

# INSULATED TELESCOPING AERIAL DEVICE

## SPECIFICATIONS – Van Mounted

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It is the intent of the following specifications to set minimum requirements for an INSULATED 29 foot bottom of platform, 34 foot working height, telescoping aerial device with a one-man platform. These specifications must be considered minimum requirements. Any exceptions to these specifications must be so stated in your bid. All units must meet OSHA and ANSI/SIA A92.2-2009 standards, without exception.

### **GENERAL SPECIFICATIONS**

Height to bottom of platform	29 feet, 2 inches
Working height	34 feet, 2 inches
Horizontal reach from center line for side mounted platform	20 feet, 9 inches
Horizontal reach from center line for end mounted platform	22 feet, 9 inches
Standard platform capacity	300 pounds
Maximum platform capacity	400 pounds
Rotation shall be 540° non-continuous	

The major components of the aerial device shall be powdercoated white. Small parts shall be powdercoated or painted black. Components must be painted or powdercoated prior to assembly.

Aerial unit weight may not exceed 1,700 pounds.

### **STABILITY**

The completed unit shall be capable of passing ANSI/SIA A92.2-2009 stability test when mounted on a cargo van of a minimum 9,000 pounds GVWR with 4,100 pounds FAWR. The use of torsion bar, outriggers or ballast for stability is unacceptable.

### **HYDRAULIC SYSTEM**

Operating pressure shall be a maximum of 2200 PSI. Operating oil volume shall be 3.0 to 3.5 GPM for lift operation. An open center type hydraulic system shall be provided. Unit shall be equipped with a 10 micron filter in the return line and a 100-mesh screen at the suction port of the 10 gallon oil reservoir.

Boom raise/lower and extension/retraction shall be done with double acting hydraulic cylinders with holding valves integral to the cylinder. Boom rotation is accomplished with a hydraulic motor that actuates the rotation drive. Any other manner of either boom elevation/lowering or extension/retraction is unacceptable. In addition, holding valves bolted to the cylinders are unacceptable.

A 3-way solenoid valve integral to the lower control valve shall be provided to divert hydraulic flow from the control valve to the reservoir. A pressure relief valve also integral to the lower control valve shall protect the hydraulic system. The relief valve setting must be at 2200 PSI. The three boom control valves are solenoid operated 4-way valves. An additional 4-way valve is included when hydraulic leveling is provided.

All hydraulic adapters must be machined from forgings. Brazed hydraulic adapters are not acceptable. Hydraulic hose to be non-conductive Parker 518C with permanent crimped on fittings. Reusable fittings must be available for field repair.

### **PEDESTAL**

The pedestal shall be 0.25 inch thick steel welded into a rectangular structure with an access door on one side. The top plate shall be 1.0 in. thick to support the rotation bearing. The hydraulic reservoir will be a separate component mounted inside the pedestal for protection. The reservoir will include a sight glass visible through the pedestal side indicating oil level and temperature. The hydraulic reservoir is to be constructed of steel and powder coated for maximum cooling and protection from corrosion. Hydraulic reservoirs integral to the pedestal or mounted external of the pedestal are not acceptable. The 100 mesh suction strainer and 10 micron return filter are located inside the pedestal.

## **TURRET**

The turret assembly shall be a welded assembly with 0.50 inch thick sides and 0.75 inch thick base plate. A formed flange on the turret wings and crossmembers provide rigidity. The turret and pedestal will be fastened to the rotation system with 0.63 inch diameter grade 5 hex head capscrews tightened to a specified torque with a thread lock to prevent loosening.

## **ROTATION DRIVE**

The rotation drive shall be a shear ball bearing with a worm driving directly on helical gear teeth machined on the outer race. The rotation bearing must be properly sized to allow the use of 0.63 inch diameter grade 5 hex head capscrews for attachment to the pedestal and turret. The worm must be self locking and hourglass shaped to engage multiple teeth at all times. The rotation bearing, worm and housing must be factory adjusted and not require field adjustment. Separate right angle gearboxes that require periodic adjustment are unacceptable. A removable cover must be provided over the rotation bearing to allow easy access for lubrication of the gear teeth. Rotation shall be limited to 540° non-continuous by means of a mechanical stop. Electric or hydraulic rotation stops are not acceptable. The worm shaft shall have an exposed hexagonal end for manual rotation.

## **BOOM ASSEMBLY**

The telescopic boom shall articulate from 14° below horizontal to 77° above horizontal by means of a 3.5 inch bore cylinder. The outer boom shall be a minimum of 6 inch by 10 inch steel tube. The inner boom shall be 5 inch by 7 inch fiberglass with a 0.38 inch wall. A 30 inch length of the fiberglass boom shall be non-tracking over any slide pads or rollers providing a **minimum insulation gap of 30 inches**. Extended, the insulation gap shall be a minimum of 42 inches. The fiberglass boom will be filament wound using oven cured epoxy resin for consistent strength. Hand layed up booms or booms made with catalyst cured polyester resins are not acceptable. The fiberglass inner boom shall have a gelcoat finish with a painted topcoat to provide maximum water resistance. The inner boom to be dielectrically tested and rated per ANSI A92.2-2009 for Category C— 46Kv and Below, fully retracted.

Boom extension/retraction shall be accomplished with a hydraulic cylinder attached between the outer and inner boom. The stroke of the hydraulic cylinder will limit extension. Any other means of limiting extension is unacceptable. The use of hydraulic or electric motors, cables, chains or electrical limit systems for extension is not acceptable. Holding valves in the extension cylinder must hydraulically prevent boom creep in both directions. Mechanical boom latches or pilot operated hydraulic valves to prevent boom creep are not acceptable.

All pivot pins shall have a minimum tensile strength of 150,000 PSI. Pins shall be zinc plated for corrosion resistance and have non-lube bearings at all points of movement.

Hoses and control circuits shall be housed inside a plastic hose carrier housed inside of the boom. The extension cylinder, hose carrier and inner boom slide pads must be accessible for service without removing the inner boom from the outer boom.

## **PLATFORM (CHOOSE ONE)**

### **For Gravity Leveled Side Mounted Platform**

The platform shall be mounted to the side of the boom and have a hydraulic dampener and infinitely adjustable positive friction brake. Locking pins are not acceptable for locking the platform in place. The platform shall be one-piece fiberglass, 24 inch by 24 inch by 42 inch with a molded step to the front. A non-skid surface will be bonded into the step surface. Self adhesive non-skid strips are not acceptable. The maximum platform capacity is 400 pounds. The horizontal side reach is 20 ft. 9 inches.

### **For Hydraulically Leveled Side Mounted Platform**

The platform shall be mounted to the side of the boom and be automatically leveled with a master/slave hydraulic leveling system. The slave cylinder shall include holding valves integral to the cylinder. Holding valves bolted to the cylinder are unacceptable. The hydraulic leveling system shall include a solenoid operated valve to allow platform leveling adjustments from the upper and lower controls. An additional valve assembly shall provide dual pilot operated check valves and dual circuit relief valves to prevent leakage from the system and to protect the system from damage. The platform shall be one-piece fiberglass, 24 inch by 24 inch by 42 inch with a molded step

to the front. A non-skid surface will be bonded into the step surface. Self adhesive non-skid strips are not acceptable. The maximum platform capacity is 400 pounds. The horizontal side reach is 20 ft. 9 inches.

#### For End Mounted Platform

The platform shall be mounted to the end of the boom and be automatically leveled with a master/slave hydraulic leveling system. The slave cylinder shall include holding valves integral to the cylinder. Holding valves bolted to the cylinder are unacceptable. The hydraulic leveling system shall include a solenoid operated valve to allow platform leveling adjustments from the upper and lower controls. An additional valve assembly shall provide dual pilot operated check valves and dual circuit relief valves to prevent leakage from the system and to protect the system from damage. The platform shall be one-piece fiberglass, 24 inch by 24 inch by 42 inch with a molded step to the front. A non-skid surface will be bonded into the step surface. Self adhesive non-skid strips are not acceptable. The maximum platform capacity is 400 pounds. The horizontal side reach is 22 ft. 9 inches.

#### For Manually Rotated Platform

A manual platform rotator shall be provided to allow positioning of the platform at 0°, 45° or 90° from the end of the boom. This shall provide for positioning of the platform for optimal work access. The platform shall be automatically leveled with a master/slave hydraulic leveling system. The slave cylinder shall include holding valves integral to the cylinder. Holding valves bolted to the cylinder are unacceptable. The hydraulic leveling system shall include a solenoid operated valve to allow platform leveling adjustments from the upper and lower controls. An additional valve assembly shall provide dual pilot operated check valves and dual circuit relief valves to prevent leakage from the system and to protect the system from damage. The platform shall be one-piece fiberglass, 24 inch by 24 inch by 42 inch with a molded step to the front. A non-skid surface will be bonded into the step surface. Self adhesive non-skid strips are not acceptable. (This option increases the maximum horizontal side reach to 23 feet, 4 inches & reduces the maximum platform capacity to 350 pounds).

#### For Hydraulically Rotated Platform

A hydraulic platform rotator shall be provided to allow infinite positioning of the platform up to 90° to either side of the boom. This shall provide for positioning of the platform for optimal work access. The platform shall be automatically leveled with a master/slave hydraulic leveling system. The slave cylinder shall include holding valves integral to the cylinder. Holding valves bolted to the cylinder are unacceptable. The hydraulic leveling system shall include a solenoid operated valve to allow platform leveling adjustments from the upper and lower controls. An additional valve assembly shall provide dual pilot operated check valves and dual circuit relief valves to prevent leakage from the system and to protect the system from damage. The platform shall be one-piece fiberglass, 24 inch by 24 inch by 42 inch with a molded step to the front. A non-skid surface will be bonded into the step surface. Self adhesive non-skid strips are not acceptable. (This feature increases the maximum horizontal side reach to 23 feet, 5 inches & reduces the maximum platform capacity to 350 pounds).

### **MOUNTING**

The pedestal base shall be mounted with a low profile 0.63 in. plate resting on spacers placed through the floor. The base plate is bolted to the frame by the use of spacers that isolate the pedestal from the body floor. Mounting that attaches to or sandwiches the floor is unacceptable. The van roof will be cut for installation of a roof bellows. The bellows shall be mounted with the use of backing strips to prevent tearing and sealed to prevent leakage.

A 30 in. bumper extension shall be provided with a non-skid finish. The extension shall have an additional stoplight built into the platform access step. A boom rest with rubber pad molded to a steel plate and ratchet tie down strap shall be mounted on the rear drip rail. Rubber pads not molded to a steel plate are unacceptable.

### **CONTROLS**

On side mounted platforms, the upper controls must be mounted on the platform support and remain level with the platform. On end mounted platforms, the upper controls must be mounted on the side of the platform. The upper controls must be an integrated radio transmitter providing total electrical isolation. To protect against inadvertent operation, a trigger in the handle must serve as an enable and speed control. The radio control allows for one handed proportional operation of upper boom raise/lower, extend/retract, boom rotation, lower boom raise/lower, engine start/stop, hydraulic leveling if provided, emergency lowering if provided, and throttle control if provided. The electric switches in the handle must be environmentally sealed for weather protection. An emergency stop control shall be provided that also functions as an engine stop control. Power for the transmitter shall be provided by four AA batteries. A low battery indicator shall be provided allowing for 8 hours of continued use. The radio receiver shall be installed at the pedestal and provides all electrical signals for aerial lift operation

## **SAFETY FEATURES**

Counterbalance Valves (Holding Valves) shall lock the elevation, extension and slave leveling cylinders in position in the event of hydraulic line or hose failure.

A 3-way valve shall divert hydraulic flow away from the control valve in the event of a valve malfunction.

Unit shall have a rotation system that prevents freewheeling in the event of hydraulic line or hose failure.

A 30 inch fiberglass section must not track over slide pads or rollers for maximum dielectric protection for the operator.

A fall protection anchor must be attached to the inner boom. Anchors attached to the platform or platform support are not acceptable. A body harness and adjustable length shock-absorbing lanyard must be provided for fall protection.

Unit must meet OSHA and ANSI/SIA A92.2-2009 standards, without exception.

## **ADDITIONAL OPTIONAL EQUIPMENT**

### **HYDRAULIC POWER SOURCE (CHOOSE ONE)**

#### **For Engine Driven Hydraulic Pump**

Hydraulic power shall be provided by an engine accessory belt driven hydraulic pump or a PTO driven hydraulic pump of sufficient size to furnish 3.0 to 3.5 GPM at engine idle. Engine stop/start controls shall be provided at the upper controls.

#### **For Electric Powered Hydraulic Pump**

Hydraulic power shall be provided by a heavy duty 12 VDC motor mounted in the pedestal. The 12V DC motor must be able to deliver 2.5 to 3.0 GPM. Two group 8D auxiliary batteries shall be supplied mounted on the turret in protective containers. The batteries are to be charged from the chassis alternator when the engine is running.

#### **For Dual Powered Hydraulic System**

Hydraulic power shall be provided by either an engine driven hydraulic pump of sufficient size to furnish 3.0 to 3.5 GPM at engine idle or a heavy duty 12 VDC motor mounted in the pedestal. The motor must be able to deliver 2.5 to 3.0 GPM. The system automatically shifts to electric operation when the chassis engine is not running. A control to actuate the 12 VDC motor is provided at the lower controls. Engine stop/start control shall be provided at the upper controls. Two group 8D auxiliary batteries shall be supplied mounted on the turret in protective containers. The batteries are to be charged from the chassis alternator when the engine is running.

### **EMERGENCY LOWERING (CHOOSE ONE)**

#### **For Engine Driven Hydraulic Pump**

A separate emergency lowering system shall be provided which includes a 12VDC motor located inside the pedestal. Controls to actuate the emergency lowering system shall be provided at the upper and lower controls.

#### **For Electric Powered Hydraulic Pump**

In the event the unit batteries become fully discharged, a control must be provided at both the upper and lower controls to utilize the chassis battery for emergency lowering. The same 12 VDC motor is used for normal and emergency operation.

#### **Gravity Descent**

This system consist of an electrical solenoid valve attached to the boom cylinder. When actuated at the upper or lower controls, the valve opens and allows the boom to slowly bleed down under gravity.

### **HYDRAULIC TOOL CIRCUIT—REQUIRES TWO SPEED THROTTLE**

An outlet for hydraulic tools shall be provided at the operator's platform. The circuit includes a selector valve and outlet manifold. The system must be designed for 5 GPM flow. Quick disconnect fittings do not need to be included. An engine driven hydraulic pump is required. A two speed engine throttle is required. At low idle, the pump shall provide 3.0 to 3.5 GPM flow for lift operation. At high idle, the pump shall provide 5 GPM flow for tool operation.

### **TWO SPEED THROTTLE**

The two speed throttle system shall provide an electric signal for the chassis electronic engine control system. The signal shall be activated from the upper or lower controls and increase engine speed for hydraulic tool operation. The signal must be deactivated for road travel through the keyed aerial master switch. During operation from the upper controls, the signal must automatically be deactivated if a boom control is actuated.

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