

# Ely Fire Department, NV

## **CHASSIS SPECIFICATIONS**

### **MODEL**

The cab and chassis shall include design considerations for one hundred (100) percent on-road applications, a high horsepower engine, including high speed operations and a consideration for above normal starts and stops. This chassis shall be designed and manufactured for heavy duty service with adequate strength and capacity of all components for the intended load to be sustained. The chassis shall be designed for a duty rating of one hundred (100) percent loaded full time.

### **APPARATUS TYPE**

The apparatus shall be created for the Emergency Services industry and include the functions of an Aerial apparatus. The apparatus shall be equipped with a rear mount aerial ladder, elevating platform or water tower.

### **TRUCK TYPE**

The chassis shall be manufactured as a truck style and designed to include permanently mounted compartments behind the cab, known as the body. The body of the truck shall be supplied and installed by the apparatus manufacturer.

### **AXLE CONFIGURATION**

The chassis shall offer a single rear drive axle with a single front steer axle configuration (4 X 2).

### **GAWR FRONT**

The gross apparatus weight rating and the gross capacity weight rating shall be adequate to carry the weight of equipment and the apparatus, with water tanks full and other tanks at full capacity, miscellaneous equipment and all personnel weights considered as recommended by the most current edition of NFPA 1901.

The chassis front gross axle weight rating (GAWR) shall be 20,000 pounds.

### **GAWR REAR**

The chassis rear gross axle weight rating (GAWR) shall be 31,000 pounds.

### **CAB STYLE**

The cab shall be a custom, enclosed model, built specifically for the fire service by a company specializing in cab and chassis design for all fire service applications.

The cab shall be manufactured for heavy-duty service utilizing adequate strength and capacity for the application of protecting firefighters. The cab shall be of a modular design offering improved strength, durability and reduced weight. The modular design shall allow for faster, less costly replacement of components. Per pound, sheet panel aluminum extrusions offer a higher tensile strength, 45,000 PSI, and yield strength, 40,000 PSI, than that of lower grade sheet such as 3003-H13. For this reason, the cab shall be of aluminum extrusion construction, which shall offer superior strength and the truest, flattest surface ensuring less expensive paint repairs if needed.

## Ely Fire Department, NV

The method of cab construction shall use a process incorporating techniques outlined in accordance with the American Welding Society D1.1-96 requirements for structural steel welding. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side panels shall be assembled using proven industrial adhesives, designed specifically for aluminum fabrication, which exceed the strength of a weld, for construction.

The insulation shall be installed throughout the cab as well as around the engine compartment and tunnel reducing engine noise and offering a quieter cab. All interior and exterior seams shall be sealed for optimum noise reduction in addition to the most favorable efficiency for heating and cooling retention.

The cab shall be constructed of 5052-H32 Marine Grade, .090 of an inch thick, one hundred percent primary aluminum plate. A single formed, one (1) piece extrusion, manufactured from 6061-T6 100 percent primary one-quarter inch thick aluminum shall be used for the "A" pillar adding strength and rigidity to the cab as well as additional roll-over protection.

The cab shall incorporate tongue and groove fitted 6061-T6 0.25 inch thick aluminum extrusions for extreme duty situations. The cab shall include multi-layer composite insulation for improved cab heating and cooling in addition to noise reduction.

Proposals offering products built with anything less than the alloy-temper mentioned or from any other material, other than aluminum, shall not be considered. Additionally, any cabs utilizing recycled or recovered aluminum plate or extrusion products shall not be considered due to impurities in the composition leading to a lack of strength.

The cab shall incorporate a fully enclosed design, allowing for a spacious cab area with no partition between the front and rear sections of the cab. The walls of the vehicle shall include roof supports allowing for an open design. The outside dimension of the cab shall be 96 inches wide with a minimum interior width of 90 inches.

The cab overall length shall be 128.00 inches in length with 54.00 inches from the centerline of the front of the axle to the back of the cab. The cab shall offer an interior height of 58.00 inches from the front floor to the headliner and a rear floor to headliner height of 55.00 inches in the crew area, at a minimum. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

In order to offer the optimum amount of cab space to occupants, there shall be no consideration given for any cab unable to comply with the minimum measurements for interior cab space as listed.

The cab shall include a driver and officer area with two (2) cab door openings. The front door opening shall offer a clear door opening of 43.00 inches wide X 56.00 inches high. The rear door opening shall offer a clear door opening of 34.00 inches wide X 54.00 inches high. This style of cab shall also include a crew area offering up to (8) seating positions.

The cab shall incorporate a (2) step configuration from the ground to the cab floor for each door opening. The lower step shall be constructed of heavy duty safety grating which meets or exceeds Federal Specification RRG-1602-latest revision and performs under dry, greasy, muddy, soapy and icy conditions and offers open drainage.

## Ely Fire Department, NV

The first step for the driver and officer area shall measure 11.44 inches deep X 31.13 inches wide. The height from the ground to the first step shall not exceed 21.00 inches. The intermediate step shall measure 8.75 inches deep X 33.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure 12.13 inches deep X 20.44 inches wide. The height from the ground to the first step shall not exceed 21.00 inches. The intermediate step shall measure 10.50 inches deep X 23.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.50 inches.

### **CAB FRONT FASCIA**

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.090 of an inch thick, one hundred percent primary aluminum plate which shall be attached as the front cab skin to offer an appealing exterior. The cab fascia will encompass the front of the aluminum cab structure at the bottom of the windshield to the lower section of the cab and include a Classic design.

The front fascia will cover the front aluminum cab structure from the bottom of the windshield down to the bottom of the cab. The front cab fascia shall include a cast molded module accommodating up to four (4) Hi/Low beam headlights and two (2) turn signal lights or up to four (4) warning lights.

### **FRONT GRILLE**

The front fascia shall include a box style, stainless steel front grille 39.00 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 632.90 square inches shall be installed on the front of the cab with the upper portion of the grille hinged. The grille shall include two (2) flush push button latches which shall allow access to the front fluid fills of the cab. The front grille shall include a cast diamond shape at the top and offer easy access in examination of and adding engine oil or wiper washer fluid as well as access to the windshield wiper motor and linkage.

### **CAB ENGINE TUNNEL**

The cab interior shall include a fixed type engine tunnel cover sized to accommodate an engine with a small or medium block. The engine tunnel shall be an integral part of the cab constructed of 5052-H32 Marine Grade, .090 of an inch thick, one hundred percent primary aluminum plate. The tunnel shall be a maximum of 41.50 inches wide X 23.00 inches high.

The engine tunnel shall be insulated with multi-layer insulating material, consisting of foam, a sound barrier of 1.00 pounds per square foot with a facing which resists heat transfer. This insulation shall be held in place by adhesive, aluminum stick pins and retention caps. Any exposed insulation seams and edges shall be sealed reducing moisture and debris.

### **CAB ENTRY DOORS**

The cab shall include a driver and officer area with two cab door openings which offer a clear door opening of 40.75 inches wide.

The doors shall be constructed of extruded aluminum with a nominal thickness of .125 inch. The exterior skins shall be constructed of .125 inch aluminum plate. The cab shall include

## Ely Fire Department, NV

four (4) entry doors as high as possible for ease of entering and egress when outfitted with an SCBA.

All cab and crew doors shall be of substantial weight for the optimum strength and rigidity for the best performance in all cab crash testing. Any cab with front and crew doors manufactured of less than the material thickness of .125 inch in both the extrusion and exterior skin shall not be considered.

The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a weather tight fit.

All door hinges shall be hidden within flush mounted cab doors for a pleasing smooth appearance and perfect fit along each side of the cab. Each hinge shall be .375 inch piano style and be constructed of stainless steel.

The piano style hinge and hidden flush mounted door is the most favorable construction keeping dirt and debris out of the hinge allowing for optimum operation throughout the lifetime of the door.

Proposals offering door hinge thickness any less than stated shall not be considered.

Proposals including doors that do not comply with the flush mounting as described or those including exposed hinges shall not be considered.

### **CAB ENTRY DOOR TYPE**

All entry doors shall be of a flush, full height design and shall be located on the sides of the cab.

### **CAB STRUCTURAL WARRANTY**

The cab structure shall be warranted for a period of ten (10) years. Warranty conditions may apply and shall be listed in the detailed warranty document that shall be provided upon request.

### **CAB CRASH TEST ECE-29**

Spartan Chassis, Inc. has successfully submitted their extruded flat floor cab to the International crash test ECE-29, Addendum 28, revision 1. As part of the ECE regulation 29 test, the frontal area of the cab is struck by a 3,700 pound pendulum weight. The weight is brought back to a sixty degree angle and then the weight is released and allowed to swing forward, imparting some 32,600 lb.ft. of force to the cab front face. The cab must be so constructed that after the test, there will be minimal intrusion of cab structure into the passenger area. Note: After the test the Spartan cab doors remained usable for both entry or exit. Also, as part of the test the cab roof must withstand a static load bearing test. The Spartan cab withstood a weight of over 60,000 pounds without permanent damage or collapse. The above tests were witnessed by and attested to by an independent third party. The test results were recorded on/by cameras, high speed imagers, accelerometers and strain gauges. Notarized copies of the letters verifying the test results and videos of said test are available upon request.

# Ely Fire Department, NV

## **CAB PAINT EXTERIOR**

The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.

All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.

The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper, the seams shall be sealed with SEM brand seam sealer and painted with two (2) to four (4) coats of an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene.

The cab shall then be painted with the upper and lower colors specifically designated by the customer with a minimum thickness of two 2.00 mils of paint, followed by a clear top coat not to exceed 2.00 mils.

## **CAB PAINT MANUFACTURER**

The cab shall be painted with PPG Industries paint.

## **CAB PAINT PRIMARY COLOR**

The paint color shall be White.

## **CAB EXTERIOR PAINT WARRANTY**

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for 10 years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first.

## **LOW VOLTAGE ELECTRICAL SYSTEM**

The chassis shall include a single starting electrical system which shall include a 12 volt direct current system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275 degree Fahrenheit minimum high temperature flame retardant loom.

## **OEM CUSTOM WIRING**

The wiring system shall include a custom wiring package which includes an extension for the aerial portion of the vehicle as well as a custom interface harness specific to and provided by the body manufacturer which includes rocker style switches on the driver side of the switch panel.

# Ely Fire Department, NV

## **APPARATUS WIRING PANEL**

An apparatus wiring panel shall be installed on the officer side bulkhead below the dash which shall include (8) each open circuits with three (3) each 20.00 amp, (1) each 30.00 amp, (3) each 10 amp and (1) each 15 amp relay and breaker with trigger wires which shall be connected to the rocker switch panel.

## **POWER AND GROUND STUD**

A 40 amp battery direct power and ground stud shall be provided and installed in the electrical distribution panel. The stud shall be size #10 and protected with a 40 amp circuit breaker.

## **ENGINE**

The power plant for the vehicle shall offer a high pressure performance, turbo charged engine which shall feature a high pressure common rail fuel system. This system shall be coupled a turbo which shall deliver performance at ratings up to 400 HP.

The engine shall be EPA certified to meet the very latest emissions standards without compromising performance, reliability or durability. The Caterpillar C9 engine shall feature an air charge cooled engine which consists of an in line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 400 horse power at 2100 RPM which shall be governed at 2300 RPM. The torque rating shall feature 1250 foot pounds of torque at 1440 RPM with 537 cubic inches of displacement. The Caterpillar C9 engine shall feature an electronic governor.

A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.

The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

The Caterpillar engine shall include an engine coolant filter with a shut-off valve. The location of the filter shall allow for easy maintenance.

Proposals offering engines equipped with coolant filters shall be supplied with standard non-chemical type particulate filters.

## **ENGINE HIGH IDLE SPEED**

The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.

## **ENGINE PROGRAMMING**

The engine programming which governs the top speed of the vehicle shall be disabled.

# Ely Fire Department, NV

## **AUXILIARY ENGINE COMPRESSION BRAKE**

The engine shall utilize a variable geometry turbo (VGT) which shall slow the engine. The VGT engine brake shall be an integral part of the turbo and shall offer a variable rate of exhaust flow. The VGT engine brake shall activate upon 0% accelerator when in operation mode. A dash mounted switch with on/ off and high/ low functions shall be installed in the interior of the cab within easy reach of the driver or officer.

## **AUXILIARY ENGINE BRAKE CONTROL**

An engine variable geometry turbo brake control device shall be included. The control device shall be electronic and shall prevent the activation of the engine compression brake during operating wherein undesirable conditions will result if the engine brakes are active. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected: a valid gear ratio is detected; the driver has requested or enabled engine compression brake operation; the throttle is at a minimum engine speed position; and the electronic controller is not presently attempting to execute an electronically controlled final drive gear shift. The variable geometry turbo brake control shall be controlled through an on/off rocker switch.

## **FORWARD FLUID FILLS**

The front of the chassis shall accommodate fluid fills for the engine oil, the windshield washer fluid and the power steering fluid through the grille. This area shall also accommodate checks for the engine oil, and power steering fluid.

## **ENGINE BLOCK HEATER**

A 1500 watt, 120 volt engine coolant heater with automatic thermostat shall be installed. The block heater shall be connected to the electrical inlet.

## **ENGINE PROGRAMMING REMOTE THROTTLE**

The engine remote throttle control harness programmed "ON".

## **ENGINE WARRANTY**

The Caterpillar C9 engine shall be warranted, in accordance for a fire apparatus, for a period of five (5) years or 6000 operating hours, whichever occurs first.

## **COOLING SYSTEM FAN**

The engine cooling system shall incorporate a heavy-duty composite fan which shall be belt driven on the engine.

## **ENGINE COOLING SYSTEM**

There shall be a heavy-duty aluminum cooling system designed to meet the demands of the fire industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall utilize heavy-duty welds and be mounted to isolate the entire system from any vibration or stress. The

## Ely Fire Department, NV

individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.

The cooling system shall be comprised of a stacked, single depth package that provides the maximum cooling capacity for the specified engine as well as offers excellent serviceability. The main components shall include a surge tank, charge air cooler, recirculation shield, radiator and transmission cooler. The system shall utilize a surge tank and shall include a coolant overflow tank as an option.

Proposals unable to offer a stacked single depth cooling package shall not be considered.

There shall be a single depth core that allows greater efficiency, enhanced serviceability, and lighter weight with a higher ambient capability. The individual cores shall be mounted to allow expansion and contraction at various rates without inducing stress into the adjoining core.

The system shall be compact enough to be removed through the grille area rather than lifting the entire package over the engine. The cooling package core shall not protrude below the frame of the vehicle by more than 1.1 inch. This feature shall improve the angle of approach thereby reducing possible damage.

The radiator shall be a cross-flow design constructed completely of aluminum with welded side tanks. The radiator shall include a minimum of a 627 square inch core and shall be bolted to the bottom of the charge air cooler to allow a single depth core, thus allowing a more efficient and serviceable cooling system. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

The cooling system shall be equipped with a surge tank that is capable of being filled and removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a cap that meets the engine manufactures pressure requirements as well as the system design requirements.

All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance. When a center hose well is installed an additional shield may be required to redirect the airflow into the coolers.

The charge air cooler shall be a cross-flow design constructed completely of aluminum with welded side tanks. The charge air cooler shall have a minimum of a 390 square inch core and be bolted to the top of the radiator to allow a single depth core, thus allowing a more efficient and serviceable cooling system.

All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel "constant torque" style clamps meeting the engine manufactures requirements.

### **ENGINE COOLANT**

The cooling package shall include Extended Life Coolant (ELC) installed. The use of ELC provides longer life and change intervals providing improved performance. The coolant shall contain propylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees F.

## Ely Fire Department, NV

Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.

### **LOW COOLANT INDICATOR LIGHT AND TONE ALARM**

The instrument panel shall feature a low engine coolant indicator light which shall be located in the center of the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.

### **ENGINE PUMP HEAT EXCHANGER**

A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. The heat exchanger shall be designed to prohibit water from the pump from coming in contact with the engine coolant. This shall allow the use of water from the discharge side of the pump to assist in cooling the engine.

### **COOLANT HOSES**

The cooling systems hose shall be formed silicone hose and formed aluminized steel tubing and include with stainless steel constant torque clamps.

### **ENGINE AIR INTAKE**

The engine air intake system shall include an ember separator air intake filter which shall be located in the front of the cab behind the officer side fascia. This filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a galvanized steel frame. This multilayered screen shall be designed to trap embers or allow them to burn out before passing through the pack, while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.

The engine shall also include an air intake filter which shall be bolted to the frame and located under the front of the cab on the officer side. The completely disposable dry type filter shall ensure containment of dust and debris safely contained inside the disposable housing, eliminating the chance of contaminating the air intake system during air filter service via a leak-tight seal.

The air flow distribution and dust loading shall be uniform throughout the high-performance filter cone pack, which shall result in increased capacity and lower pressure differential for improved horsepower and fuel economy. The air intake shall be mounted within easy access via a hinged panel behind the headlight module. The air intake system shall include a restriction indicator light in the warning light cluster which shall activate when the air cleaner element requires replacement.

The charge air cooler hose shall be formed from aluminized steel tubing and include silicone hump hose with stainless expansion rings and stainless steel "constant torque" style clamps meeting the engine manufactures requirements.

Proposals shall include an indication light representative of the need for replacement of the air intake filter and shall be located at the front of the vehicle.

# Ely Fire Department, NV

## **EXHAUST SYSTEM**

The exhaust system shall include a diesel particulate filter and a diesel oxidation catalyst to meet current EPA standards. The system shall be designed and installed using 0.065 inch aluminized steel plumbing from the diesel particulate filter to the discharge which shall terminate horizontally on the officer side of the vehicle ahead of the rear tires. The exhaust system shall be mounted on the underside of the frame outboard, maximizing space for the body compartments. All joints along plumbing following the diesel particulate filter shall be connected with lapping band style clamps.

The system shall include a 5.00 inch diameter plumbing which shall be 0.065 inch thick stainless steel exhaust between the engine turbo and the diesel particulate filter. The tubing shall include a thermal cover in order to retain heat between the engine turbo and diesel particulate filter. The entire exhaust system shall be bolted to the frame and include system joints connected with zero leak clamps between the turbo and diesel particulate filter.

## **TRANSMISSION**

The drive train shall include an Allison Gen IV model EVS 3000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

The transmission shall include two (2) internal oil filters which shall offer Castrol Transyd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

The transmission gear ratios shall be:  
1<sup>st</sup>- 3.49:1; 2<sup>nd</sup>- 1.86 to 1; 3<sup>rd</sup>- 1.41 to 1; 4<sup>th</sup>- 1.00 to 1; 5<sup>th</sup>- 0.75 to 1; 6<sup>th</sup>-0.64 to 1 (if applicable); Rev- 5.03 to 1.

## **TRANSMISSION MODE PROGRAMMING**

The transmission, upon start-up, will select the fifth speed operation without the need to press the mode button.

## **ELECTRONIC LOW TRANSMISSION OIL LEVEL INDICATOR**

The transmission fluid shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal.

## **TRANSMISSION SHIFT SELECTOR**

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach.

## **TRANSMISSION PRE-SELECT WITH AUXILLIARY BRAKE**

When the auxiliary brake is engaged, the transmission shall automatically seek shifting to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle speed.

# Ely Fire Department, NV

## **TRANSMISSION WARRANTY**

The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.

## **TRANSMISSION COOLING SYSTEM**

The transmission shall include an air to oil cooler integrated into the lower portion of cooling package. The transmission cooling system shall meet all transmission manufacturer requirements. The cooling system shall feature a circuit provision located within the hydraulic transmission oil which shall provide for rapid warm up to the optimum transmission operating temperature.

Proposals offering water to oil style transmission cooling systems shall not be accepted.

## **DRIVELINES**

All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. A splined slip joint shall be provided in each driveshaft and shall be coated with Glide coat<sup>®</sup>.

## **DRIVELINE PUMP**

A mid-ship split shaft pump shall be installed by the apparatus manufacturer. The chassis manufacturer shall not provide any driveline provisions for the pump installation.

## **FUEL FILTER/WATER SEPARATOR**

The fuel system shall have a Fleetguard FS1242 fuel filter/water separator as a primary filter. The fuel filter shall have a see through cover to allow visual inspection of fuel and filter condition and a drain valve.

A secondary fuel filter with manual fuel primer capabilities shall be included as approved by the engine manufacturer.

## **FUEL LINES**

The fuel system lines shall be black textile braid covered high tensile steel reinforced wire braided supply and return hoses with steel reusable fittings installed from the tank to engine.

## **FUEL COOLER**

An aluminum cross flow air to fuel cooler shall be provided to lower fuel temperature allowing the vehicle to operate at higher ambient temperatures.

## **FUEL TANK**

The fuel tank shall have a minimum capacity of fifty (50) gallons and measure 35.00 inches wide X 15.00 inches high X 24.00 inches long. The baffled tank shall be made of 14 gauge aluminized steel. The tank exterior is painted with a PRP Corsol™ black anti-corrosive exterior metal treatment finish. This results in a tank which offers the internal and external corrosion resistance.

## Ely Fire Department, NV

The fuel tank shall be mounted 2.00 inches below the frame, behind the rear axle. The tank can be easily lowered and removed for service purposes.

The tank shall have a vent port to facilitate venting to the top of the fill neck for rapid filling without "blow-back" and a roll over ball check vent for temperature related fuel expansion and draw.

The tank is designed with dual draw tubes and sender flanges. The tank shall have 2.00 inch NPT fill ports for right or left hand fill. A 0.5 inch NPT drain plug shall be centered in the bottom of the tank.

### **FUEL FILL PROVISIONS**

The fuel tank fill ports shall be offset with the left fill port located in the forward position and the right fill port located in the rear position.

### **FRONT AXLE**

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-20. The axle shall include a 3.74 inch drop and a 71.50 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle. The axle shall have a nominal track of 84.25 inches.

### **FRONT WHEEL BEARING LUBRICATION**

The front axle wheel bearings shall be lubricated with clear oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.

### **FRONT SHOCK ABSORBERS**

Two (2) Bilstein inert, nitrogen gas filled shock absorbers shall be provided and installed as part of the suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.

The ride afforded through the use of a gas shock is more consistent and shall not deteriorate with heat, the same way a conventional oil filled hydraulic shock would.

The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort without compromise. The working piston design shall feature fewer parts than most conventional twin tube and "road sensing" shock designs and shall contribute to the durability and long life of the Bilstein shock absorbers.

Proposals offering the use of conventional twin tube or "road sensing" designed shocks shall not be considered.

### **FRONT SUSPENSION**

The front suspension shall include three (3), 54.00 inch long and 4.00 inch wide taper leaf springs with a military double wrapped front eye. Both spring eyes shall have a case

## Ely Fire Department, NV

hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 22,000 pounds.

### **STEERING COLUMN/ WHEEL**

The cab shall include a Douglas Autotech steering column shall be a seven (7) position tilt and 2.25 inch telescopic type with an 18.00 inch steering wheel located on the left side of the cab designating the driver's position. The steering wheel shall be covered with black absorbite padding.

The steering column shall contain a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

### **POWER STEERING PUMP**

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type.

### **ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR**

The power steering fluid shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal.

### **FRONT AXLE CRAMP ANGLE**

The chassis shall have a front axle cramp angle of 48 degrees to the left and 44 degrees to the right.

### **CHASSIS ALIGNMENT**

The chassis frame rails shall be cross checked to insure the length and to make sure each is square. The front and rear axles shall be laser aligned, additionally the tires and wheels shall be aligned and toe-in set on the front tires. The completed apparatus shall be rechecked for proper alignment once the chassis has been fully loaded.

### **REAR AXLE**

The rear axle shall be a Meritor model number RS-30-185 single drive axle. The axle shall offer the widest range of ratios available, providing for compatibility engines to ensure maximum fuel efficiency and performance. The axle shall feature a life housing design with a standard 0.56 inch wall thickness.

The axle shall feature precision forged differential gears and shall have a rated capacity of 31,500 pounds.

### **REAR WHEEL BEARING LUBRICATION**

The rear axle wheel bearings shall be lubricated with oil.

### **REAR AXLE DIFFERENTIAL LUBRICATION**

The rear axle differential shall be lubricated with oil.

# Ely Fire Department, NV

## **VEHICLE TOP SPEED**

The top speed of the vehicle shall be approximately 68 MPH +/-2 MPH at governed engine RPM.

## **REAR SUSPENSION**

The single rear axle shall feature a Reyco 79KB vari-rate, self-leveling captive slipper type spring suspension, with 57.50 inch X 3.00 inch springs. One (1) adjustable and one (1) fixed torque rod shall be provided.

The rear suspension capacity shall be rated from 21,000 to 31,000 pounds.

## **FRONT TIRES**

The front tires shall be Michelin 425/65R22.5 "L" tubeless radial XFE regional tread.

The front tire stamped load capacity shall be 22,800 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

The front tire US Fire Service Intermittent Usage load capacity shall be 22,800 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

## **REAR TIRES**

The rear tires shall be Michelin 315/80R-22.5 20PR "L" tubeless radial XDN2 Grip all weather tread.

The rear tire stamped load capacity shall be 33,080 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 130 pounds per square inch.

The rear tire US Fire Service Intermittent Usage load capacity shall be 33,080 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 130 pounds per square inch.

## **FRONT WHEELS**

The front wheels shall be Accuride hub piloted, 12.25 inch X 22.50 inch polished aluminum wheels. The wheels shall be forged from a single piece of aluminum which shall be corrosion resistant, engineered to be lightweight and provide exceptional performance.

## **REAR WHEEL**

The rear wheels shall be Accuride hub piloted, 9.00" x 22.5" polished aluminum wheels.

## **WHEEL TRIM**

The front wheels shall include stainless steel lug nut covers and stainless steel baby moons with cutouts for oil seal viewing (there shall be no cutout on front drive or IFS axles). The covers and baby moons shall feature a mirror shine finish and shall be shipped loose with the chassis for installation by the apparatus builder.

## Ely Fire Department, NV

The rear wheels shall include stainless steel lug nut covers and band mounted spring clip stainless steel high hats, also in a mirror shine finish, which shall be shipped loose with the chassis for installation by the apparatus builder.

The lug nut covers, baby moons, and high hats shall be RealWheels® brand, and constructed of 304L grade, non-corrosive stainless steel meeting D.O.T. certification standards.

### **BRAKE SYSTEM**

A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a controlled service brake application during an unlikely event including primary air supply loss.

The rear axle spring brakes shall automatically apply in any situation when the air pressure loss below 25 PSI with a mechanical means for releasing the spring brake chambers if necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.

A four (4) sensor, four (4) modulator anti-lock braking system (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

### **FRONT BRAKES**

The front brakes shall be Meritor 16.5" x 6" S-cam drum type.

### **REAR BRAKES**

The rear brakes shall be Meritor 16.50 inch X 7.00 inch S-cam drum type.

### **PARK BRAKE**

Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements.

In addition to the mechanical rear brake engagement, the front service brakes will also engage via air pressure, providing additional braking capability.

### **PARK BRAKE ACTUATION VALVE**

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake system. The control shall be yellow in color.

## Ely Fire Department, NV

The parking brake actuation valve shall be mounted on the driver's dash within easy access.

### **FRONT BRAKE SLACK ADJUSTERS**

Haldex front brake automatic slack adjusters shall be installed on the chassis.

### **REAR BRAKE SLACK ADJUSTERS**

Haldex rear brake automatic slack adjusters shall be installed on the chassis.

### **AIR DRYER**

The brake system shall include a Wabco System Saver 1200 air dryer. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be located on the right frame rail behind the officer step.

### **AIR COMPRESSOR**

The air compressor provided for the engine shall be a two (2) cylinder reciprocating Caterpillar® 270 compressor which shall be capable of producing a minimum of 16.1 CFM. The compressor shall consist of a water cooled cylinder head, a cooling plate, valve plate assembly and an integral air cooled crankcase and cylinder block.

### **AIR GOVERNOR**

An air governor which shall cut-in and cut-out pressures on the vehicle shall be provided and shall be adjusted so that the maximum pressure in the air system and the minimum cut-in pressure. The air governor shall be located on the air cleaner bracket on the right frame rail behind the officer step.

### **AIR SUPPLY MOISTURE EJECTORS**

Manual drain valves shall be installed on all reservoirs of the air supply system.

### **AIR SUPPLY LINES**

A dual air system plumbed with color coded reinforced nylon tubing air lines shall be installed on the chassis. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) will be blue.

Brass compression type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.

### **REAR AIR TANK MOUNTING**

The air reservoir located towards the rear of the chassis shall be installed parallel to the frame.

### **WHEELBASE**

The chassis wheelbase shall be 216.00 inches.

# Ely Fire Department, NV

## **REAR OVERHANG**

The chassis rear overhang shall be 100.00 inches.

## **FRAME**

The frame shall consist of triple side rails and cross members forming a ladder style frame. The sides of the rails shall be constructed of "C" channel, 10.25 inches high X 3.5 inches deep X .38 inches, 110,000 psi minimum yield high strength low alloy steel. A third rail, 8.55 inches high X 2.75 inches deep X .25 inches shall be added extending from the rear of the cab to the front rear spring hanger. Each rail shall be considered on the following key items: Each rail shall be rated by a Resistance Bending Moment (RBM) minimum of 3,377,000 inch pounds and have a minimum section modulus of 16.64 cubic inches calculated by the radius method. The frame shall measure 30.70 inches in width.

RBM refers to the measure of stiffness of a cross section relative to the yield stress of the material the frame is manufactured from.

Every cross sectional profile of an object has a measure of its mechanical properties based on its shape. These properties of its shape can be broken down relative to the horizontal and vertical direction, represented as  $I_{xx}$  and  $I_{yy}$ . These act as a measure of the shape's resistance to bending.

The section modulus of mass of this profile takes into consideration the stresses imposed on this profile when a load is applied, by considering the maximum distance from the center of the profile to its outer most extremity. Section modulus is a method of measurement for the relative stiffness of a beam section and is based on the horizontal and vertical directional value plus the distance from the center of mass to the extremities of the cross section from the coordinate axis, such that  $Z_{yy} = I_{yy}/Y$  and  $Z_{xx} = I_{xx}/X$ .

Proposals calculating the frame strength using the "box method" shall not be considered.

Proposals including heat treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

A minimum of seven (7) fully gusseted 0.25 inch thick cross members shall be installed. The inclusion of the engine mounting, body mounting, pump mounting or bumpers shall not be considered as a cross member. The cross members shall be attached using grade 8 flanged head bolts and flanged lock nuts. Each cross member shall be mounted to the frame rails a minimum of utilizing 0.25 inch gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.

Any proposals not including additional reinforcement for each cross member shall not be considered.

All holes for bolts shall be drilled into the frame rails, preventing fracture or fatigue. Each hole shall be custom placed relative to its component preventing unnecessary holes that present fatigue along each frame rail.

The frames proposed shall be custom drilled for each component and shall not include any unnecessary holes.

## Ely Fire Department, NV

All relief areas shall be cut in with a minimum 2.00 inch radius at intersection points with the edges ground to a smooth finish to prevent a stress concentration point.

The frame and cross members shall carry a lifetime warranty to the original purchaser. A copy of the frame warranty shall accompany the bid.

Proposals offering warranties for frames not including cross members shall not be considered.

### **FRAME MODIFICATION OPTIONS**

The cross members following the transmission, throughout the length of the frame shall be inverted accommodating additional room for a rear mount pump application. The frame shall also include drillings accommodating the body compartments throughout the length of the frame.

### **FRAME PAINT**

The frame shall be powder coated prior to any attachment of components.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance, per ASTM D2794, shall have a direct impact resistance of 120.00 inches per pound at 2 mils. The salt spray resistance per ASTM B-117-97 shall pass 500 hours of salt spray test. The applied process shall allow the application of other products over it and still maintain or exceed the 500 hours salt spray test.

Any proposals offering painted frame with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.

### **FRAME WARRANTY**

The frame and cross members shall carry a lifetime warranty to the original purchaser.

### **FRONT BUMPER**

A one piece, two (2) rib wrap-around style, polished stainless steel front bumper shall be provided. The material shall be 10 gauge 304 stainless steel, 12" high and 101" wide.

### **FRONT BUMPER EXTENSION LENGTH**

The front bumper shall be extended 24.00 inches ahead of the cab.

### **AIR HORNS**

The front bumper shall include two (2) Hadley brand air horns which shall measure 24.00 inches long with a 6.00 inch round flare. The air horn shall be a trumpet style and shall include a chrome finish.

# Ely Fire Department, NV

## **AIR HORN LOCATION**

The air horns shall be recess mounted in the front bumper face, (1) on the driver side of the bumper in the outboard position relative to the left hand frame rail and (1) on the officer side of the bumper in the outboard position relative to the right hand frame rail.

## **AIR HORN AIR RESERVOIR**

One (1) air tank, with a 1200 cubic inch reservoir, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

## **CAB TILT SYSTEM**

The entire cab shall be capable of tilting 45.00 degrees to allow for easy maintenance of the engine and transmission. The lift system shall include an ignition interlock and red lock down indicator lamp, which shall illuminate when holding the "Down" switch to indicate safe road operation. It shall be necessary to activate the master battery switch with the park brake set in order to tilt the cab. Two cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab pivots shall be 1.90" ball and be anchored to frame brackets with 1.25" diameter studs.

Two (2) spring loaded hydraulic hold down hooks located outboard of the frame which shall be installed designed for holding the cab securely to the frame. A steel safety assembly shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety assembly shall fall over the lift cylinder when the cab is in the "Up" position. A cable release system shall also be provided to clear the safety assembly from the lift cylinder when lowering the cab.

## **CAB TILT CONTROL RECEPTACLE**

The cab tilt shall include a receptacle which shall be temporarily located on the right hand chassis rail rear of the cab to provide a place to plug in the cab tilt remote control pendant. The tilt pump shall include 8.00 feet of cable with a 6-pin Deutsch connector that includes a cap. The remote control pendant shall also include 20.00 feet of cable which also includes a mating connector.

## **CAB WINDSHIELD**

The cab windshield shall have a maximum of 2808 sq. in. area and be of the wraparound design, 52.00 inches wide X 27.00 inches high for maximum visibility. The distance from the Driver or Officer to the front windshield shall be a minimum of 42.00 inches at the furthest seated position. This distance shall ensure the safety of the Driver and Officer from intruding objects in the unlikely event of a head on collision. All glass utilized for the windshield or windows shall include an automotive tint. The left and right windshield shall use the same interchangeable glass.

Each proposal shall include the left and right windshield shall be fully interchangeable thereby minimizing maintenance costs. All proposals offering windshields not in compliance with the minimum measurement of viewing area stated above and are not fully interchangeable shall not be considered.

# Ely Fire Department, NV

## **CAB GLASS FRONT DOOR**

The front cab doors shall include a window which is 26.00 inches wide X 31.00 inches high. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished manually utilizing a crank style handle on the door. The front cab door windows shall be mounted in a black anodized aluminum frame with lower drain slots.

There shall be a right angle triangular shaped fixed window which shall measure 2.50 inches wide at the top, 8.00 inches wide at the bottom X 26.00 inches high, more commonly known as "cozy glass" ahead of the front cab door windows. These windows shall be mounted in a rubberized frame.

The glass utilized for these windows shall include a green automotive tint unless otherwise noted.

## **WINDOW TINT FRONT**

The cab windshield shall have a standard green automotive tint which shall allow seventy-five (75) percent light transmittance.

The cab driver and officer door glass shall have a standard green automotive tint which shall allow seventy-five (75) percent light transmittance.

## **CAB GLASS REAR DOOR OFFICER SIDE**

The rear officer's side crew door shall include a window which is 26.00 inches wide X 31.00 inches high. This window shall have the capability to roll down completely within the door housing. This shall be accomplished manually utilizing a crank style handle on the inside of the door. The window shall be mounted in a black anodized aluminum frame with lower drain slots. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

## **WINDOW TINT OFFICER SIDE**

The officer side window shall include a standard green automotive tint which shall allow seventy-five (75) percent light transmittance.

## **CAB GLASS REAR DOOR DRIVER SIDE**

The rear driver's side crew door shall include a window which is 26.00 inches wide X 31.00 inches high. This window shall have the capability to roll down completely within the door housing. This shall be accomplished manually utilizing a crank style handle on the inside of the door. The window shall be mounted in a black anodized aluminum frame with lower drain slots. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

## **WINDOW TINT DRIVER SIDE**

The driver side window shall include a standard green automotive tint which shall allow seventy-five (75) percent light transmittance.

# Ely Fire Department, NV

## **CAB GLASS SIDE MID OFFICER SIDE**

The cab shall include a window on the officer's side behind the front and ahead of the crew doors which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

## **WINDOW TINT MIDDLE OFFICER SIDE**

The window on the officer side of the cab located between the driver and officer doors shall include a standard green automotive tint which shall allow seventy-five (75) percent light transmittance.

## **CAB GLASS SIDE MID DRIVER SIDE**

The cab shall include a window on the driver's side behind the front door and ahead of the crew door and above the wheel well which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

## **WINDOW TINT MIDDLE DRIVER SIDE**

The window on the driver side of the cab located between the driver and officer doors shall include a standard green automotive tint which shall allow seventy-five (75) percent light transmittance.

## **CAB WALL INSULATION**

All seams throughout the entire cab structure shall be completely sealed. The cab walls shall include 0.50 inch thick foam insulation. The insulation shall include an aluminum foil back which includes grid reinforcement and shall be installed and completely sealed. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

The cab shall also include additional insulation throughout the interior which shall mute road noise and offer a quieter interior. The additional insulation shall contribute to higher heating and cooling efficiency and assist in sustaining a more concurrent interior temperature.

## **ENGINE TUNNEL INSULATION**

The exterior of the cab tunnel surrounding the engine shall include reinforced closed cell foam insulation. The insulation shall measure 1.00 inch thick and shall include a foil backing and grid reinforcement. The foam shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation under the tunnel shall act as a noise barrier absorbing noise from the engine as well as assisting in sustaining the desired climate within the cab interior.

## **CEILING MOUNTED HEATING AND A/C UNIT**

The heating and air conditioning unit shall include a vacuum formed ABS cover mounted on the ceiling of the cab between the driver and officer seating positions over the engine tunnel. The combination air conditioning and defrosting unit shall measure 48.00 inches long X 34.50

## Ely Fire Department, NV

inches wide X 13.00 inches deep. The system shall be rated for 45,000 BTU of cooling and 36,000 BTU of heating and shall heat and cool the cab through nine (9) different directional vents located one (1) each at the driver and officer position, one (1) each over the tunnel, and six (6) at the back of the unit for heating the crew area. There shall be six (6) total vents at the front of the unit in the direction of the windshield for defrosting purposes.

### **CLIMATE CONTROL ACTIVATION**

The heating controls, and air conditioning if included, shall be located on the dash next to the driver panel, in a position which is easily accessible to the driver.

### **A/C CONDENSER LOCATION**

A roof mounted A/C condenser shall be installed on driver's side of the cab, mid-roof.

### **A/C COMPRESSOR**

The air-conditioning compressor shall be an engine driven Seltec TM-21 and utilize R-134A refrigerant.

### **INTERIOR TRIM FLOOR MAT**

The floor of the cab shall be covered with a multi-layer mat consisting of .25 inch sound absorbing closed cell foam and a .06 inch non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive with aluminum cornering trim. All exposed seam shall be sealed to reduce moisture and debris.

### **INTERIOR TRIM VINYL**

The cab interior shall include trim on the front and rear crew ceiling, the cab walls and the rear wall of the cab. The trim shall be constructed of insulated vinyl over a hard board backing. The material shall be securely fastened to the interior of the cab utilizing snap style fasteners with a decorative fastener for a more appealing appearance.

### **CAB INTERIOR TRIM HEADER ABS**

The cab interior shall include a header over the driver and officer dash which shall be vacuum formed ABS composite panel with robust styling grooves providing structural integrity. The header shall include (2) vents within the header which are directed at the windshield. Also included will be a drop down panel for access behind the header for service of electronic components, if necessary. The header shall include (2) cut outs, (1) over the driver and (1) over the officer to accommodate speakers and molded areas to accommodate the sun visors.

### **INTERIOR TRIM SUNVISOR**

The header shall include one (1) sun visor above the driver and officer seating positions and above the windshield. Each sun visor shall be constructed of masonite and covered with insulated gray vinyl trim.

### **CAB INTERIOR TRIM LH DASH ABS**

The driver side dash shall be a (1) piece hinged panel which shall be constructed of durable vacuum formed ABS composite panel which shall be custom molded for a perfect fit surrounding the dash. The ABS shall be aesthetically pleasing in its gray coloring.

# Ely Fire Department, NV

## **CAB INTERIOR CENTER DASH**

The main center dash cover shall be constructed of durable vacuum formed ABS composite. The cover shall include three (3) panels within the dash which shall accommodate any additional gauges and controls. All gauges and controls within the panels shall be backlit for night vision and clearly identified representative of their specific function. The center panel shall be within comfortable reach of both the driver and officer due to its ergonomic and aesthetically pleasing design.

## **TRIM OFFICER DASH**

The cab interior dash trim officer panel shall consist of a vacuum formed ABS composite module, which contains a glove compartment with a hinged locking door. The compartment size shall be 13.00 inches wide X 6.00 inches high X 5.50 inches deep.

A Mobile Data Terminal (MDT) provision shall be provided above the glove compartment. The MDT provision shall be recessed 3.00 inches below the surface of the dash. The surface area of the MDT provision shall be 13.75 inches wide X 9.50 inches deep.

## **ENGINE TUNNEL TRIM**

The cab engine tunnel shall be covered with .44 of an inch thick multi-layer mat consisting of .25 inch closed cell foam, .13 of an inch thick rubber and .06 inch thick non-slip pebble grain.

## **STEP TRIM**

The cab steps shall include a 14 gauge 304 perforated stainless steel construction on the first step, the step closest to the ground. The stainless steel finish shall be a number 7 mirror. The step shall include a frame which is integral with the construction of the cab for rigidity and strength. The perforation shall allow water and other debris to flow through rather than becoming packed under the step. The middle step shall be integral with the cab in construction and shall be trimmed in 3003-H22 embossed aluminum tread plate which is 0.084 inches thick.

## **INTERIOR DOOR TRIM**

The doors of the cab shall include an aluminum panel constructed of 5052-H32 Marine Grade, .090 of an inch thick, one hundred (100) percent primary aluminum plate. The panel shall be located on the interior of the door and shall include a DA sanded finish.

## **DOOR PANEL CUSTOMER NAMEPLATE**

The interior door trim on the front doors shall include a customer nameplate which states the vehicle was custom built for their Department.

## **CAB DOOR TRIM REFLECTIVE**

A reflective chevron sign shall be installed on the lowest portion of the inner door panel, one (1) on each door. A stripe of reflective tape shall be installed at the outer edge of each door.

# Ely Fire Department, NV

## **INTERIOR GRAB HANDLE**

A rubber covered 11.00 inch grab handle shall be provided on the inside of the cab on the hinge post at the driver and officer doors. The handle shall assist personnel in exiting and entering the cab.

## **GRAB HANDLE FRONT DOOR**

Each front door shall include one (1) ergonomically contoured 9.00 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish and provide ease of access and exiting the cab.

## **INTERIOR GRAB HANDLE REAR DOOR**

A black powder coated cast aluminum assist handle shall be provided on the inside of each rear crew door the full width of the door below the window glass and shall measure 30 inches in length. The handle shall assist personnel in exiting and entering the cab.

## **CAB INTERIOR FLOOR MAT COLOR**

The cab interior floor mat shall be gray in color.

## **INTERIOR TRIM VINYL COLOR**

The cab interior vinyl trim surfaces shall be gray in color.

## **INTERIOR ABS TRIM COLOR**

The cab interior vacuum formed ABS composite trim surfaces shall be gray in color.

## **CAB PAINT INTERIOR**

The interior metal surfaces shall be painted with a Zolatone #20-72 silver gray texture finish.

## **CONTROL PANELS**

The dash shall include three removable panel's located one (1) to the right of the driver position, one (1) in the center of the dash just ahead of the engine tunnel and one (1) to the right of the officer position.

## **SWITCH PANEL CENTER**

The center dash shall include a blank panel.

## **SWITCH PANEL DRIVER**

The interior shall include a durable vacuum formed ABS composite switch panel which shall be located in the left side of the dash. The panel shall include seven (7) switches, four (4) across the top of the panel and three (3) centered underneath, which shall be appropriately labeled as to their specific function.

Proposals offering add-on style panel shall not be considered, all panels shall be designed for the specific chassis and shall match the interior for a more uniform and attractive appearance.

# Ely Fire Department, NV

## **SWITCH PANEL OFFICER**

The interior shall include a durable vacuum formed ABS composite switch panel which shall be located on the officer side of the dash and shall not include any switches.

## **SEATBELT WARNING SYSTEM**

A seatbelt warning system shall be installed for each seat within the chassis. The system shall provide visual and audible warning when any seat is occupied (sixty pounds minimum), the corresponding seat belt remains unfastened, and the park brake is released.

Once activated, the visual and audible indicators shall remain active until all occupied seats have the seat belts fastened.

## **SEAT MATERIAL**

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids.

## **SEAT COLOR**

All seats supplied on the chassis shall be gray in color. This material shall be semi-resistant to UV rays and from being saturated or contaminated by fluids.

## **SEAT BACK LOGO**

The seat back shall include a black and red capital R representing the Rosenbauer logo. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

## **DRIVER SEAT**

The driver's seat shall be a Seats Inc. 911 series. The seat shall feature a tapered and padded seat, and cushion. The two (2)-way, manually adjustable tracks shall include a 4.00 inch adjustment forward and reverse.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a red, three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall measure at minimum 37.00 inches, from the height adjustment in its lowest position and the suspension inflated and/ or raised to the upper limit of its travel to the cab ceiling.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and 20 times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile

## Ely Fire Department, NV

hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

### **DRIVER SEAT BACK**

The driver's seat shall include a standard seat back incorporating the all belts to seat feature (ABTS) as described above. The seat back shall feature a contoured, adjustable head rest.

### **OFFICER SEAT**

The officer's seat shall be a Seats Inc. 911 ABTS series. The seat shall feature a tapered and padded seat, and cushion. The seat shall be mounted in a fixed position.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a red, three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall measure at minimum 37.00 inches, from the height adjustment in its lowest position and the suspension inflated and/ or raised to the upper limit of its travel to the cab ceiling.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

### **OFFICER SEAT BACK**

The officer's seat shall include a standard seat back incorporating the all belts to seat feature (ABTS) as described above. The seat back shall feature a contoured, adjustable head rest.

### **REAR FACING OUTER SEAT QUANTITY**

The crew area shall include two (2) rear facing crew seats, which include one (1) located directly behind the driver seat and one (1) located directly behind the officer seat.

### **REAR FACING OUTBOARD SEAT**

The crew area shall include a seat in the rear facing outboard position which shall be a Seats Inc. 911 series. The seat shall feature a tapered and padded seat, and cushion. The seat and cushion shall be hinged and compact in design for additional room and shall remain in the stored position until occupied.

## Ely Fire Department, NV

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a red, three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall measure at minimum 37.00 inches, from the height adjustment in its lowest position and the suspension inflated and/ or raised to the upper limit of its travel to the cab ceiling.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

### **REAR FACING OUTER SEAT BACK**

The crew area shall include a seat back in the rear facing outer position which shall include a Ziamatic brand Load and Lock™ walk away self contained breathing apparatus (SCBA) bracket. The mechanical walk away bracket shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of fire truck cabs. The bracket shall consist of a back plate and a short back plate, both of which shall be thermoplastic coated for trouble free service. The bracket shall feature two (2) high cycle double coated clips which shall not mar the cylinders.

The bracket shall accommodate and secure all types of self-contained breathing apparatus cylinders. Each bracket shall include a model LLS strap assembly which shall meet the NFPA 1901-03 standard for SCBA retention and shall be easily adjustable. The seat back shall include a removable padded vinyl cover which shall be provided over the SCBA cavity.

### **FORWARD FACING SEAT FRAME**

The forward facing center seating positions shall include an enclosed seat frame which is located and installed on the rear wall. The seat frame shall measure 42.38 inches wide X 12.38 inches high X 22.00 inches deep and shall be fully open offering storage within this area. There shall be (2) access points to this storage area, (1) via the driver side of the seat frame and (1) via the officer side of the seat frame. The seat frame shall be constructed of 5052-H32 Marine Grade, .190 inch thick, 100 percent primary smooth aluminum plate. The seat box shall be painted with the same color as the remaining interior.

### **SEAT FRAME STORAGE ACCESS**

There shall be two (2) access points to the storage area one (1) each side of the seat frame. Each access point shall be covered by a hinged door which measures 18.00 inches wide X 8.63 inches high to allow access for storage in the seat box. The seat box doors shall be painted with the same interior coating as the cab.

# Ely Fire Department, NV

## **WINDSHIELD WIPER SYSTEM**

The cab shall include a parallel arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers, one (1) for the driver and one (1) for the officer, which shall be affixed to a rod style arm. The system shall include a single motor which shall initiate the arm in which both the driver and officer windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.

## **ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR**

The windshield washer fluid level shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal.

## **CAB DOOR HARDWARE**

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be FRP composite with a black matt finish. All doors shall include keyed alike locks that are designed to prevent accidental lockout.

The interior latches shall be black flush paddle type, which are incorporated into an upper door panel.

## **DOOR LOCKS**

The entry doors shall include an independent manual door lock actuated through the a toggle switch located on the interior of the cab door near the paddle handle or through a keyhole on the exterior of the door via a 2004 style Hansen door key.

## **CAB EXTERIOR GRAB HANDLES**

The cab shall include one (1) each 18.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The assist handle shall be made of 14 gauge 304- stainless steel and be 1.25 inch diameter to enable non-slip assistance with a gloved hand.

## **REARVIEW MIRRORS**

The cab exterior shall include Retrac West Coast style mirror heads one (1) each on the driver and officer door on each side of the cab. The mirrors shall be flange mounted to the side of the cab via a plain style aluminum arm and shall measure 6.00 inches wide X 16.00 inches high. The West Coast style mirrors shall be model 1158E constructed of bright anodized aluminum and shall include embossed chevrons on the mirror backs. The mirrors shall include the finest quality non-glare glass and shall be lightweight for vibration free performance. Both mirrors shall be corrosion free under all weather conditions.

## **CAB FENDERS**

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. The two-piece liners shall consist of an inner liner 16" wide made of vacuum formed ABS composite and an outer fenderette 3.50" wide made of 12 gauge polished aluminum.

# Ely Fire Department, NV

## **CAB MODEL IDENTIFICATION**

The cab shall include custom "Gladiator" nameplates on the front driver and officer side doors.

## **EXTERIOR EMBLEM**

The front and each cab side shall include one (1) manufacturer's emblem installed on the outside of the cab above each front wheel well. The front of the cab shall include one (1) manufacturer's emblem installed on the outside of the cab within the grille.

## **IGNITION**

The master starting system, ignition system shall include chrome thumb turn switch which shall be mounted on the driver side of the cab to the left of the steering wheel on the dash. Each switch will be accompanied by (1) green LED indication light which shall light when the ignition is in the "ON" position and (1) for the master battery switch when in the "ON" position. The thumb turn switches shall also be accompanied by a chrome push button which shall only operate when both the master battery and ignition thumb switches are in the "ON" position.

## **BATTERIES**

The single start electrical system shall include (3) Harris BCI 31 950 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541. The cables shall have encapsulated ends with heat shrink and sealant.

## **BATTERY BOX**

The batteries shall be contained within a black powder coated steel battery box which shall be located on the driver side of the chassis, securely bolted to the frame rails. The box shall include drain holes in the bottom for sufficient drainage of water and shall include phenolic board battery hold downs and a durable, Dry-Deck in the bottom of the tray under each battery to allow for air flow and drainage.

## **BATTERY CABLES**

The starting system shall include cables which shall be protected by 275 degree F. minimum high temperature flame retardant loom, sealed and encapsulated at the ends with heat shrink and sealant.

## **BATTERY JUMPER STUDS**

The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

## **ALTERNATOR**

The starting system shall include a 270 amp Leece Neville 12 volt alternator, model number A0014949PA. The alternator shall include a self-excited integral regulator.

# Ely Fire Department, NV

## **HEADLIGHTS**

The cab front shall include (4) rectangular halogen headlamps with separate high and low beams mounted in bright chrome bezels. The headlamps shall be equipped with the "Daytime Running" light feature, which shall illuminate the headlights to 80% brilliance when the ignition switch is in the "On" position and the parking brake is released.

The headlights shall be controlled through a rocker switch on the driver's dash.

## **TURN SIGNALS**

The front fascia shall include two (2) Whelen model 600 4.00 inch X 6.00 inch halogen amber arrow shaped turn signals shall be installed outboard of the warning lights in matching bezels located above the headlamps.

## **SIDE MARKER/ TURN SIGNALS**

The sides of the cab shall include (2) incandescent round side marker lights which shall be provided just behind the front cab radius corners.

## **MARKER AND ICC LIGHTS**

In accordance with FMVSS, there shall be five (5) cab LED marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.

## **GROUND LIGHTS**

Each door shall include an incandescent NFPA compliant ground lights mounted to the under side of the cab on each side of the driver and officer sides of the cab below each door. The lights shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The ground lighting shall be activated by the opening of the respective door as well as rocker switched.

## **ENGINE COMPARTMENT LIGHT**

There shall be an incandescent NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life.

## **INTERIOR CAB LIGHTING**

The cab shall include an incandescent dome lamp with a red and white lens located over each door. The dome lamps shall be rectangular in shape and shall measure 9.50 inches in length and approximately 5.00 inches wide including a black colored bezel. The white lamp shall be activated by its respective door when opened and both the red and white lamp shall be activated by an individual switch on the light.

A fifth red and clear lamp shall be located in the headliner, over the engine tunnel.

## **DO NOT MOVE APPARATUS WARNING**

The front headliner of the cab shall include a red flashing light, located in the center for greatest visibility. The light shall be 6.00 inches long X 2.50 inches wide X 1.75 inches high

## Ely Fire Department, NV

and shall be clearly labeled "Do Not Move Apparatus". The light shall be interlocked for activation when a cab door is not firmly closed, an apparatus cabinet door is not closed and the parking brake is released.

### **MASTER WARNING**

The optical warning system shall be controlled by a master switch which shall include all "ON" and all "OFF" capability via a rocker switch on the main panel. Any warning light switches left in the "ON" position shall activate when the master switch is activated. This switch shall be clearly labeled for identification.

### **INBOARD FRONT WARNING LIGHTS**

The cab front fascia shall include dual modules containing headlights which shall not be wired.

### **AIR HORN SELECTOR SWITCH**

A rocker switch shall be installed in the switch panel between the driver and officer to allow control to either the air horn or the electric horn from the steering wheel horn button. The electric horn shall sound by default when the selector switch is in either position which is in accordance with FMVSS requirement.

### **AIR HORN ACTUATION**

The air horn actuation shall be accomplished by the steering wheel horn button and a right side officer's mounted Linemaster model SP491-S81 foot switch.

### **BACKUP ALARM**

An ECCO model 575 backup alarm shall be installed at the rear of the chassis with an output level of not less than 107 dB. The alarm will automatically activate when the transmission is placed in reverse.

### **INSTRUMENTATION**

An ergonomically designed instrument panel shall be provided. The gauges shall be backlit with red LED lamps. All gauges shall be driven by stepper motor movements. The instrumentation system shall be multiplexed and shall receive engine and transmission information over the J1939 data bus to reduce redundant sensors.

The instrument panel shall contain the following gauges:

One (1) electronic tachometer with an integral LCD hour meter shall be included. The scale on the tachometer shall read from 0 to 3000 RPM. The hour meter shall display engine hours of operation.

One (1) electronic speedometer with an integral LCD odometer/ trip odometer shall be included. The speedometer shall have a dual scale with miles per hour (MPH) as the dominant scale and kilometers per hour (KPH) on the minor scale. The speedometer scale shall read from 0 to 90 MPH (0 to 140 KPH). The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display up to 9,999.9 miles. The LCD screen shall also be capable of displaying certain diagnostic functions.

## Ely Fire Department, NV

One (1) three function gauge with primary system, secondary system and fuel level shall be included. The scale on the air pressure gauges shall read from 0 to 140 pounds per square inch (PSI). The air pressure scales shall be non-linear to expand the scales in the region of normal operation. A red indicator light in the gauge shall indicate a low air pressure. The scale on the fuel level gauge shall read from empty to full. A yellow indicator light shall indicate low fuel at the quarter tank level.

One (1) four function gauge with engine oil pressure, coolant temperature, transmission oil temperature and a voltmeter shall be included. The scale on the engine oil pressure gauge shall read from 0 to 140 pounds per square inch (PSI). The engine oil pressure scale shall be non-linear to expand the scale in the region of normal operation. A red indicator light in the gauge shall indicate low engine oil pressure. The scale on the coolant temperature gauge shall read from 160 to 250 degrees Fahrenheit (F). A red indicator light in the gauge shall indicate high coolant temperature. The scale on the transmission oil temperature gauge shall read from 100 to 300 degrees Fahrenheit (F). A red indicator light in the gauge shall indicate high transmission oil temperature. The scale on the voltmeter shall read from 8 to 16 volts. A red indicator light shall indicate high or low system voltage.

The instrument panel shall contain an Annunciator Module that contains the following indicator lights. All indicator lights shall contain LED lamps.

### **RED LAMPS**

Stop Engine - indicates critical engine fault. (5)  
Park Brake - indicates park brake is set.  
Volts - indicates high or low system voltage. (4)  
Low Oil Press - indicates low engine oil pressure. (4)  
High Coolant Temp - indicates excessive engine coolant temperature. (4)  
High Trans Temp - indicates excessive transmission oil temperature. (4)  
Low Air - indicates low air pressure in either system one or system two. (4)  
Low Coolant Level - indicates low engine coolant level. (1) (5)  
Air Filter - indicates excessive engine air intake restriction. (5)  
Brake System Fault – indicates a failure in the brake system (hydraulic brake systems only). (5)  
Seat Belt Indicator – indicates when a seat is occupied and corresponding seat belt remains unfastened.

### **YELLOW LAMPS**

Check Engine - indicates engine fault. (5)  
Check Trans - indicates transmission fault. (5)  
Wait to Start - indicates active engine air preheat cycle. (2) (5)  
ABS - indicates anti-lock brake system fault. (5)  
Water in Fuel - indicates presence of water in fuel filter. (1) (5)  
Check Message Center – indicates there is a fault message present in the LCD digital display.  
SRS – indicates a problem in the RollTek supplemental restraint system. (1) (5)  
DPF – indicates a restriction of the diesel particulate filter. (3) (5)  
HEST – indicates a high exhaust system temperature. (3) (5)  
MIL – indicates an engine emission control system fault. (3) (5)  
Low Fuel – indicates low fuel. (4)

# Ely Fire Department, NV

## **GREEN LAMPS**

Left and Right turn signal indicators.

Aux Brake Active - indicates secondary braking device is active. (1)

High Idle - indicates engine high idle is active. (1)

ATC – indicates low wheel traction for automatic tractions control equipped vehicles, also indicates mud/snow mode is active for ATC system. (1) (5)

OK to Pump – indicates the pump engage conditions have been met. (1)

Pump Engaged – indicates the pump is currently in use. (1)

## **BLUE LAMPS**

High beam indicator.

The instrumentation system shall provide a constant audible alarm for the following situations:

Low air pressure.

Low engine oil pressure.

High engine coolant temperature.

High transmission oil temperature.

Low coolant level. (1)

High or low system voltage

Critical engine fault (Stop Engine).

The Check Message Center icon will illuminate and a message will be displayed in the LCD screen for the following situations:

Cab Ajar

Low Oil Level

Door Ajar

Engine Communication Error

Transmission Communication Error

ABS Communication Error

High Coolant Temp

Turn Signal Reminder

Low Fuel

Low Oil Pressure

Low Coolant Level

Low Battery Voltage

High Battery Voltage

Low Primary Air Pressure

Low Secondary Air Pressure

High Trans Temp

The instrumentation system will provide a continuous alarm for the following situations:

Stop Engine

Low Coolant Level (1)

Brake System Fault

Check Trans

Check Engine

ABS

Engine Communications Error

Transmission Communications Error

ABS Communications Error

Low Fuel

## Ely Fire Department, NV

Low Primary Air Pressure  
Low Secondary Air Pressure  
Low or High Battery Voltage  
High Trans Temp  
Low Oil Pressure  
High Coolant Temp

The instrumentation system will provide a 160mSec second alarm every 880mSec for the following situations:

Seat Belt  
Air Filter  
Water in Fuel (1)  
Cab Ajar  
Low Oil Level  
Door Ajar

The instrumentation system will provide a 160mSec second alarm every 5Sec for the following situations:

Turn Signal Reminder

- (1) Feature only available when optionally equipped.*
- (2) Feature only available on engines with preheat capability.*
- (3) Feature only on vehicles with diesel particulate filter (DPF).*
- (4) Warning light is present in gauge.*
- (5) A message in the LCD screen will also be displayed.*

### **FIRE EXTINGUISHER**

A 2.50 pound BC D.O.T approved fire extinguisher shall be shipped loose with the cab.

### **DOOR KEYS**

The cab and chassis shall include a total of four (4) door keys for the manual door locks.

### **CHASSIS WARRANTY**

The chassis manufacturer shall warrant to the original purchaser the custom fire truck chassis for a period of twelve (12) months. The warranty period shall commence on the date the vehicle is delivered to the original purchaser and continue for twelve (12) months thereafter. The warranty shall include conditional items listed in the detailed warranty document which may be provided upon request.

### **OPERATORS MANUAL AND PARTS LIST**

There shall be one (1) chassis operator's manual which includes a parts list including wiring and air plumbing diagrams provided and shipped loose with the vehicle. All standard wiring and plumbing diagrams shall be created specifically to the chassis model.

### **ENGINE AND TRANSMISSION OPERATION MANUALS**

There shall be one (1) set of engine operation and maintenance manuals and one (1) set of transmission operation manuals specific to the models ordered included with the final vehicle in the ship loose items.

# Ely Fire Department, NV

## **CATERPILLAR ENGINE SERVICE MANUALS**

There shall be a Caterpillar C9 service manual provided with the final chassis and included with the ship loose items.

## **ALLISON 3000 EVS TRANSMISSION SERVICE MANUALS**

There shall be one (1) set of the following manuals included with the final vehicle relative to the Allison 3000 transmission:

Allison Parts Catalog, part number PC2809EN  
Allison Service Manual, part number SM2148EN  
Allison Technician Manual, part number GN2055EN  
Electronic Controls Troubleshooting Manual, part number TS2973EN  
Mechanic's Tips, part number MT3004EN

# Ely Fire Department, NV

## **CHASSIS ADDITIONS AND MODIFICATIONS**

One (1)  
10-03-6110

### **REAR TOWING PROVISIONS**

There shall be two (2) tow eyes furnished at the rear of the body and attached directly to each chassis frame rail. The tow eyes shall be accessible above the rear tailboard. The tow eyes shall be constructed of 5/8" plate steel with a 4" I.D. hole, large enough for passing through a tow chain end hook.

One (1)  
80-43-2400

### **TOW PLATE PAINTING**

The tow plates shall be painted black.

One (1)  
10-04-2350

### **FRONT BUMPER GRAVELSHIELD**

A 21" front to rear filler panel constructed from NFPA compliant, slip resistant aluminum tread plate shall be provided on the front chassis frame extension. The extension shall be covered on the top and sides, up to the level of front bumper and shall be reinforced to support one (1) firefighter (approximately 250 pounds) and the equipment specified to be installed.

One (1)  
10-04-2520

### **BUMPER COMPARTMENTS**

The bumper compartments shall be constructed by the body builder.

One (1)  
10-04-2720

### **FRONT BUMPER COMPARTMENT**

One (1) recessed fire hose compartment constructed from smooth aluminum shall be installed in the center of the front bumper extension. Water drain holes shall be drilled in the bottom.

One (1)  
10-04-3150

### **BUMPER COMPARTMENT DOOR**

One (1) aluminum tread plate door for the front bumper compartment shall be supplied. The flat door shall have a stainless steel hinge at the rear and a latch to secure the compartment.

# Ely Fire Department, NV

## **PUMP AND PLUMBING**

One (1)  
20-23-8200

### **WATEROUS CMUC10 TWO STAGE PUMP**

A Waterous model CMUC10, two stage centrifugal pump shall be designed to mount on the chassis frame rails and shall be split-drive shaft driven. The pump casing shall be of high-tensile, close-grained gray iron. Pump body shall be horizontally split in two (2) sections, for easy removal of impeller assembly including wear rings and bearings from beneath the pump without disturbing the mounting or piping.

#### Impellers

Two (2) matched bronze impellers specifically designed for the fire service will be provided. They will be accurately balanced both mechanically and hydraulically, for vibration-free operation. Stainless steel heat-treated and precisely ground to size. It shall be supported on both ends by oil or grease lubricated ball bearings.

Replaceable wear rings, bronze, reverse-flow, labyrinth-type shall be provided. Deep groove ball bearings shall be located outside the pump to give rugged support and proper alignment to the impeller shaft. The bearings shall be oil or grease lubricated. All bearings shall be completely separated from the water being pumped.

#### Pump Transmission

The housing shall be constructed of high tensile ductile iron and be of three (3) piece, horizontally split design. The transmission driveline shafts shall be made from alloy steel forging, hardened and ground to size. The drive and driven sprockets shall be made of steel and shall be carbonized and hardened.

The drive chain shall be Morse HV involute form chain. The lubrication system shall be an impeller shaft driven oil pump to deliver oil to an integral spray header, to completely pressure lubricate the drive chain.

#### Pump Mounting

The pump shall be bolted to steel angles in pump module, using grade 8 bolts.

#### Drive Line

Hollow-tube drivelines and universals shall be properly matched to the engine and transmission output torque ratings.

One (1)  
01-17-0750

### **PUMP WARRANTY**

Waterous warrants, to the original buyer only, that products and parts manufactured by Waterous will be free from defects in material and workmanship under normal use and service for a period of five (5) years from the date the product is first placed in service, or five and one half 5-1/2 years from the date of shipment by Waterous, whichever period will be the first to expire; provided the buyer notifies Waterous in writing, of the defect in said product within the warranty period, and said product is found by Waterous to be conforming with the aforesaid warranty.

# Ely Fire Department, NV

When required in writing by Waterous, defective products must be promptly returned by the buyer to the Waterous Company at Waterous' plant at South St. Paul, Minnesota, or at such other place as may be specified by Waterous with transportation and other charges prepaid. A returned materials authorization (RMA) is required for all products and parts and may be requested by phone, fax or mail. The previously mentioned warranty excludes any responsibility or liability of Waterous for:

- A. Damages or defects due to accident, abuse, misuse, abnormal operating conditions, negligence, accidental causes or improper maintenance, or attributable to written specifications or instructions furnished by buyer;
- B. Defects in products manufactured by others and furnished by Waterous hereunder, it being understood and agreed by the parties that the only warranty provided for such products shall be the warranty provided by the manufacturer thereof which, if assignable, Waterous will assign to the buyer, if requested by Buyer;
- C. Any product or part, altered, modified, serviced or repaired other than by Waterous, without its prior written consent.
- D. The cost of dismantling, removing, transporting, storing, or insuring the defective product or part and the cost of reinstallation.
- E. Normal wear items (packing, strainers, filters, light bulbs, anodes, intake screens, etc.)

This warranty is subject to Waterous' conditions of sale (Waterous Company form number F-2190 as currently in effect all of which are herein incorporated and by this reference made a part hereof.

All other warranties are excluded, whether expressed or implied by operation of law or otherwise, including all implied warranties of merchantability or fitness for purpose. Waterous shall not be liable for consequential or incidental damages directly or indirectly arising or resulting from breach of any of the terms of this limited warranty or from the sale, handling, or use of any other product or part. Waterous' liability hereunder, either for breach of warranty or for negligence, is expressly limited at Waterous' option:

- A. To the replacement at the agreed point of delivery of any product or part, which upon inspection by Waterous or its duly authorized representative, is found not to conform to the limited warranty set forth above, or
- B. To the repair of such product or part, or
- C. To the refund or crediting to buyer of the net sales price of the defective product or part.

Buyer's remedies contained herein are exclusive of any other remedy otherwise available to the buyer.

One (1)  
20-23-8110

## **1500 GPM FIRE PUMP SPECIFICATIONS**

The centrifugal type fire pump shall be a Waterous model CMUC10 midship mounted with a rated capacity of 1500 GPM. The pump shall meet NFPA 1901 requirements.

The pump shall be certified to meet the following deliveries:

- 1500 GPM @ 150 PSI
- 1500 GPM @ 165 PSI
- 1050 GPM @ 200 PSI
- 750 GPM @ 250 PSI

## Ely Fire Department, NV

One (1)  
22-03-1650

### **LEFT SIDE -- 6" UNGATED INTAKE**

One (1) 6" ungated suction intake shall be installed on the left side pump panel to supply the fire pump from an external water supply. The threads shall be 6" NST. The intake shall be provided with a removable screen.

One (1)  
22-41-6000

One (1) 6" chrome plated cap shall be provided. The threads shall be NST and the cap shall be equipped long handles.

One (1)  
22-03-2650

### **RIGHT SIDE -- 6" UNGATED INTAKE**

One (1) 6" ungated suction intake shall be installed on the right side pump panel to supply the fire pump from an external water supply. The intake shall be provided with a removable screen.

One (1)  
22-41-6000

One (1) 6" chrome plated cap shall be provided. The threads shall be NST and the cap shall be equipped long handles.

One (1)  
20-26-1200

### **ELECTRIC TRANSFER VALVE**

The two-stage fire pump pressure and volume control shall be provided of the latest "ball" type all bronze construction and incorporating a hydraulically balanced seal assembly to minimize leakage around the ball and assure maximum water flow and pump efficiency.

The transfer valve actuator shall be operated electrically, by a control switch mounted on the pump operator's panel complete with two indicator lights indicating PRESSURE and VOLUME. Operation of the transfer valve shall provide smooth changing of the transfer valve to either pressure or volume without shutting down at any discharge pressure up to 250 psig.

One (1)  
27-10-3250

### **PRESSURE GOVERNOR AND ENGINE-PUMP MONITORING**

One (1) Fire Research In-Control model TGA100-A00 pressure governor and monitoring display kit shall be provided on the pump panel. The kit shall include a control panel, intake pressure sensor, discharge pressure sensor, audible alarm buzzer, and cables. The control panel case shall be waterproof and have dimensions not to exceed 4 3/4" high by 9 3/4" wide by 2 3/4" deep. The panel shall have Leeds to indicate PSI mode, RPM mode, OK TO PUMP, and IDLE RPM.

The following continuous displays shall be provided:

- 1) Pump discharge; shown with four daylight bright LED digits more than 1/2" high
- 2) Pump Intake; shown with four daylight bright LED digits more than 1/2" high
- 3) PSI/RPM setting; shown on an LED bar graph display
- 4) Engine RPM; shown with four daylight bright LED digits more than 1/2" high, updated in 10 RPM increments
- 5) Oil pressure; shown on an LED bar graph display

## Ely Fire Department, NV

- 6) Engine coolant temperature; shown on an LED bar graph display
- 7) Battery voltage; shown on an LED bar graph display.

Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 psi. The intake pressure display shall show pressures from -30 in. Hg to 600 psi.

There shall be two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between pressure and RPM modes. When the pump engaged interlock signal is recognized an OK TO PUMP LED will light to indicate throttle ready and the governor shall be in pressure mode with the engine RPM set to idle. In pressure mode the 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 governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi.

The program features shall be accessed via push buttons located on the front of the control panel. The program shall support manual control of pump discharge pressure and RPM settings, field programmable presets, and diagnostic capabilities. Safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.

One (1)  
20-26-2250

### **FIRE PUMP MECHANICAL SHAFT SEAL**

The Waterous fire pump shall be equipped with self-adjusting, maintenance free, 'mechanical shaft seal' which is designed to be functional in the unlikely event of a seal failure.

One (1)  
20-26-2300

### **IMPELLER HUBS**

The Waterous fire pump impeller hubs shall be standard bronze type.

One (1)  
20-26-3250

### **FIRE PUMP SHIFT**

The Waterous fire pump shall be equipped with an air operated pump shift, pneumatically controlled using a power-shifting cylinder. The air shift control valve shall be mounted in the cab.

The fire pump-shift system shall be equipped with a means to prevent unintentional movement of the control device from its set position. The system shall include a nameplate indicating the chassis transmission shift selector position to be used for pumping and located so that it can be easily read from the driver's position.

The system shall include the applicable NFPA standard interlocks, pump shift and OK TO PUMP indicator lights in the cab and pump panel. The fire pump system shall be equipped with an interlock system shall be provided to ensure that the pump drive system components are properly engaged in the pumping mode of operation so that the pumping system can be safely operated from the pump operator's position.

If applicable, the secondary braking device shall be automatically disengaged for pumping operations.

# Ely Fire Department, NV

One (1)  
20-26-4150

## **FIRE PUMP PRIMING SYSTEM**

A Waterous model number VPO electrically driven, positive displacement, rotary vane type priming pump shall be installed. The system shall be activated with a manual pull type control.

The pump shall be capable of taking suction and discharging water with a lift of 10 feet in not more than 30 seconds with the pump dry, through 20 feet of suction hose of appropriate size. The priming system shall comply with applicable sections of NFPA standards.

The primer shall be automatically lubricated from a five (5) quart oil reservoir located in an area where it can be easily serviced.

One (1)  
20-30-5100

## **FIRE PUMP SPLIT SHAFT DRIVESHAFTS AND INSTALLATION**

The mid-ship split shaft fire pump shall be installed and shall include installation of the fire pump, modification and/or fabrication of new drivelines and all pump-mounting brackets. The drive shaft(s) shall be spin balanced prior to final installation.

One (1)  
20-31-1600

## **UNDERWRITERS LABORATORIES FIRE PUMP TEST**

The pump shall undergo an Underwriters Laboratories Incorporated test per applicable sections of NFPA standards, prior to delivery of the completed apparatus.

The UL acceptance certificate shall be furnished with the apparatus on delivery.

One (1)  
20-31-1550

## **FIRE PUMP TEST LABEL**

A fire pump performance and rating label shall be installed on the fire apparatus pump panel. The label shall denote levels of pump performance and testing completed at factory. These shall include GPM at net pump pressure, RPM at such level, and other pertinent data as required by applicable NFPA standards. In addition, the pressure control device, tank to pump flow tests, and other required testing shall be completed.

In addition, the entire pump, suction and discharge passages shall be hydrostatically tested to a pressure as required by applicable NFPA standards. The pump shall be fully tested at the pump manufacturer's factory to the performance specifications as outlined by applicable NFPA standards. Pump shall be free from objectionable pulsation and vibration.

If applicable, the fire pump shall be tested and rated as follows:

- 100% of rated capacity at 150 pounds net pressure.
- 70% of rated capacity at 200 pounds net pressure.
- 50% of rated capacity at 250 pounds net pressure.
- 100% or rated capacity at 165 pounds net pressure.

# Ely Fire Department, NV

One (1)  
20-31-6100

## **FIRE PUMP COOLING**

The fire pump shall be equipped with 3/8" cooling line from the pump to the water tank. This re-circulation line shall be controlled by a pump panel control valve with nameplate label noting it as the "fire pump bypass cooler".

One (1)  
20-31-6200

## **CHASSIS ENGINE HEAT EXCHANGER COOLING SYSTEM**

The apparatus shall be equipped with a heat exchanger for supplementary chassis engine cooling during fire pump operations. A manually opened valve, mounted at the operator's panel, shall direct water from the fire pump to the heat exchanger that is mounted in the engine radiator cooling hose. The system shall provide cooling water from the fire pump to circulate around the engine radiator coolant without mixing or coming in direct contact with the engine coolant. The complete installation shall be done by the fire apparatus manufacturer.

A nameplate label shall be installed on the pump panel noting "engine cooling system" with "on-off" opening directions noted.

One (1)  
22-52-0100

## **WATER TANK TO PUMP LINE**

One (1) 3" water tank to fire pump line shall be provided with a full flow quarter turn ball valve, 4" piping, and with flex hose and stainless steel hose clamps. The tank to pump line shall be equipped with a check valve to prevent pressurization of the water tank.

The line shall be flow tested during the fire pump testing and shall meet applicable requirements of NFPA standards.

One (1)  
22-55-1150

The specified intake valve shall be equipped with one (1) manually operated pull rod, with quarter turn locking feature. The handle shall be equipped with color coded engraved type name plate.

One (1)  
24-61-1860

The specified valve shall be an Akron 8800 Series three-inch (3") valve with a stainless ball.

One (1)  
23-02-2300

## **FIRE PUMP TO WATER TANK FILL LINE**

One (1) 2" fire pump to water tank refill and pump bypass cooler line shall be provided. The valve shall be a full flow quarter turn ball valve with 2" piping and flex hose to tank. The valve control handle shall have a nameplate located near the valve control.

One (1)  
24-50-1150

One (1) manually operated pull rod, with quarter turn valve, with locking feature shall be provided on the specified discharge. The handle shall be equipped with color coded engraved type name plate.

One (1)  
24-61-1820

The specified valve shall be an Akron 8800 Series two-inch (2") valve with a stainless ball.

# Ely Fire Department, NV

One (1)  
23-02-2300

## **FIRE PUMP TO WATER TANK FILL LINE**

One (1) 2" fire pump to water tank refill and pump bypass cooler line shall be provided. The valve shall be a full flow quarter turn ball valve with 2" piping and flex hose to tank. The valve control handle shall have a nameplate located near the valve control.

One (1)  
24-50-1150

One (1) manually operated pull rod, with quarter turn valve, with locking feature shall be provided on the specified discharge. The handle shall be equipped with color coded engraved type name plate.

One (1)  
24-61-1820

The specified valve shall be an Akron 8800 Series two-inch (2") valve with a stainless ball.

One (1)  
22-09-1110

## **LEFT SIDE -- 2-1/2" GATED INTAKE**

One (1) 2-1/2" gated suction intake shall be installed on left side pump panel to supply the fire pump from an external water supply. The control valve shall be a quarter turn ball valve and shall have 2-1/2" NST female thread of chrome plated brass.

The intake shall be equipped with a 3/4" drain and bleeder valve, controlled at the base of the pump panel. A nameplate label and removable screen shall be installed.

One (1)  
22-41-1150

One (1) 2-1/2" chrome plated plug shall be provided. The threads shall be NST and the plug shall be equipped rocker lugs and chain or cable securement.

One (1)  
22-55-2150

The specified intake valve shall be equipped with one (1) manually operated swing type manual control located adjacent the intake. The valve shall be equipped color coded engraved type name plate.

One (1)  
22-80-0000

## **DISCHARGES**

One (1)  
23-05-3200

### **2" DISCHARGE FRONT CENTER BUMPER**

One (1) 2" quarter turn ball valve discharge shall be installed at front center bumper area with stainless steel or brass swivel outlet with 1-1/2" NST male threads. The valve control shall be on pump panel and a nameplate label provided at valve control area.

The plumbing shall be flexible hose with abrasion resistant support mountings. Auxiliary low point drains shall be provided on the discharge line.

One (1)  
21-01-2300

A 3/4" quarter turn bleeder valves shall be installed on gated intakes and discharges larger than 1-1/2" in size.

## Ely Fire Department, NV

One (1)  
23-05-9200

Note: the hose connection for the front discharge shall be swivel type located above the front bumper deck level.

One (1)  
24-61-1200

The specified valve shall be an Akron 8800 Series two-inch (2") valve with a stainless ball.

One (1)  
24-50-1400

For valve actuation, the specified discharge shall be equipped with a side mount valve control. The ergonomically designed 1/4 turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and signage. the gear-control rod, double laminated locking clips, and rod housing shall be stainless steel and provide true positive lock that will eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall eliminate rod deflection, never need lubrication and ensure consistent long-term operation.

The control assembly shall include a decorative chrome-plated zinc panel mounted bezel with recessed color-coded label.

One (1)  
27-02-1100

One (1) 2-1/2" pressure gauge rated at 0-400 PSI shall be provided. The gauge shall include a color coded label and be installed on the pump instrument panel. The face of the gauge shall have a white dial with black letters.

One (1)  
23-06-2260

### **TWO (2) 1-1/2" CROSSLAY DISCHARGES**

Two (2) pre-connect 1-3/4" hose crosslays shall be installed over pump enclosure, with quarter turn 2" diameter ball valves. The outlets shall be a 2" NPT female swivel x 1-1/2" male NST hose threads.

The crosslay hose beds shall have smooth aluminum sides. The hose bed decking shall be constructed with slots integrated into the hose bed floor.

Each hose bed shall provide for a minimum capacity of 200 feet of 1-3/4" diameter double jacket hose with nozzle, for hose provided by the fire department.

Two (2)  
21-01-2150

A 3/4" quarter turn bleeder valves shall be installed on gated intakes and discharges larger than 1-1/2" in size.

Two (2)  
24-50-1150

Two (2) manually operated pull rod, with quarter turn valve, with locking feature shall be provided on the specified discharge. The handle shall be equipped with color coded engraved type name plate.

Two (2)  
24-61-1820

The specified valve shall be an Akron 8800 Series two-inch (2") valve with a stainless ball.

Two (2)  
27-02-1150

Two (2) 2-1/2" pressure gauge rated at 0-400 PSI shall be provided. The gauge shall include a color coded label and be installed on the pump instrument panel. The face of the gauge shall have a white dial with black letters.

# Ely Fire Department, NV

One (1)  
23-08-3150

## **CROSSLAY HINGED COVER**

The crosslay hose bed shall be equipped with a single aluminum diamond plate hinged cover. The cover shall have rubber bumpers, latching devices, and lift up handle on each end of the cover.

One (1)  
23-08-4150

## **ROLLERS FOR CROSSLAY HOSE BED**

The crosslay hose bed shall be equipped stainless steel "U" shaped roller system, one on each end of the hose bed.

Two (2)  
23-09-4210

## **LEFT SIDE PUMP PANEL -- 2-1/2" DISCHARGE**

Two (2) 2-1/2" discharge shall be installed on the left side pump panel area and shall be controlled by a quarter turn ball valve. The discharge shall have 2-1/2" NST male hose threads and a chrome plated elbow with rocker lugs with 2-1/2" NST swivel female x 2-1/2" NST male hose threads. A color coded nameplate label shall be provided adjacent the control handle.

Two (2)  
21-01-2150

A 3/4" quarter turn bleeder valves shall be installed on gated intakes and discharges larger than 1-1/2" in size.

Two (2)  
24-02-3200

Two (2) chrome plated elbow with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NST male hose threads.

Two (2)  
24-03-3400

Two (2) 2-1/2" NST rocker lug chrome plated vented cap and cable or chain securement shall be provided.

Two (2)  
24-50-1150

Two (2) manually operated pull rod, with quarter turn valve, with locking feature shall be provided on the specified discharge. The handle shall be equipped with color coded engraved type name plate.

Two (2)  
24-61-1850

The specified valve shall be an Akron 8800 Series two and one half-inch (2-1/2") valve with a stainless ball.

Two (2)  
27-02-1150

Two (2) 2-1/2" pressure gauge rated at 0-400 PSI shall be provided. The gauge shall include a color coded label and be installed on the pump instrument panel. The face of the gauge shall have a white dial with black letters.

One (1)  
23-10-4210

## **RIGHT SIDE PUMP PANEL -- 2-1/2" DISCHARGE**

One (1) 2-1/2" discharge shall be installed on the right side pump panel area and shall be controlled by a quarter turn ball valve. The outlet shall have 2-1/2" NH male hose threads. A

## Ely Fire Department, NV

chrome plated elbow with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NH male hose threads. A color coded nameplate label shall be provided adjacent the control handle.

One (1)  
21-01-2150

A 3/4" quarter turn bleeder valves shall be installed on gated intakes and discharges larger than 1-1/2" in size.

One (1)  
24-02-3200

One (1) chrome plated elbow with rocker lugs shall be provided with 2-1/2" NST swivel female x 2-1/2" NST male hose threads.

One (1)  
24-03-3400

One (1) 2-1/2" NST rocker lug chrome plated vented cap and cable or chain securement shall be provided.

One (1)  
24-50-1150

One (1) manually operated pull rod, with quarter turn valve, with locking feature shall be provided on the specified discharge. The handle shall be equipped with color coded engraved type name plate.

One (1)  
24-61-1850

The specified valve shall be an Akron 8800 Series two and one half-inch (2-1/2") valve with a stainless ball.

One (1)  
27-02-1150

One (1) 2-1/2" pressure gauge rated at 0-400 PSI shall be provided. The gauge shall include a color coded label and be installed on the pump instrument panel. The face of the gauge shall have a white dial with black letters.

One (1)  
23-10-5400

### **RIGHT SIDE PUMP PANEL -- 3" DISCHARGE**

One (1) 3" discharge shall be installed on the right side pump panel area and shall be controlled by a quarter turn ball valve. The discharge shall have 3" NST male hose threads. A color coded nameplate label shall be provided adjacent the control handle.

One (1)  
21-01-2150

A 3/4" quarter turn bleeder valves shall be installed on gated intakes and discharges larger than 1-1/2" in size.

One (1)  
24-02-3400

One (1) chrome plated elbow with rocker lugs shall be provided with 3" NST swivel female x 3" NST male hose threads.

One (1)  
24-03-3500

One (1) 3" NST rocker lug chrome plated vented cap and cable or chain securement shall be provided.

One (1)  
24-53-0150

One (1) Akron valve equipped with a manually operated pull rod, with quarter turn locking feature and a manual slow close device shall be provided on the specified discharge. The handle shall be equipped with color coded engraved type name plate.

## Ely Fire Department, NV

One (1)  
24-61-1860

The specified valve shall be an Akron 8800 Series three-inch (3") valve with a stainless ball.

One (1)  
27-02-1150

One (1) 2-1/2" pressure gauge rated at 0-400 PSI shall be provided. The gauge shall include a color coded label and be installed on the pump instrument panel. The face of the gauge shall have a white dial with black letters.

# Ely Fire Department, NV

One (1)  
25-25-0300

## **WATER TANK - 400 GALLON**

The apparatus shall be equipped with a four-hundred (400) gallon polypropylene water tank. The tank shall be equipped with a three-inch (3") overflow pipe. The tank body and end bulkheads shall be constructed of .5" thick, polypropylene, nitrogen-welded and tested inside and out. Tank construction shall conform to applicable NFPA standards. The tank shall carry a lifetime warranty.

The transverse and longitudinal .375" thick swash partitions shall be interlocked and welded to each other as well as to the walls of the tank. The partitions shall be designed and equipped with vent holes to permit air and liquid movement between compartments.

The .5" thick cover shall be recessed .375" from the top of the side walls. Hold down dowels shall extend through and be welded to both the covers and the transverse partitions, providing rigidity during fast fill operations. Drilled and tapped holes for lifting eyes shall be provided in the top area of the booster tank.

The water fill tower shall be provided at front of the tank. The 0.5" thick polypropylene fill and overflow tower shall be equipped with a hinged lid and a removable polypropylene screen. The overflow tube shall be installed in fill tower and piped with schedule 40 PVC pipe through the tank.

The water tank sump shall be a minimum of 10" x 10" x 3" deep and located in the forward area of the tank. There will be a schedule 40 polypropylene tank suction pipe from the front of the tank to the tank sump. The tank drain and clean out shall be a 3.0" IPT schedule 80 female flange with plug, located in the bottom of the tank sump.

The pump to tank refill connection shall be a sized to mate with tank fill discharge line. A deflector shield inside the tank will also be provided.

The water tank manufacturer shall certify the capacity of the water tank prior to delivery of the apparatus. This capacity shall be recorded on the manufacturer's record of construction and the certification shall be provided to the purchaser when the apparatus is delivered.

One (1)  
25-44-1200

## **WATER TANK FILL TOWER**

A fill tower measuring approximately 10" x 10" square shall be provided on the water tank up to and including 500 gallons total capacity.

# Ely Fire Department, NV

One (1)  
26-12-0000

## **SIDE MOUNT PUMP ENCLOSURE - PUMP PANELS - OPTIONS**

One (1)  
26-12-2000

### **SIDE MOUNT PUMP ENCLOSURE**

The side mount pump enclosure shall be removable and supported from the chassis frame rails. This enclosure will allow independent flexing of the pump enclosure from the body and allow for quick removal. The support structure shall be constructed of extruded aluminum tubing and angle.

All pump suction and discharge controls are to be mounted on the driver side pump operator's panel so as to permit operation of the pump from a central location. The fire pump, valves and controls shall be accessible for service and maintenance as required by applicable sections of NFPA standards.

All gauges shall be suitably enclosed and mounted on a full pump compartment width "hinged" gauge panel constructed of the same material as the pump operators control panel, allowing access to the backside of all gauges and gauge lines. Panel is to include a stainless steel piano hinge, flush mounted chrome plated trigger latch, and stainless steel cable end stops. Electrical wiring and all gauge lines shall be properly tie wrapped to prevent kinking or cutting of the lines when the panel is opened.

The following controls and equipment shall be provided on the pump panel or within the pump enclosure:

- 1) Electric primer.
- 2) Pump and plumbing area service lights.
- 3) Pressure control device and throttle control.
- 4) Fire pump and engine instruments.
- 5) Pump intakes and discharge controls.
- 6) Master intake and discharge gauges.
- 7) Tank fill control.
- 8) Tank suction control.
- 9) Water tank level gauge.
- 10) Pump panel lights.

### **Crosslay Installation**

The dunnage area atop the pump enclosure shall be notched for the installation of a crosslay hose bed. The hose bed shall have smooth sides and a perforated floor to allow for drainage. Provisions shall be provided to secure hose and equipment per requirements of applicable NFPA standards.

One (1)  
26-30-1500

### **LEFT SIDE RUNNING BOARD**

The left pump panels shall be equipped with a side running board. The running board will extend along the width of the pump enclosure from the forward end of the body module to behind the chassis cab.

## Ely Fire Department, NV

The running board shall be constructed of aluminum tread plate, bolted in place with stainless steel fasteners. The step surfaces shall be in compliance to applicable sections of NFPA requirements.

One (1)  
26-30-1550

### **RIGHT SIDE RUNNING BOARD**

The right pump panel shall be equipped with a side running board. The running board will extend along the width of the pump enclosure from the forward end of the body module to behind the chassis cab.

The running board shall be constructed of aluminum tread plate, bolted in place with stainless steel fasteners. The step surfaces shall be in compliance to applicable sections of NFPA requirements.

One (1)  
26-30-3050

### **PUMP SLIDE OUT STEP -- LEFT SIDE**

A slide out step assembly shall be installed on the left side pump panel using roller bearing slide tracks. The step shall be fabricated of slip resistant NFPA compliant grating, and shall extend out approximately 24" and lock in both the in and out positions.

One (1)  
26-35-1100

### **LEFT SIDE PUMP PANEL -- BOLTED**

A pump panel shall be installed on the on the left hand side of the pump enclosure. The panel shall be fastened to the pump enclosure with 1/4" stainless steel bolts.

One (1)  
26-35-1200

### **RIGHT SIDE PUMP PANEL -- BOLTED**

A pump panel shall be installed on the on the right hand side of the pump enclosure. The panel shall be fastened to the pump enclosure with 1/4" stainless steel bolts.

One (1)  
26-35-7000

### **PUMP PANEL -- SIDE MOUNT**

The left hand and right hand pump panels shall be constructed of black thermoplastic coating aluminum material and be fastened to the pump enclosure with 1/4" stainless steel bolts.

The instrument area shall have a stainless steel continuous hinge that shall swing for easy access to gauges.

One (1)  
26-55-5000

### **LABELS**

Safety, information, data, and instruction labels for apparatus shall be provided and installed at the operator's instrument panel.

The labels shall include rated capacities, pressure ratings, and engine speeds as determined by the certification tests. The no-load governed speed of the engine, as stated by the engine manufacturer, shall also be included.

# Ely Fire Department, NV

The labels shall be provided with all information and be attached to the apparatus prior to delivery.

One (1)  
26-55-5100

## **COLOR CODED PUMP PANEL LABELLING AND NAMEPLATES**

Discharge and intake valve controls shall be color coded in compliance to guidelines of applicable sections of NFPA standards.

Permanent type nameplates and instruction panels shall be installed on the pump panel for safe operation of the pumping equipment and controls.

One (1)  
26-50-3100

## **PUMP ENCLOSURE HEAT PAN**

A removable casing constructed of galvanized steel, completely enclosing the underside of the pump compartment and heated by the engine exhaust shall be provided. The heat pan assembly shall include individual panels that can be easily removed from their mounting locations. The two outer slide-out panels shall be bolted in place.

One (1)  
26-56-5100

## **MIDSHIP PUMP PANEL LIGHTS -- LEFT SIDE**

Three (3) Weldon #2025 or equal lights with clear lenses shall be installed under an instrument panel light hood on the left side pump panel. The lights shall be controlled by a switch located on the operator's instrument panel.

One (1)  
26-56-5110

## **MIDSHIP PUMP PANEL LIGHTS -- RIGHT SIDE**

Two (2) Weldon #2025 or equal lights with clear lenses shall be installed under an instrument panel light hood on the right side pump panel. The lights shall be controlled by a switch located on the operator's instrument panel.

One (1)  
26-56-5200

## **PUMP PANEL LIGHTS**

One (1) of the pump panel lights shall be illuminated at the time the fire pump is engaged into operation. The remaining lights shall be controlled by a switch located on the operator's instrument panel.

One (1)  
27-01-4150

## **TEST TAPS**

Test taps for pump intake and pump pressure shall be provided on the pump instrument panel and be properly labeled.

One (1)  
27-35-2050

## **WATER TANK GAUGE**

The apparatus shall be equipped with one (1) Class1 "Intelli-Tank" water tank level gauge and shall be installed on the pump panel. The tank level gauge shall indicate the liquid level on an easy to read LED display and show increments of 1/8 of a tank.

## Ely Fire Department, NV

Each tank level gauge system shall include:

- 1) A pressure transducer mounted on the outside of the tank in an easily accessible area. Sealed foam tanks will require zero pressure vacuum vents.
- 2) Super bright LED 4-light display with a visual indication at nine accurate levels.
- 3) Weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power.

# Ely Fire Department, NV

## **APPARATUS BODY SPECIFICATIONS**

One (1)  
43-00-4110

### **HOSEBED STORAGE AREA**

The apparatus hose body is to be properly reinforced without the use of angles or structural shapes, and free from all projections which might injure the fire hose.

The main hose body of the aerial unit shall run along the right side of the apparatus body, above the lower body compartments. The width of the hose bed shall be from the side wall of the aerial torque box to the side sheet of the apparatus body.

One (1)  
43-00-4150

### **ALUMINUM HOSEBED GRATING SINGLE AXLE**

The hose bed compartment deck shall be constructed entirely from maintenance-free, extruded aluminum slats. The slats shall have an anodized, radiused ribbed top surface. The slats shall be of widths approximately 3/4" high x 6" wide and shall be welded into a one-piece grid system to prevent the accumulation of water and allow ventilation to assist in drying hose.

One (1)  
43-00-4300

### **VINYL HOSEBED COVER SINGLE AXLE**

The apparatus shall be equipped with a vinyl hose bed cover with a weighted rear flap.

The cover, approximately 74" wide, shall be secured utilizing a Velcro fastening system at the front and sides of the hose bed body.

One (1)  
43-04-1010

### **1/8" ALUMINUM BODY**

The body shall be fabricated of aluminum extrusions; smooth aluminum sheet and aluminum tread plate.

The aluminum extrusion alloy shall be 6061 with a temper rating of T6, and have a tensile strength of 45,000 PSI and yield strength of 40,000 pounds. The aluminum extrusions shall 3" x 3" aluminum tubing, 1-3/4" x 3" aluminum tubing and 3" x 3" aluminum angle and specially designed extrusions, up to .250" wall thickness where applicable.

The smooth aluminum sheet material alloy shall be 5052 with a temper rating of H32, and have a tensile strength of 33,000 PSI and yield strength of 28,000 pounds.

The aluminum tread plate alloy shall be 3003 with a temper rating of H22, and have a tensile strength of 30,000 PSI and yield strength of 28,000 pounds.

The extrusions shall be designed as structural-framing members with the smooth aluminum and tread plate fabricated to form compartments, hose beds, and floors. All aluminum material shall be welded together using the latest mig spray pulse arc welding system.

Compartments to be sweep out design and to be water and dust proof. All compartments shall be made to the maximum practical dimensions to provide maximum storage capacity. To ensure maximum storage space, the apparatus shall be constructed without any void

# Ely Fire Department, NV

spaces between the body and the compartment walls. Double wall construction does not meet this requirement.

All exterior compartments shall have polished aluminum drip moldings installed above the doors where necessary to prevent water from entering the compartments.

Wheel well panels shall be formed aluminum that is welded in place. There shall be no visible bolt heads, retention nuts or fasteners on the exterior surface of the panel. To fully protect the wheel well area from road debris and to aid in cleaning, a full depth radius wheel well liner shall be provided. The frame side of the wheel well area on each side of the opening shall be attached to the frame side of the front and rear compartments. All seams on the frame side of the body shall be welded and caulked to prevent moisture from entering the compartments.

The rear wheel wells shall be radius cut for a streamlined appearance. A polished aluminum fenderette shall be furnished at each rear wheel well opening, held in place with stainless steel fasteners.

## FASTENERS

All aluminum and stainless steel components shall be attached using stainless steel fasteners.

Compartment door hinges, handrails and running boards shall be attached using minimum 1/4" diameter machine bolt fasteners.

3/16" diameter fasteners shall only be used in nonstructural areas such as; door handles, trim moldings, gauge mounting, etc.

One (1)  
43-00-0420

## **SINGLE AXLE WHEEL WELL LINER AND FENDERETTES**

For ease of accessibility and maintenance, wheel well panels shall be double break formed painted smooth plate that is welded in place.

To fully protect the wheel well area from road debris and to aid in cleaning, a full depth (minimum of 25") radius wheel well liner shall be provided. Wheel well liner shall be smooth aluminum to prevent corrosion.

The rear wheel wells shall be radius cut for a streamlined appearance. A polished aluminum fenderette shall be furnished at each rear wheel well opening, held in place with concealed stainless steel fasteners.

One (1)  
43-08-0510

## **ROLL UP DOOR CONSTRUCTION**

The roll up door(s) shall be fabricated from aluminum extrusions and be manufactured and assembled in the United States.

The door slats shall be double-wall extrusions with dimensions of 1.366" high x .315" thick. The exterior surface shall be flat and the interior surface concave to deflect loose equipment to prevent the door from jamming. Each slat shall have interlocking end shoes to prevent the slat from moving side to side resulting in binding of the door. Each slat shall be separated by a co-extruded PVC and rubber inner seal to prevent metal to metal contact and minimize dirt

# Ely Fire Department, NV

and moisture from entering the compartment. The inner seal shall not be visible from the exterior to maintain a clean appearance of door. The slats shall have interlocking joints with a folding locking flange to provide security and prevent penetration by sharp objects.

The track shall be a one (1) piece aluminum assembly that has an attaching flange and finishing flange incorporated into the design that facilitates installation and provides a finished look to the door without additional trim or caulking. A low profile side seal shall be utilized to maximize usable compartment space.

A drip rail designed to prevent water from dripping into the compartment shall be provided. The drip rail shall have a built in replaceable non-contacting seal to eliminate scratching of the surface of the door.

Bottom rail extrusion must have smooth back to prevent loose equipment from jamming the door and have "V" shaped double seal to prevent water and debris from entering the compartment. A two (2) inch wide finger pull shall be integrated into the bottom rail extrusion for easy one hand opening and closing. The door latch system shall be a full width one (1) piece lift bar that enables the user to operate with one hand.

The roll mechanism shall have a clip system that connects the curtain slats to the operator drum to allow for easy tension adjustment without tools. A four (4) inch diameter counterbalanced operator drum to shall be incorporated to assist in lifting the door.

One (1)  
43-08-0512

## **ROLLUP DOORS**

The rollup doors shall be ROM manufacturing roll up doors.

One (1)  
43-10-0000

## **LEFT SIDE BODY COMPARTMENTS**

The left side body compartmentation shall be as follows:

One (1)  
43-10-1700

## **LEFT FRONT COMPARTMENT**

There shall be two (2) full height compartments located ahead of the rear wheels. Each compartment shall be equipped with a full height single natural finish roll up door.

Two (2)  
55-02-2200

## **COMPARTMENT LIGHTS**

One (1) incandescent light fixture shall be installed in each exterior compartment of the apparatus. The light shall have a clear lens.

Two (2)  
55-06-1100

## **COMPARTMENT LIGHT SWITCH**

The exterior compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

# Ely Fire Department, NV

One (1)  
43-10-3300

## **LEFT OVERWHEEL COMPARTMENT**

There shall be one (1) compartment above the rear wheels. The compartment shall be equipped with a single natural finish roll up door.

The compartment shall be equipped with the following:

One (1)  
55-02-2200

## **COMPARTMENT LIGHTS**

One (1) incandescent light fixture shall be installed in each exterior compartment of the apparatus. The light shall have a clear lens.

One (1)  
55-06-1100

## **COMPARTMENT LIGHT SWITCH**

The exterior compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

One (1)  
43-10-5000

## **LEFT REAR COMPARTMENT**

There shall be one (1) full height compartment located behind the rear wheels. The compartment shall be equipped with a full height single natural finish roll up door.

The compartment shall be equipped with the following:

One (1)  
55-02-2200

## **COMPARTMENT LIGHTS**

One (1) incandescent light fixture shall be installed in each exterior compartment of the apparatus. The light shall have a clear lens.

One (1)  
55-06-1100

## **COMPARTMENT LIGHT SWITCH**

The exterior compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

One (1)  
43-12-0000

## **RIGHT SIDE BODY COMPARTMENTS**

The right side body compartmentation shall be as follows:

One (1)  
43-12-2000

## **RIGHT FRONT COMPARTMENT**

There shall be two (2) low compartments located ahead of the rear wheels. Each compartment shall be equipped with a full height single natural finish roll up door.

# Ely Fire Department, NV

Two (2)  
55-02-2200

## **COMPARTMENT LIGHTS**

One (1) incandescent light fixture shall be installed in each exterior compartment of the apparatus. The light shall have a clear lens.

Two (2)  
55-06-1100

## **COMPARTMENT LIGHT SWITCH**

The exterior compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

One (1)  
43-12-5300

## **RIGHT REAR COMPARTMENT**

There shall be one (1) low compartment located behind the rear wheels. The compartment shall be equipped with a low natural finish roll up door.

The compartment shall be equipped with the following:

One (1)  
55-02-2200

## **COMPARTMENT LIGHTS**

One (1) incandescent light fixture shall be installed in each exterior compartment of the apparatus. The light shall have a clear lens.

One (1)  
55-06-1100

## **COMPARTMENT LIGHT SWITCH**

The exterior compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

One (1)  
43-14-1400

## **REAR COMPARTMENT**

There shall be one (1) compartment located at the rear of the apparatus. The compartment shall be located within the aerial torque box to accommodate the specified ladders and pike poles. The compartment shall be equipped with a natural finish roll up door.

One (1)  
55-02-2200

## **COMPARTMENT LIGHTS**

One (1) incandescent light fixture shall be installed in each exterior compartment of the apparatus. The light shall have a clear lens.

One (1)  
55-06-1100

## **COMPARTMENT LIGHT SWITCH**

The exterior compartment light will be controlled by an automatic "On-Off" switch located on each compartment door.

# Ely Fire Department, NV

Seven (7)  
45-01-1050

## **ADJUSTABLE SHELVING TRACKS**

The compartments shall be equipped with two (2) aluminum adjustable tracks, vertically mounted, that are bolted in place for adjustable shelving and equipment mounting.

Seven (7)  
45-02-1200

## **ADJUSTABLE SHELF**

Seven (7) adjustable shelves shall be constructed of .125" thick smooth aluminum plate and be mounted in the following compartments with bolt on aluminum shelf brackets.

Each of the seven (7) compartments shall contain one (1) adjustable shelf.

Six (6)  
45-06-1100

## **500# ROLLOUT TRAY**

Six (6) rollout equipment trays shall be installed in a standard depth compartment. The 500# rated tracks shall have roller bearings. The tray shall be constructed of .188" smooth aluminum plate, fabricated with four 3" sides.

The slide out trays shall be floor mounted and located in the following compartments:

- One (1) L1
- One (1) L2
- One (1) L4
- One (1) R1
- One (1) R2
- One (1) R3

One (1)  
90-02-3800

## **SLIDE OUT REAR LADDER AERIAL TORQUE BOX**

Ground ladders and pike poles shall be accessed from the rear of the apparatus. All ladders shall mounted individual brackets and slide on composite material so as not to damage the main beams of the ladders. Pike poles and the folding ladder shall be stored in individual storage area. Ladders shall have stops provided on the front of all slides so ladders will not slide forward during emergency braking conditions.

One (1)  
43-18-0600

## **EXTRUDED ALUMINUM RUB RAILS**

Full body length polished aluminum rub rails shall be bolted in place on the right and left body sides and in the pump panel area. The rub rails shall extend outward beyond the body sides for protection of the compartments and doors. There shall be a bolt on aluminum corner casting on each rear corner to blend the rear tailboard assembly with the side rub rails.

The side rub rails shall be a heavy extruded aluminum "C" channel.

# Ely Fire Department, NV

One (1)  
43-18-0700

## **SIDE AND REAR OVERLAYS**

Overlay panels shall be constructed of 3003 polished aluminum tread plate. Polished aluminum overlay shall be provided and installed in all required areas of the apparatus body.

Overlay shall be installed with "Aluminized" stainless steel bolts to prevent corrosion.

One (1)  
43-18-1000

## **REAR STEP/TAILBOARD**

A single piece .188 rear step/tailboard shall be furnished that is a minimum of 12.00" deep and full width of the apparatus body, from rub rail to rub rail. The tailboard shall be provided with a removable casting on each corner for a pleasing appearance.

One (1)  
43-19-2000

## **AIR CYLINDER COMPARTMENT IN WHEELWELL**

Four (4) breathing air cylinder storage compartments shall be provided and located in the rear wheel well area of the apparatus body.

The cylinder storage compartment shall be constructed entirely of aluminum. The door assemblies shall be provided with a gasket between door and body side, bolted in-place and removable for repair or replacement.

Compartment shall be provided with SCBA cylinder scuff protection. A brushed aluminum door with push button trigger latch shall be provided.

One (1)  
43-19-3100

## **HANDRAIL REAR STEP**

Two (2) extruded aluminum non-slip handrails, approximately 48" in length, shall be provided and mounted on the rear of the apparatus, one (1) on each side of the body.

Two (2)  
43-19-4100

## **FOLDING STEP REAR**

An 8" square folding step of die cast aluminum shall be provided. The step shall comply to NFPA #1901 non-slip standards and shall be installed on the rear left side of the body.

# Ely Fire Department, NV

One (1)  
50-00-5200

## 12-VOLT ELECTRICAL SYSTEM

One (1)  
50-03-1050

## LOW VOLTAGE ELECTRICAL SYSTEM SPECIFICATIONS

The electrical system shall include all panels, electrical components, switches and relays, wiring harnesses and other electrical components. The electrical equipment installed by the apparatus manufacturer shall conform to current automotive electrical system standards, the latest Federal DOT standards, and the requirements of the applicable NFPA standards.

All wiring shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 percent of the maximum current for the protected circuit. Voltage drops in all wiring from the power source to the using device shall not exceed 10 percent. The wiring and wiring harness and insulation shall be in conformance to applicable SAE and NFPA standards. The wiring harness shall conform to SAE J-1128 with GXL temperature properties. All exposed wiring shall be protected in a loom with a minimum 289 degree Fahrenheit rating. All wiring looms shall be properly supported and attached to body members. The electrical conductors shall be constructed in accordance with applicable SAE standards, except when good engineering practice requires special construction.

The wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection and shall be installed in accordance with the device manufacturer's instructions. Electrical connections shall be with mechanical type fasteners and large rubber grommets where wiring passes through metal panels.

The wiring between the cab and body shall be joined using Deutsche type connectors or an enclosed in a terminal junction panel area. This system will permit body removal with minimal impact on the apparatus electrical system. All connections shall be crimp-type with insulated shanks to resist moisture and foreign debris such as grease and road grime. Weather-resistant connectors shall be provided throughout to ensure the integrity of the electrical system.

Any electrical junction or terminal boxes shall be weather resistant and located away from water spray conditions. In addition, the main body junction panel shall house the automatic reset breakers and relays where required.

There shall be no exposed electrical cabling, harnesses, or terminal connections located in compartments, unless they are enclosed in a junction box or covered with a removable electrical panel. The wiring shall be secured in place and protected against heat, liquid contaminants and damage. Wiring shall be uniquely identified at least every two feet (2') by color coding or permanent marking with a circuit function code and identified on a reference chart or electrical wiring schematic per requirements of applicable NFPA #1901 standards.

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.

## Ely Fire Department, NV

The electrical system shall include the following:

- a) Electrical terminals in weather exposed areas shall have a non-conductive grease or spray applied. A corrosion preventative compound shall be applicable to all terminal plugs located outside of the cab or body.
- b) The electrical wiring shall be harnessed or be placed in a protective loom.
- c) Holes made in the roof shall be caulked with silicone. Large fender washers shall be used when fastening equipment to the underside of the cab roof.
- d) Any electrical component that is installed in an exposed area shall be mounted in a manner that will not allow moisture to accumulate in it.
- e) A coil of wire must be provided behind an electrical appliance to allow them to be pulled away from mounting area for inspection and service work.
- f) All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.

The warning lights shall be switched in the chassis cab with labeled switches in an accessible location. Individual rocker switches shall be provided only for warning lights provided over the minimum level of warning lights in either the stationary or moving modes. All electrical equipment switches shall be mounted on a switch panel mounted in the cab convenient to the operator. The warning light switches shall be of the rocker type. For easy nighttime operation, an integral indicator light shall be provided to indicate when the circuit is energized. All switches shall be appropriately identified as to their function.

A single warning light switch shall activate all required warning lights. This switch will allow the vehicle to respond to an emergency and "call for the right of way". When the parking brake is applied, a "blocking right of way" system shall automatically activate per requirements of the applicable NFPA standards. All "clear" warning lights shall be automatically turned off upon application of the parking brake.

### **NFPA REQUIRED TESTING OF ELECTRICAL SYSTEM**

The apparatus shall be electrically 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 the applicable NFPA standards. 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 failed test.

#### 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.

# Ely Fire Department, NV

### 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 is permitted during this test. However, if an alarm sounds due to excessive battery discharge, as detected by the system requirements in the NFPA standards, or a system voltage of less than 11.7 volts dc for more than 120 seconds is present, the test has failed.

### 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 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:
  - 1. The nameplate rating of the alternator.
  - 2. The alternator rating under the conditions.
  - 3. Each specified component load.
  - 4. Individual intermittent loads.

One (1)  
50-12-5200

### ROCKER SWITCH CONSOLE

One (1) switch console with individual rocker switches to control electrical equipment and emergency lighting shall be installed in the chassis cab dash area.

One (1)  
50-15-3500

### MASTER ELECTRIC SWITCH

One (1) master battery disconnect switch shall be located conveniently to the driver of the apparatus. The switch shall disconnect the 12 volt power supply from the battery system.

A green "Master On" light shall be provided. This light shall illuminate anytime the master switch is in the "ON" position.

One (1)  
50-26-1000

### BATTERY CHARGER AND AIR COMPRESSOR

One (1) Kussmaul Auto Charge 1000 model #091-56-12-B1 battery charger and air compressor system shall be installed. The 120 volt compressor system shall be designed to

# Ely Fire Department, NV

maintain the air pressure in the chassis brake system whenever the pressure drops below a predetermined level.

The battery charger shall be supplied from the 120 volt shore power receptacle and be a fully automatic high output charging system. The unit shall be mounted in a clean dry area and will be accessible for service and/or maintenance.

The charger shall have a built in 3-amp battery saver for rechargeable hand lights.

One (1)  
50-26-1010

## **SHORE POWER RECEPTACLE**

One (1) Kussmaul 20 amp "super auto-eject" shore power receptacle shall be provided on the apparatus. The shore power plug shall be "ejected" when the chassis's engine starter is engaged. The receptacle shall be wired to any 120 volt A/C equipment that requires shore power. An aluminum enclosure shall be provided with the receptacle for protection from road dirt and damage. A hinged weatherproof cover shall be provided.

One (1)  
51-05-7100

## **ENGINE COMPARTMENT LIGHT**

One (1) 12 volt incandescent light with switch shall be mounted in the engine enclosure.

One (1)  
51-05-7200

## **PUMP ENCLOSURE LIGHTS**

One (1) incandescent work light shall be provided in the pump enclosure. The control switch shall be mounted on the light head.

Two (2)  
51-15-1200

## **12V 150 WATT FLOODLIGHT**

Two (2) Fire Research Focus model FCA100-D15 lamp head shall be provided. The lamp head mounting arm shall terminate in 3/4" NPT threads. Wiring shall extend from the lamp head mounting arm bottom.

The lamp head shall have one (1) quartz halogen 150 watt 12 volt bulb. The bulb will draw 12.5 amps and generate 2600 lumens. The bulb shall be accessible through the front. The lamp head shall direct 50 percent of the light onto the action area while providing 50 percent to illuminate the working area. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamp head shall incorporate heat-dissipating fins and be no more than 5" deep by 3 3/8" high by 10" wide. Lamp head and mounting arm shall be powder coated white. The floodlight shall be UL listed as a scene light for fire service use.

Two (2)  
51-15-2100

## **TELESCOPIC POLE**

Two (2) Fire Research 530 series side mount bottom raise telescopic light pole shall be provided. The light pole shall extend approximately 30" in height and be anodized aluminum. A knurled twist lock mechanism to secure the extension pole in position shall be included with the pole.

# Ely Fire Department, NV

Two (2)  
51-20-4100

## **LIGHT SWITCH ON LAMPHEAD**

A switch shall be installed on the quartz light lamp head. The weatherproof on-off toggle switch shall be mounted on the lower left side of the lamp head.

Two (2)  
51-20-3600

## **LIGHT MOUNTING LOCATIONS**

The mounting locations for the specified telescoping lights shall be on the pump enclosure, one each side.

One (1)  
52-01-1800

## **BACK-UP ALARM**

One (1) Ecco model #SA-907 "Smart Alarm" automatic electric back-up alarm shall be wired to the back-up light circuit, and mounted under the rear of the apparatus body.

One (1)  
52-15-1200

## **RADIO**

One (1) Kenwood Model #TK790 Radio shall be provided and installed in the cab.

## **RADIO ANTENNA**

One (1) radio antenna shall be supplied and installed on the apparatus.

One (1)  
53-01-1500

## **MARKER LIGHTS**

Incandescent marker lights shall be installed on the vehicle in conformance to the Department of Transportation requirements.

One (1)  
53-02-1500

## **LICENSE PLATE BRACKET**

One (1) license plate bracket shall be provided at the rear bumper. The bracket shall have a light and shall be chrome plated.

One (1)  
53-03-2450

## **TAIL LIGHTS**

Two (2) Weldon LED tail/brake lights shall be provided. The rectangular 4"x6" light shall be red.

One (1)  
53-04-1450

## **TURN SIGNALS**

Two (2) Weldon turn signals shall be provided. The incandescent light shall be rectangular in shape.

# Ely Fire Department, NV

One (1)  
53-06-3350

## **BACKUP LIGHTS**

Two (2) Weldon Series 4600 LED backup lights shall be installed on the rear of the apparatus body. The dimensions shall be 4" x 6" and the lens color shall be clear.

One (1)  
54-02-1700

## **CAB GROUND LIGHTS**

Incandescent ground lights shall be installed under the cab doors.

One (1)  
54-04-1999

## **GROUND LIGHT SWITCH**

The ground lights shall automatically activate when the parking brake is applied.

One (1)  
54-03-1150

## **PUMP PANEL GROUND LIGHTS**

Two (2) incandescent ground lights shall be installed under the pump panel running boards. One (1) light shall be located on the driver's side and one (1) light located on the officer's side of the apparatus.

One (1)  
54-04-1999

## **GROUND LIGHT SWITCH**

The ground lights shall automatically activate when the parking brake is applied.

One (1)  
54-03-1550

## **REAR STEP GROUND LIGHTS**

Two (2) incandescent ground lights shall be installed under rear step of the apparatus.

One (1)  
54-04-1999

## **GROUND LIGHT SWITCH**

The ground lights shall automatically activate when the parking brake is applied.

One (1)  
54-10-1600

## **STEP LIGHT**

One (1) incandescent step light with clear lens shall be installed on the rear step of the apparatus body.

One (1)  
54-11-2100

## **STEP / WALKWAY LIGHT SWITCH**

The step/walkway light switch shall be installed and wired to the parking brake.

# Ely Fire Department, NV

One (1)  
55-11-2000

## **DOOR OPEN/HAZARD WARNING LIGHT**

A red flashing, warning light shall be provided and installed in the driver's compartment to indicate an open passenger or apparatus compartment door. The warning light shall also be attached to folding equipment racks and light towers as specified. The light shall be a flashing rectangular incandescent marker light with a red lens and shall be properly marked and identified.

One (1)  
56-01-2000

## **ELECTRIC SIREN**

One (1) Code 3 Model #3672 V-Con electronic siren shall be mounted in the cab. The unit shall feature an electronic air horn, wail, yelp, hi-lo siren and shall have a hard wired microphone.

One (1)  
56-02-2000

## **SPEAKER**

One (1) Federal Signal DynaMax Model #MS100 speaker shall be installed.

One (1)  
56-06-0500

## **FEDERAL MECHANICAL SIREN**

One (1) Federal Signal Q2B mechanical siren shall be recess mounted into the left side of the front bumper. The siren control switch shall be installed in the cab.

One (1)  
56-07-1300

## **SIREN CONTROL**

One (1) foot switch shall be provided on the driver's side of the cab floor to activate the Federal Signal Q2B siren.

One (1)  
56-07-1400

## **SIREN CONTROL**

One (1) foot switch shall be provided on the officer's side of the cab floor to activate the Federal Signal Q2B siren.

One (1)  
56-07-1100

## **SIREN BRAKE**

One (1) push button siren brake to silence the Federal Signal Q2B siren shall be provided on the driver's side dash.

One (1)  
52-10-4100

## **INTERCOM SYSTEM**

The vehicle shall be equipped with a Sigtronics US45S intercom master station. The system comes standard with connections for up to four (4) positions plus one (1) pump panel position.

## Ely Fire Department, NV

The driver and officer positions will have push to talk headsets with radio and intercom capability.

The two (2) crew positions shall have intercom capability only.

A jack shall be provided on the pump panel for use with the driver's headset

This system shall be interfaced with the specified radio.

# Ely Fire Department, NV

One (1)  
56-92-2000

## **EMERGENCY LIGHTING PACKAGES**

One (1)  
57-03-6800

## **LIGHTBAR**

Two (2) Code 3 Model #2118NFPA2 light bars shall be installed on the apparatus cab roof. The LED X2100 Series light bars shall be 18" in length and each shall include nine (9) red LED single modules. The lens colors shall be red and clear.

One (1)  
58-04-3100

## **LOWER FRONT WARNING LIGHTS**

One (1) pair of Code 3 model #45 red LED lights shall be installed, one each side one the front of the chassis cab. The dimensions of the lights shall be 3" x 7".

One (1)  
58-10-3100

## **INTERSECTION WARNING LIGHTS**

One (1) pair of Code 3 model #45 red LED lights shall be installed on the side of the front bumper. The dimensions of the lights shall be 3" x 7" and shall have a red lens.

One (1)  
58-27-3100

## **LOWER MID-BODY WARNING LIGHTS**

One (1) pair of Code 3 series 45 red LED warning lights shall be installed, one each side of the apparatus, mid-body. The dimensions of the lights shall be 3" x 7".

One (1)  
58-37-3100

## **LOWER REAR SIDE WARNING LIGHTS**

One (1) pair of Code 3 series 45 red LED warning lights shall be installed, one each side of the apparatus body, towards the rear of the body. The dimensions of the lights shall be 3" x 7".

One (1)  
58-72-3000

## **UPPER REAR WARNING LIGHTS**

One (1) pair of Code 3 model 550 rotating beacon halogen warning lights shall be installed, one each side on the upper rear of the apparatus body. The rotary light shall have a 50 watt halogen lamp with the total dimensions of the lights 6" x 6" and shall have one red lens and one amber lens.

One (1)  
58-74-5300

## **REAR WARNING LIGHT MOUNTING**

The upper rear lights shall be mounted on cast aluminum stanchions attached to the apparatus body, one on each side.

## Ely Fire Department, NV

One (1)  
58-82-3100

### **LOWER REAR WARNING LIGHTS**

One (1) pair of Code 3 series 45 red LED warning lights shall be installed, one each side on the lower rear of the apparatus body. The dimensions of the lights shall be 3" x 7".

# Ely Fire Department, NV

## APPARATUS PAINT AND FINISH

One (1)  
80-06-1000

### BODY PAINT PROCESS

All bright metal fittings, if unavailable in stainless steel shall be heavily chrome plated. Iron fittings shall be copper plated prior to chrome plating.

All seam shall be caulked both inside and along the exterior edges with a urethane automotive sealant to prevent moisture from entering between any body panels.

The body and all parts shall be thoroughly washed with a grease cutting solvent (PPG DX330) prior to any sanding. After the body has been sanded and the weld marks and minor imperfections are filled and sanded, the body shall be washed again with (PPG DX330) to remove any contaminants on the surface.

The first coating to be applied is a pre-treat self etching primer (PPG DX1787) (.5 to 1.0 dry film build) for maximum adhesion to the body material. The next two to four coats (depending on need) shall be an acrylic urethane primer surfacer (PPG K38). The film build shall be 4-6 mils when dry. The primer surfacer coat, after appropriate dry time, shall be sanded with 320-600 grit sandpaper to ensure maximum gloss of the paint. The last step is the application of at least three coats of PPG Concept acrylic urethane two-component color (single stage). The film build being 2-3 mils dry. The single stage acrylic urethane, when mixed with component (PPG DCX61) catalyst shall provide a UV barrier to prevent fading and chaulking.

All products and technicians are certified by PPG every two (2) years.

One (1)  
80-06-3000

### CAB PAINT

The chassis cab exterior shall be single color and painted by the chassis manufacturer.

One (1)  
80-30-5000

### INTERIOR COMPARTMENT FINISH

The apparatus side compartment interiors are to be painted with a splatter finish material. The compartments shall be cleaned with a grease remover, and then the surface sanded and prepared for painting. The compartment shall be provided with two (2) coats of white epoxy. The compartments are then coated with a splatter paint top coat.

Compartment interiors that are wrinkle finished or are topcoat web painted do not meet the intent or durability of this requirement and are not acceptable.

One (1)  
80-44-1600

### UNDERCOATING

The entire underside of the single axle apparatus body is to be cleaned and properly prepared for application of a sprayed on automotive type undercoating for added corrosion resistance. Undercoating is to be a solvent based, rubberized coating, black in color.

# Ely Fire Department, NV

One (1)  
80-51-1200

## **LETTERING**

Two (2) painted panels shall be supplied for attachment to the sides of the aerial device. The panels shall be painted to match the color of the aerial device. Lettering (up to fifty (50) letters) shall be provided on the aerial sign panels. The maximum size of the panels shall be up to 10" x 144". The lettering provided shall be painted or vinyl with the color specified by the customer at pre-construction conference.

One (1)  
80-71-1400

## **REFLECTIVE STRIPING**

A 1" x 6" x 1" wide 3M brand Scotchlite reflective multi-stripe shall be affixed to the perimeter of the vehicle. There shall be a 1" gap between each of the stripes. Striping shall conform to applicable NFPA requirements. At least 50% of the perimeter length of each side and width of the rear, and at least 25% of the perimeter width of the front of the vehicle shall have reflective striping.

The color of the striping shall be red.

# Ely Fire Department, NV

## ADDITIONAL EQUIPMENT

The following Ladders and Pike Poles shall be provided with the apparatus.

Two (2) 90-03-3400	Two (2) Duo-Safety 16' 2-section aluminum extension ladders
One (1) 90-06-4600	One (1) Duo-Safety 24' 2-section aluminum extension ladder
One (1) 90-07-4300	One (1) Duo-Safety 35' 3-section aluminum extension ladder
One (1) 90-08-2600	One (1) Duo-Safety 10' aluminum folding attic ladder
One (1) 90-08-2300	One (1) Duo-Safety 14' 2-section Fresno attic ladder
Two (2) 90-16-2200	Two (2) 4' Pike poles, fiberglass, with D-ring handles
Two (2) 90-16-2600	Two (2) 8' Pike poles, fiberglass, with straight handles
Two (2) 90-16-3000	Two (2) 12' Pike poles, fiberglass, with straight handles

# Ely Fire Department, NV

One (1)  
00-00-1400 10

## **75' THREE SECTION REAR MOUNT LADDER**

One (1)  
00-03-1400

## **TECHNICAL DRAWINGS**

Technical and engineering drawings shall be provided for the 75' (3) section aerial ladder as follows: left side view, top view and rear view.

One (1)  
00-07-3000

## **AERIAL OPERATING INSTRUCTIONS AND DEMONSTRATION**

As required by applicable sections of NFPA #1901, operating instructions and demonstration of the aerial apparatus shall be provided at the purchaser's location. A trained and qualified technician of the sales representative shall provide these instructions and demonstration of the aerial apparatus.

Personnel providing the instructions shall be professionally trained by the aerial manufacturer prior to delivery process. All costs of these instructions shall be borne by the bidder. The bidder shall notify the purchaser a minimum of 14 days prior to the instruction period. The bidder shall provide classroom instructions, instruction and operating manuals as required by NFPA #1901, and provide all other necessary material necessary to assure proper operation of the aerial device.

This instruction period shall be a minimum of one (1) day at the purchaser's location.

One (1)  
00-08-1000

## **AERIAL OPERATION AND SERVICE DOCUMENTATION**

The bidder shall supply, at time of delivery, at least two (2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted. The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof. This documentation and manuals shall be provided in the English language.

The bidder shall also provide documentation of the following items for the entire apparatus and each major operating system or major component of the apparatus:

- (1) Manufacturer's name and address
- (2) Country of manufacture
- (3) Source for service and technical information
- (4) Parts replacement information
- (5) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device
- (6) Wiring diagrams for low voltage and line voltage systems to include the following information:
  - (a) Pictorial representations of circuit logic for all electrical components and wiring

## Ely Fire Department, NV

- (b) Circuit identification
  - (c) Connector pin identification
  - (d) Zone location of electrical components
  - (e) Safety interlocks
  - (f) Alternator-battery power distribution circuits
  - (g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
- (7) Lubrication charts
  - (8) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
  - (9) Precautions related to multiple configurations of aerial devices
  - (10) Instructions regarding the frequency and procedure for recommended maintenance
  - (11) Overall apparatus operating instructions
  - (12) Safety considerations
  - (13) Limitations of use
  - (14) Inspection procedures
  - (15) Recommended service procedures
  - (16) Troubleshooting guide
  - (17) Apparatus body, chassis, and other component manufacturer's warranties
  - (18) Special data required by this standard
  - (19) Copies of required manufacturer test data or reports, manufacturer certifications, and independent third-party certifications of test results
  - (20) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

The bidder shall deliver with the apparatus all manufacturers' operations and service documents supplied with components and equipment that are installed or supplied by the bidder.

### **DOCUMENTATION SUPPLIED WITH FIRE APPARATUS**

Any documentation provided with the aerial apparatus shall be permitted to be in printed format, electronic format, audiovisual format, or a combination thereof. This documentation and manuals shall be provided in the English language.

### **Data Required from the Bidder**

The bidder shall supply, at the time of delivery, two (2) copies of the following documents:

## Ely Fire Department, NV

- (1) The manufacturer's record of apparatus construction details, including the following information:
  - (a) Owner's name and address
  - (b) Apparatus manufacturer, model, and serial number
  - (c) Chassis make, model, and serial number
  - (d) GAWR of front and rear axles
  - (e) Front tire size and total rated capacity in pounds (kilograms)
  - (f) Rear tire size and total rated capacity in pounds (kilograms)
  - (g) Chassis weight distribution in pounds (kilograms) with water and manufacturer- mounted equipment (front and rear)
  - (h) Engine make, model, serial number, rated horsepower and related speed, and governed speed
  - (i) Type of fuel and fuel tank capacity
  - (j) Electrical system voltage and alternator output in amps
  - (k) Battery make, model, and capacity in cold cranking amps (CCA)
  - (l) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
  - (m) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
  - (n) Pump transmission make, model, serial number, and gear ratio
  - (o) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
  - (p) Water tank certified capacity in gallons or liters
  - (q) Aerial device type, rated vertical height in feet (meters), rated horizontal reach in feet (meters), and rated capacity in pounds (kilograms)
  - (r) Paint manufacturer and paint number(s)
  - (s) Company name and signature of responsible company representative
- (2) Certification of slip resistance of all stepping, standing, and walking surfaces
- (3) If the apparatus has a fire pump or an industrial supply pump, the pump manufacturer's certification of suction capability
- (4) A certification of inspection and test for the aerial device

# Ely Fire Department, NV

- (5) All the technical information required for inspections to comply with NFPA 1914, Standard for Testing Fire Department Aerial Devices
- (6) If the apparatus has a fixed line voltage power source, the certification of the test for the fixed power source
- (7) If the apparatus is equipped with an air system, test results of the air quality the SCBA fill station and the air system installation
- (8) Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose)
- (9) Written load analysis and results of the electrical system performance tests
- (10) When the apparatus is equipped with a water tank, the certification of water tank capacity

One (1)  
00-09-1200

## **OVERALL AERIAL WARRANTY**

The aerial manufacturer shall provide a one (1) year or 100,000 miles overall parts and labor warranty as follows:

The aerial manufacturer shall warrant to the purchaser that the complete aerial device and system was manufactured to comply with the manufacturer's bid specifications and free in all respects from any defects in materials or workmanship.

The warranty shall expire one (1) year or 100,000 miles from the date of delivery and acceptance of the apparatus. This warranty shall include all parts and labor. The cost of transportation of vehicle to the warranty location shall be provided by purchaser.

The obligations of the aerial manufacturer, pursuant to the foregoing warranty, with respect to aerial shall be limited to the cost of bringing such aerial into compliance with the specifications or of removing any defects in materials or workmanship.

Any work or alterations on or misuse of the aerial performed by any one other than the aerial manufacturer's designated personnel, either before or after delivery to the purchaser, shall not be warranted by the manufacturer and shall cause to make this warranty invalid.

One (1)  
00-09-2250 10

## **AERIAL STRUCTURAL WARRANTY**

The aerial ladder sections shall carry a warranty against structural failures caused by defective design or workmanship for a period of twenty (20) years or 100,000 miles.

The structural warranty shall be conditional upon normal and reasonable maintenance and testing as required by NFPA #1911 and #1914 as it relates to "in-service" fire apparatus. The warranty shall not cover defects caused from misuse, negligence, and accidents. Exact details of the bidders warranty shall be submitted with the bid.

# Ely Fire Department, NV

One (1)  
00-09-3025

## **WATERWAY WARRANTY**

The aerial waterway shall be warranted for one (1) year by the aerial manufacturer. Provisions and requirements of this warranty shall be provided with the bid.

One (1)  
00-10-1100

## **TESTING CRITERIA**

The aerial ladder shall be inspected and tested by Underwriters Laboratories, Inc. The inspection shall be "Type One" system testing. A non-destructive test shall be performed on each unit at a rate of 100% inspection by the Underwriters Laboratories inspector, exceeding the requirements applicable section of NFPA #1901 for new apparatus. All non-destructive procedures shall be fully documented and meet or exceed the requirements of applicable sections of NFPA #1901.

One (1)  
00-10-2100

## **AERIAL WATERWAY FLOW TESTING**

The waterway flow test shall be conducted by an accredited third party testing organization with certified results provided on delivery of the apparatus. If the aerial device is equipped with a permanent water system and has a rated vertical height of 110 ft (34 m) or less, standard model flow test data shall be provided to the purchaser.

If the water system has been modified from the standard model configuration, a new flow test shall be conducted to determine that the friction loss in the water system between the base of the swivel and the monitor outlet does not exceed 100 psi (700 kPa) with 1000 gpm (4000 L/min) flowing and with the water system at full extension.

A flow test shall be conducted on each vehicle to determine that the water system is capable of flowing 1000 gpm (4000 L/min) (or rating as specified in these specifications) at 100 psi (700 kPa) nozzle pressure with the aerial device at full elevation and extension.

Where the apparatus is equipped with a fire pump designed to supply the water system, the test shall be conducted using the onboard fire pump.

The intake pressure to the fire pump shall not exceed 20 psi (140 kPa).

# Ely Fire Department, NV

One (1)  
01-12-1000

## **75' THREE-SECTION REAR MOUNT LADDER SPECIFICATIONS**

### Aerial Ladder Design and Construction

A 75' three-section steel rear mount aerial ladder shall be provided. It shall have a maximum height of 75' at the top rung of the fly section at 75-degrees elevation. The horizontal reach from the top rung to the center of the turntable shall be 70' 6".

### Operation on grades

The aerial shall be capable of being operated with full rated capabilities in any plane up to 5-degrees out of level with the turntable leveled as much as possible by placement of the outriggers. Operation beyond this limit shall be at the operator's discretion.

### Extension and Retraction System

Two [2] 4" inside diameter cylinders, each with 2" outside diameter rods and a 60" stroke, are used in the extension and retraction system. The specified extension cylinders shall not exceed the specified length. The required length cylinders shall place the cylinder weight closer to the base of the aerial device. Smaller size cylinders are required since they are easier to handle for removal for service reasons. In addition, the specified shorter stroke cylinders provide less potential for damage to the rod by hitting an obstacle when extended.

The extension cylinders shall have counter balance valves mounted directly to them and shall extend and retract the aerial with a 4 to 1 cable cylinder arrangement from totally retracted to 75' at 75 degrees totally extended.

The extension and retraction system shall have four [4] pairs of cables. Mid section cables shall have a .375" diameter and fly section cables shall have a .3125" diameter.

Each of the cylinders, cables, and sheave assemblies shall be completely independent of the other system, so as to provide a safety factor wherein a failure of one assembly shall not affect the function and operation of the other assembly. Each set of cables shall be capable of operating the ladder in the event of a failure of the other.

There are no restrictions on the waterway as the ladder is extended and retracted

### Ladder Cradle Alignment Light

An amber LED indicator light will be supplied on the control console to indicate to the operator when the aerial is aligned with the travel bed support and can be lowered into the travel support.

A limit switch on the base section shall signal by means of an amber indicator light when the aerial rungs are in alignment.

### Testing Criteria

The aerial ladder shall receive Underwriters Laboratories Type #1 System testing. Non-destructive testing (NDT) shall be performed on each unit at a rate of 100% inspection by the Underwriters Laboratories inspector, exceeding the requirements of NFPA #1901. All NDT procedures shall be fully documented and meet or exceed the requirements of NFPA #1901.

# Ely Fire Department, NV

## State-of-the Art Technology

The aerial device materials, parts, technology or procedures used in construction of the apparatus are subject to change at the manufacturer's discretion to provide "equal or better" products and must be in compliance to applicable NFPA #1901 standards and industry standard practice.

One (1)  
01-12-1010

## **LADDER BASE SECTION**

The ladder base section length shall be 28' 10", with inside dimension of 34.25", distance between the top of the handrail and the centerline of the rungs shall be 23.875".

The base rails shall be constructed with 100,000 PSI material steel material and the handrails shall be constructed with 70,000 PSI material.

One (1)  
01-12-1030

## **LADDER MID-SECTION**

The ladder mid-section length shall be 28' 11", with inside dimension of 28.375", the distance between the top of the handrail and the centerline of the rungs shall be 19.875".

The base rails shall be 70,000 PSI material and the handrails shall be with 70,000 PSI steel material.

One (1)  
01-12-1045

## **LADDER FLY SECTION**

The ladder fly section length shall be 32' including the bolt-on egress, with inside dimension of 23.5", the distance between the top of the handrail and the centerline of the rungs shall be 16.375".

The handrails and base rails shall be 70,000 PSI steel material.

One (1)  
45-03-1010

## **MOUNTING PLATE FOR AXE AND PIKE POLE -- FLY SECTION**

A welded-in mounting plate shall be installed for the axe handle brackets on the right side and pike pole brackets located on the left side of the fly section.

One (1)  
10-05-1100

## **AERIAL WEAR PADS**

The aerial wear pads shall be "PET" type and shall incorporate semi-crystalline hardness, rigidity, mechanical strength with exceptional sliding properties and very low sliding wear. The pads shall be used between the telescoping sections for maximum weight distribution, strength, and smooth operation. Side wear pads shall be nylatron GSM, stainless steel adjustment screws shall be provided on the side wear pads to permit proper side clearance.

One (1)  
10-05-1200

## **AERIAL LADDER BED**

A heavy duty ladder bed shall be provided for support of the aerial in the travel position.

# Ely Fire Department, NV

On the base section of the aerial device, a stainless steel scuff plate shall be installed where the aerial comes in contact with the travel support.

One (1)  
10-06-1200

## **AERIAL SIGN BRACKETS**

The aerial manufacturer shall supply aerial sign brackets welded to the base section of the aerial. These brackets shall be located on both sides of the base section.

One (1)  
70-03-1300

## **RELIEF VALVE -- WATERWAY SYSTEM**

A 2-1/2" preset relief valve shall be placed in the aerial waterway system and shall be capable of the dumping of water to the environment to protect the waterway system.

One (1)  
70-04-1100

## **DRAIN VALVE -- WATERWAY**

One (1) 1-1/2" quarter turn drain valve shall be installed at the low point of the waterway plumbing system.

One (1)  
90-04-1300

## **HYDRAULIC SYSTEM -- ELEVATION SYSTEM**

The hydraulic elevation system shall have two (2) 5" inside diameter cylinders that have 2-1/2" diameter rods and a 30" stroke. The elevation system shall elevate the aerial from -5 degrees to +75 degrees. Each cylinder shall have lock valves connected directly to the barrel of the cylinder.

The hydraulic elevation system shall have a load gauge giving a continuous reading of the "dead load" and "live load" of the aerial from -10 degrees to a +75 degrees elevation. The load gauge shall activate an alarm when the aerial has been overloaded by 10% of the rated load.

A pressure-reducing valve shall limit the force of the aerial when lowering and the system pressure limits the force when elevating the aerial.

All hydraulic cylinders utilized in the aerial elevation and extension system shall be of commercially available and shall be of standard sizes and lengths rather than special sizes or of proprietary manufacture. This requirement is important since it assures quicker parts availability, shorter down time, and less costly replacement parts for cylinders.

One (1)  
90-06-1100

## **HYDRAULIC PUMP DRIVE SYSTEM**

An electrical start-stop "hot shift" PTO shall be mounted to the transmission. The PTO shall be connected to the hydraulic pump and shall supply power for all aerial and outrigger operations. Electrical safety wiring shall require that the vehicle be in neutral and the parking brake set before the PTO will operate. A "PTO Engaged" indicator light is installed in the cab of the apparatus.

# Ely Fire Department, NV

One (1)  
90-07-1100

## **EMERGENCY HYDRAULIC SYSTEM -- 12VOLT**

An emergency hydraulic system shall be provided for capability for limited ladder functions and to stow the ladder and outriggers in case of prime mover failure.

The emergency system shall be powered from the 12-volt electrical system from the apparatus battery system and shall not be load managed.

One (1)  
90-25-1200 10

## **CORROSION PROTECTION -- AERIAL LADDER SECTIONS**

Prior to assembly, each aerial ladder section shall be hot dipped galvanized. The galvanizing process will permeate each ladder section to prevent rust and corrosion and not be merely an over-coating. The galvanized aerial ladder sections shall be provided in the natural finish eliminating the requirement for finish paint and the subsequent requirements for touch up paint and/or total repaint after a period of time due to nicks, chips and corrosion resulting from hitting the ladder many times in use. The galvanized ladder shall reduce the maintenance requirement for grease once or twice a year, based on duty cycle.

The aerial ladder sections are galvanized inside and out, including base rails, hand rails, diagonals, rungs and K-Braces. This process eliminates the rusting, scratching or paint chips on the aerial sections. Galvanizing has been recognized as an effective way to protect steel from corrosion.

Galvanizing shall provide a barrier and cathodic protection from corrosion. During the galvanizing process, the complete aerial ladder sections shall be immersed in molten zinc. Through diffusion, the zinc shall bond to the steel at the molecular level. The resulting zinc coating shall provide a barrier that shields the steel from the environment.

One (1)  
00-09-8200

## **AERIAL LADDER SECTIONS -- CORROSION PROTECTION WARRANTY**

The aerial ladder sections shall be provided with a twenty-five (25) year galvanized steel and corrosion warranty. The aerial manufacturer shall provided details and requirements of the corrosion protection warranty with the bid.

One (1)  
90-21-1100

## **FLY SECTION -- EGRESS SECTION PAINTING**

The fly section shall have a bolt-on egress section. The egress area shall be painted the same color as the ladder sections.

One (1)  
90-22-1100

## **GALVANIZED OUTRIGGERS AND STABILIZERS**

The aerial stabilizer assemblies, outriggers assemblies, beam, outer jack tube, inner jack tube and jack pad shall be galvanized.

The outriggers and stabilizers shall be galvanized inside and out. The process shall eliminate the rusting, scratching or paint chips on the outriggers. The galvanizing process shall permeate the metal and shall not be an "over-coating only" on outside surfaces. The galvanized components shall lessen the potential for corrosion and eliminates the

# Ely Fire Department, NV

requirement for finish paint. The process shall negate any later requirement for touch-up paint or total repaint of the outriggers/stabilizer assemblies.

The galvanizing shall provide the steel outriggers with both barrier and cathodic protection from corrosion. The galvanizing process shall immerse the complete outrigger and stabilizer components in molten zinc. The galvanizing diffusion process shall allow the zinc to bond to the steel, at the molecular level. The galvanized zinc coating shall provide a barrier that shields the steel from the environment.

One (1)  
00-09-8625

## **AERIAL OUTRIGGER AND STABILIZER -- CORROSION WARRANTY**

The aerial outriggers and stabilizers shall be provided with a twenty-five (25) year galvanized steel protection and corrosion warranty. The aerial manufacturer shall provided details and requirements of the corrosion protection warranty with the bid.

One (1)  
10-01-1200

## **AERIAL LADDER RUNG SPECIFICATIONS**

For ease of climbing the ladder rungs shall be equally spaced on a maximum 14" centers and minimum 11.75" centers and shall have a skid-resistant surface or covering.

For added safety, skid-resistant rung covering shall be provided. The rung covering shall not twist and shall cover at least 60 percent of the length of each rung.

Round rungs shall be provided and shall have a minimum outside diameter of 1-1/4", including the skid-resistant surface or covering.

For maximum strength, the minimum design load for each rung shall be 500 lb distributed over a 3-1/2" wide area at the center of the length of the rung with the rung oriented in its weakest position.

## **NON-SKID AERIAL RUNG COVERING**

Each aerial rung shall be covered with two (2) pieces of a protective, 3-M safety walk non skid material.

One (1)  
10-06-2100

## **EXTENSION MARKINGS**

To improve safety and to provide the operator with vital information, extension markings shall be provided. For best visibility the base section of the ladder shall include markings on the outside of both handrails to indicate extension position of the ladder in operation. The markings will be black numbers starting at 45' and continuing every 10 feet with a hash mark between the numbers.

One (1)  
45-01-1100

## **FOLDING STEPS -- FLY SECTION**

The ladder shall be equipped with two (2) folding steps, one on each side of the ladder at the upper end of the fly section. These steps are spring loaded to hold in the stowed position. Once lowered, steps lock in the lowered position for use.

# Ely Fire Department, NV

When steps are in the use position there shall be approximately a 7-1/2" diameter circular space for a hose to be placed on the rungs. The folding steps shall comply with applicable standards of NFPA #1901.

One (1)  
45-01-3100

## **ROPE RESCUE EYELETS -- FLY SECTION**

Two (2) rope rescue eyelets shall be installed one on each side at the tip of the fly section, each anchor being rated for 250 pounds, for a total combined weight rating of 500 pounds.

One (1)  
50-00-1200

## **ROTATION SYSTEM**

The rotation system shall be powered by a hydraulic motor to drive an eccentric planetary gearbox, capable of field adjustment, to rotate the aerial.

A 43.6" pitch diameter external tooth bearing shall be provided for 360 degree continuous rotation in either direction. As turntable bearing bolts are required to be checked and re-torqued at regular intervals, to make this task relatively simple, the ability to re-torque all bolts from the top of the turntable is mandatory.

The bearing shall be bolted to the bearing base plate using thirty (30) .625" SAE Grade 8 bolts and shall also be bolted to the turntable using twenty-nine (29) .625" SAE Grade 8 bolts.

A hydraulic release spring applied brake shall provide a positive lock for the rotation.

Two [2] pressure relief valves shall control the force of the rotation to protect the aerial from excessive side loads.

One (1)  
50-01-1800

## **TURNTABLE AND AERIAL CONTROL CONSOLE**

The turntable walking area shall be covered with NFPA #1901 compliant aluminum tread plate material, with a 2-1/2" lip.

### **Hand Rails**

Three (3) 42" high, rubber covered handrails capable of withstanding a 225 pound force applied from any direction shall be installed on the turntable.

### **Aerial Control System**

The aerial control system is monitored by a programmable logic control.. The programmable logic control operating system controls many different ladder functions up to 50 times per second and offers maximum safety for the aerial ladder.

Aerial control functions as follows:

1. The aerial speed is proportionally regulated by the height and extension of the aerial.
2. Logic controlled outrigger placement which allows outrigger short jacking and aerial to rotate over the short jacked outrigger if proportionally extended and elevated to meet programmable logic control program.

## Ely Fire Department, NV

3. Programmable cab and body collision protection control.
4. Auto bedding of aerial ladder
5. Monitors aerial rung alignment

The aerial shall be supplied with "Soft Touch" controls. The aerial "Soft Touch" controls shall include the following:

1. Ramping up and ramping down of all ladder functions, controlled by the programmable logic control for the logic controlled outrigger placement which allows outrigger short jacking and aerial to rotate over the short jacked outrigger if proportionally extended and elevated to meet programmable logic control program.
2. All ladder controls operate at high (full speed) or low (reduced speed). Each aerial "Soft Touch" control handle shall lock in the neutral position. When the ladder control handle is activated it will maintain that RPM for 5 seconds after returning to the neutral position. Should it be necessary to stop the high idle engine speed quickly, there is an emergency stop button located on the turntable control console to return to normal idle speed and the hydraulic system is de-energized.
3. The elevation system shall proportionally reduce the speed at 60 - 75-degrees and ramp to off at full elevation. Lowering shall proportionally reduce the speed at 3-degrees and ramp to off at -5 degrees.
4. A red warning light at the outrigger and aerial operator's control consoles shall warn the operator that one (1) or more outriggers have been "short set". In the event the vehicle has been set up with one (1) or more of the outriggers "short set", any rotation of the turntable to the short set outrigger shall automatically ramp the rotation of the turntable to a feather-soft stop and shall allow the operator to return to safe operating parameters.

### Turntable Control Console

The turntable control console shall have a toggle switch to energize the hydraulic system for the aerial functions. The switch shall have three (3) functions, "high speed", "low speed", and "off".

The aerial control functions shall increase the engine speed from idle to an average of 1,250 RPM and energize the hydraulic system and maintain that function for five (5) seconds after the controls are used.

The emergency stop button shall be used for emergency stopping and shall return the system to the "off" position, the engine speed to return to normal idle speed and the hydraulic system de-energized.

If the ladder is over loaded the extension and lowering ability of the aerial is disabled until the weight can be removed or shifted.

The turntable shall have the control console mounted on the left side with the following items on the panel:

- One (1) panel light switch
- One (1) tip light switch

## Ely Fire Department, NV

- One (1) tracking light switch
- One (1) rung alignment light
- One (1) emergency pump switch
- One (1) system pressure gauge, 0-5,000 psi minimum
- One (1) aerial 'Load-Minder' system display
- One (1) emergency stop button
- One (1) red light to indicate when outriggers are not fully extended
- One (1) switch to lock all aerial functions
- Three (3) lights to indicate when the aerial is aligned with the ladder bed
- Three (3) remote nozzle switches
- Three (3) handles for operation of the aerial for raise/lower, extension/retraction, and swing left/right functions
- Three (3) lights - "Left Rotation Disabled", "Lower Disabled" and "Right Rotation Disabled"

The system shall be capable of performing simultaneous outrigger functions or simultaneous aerial functions.

### Console Cover and Lighting

A hinged cover shall be provided on the turntable control console with one (1) courtesy light located in the cover.

Three (3) turntable work lights shall be provided on the turntable for added operator visibility and safety.

### Aerial Load Gauge

An aerial load gauge shall give a continuous reading of the load on the device. This gauge shall have a green light showing the tip load on the ladder, an amber light will tell the operator he is nearing his rated load and a red light will flash at the point where rated load capacity is reached. Additionally, there shall be a pulsating warning horn that shall sound if the ladder is overloaded by 0 - 10% of its rated capacity. The horn shall emit a constant sound when rated capacity is exceeded by more than 10%.

### Cab And Body Collision Protection

Cab and body collision protection shall limit the lowering and rotation of the aerial device toward the cab and body to prevent the possibility of cab or body damage by the premium motion encoder.

Three (3) lights, "Left Rotation Disabled", "Lower Disabled" and "Right Rotation Disabled" on the turntable control station shall warn the operator when entering the danger zone. The three (3) lights shall turn on in the proper danger zone and shall ramp the aerial to a slow, soft stop. The operator shall be able to rotate out of the danger zone without the use of any extra switches or controls. This design shall allow the aerial to be lowered into the ladder bed only when the "Lower Disabled" light is not on.

### Auto-Bedding Operation

Auto-Bedding shall be included and shall be capable when the elevation of the aerial is below a pre-set level, and the aerial rotation is at a pre-set rotation point the automatic alignment location feature will stop rotation of the aerial, and only allow the aerial to be lowered into the bed. In order to continue rotation, it shall be necessary to elevate the aerial slightly before rotating.

## Ely Fire Department, NV

A manual override valve shall be provided to allow operation of all aerial controls, located inside the turntable control stand. The valve shall override all cab and body collision protection and all short jacking.

One (1)  
50-02-1500

### **SPEED CONTROL -- SOFT TOUCH**

The turntable control console shall energize the engine from idle to an average of 1,250 RPM and energize the hydraulic system and maintain that function for five (5) seconds after the controls are used.

Should it be necessary to stop the high idle engine speed quickly, there is an emergency stop button located on the turntable control console to return to normal idle speed and the hydraulic system is de-energized.

One (1)  
50-07-1100

### **AERIAL WARNING LABELS**

Danger, caution, and warning labels shall be installed at all aerial control stations, individual controls, and at various locations on the aerial device. These labels shall be in compliance to industry warning symbols, ASME, SAE, and applicable NFPA #1901 standard. These labels shall be in English with commonly used symbols used in the fire industry.

One (1)  
50-08-1100

### **SAFETY CHAINS -- TURNTABLE OPENINGS**

Aerial manufacturer shall install safety chains between the openings on the covered handrails on the turntable.

One (1)  
50-10-1100

### **AERIAL LOAD CHART -- TURNTABLE CONTROL STAND**

An aerial load chart shall be mounted on the base section of the aerial to supplement the load gauge installed on the aerial control console. The load chart shall include the height and reach, the load at six (6) different angles with and with out water. An arrow will be attached to the load chart to indicate the angle of elevation. To comply with NFPA standards the load chart shall be illuminated by a light.

One (1)  
50-11-1300

### **AERIAL TURNTABLE CONSOLE**

The aerial control console will be constructed from smooth aluminum and painted to match the apparatus body or cab paint color.

One (1)  
50-12-3050

### **AERIAL WATERWAY FLOW METER**

One (1) Class 1 single display water flow meter will be provided with the display located on the aerial control console.

# Ely Fire Department, NV

One (1)  
50-21-1100

## **AERIAL BEDDING ALIGNED INDICATOR**

An amber LED indicator light shall be supplied on the turntable control counsel to indicate to the operator when the aerial is aligned with the travel bed support and can be lowered into the travel support.

One (1)  
50-16-1200

## **CAB AND BODY COLLISION PROTECTION**

Cab and body collision protection shall limit the lowering and rotation of the aerial device toward the cab and body to prevent the possibility of cab or body damage.

Three (3) lights shall be installed as follows:

1. "Left Rotation Disabled"
2. "Lower Disabled"
3. "Right Rotation Disabled" on the turntable control station shall warn the operator when entering the danger zone.

The three (3) lights shall turn on in the proper danger zone and shall ramp the aerial to a slow, soft stop. The operator shall be able to rotate out of the danger zone without the use of any extra switches or controls. This design shall allow the aerial to be lowered into the ladder bed only when the "Lower Disabled" light is not on.

An "Auto Bedding" system shall be included. When the elevation of the aerial is below a pre-set level, the automatic alignment location feature will stop rotation of the aerial, and only allow the aerial to be lowered into the bed. In order to continue rotation, it shall be necessary to elevate the aerial slightly before rotating.

A manual override valve shall allow operation of all aerial controls, located inside the turntable control stand. This valve shall override all cab and body collision protection.

When short jacking is in use and when the aerial is 10-degrees to the short jacked side of the truck, the aerial shall come to a slow, soft stop. Two (2) operators shall be able to bring the aerial back to safe operating position.

One (1)  
65-01-1100

## **AERIAL OUTRIGGERS AND STABILIZER SPECIFICATIONS**

The aerial device outriggers and stabilizers shall be designed to function with the standard hydraulic components. Each Outrigger shall have a pad that pivots left-to-right and front-to-rear.

### **Aerial Set-Up Requirements**

1. With the stabilizers set, the aerial device shall be capable of being raised from the bedded position to maximum elevation and extension and rotated 90 degrees.
2. Two or more of these functions shall be permitted to be performed simultaneously.
3. The functions shall be accomplished within 120 seconds

# Ely Fire Department, NV

## Extension Beams

The extension beams shall entirely enclose the extension cylinders to prevent damage to the rods and hoses. Each outrigger shall be controlled independently with one (1) joystick controller, which can extend and lower the outrigger at the same time or raise and retract the outrigger at the same time.

A double box design shall enclose the jack cylinders completely to protect the rods from damage that could result from exterior circumstances.

## Jack Cylinders

The jack cylinders shall have pilot operated check valves for both the raised and lowered positions. Each jack tube shall be drilled for mechanical pin locks for a safety backup.

The outrigger jack cylinders shall be so mounted that they can be reached for service or removal from the top of the jack rather than from the bottom. Since the bottom design is more difficult and time consuming and also requires special placement for service shall not be an acceptable design.

## Outrigger Deployment Alarm and Warning System

The outrigger deployment alarm shall sound at all times while the outrigger master switch is in the "on", position and stops sounding only when the outrigger switch is turned off. The audible alarm shall warn personnel that outrigger movement is possible at any time the switch is on.

A red LED flashing light shall be mounted to the inside of the vertical outrigger jack beam. The aerial master switch shall activate the lights.

An amber indicator light shall be located on the outrigger control panel for each outrigger to indicate when the outrigger jack is supporting enough load to be in firm contact with the ground.

## Safety Features

The outrigger system provides the following safety features:

1. The outrigger interlock system shall prevent raising of the aerial ladder prior to all outriggers being in firm contact with the ground.
2. Amber indicator lights at the outrigger control station shall indicate circuit completion to show that the unit is ready for aerial operation.
3. Red warning lights at the outrigger and aerial operator's control consoles shall warn the operator that one (1) or more outriggers has been "short set." In the event the vehicle has been set up with one or more of the outriggers "short set," any rotation of the turntable by 10 degrees to the short set side shall activate an aerial short jacking system.
4. An aerial cradle/outrigger interlock system shall be provided to prevent the lifting of the aerial from the nested position until the operator places all jacks in the load supporting configuration. A limit switch at the ladder rest prevents operation of the outriggers once the aerial has been elevated from the nested position.

# Ely Fire Department, NV

5. Ground illumination lights shall be provided to illuminate the area directly under the outriggers for each extending outrigger.
6. Outriggers shall be wired with outrigger stowed switches with a light in the cab.

## Outrigger and Stabilizer Specifications

The specified outriggers and torque box system shall provide a 1-1/2 to 1 stability safety factor when the aerial is in any operating position.

The stability requirements shall be met by the apparatus on which the aerial device is mounted when that apparatus is in a service-ready condition but with all normally removable items such as water, hose, ground ladders, and loose equipment removed.

The aerial device shall be capable of sustaining a static load 1-1/3 times its rated capacity in every position in which the aerial device can be placed when the apparatus is on a slope of 5 degrees downward in the direction most likely to cause overturning.

An audible alarm, of not less than 87 DBA measured at any position the stabilizer can be in, shall sound when a stabilizer is moving.

The ground contact area for each stabilizer shall be such that a unit pressure of not greater than 75 psi will be exerted over the ground contact area when the apparatus is loaded to its maximum in-service weight and the aerial device is carrying its rated capacity in every position permitted by the manufacturer. This requirement shall be outrigger or stabilizer pads in conjunction with the permanently mounted shoes to meet the loading requirement of 75 psi or less.

The outrigger and stabilizer shoes shall be capable of positioning the shoe front to back and side to side on an eight degree slope.

All outriggers and stabilizers that protrude beyond the body of the apparatus shall be striped or painted with reflective material so as to indicate a hazard or obstruction. All outriggers and stabilizers that protrude beyond the body of the apparatus shall be provided with one or more red warning lights located either on the stabilizer or in the body panel above the stabilizer visible on the side of the apparatus where the stabilizer is located.

One (1)  
65-09-1300

## **OUTRIGGER STOWED LIGHT**

An outrigger stowed indicator light will be provided in the cab to show that one or more outriggers are not in the stowed position. The light will be connected to the outrigger extend light in the cab.

One (1)  
65-03-1300

## **SHORT JACKING**

The aerial device shall be equipped with a "Smart Truck" soft touch system for short-jacking.

# Ely Fire Department, NV

One (1)  
70-01-1300

## **TELESCOPING WATERWAY -- AERIAL**

A aerial waterway shall be provided from the base of the aerial device to the tip of the fly section. The waterway shall provide a minimum of 1,000GPM from the swivel on the turntable to the end of the fly section.

### Waterway Construction

The aerial telescoping aluminum waterway shall be fabricated of aluminum and shall have three (3) tubes are as follows:

1. 4-1/2" outside diameter at the base section
2. 4" outside diameter at the middle section
3. 3.5" outside diameter at the fly section.

### Monitor Installation

A three-function electronically controlled monitor with nozzle shall be mounted to a retractable pan capable of being pinned to the end of the fly section or the next lower-section by a single lever handle. Systems using manual hand plugs or external reels are not acceptable.

The lever handle latching to the forward position connects the monitor to the fly and the lever handle latching to the back position connects the monitor to the next lower-section. Aerial ladder shall be retracted when moving the retractable waterway handle.

Monitor controls shall be located on the retractable pan and on the turntable control console. All electrical connections shall be directly connected to the monitor.

Monitor control functions shall be as follows:

1. Operation to "Raise and Lower" the stream
2. Operate the monitor to the "Left and Right"
3. To control the shape of the stream pattern

# Ely Fire Department, NV

One (1)  
70-00-1100

## AERIAL LADDER CAPABILITIES -- 1000GPM

The following are aerial ladder and water capabilities for the operation of this unit in the unsupported configuration with the truck level, the outriggers fully extended and lowered to relieve the chassis weight from the axles. The capabilities are based upon 360-degree continuous rotation and up to full extension.

### Ladder Operations

<u>ELEVATION</u>	<u>CAPABILITIES</u>
-10 Degrees to 30 Degrees	500 pounds at the outermost rung of the fly section or 1,000 pounds evenly distributed
30 Degrees to 45 Degrees	500 pounds at the outermost rung of the fly section or 1,500 pounds evenly distributed
45 Degrees to 60 Degrees	750 pounds at the outermost rung of the fly section or 2,000 pounds evenly distributed
60 Degrees to 75 Degrees	1000 pounds at the outermost rung of the fly section or 2,500 pounds evenly distributed

### Ladder Operations With 1000 GPM Water Flowing

The following capabilities are based upon continuous 360-degree rotation and up to full extension.

The aerial ladder and water system shall be designed to permit the following flows:

1,000 GPM	90-degrees to the side of the ladder centerline
1,000 GPM	135-degrees down from a line parallel to the centerline

<u>FLOW / ELEVATION</u>	<u>CAPABILITIES</u>
-10 Degrees to 45 Degrees	500 pounds at the outermost rung of the fly section or 750 pounds evenly distributed
45 Degrees to 60 Degrees	500 pounds at the outermost rung of the fly section or 1,500 pounds evenly distributed
60 Degrees to 75 Degrees	500 pounds at the outermost rung of the fly section or 2,000 pounds evenly distributed

The above ratings shall be based on average weight of personnel on the ladder at 250 pounds each.

The ladder meets the 2:1 safety factor requirement for material based on the weight of the ladder plus a 500 pound live load at the platform, or a 500 pound live load at the platform and

# Ely Fire Department, NV

flowing 1,000 GPM of water at 90 degrees to the side of the platform at zero degrees elevation.

When the Vulcan monitor is above 0 degrees elevation the tip load is reduced to 250lbs.

One (1)  
80-01-1500

## **AERIAL COMMUNICATION SYSTEM -- TURNTABLE**

An aerial communication system shall be provided with master station installed at the aerial turntable. The intercom shall include the following:

1. Master station
2. Remote tip station
3. Interconnecting cables and wiring

The master station shall have a volume control and a push-to-talk button. The remote station shall operate "hands free" and constantly transmit to the master station and speaker, unless the master station push-to-talk button is pressed.

The intercom shall be designed for exterior aerial application. Each station shall have a weather resistant and protective housing and water resistant speakers.

The power requirements for the intercom shall be 12 volt with a minimum output power shall be 16 watts.

One (1)  
80-01-2400

## **TWO STATION INTERCOM**

The two station intercom communication system shall have the master station at the turntable and secondary intercom and speaker at the tip of the aerial.

One (1)  
80-01-4300

The intercom system shall be manufactured by Atkinson Electronics.

One (1)  
90-00-1100

## **HYDRAULIC SYSTEM**

The hydraulic system shall have a load sensing, variable gallonage, hydraulic piston pump with a 12-volt pressure reducing system. To reduce the normal time for aerial set up, the hydraulic pump shall be of the load sensing design. The hydraulic system shall have sufficient oil flow to provide the capability of performing multiple functions simultaneously without reducing operating speeds of the selected functions.

The hydraulic oil for the aerial shall be directed through a hydraulic swivel with 360 degrees continuous rotation. Enclosed in the hydraulic swivel shall be a minimum of twenty (20) electrical collector rings and a maximum of thirty-six (36) electrical collector rings with 360-degrees continuous rotation. There shall be a 4" waterway through the hydraulic swivel.

The hydraulic pump shall be large enough to provide oil to meet all of the requirements needed for aerial and outrigger operation standards.

A pressure reducing valve set at 500 PSI above the system pressure shall be connected to the hydraulic pump. This pressure reducing valve shall be a safety device for hydraulic pump failure. The hydraulic oil shall be directed through high pressure hydraulic hose and tubing.

# Ely Fire Department, NV

The hydraulic system shall be designed to direct oil to the outriggers only while the ladder is in the bedded position. The oil can be directed to the aerial operation only when all of the outriggers are supporting sufficient load. This operation is made available through the use of electrical diverter valves with a manual override system for safety backup.

## Hydraulic System Installation

The non-sealing moving parts of all hydraulic components, whose failure results in motion of the aerial device, shall have a minimum bursting strength of four times the maximum operating pressure to which the component is subjected.

Dynamic sealing parts of all hydraulic components, whose failure results in motion of the aerial device, shall not begin to extrude or otherwise fail at pressures at or below two times the maximum operating pressure to which the component is subjected.

Static sealing parts of all hydraulic components, whose failure results in motion of the aerial device, shall have a minimum bursting strength of four times the maximum operating pressure to which the component is subjected.

All hydraulic hose, tubing, and fittings shall have a minimum bursting strength of at least three times the maximum operating pressure to which the components are subjected.

All other hydraulic components shall have a minimum bursting strength of at least two times the maximum operating pressure to which the components are subjected.

The hydraulic system shall be provided with an oil pressure gauge at the control station position.

## Hydraulic Reservoir

The hydraulic system shall be supplied by a 30 gallon oil tank with a 10 micron filter on the return line and a 200 mesh filter on the pump inlet side.

A means for checking and filling the hydraulic reservoir shall be readily accessible.

The fill location shall be conspicuously marked with a label that reads "Hydraulic Oil Only."

Instructions for checking and filling the hydraulic reservoir shall be provided.

The hydraulic system components shall be capable of maintaining, under all operating conditions, oil cleanliness and temperature that comply with the component manufacturer's recommendations.

One (1)  
90-01-1100

## **THREE PORT HYDRAULIC SWIVEL SPECIFICATIONS**

The hydraulic oil for the aerial shall be directed through a three-port hydraulic swivel with 360 degrees continuous rotation. Enclosed in the hydraulic swivel shall be a minimum of twenty [20] electrical collector rings with 360-degrees continuous rotation. There shall be a 4" waterway through the hydraulic swivel.

# Ely Fire Department, NV

One (1)  
90-01-1400

## **HYDRAULIC DRAIN LINE**

One (1) quarter turn gated drain line and gated valve shall be supplied to shut-off the flow of the hydraulic oil from the hydraulic tank.

One (1)  
90-01-1450

## **HYDRAULIC OIL VALVE CONTROL**

One (1) quarter turn gated valve and suction line shall be provided to stop the flow of oil between the hydraulic reservoir and the hydraulic pump.

One (1)  
90-05-1100

## **HYDRAULIC ELEVATION SYSTEM -- MANUAL CONTROLS**

The hydraulic elevation system shall ramp to a reduced speed at 70-degrees and shall bring the aerial to a "feather soft" stop at 75-degrees elevation.

The slow down linkage shall be connected directly from the aerial base section to the elevation control handle.

One (1)  
70-17-1100

## **STYLE 3578 STREAMMASTER ELECTRIC MONITOR**

An Akron Brass, model 3578, 2000 GPM rated monitor shall be provided at the end of the waterway. The monitor is an all electric single waterway monitor constructed of lightweight Pyrolite with a 4", 150 pound flange inlet and 3.5" thread outlet with cast-in turning vanes in each elbow. The monitor shall have fully enclosed motors and gears with manual overrides for both horizontal and vertical rotation. The manual overrides shall have captive cranks, one for horizontal and one for vertical rotation, and may be used simultaneously.

The monitor is not to exceed 16 1/4" high and 12 1/4" wide. The rotation of the monitor is from 0° to 135° below horizontal elevation. The logic box shall include coated, solid state components to resist water corrosion.

Three (3) toggle switches shall be located at the turntable aerial control stand and at the tip of the aerial. The switches will control the raise/lower, stream/shape, and left/right functions of the monitor. The controls at the aerial control stand will over-ride the controls at the tip of the aerial.

One (1)  
70-17-1210

## **STYLE 5177 AKROMATIC 1250 ELECTRIC MASTER STREAM NOZZLE**

An Akron Brass item 51770001 Akromatic 1250 electric combination fog and straight stream master stream nozzle with automatic flow mechanism shall be installed on the Akron monitor. The nozzle shall be constructed of durable, lightweight Pyrolite and shall have electric pattern selection from straight stream to wide fog controlled by a 12V motor and linear ball screw, a manual override pattern control knob, built-in stream shaper, and 3.5" NH swivel base.

# Ely Fire Department, NV

One (1)  
50-06-1900

## **TURNTABLE SHAPE**

The turntable shall be two sided, 68" wide x 71.5" deep, with the right side cut off to allow for hose bed.

One (1)  
50-15-1100

## **RUNG ALIGNMENT LIGHT**

A rung alignment light shall be installed at the turntable console.

One (1)  
60-01-1200

## **TORQUE BOX**

The torque box connecting the turntable to the outriggers shall provide the rigidity needed for the aerial to be operated at -5 degrees to +75 degrees of elevation and full extension.

The torque box shall have approximate dimensions of:

1. 43" inside width
2. 26" inside height
3. 201" long (plus or minus 12") the back shall be open for ground ladder storage.

One (1)  
65-02-1200

## **OUTRIGGERS AFT OF REAR AXLE**

Two (2) out-and-down outriggers shall be installed aft the rear axle and shall be connected to the torque box at the rear of apparatus.

The outrigger assembly shall consist of the following components

1. A 2" inside diameter cylinder with a 1.125" outside diameter rod shall extend and retract the outrigger 48".
2. A 5" inside diameter cylinder with a 3" outside diameter rod shall raise and lower each jack tube a distance of 22".

### **Outrigger Spread**

The total width from the center of pivot pin to center of pivot pin when the outriggers are fully extended shall be: 15' 6".

One (1)  
65-04-1100

## **OUTRIGGER CONTROL PANEL**

The outrigger control panel shall have a switch to energize the hydraulic system for outrigger functions. The switch shall increase the engine speed to 1,200 RPM when in the "ON" position. In the "OFF" position, the engine speed shall return to normal idle speed and the hydraulic system shall be de-energized.

# Ely Fire Department, NV

## Control Panel

The control panel shall include the following:

1. Manual override system to override the outrigger-aerial interlock system
2. One (1) switch to start and stop all aerial and outrigger operations.
3. One (1) switch for the emergency power unit.
4. Amber indicating lights shall signal when the outriggers are supporting sufficient load.
5. A pulsing beeper shall be activated when the outrigger system is in use.
6. One (1) red light shall be provided to indicate if outriggers have been short set.
7. One (1) aerial hour meter connected to the PTO shall be installed at the outrigger control station.

One (1)  
65-04-1200

## MANUAL OUTRIGGER CONTROL VALVES

The aerial shall be equipped with two (2) sets of manual outrigger control valves, located at the rear and to the outside of the chassis. This location shall give the operator full view and control of each outrigger.

One (1)  
65-05-1200

## SIDE TO SIDE LEVELING GAUGE

A leveling gauge shall be installed on the rear to show when the apparatus is level from side to side. The approximate size of the leveling gauge shall be 3" x 1-1/2".

One (1)  
65-07-1100

## OUTRIGGER AUXILIARY PLATES

Two (2) auxiliary outrigger plates shall be provided. The units shall be 2' x 2' in size., one for each outrigger made from 3/8" aluminum with a handle for easy movement. The mounting for the plates shall be provided by the body manufacturer.

One (1)  
65-08-1100

## OUTRIGGER SHIELD LIGHTS

Warning lights shall be located on the outside of the outrigger shield. The lights will be wired to the aerial master switch located in the cab.

One (1)  
65-11-1100

## OUTRIGGER ACCESS PANELS -- EXTENSION PANELS

Outrigger access panels shall be located on the body of the aerial to allow easy access to the outrigger extension cylinders. These panels shall be located beside the outrigger jack cylinder.

# Ely Fire Department, NV

One (1)  
65-11-1200

## **OUTRIGGER WARNING SIGNS**

The outrigger shields shall have warning signs installed to warn of dangers in operation of the outrigger system.

One (1)  
70-02-1200

## **WATERWAY QUARTER-TURN VALVE -- BELOW WATER SWIVEL**

One (1) 4" quarter-turn butterfly valve for the waterway system shall be installed. The valve shall be air operated shall be mounted directly below the water swivel.

The air operated butterfly valve control shall be on the pump panel.

One (1)  
80-10-1100

## **FLOODLIGHTS -- 12 VOLT BASE SECTION**

Two (2) Collins model #FX-12 floodlights shall be installed at the lower end of the base section ahead of the lift cylinders of the ladder. The floodlights shall have one (1) spot and one (1) flood type bulbs.

One (1)  
81-44-1100

## **FLOODLIGHTS -- 12 VOLT FLY SECTION**

Two (2) Collins model #FX-12 floodlights shall be installed at the upper end of the fly section. The floodlights shall have one (1) spot and one (1) flood type bulbs.

One (1)  
82-10-2000

## **LASER LIGHTING – FLY SECTION TIP**

Two (2) laser lights shall be provided at the tip of the fly section to help when positioning the ladder.

One (1)  
87-10-2000

## **LADDER RUNG LIGHTING**

The ladder rungs of each aerial section shall be equipped with 12-volt LED lights. There shall be four (4) lights in each section, with equal spacing in the climbing area. The lights shall be activated with a switch on the turntable.

One (1)  
87-10-3100

## **AMBER RUNG LIGHTS**

The ladder rung lights shall be "amber" in color.

One (1)  
90-25-5100 40

## **GALVANIZED CORROSION PROTECTION -- TORQUE BOX ASSEMBLY**

The torque box shall be hot dipped galvanized inside and out. The galvanizing shall include the top and bottom and sides of the torque box, outrigger electrical compartment, and outrigger valve control compartment.

## Ely Fire Department, NV

The torque box shall be totally hot dipped galvanized. The galvanizing process shall not be an over-coating only to outside surfaces but shall permeate the metal. The galvanizing process shall prevent or greatly lessen rust and corrosion on the torque box and in areas between the torque box and chassis frame rails. Also areas which cannot be reached when washing the unit and which cannot be visually inspected and shall eliminate the need to finish paint the torque box.

The galvanizing process shall provide the steel torque box assembly with both barrier and cathodic protection from corrosion. The galvanizing process shall immerse the complete torque box component in molten zinc. The galvanizing diffusion process shall allow the zinc to bond to the steel, at the molecular level. The galvanized zinc coating shall provide a barrier that shields the steel from the environment.

One (1)  
00-09-8425

### **AERIAL TORQUE BOX -- CORROSION WARRANTY**

The aerial torque box assembly shall be provided with a twenty-five (25) year galvanized steel protection and corrosion warranty. The aerial manufacturer shall provide details and requirements of the corrosion protection warranty with the bid.

# Ely Fire Department, NV

One (1)  
01-16-0150

## **BUMPER TO BUMPER WARRANTY**

We warrant each new motorized fire apparatus manufactured by ROSENBAUER AMERICA, LLC for a period of ONE YEAR from the date of delivery, except for chassis and other components noted herein.

Under this warranty we agree to furnish any parts to replace those that have failed due to defective material or workmanship where there is no indication of abuse, neglect, unusual or other than normal service providing that such parts are, at the option of ROSENBAUER AMERICA, LLC, made available for our inspection at our request, returned to our factory or other location designated by us with transportation prepaid within thirty days after the date of failure or within one year from the date of delivery of the apparatus to the original purchaser, whichever occurs first, and inspection indicates the failure was attributed to defective material or workmanship.

The warranty on the chassis and chassis supplied components, storage batteries, generators, electrical lamps and other devices subject to deterioration is limited to the warranty of the manufacturer thereof and adjustments for the same are to be made directly with the manufacturer by the customer.

This warranty will not apply to any fire apparatus that has been repaired or altered outside our factory in any way, which in our opinion might affect its stability or reliability.

This warranty shall not apply to those items that are usually considered normal maintenance and upkeep services: including, but not limited to, normal lubrication or proper adjustment of minor auxiliary pumps or reels.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part. We neither assume nor authorize any person to assume for us any liability in connection with the sales of our apparatus unless made in writing by ROSENBAUER AMERICA, LLC.

One (1)  
01-19-0250

## **ALUMINUM BODY WARRANTY - FIVE YEAR**

Rosenbauer America, LLC warrants to the original purchaser only, that the all aluminum body, fabricated by Rosenbauer America, LLC, under normal use and with reasonable maintenance, be structurally sound and will remain free from corrosion perforation for a period of FIVE (5) years.

This warranty does not apply to the following items that are covered by a separate warranty: paint finish, hardware, moldings, and other accessories attached to this body. In addition, this warranty does not apply to any part or accessory manufactured by others and attached to this body.

ROSENBAUER AMERICA, LLC MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, WITH RESPECT TO THE ALUMINUM BODY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND HEREBY DISCLAIMED.

Rosenbauer America, LLC will replace without charge, repair or make a fair allowance for any defect in material or workmanship demonstrated to its satisfaction to have existed at the time

## Ely Fire Department, NV

of delivery or not due to misuse, negligence, or accident. If Rosenbauer America, LLC elects to repair this body, the extent of such repair shall be determined solely by Rosenbauer America, LLC, and shall be performed solely at the Rosenbauer America, LLC factory, or at an approved facility. The expense of any transportation to or from such repair facility shall be borne by the purchaser and is not an item covered under this warranty.

Rosenbauer America, LLC will not be liable for damages and under no circumstances will its liability exceed the price for a defective body. The remedies set forth herein are exclusive and in substitution for all other remedies to which the purchaser would otherwise be entitled.

Rosenbauer America, LLC will be given a reasonable opportunity to investigate all claims. The purchaser must commence any action arising out of, based upon or relating to agreement or the breach hereof, within twelve months from the date the cause of the action occurred.

One (1)  
01-20-0250

### **PAINT WARRANTY FIVE YEAR**

The PPG paint performance guarantee will cover the areas of the vehicle finished with the specified product for a period of FIVE (5) years beginning the day the vehicle is delivered to the purchaser.

The areas as outlined on the guarantee certificate will be covered for the following paint failures:

#### **Guarantee Inclusions:**

Full apparatus body manufactured and painted by Rosenbauer America. LLC:

1. Peeling or delaminating of the topcoat and/or other layers of paint.
2. Cracking or checking.
3. Loss of gloss caused by cracking, checking, or hazing.
4. Any paint failure caused by defective PPG Fleet Finishes, which are covered by this guarantee.

All guarantee exclusions, limitations, and methods of claims are covered in the full certificate provided to the original purchaser.