| Specification for Rapid City Fire Department Structure Pumpers w/ 2007 Engine | Bidder Complies | |
|---|---|---|
| | Yes | No |

**INTENT OF SPECIFICATIONS**

It shall be the intent of these specifications to cover the furnishing and delivery of a complete fire apparatus. These detailed specifications cover the requirements as to the type of construction and test to which the apparatus shall conform, together with certain details as to finish, equipment and appliances with which the successful bidder shall conform. Minor details of construction and materials, which are not otherwise specified, are left to the discretion of the contractor. Otherwise, in accordance with NFPA 1901, 2009 edition, the proposal shall specify whether the fire department or apparatus dealership shall provide required loose equipment.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction. Further, bidder shall maintain dedicated service facilities for the repair and service of products. Evidence of such a facility shall be included in bidder proposal.

Each bidder shall furnish satisfactory evidence of their ability to construct the apparatus specified and shall state the location of the factory where the apparatus is to be built. The bidder shall also show that the company is in position to render prompt service and to furnish replacement parts.

Each bid shall be accompanied by a detailed set of "Contractor's Specifications" consisting of a detailed description of the apparatus and equipment proposed, and to which the apparatus furnished under contract shall conform. These specifications shall indicate size, type, model and make of all component parts and equipment.

**QUALITY AND WORKMANSHIP**

The design of the apparatus shall embody the latest approved automotive engineering practices. The workmanship shall be of the highest quality in its respective field. Special consideration shall be given to the following points: Accessibility of the various units which require periodic maintenance; ease of operation (including both pumping and driving); and symmetrical proportions. Construction shall be rugged and ample safety factors shall be provided to carry the loads specified and to meet both on and off road requirements and speed conditions as set forth under "Performance Tests and Requirements".

**DELIVERY**

Apparatus, to insure proper break in of all components while still under warranty, **shall be delivered under its own powe**r. A qualified delivery engineer representing the contractor shall deliver the apparatus and remain for a sufficient length of time to instruct personnel in the proper operation, care and maintenance of the equipment delivered.

**INFORMATION REQUIRED**

The manufacturer shall supply at time of delivery, complete operation and maintenance manuals covering the completed apparatus as delivered. A permanent plate shall be mounted in the driver's compartment which specifies

the quantity and type of fluids required including engine oil, engine coolant, transmission, pump transmission lubrication, pump primer and drive axle.

**SAFETY VIDEO**

Documentation provided at the time of delivery shall also include an apparatus safety video, in DVD format. This video shall address key safety considerations for personnel to follow when they are driving, operating, and maintaining the apparatus. Safety procedures for the following shall be included: vehicle pre-trip inspection, chassis operation, pump operation, and maintenance.

**LIABILITY**

The successful bidder shall defend any and all suits and assume all liability for the use of any patented process including any device or article forming a part of the apparatus or any appliance furnished under the contract.

**SPECIFICATION BID REQUIREMENTS**

Bidders shall also indicate in the "yes/no" column if their bid complies **on each item** (PARAGRAPH) specified. Exceptions shall be allowed if they are equal to or superior to that specified and provided they are listed and fully explained on a separate page. **Proposals taking total exception to specifications shall not be acceptable**.

Also, bidders shall submit a detailed proposal. A letter only, even though written on a company letterhead, shall not be sufficient. Bid proposals shall be submitted in the same sequence as specifications for ease of evaluation, comparison and checking of compliance. **An exception to these requirements shall not be tolerated.**

**EXCEPTIONS**

All exceptions shall be stated no matter how seemingly minor. Any exceptions not taken shall be assumed by the purchaser to be included in the proposal, regardless of the cost to the bidder.

**GENERAL CONSTRUCTION**

The apparatus shall be designed with due consideration to distribution of load between the front and rear axles. Weight balance and distribution shall be in accordance with the recommendations of the National Fire Protection Association.

**COMMERCIAL GENERAL LIABILITY INSURANCE**

The successful bidder shall, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of commercial general liability insurance:

| | |
|---|---|
| Each Occurrence | $1,000,000 |
| Products/Completed Operations Aggregate | $1,000,000 |
| Personal and Advertising Injury | $1,000,000 |
| General Aggregate | $5,000,000 |

Coverage shall be written on a Commercial General Liability form. The policy shall be written on an occurrence form and shall include Contractual Liability coverage for bodily injury and property damage subject to the terms and conditions of the policy. The policy shall include owner as an additional insured when required by written contract.

**COMMERCIAL AUTOMOBILE LIABILITY INSURANCE**

The successful bidder shall, during the performance of the contract keep in force at least the following minimum limits of commercial automobile liability insurance:

Each Accident Combined Single Limit: $1,000,000

Coverage shall be written on a Commercial Automobile liability form.

**UMBRELLA/EXCESS LIABILITY INSURANCE**

The successful bidder shall, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of umbrella liability insurance:

Aggregate: $25,000,000

Each Occurrence: $25,000,000

The umbrella policy shall be written on an occurrence basis and at a minimum provide excess to the Bidder's General Liability, Automobile Liability and Employer's Liability policies. Owner shall be included as an additional insured on the General Liability policy when required by written contract.

The required limits can be provided by one or more policies provided all other insurance requirements are met.

Coverage shall be provided by a carrier(s) rated A- or better by A.M. Bests.

Bidder agrees to furnish owner with a current Certificate of Insurance with the coverages listed above along with its bid. The certificate shall show the purchaser as certificate holder. The Certificate of Insurance shall provide the following cancellation clause: Should any of the above described polices be cancelled before the expiration date thereof, the issuing insurer shall endeavor to mail 30 days written notice to the certificate holder named to the left, but failure to do so shall impose no obligation or liability of any kind upon the insurer, its agents or representatives.

**SINGLE SOURCE MANUFACTURER**

Bids shall only be accepted from a single source apparatus manufacturer. The definition of single source is a manufacturer that designs and manufactures their products using an integrated approach, including the chassis, cab and body being fabricated and assembled on the bidder's premises. The warranties relative to the chassis and body design (excluding component warranties such as engine, transmission, axles, pump, etc.) must be from a single source manufacturer and not split between manufacturers (i.e. body and chassis). The bidder shall provide evidence that they comply with this requirement.

| Specification for Rapid City Fire Department Structure Pumpers w/ 2007 Engine | Bidder Complies | |
|---|---|---|
| | Yes | No |
| **NFPA 2009 STANDARDS**<br>This unit shall comply with the NFPA standards effective January 1, 2009, except for fire department specifications that differ from NFPA specifications. These exceptions shall be set forth in the Statement of Exceptions.<br><br>Certification of slip resistance of all stepping, standing and walking surfaces shall be supplied with delivery of the apparatus.<br><br>A plate that is highly visible to the driver while seated shall be provided. This plate shall show the overall height, length, and gross vehicle weight rating.<br><br>The manufacturer shall have programs in place for training, proficiency testing and performance for any staff involved with certifications.<br><br>**NFPA COMPLIANCY**<br>Apparatus proposed by the bidder shall meet the applicable requirements of the National Fire Protection Association (NFPA) as stated in current edition at time of contract execution. Fire department's specifications that differ from NFPA specifications shall be indicated in the proposal as "non-NFPA".<br><br>**TOTAL VEHICLE ASSESSMENT CERTIFICATION**<br>The apparatus shall be third-party, independent, audit-certified through Underwriters Laboratory (UL) to the current edition of NFPA 1901 standards. The certification includes: all design, production, operational, and performance testing of the apparatus. (no exception)<br><br>**PUMP TEST**<br>The pump shall be tested, approved, and certified by Underwriter's Laboratory at the manufacturer's expense. The test results and the pump manufacturer's certification of hydrostatic test; the engine manufacturer's certified brake horsepower curve; and the manufacturer's record of pump construction details shall be forwarded to the Fire Department.<br><br>**APPROVAL DRAWING**<br>A drawing of the proposed apparatus shall be provided for approval before construction begins. The sales representative shall also have a copy of the same drawing. The finalized and approved drawing shall become part of the contract documents. This drawing shall indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc.<br><br>A "revised" approval drawing of the apparatus shall be prepared and submitted by the manufacturer to the purchaser showing any changes made to the approval drawing.<br><br>**ONE (1) YEAR MATERIAL AND WORKMANSHIP**<br>Each new piece of apparatus shall be provided with a minimum one (1) year basic apparatus material and workmanship limited warranty. The warranty shall cover such portions of the apparatus built by the manufacturer as being free from defects in material and workmanship that would arise under normal use and service. | | |

A copy of the warranty certificate shall be submitted with the bid package (No Exception).

**WARRANTY 1 YEAR CUSTOM CHASSIS**

Each piece of new fire or rescue apparatus shall be warranted to be free from defects in materials or workmanship under normal use and service. Each manufacturer shall supply, as a part of their bid package, a copy of the warranty or warranties that they propose to provide, and in no case shall it be less than one (1) year on the entire apparatus.

All other warranties, as outlined in these specifications shall be provided in writing as a part of the bid package.

Failure to provide the warranties as outlined throughout these specifications shall be cause for rejection of the bid package.

**CROSSMEMBERS WARRANTY**

A one (1) year parts and labor warranty shall be provided on all chassis frame crossmembers.

**CHASSIS**

Chassis provided shall be a new, tilt-type custom fire apparatus. The chassis shall be manufactured in the apparatus body builder's facility eliminating any split responsibility. The chassis shall be designed and manufactured for heavy-duty service, with adequate strength, capacity for the intended load to be sustained, and the type of service required. The chassis shall be the manufacturer's heavy-duty line tilt cab.

**SEATING CAPACITY**

The seating capacity in the cab shall be four (4).

**WHEELBASE**

The wheelbase of the vehicle shall be no greater than 188.50".

**GVW RATING**

The gross vehicle weight rating shall be a minimum of 46,800 lbs.

**FRAME**

The chassis frame shall be built with two (2) steel channels bolted to five (5) cross members or more, depending on other options of the apparatus. The side rails shall have a 13.38" tall web over the front and mid sections of the chassis, with a continuous smooth taper to 10.75" over the rear axle. The frame rails shall be constructed of 120,000 psi yield strength heat-treated .38" thick steel, with 3.50" wide flanges.

**FRONT AXLE**

The front axle shall be of the independent suspension design with a ground rating of 22,800 pounds.

Upper and lower control arms shall be used on each side of the axle. Upper control arm castings shall be made of 100,000-psi yield strength 8630 steel and the lower control arm casting shall be made of 55,000-psi yield ductile iron.

Each control arm shall be mounted to the center section using elastomer bushings. These rubber bushings shall rotate on low friction plain bearings and be lubricated for life. Each bushing shall also have a flange end to absorb longitudinal impact loads, reducing noise and vibrations.

There shall be nine (9) grease fittings supplied, one (1) on each control arm pivot and one (1) on the steering gear extension.

The upper control arm shall be shorter than the lower arm so that wheel end geometry provides positive camber when deflected below rated load and negative camber above rated load.

Camber at load shall be zero degrees for optimum tire life.

The kingpin bearing shall be of low friction design and be sealed for life.

Toe links that are adjustable for alignment of the wheel to the center of the chassis shall be provided.

The wheel ends must have little to no bump steer when the chassis encounters a hole or obstacle.

The steering linkage shall provide proper steering angles for the inside and outside wheel, based on the vehicle wheelbase.

The axle shall have a third party certified turning angle of 45 degrees. Front discharge, front suction, or aluminum wheels shall not infringe on this cramp angle.

**OIL SEALS**
Oil seals with viewing window shall be provided on the front axle.

**SHOCK ABSORBERS**
Heavy-duty telescoping shock absorbers shall be provided on the front suspension.

**REAR AXLE**
The rear axle shall have a capacity of 24,000 pounds. A 2 year limited warranty shall be provided.

**TOP SPEED OF VEHICLE**
A rear axle ratio shall be furnished to allow the vehicle to reach a top speed of 68 MPH.

**OIL SEALS**
Oil seals shall be provided on the rear axle.

**FRONT SUSPENSION**
Front independent suspension shall be provided with a minimum ground rating of 22,800 pounds.

The independent suspension system shall be designed to provide maximum ride comfort. The design shall allow the vehicle to travel at highway speeds over improved road surfaces and at moderate speeds over rough terrain with

minimal transfer of road shock and vibration to the vehicle's crew compartment.

Each wheel shall have torsion bar type spring. In addition, each front wheel end shall also have energy absorbing jounce bumpers to prevent bottoming of the suspension.

The suspension design shall be such that there is at least 10.00" of total wheel travel and a minimum of 3.75" before suspension bottoms.

The torsion bar anchor lock system allows for simple lean adjustments, without the use of shims. Anchor adjustment design is such that it allows for ride height adjustment on each side.

**REAR SUSPENSION**

The rear springs shall be semi-elliptical, 3.00" x 52.00", 10 leaves with a ground rating of 24,000 pounds. Spring hangers shall be castings with provisions for lubrication. The grease fittings shall be 90-degree type and shall be accessible without removing the wheels or cutting any sheet metal. Two (2) top leaves shall wrap the forward spring hanger pin and the top leaf shall wrap the rear spring hanger pin on both the front and rear suspensions.

Spring pins shall be provided, with double "figure-eight" grease grooves and a layer of electroless nickel plating, 1.0 mil thick, around the entire pin. The bushing that holds the spring pin in place shall also have a grease groove.

**ANTI-LOCK BRAKE SYSTEM**

The vehicle shall be equipped with an anti-lock braking system. The ABS shall provide a four (4) channel anti-lock braking control on both the front and rear wheels. A digitally controlled system that utilizes microprocessor technology shall control the anti-lock braking system. Each wheel shall be monitored by the system. When any particular wheel begins to lockup, a signal shall be sent to the control unit. This control unit then shall reduce the braking of that wheel for a fraction of a second and then reapply the brake. This anti-lock brake system shall eliminate the lockup of any wheel thus helping to prevent the apparatus from skidding out of control.

**ANTI-LOCK BRAKE SYSTEM WARRANTY**

The ABS system shall come with a **three (3) year or 300,000 mile parts and labor** warranty.

**BRAKES**

The service brake system shall be full air type.

The front brakes shall be disc type with a 17.00" ventilated rotor for improved stopping distance.

The brake system shall be certified, third party inspected, for improved stopping distance.

The rear brakes shall be 16.50" x 7.00" cam operated with automatic slack adjusters.

| Specification for Rapid City Fire Department Structure Pumpers w/ 2007 Engine | Bidder Complies | |
|---|---|---|
| | Yes | No |

**ENGINE BRAKE**

An engine brake is to be installed with the controls located on the instrument panel within easy reach of the driver.

The driver shall be able to turn the engine brake system on/off and have a high, medium and low setting.

The engine brake shall be installed in such a manner that when the engine brake is slowing the vehicle the brake lights are activated.

The ABS system shall automatically disengage the auxiliary braking device, when required.

**BRAKE SYSTEM**

The brake system shall include:

- A dual brake treadle valve with vinyl covered foot surface

- An air compressor with a output of 15.8 cubic feet per minute at 1250 RPM.

- An air dryer w/ a heated automatic moisture ejector

- Total air system capacity of 4,362 cubic inch

- Two (2) air pressure gauges with red warning light and audible alarm, that activates when air pressure falls below 60 psi

- MGM spring set parking brake system

- Parking brake operated by a push/pull control valve

- A parking "brake on" indicator light on instrument panel

- A valve in conjunction with a double check valve system, shall be provided with an automatic spring brake application at 40 psi

- Color-coded nylon brake lines shall be provided. The lines shall be wrapped in a heat protective loom where necessary in the chassis.

**AIR INLET**

One (1) air inlet with male coupling shall be provided. It shall allow station air to be supplied to the apparatus brake system through a shoreline hose. The inlet shall be located in the driver side lower step well of cab. A check valve shall be provided to prevent reverse flow of air. The inlet shall discharge into the "wet" tank of the brake system. A mating female coupling shall also be provided with the loose equipment.

**ENGINE**

The chassis shall be powered by a Detroit Diesel electronically controlled engine as described below:

- Model: Series 60, 14.0L (855 cubic inches)

- Maximum Horsepower: 470 bhp at 1800 rpm

- Peak Torque: 1650 lb-ft at 1200 rpm

- Governed Speed: 2000 rpm

- Bore and Stroke: 5.24" x 6.61"

- Number of Cylinders: Six (6)

- Compression Ratio: 17.25:1

Standard equipment on the engine shall include the following:

- Governor: Limiting speed type

- Injectors: Cam operated, unit type, clean tip

- Starting Motor: 12-volt

- Turbocharger

- Air To Air Aftercooled

- Lube Oil Cooler

- Lube Oil Filter: Full flow

- Air Cleaner: Farr or equal

- Fuel Filters: Dual, with check valve

- Coolant Filter: Spin-on with shut off valves on the supply and return line (precharged with coolant inhibitor)

**ENGINE WARRANTY**

The engine shall come with a **five (5) year or 100,000 mile** warranty provided by the Detroit Diesel Corporation.

**CONTROLS AND INDICATOR LIGHTS**

The following amber indicator lights shall be located on the driver's side of the cab to denote engine information:

- Diesel Particulate Filter (DPF)

- High Exhaust Temperature (HET)

- Malfunction Indicator Lamp (MIL)

A switch to initiate the diesel particulate filter regeneration cycle shall be located on the driver's side instrument panel.

**ENGINE INSTALLATION CERTIFICATION**

The fire apparatus manufacturer shall provide a certification, along with a letter from the engine manufacturer stating they approve of the engine installation in the bidder's chassis. The certification shall be provided at the time of bid.

**ENGINE AIR INTAKE**

The air intake with an ember separator shall be mounted high on the passenger side of the cab, to the front of the crew cab door. The ember separator is designed to prevent road dirt and recirculating hot air from entering the engine.

The ember separator shall be easily accessible through a hinged stainless steel grille, with one (1) flush quarter turn latch.

**EXHAUST SYSTEM**

The exhaust system shall be stainless steel from the turbo to the inlet of the diesel particulate filter and shall be 5.00" in diameter. The exhaust system shall include a diesel particulate filter and a diesel oxidation catalyst. The exhaust shall terminate horizontally ahead of the passenger side rear wheels. A tailpipe diffuser shall be provided to reduce the temperature of the exhaust as it exits. An insulation wrap shall be provided on the exhaust pipe between the turbo and DPF inlet to minimize the transfer of heat to the cab. Heat deflector shields shall be provided to isolate chassis and body components from the heat of the tailpipe diffuser.

**HIGH IDLE**

A high idle switch shall be provided, inside the cab, on the instrument panel, that shall automatically maintain a preset engine rpm. A switch shall be installed, at the cab instrument panel, for activation/deactivation.

The high idle shall be operational only when the parking brake is on and the truck transmission is in neutral. A green indicator light shall be provided adjacent to the switch. The light shall illuminate when the above conditions are met. The light shall be labeled "OK to Engage High Idle".

**COOLANT LINES**

Silicone hoses shall be used for all engine/heater coolant lines installed by the chassis manufacturer.

Hose clamps shall be stainless steel "constant torque type" to prevent coolant leakage. They shall react to temperature changes in the cooling system and expand or contract accordingly while maintaining a constant clamping pressure on the hose.

**RADIATOR**

The radiator and the complete cooling system shall meet or exceed NFPA and engine manufacturer cooling system standards.

For maximum cooling performance, the radiator core shall be made of copper fins having a serpentine design, soldered to brass tubes. The tubes shall be welded to brass headers. The radiator shall be compatible with commercial antifreeze solutions.

The radiator shall be mounted in such a manner as to prevent the development of leaks caused by twisting or straining when the apparatus operates over uneven ground. The radiator assembly shall be isolated from the chassis frame rails with rubber isolators.

The radiator shall include an integral deaeration tank, with a remote-mounted overflow tank. For visual coolant level inspection, the radiator shall have a built-in sight glass. The radiator shall be equipped with a 15 psi pressure relief cap.

A drain port shall be located at the lowest point of the cooling system and/or the bottom of the radiator to permit complete flushing of the coolant from the system.

A heavy-duty fan shall draw in fresh, cool air through the radiator. Shields or baffles shall be provided to prevent recirculation of hot air to the inlet side of the radiator.

**CLUTCH FAN**

A clutch fan shall be provided. The fan clutch shall be automatic when the pump transmission is in "Road" position, and fully engaged in "Pump" position.

**FUEL TANK**

A 75-gallon fuel tank shall be provided and mounted at rear of chassis. The tank shall be constructed of 12-gauge, hot rolled steel. It shall be equipped with swash partitions and a vent.

A .75" drain plug shall be provided in a low point of the tank for drainage.

A fill inlet shall be located on the driver's side of the body and be covered with a hinged, spring loaded, stainless steel door that is marked "Diesel Fuel Only".

A .50" diameter vent shall be provided running from top of tank to just below fuel fill inlet.

All fuel lines shall be provided as recommended by the engine manufacturer.

**FUEL SHUTOFF**

A shutoff valve shall be installed in the fuel line, on both sides of the fuel filters.

**FUEL COOLER**

An air to fuel cooler shall be installed in the engine fuel return line.

**TRANSMISSION**

An Allison Gen IV, model EVS 4000P, electronic, torque converting, automatic transmission shall be provided.

Two (2) PTO openings shall be located on left side and top of converter housing (positions 8 o'clock and 1 o'clock).

A transmission temperature gauge with red light and buzzer shall be installed on the cab instrument panel.

**TRANSMISSION SHIFTER**

A six (6)-speed push button shift module shall be mounted to right of driver on console. Shift position indicator shall be indirectly lit for after dark operation.

The transmission ratio shall be 1st - 3.49 to 1.00, 2nd - 1.86 to 1.00, 3rd - 1.41 to 1.00, 4th - 1.00 to 1.00, 5th - 0.75 to 1.00, 6th - 0.65 to 1.00, R - 5.03 to 1.00.

**TRANSMISSION COOLER**

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

| Specification for Rapid City Fire Department Structure Pumpers w/ 2007 Engine | Bidder Complies | |
|---|---|---|
| | Yes | No |
| **TRANSMISSION WARRANTY**<br>The transmission shall have a **five (5) year/unlimited mileage** warranty covering 100% parts and labor. The warranty is to be provided by Allison Transmission and not the apparatus builder.<br><br>**DRIVELINE**<br>Drivelines shall be a heavy-duty metal tube and be equipped with Spicer 1810 universal joints.<br><br>The shafts shall be dynamically balanced before installation.<br><br>A splined slip joint shall be provided in each driveshaft, slip joint shall be coated with Glidecoat or equivalent.<br><br>**STEERING**<br>Dual steering gears, with integral heavy-duty power steering, shall be provided. The power steering shall incorporate a three (3)-line hydraulic pump with integral pressure and flow control.<br><br>The steering wheel shall be:<br><br>- 18.00" in diameter<br><br>- Capable of tilting and telescoping<br><br>- Four (4)-spoke design<br><br>**STEERING WARRANTY**<br>The steering gear shall have a three (3) year parts and labor warranty.<br><br>**TIRES & WHEELS**<br>Front tires shall be 425/65R22.50 radials, 20 ply Highway tread.<br><br>The tires shall be mounted on 22.50" x 12.25" polished aluminum disc-type wheels with a ten (10) stud, 11.25" bolt circle.<br><br>The rear tires shall be four (4) 12R22.50 radials, 16 ply, all season tread.<br><br>The tires shall be mounted on 22.50" x 8.25" polished aluminum disc wheels with a ten (10)-stud 11.25" bolt circle.<br><br>Chrome plated lug nut covers shall be installed on all lug nuts.<br><br>Stainless steel hub covers shall be provided on the front axle. An oil level viewing window shall be provided.<br><br>A pair of stainless steel high hat hub covers shall be provided on rear axle hubs.<br><br>**WHEEL CHOCKS**<br>There shall be one (1) set(s) of folding aluminum alloy, wheel blocks with easy-grip handle provided.<br><br>They shall be horizontally mounted underneath the truck.<br><br>**MUD FLAPS**<br>Mud flaps shall be installed behind the front and rear wheels of the apparatus. | | |

| Specification for Rapid City Fire Department Structure Pumpers w/ 2007 Engine | Bidder Complies | |
|---|---|---|
| | Yes | No |
| **TIRE PRESSURE MANAGEMENT**<br>There shall be a tire alert pressure management system provided that shall monitor each tire's pressure. A chrome plated brass sensor shall be provided on the valve stem of each tire for a total of six (6) tires.<br><br>The sensor shall calibrate to the tire pressure when installed on the valve stem for pressures between 20 and 120 psi. The sensor shall activate an integral battery operated LED when the pressure of that tire drops 8 psi.<br><br>Removing the cap from the sensor shall indicate the functionality of the sensor and battery. If the sensor and battery are in working condition, the LED shall immediately start blinking.<br><br>**CAB**<br>The cab shall be designed specifically for the fire service and manufactured by the chassis builder.<br><br>Construction of the cab shall consist of 5052-H32 .125" aluminum welded to extruded aluminum framing.<br><br>The cab shall be 96.00" wide, with an interior width of approximately 87.50".<br><br>The forward cab section shall have an overall height (from the cab roof to the ground) of approximately 103.00". The crew cab section shall have a 10.00" raised roof, with an overall cab height of approximately 113.00". The overall height listed shall be calculated based on a truck configuration with the lowest suspension weight ratings, the smallest diameter tires for the suspension, no water weight, no loose equipment weight and no personnel weight. Larger tires, wheels and suspension shall increase the overall height listed.<br><br>The floor to ceiling height inside the crew cab shall be 64.00" in the center and 69.75" in the outboard positions.<br><br>The crew cab floor shall measure 44.50” from rear wall to the back side of engine tunnel.<br><br>The engine tunnel, at the rearward highest point (knee level), shall measure 50.88" to the back wall.<br><br>The crew cab shall be of the totally enclosed design, with access doors constructed in the same manner as the driver and passenger doors.<br><br>The cab shall be a full tilt cab style. The engine shall be easily accessible and capable of being removed with the cab tilted. The cab shall be capable of tilting 45 degrees and 90 degrees with crane assist.<br><br>The cab shall have three (3)-point rubber mounting and shall be tilted by a hydraulic pump connected to two (2) cab lift cylinders. The cab shall then be locked down by a two (2)-point automatic locking mechanism that actuates after the cab has been lowered.<br><br>The cab access steps shall be 23.25" wide, crew cab shall be 21.50” wide x 8.00” minimum depth and shall be the half-height style door, blistered inward at the bottom. | | |

| Specification for Rapid City Fire Department Structure Pumpers w/ 2007 Engine | Bidder Complies | |
|---|---|---|
| | Yes | No |
| The lower exposed step area at each door location shall be trimmed with aluminum treadplate and have a grip strut insert in the bottom step.<br><br>The inside cab steps shall not exceed 18.00" high.<br><br>The crew cab entrance shall be a one (1) step design to the cab floor, for easy access.<br><br>A 20.00", slip resistant, handrail shall be provided adjacent to all door openings to assist entrance into the cab.<br><br>A chrome handrail shall be provided inside each front cab door, for ease of entry.<br><br>The cab doors shall be 37.00" wide x 58.50" high.<br><br>The crew cab doors shall be 34.25" wide x 67.00" high for easy entry, and located on the side of the cab.<br><br>The cab and crew cab doors shall be constructed of extruded aluminum with a nominal material thickness of .125". The exterior skins shall be constructed from .090" aluminum.<br><br>All cab and crew cab entry doors shall contain a conventional roll down window.<br><br>Flush mounted, chrome plated paddle type door handle shall be provided on the exterior of the cab doors.<br><br>All interior cab door handles shall also have flush paddle handles.<br><br>The cab doors shall be provided with both interior (rotary knob) and exterior (keyed) locks. The locks shall be capable of activating when the doors are open or closed. The doors shall remain locked if locks are activated when the doors are opened, then closed.<br><br>The door hinge shall be a stainless steel piano type with a .25" pin.<br><br>There shall be double automotive type rubber seals around the perimeter of the door framing and door edges to ensure a weather tight fit.<br><br>Full height polished stainless steel scuffplates shall be installed on the inside of all cab doors.<br><br>Cab door panels shall be removable without disconnecting door and window mechanisms.<br><br>Engine hood side walls shall be constructed of .50" aluminum, top shall be constructed of .19” aluminum and shall be tapered at top to allow for more driver and passenger elbow room.<br><br>The engine hood shall be insulated for protection from heat and sound. The noise insulation keeps the DBA level within the limits stated in the current NFPA series 1900 pamphlet. There shall be access, 15.00" wide x 11.25" high, at the rear of the engine tunnel to access the engine fluid checks. | | |

Full circular inner fender liners, in the wheel wells, shall be provided.

Bright aluminum treadplate shall be overlaid on the outside rear wall of the crew cab except for areas that are not typically visible when the cab is lowered.

A curved, safety glass windshield shall be provided, with over 2,754 square inches of clear viewing area.

The cab windshield shall have bright trim inserts in the rubber molding holding the glass in place.

All cab glass shall be tinted.

Economical windshield replacement glass shall be readily available from local auto glass suppliers.

Two (2) smoked Lexan sun visors, 8.75” x 31.00" long, shall be provided. The sun visors shall be located above the windshield with one (1) mounted on each side of the cab.

Two (2) Electric windshield wipers with washer shall be provided.

The washer reservoir shall be able to be filled without raising the cab.

A glove box with a drop-down door shall be installed in the front dash panel in front of the officer's position.

**CAB DOOR DURABILITY CERTIFICATION**

Robust cab doors help protect occupants. The bidder shall certify that the sample doors similar to those provided on the apparatus have been tested and have met these criteria without structural damage, latch malfunction, or significant component wear.

**CAB FLOOR**

The cab and crew cab floor areas shall be covered with acoustical floor mat consisting of a black pyramid rubber facing and closed cell foam decoupler.

The top surface of the material has a series of raised pyramid shapes evenly spaced, which offer a superior grip surface. Additionally, the material has a .25" thick closed cell foam (no water absorption) which offers a sound dampening material for reducing sound levels.

**CREW CAB WINDOWS**

On each side of the crew cab, a window with tinted glass shall be provided.

**ELECTRIC OPERATED CAB DOOR WINDOWS**

All four (4) cab doors shall be equipped with electric operated windows with flush mounted automotive style switches.

The driver's side lower instrument panel shall also have three (3) controls, officer's door window and both crew cab door windows.

**ELECTRIC CAB DOOR LOCKS**

The front driver and officer doors shall have a door lock master switch. The master switches shall control all cab door locks.

The rear cab doors shall have the standard manual lock control.

There shall be one (1) concealed switch located in an easily accessible chassis specific location that shall unlock all the doors.

The lock system shall include two (2) key FOBs that allow for keyless entry into the vehicle. The key FOB system shall use code hopping technology for high security and be FCC part 15 compliant.

**KEY PAD FOR ELECTRIC DOOR LOCKS**

For improved convenience, the cab door locks shall include a keypad entry system to provide complete keyless entry to the cab. There shall be two (2) keypads provided, located one each side of the cab behind the front cab doors. The keypads shall include visual and audio feedback to confirm activation and acknowledge correct entry code. For enhanced night time use, the keypads shall be lighted. For increased security, the system shall allow over 3000 possible code combinations.

**STORAGE COMPARTMENTS**

Provided on each side of the cab, below the cab floor, to the rear of the crew cab access doors, shall be a storage compartment. The compartments shall be 9.50" wide x 13.00" deep x 18.00" high.

The doors shall be of the single pan construction with two (2) flush quarter turn latches. A rubber-covered bumper shall be used as a doorstop.

**FENDER CROWNS**

Stainless steel fender crowns shall be installed at the cab wheel openings. The fender crowns shall have a radius outside corner that allows the fender crown to extend beyond the side wall of the front tires and also allow the crew cab doors to open fully.

**SCUFFPLATE**

A brushed stainless steel scuffplate shall be provided on the entire rear vertical surface of the engine tunnel.

**DOOR JAM SCUFFPLATES**

All cab door jambs shall be furnished with a polished stainless steel scuffplate, mounted on the striker side of the jam.

**TRIM BAND (Cab Face)**

A 10.00" band of 22 gauge pattern finish stainless steel trim shall be installed across the front of the cab, from door hinge to door hinge. The trim band shall be centered on the head lights and applied with two-sided tape. A .625" self-adhesive trim strip shall be applied around the perimeter of the trim band.

**MOLDING (on sides of cab)**

Chrome molding shall be provided on both sides of cab.

**CAB LIFT**

A hydraulic cab lift system shall be provided consisting of an electric powered hydraulic pump, dual lift cylinders, and necessary hoses and valves.

Lift controls shall be on a panel located on the pump panel or front area of the body in a convenient location.

Cab shall be locked down by a two (2)-point automatic spring-loaded hook mechanism that actuates after the cab has been lowered.

The hydraulic cylinders shall be equipped with a velocity fuse that protects the cab from accidentally descending when the control is located in the tilt position.

A redundant mechanical stay arm shall automatically be engaged once the cab has been fully raised. Before lowering the cab, this device must be disengaged using the stay arm control located near the cab raise/lower switch.

**INTERLOCK, CAB LIFT TO PARKING BRAKE**

The cab lift system shall be interlocked to the parking brake. The cab tilt mechanism shall be active only when the parking brake is set and the ignition switch is in the on position, if the parking brake is released the cab tilt mechanism shall be disabled.

**MIRRORS**

One (1) Ramco, Model 6000FFHR-750, or equivalent, polished aluminum mirror shall be mounted on each of the cab doors. The mirrors shall be 9.25" x 13.50", with a full flat face. An additional convex section shall be bolted to the top of each mirror. The mirror head shall have a highly polished aluminum finish.

The flat glass in each mirror shall be heated and adjustable, with remote controls that are convenient to the driver.

The convex section in each mirror shall be adjusted manually.

**BUMPER**

A one (1) piece, ten (10) gauge, 304-2B type polished stainless steel bumper, a minimum of 10.00" high, shall be attached to a bolted modular extension frame constructed of 50,000 psi tensile steel "C" channel mounted directly behind it to provide adequate support strength.

The bumper shall be extended 19.00" from front face of cab.

Documentation shall be provided, upon request to show that the options selected have been engineered for fit-up and approval for this modular bumper extension. A chart shall be provided to indicate the option locations and shall include, but not be limited to the following options: air horns, mechanical sirens, speakers, hose trays (with hose capacities), winches, lights, discharge, and suction connections.

**GRAVEL PAN**

A gravel pan, constructed of bright aluminum treadplate, shall be furnished between the bumper and cab face.

The gravel pan shall be properly supported from the underside to prevent flexing and vibration of the aluminum treadplate.

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|---|---|---|
| | Yes | No |
| **LIFT AND TOW MOUNTS**<br>Mounted to the frame extension shall be lift and tow mounts. The lift and tow mounts shall be designed and positioned to adapt to certain tow truck lift systems.<br><br>The lift and tow mounts with eyes shall be painted the same color as the frame.<br><br>**HOSE TRAY**<br>A hose tray, constructed of aluminum, shall be placed in the center of the bumper extension.<br><br>The tray shall have a capacity of 150' of 1.50" double jacket cotton-polyester hose.<br><br>Black rubber grating shall be provided at the bottom of the tray. Drain holes are also provided.<br><br>**COVER, HOSE TRAY**<br>A bright aluminum treadplate cover shall be provided over the one (1) hose tray.<br><br>The cover shall be attached with a stainless steel hinge and located center hose tray recess in bumper extension..<br><br>A "D" ring latch shall secure the cover in the closed position and a pneumatic stay arm shall hold the cover in the open position.<br><br>**CAB INTERIOR**<br>The cab dash fascias shall be a flat faced design to provide easy of maintenance and shall be constructed out of painted aluminum.<br><br>The engine tunnel shall be padded and covered with 46 ounce leather grain vinyl resistant to oil, grease and mildew.<br><br>The headliner shall be installed in both forward and rear cab sections. Headliner material shall be vinyl. A sound barrier shall be part of its composition. Material shall be installed on aluminum sheet and securely fastened to interior cab ceiling.<br><br>Forward portion of cab headliner shall provide easy access for servicing electrical wiring or for other maintenance needs without removing the entire unit.<br><br>**CAB INTERIOR UPHOLSTERY**<br>The cab interior upholstery shall be dark silver gray.<br><br>**INTERIOR PAINT (Cab)**<br>The cab interior metal surfaces shall be painted gray, vinyl texture paint.<br><br>**GRAB HANDLE**<br>A black rubber covered grab handle shall be mounted on the lower portion of the driver's side cab entrance to assist in entering the cab. The grab handle shall be securely mounted to the post area between the door and steering wheel | | |

column. A long rubber grab handle shall be mounted on the dash board in front of the officer.

**DRIVER SEAT**

A "scissors-action" air-ride high-back style seat shall be provided in the cab for the driver.

The driver's seat shall be furnished with three (3)-point shoulder type seat belt. The seat belt shall be furnished with automatic retractor. Extension shall be provided with the seat belt so the male end can be easily grasped and the female end easily located while sitting in a normal position.

The seat back shall be removable for ease of access to components located behind the driver seat.

**OFFICER SEAT**

A SCBA seat with high-back shall be provided in the cab for the officer. The SCBA cavity shall be adjustable front to rear in 0.50" increments to accommodate different size SCBA bottles.

Moving the SCBA cavity shall be accomplished by unbolting, relocating and rebolting in the desired location.

The officer seat shall be furnished with three point shoulder type seat belts. The seat belts shall be furnished with automatic retractors. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

**RADIO COMPARTMENT**

A radio compartment shall be provided under the officer's seat.

The inside compartment dimensions shall be 14.50" deep x 14.50" across x 9.00" high.

A drop-down door with a chrome plated lift and turn latch shall be provided for access.

The compartment shall be constructed of smooth aluminum and painted to match the cab interior.

**REAR FACING PASSENGER SIDE OUTBOARD SEATS**

One (2) rear facing SCBA seats shall be provided one (1) on the passenger side outboard position in crew cab, one (1) on the driver side outboard position in crew cab,. The SCBA cavity shall be adjustable front to rear in .50" increments to accommodate different size SCBA bottles.

Moving the SCBA cavity shall be accomplished by unbolting, relocating and rebolting in the desired location.

Seat shall be furnished with three-point shoulder type seat belt. The seat belt shall be furnished with automatic retractors. Extension shall be provided with the seat belt so the male end can be easily grasped and the female end easily located while sitting in a normal position.

**FORWARD FACING CENTER SEATS**

There shall be two (2) forward facing, Seats Incorporated 911 SCBA seats provided at the center position in the crew cab. The SCBA cavity shall be adjustable front to rear in .50" increments to accommodate different size SCBA bottles.

Moving the SCBA cavity shall be accomplished by unbolting, relocating and rebolting in the desired location.

The seats shall be furnished with a three three-point, shoulder type seat belt. The seat belts shall be furnished with automatic retractors. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

**AIR BOTTLE HOLDERS**

All SCBA type seats in the cab shall have a "Hands-Free" auto clamp style bracket in its backrest. For efficiency and convenience, the bracket shall include an automatic spring clamp that allows the occupant to store the SCBA bottle by simply pushing it into the seat back. For protection of all occupants in the cab, in the event of an accident, the inertial components within the clamp shall constrain the SCBA bottle in the seat and shall exceed the NFPA standard of 9G. Bracket designs with manual restraints (belts, straps, buckles) that could be inadvertently left unlocked and allow the SCBA to move freely within the cab during an accident, shall not be acceptable.

There shall be a quantity of four (4) SCBA brackets.

**SEAT BELTS**

All seating positions in the cab and crew cab shall have red seat belts.

**SHOULDER HARNESS HEIGHT ADJUSTMENT**

All seating positions furnished with three (3)-point shoulder type seat belts shall include a height adjustment. This adjustment shall optimize the belts effectiveness and comfort for the seated firefighter.

**SEAT BELT ANCHOR STRENGTH**

Seat belt attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat belt anchor design shall withstand 3000 lbs of pull on both the lap and shoulder belt. The bidder shall certify that each anchor design was pull tested to the required force and met the appropriate criteria.

**SEAT MOUNTING STRENGTH**

Seat attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat mounting design shall be tested to withstand 20 G's of force. The bidder shall certify that each seat mount and cab structure design was pull tested to the required force and met the appropriate criteria.

**SEAT BELT MONITORING SYSTEM**

A seat belt monitoring system (SBMS) shall be provided. The SBMS shall be capable of monitoring up to ten (10) seat positions indicating the status of each seat position with a green or red LED indicator as follows:

Driver Seat:

Seat Occupied Buckled Green

No Occupant Unbuckled Not Illuminated

The driver seat shall not include an occupant sensor. The display indication for the driver seat shall illuminate red any time the parking brake is released and the driver seat belt is not buckled.

All Other Seats:

Seat Occupied Buckled Green

Seat Occupied Unbuckled Red

No Occupant Buckled Red

No Occupant Unbuckled Not Illuminated

Alarm:

The SBMS shall include an audible alarm that shall be activated when a red illumination condition exists and the parking brake is released, or a red illumination condition exists and the transmission is not in park.

**CAB MEDICAL COMPARTMENT**

A cabinet shall be provided in the crew cab area along the rear wall of the cab. This cabinet will be used to store medical supplies and equipment. The size should be approximately 40” wide 24” deep and run from floor to ceiling. There shall be two adjustable shelves provided.

A single rollup door shall be provided on the front of the compartment

This compartment shall have both 120 volt AC from shore power and 12 DC power sources.

**EMS COMPARTMENT**

A forward facing EMS compartment shall be provided in the crew cab located at the passenger side outboard position.

The compartment shall be 17.00" wide x 60.00" high x 14.00" deep with one (1) vertically hinged door, locking. The clear door opening of the compartment shall be 57.50" high x 14.50" wide.

The compartment shall be constructed of smooth aluminum, and painted to match the cab interior.

**COMPARTMENT LIGHT**

There shall be one (1) LED strip light installed on the left side of the compartment opening. The lights shall be controlled by an automatic door switch.

**EMS COMPARTMENT**

A forward facing EMS compartment shall be provided in the crew cab located at the driver side outboard position.

The compartment shall be 17.00" wide x 60.00" high x 14.00" deep with one (1) vertically hinged door, locking. The clear door opening of the compartment shall be 57.50" high x 14.50" wide.

The compartment shall be constructed of smooth aluminum, and painted to match the cab interior.

**COMPARTMENT LIGHTS**

There shall be two (2) LED strip light installed on both sides of the compartment door opening. The lights shall be controlled by an automatic door switch.

**HELMET STORAGE, BY FIRE DEPARTMENT**

NFPA 1901, 2009 edition, section 14.1.8.4.1 requires a location for helmet storage be provided.

There is no helmet storage on the apparatus as manufactured. The fire department shall provide all necessary provisions and or brackets required for the storage of crew helmets.

**FRONTAL IMPACT PROTECTION**

The cab shall be equipped with a frontal impact protection system consisting of one (1) air bag in front of the driver, one (1) knee bolster air bag in front of the forward passenger seating position, and S4 for suspension seats or belt pretensioners for fixed seats in the driver and forward passenger positions. The air bags shall be designed specifically for the cab configurations.

The cab and chassis design shall have been subjected, via third party test facility, to a 21 MPH crash impact during frontal and oblique impact testing. Testing shall include all major chassis and cab components such as mounting straps for fuel and air tanks, suspension mounts, front suspension components, rear suspension components, frame rail cross members, engine and transmission and their mounts, pump house and mounts, frame extensions and body mounts. The testing shall provide configuration specific information used to optimize the timing for firing the air bags. (no exception)

The driver side air bag shall be mounted in the steering wheel and shall be designed to protect the head and upper torso of the occupant, when used in combination with the 3-point seat belt, in the event of a frontal or oblique impact. The passenger side knee bolster air bag shall be mounted in the modesty panel below the dash panel and shall be designed to protect the legs of the occupant, when used in combination with the 3-point seat belt, in the event of a frontal or oblique impact.

In the event of a frontal or oblique impact, the system shall deploy the front driver and passenger side air bags, and activate the following components integrated into the driver and front passenger cab seats:

- Suspension seats shall be retracted to lowest travel position.

- Seat belts shall be pretensioned to firmly hold the occupants in place.

**ADVANCED SIDE ROLL PROTECTION PACKAGE**

An advanced side roll protection system shall be provided. The system shall be a supplemental restraint system designed for use with seat belts. The system shall be designed for a fast or slow vehicle 90-degree roll to the side, where the vehicle comes to rest on its side. The system shall consist of the following key components:

Side air bags shall only be provided outboard of the driver and officer forward positions. The side air bag shall be a tubular structure that extends diagonally across the width of the side window to help keep the occupant's head inside the vehicle and away from the window opening.

An integral suspension seat safety system shall be installed on the driver's seat. When activated, this system shall remove excess slack from the seat belt and retract the seat to its lowest travel position.

Seat belt pretensioners shall be provided in the remaining seating positions. When activated, these pretensioners shall remove excess slack from the seat belt.

Side wall impact-absorbing cushions shall be provided outboard of the crew cab seating positions.

A Side Roll Sensor shall be installed in the cab above the engine tunnel between the head liner and the cab roof skin. The sensor shall analyze the vehicle's angle and rate of roll to activate the advanced occupant restraints 120ms before the cab reaches 60 degrees from vertical. In the event of a side roll, the sensor shall activate the advanced occupant restraints. The sensor shall not activate in the event of a frontal impact, side impact, or any other incidents not involving a vehicle side rollover. If more than eight protective devices are required, a slave side roll sensor shall be provided with capacity for additional protective devices. The sensor(s) shall perform real time diagnostics of all critical subsystems and shall record sensory inputs immediately before and during a side roll event. A fault-indicating light shall be provided on the vehicles instrument panel.

The apparatus shall have four (4) crew seats in the crew cab.

Apparatus with tiller cabs shall include seats with seat belts. The tiller cab shall not be equipped with any side roll protection components.

**TEN (10) YEAR STRUCTURAL INTEGRITY**

The cab shall be provided with a ten (10) year material and workmanship limited warranty. The warranty shall cover such portions of the cab built by the

manufacturer as being free from structural failures caused by defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package

**ENGINE COMPARTMENT LIGHT**

An engine compartment light shall be installed under the engine hood, of which the switch is an integral part. Light shall have a .125" diameter weep hole in its lens to prevent moisture retention.

**CAB INTERIOR LIGHTING**

Auxiliary lights shall be provided in the cab and consisting of:

- Two (2) red/clear dome light located, one (1) on the officer side and one (1) on the driver side, controlled by the following:

Clear forward light controlled by the door switch and the lens switch.

Red rearward light controlled by the lens switch.

- Two (2) Adjustable Map Lights: With switches mounted on the cab ceiling.

**CREW CAB INTERIOR LIGHTING**

Auxiliary lights shall be provided in the crew cab and consist of:

- Two (2) red/clear dome lights located one (1) each side, controlled by the following:

Clear forward light controlled by the door switch and the lens switch.

Red rearward light controlled by the lens switch.

- A courtesy light at each door opening, controlled by automatic door switches

**STEP LIGHTS**

For reduced overall maintenance costs compared to incandescent lighting, there shall be four (4) LED, step lights provided. The lights shall be installed at each cab and crew cab door, one (1) per step, in the driver side front doorstep, driver side crew cab doorstep, passenger side front doorstep and passenger side crew cab doorstep.

The lights shall be activated when the adjacent door is opened.

**CAB DEFROSTER**

There shall be a 41,000 BTU/hr defroster in the cab located under the engine tunnel.

The defroster ventilation shall be built into the design of the cab dash instrument panel and shall be easily removable for maintenance.

The defroster shall have a three (3) speed blower, and temperature controls accessible to the driver and officer.

The defroster ducts shall be designed to provide maximum defrosting capabilities for the front cab windows.

**CAB/CREW CAB HEATER**

Two (2) auxiliary heaters with 32,000 BTU/hr each shall be provided in the cab. The heaters shall have a three (3) speed blower, and temperature controls accessible to the driver and officer. There shall also be louvers located below the rear facing seat riser and below the driver and officer positions for airflow.

The heaters shall be mounted, one (1) within each rear facing seat riser.

**CAB DEFROSTER CERTIFICATION**

Visibility during inclement weather is essential to safe apparatus performance. The defroster system shall clear the required windshield zones The bidder shall certify that the defrost system design has been tested in a cold chamber and passes.

**CAB HEATER CERTIFICATION**

Good cab heat performance and regulation provides a more effective working environment for personnel, whether in-transit, or at a scene. The cab heaters shall warm the cab 75 F from a cold-soak, within 30 minutes when tested using the coolant supply methods The bidder shall certify that a substantially similar cab has been tested.

**AIR CONDITIONING**

A high performance, customized air conditioning system shall be furnished inside the cab and crew cab. A 19.1 cubic inch compressor shall be installed on the engine.

The air conditioning system shall be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 78 degrees Fahrenheit within 30 minutes at 50% relative humidity. The cooling performance test shall be run only after the cab has been heat soaked at 100 degrees Fahrenheit for a minimum of 4 hours.

A combination condenser and evaporator with a BTU rating sufficient to meet the performance specification shall be installed on each side of the cab roof. Mounting the condenser below the cab or body would reduce the performance of the system and shall not be acceptable.

The evaporator unit shall have a BTU rating sufficient to meet and exceed the performance specifications. Adjustable air outlets shall be strategically located on the evaporator cover as follows:

Two (2) shall be directed towards the drivers location

Two (2) shall be directed towards the officers location

Eight (8) shall be directed towards the crew cab area

The air conditioner refrigerant shall be R-134A, installed by a certified technician.

The air conditioner shall be controlled by a single electronic control panel. For ease of operation, the control panel shall include variable adjustment for temperature and fan control and be conveniently located on the dash in clear

view of the driver. The control panel shall include robust knobs for both fan speed and temperature adjustment.

**INTERIOR CAB INSULATION**

The cab shall be insulated with 1.50" insulation in the ceiling and side walls, 2.00" in the rear wall, and 1.00" insulation on the slant of a raised roof to reduce heat transfer into the cab.

The insulation shall be covered with a vinyl liner or a metal panel painted to match the interior.

An additional red warning light shall be installed to the side of the exterior air conditioning housing. The light shall match the upper zone lighting package to meet NFPA requirements.

**AIR CONDITIONING HOUSINGS**

The housings protecting the air conditioning units on either side of the cab shall be fabricated from smooth aluminum. The back of the housings shall be contoured to match the slope of the raised roof. The housings shall be painted to match the exterior of the cab roof, in place of the standard 4-way aluminum.

**CAB INSTRUMENTATION**

The cab instrument panel shall include gauges, telltale indicator lamps, control switches, alarms, and a diagnostic panel. The function of the instrument panel controls and switches shall be identified by a label adjacent to each item. Actuation of the headlight switch shall illuminate the labels in low light conditions. Telltale indicator lamps shall not be illuminated unless necessary. The cab instruments and controls shall be conveniently located within the forward cab section, forward of the driver. The gauge assembly and switch panels are designed to be removable for ease of service and low cost of ownership.

**GAUGES**

The gauge panel shall include the following nine (9) black faced gauges with black bezels to monitor vehicle performance:

Voltmeter gauge (volts):

Low volts (11.8 VDC)

Amber telltale light on indicator light display with steady tone alarm

High volts (15.5 VDC)

Amber telltale light on indicator light display with steady tone alarm

Engine Tachometer (RPM)

Speedometer MPH

Fuel level gauge (Empty - Full in fractions):

Low fuel (1/8 full)

Amber telltale light on indicator light display with steady tone alarm

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| | Yes | No |
| Engine Oil pressure Gauge (PSI)<br>Low oil pressure to activate engine warning lights and alarms<br>Red telltale light on indicator light display with steady tone alarm<br>Front Air Pressure Gauges (PSI)<br>Low air pressure to activate warning lights and alarm<br>Red telltale light on indicator light display with steady tone alarm<br>Rear Air Pressure Gauges (PSI)<br>Low air pressure to activate warning lights and alarm<br>Red telltale light on indicator light display with steady tone alarm<br>Transmission Oil Temperature Gauge (Fahrenheit):<br>High transmission oil temperature activates warning lights and alarm<br>Amber telltale light on indicator light display with steady tone alarm<br>Engine Coolant Temperature Gauge (Fahrenheit):<br>High engine temperature activates an engine warning light and alarms<br>Red telltale light on indicator light display with steady tone alarm<br>**INDICATOR LAMPS**<br>To promote safety, the following telltale indicator lamps shall be located on the instrument panel in clear view of the driver. The indicator lamps shall be "dead-front" design that is only visible when active. The colored indicator lights shall have descriptive text or symbols.<br>The following amber telltale lamps shall be present:<br>Low coolant<br>Trac cntl (traction control) (where applicable)<br>Check engine<br>Check trans (check transmission)<br>Air rest (air restriction)<br>Driver door open<br>Passenger door open<br>Tower (tower raised) (where applicable)<br>DPF (engine diesel particulate filter regeneration)<br>HET (engine high exhaust temperature) (where applicable)<br>ABS (antilock brake system) | | |

| Specification for Rapid City Fire Department Structure Pumpers w/ 2007 Engine | Bidder Complies | |
|---|---|---|
| | Yes | No |
| MIL (engine emissions system malfunction indicator lamp) (where applicable)<br><br>Regen inhibit (engine emissions regeneration inhibit) (where applicable)<br><br>Trans temp (transmission temperature)<br><br>Side roll fault (where applicable)<br><br>Front air bag fault (where applicable)<br><br>Aux brake overheat (auxiliary brake overheat) (where applicable)<br><br>The following red telltale lamps shall be present:<br><br>Ladder rack down<br><br>Parking brake<br><br>Stop engine<br><br>The following green telltale lamps shall be present:<br><br>Left turn<br><br>Right turn<br><br>Battery on<br><br>Ignition<br><br>Aux brake (auxiliary brake engaged) (where applicable)<br><br>The following blue telltale lamps shall be present:<br><br>High beam<br><br>**ALARMS**<br>Audible steady tone warning alarm: A steady audible tone alarm shall be provided whenever a warning message is present.<br><br>**INDICATOR LAMP AND ALARM PROVE-OUT**<br>A system shall be provided which automatically tests telltale indicator lights and alarms located on the cab instrument panel. Telltale indicators and alarms shall perform prove-out when the ignition switch is held in the up position for three (3) to five (5) seconds to ensure proper performance.<br><br>**CONTROL SWITCHES**<br>For ease of use, the following controls shall be provided immediately adjacent to the cab instrument panel within easy reach of the driver. All switches shall have backlit labels for low light applications.<br><br>Headlight/Parking light switch: A three (3)-position maintained rocker switch shall be provided. The first switch position shall deactivate all parking and headlights. The second switch position shall activate the parking lights. The third switch shall activate the headlights.<br><br>Panel backlighting intensity control switch: A variable voltage control switch shall be provided. The switch moved in the up direction increases the panel | | |

backlighting intensity to a maximum and the switch moved in a down direction decreases the panel backlighting intensity to a minimum level.

Ignition switch: A three (3)-position maintained/momentary rocker switch shall be provided. The first switch position shall deactivate vehicle ignition. The second switch position shall activate vehicle ignition. The third momentary position shall perform prove-out on the telltale indicators and alarms when the ignition switch is held in the up position for three (3) to five (5) seconds to ensure proper performance. A green indicator lamp is activated with vehicle ignition.

Engine start switch: A two (2)-position momentary rocker switch shall be provided. The first switch position is the default switch position. The second switch position shall activate the vehicle's engine. The switch actuator is designed to prevent accidental activation.

Hazard switch shall be incorporated into the steering column.

Heater and defroster controls.

Turn signal arm: A self-canceling turn signal with high beam headlight controls.

Windshield wiper control shall have high, low, and intermittent modes.

Parking brake control: An air actuated push/pull park brake control.

Chassis horn control: Activation of the chassis horn control shall be provided through the center of the steering wheel.

**CUSTOM SWITCH PANELS**

The design of cab instrumentation shall allow for emergency lighting and other switches to be placed within easy reach of the operator, thus improving safety. There shall be positions for up to three (3) switch panels in the overhead console on the driver's side, up to five (5) switch panels in the engine tunnel console, and up to three (3) switch panels in the overhead console on the officer's side. All switches have backlit labels for low light applications.

High idle engagement switch: A maintained rocker switch with integral indicator lamp shall be provided. The switch shall activate and deactivate the high idle function. The "Ok To Engage High Idle" indicator lamp must be active for the high idle function to engage. A green indicator lamp integral to the high idle engagement switch shall indicate when the high idle function is engaged.

"Ok To Engage High Idle" indicator lamp: A green indicator light shall be provided next to the high idle activation switch to indicate that the interlocks have been met to allow high idle engagement.

Diesel particulate filter regeneration switch (where applicable).

Diesel particulate filter regeneration inhibit switch (where applicable).

**DIAGNOSTIC PANEL**

A diagnostic panel shall be accessible while standing on the ground and shall be located inside the driver's side door, left of the steering column. The diagnostic panel shall allow diagnostic tools such as computers to connect to various vehicle systems for improved troubleshooting providing a lower cost of ownership. Diagnostic switches shall allow engine and ABS systems to provide blink codes should a problem exist. The diagnostic panel shall include the following:

Engine diagnostic port

Transmission and ABS diagnostic port

Roll sensor diagnostic port

Engine diagnostic switch (blink codes flashed on check engine telltale indicator)

ABS diagnostic switch (blink codes flashed on ABS telltale indicator)

- High Air Restriction Warning Indicator Light (electronic).

**WIPER CONTROL**

Wiper control shall consist of a two (2)-speed individual windshield wiper control with intermittent feature and windshield washer controls. The control shall also have a "return to park" provision, which allows the wipers to return to the stored position when the wipers are not in use.

**RADIO ANTENNA MOUNT**

An antenna-mounting base for a VHF Digital radio with ample coax cable and weatherproof cap shall be provided for a two-way radio.

The mount shall be located on the cab roof just to the rear of the officer seat.

The cable shall be routed to the center of the dash.

**SWITCH PANELS**

The built-in emergency light switch panel shall have a master switch plus individual switches for selective control. The switch panel shall be located in the "overhead" position above the windshield on the driver's side to allow for easy access. Switches shall be rocker type with an indicator light, of which is an integral part of the switch.

**ELECTRICAL POWER CONTROL SYSTEM**

A compartment shall be provided in or under the cab to house the vehicle's electrical power and signal circuit protection and control components. The power and signal protection and control compartment shall contain circuit protection devices and power control devices. Power and signal protection and control components shall be protected against corrosion, excessive heat, excessive vibration, physical damage and water spray.

Serviceable components shall be readily accessible.

Circuit protection devices, which conform to SAE standard, shall be utilized to protect each circuit. All circuit protection devices shall be sized to prevent wire and component damage when subjected to extreme current overload. General protection circuit breakers shall be Type-I automatic reset (continuously resetting) and conform to SAE J553 or J258. PTO power circuits shall be protected by Type III manual reset non-cycling circuit breakers conforming to SAE J553 or J258 which remain open until manually reset. When required, automotive type fuses conforming to SAE J554, J1284, J1888 or J2077 shall be utilized to protect electronic equipment.

Power control relays and solenoids shall have a direct current (dc) rating of 125 percent of the maximum current for which the circuit is protected.

Visual status indicators shall be supplied to identify control safety interlocks and vehicle status. In addition to visual status indicators, audible alarms designed to provide early warning of problems before they become critical shall be used.

**VOLTAGE MONITOR SYSTEM**

A voltage monitor system shall be provided to indicate the status of each battery system connected to the vehicles electrical load. The monitor system shall provide visual and audio warning when the system voltage is above or below optimum levels.

**POWER AND GROUND STUDS**

A 12-volt power stud and a grounding stud shall be provided in the electrical component compartment for two-way radio equipment.

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

The apparatus proposed shall have the ability to operate in the electromagnetic environment typically found in fire ground operations. The contractor shall be able to demonstrate the EMI and RFI testing has been done on similar apparatus and certifies that the vehicle proposed meets SAE J551 requirements.

EMI/RFI susceptibility shall be controlled by applying immune circuit designs, shielding, twisted pair wiring and filtering. The electrical system shall be designed for full compatibility with low level control signals and high powered two-way radio communication systems. Harness and cable routing shall be given careful attention to minimize the potential for conducting and radiated EMI-RFI susceptibility.

**VEHICLE DATA RECORDER**

A vehicle data recorder (VDR) shall be provided. The VDR shall be capable of reading and storing vehicle information. The VDR shall be capable of operating in a voltage range from 8VDC to 16VDC. The VDR shall not interfere with, suspend, or delay any communications that may exist on the

CAN data link during the power up, initialization, runtime, or power down sequence. The VDR shall continue operation upon termination of power or at voltages below 8VDC for a minimum of 10ms.

The information stored on the VDR can be downloaded through a USB port mounted in a convenient location determined by cab model. A CD provided with the apparatus shall include the programming to download the information from the VDR. A USB cable can be used to connect the VDR to a laptop to retrieve required information.

The vehicle data recorder shall be capable of recording the following data via hardwired and/or CAN inputs:

Vehicle Speed - MPH

Acceleration - MPH/sec

Deceleration - MPH/sec

Engine Speed - RPM

Engine Throttle Position - % of Full Throttle

ABS Event - On/Off

Seat Occupied Status - Yes/No by Position (7-12 Seating Capacity)

Seat Belt Buckled Status - Yes/No by Position (7-12 Seating Capacity)

Master Optical Warning Device Switch - On/Off

Time - 24 Hour Time

Date - Year/Month/Day

**BATTERY SYSTEM**

Six (6) 12 volt, batteries that include the following features shall be provided:

- 950 CCA, cold cranking amps

- 190 amp reserve capacity

- High cycle

- Group 31

- Rating of 5700 CCA at 0 degrees Fahrenheit

- 1140 minutes of reserve capacity

- Threaded stainless steel studs

Each battery case shall be a black polypropylene material with a vertically ribbed container for increased vibration resistance. The cover shall be manifold vented with a central venting location to allow a 45 degree tilt capacity.

The inside of each battery shall consist of a "maintenance free" grid construction with poly wrapped separators and a flooded epoxy bottom anchoring for maximum vibration resistance.

**STARTING SYSTEM**

A single starting system shall be provided.

An ignition switch and starter button shall be located on the instrument panel.

**MASTER BATTERY SWITCH**

A master battery switch, to activate the battery system, shall be provided inside the cab within easy reach of the driver.

An indicator light shall be provided on the instrument panel to notify the driver of the status of the battery system.

**BATTERY COMPARTMENTS**

Batteries shall be placed on non-corrosive mats and be stored in well-ventilated compartments located under the cab. The battery hold-downs shall be of a non-corrosive material. All bolts and nuts shall be stainless steel.

Heavy-duty battery cables shall be used to provide maximum power to the electrical system. Cables shall be color-coded.

Battery terminal connections shall be coated with anti-corrosion compound. Battery solenoid terminal connections shall be encapsulated with semi-permanent rubberized compound.

There shall be a door in the crew cab floor to provide access to the battery terminals.

**JUMPER STUDS**

One (1) set of battery jumper studs with plastic color-coded covers shall be installed on the front side of battery box on the driver's side. This shall allow enough room for easy jumper cable access.

**BATTERY CHARGER**

A battery charger with controller shall be provided.

The battery charger shall be wired to the AC auto eject shoreline inlet located near the driver’s side front door.

A remote indicator shall be included.

Battery charger shall be located in the crew cab seat riser.

The battery charger indicator shall be located on the driver's seat riser.

**ALTERNATOR**

An alternator shall be provided. It shall have a rated output current of 400 amp. It shall have a high volume air cooling fan and fan guard. It shall also have a custom three (3)-set point voltage regulator. The alternator shall be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

**SPARE CIRCUIT**

There shall be one (1) pair of wires, including a positive and a negative, installed on the apparatus.

The above wires shall have the following features:

The positive wire shall be connected directly to the battery power.

The negative wire shall be connected to ground.

Wires shall be protected to 15 amps at 12 volts DC.

Power and ground shall terminate between driver and officer seat on dashboard.

Termination shall be with 15 amp, power point plug with rubber cover.

Wires shall be sized to 125% of the protection.

This circuit(s) may be load managed when the parking brake is set.

**ELECTRONIC LOAD MANAGEMENT**

An electronic load management (ELM) system shall be provided that monitors the vehicles 12-volt electrical system, and automatically reduces the electrical load in the event of a low voltage condition and by doing so, ensures the integrity of the electrical system.

The ELM shall monitor the vehicle's voltage while at the scene (parking brake applied). It shall sequentially shut down individual electrical loads when the system voltage drops below a preset value. Five (5) separate electrical loads shall be controlled by the load manager. The ELM shall sequentially re-energize electrical loads as the system voltage recovers.

The (ELM) also includes sequencer function for the five (5) managed loads and two (2) additional.

**AMP DRAW REPORT**

The bidder shall provide, at the time of bid and delivery, an itemized print out of the expected amp draw of the entire vehicle's electrical system.

The manufacturer of the apparatus shall provide the following:

1) Documentation of the electrical system performance tests.

2) A written load analysis, which shall include the following:

A) The nameplate rating of the alternator.

B) The alternator rating under the conditions specified per NFPA

C) The minimum continuous load of each component that is specified per NFPA.

D) Additional loads that, when added to the minimum continuous load, determine the total connected load.

E) Each individual intermittent load.

All of the above listed items shall be provided by the bidder per NFPA

**EXTERIOR LIGHTING**

Exterior lighting shall meet or exceed Federal Department of Transportation, Federal Motor Vehicle Safety Standards and National Fire Protection Association requirements in effect at time of proposal.

Front headlights shall be halogen, rectangular shape, one (1) pair mounted in each front trim housing.

The LED directional lights shall wrap-around on the outside corners of the trim housing. The headlight and LED directional lights shall be in the same assembly.

Five (5) LED clearance and marker lights shall be installed across the leading edge of the cab.

**WARNING LIGHTS (Cab Face)**

Four (4) Whelen Model M6*C LED flashing warning lights shall be installed on the cab face, above the headlights, mounted in a common bezel.

The driver's side front outside warning light to be red.

The driver's side front inside warning light to be red.

The passenger's side front inside warning light to be red.

The passenger's side front outside warning light to be red.

All four (4) lights shall include a clear lens.

All four (4) lights shall be controlled by a lighted switch in the cab on the switch panel.

The inside lights may be load managed if colored or disabled if white, when the parking brake is set.

**BACK-UP ALARM**

A solid-state electronic audible back-up alarm that actuates when the truck is shifted into reverse shall be provided. The device shall sound at 60 pulses per minute and automatically adjust its volume to maintain a minimum five (5) dBA above surrounding environmental noise levels.

**MANUAL, FIRE APPARATUS PARTS**

Two (2) custom parts manuals for the complete fire apparatus shall be provided in hard copy with the completed unit.

The manual shall contain the following:

- Job number

- Part numbers with full descriptions

- Table of contents

- Parts section sorted in functional groups reflecting a major system, component, or assembly

- Parts section sorted in Alphabetical order

- Instructions on how to locate a part

The manual shall be specifically written for the chassis and body model being purchased. It shall not be a generic manual for a multitude of different chassis and bodies.

**SERVICE PARTS INTERNET SITE**

The service parts information included in this manual is also available on the factory website. The website offers additional functions and features not contained in this manual, such as digital photographs and line drawings of select items. The website also features electronic search tools to assist in locating parts quickly.

**MANUALS, CHASSIS SERVICE**

Two (2) chassis service manuals containing parts and service information on major components shall be provided with the completed unit.

The manuals shall contain the following sections:

- Job number

- Table of contents

- Troubleshooting

- Front Axle/Suspension

- Brakes

- Engine

- Tires

- Wheels

- Cab

- Electrical, DC

- Air Systems

- Plumbing

- Appendix

The manual shall be specifically written for the chassis model being purchased. It shall not be a generic manual for a multitude of different chassis and bodies.

**MANUALS, CHASSIS OPERATION**

Two (2) chassis operation manuals shall be provided.

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|---|---|---|
| | Yes | No |
| **ELECTRICAL WIRING DIAGRAMS**<br>Two (2) electrical wiring diagrams, prepared for the model of chassis and body, shall be provided.<br><br>**WATER TANK**<br>Booster tank shall have a capacity of 750 gallons and be constructed of polypropylene plastic.<br><br>Tank joints and seams shall be nitrogen welded inside and out.<br><br>Tank shall be baffled in accordance with NFPA.<br><br>Baffles shall have vent openings at both the top and bottom to permit movement of air and water between compartments.<br><br>Longitudinal partitions shall be constructed of .38" polypropylene plastic and shall extend from the bottom of the tank through the top cover to allow for positive welding.<br><br>Transverse partitions shall extend from 4.00" off the bottom of the tank to the underside of the top cover.<br><br>All partitions shall interlock and shall be welded to the tank bottom and sides.<br><br>Tank top shall be constructed of .50" polypropylene. It shall be recessed .38" and shall be welded to the tank sides and the longitudinal partitions.<br><br>Tank top shall be sufficiently supported to keep it rigid during fast filling conditions.<br><br>Construction shall include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions. Two (2) of the dowels shall be drilled and tapped (.50" diameter, 13.00" deep) to accommodate lifting eyes.<br><br>A sump that is 8.00" long x 8.00" wide x 6.00" deep shall be provided at the bottom of the water tank.<br><br>Sump shall include a drain plug and the tank outlet.<br><br>Tank shall be installed in a fabricated cradle assembly constructed of structural steel.<br><br>Sufficient crossmembers shall be provided to properly support bottom of tank. Crossmembers shall be constructed of steel bar channel or rectangular tubing.<br><br>Tank shall "float" in cradle to avoid torsional stress caused by chassis frame flexing. Rubber cushions, .50" thick x 3.00" wide, shall be placed on all horizontal surfaces that the tank rests on.<br><br>Stops or other provision shall be provided to prevent an empty tank from bouncing excessively while moving vehicle.<br><br>Mounting system shall be approved by the tank manufacturer. | | |

Fill tower shall be constructed of .50" polypropylene and shall be a minimum of 8.00" wide x 14.00" long.

Fill tower shall be furnished with a .25" thick polypropylene screen and a hinged cover.

An overflow pipe, constructed of 4.00" schedule 40 polypropylene, shall be installed approximately halfway down the fill tower and extend through the water tank and exit to the rear of the rear axle.

**LIFETIME MATERIAL AND WORKMANSHIP**

The poly water tank shall be provided with a lifetime material and workmanship limited warranty.

A copy of the warranty certificate shall be submitted with the bid package

**HOSE BED**

The hose body shall be fabricated of .125"-5052 aluminum with a 38,000 psi tensile strength.

Hose body width shall be a minimum of 68.00" inside.

Upper and rear edges of side panels shall have a double break for rigidity, a split tube finish shall not be acceptable.

The upper inside area of the beavertails shall be covered with brushed stainless steel to prevent damage to painted surface when hose is removed.

Flooring of the hose bed shall be removable aluminum grating with the top surface corrugated to aid in hose aeration. The grating slats shall be a minimum of .50" x 4.50" with spacing between slats for hose ventilation.

Hose bed shall accommodate 1000' of 5.00" hose and 1000' of 2.50" hose..

Two (2) adjustable hosebed dividers shall be furnished for separating hose.

Each divider shall be constructed of a .125" brushed aluminum sheet fitted and fastened into a slotted, 1.50" diameter radiused extrusion along the top, bottom, and rear edge.

Partition shall be fully adjustable by sliding in tracks, located at the front and rear of the hose bed.

Divider shall be held in place by tightening bolts, at each end.

Acorn nuts shall be installed on all bolts in the hose bed which have exposed threads.

**HOSE RESTRAINT**

The hose in the hosebed shall be restrained by black nylon Velcro straps at the top of the hosebed and a black nylon web strap netting at the top and rear of the hosebed. The netting shall include quick release fasteners.

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|---|---|---|
| | Yes | No |
| **RUNNING BOARDS**<br>Running boards shall be fabricated of .125" bright aluminum treadplate.<br><br>Each running board shall be supported by a welded 2.00" square tubing and channel assembly, which shall be bolted to the pump compartment substructure.<br><br>Running boards shall be 12.75" deep and spaced .50" away from the pump panel.<br><br>A splashguard shall be provided above the running board treadplate.<br><br>**TAILBOARD**<br>Rear step shall also be constructed of .125" bright aluminum treadplate and spaced .50" from the body, as well as supported by a structural steel assembly.<br><br>The rear tailboard shall be 16.00" deep.<br><br>The exterior side shall be flanged down and in.<br><br>Flanges shall not be notched.<br><br>Entire rear surface between the beavertails shall be covered with smooth aluminum.<br><br>Inside surface of each beavertail in the hose bed area shall be covered with stainless steel to protect the paint finish.<br><br>The remaining inside surface of the beavertails shall be covered with bright aluminum treadplate.<br><br>**TOW BAR**<br>A tow bar shall be installed under the tailboard at center of truck.<br><br>Tow bar shall be fabricated of 1.00" CRS bar rolled into a 3.00" radius.<br><br>Tow bar assembly shall be constructed of .38" structural angle. When force is applied to the bar, it shall be transmitted to the frame rail.<br><br>Tow bar assembly shall be designed and positioned to allow up to a 30-degree upward angled pull of 17,000 pounds, or a 20,000-pound straight horizontal pull in line with the centerline of the vehicle.<br><br>Tow bar design shall have been fully tested and evaluated using strain gauge testing and finite element analysis techniques.<br><br>**COMPARTMENTATION**<br>Body and compartments shall be fabricated of .125", 5052-H32 aluminum with a tensile strength range of 31,000 to 38,000 psi.<br><br>Side compartments shall be an integral assembly with the rear fenders.<br><br>Circular fender liners shall be provided for prevention of rust pockets and ease of maintenance. | | |

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|---|---|---|
| | Yes | No |
| Compartment flooring shall be of the sweep out design with the floor higher than the compartment door lip.<br><br>The compartment door opening shall be framed by flanging the edges in 1.75" and bending out again .75" to form an angle.<br><br>Drip protection shall be provided above the doors by means of bright aluminum extrusion, formed bright aluminum treadplate or polished stainless steel.<br><br>The top of the compartment shall be covered with bright aluminum treadplate rolled over the edges on the front, rear and outward side. These covers shall have the corners "TIG" welded.<br><br>Side compartment covers shall be separate from the compartment tops.<br><br>Front facing compartment walls shall be covered with bright aluminum treadplate.<br><br>All screws and bolts which protrude into a compartment shall have acorn nuts on the ends to prevent injury.<br><br>**UNDERBODY SUPPORT SYSTEM**<br>Due to the severe loading requirements of this pumper a method of body and compartment support suitable for the intended load shall be provided.<br><br>The backbone of the support system shall be the chassis frame rails which is the strongest component of the chassis and is designed for sustaining maximum loads.<br><br>The support system shall include .375" thick steel vertical angle supports bolted to the chassis frame rails with .625" diameter bolts.<br><br>Attached to the bottom of the steel vertical angles shall be horizontal angles, with gussets welded to the vertical members, which extend to the outside edge of the body.<br><br>A steel frame shall be mounted on the top of these supports to create a "floating substructure" which shall result in a 500 pound equipment support rating per lower compartment.<br><br>The floating substructure shall be separated from the horizontal members with neoprene elastomer isolators. These isolators shall reduce the natural flex stress of the chassis from being transmitted to the body.<br><br>Isolators shall have a broad load range, proven viability in vehicular applications, be of a fail safe design and allow for all necessary movement in three (3) transitional and rotational modes.<br><br>The neoprene isolators shall be installed in a modified "V" three (3)-point mounting pattern to reduce the natural flex of the chassis being transmitted to the body.<br><br>A design with body compartments hanging on the chassis in an unsupported fashion shall not be acceptable. | | |

**AGGRESSIVE WALKING SURFACE**

All exterior surfaces designated as stepping, standing, and walking areas shall comply with the required average slip resistance of the current NFPA standards.

**LOUVERS**

All body compartments shall have a minimum of one (1) set of louvers stamped into a wall to provide the proper airflow inside the compartment and to prevent water from dripping into the compartment. These louvers shall be formed into the metal and not added to the compartment as a separate plate.

**COMPARTMENTATION, DRIVER'S SIDE**

A full height, roll-up door compartment ahead of the rear wheels shall be provided. The interior dimensions of this compartment shall be 34.50" wide x 58.25" high x 25.88" deep in the lower 26.00" of the compartment and 12.00" deep in the remaining upper portion. The height of the compartment shall be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 28.75" wide x 58.25" high.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

A roll-up door compartment over the rear wheels shall be provided. The interior dimensions of this compartment shall be 66.50" wide x 25.38" high x 12.00" deep. The height of the compartment shall be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 58.25" wide x 25.12" high.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

A full height, roll-up door compartment behind the rear wheels shall be provided. The interior dimensions of this compartment shall be 47.50" wide x 58.25" high x 25.88" deep in the lower 26.00" of height and 12.00" deep in the remaining upper section of the compartment. The height of the compartment shall be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 44.75" wide x 58.25" high.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

**COMPARTMENTATION, PASSENGER'S SIDE**

A full height, roll-up door compartment ahead of the rear wheels shall be provided.. The interior dimensions of this compartment shall be 34.50" wide x 58.25" high x 25.88" deep in the lower 26.00" of the compartment and 12.00" deep in the remaining upper portion. The height of the compartment shall be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 28.75" wide x 58.25" high. Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

A roll-up door compartment over the rear wheels shall be provided. The interior dimensions of this compartment shall be 66.50" wide x 25.38" high x 12.00" deep. The height of the compartment shall be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 58.25" wide x 25.12" high. Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

A full height, roll-up door compartment behind the rear wheels shall be provided. The interior dimensions of this compartment shall be 47.50" wide x 58.25" high x 12.00" deep. A section of this compartment shall be 25.88" deep x 47.50" wide x 26.00" high directly behind the rear wheels. The height of the compartment shall be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 44.75" wide x 58.25" high. Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

**DOORS, SIDE COMPARTMENT**

Seven (7) compartment doors shall be provided with roll-up doors.

The roll-up doors shall be double faced, aluminum construction and manufactured by Amdor, Inc. These doors shall be painted one color to match the lower portion of the body.

A stainless steel lift bar shall be provided for opening door. It shall be located at the bottom of door and have latches on the outer extrusion of the door frame. A ledge shall be supplied over lift bar for additional area to aid in closing the door.

A heavy-duty magnetic switch shall be used for control of the "Open Compartment Door" warning lights.

The door frames shall be capable of mounting Luma Bar compartment lighting.

**COMPARTMENTATION, REAR**

A roll-up door compartment above the rear tailboard shall be provided.

Interior dimensions of this compartment shall be 40.00" wide x 47.38" high x 25.88" deep in the lower 38.75" of height and 15.75" deep in the remaining upper portion. Depth of the compartment shall be calculated with the compartment door closed.

A louvered, removable access panel shall be furnished on the back wall of the compartment.

Rear compartment shall be open into the rear side compartments.

Clear door opening of this compartment shall be 33.25" wide x 38.75" high.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

**DOOR(S), REAR COMPARTMENT**

The rear roll-up door(s) shall be double faced, aluminum construction and manufactured by Amdor, Inc. This door shall be satin aluminum.

A heavy-duty magnetic switch shall be used for control of the "Open Compartment Door" warning lights.

The door frames shall be capable of mounting Luma Bar compartment lighting.

**PULL-OUT TRAY**

There shall be four (4) slide-out trays with 2.00" sides and a minimum capacity of 500 pounds provided. Capacity rating shall be in the extended position.

Slides shall be General Device ball bearing type for ease of operation and years of dependable service.

Automatic locks shall be provided for both the "in" and "out" positions. The trip mechanism for it shall be located at the front of the tray for ease of use with a gloved hand.

Tray location shall be One tray in compartments D1, D3, P1 & P3.

Heavy-duty steel angle iron assembly shall support the body under the compartment floor. It shall be attached to the chassis frame for load transfer and to reduce stress on body.

**ADJUSTABLE SHELVES**

There shall be eight (8) shelves, with a minimum capacity of 215 pounds provided. The shelf construction shall consist of .125" pan-shaped aluminum with 2.00" sides. Each shelf shall be infinitely adjustable by means of a threaded fastener, which slides in a track.

The location shall be One shelf in D1, D2, D3, P1, P2, P3 and Two shelves in R1.

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|---|---|---|
| | Yes | No |
| **MOUNTING TRACKS**<br>There shall be eight (8) sets of tracks for mounting shelf(s) in all body compartments. These tracks shall be installed vertically to support the adjustable shelf(s).<br><br>**RUB RAIL**<br>Bottom edge of the side compartments shall be trimmed with a bright aluminum extruded rub rail.<br><br>Trim shall be 2.12" high with 1.38" flanges turned outward for rigidity.<br><br>The rub rails shall not be an integral part of the body construction, which allows replacement in the event of damage.<br><br>**BODY FENDER CROWNS**<br>Stainless steel fender crowns shall be provided around the rear wheel openings.<br><br>A rubber welting shall be provided between the body and the crown to seal the seam and restrict moisture from entering.<br><br>A dielectric barrier shall be provided between the fender crown fasteners (screws) and the fender sheet metal to prevent corrosion.<br><br>**HANDRAILS**<br>The handrails shall be 1.25" diameter anodized aluminum extrusion, with a ribbed design, to provide a positive gripping surface.<br><br>Chrome plated end stanchions shall support the handrail. Plastic gaskets shall be used between end stanchions and any painted surfaces.<br><br>Drain holes shall be provided in the bottom of all vertically mounted handrails.<br><br>- Four (4) handrails shall be provided, two above each side pump panel.<br><br>- One (1) vertical handrail shall be provided on the driver's side body, on the front bulkhead door frame.<br><br>- One (1) vertical handrail, not less than 29.00" long, shall be located on each rear beavertail.<br><br>- One (1) full width horizontal handrail shall be provided below the hose bed at the rear of the apparatus.<br><br>- Two (2) handrails shall be provided mounted front of body, one each side mounted vertical..<br><br>**AIR BOTTLE STORAGE (Single bottle)**<br>A total of four (4) air bottle compartments shall be provided and located recessed in body fender panel, two each side of truck.. The air bottle compartment shall be in the form of a round tube (7.63" diameter minimum) and of adequate depth to accommodate different size air bottles. Flooring shall be rubber lined and have a drain hole. A stainless steel door with a chrome-plated latch shall be provided to contain the air bottle. A dielectric barrier shall be provided between the door hinge, hinge fasteners and the body sheet metal. | | |

A stainless steel scuffplate shall be provided around each air bottle compartment opening. The scuffplates shall not be visible when the air bottle compartment door is closed.

**EXTENSION LADDER**
There shall be a 24', two (2) section, aluminum, Duo-Safety, Series 900-A extension ladder provided.

**ROOF LADDER**
There shall be a 14' aluminum, Duo-Safety, Series 775-A roof ladder provided.

**LADDER STORAGE**
The ladders shall be stored between the water tank and the passenger's side compartments.

The ladders shall extend into the pump compartment just to the rear of the water pump discharges.

The ladder storage area shall be enclosed as practical by means of sheet metal to protect the ladders from road dirt. The ladders that extend into the pump house shall also be enclosed. A black rubber boot shall be provided to enclosed the ladders in the gap between the pump house and the body.

Each ladder shall be stored vertically in a separate stainless steel storage trough. Each stainless steel trough shall be lined with Dura-Surf nylon slides.

A bright aluminum treadplate enclosure shall be provided at the rear of the body to properly contain the ladders This enclosure shall extend to the rear of the side body compartments.

The enclosure shall also include a vertically hinged smooth aluminum door with a lift and turn latch to access the ladders.

**FOLDING LADDER**
One (1) 10' aluminum, folding ladder shall be installed in a U-shaped trough inside the ladder storage compartment.

**PIKE POLE, 8'**
One (1) pike pole, 8' long with a fiberglass handle, shall be provided and located in ladder storage compartment.

**PIKE POLE, 6'**
One (1) pike pole, 6' long with a fiberglass I-beam shaped handle, shall be provided and located in ladder storage compartment.

**PIKE POLE STORAGE**
Aluminum tubing shall be used for the storage of two (2) pike poles and shall be located in ladder storage compartment. If the head of a pike pole can come in contact with a painted surface, a stainless steel scuffplate shall be provided.

**STEPS**
A step shall be provided on the front of each fender compartment. The front step shall be a bright finished folding type.

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|---|---|---|
| | Yes | No |
| **REAR FOLDING STEPS**<br>Chrome folding steps and corner steps shall be provided at the rear. All steps shall provide adequate surface for stepping.<br><br>Four (4) additional folding steps shall be located on the front body bulkhead. Twol steps on each side<br><br>**PUMP**<br>Pump shall be a Waterous CSU, 1500 gpm single (1) stage midship mounted centrifugal type.<br><br>Pump shall be the class "A" type.<br><br>Pump shall deliver the percentage of rated discharge at pressures indicated below:<br><br>- 100% of rated capacity at 150 psi net pump pressure.<br><br>- 70% of rated capacity at 200 psi net pump pressure.<br><br>- 50% of rated capacity at 250 psi net pump pressure.<br><br>Pump body shall be close-grained gray iron, bronze fitted, and horizontally split in two (2) sections for easy removal of the entire impeller shaft assembly (including wear rings).<br><br>Pump shall be designed for complete servicing from the bottom of the truck, without disturbing the pump setting or apparatus piping.<br><br>Pump case halves shall be bolted together on a single horizontal face to minimize chance of leakage and facilitate ease of reassembly. No end flanges shall be used.<br><br>Discharge manifold of the pump shall be cast as an integral part of the pump body assembly and shall provide a minimum of three (3) 3.50" openings for flexibility in providing various discharge outlets for maximum efficiency.<br><br>The three (3) 3.50" openings shall be located as follows: one (1) outlet to the right of the pump, one (1) outlet to the left of the pump, and one (1) outlet directly on top of the discharge manifold.<br><br>Impeller shaft shall be stainless steel, accurately ground to size. It shall be supported at each end by sealed, anti-friction ball bearings for rigid precise support. Impeller shall have flame plated hubs assuring maximum pump life and efficiency despite any presence of abrasive matter in the water supply.<br><br>Bearings shall be protected from water and sediment by suitable stuffing boxes, flinger rings, and oil seals. No special or sleeve type bearings shall be used.<br><br>Stuffing boxes shall be of the conventional two (2) piece, split-gland type, to permit adjustment or replacement of Grafoil packing without disturbing the pump. Water shall be fed into stuffing box lantern rings for proper lubrication and cooling when the pump is operating. | | |

Lantern rings shall be located at the inner ends of the stuffing boxes, to avoid having to remove them when replacing pump packing.

Wear rings shall be bronze and easily replaceable to restore original pump efficiency and eliminate the need to replace the entire pump casing due to wear.

**PUMP TRANSMISSION**

Pump transmission shall be made of a three (3) piece, aluminum, horizontally split casing. Power transfer to pump shall be through a high strength Morse HY-VO silent drive chain.

Drive shafts shall be a minimum of 2.35" diameter hardened and ground alloy steel. All shafts shall be ball bearing supported. The case shall be designed as to eliminate the need for water cooling.

**AIR PUMP SHIFT**

Pump shift engagement shall be made by a two (2) position sliding collar, actuated pneumatically (by air pressure), with a three (3) position air control switch located in the cab. A manual back-up shift control shall also be located on the driver's side pump panel.

Two (2) indicator lights shall be provided adjacent to the pump shift inside the cab. One (1) green light shall indicate the pump shift has been completed and be labeled "pump engaged". The second green light shall indicate when the pump has been engaged, and that the chassis transmission is in pump gear. This indicator light shall be labeled "OK to pump".

Another green indicator light shall be installed adjacent to the hand throttle on the pump panel and indicate either the pump is engaged and the road transmission is in pump gear, or the road transmission is in neutral and the pump is not engaged. This indicator light shall be labeled "Warning: Do not open throttle unless light is on".

The pump shift control in the cab shall be illuminated to meet NFPA requirements.

**TRANSMISSION LOCK-UP**

The direct gear transmission lock-up for the fire pump operation shall engage automatically when the pump shift control, in the cab, is activated.

**AUXILIARY COOLING SYSTEM**

A supplementary heat exchange cooling system shall be provided to allow the use of water from the discharge side of the pump for cooling the engine water. Heat exchanger shall be cylindrical type and shall be a separate unit. It shall be installed in the pump or engine compartment with the control located on the pump operator's control panel. Exchanger shall be plumbed to the master drain valve.

**INTAKE RELIEF VALVE**

A relief valve shall be installed on the suction side of the pump preset at 125 psig.

Relief valve shall have a working range of 75 psig to 250 psig.

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| | Yes | No |
| Outlet shall terminate below the frame rails with a 2.50" National Standard hose thread adapter and shall have a "do not cap" warning tag.<br><br>Control shall be located behind an access door at the right (passenger's) side pump panel.<br><br>**PRESSURE CONTROLLER**<br>A pressure governor shall be provided. An electric pressure governor shall be provided which is capable of automatically maintaining a desired preset discharge pressure in the water pump. When operating in the pressure control mode, the system shall automatically maintain the discharge pressure set by the operator (within the discharge capabilities of the pump and water supply) regardless of flow, within the discharge capacities of the water pump and water supply.<br><br>A pressure transducer shall be installed in the water discharge of the pump. The transducer continuously monitors pump pressure sending a signal to the Electronic Control Module (ECM).<br><br>The governor can be used in two (2) modes of operation, RPM mode and pressure modes.<br><br>In the RPM mode, the governor can be activated after vehicle parking brake has been set. When in this mode, the governor shall maintain the set engine speed, regardless of engine load (within engine operation capabilities).<br><br>In the pressure mode, the governor system can only operate after the fire pump has been engaged and the vehicle parking brake has been set. When in the pressure mode, the pressure controller monitors the pump pressure and varies engine speed to maintain a precise pump pressure. The pressure controller shall use a quicker reacting J1939 database for engine control. (excluding Cat engines)<br><br>A preset feature allows a predetermined pressure or rpm to be set.<br><br>A pump cavitation protection feature is also provided which shall return the engine to idle should the pump cavitate. Cavitation is sensed by the combination of pump pressure below 30 psi and engine speed above 2000 rpm for more than five (5) seconds.<br><br>The throttle shall be a vernier style control, with a large control knob for use with a gloved hand. A throttle ready light shall be provided adjacent to the throttle control. A large .75" RPM display shall be provided to be visible at a glance.<br><br>Check engine, and stop engine indicator lights shall be provided for easy viewing.<br><br>Large .75" push buttons shall be provided for menu, mode, preset, and silence selections.<br><br>The water tank level indicator shall be incorporated in the pressure governor.<br><br>A fuel level indicator shall be incorporated in the pressure controller. | | |

A pump hour meter shall be incorporated in the pressure controller.

The pressure controller shall incorporate monitoring for engine temperature, oil pressure, fuel level alarm, and voltage. Pump monitoring shall include, pump gearcase temperature, error codes, diagnostic data, pump service reminders, and time stamped data logging, to allow for fast accurate trouble shooting. It shall also notify the driver/engineer of any problems with the engine and the apparatus. Complete understandable messages shall be provided in a 20-character display, providing for fewer abbreviations in the messages. An automatic dim feature shall be included for night operations.

The pressure controller shall include a USB port for easy software upgrades, which can be downloaded through a USB memory stick, eliminating the need for a laptop for software installations.

A complete interactive manual shall be provided with the pressure controller.

**PRIMING PUMP**

Priming pump shall be a positive displacement vane type, electrically driven.

One (1) priming control shall open the priming valve and start the priming motor.

Primer shall be environmentally safe and self lubricating.

**PUMP WARRANTY**

A Waterous five **(5) year** warranty shall be provided for the pump.

**PUMP MANUALS**

Two (2) pump manuals from the pump manufacturer shall be furnished in compact disc format with the apparatus. Manuals shall cover pump operation, maintenance, and parts.

**PLUMBING**

All inlet and outlet plumbing, 3.00" and smaller, shall be plumbed with either stainless steel pipe or synthetic rubber hose reinforced with high-tensile polyester braid. Small diameter secondary plumbing such as drain lines shall be stainless steel, brass or hose.

Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping shall be equipped with Victaulic or rubber couplings.

Plumbing manifold bodies shall be ductile cast iron or stainless steel.

All lines shall drain through a master drain valve or shall be equipped with individual drain valves. All individual drain lines for discharges shall be extended with a hose to drain below the chassis frame.

All water carrying gauge lines shall be of flexible polypropylene tubing.

**PUMP PLUMBING WARRANTY**

The stainless steel plumbing components and ancillary brass fittings used in the construction of the water/foam plumbing system shall be warranted for a period

of **ten (10) years or 100,000 miles**. This covers structural failures caused by defective design or workmanship, or perforation caused by corrosion, provided the apparatus is used in a normal and reasonable manner. This warranty is extended only to the original purchaser for a period of ten years from the date of delivery. A copy of the warranty shall be submitted with the bid. (no exception)

**MAIN PUMP INLETS**

A 6.00" pump manifold inlet shall be provided on each side of the vehicle. The suction inlets shall include removable die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

The main pump inlets shall have National Standard Threads with a long handle chrome cap.

The cap shall be the VLH, which incorporates an exclusive thread design to automatically relieve stored pressure in the line when disconnected. (no exception)

**VALVES**

All ball valves shall be Akron Brass in-line valves. The Akron valves shall be the 8000 series heavy-duty style with a stainless steel ball and a simple two-seat design. No lubrication or regular maintenance is required on the valve.

Valves shall have a ten (10) year warranty.

**INLET (Left side)**

On the left side pump panel shall be one (1) 2.50" auxiliary suction, terminating in 2.50" National Standard Hose Thread. The auxiliary suction shall be provided with a strainer, chrome swivel and plug.

The location of the valve for the one (1) inlet shall be recessed behind the pump panel.

**INLET CONTROL**

Control for the side auxiliary inlet(s) shall be located at the inlet valve.

**INLET BLEEDER VALVE**

A .75" bleeder valve shall be provided for each side gated inlet. The valves shall be located behind the panel with a swing style handle control extended to the outside of the panel. The handles shall be chrome plated and provide a visual indication of valve position. The swing handle shall provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. The water discharged by the bleeders shall be routed below the chassis frame rails.

**TANK TO PUMP**

The booster tank shall be connected to the intake side of the pump with heavy duty piping and a quarter turn 3.00" full flow line valve with the control remotely located at the operator's panel. Tank to pump line shall run straight (no elbows) from the pump into the front face of the water tank and angle down into the tank sump. A rubber coupling shall be included in this line to prevent damage from vibration or chassis flexing.

A check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

**TANK REFILL**

A 1.50" combination tank refill and pump re-circulation line shall be provided, using a quarter-turn full flow ball valve controlled from the pump operator's panel.

**DISCHARGE OUTLETS (Left Side)**

There shall be two (2) discharge outlets with a 2.50" valve on the left side of the apparatus, terminating with a male 2.50" National Standard hose thread adapter.

**DISCHARGE OUTLETS (Right Side)**

There shall be two (2) discharge outlets 2.50" valve on the right side of the apparatus, terminating with a male 2.50" National Standard hose thread adapter.

**DISCHARGE OUTLET, 4.00"**

There shall be a 4.00" discharge outlet with a 3.50" Akron Slo-Cloz valve with a 3.00" ball, installed on the right side of the apparatus, terminating with male a 4.00" National Standard hose thread adapter. This discharge outlet shall be actuated with a handwheel control with position indicator at the pump operator's control panel.

The 4.00" outlet shall be furnished with a 4.00"(F) National Standard hose thread x 5.00" Storz elbow adapter with Storz cap.

**DISCHARGE OUTLET (Front)**

There shall be a 1.50" gated discharge outlet plumbed to the lower portion of the tray in the center front bumper extension. The outlet shall be centered near the bottom in the selected tray.

The discharge shall have a 90-degree swivel and terminate with 1.50" NHT.

Plumbing shall consist of 2.00" piping with a 2.00" full flow ball valve controlled at the pump operator's panel.

Automatic drains shall be provided at all low points in the plumbing.

**DISCHARGE OUTLET (Rear)**

There shall be one (1) discharge outlet piped to the rear of the hose bed, on driver's side, installed so proper clearance is provided for spanner wrenches or adapters. Plumbing shall consist of 3.00" piping along with a 3.00" full flow ball valve with the control from the pump operator's panel. The one (1) discharge outlet shall terminate with a 2.50" male National Standard hose thread adapter.

**DISCHARGE CAPS**

Chrome plated, rocker lug, caps with chains shall be furnished for all side discharge outlets.

The caps shall be the VLH, which incorporates an exclusive thread design to automatically relieve stored pressure in the line when disconnected. (no exception)

**OUTLET BLEEDER VALVE**

A .75" bleeder valve shall be provided for each outlet 1.50" or larger. Automatic drain valves are acceptable with some outlets if deemed appropriate with the application.

The valves shall be located behind the panel with a swing style handle control extended to the outside of the side pump panel. The handles shall be chrome plated and provide a visual indication of valve position. The swing handle shall provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. Bleeders shall be located at the bottom of the pump panel. They shall be properly labeled identifying the discharge they are plumbed in to. The water discharged by the bleeders shall be routed below the chassis frame rails.

**ELBOWS, FOR 2 1/2 " OUTLETS**

All 2.50" discharge outlets, located on the truck, shall be furnished with a 2.50"(F) National Standard hose thread x 2.50"(M) National Standard hose thread, chrome plated, 45 degree elbow.

**DISCHARGE OUTLET CONTROLS**

The discharge outlets shall incorporate a quarter-turn ball valve with the control located at the pump operator's panel. The valve operating mechanism shall indicate the position of the valve.

If a handwheel control valve is used, the control shall be a minimum of a 3.9" diameter chrome plated handwheel with a dial position indicator built in to the center of the handwheel.

**DELUGE RISER**

A 3.00" deluge riser shall be installed above the pump in such a manner that a monitor can be mounted and used effectively. Piping shall be installed securely so no movement develops when the line is charged. The riser shall be gated and controlled at the pump operator's panel. The outlet shall include an Akron valve with a handwheel control.

The deluge riser shall have a 3.00" four (4)-bolt flange for mounting the monitor.

**CROSSLAY HOSE BEDS**

Two (2) crosslays with 1.50" outlets shall be provided. Each bed to be capable of carrying 200 feet of 1.75" double jacketed hose and shall be plumbed with 2.00" i.d. pipe and gated with a 2.00" quarter turn ball valve.

Outlets to be equipped with a 1.50" National Standard hose thread 90 degree swivel located in the hose bed so that hose may be removed from either side of apparatus.

The crosslay controls shall be at the pump operator's panel.

The center crosslay dividers shall be fabricated of .25" aluminum and shall provide adjustment from side to side. The divider shall be unpainted with a brushed finish. The remainder of the crosslay bed shall be painted job color.

Vertical scuffplates, constructed of stainless steel, shall be provided at the front and rear ends of the bed on each side of vehicle.

Crosslay bed flooring shall consist of removable perforated brushed aluminum.

**CROSSLAY HOSE BEDS, 2.50"**

One (1) crosslay with 2.50" outlets shall be provided. This bed to be capable of carrying 200 feet of 2.50" double jacketed hose and shall be plumbed with 2.50" i.d. pipe and gated with a 2.50" quarter turn ball valve.

Outlet to be equipped with a 2.50" National Standard hose thread 90 degree swivel located in the hose bed so that hose may be removed from either side of apparatus.

The crosslay control shall be at the pump operator's panel.

The center crosslay dividers shall be fabricated of .25" aluminum and shall provide adjustment from side to side. The divider shall be unpainted with a brushed finish. The remainder of the crosslay bed shall be painted job color.

Stainless steel vertical scuffplates shall be provided at hose bed ends (each side of vehicle). Bottom of hose bed ends (each side) shall also be equipped with a stainless steel scuffplate.

Crosslay bed flooring shall consist of removable perforated brushed aluminum.

**CROSSLAY COVER**

A bi-fold aluminum treadplate cover shall be installed over the crosslay hose beds. It shall include a latch at each end of the cover to hold it securely in place, a chrome grab handle at each end for opening and closing the cover and a foam rubber gasket where the cover comes into contact to a painted surface.

**CROSSLAY COVER**

A black vinyl cover with lift-a-dot fasteners shall be provided over the ends of the crosslay hose beds.

**FOAM PROPORTIONER**

A foam proportioning system shall be provided that is an on demand, automatic proportioning, single point, direct injection system suitable for all types of Class "A" & "B" foam concentrates, including the high viscosity (6000 cps), alcohol resistant Class B foams. Operation shall be based on direct measurement of water flow, and remain consistent within the specified flows and pressures. The system shall automatically balance and proportion foam solution at rates from 0.1% to 9.9% regardless of variations in water pressure and flow, up to the maximum rated capacity of the foam concentrate pump.

Class A foam setting in .1 % increments from .1% to 1%. Typical settings of 1%, .5% and .3% (Maximum capacity shall be limited to the plumbing and water pump capacity)

The system shall be equipped with a digital electronic control display located on the pump operators panel. Push button controls shall be integrated into the panel to turn the system on/off, control the foam percentage, direct which foam to use on a multi-tank system, and to set the operation modes (automatic, manual, draft, calibration, or flush).

The percent of injection shall have presets for class A and class B foam. These presets can be changed at the fire department as desired. The percent of injection shall be able to be easily changed at the scene to adjust to changing demands.

System on and foam pump on indicator lights shall also be included. Information displayed shall include mode of operation (automatic, manual, draft, calibration, or flush), foam supply selected (Class A or Class B), water total, foam total, foam percentage, remaining gallons, and time remaining.

The control display shall direct a microprocessor, which receives input from the systems water flow meter while also monitoring the position of the foam concentrate pump. The microprocessor shall compare the values of the water flow versus the position/rate of the foam pump, to ensure the proportion rate is accurate. One (1) check valve shall be installed in the plumbing to prevent foam from contaminating the water pump.

The foam concentrate pump shall be of positive displacement, self-priming; linear actuated design, driven by the hydraulic motor. The pump shall be constructed of brass body; chrome plated stainless steel shaft, with a stainless steel piston. In order to increase longevity of the pump, no aluminum shall be present in its construction.

A relief system shall be provided which is designed to protect the drive system components and prevent over pressuring the foam concentrate pump

The foam concentrate pump shall have minimum capacity for 12 gpm with all types of foam concentrates with a viscosity at or below 6000 cps including protein, fluoroprotein, AFFF, FFFP, or AR-AFFF. The system shall deliver only the amount of foam concentrate flow required, without recirculating foam back to the storage tank. Recirculating foam concentrate back to the storage tank can cause agitation and premature foaming of the concentrate, which can result in system failure. The foam concentrate pump shall be self-priming and have the ability to draw foam concentrate from external supplies such as drums or pails.

**EXTERNAL FOAM CONCENTRATE PICKUP**

An external foam pick-up shall be provided to enable use of a foam agent that is not stored on the vehicle. The external foam pick-up shall be designed to allow continued operation after the on-board foam tank is empty. The external foam pick-up shall be designed to allow use with training foam or colored water for training purposes.

A bronze body strainer / connector unit shall be provided. The unit shall be mounted to the pump panel. The external foam pick-up shall be one (1) - 1.00" male connection with chrome-plated cap integrated to a 2.00” strainer cleanout

cap. A check valve shall be installed in the pick-up portion of the cleanout cap. A basket style stainless steel screen shall be installed in the body of the strainer / connector unit.

A 1.00" flexible hose with an end for insertion into foam containers shall be provided. The hose shall be supplied with a 1.00" female swivel NST thread swivel connector. The hose shall be shipped loose.

**FOAM DISCHARGES**

The foam system shall be plumbed to the front bumper discharge and all (3) three cross lays.

**FOAM TANK**

The foam tank shall be an integral portion of the polypropylene water tank. The cell shall have a capacity of 25 gallons of foam with the intended use of Class "A" foam. The brand of foam stored in this tank shall be Ansul. The foam cell shall not reduce the capacity of the water tank. The foam cell shall have a screen in the fill dome and a breather in the lid.

**FOAM TANK DRAIN**

A system of 1.00” foam tank drains shall be provided, integrated into the foam systems strainer and tank to foam pump valve management system. The tank to pump hoses running from the tank(s) to the panel mounted strainer shall 1.00” diameter. The foam system controller shall have a mode that allows for a given foam valve to be opened at will. Flow of foam from the tank valve to the strainer shall be usable as a tank drain mode.

An adaptor shall be supplied, that allows the 1.00” foam intake screen to assembly to be used as a drain outlet. The standard supplied 1.00” foam pick up hose shall be attached to the screen assembly by way of the adapter. The drain mode shall allow the operator to open and close the tank valve as required from the control head, to drain foam and re-fill foam containers through the connected hose, without foam spillage beneath the vehicle.

**FOAM TANK VALVE**

An electric valve shall be used for the foam supply valve. The foam supply valve shall be controlled at the foam system control head for ease of operation. The supply valve shall be electric, remote controlled, to eliminate air pockets in the foam tank supply hose.

**FOAM LEVEL GAUGE**

An electronic foam level gauge shall be provided on the operator's panel that registers foam level by means of five colored LED lights. The lights shall be durable, ultra-bright five 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 light shall flash when the level drops below the given level indicator to provide an eighth of a tank indication. To further alert the pump operator, the lights shall flash sequentially when the foam tank is empty.

The level measurement shall be based on the sensing of head pressure of the fluid in the tank.

The display shall be constructed of a solid plastic material with a chrome plated die cast bezel to reduce vibrations that can cause broken wires and loose electronic components. The encapsulated design shall provide complete protection from foam and environmental elements. An industrial pressure transducer shall be mounted to the outside of the tank. The display shall be able to be calibrated in the field and shall measure head pressure to accurately show the tank level.

**PUMP COMPARTMENT**

The pump compartment shall be separate from the hose body and compartments so that each may flex independently of the other. It shall be a fabricated assembly of steel tubing, angles and channels which supports both the fire pump and the side running boards.

The pump compartment shall be mounted on the chassis frame rails with rubber biscuits in a four point pattern to allow for chassis frame twist.

Pump compartment, pump, plumbing and gauge panels shall be removable from the chassis in a single assembly.

**PUMP MOUNTING**

Pump shall be mounted to a substructure which shall be mounted to the chassis frame rail using rubber isolators. The mounting shall allow chassis frame rails to flex independently without damage to the fire pump.

**PUMP CONTROL PANELS (Left Side Control)**

All pump controls and gauges shall be located at the left (driver's) side of the apparatus and properly identified.

Layout of the pump control panel shall be ergonomically efficient and systematically organized.

The pump operator's control panel shall be removable for ease of maintenance:

All push/pull valve controls shall have 1/4 turn locking control rods with polished chrome plated zinc tee handles. Guides for the push/pull control rods shall be chrome plated zinc castings securely mounted to the pump panel. Push/pull valve controls shall be capable of locking in any position. The control rods shall pull straight out of the panel and shall be equipped with universal joints to eliminate binding.

**IDENTIFICATION TAGS**

The identification tag for each valve control shall be recessed in the face of the tee handle.

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| | Yes | No |
| All discharge outlets shall have color coded identification tags, with each discharge having its own unique color. Color coding shall include the labeling of the outlet and the drain for each corresponding discharge.<br><br>All line pressure gauges shall be mounted directly above the corresponding discharge control tee handles and recessed within the same chrome plated casting as the rod guide for quick identification. The gauge and rod guide casting shall be removable from the face of the pump panel for ease of maintenance. The casting shall be color coded to correspond with the discharge identification tag.<br><br>All remaining identification tags shall be mounted on the pump panel in chrome plated bezels.<br><br>The pump panel on the right (passenger's) side shall be removable with lift and turn type fasteners.<br><br>Trim rings shall be installed around all inlets and outlets.<br><br>**PUMP AND GAUGE PANEL**<br>The pump and gauge panels shall be constructed of black vinyl covered aluminum, to allow easy identification of the gauges and controls and to eliminate glare.<br><br>A polished aluminum trim molding shall be provided around each panel.<br><br>The passenger's side pump panel shall be removable.<br><br>**MASTER INTAKE AND PRESSURE GAUGES**<br>The master intake and pressure gauges shall be silicone filled.<br><br>The gauges shall be a minimum of 4.00" in diameter and shall have white faces with black lettering, with a pressure range of 30.00"-0-600#.<br><br>The pump pressure and vacuum gauges shall be installed adjacent to each other at the pump operator's control panel.<br><br>Test port connections shall be provided at the pump operator's panel. One shall be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They shall have 0.25 in. standard pipe thread connections and non-corrosive polished stainless steel or brass plugs. They shall be marked with a label.<br><br>This gauge shall include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.<br><br>**LINE PRESSURE GAUGES**<br>The individual "line" pressure gauges for the discharges shall be interlube filled and manufactured by Class 1.<br><br>They shall be a minimum of 2.00" in diameter and shall have white faces with black lettering.<br><br>Gauge construction shall include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut. | | |

Gauges shall have a pressure range of 30"-0-400#.

The individual pressure gauge shall be installed as close to the outlet control as practical.

This gauge shall include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

**WATER LEVEL GAUGE**

An electric water level gauge shall be incorporated in the pressure controller that registers water level by means of a series of LED indicator lightss. The LEDs shall be a bright type that is readable in sunlight, and have a full 180-degree of clear viewing.

To further alert the pump operator, the gauge shall have a warning flash when the tank volume is less than 25%, and shall have "Down Chasing LEDs when the tank is almost empty.

The level measurement shall be ascertained by sensing the head pressure of the fluid in the tank or cell.

**LIGHT SHIELD**

The pump panel controls and gauges shall be illuminated by incandescent lights installed under an aluminum diamond plate combination step/light shield. The stepping surface shall be a minimum of 8.00" deep and properly reinforced to support a man's weight.

Illumination shall be provided for controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus and the equipment provided on it. External illumination shall be a minimum of five (5) foot-candles on the face of the device.

A light shall come on above the pump panel light switch when the parking brake is set. This is to afford the operator some illumination when first approaching the control panel. A green pump engaged indicator shall come on at the operator's panel when the pump is shifted into gear from inside the cab. One (1) pump panel light shall also come on when the pump is shifted into gear from inside the cab. The remaining lights to be actuated from a switch located on the pump panel.

A step light shall be installed as to illuminate the top of the step for night time vision. The step light shall be activated by the pump panel light switch.

**ELECTRICAL**

All 12-volt electrical equipment installed by the apparatus manufacturer shall conform to modern automotive practices. All wiring shall be high temperature type. Wiring shall be run in loom, where exposed, and have grommets where wire passes through sheet metal. Automatic reset circuit breakers shall be provided which conform to SAE Standards. Wiring shall be color, function and number coded. Function and number codes shall be continuously imprinted on all wiring harness conductors at 2.00" intervals. Exterior exposed wire connectors shall be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids.

Electrical wiring and equipment shall be installed utilizing the following guidelines:

(1) All holes made in the roof shall be caulked with silicon, rope caulk is not acceptable. Large fender washers, liberally caulked, shall be used when fastening equipment to the underside of the cab roof.

(2) Any electrical component that is installed in an exposed area shall be mounted in a manner that shall not allow moisture to accumulate in it. Exposed area shall be defined as any location outside of the cab or body.

(3) Electrical components designed to be removed for maintenance shall not be fastened with nuts and bolts. Metal screws shall be used in mounting these devices. Also a coil of wire shall be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.

(4) Corrosion preventative compound shall be applied to all terminal plugs located outside of the cab or body. All non-waterproof connections shall require this compound in the plug to prevent corrosion and for easy separation (of the plug).

(5) All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.

(6) All electrical terminals in exposed areas shall have silicon (1890) applied completely over the metal portion of the terminal. All emergency light switches shall be mounted on a separate panel installed in the cab. A master warning light switch and individual switches shall be provided to allow pre-selection of emergency lights. The light switches shall be "rocker" type with an internal indicator light to show when switch is energized. All switches shall be properly identified and mounted in a removable panel for ease in servicing. Identification of the switches shall be done by either printing or etching on the switch panel. The switches and identification shall be illuminated.

Rear identification lights shall be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads shall be protected from damage by installing a false bulkhead inside the rear compartments.

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 tests shall be recorded and provided to the purchaser at time of delivery.

**STEP LIGHTS**

Four (4) LED, step lights shall be provided. One (1) step light shall be provided on each side, on the front compartment face and two (2) step lights at the rear to illuminate the tailboard.

These step lights shall be actuated with the pump panel light switch.

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| | Yes | No |
| **REAR FMVSS LIGHTING**<br>The rear stop/tail and directional LED lighting shall consist of the following:<br><br>Two (2) red LED stop/tail lights.<br><br>Two (2) amber LED arrow turn lights.<br><br>Each light shall be installed separately at the rear with chrome trim and colored lenses.<br><br>Four (4) red reflectors shall be provided.<br><br>A license plate bracket shall be mounted on the driver's side above the warning lights. A incandescent step lamp shall illuminate the license plate.<br><br>**BACKUP LIGHTS**<br>There shall be two (2) LED backup lights provided in the tail light housing.<br><br>**"DO NOT MOVE APPARATUS" INDICATOR**<br>A flashing red indicator light, located in the driving compartment, shall be illuminated automatically per the current NFPA requirements. The light shall be labeled "Do Not Move Apparatus If Light Is On".<br><br>The same circuit that activates the Do Not Move Apparatus indicator shall activate a steady tone alarm when the parking brake is released.<br><br>**OPEN DOOR INDICATOR LIGHT**<br>Two (2) red indicator lights shall be provided and located in clear view of the driver, warning of an open passenger or equipment compartment door.<br><br>One (1) light shall indicate status of doors on the driver's side of the vehicle and the other light shall indicate the status of the passenger side and rear compartment doors.<br><br>**COMPARTMENT LIGHTING**<br>There shall be seven (7) compartments with LED compartment light strips. Each strip shall be centered vertically along the door framing. The compartments with these strip lights shall be located driver side lights on left side, passenger side lights on right side of compartment.. There shall be a minimum of one (1) light per compartment.<br><br>Any remaining compartments shall include 6.00" diameter lights in each enclosed compartment. Each light shall have a number 1076 one filament, two wire bulb.<br><br>Opening the compartment door shall automatically turn the compartment lighting on.<br><br>**PUMP COMPARTMENT LIGHT**<br>A pump compartment light shall be provided inside the right side pump enclosure and accessible through a door on the pump panel.<br><br>A .125" weep hole shall be provided in each light lens, preventing moisture retention. | | |

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| | Yes | No |
| **PERIMETER SCENE LIGHTS, CAB**<br>There shall be a 4.00", LED, grommet mount weatherproof light provided for each cab door. Lighting shall be designed to provide illumination on areas under the driver, officer, and crew cab riding area exits, which shall be activated automatically when the exit doors are opened, by the door jam switch and by the same means as the body perimeter lights.<br><br>The lighting shall be capable of providing illumination at a minimum level of two (2) foot-candles on ground areas within 30.00" of the edge of the apparatus in areas which personnel climb in or out of the apparatus or descend from the apparatus to the ground level.<br><br>**PERIMETER SCENE LIGHTS, BODY**<br>There shall be a total of four (4) LED lights provided on the apparatus. Each light shall consist of a 4.00" weatherproof LED light, rubber mount, and pigtail kit.<br><br>The lights shall be mounted in the following locations:<br><br>Two (2) lights shall be provided under the rear step area.<br><br>One (1) light shall be provided each side under the pump panel running boards.<br><br>The lighting shall be capable of providing illumination at a minimum level of two (2) foot-candles on ground areas within 30.00" of the edge of the apparatus in areas designed for personnel to climb onto the apparatus or descend from the apparatus to the ground level.<br><br>The lights shall be activated by a parking brake.<br><br>**SCENE LIGHTS**<br>There shall be two (2) LED scene light(s) with chrome trim bezel installed at the rear of the apparatus, on rear body bulkheads, directly below the LED warning light..<br><br>A control for the light(s) selected above shall be the following:<br><br>a switch at the driver's side switch panel<br><br>a switch at the pump operator's panel<br><br>no additional switch location<br><br>no additional switch location<br><br>These lights may be load managed when the parking brake is set.<br><br>**12 VOLT LIGHTING**<br>There shall be two (2), 12 volt LED floodlight(s) with housing provided. The light(s) shall be recessed and located recessed behind crew cab doors, high as possible..<br><br>The lights selected above shall be controlled by the following:<br><br>From the first switch feature, a control from two (2) switches on the driver side switch panel, a driver side switch, and an officer side switch. | | |

a switch at the pump operator's panel.

These lights may be load managed when the parking brake is set

**AIR HORN SYSTEM**
Two (2) air horns shall be provided and located, in the front bumper, recessed recessed in front bumper, outside frame rails.. The horn system shall be piped to the air brake system wet tank utilizing .38" tubing. A pressure protection valve shall be installed in-line to prevent loss of air, in the air brake system.

**AIR HORN CONTROL**
The air horns shall be actuated by a foot switch on the officer's side and by the horn button in the steering wheel. The driver shall have the option to control the air horns or the chassis horns from the horn button by means of a selector switch located on the instrument panel.

**ELECTRONIC SIREN**
An electronic siren with noise canceling microphone shall be provided.

**ELECTRIC SIREN, LOCATION,**
Siren head shall be mounted recessed in switch panel.

The electronic siren shall be controlled on the siren head only. No horn button or foot switches shall be required.

**SPEAKER**
There shall be one (1) speaker with chrome finish provided. Connection shall be connected to the siren amplifier.

The speaker(s) shall be recessed in the front bumper on the passenger's side.

**MECHANICAL SIREN, (Auxiliary)**
A Federal Q2B siren shall be furnished. A siren brake button shall be installed on the switch panel.

The control solenoid shall be powered up after the emergency master switch is activated.

The mechanical siren shall be mounted on the bumper deckplate. It shall be mounted on the left side. The siren mounting shall include a reinforcement plate.

The mechanical siren shall be actuated by two (2) foot switches, one (1) located on the officer's side and one (1) on the driver's side.

**LIGHTBAR**
One (1) 82.00" LED lightbar shall be mounted on the cab roof.

This lightbar shall include the following:

Two (2) red flashing forward facing LED modules.

Two (2) clear flashing forward facing LED modules.

Two (2) red flashing front corner LED modules.

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| | Yes | No |
| One (1) red flashing driver side facing LED module.<br><br>One (1) red flashing officer side facing LED module.<br><br>One (1) switch located in the cab on the switch panel shall control this lightbar.<br><br>The lens color shall be clear.<br><br>**HEADLIGHT FLASHER**<br>The high beam headlights shall flash alternately between the left and right side, with a control switch located on the cab instrument panel.<br><br>The flashing shall automatically cancel when the headlight switch is activated or when the parking brake is set.<br><br>**SIDE ZONE LOWER LIGHTING**<br>Six (6) LED flashing warning lights with bezels shall be located in the following positions:<br><br>Two (2) lights, one (1) each side on the bumper extension.<br><br>The side front lights to be red.<br><br>Two (2) lights, behind crew cab doors, directly below handrail mid height..<br><br>The side middle lights to be red.<br><br>Two (2) lights, rear body fender panels..<br><br>The side rear lights to be red.<br><br>All six (6) lights shall include a clear lens.<br><br>All six (6) lights shall be controlled by a lighted switch on the cab switch panel.<br><br>**REAR ZONE LOWER LIGHTING**<br>Two (2) LED flashing warning lights with bezels shall be located at the rear of the apparatus.<br><br>The driver's side rear light to be red.<br><br>The passenger's side rear light to be red.<br><br>Both lights shall include a lens that is clear.<br><br>Both lights shall be controlled by a lighted switch on the switch panel.<br><br>**WARNING LIGHTS (Rear)**<br>There shall be two (2) LED flashing warning light(s) with bezel(s) provided on rear body bulkhead, one each side, high as possible..<br><br>The color of these light(s) shall be red.<br><br>These light(s) shall be controlled with the rear upper warning switch.<br><br>These light(s) shall include a lens that is clear. | | |

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| | Yes | No |
| **WARNING LIGHTS (Rear of Hose Bed)**<br>Two (2) LED warning beacons shall be provided at the rear of the truck, located one (1) each side. These lights shall be activated by a lighted switch on the instrument panel.<br><br>The color of the lights shall be red LEDs with both domes clear.<br><br>The rear warning lights shall be mounted on top of the compartmentation with all wiring totally enclosed. The rear deck lights shall be mounted on the beavertails high as possible.<br><br>**TRAFFIC DIRECTING LIGHT**<br>There shall be one (1) approximately 34" long x 1.5" high x 1.5" deep, amber LED traffic directing light installed at the rear of the apparatus.<br><br>A switch and control box shall be included with this installation.<br><br>This traffic directing light shall be recessed with a stainless steel trim plate at the rear of the apparatus as high as practical.<br><br>The traffic directing light control head shall be located in the driver side overhead switch panel in the right panel position.<br><br>**KUSSMAUL AUTO EJECT FOR SHORELINE**<br>One (1) shoreline receptacle shall be provided to operate the dedicated 120-volt circuits on the truck without the use of the generator.<br><br>The shoreline receptacle (s) shall be provided with a NEMA 5-20, 120 volt, 20 amp, straight blade Kussmaul Super auto eject plug with a red weatherproof cover. The cover is spring loaded to close, preventing water from entering when the shoreline is not connected.<br><br>The unit is completely sealed to prevent road dirt contamination.<br><br>A solenoid wired to the vehicle's starter is energized when the engine is started. This instantaneously drives the plug from the receptacle.<br><br>An internal switch arrangement shall be provided to disconnect the load prior to ejection to eliminate arcing of the connector contacts.<br><br>The shoreline shall be connected to battery charger.<br><br>A mating connector body shall also be supplied with the loose equipment.<br><br>The shoreline receptacle shall be located on the driver side of cab, above wheel.<br><br>**PAINT**<br>The exterior custom cab and body painting procedure shall consist of<br><br>1. Manual Surface Preparation - All exposed metal surfaces on the custom cab and body shall be thoroughly cleaned and prepared for painting. Surfaces that shall not be painted include all chrome plated, polished stainless steel, anodized aluminum and bright aluminum treadplate. Each imperfection on the exterior | | |

metal surface shall be removed or filled and then sanded smooth for a smooth appearance. All seams shall be sealed before painting.

2. Chemical Cleaning and Treatment - The metal surfaces shall be properly cleaned using a high pressure and high temperature cleaning system. Surfaces are chemically cleaned to remove all dirt, oil, grease and metal oxides to ensure the subsequent coatings bond well.

3. Primer/Surfacer Coats - A two (2) component urethane primer/surfacer shall be hand applied to the chemically treated metal surfaces to provide a strong corrosion protective base coat and to smooth out the surface.

4. Hand Sanding - The primer/surfacer coat shall be lightly sanded to an ultra smooth finish.

5. Sealer Primer Coat - A sealer primer coat shall be applied over the sanded primer.

6. Topcoat Paint - Urethane base coat shall be applied to opacity for correct color matching.

7. Clearcoat - Two (2) coats of an automotive grade two (2) component urethane shall be applied. Lap style doors shall be clear coated to match the body. Roll-up doors shall not be clear coated and the standard roll-up door warranty shall apply.

All removable items such as brackets, compartment doors, door hinges, trim, etc. shall be removed and painted separately to insure paint behind all mounted items. Body assemblies that cannot be finish painted after assembly shall be finish painted before assembly.

The cab shall be two-tone, with the upper section painted white and lower section of the cab and body painted Red, to match existing apparatus.

**PAINT CHASSIS FRAME ASSEMBLY**

The chassis frame assembly shall be painted black before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc. Components that are included with the chassis frame assembly that shall be painted black are frame rails, cross members, axles, suspension, steering gear, fuel tank, body substructure supports, miscellaneous mounting brackets, etc.

**WARRANTY - PAINT AND CORROSION**

The cab and body exterior paint finish shall be warranted against blistering, peeling, corrosion, lack of adhesion or any other manufacturing or material defect for a period of **ten (10) years**.

The cab and body shall also be warranted against corrosion perforation for a period of **ten (10) years**.

A copy of the manufacturer's warranty shall be included with the bid.

**PAINT, COMPARTMENT INTERIOR**

Interior of the compartments shall be painted with gray spatter type paint.

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| | Yes | No |

**REFLECTIVE STRIPES**

Three (3) reflective stripes shall be provided across the front of the vehicle and along the sides of the body and the cab front. The reflective band shall consist of a 1.00" white stripe at the top with a 1.00" gap then a 6.00" white stripe with a 1.00" gap and a 1.00" white stripe on the bottom.

**CHEVRON STRIPING, REAR**

There shall be alternating chevron striping located on the rear-facing vertical surface of the apparatus. The entire rear surface, excluding the rear compartment door, shall be covered.

The colors shall be red and fluorescent yellow green diamond grade.

Each stripe shall be 6.00" in width.

A black outline shall be applied on the top and the bottom of the reflective band.

**REFLECTIVE STRIPE, CAB DOORS**

A 6.00" x 16.00" white reflective stripe shall be provided across the interior of each cab door. The stripe shall be located approximately 1.00" up from the bottom, on the door panel.

**UNDERCOATING, CAB & BODY**

The underside of the apparatus shall be undercoated with an asphalt petroleum based material, dark in color.

The undercoating material utilized on the apparatus shall be formulated to resist corrosion and deaden unwanted sound or road noise.

Coating texture shall appear firm, flexible, and resistant to abrasion. Minimum dry film thickness shall be in the range of 8.00 to 12.00 mils.

The material shall be applied to the following areas:

-Body and cab wheel well fender liners, on the back side only.
-Underside of body and cab sheet metal, and structural components.
-Underside and vertical sides of all sheet metal compartmentation, including support
angles.
-Structural support members under running boards, rear platforms, battery boxes, walkways, etc.
-Inside surfaces of the pump heat enclosure. (when installed)
-Suspension mounts.
-Transmission cooler fittings.
-Engine mounts.

**LOOSE EQUIPMENT**

The following equipment shall be furnished with the completed unit:

- One (1) bag of chrome, stainless steel, or cadmium plated screws, nuts, bolts and washers, as used in the construction of the unit

- One (1) set of reflective emergency triangles shall be provided.