SECTION 11 24 00

FACADE MAINTENANCE EQUIPMENT

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\*\* NOTE TO SPECIFIER \*\* Tractel Ltd.; roofcars, powered davit carriages, portable davits, powered platforms, rolling ladders, safety tieback anchors, horizontal lifelines and special applications.
This section is based on the products of Tractel Ltd., which is located at:
1615 Warden Ave.
Scarborough, ON, Canada M1R 2T3
Tel: 416-298-8822
Email: [request info (steve.gallagher@alimakgroup.com)](https://arcat.com/rfi?action=email&company=Tractel%252BLtd.&message=RE%253A%2520Spec%2520Question%2520(11010tra)%253A%2520&coid=36094&spec=11010tra&rep=&fax=)
Web: <http://www.tractel.com> | <https://www.tractel.com/us>
 [ [Click Here](https://arcat.com/company/tractel-ltd-36094) ] for additional information.
We are a multinational Group located in 14 different countries, present worldwide through dealers and agents. We specialize in Lifting, Material Handling, Measurement of Tension and Loads, Suspended Working Platforms, Building Maintenance Installations and Fall Arrest Safety Equipment.
The Swingstage Division engineering team will provide design assistance for your project. We have built our reputation on developing innovative systems that adapt to today's architecture - and accept the responsibility that every system is durable and practical for the maintenance trades operating them.
Architects, engineers, construction managers and building owners have the security of a renowned company with experienced field personnel who understand the construction environment and handle unexpected difficulties as smoothly as the final demonstration and hand-over.

1. GENERAL
	1. SECTION INCLUDES

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

* + 1. Roof Mounted Facade Maintenance Equipment:
			1. Roofcar systems.
			2. Monorail systems.
			3. Exterior or interior rolling ladders.
			4. Fixed davit systems.
			5. Powered rolling davit system.
			6. Powered modular stage platforms.
			7. Outrigger pedestals and fastening hardware.
			8. Outrigger equipment.
			9. Horizontal lifeline systems.
			10. Safety tieback anchors.
			11. Drop through rigging sleeves.
			12. Pull under brackets.
			13. Portable wind anemometer.
			14. Communication equipment.
			15. Power requirements.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 30 00 - Cast-in-Place Concrete.
		2. Section - .
		3. Section 05 12 13 - Architecturally-Exposed Structural Steel Framing.
		4. Section 05 50 00 - Metal Fabrications.
		5. Section 08 44 16 - Glazed Bronze Curtain Walls.
		6. Division 16050 - General Electrical Methods and Materials: Electrical service.
	1. REFERENCES

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

* + 1. American Institute of Steel Construction (AISC):
			1. AISC S328 - Load and Resistance Factor Design Specification for Structural Steel Buildings, including Commentary.
			2. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges, including Commentary.
		2. American National Standards Institute (ANSI):
			1. ANSI A 1201.1 - Safety Requirements for Powered Platforms for Exterior Building Maintenance.
			2. ANSI/IWCA I 14.1 - Window Cleaning Safety 2002.
		3. American Welding Society (AWS):
			1. AWS D 1.1 - Structural Welding Code, Steel.
			2. AWS D 1.2 - Structural Welding Code, Aluminum.
		4. National Fire Protection Association (NFPA):
			1. NFPA 70 - National Electric Code.
		5. New York State Department of Labor (NYS):
			1. New York State (NYS) Industrial Code, Rule 21 (Section 21.3 amended 10/1/66) - Protection of Persons Employed at Window Cleaning, Structural Requirements, Equipment and Procedures.
			2. New York State (NYS) Advisory Standards 101 NYS Dept. of Labor (Effective 5/23/73) - Construction, Operation and Maintenance of Suspended Scaffolds used for Window Cleaning and Light Maintenance.
		6. Occupational Safety and Health Administration (OSHA):
			1. Cal/OSHA Title 8 Articles five (5) and six (6).
			2. OSHA Part 1910, paragraph 1910.66 - Power Platforms for Exterior Building Maintenance.
		7. Underwriters Laboratories (UL):
			1. Electrical components shall be UL listed.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Pre-Design Submittal: Before beginning design submit an overall system description including the following:
			1. Description of major items of equipment and catalogue cut sheets.
			2. Preparation instructions and recommendations.
			3. Storage and handling requirements and recommendations.
			4. Installation methods.
			5. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
			6. Manufacturer's evidence of insurance. Manufacturer shall have specific liability insurance (products and completed operations insurance in the amount of 10,000,000 dollars). This insurance shall cover the failure of the facade maintenance equipment.
		3. Design and Construction Submittal:
			1. Dimensioned Shop Drawings: Before beginning fabrication of equipment submit scaled shop drawings showing layout, profiles and product components, including anchorage, accessories and finish, along with general arrangement of the equipment and their working positions.
			2. Load Requirements: Indicate loads imposed on the building structure and curtain wall.
			3. Structural calculations prepared and certified by a Licensed Professional Engineer registered in the State where the project is located. Demonstrating design assumptions and method of design.
			4. Location and characteristics of electrical connections.
			5. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
			6. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria, and physical properties.
		4. Operation and Maintenance Manual: Submit 3 sets of the Operation and Maintenance Manuals that are bound and neatly labeled describing operation and maintenance of all equipment installed; include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance. Include in these manuals a detailed rescue plan.
			1. Provide complete listing of replacement parts, including identifying numbers and ordering instructions.
			2. Include 3 copies of the warranty documents specified.
			3. Provide a sample inspection log for Owner's use in recording inspections; include recommended list of daily, weekly, periodic, and biannual inspections.
		5. Project Record Documents: Submit project record ("as-built") drawings showing actual installed locations and configuration, and record specifications documenting all changes to original design criteria and other specification requirements. Include in the "as built" drawings wiring diagrams showing all electrical connections of equipment, including a legend sheet.
		6. Closeout Submittals: Documentation of manufacturer's warranty.
	2. MAINTENANCE CONTRACT
		1. Submit a proposal for a one-year equipment maintenance contract to provide services four times per annum.
		2. Submit a separate quotation to renew equipment maintenance contract for anadditional four years to provide services four times per annum.
	3. QUALITY ASSURANCE
		1. Manufacturer and Installer Qualifications:
			1. Facade Maintenance Equipment Contractor is solely responsible for quality control of the Work. Comply with the requirements specified in Section Quality Control.
			2. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances and regulations of the authorities having jurisdiction. Obtain necessary approvals from all such authorities.
			3. Required tests shall be made in the presence of the authorized representative of such local authorities. The Facade Maintenance Equipment Contractor shall issue a certificate of adequacy of the whole installation and of the testing performed.
		2. Pre-Installation Meetings: Conduct pre-installation meetings to verify project requirements, substrate conditions, construction documents, details and manufacturer's warranty requirements.
	4. DELIVERY, STORAGE, AND HANDLING
		1. Delivery: Deliver materials in manufacturer's original, unopened, undamaged rolls/pallets with identification labels intact.
			1. All facade maintenance equipment unloading at the job site shall be the responsibility of the facade maintenance equipment Contractor.
		2. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
	5. PROJECT CONDITIONS
		1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
	6. WARRANTY
		1. Provide manufacturer's warranty for 1 year against defects in materials and installation, executed by an authorized company official.
			1. PRODUCTS

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

* 1. MANUFACTURERS
		1. Acceptable Manufacturer: Tractel Ltd., which is located at:
		1615 Warden Ave.
		Scarborough, ON, Canada M1R 2T3
		Tel: 416-298-8822
		Email: [request info (steve.gallagher@alimakgroup.com)](https://arcat.com/rfi?action=email&company=Tractel%252BLtd.&message=RE%253A%2520Spec%2520Question%2520(11010tra)%253A%2520&coid=36094&spec=11010tra&rep=&fax=);Web: <http://www.tractel.com> | <https://www.tractel.com/us>

\*\* 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. Approved equivalent contractor (manufacturer) shall be firm whose main concern and business is engineering design, manufacture and installation of building maintenance equipment, and has been actively engaged in this business for (10) years minimum.
			2. Facade Maintenance Equipment shall show proof of products insurance. Companies such as miscellaneous metal fabricators, who are not normally designing and manufacturing Permanent Facade Maintenance Equipment are not permitted to bid.
	1. GENERAL REQUIREMENTS
		1. Construct components of heat-treated aluminum alloy, stainless steel, or hot-dipped galvanized structural steel. Protect dissimilar metals against electrolytic actions.
			1. Connectors: Stainless steel unless otherwise noted.
			2. Welding: By certified welders. Examine all welds by non-destructive testing.
		2. Components contacting facades and platform casters to be non-marking and scuff resistant material.
		3. Exterior finish of roof carriages and other factory painted assemblies shall be machinery enamel of a color as directed by the Architect or Owner. Aluminum and stainless steel assemblies to be mill finished. Carbon steel components are hot-dipped galvanized.
		4. Hardware, i.e. clips, bolts, nuts, washers, etc. shall be stainless steel.
		5. Electrical equipment shall have phase protection.
		6. Design: Structural members designed with a minimum 4:1 safety factor based on ultimate strength and normal operating conditions unless otherwise noted. Stresses and deflections are limited in accordance with governing codes and regulations.

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

* 1. ROOFCARS

\*\* NOTE TO SPECIFIER \*\* Senior Roofcars are designed for high-rise buildings or for buildings where access is difficult. This compact sized equipment is capable of servicing buildings with heights of 600 ft. (200 m) or more. Work platforms are typically designed for two maintenance personnel, and Senior roofcars ensure fast and safe operation. Delete paragraphs not required.

* + 1. Senior Roofcars as manufactured by TRACTEL Limited Mobile traversing roofcar with boom, lifting, and control mechanisms. Suspended work platforms with 1100 ft. (335 m) maximum drop. 360 degree slewing permits optimum platform placement.
			1. Controls: MAGTRON Remote Control Units as supplied by TRACTEL Limited.
				1. Lifting and lowering the platform.
				2. Boom angle (luffing).
				3. Boom telescoping.
				4. Traversing frame.
				5. Slewing of the turret and spreader bar.
			2. Standard Series:

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

* + - * 1. Fixed Boom and Cross-boom: SF-Series.

Platform Length: 40 ft (12.19 m) maximum.

\*\* NOTE TO SPECIFIER \*\* Delete track gauges not required.

Track Gauge: 3 ft (0.91 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reach not required.

Boom: 10 ft (3.05 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 15 ft (4.57 m); Wheel Capacity: 2248 lbs (10 kN).

Track Gauge: 4 ft (1.22 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 10 ft (3.05 m); Wheel Capacity: 2248 lbs (10 kN).

Boom: 15 ft (4.57 m); Wheel Capacity: 2248 lbs (10 kN).

Boom: 20 ft (6.10 m); Wheel Capacity: 4496 lbs (20 kN).

Track Gauge: 5 ft (1.52 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 10 ft (3.05 m); Wheel Capacity: 2248 lbs (10 kN).

Boom: 15 ft (4.57 m); Wheel Capacity: 2248 lbs (10 kN).

Boom: 20 ft (6.10 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 25 ft (7.62 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 30 ft (9.14 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 35 ft (10.7 m); Wheel Capacity: 6744 lbs (30 kN).

Track Gauge: 6 ft (1.83 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 10 ft (3.05 m); Wheel Capacity: 2249 lbs (10 kN).

Boom: 15 ft (4.57 m); Wheel Capacity: 2249 lbs (10 kN).

Boom: 20 ft (6.10 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 25 ft (7.62 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 30 ft (9.14 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 35 ft (10.7 m); Wheel Capacity: 6744 lbs (30 kN).

* + - * 1. Luffing Boom with Rotating Cross-boom: SL Series. Hydraulic Powered.

Maximum reach: 35 ft (10.67 m).

Platform Length: 40 ft (12.19 m) maximum.

\*\* NOTE TO SPECIFIER \*\* Delete track gauges not required.

Track Gauge: 3 ft (914 mm).

\*\* NOTE TO SPECIFIER \*\* Delete boom reach not required.

Boom: 10 ft (3.05 m); Wheel Capacity: 2249 lbs (10 kN).

Boom: 15 ft (4.57 m); Wheel Capacity: 2249 lbs (10 kN).

Track Gauge: 4 ft (1.22 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 10 ft (3.05 m); Wheel Capacity: 2249 lbs (10 kN).

Boom: 15 ft (4.57 m); Wheel Capacity: 2249 lbs (10 kN).

Boom: 20 ft (6.10 m); Wheel Capacity: 4496 lbs (20 kN).

Track Gauge: 5 ft (1.52 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 10 ft (3.05 m); Wheel Capacity: 2249 lbs (10 kN).

Boom: 15 ft (4.57 m); Wheel Capacity: 2249 lbs (10 kN).

Boom: 20 ft (6.10 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 25 ft (7.62 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 30 ft (9.14 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 35 ft (10.7 m); Wheel Capacity: 6744 lbs (30 kN).

Track Gauge: 6 ft (1.83 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 10 ft (3.05 m); Wheel Capacity: 2249 lbs (10 kN).

Boom: 15 ft (4.57 m); Wheel Capacity: 2249 lbs (10 kN).

Boom: 20 ft (6.10 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 25 ft (7.62 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 30 ft (9.14 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 35 ft (10.7 m); Wheel Capacity: 6744 lbs (30 kN).

* + - * 1. Telescopic Boom with Rotating Cross-boom: ST Series.

Hydraulic powered with maximum reach of 35 ft (10.67 m).

Platform Length: 40 ft (12.19 m) maximum.

\*\* NOTE TO SPECIFIER \*\* Delete track gauges not required.

Track Gauge: 4 ft (1.22 m).

Boom: 20 ft (6.10 m); Wheel Capacity: 4496 lbs (20 kN).

Track Gauge: 5 ft (1.52 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 20 ft (6.10 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 25 ft (7.62 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 30 ft (9.14 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 35 ft (10.7 m); Wheel Capacity: 6744 lbs (30 kN).

Track Gauge: 6 ft (1.83 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 20 ft (6.10 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 25 ft (7.62 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 30 ft (9.14 m); Wheel Capacity: 4496 lbs (20 kN).

Boom: 35 ft (10.7 m); Wheel Capacity: 6744 lbs (30 kN).

* + - 1. Special Series: Maximum boom reach of 60 ft (18.29 m). Fixed Boom and Cross-boom, Series XF.

\*\* NOTE TO SPECIFIER \*\* Delete platform length not required.

* + - * 1. Platform Length: 30 ft (9.14 m) maximum.

Track Gauge: 6 ft (1.83 m).

Boom: 40 ft (12.2 m); Wheel Capacity: 6744 lbs (30 kN).

* + - * 1. Platform Length: 40 ft (12.19 m) maximum.

\*\* NOTE TO SPECIFIER \*\* Delete track gauge not required.

Track Gauge: 8 ft (2.44 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 35 ft (10.7 m); Wheel Capacity: 6744 lbs (30 kN).

Boom: 40 ft (12.2 m); Wheel Capacity: 6744 lbs (30 kN).

Boom: 50 ft (15.2 m); Wheel Capacity: 6744 lbs (30 kN).

Boom: 60 ft (18.3 m); Wheel Capacity: 6744 lbs (30 kN).

Track Gauge: 10 ft (3.05 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 40 ft (12.2 m); Wheel Capacity: 6744 lbs (30 kN).

Boom: 50 ft (15.2 m); Wheel Capacity: 6744 lbs (30 kN).

Boom: 60 ft (18.3 m); Wheel Capacity: 6744 lbs (30 kN).

* + - 1. Telescopic Boom and Rotating Crooks-boom, Series XT.

\*\* NOTE TO SPECIFIER \*\* Delete platform length not required.

* + - * 1. Platform Length: 30 ft (9.14 m) maximum.

Track Gauge: 6 ft (1.83 m).

Boom: 40 ft (12.2 m); Wheel Capacity: 6744 lbs (30 kN).

* + - * 1. Platform Length: 40 ft (12..19 m) maximum.

\*\* NOTE TO SPECIFIER \*\* Delete track gauge not required.

Track Gauge: 8 ft (2.44 m).

 \*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 35 ft (10.7 m); Wheel Capacity: 6744 lbs (30 kN).

Boom: 40 ft (12.2 m); Wheel Capacity: 6744 lbs (30 kN).

Boom: 50 ft (15.2 m); Wheel Capacity: 6744 lbs (30 kN).

Boom: 60 ft (18.3 m); Wheel Capacity: 6744 lbs (30 kN).

Track Gauge: 10 ft (3.05 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom reaches not required.

Boom: 40 ft (12.2 m); Wheel Capacity: 6744 lbs (30 kN).

Boom: 50 ft (15.2 m); Wheel Capacity: 6744 lbs (30 kN).

Boom: 60 ft (18.3 m); Wheel Capacity: 6744 lbs (30 kN).

* + - 1. System Description:
				1. Traversing System: Lower frame constructed of galvanized rectangular steel tube. Traversing frame and turret are connected by slewing ring powered by a hydraulic motor. Four wheel assemblies are fitted to the frame. Rear wheel assemblies are mounted on an articulated spreader beam to ensure an even load distribution.

Electrical Motor Speed: 20 ft per min (6 m per min). The two wheels nearest the building facade are powered.

Traversing frame is guided along track by guide wheels placed laterally on the wheel assemblies.

Guide Track: 'L' shaped or I-beam.

* + - * 1. Lifting Mechanism: Two TWIN-TIRAK model T-1000 hoists, by the TRACTEL Group designed for TRACTEL Limited.

Wire rope travels in ' S' path around two adhesion pulleys.

Overspeed Safety Brake: Engages if platform descends too fast.

Disc Brake: Stops hoist during normal operation.

* + - * 1. Hydraulic System: Hydraulic ram operates the angle of the boom.
				2. Boom Luffing (series SL): The boom can be articulated on an axle fixed to the turret frame. A crossbar fixed to the boom takes the head of the hydraulic ram for operating the boom.
				3. Cross-boom: Fixed at head of the boom enabling platform to rotate 140 degrees.
				4. Telescopic Masts: Used for discrete parking of machine and lifting it to the operating position.
				5. Platform: ' F-type platforms' as defined by US Federal OSHA (dual-line suspension). Driven by hoists on roof unit, instead of on platform. Constructed of tubular aluminum, clad in perforated aluminum panels. Two foam rollers allow the platform to rest lightly against the facade with force of 56 lbs. (0.25 kN) and absorb swaying movements of unit. Four swivel castors fitted to base of platform make ground movement easier. Suspension stirrups can be end mounted or intermediate-type for a cantilever. Obstruction bar fitted under platform prevents collision with obstacles on descent.

Typical Length: 10 ft. (3 m), however this may be increased to a maximum of 40 ft.

Typical Capacity: 525 lbs. (240 kg) max.

* + - * 1. Wire Ropes: Platform is suspended from boom by four greased galvanized steel wire ropes 5/16 in (8.4 mm) nom. dia. When the wire ropes have passed through the hoist they are wound on powered dual reelers driven by the output shaft of the hoist, via a chain and pinion system.

Minimum Guaranteed Breaking Load: 11,500 lbs. (51.5 kN).

* + - * 1. Electrical System on Building:

The main switch, located on the roof.

Power supply points, 3-phase plus ground, positioned along the track and protected by a 30 amp circuit breaker (supplied by the customer).

* + - * 1. Electrical System on Traversing Frame:

Power supply cable for connecting the roofcar frame to the power points. This cable is stored on a reel under the unit.

Electrical panel with a remote control for the unit.

* + - * 1. Electrical System on Platform:

MAGTRON control box.

Auxiliary control box.

* + - * 1. Electronic Equipment:

Programmable logic controller (PLC).

MAGTRON patented remote control system.

Microprocessor card, developed by TRACTEL for the remote control of the Senior Roofcar.

LED display units to assist with control and maintenance.

* + - * 1. Control Circuit: The equipment is controlled by a programmable controller (PLC). The PLC performs three essential functions:

Control of the various operating sequences.

Fault detection and display.

Decoding the trolley and platform control signals.

Control Panels: Control panel is selected using key switch on main control box.

Work platform remote control panel with MAGTRON 4020.

Roofcar control panel with a 20-function keypad for switching to work phase and for backup operations in the event of failure of the main panel.

* + - * 1. Main Control Panel Box:

Main switch.

Lockable rotary switch for ROOFCAR control or PLATFORM control.

PLC display.

Roofcar remote control.

Buzzer.

Telephone.

Call platform.

* + - * 1. Remote Control Panel: The MAGTRON system is uses duplex transmission of data and telephone signals between platform and roofcar, by magnetic field induction in a closed circuit created by the steel suspension wire ropes. Signals are transmitted by 4 transducers (1 transmitter and 1 receiver each on the platform and the roofcar).

A special frequency band is not required. The transmission medium is the wire rope and not radio waves.

Alleviates the risks associated with radio transmission i.e. nearby systems on the same frequency, causing interference.

Control Voltage: 10 V; no risk of electrocution.

The telephone and LED display are provided as standard.

The platform control box is easy to remove protecting it from weather and preventing improper use of machinery.

Safety analysis (APAVE no. 9454079 - France) guarantees system failure will not cause a dangerous situation, such as the loss of the emergency stop or the transmission of an incorrect command.

Control Keypad: Identical commands as roofcar remote control.

Telephone.

Charger.

Platform Auxiliary Control Box:

Emergency stop.

Start/Stop.

Lower obstruction bar shunt.

Keypad validation.

Power Supply: A NI/MH (nickel hydride) main battery.

Battery Life: 9 hours; recharging: 3 hours.

Back-up battery providing one hour of operation when main battery is exhausted so users can take the platform back up to the roof.

* + - * 1. Telephone and Alarm System:

Trolley and Platform Telephone: The remote control is fitted with a telephone (106) for communication with roofcar telephone, using the principle of alternate transmission.

\*\* NOTE TO ASPECIFIER \*\* The next two subparagraphs are each optional. Delete if not required.

Control Office Telephone: Telephone link between the platform and the building's control office.

Control Office Alarm: In the event of a fault, an alarm (1 volt free contact) is sent automatically to the control office or the technical room.

* + - * 1. Safety Devices:

Platform:

Emergency stop.

Lower obstruction bar.

Overload safety device.

Anti-tilt safety device.

\*\* NOTE TO SPECIFIER \*\* Optional delete if not required.

Upper Obstruction Bar.

Roofcar:

Emergency stop.

Platform final upper limit switch.

Cross boom rotation.

Slack wire rope safety device.

End of wire rope safety device.

Electrical supply cable end limit.

Traversing end limit

Turret slewing.

Overspeed protection.

Emergency lowering handle.

Phase order safety device.

Manual lowering in the event of a power break.

Telescopic boom retraction/extension.

Telescopic mast retraction/extension (special design).

\*\* NOTE TO SPECIFIER \*\* Delete optional features not required.

Boom lifting safety device.

Boom anti-collision device.

Anemometer (wind speed indicator).

Track detector.

Self-test safety devices on the roofcar remote control, and contactors.

* + - * 1. Fault Management:

PLC Display: The control fault codes are handled by the TSX 37-10 and shown on the display.

Maintenance Functions:

state of the PLC I/O.

faults on the I/O cards.

codes sent by the roofcar or platform remote controls.

Platform Display:

battery capacity.

state of the sensors fitted on the cradle.

control fault codes.

* + 1. Junior Model B Roofcars as manufactured by TRACTEL Limited.
			1. Servicing buildings up to 720 ft. (220 m) in height.
			2. Suspended platform for two maintenance personnel with tools and cleaning materials.
				1. Minimum Capacity: 500 lbs (220 kg).
			3. Features:
				1. Mobile traversing roofcar with hydraulic luffing boom.

Track for traversing.

* + - * 1. Maximum Reach: 20 ft (6 m).
				2. Electric Tirak hoists and controls.
				3. Platform suspended from boom by four independent galvanized steel wire ropes.
				4. Operations Control Panel on Platform:

Lifting and lowering the platform.

Boom angle (luffing).

Traversing the trolley.

* + - * 1. Magtron wireless control.
				2. Slewing of turret, allows rotation of platform to in board position.
			1. System Description:
				1. Traversing Frame: Lower frame constructed of galvanized rectangular steel tube. Four wheel assemblies are fitted to the frame.

Two Front Wheels: Powered.

Two Rear Wheels: Mounted on articulated beam ensuring even load distribution.

Guided by wheels placed laterally on wheel assemblies, whether 'L' shaped guide track or I-beam track is used.

* + - * 1. Traversing System: Electrical motor; 20 ft per min (6 m per min.)
				2. Lifting Mechanism: TIRAK electric traction hoist. Wire ropes gripped by a set of rollers, activated by a compression spring.
				3. Hydraulic System: Single hydraulic cylinder controls boom angle. Boom angle determines working positions on the building, from upright (park position) to horizontal (maximum reach).
				4. Platform: ' F-type platforms' as defined by US Federal OSHA (dual-line suspension). Constructed of tubular aluminum, clad in perforated aluminum panels.

Typical Length: 10 ft (3 m).

Maximum Length: 36 ft (10.97 m).

Minimum Capacity: is 500 lbs (220 kg).

* + - * 1. Electrical System on Building:

Main Switch: located on roof.

Power Supply Points: 3-phase plus ground, positioned along rack and protected by a 30 amp circuit breaker (supplied by customer).

* + - * 1. Electrical System on Traversing Frame:

Power supply cable for connecting the roofcar frame to the power points. Cable is stored on a reel under the unit.

An electrical panel with a control box for the unit.

* + - * 1. Electrical System on Platform:

Main control panel connected by a flexible cable.

* + 1. Track Description: TRACTEL roofcars are designed to run on flanged track.
			1. General Requirements:
				1. Furnish and install supports, track system and related work necessary for complete installation. Indicate total system compatibility with building structure. Notify Construction Manager of incompatibilities. Assure attachment to the building's load carrying members is within allowable limits and no members are overstressed. Loads imposed on structure to be reviewed by Structural Engineer and Architect.
				2. Tracks and Track Supports: Fabricated from structural steel shapes.
				3. Curved Tracks: To be smooth continuous radii (not segmented).
				4. End Stops: Prevent wheel carriages from leaving end of tracks.

Provide method for removal and inspection of wheel carriages during routine maintenance.

* + - * 1. Exterior Track System: Located for controlled positioning of unit allowing platform to be safely suspended in working positions over side of building, at any designated position.
				2. Hardware, i.e. clips, bolts, nuts, washers, etc. shall be stainless steel.
				3. Include workstation alignment components, as necessary, assuring programmable positioning of carriage.
				4. Size track to permit pedestal spans up to10 ft (3.05 m) center-to-center.
				5. Thermal Expansion: Will not adversely affect carriage movement.

\*\* NOTE TO SPECIFIER \*\* Delete subparagraph if track is not supplied or installed by others.

* + - * 1. Track and/or Support Pedestals are Provided by Others:

Track Joints: Level within 1/16 inch (1.6 mm) in any direction. Not to exceed 1/8 inch (3.2 mm) gap.

Track System (by elevation): Maintain constant elevation plus or minus 1/4 inch (6 mm) every 120 inches (3048 mm).

Dual tracks to run parallel plus or minus 2 inches (51 mm).

Support applied loads for all conditions including switches, openings, and joints.

End stops at all track ends.

Clearance above and below bottom track flange for wheels and lugs.

* + - 1. Track sections are joined together using bolted or welded fishplates.
			2. Track and track supports are hot galvanized to prevent corrosion.

\*\* NOTE TO SPECIFIER \*\* The size of the rail depends on the weight of the machine and the distance between the track supports. Delete rail sizes not required.

* + - 1. Rail Size: W10x22.
			2. Rail Size: W10x30.
			3. Rail Size: W12x50.
			4. Rail Size: S12x31.8.
			5. Rail Size: S12x35.

\*\* NOTE TO SPECIFIER \*\* 10 K (45kN) wheel assembly

* + - 1. I-Beam Wheel Assembly: IPE 160.

\*\* NOTE TO SPECIFIER \*\* Over 10K (45kN) wheel assembly

* + - 1. WF-Beam Wheel Assembly: HEB 180.
			2. Track Tolerances:
				1. Track Joints: 1/16 in. (1.5mm) maximum. in all directions.
				2. Track Joint Gaps: 1/8 in. (3 mm) maximum.
				3. Track Elevation: Within of 1/4 in. (6.4 mm) over every 120 in. (3 m) length.
				4. Track System (by elevations): Maintain a constant elevation of 1 in. (25 mm).
			3. Track Supports:
				1. Spacing: Track sections set on supports every 8 to 10 ft. (2.4 to 3 m) depending on carriage wheel loading.
				2. Standard Steel Track Supports: Length of tube section with welded top plate. Track sections are fixed to the top plates with clamp plates.
				3. Clamp Plates: Designed to meet requirements of transverse adjustment and resistance to lateral pressure applied by the guide rollers. The low-profile clamp plates allow uninterrupted travel of wheel assemblies. Each are fixed to the top plate with A235 galvanized bolts.
		1. Facade Stabilization Anchors:
			1. Stabilization anchoring systems must be installed in buildings over 130 ft (39.62 m) in USA, 150 ft (45.72 m) in Canada.
				1. Horizontal Spacing: Equal to the center-to-center distance of the stage platform suspension wire ropes at all required service drop positions.
				2. Vertical Spacing: First anchor to be 50 ft (15.24 m) from the top of the building. Vertical distance between anchors below 50 ft (15.24 m) must be 50 ft (15.24 m) or 3 floors whichever is less.
				3. Ultimate Pull Strength: 600 lbs (2.67 kN) in any direction.
				4. Coordinate location and method of support with the wall supplier.

Facade Maintenance Equipment contractor to provide shop drawings indicating location, loads imposed and structural requirements of the intermittent stabilization system.

\*\* NOTE TO SPECIFIER \*\* Delete Anchor types not required.

* + - 1. Shoulder Bolt Stabilization Anchors:

\*\* NOTE TO SPECIFIER \*\* Delete anchor adaptors not required.

* + - * 1. Anchor Adapter: Cast-in place.
				2. Anchor Adapter: Drill-in cavity wall expansion.
				3. Anchor Adapter: Drill-in expansion anchor.
				4. Anchor Adapter: Mullion-mounted.
				5. Size: 3/4 inch (19 mm) diameter shoulder bolt (button) type.
				6. Lanyards: Galvanized aircraft cable, or equal, with adjustable length.

One-piece and stored around the platform fair leads.

Provide tie-in lanyards for intermittent stabilization of each of the platform's suspension ropes complete with stainless steel "Quick Connect" devices for attachment to building anchors.

* + - * 1. Suspension Rope: Placed through lanyard loop before rope is attached to the building. Lanyard can only be removed when the suspension rope is detached from the building.
				2. Length of the lanyard from suspension rope to the building is adjusted for tautness by sliding the adjustment plate along the lanyard cable towards the building. Tension on the lanyard then locks the adjustment plate firmly in position.
			1. Detent Pin Stabilization Anchors: Vertically spaced for every third floor.

\*\* NOTE TO SPECIFIER \*\* Delete stabilizer inserts not required.

* + - * 1. Stabilizer Insert: Mounted to structure.
				2. Stabilizer Insert: Cast-in place.
				3. Stabilizer Insert: Mullion mounted.
				4. Lanyards: Galvanized aircraft cable, or equal, with adjustable length.

One-piece and stored around the platform fair leads.

Provide tie-in lanyards for intermittent stabilization of each of the platform's suspension ropes complete with stainless steel "Quick Connect" devices for attachment to the building anchors.

* + - * 1. Suspension Rope: Placed through lanyard loop before rope is attached to the building. Lanyard can only be removed when the suspension rope is detached from the building.
				2. Length of the lanyard from suspension rope to the building is adjusted for tautness by sliding the adjustment plate along the lanyard cable towards the building. Tension on the lanyard then locks the adjustment plate firmly in position.
			1. Mullion Guide Stabilizing Anchoring System: Continuous platform descent along building facade by guide rollers on the platform, running in guide rails the length of the building.
				1. Guide Rails: Open extruded aluminum profile, which is fixed, to the facade and supplied and installed by others.

Co-ordinate design with the supplier of the guide track to ensure smooth operation of the mullion guides.

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

* 1. MONORAIL SYSTEMS
		1. General Requirements:
			1. Furnish and install supports, monorail track system and related work necessary for complete installation. Indicate total system compatibility with building structure. Notify Construction Manager of incompatibilities. Assure attachment to the building's load carrying members is within allowable limits and no members are overstressed. Loads imposed on structure to be reviewed by Structural Engineer and Architect.
			2. Thermal Expansion: Will not adversely affect trolley or equipment movement.
			3. Working Load: 1150 lbs per support trolley.
			4. Provide sufficient monorail supports with bracing (if required) and hardware to support the monorail track. Supports not to be dependent on a single fastener. Fit fasteners with locking devices.
			5. Smooth, quiet running while supporting working load. Load bearing and guide wheels machined to suit track profile and fitted with sealed bearings

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

* + - * 1. Traversing: Powered friction drive.
				2. Traversing: Manual pullers.

\*\* NOTE TO SPECIFIER \*\* Delete subparagraph if track is not supplied or installed by others.

* + - 1. Track and/or Support Pedestals are Provided by Others:
				1. Track Joints: Level within 1/16 inch (1.6 mm) in any direction. Not to exceed 1/8 inch (3.2 mm) gap.
				2. Track System (by elevation): Maintain constant elevation plus or minus 1/4 inch (6 mm) every 120 inches (3048 mm).
				3. Dual tracks to run parallel plus or minus 2 inches (51 mm).
				4. Support applied loads for all conditions including switches, openings, and joints.
				5. End stops at all track ends.
				6. Clearance above and below bottom track flange for wheels and lugs.
		1. Basis of Design: Monorail Track and Trolleys as manufactured by TACTEL Limited.

\*\* NOTE TO SPECIFIER \*\* For recessed or overhanging facades and access to the inside of glazed atria such as those covering modern commercial centers, monorail systems are often the best practical solution.

* + - 1. Monorails follow the line of the facade, with platforms suspended from manual or powered trolleys, reaching the various points of the facade or ceiling. Monorails support powered platforms, work cages, travelling ladders and gantries.

\*\* NOTE TO SPECIFIER \*\* Delete monorail track section not required.

* + - * 1. Monorail Track Sections: Steel, primed or galvanized finish.
				2. Monorail Track Sections: Aluminum construction, mill finish.
				3. Curved Tracks: Smooth finish with continuous radii (not segmented).
				4. End Stops: Prevent wheel carriages from leaving end of tracks.

Provide method for removal and inspection of wheel carriages during routine maintenance.

* + - * 1. Puller assembly.
				2. Rail connector clamps.
			1. Trolleys: Steel construction, cadmium plated finish.
				1. Traversing rollers, guide rollers, locking device, safety suspension point, and primary suspension point.
				2. Capacity: 1000 lbs (455 kg)
			2. Hanger Brackets:
				1. Structural Support: By others.
				2. Fasteners: C/W Fasteners
				3. Shims: Vertical adjustment.
				4. Alignment channel.

\*\* NOTE TO SPECIFIER \*\* Span is based on 1000 lbs (455 kg) applied loading. Delete span and rail type not required.

Span Between Brackets; Aluminum Rail: 5 ft (1.5 m).

Span Between Brackets; Steel Rail: 10 ft (3.0 m).

* + - 1. Turntable Assembly: Manual rotation with two and four way configurations.
				1. Turning Handle: Spring loaded lock position retainer.
			2. Hardware, i.e. clips, bolts, nuts, washers, etc. shall be stainless steel.
		1. Basis of Design: RAILSCAF Horizontal Monorail System as manufactured by TACTEL Limited.
			1. RAILSCAF is monorail system fixed around the perimeter of a building or structure. A traversing trolley, suspends a SOLO cradle or SOLSIT powered seat, and travels along the monorail.
				1. System can also suspend a 78.75 or 118.12 in (2 or 3 m) platform from 2 traversing trolleys. Consult manufacturer about maximum allowable distances between support brackets. It is essential to ensure traversing around bends can be done with the platform on the ground.
			2. Height of Lift: Limited to 131 ft (40 m).
			3. Suspended Load on Each Lifting Point is 772 lbs (350 kg).
			4. The trolley travels horizontally and is manually or power traversed.
			5. Rails
				1. Aluminum profile: 4.72 x 1.57 in (120x40 mm).
				2. Standard length: 19 ft (5800 mm).
				3. Weight: 4.06 lbs per ft (6.05 kg per m).
				4. Aluminum Material: Series 6060 F18-20
				5. Limit of Elasticity: 23206 lbs per sq in (160 MPa) minimum
				6. Breaking Strain: 27557 lbs per sq in (190 MPa) minimum
				7. Standard Elasticity: 10080123 lbs per sq in (69500 MPa)
				8. Linear Expansion Coefficient: .555558 per degrees F (23 10E-06 per degrees C).
				9. Cross Section Area: 3.47 sq in (22.4 sq cm).
				10. Inertia:

Ixx: 6.63 in4 (276 cm4 ).

Iyy: 0.82 in4 (34.3 cm4).

Wxx: 1.10 in3 (46 cm3 ).

Wyy: 1 in3 (16.5 cm3).

* + - * 1. Minimum Bending Radius (outer/inner): 19.68 in (500 mm) made in the factory before shipping.

\*\* NOTE TO SPECIFIER \*\* In these conditions, the safety coefficient compared to the breaking strain of the rail, as well as the various connecting sections, is greater than 4. The distortion of the rail under a load of 350 kg is less than 1/250th of the span, i.e. less than 12 mm.

* + - * 1. Support Bracket Spacing: 118.11 in (3000 mm) maximum with a suspended load of 771.6 lbs (350 kg.).

The rails are fixed to the support brackets with hammerhead M12 hot galvanized 8.8 steel bolts.

Finish Protection:

\*\* NOTE TO SPECIFIER \*\* Delete anodization or electro-static painting.

Anodization: gives protection against corrosion by depositing a layer of aluminum oxide.

\*\* NOTE TO SPECIFIER \*\* Delete class thickness not required.

Class 20: 20 im. thickness.

Class 25: 25 im. thickness.

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

Color: Natural aluminum - Light beige Eurocolor 2005.

Color: Gold - Dark beige Eurocolor 2006.

Color: Chestnut Eurocolor 2007.

Color: Black Eurocolor 2008.

Electro-Static Painting:

\*\* NOTE TO SPECIFIER \*\* Colors available are in the RAL range,

Color: \_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Delete finish texture not required.

Finish Texture: Mat.

Finish Texture: Gloss.

* + - * 1. Rail Fixed Connections: 2 aluminum rods, 1.18 in (30 mm) diameter by x 9.65 in (245 mm), fixed by 8, 0.145 in (3.7 mm) diameter pins, 0.75 in (19 mm) long. This type of connection should be done with a maximum distance of 19.68 in (500 mm) from a support bracket.
				2. Rail Expansion Connections: Fitted after two fix connections, every 685 in (17.40 m). The connection is by 2 aluminum rods. This type of connection should be done with a maximum distance of 19.56 in (500 mm) from a support bracket.
				3. Fish Plate Connection: Only at the end of a closed travelling track. The connection is by 2 fish plates 1.57 x 7.87 x 0.31 in (40 x 200 x 8 mm) This type of connection should be done with a maximum distance of 16.56 in (500 mm) from a support bracket.
				4. Rail End Stop: On "open" trackways an end stop must be fitted at the end of the rails and is mounted with screws.

End limit sensors fitted on the motorized trolley stop the trolley at the end of the trackway, approaching the end stop.

* + - * 1. Rail Support Brackets: Positioned every 118.11 in (3 m) on the straight sections.

Material: Galvanized or stainless steel.

Fixing plate of the bracket has a plus or minus 0.4 in (10 mm) vertical adjustment.

* + - * 1. Finish Protection:

\*\* NOTE TO SPECIFIER \*\* Delete anodization or electro-static painting.

Anodization: gives protection against corrosion by depositing a layer of aluminum oxide.

\*\* NOTE TO SPECIFIER \*\* Delete class thickness not required.

Class 20, 20 i m. thickness.

Class 25, 25 i m. thickness.

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

Color: Natural alum; Light beige Eurocolor 2005.

Color: Gold; Dark beige Eurocolor 2006.

Color: Chestnut Eurocolor 2007.

Color: Black Eurocolor 2008.

Electro-Static Painting:

\*\* NOTE TO SPECIFIER \*\* Colors available are in the RAL range,

Color: \_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Delete finish texture not required.

Finish Texture: Mat.

Finish Texture: Gloss.

* + - 1. Traversing Trolley: Designed for a solo cradle or SOLSIT powered seat, on a single suspension system, to pass around the corners of buildings. On straight parts 2 m or 3 m platforms may be used on two suspension points. The trolley comprises 2 travelling rollers and 1 guide roller, fitting around the rail. The rollers have a polyurethane tread to prevent wear to the rail. The casing of the trolley is in stainless steel. The trolley is either manually or power traversed.
				1. Manual Trolley: By endless rope. Generally, a manual traversing trolley is sufficient, since the effort required to traverse the trolley is low.

Weight: 39.7 lbs (18 kg)

* + - * 1. Powered Trolley: Completely enclosed geared motor with brake.

Level of Protection: IP 54.

Class F insulation: Suitable for use in tropical conditions.

3 phase 220/380 V or 240/415 V, 50 Hz.

Controls by push-button pendant including up, down, and emergency stop.

Weight: 52.9 lbs (24 kg.).

* + 1. Basis of Design: RAILSCAF Horizontal and Inclined Operation Monorail System as manufactured by TACTEL Limited.
			1. A monorail fixed around the perimeter of a building or structure. A traversing trolley, from which may be suspended a SOLO cradle travels along the monorail to reach the various parts of the building.
			2. Height of Lift: Limited to 131 ft (40 m).
			3. Suspended Load on Each Lifting Point is 772 lbs (350 kg).
			4. Powered trolley traveling horizontally or on an inclined track up to 60 degrees.
				1. For Incline: An integrated chain. Trolley is fitted with a pinion which engages automatically in the chain, giving safe and reliable traversing.
			5. Rails:
				1. Aluminum Profile: 4.72 x 1.77 in (120 x 45 mm).
				2. Standard Length: 19 ft (5800 mm).
				3. Weight: 5.11 lbs per ft (7.6 kg per m).
				4. Aluminum Material: Series 6060 F18-20
				5. Limit of Elasticity: Re is 23206 lbs per sq in (160 MPa) minimum
				6. Breaking Strain: Rm is 27557 lbs per sq in (190 MPa) minimum
				7. Standard elasticity: E = 10080123 lbs per sq in (69500 MPa)
				8. Linear Expansion Coefficient: .555558 per degrees F (23 10E-06 per degrees C).
				9. Cross Section Area: 3.47 sq in (22.4 sq cm).
				10. Inertia:

Ixx: 6.63 in4 (276 cm4 ).

Iyy: 0.82 in4 (34.3 cm4).

Wxx: 1.10 in3 (46 cm3 ).

Wyy: 1 in3 (16.5 cm3).

* + - * 1. Minimum Bending Radius (outer/inner): 27.56 in (700 mm) made in the factory before shipping.
				2. Chain (only in inclined segments): ASA 3/4 x 1/2 in.

\*\* NOTE TO SPECIFIER \*\* In these conditions, the safety coefficient compared to the breaking strain of the rail, as well as the various connecting sections, is greater than 4. The distortion of the rail under a load of 350 kg is less than 1/250th of the span, i.e. less than 12 mm.

* + - * 1. Support Bracket Spacing: 118.11 in (3000 mm) maximum with a suspended load of 771.6 lbs (350 kg.).

The rails are fixed to the support brackets with hammerhead M12 hot galvanized 8.8 steel bolts.

Finish Protection:

\*\* NOTE TO SPECIFIER \*\* Delete anodization or electro-static painting.

Anodization: gives protection against corrosion by depositing a layer of aluminum oxide.

\*\* NOTE TO SPECIFIER \*\* Delete class thickness not required.

Class 20: 20 im. thickness.

Class 25: 25 im. thickness.

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

Color: Natural aluminum - Light beige Eurocolor 2005.

Color: Gold - Dark beige Eurocolor 2006.

Color: Chestnut Eurocolor 2007.

Color: Black Eurocolor 2008.

Electro-Static Painting:

\*\* NOTE TO SPECIFIER \*\* Colors available are in the RAL range,

Color: \_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Delete finish texture not required.

Finish Texture: Mat.

Finish Texture: Gloss.

* + - * 1. Rail Fixed Connections: By 2 splice bars and 1 aluminum rod, fixed by 4 pins. This type of connection should be done with a maximum distance of 19.68 in (500 mm) from the bracket.
				2. Rail Expansion Connections: Fitted after two fix connections by 1 aluminum rod and 1 splice bar, fixed to the bracket. This type of connection must always be done on a bracket.
				3. Rail End Stop: On "open" trackways an end stop must be fitted at the end of the rails and is mounted with screws.

End limit sensors fitted on the motorized trolley stop the trolley at the end of the trackway, approaching the end stop.

* + - * 1. Rail Support Brackets: Positioned every 118.11 in (3 m) on the straight sections.

Material: Galvanized or stainless steel.

Fixing plate of the bracket has a plus or minus 0.4 in (10 mm) vertical adjustment.

* + - * 1. Finish Protection:

\*\* NOTE TO SPECIFIER \*\* Delete anodization or electro-static painting.

Anodization: gives protection against corrosion by depositing a layer of aluminum oxide.

\*\* NOTE TO SPECIFIER \*\* Delete class thickness not required.

Class 20: 20 i m. thickness.

Class 25: 25 i m. thickness.

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

Color: Natural alum; Light beige Eurocolor 2005.

Color: Gold; Dark beige Eurocolor 2006.

Color: Chestnut Eurocolor 2007.

Color: Black Eurocolor 2008.

Electro-Static Painting:

\*\* NOTE TO SPECIFIER \*\* Colors available are in the RAL range,

Color: \_\_\_\_\_\_.

\*\* NOTE TO SPECIFIER \*\* Delete finish texture not required.

Finish Texture: Mat.

Finish Texture: Gloss.

* + - 1. Traversing Trolley: One geared motor, the main brake doubled by a fall stop device (secondary overspeed brake) and 1 set of guide rollers and sliding contacts fitted on the rail and giving a safe and reliable traversing around the corners and on inclined sections. The casing of the trolley is in stainless steel. On inclined sections, the motor pinion engages automatically in the integrated chain of the rail.
				1. Traversing Speed: 21.3 ft per min (6.5 m per min).
				2. Level of protection: IP 55.
				3. Class F Insulation: Suitable for use in tropical conditions.
				4. 3 phase 220/380 V or 240/415 V, 50 Hz.
				5. Controls by push-button control box or cradle control box.

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

* 1. EXTERIOR OR INTERIOR ROLLING LADDERS
		1. General Requirements:
			1. Fabrication: High strength aluminum.
			2. Safe Working Capacity: 500 lbs (226.8 kg).
			3. Handrails: 42 in (1067 mm) in height provided along both sides of each rolling ladder.
			4. Platform Deck: Non-slip aluminum flooring.
			5. Four wheel assemblies running on galvanized steel track support each unit.
			6. Retaining devices secure units in storage and work positions.
			7. Factory installed 5/16 in (8 mm) diameter galvanized wire rope safety static line at the deck level of the rolling ladder for the attachment of the lanyards from the worker's fall protection equipment
				1. Static line to be secured to a structural member of the platform's deck at both ends.
				2. The connections shall sustain a minimum of 5000 lbs (2268 kg) before failure.
				3. Rope clips shall not be used.
			8. Provide a metal sign attached to the ladder stating the maximum load capacity.
			9. Traversing of the rolling ladder:

\*\* NOTE TO SPECIFIER \*\* Delete horizontal movement subparagraph not required.

* + - * 1. Horizontal Movement: Powered friction drive (if required), to traverse track system.
				2. Horizontal Movement: Manual hand crank, to traverse track system.
		1. Basis of Design: Interior Traveling Ladder as designed and manufactured by TRACTEL Limited.
			1. Designed for complex interior surfaces where access is difficult; buildings with sloped roofs, i.e. interior atriums.
				1. Supported or suspended from tracks closely following the line of the building facade.
				2. Manual or powered platforms, reaching various points of facade or roof.

Systems include platforms with guardrails.

Ladders with elevating work cages.

Folding platforms.

Enclosed ladders.

Low visibility ladders.

* + - * 1. Ladders, mounted vertically or inclined, traveling on special trackways.
				2. Rubber tread rollers designed to run on various surfaces.
				3. Ladder Guard Rails:

Fixed.

Modular.

Folding.

Circular guard rails for vertically mounted ladders.

* + - * 1. Rail and platform systems for atriums are supplied with specially designed aluminum profiles to suit the working conditions. Open meshed floor panels blend well with the structure of the building.
				2. Finish: Match color of roof structure; anodized or painted.
			1. Track System and Supports:
				1. Furnish and install supports, track system and related work necessary for complete installation. Indicate total system compatibility with building structure. Notify Construction Manager of incompatibilities. Assure attachment to the building's load carrying members is within allowable limits and no members are overstressed. Loads imposed on structure to be reviewed by Structural Engineer and Architect.
				2. Tracks and Track Supports: Fabricated from structural steel shapes.
				3. Curved Tracks: To be smooth continuous radii (not segmented).
				4. End Stops: Prevent wheel carriages from leaving end of tracks.

Provide method for removal and inspection of wheel carriages during routine maintenance.

* + - * 1. Located to allow ladder to be safely located in any designated position.
				2. Hardware, i.e. clips, bolts, nuts, washers, etc. shall be stainless steel.
				3. Size track to permit pedestal spans up to10 ft (3.05 m) center-to-center.
				4. Thermal Expansion: Will not adversely affect ladder movement.

\*\* NOTE TO SPECIFIER \*\* Delete subparagraph if track is not supplied or installed by others.

* + - * 1. Track and/or Support Pedestals are Provided by Others:

Track Joints: Level within 1/16 inch (1.6 mm) in any direction. Not to exceed 1/8 inch (3.2 mm) gap.

Track System (by elevation): Maintain constant elevation plus or minus 1/4 inch (6 mm) every 120 inches (3048 mm).

Dual tracks to run parallel plus or minus 2 inches (51 mm).

Support applied loads for all conditions including switches, openings, and joints.

End stops at all track ends.

Clearance above and below bottom track flange for wheels and lugs.

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

* 1. FIXED DAVIT SYSTEMS
		1. Davit Systems: Traditional and effective method to provide permanent access to exterior building facades.
			1. Nominal Service Load: 1150 lbs (521.6 kg).
				1. Signage: Metal sign attached to davit stating maximum load capacity.
			2. Basic System:
				1. Fixed davit bases.
				2. Portable davit arms (mast and boom assemblies).
				3. Powered work platform.
				4. Dual-line suspension system.

TRACTEL davit systems are rigged with a primary suspension and secondary safety wire rope. This dual-line suspension system incorporates fixed horizontal life-lines along the length of the platform, to which each operator's body harness is connected.

* + - * 1. Horizontal life-lines.
				2. Other Davit System Equipment:

TIRFOR manual davit lifting hoists.

Davit arm lifting brackets.

Davit boom turning handles.

Material lifting hoists.

\*\* NOTE TO SPECIFIER \*\* The following two subparagraphs are optional. Delete if not required

Portable davit bases.

Flush mounted pedestals.

* + - 1. Davit Bases: Permanently fixed elements of a Davit System. Transportable davit arms are fitted to these bases. TRACTEL standard davit bases are designed to accommodate typical applied loads, which vary according to mast height and boom reach.
				1. Mount directly to roof structure with cast-in anchors.
				2. Material: Galvanized steel.
				3. Anchor Bolt Cage: Zinc plated steel.
				4. Hex Nuts and Washers: Zinc plated or galvanized steel.

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

* + - * 1. Angulation: 15 degrees CW
				2. Angulation: 30 degrees CW
				3. Angulation: 0 or 90 degrees
				4. Angulation: 15 degrees CCW
				5. Angulation: 30 degrees CCW
				6. Angulation: 45 degrees

\*\* NOTE TO SPECIFIER \*\* Other attachment methods are available.

* + - 1. Flush Davit Bases: A pair of portable flush davit bases slide into fixed flush style davit pedestals and are secured with provided pins. Davit arms are then fitted to each base, and davits are erected and secured. The flush davit bases are then moved from location to location, along with the powered platform. All varieties of flush style pedestals are available for every mounting method, including new or retrofit applications
			2. Davit Base Pedestals: can be bolted or welded to the building structure and use for mounting and supporting the fixed davit base.
				1. Material: Galvanized steel.
				2. Anchor Rods: Zinc plated steel.
				3. Hex Nuts and Washers: Zinc plated or galvanized steel.
			3. Davit Arms: Typically used to suspend 20 to 30 foot (6 m to 9 m) long work platforms. This length is based on the spacing of the fixed bases - located at the structural elements of the building.
				1. The davit arms are hoisted into position and secured with pins provided. When the work is complete, the davit arms are relocated to the next work area.

\*\* NOTE TO SPECIFIER \*\* This two-piece construction is easier to transport, and simplifies boom rotation.

* + - * 1. Comprised of a separate boom and mast.
				2. Davit Boom: 360 degrees Rotation on a special rolling collar to allow the platform to be maneuvered over the parapet. A captive trolley rolls within the custom extrusion, to allow optimum positioning of the work platform it suspends.

Materials:

Boom: Type 6061 T-6 extruded aluminum,

Bracing: G40.21-44W galvanized steel Fy = 44 KSI,

Fasteners: Zinc plated or galvanized steel

bronze bushings.

\*\* NOTE TO SPECIFIER \*\* Delete boom reach not required.

Boom Reach: 60 in (1524 mm).

Boom Reach: 66 in (1676 mm).

Boom Reach: 72 in (1829 mm).

Boom Reach: 78 in (1981 mm).

Boom Reach: 84 in (2134 mm).

Boom Reach: 90 in (2286 mm).

Boom Reach: 96 in (2438 mm).

Boom Reach: 102 in (2591 mm).

Boom Reach: 108 in (2743 mm).

Boom Reach: 114 in (2896 mm).

Boom Reach: 120 in (3049 mm).

Boom Reach: 126 in (3200 mm).

Boom Reach: 132 in (3352 mm).

Boom Reach: 138 in (3505 mm).

Boom Reach: 144 in (3658 mm).

Boom Reach: 150 in (3810 mm).

* + - * 1. Davit Mast: Can also be used so that the boom height is just above the building's parapet. These ground rigged systems require a clear path of travel at ground level. With mast heights of 66 in (1676 mm) or less, suspension arms are easy to handle.

Separates from the boom and is transportable by means of a permanent pair of wheels at one end. Davit pivoting pins are provided for connection to the davit base. The turning bracket & handle permit easy boom rotation from inside the platform.

Standard masts have rated capacity of 1150 lbs (525 kg).

Options:

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

Davit lifting bracket.

Manual lifting hoist.

Davit Turning handle.

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

Boom reach up to 120 in (2591 mm).

\*\* NOTE TO SPECIFIER \*\* Delete mast heights not required.

Mast Height: 63 in (1600 mm).

Mast Height: 100 in (2540 mm).

Mast Height: 117 in (2972 mm).

Mast Height: 130 in (3302 mm).

Mast Height: 147 in (3734 mm).

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

Boom reach up to 150 in (3810 mm).

\*\* NOTE TO SPECIFIER \*\* Delete mast heights not required.

Mast Height: 112 in (2845 mm).

Mast Height: 130 in (3302 mm).

Mast Height: 150 in (3810 mm).

* + - 1. Platform: Suspended from a captive trolley moving along the davit boom.
				1. Standard TRACMOD powered platforms are supplied with suitable TIRAK traction hoists, complete with wire rope collection reelers. Many other standard features and options are also provided.
				2. Single-user work cages and bosun's chairs may also be suspended from individual davits.
			2. Lifting Kits: Standard davit system accessory and used with larger davit arms. Comprised of a davit lifting bracket, a manual lifting hoist, and a length of wire rope, complete with connection points at each end.
			3. Davit Hoist: For buildings with multiple roof levels to transfer the davit arms and suspension wire/ropes between various roof levels. Portable davit transfer hoist arm complete with a 200 Lbs. capacity winch. Supported from same davit bases, which support davit poles and arms.

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

* 1. POWERED ROLLING DAVIT SYSTEMS
		1. Basis of Design: Powered Davit Carriages as manufactured by TRACTEL Limited.
			1. A pair of electric motor powered traversing davit carriages, each with a davit mast and manually rotating davit boom.
				1. TRACMOD work platform suspended from davit booms by four independent galvanized steel wire ropes. The platform is launched over the parapet using conventional manual davit system method.
				2. Carriages and masts are connected with pin or bolt connections.
				3. The davit mast assembly is lifted into position with manual winches connected to special lifting brackets.

Winches also lower masts to a position out of view when not in use.

* + - 1. Standard Requirements:
				1. The stability factor of each system shall be calculated, considering the suspended scaffold in its most outboard positions for traversing, operating and storage. System stability shall be obtained by attachment to structural supports and track systems.
				2. Stability Factor During Horizontal Traversing: Not less than 4, with a 10 lbs per sq ft (0.48 kPa) wind load applied to the equipment.
				3. Wind Velocities: Equipment to be capable of withstanding highest wind velocities expected, for the specific area, when equipment is in a stored position. When in use equipment to be capable of withstanding 100 mph (1770 mph).
				4. Automatically Applied Braking System: Prevents unintentional traverse of the powered rolling davit carriages.
				5. Key Lockout: Prevents unauthorized use.
				6. Enclosures and Guards: Prevent accidental contact by personnel with moving parts or pinch points.
				7. Interlocks on Carriage and Power Cord Reel: Preventing undue strain on power cord and prevents cord from being trapped between carriage wheels and roof tracks.
				8. Traversing Controls: Continuous pressure weatherproof type. Multi controls when provided, are arranged to permit operation from only one control station at a time.
			2. Each work station identified by indexing vanes clamped to track rails.
			3. Power Requirements: 208 Vac, 3 Phase, 60 Hz, 30 A (enema rating L15-30).
				1. Power locations provided during shop drawing submissions.
				2. A dedicated electrical circuit from power outlets must power rolling davit carriages.
				3. Electric Cord: On electric power reel, mounted on unit, automatically unwinding and collecting the cord during movement.

The reel shall have interlocks to stop travel before the cord reaches its end.

* + - * 1. Each outlet will be provided with a strain relief anchor.
			1. Operating controls to be connected and interlocked so traversing of the powered rolling davit carriages is not possible until:
				1. The suspended scaffold is located at its uppermost position for traversing
				2. Free of contact with the face of the building, and is at its innermost position on the davit arm.

Controls shall be accessible from the suspended scaffold.

* + - * 1. Protective devices and interlocks are in the proper position to allow traversing of the carriage.
			1. Other Equipment and Accessories: All electrical controls, interlocks and attachments for a safe and efficient operation.

\*\* NOTE TO SPECIFIER \*\* Delete roof mounting or parapet mounting.

* + - 1. Roof-Mounted:
				1. Platform Length: 40 ft (12.19 m) maximum.

\*\* NOTE TO SPECIFIER \*\* Delete track gauges not required.

* + - * 1. Track Gauge: 3 ft (0.91 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom options not required.

Boom: 66 in (1.68 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 72 in (1.83 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 78 in (1.98 m); Wheel Capacity: 2248lbs (10 kN).

* + - * 1. Track Gauge: 3 ft (0.91 mm).

\*\* NOTE TO SPECIFIER \*\* Delete boom options not required.

Boom: 66 in (1.68 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 72 in (1.83 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 78 in (1.98 m); Wheel Capacity: 2248lbs (10 kN).

* + - * 1. Track Gauge: 3 ft 6 in (1.07 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom options not required.

Boom: 66 in (1.68 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 72 in (1.83 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 78 in (1.98 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 84 in (2.13 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 90 in (2.29 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 96 in (2.44 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 102 in (2.59 mm); Wheel Capacity: 2248lbs (10 kN).

* + - * 1. Track Gauge: 4 ft (1.22 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom options not required.

Boom: 66 in (1.68 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 72 in (1.83 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 78 in (1.98 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 84 in (2.13 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 90 in (2.29 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 96 in (2.44 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 102 in (2.59 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 114 in (2896 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 120 in (3048 mm); Wheel Capacity: 2248lbs (10 kN).

* + - * 1. Track Gauge: 5 ft (1.52 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom options not required.

Boom: 78 in (1.98 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 84 in (2.13 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 90 in (2.29 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 96 in (2.44 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 102 in (2.59 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 108 in (2743 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 120 in (3048 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 132 in; (3353 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 144 in (3658 mm); Wheel Capacity: 2248lbs (10 kN).

* + - * 1. Track Gauge: 6 ft (1.83 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom options not required.

Boom: 78 in (1.98 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 84 in (2.13 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 90 in (2.29 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 96 in (2.44 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 102 in (2.59 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 108 in (2743 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 120 in (3048 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 132 in; (3353 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 144 in (3658 mm); Wheel Capacity: 2248lbs (10 kN).

* + - * 1. Main Components of Roof-Mounted Powered Davit System:

Dual suspension trolley with manual brake.

Aluminum davit boom.

Primary suspension wire rope.

Secondary suspension wire rope.

Pendant control for traversing.

TRACMOD powered platform.

Davit turning bracket.

Galvanized steel davit mast.

Davit lifting winch.

Davit lifting bracket.

Electrical power cable collection reel.

Drive wheel (foreground) (1 per carriage).

Front idler wheel (background) (1 per carriage).

Rear idler wheel (1 per carriage).

* + - 1. Parapet-Mounted:
				1. Platform Length: 40 ft (12.19 m) maximum.

\*\* NOTE TO SPECIFIER \*\* Delete track gauge not required.

* + - * 1. Track Gauge: 3 ft (0.91 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom options not required.

Boom: 66 in (1.68 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 72 in (1.83 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 78 in (1.98 m); Wheel Capacity: 2248lbs (10 kN).

* + - * 1. Track Gauge: 3 ft 6 in (1.07 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom options not required.

Boom: 66 in (1.68 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 72 in (1.83 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 78 in (1.98 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 84 in (2.13 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 90 in (2.29 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 96 in (2.44 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 102 in (2.59 mm); Wheel Capacity: 2248lbs (10 kN).

* + - * 1. Track Gauge: 4 ft (1.22 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom options not required.

Boom: 66 in (1.68 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 72 in (1.83 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 78 in (1.98 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 84 in (2.13 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 90 in (2.29 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 96 in (2.44 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 102 in (2.59 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 114 in (2896 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 120 in (3048 mm); Wheel Capacity: 2248lbs (10 kN).

* + - * 1. Track Gauge: 5 ft (1.52 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom options not required.

Boom: 78 in (1.98 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 84 in (2.13 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 90 in (2.29 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 96 in (2.44 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 102 in (2.59 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 108 in (2743 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 120 in (3048 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 132 in; (3353 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 144 in (3658 mm); Wheel Capacity: 2248lbs (10 kN).

* + - * 1. Track Gauge: 6 ft (1.83 m).

\*\* NOTE TO SPECIFIER \*\* Delete boom options not required.

Boom: 78 in (1.98 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 84 in (2.13 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 90 in (2.29 m); Wheel Capacity: 2248lbs (10 kN).

Boom: 96 in (2.44 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 102 in (2.59 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 108 in (2743 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 120 in (3048 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 132 in; (3353 mm); Wheel Capacity: 2248lbs (10 kN).

Boom: 144 in (3658 mm); Wheel Capacity: 2248lbs (10 kN).

* + - * 1. Main Components of Parapet-Mounted Powered Davit System:

Dual suspension trolley with manual brake.

Aluminum davit boom.

Primary suspension wire rope.

Secondary suspension wire rope.

Control for traversing.

TRACMOD powered platform.

Davit turning bracket.

Galvanized steel davit mast.

Electrical power cable collection reel.

Drive wheel (foreground) (1 per carriage).

Upper idler wheel (background) (1 per carriage).

Lower idler wheel (1 per carriage).

* + - 1. Traversing System: Three wheel assemblies fitted to the frame. The powered drive wheel is located on the parapet side of the unit. The other two idler wheels are located at the front and rear of each unit. Powered by electrical motor at 20 ft./min (6 m/min).
			2. Descent and Ascent: Controlled from a central control panel operated by one worker on the TRACMOD work platform.
			3. Stabilization: The platform must be tied into structure as it descends the building facade in accordance with all applicable codes.
			4. TRACMOD Platform with D2C Davit Carriages: TRACMOD powered platforms are ' F-type' as defined by US Federal OSHA (dual line suspension).
				1. Platform Lengths: 20 to 30 ft. (6 to 9 m). 40 ft.(13m) maximum.
			5. Electrical Systems:
				1. On Building: Power supply, located on the roof; 3-phase plus ground, on-off switch positioned along the track, and protected by a 30 mA differential circuit-breaker (supplied by the customer).
				2. On Traversing Carriage: Power supply cable for connecting the frame to the power points. Cable is stored on a reel on the unit.

An electrical panel with a pendant control for traversing only.

* + - * 1. On Platform: Central control on the TRACMOD platform for decent and ascent.
			1. Safety Devices on Platform:
				1. Emergency stop.
				2. Lower obstruction bar.
				3. Overload safety device.
				4. Anti-tilt safety device.

\*\* NOTE TO SPECIFIER \*\* Optional safety devices on the platform. Delete if not required.

* + - * 1. Upper obstruction bar.
				2. Anemometer (wind speed indicator).
			1. Safety Devices on Davit Carriage:
				1. Emergency stop.
				2. Platform upper limit sensor for carriage traverse.
				3. Electrical supply cable end limit.
				4. End of track limit.
			2. WF Track System and Supporting Pedestals:
				1. Furnish and install supports, track system and related work necessary for complete installation. Indicate total system compatibility with building structure. Notify Construction Manager of incompatibilities. Assure attachment to the building's load carrying members is within allowable limits and no members are overstressed. Loads imposed on structure to be reviewed by Structural Engineer and Architect.
				2. Tracks and Track Supports: Fabricated from structural steel shapes.
				3. Curved Tracks: To be smooth continuous radii (not segmented).
				4. End Stops: Prevent wheel carriages from leaving end of tracks.

Provide method for removal and inspection of wheel carriages during routine maintenance.

* + - * 1. Exterior Track System: Located for controlled positioning of unit allowing platform to be safely suspended in working positions over side of building, at any designated position.
				2. Hardware, i.e. clips, bolts, nuts, washers, etc. shall be stainless steel.
				3. Include workstation alignment components, as necessary, assuring programmable positioning of carriage.
				4. Size track to permit pedestal spans up to10 ft (3.05 m) center-to-center.
				5. Thermal expansion: Will not adversely affect carriage movement.

\*\* NOTE TO SPECIFIER \*\* Delete subparagraph if track is not supplied or installed by others.

* + - * 1. Track and/or Support Pedestals are Provided by Others:

Track joints: Level within 1/16 inch (1.6 mm) in any direction. Not to exceed 1/8 inch (3.2 mm) gap.

Track system (by elevation): Maintain constant elevation plus or minus 1/4 inch (6 mm) every 120 inches (3048 mm).

Dual tracks to run parallel plus or minus 2 inches (51 mm).

Support applied loads for all conditions including switches, openings, and joints.

End stops at all track ends.

Clearance above and below bottom track flange for wheels and lugs.

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

* 1. POWERED MODULAR STAGE PLATFORM
		1. Basis of Design: TRACMOD Permanent Powered Platforms as manufactured by TRACTEL Limited
			1. Self-powered modular stage platform.
				1. Supported by Four Wire Ropes: 2 primary and 2 secondary.
				2. Fabrication: Aluminum.
				3. Stage: Permanently enclosed to height of 42 inches (1067 mm) with aluminum-perforated sheet.
				4. Work Deck: Aluminum-extruded sections with non-slip surface surrounded by a six-inch toe-guard on all sides.

Work deck to have small openings or holes allowing passage of air and preventing uplift of platform due to wind pressures.

Openings shall not allow tools or other normally carried equipment to pass through.

* + - * 1. Powered End Sections: Can be attached together by removing center sections to accommodate required stage lengths to perform service drops around building perimeter.

Provisions to be made so both powered ends can be used independently as single man work cages.

* + - * 1. Provide wheels or casters on all platform sections.
				2. Safe Working Load: 500 lbs (227 kg) exclusive of the weight of the stage and the cables.
			1. Platform Width: 36 in (762 mm).
			2. Platform Length: As required,
			3. Facade Rollers: Designed to maintain contact with building facades; provide 2-1/2 inches (64 mm) minimum diameter non-marking rollers on inboard side of the platform.
			4. Hoist: Traction type electric hoist with dual 5/16 inch (8 mm) wire suspension ropes and associated powered wire winder to prevent suspension rope tail lines from hanging below the platform.
				1. Platform overload and slack wire device at each hoist.
				2. Upper travel limit switch at the top fairlead of each hoist with an interlock system to prevent further upward movement in the event the platform contacts the support.
			5. Suspension Wire Ropes: Long enough to negotiate buildings full height at all intended working stations with four (4) full wraps remaining on the wire winder.
				1. The secondary wire rope shall pass through an overspeed rope grab device with a governor that automatically activates should platform achieve an overspeed condition.
				2. If failure occurs of one wire rope or suspension attachment the stage platform shall not upset.
			6. Operating Speed: During ascent or descent; approximately thirty-five (35) feet per minute (11 m/sec).
			7. Emergency Stop Switches: Provide two. One at each operator's station that shall stop any further platform travel, up or down, after either is activated.
			8. Individual controls for each hoist for raising, lowering and leveling of the platform.
			9. Painted Metal Sign: Attached to the platform, stating maximum load capacity of platform / system; 500 lbs (227 kg) live load.
			10. Non-Corrosive Metal Water Tanks: For fresh water, with faucets at the bottom for draining.
			11. Fire Extinguisher: Mounted on platform.
			12. Lower Obstruction Detectors: Will stop downward travel after contacting an obstruction from below.
			13. Level Sensing System: Will prevent platform from being out-of-level by more than five (5) degrees. Arrange system so either hoist operator can correct out-of level conditions.
			14. Hardware, i.e. clips, bolts, nuts, washers, etc. shall be stainless steel.
			15. Factory installed 5/16 in (8 mm) diameter galvanized wire rope safety static line at the rear midrail level of the stage platform for the attachment of the lanyards from the worker's fall protection equipment.
				1. Static line to be secured to a structural member of the platform's deck at both ends.
				2. The connections shall sustain a minimum of 5000 lbs (2268 kg) before failure.
				3. Rope clips shall not be used.
			16. Manual Platform Lowering Device: In case of an emergency.
			17. Power Requirements: 208VAC, 3 Phase, 60 HZ, 30 A.
				1. Power locations provided during shop drawing submissions.
				2. Stage Platform: Powered by a dedicated electrical circuit from power outlets.
				3. Electric Cord: Collected in a bin, mounted on the platform.
			18. Stage tie down anchors. Tie downs to have a round base, extending a minimum of eight inches above the roof membrane, for ease of flashing. The anchor eye attachment shall be stainless steel.

\*\* NOTE TO SPECIFIER \*\* New York State requirement. Delete if not required.

* + - 1. Provide metal hoist covers.

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

* 1. OUTRIGGER PEDESTALS AND FASTENING HARDWARE
		1. Sufficient hot dip galvanized, permanently attached steel outrigger pedestals shall be supplied for mounting to structure with appropriate stainless steel fastening hardware and cast-in-anchor bolt cage (if required). Each pedestal is fitted with a safe attachment point for securing the worker's safety line.
		2. The outrigger pedestal shall be accurately machined to receive the portable outrigger socket and shall be shimmed as necessary during installation to steel / cast-in-anchor bolt cage.

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

* + 1. Roof Mounted Outrigger Pedestal TRACTEL product type:

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

* + - 1. Welded to steel.
			2. Corner welded to steel.
			3. Embedded anchor bolt.
			4. Corner embedded anchor bolt.
			5. Thru bolt.
			6. Corner thru bolt.

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

* + 1. Ceiling Mounted Outrigger Pedestal TRACTEL product type:

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

* + - 1. Welded to steel.
			2. Corner welded to steel.
			3. Embedded anchor bolt.
			4. Corner embedded anchor bolt.
			5. Thru bolt.
			6. Corner thru bolt.

\*\* NOTE TO SPECIFIER \*\* New York Style Delete article if not required.

* 1. OUTRIGGER PEDESTALS AND FASTENING HARDWARE

\*\* NOTE TO SPECIFIER \*\* Delete one of the two following paragraphs

* + 1. Hot dip galvanized permanently attached steel outrigger bases for mounting to pre-installed outrigger pedestals with stainless steel fastening hardware. Each base fitted with a safe attachment point for securing the worker's safety line. Machined to receive portable outriggers. Shimmed as necessary during installation to steel outrigger pedestals.
		2. Hot dip galvanized steel outrigger pedestals are to be supplied and installed by others.

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

* 1. OUTRIGGER EQUIPMENT
		1. Portable Outrigger Sockets: Hot dip galvanized steel outrigger sockets supplied for attachment to outrigger pedestals. Machined to receive the portable outriggers, complete with rollers and nylon sliders.
		2. Outrigger Horizontal Boom: Comprised of extruded aluminum complete with position retaining pins. Designed to engage portable outrigger sockets and manually push out through an access panel (panel by others).
		3. Carrying Handle : Used for moving outrigger from one position to another.
		4. Safe Working Load: 1000 lbs (454 kg) each outrigger. Two outriggers working in tandem to be rated to support a total of 2000 lbs (908 kg).

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

* 1. HORIZONTAL LIFELINE SYSTEMS
		1. Basis or Design: TRAVSAFE Horizontal Lifeline Systems as manufactured by TRACTEL Limited.
			1. Hands free system allowing 7 users (if conditions allow) unhindered travel for unlimited distances without disconnecting and reconnecting at anchorages.
			2. Applicable Standards: OSHA, ANSI, CSA and Provincial occupational health and safety acts and regulations.
			3. Features:
				1. Twin lines ensure smooth hands-free travel over anchors and around corners.
				2. When a fall occurs, the traveler's jaws close tightly around the lines.
				3. Relatively few components when compared to other systems.
				4. The system can be secured to walls, floors or ceilings.
			4. Personal Fall Protection Equipment:
				1. Full-body harness.
				2. Shock-absorbing lanyard or self-retracting device.
			5. Intermediate Anchors: Anchored to the structure by type A325 (M16) or equivalent mounting fastener. There are two parallel borings along their length for passage of wire ropes.

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

* + - * 1. Material: Extruded aluminum
				2. Material: Cast stainless steel
			1. End Anchors: like the intermediate anchors with an end stop.
				1. End Stop: Equipped with spring located at rotation axis that returns the stop back to closed position after the traveler has been inserted.

End stop or anti return lever allows traveler to easily enter the system but does not allow it to come off unintentionally.

* + - 1. Anchor Mounting: Can be mounted to ceilings, wall or floors. Can incorporate a combination of these mounting methods if designed and installed properly.
				1. Wall Mounted: A 4 to 6 ft. (1.2 to 1.8 m) distance from floor is considered optimum.
				2. Ceiling Mounted: A maximum height of 50 ft. (15 m) between user and system is recommended when using retractable lanyards. Greater heights are achievable using lifelines and with rope grabs.
				3. Floor Mounted: Recommended the system is clear of work area yet close enough to aid in reduction of additional dynamics on system as this configuration almost always results in higher loading.
			2. Shock Absorbing Sleeves: For end anchors and some intermediate anchors.
				1. Engineered to reduce the impact force of a fall on the lifeline.
				2. Positioned at corners, at each end anchor of the lifeline and at each side of an intermediate anchor every 200 ft. (60 m).
			3. Wire Rope:

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

* + - * 1. 5/16 in. (8.3 mm) diameter galvanized steel. Occasional use under moderate conditions.
				2. 5/16 in. (8.3 mm) diameter stainless steel. Frequent use or severe climate conditions.
			1. Travelers: A mobile stainless steel anchor point comprised of two jaws that hold it on the wire ropes and automatically grip when fall occurs.

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

* + - * 1. Standard traveler.
				2. Removable traveler.
				3. Roll safe traveler.

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

* 1. SAFETY TIEBACK ANCHORS
		1. Tieback Anchors: "U" Bar 3/4 inch (19 mm) 42 ksi (289.6 mPa)yield strength type 304 stainless steel, Pipe Support 4 inches (102 mm) diameter.
		2. Fabrication: Take measurements on site as required for fabrication and installation.
			1. Fabricator responsible for correct fit of window washing systems.
			2. Fabricate and assemble in shop to greatest extent feasible.
			3. Fabricate for delivery sequence.

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

* + - 1. Roof Mount Tieback Anchors:
				1. Minimum Height: 6 inches 152 mm) above roof membrane.
				2. Anchors have 2-1/2 inches (64 mm) inside diameter stainless steel ring for attaching a suspension wire rope or safety lifeline.

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

Weld to Steel.

Embedded Anchor Bolt.

Thru Bolt Anchor.

Hilti type Anchor.

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

* + - 1. Wall Mount Tieback Anchors with Base Plate:
				1. Anchors have 2-1/2 inches (64 mm) inside diameter stainless steel ring for attaching a suspension wire rope or safety lifeline.

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

Embedded Anchor Bolt.

Thru Bolt.

Hilti Type Anchor.

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

* + - 1. Flush Roof Mount Tieback Anchors:
				1. Minimum height of 4 inch (102 mm) roof pavers system.
				2. Anchors have 2-1/2 inches (64 mm) inside diameter stainless steel ring for attaching a suspension wire rope or safety lifeline.

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

Weld to Steel.

Embedded Anchor Bolt.

Thru Bolt Anchor.

Hilti Type Anchor.

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

* 1. DROP THROUGH RIGGING SLEEVES
		1. Permanently attached, drop through rigging sleeve supplied for mounting to structure
			1. Material: Hot dipped galvanized steel,
			2. Hardware, i.e. clips, bolts, nuts, washers, etc. shall be stainless steel.
			3. Accurately machined to receive dual suspension-rigging bracket.
			4. Weatherproof cap and tether line required at rigging sleeve locations.
			5. Shim as necessary during installation.
		2. Fabrication: Take measurements on site as required for fabrication and installation.
			1. Fabricator is responsible for correct fit of window washing systems.
			2. Fabricate and assemble in shop to greatest extent feasible.
			3. Fabricate for delivery sequence.

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

* + - 1. Roof Mount: Drop through rigging sleeve, minimum height of 6 inches (152 mm) above roof membrane.
			2. Wall Mount (Soffit Bent Pipe): Drop through rigging sleeve.

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

* 1. PULL UNDER BRACKETS
		1. Permanently attached pull under brackets for mounting to underside of structure with stainless steel fastening hardware or cast-in-anchor bolt cage. Shim as necessary.
			1. Material: Hot dipped galvanized steel.
			2. Usage: Mid-air transfer of stage platform under cantilevered section of a structure.
		2. Fabrication: Take measurements on site as required for fabrication and installation.
			1. Fabricator is responsible for correct fit of window washing systems.
			2. Fabricate and assemble in shop to greatest extent feasible.
			3. Fabricate for delivery sequence.
		3. Portable Dual Suspension Pull Over Device; shall be supplied for use with stage platform.

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

* 1. PORTABLE WIND ANEMOMETER
		1. Platform mounted wind anemometer, monitoring wind velocity during platform use.
			1. Readout: Miles per hour.
			2. Powered By: Internal turbine or 9-volt battery.
		2. Provide equipment by the following manufacturers, unless firms submit records of experience acceptable to Owner.
			1. Davis Instruments Mfg. Co. Inc., Baltimore, Maryland.
			2. Science Associates Incorporated, Princeton, New Jersey.
			3. Texas Electronics Inc., Dallas, Texas.

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

* 1. COMMUNICATION EQUIPMENT
		1. Communication equipment provided for each operator for use in an emergency. Equipment to be Owner furnished walkie-talkies.

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

* 1. POWER REQUIREMENTS
		1. Roof Carriage: Protected mainline power and weatherproof, twist-lock receptacle to suit Roof Carriage power requirement power outlets based upon 460 VAC, 3 Phase, 60 HZ, 30 AMPS, by electrical contractor. Electric power provided at designated outlets, each providing 30 amperes, 460 volts, 60 HZ, three phase, under full loading of equipment with not more than 3 percent voltage drop at outlets, or at value compatible with proposed equipment. Consult Owner for supplied voltage.
		2. Powered Stage: Protected mainline power and weatherproof, twist-lock receptacle to suit Powered Stage Platform requirement power outlets based upon 230VAC, 3 Phase, 60 HZ, 30 AMPS, by electrical contractor. Electric power provided at outlets, each providing 30 amperes, 240 volts, 60 HZ, three phase, under full loading of equipment with not more than 3 percent voltage drop at outlets, or at value compatible with proposed equipment. Consult the Owner for supplied voltage.
			1. Outlets on each level of building to be on separate circuits from each other and other equipment. They will contain separate grounding conductors for an equipment ground. Outlets provided with an adjacent stainless steel strain relief anchor for strain relief attachment on the traveling cables.
			2. Power at electrical outlets to be available only while platform is in use and not available any other time. Circuits to be lockable in "OFF" position. Switch to be conveniently located with respect to primary operating area of equipment to allow the operators of the equipment access to the switch.
			3. EXECUTION
	2. PREPARATION
		1. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
		2. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
		3. Commencement of installation constitutes acceptance of conditions.
	3. INSTALLATION
		1. Install products in strict accordance with manufacturer's instructions and recommendations.
		2. Install facade maintenance equipment and components in strict accordance with the approved shop drawings when construction and finish of adjoining work will permit and in sufficient time to avoid delays to the construction process. All equipment shall be secured in place as shown on drawings and/or as herein specified by rigid approved methods.
	4. FIELD QUALITY CONTROL
		1. Conduct full live load and operational tests, after completion of the installation, under maximum design live loading conditions over the full range of all the building surfaces, in accord with applicable standards.
		2. At a time, mutually agreeable to all parties, allow one full day to conduct operational demonstrations for the Owner and/or the Owner's representative, after completion of the operational tests.
		3. Repair or replace any components and correct all deficiencies observed because of these tests and demonstrations, and retest to assure compliance with the Contract Documents.
		4. Approvals: Submit documentation required to obtain the necessary approval for the equipment installation from the governing authority for operation of the facade maintenance system. Conduct field operational tests for personnel from the governing authority (separate from the Owner's demonstrations).
	5. CERTIFICATION
		1. Provide written certification that all components have been successfully operated, and will perform in accordance with the intent of this design.
	6. INSTRUCTIONS
		1. The Facade Maintenance Equipment supplier shall instruct the Owner's Representatives and selected User Personnel in the proper usage of the BME. Representative of the BME supplier shall, at time as selected by the Owner, spend one man-day as needed at the building furnishing this instruction.
		2. Facade Maintenance Equipment training attendance certificates are to be issued by the Facade Maintenance Equipment supplier to each of the Owner's Representatives and selected User Personnel upon completion of training.
	7. PROTECTION
		1. Protect installed products until completion of project.
		2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION