SECTION 11 81 23

WINDOW CLEANING EQUIPMENT

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\*\* NOTE TO SPECIFIER \*\* Lynn Safety, Incorporated; window cleaning/fall arrest systems. A CA.gov Small Business Disabled Veteran Business Enterprise.  
This section is based on the products of Lynn Safety, Incorporated, which is located at:  
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Concord, CA 94520  
Toll Free Tel: (800) 436-6201  
Tel: (925) 609-7646  
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Web: [www.lynnsafety.com](http://www.lynnsafety.com)   
When it comes to exterior building maintenance systems, Lynn Safety is an industry specialist. Our turnkey services include: design, engineering, installation, retrofitting, inspections, testing, certification, training, and OPOS documentation. We specialize in bringing your existing exterior building maintenance system, commonly referred to a window cleaning systems, into compliance with OSHA safety standards.  
Headquartered in the Bay Area and offering services nationwide, our mission is to help you provide the necessary exterior building maintenance equipment to keep workers safe, protect the public, prevent accidents, avoid OSHA fines and protect your assets when persons are working at heights on your building.  
Lynn Safety has 42 years of experience in the suspended scaffold and access industry and working at heights. Our company's principal is a member of committees which promote safety within the Exterior Building Maintenance Industry. These committees establish and amend Safety Standards for the Window Cleaning Industry, Exterior Building Facade Access Equipment and Fall Protection.  
Let's work together to ensure your building is a safe place to work and the access equipment is maintained.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Design, supply and installation of window cleaning systems and suspended maintenance equipment including:
       1. Powered platforms.
       2. Stabilization systems.
       3. Davit systems.
       4. Outrigger systems.
       5. Catenary lifelines.
       6. Horizontal lifelines.
       7. Tie-back anchors.
       8. Tie-down anchors.
  1. RELATED SECTIONS
     1. Section 05 52 00 - Metal Railings.
     2. Section 05 50 00 - Metal Fabrications.
     3. Section 07 62 00 - Sheet Metal Flashing and Trim.
     4. Section - .
     5. Section 26 05 00 - Common Work Results for Electrical.

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* 1. REFERENCES
     1. American Institute of Steel Construction (AISC).
        1. AISC S342L - Load and Resistance Factor Design Specification for Structural Steel Buildings (including Supplement No.1).
     2. Aluminum Association (AA).
        1. AA ADM-1 - Aluminum Design Manual.
        2. AA DAF 45 - Designation System for Aluminum Finishes.
     3. American Society of Mechanical Engineers (AMSE).
        1. ASME A120.1 - Safety Requirements for Powered Platforms and Traveling Ladders and Gantries for Building Maintenance.
     4. American National Standards Institute / International Window Cleaning Association (ANSI/IWCA).
        1. ANSI/IWCA I-14.1 - Window Cleaning Safety Standard.
        2. ANSI A10.32- Standard Details Construction Fall Protection.
        3. ANSI A39.1 - Window Cleaning.
        4. ANSI A120.1 - Safety Requirements for Powered Platforms and Traveling Ladders and Gantries for Building Maintenance.
        5. ANSI Z359.1 - Safety Requirements for Personal Fall Arrest Systems, Subsystems, and Components.
     5. American Welding Society (AWS).
        1. AWS D1.2/D1.2M - Structural Welding Code - Aluminum.
        2. AWS D1.1/D1.1M - Structural Welding Code - Steel.
     6. ASTM International (ASTM).
        1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
        2. ASTM A167 - Specification for Stainless and Heat Resisting Chromium Nickel Steel Plate, Sheet and Strip.
        3. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.
        4. ASTM A492 - Standard Specification for Stainless Steel Rope.
        5. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
     7. International Code Council (ICC).
        1. International Building Code.
     8. Occupational Safety and Health Administration (OSHA).
        1. OSHA 1910, Subpart D, Walking and Work Surfaces.
           1. OSHA 1910.23 - Guarding floor and wall openings and holes.
           2. OSHA 1910.27 - Scaffolds and rope descent systems.
        2. 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)
        3. OSHA Ruling on Window Cleaning by Bosun's Chair.
        4. OSHA 1910.66 Subpart F, Powered Platforms.
        5. OSHA 1926 Subpart L - Scaffolds.
        6. OSHA 1926 Subpart M, Fall Protection.
     9. National Roofing Contractors Association (NRCA)
        1. The NRCA Roofing and Waterproofing Manual.
  2. SUBMITTALS
     1. General: Submit in accordance with Section 01 30 00 - Administrative Requirements.
     2. 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. Include installation and rigging instructions and:
           1. Required restrictive working usage and general safety notes.
           2. Non-restrictive working usage and general safety notes.

\*\* NOTE TO SPECIFIER \*\* Owner or Owner's representative may request either submission of calculations or test reports, or they may require submission of both. Edit the following Paragraph to meet project requirements. Delete if not required.

* + - 1. Ensure Shop Drawings are reviewed by Engineer licensed in State of Project location and submit calculations and test reports to Architect.
    1. 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.
    2. 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.

\*\* NOTE TO SPECIFIER \*\* Include the following Article for projects in California.

* + 1. Operating Procedures Outline Sheet (OPOS):

\*\* NOTE TO SPECIFIER \*\* An OPOS establishes safe window cleaning and exterior maintenance procedures for buildings and structures.

* + - 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 California Labor Code orders. Ensure that OPOS contains as a minimum, elements as follows:
         1. 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.
         2. Identification of drop zones, recommended drop sequences, scaffold configurations, and specific building maintenance procedures including equipment to be used.
         3. Identification of anchorage points for personal fall arrest systems and building maintenance equipment.
         4. Identification of personal fall protection requirements and procedures for securing equipment.
         5. Identification of dangerous areas on roof by highlighting of "Danger Zone" on pictorial drawing.
         6. Description of means and methods to be used to transfer equipment from drop location or between building levels.
         7. Identification of equipment limitations, load ratings, and special use conditions.
         8. Provisions for pre-operational, operation and maintenance inspections.
         9. Identification of access and egress to work locations and storage area(s) for permanent or transportable building maintenance equipment.
         10. Indication of location and method of stabilization provided for suspended equipment.
         11. Emergency and rescue procedures and means of communications to be used during such procedures.
         12. Method to be used to control employee exposure to falls while in "Danger Zone."

\*\* NOTE TO SPECIFIER \*\* Coordinate Paragraph below with Part 3 Field Quality Requirements Article. Retain or delete as applicable.

* + 1. Manufacturer's field reports as specified.
  1. CLOSEOUT SUBMITTALS
     1. Submit 1-year standard manufacturer warranty documents as specified.
     2. 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:
           1. Manufacturer's instructions covering maintenance requirements and parts catalog giving complete list of repair and replacement parts with cuts and identifying numbers.
           2. One copy of system Equipment Manual & Inspection Log Book, with "Initial Inspection - Certification for Use" and "Inspection Sign-Off" forms completed.
           3. Two copies of reduced, "as-built shop drawing" showing equipment locations and details. Ensure drawing is posted adjacent exits to roof.
  2. QUALITY ASSURANCE
     1. 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.

\*\* NOTE TO SPECIFIER \*\* Delete any or all additional turnkey services not required.

* + - * 1. Additional Turnkey Services:

Installation.

Inspection and testing.

Certification.

Training.

Retrofitting: Bring existing exterior building maintenance systems into compliance with OSHA safety standards listed in the "Regulatory Requirements"

* + 1. Provide window cleaning equipment components and materials from single manufacturer to the greatest extent practical.

\*\* NOTE TO SPECIFIER \*\* Article below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Contact Conditions and Section 01 40 00 - Quality Requirements. Repetitive statements should be avoided. Current data on building code requirements and product compliance may be obtained from manufacturer technical support specialists.

* + 1. Regulatory Requirements.

\*\* NOTE TO SPECIFIER \*\* Window cleaning equipment systems must also meet the requirements of building codes and zoning bylaws issued by Federal, State and local government authorities having jurisdiction. Ensure that project specification section reflects the need to meet these requirements. Edit Article below as applicable.

* + - 1. Comply with applicable code of local jurisdiction.
      2. Comply with OSHA regulations as follows:
         1. OSHA 1910, Subpart D, Walking and Working Surfaces.

OSHA 1910.23 - Guarding floor and wall openings and holes.

OSHA 1910.27 - Scaffolds and rope descent systems.

* + - * 1. OSHA 1910.66, Subpart F, Powered Platforms.
        2. OSHA 1910, Subpart F, Appendix C, Personal Fall Arrest Systems.

OSHA 1910.66 - Powered Platforms for Building Maintenance

OSHA 1910.66 - Guidelines (Advisory)

OSHA 1910.66 - Exhibits (Advisory)

* + - * 1. OSHA Ruling on Window Cleaning by Bosun's Chair.
        2. OSHA 1926 Subpart L - Scaffolds.
        3. OSHA 1926 Subpart M, Fall Protection.

\*\* NOTE TO SPECIFIER \*\* Include the following Paragraph for projects in California. Delete if not required.

* + - 1. Comply with California State regulations as follows:
         1. Code of Regulations, Title 8 - Industrial Relations, Article 5 (Window Cleaning), Article 6 (Powered Platforms for Exterior Building Maintenance), and Appendix C to Article 6 (Personal Fall Arrest System).
    1. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01 30 00 - Administrative Requirements.
  1. DELIVERY, STORAGE AND HANDLING
     1. General: Comply with 01600 - Product Requirements.
     2. Delivery: Deliver materials in manufacturer's original packaging with identification labels intact and in sizes to suit project.
     3. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

\*\* NOTE TO SPECIFIER \*\* Modify the requirements below to comply with local code requirements required.

* + 1. Transportation and Handling:
       1. Ensure center of gravity of davits weighing 80 lbs (36.3 kg) or greater remains 36 inches (915 mm) maximum above safe surface while transporting.
       2. Ensure davits requiring 140 lbs (63.4 kg) or greater lifting effort are equipped with mechanical means of hoisting into position.
  1. PROJECT AMBIENT CONDITIONS
     1. Installation Location: Assemble and erect components only when temperatures are above 40 degrees F (4 degrees C).
  2. SEQUENCING
     1. Sequence with other Work and Comply with window cleaning equipment manufacturer's written recommendations for sequencing construction operations.
  3. WARRANTY
     1. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Lynn Safety, Inc., which is located at:110 Mason Circle, Suite AConcord, CA 94520Toll Free Tel: 800-436-6201Tel: 925-609-7646Fax: 925-609-6446Email: [request info (Jr@lynnsafety.com)](https://arcat.com/rfi?action=email&company=Lynn%252BSafety%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(11010lyn)%253A%2520&coid=49484&spec=11010lyn&rep=&fax=925-609-6446);Web: <http://www.lynnsafety.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
  1. DESIGN PERFORMANCE REQUIREMENTS
     1. Provide complete engineering design of all unique components as well as engineering of the system as a whole.
     2. Verify all components are properly configured to access all windows for maintenance.
     3. Design window cleaning and suspended maintenance system to suit project requirements to AISC S342L and as specified.
     4. Locate anchorages to suit suspension equipment specified.
     5. 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.
     6. 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. Supports for Suspended Platforms including davits and rigging sleeves:
           1. SEQ CHAPTER 1Safety factor against fracture or detachment: 4 to 1.
           2. Vertical service load: 1000 lbs (4.45 kN) minimum.
           3. Rated load against fracture: 4000 lbs (17.8 kN) minimum.
        3. Fall Arrest Safety Anchors:
           1. Fall arresting force safety factor of 2 to 1 without permanent deformation: 1800 lbs (8.0 kN) minimum.

\*\* NOTE TO SPECIFIER \*\* For projects in California specify fall arrest force against fracture or detachment of 5000 lbs (24 kN) minimum. Delete if not required.

* + - * 1. Fall arrest force against fracture or detachment: 5,000 lbs (22.4 kN) minimum.

\*\* NOTE TO SPECIFIER \*\* Powered, suspended work platforms are custom order items, modular by nature and designed to match your building's needs. We provide this equipment with versatility built-in and safety always in mind. Delete if not required.

* 1. POWERED PLATFORMS
     1. Powered Platforms: Powered, suspended work platforms designed and engineered for versatility and safety, for use by exterior building maintenance personnel.
     2. Suspended Platform: Type 6061-T6 aluminum alloy to ASTM B221, mill and powder coated finished modular platform system to ASME A120.1, engineered length and width to suit application as indicated and based on load bearing frame, with non-slip, aluminum deck, soft rubber wall rollers and caster wheels.
        1. Provide integral, detachable 60 inches (1524 mm) long single work cage at one end complete with necessary components to meet project requirements.
        2. Comply with OSHA 1910.66 Subpart F, Powered Platforms.
     3. Frame and Rails:

\*\* NOTE TO SPECIFIER \*\* Delete side frame and connecting frame material not required.

* + - 1. Side Frames and Connecting Frames: Structural aluminum.
      2. Side Frames and Connecting Frames: Galvanized mild steel.
      3. Side Frames and Connecting Frames: Powder coated steel.
      4. Guard rails and guard rails posts: Square, thick wall aluminum extrusions with rails 36 inches (915 mm) minimum, above deck level at working side of platform, 42 inches (1067 mm) at non-working side.
    1. Stirrups: Fitted with manufacturer's standard hoist unit, top limit switch assembly, striker plate, and high "fair lead".

\*\* NOTE TO SPECIFIER \*\* Delete material not required.

* + - 1. Material: Structural aluminum.
      2. Material: Galvanized mild steel.
      3. Material: Powder coated steel.

\*\* NOTE TO SPECIFIER \*\* To ensure that drums wind evenly and prevent loose wires from jamming, specify wire winders with drums built into the stirrups.

* + - 1. Wire winders:

\*\* NOTE TO SPECIFIER \*\* Delete operation not required.

* + - * 1. Electric powered.
        2. Passive type.

\*\* NOTE TO SPECIFIER \*\* Delete drum not required.

* + - * 1. Single drum built into stirrups.
        2. Twin drum built into stirrups.
        3. Capacity: As required to suit project requirements.
        4. Dimensions: As required to suit project requirements.
    1. Cable Storage Bin: Include cable storage bin on rear guard rail.
       1. Capacity: As required to suit project requirements.
       2. Dimensions: As required to suit project requirements.
    2. Safety Controls:
       1. Electro mechanical overload system: Integral with each hoist preset to safe working load plus 25% minimum, and designed to operate limit switch and cut power supply if platform overloads.
       2. Include upper limit switch assembly at each stirrup top and ensure system cuts electric power supply when switch contacts striker plate on suspension rope at top limit of travel.
       3. Lower limit trip bar assembly: Hinged aluminum bar at each end of platform working face underside.
          1. Design to ensure limit switch interrupt electric power supply to both hoists if bar is pushed upwards by obstruction on building facade during descent. Ensure system continues to allow platform to operate in upward direction.
    3. Main and Auxiliary Control Boxes: Include electric control gear for both hoists and wire winder motors contained in central control box and mounted on rear guardrail. Include components as follows:

\*\* NOTE TO SPECIFIER \*\* Edit the following list to suit project requirements.

* + - 1. Switches marked "UP/DOWN" and "HOLD TO RUN".
      2. Hoist selector switch marked "LEFT/RIGHT/BOTH".
      3. Bottom trip bar over-ride button.
      4. Emergency stop button.
      5. Platform self-leveling system.
      6. Power "ON" indicator light.
      7. Three phase protection and light indicator.
      8. Locking facility on main switch.
      9. Hand wheel for manual hoist operation.
      10. Watertight electrical "quick" connections.
    1. Hoist Unit: Power platform using two UL listed traction type hoists with features as follows:

\*\* NOTE TO SPECIFIER \*\* Edit the following list to suit project requirements.

* + - 1. 30 amp 230 volt 60 Hertz hoist with lift capacity to suit platform weight and live load.
      2. 35 feet per minute (10.7 meters per minute) minimum speed.
      3. Slack rope safety device acting on safety rope.
      4. Electro mechanical overload system.
      5. Electro mechanical main brake.
      6. "No Power" controlled emergency descent system.
      7. Hoist protection cover.
      8. Main line power protection: \_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Specify four wire ropes for buildings over 300 feet (91.4 m) high. If two wire ropes are specified, separate lifeline anchors are required for workers.

* + 1. Steel Wire Rope:

\*\* NOTE TO SPECIFIER \*\* Delete number of wire rope not required.

* + - 1. Ensure platform is complete with two, 0.3125 inches (8 mm) minimum diameter galvanized high tensile steel wire ropes, length and construction to suit project requirements.
      2. Ensure platform is complete with four, 0.3125 inches (8 mm) minimum diameter galvanized high tensile steel wire ropes, length and construction to suit project requirements.
      3. Ensure each rope includes thimble and brazed "bullet-end".
    1. Electrical Supply Cable: Fit trailing supply cable with cable support clamp and CEE plug for connection to central control box and supplied with cable support clamp.

\*\* NOTE TO SPECIFIER \*\* Specify electrical supply cables for buildings over 350 feet (107 m) high to be equipped with reinforced core. Delete length not required.

* + - 1. SEQ CHAPTER 1Electrical supply cables: \_\_\_\_ feet (\_\_\_ m) long.
      2. SEQ CHAPTER 1Electrical supply cables: \_\_\_\_ feet (\_\_\_ m) long with reinforced core.
    1. Powered Platform Accessories:

\*\* NOTE TO SPECIFIER \*\* Edit the following list to suit project requirements.

* + - 1. Portable fire extinguisher securely attached to platform.
      2. Water container attached to rear guard rail.
      3. Electric power tool receptacle on central control box.

\*\* NOTE TO SPECIFIER \*\* Designed to keep equipment such as a platform, cage, or bosun's chair in contact with the building's facade and to prevent movement from winds, keeping workers safe and preventing damage to the building face. Delete if not required.

* 1. STABILIZATION SYSTEMS
     1. Powered Platform Stabilization (Tie-In Guides):
        1. Continuous stabilization: Provide guide roller/sliding shoe assembly at each end of bottom of platform designed to provide continuous engagement between platform and internal tracks.
           1. Co-ordinate design with curtain wall manufacturer to ensure smooth operation.
           2. Internal track tie-in guides: Design tracks to ensure platform trolleys can be inserted from top and bottom of building.
        2. Intermittent stabilization anchor buttons. Include sufficient quantity of stainless steel stabilizer ties.
           1. Working load: To AISC S342L, 300 lbs (1.33 kN) minimum.
           2. Load against fracture or detachment: To AISC S342L, 600 lbs (2.67 kN) minimum.

\*\* NOTE TO SPECIFIER \*\* If the building has been designed with davit bases to suit roof rigged davit arms, locate buttons/detent pins every third floor or 50 feet (15.3 m) whichever is less in line with davit base suspension points. Note that New York Department of Labor recommends 40 feet (12.2 m) maximum.

* + - * 1. Locate buttons in line with davit base suspension points.

\*\* NOTE TO SPECIFIER \*\* Delete spacing not required.

Every third floor.

40 feet (12.2 m) maximum.

50 feet (15.3 m) maximum.

\*\* NOTE TO SPECIFIER \*\* Specify detent pins only where flush building appearance is critical. Delete if not required.

* + - 1. Detent pins: Stainless steel tie handles with spring loaded ball lock to suit building facade. Include sufficient quantity of stabilizer ties.
         1. Size: \_\_\_ diameter.
         2. Working load: To AISC S342L, 300 lbs (1.33 kN) minimum.
         3. Load against fracture or detachment: To AISC S342L, 600 lbs (2.67 kN) minimum.

\*\* NOTE TO SPECIFIER \*\* If the building has been designed with davit bases to suit roof rigged davit arms, locate buttons/detent pins every third floor or 50'-0" (15.3 m) whichever is less in line with davit base suspension points. Note that New York Department of Labor recommends 40 feet (12.2 m) maximum.

* + - * 1. Locate detent pins in line with davit base suspension points.

\*\* NOTE TO SPECIFIER \*\* Delete spacing not required.

Every third floor.

40 feet (12.2 m) maximum.

50 feet (15.3 m) maximum.

\*\* NOTE TO SPECIFIER \*\* As well as items listed in the following Article, a complete Davit system includes some or all of those items listed in the Article titled "Accessories". Edit this section to include those accessories necessary for the project requirements.

* 1. DAVITS

\*\* NOTE TO SPECIFIER \*\* Edit the following Paragraphs to suit project requirements.

* + 1. Davit Booms:

\*\* NOTE TO SPECIFIER \*\* Delete rigging location type not required.

* + - 1. Ground rigged, aluminum sections of engineered length and size to suit application or as indicated, equipped with carrying handles and designed to carry 1000 lbs (4.5 kN) vertical service load, minimum.

\*\* NOTE TO SPECIFIER \*\* Delete outboard end configuration not required.

* + - * 1. Stainless steel rolling trolley on outboard end.
        2. Stainless steel friction trolley on outboard end.
        3. Galvanized fixed shackle on outboard end.
      1. Roof rigged, aluminum sections of engineered length and size to suit application or as indicated, equipped with carrying handles and designed to carry 1000 lbs (4.5 kN) vertical service load, minimum.

\*\* NOTE TO SPECIFIER \*\* Delete outboard end configuration not required.

* + - * 1. Stainless steel rolling trolley on outboard end.
        2. Stainless steel friction trolley on outboard end.
        3. Galvanized fixed shackle on outboard end.
      1. 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.
    1. Davit Masts: Capable of rotating through 360 degree with carrying handles and connecting pins. Provide wheels for davits that weight more than 80 pounds (36.3 kg).

\*\* NOTE TO SPECIFIER \*\* Maximum allowable weight of davit arm pieces is 80 lbs (36.3 kg) throughout the USA with the exception of projects in California which allows pieces to be 140 pounds (73 kg) without mechanical means of hoisting into position. Delete material not required.

* + - 1. Material: Aluminum.
      2. Material: Steel.

\*\* NOTE TO SPECIFIER \*\* Maximum allowable weight of davit arm pieces is 80 lbs (36.3 kg) throughout the USA with the exception of projects in California which allows pieces to be 140 lbs (73 kg) without mechanical means of hoisting into position.

* + 1. Davit Arms: Davits to be demountable, portable, capable of being easily and quickly broken down into pieces weighing not more than the following:

\*\* NOTE TO SPECIFIER \*\* Delete maximum weight not required.

* + - 1. 80 lbs (36.3 kg) maximum.
      2. 140 lbs (73 kg) maximum.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Ensure davit arm booms equipped with rolling trolleys or friction trolleys have stops to prevent detachment from boom.

\*\* NOTE TO SPECIFIER \*\* For tall davit arms greater than 6 feet (1.83 m) high, specify hoisting winches to safely raise and lower davit arms and dolly wheels to roll davit arms into place. Delete if not required.

* + - 1. Provide hoisting winches and dolly wheels.
    1. Davit Bases: Round, mild steel, hollow section piers, Type 350W with 50 Ksi (350 MPa) minimum yield strength.

\*\* NOTE TO SPECIFIER \*\* Delete metal surface treatments not required.

* + - 1. Hot dipped galvanized to ASTM A123/A123M]
      2. Manufacturer's polyurethane/polyurea coating system.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Provide \_\_\_\_ inch diameter U-bar safety anchor, and securement to suit application as indicated or required.

\*\* NOTE TO SPECIFIER \*\* Lynn Safety's Outrigger Beam Assemblies are designed on a per project basis and used to suspend powered equipment.

* 1. OUTRIGGER BEAMS
     1. 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.

\*\* NOTE TO SPECIFIER \*\* Delete type not required.

* + - 1. Aluminum "I" beam.
      2. Galvanized steel "I" beam.
      3. Galvanized hollow steel section.

\*\* NOTE TO SPECIFIER \*\* Delete outboard ends not required.

* + - 1. Equipped with shackle on outboard end.
      2. Equipped with friction U-bar on outboard end.
      3. Equipped with trolley on outboard end.
      4. 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.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Provide outrigger beams equipped with rolling or friction trolleys with stops to prevent detachment from beam.

B.Outrigger Base/Roof Anchor Hollow Steel Section (HSS) piers: Hollow steel section (HSS) piers: Mild steel, Type 300W with 50 Ksi (350 MPa) minimum yield strength.

* + - 1. Wall thickness to suit application or as indicated.

\*\* NOTE TO SPECIFIER \*\* Delete metal surface treatments not required.

* + - 1. Hot dipped galvanized to ASTM A123/A123M.

\*\* NOTE TO SPECIFIER \*\* Lynn Safety's horizontal lifeline system is designed on a per project basis and used for fall protection. Horizontal lifelines are designed to be secured between anchor points. These lifelines can be hands free or used in conjunction with a duel leg lanyard. The ultimate capacity of each lifeline is base on project requirements. Horizontal lifelines can be used for fall arrest or fall restraint. Delete if not required.

* 1. HORIZONTAL LIFELINES
     1. Cable: 5/16 or 3/8 inch 7x19 stainless steel aircraft cable as applicable.
     2. 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.
     3. Standard Intermediate Support Brackets: Stainless steel to ASTM A167, Type 316, multi-position, with reinforcing end caps and suitable for installation at any height.

\*\* NOTE TO SPECIFIER \*\* Delete material not required.

* + - 1. Secure using stainless steel fasteners.
      2. Secure using galvanized fasteners.

\*\* NOTE TO SPECIFIER \*\* Specify mobile intermediate support brackets when project requires working on both sides of a sloped roof at the ridge point. Delete if not required.

* + 1. Mobile Intermediate Support Brackets: Multi position, stainless steel to ASTM A167, Type 316, multi-position, with reinforcing end caps and suitable for installation at any height.

\*\* NOTE TO SPECIFIER \*\* Delete material not required.

* + - 1. Secure using stainless steel fasteners.
      2. Secure using galvanized fasteners.

\*\* NOTE TO SPECIFIER \*\* Specify corner units as needed to meet project requirements.

* + 1. Corner Units: 90 degree and 135 degree flexible corner units, as required, from manufacturer's standard components to meet project requirements.
    2. End Terminal Hardware: 1/2 inch Crosby HG228 turnbuckle, or similar, at one end. 1/2 inch Crosby G-2130/G-2150 shackle, or similar, at opposite end.
    3. Thimble: 3/8 inch Crosby G-411 or similar.
    4. Swage Sleeve Termination: Crosby S-506 or similar.

\*\* NOTE TO SPECIFIER \*\* Paragraph below is for hands-free operation. Delete if not required.

* + 1. Lanyard Cable Runner: Stainless steel to ASTM A167, Type 316 with automatic runner bypass for continuous "hands-free" operation.
       1. Ensure lanyard can be inserted or removed anywhere on cable.

\*\* NOTE TO SPECIFIER \*\* Lynn Safety's catenary lifeline system is designed on a per project basis and used to secure personal fall protection equipment, controlled descent apparatus equipment, and for securing building maintenance equipment to the building. Catenary lifelines are designed to be secured between two anchor points. Delete if not required.

* 1. CATENARY LIFELINES
     1. Fall Arrest Capacity:
        1. Rated Capacity: 1,250 pounds in any direction.
        2. Ultimate Capacity: 5,000 pounds in any direction.
     2. Wire Rope: 3/8 inch diameter, 6x19 IWRC stainless steel wire rope.
        1. Minimum 12,000 pound break strength.
        2. Sag: \_\_\_\_.
     3. Weldless Link: Crosby 7/8 x 4 inch C-340 hot dipped galvanized.
        1. Rated Capacity: 12,000 pounds.
     4. Anchor Spacing: \_\_\_\_.
     5. 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.

\*\* NOTE TO SPECIFIER \*\* Lynn Safety's tie-back anchor is designed on a per project basis and used to secure personal fall protection equipment, horizontal lines, catenary lifeline pairs, and for securing building maintenance equipment to the building. Delete if not required.

* 1. TIE-BACK ANCHORS
     1. 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.

\*\* NOTE TO SPECIFIER \*\* Delete the material not required.

* + - 1. Material: Stainless steel to ASTM A276,Type 304 with 35 Ksi (240 MPa) minimum yield strength.
      2. Material: Mild steel, Type 300W with 44 Ksi (300 MPa) minimum yield strength, hot-dip galvanized to ASTM A123/A123M.
      3. Label: Durable weatherproof label attached to anchor that states "Safety Tie-Back Anchor. See OPOS for usage."

\*\* NOTE TO SPECIFIER \*\* Lynn Safety's tie-down anchor is designed on a per project basis and used to secure tie-down outrigger beam assemblies. The ultimate capacity of each anchor is dependent on that project's design criteria. Delete if not required.

* 1. TIE-DOWN ANCHORS
     1. 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.

\*\* NOTE TO SPECIFIER \*\* Delete the material not required.

* + - 1. Material: Stainless steel to ASTM A276,Type 304 with 35 Ksi (240 MPa) minimum yield strength.
      2. Material: Mild steel, Type 300W with 44 Ksi (300 MPa) minimum yield strength, hot-dip galvanized to ASTM A123/A123M.
      3. Label: Durable weatherproof label attached to anchor that states "Tie-Down Anchor. See OPOS for usage."

SEQ CHAPTER \*\* NOTE TO SPECIFIER \*\* Items from the following list should be included with the equipment specified in this section to ensure the various systems are complete. Follow manufacturer's recommendations and edit the list of "Accessories" to suit project requirements.

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

1. EXECUTION
   1. INSTALLERS
      1. 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.
      2. Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions and technical data sheets.
   2. EXAMINATION
      1. 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. PREPARATION
      1. Verify structure or substrate is adequate to support complete window cleaning equipment system.
      2. 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.
   4. INSTALLATION

\*\* NOTE TO SPECIFIER \*\* Co-ordinate installation with the manufacturer's written installation details and instructions.

* + 1. Coordinate window cleaning equipment work with work of other trades, for proper time and sequence to avoid construction delays.
    2. Install window cleaning equipment plumb and level in accordance with manufacturer's written instructions.
    3. SEQ CHAPTER 1Mechanically fasten anchors in accordance with manufacturer's recommendations.
    4. Accurately fit and align, securely fasten and install free from distortion or defects.
    5. Deform threads of tail end of anchor studs after nuts have been tightened to prevent accidental removal and vandalism.
  1. FIELD QUALITY CONTROL

\*\* NOTE TO SPECIFIER \*\* Use the following Paragraphs when manufacturer's field services are desired to verify the quality of the installed components. Establish the number and duration of periodic site visits required by the Manufacturer and specify below. Consult with the Manufacturer for services required. Delete if field services are not required.

* + 1. 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:
          1. Weekly.
          2. 2 times during progress of work at 25% and 60% of completion.
       4. Upon completion of work, after cleaning is carried out.
    2. 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.
  1. ADJUSTMENT
     1. Lubricate moving parts to operate smoothly and fit accurately.
     2. Complete "Initial Inspection - Certification for Use" form included in Equipment Manual and Inspection Log Book provided by manufacturer.
  2. FINAL CLEANING
     1. Do cleanup in accordance with Section 01 70 00 - Execution and Closeout Requirements.
     2. Upon completion, remove surplus and excess materials, rubbish, tools and equipment.
  3. PROTECTION
     1. Protect installed product from damage during construction.
     2. Repair or replace damage to adjacent materials caused by window cleaning equipment installation.
  4. MAINTENANCE
     1. Include complete maintenance on window cleaning equipment for 12 months after date of acceptance by Architect.
     2. Regularly and systematically examine, clean, adjust and lubricate moving parts.

\*\* NOTE TO SPECIFIER \*\* Delete schedule not required.

* + - 1. Schedule: Weekly.
      2. Schedule: Semi-monthly.
      3. Schedule: Monthly.
    1. 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