E-ONE FIRE APPARATUS
HR-100 RMQ SPECIFICATION
ATTACHMENT "B"

Customer: CITY OF RIVERSIDE FIRE DEPARTMENT

TESTING COMPLIANCE STANDARD

Hose Bed Capacity

The rear hose bed shall have the capacity to store 600' of 4" DJ hose as a single load.

Overall Height Restriction

The apparatus shall have overall height restriction of 11'-8" (unloaded condition).

The height of the apparatus shall be measured with no water/foam in the water/foam tank, no equipment, no ground ladders and no hoses.

Overall Length Restriction

The completed unit shall have an overall length restriction of 42'-2".

NFPA Compliance

The E-ONE supplied components of the apparatus shall be compliant with NFPA 1900, 2024 edition.

Equipment Capacity

Equipment allowance on the apparatus shall be 2500 lbs. This allowance is in addition to the weight of the hoses and ground ladders listed in the shop order as applicable.

BUMPERS

Bumper Extension

The bumper extension shall be approximately 28" from the face of the cab as required.

Bumper Gravel Shield

The extended front bumper gravel shield shall be made of 3/16" (.375") aluminum tread plate material.

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Bumper Overlay

The 10" heavy duty front bumper face shall be provided with a 14GA polished stainless steel overlay.

Swing Down Officer Bumper

The section of the bumper in front of the officer side tray and/or front suction shall be hinged to provide access to the officer bumper tray and/or front suction.

Heavy Duty Bumper

A heavy duty 10" high formed type front bumper constructed of 1/4" (.250") ASTM A36 steel shall be provided with 2 7/16" (2.4") top and bottom flanges. The front corners of the bumper shall be provided with a 45 degree tapered to produce an 8.5" wide mounting surface and to reduce swing clearance.

Additional support (as applicable) shall be provided from the frame rails for the outboard side areas on bumper extensions greater than 12in.

The bumper shall be painted as specified.

BUMPER TRAYS

Bumper Tray - Center

A hose tray constructed of 1/8" aluminum shall be recessed into the front bumper extension. The tray shall be located in the center of the bumper and be approximately 14" deep (13" to the top of the slats). One inch thick aluminum slats shall be included in the bottom of the hose tray to aid in the dissipation of water from the tray.

Bumper Tray - Officer Side

A hose tray constructed of 1/8" aluminum shall be recessed into the front bumper extension. The tray shall be located on the officer side of the bumper outboard of the frame rail and be approximately 14" deep (13" from the top of the slats). One inch thick aluminum slats shall be included in the bottom of the hose tray to aid in the dissipation of water from the tray.

Lid, Bumper Hose Tray

The center bumper tray shall have a diamond plate lid. The lid shall be hinged and include a D-Ring latch, rubber seal and gas shock hold open device.

Lid, Bumper Hose Tray

The officer side bumper tray shall have a diamond plate lid. The lid shall be hinged and include a D-Ring latch, rubber seal and held open with a pneumatic shock.

Bumper Tray Notch

The front bumper tray shall be notched to accommodate a siren speaker and/or Q2B siren. Due to the notch, the compartment hose/equipment load shall be reduced depending on the option(s) selected.

FRAME ASSEMBLY

Frame Rail Construction

The chassis frame shall utilize an integral torque box type design. The integral torque box shall combine the chassis frame and aerial torque box into a single structure. The integral torque box shall provide an optimized design that lowers vehicle center of gravity, eliminates the need to torque aerial frame attachment bolts, and permits underslung outriggers to maximize body compartmentation.

The 19" high x 34" wide torque box shall be fabricated of 50,000 psi minimum yield, high strength, low alloy steel. The frame and torque box shall be made of 42.7 lbs. per foot structural channel with .500" thick top and bottom plates and .500" integral bulkhead supports. Certified welders shall construct the torque box. The design shall utilize 100% welded joints for a totally sealed box. Skip welding shall not be acceptable. Complete Finite Element Analysis and strain gauge testing shall be employed to verify minimum safety factors for road traveling (5:1) and aerial operation (2.5:1).

The completed torque box shall have the following attributes:

Resistance to bending moment 14,350,000 in. lbs.

Section modulus 287 cu. in.

The frame section immediately forward of the torque box shall have the following attributes:

Resistance to bending moment 4,907,000 in. lbs.

Section modulus 98.14 cu. in.

The torque box shall incorporate a stainless steel schedule 40 4" water pipe through the torque box for the aerial waterway discharge. In addition, the torque box shall have two (2) 3" conduits full length to encapsulate the hydraulic, air and electrical lines.

The entire assembly shall be sand-blasted and painted black before chassis assembly.

The custom chassis frame shall have a **WHEEL ALIGNMENT** in order to achieve maximum vehicle road performance and to promote long tire life. The alignment shall conform to the manufacturer`s internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery upon request.

Coated Fasteners

The custom chassis frame assembly shall be assembled using GEOMET 720 coated fasteners for corrosion resistance.

AXLE OPTIONS

Shock Absorbers Front

Koni model 90 shock absorbers shall be provided for the front axle. The shocks shall be three way adjustable.

The shocks shall be covered by the manufacturer`s standard warranty.

Front Axle Sight Glass

The front axle shall have a Stemco sight glass on the hubs to check the lubricant level of the axle spindles.

The inboard wheel seals shall be Chicago Rawhide brand (or equivalant).

Rear Axle

The vehicle shall utilize an Meritor RT-46-160, 48,000 lb. capacity rear tandem axle with single reduction hypoid gearing.

The axle shall be equipped with oil-lubricated wheel bearings with Meritor oil seals.

An Inter-Axle Differential (IAD) shall be provided for the rear axles. The IAD shall allow for speed differences between the forward and rear axles in a tandem while also providing equal

pulling power from each axle of the tandem. The IAD shall be controlled by a switch accessible by the driver.

Driver Controlled Differential

A Rockwell driver controlled main differential lock shall be supplied. Operated from within the cab, it reduces wheel spin-outs by transferring power from the slipping wheel to the wheel with traction. An indicator shall be provided visible to the driver to show when the lock is engaged.

When used in a tandem axle application, the DCDL will be installed on the rear/rear axle only.

Front Axle

The vehicle shall utilize a Dana D-2200W drop beam front axle with a rated capacity of 24,000 lbs. It shall have 71" kingpin centers. The axle shall be of I-beam construction and utilize grease-lubricated wheel bearings. The vehicle shall have a nominal cramp angle of 42 degrees, plus two (+ 2) degrees to minus three (- 3) degrees including front suction applications.

The front axle hubs shall be made from ductile iron and shall be designed for use with 10 hole hub-piloted wheels in order to improve wheel centering and extend tire life.

The front springs shall be parabolic tapered, minimum 4" wide x 54" long (flat), minimum four (4) leaf, progressive rate. The springs shall have Berlin style eyes and rubber maintenance free bushings on each end with an additional standard wrap at the front eye. The capacity shall be 24,000 lbs. at the ground.

Tapered leaf springs provide a 20% ride improvement over standard straight spring systems. Supporting documentation/data shall be provided upon request.

The vehicle shall be equipped with a Sheppard integral model M-110 power steering gear, used in conjunction with a power assist cylinder. The steering assembly shall be rated to statically steer up to a maximum front axle load of 24,000 lbs. Relief stops shall be provided to reduce system pressure upon full wheel cut. The system shall operate mechanically should the hydraulic system fail.

SUSPENSIONS

Rear Suspension

The vehicle shall be equipped with a Hendrickson FIREMAAX EX model FMX-482 air ride suspension for tandem drive axles. The suspension shall include dual height control valves that allow uneven, side heavy loads to be balanced, Quik-Align for easy axle alignment and

four (4) hydraulic shock absorbers. The suspension shall be rated for the maximum axle capacity.

WHEEL OPTIONS

Front Wheels

The vehicle shall have two (2) polished (on outer wheel surfaces only) Alcoa aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires.

Front Wheel Trim Package

The front wheels shall have stainless steel lug nut covers (for use with aluminum wheels) or chrome plated plastic (for use with steel wheels). The front axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel universal baby moons. All stainless steel baby moons shall carry a lifetime warranty plus a 2 year re-buffing policy. There shall be two (2) baby moons and twenty (20) lug nut covers.

Rear Wheels

The vehicle shall have eight (8) polished (on outer wheel surfaces only) Alcoa aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires.

Rear Wheel Trim Package, Tandem Axle

The rear wheels shall have stainless steel lug nut covers (chrome plated steel lug nut covers not acceptable), or American made chrome plated plastic lug nut covers. The rear axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel, spring clip band mount high hats, DOT user friendly. All stainless steel high hats shall carry a lifetime warranty plus a 2 year rebuffing policy. There shall be four (4) high hats and forty (40) lug nut covers.

Aluminum Wheel Finish [Qty: 10]

A Dura-Brite high performance sealant shall be supplied on the aluminum wheel. The sealant shall not yellow under UV light exposure and shall impede staining and corrosion of the aluminum wheel.

Valve Stem Extensions

Each inside rear wheel on the rear axles shall have valve stem extensions.

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TIRE OPTIONS

Front Tires

The front tires shall be two (2) Michelin 425/65R22.5 tubeless type 20 PR radial tires with XZE highway tread.

The tires with wheels shall have the following weight capacity and speed rating:

Max front rating 22,800 @ 68 mph (Intermittent fire service max speed rating 75 MPH).

Max front rating with Alco aluminum wheels - 24,400 @ 65 MPH (intermittent fire service rating if GAW is over 22,800)

The wheels and tires shall conform to the Tire and Rim Association requirements.

Rear Tires

The rear tires shall be Michelin 11R22.5 tubeless type 16 PR radial tires with XZE2 highway tread.

The tires with wheels shall have the following weight capacity:

48,040 lbs. (tandem duals) @ 75 MPH.

The wheels and tires shall conform to the Tire and Rim Association requirements.

Intermittent Tire Service Rating

The front and / or rear tires shall be provided with and intermittent emergency vehicle service rating. Tires rating shall conform to manufacturers` service rating as applicable.

Tire Pressure Monitoring System

A PressurePro pressure monitoring system shall be provided for a tandem rear axle unit. The system shall include externally mounted sensors (model SEN-200) on the valve stem of each wheel. The pressure reading(s) shall be displayed through the multiplex display in the cab. A cabled antenna (model ABPCA-SMA) shall be provided under the apparatus wired to the display. A programming display kit shall be provided and shipped loose for programming sensors as required when servicing unit.

BRAKE SYSTEMS

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Front Brakes

The front axle shall be equipped with Dana / Bendix ADB22X 17 inch disc brakes.

A 3 year/unlimited miles parts and 3 year labor brake warranty shall be provided as standard by Dana. The warranty shall include bushings and seals.

Rear Brakes

The rear axles shall be equipped with Meritor DiscPlus EX225H 17 inch disc brakes with a maximum rated capacity of 54,000 lbs.

The brakes shall be covered by the manufacturer`s standard warranty which is two years, unlimited mileage and parts only.

Brake System

The vehicle shall be equipped with air operated brake system. The system shall meet or exceed the design and performance requirements of current FMVSS-121 and test requirements of current NFPA 1901 Standard.

Each wheel shall have a separate integral brake chamber. A dual treadle valve shall split the braking power between the front and rear systems.

The air system shall be provided with a rapid build-up feature, designed to meet current NFPA 1901 requirements. A 1/4" brass quick-release air inlet with male connection shall be located inside the driver door on the left side of the cab. The inlet shall allow a shoreline air hose to be connected to the vehicle, discharging into the wet tank.

A pressure protection valve shall be installed to prevent use of air horns or other air operated devices should the air system pressure drop below 80 psi.

One (1) reservoir shall serve as the wet tank and a minimum of one (1) tank shall be supplied for each of the front and rear axles. The total system shall carry a sufficient volume of air to comply with FMVSS-121.

The following tank sizes shall be installed:

Tank Sizes in Cubic Inches					
Suspension	**Wet**	**Front**	**Rear**	**Rear Extension**	**Total**
34-54K	1738	1738	2988	0	6464
58K	1738	1738	2988	1738	8202

An automatic drain valve shall be installed on the wet tank. All other tanks shall be equipped with manual drain valves.

A Wabco ABS system shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to axles and all electrical connections shall be environmentally-sealed, water-, weather-, and vibration-resistant.

The system shall constantly monitor wheel behavior during braking. Sensors on each wheel transmit wheel speed data to an electronic processor, which shall sense approaching wheel lock and instantly modulate brake pressure up to five (5) times per second to prevent wheel lock-up. Each wheel shall be individually controlled. To improve field performance, the system shall be equipped with a dual circuit design. The system circuits shall be configured in a diagonal pattern. Should a malfunction occur, that circuit shall revert to normal braking action. A warning light at the driver`s instrument panel shall indicate malfunction to the operator.

The system shall consist of a sensor clip, sensor, electronic control unit, and solenoid control valve. The sensor clip shall hold the sensor in close proximity to the tooth wheel. An inductive sensor consisting of a permanent magnet with a round pole pin and coil shall produce an alternating current with a frequency proportional to wheel speed. The unit shall be sealed, corrosion-resistant and protected from electro-magnetic interference. The electronic control unit shall monitor the speed of each wheel sensor and a microcomputer shall evaluate in milliseconds wheel slip. A deviation shall be corrected by cyclical brake application and release. If a malfunction occurs, the circuit shall signal the operator and the malfunctioning half of the system shall shut down. The system is installed in a diagonal pattern for side to side control. The system shall ensure that each wheel is braked in optimum efficiency up to five (5) times a second.

The system shall also interface with the application of the auxiliary engine, exhaust, or driveline brakes to prevent wheel lock.

To improve service trouble-shooting, provisions in the system for an optional diagnostic tester shall be provided. The system shall test itself each time the vehicle is started and a dash-mounted light shall go out once the vehicle is moving above 4 MPH.

A 3 year/300,000 mile parts and labor Anti-Locking Braking System (ABS) warranty shall be provided as standard by Meritor Automotive.

Park Brake Release

One (1) Bendix-Westinghouse PP-5 parking brake control valve shall be supplied on the lower dash panel within easy reach of the driver.

Electronic Stability Control

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The apparatus shall be equipped with a G4 6S6M Electronic Stability Control (ESC) system that combines the functions of Roll Stability Control (RSC) with the added capability of yaw - or rotational – sensing.

RSC focuses on the vehicle's center of gravity and the lateral acceleration limit or rollover threshold. When critical lateral acceleration thresholds are exceeded, RSC intervenes to regulate the vehicle's deceleration functions. The added feature of ESC is to automatically intervene to reduce the risk of the vehicle rotating while in a curve or taking evasive action, prevents drift out through selective braking, and controlling and reducing vehicle speed when lateral acceleration limits are about to be exceeded.

Intervention by the system occurs in three forms - engine, retarder and brake control. The ESC system uses several sensors to monitor the vehicle. These include a steering wheel angle sensor, lateral accelerometer, and yaw position sensor. ESC constantly monitors driving conditions and intervenes if critical lateral acceleration is detected or if the vehicle begins to spin due to low friction surfaces. The system provides control of engine and retarder torque as well as automatically controlling individual wheels to counteract both over steer and under steer.

To further improve vehicle drive characteristics, the unit shall be fitted with Automatic Traction Control (ATC). This system shall control drive wheel slip during acceleration from a resting point. An extra solenoid valve shall be added to the ABS system. The system shall control the engine and brakes to improve acceleration slip resistance. The system shall have a dash mounted light that shall come on when ATC is controlling drive wheel slip.

3 year/300,000 miles parts and labor warranties for ESC, RSC, and ATC shall be provided as standard by Meritor Automotive.

AIR SYSTEM OPTIONS

Air Dryer

The chassis air system shall be equipped with a Meritor/Wabco System Saver 1200 air dryer located under the cab. The air dryer shall utilize a single spin-on desiccant cartridge.

Air Inlet

A 1/4" brass quick-release air inlet with a male connection shall be provided. The inlet shall allow a shoreline air hose to be connected to the vehicle, discharging air directly into the wet tank of the air brake system. It shall be located driver door jamb.

Air Tank Drain Pull Cords

Manual drain valves with pull cords routed to side of cab/body shall be provided for all air brake system tanks. Labels shall be provided at the side of the cab/body that read "Air Tank Drain".

Isolated Air Reservoir

The air system shall have an additional 1738 cu. in. isolated reservoir. The supply side of the reservoir shall be equipped with a check valve and an 85 psi pressure protection valve.

Specified options shall be plumbed to the isolated air tank.

Auxiliary Air Tank Plumbing

The auxiliary air tank shall be plumbed to the following optional accessories, if equipped: Chassis air horns, brake system air outlet, air reel, light tower, air primer, air operated devices and or customer/dealer installed pneumatic add-on(s).

Air Lines

Air brake lines shall be constructed of color coded nylon tubing routed in a manner to protect them from damage. Brass fittings shall be provided.

Air Horns

Dual Hadley e-tone air horns shall be provided, connected to the chassis air system. The horns shall be mounted through the front bumper. The front bumper shall have two (2) holes punched to accommodate the air horns. A pressure protection valve shall be installed to prevent the air brake system from being depleted of air pressure.

Air Inlet

A 1/4" brass quick-release air inlet with a male connection shall be provided. The inlet shall allow a shoreline air hose to be connected to the vehicle, discharging air directly into the wet tank of the air brake system. It shall be located driver side pump panel.

Air Horn Location

The chassis air horns shall be located outside of the front bumper extension frame rails.

ENGINES & TRANSMISSIONS

Transmission Programming

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The transmission shall be re-programmed so that when "D" is selected, the transmission will shift from 1st through 4th gear and pressing "MODE" will allow the transmission to shift up to 5th gear. Downshift pre-select will remain as standard (4th gear).

Transmission Selector

A push-button transmission shift module, Allison model 29538373, shall be located to the right side of the steering column within easy reach of the driver. The shift position indicator shall be indirectly lit for after dark operation. The shift module shall have a "Do Not Shift" light and a "Service" indicator light. The shift module shall have means to enter a diagnostic mode and display diagnostic data including oil life monitor, filter life monitor, transmission health monitor and fluid level. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

Transmission Fluid

The transmission fluid shall be TranSynd, Shell Spirax S6ATF A295, or equivalent synthetic.

Vehicle Speed

Electronic speed limiting set at 60 MPH as required by NFPA 1901.

Engine/Transmission Package

Engine

The vehicle shall utilize a Cummins X15 engine as described below:

- 605 maximum horsepower at 1800 RPM
- Peak torque of 1850 lb.ft. at 1150 RPM with a governed RPM of 2100
- Six (6) cylinder
- Variable Geometry Turbocharged
- Charge Air Cooled (CAC) 4-cycle diesel
- Cummins XPI high pressure fuel injection system
- Fuel cooler (when equipped with a fire pump)
- 912 cu.in. (14.9 liter) displacement - 5.39 in bore x 6.65 in stroke
- Compression ratio shall be 17.2:1
- Engine lubrication system shall have a minimum capacity, to include filter, of 56 quarts
- Cooled Exhaust Gas Recirculation (EGR)
- Delco-Remy 39 MT-HD 12 volt starter
- Coolant filter with shut-off and corrosion inhibiting additive
- 18.7 cubic foot per minute air compressor
- After treatment system consisting of a oxidation catalyst and diesel particulate filter and selective catalyst reduction system

- Ember separator compliant with current NFPA 1901 standard
- Acumen telematics
- The engine shall be compliant with 2024 EPA Emission standards

The engine air intake shall draw air through the front cab grill. The intake opening shall be located on the officer (right) side behind front cab face with a plenum that directs air to the air filter. The air cleaner shall be an 11" diameter dry type that is easily accessed for service. Air cleaner intake piping shall be made from aluminized steel tubing with flexible rubber hoses. Air cleaner intake piping clamps shall be heavy-duty, constant-torque, T-bolt clamps to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

The engine exhaust piping shall be a minimum of 4" diameter welded stainless steel tubing up to and including the particulate filter and the catalyst canisters. The aftertreatment system shall be mounted horizontally under the right-hand frame rail in back of the cab in order to minimize heat transmission to the cab and its occupants. The exhaust shall be directed away from the vehicle on the right side ahead of the rear wheels in order to keep exhaust fumes as far away as possible from the cab and pump operator position.

A 5-year/100,000 miles parts and labor warranty will be provided as standard by Cummins.

The engine installation shall not require the operation of any type of "power-down" feature to meet engine installation tests.

Transmission

The vehicle shall utilize an Allison EVS4000P, electronic, 5-speed automatic transmission.

A push button shift module shall be located right side of the steering column, within easy reach of the driver. The shift position indicator shall be indirectly lit for after dark operation. The shift module shall have a "Do Not Shift" light and a "Service" indicator light. The shift module shall have means to enter a diagnostic mode and display diagnostic data. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

The transmission shall have a gross input torque rating of up to 1850 lb. ft. and a gross input power rating of up to 605 HP.

The gear ratios shall be as follows:

1 - 3.51
2 - 1.91
3 - 1.43
4 - 1.00

5 - .74
R - 4.80

The transmission shall be equipped with a fluid level sensor (FLS) system, providing direct feedback of transmission oil level information to the operator.

The transmission shall have a lubricant capacity of 51 quarts.

A transmission oil cooler shall be provided in the lower tank of the radiator.

The transmission shall contain two engine driven PTO openings located at the 1 and 8 o`clock positions.

The automatic transmission shall be equipped with a power lock-up device. The transmission lock-up shall prevent down shifting of transmission when engine speed is decreased during pump operations, thereby maintaining a constant gear ratio. Transmission lock-up shall be automatically activated when placing pump in gear. Transmission lock-up shall be automatically deactivated when disengaging pump for normal road operation.

A 5-year/unlimited miles parts and labor warranty shall be provided as standard by Allison Transmission.

Automatic Shift to Neutral

The transmission shall be programmed to comply with NFPA 1901 and automatically shift to neutral upon application of the parking brake.

SECONDARY BRAKING

Jacobs Engine Brake

One (1) Jacobs engine brake shall be installed to assist in slowing and controlling the vehicle as required by NFPA 1901 for vehicles with gross vehicle weight ratings (GVWR) of 36,000 lbs. or greater. An on-off control switch and a high-medium-low selector switch shall be mounted in the cab accessible to the driver.

When activated, the Jacobs engine brake shall cut off the flow of fuel to the cylinders and alter the timing of the exhaust valves. This shall transform the engine into a high-pressure air compressor, driven by the wheels, and the horsepower absorbed by the engine in this mode shall slow the vehicle. The selector switch allows the driver to select the amount of retarding power.

When the on-off switch is in the "on" position, the engine brake shall be automatically applied whenever the accelerator is in the idle position and the automatic transmission is in the lock-up

mode. If the accelerator is depressed or if the on-off switch is placed in the "off" position, the engine brake shall immediately release and allow the engine to return to its normal function.

The rear brake lights shall illuminate when the Jacobs engine brake is activated.

Transmission Programming

The transmission shall include the Allison 2nd gear Pre-Select feature. This option will direct the transmission to down shift to second gear when the throttle is released and the Jacobs engine brake (or Telma retarder wired to activate with release of throttle) is engaged. This feature is designed to increase brake life and aid vehicle braking.

EXHAUST OPTIONS

Exhaust Blanket

The exhaust shall be covered with an insulation blanket specifically designed for high temperature usage. The blanket shall have a silicone impregnated fiberglass sewn outer cover with a stainless steel knitted wire mesh inner liner. The cover shall be retained with stainless steel capstan rivets and stainless steel lacing wire. The blanket shall be installed from the engine turbo to the DPF.

Exhaust End Modification

The end of the exhaust tail pipe shall be modified to accommodate a Plymovent in-house exhaust extraction system. The tail pipe will be at 90 degrees and straight out below the side of body. A stop ring shall be provided on the tail pipe to properly position the Plymovent nozzle. The exhaust outlet shall be vented for use with 2013 and newer EPA engines.

COOLING PACKAGE

Engine Cooling Package

Radiator

The cooling system shall include an aluminum tube-and-fin radiator with a minimum of 1,408 total square inches of frontal area to ensure adequate cooling under all operating conditions. There shall be a drain valve in the bottom tank to allow the radiator to be serviced. A sight glass shall be included for quick fluid level assessment. The radiator shall be installed at the prescribed angle in order to achieve the maximum operational effectiveness. This shall be accomplished according to established work instructions and properly calibrated angle measurement equipment.

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Silicone Hoses

All radiator and heater hoses shall be silicone. Pressure compensating band clamps shall be used to eliminate hose pinching on all hoses 3/4" diameter and larger. All radiator hoses shall be routed, loomed, and secured so as to provide maximum protection from chafing, crushing, or contact with other moving parts.

Coolant

The cooling system shall be filled with a 50/50 mixture of water and antifreeze/coolant conditioner to provide freezing protection to minus 40 (- 40) degrees F for operation in severe winter temperatures.

Coolant Recovery

There shall be a coolant overflow recovery system provided.

Charge Air Cooler System

The system shall include a charge air cooler to ensure adequate cooling of the turbocharged air for proper engine operation and maximum performance.

Charge Air Cooler Hoses

Charge air cooler hoses shall be made from high-temperature, wire-reinforced silicone to withstand the extremely high temperatures and pressures of the turbocharged air. The hoses shall incorporate a flexible hump section to allow motion and misalignment of the engine relative to the charge air cooler. Charge air cooler hose clamps shall be heavy-duty, constant-torque, T-bolt clamps to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

Fan/Shroud

The fan shall be 30" in diameter with eleven (11) blades for maximum airflow and dynamic balance. It shall be made of nylon for strength and corrosion resistance. The fan shall be installed with grade 8 hardware which has been treated with thread locker for additional security. A fan shroud attached to the radiator shall be provided to prevent recirculation of engine compartment air around the fan in order to maximize the cooling airflow through the radiator. The fan shroud shall be constructed of fiber-reinforced high temperature plastic. The shroud shall be specifically formed with curved surfaces which improves air flow and cooling.

Transmission Cooler

The cooling system shall include a liquid-to-liquid transmission cooler capable of cooling the heat generated from the transmission. When a transmission retarder is selected, the cooler shall have an increased capacity to handle the additional heat load.

FUEL SYSTEMS

Fuel Re-Prime

An auxiliary 12 volt fuel pump shall be included in the fuel system. The electric pump shall permit re-priming of the fuel lines and engine. The pump may be manually operated with a switch located accessible to driver. The electric pump shall also automatically operate in conjunction with the mechanical fuel pump as long as engine oil pressure is present. The system shall be plumbed to allow full flow to by-pass the pump.

Fuel Shut-Off [Qty: 2]

A shut-off valve shall be supplied to prevent drain back of fuel into the main supply line during filter changes. The valve(s) shall be located: one (1) each side of fuel/water separator.

Fuel Line

All fuel lines shall be rubber.

Fuel/Water Separator

A Racor fuel/water separator shall be installed in place of the Cummins fuel/water separator with drain. The unit shall utilize a three-step separate process: centrifuge for primary contaminant separation, conical baffles for water coalescing, and a replaceable filter for final particulate removal. The separator shall have a bottom drain for removing contaminants, shall be heated and shall have a rated maximum flow of 3.16 GPM. A sensor with indicator light and audible alarm shall be provided for the Racor fuel/water separator. The indicator light shall be mounted in the cab visible to the driver with the unit located inside the frame rails (as applicable). The unit will alert the driver of high water content in the separator bowl.

Fuel Tanks

Dual side-mounted fuel tanks shall be provided for a total usable capacity of 60 gallons. Each tank shall be of an all-welded aluminized steel construction with anti-surge baffles and shall conform to all applicable Federal Highway Administration (FHWA) 393.65 and 393.67 standards. The tanks shall be mounted behind the rear axle. Each tank shall be secured by a wrap-around T-bolt type stainless steel strap. Each strap shall be fitted with protective rubber insulation and shall be secured with grade 8 hardware. This design allows for tank removal from below the chassis.

Each tank shall be equipped with a 2" filler neck, two (2) additional 80% draw pick-up/return connections, a vent with overturn leak protection, and a .50" NPT magnetic drain plug. The tanks shall be connected with a 1.0" crossover line for equalization allowing the full fuel capacity to be filled from either side of the vehicle. Fuel shall be drawn from one tank and returned to the other.

A mechanical fuel pump sized to meet the engine requirements shall be provided.

ALTERNATOR

420 Amp Alternator

There shall be a 420 amp Leece Neville alternator installed as specified. The alternator shall be a Leece Neville brushless type with integral rectifier and adjustable voltage regulator with an output of 369 amps per NFPA 1901 rating (420 amps per SAE J56).

BATTERIES

Battery System

The manufacturer shall supply six (6) heavy-duty Group 31 12 volt maintenance-free batteries. Each battery shall be installed and positioned so as to allow easy replacement of any single battery. Each battery shall be equipped with carrying handles to facilitate ease of removal and replacement. There shall be steel frame mounted battery boxes on the left frame rail and one (1) on the right frame rail. Each battery box shall be secured to the frame rail with Grade 8 hardware. The batteries shall have a minimum combined rating of 6,000 (6 x 1000) cold cranking amps (CCA) @ 0 degrees Fahrenheit and 1110 (6 x 185) minutes of reserve capacity for extended operation. The batteries shall have 3/8-16 threaded stud terminals to ensure tight cable connections. The battery stud terminals shall each be treated with concentrated industrial soft-seal after cable installation to promote corrosion prevention. The positive and negative battery stud terminals and the respective cables shall be clearly marked to ensure quick and mistake-proof identification.

Batteries shall be placed on non-corrosive rubber matting and secured with hold-down brackets to prevent movement, vibration, and road shock. The hold-down bracket J-hooks shall be cut to fit and shall have all sharp edges removed. The batteries shall be placed in plastic trays to provide preliminary containment should there be leakage of hazardous battery fluids. There shall be plastic trays provided for the batteries. Each battery tray shall be equipped with a rubber vent hose to facilitate drainage. The rubber vent hose shall be routed to drain beneath the battery box. The batteries shall be positioned in well-ventilated areas.

One (1) positive and one (1) negative jumper stud shall be provide in the driver door area.

Batteries shall have a warranty of twelve (12) months that shall commence upon the date of delivery of the apparatus.

CHASSIS OPTIONS

Engine Block Heater

A 120 volt coolant heater shall be installed in the engine block rated at 1500 watts.

Engine Fan Clutch

The engine shall be equipped with a thermostatically controlled engine cooling fan. The fan shall be belt driven and utilize a clutch to engage when the engine reaches a specified temperature.

When disengaged, the fan clutch shall allow for improved performance from optional floor heaters, reduced cab interior noise, increased acceleration and improved fuel economy.

The fan shall be equipped with a fail-safe engagement so that if the clutch fails the fan shall engage to prevent engine overheating.

Drivelines

Drivelines shall have a heavy duty metal tube and shall be equipped with Spicer 1810 series universal joints to allow full-transmitted torque to the axle(s). Drive shafts shall be axially straight, concentric with axis and dynamically balanced.

Front Tow Eyes

Two (2) 3/4" thick stainless steel tow eyes shall be securely attached to the front chassis frame rails to allow towing (not lifting) of the apparatus without damage. They shall be mounted down below the bumper / cab.

Rear Tow Eyes

Two (2) heavy duty tow eyes made of 3/4" (0.75") thick steel having 2.5" diameter holes shall be bolted directly to the rear of the frame to allow towing (not lifting) of the apparatus. The tow eyes shall be protruding into the rear compartment or out the rear of the body. The tow eyes shall be painted chassis black.

Side 9K Winch Receivers

An underbody side 9K winch receivers shall be provided.

Two (2) receivers shall be located one (1) each side below the body compartment ahead of the rear wheels or as shown on approval drawings. Each side facing hitch receiver shall include an electrical connection for a portable winch application. Final location must be approved by engineering.

Each portable winch connection shall be rated for a maximum of 9,000 line pull pounds.

Hydraulic Pump System

A fixed-displacement hydraulic pump system shall be provided to operate all outrigger and aerial functions as well as the chassis power steering system. This shared hydraulic system is desired because it heats the hydraulic fluid while driving to provide smoother operation to other systems in cold climate conditions, rather than utilizing a separate pump.

The hydraulic pump system shall allow the aerial system to be activated without having to shut down the water pump or reduce engine RPM`s by a switch located on the cab within easy reach of the driver. A system "engaged" indicator light shall be provided on the activation switch. Engagement of the aerial circuit shall only be allowed with the transmission in the neutral or pump gear and the parking brake engaged.

The system's hydraulic pump shall be engine mounted and able to supply thirteen (13) gpm of hydraulic fluid at a maximum pressure of 3,000 psi. The hydraulic system shall normally operate between 1,000 and 2,500 psi. It shall have flow controls to protect hydraulic components and it shall incorporate a relief valve set at 2,800 psi to prevent over-pressurization (2950 on HP78 models).

DEF Tank

A diesel exhaust fluid (DEF) tank with a ten (10) gallon capacity shall be provided.

The DEF tank shall include a heater fed by hot water directly from the engine block to prevent the DEF from becoming too cool to operate correctly per EPA requirements. The tank shall include a temperature sensor to control the heater control valve that controls the feed of hot water from the engine to the DEF tank heater.

A sender shall be provided in the DEF tank connected to a level gauge on the cab dash.

The tank shall be located left side below rear of cab.

CAB MODEL

Cab Cyclone - Long 4 door

E-ONE FIRE APPARATUS

HR-100 RMQ SPECIFICATION

ATTACHMENT "B"

The vehicle shall be distinguished by an all-welded aluminum and fully enclosed tilt cab. The cab shall be designed exclusively for fire/rescue service and shall be pre-engineered to ensure long life. It shall incorporate an integral welded substructure of high-strength aluminum alloy extrusions that creates an occupant compartment that is essentially a protective perimeter. The end result is a distinctive structure that is aesthetically appealing, functionally durable, and characterized by increased personnel safety.

The cab shall be constructed from 3/16" (0.188") 3003 H14 aluminum alloy plate roof, floor, and outer skins welded to a high-strength 6063-T6 aluminum alloy extruded subframe. Wall supports and roof bows are 6061 T6 aluminum alloy. This combination of a high-strength, welded aluminum inner structure surrounded on all sides by load-bearing, welded aluminum outer skins provides a cab that is strong, lightweight, corrosion-resistant, and durable.

The inner structure shall be designed to create an interlocking internal "roll-cage" effect by welding two (2) 3" x 3" x 0.188" wall-thickness 6063-T5 aluminum upright extrusions between the 3" x 3" x 0.375" wall-thickness 6061-T6 roof crossbeam and the 2.25" x 3" x 0.435" wall-thickness 6063-T6 subframe structure in the front. An additional two (2) aluminum upright extrusions within the back-of-cab structure shall be welded between the rear roof perimeter extrusion and the subframe structure in the rear to complete the interlocking framework. The four (4) upright extrusions -- two (2) in the front and two (2) in the rear -- shall be designed to effectively transmit roof loads downward into the subframe structure to help protect the occupant compartment from crushing in a serious accident. All joints shall be electrically seam welded internally using aluminum alloy welding wire.

The subframe structure shall be constructed from high-strength 6061-T6 aluminum extrusions welded together to provide a structural base for the cab. It shall include a side-to-side 3" x 1.5" .375 thick C-channel extrusion across the front, with 3/4" x 2-3/4" (.75" x 2.75") full-width crossmember tubes spaced at critical points between the front and rear of the cab.

The cab floor shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate welded to the subframe structure to give the cab additional strength and to help protect the occupants from penetration by road debris and under-ride collision impacts.

The cab roof shall be constructed from 3/16" (0.188") 3003 H14 aluminum treadplate supported by a grid of fore-aft and side-to-side aluminum extrusions to help protect the occupants from penetration by falling debris and downward-projecting objects. Molded fiberglass or other molded fiber-reinforced plastic roof materials are not acceptable.

The cab roof perimeter shall be constructed from 4" x 6-5/8" (4" x 6.625") 6063-T5 aluminum extrusions with integral drip rails. Cast aluminum corner joints shall be welded to the aluminum roof perimeter extrusions to ensure structural integrity. The roof perimeter shall be continuously welded to the cab roof plate to ensure a leak-free roof structure.

The cab rear skin shall be constructed from 3/16" (0.188") 3003 H14 aluminum plate. Structural extrusions shall be used to reinforce the rear wall.

The left-hand and right-hand cab side skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate. The skins shall be welded to structural aluminum extrusions at the top, bottom, and sides for additional reinforcement.

The cab front skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate. The upper portion shall form the windshield mask, and the lower portion shall form the cab front. Each front corner shall have a full 9" outer radius for strength and appearance. The left-hand and right-hand sides of the windshield mask shall be welded to the left-hand and right-hand front door frames, and the upper edge of the windshield mask shall be welded to the cab roof perimeter extrusion for reinforcement. The cab front shall be welded to the subframe C-channel extrusion below the line of the headlights to provide protection against frontal impact.

Cab Exterior

The exterior of the cab shall be 100" wide x 139.5" long to allow sufficient room in the occupant compartment for up to eight (8) fire fighters. The cab roof shall be approximately 101" above the ground with the flat roof option. The back-of-cab to front axle length shall be a minimum of 67.5".

Front axle fenderette trim shall be brushed aluminum for appearance and corrosion resistance. Bolt-in front wheel well liners shall be constructed of 3/16" (0.188") composite material to provide a maintenance-free, damage-resistant surface that helps protect the underside of the cab structure and components from stones and road debris.

A large stainless steel cooling air intake grille with an open area of no less than 81% shall be at the front of the cab.

The cab windshield shall be of a two-piece replaceable design for lowered cost of repair. The windshield shall be made from 1/4" (0.25") thick curved, laminated safety glass with a 75% light transmittance automotive tint. A combined minimum viewing area of 2,765-sq. in. shall be provided. Forward visibility to the ground for the average (50th percentile) male sitting in the driver`s seat shall be no more than 11 feet 7 inches from the front of the cab to ensure good visibility in congested areas.

Windshield Wipers

Two (2) opposed radial style windshield wipers with two (2) separate electric motors shall be provided for positive operation. The wipers shall be a wet-arm type with a one (1) gallon washer fluid reservoir, an intermittent-wipe function, and an integral wash circuit. Wiper arm length shall be approximately 20", and the blade length 21". Each arm shall have a 90 degree sweep for

full coverage of the windshield. The wipers shall be synchronized so as to wipe each windshield simultaneously.

Cab Mounts and Cab Tilt System

The cab shall be independently mounted from the body and chassis to isolate the cab structure from stresses caused by chassis twisting and body movements. Mounting points shall consist of two (2) forward-pivoting points, one (1) on each side; two (2) intermediate rubber load-bearing cushions located midway along the length of the cab, one on each side; and two (2) combination rubber shock mounts and cab latches located at the rear of the cab, one (1) on each side.

An electric-over-hydraulic cab tilt system shall be provided to provide easy access to the engine. It shall consist of two (2) large-diameter, telescoping, hydraulic lift cylinders, one (1) on each side of the cab, with a frame-mounted electric-over-hydraulic pump for cylinder actuation.

Safety flow fuses (velocity fuses) shall be provided in the hydraulic lift cylinders to prevent the raised cab from suddenly dropping in case of a burst hydraulic hose or other hydraulic failure. The safety flow fuses shall operate when the cab is in any position, not just the fully raised position.

The hydraulic pump shall have a manual override system as a backup in the event of an electrical failure. Lift controls shall be located in a compartment to the rear of the cab on the right side of the apparatus. A parking brake interlock shall be provided as a safety feature to prevent the cab from being tilted unless the parking break is set.

The entire cab shall be tilted through a 42-45 degree arc to allow for easy maintenance of the engine, transmission and engine components. A positive-engagement safety latch shall be provided to lock the cab in the full tilt position to provide additional safety for personnel working under the raised cab.

In the lowered position, the cab shall be locked down by two (2) automatic, spring-loaded cab latches at the rear of the cab. A "cab ajar" indicator light shall be provided on the instrument panel to warn the driver when the cab is not completely locked into the lowered position.

Cab Interior

The interior of the cab shall be of the open design with an ergonomically-designed driver area that provides ready access to all controls as well as a clear view of critical instrumentation.

The engine cover between the driver and the officer shall be a low-rise contoured design to provide sufficient seating and elbow room for the driver and the officer. The engine cover shall blend in smoothly with the interior dash and flooring of the cab. An all-aluminum subframe shall be provided for the engine cover for strength. The overall height of the engine enclosure shall not

exceed 23" from the floor at each side and 27" in the center section. The engine cover shall not exceed 41" in width at its widest point.

The rear portion of the forward engine cover shall be provided with a lift-up door to provide easy access for checking and filling engine oil, transmission fluid and power steering fluid without raising the cab (a separate access panel shall be provided for the power steering when equipped with an X12 or X15 engine).

The engine cover insulation shall consist of 1/2" closed cell elastomeric compound foam with aluminum foil faced fiberglass fabric manufactured to specifically fit the engine cover. All edges and seams shall be sealed using aluminum foil faced fiberglass tape. The insulation shall meet or exceed DOT standard FMVSS 302-1 and V-0 (UI subject 94 Test).

All cab floors shall be covered with a black rubber floor mat that provides an aggressive slip-resistant surface in accordance with current NFPA 1901.

The rear engine cover area shall be covered with molded 18 lb/cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99. The cover shall be approximately .5" thick with a minimum skin thickness of 0.0625 inches. The cover shall be provided to reduce the transmission of noise and heat from the engine. The cover shall be black with a pebble grain finish for slip resistance.

A minimum of 57.25" of floor-to-ceiling height shall be provided in the front seating area of the cab and a minimum of 55.25" floor-to-ceiling height shall be provided in the rear seating area. A minimum of 36" of seated headroom at the "H" point shall be provided over each fenderwell.

The interior side to side dimensions shall be 93" from wall padding to wall padding and 95.5" from door to door.

The floor area in front of the front seat pedestals shall be no less than 27" side to side by up to 25" front to rear for the driver and no less than 27" side to side by up to 27" front to rear for the officer to provide adequate legroom.

Battery jumper studs shall be provided to allow jump-starting of the apparatus without having to tilt the cab. The studs shall be located in the driver's door area unless specified otherwise.

All exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

The interior of the cab shall be insulated to ensure the sound (dbA) level for the cab interior is within the limits stated in the current edition of NFPA 1901. Insulation with padded interior panels shall consist of 2 oz. wadding and 1/4" (0.25") foam padding. The padding board shall be backed with 1/4" (0.25") thick reflective insulation. The backing shall be spun-woven polyester. Interior cab padding shall consist of a rear cab headliner, a rear wall panel, and side panels between the front and rear cab doors.

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The vehicle shall use a seven-position tilt and telescopic steering column to accommodate various size operators. An 18" padded steering wheel with a center horn button shall be provided.

The driver and officer seat risers shall be welded to the main cab floor structure. Depending on the make and model of the seats, a storage compartment with a hinged door shall be provided in the risers.

The lower front cab steps shall be a minimum of 13.5" deep x 24" wide. The lower rear cab steps shall be a minimum 19" deep x 21" wide. The first step at the front and rear cab doors shall be no more than 24.0" above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The front and rear steps shall incorporate full width intermediate steps for easy access to the cab interior. The intermediate step at the front doors shall be approximately 8" deep (minimum). The intermediate step at the rear doors shall be approximately 13.75" deep (minimum). The step surfaces shall be aluminum diamond plate with a multi-directional, aggressive gripping surface incorporated into the aluminum diamond plate in accordance with current NFPA 1901.

A handle shall be provided on the interior of each front door below the door window to ensure proper hand holds while entering and exiting the cab. An additional black grip handle shall be provided on the left and right side windshield post for additional handholds.

Cab Doors

Four (4) side-opening cab doors shall be provided. Doors shall be constructed of a 3/16" (0.188") aluminum plate outer material with an aluminum extruded inner framework to provide a structure that is as strong as the side skins.

Front cab door openings shall be approximately 36" wide x 72.5" high, and the rear cab door openings shall be approximately 33.75" wide x 72.5" high. The doors shall have limit straps set to allow the doors to open approximately 85 degrees.

The doors shall be securely fastened to the doorframes with full-length, stainless steel piano hinges, with 3/8" (0.375") diameter pins for proper door alignment, long life, and corrosion resistance. Mounting hardware shall be treated with corrosion-resistant material prior to installation. For effective sealing, an extruded rubber gasket shall be provided around the entire perimeter of all doors.

The front door windows shall provide a minimum viewing area of 518 sq. in. each. The rear door windows shall provide a minimum viewing area of 554 sq. in. each. All windows shall have 75% light transmittance automotive safety tint.

The door handles on the exterior of the cab shall be a pull type with vertical orientation. The handles shall be made with corrosion free material and have a black finish. Each exterior door handle shall have an integral keyed lock.

Recessed paddle-style door latches shall be provided on the interiors of the doors. The latches shall be designed and installed to protect against accidental or inadvertent opening as required by NFPA 1901. The rear cab door handles shall have a vertical orientation making them easily accessible from forward or rearward outboard seating positions. Each cab door shall have a manually operated door lock actuated from the interior of each respective door.

Cab Controls

Cab controls shall be located on the driver side dashboard where they are clearly visible and easily reachable. Chassis operation switches shall be installed in removable panels for ease of service. The following gauges and/or controls shall be provided:

- Master battery / ignition switch (rocker with red guard) (diesel units only)
- Engine start switch (rocker) (diesel units only)
- Master power switch (rocker) (EV only)
- Run switch (rocker) (EV only)
- Marker light/headlight control switch (rocker)
- Panel light dimmer switch (rocker)
- Self-canceling turn signal control with indicators
- Windshield wiper switch with variable speed and washer controls (if not equipped with steering wheel switch pods)
- Parking brake control with red indicator light on dash

Controls and switches shall be identified as to their function by backlit wording adjacent to each switch, or indirect panel lighting adjacent to the controls.

Electrical System

The cab and chassis system shall have designated electrical distribution areas. All electrical components shall be located such that standard operations shall not interfere with or disrupt vehicle operation. An access cover shall be provided for maintenance access to the electrical distribution area. Circuit protection shall be provided by fuses, thermal reset breakers and / or solid state controls.

A 6 place, constantly hot, and 6 place ignition switched fuse panel and ground for customer-installed radios and chargers shall be provided at the electrical distribution area. Radio suppression shall be sufficient to allow radio equipment operation without interference.

All wiring shall be mounted in the chassis frame and protected from impact, abrasion, water, ice, and heat sources. The wiring shall be color-coded and functionally-labeled every 3" on the outer

surface of the insulation for ease of identification and maintenance. The wiring harness shall conform to SAE 1127 with GXL temperature properties. Any wiring connections exposed to the outside environment shall be weather-resistant. All harnesses shall be covered in a loom that is rated at 280 degrees F to protect the wiring against heat and abrasion.

Headlight Bezels

Four (4) dual rectangular chrome plated bezels shall be installed on the front of the cab, located two (2) each side of the grill. One set of the bezels shall be for headlights and the other for turn signals and / or warning lights..

Cab Crashworthiness Requirement

The apparatus cab shall meet and/or exceed relevant NFPA 1901 load and impact tests required for compliance certification with the following:

Side Impact Dynamic Pre-Load per SAE J2422 (Section 5).

Testing shall meet and/or exceed defined test using 13,000 ft-lbs of force as a requirement. The cab shall be subject to a side impact representing the force seen in a roll-over. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

Cab testing shall be completed using 13,776 ft-lbs of force **exceeding** testing requirements.

Quasi-static Roof Strength (proof loads) per SAE J2422 (Section 6) / ECE R29, Annex 3, paragraph 5.

Testing shall meet and/or exceed defined test using 22,046 lbs of mass as a requirement. Testing shall be completed using platen(s) distributed uniformly over all bearing members of the cab roof structure.

Cab testing shall be completed using 23,561 lbs of mass **exceeding** testing requirements. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and doors shall remain closed.

Additional cab testing shall be conducted using 117,336 lbs of mass **exceeding** testing requirements by **over five (5) times**. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and the doors shall remain closed.

Frontal Impact per SAE J2420.

Testing shall meet and/or exceed defined test using 32,549 ft-lbs of force as a requirement. The cab shall be subject to a frontal impact as defined by the standard. The cab shall exhibit minimal

to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

Cab testing shall be completed using 34,844 ft-lbs of force **exceeding** testing requirements.

Additional cab testing shall be conducted using 65,891 ft-lbs of force **exceeding** testing requirements by **over two (2) times**.

The cab shall meet all requirements to the above cab crash worthiness; **NO EXCEPTIONS**.

A copy of a certificate or letter verifying compliance to the above performance by an independent, licensed, professional engineer shall be provided upon request.

For any or all of the above tests, the cab manufacturer shall provide either photographs or video footage of the procedure upon request.

Seat Mounting Strength

The cab seat mounting surfaces shall be third party tested and in compliance with FMVSS 571.207.

Seat Belt Anchor Strength

The cab seat belt mounting points shall be third party tested and in compliance with FMVSS 571.210.

ISO Compliance

The manufacturer shall ensure that the construction of the apparatus cab shall be in conformance with the established ISO-compliant quality system. All written quality procedures and other procedures referenced within the pages of the manufacturer`s Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts this process shall be strictly adhered to. By virtue of its ISO compliance the manufacturer shall provide an apparatus cab that is built to exacting standards, meets the customer`s expectations, and satisfies the customer`s requirements.

CAB ROOF TYPE

Cab Roof Flat

CAB BADGE PACKAGE

Logo Package

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The apparatus shall have manufacturer logos provided on the cab and body as applicable.

CAB DOOR OPTIONS

Rear Cab Door Position

The cab rear doors shall be moved to the rear of the wheel opening. This door placement facilitates easier entry and egress by reducing the rear facing seat protrusion into the door opening.

Rear door position to the 58" or (medium cab).

Cab Door Locks

A four-way locking system shall be provided for the cab doors. The system shall include a main module, electric solenoids each cab door, key less touch pad, wireless key fobs, barrel style key lock on exterior and manual interior locks.

Main Module

A main remote entry module shall be installed in the cab. The module shall allow for locking and unlocking of the cab doors either from interior mounted switch(es), touch pad or wireless remotes. The module shall have the capability to also control other electric locks on cab EMS compartment or body doors (optional).

Electric Cab Door Locks

An electric actuator shall be installed in each cab door to provide remote locking capability. Master lock / unlock switch(es) shall be provided for the driver and officer.

Touch Pads

Two (2) Key less numeric touch pad shall be installed. The touch pad shall have five (5) buttons to allow control of electric locks on the cab doors as well as electric locks on other cab EMS compartments or body doors (optional). The touch pad shall be mounted on the exterior of the cab adjacent to the driver cab door. **CR**

Key Fobs

Two (2) wireless remote key fobs shall be supplied.

Manual Locks

Each exterior door shall be provided with a barrel style key lock to lock or unlock each door individually. Each interior door handle shall be fitted with a manual lock mechanism to lock or unlock each door individually. The locks shall be designed to prevent the door from closing if the door is inadvertently locked while open.

Cab Door Locks

The cab shall have 1250 keyed door locks provided on the exterior entry doors to secure the apparatus.

Cab Door Panels

The inner door panels shall be made from 14 gauge brushed finish stainless steel for increased durability. The cab door panels shall be split just below the handrail and incorporate an easily removable panel for access to the latching mechanism and window regulator for maintenance or service.

Cab Door Stainless Steel Trim

Each cab door shall have a stainless steel trim on the trailing edge of the door opening. Front cab doors shall be 50" tall on rear vertical edge above floor level. Rear doors shall have full vertical height trim, if applicable.

Cab Door Reflective Material

Reflective Diamond Grade material striping shall be provided approximately 12" high on the lower cab door panels. The stripes shall run from the top outer corner to the bottom inside corner of the lower door area, forming a "A" shape when viewed from the rear. The reflective material shall meet NFPA 1901 requirements.

Cab Front Door Windows

Full roll-down windows shall be provided for the front cab doors with power operated heavy duty regulators. The regulators shall have worm gear drive cable operation for positive movement and long life. Scissors or gear-and-sector drives are not acceptable. Window switches shall be located at the center dash for access by the driver or officer.

Cab Rear Door Windows

Full roll-down windows shall be provided for the rear crew doors with power operated heavy duty regulators. The regulators shall have worm gear drive cable operation for positive movement and long life. Scissors or gear-and-sector drives are not acceptable. Window switches shall be located on each door with additional switches accessible by driver.

E-ONE FIRE APPARATUS
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Cab Door Style

The cab doors shall be barrier style with exposed lower steps.

Door Handles

The door handles on the exterior of the cab shall be a pull type with vertical orientation. The handles shall have a chrome plated zinc die-cast base with corrosion free glass reinforced nylon pull handle with a black finish. The handles shall have clearance for a gloved hand.

Each exterior door handle shall have an integral keyed lock.

CAB STEP OPTIONS

Cab Steps

The lower cab steps shall extend 3.5" past the side of the cab to provide increased surface area.

Lower Cab Step

The lower cab steps shall be four inches lower than standard. The lower cab sides and fender trim shall also be extended four inches for a clean integrated appearance. For clearance when tilting, the lower rear corners of the cab shall have a small bevel.

MIRRORS

Mirrors, Heated

Driver and officer cab mirrors to be heated. Includes all surfaces (flat and convex, as applicable).

Cab Mirrors

Two (2) Ramco model 6001FFR remote controlled aluminum mirrors shall be installed. The mirrors shall incorporate a full face main section with a convex mirror with housing model CAS750, mounted to the top. The adjustment of main sections shall be through dash mounted switches. Location: mounted on front corners of cab.

MISC EXTERIOR CAB OPTIONS

Cab Canopy Window

There shall be a fixed window provided between the front and rear doors on the driver`s side of the cab.

Window dimensions shall be as follows:

- 44" C/A cab (short cab): 16"W x 24.5"H
- 58" - 80" C/A cab (medium - extended): 26.69"W x 24.5"H

Cab Canopy Window

There shall be a fixed window provided between the front and rear doors on the officer`s side of the cab.

Window dimensions shall be as follows:

- 44" C/A cab (short cab): 16"W x 24.5"H
- 58" - 80" C/A cab (medium - extended): 26.69"W x 24.5"H

Front Mud Flaps

Black linear low density polyethylene (proprietary blend) mud flaps shall be installed on the rear of the cab front wheel wells. The design of the mud flaps shall have corrugated ridges to distribute water evenly.

Handrails

Cab door assist handrails shall consist of two (2) 1.25" diameter x 18" long 6063-T5 anodized aluminum tubes mounted directly behind the driver and officer door openings one each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2" from the mounting surface to allow a positive grip with a gloved hand.

Handrails

Cab door assist handrails shall consist of two (2) 1.25" diameter x 18" long 6063-T5 anodized aluminum tubes mounted directly behind the driver and officer rear door openings each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. Handrails shall be installed between chrome end stanchions and shall be positioned at least 2" from the mounting surface to allow a positive grip with a gloved hand.

Rear Cab Wall Construction

The rear cab wall shall be constructed using formed 3/16" aluminum smooth plate interlocking in aluminum extrusions. The smooth plate shall match the cab paint scheme.

Cab Wheel Well

The cab wheel well shall be increased in size to provide additional clearance for larger tires. The fender trim shall be adjustable in and out to better accommodate various wheel / tire offsets.

Receptacle Mounting Plate

A mounting plate shall be provided for the battery charger receptacle, battery charger indicator and if applicable the air inlet, etc. The plate shall be constructed of 14 gauge brushed finish stainless steel and be removable for service access to the receptacle(s) and indicator.

Glass Tint

The rear of the cab shall be equipped with dark tint glass. The glass shall have 20% light transmittance (+/- 10%). The dark tint shall be provided for the following windows (as equipped):

- Window on cab sides between front and rear door
- Rear door glass
- Rear cab wall glass
- Vista roof glass

HVAC

Rear AC Control

An additional air conditioning fan control shall be provided for the rear facing AC vents. Location shall be adjacent to the rear facing vents/filter on the driver side.

Air Conditioning

An overhead air-conditioner / heater system with a roof mounted condenser shall be supplied.

The unit shall be mounted to the cab interior headliner in a mid-cab position, away from all seating positions. The unit shall provide fourteen (14) comfort discharge louvers, eight (8) to the back area of the cab, six (6) to the front area of the cab including one (1) each side outboard in the forward overhead console. These louvers will be used for both AC and heated air delivery. Two (2) additional large front louvers shall be damper controlled to provide defogging and defrosting capabilities to the front windshield as necessary.

The unit shall consist of a high output evaporator coil and heater core with one (1) high output dual blower for front air delivery, and two (2) high performance single wheel blowers for rear air

delivery. For improved corrosion resistance the evaporator shall have a hydrophilic blue fin coating.

The control panel shall actuate the air-distribution system using electric actuators. The control panel shall allow blended airflow to both the comfort air vents and defrost vents. Separate three-speed blower switches shall be provided to independently control air speed for the front and rear blowers.

The condenser shall be roof mounted and have a minimum capacity of 65,000 BTU`s and have dual fans with a built in receiver drier.

Performance Data: (Unit only, no ducting or louvers)

- AC BTU: 55,000
- Heat BTU: 65,000
- CFM : 1300 @ 13.8V (All blowers)

The compressor shall be a ten-cylinder swash plate type Seltec model TM-31HD with a capacity of 19.1 cu.in. per revolution.

The system shall be capable of cooling the interior of the cab from 100 degrees ambient to 75 degrees or less with 50% relative humidity in 30 minutes or less.

SEATS

Seating Capacity Tag

A tag that is in view of the driver stating seating capacity of six (6) personnel shall be provided.

Seat, Rear Wall

One (1) fold down high back seat shall be provided each side. **CR**

The seats shall be located on the rear wall driver's side outboard, officer's side outboard.

Features to include:

• Seat bottom cushion shall be constructed of high density foam with a heavy duty, wear resistant material.
• Seat bottom automatically folds up when not in use to provide increased room in the rear of the cab.

E-ONE FIRE APPARATUS

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All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

Cab Seats

All cab seats shall be Valor brand.

Seat Cover Material

All seats shall have Valor Tech XD military grade upholstery material.

Seat Fabric Color

The color of all seats shall be black with red top stitching.

Cab Seat Embroidery

A custom embroidered logo shall be supplied on the back rest of each seat in the cab per the dealer/customer supplied artwork.

Seat, Officer

A USSC Valor P1A air suspension ABTS seat shall be supplied for the officer`s position.

Features shall include:

- Dymetrol® Active suspension
- Low-profile air suspension
- 2.75 Suspension stroke
- 350 lb. capacity
- Fore and aft adjustable tracks with 6-inches of travel
- Rotational knob for infinitely adjustable lumbar
- Adjustable seat backrest
- Integral headrest
- Dual retractor belt configuration with ReadyReach

Seats (PR), Fwd Facing Center of Rear Wall

Two (2) USSC Valor ABTS fold down high back seats shall be provided on the center of the rear wall in the center position. The seats shall be mounted on a common seat riser. **CR**

Features shall include:

- Rotational knob for infinitely adjustable lumbar
- Adjustable seat backrest
- Integral headrest
- Dual retractor belt configuration with ReadyReach

Seat, Driver

A USSC Valor P1A air suspension ABTS seat model P1A shall be supplied for the driver`s position.

Features shall include:

- Dymetrol® Active suspension
- Low-profile air suspension
- 2.75 Suspension stroke
- Fore and aft adjustable tracks with 6-inches of travel
- 350 lb. capacity
- Rotational knob for infinitely adjustable lumbar
- Adjustable seat backrest
- Integral headrest
- Dual retractor belt configuration with ReadyReach

IN-CAB SCBA STORAGE

Behind Driver and Officer Seats

There shall be a vertical rear facing SCBA storage system behind each driver and passenger seat with walk-away storage brackets for rear passenger SCBAs. **CR**

MEDICAL CABINETS

Medical Cabinet

There shall be a medical storage cabinet provided in the cab at the rear of the engine cover. The medical cabinet shall be constructed of 1/8" smooth aluminum plate. The medical cabinet shall be approximately 30" high x 38" wide x 20" deep interior.

One (1) vertically adjustable shelf shall be provided and installed in the medical cabinet. The shelf shall be constructed of 1/8" smooth aluminum plate. The shelf shall have a 1" front for added strength and reinforcement. The shelf shall be sized to the interior dimensions of the medical cabinet. The shelf shall be mounted with extruded aluminum adjustable shelf tracking attached to the cabinet walls and the shelf to be secured with aluminum brackets to the tracks to

allow for vertical height adjustment. As necessary a 3/4" x 2-3/4" aluminum extrusion shall be mounted to the underside of the shelves to provide additional reinforcement as needed.

There shall be a locking fold down door front facing and a locking roll up door rear facing on the medical cabinet to secure contents.

Medical Storage Cabinet Finish

The medical storage cabinet(s) shall have a multi-tone gray finish. The finish shall be applied to the interior, exterior, shelves (if equipped) and trays (if equipped) of the cabinet.

Medical Cabinet Doors

The medical cabinets on the custom cab shall be ROM brand roll-up type doors.

MISC INTERIOR CAB OPTIONS

Storage Under Free Standing Rear Wall Seat

There shall be one (1) horizontal-hinged door provided on the front of the riser enabling access to store equipment below the rear wall free standing seat. One (1) flush-mounted adjustable lever latch shall be provided to hold the door in the closed position. The lever shall meet NFPA 1901 standards for forward facing equipment storage.

Cab Interior Padding Color

Cab interior padding to be gray color. Includes ceiling, side and rear walls as applicable.

Sun Visors

Padded sun visors shall be provided for the driver and officer matching the interior trim of the cab and shall be flush mounted into the underside of the overhead console.

Cab Rollover Protection - Master Control Module

A RollTek rollover occupant protection system shall be installed in the apparatus cab. The system shall include an Integrated Roll Sensor (master module), Integrated Head Curtains and Integrated Seat Belt pretensioners.

The Integrated Roll Sensor (IRS) shall be a microprocessor-controlled solid-state sensing device that utilizes vehicle-specific calibrations to detect rollovers. The IRS shall be equipped with eight (8) pyrotechnic loops for connection to the protective countermeasures (Integrated Head Curtains and Integrated Seat Belt pretensioners).

The IRS shall continually monitor the truck`s acceleration and angle, and upon detection of an imminent roll-over, shall activate protective countermeasures in a pre-programmed sequence. The entire process from activation to deployment shall take less than ¼ of a second (.234).

In addition to acting as the "brain" of the RollTek system, the IRS shall also act as a "black box," recording crash events for post-crash evaluation.

Cab Rollover Protection - Slave Module for Master Control

A slave module shall be installed with the RollTek Integrated Roll Sensor (IRS) to expand the system's capabilities. The slave module shall include connections for up to eight (8) additional pyrotechnic loops for use with up to a total of sixteen (16) protective countermeasures (Integrated Head Curtains and Integrated Seat Belt pretensioners).

Cab Rollover Protection - Side Air Bags [Qty: 2]

RollTek Integrated Head Curtains (IHC) shall be installed in the apparatus cab. The pillow-shaped side air bags shall be attached either to the ABTS seats or the rear cab wall. The air bags shall be optimally placed to deploy across the window and side of the vehicle interior to protect the occupants heads during impact. The air bags shall use a combination of high-pressure stored argon and oxygen (and a pyrotechnic charge for initiation) to inflate the bags to a relatively cool (120° Fahrenheit) inflation temperature and remain inflated for several seconds.

Cab Rollover Protection - Seat Belt Pretensioners [Qty: 6]

RollTek Integrated Seat Belt Pretensioners (ISB) shall be installed in the apparatus cab. The special seat belt buckles shall be designed to receive a signal from the Integrated Roll Sensor during a roll for the pretensioners on the buckles to tighten the seat belts to the occupant, better positioning the occupant in the seats.

Mounting Plate on Engine Cover

An equipment mounting plate shall be provided between the driver and officer on the chassis engine cover. The plate shall be mounted to the engine access door spaced approximately 1/2" up to provide clearance for equipment mounting hardware. The plate shall be constructed of 3/16" aluminum plate and have a swirl finish.

Trim, Rear Engine Cover

The rear portion of the engine cover shall have an overlay of aluminum smooth plate installed to provide additional wear resistance.

Finish to match cab interior.

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Engine Cover

The engine cover shall blend in smoothly with the interior dash and flooring of the cab. The upper left and right sides shall have a sloped transition surface running front to rear providing increased space for the driver and officer.

The engine cover and engine service access door cover shall be molded 18 lb/cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99. The cover shall be approximately .5" thick with a minimum skin thickness of 0.0625 inches. The cover shall be provided to reduce the transmission of noise and heat from the engine. The cover shall be black and feature a pebble grain finish for slip resistance.

MDT Bracket

One (1) Havis model C-MD-107 slide-out mount with a model C-HDM-135 mounting base shall be provided on the officer side cab dash. A Havis model UT-1001 universal laptop computer mount shall be provided on the slide-out.

Cab Floor Overlay

The cab floor shall be overlayed with 1/8" (.125") embossed aluminum diamond plate. The diamond plate shall be installed over the existing insulated floor matting. Includes front and rear cab floors.

Cup Holders

Two (2) cup holders shall be provided on the cab engine cover. The cup holders shall be molded 18 lb/cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99 and with a minimum skin thickness of 0.0625 inches. The outer surface of the cup holders shall be black with a pebble grain finish and shall include a removable plastic liner.

The cup holders shall be located Driver and officer side of engine cover slightly ahead of access door spaced approximately 20" apart (center to center).

Front Occupant Protection

A 4Front occupant protection system shall be installed in the apparatus cab. The system shall inflate three (3) air bags in the following locations:

- Steering wheel air bag to protect the head and neck of the driver
- Knee bolster air bag to protect the driver's legs
- Knee bolster air bag to protect the officer's legs

The air bags shall use a combination of high-pressure stored argon and oxygen (and a pyrotechnic charge for initiation) to inflate the bags to a relatively cool (120° Fahrenheit) inflation temperature and remain inflated for several seconds.

The system shall be connected to the crash detection sensor that will also activate the driver and first officer Integrated Belt Pretensioners if it detects a frontal crash.

Cab Rollover Protection - Seat Pull-Down [Qty: 2]

A seat pull-down (S4) shall be installed on the air suspension seat(s) in the apparatus cab. The pull-down shall be designed to receive a signal from the Integrated Roll Sensor during a roll (or frontal impact if equipped with 4Front) lowering the air ride seat(s) to provide maximum survivable space for the occupant.

Cab Rollover Protection - Side Air Bags [Qty: 2]

Side Rollover Airbags (SRA) shall be installed in the apparatus cab. The pillow-shaped side air bags shall be attached to the seats. The air bags shall be optimally placed to deploy across the window and side of the vehicle interior to protect the occupants heads during impact. The air bags shall use a combination of high-pressure stored argon and oxygen (and a pyrotechnic charge for initiation) to inflate the bags to a relatively cool (120° Fahrenheit) inflation temperature and remain inflated for several seconds.

Overhead Console

An overhead console shall be provided in the front of the cab for the driver and officer. The areas in front of the driver and officer shall be removable panels that can be used for switches and other electrical items. The entire overhead console shall be hinged for service access.

The center of the overhead console shall have a lowered area for mounting of up to three (3) electrical components like siren heads, directional bar controllers, etc.

The overhead console shall be constructed of aluminum smooth plate painted to match the cab interior. The console shall be installed using stainless steel fasteners.

Rear Engine Cover

The rear engine cover shall be provided with a stepped profile for use with rear engine cover options and/or mounting of equipment on the cover.

Cab Dash - Low Profile Severe Duty

The driver side and center dash shall be constructed from cast aluminum for durability and long life.

The driver side cast aluminum dash shall enclose the instrument cluster.

The center dash area shall be a low profile design to provide optimal forward visibility. The driver and officer sides shall be angled for ergonomic access and designed for either a color display or switches. Access panels shall be provided on the top, front and officer side for easy service access.

The officer side dash shall be low profile and constructed from .125" smooth aluminum plate. A service access panel shall be provided in the top surface.

The driver, center and officer side dash shall be painted to match the cab interior.

The lower kick panels below the dash to be constructed from .125 aluminum plate painted to match the cab interior. The panels shall be removable to allow for servicing components that may be located behind the panels.

Cab Insulation Package

The cab shall be insulated to mitigate noise and ensure maximum cooling/heating capacity. The insulation package shall include 1" Polyester foam with Mylar facing for the front wall, rear wall, side walls, and ceiling, Reflectex (or equal) inside each cab door and 1" closed cell foam insulation below the front and rear facing seat risers.

CAB ELECTRICAL OPTIONS

Cab Dome Lights

A TecNiq LED model E12-WB0RP-1 dome light assembly with six (6) white LED, six (6) red LED, white lens and black bezel shall be provided. The white light activates with appropriate cab door and light assembly switch, the red light activates with light assembly mounted switch only.

There shall be two (2) mounted in the front of the cab, one (1) in the driver and one (1) in the officer ceiling.

There shall be two (2) mounted in the rear of the cab, one (1) in the driver side and one (1) in the officer side ceiling.

Push-Button Switch

A heavy duty metal push-button switch shall be installed on the officer`s side switch panel to operate the Q2B siren.

Push-Button Switch

A heavy duty metal push-button switch shall be installed on the officer`s side switch panel to operate the Q2B siren brake.

Horn Button Switch

A three (3) position rocker switch shall be installed in the cab accessible to driver and properly labeled to enable operator to activate the OEM traffic horn, air horn or electronic siren from the steering wheel horn button.

Inlet Receptacle

A 20 amp inlet receptacle shall be installed in the specified location.

The receptacle shall be located outside driver's door next to handrail.

The cover color shall be Red.

ATC Override

An Automatic Traction Control (ATC) override switch shall be provided. The switch shall be located within reach of the driver and allow for momentary disabling of the ATC system due to mud or snow conditions.

English Dominant Gauge Cluster

The cab operational instruments shall be located in the dashboard on the driver side of the cab and shall be clearly visible. The gauges in this panel shall be English dominant and shall be the following:

- Speedometer with odometer
- Tachometer with integral hour meter
- Engine oil pressure gauge with warning light and buzzer
- Engine water temperature gauge with warning light and buzzer
- Fuel gauge with low fuel indicator light
- Voltmeter
- Air filter restriction indicator
- Transmission oil temperature gauge
- Two (2) air pressure gauges with a warning light and buzzer (front air and rear air)
- Cab ajar warning indicator

This panel shall be backlit for increased visibility during day and night time operations.

Headlights

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The front of the cab shall have four (4) headlights. The headlights shall be mounted on the front of the cab in the lower position.

Air Compressor

A Kussmaul model 091-9B-1, 120V air compressor shall be installed.

The air compressor shall be powered by a 120 volt inlet receptacle and has an output of .76 cfm at 100 psi. A pressure switch senses the system pressure and operates the compressor whenever the pressure in the air brake system drops below a pre-determined level.

12 Volt Outlet

A plug-in type receptacle for handheld spotlights, cell phones, chargers, etc. shall be installed driver side dash, officer side dash. The receptacle shall be wired battery hot.

Windshield Fans

Two (2) adjustable windshield defogger fans with individual switches shall be mounted in the cab as specified. The fans shall be 12 volt and shall each be rated at 250 cfm. Location: centered below overhead console.

Antenna Base

There shall be a Tessco P/N 90942 universal antenna base mounted on the cab roof with a weatherproof connector. The antenna base shall be NMO Motorola Style (equivalent to a MATM style) with RG58U coax cable. The antenna shall be located driver side forward with coaxial cable terminating at the center of the dash board, driver side rearward with coaxial cable terminating at the center of the dash board, officer side forward with coaxial cable terminating at the center of the dash board, officer side rearward with coaxial cable terminating at the center of the dash board.

Auto Drain

A Kussmaul model 091-9-089 120V auto drain shall be provided for a Kussmaul 120V air compressor model 091-9B-1.

Battery Charger Location

The battery charger shall be located behind driver's seat.

Air Compressor Location

The air compressor shall be located behind officer's seat.

Auto Eject Block Heater Receptacle

The block heater receptacle shall be a Kussmaul 15 Amp NEMA 5-20 super auto-eject #091-55-15-120 with a cover. The super auto-eject receptacle shall be completely sealed and have an automatic power line disconnect.

The receptacle shall be located bumper and/or gravel shield driver's side and the cover color shall be Yellow.

Officer Speedometer

A speedometer shall be provided in the officer side multiplex display in the cab.

DPF Regeneration Override

A momentary override switch shall be provided for the Diesel Particulate Filter (DPF) regeneration. The switch will inhibit the regeneration process until the switch is reset or the engine is shut down and restarted. The switch shall be located within reach of the driver.

Cab Headlights

FireTech model FT-4x6-4KIT LED headlights shall be provided. The headlights shall include low beam, high beam, elliptical beam and an integrated halo ring park lamp. When not equipped with separate daytime running lights, the low beam headlights shall activate with the release of the parking brake for additional vehicle conspicuity and safety.

Riser Height Compartment Lighting

One (1) EON LED light shall be provided to illuminate the interior of the bench seat riser on the rear wall of the cab. The light(s) shall be wired through the compartment door switch or rocker switch as applicable if equipped with cargo nets.

Cab Door Step Area Lighting

There shall be eight (8) clear TecNiq model D07 LED lights provided to illuminate the cab step well areas. Two (2) lights shall be located at each door area, one (1) above each step. The lights shall have polished stainless steel housings. The lights shall be activated by the cab door ajar circuit.

Cab Turn Signals

A pair of TecNiq LED (Light Emitting Diode) turn signal lights with clear lens shall be installed on the front of the cab. The strip type lights shall be 1.25" high x 15" long and be mounted in a polished cast aluminum housing between the quad bezels.

Cab Dual USB Charger Socket

A Kussmaul model 091-264-N, dual port outlet. Includes (1) USB-C and (1) USB-A NGR charger sockets for cell phones, chargers, etc. shall be installed driver side dash, officer side dash. The receptacle shall be wired battery hot.

USB Dual Port 091-264-N Specifications:

Input: 10 To 30 VDC (10 To 32 VDC Absolute Min./Max.

Output:4.8 to 5.2 VDC, 4.8 Amps Max

Indicator: Device Powered: Blue LED

Battery Charger

A Kussmaul Chief Series Charger, 40 AMP w/ remote and onboard displays shall be installed.

A fully automatic charging system shall be installed on the apparatus. The system shall have a 120/240 volt, 50/60 hertz, 6/3 amp AC input with an output of 40 amps 12 volts DC. The battery charging system shall be connected directly to the shoreline to ensure the batteries remain fully charged while the vehicle is in the fire station or firehouse.

The system shall include a remote and onboard charging status indicator panels. Each panel shall consist of an information screen to provide a visual signal of battery charging status. The microprocessor shall be continuously powered from the battery to provide the charge status.

AERIAL BODY

Aerial Equipment Body

Performance

The apparatus body shall be constructed entirely of aluminum extrusions with interlocking aluminum plates. An extruded modular aluminum body is required due to the high strength-to-weight ratio of aluminum, corrosion-resistant body structure, easy damage repair, and lighter overall body weight to allow for increased equipment carrying capacity.

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The apparatus shall incorporate a rescue style body design to maximize compartment space. The rescue style left and right side body shall combine upper and lower compartments to provide more efficient use of body storage capacity. The body design shall provide 186 cubic feet of storage, which exceeds the minimum NFPA 1901 Chapter 8.5 requirement of 40 cubic feet.

The entire vehicle shall be constructed of aluminum extrusions. Body designs that incorporate steel sub-frames connected to aluminum compartments are not as corrosion-resistant and not acceptable.

Body Mainframe

The body mainframe shall be entirely constructed of aluminum. The complete framework shall be constructed of 6061T6 and 6063T5 aluminum alloy extrusions welded together using 5356 aluminum alloy welding wire.

The mainframe shall incorporate a series of vertical frame components connected in series. Each vertical frame assembly shall be constructed with 3" x 3" extrusions welded together in a square frame configuration. The open center shall permit the installation of a tunnel for ground ladder storage. The mainframe shall be held together from front to rear by two (2) solid 1/2" x 3" aluminum braces on each side of the vertical frame components. The braces shall also serve as the connection point between the torque box and body frame. The body side compartments shall be connected and supported by the extruded aluminum mainframe assembly.

Body Side Assemblies

The left and right side body assemblies shall be framed with 6063T5 1 1/2" x 4" 3/16" wall extrusions. The front and rear body corners of the side assemblies shall be a radiused corner extrusion. The body compartments shall be framed to make full height compartments ahead and behind the wheel well opening. The body side assemblies shall be designed so that the compartment walls are not required to support the body. The compartments shall be interlocked and welded to the side assembly extrusions.

The top of the body side assemblies shall be supplied with embossed diamond plate covers with polished corners to minimize maintenance and provide service access to electrical components.

Stabilizer Openings

The body shall be designed to accommodate a four (4) stabilizer aerial system. One (1) opening shall be supplied behind the rear axle as close to the wheel well opening as possible to maximize rear angle of departure and to prevent the stabilizer pads from contacting the ground during driving. The second set shall be mounted just behind the pump compartment. The openings shall be framed in aluminum extrusions. A stabilizer cover shall be supplied on the extendable stabilizer. The cover shall provide a pleasing appearance and mounting location for a red stabilizer warning light as outlined in NFPA 1901.

The stabilizer openings shall be supplied with clear LED lights to illuminate the stabilizers and the ground surrounding the openings. The lights shall illuminate when any stabilizer is moved from the stored position.

Body Mounting System

The body shall attach to the integral torque box with grade 8 bolts connected through steel mounts welded on the side of the torque box. To isolate dissimilar metals a 1/4" fiber- reinforced rubber dielectric barrier between the aluminum body and steel torque box shall be supplied. Body designs that weld to the aerial torque box or chassis frame rails shall not be acceptable due to the stress imposed on the vehicle during road travel and aerial operations.

Rear Body Design

The rear body shall be designed to provide ground ladder storage, hose deployment, and service access to aerial components. The center rear of the body shall be open for ground ladder storage. The area below the ground ladder storage shall be for a waterway inlet (if applicable), the stabilizer control panel and have access doors to hydraulic components.

A bolt-on 3/16" aluminum treadplate rear tailboard shall be supplied and attached to the underside of the aerial access staircases.

The aerial master control panel that is located on the rear of the body shall consist of a master switch, interlock light, and indicators that illuminate when each stabilizer is deployed. The stabilizer controls shall be divided into two (2) boxes located one (1) each side on the rear body so the operator may observe the stabilizers being deployed on each side of the apparatus as outlined in NFPA 1901.

Aerial Turntable Access Staircase

Two (2) staircases shall be supplied on the rear body. The staircases shall be mounted inboard of the taillights and outboard of the ground ladder storage area. The staircases shall permit continuous egress from the turntable to the ground. The staircases shall form a double beavertail rear body design with 1 1/4" OD handrails mounted to the trailing edge of the beavertail. The handrail stanchions shall be located just below body level to prevent aerial contact with the handrails when the aerial is at low angles of operation.

Access steps shall be mounted in accordance with current NFPA requirements, and shall not exceed a maximum stepping height of 18". The steps shall be a minimum of 4" deep x 15" wide. The top surface of the steps shall have a minimum of 35 sq. in. and shall have a slip-resistant surface. Access steps shall be able to support up to 500 pounds. Steps shall be located to provide a minimum of 6" clearance between the leading edge of the step and any obstruction.

Dual Fuel Fills

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The apparatus shall be supplied with a fuel fill on each side of the body. The fuel fills shall have hinged doors attached with a 1/8" stainless steel hinge and a latch to keep the doors closed.

Water Tank Mounting System

The body design shall allow the booster tank to be completely removable without disturbing or dismounting the apparatus body structure. The water tank shall rest on top of a 3" x 3" frame assembly covered with rubber shock pads and corner braces formed from 3/16" angled plate to support the tank.

The booster tank mounting system shall utilize a floating design to reduce stress from road travel and vibration. To maintain low vehicle center of gravity, the water tank bottom shall be mounted within 5" of the frame rail top. Designs that store ground ladders under the water tank and raise center of gravity shall not be acceptable.

Fire Hose Storage

The hosebed shall contain 44 cubic feet. The hosebed shall measure 11 1/2" deep by 70" wide and 93 1/2" long.

The hosebed compartment deck shall be constructed entirely from maintenance-free, extruded aluminum. Extrusions shall have an anodized ribbed top surface for maintenance-free service life. Extruded aluminum slats shall be 3/4" x 7 1/2" and shall be riveted into a one-piece grid system to prevent the accumulation of water and allow ventilation to assist in drying hose. The hosebed compartment shall be free of sharp edges and projections to prevent hose damage. The compartment deck design shall incorporate a track for the installation of adjustable hosebed dividers. The track shall hold the nut straight, so only a Torx head screwdriver is required to adjust the divider from side to side.

The hosebed sides shall consist of aluminum plate and diamond plate welded from the backside into a framework of 3" x 3" x 3/16" aluminum slotted extrusions. The extrusions shall be welded both vertically and horizontally for high rigidity. The hosebed shall feed into deployment chutes located on the left and right side of the body. The dual chutes shall permit a split hosebed design for the discharge of different size hose.

Compartments

All body compartment walls and ceilings shall be constructed from 1/8" formed aluminum 3003 H14 alloy plate. Each compartment shall be modular in design and shall not be part of the body support structure.

Compartment floors shall be constructed of 1/8" aluminum diamond plate welded in place. Compartment floors that are over 15" deep shall be supported by a minimum 1.5" x 3" x 1/8" walled aluminum extrusions. The compartment seams shall be sealed using a permanent pliable

silicone caulk. A series of louvers shall be supplied to facilitate ventilation of each compartment. Each louver shall be 3" wide by 3/4" tall and 1/2" deep.

Compartment Sizes

The approximate compartment sizes and locations shall be as follows:

Left Side:
There shall be one (1) compartment (L1) above the forward stabilizer. The compartment shall be approximately 31" wide x 32" high x 12" deep (upper) and 31" wide x 27" high x 14" deep (lower) and contain approximately 13.67 cubic feet of storage space. The door opening shall be approximately 31" wide x 59" high.

There shall be one (1) compartment (L2) behind the forward stabilizer. The compartment shall be approximately 28" wide x 39.5" high x 12" deep (upper) and 28" wide x 30" high x 26" deep (lower) and contain approximately 20.32 cubic feet of storage space. The door opening shall be approximately 28" wide x 69.5" high.

There shall be one (1) compartment (L3) over the rear wheels. The compartment shall be approximately 50.5" wide x 12.5" high x 12" deep (upper) and 50.5" wide x 23" high x 25" deep (lower) and contain approximately 21.18 cubic feet of storage space. The door opening shall be approximately 50.5" wide x 35.5" high.

There shall be one (1) compartment (L4) over the rear wheels. The compartment shall be approximately 63.5" wide x 23" high x 11.5" deep and contain approximately 9.72 cubic feet of storage space. The door opening shall be approximately 63.5" wide x 23" high.

There shall be one (1) compartment (L5) over the rear stabilizer. The compartment shall be approximately 31" wide x 27" high x 11.5" deep (upper) and 31" wide x 19.5" high x 14" deep (lower) contain approximately 10.47 cubic feet of storage space. The door opening shall be approximately 31" wide x 46.5" high.

There shall be one (1) compartment (L6) behind the rear stabilizer. The compartment shall be approximately 29" wide x 29" high x 11.5" deep (upper) and 29" wide x 28" high x 23" deep (lower) and contain approximately 16.41 cubic feet of storage space. The door opening shall be approximately 29" wide x 57" high..

Right Side:
There shall be one (1) compartment (R1) above the forward stabilizer. The compartment shall be approximately 31" wide x 32" high x 12" deep (upper) and 31" wide x 27" high x 14" deep (lower) and contain approximately 13.67 cubic feet of storage space. The door opening shall be approximately 31" wide x 59" high..

There shall be one (1) compartment (R2) behind the forward stabilizer. The compartment shall be approximately 28" wide x 32" high x 12" deep (upper) and 28" wide x 37.5" high x 26" deep (lower) and contain approximately 22.02 cubic feet of storage space. The door opening shall be approximately 28" wide x 69.5" high.

There shall be one (1) compartment (R3) over the rear wheels. The compartment shall be approximately 50.5" wide x 12.5" high x 12" deep (upper) and 50.5" wide x 23" high x 26" deep (lower) and contain approximately 21.86 cubic feet of storage space. The door opening shall be approximately 50.5" wide x 35.5" high.

There shall be one (1) compartment (R4) over the rear wheels. The compartment shall be approximately 63.5" wide x 23" high x 11.5" deep and contain approximately 9.72 cubic feet of storage space. The door opening shall be approximately 63.5" wide x 23" high.

There shall be one (1) compartment (R5) over the rear stabilizer. The compartment shall be approximately 31" wide x 27" high x 11.5" deep (upper) and 31" wide x 19.5" high x 14" deep (lower) contain approximately 10.47 cubic feet of storage space. The door opening shall be approximately 31" wide x 46.5" high.

There shall be one (1) compartment (R6) behind the rear stabilizer. The compartment shall be approximately 29" wide x 29" high x 11.5" deep (upper) and 29" wide x 28" high x 23" deep (lower) and contain approximately 16.41 cubic feet of storage space. The door opening shall be approximately 29" wide x 57" high

Handrail

Access handrails shall be provided at all step positions, including, but not limited to, the rear tailboard and installed to NFPA 1901 15.8. All body handrails shall be constructed of maintenance-free, corrosion-resistant, extruded aluminum. Handrails shall be a minimum of 1.25" OD and shall be installed between chrome end stanchions at least 2" from the mounting surface to allow for access with a gloved hand. The extruded aluminum shall be ribbed to assure a good grip for personnel safety.

The handrails shall be installed as follows:

• Four (4) 48" handrails, two (2) each side, located on the aerial access stair case.

Steps, Standing, and Walking Surfaces

The maximum stepping distance shall not exceed 18", with the exception of the ground to first step. The ground to first step shall not exceed 24". The ground to first step shall be maintained when the stabilizers are deployed by an auxiliary set of steps installed at the aerial access staircase. All steps or ladders shall sustain a minimum static load of 500 lbs. without deformation as outlined in NFPA 15.7.2.

All exterior steps shall be designed with a minimum slip resistance of 0.52 when tested wet using the Brungraber Mark II tester in accordance with the manufacturer's instructions.

Apparatus Warning Labels

A label shall be supplied on the rear body to warn personnel that riding in or on the rear step is prohibited as outlined in NFPA 1901 15.7.5. A label shall be applied to both sides of the apparatus and the rear to warn operators that the aerial is not insulated.

Rubrail

The body shall have a rubrail along the length of the body on each side and at the rear. The rubrail shall be constructed of minimum 3/16" thick anodized aluminum 6463T6 extrusion. The rubrail shall be a minimum of 2.75" high x 1.25" deep and shall extend beyond the body width to protect compartment doors and the body side.

The rubrail shall be of a C-channel design to allow marker and warning lights to be recessed inside for protection. The top surface of the rubrail shall have a minimum of 5 serrations raised .1" high with cross grooves to provide a slip-resistant edge for the rear step and running boards. The rubrail shall be spaced away from the body using 3/16" nylon spacers. The ends of each section shall be provided with a rounded corner piece. The area inside the rubrail C-channel shall be inset with a reflective material for increased side and rear visibility.

ISO Compliance

The manufacturer shall ensure that the construction of the apparatus aerial body shall be in conformance with the established ISO-compliant quality system. All written quality procedures and other procedures referenced within the pages of the manufacturer`s Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts this process shall be strictly adhered to. By virtue of its ISO compliance the manufacturer shall provide an apparatus aerial device that is built to exacting standards, meets the customer`s expectations, and satisfies the customer`s requirements.

BODY COMPT REAR

Rear Body Platework

The rear body platework shall be smooth un-painted 1/8" (.125) aluminum plate to facilitate rear body striping. The panels shall be bolt-on for a clean appearance and easier repair in the event of damage.

AERIAL BODY OPTIONS

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Rear Pike Pole Storage

Pike poles storage shall be provided at the rear of the body for six (6) pike poles. The storage area shall be labeled for two (2) 6` poles, two (2) 8` poles, and two (2) 12` poles. The pike poles shall be secured by either "J" slotted locking tubes and/or hinged door(s) that matches the rear body finish.

Ladder Tunnel Doors

A pair of 3/16" (.188) aluminum smooth plate doors with D-ring style handles shall be installed for access to the rear ladder tunnel. Each door shall open a full 90 degrees to allow easy removal of ground ladders. The doors shall match the rear body finish.

The doors shall be boxed out as required for the ladder compliment optioned.

Rear Control Doors

The driver/officer jack and master control switch panels at the rear of the body shall be provided with access doors. The doors shall have the same finish as the rear of the body.

Outrigger Covers

Two (2) piece outrigger covers constructed of .187`` aluminum smooth plate painted job color shall be provided for the jack leg openings. One piece of the cover shall be sized to cover just the extending outrigger in order to require a minimal amount of set-up space. The second piece of the cover shall be fixed and mounted to the body to cover the remaining outrigger opening.

Auxiliary Ground Pads

Four (4) auxiliary ground pads shall be provided. The pads shall be 24" x 24" x 1/2" thick aluminum plate with a 20 degree formed handle with cutout for hand hold. The pads shall be stored in double brackets holding two (2) pads each that are welded below the body.

Fuel Fill Door

The fuel fills shall have hinged treadplate doors with a 1/4" stainless steel hinge and a latch to keep the doors closed. The doors shall be labeled "Diesel Fuel Only".

Wheel Well Mod

The tandem body wheel well radius and trim shall be lowered 2" to provide room for non-folding wheel chock storage or double SCBA storage compartments.

Outrigger Control Storage Box

A storage box shall be provided for the handheld aerial outrigger control. The box shall be constructed from the same material as the rear body surface and include a hinged door with push button latch. The box shall be located at the rear of the body driver side between the tailboard and first turntable access step.

Crosslay - Special

Crosslay Special
The crosslay hosebeds shall be provided at the front area of the body to accomadate customer specifications. The crosslay decking shall be constructed entirely of maintenance-free 3/4" x 2-3/4" hollow aluminum extrusions.

Stainless steel rollers with nylon guides set in aluminum extrusions shall be installed horizontally and vertically on each end of the crosslays to allow easy deployment of the hose and help protect the body paint.

Dunnage Pan
A dunnage pan constructed of 3/16" (.188") aluminum treadplate shall be located rearward of the crosslays. The dunnage pan shall be sized to maximize available storage space (if applicable).

DOORS

Keyed Latch

The roll-up door shall be provided with locking mechanism. Two (2) #1250 keys shall be provided for the roll-up compartment door.

A locking roll-up door shall be provided in the following location(s): L1, L2, L3, L4, L5, L6, R1, R2, R3, R4, R5, R6.

Roll Up Compartment Door

An AMDOR brand roll up door with painted finish shall be provided on a compartment. The door(s) shall be installed in the following location(s): L1, L2, L5, L6, R1, R2, R5, R6. The door slats shall be 1" aluminum double wall slats with continuous ball & socket hinge joint and recessed dual durometer slat seal, double wall reinforced bottom panel with stainless steel lift bar latching system, bottom panel flange with cut-outs for ease of access with gloved hands, reusable slat shoes with positive snap-in securement, smooth interior door curtain to prevent equipment hang-ups. The slats shall have interlocking end shoes on each slat. The slats shall have

interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration.

The track shall be a one-piece painted aluminum door track / side frame, top gutter with non-marring seal, non-marring recessed side seals with UV stabilizers to prevent warpage, dual leg bottom seal, with all wear component material to be Type 6 Nylon. The track shall have a replaceable side seal to prevent water and dust from entering the compartment.

Door ajar switch system shall be magnetic proximity based components. Door striker will include support beneath the lift bar to prevent door curtain bounce.

The door opening shall be reduced by 2" in width and approximately 8-9" in height depending on door height.

Roll Up Compartment Door

An AMDOR brand roll up door with painted finish shall be provided on a compartment. The door(s) shall be installed in the following location(s): L3, L4, R3, R4. The door slats shall be 1" aluminum double wall slats with continuous ball & socket hinge joint and recessed dual durometer slat seal, double wall reinforced bottom panel with stainless steel lift bar latching system, bottom panel flange with cut-outs for ease of access with gloved hands, reusable slat shoes with positive snap-in securement, smooth interior door curtain to prevent equipment hang-ups. The slats shall have interlocking end shoes on each slat. The slats shall have interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration.

The track shall be a one-piece painted aluminum door track / side frame, top gutter with non-marring seal, non-marring recessed side seals with UV stabilizers to prevent warpage, dual leg bottom seal, with all wear component material to be Type 6 Nylon. The track shall have a replaceable side seal to prevent water and dust from entering the compartment.

Door ajar switch system shall be magnetic proximity based components. Door striker will include support beneath the lift bar to prevent door curtain bounce.

The door opening shall be reduced by 2" in width and approximately 8-9" in height depending on door height.

Drip Pan

An Amdor drip pan shall be supplied for the roll-up door. The drip pan shall be made from a high strength aluminum alloy. The splashguard and end caps shall be made from extruded and injection molded high-impact plastic. Drip pan location(s): L1, L2, L3, L4, L5, L6, R1, R2, R3, R4, R5, R6.

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Strap for Roll-Up Door

A bungee type strap shall be provided on the roll-up doors to assist in closing the door. The strap shall be affixed to both the door and the interior so the strap stays inside the compartment when lowering. The strap shall be provided on full height and high side (upper) compartments.

SHELVES

Adjustable Shelf [Qty: 12]

There shall be an aluminum adjustable shelf provided for a compartment as specified.

The shelf shall be constructed of 3/16" (.187") smooth aluminum plate. The shelf shall have a minimum 2" front and rear lips to accommodate optional plastic interlocking compartment tile systems and shall be capable of holding 100 lbs on compartments with tracks mounted on back wall (compartments up to appoximately 12" deep) or shall be capable of holding 250 lbs with tracks mounted on forward and rearward walls.

The shelf shall be sized, width and depth, to match the size and location in the compartment.

Adjustable Tracks [Qty: 8]

Tracks shall be provided in the compartment as specified for use with adjustable shelves and/or trays in non-transverse compartments. The tracks shall be vertical mounted and attached to the side and/or rear walls of the compartments.

TRAYS / TOOLBOARDS

Roll-Out/Tilt-Down Tray [Qty: 2]

A roll-out/tilt-down tray shall be adjustable mounted in a compartment as specified.

The tray shall be constructed of 3/16" (.187) aluminum with welded corners for strength and rigidity. The tray shall be sized in width and depth as applicable.

An Innovative Industries SlideMaster (model MT) aluminum tip down frame and channel assembly up to sixty (60") wide shall be provided for the tray for the ease of operation and long service life. A positive twist lock shall be provided to lock the tray in the stored position. The tray shall roll out approximately 90% from its stored position and shall tip 30 degrees from horizontal.

The capacity rating of the tray, in the extended position, shall be 200 lbs. uniformly distributed load.

Roll-Out Tray [Qty: 2]

There shall be a floor mounted SlideMaster with roll-out tray provided in a compartment as specified.

The roll-out tray shall be constructed of 3/16" (.187) smooth aluminum with welded corners for strength and rigidity. The tray shall be sized in width and depth as applicable.

An Innovative Industries SlideMaster (model AM3) aluminum frame and channel assembly shall be provided for the tray for the ease of operation and long service life. A positive twist lock shall be provided to lock the tray in the stored position. The tray shall roll out approximately 100% from the stored position.

The capacity rating shall be 600 pounds uniformly distributed load.

COVERS

Hose Bed Cover

A cover constructed of Black 18 oz. PVC vinyl coated polyester shall be installed over the apparatus hose bed. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 square inch.

The front edge of the cover shall be mechanically attached to the body. The sides of the cover shall be held in place with heavy duty Velcro strips running the length of the hose bed.

Rear Hose Bed Cover

A cover constructed of heavy duty black nylon cargo netting shall be installed at the rear apparatus hose bed.

The bottom of the cargo netting shall be mechanically attached to the hose bed. The cover shall be attached to comply with the latest edition of NFPA 1901.

Cover shall secure the hoseload at the rear open back of the hosebed and shall compliment separate top cover of vinyl, diamond plate pr similar cover that secures top of body open areas over hoseload.

Crosslay Cover

A crosslay cover shall be provided for the crosslay storage area of the pump module. The crosslay cover shall be provided in compliance with NFPA 1901.

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The crosslay cover shall be constructed from 3/16" (.187") aluminum treadplate. The cover shall include a full-length stainless steel 1/4" (0.25") rod piano-type hinge. The cover shall be hinged to open and not interfere with applicable plumbing components on the apparatus.

The crosslay cover shall include applicable grab handle(s) and two (2) butterfly style latches to secure the cover in the closed position.

Crosslay Cover Hinge

The crosslay cover shall be hinged along the forward edge of the crosslay area.

Crosslay Cover - Sides

A pair of covers constructed of Black 18 oz. PVC vinyl coated polyester shall be installed over the side openings of the apparatus crosslay.The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 per square inch.

The side flaps shall be secured in place to comply with the latest edition of NFPA 1901

Hold Open

Hold open device(s) shall be provided for aluminum crosslay (single or bi-fold) cover.

PUMP MODULE

Pump Panel Opening

The panel opening on the pump module shall be 41" wide.

Pump Module

Pump Module Frame

An extruded aluminum pump module shall be provided and located forward of the apparatus body. The pump module shall be constructed entirely of welded aluminum alloy extrusions and interlocking aluminum plates. The pump module framework shall consist of 1.5" x 3" x .188" wall, 1.5" x 3" x .375" wall with center web and 3" x 3" x .188" wall extrusions.

The pump module design and mounting shall be separate from the body to allow the pump module and body to move independently of each other in order to reduce stress from frame twisting and vibration.

Pump Module Mounting

The pump module shall be attached to the chassis using four (4) center bonded isolation mounts and a steel mounting frame. The isolation mounts shall be 2.75" diameter and mount to the chassis with two (2) 4" x 4" x .312" A36 steel angles.

Pump Access

A pump service access opening shall be provided at the front of the pump module.

Pump Module Running Boards

A side running board formed from 1/8" aluminum diamond plate shall be provided and shall extend the full length of the pump module on each side of the apparatus. The running board shall be bolted to the pump compartment for rigidity and to provide easy removal for replacement in the case of damage.

Stepping Surface

Each running board shall include a multi-directional, aggressive gripping surface incorporated into the treadplate. The surface shall extend vertically from the diamond plate sheet a minimum of .125". Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". Each running board shall be bolted on to the pump module and be easily removable for replacement in the case of damage.

PUMP PANELS

Side Mount Pump Panels

The driver and officer side pump panels shall be constructed of 14 gauge stainless steel. Each panel shall have the ability to be removed from the module for easier access and for maintenance in the pump area.

Hinged Gauge Panel

The driver side stainless steel single gauge panel shall be positioned where it can be opened downward for access to gauges and other interior pump module mounted items. The gauge panel shall include latches to secure the panel in the closed position. Two (2) cable tethers shall be provided to hold the panel in the open position.

Pump Access Door

The officer side pump module shall include an upper horizontally-hinged pump access door.

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The door shall be constructed of 14 gauge brushed stainless steel. The compartment door shall be securely attached with a full-length stainless steel piano type hinge with 1/4" pins. The hinge shall be "staked" on every other knuckle to prevent the pin from sliding. The door shall include two (2) push-button style latches to secure the door in the closed position and hold-open device(s) to hold the door in the open position.

MISC PUMP PANEL OPTIONS

Pump Panel Tags

Color coded pump panel labels shall be supplied to be in accordance with NFPA 1901 compliance.

Air Outlet

A 1/4" female air hose fitting shall be mounted with a 1/4" valve. The fitting and valve shall be connected to the air reservoir tank.

Location: driver's side pump panel.

PUMP MODULE OPTIONS

Flex Joint

The area between the pump modules and body shall include a rubber flex joint.

Air Horn Switch

A heavy duty weatherproof push-button switch shall be installed at the pump operator`s panel to operate the air horns.

The switch shall be labeled "Evacuation Alert".

Location: driver side pump panel.

WATER TANK

Booster Tank

The booster tank shall be T-shaped in configuration and shall have a useable capacity of 500 gallons (U.S.). The tank sides, top, and bottom shall be constructed of 1/2" (0.50") black UV-stabilized copolymer polypropylene for high strength, corrosion resistance, and long life.

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The tank shall be constructed utilizing latest thermoplastic welding technology. A clean, hot air controlled temperature process shall ensure that the weld reaches its plasticized state without cold or hot spots.

The tank shall undergo extensive testing prior to installation in the truck. The process shall include an electronic spark and waterfill test after both the internal and external tank shell welds are completed.

The tank shall have a combination vent and manual fill tower. The tower shall be located in the left front corner of the tank. The tank overflow shall be 4" diameter (3" may be provided on aerial applications with up to 1.5" tank fill only) and shall dump behind the rear wheels to permit maximum traction. The tower shall have a hinged cover and a 1/4" (0.25") thick polypropylene screen.

There shall be two (2) standard tank openings; one (1) for the tank-to-pump suction line with an anti-swirl plate, and one (1) for the tank fill line.

Baffles, both longitudinal and latitudinal, shall be interlocking and thermo welded to minimize water surge during travel, enhancing road handling stability. Openings in the baffles shall be positioned to allow waterflow to NFPA standards during filling or pumping operations.

The tank shall be supported in an aluminum cradle resting on the frame on fiber-reinforced rubber strips to prevent wear and galvanic corrosion caused when two dissimilar metals come it contact. The tank shall be completely removable without disturbing or dismounting the apparatus body structure.

A lifetime manufacturer`s limited warranty shall be included.

Tank Brand

The water tank and foam tank (if applicable) shall be UPF brand.

WATER TANK OPTIONS

Tank Sleeve

Tank sleeve to accommodate a long ground ladder in tunnel.

TANK PLUMBING

Tank Fill 2 Akron Valve

One (1) 2" pump-to-tank fill line having a 2" manually operated full flow valve. The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times. The fill line shall be controlled using a chrome handle with an integral tag.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Tank to Pump, 3" Akron Valve

One (1) manually operated 3" Akron valve shall be installed between the pump suction and the booster tank in order to pump water from the tank. The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

FOAM TANK

15 Gallon Foam Tank

A 15 gallon (U.S.) foam cell for Class A foam shall be supplied. The foam cell shall be integral to the water tank.

The integral tank top, sides, and bottom shall be constructed of black UV-stabilized copolymer polypropylene. The copolymer polypropylene tank material shall be welded together utilizing thermoplastic welding technology. A clean hot air temperature controlled process, shall ensure that each weld reaches its plasticized state without cold or hot spots. The copolymer

polypropylene material shall be used for its high strength and corrosion resistance for a prolonged tank life.

The foam tank shall have one (1) fill tower with a hinged lid. The foam fill tower shall include a stainless steel butterfly latch to secure the lid in the closed position and a pressure/vacuum vent mounted in the lid. The fill tower shall be located in the forward area of the tank. The fill tower shall include a removable 1/4" (0.25") thick polypropylene screen.

The foam tank shall undergo extensive testing prior to installation in the truck. The testing shall include an electronic spark and tank fill test after both the internal and external tank shell welds are completed.

A lifetime manufacture`s limited warranty shall be included. As this vehicle is intended to perform the function of a pumper with foam capability, foam tank capacity of less than 15 gallons shall not be acceptable.

LADDER STORAGE / RACKS

Rear Ladder Storage

A ladder storage tunnel shall be provided beneath the aerial device frame work. There shall be access to the ladders via an opening at the rear.

This tunnel shall be lined with .090" aluminum. The ladders will be held captive top and bottom by aluminum tracks and slide on friction reducing material. All ladders shall be removable individually without having to remove any other ladder.

The ladder tunnel shall hold: PEL-35, PEL-28, (2)PEL-20, PRL-14 and FL-10.

HANDRAILS / STEPS

Slide-Out Platform

The slide-out platform shall be approximately 21" deep and shall be constructed of 1/8" aluminum treadplate. The platform shall be mounted under the apparatus body. The platform shall utilize a maintenance-free slide system incorporating stainless steel shoulder bolts that slide in slotted heavy wall aluminum angles. Notches shall be provided at each end of the slots to hold the platform in both the extended and retracted positions.

A chrome grab handle shall be provided on the front face of the platform for ease of operation.

Non-slip aluminum hand rail(s) with chrome plated stanchions shall be provided as best suited for use with the platform operation.

If applicable, NFPA pump throttle height requirement shall be measured from the top of the slide-out platform on all aerials and from the ground on side mounted pump operator panels on non-aerial apparatus.

Location: below driver side pump panel.

Flop Down Step

A pair of rear flop down steps shall be provided at the back of the unit to reduce the stepping height from the ground to tailboard. The steps shall be constructed of aluminum extrusions. Side brackets constructed of 1" by 1.5" aluminum shall support two skid-resistant oval rungs. The bottom rung shall be angled at 40 degrees. Each step shall be approximately 12" wide and come with locking devices to hold the steps up. In the stored position the steps shall not reduce the angle of departure.

Folding Steps [Qty: 2]

Innovative Controls dual lighted LED folding step(s) shall be located officer side front compartment face, driver side front compartment face. The folding step(s) shall meet current NFPA in step height and surface area.

Innovative Controls dual lighted LED folding step with LED lights integral to the step on the top to provide NFPA requirements of 2 fc (20 lx) on the stepping surface. Folding step shall also have a LED light integral to the bottom of the step to meet NFPA requirements of a stepping surface up to 18" below the step. The folding step shall sustain a minimum static load of 500 lb with a 3 to 1 safety factor. The folding step shall also meet NFPA slip resistance qualifications. Corrosion resistance shall be demonstrated by a 1000 hr salt spray test with no visible signs of deterioration of the step body or hardware.

One (1) hand rail shall be installed in compliance with current NFPA. The hand rail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

MISC BODY OPTIONS

Mud Flaps

Black mud flaps with E-ONE logo shall be provided for the body wheel wells.

Interior Body Compartment Finish

The body compartment interiors shall have a multi-tone gray finish. Includes inner pan of hinged doors and floors (if smooth plate) and tool compartments (as applicable). Does not include floors if they are diamond plate. Does not include roop top compartments if equipped.

Deluxe Interior Body Compartment Finish

The body compartment interiors shall have a multi-tone gray finish. To include pan of hinged doors, and tool compartments, floors (if smooth plate) and all shelves, trays and compartment partitions (as applicable). Does not include roop top compartments if equipped.

Body Wheel Well

The body wheel well frame shall be constructed from 6063-T5 aluminum extrusion with a slot the full length to permit an internal fit of 3/16" (0.188") aluminum smooth plate painted job color. The wheel well trim shall be constructed from 6063-T5 formed aluminum extrusion. The wheel well liners shall be constructed of a 3/16" (.187") composite material. The liners shall be bolt-on and shall provide a maintenance-free and damage-resistant surface.

Stanless Steel Trim

A stainless steel trim shall be located at the bottom edge of all body compartment openings with painted edge (as applicable). The trim shall provide added protection of the painted surface of the body when equipment is removed from the compartment.

Custom Toolbox

CTECH Brand tool box shall be provided. Drawer size and finish per customer requirements. Location per customer approval drawing.

CTECH utility tool box shall feature all aluminum alloy construction for superior strength with less weight with mechanic style tool drawers on durable ball bearing slides. The drawers shall be equipped with one hand operation "Motion Latch" handles that secure when closed to prevent opening in transit.

SCBA BOTTLE STORAGE

SCBA Strap

Straps shall be provided in each exterior storage compartment to provide secondary means to hold each SCBA bottle in the compartment. The straps shall be constructed from 1" nylon webbing formed in a loop. The strap(s) shall be mounted to the storage compartment ceiling directly inside the door opening at each bottle location.

E-ONE FIRE APPARATUS

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SCBA 1 BOTTLE STORAGE E-ONE

E-ONE designed (1) SCBA bottle storage constructed with aluminum plate with hinged door and push button latch shall be provided in the body wheel well area.

The door shall match wheel well area material and finish.

The door shall cover the recessed fuel fill if located in the wheel well adjacent to the SCBA storage.

U-shaped trough made out of aluminum smooth plate with rubbert insert shall be provided to store SCBA bottles.

Location: driver side rear wheel well offset rearward, officer side rear wheel well offset rearward

SCBA 3 BOTTLE STORAGE E-ONE

E-ONE designed (3) SCBA bottle storage constructed with aluminum plate with hinged door and push button latch shall be provided in the body wheel well area.

The door shall match wheel well area material and finish.

The door shall cover the recessed fuel fill if located adjacent to the SCBA storage.

U-shaped troughs made out of aluminum smooth plate with rubbert inserts shall be provided to store standard size SCBA bottles up to 6.75" in diameter and 24.5" in length. The upper two troughs can also store a standard size 20lbs ABC Extinguisher or 2.5 gal Water Extinguisher in each trough.

Location: driver side rear wheel well offset forward over rearward wheel of tandem, driver side rear wheel well offset rearward over forward wheel of tandem, officer side rear wheel well offset forward over rearward wheel of tandem, officer side rear wheel well offset rearward over forward wheel of tandem

SCBA STORAGE

E-ONE designed SCBA air pack storage with hinged door and push button latch shall be provided in the body wheel well area.

The door shall match the wheel well area material and finish. Door wired to "Door Open" indicator inside cab.

Location: driver side rear wheel well offset forward, officer side rear wheel well offset forward

E-ONE FIRE APPARATUS
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ATTACHMENT "B"

Wheel Well Storage Doors

Wheel well storage area door(s) to be polished stainless steel in place of standard.

PUMPS

Pump Rating

The fire pump shall be rated at 1500 GPM.

Fire Pump System

The pump shall be a midship-mounted Hale QMAX single stage centrifugal pump. The pump shall be mounted on the chassis frame rails of commercial or custom truck chassis and have the capacity of 1,250 to 2,250 gallons per minute (U.S. GPM) NFPA 1901 rated performance, and shall be split-shaft driven from the truck transmission.

The entire pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 psi (207 MPa). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump body shall be horizontally split in two sections, for easy removal of impeller assembly including wear rings and bearings from beneath the pump without disturbing pump mounting or piping.

The pump impeller shall be hard, fine grain bronze of the mixed flow design and shall be individually ground and hand balanced. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wrap-around double labyrinth design for maximum efficiency.

The pump shaft shall be heat-treated, corrosion-resistant stainless steel and shall be rigidly supported by three (3) bearings for minimum deflection. The sleeve bearing is to be lubricated by a force fed, automatic oil lubricated design, pressure-balanced to exclude foreign material. The remaining bearings shall be heavy-duty, deep groove ball bearings in the gearbox and shall be splash-lubricated. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of the gearbox.

Two (2) 6" diameter suction ports with 6" NST male threads and removable screens shall be provided, one each side. The ports shall be mounted one (1) on each side of the midship pump and shall extend through the side pump panels. Inlets shall come equipped with long handle chrome caps.

Gearbox – G Gearbox

Pump gearbox shall be of sufficient size to withstand up to 16,000 lbs. ft. of drive through torque of the engine system. The drive unit shall be designed of ample capacity for lubrication reserve

and to maintain the proper operating temperature. The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2-3/4 inches in diameter, on both the input and output drive shafts. They shall withstand the full torque of the engine. All gears, both drive and pump, shall be of highest quality electric furnace chrome nickel steel. Bores shall be ground to size and teeth integrated and hardened, to give an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrust. (No exceptions.) The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected. If the gearbox is equipped with a power shift, the shifting mechanism shall be a heat treated, hard anodized aluminum power cylinder, with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump. For automatic transmissions, three green warning lights shall be provided to indicate to the operator(s) when the pump has completed the shift from Road to Pump position. Two green lights to be located in the truck driving compartment and one green light on pump operators panel adjacent to the throttle control. For manual transmissions, one green warning light will be provided for the driving compartment. All lights to have appropriate identification/instruction plates.

Discharge Manifold

The pump system shall utilize a stainless steel discharge manifold system that allows a direct flow of water to discharge valves. The manifold and fabricated piping systems shall be constructed of a minimum of Schedule 10 stainless steel to reduce corrosion.

Pump Shift

The pump shift shall be pneumatically-controlled using a power shifting cylinder.

The power shift control valve shall be mounted in the cab and be labeled "PUMP SHIFT". The apparatus transmission shift control shall be furnished with a positive lever, preventing accidental shifting of the chassis transmission.

A green indicator light shall be located in the cab and be labeled "PUMP ENGAGED". The light shall not activate until the pump shift has completed its full travel into pump engagement position.

A second green indicator light shall be located in the cab and be labeled "OK TO PUMP". This light shall be energized when both the pump shift has been completed and the chassis automatic transmission has obtained converter lock-up (4th gear lock-up).

Test Ports

Two (2) test plugs shall be pump panel mounted for third party testing of vacuum and pressures of the pump.

Gearbox Cooler

A gearbox cooler shall be provided to maintain safe operating temperatures during prolonged pumping operations for pump rating 1500 GPM and over.

PUMP CERTIFICATION

Pump Certification

The pump, when dry, shall be capable of taking suction and discharging water in accordance with current NFPA 1901. The pump shall be tested at the manufacturer`s facility by an independent, third-party testing service. The conditions of the pump test shall be as outlined in current NFPA 1901.

The tests shall include, at a minimum, the pump test, the pumping engine overload test, the pressure control system test, the priming device tests, the vacuum test, and the water tank to pump flow test as outlined in current NFPA 1901.

A piping hydrostatic test shall be performed as outlined in current NFPA 1901.

The pump shall deliver the percentage of rated capacities at pressures indicated below:

- 100% of rated capacity at 150 psi net pump pressure
- 100% of rated capacity at 165 psi net pump pressure
- 70% of rated capacity at 200 psi net pump pressure
- 50% of rated capacity at 250 psi net pump pressure

A test plate, installed at the pump panel, shall provide the rated discharges and pressures together with the speed of the engine as determined by the certification test, and the no-load governed speed of the engine.

A Certificate of Inspection certifying performance of the pump and all related components shall be provided at time of delivery. Additional certification documents shall include, but not limited to, Certificate of Hydrostatic Test, Electrical System Performance Test, Manufacturer`s Record of Pumper Construction, and Certificate of Pump Performance from the pump manufacturer.

PUMP OPTIONS

Steamers Flush

The pump 6" Steamer/Intake(s) shall be "Flush" mounted with cap installed close as possible/practicable to pump panel. Actual dimension will vary due to pump module width and options selected. The Flush option could result in panel scratching.

Example 72" or 76".

Location: driver's side, officer's side.

Zinc Anodes

The zinc anodes help prevent damage caused by galvanic corrosion within the fire pump. The system provides a sacrificial metal which helps to diminish or prevent pump and pump shaft galvanic corrosion. One anode will be located on the suction side and one will be located on the discharge side of the pump.

Mechanical Pump Seal

The midship pump shall be equipped with a high quality, spring loaded, self-adjusting mechanical seal capable of providing a positive seal to atmosphere under all pumping conditions. This positive seal to atmosphere must be achievable under vacuum conditions up to 26 Hg (draft) or positive suction pressures up to 250 psi.

The mechanical seal assembly shall be 2 inches in diameter and consist of a carbon sealing ring, stainless steel coil spring, Viton rubber boot, and a tungsten carbide seat, with a Teflon back-up seal provided.

Only one mechanical seal shall be required, located on the first stage suction (inboard) side of the pump and be designed to be compatible with a one piece pump shaft (no exceptions). A continuous cooling flow of water from the pump shall be directed through the seal chamber when the pump is in operation.

Manual Master Drain

A manual master drain valve shall be installed and operated from the driver side. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal.

The manual master drain valve shall have twelve (12) individually-sealed ports that allow quick and simultaneous draining of multiple intake and discharge lines. It shall be constructed of corrosion-resistant material and be capable of operating at a pressure of up to 600 PSI.

The master drain shall provide independent ports for low point drainage of the fire pump and auxiliary devices.

Pump Cooler

The pump shall have a 3/8" line installed from the pump discharge to the booster tank to allow a small amount of water to circulate through the pump casing in order to cool the pump during sustained periods of pump operation when water is not being discharged. The pump cooler line shall be controlled from the pump operator`s panel by a Innovative Controls 1/4 turn valve with "T" handle. Each 1/4 turn handle grip shall feature built-in color-coding labels and a verbiage tag

Pump Primer

AUTOMATIC FIRE PUMP PRIMING SYSTEM

A Trident Model #31.011.0 automatic air operated priming system shall be installed. The unit shall be of all brass and stainless steel construction and designed for fire pumps of 1,250 GPM (4,690 LPM) or more. Due to corrosion exposure no aluminum or vanes shall be used in the primer design. The primer shall be three-barrel design.

The primer shall be mounted above the pump impeller so that the priming line will automatically drain back to the pump. The primer shall also automatically drain when the panel control actuator is not in operation. The inlet side of the primer shall include a removable fine mesh strainer to prevent entry of debris into the primer body.

Performance, Safety, and NFPA Compliance

The priming system shall be capable to a vertical lift to 22 inches of mercury and shall be fully compliant to applicable NFPA standards for vertical lift. The system shall create vacuum by using air from the chassis air brake system through a three-barrel multi-stage internal "venturi nozzles" within the primer body. The noise level during operation of the primer shall not exceed 75 Db.

Air Flow Requirements

The primer shall require a minimum of 15.6 cubic foot per minute air compressor and shall be capable of meeting drafting requirements at high idle engine speed. The air supply shall be from a chassis supplied 'protected' air storage tank with a pressure protection valve. The air supply line shall have a pressure protection valve set between 70 to 80 PSIG.

Automatic Primer Control with Vacuum Gauge Panel

The 12 volt primer control shall be an "automatic" type, with a pump panel three-way switch to operate an air solenoid valve. The air valve shall direct air pressure from the air brake system to the primer. To prevent freezing, no water shall enter the primer valve control.

A vacuum gauge 2" in diameter, with graduations from zero to 30 feet, shall be installed in the primer control panel. The gauge shall be physically connected to the vacuum side of the primer

and read only when the primer is running so it will never see or be subject to damagte from high pump intake pressures.

The automatic priming switch shall have three positions as follows:

- **"Prime" –** the lower position shall be a momentary "push to prime". The "Prime" position also allows the operator to "ramp" test the primer without the fire pump being engaged.

- **"Off"** -- center position

- **"Auto-Prime"** – in the upper position, a "green" LED pilot light shall be illuminated when the switch is the auto-prime position. The "Auto-Prime" operates automatically when the pump pressure drops below 20 PSIG. The primer shuts "off" automatically when the pump pressure is re-established and exceeds 20 PSIG. The "Auto" mode only operates when the fire pump is engaged.

Power Requirements

To reduce the electrical power requirements on the fire apparatus the priming system shall be air powered. The system shall not require annual tear-down and maintenance, an electric motor, lubrication, belt drive, or clutch assembly. The maximum current draw shall not exceed 0.5 amps during operation.

Warranty

The primer shall be covered by a five (5) year parts warranty.

INTAKES

Left Intake 2.5 Akron Valve

One (1) 2-1/2" suction inlet with a manually operated 2-1/2" Akron valve shall be provided on the left side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The outlet of the valve shall be connected to the suction side of the pump with the valve body located behind the pump panel. The valve shall come equipped with a brass inlet strainer, 2-1/2" NST female chrome inlet swivel, and shall be equipped with a chrome plated rockerlug plug with a retainer device.

The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

A 3/4" bleeder valve assembly will be installed on the left side pump panel.

Right Intake 2.5 Akron Valve

One (1) 2-1/2" gated suction inlet with a manual operated Akron valve shall be installed in the right side pump panel with the valve body behind the panel. The valve control shall be located at the intake and shall visually indicate the position of the valve at all times.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The outlet of the valve shall be connected to the suction side of the pump with the valve body located behind the pump panel. The valve shall come equipped with a brass inlet strainer, 2-1/2" NST female chrome inlet swivel and shall be equipped with a chrome plated rockerlug plug with a retainer device.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

A 3/4" bleeder valve assembly will be installed on the right side pump panel.

5'' Front Intake w/Relief Electric Akron Thru Bumper

One (1) 5" intake with an Akron electric actuated valve shall be provided from the intake side of the pump to the front of the apparatus terminating in tray behind front bumper access door with 5" MNPT threads. An intake relief valve shall be installed external of the electric valve to relieve excess pressure.

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The valve shall be 5" Akron 7900 series electric butterfly. The valve shall utilize an electric driven worm gear actuator. The valve may also be operated manually in case of electrical system failure.

Quarter turn valves shall be provided at the lowest point to allow water to be drained from the intake.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

INTAKE OPTIONS

Intake Relief Valve

The pump shall be equipped with an Akron style 59 cast brass, variable-pressure-setting relief valve on the pump suction side. It shall be designed to operate at a maximum inlet pressure of 250 PSI. The relief valve shall be normally closed and shall be set to begin opening at 125 PSI in order to limit intake pressures in the pumping system. When the relief valve opens, the overflow water shall be directed through a plumbed outlet to discharge below the body in an area visible to the pump operator. The overflow outlet shall terminate with a male 2-1/2" NST threaded fitting to allow the overflow water to be directed away from the vehicle with a short hose (supplied by the fire department) during freezing weather or under other conditions where an accumulation of water around the apparatus might be hazardous.

Adapter 5FNST x 4MNST

A 5" female NST x 4" male NST chrome plated adapter with suction strainer and 4" long handle chrome cap shall be installed on the front, rear, or side suction piping.

Intake Piping

Front Intake piping shall be mounted so the end piping is approximately 3" from the bumper tray back wall.

DISCHARGES AND PRECONNECTS

Front Jump Line 1.5 Akron Valve

One (1) 1-1/2" preconnect outlet with a manually operated Akron valve shall be supplied to the extended front bumper. The preconnect shall consist of a 2" heavy duty hose coming from the pump discharge manifold to a 2" FNPT x 1-1/2" MNST mechanical swivel hose connection to permit the use of the hose from either side of the apparatus.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

An air blow-out valve shall be installed between the chassis air reservoir and the front jump line. The control shall be installed on the pump operator`s panel.

The discharge shall be supplied with a Class 1 automatic 3/4" drain valve assembly. The automatic drain shall have an all-brass body with stainless steel check assembly. The drain shall normally be open and automatically close when the pressure is greater than 6 psi.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Front Bumper Discharge Swivel, Brass In Tray

There shall be a brass swivel provided for the front bumper discharge located in hose tray center front bumper on lower back wall.

1.5 Single Crosslay Akron Valve [Qty: 2]

One (1) single crosslay discharge shall be provided at the front area of the body. The crosslay shall include one (1) 2" brass swivel with a 1-1/2" hose connection to permit the use of hose from either side of the apparatus.

The crosslay hose bed shall consist of a 2" heavy-duty hose coming from the pump discharge manifold to the 2" swivel. The hose shall be connected to a manually operated 2" Akron valve. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Location: crosslay 1 & 2.

Discharge Left Panel 2.5 Akron Droop

One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be provided at the left hand side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

The discharge shall extend out beyond the pump panel with a 30 degree downward angle with 2-1/2" NST threads to help prevent kinking of the discharge hose. The 30 degree chrome droop shall be an integral part of the discharge valve and shall be equipped with a chrome plated rocker lug cap with a retainer chain.

The discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the gauge pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Location: left side discharge 1, left side discharge 2.

Discharge Right Panel 2.5 Akron Droop

One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall be provided at the right side pump panel.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position with water flowing through it.

The valve shall be of the unique Akron swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve control shall be located at the pump operator panel and shall visually indicate the position of the valve at all times.

The discharge shall extend out beyond the pump panel with a 30 degree downward angle with chrome plated 2-1/2" NST threads to help prevent kinking of the discharge hose. The 30 degree chrome droop shall be an integral part of the discharge valve and shall be equipped with a chrome plated rocker lug cap with a retainer chain.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

Location: right side discharge 2.

4'' Panel Discharge 3'' Electric Akron

One (1) 4" panel discharge with an 3" electrically actuated Akron valve shall be provided. The discharge shall consist of a 3" valve with a 4" NST stainless steel adapter as an integral part of the valve protruding through the pump panel. The 4" adapter shall be equipped with a 4"FNST swivel x 4"MNST 30 degree droop adapter. A chrome-plated, rocker-lug cap with a retainer shall be provided.

The valve shall be an Akron 8600HD series with 316 stainless ball and polymer seals for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the stainless ball when in a throttle position with water flowing. The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve shall utilize an electric driven worm gear actuator. The valve may also be operated manually in case of electrical system failure.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

*Location: right side discharge 1

*Waterous pumps high output location is forward lower port (right side discharge 2).

4'' Waterway Discharge Electric Akron

A 4" diameter discharge with an electrically actuated Akron valve shall be provided from the pump to the aerial waterway.

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The valve shall be 4" Akron 8800HD series with bronze flat ball and polymer seals for ease of operation and increased abrasion resistance. The valve shall have a self-locking ball feature using an automatic friction lock design to balance the brass ball when in a throttle position with water flowing. The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve shall utilize an electric driven worm gear actuator. The valve may also be operated manually in case of electrical system failure.

All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

DISCHARGE OPTIONS

IC Push/Pull Control

The apparatus pump panel shall be equipped with Innovative Controls Side Mount Valve Controls. The ergonomically designed ¼ turn push-pull T-handle shall be chrome-plated zinc with recessed labels for color-coding and verbiage. An anodized aluminum control rod and housing shall, together with a stainless spring steel locking mechanism, eliminate valve drift. Teflon impregnated bronze bushings in both ends of the rod housing shall minimize rod deflection, never need lubrication, and ensure consistent long-term operation. The control assembly shall include a decorative chrome-plated zinc panel-mounting bezel with areas for color-coding and/or FOAM and CAFS identification labels.

Bleeder Drain Valve [Qty: 8]

The bleeder/drain valves shall be Innovative Controls ¾" ball brass drain valves with chrome-plated lift lever handles and ergonomic grips. Each lift handle grip shall feature built-in color-coding labels and a verbiage tag identifying each valve, also supplied by Innovative Controls. The color labels shall also include valve open and close verbiage.

Discharge/Intake Bezel

Innovative Controls intake and/or discharge swing handle bezels shall be installed to the apparatus with mounting bolts. These bezel assemblies will be used to identify intake and/or discharge ports with color and verbiage. These bezels are designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The specified assemblies feature a chrome-plated panel-mount bezel with durable UV resistant polycarbonate inserts. These UV resistant polycarbonate graphic inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. All insert labels shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

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Akron Electric Valve 9333 Controller

An Akron Brass Style 9333 Valve Controller shall be provided with a five year manufacturer warranty. The display shall be a full color LCD display with a backlight and manual adjustment of the brightness as well as an auto-dimming option. The electric controls shall provide true position feedback, requiring no clutches in the motor or current limiting. The unit shall be sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. The controller will provide an LCD display showing valve position indication and have up to three preset locations that can be user set and easily recalled upon each use. Valve position indication will be determined from true position feedback and indicate the exact position of the valve.

Two additional buttons shall be available to be used for preset selection, preset activation and menu navigation.

Locate on pump operator panel to control 5 in. front intake, waterway discharge, right side discharge 1.

PRESSURE GOVERNORS

FRC PumpBoss Pressure Governor

Fire Research PumpBoss Max series PBA500-A00 pressure governor and control module kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module housing shall be waterproof and have dimensions not to exceed 7 1/2" high by 3 5/8" wide. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 2" from the front of the control module. The control LCD shall be 3.5" in size with a minimum brightness of 1000 nits and optically bonded to 3 mm Borofloat Glass. Inputs for monitored engine information shall be from a J1939 data bus or independent sensors. Outputs for engine control shall be on the J1939 data bus or engine specific signal wiring. Inputs from the pump discharge and intake pressure sensors shall be electrical.

The following continuous displays shall be provided:

- Engine RPM; shown on LCD screen
- Check engine and stop engine warning; shown on LCD screen
- Engine oil pressure; shown on LCD screen
- Engine coolant temperature; shown on LCD screen
- Transmission Temperature; shown on LCD screen
- Battery voltage; shown on LCD screen
- Pressure and RPM operating mode LEDs
- Pressure / RPM setting; shown on LCD screen
- Throttle ready / Ok to Pump LEDs.

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On screen (LCD) message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. LCD Screen and LED's intensity shall be automatically adjusted for day and nighttime operation.

The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

- High Battery Voltage
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Transmission Temperature
- Low Engine Oil Pressure
- High Engine Coolant Temperature
- Out of Water (visual alarm only)
- No Engine Response (visual alarm only).

The program features shall be accessed via push buttons located on the front of the control module. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.

The pressure governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready and Ok to Pump LED shall light when the interlock signal is recognized. The pressure governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the pressure governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The pressure governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of low water and no water conditions with an automatic programmed response and a push button to return the engine to idle.

GAUGES

Fuel Gauge

A 2" weatherproof engine fuel gauge shall be pump panel mounted.

GAUGE IC 10 LED TANK LEVEL WATER MINI

Innovative Controls miniature tank indicator shall be installed in the cab cab dash. The indicator shall show the volume of water in the tank on five (***5) easy to see super bright LED`s*** with auto

dimming feature. The miniature indicator shall receive input information over a single wire from a tank primary indicator.

GAUGE IC SL PLUS LED WATER TANK LEVEL

An Innovative Controls SL Plus Tank Level Monitor System shall be installed. The system shall include [1] electronic display module(s), a stainless steel pressure transducer sender unit, and the necessary wiring with water-tight plug terminations that do not require sealing grease.

The master display module shall show the tank level using 16 super-bright easy-to-see LEDs. Tank level indication shall be achieved by the appropriate illumination of 4 horizontal rows of LEDs, with 4 LEDs per row. Full and near-full levels shall be indicated with the illumination of all 4 rows of LEDs, including the illumination of the top row of 4 green LEDs. Tank levels between ½ and ¾ full shall be indicated with the illumination of the bottom 3 rows of LEDs, including the illumination of the top row of 4 blue LEDs. Tank levels between ¼ and ½ full shall be indicated with the illumination of the bottom 2 rows of LEDs, including the illumination of the top row of 4 amber LEDs. Tank levels between ¼ full and near empty shall be indicated with the illumination of the bottom row of 4 red LEDs only. Tank levels between near empty and empty shall be indicated by flashing the bottom row of 4 red LEDs.

The master display shall have a backlit area above at the top with illuminated [water icon/ foam icon / foam A icon / foam B icon / WATER LEVEL text / FOAM LEVEL text / FOAM A text / FOAM B text] and a backlit area at the bottom with illuminated [tank capacity / IC logo / OEM logo].

A wide-angle polycarbonate diffusion lens in front of the LEDs shall produce a 180° viewing angle. The electronic display module shall be waterproof and shock resistant being encapsulated in a urethane-based potting compound. The potted display electronics shall be integral to a chrome-plated panel-mount reflector that is secured to the apparatus panel with 4 screws installed from the inside of the panel or optional decorative bezel, through the reflector, and into 4 threaded inserts in the outer diffusion lens.

GAUGE IC SL PLUS LED FOAM A TANK LEVEL

An Innovative Controls SL Plus Tank Level Monitor System shall be installed. The system shall include [1] electronic display module(s), a stainless steel pressure transducer sender unit, and the necessary wiring with water-tight plug terminations that do not require sealing grease.
The master display module shall show the tank level using 16 super-bright easy-to-see LEDs. Tank level indication shall be achieved by the appropriate illumination of 4 horizontal rows of LEDs, with 4 LEDs per row. Full and near-full levels shall be indicated with the illumination of all 4 rows of LEDs, including the illumination of the top row of 4 green LEDs. Tank levels between ½ and ¾ full shall be indicated with the illumination of the bottom 3 rows of LEDs, including the illumination of the top row of 4 blue LEDs. Tank

levels between ¼ and ½ full shall be indicated with the illumination of the bottom 2 rows of LEDs, including the illumination of the top row of 4 amber LEDs. Tank levels between ¼ full and near empty shall be indicated with the illumination of the bottom row of 4 red LEDs only. Tank levels between near empty and empty shall be indicated by flashing the bottom row of 4 red LEDs.
The master display shall have a backlit area above at the top with illuminated [foam A icon / FOAM A text] and a backlit area at the bottom with illuminated [tank capacity / OEM logo].
A wide-angle polycarbonate diffusion lens in front of the LEDs shall produce a 180° viewing angle. The electronic display module shall be waterproof and shock resistant being encapsulated in a urethane-based potting compound. The potted display electronics shall be integral to a chrome-plated panel-mount reflector that is secured to the apparatus panel with 4 screws installed from the inside of the panel or optional decorative bezel, through the reflector, and into 4 threaded inserts in the outer diffusion lens.

Pressure Gauge [Qty: 8]

Innovative Controls TC Series 2.5" (63MM) pressure gauge(s) shall be provided. Each gauge shall have a glass-filled nylon case, a clear scratch-resistant lens, and a highly-polished stainless steel bezel.

The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve-identifying verbiage and/or color labels.

The gauge shall be fully-filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40°F to +160°F.

Each gauge shall exceed (NFPA 1901 16.12.3.7) ASME B40.100 Grade B requirements (3% 2% 3%) with an accuracy of +/- 1.5% full scale and include an internal thermal expansion bladder that allows the gauge fill to expand in high temperature environments.

The gauges shall also include a KEM-X Socket Saver diaphragm in the stem to eliminate freeze-up and contain a low temperature instrument oil that fills and protects the socket and bourdon tube.

The gauges shall display a range specified with enhanced black markings on a white dial.

Pressure Gauge

Innovative Controls TC Series 4" (100MM) Master pressure gauges with dual bezel shall be provided. Includes test ports and alarm.

Each gauge shall have a glass-filled nylon case, a clear scratch-resistant lens, and a highly-polished stainless steel bezel.

The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve-identifying verbiage and/or color labels.

The gauge shall be fully-filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40°F to +160°F.

Each gauge shall exceed (NFPA 1901 16.12.3.7) ASME B40.100 Grade B requirements (3% 2% 3%) with an accuracy of +/- 1.5% full scale and include an internal thermal expansion bladder that allows the gauge fill to expand in high temperature environments.

The gauges shall also include a KEM-X Socket Saver diaphragm in the stem to eliminate freeze-up and contain a low temperature instrument oil that fills and protects the socket and bourdon tube.

The gauges shall display a range specified with enhanced black markings on a white dial.

Pressure Gauge

Pump panel pressure gauges shall be 0-400 / Master Intake gauge shall be 30-0-400.

FOAM SYSTEMS

FoamPro Foam System

There shall be a fully automatic 2002 FoamPro electronic direct injection foam proportioning system furnished and installed on the apparatus for the specified discharge(s). The system shall be capable of Class A foam concentrates and most Class B foam concentrates. The proportioning operation shall be based on an accurate direct measurement of water flow with no restriction. The proportioning system shall meet NFPA standards for foam proportioning systems and the design shall have passed testing against SAE automotive reliability standards appropriate for the application. The foam system shall be installed in accordance with the manufacturer recommendations.

The digital computer control display shall enable the pump operator to perform the following control and operation functions for the foam proportioning system:

Provide push-button control of foam proportioning rates from 0.1% to 10.0%, in 0.1% increments.

Show current flow-per-minute of water

Show total volume of water discharged during and after foam operations are completed

Show total amount of foam concentrate consumed

Simulate flow rates for manual operation

Perform setup and diagnostic functions for the computer control microprocessor

Flash a "low concentrate" warning when the foam concentrate tank(s) runs low

Flash a "no concentrate" warning and shut the foam concentrate pump off, preventing damage to the pump, should the foam tank(s) empty

The display shall have the capabilities when using a Hypro/FoamPro manual or electronic dual tank switching system of the following additional functions:

• Display which foam concentrate tank is selected (tank A: PA or tank B: PB)
• Separate default setting for foam concentrate injection rate.
• Total amount of foam concentrate used from selected tank.
• Dual foam concentrate foam pump calibration.

FoamPro 2002 Maximum Water Flow Concentration GPM (L/min)
0.2% @ 2,500 (9,464)
0.5% @ 1,000 (3,785)
1.0% @ 500 (1,893)
3.0% @ 166 (628)

The FoamPro 2002 system shall have a 12 volt, 3/4 hp "TENV" electric motor designed for wet and high humidity environments, direct coupled to a positive displacement piston type foam pump with a rated capacity of .01 to 5.0 gpm with operating pressures up to 400 psi.

Foam System Certification

The foam system performance shall be tested and certified in compliance with the edition of NFPA documented elsewhere in these specifications.

FOAM SYSTEM OPTIONS

Foam System Plumbing

The specified foam system shall be plumbed to 1.5 first crosslay, 1.5 second crosslay, center bumper front jump line.

E-ONE FIRE APPARATUS
HR-100 RMQ SPECIFICATION
ATTACHMENT "B"

FoamPro Power Fill Foam Refill System

A FoamPro Power Fill foam tank refill system shall be provided. The system shall include a push button start/stop control with indicator light status, 12 volt self priming pump that shall fill at up to 10 GPM for Class A or Class B foam concentrates, emulsifiers, gels and decontamination concentrates.

Re-filling shall be from an externally accessed intake/flush port(s) to the foam cell(s) from a quick-connect, cam-lock type stainless steel pick-up wand and 6 feet of clear reinforced suction hose, 1" in diameter to allow maximum flow.

The system shall receive readings when the concentrate tank is full and stop operation to prevent overfill. An override shall be provided for the operator when "full tank" conditions occur.

An installation and operation manual shall be provided, along with a one year limited warranty by the manufacturer.

The control and quick-connect shall be located driver's side pump panel.

ELECTRICAL SYSTEMS

Multiplex Electrical System

Electrical System

The apparatus shall incorporate a Weldon V-MUX multiplex 12 volt electrical system. The system shall have the capability of delivering multiple signals via a CAN bus. The electrical system installed by the apparatus manufacturer shall conform to current SAE standards, the latest FMVSS standards, and the requirements of the applicable NFPA 1901standards.

The electrical system shall be pre-wired for optional computer modem accessibility to allow service personnel to easily plug in a modem to allow remote diagnostics.

The electrical circuits shall be provided with low voltage over-current protective devices. Such devices shall be accessible and located in required terminal connection locations or weather-resistant enclosures. The over-current protection shall be suitable for electrical equipment and shall be automatic reset type and meet SAE standards. All electrical equipment, switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. The system shall have electro-magnetic interference suppression provided as required in applicable SAE standards.

Any electrical junction or terminal boxes shall be weather-resistant and located away from water spray conditions.

Multiplex System

For superior system integrity, the networked multiplex system shall meet the following minimum component requirements:

• The network system must be Peer to Peer technology based on RS485 protocol. No one module shall hold the programming for other modules. One or two modules on a network referred to as Peer to Peer, while the rest of the network consists of a one master and several slaves is not considered Peer to Peer for this application.
• Modules shall be IP67 rated to handle the extreme operating environment found in the fire service industry.
• All modules shall be solid state circuitry utilizing MOS-FET technology and utilize Deutsch series input/output connectors.
• Each module that controls a device shall hold its own configuration program.
• Each module should be able to function as a standalone module. No "add- on" module will be acceptable to achieve this form of operation.
• Load shedding power management (8 levels).
• Switch input capability for chassis functions.
• Responsible for lighting device activation.
• Self-contained diagnostic indicators.
• Wire harness needed to interface electrical devices with multiplex modules.
• The grounds from each device should return to main ground trunk in each sub harness by the use of ultrasonic splices.

Wiring

All harnessing, wiring and connectors shall be manufactured to the following standards/guidelines. No exceptions.

• NFPA 1901-Standard for Automotive Fire Apparatus
• SAE J1127 and J1127
• IPC/WHMA-A-620 – Requirements and Acceptance for Cable and Wire Harness Assemblies. (Class 3 – High Performance Electronic Products)

All wiring shall be copper or copper alloys of a gauge rated to carry 125 of the maximum current for which the circuit is protected. Insulated wire and cable 8ga and smaller shall be SXL, GXL, or TXL per SAE J1128. Conductors 6ga and larger shall be SXL or SGT per SAE J1127.

All wiring shall be colored coded and imprinted with the circuit's function. Minimum height of imprinted characters shall not be less than .082" plus or minus .01". The imprinted characters shall repeat at a distance not greater than 3".

A coil of wire shall be provided behind electrical appliances to allow them to be pulled away from mounting area for inspection and service work.

Wiring Protection

The overall covering of the conductors shall be loom or braid.

Braid style wiring covers shall be constructed using a woven PVC-coated nylon multifilament braiding yarn. The yarn shall have a diameter of no less than .04" and a tensile strength of 22lbs. The yarn shall have a service temperature rating of -65 F to 194 F. The braid shall consist of 24 strands of yarn with 21 black and 3 yellow. The yellow shall be oriented the same and be next to each other.

Wiring loom shall be flame retardant black nylon. The loom shall have a service temperature of -40 F to 300 F and be secured to the wire bundle with adhesive-backed vinyl tape.

Wiring Connectors

All connectors shall be Deutsch series unless a different series of connector is needed to mate to a supplier's component. The connectors and terminals shall be assembled per the connector/terminal manufacturer's specification. Crimble/Solderless terminals shall be acceptable. Heat shrink style shall be utilized unless used within the confines of the cab.

Fast Idle System

A fast idle system shall be provided and controlled by a switch accessible by the driver. The system shall increase engine idle speed to a preset RPM for increased alternator output.

NFPA Required Testing of Electrical System

The apparatus shall be electrical tested upon completion of the vehicle and prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation per requirements of NFPA #1901. The following minimum testing shall be completed by the apparatus manufacturer:

1. Reserve capacity test:

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes. All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test fail.

2. Alternator performance test at idle:

The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating temperature. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

3. Alternator performance test at full load:

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer`s governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during this test. However, an alarm sounded by excessive battery discharge, as detected by the system required in NFPA #1901 Standard, or a system voltage of less than 11.7 volts dc for a 12 volt nominal system, for more than 120 seconds, shall be considered a test failure.

4. Low voltage alarm test:

Following the completion of the above tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts dc for a 12 volt nominal system shall be considered a test failure. The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

NFPA Required Documentation

The following documentation shall be provided on delivery of the apparatus:

A. Documentation of the electrical system performance tests required above.

B. A written load analysis, including:

a. The nameplate rating of the alternator
b. The alternator rating under the conditions
c. Each specified component load
d. Individual intermittent loads

Vehicle Data Recorder

A vehicle data recorder system shall be provided to comply with the 2009 and 2016 editions of NFPA 1901 and 2024 edition of NFPA 1900 (Annex A). The following data shall be monitored:

- Vehicle speed MPH
- Acceleration (from speedometer) MPH/Sec.
- Deceleration (from speedometer) MPH/Sec.
- Engine speed RPM
- Engine throttle position % of full throttle
- ABS Event On/Off
- Seat occupied status Occupied Yes/No by position
- Seat belt status Buckled Yes/No by position
- Master Optical Warning Device Switch On/Off
- Time: 24 hour time
- Date: Year/Month/Day

Occupant Detection System

There shall be a visual and audible warning system installed in the cab that indicates the occupant buckle status of all cab seating positions that are designed to be occupied during vehicle movement.

The audible warning shall activate when the vehicle's park brake is released and a seat position is not in a valid state. A valid state is defined as a seat that is unoccupied and the seat belt is unbuckled, or one that has the seat belt buckled after the seat has been occupied.

The visual warning shall consist of a graphical representation of each cab seat in the multiplex display screen that will continuously indicate the validity of each seat position.

The system shall include a seat sensor and safety belt latch switch for each cab seating position, audible alarm and braided wiring harness.

HVAC Controls

The air conditioning and heating systems of the apparatus chassis cab shall be controlled through the multiplex electrical system`s color display(s). The system shall have the capability to provide automatic climate control.

Multiplex Display

The V-MUX multiplex electrical system shall include a Vista IV color display.

The display shall have the following features:

- Aspect ratio of 16:9 (Wide Screen)
- Diagonal measurement of no less than 7"
- Master warning switch
- Engine high idle switch

- Five (5) tactile switches to access secondary menus
- Eight (8) multi-function programmable tactile switches
- Specific door ajar indication
- Real time clock
- Provides access to the multiplex system diagnostics
- Video capability for optional back-up camera(s) and GPS display

The display shall be located officer's side engine cover, driver's side engine cover.

Electrical Connection Protection

The vehicle electrical system shall be made more robust by the application of a corrosion inhibiting spray coating on all exposed electrical connections on the chassis and body. If equipped with an aerial device, the exposed connections on the aerial components shall also be protected.

The coating shall use nanotechnology to penetrate at the molecular level into uneven surfaces to create a protective water repellant film. The coating shall protect electrical connections against the environmental conditions apparatus are commonly exposed to.

LIGHT BARS

Front Light Bar Color(s)

The front light bar shall be provided with the following color LED modules: Red/White with clear lenses

If applicable, includes side facing light bars when colors are the same.

Light Bars

A pair of side facing Whelen Mini Freedom IV Series 21.5" LED light bars shall be provided. Each light bar shall contain four (4) LED modules. Each side facing light bar shall contain one (1) corner LED module forward facing, two (2) side facing LED modules and one (1) corner LED module rearward facing.

The white LEDs (if equipped) shall be switched off in blocking right of way mode.

The light bars shall be installed in the following location: centered above rear cab doors.

Light Bar Mount

One (1) pair of Whelen 1.5" tall (model MKEZ7) mounts shall be provided on each front mini light bars.

Light Bar Mount

One (1) pair of Whelen 1.5" tall (model MKEZ7) mounts shall be provided on the side facing mini light bars.

Light Bars

A pair of Whelen Mini Freedom IV Series 21.5" LED light bars shall be provided.

Each light bar shall contain two (2) corner LED modules forward facing, two (2) forward facing Long LED modules and one (1) outward facing Short LED module. No rear facing LEDs.

The white LEDs (if equipped) shall be switched off in blocking right of way mode.

The light bars shall be installed in the following location: front cab corners.

WARNING LIGHTS

Upper Rear Warning Lights

Two (2) Whelen model L31H Super LED beacons with RED with RED lenses domes shall be supplied.

The lights shall be located each side at upper rear of body on aerial style brackets, top of light even with top of body to meet Zone C upper requirements.

Opticom Emitter

A GTT 794H LED Opticom emitter light head shall be installed driver's side brow.

Hazard (Door Ajar) Light

There shall be a TecNiq model S38 red LED hazard (door ajar) light installed as specified.

The light shall be located center overhead.

Warning Lights

Two (2) Whelen M6 series Linear Super LED RED with CLEAR lenses, RED with CLEAR lenses, RED with CLEAR lenses, RED with CLEAR lenses, RED with CLEAR lenses, RED

with CLEAR lenses, RED with CLEAR lenses shall be provided. The rectangular lights shall include chrome flanges where applicable.

Location: (1) each side NFPA/ULC required lower zone front facing, (1) each side NFPA/ULC required lower zone forward side facing, (1) each side NFPA/ULC required lower zone midship side facing, (1) each side NFPA/ULC required lower zone rear side facing, (1) each side NFPA/ULC required lower zone rear facing, (1) each side in front quad inboard of NFPA warning light, (1) each side above tail lights.

DIRECTIONAL LIGHT BARS

Directional Light Bar Control Location

The directional light bar control head shall be located in the center overhead console offset to officer side.

Directional Traffic Warning Light

One (1) Whelen model TAM83 LED Traffic Advisor™ with clear lenses shall be provided. The light bar shall include Eight (8) TIR3™ Super-LED® lamps.

The directional bar shall include a TACTLD1 control head. The control head shall include a remote flash control and end lamp enable/disable feature.

The light shall be installed at rear of body to direct traffic around the apparatus.

Dimensions: 2.875" high x 2.25" wide x 30.36" long.

Directional Light Shield

There shall be a diamond plate shield mounted over the directional light to protect it from damage.

SIRENS

Electronic Siren

A Whelen 295SLSA1 electronic siren shall be installed in the cab. The siren amplifier and control panel module shall include a rotary selector for six (6) functions, on/off switch, push button switch for manual siren or air horn tones, and noise canceling microphone.

Electronic Siren Control Location

The electronic siren control shall be located in the center overhead.

Mechanical Siren

A chrome plated and pedestal mounted Federal Q2B-P coaster siren shall be installed on top of the front bumper extension. An electric siren brake switch shall be located in the cab accessible to the driver.

The siren shall be located driver side front bumper.

SPEAKERS

Siren Speaker

One (1) Whelen model SP123BMC, 100 watt speaker with chrome grill shall be recessed in the front bumper.

The speaker shall produce a minimum sound output of 120 dB at 10 feet to meet current NFPA 1901 requirements.

The speaker shall be located officer side front bumper inboard of frame.

DOT LIGHTING

License Plate Light

One (1) Truck-Lite model 15905 white LED license plate light mounted in a Truck-Lite model 15732 chrome plated plastic license plate housing shall be mounted at the rear of the body.

Tail Lights

Three (3) Whelen model M6 series LED (Light Emitting Diode) lights shall be installed in a four (4) light vertical housing each side at rear and wired with weatherproof connectors.

Light functions shall be as follows:

- One (1) model M62BTT LED red running light with red brake light in upper position.
- One (1) model M62T LED amber turn signal in middle position.
- One (1) model M62BU LED clear back-up light in lower position.

A one-piece cast housing shall be mounted around the three (3) individual lights in a vertical position. The lower space will be used by the M6 or equivalent lower NFPA warning light.

License Plate Bracket

There shall be bracket fabricated from aluminum smooth plate sanded, secured to rear of the body to accommodate a license plate.

Turn Signals

A pair of Weldon model 9186-8580-29 bubble style LED amber auxiliary turn signals with stainless steel bezels shall be installed.

Location: (1) each side in center of rear tandem wheel well.

LED Marker Lights

LED clearance/marker lights shall be installed on the cab. The body marker lights shall be TecNiq 3/4" grommet mounted LED.

Upper Cab:
• Five (5) amber LED clearance lights on the cab roof.

Lower Cab:
• One (1) amber LED side turn/marker each side of cab ahead of the front door hinge.

Upper Body:
• One (1) red LED clearance light each side, rear of body to the side.

Lower Body:
• Three (3) red LED clearance lights centered at rear, recessed in the rubrail.
• One (1) red LED clearance light each side at the trailing edge of the apparatus body, recessed in the rubrail.
• One (1) amber LED clearance light each side front of body just in front of rear wheels, recessed in the rubrail.
• Two (2) amber LED (one (1) clearance; one (1) auxiliary turn) lights each side front of body, recessed in the rubrail.

Turn Signal Flash Pattern

The forward (if applicable) and rear turn signals shall have a populated full light flash pattern.

LIGHTS - COMPARTMENT, STEP & GROUND

Compartment Light Package

Two (2) TecNiq E45 LED compartment light strip shall be mounted in each body compartment greater than 4 cu. ft. Transverse compartments shall have four (4) lights, located two (2) each side of the body.

Each light bar shall include super bright white LEDs mounted to circuit boards encapsulated in an aluminum extrusion using TecSeal with TPE sealed end caps. The lights shall produce approx. 600 lumens per foot and shall be provided with a limited lifetime warranty.

Compartment lights shall be wired to a master on/off switch located in the cab.

The wiring connection for the compartment lights shall be made with a weather-resistant plug in style connector. A single water and corrosion-resistant switch with a polycarbonate actuator and sealed contacts shall control each compartment light. The switch shall allow the light to illuminate if the compartment door is open.

Medical Cabinet Lighting

One (1) TecNiq E45 LED compartment light strip shall be mounted in the medical cabinet(s).

The light bar shall include super bright white LEDs mounted to circuit boards encapsulated in an aluminum extrusion using TecSeal with TPE sealed end caps. The lights shall produce approx. 600 lumens per foot and shall be provided with a limited lifetime warranty.

The light shall be controlled by a compartment door switch.

Ground Lights

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the ground areas around the apparatus in accordance with current NFPA requirements. The lights shall be TecNiq model T440 4" circular LED (Light Emitting Diode) with clear lenses mounted in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather resistant plug in style connector.

Ground area lights shall be switched from the cab dash with the work light switch.

One (1) ground light shall be supplied under each side of the front bumper extension if equipped.

Lights in areas under the driver and crew area exits shall be activated automatically when the exit doors are opened.

Step Lights

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the steps around the apparatus in accordance with current NFPA requirements. The lights shall be

TecNiq model T440 4" circular LED (Light Emitting Diode) with clear lenses mounted in a resilient shock absorbent mount for improved bulb life (a smaller light may be used if space is limited). The wiring connections shall be made with a weather resistant plug in style connector.

The step lights shall be switched from the cab dash with the work light switch.

Ladder Tunnel Light [Qty: 2]

An EON LED light shall be provided to illuminate the ladder tunnel at the opening. The light shall be wired through the door ajar circuit on the ladder tunnel door.

LIGHTS - DECK AND SCENE

Rear Work Lights

Two (2) FireTech LED lights model FT-WL3500-FT-W shall be installed. The lights shall produce 1,981 effective lumens and have a white housing. The lights shall be switched with work light switch in the cab.

Location: (1) each side over rear ladder tunnel.

Crosslay Light

A FireTech LED light model WL2000 with white housing shall be installed at the rear area of the crosslay to provide crosslay lighting per current NFPA 1901. The crosslay light shall be switched with work light switch in the cab.

LIGHTS - NON-WARNING

Pump Compartment LED Light

An LED light shall be provided in the pump compartment area for NFPA compliance. The light shall be wired to operate with the work light switch in the cab.

LED Pump Panel Light Package

Three (3) TecNiq model E10 LED lights shall be mounted under a light shield directly above each side pump panel. The work light switch in the cab shall activate the lights when the park brake is set.

Engine Compartment Light

There shall be lighting provided to illuminate the engine compartment area in compliance with NFPA 1901. The light shall be an Optronics ILL22 Series LED that has a polycarbonate lense, sealed / waterproof housing and integral switch. The light wiring circuit shall activate when the cab is tilted and master power is switched on.

CONTROLS / SWITCHES

Foot Switch Bracket [Qty: 2]

A bracket costructed of 1/8" (.125) smooth aluminum shall be provided for a foot switch. The bracket shall position the switch at a 30 degree angle from the floor.

Door Ajar Alarm

An audible alarm shall be provided through the multiplex display(s) in the cab wired into the door ajar or indicator.

Foot Switch

A heavy duty metal floor mounted foot switch shall be installed to operate the air horns. It shall be located officer's side.

Programming Instructions

Additional programming shall be provided. Additional programming shall be: outrigger/jack leg warning lights to activate with lower warning IATS.

CAMERAS / INTERCOM

Camera Shield

A diamond plate protective shield shall be provided for the top and sides of a camera. The shield shall be designed not to impede in the operational envelope of the camera.

Camera, Officer Side

A Safety Vision model SV-622RS camera will be located on the officer side front corner of the cab. This camera will be interlocked with the turn indicator. The system shall include a cable with metallic waterproof threaded o-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator.

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Requires the option for the Safety Vision back-up camera system which consists of the colored monitor, back-up camera and control box.

Camera, Driver Side

A Safety Vision model SV-622LS camera will be located on the driver side front corner of the cab. This camera will be interlocked with the turn indicator. The system shall include a cable with metallic waterproof threaded o-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator.

Requires the option for the Safety Vision back-up camera system which consists of the colored monitor, back-up camera and control box.

Two-Way Intercom

A Fire Research ACT two-way intercom system shall be installed to provide communications between the turntable control station and the aerial tip. The intercom system shall include two (2) speakers and two (2) control modules; one (1) with a push-to-talk button at the turntable control station and one (1) hands free at the aerial tip.

The control modules shall have push-button volume control and a LED volume display. The hands free module shall constantly transmit to the other module unless the push-to-talk button is pressed.

The intercom shall have active noise cancellation and be designed for exterior use.

Back-Up Camera Speaker

One (1) Standard Horizon model MLS 310 speaker shall be provided in the cab accessible to the driver. Speaker shall feature an on/off switch and volume control.

Camera Back-Up

There shall be a Safety Vision camera model number SV-625B-KIT provided. The camera shall be mounted up high at the rear of the vehicle to provide a wide angle rear view with audio. The camera shall include a cable with metallic waterproof threaded o-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator. The camera shall be interlocked with the chassis transmission. When the apparatus is placed in reverse the camera shall automatically be activated and when the transmission is placed in any other gear the screen shall return to the previously displayed screen.

Intercom 6 Cab

A FireCom intercom package shall be installed within the cab interior. One (1) model 5200D dual radio digital intercom with touch pad adjustable volume with advanced digital noise reduction circuitry. The intercom uses a durable membrane switch plate to control volume and change radios.
This intercom provides hearing loss protection that can occur from exposure to high noise levels.

The system contains:

- One (1) FireCom model 5200D dual radio monitor shall be provided in the cab (two (2) year limited warranty).
- Six (6) FireCom model HM-10 plug in modules shall be provided at each seated position.
- Six (6) NFPA compliant headset hooks, FireCom part number 108-0678-00 shall be provided at each seated position.

Headsets shall be ordered separately and are not included as part of the Intercom package.

MISC ELECTRICAL

Back-Up Alarm

An electronic back-up alarm shall be supplied. The 97 dB alarm shall be wired into the chassis back-up lights to signal when the vehicle is in reverse gear.

12 Volt Power Lead

One (1) 12 volt/12 gauge/10 amp constant hot lead shall be provided. The lead shall be 24" long and include a ground wire and fuse.

The lead shall be located L1 upper foward wall, L2 upper forward wall.

Back-Up Sensor System

A PORON rear obstacle detection system with voice distance indication shall be installed on the apparatus. The model MAX1 system shall include four (4) heavy duty stainless steel sensors located at the rear of the vehicle, a weatherproof control box and a speaker in the cab near the driver. The system shall "warn" the driver with a "beeping" sound indicating potential obstacles at the rear of the vehicle and a clear voice shall "tell" the operator with a countdown of the remaining distance in feet as the vehicle reverses.

12 Volt DC Power Distribution Module

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A Blue Sea model 5032 12 place, split bus fuse block with ground, 12 volt DC power distribution module shall be provided. The module shall provide two isolated groups of six circuits, and shall be wired through switched hot and battery hot, and include a battery ground.

Location: L1 high on forward wall, behind officer's seat.

GENERATOR

Hydraulic Generator

A Smart Power model HR-8 top mount style 8000 watt hydraulic generator shall be provided. Generator location: dunnage pan offset to driver side.

The unit shall come equipped with: modular generator unit (which includes the hydraulic motor and filter, generator, and cooler), axial piston hydraulic pump, hydraulic reservoir, and a gauge panel.

The gauge panel shall display voltage, hour meter, frequency, and amperage.

The hydraulic motor, generator, blower, cooler, and necessary hydraulic components shall be mounted in a rugged steel case.

The modular generator unit shall be 32" long x 13.5" wide x 17" high and weigh approximately 255 pounds.

The hydraulic pump shall be driven by a chassis transmission mounted power take off (PTO).

A generator control / PTO engage switch shall be mounted on the cab instrument panel to engage the PTO and start the generator.

Ratings and Capacity

Rating:	8000 watts continuous 9000 watts peak
Volts:	120/240 volts
Phase:	Single, 4 wire
Frequency:	60 Hz
Amperage:	66 amps @ 120 volts or 33 amps @ 240 volts
Engine speed at engagement:	Recommend below 1000 RPM
Operation range:	800 to 2100 RPM

Testing

The generator shall be tested in accordance with current NFPA 1901 standards.

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Notes:
*All ratings and capacities shall be derived utilizing current NFPA 1901 test parameters.
*Extreme ambient temperatures could affect generator performance.

GENERATOR TEST

Line Voltage Power Source Testing

The line voltage power source (generator and / or inverter) shall be tested at the manufacturer`s facility by an independent, third-party testing service. The conditions and testing of the power source shall be as outlined in NFPA.

The test shall include operating the power source for two hours at 100% of the rated load. Power source voltage, amps, frequency shall be monitored. The prime mover`s oil pressure, water temperature, transmission temperature (if applicable) and power source hydraulic fluid temperature (if applicable) shall be monitored during testing.

The results of the test shall be recorded and provided with delivery documentation.

BREAKER BOXES

Circuit Breaker Panel

An eight (8) place breaker box with up to six (6) appropriately sized ground-fault interrupter circuit breakers shall be supplied. The breaker box will include a master breaker sized according to the generator output which will occupy two (2) places. The breaker box will be located in the specified compartment, not to exceed 12` run of wire.

Dimensions: 12.50" high x 8.88" wide x 3.80" deep.

Location: L1 back wall above jack access panel.

LIGHTS - AREA

Cab Brow Light

One (1) FireTech 12V LED model FT-B-72-ML-W 75" white housing brow light with spot, flood, beam patterns and integral marker lights provided. The light shall be installed on the front cab brow in place of the standard DOT marker lights. the light shall feature 54 LEDs` producing 19,665 usable lumens and five (5) DOT approved marker lights. The 285W 12V light shall draw 23.75 amps.

Cab Brow Light [Qty: 2]

One (1) FireTech 12V LED mini-brow flood light model FT-MB-27-F-W 35" long shall be provided. The light shall feature 27 LEDs` producing 9,317 usable lumens. The 135W 12V light shall draw 11.25 amps. A switch shall be provided, accessible to driver, for activation of light.

The light assembly shall be located driver and officer side over rear cab door.

Extended Brow Brackets

The forward facing brow mounted flood light shall be provided with extended brackets for use with a standard trough aerial cab.

RECEPTACLES

Receptacle

A 20 amp, 110 volt NEMA L5-20 twist lock receptacle with a weatherproof cover plate shall be installed as specified by the department.

Location: driver side rear wheel well offset rearward, officer side rear wheel well offset rearward, driver side rear of extended high side, officer side rear of extended high side.

Receptacle

A 20 amp, 110 volt 3 prong straight blade NEMA #5-20 duplex receptacle with a weatherproof cover plate shall be installed.

Location: R1.

ELECTRIC CORD REELS

Rollers, Cord Reel

Rollers, captive for cord reel mounted on reel.

Stainless steel cord reel rollers shall be installed and located on the reel.

The rollers shall facilitate smooth removal of the electric cord.

{May include a bracket (as required)}

Electric Cord Reel

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Hannay electric rewind cord reel(s) (ECR 1618-17-18) shall be installed and located floor mounted in officer side compt over front axle of rear tandem offset forward.

The reel(s) shall include 200` of yellow 10 gauge 4 conductor type SOOW cord. The cord shall be rated at 20 amps @ 220 volts. The end of the cord shall be terminated for the installation of a department required connector.

Cord Reel Rewind Switch

A heavy duty rubber covered electric reel rewind button shall be installed on wall near cord reel.

Cord Connector

A Daniel Woodhead 30 amp, 220 volt (NEMA #L6-30) twist lock female cord connector shall be installed as specified.

Location: floor mounted in officer side compt over front axle of rear tandem offset forward.

AERIAL MODEL

Turntable Extension

The right side of the turntable shall be extended to provide additional space for personnel and / or equipment. The extension shall include an additional 42`` high handrail along the outside of the turntable as outlined in NFPA 1901 Section 19.18.1.

100` Aerial Device

Aerial Ladder Requirements

It is the intent of these specifications to describe a telescopic aerial ladder of the open truss design that is compliant with the current edition of NFPA 1900. Some portions of this specification exceed minimum NFPA recommendations and are to be considered a minimum requirement to be met.

The aerial ladder shall consist of four (4) extruded aluminum telescopic ladder sections operating from -6 degrees to 81 degrees and designed to provide continuous egress for firefighters and civilians from an elevated position to the turntable.

The aerial device shall have a vertical height of 100 ft at full extension and elevation as defined in NFPA 1900.

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The rated horizontal reach shall be 92 ft. The measurement shall be from the outermost rung at full extension to the centerline of turntable rotation.as defined in NFPA 1900.

The aerial shall have a maximum stabilizer spread of 12 ft from centerline to centerline of the stabilizer pads to allow set-up in confined spaces.

The ladder shall be able to provide full operating capacities in up to 50 mph wind conditions.

Aluminum Aerial Ladder

The aerial ladder shall exceed the requirements of NFPA 1900 as detailed in these specifications. To ensure a high strength-to-weight ratio and an inherent corrosion resistance, the aerial ladder shall be completely constructed of high strength aluminum. All side rails, rungs, handrails, uprights and K-braces shall be made of structural 6061T6 aluminum alloy extrusions. All material shall be tested and certified by the material supplier. All ladder sections shall be semi-automatically welded by inert gas shielded arc welding methods using 5356 aluminum alloy welding wire. Structural rivets or bolts shall not be utilized in the ladder weldment sections.

Due to the unpredictable nature of fireground operations, a minimum safety factor of 2.5 to 1 is desired. This structural safety factor shall apply to all structural aerial components including turntable and torque box stabilizer components. Definition of the structural safety factor shall be as outlined in NFPA 1900:

DL = Dead load stress. Stress produced by the weight of the aerial device and all permanently attached components.
RL = Rated capacity stress. Stress produced by the rated capacity load of the ladder.
WL= Water load stress. Stress produced by nozzle reaction force and the weight of water in the water delivery system.
FY = Material yield strength. The stress level at which the material exhibits permanent deformation.

2.5 x DL + 2.5 x RL + WL equal to/less than FY

The minimum NFPA specification of 2.0 to 1 is exceeded in this paragraph by requiring a 2.5 to 1 safety margin on dead load and live load while flowing water.

The stability factor or tip over safety margin shall be a minimum of 1.5 to 1 as defined by NFPA 1900. The 1.5 to 1 stability factor shall be achieved in all ranges, including the front working area, without relying on the chassis front axle for stabilization.

An independent engineering firm shall verify the aerial safety factor. Design verification shall include computer modeling and analysis, and extensive strain gauge testing performed by an independent registered professional engineer. Verification shall include written certification from

the independent engineering firm made available by the manufacturer upon request from the purchaser.

All welding of aerial components, including the aerial ladder sections, turntable, torque box and outriggers shall be performed by welders who are certified to American Welding Society Standards D1.1, D1.2 and D1.3.

The weldment assemblies of each production unit shall be tested visually and mechanically by an ASNT certified level II non-destructive test technician to comply with NFPA 1900. Testing procedures shall conform to the American Welding Society Standard B1.10 Guide for non-destructive testing. Test methods may include dye penetrate, ultrasound and magnetic particle where applicable.

Each ladder section shall consist of two (2) heavy extruded aluminum side rails and a combination of aluminum rungs, tubular diagonals, verticals and two (2) full-length handrails. The rungs on all four (4) ladder sections shall be K-braced for maximum lateral stability. This K-bracing shall extend to the center of each rung to minimize ladder side deflection.

The ladder rungs shall be designed to eliminate the need for rubber rung covers. The rungs shall be spaced on 14 inch centers and have an integral skid-resistant surface as outlined in NFPA 1900. An oval-shaped rung shall be utilized to provide a larger step surface at low angles and more comfortable grip at elevated positions. The minimum design load shall be 500 pounds distributed over a 3 1/2 " wide area per rung as outlined in NFPA 1900.

The aerial ladder shall exceed NFPA 1900 governing the minimum ladder section width and handrail height.

Section	**Width**	**Height**
Base Section	36"	28-1/2"
Second Section	29-3/4"	25-3/4"
Third Section	24-3/8"	23"
Fly Section	19-3/4"	20-3/8"

Ladder Extension Mechanism

Both power extension and retraction shall be furnished and meet the requirements of NFPA 1900. Extension shall be by way of two (2) extending cylinders mounted on the underside of the base section of the ladder.

Extension Cylinder Size
Bore: 3-1/4"
Stroke: 80"

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The cylinders shall operate through a block and tackle cable arrangement to extend and retract the ladder. Maximum extension of the ladder is to be automatically limited by the stroke of the cylinders. The normal operating cable safety factor shall be 5:1 and the stall safety factor shall be 2:1 based on the breaking strength of the cables. The minimum ratio of the diameter of wire rope used to the diameter of the sheave used shall be 1 to 12. The cables shall be treated with Pre-Lube 6 for increased service life.

Ladder Cable Size

1st section (4 cables - 2 extend, 2 retract)	1/2" 6 x 19 galvanized cable
2nd section (4 cables - 2 extend, 2 retract)	5/16" 6 x 25 galvanized cable
3rd section (4 cables - 2 extend, 2 retract)	5/16" 6 x 25 galvanized cable

The ladder assembly shall consist of four (4) separate weldments that shall extend and retract within each other. Nylatron NSM slide pads shall be utilized between each section to minimize friction. Nylatron NSM slide pads shall be installed at the tip of the lower three sections to accommodate the sliding loads as the ladder is extended.

Aerial Extension Indicator

Reflective tape stripes shall be installed on the ladder top handrail of the base section to indicate extension in 5 ft increments. Numeric indicators shall be placed at 10 ft increments. A reflective dot on the base of the 2nd section shall provide a visual reference for the operator to estimate aerial elevation.

Aerial Finish

To reduce maintenance expense the aerial shall have a natural aluminum swirled finish. Visible inspection of all ladder weld joints shall be possible without having to remove paint or body filler to reveal the weld bead.

Operation Times

The aerial shall complete the NFPA 1900 time test in no more than 120 seconds. This test involves raising the aerial from the bedded position to full elevation and extension and rotating to 90 degrees. This test is to begin with the stabilizers deployed.

Time to extend ladder	maximum 30 seconds
Time to retract ladder	maximum 30 seconds
Time to raise ladder	maximum 25 seconds
Time to lower ladder	maximum 25 seconds
Time to rotate 180 degrees	maximum 80 seconds

Aerial Ladder Rated Capacity

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The aerial device shall have a rated capacity of 500 lbs. consistent with NFPA 1900. The aerial device shall be rated in multiple configurations. A sign mounted at the base of the aerial shall communicate the following ratings in the unsupported fully extended configuration while maintaining a 2.5 to 1 safety margin as defined in NFPA 1900. The loads in each configuration are in addition to 75 lbs. of equipment mounted at the tip.

Condition #1- Tip load only, no water flowing.

Elevation	**Capacity**	**Pounds**
- 6 to 30 degrees	2 person	500 lbs.
31 to 50 degrees	3 people	750 lbs.
51 to 81 degrees	4 people	1000 lbs.

Note: Special electronic control programming for 750 lbs. rescue tip load in all positions per E-One.

Condition #2- Distributed loads no water flowing. (These include one person at the tip)

Elevation	**Capacity**	**Pounds**
- 6 to 20 degrees	3 person	750 lbs.
21 to 40 degrees	4 people	1000 lbs.
41 to 60 degrees	6 people	1500 lbs.
61 to 81 degrees	10 people	2500 lbs.

Condition #3- Ladder tip load while flowing pre-piped waterway

Elevation	**Capacity**	**Pounds**
-6 to 44 degrees	2 people	500 lbs.
45 to 81 degrees	3 people	750 lbs.

Hydraulic System

The hydraulic plumbing shall consist of hydraulic stainless steel tubing wherever possible in order to:

- Eliminate hose wear.
- Eliminate the corrosion associated with galvanized steel tubing.
- Provide a stronger medium to carry the hydraulic fluid.

An interlock device shall be provided to prevent activation of the aerial ladder hydraulic pump until either the transmission is placed in neutral and the parking brake is set, or the transmission is placed in drive and the rear driveline is disengaged.

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The hydraulic system shall be of the latest design and incorporate features to minimize heat build up and provide smooth control of the aerial ladder. The system shall meet the performance requirement in NFPA 1900, which requires adequate cooling under 2 1/2 hours of operations.

All hydraulic components that are non-sealing whose failure could result in the movement of the aerial shall comply with NFPA 1900 and have burst strength of 4 to 1. Dynamic sealing components whose failure could cause aerial movement shall have a margin of 2 to 1 on maximum operating pressure per NFPA 1900. All hydraulic hoses, tubes and connections shall have minimum burst strength of 3 to 1 per NFPA 1900.

A hydraulic oil pressure gauge shall be supplied at the base control location.

The hydraulic system shall consist of a 55 gallon reservoir mounted to the torque box and plumbed to the hydraulic pump. The tank shall be supplied with a removable top to access tank strainer filter. There shall be plumbing for a supply and return line and a tank drain on the reservoir. Connections on the bottom of the tank shall utilize Code 61 flange fittings for ease of service. Gated valves under the tank shall facilitate filter changes.

The hydraulic system shall use 5w-20 multi-weight, SAE 32 grade oil and incorporate the following filters to provide dependable service:

Reservoir Breather:	10-micron
Magnetic Reservoir Strainer:	125-mesh
Pressure Filter (Torque Box):	3-micron
Return Filter:	10-micron

The aerial hydraulic system shall be designed in such a manner that a hydraulic pump failure or line rupture shall not allow the aerial or outriggers to lose position. Hydraulic holding valves shall be mounted directly on cylinders. To ensure reliable performance of holding valves, no hoses shall be permitted between a holding valve and cylinder.

The hydraulic system shall be designed with an auxiliary power unit meeting the guidelines of NFPA 1900. The auxiliary power unit shall be a 12-volt pump connected to the chassis electrical system. The pump shall provide operation at reduced speeds to store the aerial device and outriggers for road transportation. Self-centering switches shall be provided at the turntable and each stabilizer control station to activate the system. The system shall be designed to provide a minimum of five (5) minutes of hydraulic power to operate functions.

Hydraulic power to the ladder shall be transferred from the torque box by a hydraulic swivel.

Aerial Torque Box

The aerial shall utilize an integral torque box design. The integral torque box design shall serve to carry the chassis, body and aerial device as an integrated system. The system design shall

provide a lower center of gravity to enhance road performance, a mounting location for under-slung stabilizers, and additional space for body compartments. The strength of the torque box shall be a minimum 12.6 million-inch pounds resistance to bending moment. The stabilizers and turntable supports shall be welded directly to the torque box.

Stabilization

The unit shall be equipped with two (2) sets of extendable criss-cross, under-slung stabilizers. The stabilizers shall have a spread of 12` centerline to centerline of the stabilizer pads when fully extended. One (1) set of stabilizers shall be mounted in the forward body area and a second set close to the rear axle to minimize impact on departure angle. The stabilizers shall have an inner and outer tube that slide on a low-friction pad for deployment. The stabilizers shall have a tip-over safety margin of 1-1/2 times the rated load imposed by the aerial in any position the aerial device can be placed as outlined in NFPA 1900. The apparatus stabilization shall be accomplished without the assistance of the chassis suspension or tires in contact with the ground.

The aerial shall be able to sustain a 1-1/3 to 1 rated load on a 5-degree slope downward in the position most likely to cause overturning as outlined in NFPA 1900. The maximum ground slope the apparatus can be set up on is 12 percent. On the 12 percent slope, the apparatus can be leveled within a 6 percent operating range for the apparatus.

The cylinders shall be supplied with dual pilot-operated check valves on each stabilizer cylinder to hold the cylinder in the retracted (stowed) or extended (working) position should a charged line be severed at any point in the hydraulic system. The stabilizers shall level side-to-side, corner-to corner, and front-to-rear on uneven terrain. Stabilizers shall contain safety lock valves. This assures there will be no "leak down" of stabilizer legs. Mechanical pins are not required. This feature contributes to efficient set-up and field operation.

The stabilizer lift cylinders shall be sized to maximize ground penetration. The lift cylinders shall be mounted on the side of the torque box for protection and shall have the following dimensions:

Bore: 6"
Stroke: 13"

The stabilizer extension cylinders shall have the following dimensions:

Bore: 2 "
Stroke: 31-1/2"

Each stabilizer that can be extended from the body shall be supplied with a red warning light as outlined in NFPA 1900. A stabilizer extended warning light shall be supplied in the cab to warn the driver of an extended stabilizer condition as outlined in NFPA 1900. A floodlight shall be

supplied in each stabilizer location to illuminate the stabilizer and ground. The light shall automatically turn on with the deployment of the stabilizer.

The stabilizer ground contact area for each foot pad shall be 10" x 14" without auxiliary pads and 24" x 24" with auxiliary pads deployed. The ground pressure shall not exceed 100 psi with auxiliary pads deployed when the apparatus is fully loaded and the aerial device is carrying its rated capacity in every position. This shall be accomplished with the stabilizer pads deployed, as outlined in NFPA 1900.

Stabilizer Controls

Four (4) electric solenoid valves shall control the stabilizers. The control switches shall be located at the rear of the apparatus so the operator may observe the stabilizers during deployment. An audible alarm with a minimum 87 dBA shall also sound while the stabilizers are in motion. Stabilizer deployment shall be completed in less than 60 seconds.

There shall be an interlock that prevents the operation of the ladder until the stabilizers are down and properly set as outlined in NFPA 1900. Four (4) micro-switches, one (1) on each jack leg, shall sense when all four (4) jack feet are in firm contact with the ground. This condition shall be indicated when all four (4) yellow jack-down indicator lights are on and the green interlock light is on. When the apparatus has been leveled, a manual transfer switch shall be used to shift hydraulic power to ladder operations. The interlock system shall have a manual override with access through a door on the rear control panel.

To simplify leveling the apparatus, two (2) color-coded level indicators shall be supplied at the rear of the apparatus. One (1) indicator shall be for front to rear level and one (1) for side to side level.

Forward Aerial Support

The aerial ladder support shall be fabricated from steel components and be welded directly to the torque box chassis. The ladder support uprights shall be constructed from 7/8" thick steel plate. Bolt-in diagonal bracing shall be installed on the support structure in an "X" pattern to restrict to side movement. This design shall allow for a pre-determined amount of flex preventing premature failure that can be found in an overly rigid structure. The support shall be located behind the rear wall of the cab.

Turntable Support Assembly

The aerial ladder turntable assembly shall be mounted at the rear of the apparatus. The turntable support assembly shall be welded to the integral torque box for efficient transfer of aerial loads to the stabilizers and shall permit storage of ground ladders in the center rear of the apparatus. The complete turntable support assembly shall be multi-pass welded to the sides of the combination chassis frame torque box.

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The turntable support assembly shall be a steel weldment constructed of four (4) vertical 1/2" x 5" x 5" square tubing with identical tubing welded in between the top ends of the verticals.

A bearing mounting plate shall be welded to the top of the verticals and sides of the horizontals on the turntable pedestal. The bearing mounting plate shall be 43" x 43" and shall have a 1-1/2" thickness. This bearing mounting plate shall be attached to a 3/4" steel plate that is welded to the bottoms of the horizontal tubing. The use of multi-pass welding shall be utilized wherever possible.

A 34-1/4" rotation bearing with a 3" face drive gear shall be bolted to the top of the bearing mounting plate with thirty (30) 3/4" grade 8 plated bolts. The gear tooth shall be stub tooth form.

Upper Turntable

The upper turntable assembly shall attach to the rotation bearing and the base of the ladder. The turntable assembly shall be bolted to the turntable bearing by twenty (20) 3/4" grade 8 plated bolts. The turntable assembly shall provide a mounting base for the ladder and elevating cylinders.

The turntable working platform shall be a fabricated steel structure covered with a non-skid 3/16" thick aluminum material for operator safety. The right side of the turntable shall be modified to allow full access to the body`s SideStacker hosebed (if applicable). There shall be a control pedestal mounted on the left side of the turntable.

Two (2) railings 42" high shall be provided along the perimeter of the turntable as outlined in NFPA 1900. Two (2) Mansaver bars shall be provided to allow access to the turntable area.

An 11" high step shall be installed on the turntable deck to provide convenient access to the ladder sections for egress.

Two (2) lights shall be provided in the turntable step to illuminate the turntable deck area.

The ladder pivot point shall connect to the upper turntable assembly by two (2) 2-1/4" ID spherical bearings.

Elevation Mechanism

The aerial shall utilize dual 5" bore 42 5/8" stroke elevating cylinders to attach the upper turntable assembly and bottom of the base ladder section. A 1 3/4" pin and bearing system shall connect to the turntable. A 2" pin and bearing system shall connect to the base section of the ladder. The elevation hydraulic cylinders shall incorporate cushions on the upper limit of travel. The hydraulic elevation cylinders shall also serve as a locking device to hold the aerial in the stored position for road travel.

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Rotation Mechanism

The aerial shall be supplied with a hydraulically-powered rotation system. The hydraulic rotation motor and planetary gear drive system shall provide continuous rotation under all rated conditions and be supplied with a spring-applied brake to prevent unintentional rotation.

Aerial Electric Power

A hydraulic swivel shall be installed to provide hydraulic fluid transfer to the aerial ladder cylinders, electrical power to the aerial ladder, and water delivery to the pre-plumbed waterway while permitting continuous 360-degree rotation. The swivel shall provide two (2) hydraulic circuits, twenty four (24) electrical circuits, and one (1) 4" passage for waterflow. The swivel shall be environmentally-sealed to prevent contamination of the hydraulic fluid.

Aerial Ladder Operating Position

An aerial ladder operator`s position shall be supplied as outlined in NFPA 1900. The operator`s position shall be located on the left side of the aerial turntable. The apparatus shall be supplied with labels to warn of electrocution hazard. The control console shall provide a service access door on the front and side of the console to access hydraulic and electrical connections. The electrical panel shall be contained in junction box with labeled wires. The console shall be angled, labeled, and supplied with lights for night operation.

Console Cover

A diamond plate contoured hinged cover shall be supplied to protect the console from the elements. The cover shall latch in the stored position and swing away from the console so as not to interfere with sight of the aerial device.

Aerial Ladder Control Levers

The control levers shall be arranged as outlined in NFPA 1900. The first lever from the left shall be the extension control (forward for extend and back for retract). The second lever shall be for rotation (forward for clockwise and back for counter clockwise). The third handle shall control elevation (forward for down and back for up). A ring around the control console shall be provided to prevent unintentional movement as outlined in NFPA 1900.

Rung Alignment Indicator

A light on the control console shall indicate when the ladder rungs are aligned for climbing.

Aerial Alignment Indicator

A reflective arrow mounted to the body and the turntable shall indicate when the aerial is aligned for travel bed.

Load Indication System

A lighted elevation/safe load indicator diagram shall be located on the lower left side of the base section to indicate safe load capacity at any angle of elevation. The safe load indicator shall be 15" x 15" in size and clearly communicate aerial capacity in any one of the following conditions: tip load only, tip load with water flowing, and distributed load at full extension. The chart shall identify capacity using graphic characters to indicate each 250 lb. increment. The chart shall be equipped with lighting and warn of electrocution hazards from power lines and lightning.

Aerial Waterway

A pre-piped waterway shall be supplied as outlined in NFPA 1900. The waterway shall telescope to the end of the fourth section. A waterway of 4" internal diameter shall run through the turntable and a swivel joint to connect to the tubular aerial waterway. The tubular waterway shall run under the aerial ladder. The waterway tubes shall have the following sizes:

Base Section: 5" OD
Mid Section: 4-1/2" OD
3rd Section: 4" OD
Fly Section: 3-1/2" OD

The tubes shall be constructed of hard coat anodized aluminum and shall be telescopic with the aerial ladder through sealed slip joints. The slip joints shall be designed with grease zerk fittings to facilitate lubrication.

A 1-1/2" drain valve shall be installed and operated from the rear of the apparatus.

The water system shall be capable of flowing up to 1500 GPM at full elevation and extension. The friction loss between the tip and below the swivel shall not exceed 100 psi while flowing 1000 GPM as outlined in NFPA 1900.

Waterway Relief Valve

An automatic relief valve preset at 250 psi shall be installed in the aerial waterway to prevent over-pressurization of waterway system. The relief valve shall be mounted in the lower portion of the waterway where it enters the aerial torque box frame and dumps under the apparatus.

Ladder Tip Step

Two (2) split design folding steps shall be located near the ladder tip to provide a position for a firefighter using the ladder pipe/monitor as outlined in NFPA 1900. The steps shall have a raised surface for traction and cut outs for deployment.

ISO Compliance

The manufacturer shall operate a Quality Management System meeting the requirements of ISO 9001:2015.

The International Organization for Standardization (ISO) is a recognized world leader in establishing and maintaining stringent manufacturing standards and values. The manufacturer`s certificate of compliance affirms that these principles form the basis for a quality system that unswervingly controls design, manufacture, installation, and service.

The manufacturer`s quality systems shall consist of, but not be limited to, all written quality procedures (aka QOP) and other procedures referenced within the pages of the manufacturer`s Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts products or processes. In addition, all apparatus assembly processes shall be documented for traceability and reference. The manufacturer shall also engage the services of a certified third party for testing purposes where required.

If the manufacturer operates more than one manufacturing facility each facility must be ISO certified.

By virtue of its ISO compliance the manufacturer shall provide an apparatus that is built to exacting standards, meets the customer`s expectations, and satisfies the customer`s requirements.

A copy of the manufacturer`s certificate of ISO compliance for each manufacturing facility shall be provided with the bid.

AERIAL HYDRAULIC SYSTEM OPTIONS

Aerial Hydraulic Oil Level Gauge

A hydraulic oil level gauge shall be supplied for easy fluid level verification. The three-light system shall indicate full oil level with a green light, acceptable oil level with yellow light, and low oil level with a red light. The display shall be located on pump operator's panel.

AERIAL CONTROLS

Aerial Control System

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The aerial hydraulic system shall be equipped with a microprocessor based electric over hydraulic control system. The system shall include electronic ramping to provide smooth acceleration and deceleration of aerial functions during sudden movements of the operator control levers. The ladder shall utilize three (3) combination proportional control valves for smooth aerial device movements. The hydraulic system valve body shall be located in the turntable console.

The switch modules on the console shall be CAN based for reliable operation. The system shall utilize 32-bit control module(s) rated for mobile applications.

The control system shall have manual overrides in the event of a system failure. The overrides shall be located directly on the electric / hydraulic control valve within easy reach of the turntable operator. The manual system shall be organized to match the base controllers with the functions clearly labeled.

Joystick Control Levers

The control system shall incorporate three (3) joysticks at the aerial control console. The joysticks shall be single axis, one (1) to extend / retract, one (1) for rotating left / right and one (1) to elevate / lower the aerial in accordance with NFPA 1901. A ring shall be provided around each joystick to prevent unintentional movement as outlined in NFPA 19.17.6.2.

Aerial Speed Switch

The control system shall be provided with a "creep speed" switch for precise aerial movement. When activated, the aerial shall operate a slow speed and the chassis engine will remain at idle speed.

Variable Ramping

A three (3) position switch shall be provided to select system ramping (ladder movement when initiating or ceasing movement of a control lever). The switch shall allow selection of normal (1/2 second), firm (1/4 second) or soft (3/4 second) ramping based on operator preference.

End of Stroke Cushioning

The aerial system shall monitor the aerial position and when the ladder is near full extension, retraction and elevation (up and down) will slow the ladder movement down for softer stops. The sensors shall be CAN based for accurate and reliable performance.

Body Protection

The aerial control system shall feature programming to prevent the aerial from contacting the body. The system shall feature multiple zones to optimize operational envelop based on a

specific apparatus configuration. When approaching a protected zone the aerial shall automatically ramp down in speed to come to a soft stop. A momentary switch shall be provided to allow the aerial operator to by-pass the body protection zone.

Aerial Information System Display

The aerial device shall be equipped with a color display at the turntable console that provides critical information to the aerial operator for added safety.

Information shall be conveyed to the operator using J1939 protocol through multiple mission-specific screens, each tailored for a specific fireground activity. The screens display shall include available tip load, distributed load, master stream and aerial systems data.

The available tip load shall be represented in simple "Stick-Figure" type symbols that show the allowable quantity of people at the tip based on ladder position. The screen layouts shall be uncluttered allowing the symbols to be easily read at a glance. The system shall also feature programming that calculates the allowable tip load based on elevation and extension, allowing for increased tip capacity when possible. Systems that rely on hydraulic pressure to determine load shall not be acceptable.

In addition to available tip load, the display shall provide the following information:

- Ladder extension (%)
- Ladder inclination in degrees
- Ladder rotation position
- Rated distributed load
- Waterway flow
- Total waterway flow (with reset button)
- Waterway pressure
- Tip temperature
- Hydraulic oil pressure
- Hydraulic oil temperature
- Hydraulic oil level
- Aerial hourmeter
- Rung alignment status
- Cradle alignment status
- Aerial PTO status
- Aerial PTO engage
- Breathing air status (if equipped with breathing air)
- Fuel Level
- Transmission temperature
- Engine RPM
- Coolant temperature
- Engine oil pressure

- Battery voltage
- Pump in gear status (if equipped with a pump)
- OK to pump status (if equipped with a pump)
- Chassis engine start / stop
- Chassis air horn switch

The display shall be capable of showing system units in standard or metric values.

Audible Warnings

The system shall include alarms to indicate when tip temperature is greater than 300°F, tip temp below 32°F, hydraulic oil temperature is above 190°F and when breathing air is below 20% and 5% volume (if equipped),

Visual Warnings

In addition to the audible warnings, the system shall include visual warning indicators for high tip temperature, low tip temperature, high hydraulic oil temperature and low breathing air (if equipped),

Display Screen

- 7" bonded Transflective LCD screen (Sunlight viewable)
- 16-bit color format
- 800 x 480 resolution
- LED backlighted switches
- Environmentally sealed housing
- Fourteen (14) integrated tactile navigation buttons

Sensors

- Ladder extension
- Ladder inclination
- Turntable rotation
- Waterway pressure
- Waterway flow
- Tip temperature
- Hydraulic oil pressure
- Hydraulic oil temperature
- Hydraulic oil level
- Cradle alignment
- Rung alignment
- Breathing air pressure (If equipped with breathing air)

Cradle Assist Switch

The control system shall also include a momentary switch to assist in stowing the aerial. The switch, in conjunction with moving the "down" aerial control lever shall cause the aerial to rotate to center and lower into the cradle. The system shall be operational when the aerial is below 30 degrees in elevation and 30 degrees left or right of center.

Cradle Alignment Light

A green light shall be provided at the turntable control console to indicate when the aerial is aligned for bedding.

Monitor Stow Switch

The control system shall also include a switch to deploy and stow the waterway monitor (if equipped with a pre-piped waterway).

Emergency Stop Switch

An emergency stop switch shall be provided on the console that turns off the controllers and de-energizes the PTO in the event the aerial must be stopped immediately. The system shall include both visual and audible indicators that the switch has been activated.

Durability

The components shall be thoroughly tested and have a proven reliability in severe environments to ensure long life on the fireground. The system shall be capable of operating in a temperature range of -40°C through +85°C.

Diagnostics

The system shall feature diagnostic capabilities that includes an I/O status screen separated by component.

Retraction Stops

The aerial ladder shall have mechanical retraction stops to keep the monitor ahead of the cab.

Automatic Leveling System

The aerial stabilizers shall include an automatic leveling system. The stabilizers shall be semi-automatically controlled by a microprocessor leveling system which can level the chassis within operating range as long as the grade is within the capabilities of the stabilizer system.

The stabilizer leveling system shall be operated by a tethered handheld controller. The controller shall have buttons for individual stabilizer control as well as auto level and auto retract. The system shall require the operator to hold the Auto Level button as it runs through it's process. Releasing the button will cease operations if needed. This controller shall be in addition to standard stabilizer switch panels on the apparatus body.

The tethered control shall be located in storage box for handheld jack control (box is a separate option).

MONITORS

Monitor Finish

The aerial monitor(s) shall be ordered from the OEM manufacturer painted silver.

Electric Monitor

The aerial ladder shall be equipped with an Akron style 3486 StreamMaster II electrically controlled monitor with integrated shut-off valve (AVM) . The monitor shall be made from Akron`s unique lightweight Pyrolite construction to minimize ladder tip loads. The monitor shall be equipped with an Akron style 5177 Akromatic electrically controlled automatic nozzle capable of discharging 250-1,250 gpm at 80 psi nozzle pressure. This waterflow capability shall be available at any extension, elevation, or position. A minimum stability factor of 1.5 to 1 shall be maintained in this configuration.

The operational range of the electric monitor and nozzle shall be 135 degrees through the vertical plane (90 degrees upwards from a line perpendicular to the aerial ladder and 45 degrees downward), and 180 degrees through the horizontal plane (90 degrees to either side of the aerial ladder center line). The monitor shall be able to move in the horizontal and vertical axis simultaneously.

The monitor relay box shall include an electronic control system that is attached to the inlet base of the monitor and be totally encapsulated to prevent moisture intrusion. The monitor shall have fully enclosed motors and gears with built in manual override capability and quick-attach handles. A battery, which continuously charges from the vehicle power system shall provide power for monitor movement. Systems which do not utilize a battery shall not be acceptable due to the higher incidence of failure with this type of system. NO EXCEPTIONS.

Control switches for horizontal movement, vertical movement and pattern selection shall be located at the aerial control console.

Monitor Tip Controls

In addition to the controls at the operator console, electric monitor directional and stream controls shall be installed in close proximity to the monitor on the ladder to allow operation by a firefighter on the ladder.

Shut-Off Valve

The monitor shall have an integrated ball valve to control flow of water to the monitor. The valve shall have a manual gear actuator.

2.5" Valve

An auxiliary 2.5" discharge elbow shall be mounted at the base of the monitor. The outlet shall include a 1/4 turn ball valve.

AERIAL WARNING LIGHTS

LED Outrigger Lights (4)

Four (4) Whelen M6V2RC Super LED red light heads with clear lens shall be provided. The rectangular lights shall include chrome flanges. The lights shall be surface mounted on the outrigger covers in compliance with current NFPA 1901. Warning and ground lights shall be activated when outrigger is deployed.

Warning Lights

Two (2) Whelen ION-T Series model TLI Super LED light heads shall be provided. The lights shall be RED with CLEAR lenses. The lights shall include chrome flanges where applicable.

Location: [#LOC].

AERIAL LIGHTING

Ladder Climbing Lights

A Luma-Bar Pathfinder LED lighting system shall be provided to illuminate the climbing area inside both sides of each ladder section. The strip type lights shall be located above ladder rung level and directed toward the centerline of the ladder to reduce glare. The lights shall be mounted to a 1.25" x .5" x .125" extruded aluminum channel and wired to not be an obstruction during climbing. The lights shall be controlled with the ladder lights switch at the operator`s control console.

The LED lights shall be Blue.

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Whelen Pioneer 120V LED Flood Light

A Whelen Pioneer Plus series 120V LED flood light shall be provided on a Whelen permanent mount non-telescoping base. The rectangular extruded light fixture with die cast end caps shall measure 14" wide by 4-5/8" high by 3" deep and have a white powder coat finish. The light fixture shall have a dual panel (4) clusters of LED lamps with molded vacuum metalized reflector that draws 1.25 amps and produce 11,000 usable lumens.

The light assembly shall be mounted at the tip of the aerial as specified. The base shall allow for 360-degree rotation of the light. A locking knob shall hold the pole at the desired angle. The light shall be fitted with a weather-resistant switch to control the light when the aerial power circuit is activated.

Location: left side tip of base section, right side tip of base section.

Base Flood/Spot Light

A pair of 12V FireTech model FT-WL3500-FT-W LED flood/spot lights shall be provided on the base section of the aerial device. Includes hardwired switch at turntable console.

Tip Light

A 12V FireTech model FT-WL-X-9-FT-W-SH LED combination spot / flood light with white housing shall be provided on the aerial device. The light shall produce 7,200 lumens and draw 4.3 amps. Includes switch on lighthead at turntable console. The light shall be located left side tip, right side tip.

WATERWAY OPTIONS

Pinned Waterway Upgrade

A remote-controlled monitor/nozzle assembly shall be attached to a ladder fly section through C-channel slide pads which shall allow the monitor/nozzle assembly to be positioned at the tip of a section for maximum master stream reach or at the tip of the next section down for unobstructed rescue capabilities. The monitor/ nozzle assembly shall be pinned at either operating location with a single stainless steel "T" handle locking ball pin. A monitor control station shall be attached to the sliding monitor/nozzle assembly and shall move with it.

The turntable monitor controls shall be connected to the sliding monitor system using an electronic multiplexing system that sends all monitor control signals over a shielded pair of wires through a spring retract electric cable reel. The collector rings in the cable reel shall be specifically designed for accurate transmission of electronic signals.

A gel-cell rechargeable battery shall be located on the sliding monitor assembly. A dedicated ground wire and 12VDC positive charging wire shall be routed from the turntable control station through the electric cable reel to the monitor battery. The charging wire shall be directly connected to the chassis 12VDC battery system through a 20 amp auto reset circuit breaker.

The moveable monitor/nozzle assembly shall be capable of flowing from 300 gpm to 1000 gpm while maintaining a constant 80-100 psi nozzle pressure for maximum stream projection.

Rear Inlet Valve

A valve shall be installed in the waterway to permit the rear inlet to be used as a discharge. The valve control shall be rear mounted and labeled to indicate open or closed.

Waterway Inlet

One (1) 4" inlet shall be provided at the rear of the apparatus and shall be connected to the vertical pedestal waterway piping to supply water to the aerial waterway from an outside source. All fabricated piping shall be constructed of a minimum of Schedule 10 stainless steel piping to help prevent corrosion. The threads shall be NST. A long handle chrome plated 4" NST cap shall be installed on the inlet.

Waterway Relief

The aerial waterway pressure relief valve shall be a Trident AirMax with dual valves in place of standard. The system shall include a control panel with adjustment knob and pressure gauge.

Waterway Pressure Gauge

Innovative Controls TC Series 2.5" (63MM) waterway inlet pressure gauge (0-400) shall be provided. Each gauge shall have a glass-filled nylon case, a clear scratch-resistant lens, and a highly-polished stainless steel bezel.

The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve-identifying verbiage and/or color labels.

The gauge shall be fully-filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40°F to +160°F.

Each gauge shall exceed (NFPA 1901 16.12.3.7) ASME B40.100 Grade B requirements (3% 2% 3%) with an accuracy of +/- 1.5% full scale and include an internal thermal expansion bladder that allows the gauge fill to expand in high temperature environments.

The gauges shall also include a KEM-X Socket Saver diaphragm in the stem to eliminate freeze-up and contain a low temperature instrument oil that fills and protects the socket and bourdon tube.

The gauges shall display a range specified with enhanced black markings on a white dial.

MISC AERIAL ELECTRICAL

Aerial Tip Receptacle

A 110 volt twist lock 20 amp receptacle outlet shall be installed at the tip of the aerial device and wired into an apparatus breaker box with a 30 amp breaker. The breaker shall be fitted with a GFI protection feature. The receptacle box shall be fitted with a weather-resistant cover.

AERIAL EQUIPMENT

Axe Bracket

An axe bracket shall be provided on the aerial ladder. The bracket shall be Zico model# H-AB blade guard and PAC TRAC model# 1004 clamp for the handle. The bracket shall be designed to hold a 6 lb. axe and include a pick cover.

Location: left side fly section.

Pike Pole Mount

There shall be an aluminum tube mounted directly on the ladder for storage of a 6` pike pole. The tube shall be located right side fly section.

Rope Roller

A dual rope roller shall be provided to aid in rope rescue operations. The rope roller shall consist of a welded aluminum frame, two aluminum pulleys and a lifting handle. The assembly shall be portable allowing it to be placed in various locations along the ladder. The assembly shall be held in place between rungs through the use of two (2) 1/2" locking pins. The pulleys shall be rated for 250 lbs. each.

Stokes Basket Brackets

Brackets shall be provided to mount a stokes basket to the aerial base section while not in use. Brackets shall hold a CMC Model 726100 stokes. The stokes basket shall mount on the base section on the left side towards rear (over breathing air bottle if equipped). Stokes not included. CR

Lifting Eyes

A pair of lifting eyes shall be located one each side at the ladder tip. The lifting eyes shall be constructed of 6061T6 aluminum and be welded one each side to the tip of the aerial`s fly section main rail. The hole in the eye shall have chamfered edges and be designed to allow attachment of 2" webbing. The lifting eyes shall have a capacity of 250 lbs. each / 500 lbs. Load on eyes and personnel at tip not to exceed rated capacity of the ladder.

Aerial Fly Folding Step

Additional set of folding steps (PR). Locate at base of aerial fly.

Chain Saw Mount

Saw scabbard mounting bracket for chain saw. Mounting bracket for use only at scene not for permanent storage. Includes an angled pocket constructed of stainless steel for inserting the saw while mounted. Located at tip of aerial device (right side).

Spreader Bar with Winch

A removable spreader bar with Harken model 40.2STA 2-speed winch shall be provided for rope rescue operations. A Harken model B10ASG 10" detatchable handle shall be provided for the winch.

The spreader bar shall include two (2) tie-off eyes. Quick release fasteners shall hold the bar in place at the turntable end of the base section handrails.

A storage box shall be provided at the base section of the aerial for the spreader bar and hand crank.

AERIAL LADDER BRACKETS

Roof Ladder Bracket

A lift-out style roof ladder mounting bracket shall be installed on the outside of the ladder base section. The bracket shall be designed to hold a PRL/DRL-16 on right side of base section.

SIGN PLATES

Aerial Sign Plate

Two (2) 22" x 144" x 1/8" (0.125") thick smooth aluminum plates shall be provided. The plates shall have 1" lips top and bottom for rigidity. Each sign plate shall be bolted on either side of the

base section, approximately at the midpoint. The plates shall be provided to display the department`s name or other information. The plates shall be painted Job Color as specified by the customer.

AERIAL TESTING

Third-Party Flow Test

A flow test shall be conducted to determine that the water system is capable of flowing 1,000 gpm at 100 psi nozzle pressure with the aerial device at full extension and elevation. When the aerial apparatus is equipped with a fire pump, the test shall be conducted using the onboard pump. Intake pressure for the onboard pump shall not exceed 20 psi.

In addition to the flow test, a hydrostatic test shall be done on the waterway system. The permanent water system, piping, and monitor shall be hydrostatically tested at the maximum operating pressure required to flow 1,000 gpm at 100 psi nozzle pressure at maximum elevation and extension.

These results shall be certified by an independent, third-party testing organization, per NFPA 16.13.1 through 16.13.1.3.

Aerial Certification

The aerial device shall be tested in compliance with the edition of NFPA documented elsewhere in these specifications.

Upon satisfactory completion of all inspections and tests, an independent third-party inspection firm shall submit a certificate indicating that all specified standards have been met.

MISC LOOSE EQUIPMENT

DOT Required Drive Away Kit

Three (3) triangular warning reflectors with carrying case shall be supplied to satisfy the DOT requirement.

EXTERIOR PAINT

Paint Sample Spray Out

A paint sample spray out of the base cab / body paint color will be provided for approval prior to painting. Qty one in BOM will supply a pair of paint samples.

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Paint Valve Ends

The valve ends shall be painted job color.

Painted Pump/Pre-Connect Module(s)

The apparatus pump/pre-connect module(s) shall be painted job color.

The paint process shall match what is applied to the body.

Tip Paint

The tip of the aerial ladder shall be painted job color to assist firefighters in locating the ladder tip. The last three rungs, uprights and beams from the tip shall be painted; including nozzle guard (if equipped).

Painted Header Plate

The roll up door header plates shall be painted job color for all painted roll-up doors.

Paint Chassis Frame Rails

Chassis frame rails, springs, cross-members, fire pump, drivelines, fuel and air tanks, axles, front bumper extensions with brackets and front suction piping (if applicable) shall be painted: FLNA 3225 E-ONE RED.

Paint Custom Cab

The apparatus cab shall be painted Sikkens FLNA 3225 E-ONE RED. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The aluminum cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces. Cab doors and any hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on cab, door jambs and door edges.

Paint process shall feature Sikkens high solid LV products and be performed in the following steps:

- Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.
- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, hand rails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20 degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

Paint Body Large

The apparatus body shall be painted Sikkens FLNA 3225 E-ONE RED. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The aluminum body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces of the body. Any vertically or horizontally hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on body, door jambs and door edges.

Paint process shall feature Sikkens high solid LV products and be performed in the following steps:

- Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.
- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.

- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, hand rails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20 degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

Aerial Paint

The lift cylinders, extension cylinders and upper turntable steelwork (less turntable) shall be painted to match the primary job color.

Air Conditioning Condenser(s)

The air conditioning condenser cover(s) mounted on the roof of the cab shall be painted color: Job Color.

INTERIOR PAINT

Cab Interior Paint

The interior of the cab shall be painted multi-tone gray finish. Prior to painting, all exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

PROTECTIVE COATINGS

LINE-X: Cab Engine Cover Trim

LINE-X package: Cab engine cover overlay trim shall be coated with LINE-X.

Scorpion Bumper Top Perimeter

The top perimeter of the formed heavy duty bumper shall have Job Color Scorpion finish. The finish shall be applied to the top flange, radius and 1" down on the face of the heavy duty bumper front, corners and sides.

LETTERING

Sign Gold Letter [Qty: 50]

Sign Gold letters upto 6" tall shall be applied.

The exact size and location of the letters shall be as specified by the customer.

Lettering Shade and/or Outline [Qty: 50]

Existing letters shall be shaded and/or outlined as specified by the customer to provide a contrast.

STRIPING

Reflective Stripe in Rubrail

The reflective stripe in the body rubrail shall be white.

CAB AND BODY STRIPE

A single Scotchlite stripe, up to 6 inches in width shall be installed on the cab and body . The stripe shall have a hockey style, Z or S style or any other customer specific design style.

The stripe shall be NFPA compliant and the size, color and location shall be as specified by the customer.

CAB AND BODY STRIPE [Qty: 2]

An additional Scotchlite stripe, up to 3 inches in width shall be installed on the cab and body.

The stripe shall be NFPA compliant and the design, size, color and location shall be as specified by the customer.

Rear Body 3M Diamond Grade Striping

Chevron style 3M Diamond Grade striping shall be provided on the rear of the apparatus. The stripes shall consist of 6" Red/Fluorescent Yellow Green alternating stripes in an "A" pattern. The striping shall be located on the rear facing extrusions, panels and doors inboard and outboard of the beavertails if applicable.

Reflective Tape on Stabilizers

The four (4) aerial ladder stabilizers which protrude beyond the side of the body shall be striped with alternating color diamond grade reflective tape. The stripes shall run at a 45 degree angle sloping down and away from the center, forming an "A" shape when viewed from the front or rear of the unit. The reflective material shall meet NFPA 1901 requirements.

Stripe colors to be Red/Fluorescent Yellow Green.

Designated Standing / Walking Area Indication

1" wide yellow perimeter marking consisting of individual Reflexite diamonds shall be applied to indicate the outside edge of designated standing and walking areas above 48" from the ground in compliance with 2016 NFPA 1901. Steps, ladders and areas with a railing or structure at least 12" high are excluded from this requirement.

GRAPHICS

Logo [Qty: 2]

Customer logo supplied to E-ONE`s Graphics department in a digital format to assist with design. Logo to be installed reference graphics layout drawing.

Customer Logo [Qty: 2]

A SignGold customer logo (up to 12") shall be supplied from an existing E-ONE design. The logo shall be located on reference graphics layout drawing.

Graphics Drawing

A graphics drawing shall be provided for the apparatus. The drawing shall include striping, lettering and logos meeting NFPA guidelines. The drawing shall be presented for review and approval by the end user prior to application of the graphics.

Logo

A E-ONE logo with a grey background shall be provided on each of the rear vertical M6 tail light housings.

WARRANTY / STANDARD & EXTENDED

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General 1 Year Warranty

Purchaser shall receive a General One (1) Year or 24,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0001. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Aerial Ladder Structural Warranty

Purchaser shall receive an Aerial Ladder Structure Twenty (20) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0403. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Body Structural (Aluminum) Warranty

Purchaser shall receive a Body Structure (Aluminum) Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0502. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Plumbing and Piping (Stainless Steel) Warranty

Purchaser shall receive a Plumbing and Piping (Stainless Steel) Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0800. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Meritor Rear Axle Warranty

A 5-year/unlimited miles, 5-year parts and 5-year labor rear drive single or rear drive tandem axle warranty shall be provided by Meritor Automotive.

Front Axle Warranty

A 5-year/unlimited miles, 5-year parts and 5-year labor front non-drive steer axle warranty shall be provided by Dana Corporation.

Custom Chassis Warranty

Purchaser shall receive a Custom Chassis One (1) Year or 18,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0101. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Emissions Systems Warranty

Purchaser shall receive a Regulated Emissions Systems Five (5) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0140. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Electrical Warranty

Purchaser shall receive an Electrical One (1) Year or 18,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0201. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Cab Structural Warranty

Purchaser shall receive a Cab Structure Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0602. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Paint and Finish Warranty

Purchaser shall receive a Paint and Finish Ten (10) Years limited warranty in accordance with, and subject to, warranty certificate RFW0710. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

Frame Rail Warranty

Purchaser shall receive a Frame Rail Lifetime (50) Years or 250,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0305. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

SUPPORT, DELIVERY, INSPECTIONS AND MANUALS

Training

The manufacturer shall provide three (3) consecutive days of training covering vehicle maintenance and operational familiarization.

This training shall be provided by a full time, manufacturer employee trainer who specializes in aerial training.

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Pump Panel Approval Drawing

A detailed large scale approval drawing of the pump panel(s) shall be provided. The drawing shall be provided on an purchased unit prior to the construction process.

Approval Drawings

A general arrangement drawing depicting the vehicles appearance shall be provided. The drawing shall consist of left side, right side, front, and rear elevation views.

Vehicles requiring pump controls shall include a general arrangement view of the pump operator`s position, scaled the same as the elevation views.

Approval Drawings - Dash Panel Layout

A detailed large scale approval drawing of the dash/console panel layout shall be provided. The drawing shall be provided on an purchased unit prior to the construction process.

Electronic Manuals

Two (2) copies of all operator, service, and parts manuals MUST be supplied at the time of delivery in digital format -NO EXCEPTIONS! The electronic manuals shall include the following information:

- Operating Instructions, descriptions, specifications, and ratings of the cab, chassis, body, aerial (if applicable), installed components, and auxiliary systems.
- Warnings and cautions pertaining to the operation and maintenance of the fire apparatus and firefighting systems.
- Charts, tables, checklists, and illustrations relating to lubrication, cleaning, troubleshooting, diagnostics, and inspections.
- Instructions regarding the frequency and procedure for recommended maintenance.
- Maintenance instructions for the repair and replacement of installed components.
- Parts listing with descriptions and illustrations for identification.
- Warranty descriptions and coverage.

The electronic document shall incorporate a navigation page with electronic links to the operator`s manual, service manual, parts manual, and warranty information, as well as instructions on how to use the manual. Each copy shall include a table of contents with links to the specified documents or illustrations.

The electronic document must be formatted in such a manner as to allow not only the printing of the entire manual, but to also the cutting, pasting, or copying of individual documents to other electronic media, such as electronic mail, memos, and the like.

A find feature shall be included to allow for searches by text or by part number.

These electronic manuals shall be accessible from any computer operating system capable of supporting portable document format (PDF). Permanent copies of all pertinent data shall be kept file at both the local dealership and at the manufacturer`s location.

NOTE: Engine overhaul, engine parts, transmission overhaul, and transmission parts manuals are not included.

Fire Apparatus Safety Guide

Fire Apparatus Safety Guide published by FAMA, latest edition. This safety manual is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of a fire apparatus and to suggest possible ways of dealing with these situations. This manual is NOT a substitute for the E-ONE`s fire apparatus operator and maintenance manuals or commercial chassis manufacturer`s operator and maintenance manuals.

DEALER PROVISIONS

Loose Equipment

Ground ladders consistent with storage provisions

Ball intake valves (2)

Diagnostic software for engine, transmission, V-Mux, ABS (not to include lap-top/hardware)

Tool Mounting/Outfitting

Per Riverside inventory and compartment layout

Communications Installation

Estimated per Riverside preferred vendor and specification

In-House Warranty Service Agreement