspended maintenance equipment system.
  - 1. Do steel welding to AWS D1.2/D1.2M.
  - 2. Do aluminum welding to AWS D1.1/D1.1M.
- B. Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions and technical data sheets.

**3.2 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 window cleaning equipment.
2. Inform Architect of unacceptable conditions immediately upon discovery.
3. Proceed with installation only after unacceptable conditions have been remedied.

### 3.3 PREPARATION

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

### 3.4 INSTALLATION

- A. Coordinate window cleaning equipment work with work of other trades, for proper time and sequence to avoid construction delays.
- B. Install window cleaning equipment plumb and level in accordance with manufacturer's written instructions.
- C. SEQ CHAPTER 1Mechanically 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.

### 3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Have manufacturer's technical representative or authorized representative schedule site visits to review work as follows:
  1. After delivery and storage of products.
  2. When preparatory work for which work of this Section depends is complete, but before installation begins.
  3. During Installation:
    - a. Weekly.
    - b. 2 times during progress of work at 25% and 60% of completion.
  4. Upon completion of work, after cleaning is carried out.
- B. Testing: Test On Site 100 percent of anchors relying upon chemical adhesive fasteners using load cell test apparatus in accordance with manufacturer's written recommendations.

### 3.6 ADJUSTMENT

- A. Lubricate moving parts to operate smoothly and fit accurately.
- B. Complete "Initial Inspection - Certification for Use" form included in Equipment Manual and Inspection Log Book provided by manufacturer.

**3.7 FINAL CLEANING**

- A. Do cleanup in accordance with Section 01 70 00 - Execution and Closeout Requirements.
- B. Upon completion, remove surplus and excess materials, rubbish, tools and equipment.

**3.8 PROTECTION**

- A. Protect installed product from damage during construction.
- B. Repair or replace damage to adjacent materials caused by window cleaning equipment installation.

**3.9 MAINTENANCE**

- A. Include complete maintenance on window cleaning equipment for 12 months after date of acceptance by Architect.
- B. Regularly and systematically examine, clean, adjust and lubricate moving parts.
  - 1. Schedule: Monthly.
- C. Repair or replace parts of window cleaning equipment whenever required due to defect and normal wear and tear.
  - 1. Use only standard parts of product line of manufacturer of window cleaning equipment.
  - 2. Maintain locally adequate stock of parts for replacement or emergency purposes.
  - 3. Provide personnel to perform work under supervision and in direct employ of window cleaning equipment system manufacturer or manufacturer's licensed agent.
  - 4. Perform work during regular trade working hours satisfactory to Architect.
  - 5. Provide emergency call-back at no extra cost and ensure fulfillment of maintenance and emergency service without undue loss of time to Architect.
  - 6. Ensure that maintenance personnel register with designated building personnel at time of inspections and maintenance.

END OF SECTION 118123