



SPECIFICATIONS

ON A

PUMPER RESCUE

APPARATUS

FOR

THE CITY OF SHARONVILLE

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Summit Fire Apparatus submits the following detailed proposal is submitted for your consideration:

Unit will be protected by permanent Anti-Freeze for operation between -30 degrees F to +235 degrees F and shall have all fluid levels filled prior to delivery.

Unit will be designed and constructed to follow the requirements of the following:

FMVSS; DOT; ICC; NFPA Pamphlet 1901; SAE; TRA; ULI; TBEA; and State Motor Vehicle regulations (NFPA loose equipment not requested is not included).

Summit Fire Apparatus has been in operation since 1957. Summit Fire Apparatus Maintains a complete, on-site parts department, and ships spare parts orders the same day they are received.

The apparatus will be manufactured at 11 Sperti Drive, Edgewood Kentucky.

The apparatus will be designed and assembled completely in the USA.

Unit will be quality control inspected and documented at each step of manufacturing, and will be fully road tested.

Unit will be fully covered by manufacturer's insurance until delivery is made.

Unit will be designed and assembled so that all recommended daily maintenance checks can be performed easily by the operator without the need for hand tools. Apparatus components that interfere with removal or repair of other major components will be attached with fasteners and installed with normal hand tools. These components will not be welded or otherwise permanently secured into place.

A test data plate will be provided at the pump operator's position which gives the rated discharges and pressures, together with the speed of the engine as determined by the manufacturer's test for this unit.

A manufacturer's certification of GVWR and GAWR on a nameplate will be affixed to the completed vehicle.

APPROVAL DRAWINGS

There shall be a complete set of drawings that are designed from the specifications and/or any change orders signed by the purchaser before construction begins. These drawings shall indicate the chassis make and model, location of lights, siren, horns, compartments and all major components of the unit. The signed drawings will become part of the contract documents.

INSPECTION TRIPS

The successful bidder can expect at least three (3) inspection trips from the City of Sharonville. The trips will be scheduled for:

Pre-Construction Meeting, before body painting & mounting, and final inspection.

There could be more trips by the City if deemed necessary or as requested by contractor. The bidder shall submit to the City a complete schedule of events once the truck starts on the production line.

DELIVERY

The completed unit shall be delivered to the Fire Department at a destination determined by the fire department.

TRAINING AFTER DELIVERY

Within two (2) weeks after delivery, an appointment shall be made to have a factory representative present to familiarize those persons, designated by the Fire Chief, with the basic operations of the apparatus and its components.

WARRANTIES

LIMITED WARRANTY

The body manufacturer shall warrant the new apparatus for a period of twelve (12) months or 12,000 miles (whichever occurs first) from the date of delivery to the original retail purchaser. The warranty will ensure that the vehicle will be free from defects in material and workmanship that may appear under normal use and service within the warranty period.

PAINT WARRANTY

The body manufacturer shall warrant the new apparatus paint finish for a period of seven (7) years or 84,000 miles (whichever occurs first) from the date of delivery to the original retail purchaser. The warranty will ensure that the vehicle will be free from peeling, cracking, loss of gloss caused by cracking, and any paint failure caused by defective finishes as determined by the manufacturer under normal use and service within the warranty period.

ELECTRICAL WARRANTY

The body manufacturer shall warrant the new apparatus electrical system for a period of ten (10) years or 100,000 miles (whichever occurs first) from the date of delivery to the original retail purchaser. The warranty will ensure that the vehicle will be free from defects in the electrical harness and connections under normal use and service within the warranty period.

BODY STRUCTURAL WARRANTY

The body manufacturer shall warrant the new apparatus for structural integrity for a period of twenty (20) years from the date of delivery to the original retail purchaser. The warranty will ensure that the vehicle will be free all structural defects of both material and workmanship that may appear under normal use and service within the warranty period.

CAB 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 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.

ENGINE WARRANTY

The Detroit Diesel engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.

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.

FRAME WARRANTY

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

WARRANTY - CAB AND CHASSIS

The chassis manufacturer shall warrant to the original purchaser the custom fire truck chassis for a period of twelve (12) months, or the first 24,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user. The warranty shall include conditional items listed in the detailed warranty document, which may be provided upon request.

CHASSIS

MODEL

The cab and chassis shall include design considerations for multiple emergency vehicle applications, rapid transit and maneuverability. This chassis shall be manufactured for heavy-duty service with strength and capacity for a duty rating of one hundred (100) percent loaded full time.

MODEL YEAR

The chassis shall have a vehicle identification number that reflects a 2009 model year.

COUNTRY OF SERVICE

The chassis shall be put in service in the country of United States of America (USA).

APPARATUS TYPE

The apparatus shall be classified as a Pumper type apparatus and shall be equipped with a permanently mounted fire pump, which has a minimum rated capacity of 750 gallons per minute (3000 L/min). The apparatus shall include a water tank and hose body whose primary purpose is to combat structural and associated fires.

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).

GROSS AXLE WEIGHT RATINGS 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 21,500 pounds.

GROSS AXLE WEIGHT RATINGS REAR

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

PUMP PROVISION

The chassis shall include provisions to mount a driveline pump in the middle of the chassis, behind the cab, more commonly known as the midship location.

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.

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.

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, 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 side wall skins and shall be 0.125 inch thick, the rear wall and roof skin shall be 0.19 inch thick, the front skin shall be 0.125 inch thick.

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 143.88 inches in length with 67.50 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 65.00 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 63.00 inches high. This style of cab shall also include a crew area offering up to ten (10) 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.

The first step for the driver and officer area shall measure 11.44 inches deep X 31.13 inches wide. 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 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 smaller block or an engine, which has a large 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 29.00 inches high.

The engine tunnel shall be insulated with multi-layer insulating material, consisting of foam, a sound barrier of 1.0 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 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 doorframe 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.

LH EXTERIOR REAR COMPARTMENT

The cab shall offer an exterior compartment on the left side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 21.19 inches high. The compartment size shall be 11.34 inches wide X 21.19 inches high X 21.19 inches deep. The compartment shall have a 10.63-inch wide, 32.00-inch high and 1.50 inch thick hinged box pan style flush mount door with a locking bent D-ring slam latch. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

Access shall be provided to the under seat storage areas through the exterior compartment. The height of the upper storage area will be 12.00 inches and depth will depend on the seat box. An individual outboard seat box shall provide an additional compartment on the left side of the cab; an enclosed full width seat bench shall provide a compartment, which is also accessible through the interior of the cab.

LH EXTERIOR REAR COMPARTMENT LIGHTING

There shall be one (1) Sound Off Signal brand LED strip light installed to illuminate the exterior rear compartment on the left side of the cab. The strip light shall be 10" long and shall include three (3) bright white Gen3 LEDs for long life and low amp draw.

RH EXTERIOR REAR COMPARTMENT

The cab shall offer an exterior compartment on the right side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 21.19 inches high. The compartment size shall be 11.34 inches wide X 21.19 inches high X 21.19 inches deep. The compartment shall have a 10.63-inch wide, 32.00-inch high and 1.50 inch thick hinged box pan style flush mount door with a locking bent D-ring slam latch. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

Access shall be provided to the under seat storage areas through the exterior compartment. The height of the upper storage area will be 12.00 inches and depth will depend on the seat box. An individual outboard seat box shall provide an additional compartment on the left side of the cab; an enclosed full width seat bench shall provide a compartment, which is also accessible through the interior of the cab.

RH EXTERIOR REAR COMPARTMENT LIGHTING

There shall be one (1) SoundOff Signal brand LED strip light installed to illuminate the exterior rear compartment on the right side of the cab. The strip light shall be 10" long and shall include three (3) bright white Gen3 LEDs for long life and low amp draw.

CAB ROOF REINFORCEMENT

The cab roof shall include reinforcement for the Command Light CL615. The reinforcement shall consist of 5052-H32 Marine Grade, 0.19 inch thick, and one hundred (100) percent primary aluminum angles which shall be integral with the roof bows and the outer peripheral extrusion for strength.

LIGHT TOWER ORIENTATION

The roof reinforcement shall be installed parallel to the rear wall of the cab.

LIGHT TOWER HORIZONTAL JUSTIFICATION

The roof reinforcement shall be justified in the direct center of the cab.

LIGHT TOWER VERTICAL ORIENTATION

The roof reinforcement shall be oriented on the roof of the cab vertically and centered from front to rear.

LIGHT TOWER LIGHT HEAD ORIENTATION

The roof reinforcement shall be oriented in order for the light head on the light tower to be on the driver's side while in the stored position.

CAB 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 and 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.

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 specific color designated by the customer with a minimum thickness of 2.00 mils of paint, followed by a clear topcoat not to exceed 2.00 mils.

CAB PAINT MANUFACTURER

The cab shall be painted with PPG Industries paint.

CAB PAINT PRIMARY/ LOWER CAB COLOR

The primary/lower paint color shall be PPG FBCH 92361 White.

CAB 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.

POWER & 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.

POWER AND GROUND STUDS - BATTERY DIRECT

Power and grounding studs shall be provided and installed behind the electrical center cover with a breaker. The studs shall be #10 and capable of carrying up to a 40 amp battery direct load.

ADDITIONAL POWER & GROUND STUD

An additional set of power and ground studs shall be provided and installed behind the electrical center cover with a 40-amp breaker. The studs shall be .375-inch diameter and capable of carrying up to a 40-amp load switched with the master power switch.

EXTERIOR ELECTRICAL TERMINAL COATING

All terminals exposed to the elements will be sprayed with a yellow protective rubberized coating to prevent corrosion.

ENGINE

The power plant for the vehicle shall offer proven performance and reliability while meeting all Federal diesel-engine emission requirements. During acceleration, the electronically actuated variable geometry turbocharger (VGT) shall automatically and precisely boost output across the operating range for improved throttle response and greatly reduced turbo lag. The VGT shall optimize airflow during Jake operation, which shall offer increased auxiliary engine braking performance.

The Detroit Diesel engine shall achieve the oxides of nitrogen by 55 percent and particulate matter by 90 percent. The Detroit Diesel shall achieve the nitrogen oxide target by optimizing the existing exhaust gas recirculation system. Particulates shall be reduced with the after treatment system, comprised of a Diesel Oxidation Catalyst and a Diesel Particulate Filter (DPF). The engine manufacturer shall be responsible for total engine emissions by the addition of maintenance free crankcase breather and oil separator. The centrifugal oil separator shall send oil droplets back to the sump, which shall emit a much cleaner vapor.

The Series 60 engine shall include an advanced fuel system, which shall add performance and cleanliness to the engine. Dual solenoid Electronic Unit Ejectors shall provide exact fuel and metering and enable independent injection pressure control. This system shall have multiple injection capability to maintain performance advantages and improved sound quality. The Series 60 shall be rated at 515 HP at 1800 RPM and shall be governed at 2100 RPM with 1650 foot pounds of torque with peak torque occurring at 1100 RPM for rapid off the line acceleration. The engine shall have an 855 cubic inch displacement (14 Liters).

The Series 60 shall include a DDEC VI engine management system. The DDEC VI shall employ a powerful microprocessor, increased memory and enhanced diagnostics. The DDEC VI shall be capable of managing all engine functions and shall be a key strategy in greater operating efficiency and cleaner exhaust emissions. 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 Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil, which shall be utilized for proper engine lubrication.

DIESEL PARTICULATE FILTER CONTROLS

There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one (1) control shall be for regeneration inhibit.

ENGINE CONFIGURATION

The engine shall be located in the front of the chassis in cab-over configuration.

ENGINE PROGRAMMING HIGH IDLE SPEED

The engine high idle control shall maintain the engine idle at approximately 1200 RPM when engaged.

ENGINE HIGH IDLE CONTROL

The vehicle shall be equipped with a high-idle speed control which shall be pre-set to maintain the engine idle at a pre-determined rate when activated manually. This device shall operate when the master switch is activated and safely interlocked only to function when the transmission is in neutral with the parking brake set.

ENGINE PROGRAMMING ROAD SPEED GOVERNOR

The engine shall include programming which will govern the top speed of the vehicle.

AUXILIARY ENGINE BRAKE

A Jacobs engine compression brake, for the six (6) cylinder engine, with brake light actuation and cutout relay for when in pump mode or when an ABS event occurs shall be installed. The engine brake shall activate upon 0% accelerator when in operation mode.

AUXILIARY ENGINE BRAKE CONTROL

An engine compression brake control device shall be included. 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 compression brake shall be controlled through an on/off switch and a low/medium/high selector switch.

FLUID FILLS

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

ELECTRONIC ENGINE OIL LEVEL INDICATOR

The engine oil shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal. The light shall activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.

EMERGENCY ENGINE SHUTDOWN SYSTEM

An emergency engine shutdown, which shuts off the air supply to the engine by activating a flapper valve to stop a run-away engine, shall be installed in the air intake system. It shall be activated by a locking rocker switch located on the rocker switch panel.

Resetting this flapper valve shall require manually resetting the rocker switch and turning the lever on the air intake flapper valve. Refer to the chassis operator manual for complete instructions for resetting the air intake flapper valve.

ENGINE WARRANTY

The Detroit Diesel engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.

REMOTE THROTTLE HARNESS

An apparatus interface wiring harness shall also be included which shall be wired to the cab harness interface connectors and shall incorporate circuits with relays to control pump functions. This harness shall control the inputs for the transmission lock up circuits, governor/ hand throttle controls and dash display which shall incorporate "pump engaged" and "OK to Pump" indication lights. The harness shall contain circuits for the apparatus builder to wire in a pump switch.

ENGINE PROGRAMMING REMOTE THROTTLE

The engine ECM (Electronic Control Module) discreet wire remote throttle circuit shall be turned off for use with a J1939 based pump controller or when the discreet wire remote throttle controls are not required.

ENGINE PROGRAMMING IDLE SPEED

The engine low idle speed will be programmed at 700 rpm.

ENGINE FAN DRIVE

The engine cooling system fan shall incorporate a thermostatically controlled, Horton clutched type fan drive.

When the clutched fan is disengaged it shall facilitate improved vehicle performance, cab heating in cold climates, and fuel economy. The fan clutch design shall be fail safe so that if the clutch drive fails the fan shall engage to prevent engine overheating due to the fan clutch failure.

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 vibration or stress. The 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.

There shall be a single depth core that allows greater efficiency, enhanced serviceability, and lighter weight with a higher ambient capability.

The cooling package core shall be protected by a radiator skid plate and not protrude below the frame of the vehicle by more than 3.5 inches. This feature shall provide an improved 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 910 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 include a one piece injected molded Polymer fan blade designed to provide long life in harsh environments. Polymer fans provide a significant weight reduction over metal fans providing longer life for fan clutch linings and bearings along with increased fan belt life.

The cooling system shall be equipped with a surge tank that is capable of 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 manufacturer's 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 bumper compartment 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 473 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 manufacturer's requirements.

ENGINE COOLANT

The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees F.

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

ENGINE COOLANT FILTER

An engine coolant filter with a shut-off valve for the inlet and outlet shall be installed on the chassis. 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.

ELECTRONIC COOLANT LEVEL INDICATOR

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 stainless steel constant torque band 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 airflow 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.

ENIGINE 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 below the frame in the outboard position providing maximum space for frame-mounted components such as midship pumps. All joints following the diesel particulate filter shall be connected with lapping band style clamps.

The system shall include 5.00 inch diameter plumbing, which shall be 0.065 inch thick stainless steel exhaust tubing 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-E model EVS 4000 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 TranSynd™ 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 Gen IV-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

The transmission gear ratios shall be:

1st - 3.51:1

2nd - 1.91:1

3rd - 1.43:1

4th - 1.00:1

5th - 0.74:1

6th - 0.64:1 (if applicable)

Rev- 4.80:1

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will automatically select a four (4) speed operation. The fifth speed over drive shall be available with the activation of the mode button on the shifting pad.

TRANSMISSION FEATURE PROGRAMMING

The EVS group package number 127 shall contain the 198 vocational package in consideration of the duty of this apparatus as a Pumper. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override. This package shall be coupled with the use of a split shaft PTO and incorporate pumping circuits. These circuits shall be used allowing the vehicle to operate in the fourth range lockup while operating the pump mode due to the 1 to 1 ratio through the transmission, therefore the output speed of the engine is the input speed to the pump. The pump output can be easily calculated by using this input speed and the drive ratio of the pump itself to rate the gallons of water the pump can provide.

An 8 pin Delphi connector will be provided next to the steering column connector. This will contain the following input/output circuits to the transmission tcm.

Function ID	Description	Wire assignment
C	PTO Request	142
J	Fire Truck Pump Mode (4th Lockup)	122 / 123
C	Range Indicator	145 (4th)
G	PTO Enable Output	130
	Signal Return	103

TRANSMISSION SHIFT SELECTOR

An Allison "T" style handle range selector shall be provided and located to the right of the driver within clear view and easy reach. The shift selector will provide a prognostic indicator (wrench symbol) between the selected and attained indicators.

ELECTRONIC 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 PRE-SELECT WITH AUXILIARY 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.

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.

DRIVELINE

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 drive shaft and shall be coated with Glide coat®.

MIDSHIP PUMP / GEARBOX

A temporary jackshaft driveline shall be installed by the chassis manufacturer to accommodate the mid-ship split shaft pump as specified by the apparatus manufacturer.

MIDSHIP PUMP / GEARBOX MODEL

The driveline shall be for a Hale QMAX model pump, which shall be installed by the original equipment manufacturer or body builder.

FUEL FILTER/WATER SEPARATOR

The fuel system shall have a fuel filter/water separator as a primary filter as approved by the engine manufacturer. A secondary fuel filter 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 SHUTOFF VALVE

A fuel shutoff valve shall be installed in the fuel draw line at the secondary fuel filter to allow the fuel filter to be changed without loss of fuel to the fuel pump.

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.

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 TANK FILL PORT

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

A 1.50 inch diameter hole shall be provided in the left frame rail for vent hose routing provisions. The hole shall be located 32.12-inch rear of axle and 3.00 inch up from the bottom of the rail.

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 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle. The weight capacity for the axle shall be rated to 21,500 pounds FAWR.

FRONT WHEEL BEARING LUBRICATION

The front axle wheel bearings shall be lubricated with synthetic 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 nine (9), 54.00 inch long and 4.00 inches wide taper leaf springs with a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 21,500 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 Vickers 20V and shall be gear driven from the engine. The pump shall be a fixed displacement 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.

POWER STEERING GEAR

The power steering gear shall be a TRW model TAS 65 with an assist cylinder.

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 synthetic oil.

VEHICLE TOP SPEED

The top speed of the vehicle shall be approximately 65 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 conventional 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 31,500 pounds.

FRONT TIRE

The front tires shall be Michelin 425/65R-22.5 20PR "L" tubeless radial XZY3 mixed service tread.

The front tire stamped load capacity shall be 22,800 pounds per axle with a speed rating of 65 miles per hour when properly inflated to 120 pounds per square inch.

The front tire U. S. Fire Service intermittent load capacity shall be 23,000 pounds per axle with a speed rating of 65 miles per hour when properly inflated to 120 pounds per square inch.

REAR TIRE

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.

TIRE PRESSURE INDICATOR

There shall be a tire pressure indicator at each tire's valve stem on the vehicle that shall indicate if there is insufficient pressure in the specific tire.

FRONT WHEEL

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.

BALANCE WHEELS AND TIRES

All of the wheels and tires, including any spare wheels and tire assemblies, shall be dynamically balanced.

AUXILIARY LUBRICATION SYSTEM

A Vogel centralized lubrication system shall be installed on the chassis. The system shall be capable of lubricating up to twenty-four (24) grease points on the chassis. A park brake interlock is incorporated into the ignition system to keep the system from operating while parked. The main line system shall be monitored via a pressure switch.

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 falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when 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 EX225 Disc Plus disc brakes with 17" vented rotors.

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.

PARK BRAKE CONTROL

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

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

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.

FRONT BRAKE CHAMBERS

The front brakes shall be provided with MGM type 24 long stroke brake chambers.

REAR BRAKE CHAMBERS

The rear axle shall include TSE 30/36 brake chambers shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE Type 36 brake chamber has a 36.00 square inch effective area.

AIR COMPRESSOR

The air compressor provided for the engine shall be to provide and maintain air under pressure to operate devices in air brake systems. The brand provided shall be a Bendix BA-922 which shall be a twin-cylinder reciprocating compressor rated at 32.00 CFM. The compressor shall consist of a water-cooled cylinder head assembly and an integral air-cooled crankcase assembly.

The cylinder head assembly shall be made up of the cylinder head, cooling plate and valve plate assembly and shall use two sealing gaskets. Depending on the application, the cylinder head and cooling plate may be aluminum or cast iron. A cooling plate shall be located between the cylinder head and valve plate assemblies and assists in cooling. The valve plate assembly consists of brazed steel plates, which have valve openings and passages for air and engine coolant to flow into and out of the cylinder head. The compressor's discharge valves shall be part of the valve plate assembly. The inlet reed valve/gasket shall be installed between the valve plate assembly and the top of the crankcase.

AIR GOVERNOR

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be located on the air cleaner bracket on the right frame rail behind the officer step.

MOISTURE EJECTORS

Automatic moisture ejectors with a manual drain provision shall be installed on all reservoirs of the air supply system. The actuation pull cable shall be coiled and tied at the drain valve on the tank. The supplied lengths shall be sufficient to be extended to the frame rail to allow drains to be activated from the side of the chassis.

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.

WHEELBASE

The chassis wheelbase shall be 222.50 inches.

REAR OVERHANG

The chassis rear overhang shall be 51.00 inches.

FRAME

The frame shall consist of double channel 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 thick with an inner channel of 9.44 inches high X 3.13 inches deep and .38 inches thick, 110,000 psi minimum yield high strength low alloy steel. Each rail shall be considered on the following key items: Each rail shall be rated by a Resistance Bending Moment (RBM) minimum of 3,213,100 inch pounds and have a minimum section modulus of 29.21 cubic inches calculated by the radius method. The frame shall measure 35.00 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 thick 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.

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 WARRANTY

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

FRAME PAINT

The frame shall be powder coated black 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.

REAR TOW DEVICE

Two (2) heavy duty painted tow eyes shall be installed below the frame at the rear of the chassis. The tow eyes shall be fabricated from 0.75 inch thick #1020 ASTM-36 hot rolled steel. The inside diameter of the tow eye shall be 2.00 inches and shall have a chamfered edge. The tow eyes shall be bolted directly to the chassis frame with grade 8 bolts.

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 28.00 inches ahead of the cab.

FRONT BUMPER EXTENSION WIDTH

The front bumper extension splayed frame rails shall include an overall width of 44.75 inches.

AIR HORN

The front bumper shall include two (2) Hadley brand E-Tone 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 on the inside and a black painted finish on the outside of the trumpet.

AIR HORN LOCATION

The two (2) air horns shall be shipped loose for the body manufacturer to install in the bumper. The body manufacturer shall cut all holes required in the bumper for the horn installation.

AIR HORN RESERVOIR

One (1) air tank, with a 2084 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.

FRONT BUMPER TOW EYES

The bumper shall include two (2) chrome plated tow eyes shall be installed through the front bumper. The eyes shall be fabricated from 0.75-inch thick #1020 ASTM-A36 hot rolled steel. The inside diameter of the eye shall be 2.00 inches and include a chamfered edge.

CAB TILT SYSTEM

The entire cab shall be capable of tilting 45 degrees to allow for easy maintenance of the engine and transmission.

The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the "Down" button to indicate safe road operation.

It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.

Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once the hold-down hooks are set in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.

Two (2) cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab tilt pivots shall be 1.90" ball and be anchored to frame brackets with 1.25" diameter studs.

A steel safety channel assembly shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.

CAB TILT AUXILIARY PUMP

A manual cab tilt pump module shall be attached to the rear surface of the driver side battery box.

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 TILT LOCK DOWN INDICATOR

The cab interior shall include a light located within the instrument panel, which shall only illuminate when the cab is unlocked and ajar, the light shall go out when the cab is in the fully lowered position and the hold down hooks are secured and locked to the cab mount.

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.

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.

GLASS TINT FRONT DOOR

The windows located in the left and right front doors shall have a standard green automotive tint, which shall allow seventy-five percent (75%) light transmittance.

GLASS REAR DOOR RH

The rear right hand side door shall include a window, which is 31.00 inches wide X 26.00 inches high. This window shall roll up and down manually utilizing a crank style handle on

the inside of the door. The glass utilized for this window shall include an automotive tint unless otherwise noted.

GLASS TINT REAR DOOR RH

The window located in the right hand side rear door shall include a standard green automotive tint, which shall allow seventy-five percent (75%) light transmittance.

GLASS REAR DOOR LH

The rear left hand side door shall include a window, which is 31.00 inches wide X 26.00 inches high. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. The glass utilized for this window shall include an automotive tint unless otherwise noted.

GLASS TINT REAR DOOR LH

The window located in the left hand side rear door shall include a standard green automotive tint, which shall allow seventy-five percent (75%) light transmittance.

GLASS SIDE MID RH

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 capable of sliding vertically within this space and shall be rectangular in shape. The window shall be mounted in a black anodized aluminum frame with lower drain slots. The glass utilized for the window shall include a green automotive tint unless otherwise noted.

GLASS TINT SIDE MID RH

The window located on the right hand side of the cab between the front and rear doors shall include a standard green automotive tint, which shall allow seventy-five percent (75%) light transmittance.

GLASS SIDE MID LH

The cab shall include a window on the drivers' side behind the front door and ahead of the crew doors and above the wheel well, which shall measure 16.00 inches, wide X 26.00 inches high. This window shall be capable of sliding vertically within this space and shall be rectangular in shape. 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.

GLASS TINT SIDE MID LH

The window located on the left hand side of the cab between the front and rear doors shall include a standard green automotive tint, which shall allow seventy-five percent (75%) light transmittance.

CLIMATE CONTROL

The cab shall be equipped with a ceiling mounted combination defrost / heating and air-conditioning system mounted above the engine tunnel in a central location.

The system shall offer sixteen (16) adjustable louvers. Six (6) of the louvers shall face forward towards the windshield, offering 45,000 BTU of heat at 320 CFM for defrosting. The system shall include six (6) rearward facing louvers to direct air for the crew area and four (4)

for driver and officer comfort. When in "Cabin Mode" the system shall be designed to produce 60,000 BTU of heat and 32,000 BTU of cooling. The HVAC cover shall be made of ABS plastic.

All auxiliary heating units (if optionally equipped) shall be plumbed in series independent of the heater/defroster system with one (1) seasonal shut-off valve at the front corner on the officer side of the cab.

The air conditioning system shall be capable of lowering the cab interior temperature from 100 degrees to 70 degrees within thirty minutes, with a relative humidity of sixty percent.

The air conditioner lines shall be a mixture of custom bent zinc coated steel fittings and Aero-quip GH 134 flexible hose with Aero-Quip EZ-Clip fittings.

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 centered on cab forward of raised roof against the slope rise.

A/C COMPRESSOR

The air-conditioning compressor shall be a belt driven, engine mounted, open type compressor that shall be capable of producing a minimum of 32000 BTU at 1500 engine RPMs. The compressor shall utilize R-134A refrigerant and PAG oil.

CAB INSULATION

The cab ceiling and walls shall include 1.00-inch thick foam insulation. The insulation shall include a foil facing which includes grid reinforcement. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

UNDER CAB INSULATION

The underside of the cab tunnel surrounding the engine shall be lined with foam insulation, engineered for application inside diesel engine compartments.

The foam insulation shall measure .56 inch thick including a 1.0#/sf PVC barrier and a moisture and heat reflective foil backing, reinforced with fiberglass strands. The foil surface acts as protection against moisture and other contaminants.

The insulation shall act as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations. And as an additional benefit, the insulation shall assist in sustaining the desired temperature within the cab interior.

The insulation shall be held in place by 3 mils of acrylic pressure sensitive adhesive and aluminum pins with hard hat, hold in place fastening heads.

The foam shall meet or exceed MVSS 302 flammability test.

The foam shall be cut precisely to fit each section and sealed for additional heat and sound deflection.

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 style finish. All exposed seam shall be sealed to reduce moisture and debris. The floor then shall be covered in 3003-H22 aluminum embossed tread plate, which is 0.084 inches thick. The mat shall be held in place by a pressure sensitive adhesive and diamond plate shall be held down with screws and the aluminum cornering trim.

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.

HEADER TRIM

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 two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield. Each sun visor shall be constructed of Masonite and covered with padded vinyl trim.

TRIM LH DASH

The left hand dash shall be a one (1) piece durable vacuum formed ABS composite housing which shall be custom molded for a perfect fit around the instrument panel and the lower control panels to the left and right of the steering column.

TRIM CENTER DASH

The main center dash area shall be constructed of 5052-H32 Marine Grade, .090 of an inch thick, one hundred percent primary aluminum plate.

TRIM RH DASH

The right hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick, one hundred percent primary aluminum plate and shall include a glove compartment with a hinged door and a Mobile Data Terminal (MDT) provision. The glove compartment size will measure 14.00 inches wide X 6.63 inches high X 5.88 inches deep. The MDT provision shall be provided above the glove compartment, recessed 3.00 inches below the surface of the dash and measure 16.00 inches wide X 14.00 inches deep.

TRIM RH DASH ACCESSORIES

The MDT slide-out tray shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick, one hundred percent primary aluminum plate. The tray shall be mounted in the area specifically provided on the right hand dash. The mounting surface of the tray measures 12.50 inches wide X 10.75 inches deep which shall allow for the mounting of a MDT with the added luxury of sliding it toward the officer as much as 11.00 inches.

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.

POWER POINT DASH MOUNT

The cab shall include one (1) 12-volt cigarette lighter type receptacle in the cab dash as a power source for additional portable or mobile items.

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.

STEP TRIM KICKPLATE

The cab steps shall include a kick plate in the rise of each step. The risers shall be trimmed in 3003-H22 embossed aluminum tread plate, which is 0.072 inches thick. The risers in the crew steps shall include an access door to the batteries constructed DA finish aluminum with a push and turn latch.

INTERIOR DOOR TRIM

The doors of the cab shall include an aluminum plate the same weight and grade as the cab on the interior of the door. The aluminum shall be then painted.

DOOR TRIM 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.

INTERIOR GRAB HANDLE 'A' PILLAR

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.

INTERIOR 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.

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.

CAB PAINT INTERIOR DOOR TRIM

The inner door panel surfaces shall be painted with a Zolatone #20-72 silver gray texture finish.

DASH PANEL GROUP

The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer.

SWITCHES CENTER PANEL

The center dash panel shall include twelve (12) rocker switch positions in a six (6) over six (6) switch configuration in the left portion of the panel.

A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

SWITCHES LEFT PANEL

The left dash panel shall include seven (7) switches, four (4) across the top of the panel and three (3) staggered on the left hand portion of the panel. Four (4) rocker switch positions and one (1) wiper switch, one (1) headlight switch, and one (1) dimmer switch shall be provided.

A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

SWITCHES RIGHT PANEL

The right dash panel shall include no rocker switches or legends.

SWITCH PANEL IGNITION

The vehicle shall be equipped with a keyless ignition and master, with an “Off/ On” and a two switch for “Off/ Start”.

SEAT BELT WARNING

A Class One seat belt warning system, integrated with the Vehicle Data Recorder 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. The instrument panel shall include an indicator display showing the occupancy of each seat.

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 gray diamond logo, which features a capital S in red located in the middle of the diamond. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

SEAT DRIVER

The driver's seat shall be a Seats Inc. 911 Universal series. The seat shall feature 6.00-inch vertical travel air suspension and a high back. The seat shall feature two (2) way adjustable lumbar support and offer an infinite fully reclining adjustable titling seat back. The seat cushion shall include an adjustment for height and rake angle offering added comfort.

There shall be a red, three-point shoulder harness with lap belt and an automatic retractor attached to the cab and available to the seat. The buckle portion of the seat belt shall be mounted on a rigid or semi-rigid stalk such that the buckle remains positioned in an accessible location. The seat belt assembly anchorages shall conform to the Federal Safety Standard (FMVSS) No. 210, “Seat belt assembly anchorages”.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 37.00 inches measured with the seat suspension raised to the upper limit of its travel.

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.

SEAT BACK DRIVER

The driver's seat shall feature a two (2) way adjustable lumbar support and offer an infinite fully reclining adjustable titling seat back. The seat back shall also feature a contoured head rest.

SEAT OFFICER

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 be 37.00 inches.

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.

SEAT BACK OFFICER

The officer seat back shall include a Ziamatic brand Rol-Loc® mechanical self contained breathing apparatus (SCBA) bracket. The Positive Locking 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 be third Party tested to ten (10) times the force of gravity.

The bracket shall secure a self-contained breathing apparatus with all sizes of cylinders. The bracket shall include four PVC coated clamping arms, which securely lock the SCBA in place without damaging the cylinder wall. The bracket shall also include a pull release strap, which shall include a 30.00-inch nylon lanyard, which activates the lever on the bracket saving the occupant from reaching behind the SCBA in order to release the bracket. The nylon strap shall be located on the right side of the seat.

The basic bracket and clamp arms shall be made of strong, yet light-weight, aluminum alloys. Hex arms and operating levers shall be plated steel to withstand years of constant use. The bracket shall feature donning of the SCBA in a fast and easy manner.

SEAT QUANTITY REAR FACING OUTER

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.

SEAT CREW REAR FACING OUTER

The crew area shall include a seat in the rear facing outboard position, which 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 be 37.00 inches.

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.

SEAT BACK REAR FACING OUTER

The rear facing outboard seat back shall include a Ziamatic brand Rol-Loc® QLM-U mechanical self contained breathing apparatus (SCBA) bracket. The Positive Locking 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 be third Party tested to ten (10) times the force of gravity.

The bracket shall secure a self-contained breathing apparatus with all sizes of cylinders. The bracket shall include four PVC coated clamping arms, which securely lock the SCBA in place without damaging the cylinder wall. The bracket shall also include a pull release strap, which shall include a 30.00-inch nylon lanyard, which activates the lever on the bracket saving the occupant from reaching behind the SCBA in order to release the bracket. The nylon strap shall be located on the right side of the seat.

The basic bracket and clamp arms shall be made of strong, yet lightweight, aluminum alloys. Hex arms and operating levers shall be plated steel to withstand years of constant use. The bracket shall feature donning of the SCBA in a fast and easy manner.

SEAT MOUNTING REAR FACING OUTER

The rear facing outer seat shall be mounted facing the rear of the cab.

SEAT BELT ORIENTATION CREW

The crew position seat belts shall follow the standard orientation, which extends from the outboard shoulder extending to the inboard hip.

SEAT QUANTITY FORWARD FACING CENTER

The crew area shall include two (2) forward facing center crew seats with both located at the center of the rear wall.

SEAT CREW FORWARD FACING CENTER

The crew area shall include a seat in the forward facing center 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.

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 be 37.00 inches.

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.

SEAT BACK FORWARD FACING CENTER

The forward facing center seat backs shall include a Ziamatic brand Rol-Loc® mechanical self contained breathing apparatus (SCBA) bracket. The Positive Locking 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 be third Party tested to ten (10) times the force of gravity.

The bracket shall secure a self-contained breathing apparatus with all sizes of cylinders. The bracket shall include four PVC coated clamping arms, which securely lock the SCBA in place without damaging the cylinder wall. The bracket shall also include a pull release strap, which shall include a 30.00-inch nylon lanyard, which activates the lever on the bracket saving the occupant from reaching behind the SCBA in order to release the bracket. The nylon strap shall be located on the right side of the seat.

The basic bracket and clamp arms shall be made of strong, yet lightweight, aluminum alloys. Hex arms and operating levers shall be plated steel to withstand years of constant use. The bracket shall feature donning of the SCBA in a fast and easy manner.

SEAT MOUNTING FORWARD FACING CENTER

The forward facing center seats shall be installed facing the front of the cab.

SEAT FRAME FORWARD FACING

The forward facing center seating positions shall include a full width, enclosed style seat frame, which is located and installed at the rear wall. The seat frame shall be open to the rear compartment offering interior access to this compartment. The seat frame shall measure 89.25 inches wide X 12.38 inches high X 22.00 inches deep and shall be transverse into the rear compartment. There shall be four (4) access points to the storage area, two (2) through the front of the frame and two (2) through the rear compartments. The seat frame shall be constructed of 5052-H32 Marine Grade, .190 inch thick, 100 percent primary smooth aluminum plate. The seat box lid shall be painted with the same color as the remaining interior.

SEAT FRAME FORWARD FACING STORAGE ACCESS

There shall be two (2) access points to the storage area centered on the front 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 doors and the forward facing seat panel shall be painted with the same material as the interior of the cab.

CAB FRONT UNDERSEAT STORAGE ACCESS DOOR

The driver and officer under seat storage area shall have a solid aluminum painted, hinged door with latch.

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 aluminum with a polished chrome plated finish. The exterior pull handles shall include a scuff plate behind the handle constructed of polished stainless steel. All doors shall be keyed alike and 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 a toggle switch located on the interior of the cab door near the paddle handle or by using a Trimark key through the exterior of the door.

DOOR LOCK LH REAR CAB COMPARTMENT

The driver side rear compartment shall feature a manual door lock.

DOOR LOCK RH REAR CAB COMPARTMENT

The officer side rear compartment shall feature a manual door lock.

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 Ramco bus style mirrors, one (1) mounted on the drivers' door and one (1) mounted on the right front cab corner radius below the windshield.

The left side mirror shall be model CRM-310-1750-TPCHR The mirror head shall be injection molded chrome plated ABS plastic that measures 9.50 inches wide X 17.50 inches high and is mounted with a polished die-cast aluminum arm.

The right side mirror shall be model CRM-310-1752-A8-TPCHR. The mirror head shall be injection molded chrome plated ABS plastic that measures 9.50 inches wide X 17.50 inches high and is mounted with a 17.00 inch long polished cast aluminum arm.

Both the flat and convex mirrors shall be heated and remote controlled. The mirror control switches shall be located within easy reach of the driver and a mirror heat switch shall be provided on the dash. The mirrors shall be manufactured using the finest quality non-glare glass and shall feature a rigid mounting thereby reducing vibration. The mirrors shall be corrosion free under all weather conditions.

REARVIEW MIRROR HEAT SWITCH

The heated rearview mirrors shall be controlled through a rocker switch on the driver side dash.

CAB FENDER

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.

CAB EXTERIOR MODEL NAMEPLATE

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

CAB EXTERIOR FRONT & SIDE EMBLEMS

The chassis shall include three (3) chassis manufacturer's emblems. There shall be one (1) installed on the front air intake grille and one (1) installed on each side of the cab above the wheel well.

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.

BATTERY

The single start electrical system shall include (6) 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 two (2) black powder coated steel battery boxes which shall be located on the driver and officer side of the chassis, securely bolted to the frame rails. The boxes 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 BOX COVER

The battery box enclosures shall include a steel cover, which protects the top of the batteries. The cover shall include flush latches, which shall keep the cover secure as well as a handle for convenience when opening.

BATTERY CABLE

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 STUD

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. The alternator shall include a self-excited integral regulator.

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.

HEADLIGHT LOCATION

The headlights shall be located on the front fascia of the cab directly below the front warning lights.

FRONT TURN SIGNALS

The front fascia shall include two (2) Whelen model 600 4.00 inch X 6.00 inch LED programmable amber turn signals, which shall be installed in the outboard position.

SIDE MARKER/TURN SIGNALS

The sides of the cab shall include (2) LED 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. The lights shall include a polycarbonate lens, a housing that 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 being activated when the parking brake is set.

STEP LIGHTS

The middle step located at each door shall include a NFPA compliant 4.00" round incandescent light, which shall activate with the opening of the respective door.

The lights shall have 21-candle power of illumination and draw 1.5 amps.

ENGINE COMPARTMENT LIGHTS

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 that is vibration welded and a bulb, which shall be shock, mounted for extended life.

INTERIOR OVERHEAD 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 LIGHT

The front headliner of the cab shall include a Whelen 500 series red LED light, located in the center for greatest visibility. The light shall be 5.40 inches long X 1.70 inches wide X 0.90 inches high and shall be clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound when a door is open and the parking brake is released.

The light and alarm 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 SWITCH

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.

HEADLIGHT FLASHER

An alternating high beam headlamp flashing system shall be installed into the high beam headlamp circuit, which shall allow the high beams to flash alternately from left to right.

Deliberate operator selection of high beams will override the flashing function until low beams are again selected. Per NFPA, these clear flashing lights will also be disabled "On Scene" when the park brake is applied.

ALTERNATING HEADLIGHT SWITCH

The flashing headlights shall be activated through a rocker switch on the main switch panel. The rocker switch shall be clearly labeled for identification.

INBOARD FRONT WARNING LIGHTS MODEL

The cab front fascia shall include dual modules containing headlights in the inboard position, which shall not be wired.

HORN RING 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 ACTIVATION

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. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

BACK-UP 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 shall be included. The scale on the tachometer shall read from 0 to 3000 RPM.

One (1) electronic speedometer with an integral LCD odometer/ trip odometer and hour meter 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. The hour meter shall display engine hours of operation.

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)

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 (turn signal left on for more than one (1) mile)
- 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
- 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 160 millisecond second alarm every 880 milliseconds 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 160 millisecond second alarm every 5 seconds for the following situation:

Turn Signal Reminder (turn signal left on for more than one (1) mile)

- (1) Feature only available when optionally equipped.*
- (2) Feature only available on engines with pre-heat 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.*

ADDITIONAL SPEEDOMETER

The officer dash shall include a speedometer. The speedometer shall be analog and shall be housed in a chrome bezel.

VEHICLE DATA RECORDER

The chassis shall have a Class One Vehicle Data Recorder system installed. The system shall be designed to meet NFPA 1901. The following information shall be recorded:

- Vehicle Speed
- Acceleration
- Deceleration
- Engine Speed
- Engine Throttle Position
- ABS Event
- Seat Occupied Status
- Seat Belt Status
- Master Optical Warning Device Switch Position
- Time
- Date

Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system.

CAB EXTERIOR PROTECTION

The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.

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.

AS-BUILT WIRING DIAGRAMS

The cab and chassis shall include three (3) complete set of wiring schematics and option wiring diagrams.

WARRANTY - CAB AND CHASSIS

The chassis manufacturer shall warrant to the original purchaser the custom fire truck chassis for a period of twelve (12) months, or the first 24,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user. The warranty shall include conditional items listed in the detailed warranty document, which may be provided upon request.

OPERATORS AND PARTS LIST MANUAL

There shall be three (3) 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 two (2) sets of engine operation and maintenance manuals and two (2) sets of transmission operation manuals specific to the models ordered?? included with the final vehicle in the ship loose items.

ENGINE SERVICE MANUALS

There shall be two (2) sets of the following Detroit Diesel engine service manuals, which shall be provided with the chassis.

Series 60 Service Manual, part number 6SE483
DDEC V / VI Trouble shooting Guide, part number 6SE497

CHASSIS MODIFICTAIONS OR ALTERATIONS

STRAIGHT FRAME RAILS

The chassis frame rails shall remain straight and clear rails.

REAR DROP FRAME

The service requirements of this vehicle dictate that this unit have the maximum sized rear compartment as possible or available. For that reason we require the frame behind the rear axle be dropped, so as to allow maximum compartment depth.

The truck chassis shall be cut and dropped to accept the enlarged rear compartment. The work shall be performed only by highly experienced personnel in this field. The materials and workmanship for frame modifications shall be equal to or greater than the original frame strength of the chassis.

The actual frame main rails shall be 10 inch by 22 Lb. structural channel. The channel shall be reinforced at the connection points with 1/4" inch steel formed plate.

The rear drop frame shall be coated with a black rust prevention coating before the installation of the body on the chassis.

In performing the previously described frame modifications, the remaining frame will maintain its original warranty.

FRONT BUMPER EXTENSION W/ REEL & TOOL STORAGE COMPARTMENT

The front bumper and frame shall be extended for storage of reel and tool storage. The frame modification or factory extension shall be capable of adequately supporting reels, equipment or tool storage.

The front bumper extension shall be outfitted with an enclosed storage compartment, which consists of three (3) recessed storage areas, or compartments constructed to hold specified hydraulic rescue equipment.

Compartments shall be constructed entirely from aluminum and be enclosed by use of a single tread- brite aluminum hinged door utilizing a stainless steel continuous hinge. Two (2) D-ring release latches shall be provided. These compartments shall be weather resistant to prevent road debris and moisture from collecting.

The officer side compartments shall be constructed large enough to facilitate storage of two (2) hydraulic hose reels, Hannay 2016-17-18 hydraulic hose reel(s) shall be furnished and installed with a minimum of 100' of hydraulic hose.

The drivers side compartment shall be capable of storing 100 ft. of 1.75" hose, as well as the appropriate nozzle. This hose line shall be pre-connected to the discharge

The center compartment shall be a shelf across the frame rails available for hydraulic rescue tool storage. The compartment shall provide adequate space for up to two (2) specified rescue tools pre-connected to reels.

Proper drain holes shall be installed in each of these compartments. A removable screw-type drain plug shall be installed in each drain hole.

There shall be a minimum ground clearance of 16" for all of the compartments in the front bumper.

TIRE CHAINS

A set of Rudd Rotogrip III automatic chains shall be supplied and installed on the unit. The system shall be tied in with the chassis air brake system. The chains shall be capable of low speed operation (5 MPH or less). Each wheel shall have 18 round link alloy strand of chain and design so as to allow field replacement. A switch in the cab shall control them.

AIR CONNECTION

There shall be two (2) external air connections provided in a specified location at the front and rear of the apparatus to provide air source for operating equipment off the chassis air supply. A tractor protection valve shall be installed in line to protect the chassis air from completely depleting. In addition a pressure gauge shall be provided at each connection point.

EXHAUST SYSTEM

The factory right hand discharge exhaust shall be kept

REAR MUD FLAPS

There shall be a single rear full width anti-spray black mud flap shall be installed under the rear of the apparatus behind the rear wheels.

REAR TOW EYES

Under the rear tail board there shall be structural steel reinforcement attached to frame rails of chassis to support tow eye assemblies. Mounted at rear center of apparatus it must be capable to with stand the requirements of towing as well as lifting the apparatus without damage.

UNFINISHED WHEELS

The wheels on chassis shall remain the factory-installed aluminum wheels as per request of the Fire Department.

WHEEL TRIM

Wheel lug covers, baby moon and hub caps shall be provided with the finished apparatus.

STORAGE TRAY

A tray shall be provided between the driver and officer and extend back between the two rear facing SCBA seats above the engine cowl in the crew compartment. The tray shall provide storage and mounting locations for fire department.

The desktop shall be illuminated by use of 12 volt lights mounted on or above the desk with a switch located on or adjacent to the light.

Tray shall be constructed of smooth aluminum plate and spray coated with a gray rubberized liner for both protection and aesthetic appearance.

BOOK AND MAP STORAGE

Located in the cab near the officer seating position, on the aluminum storage tray shall be provided to store department binders, books and maps. Each slot shall be 14" wide and 8" deep. They shall slant at a 30-degree angle. The box shall be constructed of .125 aluminum.

Nylon straps with Velcro fastening shall be provided to secure binders and books in compartment and provide quick and easy access.

RADIO TREE

Located on the storage tray over the engine tunnel shall be mounting bracket for the customer radios to be secured to. The bracket shall be installed on a swivel to allow the radio to be turned around for access to the rear seating positions when the tray is extended into the desktop function.

OVERHEAD STORAGE COMPARTMENT

A transverse storage cabinet shall be installed over the forward facing rear seats and between the two EMS cabinets. This cabinet shall be constructed from smooth aluminum plate and provided with clear Plexiglas or equivalent doors. Each door shall slide in a

provided channel at the front of the compartment. Tracks shall be designed to secure the doors from rattling, yet allowing for easy operation of the sliding doors.

EMS CABINETS

Two (2) custom EMS cabinets to hold EMS supplies shall be constructed and installed in the cab of the unit. It shall be approximately 52" tall x 18" wide x 14" deep. Compartment shall completely enclosed. A roll up access door shall be installed to secure contents during transport. Compartments shall be constructed of smooth aluminum plate and spray coated with a gray rubberized liner for both protection and aesthetic appearance.

The location of these cabinets shall be against the back wall on either side of the cab adjacent to the forward facing seating position. A single track of unistrut shall be installed on each internal side to allow the movement for adjustable shelves.

There shall be two (2) adjustable shelves with formed flanges installed in each of the compartments.

FLUID IDENTIFICATION PLATE

A permanently engraved plate shall be installed in the cab specifying the quantity and type of fluids used in the apparatus.

FUEL TYPE PLATE

A permanently engraved plate shall be installed on or near the fuel fill to designate the chassis fuel type.

SEATING LABEL

There shall be a label located in the cab or in view of the driver, stating maximum seating capacity.

VEHICLE HEIGHT LABEL

There shall be a label located in the cab or in view of the driver, stating the overall height of the vehicle.

SEAT BELT WARNING LABEL

There shall be a label located at all seating areas, warning personnel that death or serious injury could result from not wearing seat belts while the vehicle is in motion.

RIDING ON STEP WARNING LABEL

There shall be a label located at all exterior stepping surfaces, stating "Warning: Death or serious injury may result from riding on any stepping surface when the vehicle is in motion.

BODY CONSTRUCTION

Construction material of the body shall be aluminum, fully welded, with no rivets. The use of rivets, bolted panels, or adhesive as a structural fastening system is not acceptable.

All aluminum body parts are to be welded for unitized construction to give maximum strength throughout the body.

All welds whether seen or not, shall be of good craftsmanship, and pleasing appearance. Welds, which are visible, shall be either ground smooth, cleaned or power wire brushed. We are stating that we want Fire Truck quality workmanship not standard delivery practice.

The entire body is to be modular in design, and shall be fully capable of being removed and remounted on another chassis. Use of independent dissimilar metal understructures is not acceptable.

The body under-structure shall be entirely of aluminum. It shall consist of a combination formed .160 wall channel, 2" x 4" x 1/4" support 6061-T6 alloy crossmembers.

All floors shall be .160", 5052 aluminum sheet capable of supporting a five hundred (500) pound load. All compartments shall be of sweep-out type with no lip at bottom edge. The compartment floors shall be raised 1" above the lower sill to prevent water from entering the bottom of the opening. Each compartment shall be fitted with a drain and located in such a manner as to minimize or eliminate water from entering.

The body corner and intermediate Mid-post compartment dividers shall be heavy formed wall .160", 5052 aluminum welded as an integral part of the body. Each post shall be "multi-disciplined". Serving as a structural load bearing member, slotted to provide an internal seat from which header and compartment partitions can be secured, while also serving as a sturdy location to secure roll up door track.

The bulkheads shall be of .160", 5052 aluminum, MIG welded to the corner post and header; Partitions shall be .160", 5052 aluminum sheet, welded to inner framing of Corner Posts.

The front bulkhead shall be overlaid with .125" aluminum tread-brite on the edges to provided the painted body face from stone damage and road debris.

All header walls and partitions dividing the compartments shall be of a double wall construction. This method will not only provide extra body strength, it serves several other unique functions. The partition walls are "multi-disciplined". They provide structural integrity that single wall construction cannot, plus provide a raceway for all wires required for door switches and compartment lighting, while also providing refuge for compartment lighting, receptacle boxes, etc....

All exterior panels shall be 5052-H32/H34 corrosion resistant aluminum. The roof and wall beams shall be MIG welded to body exterior panels.

Roof and sidewall panels shall be one piece. The roof rails shall be of .160" aluminum of 5052-H32/H34 alloy and shall be a continuous formed sheet to "square up" the top of the body to enhance looks and provide a flat mounting surface for lights. The roof rails shall extend up from the integral drip channel approximately 24" at the front, rear and sides. Rails shall be formed over to create a flange around the top to give rigidity to the sidewalls and secure seat for the welded roof.

The roof sheet shall be of .160", 5052 welded around perimeter. The roof shall support a two hundred fifty (250) pound person at any location without damage to the roof. All designated

walking or standing location on the roof shall be overlaid with NFPA approved 125" aluminum tread-plate.

All compartments shall be of sweep-out type with no lip at bottom edge. The compartment floors shall be raised 1" above the lower sill to prevent water from entering the bottom of the opening. Each compartment shall be fitted with a drain and located in such a manner as to minimize or eliminate water from entering.

All compartment sills shall be overlaid with fire industry grade tread plate aluminum to protect body finish from damage or scratches when accessing the compartments.

The outer lower channels shall be clad with .125" aluminum tread plate. The tread plate shall be installed with a special fastening system. There shall be no welding of this plate.

The rear wheel wells will have a polished fenderette installed on them. A rubber welting will be provided between the body and fenderette to seal the seam and restrict moisture.

The rear tailboard shall be constructed from impact resistant unitized steel, trimmed out in aluminum tread-plate and securely mounted to the unit's super structure. It shall be a minimum of 9" deep and approximately 20" from ground to the tailboard. As specified in NFPA 1901-2009 edition, the tailboard shall be designed to sustain a minimum static load of 500lbs without deformation and shall be punch raised to provide skid resistance when stepping. It shall adequately support the stepping and standing of a fire person in full turnout gear but not be used to transport firefighters.

The body mounting system shall feature cross members at the front panel and at each end of the wheelbox for bolting directly to the steel frame, which straddles the frame rails. Mounting should be isolated from the steel frame by other synthetic material.

There shall be minimal clearance between cab body and box. Consideration shall be given for the presence of pushup floodlights and any other equipment placed between the cab and body.

This body channel support, shall be isolated with a .125" UHMW polyethylene type 819. The isolator shall lay the full length of both sides of frame rails.

All dissimilar metals shall have a barrier material between them to prevent electrolysis.

On all items that are bolted or fastened onto a painted surface there will be isolation strips installed between mating surfaces. This is to prevent problems associated with dissimilar metals and cutting the painted surface by sharp edge of installed items.

The overall body width shall be 96".

The entire body is to be modular in design, it shall be fully capable of being removed and remounted on another chassis.

The entire rescue module will be undercoated.

DIMENSIONS

Body Length: 194" (16 feet)

Body Height: 92"

Body Width: 96"

Cab to Axle: 147"

Compartment dimensions of this rescue vehicle are as follows:

Driver Side #1: **60" wide x 72" high x 25.95" deep lower and transverse upper**

Driver Side #2: **60" wide x 36" high x 25.95" deep**

Driver Side #3: **60" wide x 72" high x 25.95" deep**

Passenger Side #1: **60" wide x 72" high x 25.95" deep lower and transverse upper**

Passenger Side #2: **60" wide x 36" high x 25.95" deep**

Passenger Side #3: **60" wide x 72" high x 25.95" deep**

Rear# 1: **40" wide x 30" high x 24" deep**

DOORS

The compartment doors shall be of the type that roll up on themselves. The door shall have an adjustable tubular type counter balance which assures easy lifting and lowering of the compartment doors while eliminating the risk of accidental closing.

Doors shall be front roll up style to maximize upper compartment storage.

Door tracks shall be one-piece aluminum extrusions, which have no obstructions to bind the doors. Tracks shall have a replaceable side seal that shall inhibit water and dust from intruding into the compartments.

An aluminum drip rail shall be provided above each door with standard non-abrasive top seals to provide a water and dust barrier to keep compartment equipment clean and dry while maintaining shutter appearance.

Door slats shall be constructed from double wall box frame aluminum extrusion. Slat exteriors shall have a flat surface while the interior surface shall be concave to aid in preventing loose equipment from interfering with roll up operation.

Between each slat shall be a co-extruded innerseal to prevent metal-to-metal contact and to repel moisture from the joints.

Each door slat shall have interlocking joints with folding locking flange and end shoes secured by a swage process. The interlocking end shoes provide tight fitting operation,

removing any play between slats and keeping graphics (if applicable) aligned. Shoes are swaged / dimpled (never riveted) into place for easy replacement.

Nested end shoes prevent metal-to-metal contact and protect the shutters from damage as the doors move up and down in the tracks.

Doors shall have a full width lift bar (operable by one hand), shall be used as a positive latch device for securing each individual compartment door in the closed position. All doors shall be equipped with indicator switches to alert the driver that one or more doors are not fully closed. These switches may all be connected to a single flashing warning light on the dash of the cab.

Doors shall be available in an anodized satin finish.

Door Style: R.O.M. Robinson rollup doors

HOSE BED

There shall be a NFPA 1901 compliant hose storage area provided over top of the booster tank.

The hose bed shall be divided to accommodate 300 ft. of 1-3/4" hose; 400 ft. of 2-1/2" hose; 1,050 ft. of 5" supply hose, 400 ft. of 2-1/2" hose, and well as 300 ft. of 1-3/4" hose.

The floor of the hose bed shall be made of 3/4" x 3" aluminum hose bed extrusion ribbed on top. The extrusions shall be welded together with 3/4" spacing to vent the hose bed and remain removable. The hose bed shall be free from all objects that may pose potential harm or premature wear of the hose stored in it.

Provisions shall be made to allow the hose to smoothly pay out from the rear of the apparatus without snagging. The hose bed opening shall be covered with a vinyl cover, red in color.

A lift up tread plate cover shall be supplied as the hose bed cover. It shall be able to support 500 lbs. and act as a walkway. Any device used to assist in penning and closing of the cover must not interfere with the deployment of the hose. Acorn nuts shall be used wherever possible to prevent damage to the hose.

GRAB RAILS

Hand rails of 1 1/4" diameter aluminum extrusion anti-slip grip, shall be mounted on the rear of the apparatus each side on the beaver tail, one horizontally mounted at rear of the hose bed, and one (1) near the control panel to assist the operator onto running boards. Handrail shall meet or exceed the National Fire Protection Associations Pamphlet 1901.

HOSE BED DIVIDER (S)

There shall be four (4) D.A. sanded aluminum hose bed divider provided and mounted per fire department instructions. Uni-strut shall be installed in the hose bed so to allow the hose bed divider to be adjustable.

ROOF TOP STORAGE CONFIGURATION

The compartments shall be arranged as follows:

There shall be a series of storage compartments on each side of the roof mounted against the extended head rail.

Each box on the rooftop shall be comprised of one compartment on each side approximately 164" long. Each compartment shall be divided into sections with two separate flip up lids per compartment.

Each compartment shall extend inward from the body side approximately 26.25" from the sides leaving a 44" walkway in the center. The compartment depths shall be approximately 18" deep. The boxes shall be securely fastened to the rooftop, by welding or use of stainless fasteners.

ROOF LADDER

A Zico Quic-Ladder shall be installed on the left rear of the body. This ladder shall provide access to the roof of the unit. Ladder shall be constructed of 1-1/4" aluminum tubing, covered between each rung with a black anti-slip coating a firm grip. The rungs shall be cast aluminum with non-skid surface. Each rung shall have a 3" Deep x 15" Wide surface area.

Ladder features a positional climbing angle. The ladder stores parallel to the body vertical surface when not in use, but pulls out away from the body and locks into a comfortable angle position for ascending and descending from the rooftop. A quick release handle shall allow the release of the scissor mechanism, which will extend the ladder outward from the body until it locks into its final climbing position.

LADDER STORAGE

In the rear of the rescue body, there shall be a ladder storage compartment installed at the ceiling. It shall extend from the rear compartment door to the front of the body. To secure items from hitting the rear compartment door during transit, a latch-able access door shall be provided.

The door shall be attached with a stainless steel continuous hinge and incorporate the use of a D-ring stainless steel latch. The compartment shall be capable of supporting one 24' extension, one 14' roof, and one 10' folding ladder. Compartment dividers to be provided for individual ladder storage.

SCBA STORAGE IN WHEEL WELL

There shall be three (3) storage compartments recessed one in each corner of the rear wheel well with the exception of the drivers rear. Each compartment shall hold two (2) MSA 4500 SCBA bottles. The compartment door shall be a latchable-brushed aluminum type.

WHEEL STEPS

There shall be two (2) stainless steel wheel steps. They shall be removable, spring steel bar steps capable of supporting a minimum of four hundred (400) pounds. They shall not interfere with snow chains.

COMPARTMENT FLOOR TILE

Each compartment floor, all shelving and slide trays in the apparatus body shall have Mateflex brand plastic floor Tile installed.

ADJUSTABLE SHELF

The heights of all shelves shall be easily adjustable by using P-1000 aluminum unistrut, welded permanently to the side bay walls, along with appropriate fasteners. The unistrut is to be continuous from the top to the bottom portion of the compartment.

Each shelf shall be capable of supporting a minimum weight of three hundred (300) pounds.

All shelves are to be of 3/16" smooth aluminum with press formed flanges of 2" on all four sides and have D.A. sanded finish.

Shelf dimensions shall vary to accommodate the specified compartment for which it is to be mounted.

ADJUSTABLE SLIDEOUT TRAY

The heights of all trays shall be easily adjustable by using P-1000 aluminum unistrut, welded permanently to the side bay walls, along with appropriate fasteners. The unistrut is to be continuous from the top to the bottom portion of the compartment.

Each tray shall be capable of supporting a minimum weight of three hundred (300) pounds, even when fully extended.

All trays are to be of 3/16" smooth aluminum with press formed flanges of 2" on all four sides.

All slide trays shall be on roller mechanisms, which will allow them to extend beyond compartment by ninety percent (90%) of their overall length. An automatic latching system shall be provided to hold the slide trays in their fully retracted and extended positions.

The latching system shall be deactivated or unlatched, by simply pulling or pushing the slide tray with approximately 20 lbs. of force. No other latches shall be required to operate the slides, NO EXCEPTIONS.

Tray dimensions shall vary to accommodate the specified compartment for which it is to be mounted.

ARTICULATING SLIDE TRAY

The articulating tray shall provide easier access to the upper portion of the compartments by allowing the tray to roll outside the compartment and tilt the front of the tray forward and downward to a preset distance providing better visibility and access to the trays contents.

They shall be capable of supporting a minimum weight of two hundred and fifty (250) pounds, even when fully extended.

The tray will be of 3/16" smooth aluminum with press formed flanges of 2" on all four sides. It shall be mounted on roller mechanisms, which will allow them to extend out approximately half its length and shall tilt down approximately 30 degrees.

Tray dimensions shall vary to accommodate the specified compartment for which it is to be mounted.

SLIDEOUT TOOL BOARD

All slide out tool boards shall have the capability of lateral adjustments by using P-1000 aluminum unistrut, welded permanently to the top and bottom of the compartment, along with appropriate fasteners.

The tool boards shall be capable of supporting a minimum weight of three hundred (300) pounds, even when fully extended.

All tool boards are to be of 3/16" smooth aluminum with a formed full-length handle on front and rear of the board. The board shall be mounted on ball bearing type slides, which shall allow the board to roll out with the capability of locking the board in or out.

Board dimensions shall vary to accommodate the specified compartment for which it is to be mounted.

COMPARTMENT DIVIDER

Compartment dividers installed in specified compartment(s) shall be constructed of .188" smooth aluminum with a D.A. sanded finish. Two (2) channels of uni-strut shall be installed on one side of the divider and run the full length of the divider.

RESCUE TOOL MOUNTING

An allowance shall be provided with each proposal for the purpose of mounting customer supplied hand and powered rescue tools in specified compartments. The tools shall have either custom and or procured brackets used and mounted on the desired shelf or slide tray specific tools.

PAINTED REAR BODY

The rear of the body including rear headrail, shall be painted job color in lieu of the tread-brite aluminum diamond plate.

FLOOR DRY HOPPER

There shall be a smooth aluminum hopper incorporated into the upper roof compartments. It shall be constructed from smooth aluminum and provide approximately 300 Lbs of storage capacity. The floor of the hopper shall slope to a single outlet approximately 3" in diameter.

The 3 inch discharge in the bottom of the hopper floor shall allow a steady flow of floor dry to pass through a gated air operated valve. This valve shall be abrasion resistant and designed for handling solids. Valve shall derive its air from the chassis air system.

Hopper shall terminate with an 8' x 3" flexible of plastic hose.

COMPARTMENTATION

(LAYOUT MAY CHANGE PENDING ON TRANSVERSE COMPARTMENT DIMENSIONS)

L1 COMPARTMENT (FIRST ROADSIDE COMPARTMENT BEHIND CAB)

This compartment shall contain the following:

Four (4) extruded aluminum tracks mounted for adjustable shelving.

Three (3) adjustable shelf/shelves furnished and installed.

Two (2) heavy duty slide out toolboard(s) shall be furnished and installed.

Two (2) aluminum vertical compartment divider(s) furnished and installed.

One (1) 120-volt electric cord reel(s) with 200 feet of black 10/3 cable shall be furnished and installed.

One (1) fairlead shall be located with the cord reel location.

The cord reel shall be provided with a GFE electrical outlet junction box with 15 amp receptacles.

L2 COMPARTMENT (ROADSIDE OVER WHEEL WELL COMPARTMENT)

This compartment shall contain the following:

Four (4) extruded aluminum tracks mounted for adjustable shelving.

One (1) articulating slide tray(s) furnished and installed.

L3 COMPARTMENT (ROADSIDE COMPARTMENT BEHIND REAR WHEELS)

This compartment shall contain the following:

Four (4) extruded aluminum tracks mounted for adjustable shelving.

One (1) full height vertical compartment divider

Divider Provisions for wood and composite cribbing

Two (2) adjustable shelf/shelves furnished and installed.

One (1) articulating slide tray(s) furnished and installed.

Provisions for department supplied Air bag storage

R1 COMPARTMENT (FIRST COMPARTMENT BEHIND CAB, CURBSIDE)

This compartment shall contain the following:

Four (4) extruded aluminum tracks mounted for adjustable shelving.

One (1) full height vertical compartment divider

One (1) slide out toolboard(s) shall be furnished and installed.

Two (2) adjustable slide trays furnished and installed.

One (1) articulating slide tray(s) furnished and installed.

R2 COMPARTMENT (CURBSIDE COMPARTMENT OVER REAR WHEELS)

This compartment shall contain the following:

Four (4) extruded aluminum tracks mounted for adjustable shelving.

One (1) articulating slide tray(s) furnished and installed.

R3 COMPARTMENT (CURBSIDE COMPARTMENT BEHIND REAR WHEELS)

This compartment shall contain the following:

Four (4) extruded aluminum tracks mounted for adjustable shelving.

One (1) adjustable shelf/shelves furnished and installed.

One (1) aluminum vertical compartment divider(s) furnished and installed.

One (1) slide out toolboard(s) shall be furnished and installed.

One (1) articulating slide tray(s) furnished and installed.

Bins for cribbing storage

One (1) 120-volt electric cord reel(s) with 200 feet of black 10/3 cable shall be furnished and installed.

One (1) fairlead shall be located with the cord reel location.

The cord reel shall be provided with a GFE electrical outlet junction box with 15 amp receptacles.

REAR COMPARTMENT

This compartment shall contain the following:

Four (4) extruded aluminum tracks mounted for adjustable shelving.

One (1) heavy duty floor mounted slide master slide tray

Provisions shall be made in this compartment for forward storage of specified ladders.

Two (2) customer supplied hydraulic hose reel(s) shall be installed.

Two (2) fairlead shall be located with the hydraulic reel location.

PUMP

The pump shall be Hale and of a size and design to mount on the chassis rails of commercial and custom truck chassis, and have the capacity of 2000 gallons per minute (U.S. GPM), NFPA 1901 rated performance.

The entire pump shall be assembled and tested at the pump manufacturers factory.

The pump shall be driven by a driveline from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable the pump to meet and exceed its rated performance.

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 500 PSI. The pump shall be fully tested at the pump manufacturers factory to the performance specs as outlined by the latest NFPA Pamphlet No. 1901. Pump shall be free from objectionable pulsation and vibration.

The pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI (2069 bar). All moving metal parts in contact with water shall be of high quality bronze or stainless steel. Pumps utilizing castings made of lower tensile strength cast iron not acceptable.

Pump body shall be split on a single plane for easy removal of entire impeller assembly including wear rings and bearings from beneath the pump without disturbing piping or the mounting of the pump in chassis.

Pump shaft to be rigidly supported by three bearings for minimum deflection. The bearings shall be heavy-duty, deep groove ball bearings in the gearbox and they shall be splash lubricated.

Mechanical seal only required on the inboard side of the pump. The mechanical seal must be two (2) inches in diameter and shall be spring-loaded, maintenance-free and self-adjusting. Mechanical seal construction shall be a carbon sealing ring, stainless steel coil electric furnace chrome nickel steel, Bores shall be ground to size and teeth integrated, shaved, hardened and ground to give an extremely accurate gear for long life, smooth quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrust.

The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected.

If gearbox is equipped with a power shift, the shifting mechanism shall be a heat-treated, hard-anodized aluminum power cylinder, with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump.

For automatic transmissions, three green warning lights shall be provided to indicate to the operator(s) when the pump has completed the shift from Road to pump position.

Two green lights to be located in the truck driving compartment and one green light on pump operators panel adjacent to the throttle control. For manual transmissions, one green warning light will be provided for the driving compartment. All lights to have appropriate identification/instruction plates.

The drive unit shall be cast and completely manufactured and tested at the pump manufacturers factory.

Pump drive unit shall be of sufficient strength to withstand up to 16,000 lbs. of foot torque of the engine in both road and pump operating conditions. The drive unit shall be designed of ample capacity for lubrication reserve and to maintain the proper operating temperature.

GEARBOX

The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2.750" diameter, on both input and output drive shafts. They shall withstand the full torque of the engine in both road and pump conditions.

All gears drive and pump shall be of highest quality electric furnace chrome nickel steel. Bronze shall be ground to size and teeth integrated, crown-shaved and hardened, to give an extremely accurate gear for long life, smooth, quiet running and higher load carrying capability. An accurate cut spur design shall be provided to eliminate all possible end thrust.

The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected.

PRIMING PUMP

The priming pump shall be a positive displacement vane type, electrically driven, and conform to standards outlined in NFPA Pamphlet No. 1901. One priming control shall both start the priming motor, and open the priming valve.

ANODES

There shall be a minimum of two (2) anodes provided with the pump.

MOUNTING

Extra heavy-duty pump mounting brackets shall be furnished. There shall be bolted to the frame rails in such a position to perfectly align the pump so that the angular velocity of the driveline joints will be the same on each end of the drive shaft. This will assure full capacity performance with a minimum of vibration. Mounting hardware shall utilize grade 8 bolts.

As an automatic transmission is furnished, a lock-up assembly shall be installed to prevent the transmission from shifting gears while in the pumping mode.

AUXILIARY COOLER

An auxiliary cooler or heat exchanger shall be installed in the engine compartment between the engine and the chassis radiator. The cooler shall permit the use of water from the pump for cooling of water circulating through the engine cooling system. This cooling shall be done without mixing engine and pump water.

PLUMBING

Pump plumbing shall utilize a stainless steel manifold system. Discharges and auxiliary inlets shall be plumbed using these manifold systems. Any plumbing connections shall have flexibility to prevent undue stress to the plumbing systems. Victaulic or rubber couplings shall be used where necessary to allow flexing of plumbing, which will prevent damage or loosening of piping. High-pressure hose, rated for the fire industry along with stainless steel connections shall be utilized where necessary.

Pump and plumbing shall meet the standards of the latest NFPA requirements.

VALVES

All intake and discharge shall be Akron brand 8800 series, quarter turn, full flow valves. Each valve shall be operated by a control located on the pump panel. Any valve 3 or larger shall be provided with a slow close feature.

All discharges and pony suctions shall terminate in 3.095 x 6 "Old Cincinnati thread.

STEAMER INLETS

A 6" steamer inlet shall be provided on the left side and right side pump panel. They shall have NST threads and terminate with a screen and long handled chrome cap.

MASTER DRAIN

Master drain that will have the capacity to drain all lines and main pump at the same time. The master drain will be mounted under the running board on the left side of the vehicle for ease of operation.

INSTRUMENT PANEL

The instrument panel must contain the following gauges and equipment. These are to be located according to N.F.P.A. 1901 applicable codes.

A Class One Pressure Governor will be supplied on the pump panel. The unit shall regulate the engine speed to maintain a steady pump pressure regardless of the flow rate. Operation shall be changeable from pressure mode to RPM mode and back again if desired while pumping without any pressure variation using the MODE button. Pressure or RPM setting shall be varied using the INCREASE and the DECREASE buttons. A PRESET button allows a preprogrammed pressure or RPM to be set quickly. This preprogrammed Pressure or RPM setting shall be stored in the memory even with the power off. An IDLE button allows for quick shutdown after each operation. EFC shall bring the engine to idle in the event of pump cavitations. It shall resume **operation automatically** once water is available to the pump again.

The governor shall display the pump Discharge and intake pressure. It shall display pressure in psi up to 600 psi. The Intake pressure display window shall also display the control setting

each time a setting is changed; the engine RPM shall be displayed in 10-RPM increments. The visual alarm is not cancelable while the audio alarm shall be cancelable using the SILENCE button. All warnings shall reset automatically when the problems are corrected.

There shall be a 4-1/2" Class one gauge supplied for the master intake and discharge.

A Class One 2-1/2 compound pressure gauge shall be supplied for each discharge 1-1/2 or larger unless otherwise specified. The specified pressure gauge will be located directly be of the liquid silicone filled type. Water pressures and suction gauges will be filled with liquid silicone solution to assure visual reading to with 1% accuracy and function accurately in sub-zero temperatures.

This liquid silicone gauges eliminates the need of snubber valves.

The engine oil pressure, engine water temperature, tachometer, audible and visual warning devices shall be performed by an all in one instrument panel.

A Class One governor shall include an all in one module shall eliminate the use of multiple gauges, alarms and warnings to simplify the pump operators panel. The unit provides a large display for the engine RPM, battery voltage, and display engine oil pressure and coolant temperature. Plus provides visual and external audible warning such as, horn or a bell to identify any monitored failure. Unit also, accumulates and displays engine hours, pump operating hours and incident times.

The throttle and pump in gear indicator will also be installed in the center of the pump operators panel.

The following instruments and controls will be supplied at the operators panel:

One (1) -30 x 600 PSI chrome 4 -1/2 main pressure gauge.

One (1) -30 x 600 PSI chrome 4 -1/2 main suction gauge

One (1) 0 x 600 PSI chrome 2-1/2 individual pressure gauges for each 1-1/2 or larger discharge.

One (1) Class One Enfo III instrument panel

One (1) Class One Pressure Governor

One (1) Intell-i Tank lighted level water gauge.

One (1) engine cooler control.

One (1) tank fill control.

One (1) pump to tank control.

Pump cooling controls.

Pump discharge controls.

Relief valve control.

Primer control

U.L. test plug panel.

LABELS

Each control and gauge will be clearly marked by a color-coded nameplate, permanently affixed to the operator's panel.

All discharge and suction gauges are to be identified at the gauge and discharge and suction points as well as open-closed positions with identification plates of black background and natural letters.

AIR HORN BUTTON

An air horn control button shall be provided at the pump operator's panel. The button shall be properly labeled and placed within easy reach of the operator.

PUMP MODULE

The pump module shall be a self-supported structure mounted independently from the body and chassis cab. The design shall allow normal frame deflection without imposing stress on the pump module structure of side running boards. The pump module shall be a welded framework utilizing structural components properly braced to withstand the rigors of chassis frame flex. The pump module shall be bolted to the frame rails at four points.

There shall be a dunnage storage area located above the pump. The dunnage area shall be recessed into the pump compartment and shall be constructed of .125" fire apparatus quality aluminum tread brite. Dunnage area shall be designed to hold a Hydraulic generator

Aluminum tread plate running boards shall be installed along both sides of the pump house to provide access to the operator's panel. Running boards shall be separate from the pump house and not be an integral part of a compartment. They shall maintain at least a 1/2 clearance from pump hose. Each step shall be rigidly braced and supported.

PUMP PANELS

The pump house side panels shall be constructed from stainless steel panels and shall be hinged in order to access the internal pump house. Trigger latches shall be used to secure pump panels on pump house.

Above both side pump panels, there shall be stainless steel hinged access panels to access the pump house. The left side panel or instrument panel shall be horizontally hinged for pump maintenance and gauge inspection. The right side hinged access panel shall be an inspection door. Each panel shall be hinged using a continuous stainless steel hinge and be operated by a two (2) Eberhard style trigger latches.

Controls for pump system will be accessible at the side mounted operators panel.

The upper portion of the both the side operators panel and right side will be formed to extend upward and have stainless steel hood returning forward, thus forming a illumination hood for panel lights. Under this hood there will be two (2) halogen lights with switch located on the pump panel.

The side mount valve controls will be T handle type. The valve control levers will extend through the side panels and be supplied with a twist lock device. The valve control levers will utilize direct linkage and will be uniformly grouped with each respective gauge.

All controls, discharge and suction gauges are to be identified at the gauge and discharge and suction points as well as open-closed positions with identification plates of color background and natural letters.

Pump discharge and suction inlets will extend through stainless steel panels at each side of the apparatus. The 3/4 drain valves for each of the 2-1/2 or larger side discharges will be supplied.

TANK TO PUMP

The tank to pump valve shall be a 3" inline Akron brand 8800 series, quarter turn, full flow valve, installed between the water tank and the pump. Controls for the valve shall be provided on the operators control panel.

TANK FILL

One (1) 1.5" inline Akron brand 8800 series, quarter turn, full flow valve shall be supplied off the discharge side of pump and be plumbed into the front head of the tank using high-pressure hose. Controls shall be provided on the operator's panel.

LEFT SIDE DISCHARGES

There shall be two (2) 2.5" quarter turn; Akron brand 8800 series, quarter turn, full flow valve(s) shall be provided behind the left side pump panel. Control for discharge valve shall be provided on operators pump panel. The discharge(s) shall terminate with a 30-degree elbow with male NST threads, a 2.5" x 1.50" reducer and have a high polished chrome cap with chain. Each discharge is to be equipped with a .750" push/pull drain valve. Drains shall discharge below the running board. The discharge is to have a 2.5" Class 1, Sub ZII compound gauge.

RIGHT SIDE DISCHARGE

There shall be a quarter turn 4" Akron brand 8800 series, quarter turn, full flow valve shall be provided behind the pump panel forward in the pump house toward the cab. Control for discharge valve shall be provided on operators pump panel. The discharge shall terminate with a 30-degree elbow with 5" NST cap and chain. Each discharge is to be equipped with a .750" push/pull drain valve. Drains shall discharge below the running board. The discharge is to have a 2.5" Class 1, Sub ZII compound gauge.

RIGHT SIDE DISCHARGE

There shall be a quarter turn 2.5" Akron brand 8800 series, quarter turn, full flow valve shall be provided behind the pump panel rearward in the pump house toward the body. Control for discharge valve shall be provided on operators pump panel. The discharge(s) shall terminate with a 30-degree elbow with male NST threads, a 2.5" x 1.50" reducer and have a high polished chrome cap with chain. Each discharge is to be equipped with a .750" push/pull drain valve. Drains shall discharge below the running board. The discharge is to have a 2.5" Class 1, Sub ZII compound gauge.

REAR DISCHARGE

There shall be two (2) 2.5" rear discharge provided, and located in the left rear and right rear of the unit as specified. The discharge(s) shall terminate with a 30-degree elbow with male NST threads, a 2.5" x 1.50" reducer and a chrome cap and chain. The discharge is to be equipped with a .750" push/pull drain valve. Drains shall discharge below the tailboard. The discharge is to have a 2.5" Class 1, Sub ZII compound gauge.

2" FRONT DISCHARGE (Bumper)

There shall be a 2" discharge outlet furnished at the front of the apparatus in the front bumper extension. Outlet shall be gated with an Akron brand 8800 series, quarter turn, full flow valve. The front discharge shall be plumbed with 2 pipe and terminate with a 1.5 NST swivel. Controls for discharge shall be located at the operator's panel. The discharge is to have a 2.5" Class 1, SUBZII compound gauge provided at pump operators panel.

DELUGE PLUMBING

Plumbing for one (1) 3" deck gun discharge will be installed in the area directly above the pump compartment in the front upper section of the apparatus body. The discharge will be controlled by a 3" inline Akron brand 8800 series, quarter turn, full flow valve. The discharge is to have male NST threads. The discharge is to be equipped with a .750 push/pull drain valve. Drains shall discharge below the running board. The discharge is to have a 2.5" Class 1, Sub ZII compound gauge. Plumbing shall be capped above the pump house for future installation of department-supplied monitor.

AKRON DECKMASTER MONITOR

The following equipment shall be supplied with the completed apparatus. One (1) Akron Brass Deckmaster Monitor model 3440 12-volt monitor with style 5077 nozzle, pipe and tips, logic box and panel mount control with stow shall be mounted above the fire pump behind the crosslays and in front of the hose bed in the centermost position of the apparatus. Monitor controls shall be mounted on the pump operator's panel.

CROSSLAYS

There shall be one (1) divided double cross lay hose bed capable of holding 200 feet of 1.75" hose in each section installed above the pump house. The hose bed is to be constructed of extruded aluminum flooring for maintenance free service. The hose bed divider shall be installed on an aluminum track to allow the department adjustability.

The cross lay shall be equipped with 2" swivels, 2" plumbing, 2" Akron brand 8800 series, quarter turn, full flow valves and high pressure reinforced hose. Controls for the cross lay shall be provided at the operator's panel. A 2.5" Class 1, Sub ZII gauge shall be supplied for each cross lay.

CROSSLAY (2-1/2")

One (1) crosslay hosebed capable of holding 200 feet of 2.5" hose shall be installed above the pump house. The crosslay shall also be designed to allow the floor of the hose bed to be no higher than 68" from the ground. The hose bed is to be constructed of perforated aluminum flooring for maintenance free service. It shall be located to the rear of the double 1.75" crosslays.

The crosslay shall be equipped with 2.5" swivels, 2.5" plumbing, and high pressure reinforced hose. Controls for the crosslay shall be provided at the operator's panel. A 2.5" Class 1, Sub ZII gauge shall be supplied for each crosslay.

CROSSLAY HOSE BED COVER - TREAD PLATE

There shall be an aluminum tread plate hose bed cover installed over the cross lays hose beds. Cover shall open by use of a full-length continuous stainless steel hinge installed at the front of the hose beds. Provisions shall be made to prevent the lid from contacting the cab

and marring the paint when in its open position, and secure it in the closed position during transit. Vinyl Hose bed flaps shall be secured to the pump house and hosebed cover to prevent accidental deployment during transit.

ROLLER GUIDES

There shall be stainless steel roller guides installed below, as well as on either side of each hose bed to aid in the removal of the preconnected hose.

AUXILIARY COOLER

The pump shall have a 3/8 line installed from the pump discharge to the water tank to cool the pump during long periods of pumping when water is not being discharged. The pump cooler shall be controlled from the pump operators panel by a 3/8 valve consisting of a cast bronze body with 1/4 turn chrome plated bronze ball, reinforced Teflon seals, and blow-out-proof stem rated to 600 PSI. The valve shall be installed through the pump panel and clearly labeled.

THERMAL PROTECTION DEVICE

A thermal protection device shall be included on the pump if the Governor does not allow RPM mode to be locked out. The TPM monitors pump water temperature and opens to relieve water to cool the pump. The thermal protection device shall be set to relieve water when the temperature of the pump water exceeds 120 o F (49 C).

The components of the thermal protection device shall be manufactured of brass and stainless steel and be compatible with most foam concentrates. The thermal protection device shall have 1-1/4 inch NPT threads for easy adaptability to existing pump discharge openings. The discharge line shall be 3/8 inch diameter tubing vented to atmosphere or back to the booster tank. An indicator light shall be provided on the pump operator's panel. The thermal protection device shall have a hydrostatic test rating of 600 PSIG (41 BAR).

HALE MASTER INTAKE VALVE (ELECTRIC)

The inlet valve shall be a full flow butterfly type valve designed to mount on the fire pump between the suction extension and suction tube behind the pump compartment panel. The valve shall not interfere with other suction or discharge openings on the fire pump or with pump operating controls when properly mounted. The entire valve shall be manufactured and tested at the pump manufacturers factory. The valve body and related components that are in contact with water shall be manufactured of fine-grained corrosion resistant bronze.

The butterfly disc shall be manufactured from 80,000-PSI minimum yield strength heat-treated cast steel then coated with a durable nitrile rubber to provide a positive seal when the valve is closed. Testing and rating of the valve shall be accomplished at the valve manufacturers factory. The valve, less relief valve, shall be hydrostatically tested to 600 PSIG (41 BAR). The valve shall then be vacuum tested to 26 inches (660 mm) Hg.

A pressure relief valve shall be provided that is factory set to 125 PSI (9 BAR) and field adjustable from 75 to 250 PSI (5 to 17 BAR). The pressure relief valve shall provide overpressure protection for the suction hose even when the intake valve is closed. An integral relief valve-mounting pad shall be provided on the valve body. The outlet of the pressure relief valve shall have 2-1/2 inch NPT threads to allow directing the discharge flow away from the pump operator position.

The inlet valve(s) shall be operated by a 12 VDC electric motor with remote capabilities. The 12 VDC motor on the electric operated valve shall be provided with an automatic resetting, thermally compensated, over current protection circuit breaker to protect the 12 VDC motor and apparatus electrical system.

All electrical connections shall use sealed Packard Weather Pack connectors to provide extra protection from the harsh pump compartment environment to ensure long life and reliable operation.

Each valve shall be provided with panel placards indicating control operation. The placards shall have status lights to indicate whether the valve is open, closed or traversing from one position to another. Each valve shall be provided with a gear actuator that will cycle the valve from OPEN to CLOSED position in no less than 3 seconds. The gear actuators shall be sealed units designed to provide reliable service in the harsh pump compartment environment.

The valve body shall have a $\frac{3}{4}$ inch female NPT threaded port on the top to allow installation of an NFPA compliant large diameter hose air bleeder valve. The air bleeder valve shall be mounted on the operator panel and be controllable by the pump operator. Air bleeder valve connections shall have a restriction no larger than $\frac{3}{4}$ inch (19 mm) to prevent water hammer when filling hose.

The valve body shall have a $\frac{1}{4}$ inch female NPT threaded port on the bottom to permit connection of an individual water drain valve.

SUCTION

Two (2) 2.5" auxiliary suction valves with chrome female swivels and NST threads shall be provided on the pump. One (1) shall be located on each side of the pump and terminate at the pump panel.

The valves shall be Akron brand 8800 series, quarter turn, full flow valves

FOAM CONCENTRATE PROPORTIONING SYSTEM

A 12 Volt DC Powered Variable Speed Rotary Gear Pump Direct Injection Foam Concentrate Proportioning System shall provide foam concentrate proportioning. The system shall operate via a paddlewheel flow transducer in the discharge manifold, providing a signal to a Control Unit.

The Control Unit Microprocessor shall monitor total water flow and foam concentrate pump output providing the operator the set proportional amount of foam concentrate injection into the foam manifold.

Total foam pump concentrate output shall be 3.3 gallons per minute minimum.

The control unit display shall provide concentrate injection readout in tenths of percentage while also being able to read water flow, total water flowed and total amount of foam concentrate used. The control shall flash a warning indicating low concentrate in the reservoir

to the operator, and shall be able to shut off the concentrate pump to prevent damage to the pump.

A bar graph on the control unit will provide visual indication of system operating capacity and will indicate when capacity is exceeded.

Micro Processor shall automatically change concentrate injection percentage when operators switch tanks.

In-line, field serviceable foam concentrate strainer(s) shall be installed in the foam concentrate suction line(s).

Full flow ball valves will be installed in an accessible location to permit foam tank shutdown and service of this strainer.

The strainer screen shall be of reusable stainless steel mesh.

Foam concentrate Proportioning Systems that use a Venturi (either directly or indirectly) to measure water flow, and therefore, cause a restriction to that flow, will not be accepted.

A low-level sensor switch will be mounted in the tank to provide a feedback signal to the foam proportioner system electronic control. The sensor signal will indicate when the foam tank is running low and will shut down the foam concentrate pump if the tank is not refilled. The switch shall be located so that false alarms do not occur and there is (1) minute reserve capacity when switch trips.

FOAM INJECTION CHECK VALVE

The foam concentrate pump discharge line shall be equipped with a bubble tight check valve, rated at 500 PSIG (34 BAR) and 10 GPM (38 LPM), to prevent water flow into the concentrate pump from the apparatus fire pump. This valve shall have a cracking pressure of 4- 6 PSIG (0.3- 0.4 BAR) to prevent flowing concentrate through the pump due to head pressure from the concentrate reservoir.

The foam injection checks valve shall have an integral injection fitting.

Valve shall be brass or 300 Series stainless steel with an elastomeric seat compatible with fire fighting foam chemicals (No exceptions).

DEDICATED FOAM DISCHARGES

The two 1-3/4" pre-connect lines and the front trash line and one specified 2.5" discharge shall be connected to the Hale class "A" and "B" foam system.

WATER LEVEL INDICATOR

A Class One Intell-a-Tank water level system with ultra-brite L.E.Ds for better visibility shall be provided, to monitor the tank water levels. It functions by use of an industrial pressure transducer. Unit self calibrates to any size/shape tank regardless of dimensions and uses pressure sensor, no tank probe to size & maintain. Unit utilizes a one-wire data link for unlimited displays and provides operator with built in diagnostics. System shall utilize ultra-

brite LED indicators that shall provide the operator with nine accurate levels of indication. As an added feature the system offers a programmable night dimming.

EXTERIOR WATER LEVEL INDICATORS

There shall be an exterior cab mounted water level indicator installed on each side of the cab between the front doors and the rear doors. The lights shall be mounted as high as possible. The water indicator shall consist of four (4) LED lights, each designated with a different color.

TANK

A 500 gallon fiberglass tank shall be provided. The shell shall be constructed of 1/2" composite laminate. All transverse and longitudinal baffles are attached to interior of the tank tub with fiberglass chop strand, directional reinforcement fiberglass matting and wax free polyester resin, bonded both sides of connecting joint to insure maximum interior structural support.

The fill tower shall be constructed of 1/2" composite laminate. It shall measure 12"x12"x12". Its location shall be to the left side and front corner. The floor of the fill tower shall be a perforated sheet (removable-type screen), to prevent small objects from falling into the tank. The fill tower shall be mounted to allow air to escape while filling.

The tank shall be tested and certified to comply with NFPA 1901 prior to shipment to the truck manufacturer facility. The tank shall be warranted for an unlimited time after delivery, to the origin-al owner. The warranty shall warrant 100% from defects in material and workmanship, under normal use and service. The tank manufacturer shall compensate the fire department (in the U.S.A.) \$200 per day for every day a valid warranty claim causes the customers apparatus to be out of service (downtime). NO EXCEPTIONS!

The fiberglass tank shall rest on 1/4" thick by 3" wide hard rubber belting strips, which completely isolates the tank from the body main frame.

There shall be one 3"x3"x3"x3/16" angle welded to each corner of the body cross member for cradle mounting of the tank. The angles shall be mounted vertically in each corner and wrap around each corner of the tank to prevent side to side and front to rear movement of the tank. The tank shall be isolated from the corner angles with 1/4" x 3" wide hard rubber strips.

The body cross members shall be constructed of 3"x3"x 3/16" square tubing and shall be spaced 15" on center. Each cross member, including the full-length end cap tubing, shall extend 1/2" past the bottom of the tank on each side. The end cap tubing shall be constructed of 1-1/2"x 3"x 3/16" rectangular tubing welded to each side of the body cross members in full-length sections creating a solid outer foundation for the tank to rest on.

Any "T" type tank with a rear step overhang exceeding 18" shall have a full length 1-1/2"x 3" x 3/16" cross member welded to the body sides to support the step overhang. The cross member shall be centered below the step. There shall be full length 1/4" thick by 3" wide hard rubber strips on the cross member for the step overhang to rest on.

FOAM CELL(S)

Two (2) foam reservoirs conforming to NFPA standards shall be incorporated into the apparatus water tank with separate fill towers and with 1-inch NPT minimum size bottom

outlet(s). The reservoirs shall hold a volume of concentrate that ensures compliance with NFPA requirements.

A ¼ inch (6.4 mm) mesh screen shall be incorporated into the fill tower to prevent debris from entering the tank.

The foam tanks shall be an integral part of the water tank. The cells shall have a capacity of 30-gallons minimum for class A foam and 50 Gallons class B foam.

There shall be a foam tank drain of 1" with the drain valve located inside the pump compartment accessible through a door on the passenger side pump panel.

FOAM LEVEL GAUGE(S)

An electronic foam level gauge shall be provided on the operator's panel that registers foam level by means of five (5) color coded LED lights in each of the cells. The lights shall be durable ultra bright LED design viewable through 180-degrees.

The foam level indicators shall be as follows.

100% = Green

75% = Yellow

50% = Yellow

25% = Yellow

Refill = Red

The Red light will flash when the level drops below the given indicator to provide an eighth (1/8) of a tank indication. To further alert the pump operator all the lights will flash sequentially when the foam tank is empty.

The level measurements shall be based on the measuring of head pressure of the fluid in the tank. An industrial pressure transducer shall be mounted to the outside of the tank. The field calibrated display measures head pressure to accurately show the tank level.

12-VOLT ELECTRICAL SYSTEM REQUIREMENTS

GENERAL REQUIREMENTS:

All electrical work shall be performed by persons familiar with emergency vehicle systems.

All of the emergency electrical equipment shall be served by circuits separate and distinct from the vehicle chassis circuits.

The 12-Volt DC electrical system shall be controlled by an industry proven electrical system.

WIRING REQUIREMENTS:

The complete 12-volt wiring system and electrical appliances shall meet NFPA 1901 minimum standards as well as standard automotive practices throughout the installation in the apparatus. The system shall comply with all the appropriate SAE recommended practices such as J1939 and/or J1708.

All required DC power conducting wiring shall be of GXL stranded copper wire of adequate gauge for the function served so as to ensure voltage drop of less than one volt at the appliance under full amperage load.

Body wiring shall be color and function coded, grease, oil and moisture resistant, routed in protective loom through protected locations, neatly and securely fastened, and all apertures properly grommited for passing wiring. Solderless insulated connectors shall be provided where required. Primary wiring harnesses shall be bench assembled. Where crimp connections are necessary, the connections shall be made using approved connectors with heat shrink insulators. Any wiring routed within proximity of any exhaust components or other high temperature components shall be given special consideration and shielded for best protection.

Any required signal conductors shall be shielded twisted pairs rated by the system manufacturer to carry the multiplex command signals from the switch panel to the control modules.

ELECTRICAL MAINTENANCE SYSTEM:

The system installed shall be easily re-programmable and reconfigurable. Most factory authorized service centers or technicians will have on hand all required diagnostic hardware and software required for maintenance of the installed system.

PC DIAGNOSTICS:

The system shall incorporate a feature that enables a service representative to troubleshoot, repair and replace nodes in the system, should they for any reason fail. It will be run via a PC interface and will monitor all system information. All messages going across the communications bus must be seen on the screen, including analog information. Each node must be capable of being queried for its own voltage drop and capable of obtaining the status of all inputs and outputs from the diagnostics interface.

The system shall feature the following:

- Total load management.
- Load shedding capabilities (will begin load shedding when voltage drops below selected level after a 2 minute period per output.)
- Load sequencing capabilities.
- PC Diagnostics.
- Error reporting.
- Continuous system monitoring and reporting.

PC PROGRAMMING:

The system must be programmable at the factory in a language that can be downloaded to a remote service representative's PC or down loader tool with all OEM data, as programmed for this specific unit and allow field reprogramming changes as provided by the unit manufacturer.

EMI / RFI PROTECTION:

The electrical system proposed shall include means to control undesired electromagnetic and radio frequency emissions. State of the art electrical system design and components will be

used to insure radiated and conducted EMI (electromagnetic interference) and RFI (radio frequency interference) emissions are suppressed at their source.

The unit proposed will have the ability to operate in the electromagnetic environment typically found in fire ground operations. The contractor will be able to demonstrate the EMI and RFI testing has been done and meets SAE J551 requirements. Harness and cable routing be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

CONTROLS AND FUNCTIONS:

A switch panel controlling electrical devices and equipment installed on the chassis and body shall be located in the cab within easy access to the driver or centrally located convenient to the driver and/or officer positions. The panel shall include switches arranged in the most convenient and practical manner that is possible.

The panel shall control individually all emergency warning light circuits, which shall also be controlled by warning master switch.

The system will include, at a minimum, the following attributes and improvements over analog type systems: messages and status indicators.

- On board self-diagnostic message and status indicators.
- Minimize use of control relays.
- Provide control for NFPA 1901 mandated interlocks and indicators.
- Utilize system integration to eliminate redundant wiring and components.
- Improve control system reliability by reducing relay and contactor contacts.
- Advanced electrical system load management and sequencing system.
- Imbedded service interval information.
- Customized software programmed to reflect configuration.
- Field re-programmable to accommodate changes to the unit operating parameters.
- Fully Documented hardware.

SERVICE AND MAINTENANCE DIAGNOSTICS:

Advanced unit service and maintenance will be assisted with an integral software program. The software will provide troubleshooting tools to service technicians. Easy to understand diagnostic procedures.

- Automatic failure detection.
- Appropriate warning regarding components.
- System simulation and pinging of nodes for status verification.

All electrical and emergency lighting equipment and circuits not controlled by the electronic management system shall be supplied with automatic reset circuit breakers of appropriate amperage. These circuits shall be operated through a Bosch or equal continuous duty relay to remove load from all switches.

12V DC VOLTAGE OUTPUT TESTING & DOCUMENTATION:

The low voltage system of the completed apparatus shall be tested and certified by the manufacturer prior to delivery. A copy of the testing and successful completion will be provided to the purchaser with the in the Owners Manual. Any failures to these tests will require corrective actions to be taken and re-tested before delivery.

RESERVE CAPACITY TEST:

The engine shall be started and run until all engine and engine compartment temperatures are stabilized 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 shut down. The battery system shall then be capable of restarting the engine.

ALTERNATOR PERFORMANCE TEST AT IDLE:

Minimum continuous electrical load shall be activated while the unit is at idle speed. The engine and engine compartment temperatures are stabilized. 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.

ALTERNATOR PERFORMANCE TEST AT FULL LOAD:

The total continuous electrical load shall be activated with the engine running up to the manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during the test. If however, an alarm sounded by excessive battery discharge, as detected by the system, or a voltage of less than 11.7 volts DC for a 12-volt nominal system for more than 120 seconds, it shall be considered a test failure.

LOW VOLTAGE ALARM TEST:

The engine shall be shut off and the total continuous electrical load shall be activated and continue to be applied until the excessive battery discharge alarm is activated. The battery voltage measured at the battery terminals with the load still applied must be above 11.7 volts or the test shall be considered a failure and corrective actions employed.

DOCUMENTATION:

At the time of delivery an Amp Draw Report Section 13-15 will be completed and provided to the purchaser with the Owners Manual. Documentation shall include:

1. Copy of electrical system performance test complying with NFPA 1901,
2. Written load analysis with the following information.
 - a. Nameplate rating of the alternator.
 - b. The alternator rating under the conditions specified NFPA 1901
 - c. The minimum continuous load of each component specified per NFPA 1901
 - d. Additional electrical loads that, when added to the minimum continuous electrical load, determine the total electrical load.
 - e. Each individual intermittent electrical load.

STOP / TAIL / TURN / BACKUP LIGHTS

Body shall be equipped with stop, tail, turn and back up lights as required by Federal Motor Vehicle Safety Standards.

New stop/tail, turn and back-up lights, shall be installed according to the FMVSS requirements. The stop, tail, turn light type used shall be Whelen brand 600 series L.E.D lights installed in Whelen 4 way housings mounted to the rear of the apparatus. The back up light shall remain halogen white.

CLEARANCE / MARKER LIGHTS (L.E.D)

The apparatus body shall be equipped Truck-Lite brand L.E.D marker lights. Lights shall be of the proper color and in accordance with the Federal Motor Vehicle Safety Standards (FMVSS).

A license bracket shall be provided at the rear of the unit with required lighting.

COMPARTMENT LIGHTS

The body compartments shall be equipped with low voltage, light emitting diode (LED) strip style lighting. Each light strip shall consist of a single LED placed every 1.5" in a durable and impact resistant translucent shield to protect the diodes from inadvertent contact or collision which may result in damage. The lights shall be mounted vertically in each compartment where they will not interfere with adjustment or accessibility of any shelving or equipment.

Each light shall be sized accordingly to illuminate the compartment adequately.

COMPARTMENT OPEN LIGHT

A large red light shall be mounted in the cab visible from the driver's and officer's seat.

Each compartment door shall be equipped with a door open indicator switch. When contact is broken at these switches, it shall activate the compartment open light in the cab.

GROUND AREA LIGHTING (CAB)

There shall be low voltage, light emitting diode (LED) strip style lighting provided around the truck to provide proper ground area illumination in areas designed for the personnel to climb onto or descend from the apparatus cab. Each light strip shall consist of a single LED placed every 1.5" encased in a durable and impact resistant translucent shield to protect the diodes from inadvertent contact or collision which may result in damage. In addition, each strip casement shall be filled and sealed with a gel resin to protect the diodes from water as well as excess vibration.

GROUND AREA LIGHTING

There shall be low voltage, light emitting diode (LED) strip style lighting provided around the truck to provide proper ground area illumination in areas designed for the personnel to climb onto or descend from as well as for work area illumination under the body sides. Each light strip shall consist of a single LED placed every 1.5" encased in a durable and impact resistant translucent shield to protect the diodes from inadvertent contact or collision which may result in damage. In addition, each strip casement shall be filled and sealed with a gel resin to protect the diodes from water as well as excess vibration.

Lights shall be provided under the rear tail board of the apparatus; under the front bumper extension and along the body ahead of the rear wheels and behind the rear wheels.

12-VOLT POWER RECEPTACLES

There shall be two (2) 12-volt power receptacles installed in the cab to provide 12-volt power for Fire Department to use for charging equipment. Locations to be determined by the fire department at the pre-construction meeting.

STREAMLITE

There shall be four (4) Streamlite model Vulcan LED Litebox (s) installed on the (side wall / specified shelf) of the compartment.

BATTERY CONDITIONER / AIR PUMP

There shall be one (1) Kussmaul Pump Plus Super Kit 091-9-1000-S kit installed on the chassis. It shall consist of an air compressor, Auto Charge1000 120 volt AC battery conditioner with a Super Auto Eject, and remote bar graph.

The battery conditioner (charger) system shall be wired to the chassis batteries and will recharge them to required levels. Conditioner shall provide a full 15 amps of output as well as supplying up to 3 amps for loads connected directly to the battery such as radio memory, etc. System shall be connected through a 110 volt shoreline inlet or receptacle located on the cab. A 10 element LED charge indicator shall be mounted on the driver's side of the cab near the shoreline inlet.

The shoreline inlet shall be a Kussmaul Super Auto-Eject input connector with a weather proof, sealed box and cover. Auto Eject is designed to connect a 120-volt AC source to the vehicle. Unit shall automatically disconnect 120 volt AC power source by ejecting plug from the receptacle when vehicle-starting system has been energized. Super eject shall be installed on the driver's side in a location to be determined by the fire department.

The air compressor maintains the air pressure in the air brake system while the vehicle is not in use. The battery charger is designed to maintain fully charged batteries in the vehicle. The batteries are automatically charged and shall be maintained fully charged.

INTERCOM SYSTEM

A Customer supplied Fire-Com system shall be installed in the apparatus.

LIGHT BAR

A Whelen model FN72QLED 72" L.E.D. light bar shall be installed on the cab roof of the unit. There shall be four (4) red corner linear 12 L.E.D light heads, and four (4) front linear 8 L.E.D light heads. Six (6) red, and two (2) white L.E.D's. Square Ends.

LOWER ZONE WARNING LIGHTS

A Whelen NFPA 1901 L.E.D. lower zone warning light package shall be installed on the unit.

There shall be a total of ten (10) 60R02FRR 600 series L.E.D. surface mount lights mounted on the unit. Each light shall be equipped with a chrome 6E series flange. Lights shall be mounted as follows:

There shall be three (3) red 60R02FRR lights mounted on each side in the lower half of the unit (zones B & D lower); two (2) red 60R02FRR lights shall be mounted on the rear lower

half of the unit (zone C lower); and two (2) red 60R02FRR lights shall be mounted on the front of the apparatus, in the inner headlight housings (zone A lower).

UPPER ZONE WARNING LIGHTS

A Whelen NFPA 1901 L.E.D. upper zone warning light package shall be installed on the unit.

There shall be a total of six (6) 90R00FRR 900 series L.E.D. and two (2) 70R00FRR surface mount lights mounted on the unit. Each light shall be equipped with a chrome flange. Lights shall be mounted as follows:

There shall be two (2) red 90R00FRR lights mounted on each side in the upper half of the body (zones B & D upper); two (2) red 90R00FRR lights and two (2) red 70R00FRR lights shall be mounted on the rear upper half of the unit (zone C upper)

There shall be two (2) Whelen 902000RR 900 series strobe lights mounted in Upper zone C. Each light shall be equipped with a chrome flange.

WARNING LIGHTING - MODES OF OPERATION

There shall be two modes of operation, calling for the right-of-way and blocking the right-of-way. When the master optical; warning system switch is closed, and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for right-of-way shall be energized. When the master optical warning system switch is closed, and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the right-of-way shall be energized.

ELECTRONIC SIREN

There shall be two (2) Whelen model WS-295 electronic sirens with noise canceling microphone installed in the cab area accessible by the driver and officer.

MECHANICAL SIREN

There shall be one (1) customer supplied Federal model Q2B siren installed. The Q2B shall mounted per fire department request and activated by Linemaster brand Model 491-S floor switches. The floor switches shall be located one on each side of the driving compartment. There shall be a "Siren Brake" switch included on the cab switch panel.

SPEAKER

There shall be two (2) compact Cast Product SH2015 flush mount speakers with 100-watt drivers and polished finish will be supplied. They will be recessed in the front chassis bumper symmetrically balanced in the front.

SCENE LIGHTS

The unit shall be equipped with six (6) Whelen 900 series model 90COENZR 24 diode LED scene lights. Scene lights shall be surface mounted lights and located two (2) on the right side, two (2) on the left side and two (2) on the rear of the apparatus.

SCENE LIGHTS ACTIVATED IN REVERSE

The rear scene lights shall be activated when the unit is placed in reverse. This mode is in addition to the switches provided in the cab and/or at the lights.

120 VOLT & 240 VOLT REQUIREMENTS

Since the apparatus is equipped with a 120/240-volt electrical system, the system shall be installed to the required level of safety and protection to the fire apparatus. The complete wiring and electrical installation shall conform to the current National Electrical Code (NEMA) applicable to mobile applications, except where superseded by NFPA. #1901.

Electrical fixtures, components, and wiring shall be to the highest industry quality standards available. All equipment shall be the type as designed for mobile type installations subject to vibration, moisture, and severe continuous usage.

All 120/240 volt electrical wiring rated at 20 amps and higher shall be fine stranded copper type DLOC rated to 2000 volts. DLOC cable is much more flexible for mobile routing applications. The wire shall be sized to load and circuit breaker rating.

Electrical cables or conduit shall not be attached to chassis suspension components, water, fuel or brake lines. Electric wiring or harnesses shall not be within 12 inches of any exhaust system component or 6 inches of fuel lines.

All 120 / 240 volt wiring shall be run through Liquid tight flexible non-metallic conduit wherever wiring is run. Conduit shall have a UL Rating of 80°C Dry, 60°C Wet, 70°C, Oil Resistant, Sunlight Resistant, CSA Rating - 18°C to 75°C. Liquid tight straight and right angle connections to be used wherever applicable.

Exterior outlets specified herein shall be mounted in cast aluminum or zinc die cast boxes with weather resistant snap open covers. An isolation gasket shall be used whenever any portion of the outlet or covers comes into contact with a body panel.

Where receptacles are provided in possible wet locations, the receptacle outlet and inlet devices, including those on hardwired remote power distribution boxes, shall be of grounding type provided with a wet location cover and installed in accordance with NEC.

All receptacles shall be marked with the type of line voltage (120 volts or 240 volts) and the current rating in amps.

The wiring and associated receptacles shall be subjected to a 1-min, 900-V dielectric voltage withstand test with any switches in the circuit(s) closed between live parts, including neutral and the vehicle frame. This test shall be conducted after all body work has been completed.

Electrical polarity checks shall be made of permanently wired equipment and receptacles to determine that connections have been properly made.

An operational test shall be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

The results of the test shall be recorded and provided to the purchaser at the time of delivery.

GENERATOR

There shall be one (1) Harrison, model HR-20, 30,000 watt hydraulic generator provided and installed in the hose bed of the apparatus.

Harrison model 120/240VAC, 60Hz, 1-phase hydraulic generator shall be provided. The generator tray assembly shall be designed specifically for mounting on top of the vehicle or can be easily separated into its three major components (tray, cooler/fan assembly, and reservoir) for mounting in custom applications. The generator tray assembly, including reservoir, shall be delivered in a one-piece module with the cooler/fan assembly mounted such that the hot air is exhausted straight up through an NFPA approved walking grate.

The generator system shall come with a standard 5-year/1,000 hour fully transferable warranty from the manufacturer.

The unit shall come complete with: generator tray assembly (which includes the generator, hydraulic motor, cooler/fan assembly, electronics package, 10 micron spin-on fluid filter and reservoir), axial piston hydraulic pump with pressure compensated control, and Command and Control Center (CCC) display with all required wiring harnesses.

The CCC shall be an interactive operator control center, equipped with smart touch solid-state buttons, with displays for voltage, frequency, amperage, hour meter, service reminders, operator warnings, system faults and diagnostics. Standard electronics package shall include smart start engagement to reduce mechanical stress (enables generator startup at any RPM), precise voltage and frequency control to maintain frequency control within a 0.2 Hz range, cold start protection system, automatic load and temperature compensation, integrated diagnostics system, and other automated control features to protect system, vehicle and operator.

The system shall be designed for use with an optional Multiplexing Interface Module capable of converting electronic communications to SAE J1939 protocol for interface with the vehicle multiplexing system. When interfaced with a vehicle multiplexing system, all coding shall be fully SAE compliant. Control of the generator system shall be available from the vehicle multiplexing display(s), which shall also be capable of transmitting system warnings with real-time troubleshooting steps that may be followed to assist the operator in the elimination of any generator problems.

The generator shall be a commercial type with 2 heavy-duty bearings to ensure exact rotor alignment and of brushless design to ensure low maintenance. The integrated reservoir shall be equipped with an oil level sight gauge, fill cap and electronic fluid level sensor, which will display a low oil level condition on the CCC display.

The hydraulic pump shall be driven by a chassis transmission mounted power take off (PTO). The system shall be capable of producing the full rated power when driven from the vehicle PTO from idle to maximum engine speed. The generator system shall be able to operate on either a Constant Engaged PTO or a Hot Shift PTO. A Hot Shift PTO is recommended, but final determination as to which PTO to use will be made by the Fire Department. Generator shall make full rated power while vehicle is stationary or in motion. The system shall be capable of normal operation using a commonly available ATF fluid, such as Dexron III or equivalent. The reservoir/filter assembly shall be a high efficiency 3 micron glass filter.

The system shall be designed and assembled by a company with no less than 10 years experience in the manufacture of hydraulic driven generators. The system shall be tested for a full 2 hours prior to shipping and be accompanied with a test report. The generator shall be tested at 500-1000 watt increments from no load to full load to ensure reliable power delivery at all load levels.

RATINGS AND CAPACITY

Rating:	30,000 watts peak 30,000 watts continuous
Volts:	120/240 volts
Phase:	Single, 4 wire
Frequency:	60 Hz
Amperage:	83 amps @ 120 volts or 167 amps @ 24
Engine speed at engagement:	Standard soft start feature allows for speed engagement
Operation range:	1800 RPM

TESTING

The generator shall be tested in accordance with all current N.F.P.A. 1901 standards.

Notes

*All ratings and capacities shall be derived utilizing current NFPA 1901 test parameters.

The tray assembly for the generator unit shall be mounted with the air exhaust properly vented. Generator air intake shall be positioned away from personnel.

LOAD CENTER / BREAKER BOX

A minimum twenty (20) place Square D QO series circuit breaker box / load center shall be installed in the drivers side over wheel well compartment. The breaker box shall be rated at a minimum of 100 amps and supplied with one (1) main breaker rated for the maximum amperage output of the specified generator. Load center shall feature:

- Exclusive shielded copper bus features electro tin plated copper bus bars sandwiched between two rugged polymer shields to insulate and secure the interior.
- Straight-in mains wiring and uniform termination lugs help minimize service cable bends, cutting waste and saving installation time.
- Convertible mains allow fast field conversion between main breaker and main lugs to meet changing job requirements.
- Single, captive interior mounting screw can't be lost. Interior mounts quickly and can easily be removed during rough-in for paint or theft protection.
- Split branch neutral with up to 50% more terminations than UL requirement simplifies wiring and reduces clutter.

Specified breakers, as outlined herein, shall be compatible for installation in the box

Circuit breakers shall be Square D type QO (plug-on) thermal magnetic trip, with an integral crossbar to ensure simultaneous opening of all poles in multi-pole circuit breakers. Breakers shall feature:

- An overcenter, tripfree, toggle-type operating mechanism with quick-make, quick-break action and positive handle indication.
- Handles with ON, OFF, and "Tripped" positions. In addition,
- A trip indication shall be provided on the breakers. The Square D VISI-TRIP indicator appearing in the window of the circuit breaker case.
- Circuit breakers shall be UL Listed in accordance with UL standard 489 with current ratings as noted on the plans. Interrupting ratings shall be selected to provide the required load center short circuit current rating.

Each breaker shall be rated to specified wire size and load demand required for each item operated from load center.

RECEPTACLES

There shall be four (4) duplex 15 amp receptacle(s) installed in the compartment over the rear wheel well area. The receptacle(s) shall be recessed in the body and be protected by a weatherproof cover. The receptacle(s) are to be 5-15 straight blade, the plug configuration used by the Fire Department.

There shall be two (2) duplex 15 amp receptacle(s) installed on the rear of the body on either side of the rear compartment. Each receptacle shall be recessed in the body and be protected by a weatherproof cover. The receptacle(s) are to be 5-15 straight blade, the plug configuration used by the Fire Department.

RECEPTACLES (CAB)

There shall be two (2) 110-volt power strips shall be installed in the cab EMS storage compartments, one in each compartment. Each power strip shall be secured in compartment to provide power to customer equipment charging bases. Power strips shall receive power from both the generator as well as the shore power at the station

220-VOLT RECEPTACLE

There shall be one (1) 220-volt power receptacle(s) installed in a specified compartment for powering the customer supplied power unit.

1,330-WATT FRC BROW MOUNT LIGHT

There shall be one (1) 750 watt 120 volt FRC Focus LED light brow mount LED light installed on the cab roof. Light dimensions shall be 11.5" x 9.3125 x 5.3125", and be finished with a powder coat white finish. Each light can be preset to desired angles. All lights shall provide quick and simplified bulb replacement from the front by removal of just the lens cover.

Brow lights shall be operated by switches located in the cab.

750-WATT GFE QUARTZ LIGHT (BETA LIGHT HEAD)

There shall be ?? GFE Extend-A-Lite HD-4750 Low Profile Quartz light head(s) provided. Each light head shall be equipped with a 750-watt quartz bulb, top mounted handle and tilt knob assembly.

Each light head shall be mounted to a GFE E-POD-W tripod Extend-a-pole assembly. Each tripod assembly shall be constructed with a 4' aluminum extension pole with sturdy tripod base. Tripod is capable of 11' maximum extended height.

The pole shall be mounted in such a way to allow the light and pole assembly to be operated while on the truck or to be easily removed from the truck and used as portable light. The light shall be located so as not to interfere with any other lights, doors, or handles.

LIGHT TOWER

The apparatus shall be equipped with one electric light tower. The light shall be located on the cab roof. The unit shall not require tapping into vehicle braking system to be operated, eliminating the chance for vehicle brake problems. Hydraulic or pneumatic type floodlights are not acceptable alternatives to the all electric light tower specified.

The light tower shall be a two-stage articulating device with a lighting bank on top of a second stage capable of 360 degrees continuous rotation. The light shall be elevated by electric linear actuators, one (1) actuator shall elevate the light bank, and one (1) actuator shall adjust the light bank angle from 0 to 110 degrees. The overall extended height from the base to the top pair of lights shall be 120".

The light bank shall have two (2) weatherproof metal halide 1000-watt lights and four (4) 1500-watt quartz halogen lights. Light heads shall be mounted in three (3) pairs, giving two (2) vertical lines of three (3) when the lights are in the upright position. Power for light bank shall be transmitted through power collecting rings thus allowing 360+ degrees rotation in either direction.

Light tower shall be controlled with a hand-held umbilical line remote control. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature. The controls on the remote box shall be:

1. Three (3) switches, one (1) for each light bank.
2. One (1) light bank rotation switch.
3. One (1) switch for elevating lower stage.
4. One (1) switch for elevating upper stage.
5. One (1) indicator light to indicate when light bank is out of roof nest position.
6. One (1) indicator light to indicate when light bank is rotated to proper nest position.

The tower base shall have a light that illuminates the envelope of motion during any movements of the light tower mast.

The Command Light assembly shall be all aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

The overall size of nested light tower shall be approximately 40" wide x 73-1/4" long x 13" high, and weight approximately 310 lbs.

The plug for the control box is to be mounted on the left side pump panel.

A painted protective fairing shall be installed around the front and sides of the Command light to protect it from tree branches or other obstructions.

ELECTRIC REEL (120-VOLT)

Each 120-volt cord reel shall be a Hannay Model ECR-1616-17-18, 120 volt; capable of holding 200 feet of 10/3 wire shall be provided with the apparatus. Each reel shall also be equipped with a 12-volt electric motor with a sealed push button momentary switch located near that reel in the same compartment.

200 feet of 10/3 wire shall be provided on each reel. Cable color to be black.

JUNCTION BOX

A GFE electrical outlet junction box shall be located on the specified electric cord reel(s). The box shall be hardwired on the specified cable, and shall terminate with four (4) 125 volt, 15 Amp outlets. Plug type shall be as specified by the fire department.

HYDRAULIC REEL

Each hydraulic reel shall be a Hannay model 2016-17-18 reel capable of holding 100 feet of twin hydraulic hose. Each reel shall also be equipped with a 12-volt electric motor with a sealed push button momentary switch located near the reel in that same compartment.

CAPTIVE ROLLER

There shall be a fairlead located at each specified reel location. The fairlead shall be a retractable captive 4-way roller fairlead. These devices shall be so designed as to extend out of the body when the roll-up door is opened. This shall eliminate the cable or hose from rubbing against the exterior painted body surface. This device shall be activated by simply pulling it out from the body with a web strap. The design shall also not allow the cable or hose to be deployed without the device being swung out.

PAINT & LETTERING

PAINT PREPARATION

The body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments. Trim, cover plates, and external equipment being painted job color will be removed and painted separately from the body. All compartment doors (if applicable) will be painted separately to assure proper paint coverage on body, door jambs and door edges.

All painted surfaces shall follow the following procedure to insure a lasting finish.

Metal surfaces shall be sanded to remove all burrs and imperfections in aluminum, before etching other surface contaminants and treatment. The entire unit shall be power washed and dried off. All surfaces shall be air blown dry completely.

A PPG wax & grease solvent shall be used to clean and prep the aluminum surfaces to be painted. The surfaces shall then be rinsed with freshwater and air blown dry. This step removes wax, grease and thus leaving a bright, clean and conditioned surface.

A self-etching, aluminum primer shall be applied next. The self-etching primer shall fill all of the minor imperfections, scratches, etc. in the metal. This step produces a corrosion resisting conversion coating that fends off oxidation and other surface contaminants leaving a surface that gives excellent paint adhesion.

A sandable primer shall be sprayed on the metal that seals the surface for the polyurethane paint. A minimum coating thickness of 2 mil shall be applied. Primer is then sanded smooth leaving the best surface for top coat.

The apparatus body shall then be painted with a minimum of two (2) coats of PPG Delta high solids DUHS paint to insure paint depth. Color finish shall be force dried at 120 degrees Fahrenheit. Color coat shall then be spray coated with a minimum of two (2) coats of Delta urethane clear finish.

The finish shall be buffed out to a high luster finish, while removing any dust, or imperfections.

These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by the same manufacture as the top coat finish.

The body shall be painted (PAINT COLOR & CODE).

LETTERING

There shall be a maximum of sixty (60) 4" tall 3M reflective Royal Blue letters applied to the apparatus. The lettering shall also have a left drop shading applied. The exact location of the lettering shall be supplied by the department.

There shall be a maximum of thirty (36) 7" tall 3M reflective Royal Blue letters applied to the apparatus. The lettering shall also have a left drop shading applied. The exact location of the lettering shall be supplied by the department.

STRIPE

There shall be an 6" wide, white Scotchlite stripe with two (2) 1" white Scotchlite overlay's located no higher than 48" from the ground installed on the apparatus cab and body. The stripe shall cover a minimum of fifty percent (50%) of perimeter of each side of the apparatus and fifty percent (50%) of the perimeter of the rear of the apparatus and twenty-five (25%) of the perimeter of the front of the apparatus. The department shall specify the exact location of the stripe.

CHEVRON

The Chevron style reflective striping shall be supplied by the customer and installed by Summit .

CONSPICUITY STRIPING

3M Conspicuity highly reflective prismatic striping shall be installed along the apparatus rub rails. Vehicle markings are made for application to sides and rear of emergency vehicles to meet and exceed all US DOT and NHTSA and NFPA requirements.

EQUIPMENT

WHEEL CHOCK

There shall be two (2) Zico model SAC-44 wheel chocks with a horizontal hanging bracket shall be mounted in front of the left rear wheels.

LADDERS

There shall be one (1) Duo-Safety 24' two section aluminum extension ladder series 900-A supplied with the unit.

There shall be one (1) Duo-Safety 14' aluminum roof ladder series 775-A supplied with the unit.

There shall be one (1) Duo-Safety 10' aluminum folding ladder series 585-A supplied with the unit.

PIKE POLE STORAGE TUBES

There shall be one (1) PVC pike pole storage tube located on the rear crew seat for each pike pole carried on the unit.

ASSORTED FASTENERS

One (1) bag of assorted stainless steel, and chrome fasteners used in the assembly of the apparatus shall be provided with the delivery of the apparatus.

WIRING SCHEMATICS

Two (2) complete sets of detailed electrical wiring schematics shall be provided with the completed unit. The schematic shall clearly labeled and describe all electrical circuits for an accurate reference.

SERVICE MANUAL AND PARTS LIST

Two (2) service manuals shall be provided with the completed unit. Manuals shall include equipment and component information as well as warranty and service information.