

# PERMANENT POWERED PLATFORMS

Pro-Bel Enterprises Limited  
3 11010  
04  
MAINTENANCE EQUIPMENT  
window washing systems



## PRO-BEL

Safety Systems Engineered for Life



### SUSPENDED EQUIPMENT & FALL PROTECTION EXPERTS

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Window Cleaning/  
Suspended Maintenance  
Equipment & Fall  
Protection Systems

## DESCRIPTION

Dedicated to a specific building and owner purchased, permanent platforms are equipped with added safety features over and above that required for non-permanent platforms in compliance with OSHA 1910.66, Subpart F. See the following pages for list of standard equipment and options.

Normally a modular-type platform, Pro-Bel permanent platforms are manufactured of aluminum and steel and are available in connectable sections designed to suit building platform "drops".

Building design and unique architectural characteristics often dictate the necessity for a custom permanent powered platform which may include special features that allow the platform to articulate (hinge) or telescope to reach otherwise inaccessible areas of the building.

Steel cable primary suspension lines are attached to primary suspension supports on the roof. A separate fall arrest system is required for each worker, consisting of a lifeline tied off to its own independent rooftop safety anchor (T type platforms) or alternatively the worker's lanyard may be secured to a horizontal lifeline system anchored to Platform (F Type platforms).

## Types of Platforms

T Type platforms are suspended by at least two wire ropes. Failure of one wire rope would not permit the platform to fall to the ground, but would upset its normal position.

F Type platforms are suspended by at least four wire ropes and are designed so that failure of any one wire rope will not substantially alter the normal position of the platform.

## Primary Suspension Support Options

Powered platform installations permanently dedicated to exterior or interior building maintenance are intended to be used in conjunction with any of the following permanently installed support equipment:

- Davit systems
- Permanent outrigger systems
- Monorails
- Rigging sleeves
- Soffit anchors
- Rolling davit/outrigger track systems
- Rail mounted roof car machines
- Rubber tire roof car machines
- Long span boom machines



Permanent powered platforms are owner purchased and dedicated to a specific building. The Pro-Bel roof rigged system shown above (and on cover) is an F Type modular platform suspended from a Pro-Bel Davit System. See photos below. Bose Corporation, Boston, MA.



Rooftop photo shows rotating davit arms turned inwards. Platform is raised via two hoist motors mounted on the low profile walk-through stirrups, then pushed outwards to clear the parapet/safety rail.



Four point suspension platforms include a permanently installed horizontal cable system (dog line) for the attachment of workers' fall arrest lanyards (no separate hanging lifelines).

## Primary Suspension Equipment

### USE

Generally, permanent platforms can be used for ascent or descent of any height but are normally employed on buildings of less than 490'-0" (150 m). See Pro-Bel Roof Car literature (drum hoist type) for building heights over 490'-0" (150 m).

Mandatory in New York State for buildings of 75'-0" (22.8 m) height and higher, and in California State for buildings 130'-0" (39.6 m) height and higher.

F Type platforms are recommended for all buildings over 300'-0" (91.4 m) in height due to constraints imposed with handling lifelines over this height and are typically roof rigged systems.

### FEATURES

**Ease of maintenance and repair;** Pro-Bel permanent powered platforms are designed using conventional electrical and mechanical technology. Designs incorporate standard traction hoists, electric motors, and controls. Most suspended platform rental companies can service and maintain this equipment.

**All corrosion resistant materials;** components are aluminum, hot dipped galvanized steel, specially treated powder coated steel, and stainless steel.

**Wire winder design;** proven designs with minimum maintenance and clutch adjustment to ensure smooth collection of cable; suited to both end stirrups and walk-through stirrups.

**Standards conformance;** all platforms comply with OSHA and ASME/ANSI/IWCA safety requirements for window cleaning, and various materials standards.

**Engineer certified;** OSHA and ANSI/IWCA 1-14.1 requires that platforms be designed by or under the direction of a registered professional engineer experienced in such design. Pro-Bel platform performance is based on data derived from independent testing and/or engineering calculations.

**Sole responsibility;** Pro-Bel provide complete primary suspension and fall protection products/systems *from concept* to the supply and installation of same, including annual maintenance and inspection.

**Specific liability insurance;** all Pro-Bel installations automatically carry \$5,000,000.00 + coverage against product/system failure (over 5000 projects successfully completed to date).



This Pro-Bel modular aluminum platform is suspended from a Pro-Bel motorized traversing davit system which moves on a custom, narrow, double I-beam track at roof level. Sun-Coast Casino and Hotel, Las Vegas, Nevada.



This Pro-Bel powered platform employs Pro-Bel 14'-0" (4.3 m) long span davit booms to clear roof terraces and cornice at lower level. The Millennium building, New York, NY.

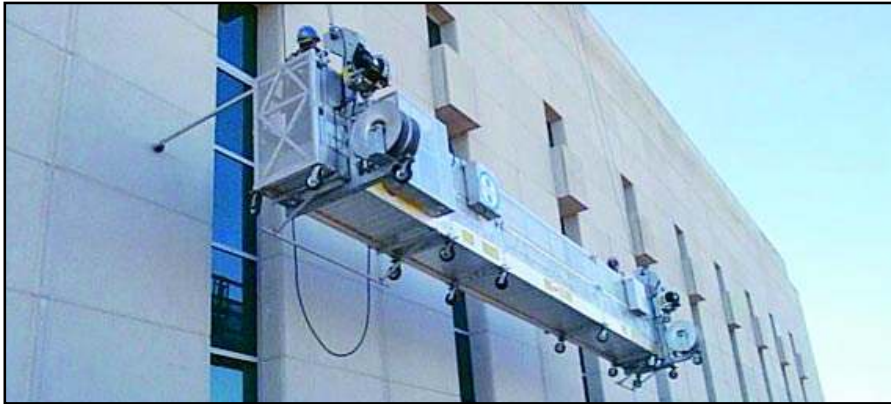


Photo shows how face roller extensions are used to clear window canopies as well as roof mounted light standards located on a lower roof.



Using the rotating davit arms, the platform is swung across the catwalk and over the parapet, and then rolled out on the booms using stainless steel trolleys. Note the custom fitted face roller extensions mounted on the platform rail.



Pro-Bel single work cage is suspended from a Pro-Bel Tall Davit which is designed to clear the high parapet rail. Davit is equipped with two gear chains, one to facilitate arm rotation, and one to facilitate movement of rolling trolley inboard or outboard under load.

#### MATERIALS/FABRICATION (as applicable)

**Suspended Platform:** Type 6061-T6 aluminum alloy mill and powder coated finished platform system of engineered length and width to suit application, based on load bearing frame with non-slip, aluminum deck, soft rubber wall rollers and caster wheels.

**Frame and rails:** side frames and connecting frames are structural aluminum, galvanized mild steel, and/or powder coated steel finish; guard rails are square, thick wall aluminum extrusions with rails a minimum of 36" (915 mm) above deck level at working side of platform and 42" (1067 mm) at non-working side. A 3-1/2" (90 mm) high toeboard is provided around circumference of platform with spaces between toeboard and guard rails covered with expanded aluminum screen, excluding front of platform between mid-rail and top rail.

**Platform Stirrups:** The primary function of a platform stirrup is to provide a structural frame on which to mount the suspension motors. Made of structural aluminum, hot-dip galvanized steel and/or powder coated steel. Twin drum electric powered wire winders are located within the stirrup, within the platform, or beneath the platform.

**High Profile End Stirrups:** high end stirrups are designed with a high "fair lead". This means that a tall stirrup will restrict the platform from rolling inboard to outboard to a maximum of 15°. High end stirrups are normally fixed at each end of the platform. In custom applications they are also designed into platform mounted monorails to provide adjustable pickup points.

**Walk-Through Stirrups:** Walk-through stirrups mounted to the outside of the platform provides greater flexibility e.g. adjustable pick-up points – and an unobstructed work area on the platform. The stirrup also facilitates transition of platform size when the platform is required to be converted into a single work cage. The suspension motors and wire winders are normally mounted to the outside of the stirrup.

**Wire winders:** available electric powered or passive type with single or double drum mounted on platform stirrups, with built-in clutch to allow drums to wind evenly to prevent loose wires and jamming; capacity and dimension to suit application.

**Cable storage bin:** fitted to rear guard rail, capacity and dimensions to suit length of power cable (building height).



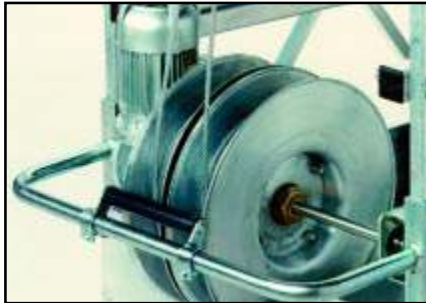
Aluminum cable storage bins are designed to suit power cable length for both modular platforms and single work cages.

**Upper limit switch assembly:** fitted on top of each stirrup, designed to cut electric power supply to hoist when switch contacts striker plate on suspension rope at top limit of travel.

**Electro mechanical overload system:** integral with each hoist preset to safe working load plus 25%, designed to operate limit switch and cut power supply if overloading of platform should occur.

**Platform self-levelling system (optional):** anti-tilt mercury switch assembly mounted in central control box, designed to interrupt electric power if platform becomes out of level to a preset angle of 10 to 15 degrees. Leading hoist to automatically stop, allowing other hoist to continue until platform is re-levelled.

**Lower limit trip bar assembly:** consists of hinged continuous aluminum bar mounted on the underside of working face of platform, designed to operate limit switch and interrupt electric power supply to both hoists in the event bar is pushed upwards by any obstruction on the building facade during descent, but still allowing platform to be operated in upward direction.



Power wire winders are mounted onto stirrups or below platforms and designed to suit cable lengths up to 490'-0" (150 m) with special consideration up to 600'-0" (183 m).



Pro-Bel platforms are designed with heavy duty limit switches for long term durability.



Overload devices are set in the factory to ensure working loads on platforms are not exceeded.



Lower limit devices are normally designed using a modular aluminum pipe and in special applications a electronic photo eye and light beam is used.

**Central control box:** electrical controls for both hoists and wire winder motors are contained in central control box and mounted to rear guardrail. Standard layout contains:

1. UP/DOWN 'HOLD TO RUN' switches for both hoists;
2. hoist selector switch (left/right/both);
3. bottom trip bar over-ride button;
4. emergency stop button;
5. platform self-levelling system;
6. Power On indicator light;
7. three phase protection and light indicator;
8. locking facility on main switch;
9. handwheel for manual hoist operation;
10. watertight electrical "quick" connections.



**Electrical supply cable:** trailing supply cable is fitted with female CEE plug for connection to the central control box and supplied with cable support clamp, length as required.

**Portable fire extinguisher:** to be securely attached to all working platforms.

**Building Face Rollers:** permanent powered platforms come equipped with non-marking inboard face rollers. Extendable building face rollers are often used to clear building projections.

**Hoist unit:** platform to be powered by UL listed traction type hoists with the following features:

1. 30 amp 208/240 volt 60 Hz hoist with 880 lb. (400 kg) lift capacity; 1100 lb. (500 kg) lift capacity; 1760 lb. (800 kg) lift capacity;
2. 35 foot (10.7 m)/minute 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.

**Steel Wire Rope:** platform is supplied complete with two or four galvanized high tensile steel wire ropes of length as required. Each rope to be fitted with safety hook with thimble talurit clamp and a brazed 'bullet-end'. Construction 6 x 19 Seale & IWRC, standard diameter 5/16" (8 mm) or 3/8" (10 mm) as required.

**Custom Permanent Platforms:** Many permanent powered platforms require special rigging provisions that involve custom engineering of the platform. Special features that can be designed into the platform include;

*Articulating Platforms* - When Sections of the platform or platform itself hinges or cantilevers inboard to provide access under a cornice, balcony, or overhang.

*Extendable End Sections* - The end section of the platform tips out or extends beyond the stirrup to provide additional platform length.

*Extendable Platform* - The platform is designed so that it can be modular in its length by having an adjustable rolling deck, which allows variable pickup points.



Highrise maintenance worker is demonstrating how the adjustable end of the platform will extend past the stirrup to reach that extra three feet (1 m) of glass.



Photo above shows non-marking building face rollers. Many permanent platforms require extendable building face rollers (See photo at top of page P-4).



Extendable accordion-type tip out end is engaged for added reach before roof rigging this custom platform.



This platform utilizes a counterbalance or counterweight concept to help move the platform inboard of the suspension points which is very useful for reaching the glass under the sunscreens in this application. The platform moves laterally via a roof car thereby allowing convenient sideways movement controlled from the platform.



This unique project employs a Pro-Bel motorized telescoping platform to access the sloped interior atrium glass. Suspended from trolleys mounted on I-beam supports, the platform can traverse horizontally as well as up and down while the telescopic feature permits the platform to be narrowed or lengthened as required in order to service the variable atrium spaces. Hartford Public Library, Hartford, Connecticut.



High-rise tower employs rolling davit carriage traveling on twin I-beam tracks at penthouse level. Modular platform can be reduced in size to service skylight notch. Inset shows davit carriage and loading area for platform. Wall Centre, Vancouver, British Columbia.



In the photo above, the suspension cables for the telescoping platform are attached to the rolling trolley equipment by first lowering a suspension line through the rigging sleeve penetrating the top of the atrium. The line is used to raise a single work cage carrying the suspension cables to the trolleys. Inset photo shows rigging sleeve being inserted through the atrium wall from an adjacent roof.



A heavy roller weight, located just above the electrical cable storage bin, counterbalances the cage in the outboard position while main suspension motor power is interrupted. Also, cage is designed to electrical-ly traverse sideways in tracks located below the main platform. Beau Rivage Hotel and Casino, Biloxi, Mississippi.



Enron Building 2 in Houston, Texas consists of a 40 storey Tower and related buildings comprising 1,300,000 square feet (119,600 m<sup>2</sup>) of office space. Architect Kendall/Heaton Inc. and Cesar Pelli and Associates.



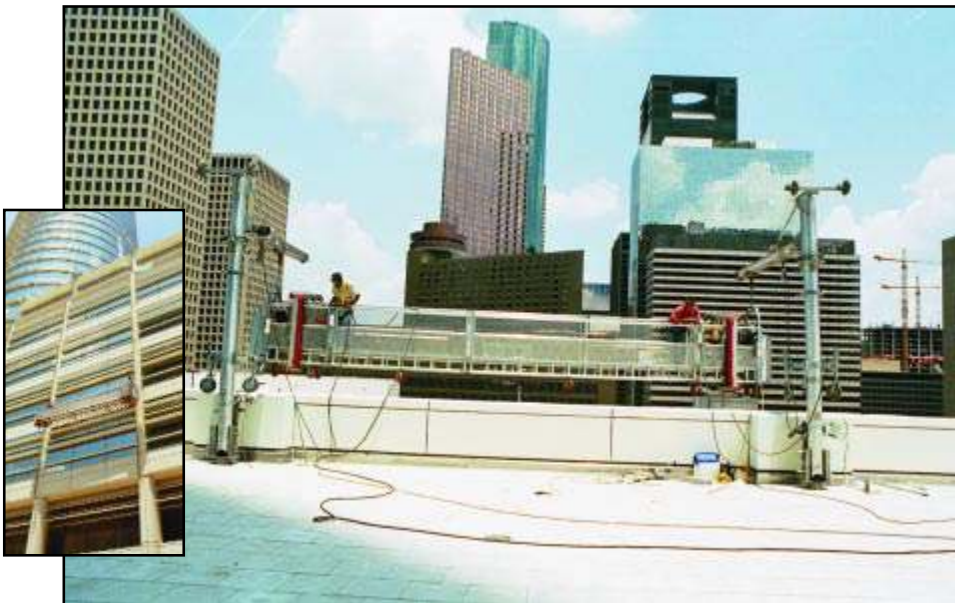
In order for the various Pro-Bel permanent powered suspended platforms to by-pass the accent pipe sections on the Garage Rotunda, Podium Rotunda, and Tower, special custom hydraulic retractable "ski rollers" that unfold to a vertical mode in front of the platform facilitate vertical travel up and down the face of the Enron building. These pipes would otherwise be difficult to circumvent with a conventional style platform.



The platforms are suspended from trolleys mounted inside monorails located on soffit overhangs at the uppermost level of the buildings. Recessed balconies or building faces at the upper levels require platforms to be switched from an interior monorail to an exterior monorail and vice versa using a "turntable." To avoid using a perimeter-type electrical bus bar system of providing power to the platforms, battery powered trolleys are used at each platform "drop". The batteries are plugged into permanent electrical outlets located in soffits when not in use.



On the Enron Tower, the 3 sequence photos show an unusual procedure requiring a Pro-Bel winch-hoist and special lifting frame be used to hoist platform sections from a Tower roof storage area, swung across a narrow terrace, and then lowered through a 10'-0" (3 m) diameter opening in the unique roof overhang, to the 40<sup>th</sup> floor balcony landing areas where the platform sections are assembled and launched. The bottom photo shows the assembled platform suspended from a monorail and battery operated trolley system.



Pro-Bel davits 14'-5" (4.4 m) high with 11'-7" (3.5 m) reach located on 8<sup>th</sup> Floor Podium are used to suspend one of a variety of different sized platforms. Inset shows platform traveling down face of Podium.



**DESIGN CONSIDERATIONS**

**Roof guarding:** Federal OSHA requires a standard 42" (1067 mm) high railing or equivalent safety system at open-sided elevations e.g. roof edge, whenever powered platforms are employed. California OSHA is more specific, calling for buildings to be provided with a perimeter guard at roofs consisting of a parapet or guardrail system 42" to 45" high (1067 mm to 1143 mm) located above the adjacent horizontal surface on which portable equipment such as davits and outriggers are used to support suspended equipment or which provides access to or from such equipment.

**Roof protection:** Paver walkways, tightly fitted, are required on the approach side of davit locations to accommodate raising and lowering of davits as well as movement of the permanent platform. As a general rule, 5 rows of pavers 2'-0" (610 mm) wide should be installed alongside of general parapet locations. At corners of the roof however, paver areas matching the length of the platform should be provided to facilitate turning. To avoid any roofing problems at all, consider covering the entire roof surface with concrete pavers if practical.

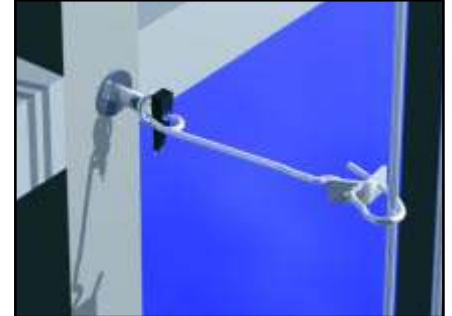
**Permanent Platform stabilization:** the stabilization of a permanent platform, an OSHA requirement for buildings over 130'-0" (39.6 m), is a system designed to keep the equipment in contact with the building facade, to prevent unwanted movement. Without stabilization, worker safety could be in jeopardy due to wind action or building faces could become damaged due to equipment impacting upon them.

A continuous mullion track stabilization system provides rigging flexibility for both roof rigging and ground rigging of a permanent powered platform. Architectural designs that feature offsets in walls, cornices or punched windows, make continuous track systems infeasible on many of these buildings.

In these instances, an intermittent stabilization system (buttons or detent pins) may be employed. Installations that employ buttons or detent pins are normally designed to suit roof rigging of a permanent powered platform. See Pro-Bel Stabilization Systems Literature.



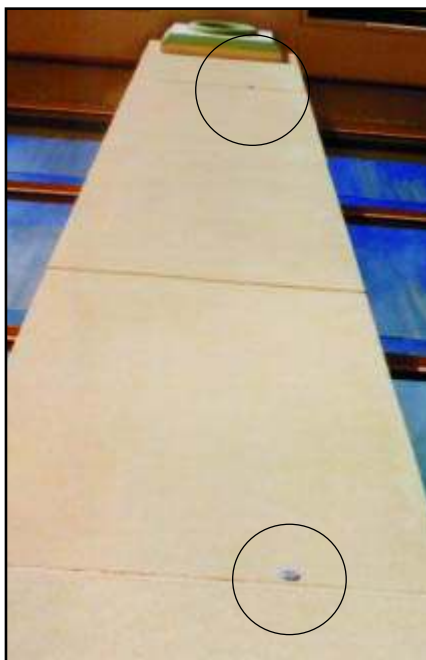
Continuous stabilization (mullion tracks)



Intermittent stabilization (detent pin)



Two types of detent pins. Left photo shows pin typically employed for concrete, stone or similar material. Right photo shows pin typically used for metal window mullion.



Worm's eye view of exterior building column shows location of platform stabilization buttons. Workers tether platform to buttons (tie-in guides) to protect against high winds. See photo at right also.



As a platform descends past the elevation of a tie-in guide, each of the platform's two occupants secure a stabilizer tie between a platform suspension cable and a detent pin or button.



Pro-Bel Model PT 3008 Roof Car (Powered Trackless Trolley) is supported on hard rubber tired wheels and operates on a reinforced concrete bearing surface (or similar) cast on top of the roof finish. Steel base frame and suspension jib have 360° slewing and luffing (up and down) capability.



Pro-Bel Model RA 3006 Roof Car (Roof Anchored Trolley) is designed to clear very high parapets. Trolleys are supported on 4 wheel assemblies operating on galvanized track mounted on concrete piers cast into the roof slab. Steel base and suspension jib have 360° slewing and luffing (up and down) capability.



A variation of Roof Anchored Trolley Roof Car. Trolleys are supported on 4 wheel assemblies operating on galvanized pipe rails mounted on concrete piers cast into the roof slab. Steel base and suspension jibs have 360° slewing and luffing capability.

**Roof Cars:** Permanent powered platforms rigged with conventional permanent support equipment such as davits, outrigger beams, monorails, etc. are impractical on some modern high rise buildings. Many of these buildings require roof cars in order to accommodate multi-level rigging, long span reaches, high parapets and other complicated building geometries. Two types of roof cars are available:

1. A conventional design roof car with the hoists mounted on the platform. This design only allows for a small 10'-0" (3 m) long platform approximately which is ideal for building heights less than 490'-0" (150 m) and can be employed for buildings up to 600'-0" (183 m) high in special situations.

This type of roof car complete with a permanent powered platform has certain advantages such as:

- the ability to move the platform from the roof car to another roof level using davits, monorails, rigging sleeves, etc. i.e. suited to other parts of the building.
- emergency descent control feature is on platform itself in the event of a power failure or emergency.
- ease of maintenance using conventional equipment and service procedures.

Disadvantages include:

- small platform
- heavier platform
- difficulty reeling cable onto wire winders with very tall buildings
- Heavy power cords which can be awkward to handle or coil into bin. The cord can become damaged and requires more frequent maintenance.

2. A more versatile design should be considered on very tall buildings with drum hoists mounted on the roof car. This design has certain advantages e.g. allows larger platforms, no cumbersome power cord to be stored on the platform, and other features. This design is suited to buildings over 490'-0" (150 m) in height.



See Pro-Bel Powered Roof Cars literature

## SPECIFICATION

*SPEC NOTE: This basic guide specification (Section 11010 - Window Washing Systems) is devoted exclusively to permanent powered platforms and is written in accordance with the CSI/GSC Three Part Section Format. It must be adapted to suit the requirements of individual projects. For primary support suspension equipment such as davits, outrigger beams, mono-rails or other equipment, refer to appropriate Pro-Bel literature and incorporate materials and/or other clauses as required. Square brackets [ ] indicate choice, alternatives, data required or need for the specifier to make a decision.*

### PART 1 - GENERAL

#### 1.01 General Requirements

- A. Comply with the conditions of the Contract and Division 1 - General Requirements.

#### 1.02 Section Includes

- A. Work of this section includes the design, supply and installation of window cleaning/suspended maintenance equipment.

#### 1.03 Related Sections

- A. Unloading and hoisting of equipment to roof Section [01500]
- B. Cast-in-place concrete, including installation of embedded items Section [03300]
- C. Precast concrete Section [03400]
- D. Structural Steel Section [05120]
- E. Open Web Steel Joists Section [05210]
- F. Metal Deck Section [05310]
- G. Catwalks Section [05516]
- H. Roofing Section [07500]
- I. Flashing Section [07600]
- J. Sealants Section [07900]
- K. Rigging access doors in walls Section [08111]
- L. Continuous track stabilization on exterior of building Section [08800]
- M. Installation of intermittent stabilization on exterior of building Section [03450]
- N. Hot & Cold water supply, faucets and drain at [every] roof level Section [15400]
- O. Three phase 230 volt 60 Hertz service at every roof level Section [16050]

*SPEC NOTE: Re 1.03.P. Specify independent protected main line power and weatherproof Hubbell twist-lock receptacle (HBL2720SW, NEMA NO. L15-30R), each to provide 230 volts, 3 phase, 60 HZ, 30 amperes under full loading current of the equipment with not more than 3% voltage drop at the platform. A separate stand alone transformer for the window cleaning equipment may be required. Power to be located no more than 100'-0" (30 m) from window cleaning/ suspended maintenance location. Pro-Bel wall or roof anchors may be employed for strain relief. Contact Pro-Bel for requirements.*

- P. Weatherproof power supply outlets with strain relief anchors Section [16132]

#### 1.04 References

- A. AISC S342L-1993, with Supplement No.1 "Load and Resistance Factor Design Specification for Structural Steel Buildings".
- B. AISI SG-971-1996, with 2000 Supplement "Specification for Design of Cold-Formed Steel Structural Members".

- C. Aluminum Association AA ADM-1-Aluminum Design Manual and AWS D1.2-97 Structural Welding Code - Aluminum.

- D. Aluminum Association AA ADM-1-Aluminum Design Manual, 2000 and AWS D1.2-97 Structural Welding Code - Aluminum.

- E. AWS D1.1-2000 Structural Welding Code - Steel.

- F. ANSI/IWCA I-14.1-2001 Window Cleaning Safety Standard (International Window Cleaning Association).

#### 1.05 Design Requirements

- A. Design window cleaning/suspended maintenance system to suit building and in accordance with plans, specifications, standards, and regulations/codes contained in section 1.04 and 1.08.

- B. Locate anchorages to suit suspension equipment which will be used on the building with respect to items such as reach, rigging, spacing, roof edge condition and similar items.

- C. Design all anchor components to provide adequate attachment to the building and suited to current window cleaning/suspended maintenance practices. Ensure compatibility with industry standard equipment.

- D. Ensure all anchor components conform to proper engineering principles and have been designed by a Professional Engineer qualified in the design of window cleaning/suspended maintenance equipment, its application and safety requirements.

- E. Design system fall arrest safety anchors and equipment supports to comply with the following structural requirements to suit a permanent powered platform:

1. Davits, rigging sleeves and monorails are used for suspending a permanent powered platform from storage and rigging/working locations on the building. These supports and the structure to which they are attached are designed to a support the rated working load which is the combined static weight of workers, materials and total weight of the suspended permanent powered platform, plus impact with a factor of safety as per AISC requirements and/or ACI or other applicable construction codes, and to 4 times the rated load against fracture or detachment.
2. Fall arrest safety anchors are designed to a typical maximum fall arresting force of 1800 lbs (8.0 kN) when wearing a body harness with a factor of safety of 2 without any permanent deformation and to 5000 lbs (22.2 kN) against fracture or detachment.

#### 1.06 Shop Drawings and Engineering Certification

- A. Submit shop drawings showing complete layout and configuration of complete window cleaning /suspended maintenance system, including all components and accessories. Clearly indicate design and fabrication details, window "drops", hardware, and installation details.

- B. Shop drawings to include installation and rigging instructions and all necessary Restrictive and Non-Restrictive Working Usage Notes and General Safety Notes.

- C. Shop drawings to be reviewed by a professional engineer, and upon request, complete with calculations or test reports.

#### 1.07 Qualifications

- A. Manufacturer: Work of this Section to be executed by manufacturer specializing in the design, fabrication and installation of window cleaning/ suspended maintenance systems having a minimum of 5 years documented experience.

- B. Loading and safety assurance: Work of this Section to meet the requirements of governing codes and jurisdiction and to comply with properly engineered loading and safety criteria for the intended use.

- C. Insurance: Manufacturer to carry specific liability insurance (products and completed operations) in the amount of \$5,000,000.00 + to protect against product/system failure.

- D. Welding to be executed by welders certified in accordance with AWS D1.1.

#### 1.08 Regulatory Requirements

*SPEC NOTE: Re 1.08.A. Specify for all States other than New York and California.*

- A. Comply with the following OSHA regulations:
  1. 1910, Subpart F (Powered Platforms).
  2. Appendix C to 1910 (Personal Fall Arrest Systems).

*Spec Note: Re 1.08.B and 1.08.C. Specify for New York State or California only as applicable.*

- B. Comply with the following New York State regulations:
  1. Department of Labor Advisory Standard 101 - Construction, Operation and Maintenance of Suspended Scaffolds Used for Window Cleaning and Light Maintenance.
  2. Advisory Standard 111 - Hoisting Machines Used for Suspended Scaffolds.
  3. Department of Labor Industrial Code Rule 21 - Protection of Persons Employed at Window Cleaning - Structural Requirements, Equipment and Procedures.

- C. Comply with the following California State regulation:
  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).

#### 1.09 Maintenance Data

- A. Submit 1 copy of system Equipment Manual & Inspection Log Book, with "Initial Inspection - Certification for Use" and "Inspection Sign-Off" forms completed.

- B. Submit 2 copies of a reduced plastic laminated as-built shop drawing showing equipment locations and details. This drawing is to be posted near exits onto the roof.

### PART 2 - PRODUCTS

#### 2.01 Manufacturer

- A. This specification is based on systems currently being manufactured by PRO-BEL ENTERPRIS-

Permanent Powered Platforms Specification (continued)

B. Other manufactured products meeting this specification may be substituted provided that manufacturers show proof of product insurance. Equipment details to be approved by the architect and/or consultant. Companies, such as miscellaneous metal fabricators, who are not normally engaged in the design and manufacture of window cleaning equipment are not permitted to bid.

2.02 Equipment

Spec Note: List type and quantity as required.

- A. [\_\_\_\_\_]
- B. [\_\_\_\_\_]
- C. [\_\_\_\_\_]

2.03 Materials

SPEC NOTE: Delete items not required.

- A. **Suspended platform:** Type 6061-T6 aluminum alloy to ASTM B221-2000 mill and powder coated finished modular platform system to ASME A120.1-2001, of engineered length and width to suit application based on load bearing frame, with non-slip, aluminum deck, soft rubber wall rollers and caster wheels.
- B. **Frame and rails:** side frames and connecting frames to be structural aluminum galvanized mild steel or powder coated steel; guard rails and guard rail posts to be square, thick wall aluminum extrusions with rails a minimum of 36" (915 mm) above deck level at working side of platform and 42" (1067 mm) at non-working side. A 3-1/2" (90 mm) high toe-board to be provided around circumference of platform with spaces between toe-board and guard rails covered with expanded aluminum screen, excluding front of platform between mid-rail and top rail.
- C. **Stirrups:** structural aluminum or hot-dip galvanized steel or powder coated steel fitted with manufacturer's standard hoist unit, top limit switch assembly and striker plate, and high fair lead.
- D. **Wire winders:** [electric powered] [passive type] with single or twin drum built into stirrups, to allow drums to wind evenly to prevent loose wires and jamming; capacity and dimension to suit application.
- E. **Cable storage bin:** fitted to rear guard rail, capacity and dimensions to suit application.
- F. **Upper limit switch assembly:** fitted on top of each stirrup, designed to cut electric power supply to hoist when switch contacts striker plate on suspension rope at top limit of travel.
- G. **Electro mechanical overload system:** integral with each hoist preset to safe working load plus 25%, designed to operate limit switch and cut power supply if overloading of platform should occur.

H. **Lower limit trip bar assembly:** consisting of hinged aluminum bar mounted at each end of underside of working face of platform, designed to operate limit switch and interrupt electric power supply to both hoists in the event bar is pushed upwards by any obstruction on the building facade during descent, but still allowing platform to be operated in upward direction.

- I. **Main and auxiliary control boxes:** electric control gear for both hoists and wire winder motors contained in central control box and mounted to rear guardrail. Standard layout to contain:
  1. UP/DOWN "HOLD TO RUN" switches for both hoists;
  2. hoist selector switch LEFT/RIGHT/BOTH (optional);
  3. bottom trip bar over-ride button;
  4. emergency stop button;
  5. platform self-levelling system;
  6. power on indicator light;
  7. three phase protection and light indicator;
  8. locking facility on main switch;
  9. handwheel for manual hoist operation;
  10. watertight electrical "quick" connections.

- J. **Hoist unit:** platform to be powered by two UL listed traction type hoists with the following features:
  1. 30 amp 230 volt 60 Hertz hoist with lift capacity to suit platform weight and live load.
  2. 35 foot/minute (10.7 m/min.) 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;

SPEC NOTE: Re 2.03.K. Specify four wire ropes for buildings over 300'-0" (91.4 m). If two wire ropes are specified, separate lifeline anchors are required for workers. See Pro-Bel Safety & Tie-back Anchors literature.

- K. **Steel wire rope:** platform to be supplied complete with [two] [four] galvanized high tensile steel wire ropes of length as required. Each rope to be fitted with 3 lb. (1.4 kg) safety hook with thimble talurit clamp and a brazed "bullet-end". Construction 6 x 19 Seale & IWRC, standard diameter 5/16" (8 mm) or 3/8" (10 mm) as required.
- L. **Electrical supply cable:** trailing supply cable to be fitted with male CEE plug for connection to the central control box and supplied with cable support clamp, length as required. Power cords for buildings over 350'-0" (107 m) to be equipped with reinforced core.
- M. **Portable fire extinguisher:** to be securely attached to platform.
- N. **Accessories (Optional):**
  1. Platform self levelling system: anti-tilt mercury switch assembly mounted in central control box, designed to interrupt electric power if platform becomes out of level to a preset angle of 15

degrees. Leading hoist to automatically stop, allowing other hoist to continue until platform is re-levelled.

2. water container fitted at rear guard rail;
3. hoist protection cover.

O. **Powder coated finish:** treatment to consist of steel sandblasted to SA3 requirement, metalized hot zinc sprayed (tread quality dia. 3.8 mm Zn-Al 850, coating thickness 40 microns), and standard blue powder coating (polyester PR 31-TR 5015 HR-58-200-F, coating thickness 60 to 80 microns).

SPEC NOTE: Re 2.03.P. See Pro-Bel Stabilization Systems literature (Specification) and include requirements here, including quantity of stabilizer ties.

P. **Platform Stabilization (Tie-In Guides):**

2.04 Fabrication

- A. General:
  1. Fabricate work true to dimension, square, plumb, level and free from distortion or defects detrimental to appearance and performance.
  2. Grind off surplus welding material and ensure exposed internal and external corners have smooth lines.

PART 3 - EXECUTION

3.01 Examination

- A. Examine surfaces and areas upon which the work of this Section depends. Report to the Contractor in writing, defects of work prepared by other trades and other unsatisfactory site conditions which would cause defective installation of products, or cause latent defects in workmanship and function.
- B. Verify site dimensions.
- C. Commencement of work will imply acceptance of prepared work.

3.02 Installation

- A. Install equipment in accordance with approved shop drawings and manufacturer's recommendations.
- B. Co-ordinate installation with work of related trades.
- C. Install all work true, level, tightly fitted and flush with adjacent surfaces as required.

SPEC NOTE: Re 3.02.D. Specify for furnish only products if required.

- D. Manufacturer to assist and/or supervise installation of window cleaning/suspended maintenance equipment installed by others.

3.03 Final Adjusting and Inspection

- A. Adjust and leave equipment in proper working order.
- B. Complete "Initial Inspection - Certification for Use" form included in Equipment Manual & Inspection Log Book.

**SERVING U.S.A. AND CANADA, COAST TO COAST.**

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