

## **TOWN of VERNON FIRE DEPARTMENT PUMPER SPECIFICATIONS**

**Legal Notice  
Town of Vernon  
Contract# 985-07/05/2011**

### **STANDARD INSTRUCTIONS TO BIDDERS**

**These instructions are standard for all proposals issued by the Town of Vernon, Connecticut for the purchase of 2 Fire Pumpers and 1 Heavy Duty Rescue Truck. The Town may delete, supersede or modify any of these standard instructions for a particular proposal by indicating such change in a section entitled “Special Instruction To Bidders”.**

- 1. The attached proposal is general specifications, conditions and requirements of this bid.**
- 2. Proposals must be submitted on the enclosed form with any required bid security.**
- 3. Bids shall be submitted in sealed envelope shall be addressed to the Town Administrator, 14 Park Place, Vernon, Connecticut 06066 and shall be clearly marked “BID DOCUMENT – DO NOT OPEN”. The bid envelope shall indicate the contract number as shown on the “Invitation To Bid”.**
- 4. Bids received later than the time and date specified in the “Invitation To Bid” will not be considered. Withdrawals of bids, received later than the time and date set for the bid opening, will not be considered.**
- 5. All deliveries of commodities hereunder shall comply in every respect with all applicable laws of Federal Government and the State of Connecticut.**
- 6. The bidder shall insert the price per stated unit and extend a total price for each item. IN THE EVENT THAT THERE IS A DISCREPANCY BETWEEN THE UNIT PRICE AND THE TOTAL PRICE EXTENSION, THE UNIT PRICE WILL GOVERN.**
- 7. In accordance with the provisions of Section 12-412 (a) of Connecticut General Statutes, the Town of Vernon is exempt from the payment of Federal or State tax and such tax or taxes shall not be included in bid prices.**

**8. Unless otherwise stated herein, all deliveries made under this contract must consist of new merchandise.**

**9. The Town reserves the right to reject any and all bids, wholly or in part, to waive technical defects and to make awards in the manner deemed to be in the best interests of the Town.**

**10. The Town will not accept any additional charges for freight or shipping.**

**11. All bids must be accompanied by bid security in the sum of not less than ten percent (10%) of the total bid and shall be in the form of a bid bond, a certified check, a treasurer's or cashier's check drawn on a National or State bank or trust company and shall be made payable to the "Town of Vernon".**

**12. The bid security shall secure the execution of the contract by the successful bidder.**

**13. Should any bidder to whom an award is made fail to enter into a contract within ten (10) days, exclusive of Saturdays, Sundays and legal Holidays, after notice of the award has been mailed to the bidder, the amount so received from the bidder through his/her bond shall become the property of the Town of Vernon, Connecticut as liquidated damages for failure.**

**14. The bid security of the successful bidder shall be held until such time as all conditions of the proposal have been met.**

**15. Copies of the RFP are available from the office of the Town Administrator from 9:00 a.m. until 4:30 p.m., Monday through Wednesday, 9:00 a.m. until 7:00 p.m. on Thursday, and 9:00 a.m. until 1:00 p.m. on Friday; or anytime online at <http://www.vernon-ct.gov/legal-notices> with reference to Contract #985-07/5/2011.**

**16. All questions about the proposals should be directed to John D. Ward, Town Administrator, by e-mail at [jward@vernon-ct.gov](mailto:jward@vernon-ct.gov), with copies to William Call, Fire Chief, by e-mail at [wcall@vernon-ct.gov](mailto:wcall@vernon-ct.gov), no later than 3:30 p.m. June 27, 2011. Answers to all so received questions shall be posted by June 30, 2011 on the Town's website under the bid section at <http://www.vernon-ct.gov/legal-notices> with the Contract #985-06/30/2011.**

**17. The selected firm must meet all municipal, state and federal AA and EEO practices and requirements. MBEs/WBEs/SBEs are encouraged to apply. The Town reserves the right to reject any or all proposals in whole or part, to award any one service or group of services or all services, to negotiate with any or all companies submitting proposals, and to enter into an agreement with any company for any services mentioned in this RFP; if it is deemed to be in the best interest of the Town.**

**John Ward**

**Town Administrator**

**Proposals will be required to be submitted to the Town of Vernon prior to the date and time listed above. Proposals will be opened on July 5, 2011  
You are not required to be present at the opening.**

**This document contains the following:**

**I. Instructions to Proposers and Specifications**

**II. Required Forms**

- a. Certificate of Non-Collusion**
- b. Proposal Price Form**
- c. Sample Agreement**
- d. References**

**III. Technical Specifications**

**NOTE #1: Proposals submitted without the required information will not be considered.**

**NOTE #2: Proposals received after the specified deadline for the bid opening will not be opened.**

**NOTE #3: Please submit four (2) complete written copies of your proposal**

**NOTE #4: Please submit one (1) complete copy of your proposal on a CD in Word or PDF format.**

**NOTE #5: Proposal prices must be firm for a period of at least 60 days beyond July 5, 2011**

**It is the intent of the Town of Vernon to enter into a contract to supply and deliver vehicles based on the attached specifications. The Town of Vernon reserves the right to accept or reject any or all proposals as deemed in the best interest of the Town of Vernon and not necessarily the lowest submitted price proposal.**

## SECTION II - REQUIRED FORMS CHECK LIST

The following forms are required:

- \_\_\_ Certificate of Non-Collusion – (fill in attached form)
- \_\_\_ 10% Bid Bond – At time of contract signing.
- \_\_\_ Insurance Certificate in Purchaser’s Name – (bidder to supply)
- \_\_\_ Statement of included Warranties – (fill in attached form)
- \_\_\_ Bid Price Form – (fill in attached form)
- \_\_\_ Vehicle Weight & Balance Statement
- \_\_\_ Authority to Sign Bid Form – (bidder to supply)
- \_\_\_ Sample Agreement – (bidder to supply)
- \_\_\_ References – (fill in attached form)
- \_\_\_ Manufacturer Equal Opportunity Statement - (bidder to supply)
- \_\_\_ Service Center EVT Certificates – (bidder to supply)
- \_\_\_ Chassis Manufacturer Authorized Service Center Letter
- \_\_\_ Bidders Letter detailing Service Center Capabilities
- \_\_\_ Bidders to supply a company financial statement for the last 5 years
- \_\_\_ Bidders to supply pricing as an option for mounting equipment on the 3 vehicles.

**CERTIFICATION OF GOOD FAITH**

**The undersigned certifies under pains and penalties of perjury that this contract has been obtained in good faith and without collusion or fraud with any other person. As used in this certification, the word “person” shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.**

**CONTRACTOR**

**By:** \_\_\_\_\_

**Name:** \_\_\_\_\_.

**Title:** \_\_\_\_\_

**Statement of Included Warrantees**

**APPARATUS BUILDER**

**Name:** \_\_\_\_\_  
**Address:** \_\_\_\_\_  
**City:** \_\_\_\_\_  
**State:** \_\_\_\_\_  
**Zip:** \_\_\_\_\_  
**Phone:** \_\_\_\_\_  
**Fax:** \_\_\_\_\_  
**Website:** \_\_\_\_\_

**Bidders to state the years and/or mileage for the warrantees listed below:**

- General Vehicle** \_\_\_\_\_
- Chassis Cab** \_\_\_\_\_
- Chassis Frame** \_\_\_\_\_
- Chassis Cross members** \_\_\_\_\_
- Chassis Cab Paint** \_\_\_\_\_
- Engine** \_\_\_\_\_
- Transmission** \_\_\_\_\_
- Axles** \_\_\_\_\_
- Fire Pump** \_\_\_\_\_
- Booster Tank** \_\_\_\_\_
- Apparatus Body** \_\_\_\_\_
- Apparatus Body Paint** \_\_\_\_\_
- Pump Gauges** \_\_\_\_\_
- Pump Valves** \_\_\_\_\_
- Pump Plumbing** \_\_\_\_\_
- Generator** \_\_\_\_\_
- Warning Lights** \_\_\_\_\_

## **Bid Price Form**

**Date:**

**Bidder Name:**

**Address:**

**City:**

**State:**

**Zip:**

**Phone:**

**Fax:**

**Website:**

**Contact Name:**

**Body Model:**

**Chassis Model:**

**Bid Price:**

**Prepayment Option**

**Discount Offered for 100% Chassis Payment:**

**Do not include in the bid price**

**Chassis Payment Amount:**

**Delivery time in calendar days from contract acceptance:**

**Authorized Signature of Bidder**

## References

**Provide six (6) references in New England within the last two (2) years who have purchased a similar vehicle. Include Contact Name and phone number.**

- 1).
- 2).
- 3).
- 4).
- 5).
- 6).

The following paragraphs will describe in detail the apparatus proposed. It meets the applicable requirements of the National Fire Protection Association (NFPA) as stated in current edition at time of contract execution, except where amended by your specifications. Loose equipment not specifically requested will not be provided

### **DELIVERY**

The apparatus will be delivered under its own power to insure proper break-in of all components while the apparatus is still under warranty.

### **INFORMATION**

At time of delivery, complete operation and maintenance manuals covering the apparatus will be provided. A permanent plate will be mounted in the driver's compartment specifying the quantity and type of fluids required including engine oil, engine coolant, transmission, pump transmission lubrication, pump primer and drive axle.

### **SAFETY VIDEO**

At the time of delivery the successful vendor will also provide one professionally-produced apparatus safety video, in DVD format. This video will address key safety considerations for

personnel to follow when they are driving, operating, and maintaining the apparatus, including the following: vehicle pre-trip inspection, chassis operation, pump operation, and safety during maintenance.

### **PERFORMANCE TESTS**

A road test will be conducted with the apparatus fully loaded and a continuous run of no less than ten (10) miles. During that time the apparatus will show no loss of power nor will it overheat. The transmission drive shaft or shafts and the axles will run quietly and be free of abnormal vibration or noise. The apparatus will meet NFPA 1901 acceleration requirements and NFPA 1901 braking requirements. The apparatus when fully loaded will not have less than 25 percent nor more than 50 percent on the front axle and not less than 50 percent nor more than 75 percent on the rear axle.

### **COMMERCIAL GENERAL LIABILITY INSURANCE**

Certification of insurance coverage will be enclosed.

### **ISO COMPLIANCE**

The manufacturer will operate a Quality Management System under the requirements of ISO 9001. These standards sponsored by the "International Organization for Standardization (ISO)" specify the quality systems that will be established by the manufacturer for design, manufacture, installation and service. A copy of the certificate of compliance will be included with the bid.

### **EXCEPTIONS TO SPECIFICATIONS**

The following specifications have been carefully reviewed by the Apparatus Committee and depict the performance requirements and components that the Department is requesting. Name brands listed are industry standards and are required as listed with NO EXCEPTIONS.

The following Chassis, Pump and Body specifications shall be strictly adhered to. 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 entitled "Exceptions to Specifications". The exception list shall refer to specification page number and paragraph. Apparatus shall be inspected upon apparatus completion for compliance with specifications. Deviations will not be tolerated and will be cause for rejection of Apparatus unless they were originally listed in bidder's proposal and accepted in writing by the department.

### **NFPA 2009 STANDARDS**

This unit will comply with the NFPA standards effective January 1, 2009, except for fire department directed exceptions. These exceptions will be set forth in the Statement of Exceptions.

Certification of slip resistance of all stepping, standing and walking surfaces will be supplied with delivery of the apparatus.

A plate that is highly visible to the driver while seated will be provided. This plate will show the overall height, length, and gross vehicle weight rating.

The manufacturer will have programs in place for training, proficiency testing and performance for any staff involved with certifications.

An official of the company will designate, in writing, who is qualified to witness and certify test results.

### **NFPA COMPLIANCY**

Apparatus proposed by the bidder will meet the applicable requirements of the National Fire Protection Association (NFPA) as stated in the current edition at time of contract execution. Fire Department's specifications that differ from NFPA specifications will be indicated in the proposal as "non-NFPA."

### **PUMP TEST**

The rated water pump will be tested, approved, and certified by an ISO certified independent third party testing agency at the manufacturer's expense. The test results, along with 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 will be forwarded to the Fire Department.

### **GENERATOR TEST**

If the unit has a generator, the generator will be tested, approved, and certified by an ISO certified independent third party testing agency at the manufacturer's expense. The test results will be provided to the Fire Department at the time of delivery.

### **SERVICE CENTER**

Each bidder is required to have a Connecticut Fire Apparatus Service Center that is equipped with a minimum of Five (5) ASE & EVT certified technicians. This service center shall be owned and operated by the bidder to allow for immediate warranty service. Dealers that utilize subcontractors for service shall take exception to this requirement. The service center shall offer 24HR 7 day per week "on the road" service via a toll free (1-800) number. The service centers road service vehicle shall be equipped with a Pro Link Diagnostic Microprocessor as well as all necessary parts required for normal chassis and pump service. In the event the apparatus needs to be transported to the service center for warranty or non warranty service, the service center shall pick up and deliver the apparatus from the firehouse free of charge. The service center shall give the unit a complete chassis and pump service after the unit arrives in Connecticut and prior to being delivered to the customer. This chassis service shall consist of full Engine Oil & Filter change, Chassis Lube, Fuel Filter Change, Brake Adjustment, U-bolt Retorque, Wheel Retorque, Pump Vacuum Test, Pump Operational Check (all valves), Lube Pump and all valves and linkages, Foam system test (if equipped) and road test.

### **MOBILE RADIO EQUIPMENT**

### **INSPECTION TRIP(S)**

The bidder will provide one (1) factory inspection trip(s) for two [2] customer representative(s). The inspection trip(s) will be scheduled at times mutually agreed upon between the manufacturer's representative and the customer. All costs such as travel, lodging and meals will be the responsibility of the bidder.

## **ONE (1) YEAR MATERIAL AND WORKMANSHIP WARRANTY**

### **BID BOND**

A bid bond as security for the bid in the form of a 10% bid bond will be provided with the proposal. This bid bond will be issued by a Surety Company who is listed on the U.S. Treasury Departments list of acceptable sureties as published in Department Circular 570. The bid bond will be issued by an authorized representative of the Surety Company and will be accompanied by a certified power of attorney dated on or before the date of bid. The bid bond will include language which assures that the bidder/principal will give a bond or bonds, as may be specified in the bidding or contract documents, with good and sufficient surety for the faithful performance of the contract, including the Basic One (1) Year Limited Warranty, and for the prompt payment of labor and material furnished in the prosecution of the contract.

Notwithstanding any document or assertion to the contrary, any surety bond related to the sale of a vehicle will apply only to the Basic One (1) Year Limited Warranty for such vehicle. Any surety bond related to the sale of a vehicle will not apply to any other warranties that are included within this bid (OEM or otherwise) or to the warranties (if any) of any third party of any part, component, attachment or accessory that is incorporated into or attached to the vehicle. In the event of any contradiction or inconsistency between this provision and any other document or assertion, this provision will prevail.

### **PERFORMANCE BOND**

Notwithstanding any document or assertion to the contrary, any surety bond related to the sale of a vehicle will apply only to the Basic One (1) Year Limited Warranty for such vehicle. Any surety bond related to the sale of a vehicle will not apply to any other warranties that are included within this bid (OEM or otherwise) or to the warranties (if any) of any third party of any part, component, attachment or accessory that is incorporated into or attached to the vehicle. In the event of any contradiction or inconsistency between this provision and any other document or assertion, this provision will prevail.

### **REFERENCE DRAWING**

A drawing of the proposed apparatus will be provided for review. This drawing will indicate the major components such as the chassis make and model, body configuration and door style, location of the lights, siren, horns, compartments, major components, etc.

### **SERVICE CENTER**

Each bidder is required to have a Connecticut Fire Apparatus Service Center that is equipped with a minimum of Five (5) ASE & EVT certified technicians. This service center shall be owned and operated by the bidder to allow for immediate warranty service. Dealers that utilize subcontractors for service shall take exception to this requirement. The service center shall offer 24HR 7 day per week "on the road" service via a toll free (1-800) number. The service centers road service vehicle shall be equipped with a Pro Link Diagnostic Microprocessor as well as all necessary parts required for normal chassis and pump service. In the event the apparatus needs to be transported to the service center for warranty or non warranty service, the service center shall pick up and deliver the apparatus from the firehouse free of charge. The service center shall give the unit a complete chassis and pump service after the unit arrives in Connecticut and prior to being delivered to the customer. This chassis service shall consist of full Engine Oil & Filter change, Chassis Lube, Fuel Filter Change, Brake Adjustment, U-bolt Retorque, Wheel Retorque, Pump Vacuum Test, Pump

Operational Check (all valves), Lube Pump and all valves and linkages, Foam system test (if equipped) and road test.

### **HEIGHT RESTRICTION**

The pumpers maximum height MUST be under 10 feet

### **SEATING CAPACITY**

The seating capacity in the cab will be six (6).

### **WHEELBASE**

The wheelbase of the vehicle will be approximately 212" ..

### **GVW RATING**

The gross vehicle weight rating will be 52,500#..

### **CUSTOM CHASSIS**

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

### **FRAME**

The chassis frame will 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 will 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. Each rail will have a section modulus of 25.992 cubic inches and a resisting bending moment (rbm) of 3,119,040 in-lb over the critical regions of the frame assembly, with a section modulus of 18.96 cubic inches with an rbm of 2,275,200 in-lb over the rear axle. The frame rails will be constructed of 120,000 psi yield strength heat-treated .38" thick steel, with 3.50" wide flanges.

### **FRAME REINFORCEMENT**

In addition, a mainframe inverted "L" liner will be provided. It will be heat-treated steel measuring 12.00" x 3.00" x .25". Each liner will have a section modulus of 7.795 cubic inches, yield strength of 110,000 psi, and rbm of 857,462 in-lb. Total rbm at wheelbase center will be 3,976,502 pounds per rail.

The frame liner will be mounted inside of the chassis frame rail and extend the full length of the frame.

### **FRONT AXLE**

The front axle will be a reverse "I" beam type with inclined king pins. It will be a Meritor™ axle, Model FL-943, with a rated capacity of 21,500 lb.

The turning angle will be 39 degrees to the right and 45 degrees to the left.

A viewing window will be provided on each side of the axle for checking the oil level.

### **STEERING CRAMP ANGLE CERTIFICATION**

The fire apparatus manufacturer will provide, at time of bid, a letter from an independent third party testing agency stating they approve the steering cramp angle.

Highly specialized options may limit the cramp.

### **FRONT AXLE TWO (2) YEAR MATERIAL AND WORKMANSHIP WARRANTY**

A Meritor axle limited warranty certificate, WA0046, is included with this proposal.

The tires will be mounted on Alcoa 22.50" x 12.25" Dura-Bright® aluminum disc-type wheels with a ten (10) stud, 11.25" bolt circle.

### **TOP SPEED OF VEHICLE**

A rear axle ratio will be furnished to allow the vehicle to reach a top speed of 65 MPH.

### **OIL SEALS**

Oil seals with viewing window will be provided on the front axle.

### **SHOCK ABSORBERS**

To provide a smoother ride, the front axle will be furnished with heavy-duty (Monroe Magnum 65) telescoping shock absorbers.

### **REAR AXLE**

The rear axle will be a Meritor™, Model RS-30-185, with a capacity of 31,000 lb.

### **REAR AXLE TWO (2) YEAR MATERIAL AND WORKMANSHIP WARRANTY**

A Meritor axle limited warranty certificate, WA0046, is included with this proposal.

The outside tires will be mounted on Alcoa 22.50" x 9.00" polished aluminum, with Dura-Bright® finish, disc wheels with a ten (10) stud-11.25" bolt circle.

The inside tires will be mounted on 22.50" x 9.00" steel disc wheels with a ten (10) stud-11.25" bolt circle.

An isolator will be provided between the steel and aluminum rims.

### **OIL SEALS**

Oil seals will be provided on the rear axle.

### **FRONT SUSPENSION**

The front springs will be a Standens, three (3)-leaf, taper leaf design, 54.00" long x 4.00" wide, with a ground rating of 21,500 lb.

The two (2) top leaves will wrap the forward spring hanger pin. The top leaf will also wrap the rear spring hanger pin. Both the front and rear eyes will be Berlin style wraps that will place the eyes in the horizontal plane within the main leaf. This will reduce bending stress from acceleration and braking.

A steel encased rubber bushing will be used in the spring eye. The steel encased rubber bushing will be maintenance free and require no lubrication.

### **REAR SUSPENSION**

The rear suspension will be Standens, semi-elliptical, 3.00" wide x 53.00" long, 12-leaf pack with a ground rating of 31,000 lbs. The spring hangers will be castings.

The two (2) top leaves will wrap the forward spring hanger pin, and the rear of the spring will be a slipper style end that will ride in a rear slipper hanger. To reduce bending stress due to acceleration and braking, the front eye will be a Berlin eye that will place the front spring pin in the horizontal plane within the main leaf.

A steel encased rubber bushing will be used in the spring eye. The steel encased rubber bushing will be maintenance free and require no lubrication.

### **ENGINE**

The chassis will be powered by an electronically controlled engine as described below:

Make: Detroit Diesel or Equivalent

Model: DD13

Power: 500 hp at 1800 rpm

Torque: 1650 lb-ft at 1200 rpm

Governed Speed: 2080 rpm

Emissions Level: EPA 2010

Fuel: Diesel

Cylinders: Six (6)

Displacement: 781 cubic inches (12.8 L)

Starter: Delco 39MT

Fuel Filters: Dual cartridge style with check valve, water separator, and water in fuel sensor

Coolant Filter: Cartridge style with shut off valves on the supply and return line.

### **ANTI-LOCK BRAKE SYSTEM**

The vehicle will be equipped with a Wabco 4S4M, anti-lock braking system. The ABS will provide a four (4) channel anti-lock braking control on both the front and rear wheels. A digitally controlled system that utilizes microprocessor technology will control the anti-lock braking system. Each wheel will be monitored by the system. When any particular wheel begins to lockup, a signal will be sent to the control unit. This control unit then will reduce the braking of that wheel for a fraction of a second and then reapply the brake. This anti-lock brake system will eliminate the lockup of any wheel thus helping to prevent the apparatus from skidding out of control.

### **ANTI-LOCK BRAKE SYSTEM WARRANTY**

The Wabco ABS system will come with a **three (3) year or 300,000 mile parts and labor** warranty provided by Meritor Wabco Vehicle Control Systems.

### **BRAKES**

The service brake system will be full air type by Meritor™.

The front brakes will be 16.50" x 6.00" cam operated with automatic slack adjusters.

The rear brakes will be Meritor™ 16.50" x 8.63" cam operated with automatic slack adjusters.

### **ENGINE BRAKE**

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

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

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

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

### **AIR COMPRESSOR, BRAKE SYSTEM**

The air compressor will be a Bendix BA-921 with 15.80 cubic feet per minute output at 1,250 RPM.

### **BRAKE SYSTEM**

The brake system will include:

- Bendix-Westinghouse dual brake treadle valve with vinyl covered foot surface
- Heated automatic moisture ejector on air dryer
- Total air system capacity of 5,198 cubic inches
- Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
- MGM spring set parking brake system
- Parking brake operated by a Bendix-Westinghouse PP-1 control valve
- A parking "brake on" indicator light on instrument panel
- Bendix-Westinghouse SR-1 valve, in conjunction with a double check valve system, providing automatic spring brake application at 40 psi

The air tank will be primed and painted to meet a minimum 750 hour salt spray test.

To reduce the effects of corrosion, the air tank will be mounted with stainless steel brackets.

- Wabco System Saver 1200 air dryer with spin-on coalescing filter cartridge
- 100 Watt Heater

### **BRAKE LINES**

Color-coded nylon brake lines will be provided. The lines will be wrapped in a heat protective loom in the chassis areas that are subject to excessive heat.

### **AIR INLET**

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

### **STEERING**

A Ross TAS-85 steering gear, with integral heavy-duty power steering, will be provided. For reduced system temperatures, the power steering will incorporate an air to oil cooler and a TRW model EV hydraulic pump with integral pressure and flow control. All power steering lines will have wire braded lines with crimped fittings.

A tilt and telescopic steering column will be provided to improve fit for a broader range of driver configurations.

### **LOGO AND CUSTOMER DESIGNATION ON DASH**

The dash panel will have an emblem containing:

Apparatus logo and customer name. The emblem will have three (3) rows of text for the customer's department name. There will be a maximum of eight (8) characters in the first row, 11 characters in the second row and 11 characters in the third row.

The first row of text will be: TOWN OF

The second row of text will be: VERNON

The third row of text will be: FIRE DEPARTMENT

### **BUMPER**

A one (1) piece, ten (1) gauge, 304-2B type polished stainless steel bumper, a minimum of 10.00" high, will 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 will be extended 19.00" from front face of cab.

Documentation will 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 will be provided to indicate the option locations and will 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.

### **BELL**

Department supplied bell will be mounted on the front bumper extension.

### **ENGINE INSTALLATION CERTIFICATION**

The fire apparatus manufacturer will 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 will be provided at the time of bid.

### **TOW HOOKS**

No tow hooks are to be provided. This truck will be equipped with a lift and tow package with integral tow eyes.

### **ENGINE AIR INTAKE**

An air intake with an ember separator (to prevent road dirt, burning embers, and recirculating hot air from entering the engine) will be mounted at the front of the apparatus, on the passenger side of the engine. The ember separator will be mounted in the air intake with flame retardant, roto-molded polyethylene housing. It will be easily accessible by the hinged access panel at the front of the vehicle.

### **HOSE TRAY**

A hose tray, constructed of aluminum, will be placed in the center of the bumper extension.

The tray will have a capacity of 100' of 1.75" double jacket cotton-polyester hose.

Aluminum grating will be provided at the bottom of the tray. Drain holes are also provided.

### **GRAVEL PAN**

A gravel pan, constructed of bright aluminum tread plate, will be furnished between the bumper and cab face.

The gravel pan will be properly supported from the underside to prevent flexing and vibration of the aluminum tread plate.

### **EXHAUST SYSTEM**

The exhaust system will include a diesel particulate filter (DPF) and a selective catalytic reduction (SCR) device to meet current EPA standards. The exhaust system will be stainless steel from the turbo to the inlet of the SCR device and will be 5.00" in diameter. An insulation wrap will be provided on all exhaust pipe between the turbo and SCR to minimize the transfer of heat to the cab. The exhaust will terminate horizontally ahead of the passenger side rear wheels. A tailpipe diffuser will be provided to reduce the temperature of the exhaust as it exits. Heat deflector shields will be provided to isolate chassis and body components from the heat of the tailpipe diffuser.

### **EXHAUST MODIFICATION**

The exhaust pipe will be brought out from under the body at a 90 degree angle from the truck. The tail pipe will extend a minimum of 2.00" past the body, adaptable for the Plymovent system. The diameter of the pipe will be 7.00". There will be a clearance of 4.00" completely around the pipe once past the side of the body. A stop will be provided on the tail pipe that will prevent the nozzle from sliding too far on.

### **DIESEL EXHAUST FLUID TANK**

A 4.5 gallon diesel exhaust fluid (DEF) tank will be provided and mounted in the driver's side body forward of the rear axle. The tank will be constructed of 16-gauge type 304- L stainless steel.

A .50" drain plug will be provided in a low point of the tank for drainage.

A fill inlet will 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 Exhaust Fluid Only".

The tank will meet the engine manufacturers requirement for 10 percent expansion space in the event of tank freezing.

The tank will include an integrated heater unit that utilizes engine coolant to thaw the DEF in the event of freezing.

### **HIGH IDLE**

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

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

### **COOLANT LINES**

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

Hose clamps will be stainless steel "constant torque type" to prevent coolant leakage. They will 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 will meet or exceed NFPA and engine manufacturer cooling system standards.

For maximum corrosion resistance and cooling performance, the entire radiator core will be constructed using long life aluminum alloy. The core will be made of aluminum fins, having a serpentine design, brazed to aluminum tubes. The tubes will be brazed to aluminum headers. No solder joints or leaded material of any kind will be acceptable in the core assembly. The radiator core will have a minimum frontal area of 1434 square inches. Supply and return tanks made of glass-reinforced nylon will be crimped on to the core assembly using header tabs and a compression gasket to complete the radiator core assembly. The radiator will be compatible with commercial antifreeze solutions.

There will be a full steel frame around the entire radiator core assembly. The radiator core assembly will be isolated within the steel frame by rubber inserts to enhance cooling system durability and reliability. The radiator will 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 will be isolated from the chassis frame rails with rubber isolators.

The radiator assembly will include an integral deaeration tank permanently mounted to the top of the radiator framework, with a readily accessible remote-mounted overflow tank. For visual coolant level inspection, the radiator will have a built-in sight glass. The radiator will be equipped with a 15 psi pressure relief cap.

A drain port will 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 will draw in fresh, cool air through the radiator. Shields or baffles will be provided to prevent recirculation of hot air to the inlet side of the radiator.

### **CLUTCH FAN**

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

### **ACCESS TO ENGINE DIPSTICKS**

For access to the engine oil and transmission fluid dipsticks, there will be a door on the engine tunnel, inside the crew cab. The door will be on the rear wall of the engine tunnel, on the vertical surface. The door will be 17.75" wide x 12.75" high and be flush with the wall of the engine tunnel.

The engine oil dipstick will allow for checking only. The transmission dipstick will allow for both checking and filling. An additional tube will be provided for filling the engine oil.

The door will have a rubber seal for thermal and acoustic insulation. One (1) flush latch will be provided on the access door.

### **FUEL TANK**

A 65-gallon fuel tank will be provided and mounted at the rear of the chassis. The tank will be constructed of 12-gauge, hot rolled steel. It will be equipped with swash partitions and a

vent. To eliminate the effects of corrosion, the fuel tank will be mounted with stainless steel straps.

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

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

A .50" diameter vent will be installed from tank top to just below fuel fill inlet.

The fuel tank will meet all FHWA 393.67 requirements including a fill capacity of 95 percent of tank volume.

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

### **FUEL COOLER**

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

### **TRANSMISSION**

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

The transmission will be equipped with prognostics to monitor oil life, filter life, and transmission health. A wrench icon on the shift selector's digital display will indicate when service is due.

Two (2) PTO openings will 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 will be installed on the cab instrument panel.

### **STEP LIGHTS**

For reduced overall maintenance costs compared to incandescent lighting, there will be eight (8) Ritar, Model M27HW2, LED, step lights provided. The lights will be installed at each cab and crew cab door, two (2) 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 will be activated when the adjacent door is opened.

### **TRANSMISSION SHIFTER**

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

The transmission ratio will be 1st - 3.51 to 1.00, 2nd - 1.91 to 1.00, 3rd - 1.43 to 1.00, 4th - 1.00 to 1.00, 5th - 0.75 to 1.00, 6th - 0.64 to 1.00, R - 4.80 to 1.00.

### **TRANSMISSION COOLER**

A shell and tube transmission oil cooler will be provided using engine coolant to control the transmission oil temperature. The cooler will have an aluminum shell and copper tubes. The cooler will be assembled using pressed in rubber tube sheets to mechanically create a reliable seal between the coolant and the oil. No brazed, soldered, or welded connections will be used to separate the coolant from the oil.

### **TRANSMISSION WARRANTY**

The transmission will have a **five (5) year/unlimited mileage** warranty covering 100 percent parts and labor. The warranty will be provided by Allison Transmission.

Note: The transmission cooler is not covered under any extended warranty you may be getting on your Allison Transmission. Please review your Allison Transmission warranty for coverage limitations.

### **DRIVELINE**

Drivelines will be a heavy-duty metal tube and be equipped with Spicer 1810 universal joints.

The shafts will be dynamically balanced before installation.

A splined slip joint will be provided in each driveshaft, slip joint will be coated with Glidecoat or equivalent.

### **STEERING WHEEL**

The steering wheel will be 18.00" in diameter, have tilting and telescoping capabilities, and a four (4)-spoke design.

### **STEERING ASSIST CYLINDER ON FRONT AXLE**

To aid in the steering of the apparatus, the front axle will be equipped with a Ross power assist cylinder.

### **FRONT TIRES**

Front tires will be Michelin 425/65R22.50 radials, 20 ply all-position XZY3 wide base tread.

### **REAR TIRES**

Rear tires will be four (4) Michelin 315/80R22.50 radials, 20 ply XDN2 Grip traction tread.

### **TIRE BALANCE**

All tires will be balanced with Counteract balancing beads. The beads will be inserted into the tire and eliminate the need for wheel weights.

### **WHEEL CHOCKS**

There will be one (1) pair of folding Ziamatic SAC-44-E, aluminum alloy, Quick-Choc wheel blocks, with easy-grip handle provided.

### **WHEEL CHOCK BRACKETS**

There will be one (1) pair of Ziamatic SQCH-44-H horizontal mounting wheel chock brackets provided for the Ziamatic SAC-44-E folding wheel chocks. The brackets will be mounted on the Ds just ahead of the rear axle..

### **HUB COVERS (front)**

Stainless steel hub covers will be provided on the front axle. An oil level viewing window will be provided.

### **HUB COVERS (rear)**

A pair of stainless steel high hat hub covers will be provided on rear axle hubs.

### **AUTOMATIC TIRE CHAINS**

One (1) pair of Onspot automatic tire chains will be provided at the rear. System will be electric over air operated with switch on cab instrument panel. System may be engaged at speeds up to 25 mph and operated at speeds up to 35 mph.

### **COVERS, LUG NUT, CHROME**

Chrome lug nut covers will be supplied on front and rear wheels.

### **MUD FLAPS**

Mud flaps will be installed behind the front and rear wheels.

### **TIRE PRESSURE MANAGEMENT**

There will be a VECSAFE LED tire alert pressure management system provided that will monitor each tire's pressure. A chrome plated brass sensor will be provided on the valve stem of each tire for a total of six (6) tires.

The sensor will calibrate to the tire pressure when installed on the valve stem for pressures between 20 and 120 psi. The sensor will activate an integral battery operated LED when the pressure of that tire drops eight (8) psi.

Removing the cap from the sensor will indicate the functionality of the sensor and battery. If the sensor and battery are in working condition, the LED will immediately start blinking.

### **CAB**

The cab will be designed specifically for the fire service and will be manufactured by the chassis builder.

The cab will be constructed of 5052-H32 aluminum skins on extruded aluminum framing. For increased structural integrity and occupant protection, the cab structure will include, directly forward of the driver and passenger areas, a .25" firewall plate and .50" lateral support plate that will tie the forward corner posts to the engine tunnel. The cab roof will include a heavy one (1)-piece aluminum extrusion with wall thickness up to .12", and will extend from side to side, and attach to the upper forward corner posts by customized aluminum castings. The sub-structure will include a 0.38" wall extrusion under the crew cab floor for support while tilting the cab. To provide quality at the source and single source customer support, the cab will be built by the apparatus manufacturer in a facility located on the manufacturer's premises.

The cab will be a full-tilt style to 80 degrees to accommodate engine maintenance and removal. The cab pivots will be located 46.00" apart to provide stability while tilting the cab. The cab will be tilted by an electric over hydraulic pump that is connected to two (2) cab lift cylinders 2.25" in diameter. The cab will be locked down by a two (2)-point automatic locking mechanism actuated after the cab has been lowered. A three (3)-point cab mount system with rubber isolators will improve ride quality by isolating chassis vibrations from the cab.

The crew cab will be a totally enclosed design with the interior area completely open to improve visibility and verbal communication between the occupants.

The forward cab section will have an overall height (from the cab roof to the ground) of approximately 102.00". The crew cab section will have a 10.00" raised roof, with an overall cab height of approximately 112.00". The overall height listed will 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 will increase the overall height listed.

The cab will have an interior width of not less than 93.50". The driver and passenger seating positions will have a minimum 24.00" clear width at knee level.

To reduce injuries to occupants in the seated positions, proper head clearance will be provided. The floor-to-ceiling height inside the forward cab will be no less than 60.25". The floor-to-ceiling height inside the crew cab will be no less than 62.95" in the center position and 68.75" in the outboard positions.

The crew cab will measure a minimum of 47.50" from the rear wall to the backside of the engine tunnel (knee level) for optimal occupant legroom.

### **INTERIOR CAB INSULATION**

The cab walls, ceiling and engine tunnel will be insulated in all strategic locations to maximize acoustic absorption and thermal insulation. The cab will be insulated with 2.00" insulation in the rear wall, 3.00" insulation in the side walls, and 1.50" insulation in the ceiling.

### **ENGINE TUNNEL**

To provide structural strength, the engine tunnel sidewalls will be constructed of .50" aluminum plate that is welded to both the .25" firewall and .38" heavy wall extrusion under the crew cab floor. To maximize occupant space, the top edges will be tapered.

The engine tunnel will be insulated on both sides for thermal and acoustic absorption. The underside of the tunnel will be covered with 1.00" thick polyether foam that is reinforced with an aluminized face. Thermal rating for this insulation will be -40 degrees Fahrenheit to 300 degrees Fahrenheit. The insulation will keep noise (dBA) levels at or lower than the specifications in the current edition of the NFPA 1901 standards.

### **FENDER LINERS**

Full-circular, aluminum, inner fender liners in the wheel wells will be provided.

### **REAR WALL COVERING**

The exterior surface of the rear wall of the cab will be overlaid with bright aluminum tread plate except for areas that are not typically visible when the cab is lowered.

### **PANORAMIC WINDSHIELD**

A one-piece, safety glass windshield with more than 2,802 square inches of clear viewing area will be provided. The windshield will be full width and will provide the occupants with a panoramic view. The windshield will consist of three (3) layers; the outer light, the middle safety laminate, and the inner light. The 0.114" thick outer light layer will provide superior chip resistance. The middle safety laminate layer will prevent the windshield glass pieces from detaching in the event of breakage. The inner light will provide yet another chip resistant layer. The cab windshield will be bonded to the aluminum windshield frame using a urethane adhesive. A custom frit pattern will be applied on the outside perimeter of the windshield for a finished automotive appearance.

### **SUNVISORS**

Two (2) smoked Lexan sunvisors 7.75" x 28.12" long will be provided. The sunvisors will be located above the windshield with one (1) mounted on each side of the cab.

### **WINDSHIELD WIPERS**

Three (3) electric windshield wipers with a washer, in conformance with FMVSS and SAE requirements, will be provided. The wiper blades will be 21.65" long and together will clear a minimum of 1,783 square inches of the windshield for maximum visibility in inclement weather.

The windshield washer fluid reservoir will be located at the front of the vehicle and be accessible through the access hood for simple maintenance.

### **FAST SERVICE ACCESS FRONT TILT HOOD**

A full-width access hood will be provided for convenient access to engine coolant, steering fluid, wiper fluid, cab lift controls, headlight power modules, and ember separator. The hood will also provide complete access to the windshield wiper motor and components. The hood will be contoured to provide a sleek, automotive appearance. The hood will be constructed of two (2) fiberglass panels bonded together and will include reinforcing ribs for structural integrity. The hood will include air cylinders to hold the hood in open and closed positions, and a heavy duty latch system that will meet FMVSS 113 (Hood Latch System). The spring-loaded hood latch will be located at the center of the hood with a double-action release lever located behind the "Pierce" logo. The two (2)-step release requires the lever first be pulled to the driver side until the hood releases from the first latch (primary latch) then to the passenger side to fully release the hood (secondary latch).

### **CAB INTEGRITY CERTIFICATION**

The fire apparatus manufacturer will provide a cab integrity certification with this proposal. The certification will state that the cab has been tested and certified by an independent third-party test facility. Testing events will be documented with photographs, real-time and high-speed video, vehicle accelerometers, cart accelerometers, and a laser speed trap. The fire apparatus manufacturer will provide a state-licensed professional engineer to witness and certify all testing events. Testing will meet or exceed the requirements below:

- European Occupant Protection Standard ECE Regulation No.29.
- SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.
- SAE J2420 COE Frontal Strength Evaluation - Dynamic Loading Heavy Trucks.
- Roof Crush

The cab will be subjected to a roof crush force of 22,050 lbs. This value meets the ECE 29 criteria and is equivalent to the front axle rating up to a maximum of 10 metric tons.

- Additional Roof Crush

The same cab will be subjected to a roof crush force of 100,000 lbs. This value exceeds the ECE 29 criteria by nearly 4.5 times.

- Side Impact

The same cab will be subjected to dynamic preload where a 13,275 lb moving barrier slams into the side of the cab at 5.5 mph at a force of 13,000 ft-lbs. This test is part of the SAE J2422 test procedure and more closely represents the forces a cab will see in a rollover incident.

- Frontal Impact

The same cab will withstand a frontal impact of 32,600 ft-lbs of force using a moving barrier in accordance with SAE J2420.

- Additional Frontal Impact

The same cab will withstand a frontal impact of 65,200 ft-lbs of force using a moving barrier, (twice the force required by SAE J2420).

The same cab will withstand all tests without any measurable intrusion into the survival space of the occupant area.

### **CAB DOOR DURABILITY CERTIFICATION**

Robust cab doors help protect occupants. Cab doors will survive a 200,000 cycle door slam test where the slamming force exceeds 20 G's of deceleration. The bidder will 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.

### **FORWARD FACING DRIVER SIDE OUTBOARD SEAT**

There will be one (1) forward facing flip-up seat provided at the driver side outboard position in the crew cab. The seat back will have an aluminum backing, covered with foam padded upholstery. The seat bottom will be constructed of a piece of plywood covered with foam rubber and upholstery. The bottom cushion will have its bottom covered with brushed stainless steel, for a pleasant appearance when the seat bottom is in the up position. To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle, that will activate an alarm indicating a seat is occupied but not buckled.

The seat will be furnished with a three-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the seat belt will have a minimum 120.00" shoulder length and 55.00" lap length. The seat belt tongue will be stored at waist position for quick application by the seat occupant. The seat belt receptacle will be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

### **EMS COMPARTMENT**

An EMS compartment, 21.00" wide x 64.00" high x 14.00" deep with one (1) Gortite roll up door, locking, with white finish will be provided in the crew cab.

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

### **COMPARTMENT LIGHT**

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

### **CAB FLOOR**

The cab and crew cab floor areas will be covered with Polydamp™ 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.

### **INTERCOM SYSTEM**

A Setcom, model IM-900, intercom system will be provided. Intercom stations will be located at the driver, officer, four (4) crew cab positions and pump panel. at two (2) forward facing seats and two (2) rearward facing seats The driver, officer and pump panel positions will be interfaced with the radio and have a "push to talk" (PTT) button located on the bottom of each headset. All other positions will have intercom only capability.

The following components will be supplied with this system:

- One (1) IM-900 intercom/radio mixer.
- One (1) CSA-902R headset, vented cup, right cable dress (driver and pump operator).
- One (1) CSA-900L headset, left cable dress (officer).
- Two (2) CSA-901L headset, left cable dress (crew)
- Two (2) CSA-901R headset, right cable dress (crew)
- One (1) JS-900 dual jump seat station
- One (1) JS-901 dual jump seat expansion station.
- One (1) PS-900 pump panel station.

### **RADIO INTERFACE NOT REQUIRED**

The apparatus manufacturer shall not provide a radio / intercom interface.

### **DOORS**

The forward cab and crew cab doors will be the half-height style door. To enhance entry and egress to the cab, the forward cab doors will be a minimum of 43.59" wide x 64.71" high. The crew cab doors will measure a minimum of 37.87" wide x 73.75" high.

The forward cab and crew cab doors will be constructed of extruded aluminum with a nominal material thickness of .125". The exterior door skins will be constructed from .090" aluminum.

Each forward cab and crew cab entry door will contain a roll-down tempered glass window. The forward cab door windows will include a 7.50" high x 10.00" wide drop area at the front to enhance visibility.

A customized, vertical, pull-down type door handle will be provided on the exterior of each cab door. The exterior handle will be designed specifically for the fire service to prevent accidental activation, and will provide 4.00" wide x 2.00" deep hand clearance for ease of use with heavy gloved hands. Each door will also be provided with an interior flush, open style paddle handle that will be readily operable from fore and aft positions, and be designed to prevent accidental activation. The interior handles will provide 4.00" wide x 1.25" deep hand clearance for ease of use with heavy gloved hands.

The cab doors will be provided with both interior (rotary knob) and exterior (keyed) locks exceeding FMVSS standards. The locks will be capable of activating when the doors are open or closed. The doors will remain locked if locks are activated when the doors are opened, then closed.

A full length, heavy duty, stainless steel, piano-type hinge with a .38" pin and 11 gauge leaf will be provided on all cab doors. There will be double automotive-type rubber seals around the perimeter of the door framing and door edges to ensure a weather-tight fit.

The inner cab door panels will be constructed of painted aluminum and be removable without requiring the disconnection of door and window mechanisms. A dark grey vacuum formed ABS panel will house the window switches and will mold into the upper sill of the door panel.

The cab steps at each cab door location will be located below the cab doors and will be exposed to the exterior of the cab.

### **CAB DOOR SCUFFPLATES**

Cab door scuffplates are not required due to stainless steel door panels on cab doors.

### **ELECTRIC WINDOW CONTROLS**

Each cab entry door will be equipped with an electrically operated window. A window control panel will be ergonomically molded into the armrest of the door panel within easy reach of the respective occupant. Each switch will allow intermittent or auto down operation for ease of use. Auto down operation will be actuated by holding the window down switch for approximately 1/2 second. The driver control panel will contain a control switch for each cab door's window. All other door control panels will contain a single switch to operate the window within that door.

### **ELECTRIC WINDOW DURABILITY CERTIFICATION**

Cab window roll-up systems can cause maintenance problems if not designed for long service life. The window regulator design will complete 30,000 complete up-down cycles and still function normally when finished. The bidder will certify that sample doors and windows similar to those provided on the apparatus have been tested and have met these criteria without malfunction or significant component wear.

### **GRILLE**

A bright finished aluminum mesh grille screen, inserted behind a formed bright finished grille surround, will be provided on the front center of the cab, and will serve as an air intake to the radiator.

### **FENDER CROWNS**

Stainless steel fender crowns will be installed at the cab wheel openings.

### **FRONT CAB TRIM**

Satin finished, stainless steel, rectangular garnish plates will be installed behind the two (2) headlight bezels for an enhanced appearance.

### **STRIPE (On Paint Break)**

There will be a gold leaf stripe provided on the paint break in place of chrome molding. The stripe will be on both sides of the cab and on the cab face with shield.

### **CAB LIFT**

A hydraulic cab lift system will be provided, consisting of an electric-powered hydraulic pump, fluid reservoir, dual lift cylinders, remote cab lift controls and all necessary hoses and valves.

The cab lift controls will be located at the driver side front of the cab, easily accessible under the full width front access hood. The controls will include a permanently mounted raise/lower switch. For enhanced visibility during cab tilt operations, a remote control tether with on/off switch will be supplied on a coiled cord that will extend from 2.00' (coiled) to 6.00' (extended).

The rear of the cab will be locked down by a two (2)-point, automatic, hydraulic, double hook mechanism that fully engages after the cab has been lowered (self-locking). The dual 2.25" diameter hydraulic cylinders will be equipped with a velocity fuse that protects the cab from accidentally descending when the cab is in the tilt position.

For increased safety, a redundant mechanical stay arm will be provided that must be manually put in place on the driver side between the chassis and cab frame when cab is in the raised position. This device will be manually stowed to its original position before the cab can be lowered.

### **INTERLOCK, CAB LIFT TO PARKING BRAKE**

The cab lift safety system will be interlocked to the parking brake. The cab tilt mechanism will 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 will be disabled.

### **BATTERY CHARGER/ AIR COMPRESSOR**

A Kussmaul Pump Plus 1000, model 091-9-1000 single output battery charger/air compressor system with internal battery saver will be provided. A display bar graph indicating the state of charge will be included.

The battery saver circuit will be capable of supplying up to three (3) amps for external loads such as hand light or auxiliary radio batteries.

The 12-volt air compressor will be installed to maintain the air system pressure when the vehicle is not in use.

The battery charger will be wired to the AC shoreline inlet through an AC receptacle adjacent to this battery charger.

Battery charger/compressor will be located in the front left body compartment.

### **MIRRORS**

A Moto Mirror-Plus polished mirror, 7.62" x 13.50" flat glass and a 6.62" x 6.25" convex glass, will be mounted on each side of the front cab doors. Driver and passenger side mirrors will be heated and adjustable with remote control convenient to the driver.

### **ALTERNATOR**

A C.E. Niehoff, model C680-1, alternator will be provided. It will have a rated output current of 430 amp as measured by SAE method J56. It will also have a custom three (3)-set point voltage regulator, manufactured by C. E. Niehoff. The alternator will be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

### **LIFT AND TOW MOUNTS**

Mounted to the frame extension will be lift and tow mounts. The lift and tow mounts will be designed and positioned to adapt to certain tow truck lift systems.

The lift and tow mounts with eyes will be painted the same color as the frame.

### **REAR FMVSS LIGHTING**

The rear stop/tail and directional LED lighting will consist of the following:

Two (2) Whelen Model M6BTT red LED stop/tail lights.

Two (2) Whelen Model M6T amber LED arrow turn lights.

Each light will be installed separately at the rear with chrome trim and colored lenses.

Four (4) red reflectors will be provided.

A 16 gauge stainless steel license plate bracket will be mounted on the driver's side above the warning lights.

A Ri-Tar LED step lamp will illuminate the license plate. A polished stainless steel light shield will be provided over the light that will direct illumination downward, preventing white light to the rear.

### **BACKUP LIGHTS**

There will be two (2) Whelen, Model: M6BUW, LED backup lights provided in the tail light housing.

### **CAB INTERIOR**

With safety as the primary objective, the wrap-around style, high impact ABS polymer cab instrument panel will be designed with unobstructed visibility to instrumentation. The dash layout will provide the driver with a quick reference to gauges that allows more time to focus on the road. The center console will be a high impact ABS polymer, and will be easily removable for access to the defroster. The center console will include louvers strategically located for optimal air flow and defrost capability to the windshield. The passenger side dashboard will be constructed of painted aluminum for durability and low maintenance. For enhanced versatility, the passenger side dash will include a flat working surface. To provide optional (service friendly) control panels, switches and storage modules, a three (3) piece, 4mm thick polyethylene roto-molded overhead console will also be provided. To complete the cab front interior design, painted aluminum modesty panels will be provided under the dash on both sides of the cab. The driver side modesty panel will provide mounting for the battery switch and diagnostic connectors, while the passenger side modesty panel provides a glove box, and ground access to the main electrical distribution panel via quick quarter turn fasteners.

To provide a deluxe automotive interior, the engine tunnel will be covered by a leather grain vinyl that is resistant to oil, grease, and mildew. For durability and ease of maintenance, the cab interior side walls and rear wall will be painted gray, vinyl texture paint aluminum.

The inner cab door panels will include grab handles and control panels molded into the upper section of the door panel. The door panels will extend 36.50" down from the door window.

The headliner will be installed in both forward and rear cab sections. The crew cab headliner will be one piece. The headliner panel will be a composition of a corrugated high density polyethylene panel covered with a sound barrier and upholstery. For quick, easy access of electrical wiring, or to perform other maintenance needs without stripping screws, the headliner will be held in place by a dual lock fastening system that will require no tools for installation or removal.

The cab structure will include designated raceways for electrical harness routing from the front of the cab to the rear upper portion of the cab. Raceways will be extruded in the forward door frame, floor, walls and overhead in the area where the walls meet the ceiling. The raceways located in the floor will be covered by aluminum extrusion, while the vertical and overhead raceways will be covered by a decorative composite panel. The raceways will improve harness integrity by providing a continuous harness path that eliminates wire chafing and abrasion associated with exposed wiring or routing through drilled metal holes. Harnesses will be laid in place, not pulled through holes drilled in aluminum tubing. Once laid in place, all harnesses will be held in position by a hook and loop fastening system. The hook and loop system will allow for bracket fastener points to not puncture harnesses. The raceways will include removable covers, providing maintenance

personnel with quick and easy access for trouble shooting, or the addition of accessories. Harnesses will be located within the raceway behind the wire way cover.

### **CAB INTERIOR UPHOLSTERY**

The cab interior upholstery will be dark silver gray. All cab interior materials will meet FMVSS 302 (flammability of interior materials).

### **INTERIOR PAINT (Cab)**

A rich looking interior will be provided by painting all the metal surfaces inside the cab gray, vinyl texture paint.

### **CD MANUAL, FIRE APPARATUS PARTS**

A custom parts manual for the complete fire apparatus will be provided in CD format with the completed unit.

The manual will 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 will be specifically written for the chassis and body model being purchased. It will 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.

### **CD MANUAL, CHASSIS SERVICE**

A CD format chassis service manual containing parts and service information on major components will be provided with the completed unit.

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

### **GRAB HANDLE**

A black rubber covered grab handle will be mounted on the door post of the driver side cab door to assist in entering the cab. The grab handle will be securely mounted to the post area between the door and windshield.

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

### **CD MANUAL, CHASSIS OPERATION**

A CD format chassis operation manual will be provided.

### **12 VOLT LIGHTING**

There will be one (1) Whelen Pioneer PCP2, 12 volt LED combination spotlight and floodlight(s) provided on the front visor, centered.

The light will be controlled by the following:

a switch at the driver's side switch panel

a switch at the passenger's side switch panel

no additional switch location

These light(s) may be load managed when the parking brake is set.

### **DRIVER SEAT**

A Seats Inc. #911 or equivalent high back style air suspension seat will be provided in the cab for the driver.

The seat will include the following features incorporated into the frontal impact protection system.

A suspension seat safety system will be included. When activated, this system will pretension the seat belt and retract the seat to its lowest travel position.

The seat will be furnished with a three (3)-point, shoulder type seat belt. The seat belt will be furnished with automatic retractor. Extension will 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.

### **OFFICER SEAT**

A Seats Inc. 911 or equivalent air suspension seat will be provided in the cab for the passenger.

The seat back will be an SCBA back style. The SCBA cavity will be adjustable from front to rear in 1.00" increments to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat will include the following features incorporated into the frontal impact protection system.

A suspension seat safety system will be included. When activated, this system will pretension the seat belt and retract the seat to its lowest travel position.

The seat will be furnished with a three (3)-point, shoulder type seat belt. The seat belt will be furnished with automatic retractor. Extension will 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.

### **REAR FACING PASSENGER SIDE OUTBOARD SEAT**

There will be one (1) Seats Inc. 911 or equivalent rear facing seat provided at the passenger side outboard position in the crew cab.

The seat back will be an SCBA back style. The SCBA cavity will be adjustable from front to rear in 1.00" increments to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat will be furnished with a three (3)-point, shoulder type seat belt. The seat belt will be furnished with automatic retractor. Extension will 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.

### **REAR FACING DRIVER SIDE OUTBOARD SEAT**

There will be one (1) Seats Incorporated 911 or equivalent rear facing seat provided at the driver side outboard position in the crew cab.

The seat back will be an SCBA back style. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat will be furnished with a three (3)-point, shoulder type seat belt. The seat belt will be furnished with automatic retractor. Extension will 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 will be two (2) Seats Inc. #911 or equivalent forward facing seats provided at the center position in the crew cab.

The seat backs will be an SCBA back style. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seats will be furnished with a three (3)-point, shoulder type seat belt. The seat belt will be furnished with automatic retractors. Extension will 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.

### **RADIO COMPARTMENT**

A compartment for the radio amplifier will be located on the floor of the cab behind the front passenger's seat. A lift-up door with a chrome plated lift and turn latch will be provided for access. The compartment will be constructed of smooth aluminum and painted to match the cab interior. The radio control will be located in the overhead console on the passenger's side.

### **SEAT UPHOLSTERY**

All Seats Inc. 911 seat upholstery will be gray woven with black Imperial 1200 material.

### **AIR BOTTLE HOLDERS**

All SCBA type seats in the cab will have a "Hands-Free" auto clamp style bracket in its backrest. For efficiency and convenience, the bracket will 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 will constrain the SCBA bottle in the seat and will 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, will not be acceptable.

There will be a quantity of five (5) SCBA brackets.

### **SEAT BELTS**

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

### **SHOULDER HARNESS HEIGHT ADJUSTMENT**

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

A total of six (6) seating positions will have the adjustable shoulder harness.

### **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 will withstand 3000 lb of pull on both the lap and shoulder belt in accordance with FMVSS 571.210 Seat Belt Assembly Anchorages. The bidder will 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 will be tested to withstand 20 G's of force in accordance with FMVSS 571.207 Seating Systems. The bidder will 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) will be provided. The SBMS will 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 will not include an occupant sensor. The display indication for the driver seat will 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 will include an audible alarm that will 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.

### **HELMET HOLDER**

There will be six (6) Zico UHH-1 helmet holder bracket(s) provided in the cab. The brackets will provide quick access and secure storage of the helmet(s). The bracket location(s) will be determined at time of final inspection.

### **TEN (10) YEAR STRUCTURAL INTEGRITY**

A cab limited warranty certificate, WA0012, is included with this proposal.

### **FRONTAL IMPACT PROTECTION**

The cab will be provided with a frontal impact protection system and will include the following:

- A supplemental restraint system (SRS) sensor will be installed on a structural cab member behind the instrument panel. The SRS sensor will perform real time diagnostics of all critical subsystems and will record sensory inputs immediately before and during a frontal impact event.
- A fault-indicating light will be provided on the vehicle's instrument panel allowing the driver to monitor the operational status of the SRS system.
- A driver side front air bag will be mounted in the steering wheel and will be designed to protect the head and upper torso of the occupant, when used in combination with the three (3)-point seat belt.
- A passenger side knee bolster air bag will be mounted in the modesty panel below the dash panel and will be designed to protect the legs of the occupant, when used in combination with the three (3)-point seat belt.
- Driver and front passenger suspension seats will be provided with devices to retract them to the lowest travel position during a frontal impact event.
- Driver and front passenger seat belts will be provided with pre-tensioners to remove slack from the seat belt during frontal impact event.

The SRS system will provide protection during a frontal or oblique impact event. The system will activate when the vehicle decelerates at a predetermined G force known to cause injury to the occupants. The cab and chassis will have been subjected, via third party test

facility, to a crash impact during frontal and oblique impact testing. Testing included all major chassis and cab components such as mounting straps for fuel and air tanks, suspension mounts, front suspension components, rear suspensions components, frame rail cross members, engine and transmission and their mounts, pump house and mounts, frame extensions and body mounts. The testing provided configuration specific information used to optimize the timing for firing the safety restraint system. The sensor will activate the pyrotechnic devices when the correct crash algorithm, wave form, is detected.

The SRS system will deploy the following components in the event of a frontal or oblique impact event:

- Driver side front air bag.
- Passenger side knee bolster air bag.
- Driver and front passenger suspension seats will be retracted to the lowest travel position.
- Driver and front passenger seat belts will be pre-tensioned to firmly hold the occupant in place.

### **ENGINE COMPARTMENT LIGHT**

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

### **CAB DOME LIGHTS**

There will be two (2) Weldon Model 8081, incandescent dome lights installed in the cab providing an overall lower cost of ownership. The lights will be mounted above the inside shoulder of the driver and officer. The forward, clear, light will be controlled by the door switch and the lens switch. The rear, red, light will be controlled by the lens switch only.

In addition, there will be two (2) adjustable map lights with an integral switch recessed into the cab ceiling. One (1) light will be located above the driver's seat and one (1) light will be located above the officer's seat.

### **CREW CAB DOME LIGHTS**

There will be two (2) Weldon Model 8081, incandescent dome lights installed in the crew cab. The forward, clear light will be controlled by the door switch and the lens switch. The rear, red light will be controlled by the lens switch only.

### **CAB DEFROSTER**

To provide maximum defrost and heating performance, a 54,961BTU heater-defroster unit with 558 SCFM of air flow will be provided inside the cab. The defroster unit will be strategically located under the center forward portion of the roto-molded instrument panel. For easy access, a removable roto-molded cover will be installed over the defroster unit. The defroster will include an integral aluminum frame air filter, high performance dual scroll blowers, and ducts designed to provide maximum defrosting capabilities for the one (1) piece windshield. The defroster ventilation will be built into the design of the cab dash instrument panel and will be easily removable for maintenance. The defroster will be capable of clearing 98 percent of the windshield and side glass when tested under conditions where the cab has been cold soaked at zero (0) degrees Fahrenheit for ten (10) hours, and a two (2) ounce per square inch layer of frost/ice has been able to build up on the exterior windshield. The defroster system will meet or exceed SAE J382 (minimum defrosting system performance requirements).

### **CAB/CREW CAB HEATER**

Two (2) 36,702 BTU auxiliary heaters with 276 SCFM each unit of air flow will be provided inside the crew cab, one (1) in each outboard rear-facing seat riser. The heaters will include high performance dual scroll blowers one (1) for each unit. Outlets for the heaters will be located below each rear-facing seat riser and below the fronts of the driver and passenger seats, for efficient airflow. An extruded aluminum plenum will be incorporated in the cab structure that will transfer heat to the forward cab seating positions.

The heater-defroster and crew cab heaters will be controlled by a single integral electronic control panel. The heater control panel will allow the driver to control heat flow to the front and rear simultaneously. The control panel will include variable adjustment for temperature and fan control, and be conveniently located on the dash in clear view of the driver. The control panel will include highly visible, progressive LED indicators for both fan speed and temperature. For increased convenience, an optional dual control for the passenger position will also be available.

### **CAB DEFROSTER CERTIFICATION**

Visibility during inclement weather is essential to safe apparatus performance. The defroster system will clear the required windshield zones in accordance with SAE J381 Windshield Defrosting Systems Test Procedure And Performance Requirements - Trucks, Buses, And Multipurpose Vehicles. The bidder will certify that the defrost system design has been tested in a cold chamber and passes the SAE J381 criteria.

### **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 will warm the cab 75 F from a cold-soak, within 30 minutes when tested using the coolant supply methods found in SAE J381. The bidder will certify that a substantially similar cab has been tested and has met these criteria.

### **AIR CONDITIONING**

A high-performance, customized air conditioning system will be furnished inside the cab and crew cab. A 19.10 cubic inch compressor will be installed on the engine.

The air conditioning system will be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 64 degrees Fahrenheit in the forward section of the cab, and 69 degrees Fahrenheit in the rear section of the cab, at 50 percent relative humidity within 30 minutes. The cooling performance test will be run only after the cab has been heat soaked at 100 degrees Fahrenheit for a minimum of 4 hours.

A roof-mounted condenser with a 63,000 BTU output that meets and exceeds the performance specification will be installed on the cab roof.

The evaporator unit will be installed in the cab, located in the center of the cab ceiling over the engine tunnel. The evaporator will include two (2) high performance cores and plenums with multiple outlets, one plenum directed to the front and one plenum directed to the rear of the cab.

The evaporator unit will have a 49,000 BTU rating that meets and exceeds the performance specifications. Adjustable air outlets will be strategically located on the evaporator cover per the following:

Two (2) will be directed towards the drivers location

Two (2) will be directed towards the officers location

Six (6) will be directed towards crew cab area

The air conditioner refrigerant will be R-134A and will be installed by a certified technician.

The air conditioner will be controlled by a single integral electronic control panel for the heater, defroster and air conditioner. For ease of operation, the control panel will include variable adjustment for temperature and fan control, and be conveniently located on the dash in clear view of the driver. The control panel will include highly visible, progressive LED indicators for both fan speed and temperature. For added convenience, an optional dual control for the passenger position will also be available.

### **INTERIOR CAB INSULATION**

The cab walls, ceiling and engine tunnel will be insulated in all strategic locations to maximize acoustic absorption and thermal insulation. The cab will be insulated with 2.00" insulation in the rear wall, 3.00" insulation in the side walls, and 1.50" insulation in the ceiling. Headliners will be constructed from a .20" high density polyethylene corrugated material. Each headliner will be wrapped with a 0.25" thick foil faced poly damp low emissivity foam insulation barrier for acoustic and thermal control. For ease of installation and removal, all headliners will be held in place by a dual lock fastening system. Headliner installation requiring removal of mechanical fasteners will not be acceptable.

Designed for maximum sound absorption and thermal insulation, the rear cab wall will be insulated with a 1.50" thick open cell acoustical foam. The thermal protection of the foam will provide an R-value of four (4) per 1.00" thickness.

### **CAB INSTRUMENTATION**

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

### **GAUGES**

The gauge panel will include the following ten (10) ivory gauges with chrome bezels to monitor vehicle performance:

- Voltmeter gauge (Volts)

Low volts (11.8 VDC)

Amber indicator on gauge assembly with alarm

High volts (15 VDC)

Amber indicator on gauge assembly with alarm

Very low volts (11.3 VDC)

Amber indicator on gauge assembly with alarm

Very high volts (16 VDC)

Amber indicator on gauge assembly with alarm

- Tachometer (RPM)

- Speedometer (Primary (outside) MPH, Secondary (inside) Km/H)

- Fuel level gauge (Empty - Full in fractions)

Low fuel (1/8 full)

Amber indicator on gauge assembly with alarm

Very low fuel (1/32) fuel

Amber indicator on gauge assembly with alarm

- Engine oil pressure gauge (PSI)

Low oil pressure to activate engine warning lights and alarms

Red indicator on gauge assembly with alarm

- Front air pressure gauge (PSI)

Low air pressure to activate warning lights and alarm

Red indicator on gauge assembly with alarm

- Rear air pressure gauge (PSI)

Low air pressure to activate warning lights and alarm

Red indicator on gauge assembly with alarm

- Transmission oil temperature gauge (Fahrenheit)

High transmission oil temperature activates warning lights and alarm

Amber indicator on gauge assembly with alarm

- Engine coolant temperature gauge (Fahrenheit)

High engine temperature activates an engine warning light and alarm

Red indicator on gauge assembly with alarm

- Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions)

Low fluid (1/8 full)

Amber indicator on gauge assembly with alarm

All gauges and gauge indicators will perform prove out at initial power-up to ensure proper performance.

### **INDICATOR LAMPS**

To promote safety, the following telltale indicator lamps will be integral to the gauge assembly and are located above and below the center gauges. The indicator lamps will be "dead-front" design that is only visible when active. The colored indicator lights will have descriptive text or symbols.

The following amber telltale lamps will be present:

- Low coolant
- Trac cntl (traction control) (where applicable)
- Check engine
- Check trans (check transmission)
- Aux brake overheat (Auxiliary brake overheat)
- Air rest (air restriction)
- Caution (triangle symbol)
- Water in fuel
- DPF (engine diesel particulate filter regeneration)
- Trailer ABS (where applicable)
- Wait to start (where applicable)
- HET (engine high exhaust temperature) (where applicable)
- ABS (antilock brake system)
- MIL (engine emissions system malfunction indicator lamp) (where applicable)
- SRS (supplemental restraint system) fault (where applicable)
- DEF (low diesel exhaust fluid level)

The following red telltale lamps will be present:

- Warning (stop sign symbol)
- Seat belt
- Parking brake
- Stop engine
- Rack down

The following green telltale lamps will be provided:

- Left turn
- Right turn
- Battery on

The following blue telltale lamp will be provided:

- High beam

### **ALARMS**

**Audible steady tone warning alarm:** A steady audible tone alarm will be provided whenever a warning message is present.

Audible pulsing tone caution alarm: A pulsing audible tone alarm (chime/chirp) will be provided whenever a caution message is present without a warning message being present.

Alarm silence: Any active audible alarm will be able to be silenced by holding the ignition switch at the top position for three (3) to five (5) seconds. For improved safety, silenced audible alarms will intermittently chirp every 30 seconds until the alarm condition no longer exists. The intermittent chirp will act as a reminder to the operator that a caution or warning condition still exists. Any new warning or caution condition will enable the steady or pulsing tones respectively.

### **INDICATOR LAMP AND ALARM PROVE-OUT**

Telltale indicators and alarms will perform prove-out at initial power-up to ensure proper performance.

### **CONTROL SWITCHES**

For ease of use, the following controls will be provided immediately adjacent to the cab instrument panel within easy reach of the driver.

Emergency master switch: A molded plastic push button switch with integral indicator lamp will be provided. Pressing the switch will activate emergency response lights and siren control. A green lamp on the switch provides indication that the emergency master mode is active. Pressing the switch again disables the emergency master mode.

Headlight / Parking light switch: A three (3)-position maintained rocker switch will be provided. The first switch position will deactivate all parking lights and the headlights. The second switch position will activate the parking lights. The third switch position will activate the headlights.

Panel backlighting intensity control switch: A three (3)-position momentary rocker switch will be provided. The first switch position decreases the panel backlighting intensity to a minimum level as the switch is held. The second switch position is the default position that does not affect the backlighting intensity. The third switch position increases the panel backlighting intensity to a maximum level as the switch is held.

The following standard controls will be integral to the gauge assembly and are located below the right hand gauges. All switches have backlit labels for low light applications.

High idle engagement switch: A two (2)-position momentary rocker switch with integral indicator lamp will be provided. The first switch position is the default switch position. The second switch position will activate and deactivate the high idle function when pressed and released. 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 will indicate when the high idle function is engaged.

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

The following standard controls will be provided adjacent to the cab gauge assembly within easy reach of the driver. All switches will have backlit labels for low light applications.

Ignition switch: A three (3)-position maintained/momentary rocker switch will be provided. The first switch position will deactivate vehicle ignition. The second switch position will activate vehicle ignition. The third momentary position will disable the

Command Zone audible alarm if held for three (3) to five (5) seconds. A green indicator lamp will be activated with vehicle ignition.

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

4-way hazard switch: A two (2)-position maintained rocker switch will be provided. The first switch position will deactivate the 4-way hazard switch function. The second switch position will activate the 4-way hazard function. The switch actuator will be red and includes the international 4-way hazard symbol.

Heater, defroster, and optional air conditioning control panel: A control panel with membrane switches will be provided to control heater/defroster temperature and heater, defroster, and air conditioning fan speeds. A green LED status bar will indicate the relative temperature and fan speed settings.

Turn signal arm: A self-canceling turn signal with high beam headlight and windshield wiper/washer controls will be provided. The windshield wiper control will have high, low, and intermittent modes.

Parking brake control: An air actuated push/pull park brake control valve will be provided.

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

### **CUSTOM SWITCH PANELS**

The design of cab instrumentation will allow for emergency lighting and other switches to be placed within easy reach of the operator thus improving safety. There will be positions for up to four (4) switch panels in the overhead console on the driver's side, up to four (4) switch panels in the engine tunnel console facing the driver, up to four (4) switch panels in the overhead console on the officer's side and up to two (2) switch panels in the engine tunnel console facing the officer. All switches will have backlit labels for low light applications.

### **DIAGNOSTIC PANEL**

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

The diagnostic panel will include the following:

- Engine diagnostic port
- Transmission diagnostic port
- ABS diagnostic port
- SRS diagnostic port (where applicable)
- Command Zone USB diagnostic port
- Engine diagnostic switch (blink codes flashed on check engine telltale indicator)
- ABS diagnostic switch (blink codes flashed on ABS telltale indicator)

- Diesel particulate filter regeneration switch (where applicable)
- Diesel particulate filter regeneration inhibit switch (where applicable)

### **CAB LCD DISPLAY**

A digital four (4)-row by 20-character dot matrix display will be integral to the gauge panel. The display will be capable of showing simple graphical images as well as text. The display will be split into three (3) sections. Each section will have a dedicated function. The upper left section will display the outside ambient temperature.

The upper right section will display, along with other configuration specific information:

- Odometer
- Trip mileage
- PTO hours
- Fuel consumption
- Engine hours

The bottom section will display INFO, CAUTION, and WARNING messages. Text messages will automatically activate to describe the cause of an audible caution or warning alarm. The LCD will be capable of displaying multiple text messages should more than one caution or warning condition exist.

### **AIR RESTRICTION INDICATOR**

A high air restriction warning indicator light LCD message with amber warning indicator and audible alarm will be provided.

### **WIPER CONTROL**

For simple operation and easy reach, the windshield wiper control will be an integral part of the directional light lever located on the steering column. The wiper control will include high and low wiper speed settings, a one (1)-speed intermittent wiper control and windshield washer switch. The control will have a "return to park" provision, which allows the wipers to return to the stored position when the wipers are not in use.

### **WINDSHIELD WIPER DURABILITY CERTIFICATION**

Visibility during inclement weather is essential to safe apparatus performance. Windshield wipers will survive a 3 million cycle durability test in accordance with section 6.2 of SAE J198 *Windshield Wiper Systems - Trucks, Buses and Multipurpose Vehicles*. The bidder will certify that the wiper system design has been tested and that the wiper system has met these criteria.

### **RADIO ANTENNA MOUNT**

An antenna-mounting base, Model MATM, with 17 feet of coax cable and weatherproof cap will be provided for a two (2)-way radio. The mount will be located on the cab roof just to the rear of the officer seat. The cable will be routed to the seat box on the officer side with enough cable for customer to route to the instrument panel if needed.

### **SWITCH PANELS**

The emergency light switch panel will have a master switch for ease of use plus individual switches for selective control. Each switch panel will contain up to six (6) rocker-type

switches each rated for two hundred thousand (200,000) cycles. Panels with less than six (6) switches will include indicators or blanks. The switch panel(s) will be located in the "overhead" position above the windshield on the driver side overhead to allow for easy access.

The switches will be rocker-type and include an integral indicator light. For quick, visual indication the switch will be illuminated whenever the switch is active. A 2-ply, scratch resistant laser engraved Gravoply label indicating the use of each switch will be placed below the switches. The label will allow light to pass through the letters for improved visibility in low light conditions. Switches and light source are integral to the switch panel assembly.

### **ELECTRICAL POWER CONTROL SYSTEM**

The primary power distribution will be located forward of the officer's seating position and be easily accessible while standing on the ground for simplified maintenance and troubleshooting. Additional electrical distribution centers will be provided throughout the vehicle to house the vehicle's electrical power, circuit protection, and control components. The electrical distribution centers will be located strategically throughout the vehicle to minimize wire length. For ease of maintenance, all electrical distribution centers will be easily accessible. All distribution centers containing fuses, circuit breakers and/or relays will be easily accessible.

Distribution centers located throughout the vehicle will contain battery powered studs for supplying customer installed equipment thus providing a lower cost of ownership.

Circuit protection devices, which conform to SAE standards, will be utilized to protect electrical circuits. All circuit protection devices will be rated per NFPA requirements to prevent wire and component damage when subjected to extreme current overload. General protection circuit breakers will be Type-I automatic reset (continuously resetting). When required, automotive type fuses will be utilized to protect electronic equipment. Control relays and solenoid will have a direct current rating of 125 percent of the maximum current for which the circuit is protected per NFPA.

### **SOLID-STATE CONTROL SYSTEM**

A solid-state electronics based control system will be utilized to achieve advanced operation and control of the vehicle components. A fully computerized vehicle network will consist of electronic modules located near their point of use to reduce harness lengths and improve reliability. The control system will comply with SAE J1939-11 recommended practices.

The control system will operate as a master-slave system whereas the main control module instructs all other system components. The system will contain patented Mission Critical software that maintains critical vehicle operations in the unlikely event of a main controller error. The system will utilize a Real Time Operating System (RTOS) fully compliant with OSEK/VDX™ specifications providing a lower cost of ownership.

For increased reliability and simplified use the control system modules will include the following attributes:

Green LED indicator light for module power

Red LED indicator light for network communication stability status

Control system self test at activation and continually throughout vehicle operation

No moving parts due to transistor logic

Software logic control for NFPA mandated safety interlocks and indicators  
Integrated electrical system load management without additional components  
Integrated electrical load sequencing system without additional components  
Customized control software to the vehicle's configuration  
Factory and field reprogrammable to accommodate changes to the vehicle's operating parameters  
Complete operating and troubleshooting manuals  
USB connection to the main control module for advanced troubleshooting

To assure long life and operation in a broad range of environmental conditions, the solid-state control system modules will meet the following specifications:

Module circuit board will meet SAE J771 specifications

Operating temperature from -40C to +70C

Storage temperature from -40C to +70C

Vibration to 50g

IP67 rated enclosure (Totally protected against dust and also protected against the effect of temporary immersion between 15 centimeters and one (1) meter)

Operating voltage from eight (8) volts to 16 volts DC

The main controller will activate status indicators and audible alarms designed to provide warning of problems before they become critical.

### **CIRCUIT PROTECTION AND CONTROL DIAGRAM**

Copies of all job-specific, computer network input and output (I/O) connections will be provided with each chassis. The sheets will indicate the function of each module connection point, circuit protection information (where applicable), wire numbers, wire colors and load management information.

### **ON-BOARD ELECTRICAL SYSTEM DIAGNOSTICS**

Advanced on-board diagnostic messages will be provided to support rapid troubleshooting of the electrical power and control system. The diagnostic messages will be displayed on the information center located at the driver's position.

The on-board information center will include the following diagnostic information:

Text description of active warning or caution alarms

Simplified warning indicators

Amber caution light with intermittent alarm

Red warning light with steady tone alarm

### **ADVANCED DIAGNOSTICS**

An advanced, Windows-based, diagnostic software program will be provided for this control system. The software will provide troubleshooting tools to service technicians equipped with an IBM compatible computer.

The service and maintenance software will be easy to understand and use and have the ability to view system input/output (I/O) information.

### **INDICATOR LIGHT AND ALARM PROVE-OUT SYSTEM**

A system will be provided which automatically tests basic indicator lights and alarms located on the cab instrument panel.

### **VOLTAGE MONITOR SYSTEM**

A voltage monitoring system will be provided to indicate the status of the battery system connected to the vehicle's electrical load. The system will provide visual and audible warning when the system voltage is below or above optimum levels.

The alarm will activate if the system falls below 11.8 volts DC for more than two (2) minutes.

### **DEDICATED RADIO EQUIPMENT CONNECTION POINTS**

There will be three (3) studs provided in the primary power distribution center located in front of the officer for two-way radio equipment.

The studs will consist of the following:

12-volt 40-amp battery switched power

12-volt 60-amp ignition switched power

12-volt 60-amp direct battery power

There will also be a 12-volt 100-amp ground stud located in or adjacent to the power distribution center.

### **ENHANCED SOFTWARE**

The solid-state control system will include the following software enhancements:

All perimeter lights and scene lights (where applicable) will be deactivated when the parking brake is released.

Cab and crew cab dome lights will remain on for ten (10) seconds for improved visibility after the doors close. The dome lights will dim after ten (10) seconds or immediately if the vehicle is put into gear.

Cab and crew cab perimeter lights will remain on for ten (10) seconds for improved visibility after the doors close. The dome lights will dim after ten (10) seconds or immediately if the vehicle is put into gear.

### **EMI/RFI PROTECTION**

To prevent erroneous signals from crosstalk contamination and interference, the electrical system will meet, at a minimum, SAE J551/2, thus reducing undesired electromagnetic and radio frequency emissions. An advanced electrical system will be used to ensure radiated and conducted electromagnetic interference (EMI) or radio frequency interference (RFI) emissions are suppressed at their source.

The apparatus will have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system will meet, without exceptions, electromagnetic susceptibility conforming to SAE J1113/25 Region 1, Class C EMR for 10Khz-1GHz to 100 Volts/Meter. The vehicle OEM, upon request, will provide EMC testing reports from testing conducted on an entire apparatus and will certify

that the vehicle meets SAE J551/2 and SAE J1113/25 Region 1, Class C EMR for 10Khz-1GHz to 100 Volts/Meter requirements. Component and partial (incomplete) vehicle testing is not adequate as overall vehicle design can impact test results and thus is not acceptable by itself.

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

### **INFORMATION CENTER**

A LCD display integral to the cab gauge panel will be included as outlined in the cab instrumentation area.

### **VEHICLE DATA RECORDER**

A vehicle data recorder (VDR) will be provided. The VDR will be capable of reading and storing vehicle information. The VDR will be capable of operating in a voltage range from 8VDC to 16VDC. The VDR will 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 will 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 will 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 will 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**

Four (4) 12 volt, Exide Model 31S950X3W batteries that include the following features will be provided:

- 950 CCA, cold cranking amps
- 190 amp reserve capacity
- High cycle
- Group 31
- Rating of 3800 CCA at 0 degrees Fahrenheit
- 760 minutes of reserve capacity
- Threaded stainless steel studs

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

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

### **BATTERY SYSTEM**

A single starting system will be provided.

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

### **MASTER BATTERY SWITCH**

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

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

### **BATTERY COMPARTMENTS**

The batteries will be stored in well-ventilated compartments that are located under the cab and bolted directly to the chassis frame. The battery compartments will be constructed of 3/16" steel plate and be designed to accommodate a maximum of three (3) group 31 batteries in each compartment. The compartments will include formed fit heavy-duty roto-molded polyethylene battery tray inserts with drains on each side of the frame rails. The batteries will be mounted inside of the roto-molded trays.

### **JUMPER STUDS**

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

The battery charger indicator will be located behind the driver's door on the outside of the cab.

### **ELECTRONIC LOAD MANAGER**

An electronic load management (ELM) system will be provided that monitors the vehicles 12-volt electrical system, automatically reducing the electrical load in the event of a low voltage condition, and automatically restoring the shed electrical loads when a low voltage condition expires. This ensures the integrity of the electrical system.

For improved reliability and ease of use, the load manager system will be an integral part of the vehicle's solid state control system requiring no additional components to perform load

management tasks. Load management systems which require additional components will not be allowed.

The system will include the following features:

System voltage monitoring.

A shed load will remain inactive for a minimum of five minutes to prevent the load from cycling on and off.

Sixteen available electronic load shedding levels.

Priority levels can be set for individual outputs.

High Idle to activate before any electric loads are shed and deactivate with the service brake.

If enabled:

“Load Man Hi-Idle On” will display on the information center.

Hi-Idle will not activate until 30 seconds after engine start up.

Individual switch "on" indicator to flash when the particular load has been shed.

The information center indicates system voltage.

The information center includes a "Load Manager" screen indicating the following:

Load managed items list, with priority levels and item condition.

Individual load managed item condition:

ON = not shed

SHED = shed

### **SEQUENCER**

A sequencer will be provided that automatically activates and deactivates vehicle loads in a preset sequence thereby protecting the alternator from power surges. This sequencer operation will allow a gradual increase or decrease in alternator output, rather than loading or dumping the entire 12 volt load to prolong the life of the alternator.

For improved reliability and ease of use, the load sequencing system will be an integral part of the vehicle's solid state control system requiring no additional components to perform load sequencing tasks. Load sequencing systems which require additional components will not be allowed.

Emergency light sequencing will operate in conjunction with the emergency master light switch. When the emergency master switch is activated, the emergency lights will be activated one by one at half-second intervals. Sequenced emergency light switch indicators will flash while waiting for activation.

When the emergency master switch is deactivated, the sequencer will deactivate the warning light loads in the reverse order.

Sequencing of the following items will also occur, in conjunction with the ignition switch, at half-second intervals:

- Cab Heater and Air Conditioning
- Crew Cab Heater (if applicable)
- Crew Cab Air Conditioning (if applicable)
- Exhaust Fans (if applicable)
- Third Evaporator (if applicable)

**AMP DRAW REPORT**

The bidder will 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 will provide the following:

- 1) Documentation of the electrical system performance tests.
- 2) A written load analysis, which will include the following:
  - A) The nameplate rating of the alternator.
  - B) The alternator rating under the conditions specified per:  
Applicable NFPA 1901 or 1906 (Current Edition).
  - C) The minimum continuous load of each component that is specified per:  
Applicable NFPA 1901 or 1906 (Current Edition).
  - 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 will be provided by the bidder per the applicable NFPA 1901 or 1906 (Current Edition).

**EXTERIOR LIGHTING**

Exterior lighting will comply with Federal Department of Transportation, Federal Motor Vehicle Safety Standards and National Fire Protection Association requirements in effect at time of proposal.

Front headlights will be rectangular shaped, quad style halogen lights mounted in the front trim housing. Headlights will consist of two (2) lights mounted in the front trim on each side of the cab grill. The outside light on each side will contain a low and high beam. The inside light on each side will contain a high beam light only.

The following LED lighting package will provide long life lights for a lower cost of ownership:

- One (1) Whelen 600 series LED combination directional/marker light will be located in the outside corners of the headlamp trim housing on each side.
- Three (3) Ri-Tar LED identification lamps will be installed in the center of the cab on the trim above the windshield.
- Four (4) Ri-Tar LED clearance lamp will be installed, one (1) each side, facing forward and one (1) each side, facing the side on the trim above the windshield.

### **BACK-UP ALARM**

A PRECO, Model 1040, solid-state electronic audible back-up alarm that actuates when the truck is shifted into reverse will be provided. The device will sound at 60 pulses per minute and automatically adjust its volume to maintain a minimum ten (10) dBA above surrounding environmental noise levels.

### **ELECTRICAL WIRING DIAGRAMS**

Two (2) electrical wiring diagrams, prepared for the model of chassis and body, will be provided.

### **WATER TANK**

Booster tank will have a capacity of 1000 gallons and be constructed of polypropylene plastic by United Plastic Fabricating, Incorporated.

Tank joints and seams will be nitrogen welded inside and out.

Tank will be baffled in accordance with NFPA Bulletin 1901 requirements.

Baffles will have vent openings at both the top and bottom to permit movement of air and water between compartments.

Longitudinal partitions will be constructed of .38" polypropylene plastic and will extend from the bottom of the tank through the top cover to allow for positive welding.

Transverse partitions will extend from 4.00" off the bottom of the tank to the underside of the top cover.

All partitions will interlock and will be welded to the tank bottom and sides.

Tank top will be constructed of .50" polypropylene. It will be recessed .38" and will be welded to the tank sides and the longitudinal partitions.

Tank top will be sufficiently supported to keep it rigid during fast filling conditions.

Construction will include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions. Two (2) of the dowels will be drilled and tapped (.50" diameter, 13.00" deep) to accommodate lifting eyes.

A sump that is 8.00" long x 8.00" wide x 6.00" deep will be provided at the bottom of the water tank.

Sump will include a drain plug and the tank outlet.

Tank will be installed in a fabricated cradle assembly constructed of structural steel.

Sufficient crossmembers will be provided to properly support bottom of tank. Crossmembers will be constructed of steel bar channel or rectangular tubing.

Tank will "float" in cradle to avoid torsional stress caused by chassis frame flexing. Rubber cushions, .50" thick x 3.00" wide, will be placed on all horizontal surfaces that the tank rests on.

Stops or other provision will be provided to prevent an empty tank from bouncing excessively while moving vehicle.

Mounting system will be approved by the tank manufacturer.

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

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

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

### **DIRECT TANK FILL**

There will be one (1) - 2.50" gated external tank fill(s) installed and properly labeled at the rear of the water tank, located driver's side and installed as high as possible.

Piping, for the fill, will be routed through the rear wall of the tank and include a flow deflector to break up the stream of water entering the water tank.

A 2.50" full flow ball valve with 2.50" piping and a 2.50" (F)NST chrome swivel will be located at the inlet.

A 2.50" chrome plated 30 degree elbow and plug with VLH automatic pressure relieving thread technology will be provided for the tank fill.

### **HOSE BED**

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

The hose body width will be 68.00" inside and the upper and rear edges of side panels have a double break for rigidity.

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

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

Hose bed will accommodate 1500' of 4.00" LDH and 500' of 2.50" double jacket fire hose..

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

Each divider will be constructed of a .25" aluminum sheet.

Each divider will be fully adjustable by sliding in tracks, located at the front and rear of the hose bed. It will be held in place by tightening bolts at each end.

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

Flat surfaces will be sanded for uniform appearance, or constructed of brushed aluminum.

### **HOSE BED COVER**

A two-section hose bed cover, constructed of .125" bright aluminum tread plate will be furnished. The cover will be hinged with full length stainless steel piano hinge. The sides will be slanted down.

The cover will be reinforced so that it can support the weight of a man walking on the cover.

The cover, when open, will activate the "Do Not Move" light inside the cab.

Chrome grab handles and gas filled cylinders will be provided to assist in opening and closing the cover. A handrail is to be provided at the rear, in the center of the support, to assist in opening the cover.

### **HOSEBED RESTRAINT REAR**

There will be a black vinyl flap installed at the rear of the hose bed. The flap will be attached to the top hose bed frame with Lift-a-dot fasteners. The flap will have straps that loop through footman loops at the bottom of the hose bed and fasten with 2.00" cam buckle fasteners and lead shot.

### **LETTERING, HOSEBED COVER**

Installed on rear flap of the hose bed cover, white reflective lettering will be provided. There will be five (5) letters provided. The reflective lettering will be approximately 10.00" high. The lettering designation on the cover will be E.T. 541 on one pumper, E.T. 141 on second.

### **RUNNING BOARDS**

Running boards will be fabricated of .125" bright aluminum tread plate.

Each running board will be supported by a welded 2.00" square tubing and channel assembly, which will be bolted to the pump compartment substructure.

Running boards will be 12.75" deep and spaced .50" away from the pump panel.

A splashguard will be provided above the running board tread plate.

### **TAILBOARD**

Rear step will also be constructed of .125" bright aluminum tread plate and spaced .50" from the body, as well as supported by a structural steel assembly.

The rear tailboard will be 16.00" deep.

The exterior side will be flanged down and in.

Flanges will not be notched.

Entire rear surface between the beavertails will be covered with smooth aluminum.

Inside surface of each beavertail in the hose bed area will be covered with stainless steel to protect the paint finish.

The remaining inside surface of the beavertails will be covered with bright aluminum tread plate.

### **TOW BAR**

A tow bar will be installed under the tailboard at center of truck.

Tow bar will be fabricated of 1.00" CRS bar rolled into a 3.00" radius.

Tow bar assembly will be constructed of .38" structural angle. When force is applied to the bar, it will be transmitted to the frame rail.

Tow bar assembly will be designed and positioned to allow up to a 30 degree upward angled pull of 17,000 lb, or a 20,000 lb straight horizontal pull in line with the centerline of the vehicle.

Tow bar design will have been fully tested and evaluated using strain gauge testing and finite element analysis techniques.

### **RUNNING BOARD HOSE RESTRAINT**

A pair of 2.00" wide black nylon straps with Velcro fasteners will be provided for each hose tray to secure the hose during travel. There will be One (1) hose tray located in the passenger side running board.

### **HOSE TRAY**

One (1) hose tray will be recessed in the passenger side running board.

Capacity of the tray will be 100' of 1.75" single jacket fire hose..

Rubber matting will be installed on the floor of the tray to provide proper ventilation.

### **COMPARTMENTATION**

Body and compartments will be fabricated of .125", 5052-H32 aluminum.

Side compartments will be an integral assembly with the rear fenders.

Circular fender liners will be provided for prevention of rust pockets and ease of maintenance.

Compartment flooring will be of the sweep out design with the floor higher than the compartment door lip.

The compartment door opening will be framed by flanging the edges in 1.75" and bending out again .75" to form an angle.

Drip protection will be provided above the doors by means of bright aluminum extrusion or formed bright aluminum tread plate.

The top of the compartment will be covered with bright aluminum tread plate rolled over the edges on the front, rear and outward side. These covers will have the corners welded.

Side compartment covers will be separate from the compartment tops.

Front facing compartment walls will be covered with bright aluminum tread plate.

All screws and bolts which protrude into a compartment will have acorn nuts on the ends to prevent injury.

### **UNDERBODY SUPPORT SYSTEM**

Due to the severe loading requirements of this pumper a method of body and compartment support suitable for the intended load will be provided.

The backbone of the support system will be the chassis frame rails which is the strongest component of the chassis and is designed for sustaining maximum loads.

The support system will include .375" thick steel vertical angle supports bolted to the chassis frame rails with .625" diameter bolts.

Attached to the bottom of the steel vertical angles will be horizontal angles, with gussets welded to the vertical members, which extend to the outside edge of the body.

A steel frame will be mounted on the top of these supports to create a floating substructure, which results in a 500 lb equipment support rating per lower compartment.

The floating substructure will be separated from the horizontal members with neoprene elastomer isolators. These isolators will reduce the natural flex stress of the chassis from being transmitted to the body.

The isolators will 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.

The neoprene isolators will be installed in a modified V three (3)-point mounting pattern to reduce the natural flex of the chassis being transmitted to the body.

### **AGGRESSIVE WALKING SURFACE**

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

### **LOUVERS**

Louvers will be stamped into compartment walls to provide the proper airflow inside the body compartments and to prevent water from dripping into the compartment. Where these louvers are provided, they will be formed into the metal and not added to the compartment as a separate plate.

### **TESTING OF BODY DESIGN**

Body structural analysis will be fully tested. Proven engineering and test techniques such as finite element analysis, stress coating and strain gauging have been performed with special attention given to fatigue, life and structural integrity of the body and substructure.

The body will be tested while loaded to its greatest in-service weight.

The criteria used during the testing procedure will include:

- Raising opposite corners of the vehicle tires 9.00" to simulate the twisting a truck may experience when driving over a curb.
- Making a 90 degree turn, while driving at 20 mph to simulate aggressive driving conditions.
- Driving the vehicle on at 35 mph on a washboard road.
- Driving the vehicle at 55 mph on a smooth road.
- Accelerating the vehicle fully, until reaching the approximate speed of 45 mph on rough pavement.

Evidence of actual testing techniques will be made available upon request.

### **COMPARTMENTATION, DRIVER'S SIDE**

A full height, roll-up door compartment ahead of the rear wheels will be provided. The interior dimensions of this compartment will 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 will be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will 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 will be 28.75" wide x 58.25" high.

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

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

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

A full height, roll-up door compartment behind the rear wheels will be provided. The interior dimensions of this compartment will 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 will be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will 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 will be 44.75" wide x 58.25" high.

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

#### **COMPARTMENTATION, PASSENGER'S SIDE**

A full height, roll-up door compartment ahead of the rear wheels will be provided.. The interior dimensions of this compartment will 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 will be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will 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 will be 28.75" wide x 58.25" high. Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

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

A full height, roll-up door compartment behind the rear wheels will be provided. The interior dimensions of this compartment will be 47.50" wide x 58.25" high x 12.00" deep. A section of this compartment will be 25.88" deep x 47.50" wide x 26.00" high directly behind the rear wheels. The height of the compartment will be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment will be calculated with the

compartment door closed. The compartment interior will 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 will be 44.75" wide x 58.25" high. Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

### **ROLL-UP DOOR, SIDE COMPARTMENTS**

There will be six (6) compartment doors installed on the side compartments. The doors will be double faced aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by A&A Manufacturing (Gortite).

Lath sections will be an interlocking rib design and will be individually replaceable without complete disassembly of door.

Between each slat at the pivoting joint will be a PVC inner seal to prevent metal to metal contact and prevent dirt or moisture from entering the compartments. Seals will allow door to operate in extreme temperatures ranging from plus 180 to minus 40 degrees Fahrenheit. Side, top and bottom seals will be provided to resist ingress of dirt and weather and be made of Santoprene.

All hinges, barrel clips and end pieces will be nylon 66. All nylon components will withstand temperatures from plus 300 to minus 40 degrees Fahrenheit.

A polished stainless steel lift bar to be provided for each roll-up door. Lift bar will be located at the bottom of door and have latches on the outer extrusion of the doors frame. A ledge will be supplied over lift bar for additional area to aid in closing the door.

Doors will be constructed from an aluminum box section. The exterior surface of each slat will be flat. The interior surfaces will be concave to provide strength and prevent loose equipment from jamming the door from inside.

To conserve space in the compartments, the spring roller assembly will not exceed 3.00" in diameter.

The header for the roll-up door assembly will not exceed 4.00".

A heavy-duty magnetic switch will be used for control of open compartment door warning lights.

### **COMPARTMENTATION, REAR**

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

Interior dimensions of this compartment will be 40.00" wide x 54.13" high x 25.88" deep in the lower 45.25" of height and 15.75" deep in the remaining upper portion. Depth of the compartment will be calculated with the compartment door closed.

Rear compartment will be open into the rear side compartments.

Clear door opening of this compartment will be 33.25" wide x 45.25" high.

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

### **ROLL-UP DOOR, REAR COMPARTMENT**

There will be a rear roll up door. The door will be double faced aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by A&A Manufacturing (Gortite).

Lath sections will be an interlocking rib design and will be individually replaceable without complete disassembly of door.

Between each slat at the pivoting joint will be a PVC inner seal to prevent metal to metal contact and prevent dirt or moisture from entering the compartments. Seals will allow door to operate in extreme temperatures ranging from plus 180 to minus 40 degrees Fahrenheit. Side, top and bottom seals will be provided to resist ingress of dirt and weather and be made of Santoprene.

All hinges, barrel clips and end pieces will be nylon 66. All nylon components will withstand temperatures from plus 300 to minus 40 degrees Fahrenheit.

A polished stainless steel lift bar to be provided for each roll-up door. Lift bar will be located at the bottom of door and have latches on the outer extrusion of the doors frame. A ledge will be supplied over lift bar for additional area to aid in closing the door.

Door will be constructed from an aluminum box section. The exterior surface of each slat will be flat. The interior surface will be concave to provide strength and prevent loose equipment from jamming the door from inside.

To conserve space in the compartments, the spring roller assembly will not exceed 3.00" in diameter.

The header for the roll-up door assembly will not exceed 4.00".

A heavy-duty magnetic switch will be used for control of open compartment door warning lights.

### **PULL-OUT ADJUSTABLE HEIGHT TRAY**

There will be two (2) slide-out trays with 2.00" sides and a capacity of 250 lb provided. Capacity rating will be in the extended position.

Slides will be equipped with ball bearings for ease of operation and years of dependable service.

Tray location will be in compartments D3 and R1 on the bottom of the compartment..

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

Each tray will be adjustable up and down within the compartment.

### **ADJUSTABLE SHELVES**

There will be five (5) shelves with a minimum capacity of 500 pounds provided. The shelf construction will consist of .188" aluminum with 2.00" sides. Each shelf will be infinitely adjustable by means of a threaded fastener, which slides in a track.

The shelves will be held in place by .12" thick stamped plated brackets and bolts.

The location will be in compartments D1, D2, D3, P1, and P3..

### **MOUNTING TRACKS**

There will be five (5) sets of tracks for mounting shelf(s) in compartments D1, D2, D3, P1, P3.. These tracks will be installed vertically to support the adjustable shelf(s).

### **RUB RAIL**

Bottom edge of the side compartments will be trimmed with a bright aluminum extruded rub rail.

Trim will be 2.12" high with 1.38" flanges turned outward for rigidity.

The rub rails will not be an integral part of the body construction, which allows replacement in the event of damage.

### **BODY FENDER CROWNS**

Stainless steel fender crowns will be provided around the rear wheel openings. These fender crowns must be wide enough to prevent splashing onto the body from the 315/80R22.5 tires on a 30,000 lb rear axle.

A rubber welting will be provided between the body and the crown to seal the seam and restrict moisture from entering.

A dielectric barrier will be provided between the fender crown fasteners (screws) and the fender sheet metal to prevent corrosion.

### **HARD SUCTION HOSE**

Two (2) lengths of 6.00" clear corrugated PVC hard suction hose, 10' in length, will be provided. The hose will be equipped with a long handle female coupling on one (1) end and a rocker lug male coupling on the other end. Couplings will be hard coated aluminum.

### **HOSE TROUGHS**

Hard suction hose will be carried in two (2) V-shaped troughs, one (1) each side, and held in place by chrome plated, quarter turn, spring loaded clamps.

Troughs will be constructed of aluminum and painted job color.

### **HANDRAILS**

The handrails will be 1.25" diameter anodized aluminum extrusion, with a ribbed design, to provide a positive gripping surface.

Chrome plated end stanchions will support the handrail. Plastic gaskets will be used between end stanchions and any painted surfaces.

Drain holes will be provided in the bottom of all vertically mounted handrails.

- Three (3) handrails will be provided on each side of the top mount control panel.
- Two (2) vertical handrails will be provided, one each side of body, on the front bulkhead door frame.
- One (1) vertical handrail, not less than 29.00" long, will be located on each rear beavertail.
- One (1) full width horizontal handrail will be provided below the hose bed at the rear of the apparatus.

### **AIR BOTTLE STORAGE (Single bottle)**

A total of one (1) air bottle compartment will be provided. mounted in the DS wheel well area, towards the back.. The air bottle compartment will be in the form of a round tube,

7.63" diameter, and will be of adequate depth to accommodate different size air bottles. The flooring will be rubber lined and have a drain hole.

A stainless steel door with a chrome plated latch will be provided to contain the air bottle. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

#### **AIR BOTTLE STORAGE (Double)**

A total of two (2) air bottle compartments will be provided. Mount brackets on the passenger side wheel well area, front and back.. Each air bottle compartment will be of adequate size to accommodate two (2) air bottles. Flooring will be rubber lined and be furnished with a drain hole. A stainless steel door with a chrome plated latch will be provided to contain the air bottles. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

#### **EXTENSION LADDER**

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

#### **ROOF LADDER**

There will be a 14' aluminum, Duo-Safety, Series 775-A roof ladder provided.

#### **LADDER STORAGE**

The ladders will be stored between the water tank and the passenger's side compartments.

The ladders will extend into the pump compartment just to the rear of the water pump discharges. A ladder stop will be provided to prevent the ladders from contacting any pump or plumbing components. The ladder storage area will be enclosed except for at the front where it extends into the pump compartment.

Each ladder will be stored vertically in a separate storage area.

A pair of pike pole storage tubes and an area for a folding ladder will also be provided.

To properly contain the ladders, a bright aluminum tread plate enclosure will be provided at the rear that will extend to the rear of the body.

A smooth aluminum, vertically hinged single pan door with D-handle latch will be provided at the rear to access the ladders.

#### **FOLDING LADDER**

One (1) 10' aluminum, Series 585-A Duo-Safety folding ladder will be installed in a stainless steel trough, below the tee of the water tank, with a stainless steel door and latch at rear.

#### **PIKE POLE, 8'**

One (1) pike pole, 8' long DUO Safety with a fiberglass handle, will be provided and located in the ladder tunnel..

#### **PIKE POLE, 6'**

One (1) pike pole, 6' long DUO Safety with a fiberglass handle, will be provided and located in the ladder tunnel..

#### **REAR FOLDING STEPS**

Chrome Eberhard folding steps will be provided at the rear. All steps will provide adequate surface for stepping.

## **MIDSHIP FIRE PUMP**

Midship fire pump will be a Hale QTWO-150, 1500 gpm two (2) stage midship mounted centrifugal type.

Pump will be the class "A" type.

Pump will deliver the percentage of rated discharges at the pressures indicated below:

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

Entire pump and both suction and discharge passages will be hydrostatically tested to a pressure of 600 psi (40.8 bar).

Pump will be fully tested at the pump manufacturer's factory to the performance requirements as outlined by the current NFPA 1901 standards and will be free from objectionable pulsation and vibration.

Pump body and related parts will be of fine grain, alloy cast iron with a minimum tensile strength of 30,000 psi (2041.2 bar).

All moving parts in contact with water will be of high quality bronze or stainless steel.

Pump body will be horizontally split, on a single plane in two (2) sections, for easy removal of entire impeller assembly, including wear rings and bearings from beneath the pump, without disturbing pump piping or the mounting of the pump in the chassis.

Pump will have two (2) impellers and series-parallel, two (2) stage design.

Pump impeller will be hard, fine grain bronze of the mixed flow design; accurately machined, hand-ground, and individually balanced. The vanes of the impeller intake eyes will be hand-ground and polished to a sharp edge. They will be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

Impeller clearance rings will be bronze and easily renewable without replacing impeller or pump volute body. They will be of the wrap-around double labyrinth design for maximum efficiency.

Pump shaft will be electric furnace heat-treated, corrosion resistant stainless steel. It will be super-finished under packing with galvanic corrosion (zinc separators in packing) protection for longer shaft life. Pump shaft will be sealed with double oil seal to keep road dirt and water out of drive unit.

Pump shaft will be rigidly supported by three (3) bearings for minimum deflection. A high lead bronze sleeve bearing will be located immediately adjacent to the impeller (on the side opposite of the drive unit). The sleeve bearing will be automatically oil lubricated and pressure balanced to exclude foreign material. The remaining bearings will be heavy-duty, deep groove ball bearings in the gearbox and will be splash lubricated.

Pump shaft will have one (1) packing gland located on inlet side of the pump, and will be of the split design for ease of repacking.

Packing gland will be a full-circle threaded design to exert uniform pressure on packing and prevent "cocking" and uneven packing load when it is tightened.

The packing gland will be easily adjusted by hand (with a rod or screwdriver), no special tools or wrenches required.

Packing rings will be of a unique, permanently lubricated, long-life graphite composition, and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion.

### **PUMP TRANSMISSION**

The drive unit will be cast and completely manufactured and tested at the Hale Products, Inc. factory. The pump drive unit will be of sufficient size to withstand up to 16,000 foot/ pounds of torque from the engine in both the road and pump operating conditions. The drive unit is will be designed with ample lubrication reserve to maintain the proper operating temperature.

The gearbox drive shafts will be of heat treated chrome nickel steel and 2.75" in diameter on both the input and output drive shafts. They will be designed to withstand the full torque of the engine in both road and pump operating conditions.

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

The apparatus manufacturer will select the pump ratio to provide the maximum performance with the engine and transmission selected. Three (3) green warning lights will be provided to indicate to the operator(s) when the pump has completed the shift from Road to Pump position. Two (2) lights will be located in the truck driving compartment and one (1) light on pump operator's panel adjacent to the throttle control.

### **AIR PUMP SHIFT**

Pump shift engagement will 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 will also be located on the drivers side pump panel.

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

Another green indicator light will 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 light will be labeled "Warning: Do not open throttle unless light is on".

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

### **TRANSMISSION LOCK-UP**

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

### **AUXILIARY COOLING SYSTEM**

A supplementary heat exchange cooling system will be provided to allow the use of water from the discharge side of the pump for cooling the engine water. The heat exchanger will

be cylindrical type and will be a separate unit. The heat exchanger will be installed in the pump or engine compartment with the control located on the pump operator's control panel. Exchanger will be plumbed to the master drain valve.

### **TRANSFER VALVE**

Transfer valve will be power operated and of the latest design.

Transfer valve will have a positive mechanical indicator to register the position of the transfer valve at all times.

Power transfer valve will have a manual override, and is not electrically operated.

### **INTAKE RELIEF VALVE**

An Elkhart relief valve will be installed on the suction side of the pump preset at 125 psig.

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

Outlet will terminate below the framerails with a 2.50" National Standard hose thread adapter and will have a "do not cap" warning tag.

Control will be located behind an access door at the right (passenger's) side pump panel.

### **RELIEF VALVE WITH INDICATOR LIGHT**

Pump will be equipped with a Hale automatic pressure control device.

A single bronze, variable pressure setting relief valve will be provided and be of ample capacity to prevent an undue pressure rise, as per NFPA pamphlet #1901.

Relief valve will be normally closed and will open against pump pressure. This relief valve will include a control light to signal when the valve is open.

In the event of relief valve control failure, the pump will remain operable for the complete range of the pump's rated capacity, without requiring the closing of any emergency (off/on) valves.

### **HALE ESP PRIMING PUMP**

Priming pump will be a positive displacement vane type, electrically driven, and conforming to standards outlined in NFPA pamphlet #1901.

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

Primer will be environmentally safe, self lubricating style.

### **PUMP MANUALS**

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

### **PLUMBING**

All inlet and outlet plumbing, 3.00" and smaller, will 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 will 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 will be equipped with victaulic or rubber couplings.

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

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

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

### **PUMP PLUMBING WARRANTY**

Except as provided below, and provided the vehicle will have been placed in service within sixty (60) days after delivery to the original purchaser as established by our original invoice, for a period ending on the first to occur of the expiration of ten years or 100,000 miles of vehicle use after delivery to the original purchaser, Pierce Manufacturing Inc. ("Pierce") warrants to the user that the stainless steel piping that is 3.00" and smaller in diameter in its first Fire and Rescue Apparatus vehicles will be free of structural failures caused by defective design, workmanship, or perforation caused by corrosion. This limited warranty will apply only if the vehicle is properly maintained and used in service which is normal to the particular vehicle. Normal service means service which does not subject the vehicle to stresses or impacts greater than normally result from the careful use of the vehicle or chassis. If the buyer discovers a defect or nonconformity it must notify Pierce in writing within thirty (30) days after the date of discovery. This limited warranty is not transferable by the first user.

Pierce's obligation under this warranty is limited to repairing or replacing without charge, as Pierce may elect, the stainless steel piping or components which Pierce determines to have failed due to defective design, workmanship, or perforation caused by corrosion.

A copy of the Pierce warranty is included with this proposal.

### **MAIN PUMP INLETS**

A 6.00" pump manifold inlet will be provided on each side of the vehicle. The suction inlets will 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 will have National Standard Threads with a long handle chrome cap.

### **VALVES**

All ball valves will be Akron Brass. The Akron valves will 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 will have a ten (10) year warranty.

### **INLET (Left side)**

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

### **INLET (Right side)**

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

Inlet valve location will be behind the pump panel.

## **INLET CONTROL**

Gating will be accomplished at the top-mount control panel by means of a control lever, similar to that used for the discharges.

### **INLET (Front)**

A 6.00" inlet front inlet with die cast zinc screens will be provided using 5.00" stainless steel pipe and a 5.00" butterfly valve. Only radiused elbows will be used in the piping, no mitered joints.

Drains are furnished in all the low points of piping and have .75" valves with push pull controls.

A bleeder valve will be located at the threaded connection.

The front suction will be located on the passenger side of the bumper extension.

The front suction will be electrically operated valve with an electric control at the pump operator's panel. The control will be momentary to allow the valve to be gated for ease of operation. Indicator lights will be provided to show if the valve is open or closed.

### **INTAKE RELIEF VALVE**

An intake relief valve, preset at 125 psig, will be installed on the inlet side of the valve.

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

Outlet will terminate below the framerails.

The front inlet will have National Standard hose threads with a long handle chrome plated cap.

The front suction will have a chromed 6.00" swivel with National Standard hose threads and a long handle chromed plated cap.

The swivel will have a rough smooth chrome finish.

### **INLET BLEEDER VALVE**

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

### **TANK TO PUMP**

The booster tank will 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 to run straight (no elbows) from the pump into the front face of the water tank and down into the tank sump. A rubber coupling will be included in this line to prevent damage from vibration or chassis flexing.

A second tank to pump line will be provided with heavy duty piping and a quarter turn 3.00" full flow valve. The second tank to pump line control will be located at the pump operator's panel. This tank to pump line will come off an inlet manifold and into the tank face. The piping will then curve down into a second sump in the water tank. A rubber coupling will be installed within this line to prevent damage from vibration or chassis flexing.

A check valve will be provided in both tank to pump supply lines to prevent the possibility of "back filling" the water tank.

### **TANK REFILL**

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

### **DISCHARGE OUTLETS (Left Side)**

There will 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 will be one (1) discharge outlet with a 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 will 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 will be actuated with a lever control at the pump operator's control panel.

### **DISCHARGE OUTLET (Front)**

There will be a 1.50" gated discharge outlet plumbed to the lower portion of the tray located in the center front bumper extension.

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

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

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

### **DISCHARGE OUTLET (Front of Hose Bed)**

There will be one (1) discharge outlet discharge/s piped to the front of the hose bed and located on the PS front of hose bed.. Plumbing will consist of 2.50" piping with a 2.50" full-flow ball valve controlled at the pump operator's panel. The discharge/s will terminate with a 2.50" male National Standard hose thread adapter.

### **DISCHARGE CAPS**

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

### **OUTLET BLEEDERS**

A .75" bleeder valve will 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 will be located behind the panel with a swing style handle control extended to the outside of the side pump panel. The handles will be chrome plated and provide a visual indication of valve position. The swing handle will provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. Bleeders will be located at the bottom of the pump panel. They will be properly labeled identifying the discharge they are plumbed in to. The water discharged by the bleeders will be routed below the chassis frame rails.

### **ELBOWS, LEFT SIDE OUTLETS**

The 2.50" discharge outlets, located on the left side pump panel, will be furnished with a 2.50"(F) National Standard hose thread x 2.50"(M) National Standard hose thread, chrome plated, 45 degree elbow.

### **ELBOWS, RIGHT SIDE OUTLETS**

The 2.50" discharge outlets, located on the right side pump panel, will be furnished with a 2.50"(F) National Standard hose thread x 2.50"(M) National Standard hose thread, chrome plated, 45 degree elbow.

### **ELBOW, 4.00" OUTLET**

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

### **DISCHARGE OUTLET CONTROLS**

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

If a handwheel control valve is used, the control will 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 will be installed above the pump in such a manner that a monitor can be mounted and used effectively. Piping will be rigidly braced and installed securely so no movement develops when the line is charged. The riser will be gated and controlled at the pump operator's panel.

The deluge riser will have male National Pipe Threads for mounting the monitor.

### **CROSSLAY HOSE BEDS, 2.50"**

One (1) cross lay with 2.50" outlets will be provided. This bed to be capable of carrying 200 feet of 2.50" double jacketed hose and will 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 cross lay control will be at the pump operator's panel.

The center cross lay dividers will be fabricated of .25" aluminum and will provide adjustment from side to side. The divider will be unpainted with a DA finish. The remainder of the cross lay bed will be painted job color.

Stainless steel vertical scuff plates will be provided at hose bed ends (each side of vehicle). Bottom of hose bed ends (each side) will also be equipped with a stainless steel scuff plate.

Cross lay bed flooring will consist of removable perforated brushed aluminum.

### **SPEEDLAYS WITH TRAY**

Ahead of the pump enclosure will be two (2) 1.50" speed lay hose beds. Each bed will have a 2.00" preconnect line with a 2.00" quarter-turn ball valve and terminate with a 1.50"

National Standard hose thread 90 degree swivel. The swivel will be located at the top of the speed lay compartment to allow easy removal of the hose in either direction.

Individual controls for the speed lays will be at the pump operator's panel.

Each compartment will be capable of carrying 200 feet of 1.75" double jacketed hose with the one (1) compartment located above the other.

A removable tray will be provided for each speed lay hose bed. The speed lay trays will be constructed of black poly to provide a lightweight sturdy tray. Two (2) hand holes will be in the floor and additional hand holes will be provided in the sides for easy removal and installation from the compartment. The floor of the trays will be perforated to allow for drainage and hose drying. The bottom of the speed lay compartments will be lined with stainless steel to allow the tray to slide with ease. Scuff plates will be provided on both sides, at the sides and bottom of each opening to protect the paint.

### **SPEED LAY HOSE RESTRAINT**

Elastic netting will be provided across the ends of two (2) speed lay opening(s) to secure the hose during travel. The netting will be permanently attached at the front of the speed lay(s). The netting at the opposite side will be removable.

### **BOOSTER HOSE REEL**

A Hannay electric rewind booster hose reel will be installed over the pump in a recessed open compartment on the right side of the apparatus.

The exterior finish of the reel will be painted job color matching the body exterior..

A polished stainless steel roller and guide assembly will be mounted on the reel side of the apparatus.

Discharge control will be provided at the pump operator's panel. Plumbing to the reel will consist of 1.50" Aeroquip hose and a 1.50" valve.

Reel motor will be protected from overload with a sized automatic reset circuit breaker.

Electric rewind control will be a rubber covered button installed on the reel side pump panel.

Booster hose, 1.00" diameter and 200 feet, with chrome plated Barway, or equal couplings will be provided.

Working pressure of the booster hose will be a minimum of 800 psi.

Capacity of the hose reel will be 200 feet of 1.00" booster hose.

An Elkhart, model S-200, booster hose nozzle will be provided.

### **FOAM SYSTEM**

An Elkhart Brass, Model 240-125P, foam eductor, with a capacity for 125 gpm, will be installed on the discharge side of the pump. Foam eductor will have a ball-type check valve to prevent water flow back into the foam agent line. Foam eductor will have a quarter-turn ball valve, for alternation between the bypass and the foam eductor.

The foam system will be a single agent system capable of handling class A foam concentrates as well as most class B foam concentrates.

The foam eductor will be plumbed to the front bumper discharge.

Controls for the foam system will be located on the pump operator's panel and labeled with red tags for easy identification. The controls for the eductor, foam supply, and the flush will be electric over pneumatic to allow for an ergonomically designed control panel and simplified operation.

Provided with the system will be an instruction plate and plumbing schematic.

Push/pull handles for the foam system will be labeled with red tags for easy identification.

All piping coming in direct contact with the foam concentrate will be immune to the concentrate, so deterioration of the plumbing will be avoided.

This system will have a bypass eductor type foam, with a rated capacity of 125 gpm at .5 percent, 1 percent, 3 percent, and 6 percent.

**Foam system operational considerations: 200 psi eductor inlet pressure will be required for proper operation.**

#### **AUXILIARY FOAM PICK-UP**

This auxiliary pick-up will allow foam to be drafted from a foam can on the ground next to the driver's side pump panel. The pick-up will have an in line ball valve behind the pump panel and a quick disconnect at the side panel. A 3/8" flush line will be provided to prevent corrosion in the plumbing. A pick-up wand and clear plastic hose will be supplied with loose equipment for use with this system.

#### **FOAM SYSTEM TRAINING**

The fire department will order [Vehicle, Qty, Training, D] with this foam system. The operation of the foam system will be demonstrated at the plant where the apparatus was manufactured.

This demonstration will include:

- A review of the foam system manual, emphasizing key areas
- A walk around review of the system components on the finished truck
- A hands-on foam system start-up and foam discharge session
- Instructions on the use of the manual overrides
- A demonstration explaining the proper way to shutdown and flush the foam system.

#### **FOAM TANK**

The foam tank will be an integral portion of the polypropylene water tank. The cell will have a capacity of 50 gallons of foam with the intended use of AFFF. The brand of foam stored in this tank will be Sylvex or equivalent. The foam cell will reduce the capacity of the water tank. The foam cell will have a screen in the fill dome and a breather in the lid.

#### **FOAM TANK DRAIN**

The foam tank drain will be a 1.00" drain valve located inside the pump compartment accessible through a door on the passenger's side pump panel.

#### **PUMP COMPARTMENT**

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

Compartment will be mounted on chassis frame rails with rubber biscuits in a four point pattern to allow for chassis frame twist.

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

### **PUMP MOUNTING**

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

### **PUMP CONTROL PANELS (Top Mount)**

All pump controls and gauges to be properly marked and located above the pump to the rear of the walkway. Operator to face the rear of the truck when viewing the control panel from the operating position.

The control panel will be in two planes.

The upper plane will be hinged at the bottom with a full length stainless steel hinge.

Both planes to be full width of the pump house structure.

The side pump panels will be 52.00" wide.

The side pump panels will be removable for ease of maintenance.

Polished stainless steel trim collars to be installed around all inlets and outlets.

Controls will have chrome plated bezels encircling the opening securely mounted to the pump panel. Identification tags for the discharge controls will be recessed within the same bezel. The discharge identification tags will be color coded, with each discharge having its own unique color.

All remaining identification tags will be mounted on the pump panel in chrome plated bezels.

### **WALKWAY**

A 19.00" wide walkway will be provided for access to the top control panel. The walkway will be constructed of bright aluminum tread plate and properly reinforced. There will be four (4) LED lights provided to illuminate the walkway. The lights will come on with the body perimeter lights.

Bright aluminum tread plate will be installed below the rear windows of the cab, as a minimum, to protect the paint on the rear of the cab.

### **PUMP PANEL CONFIGURATION**

The pump panel configuration will be arranged and installed in an organized manner that will provide user-friendly operation.

### **PUMP AND GAUGE PANEL**

The pump and gauge panels will be constructed of black vinyl covered aluminum to allow easy identification of the gauges and controls and to eliminate glare.

A polished aluminum trim molding will be provided on both sides of the pump panel.

The driver's and passenger's side pump panels will be removable and fastened with swell type fasteners.

Engine monitoring graduated LED indicators will be incorporated with the pressure controller.

- Engine Throttle

### **AIR HORN BUTTON**

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

### **MANSAVER SAFETY RAIL**

A Fire Research Mansaver safety rail assembly will be provided across each entrance to the walkway.

The safety rails will be covered in a bright yellow vinyl.

### **GAUGES, VACUUM and PRESSURE**

The pump vacuum and pressure gauges will be silicone filled and manufactured by Class 1, Inc.

The gauges will be a minimum of 4.00" in diameter and will have white faces with black lettering, with a pressure range of 30.00"-0-600#.

Gauge construction will include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

The pump pressure and vacuum gauges will be installed adjacent to each other at the pump operator's control panel.

Test port connections will be provided at the pump operator's panel. One will be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They will have 0.25 in. standard pipe thread connections and non-corrosive polished stainless steel or brass plugs. They will be marked with a label.

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

### **PRESSURE GAUGES**

The individual "line" pressure gauges for the discharges will be Class 1 interlube filled.

They will be a minimum of 2.00" in diameter and have white faces with black lettering.

Gauge construction will include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

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

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

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

### **WATER LEVEL GAUGE**

An electronic water level gauge will be provided on the operator's panel that registers water level by means of five colored LED lights. The lights will be durable, ultra-bright five LED design viewable through 180 degrees. The water level indicators will be as follows:

- 100% = Green
- 75% = Yellow
- 50% = Yellow
- 25% = Yellow
- Refill = Red

The light will 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 will flash sequentially when the water tank is empty.

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

The display will 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 will provide complete protection from water and environmental elements. An industrial pressure transducer will be mounted to the outside of the tank. The field calibratable display measures head pressure to accurately show the tank level.

#### **WATER LEVEL GAUGE, CAB SIDES**

There will be two (2) additional water level indicator, Whelen, Model: PSTANK, LED module, installed on the upper rear DS and PS of the Cab..

This light module will include four (4) colored levels, and function similar to the water level indicator located at the operators panel:

First green module indicates a full water level.

Second blue module indicates a water level above 3/4 full.

Third amber module indicates a water level above 1/2 full.

Last red module indicates a water level above 1/4 full and empty.

Above 1/4 this light will be steady burning.

At empty this light will be flashing.

This module will be activated when the pump is in gear.

#### **FOAM LEVEL LIGHT**

A low level tank indicator will be installed on the pump operator's panel. One (1) light will be provided to indicate when the foam concentrate drops to low level.

#### **LIGHT SHIELDS**

Illumination will be provided by On Scene Solutions, Model Night Stick, LED lights at each pump control panel for controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus and the equipment provided on it. External illumination will be a minimum of five (5) foot-candles on the face of the device. Internal illumination will be a minimum of four (4) foot-lamberts.

Lights will be installed under a stainless steel shield. A light will 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 will

come on at the operator's panel when the pump is in OK to Pump mode. The remaining lights to be actuated from a switch located on the pump panel.

#### **ADDITIONAL LIGHT SHIELD**

An additional On Scene Solutions, model Night Stick, LED light shield will be provided above passenger's side pump panel. The pump panel will be illuminated by Night Stick, LED lights installed under the light shield.

The lights will be operated from a switch on the pump panel.

#### **ELECTRICAL HARNESSING INSTALLATION**

All 12-volt wiring and harnessing installed by the apparatus manufacturer will conform to specification PM-QA W-101: Pierce manufacturing Wiring Harness Specification.

To ensure rugged dependability, all wiring harnesses installed by the apparatus manufacturer will conform to the following specifications:

SAE J1128 - Low tension primary cable

SAE J1292 - Automobile, truck, truck-tractor, trailer and motor coach wiring

SAE J163 - Low tension wiring and cable terminals and splice clips

SAE J2202 - Heavy duty wiring systems for on-highway trucks

NFPA 1901 - Standard for automotive fire apparatus

FMVSS 302 - Flammability of interior materials for passenger cars, multipurpose passenger vehicles, trucks and buses

SAE J1939 - Serial communications protocol

SAE J2030 - Heavy-duty electrical connector performance standard

SAE J2223 - Connections for on board vehicle electrical wiring harnesses

NEC - National Electrical Code

SAE J561 - Electrical terminals - Eyelet and spade type

SAE J928 - Electrical terminals - Pin and receptacle type A

For increased reliability and harness integrity, harnesses will be routed throughout the cab and chassis in a manner which allows the harnessing to be laid into its mounting location. Routing of harnessing which requires pulling of wires through tubes will not be allowed.

Wiring will be run in loom or conduit where exposed, and have grommets or other edge protection where wires pass through metal. Wiring will be color, function and number coded. Wire colors will be integral to each wire insulator and run the entire length of each wire. Harnessing containing multiple wires and uses a single wire color for all wires will not be allowed. Function and number codes will be continuously imprinted on all wiring harness conductors at 2.00" intervals. All wiring installed between the cab and into doors will be protected by an expandable rubber boot to protect the wiring. Exterior exposed wire connectors will be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids. Electrical wiring and equipment will be installed utilizing the following guidelines:

1. All wire ends not placed into connectors will be sealed with a heat shrink end cap. Wires without a terminating connector or sealed end cap will not be allowed.
2. All holes made in the roof will be caulked with silicon. Large fender washers, liberally caulked, will be used when fastening equipment to the underside of the cab roof.
3. Any electrical component that is installed in an exposed area will be mounted in a manner that will not allow moisture to accumulate in it. Exposed area will be defined as any location outside of the cab or body.
4. For low cost of ownership, electrical components designed to be removed for maintenance will be quickly accessible. For ease of use, a coil of wire will be provided behind the appliance to allow them to be pulled away from the mounting area for inspection and service work.
5. Corrosion preventative compound will be applied to non-waterproof electrical connectors located outside of the cab or body. All non-waterproof connections will require this compound in the plug to prevent corrosion and for easy separation of the plug.
6. Any lights containing non-waterproof sockets in a weather-exposed area will have corrosion preventative compound added to the socket terminal area.
7. All electrical terminals in exposed areas will have DOW 1890 protective Coating applied completely over the metal portion of the terminal.
8. Rubber coated metal clamps will be used to support wire harnessing and battery cables routed along the chassis frame rails.
9. Heat shields will be used to protect harnessing in areas where high temperatures exist. Harnessing passing near the engine exhaust will be protected by a heat shield.
10. Cab and crew cab harnessing will not be routed through enclosed metal tubing. Dedicated wire routing channels will be used to protect harnessing therefore improving the overall integrity of the vehicle electrical system. The design of the cab will allow for easy routing of additional wiring and easy access to existing wiring.
11. All braided wire harnesses will have a permanent label attached for easy identification of the harness part number and fabrication date.
12. All standard wiring entering or exiting the cab will be routed through sealed bulkhead connectors to protect against water intrusion into the cab.

### **BATTERY CABLE INSTALLATION**

All 12-volt battery cables and battery cable harnessing installed by the apparatus manufacturer will conform to the following requirements:

SAE J1127 - Battery Cable

SAE J561 - Electrical terminals, eyelets and spade type

SAE J562 - Nonmetallic loom

SAE J836A - Automotive metallurgical joining

SAE J1292 - Automotive truck, truck-tractor, trailer and motor coach wiring

NFPA 1901 - Standard for automotive fire apparatus

Battery cables and battery cable harnessing will be installed utilizing the following guidelines:

1. All battery cables and battery harnesses will have a permanent label attached for easy identification of the harness part number and fabrication date.
2. Splices will not be allowed on battery cables or battery cable harnesses.
3. For ease of identification and simplified use, battery cables will be color coded. All positive battery cables will be red in color or wrapped in red loom the entire length of the cable. All negative battery cables will be black in color.
4. For ease of identification, all positive battery cable isolated studs throughout the cab and chassis will be red in color.
5. For increased reliability and reduced maintenance, all electrical buss bars located on the exterior of the apparatus will be coated to prevent corrosion.

### **ELECTRICAL COMPONENT INSTALLATION**

All lighting used on the apparatus will be, at a minimum, a two (2) wire light grounded through a wired connection to the battery system. Lights using an apparatus metal structure for grounding will not be allowed.

An operational test will 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 will be recorded and provided to the purchaser at time of delivery.

### **STEP LIGHTS**

Four (4) Ri-Tar, Model M27HW2 Super LED, step lights will be provided. One (1) step light will 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 will be actuated with the pump panel light switch.

All other steps on the apparatus will be illuminated per the current edition of NFPA 1901.

### **ELECTRONIC SIREN AUXILIARY**

A FTS Mobile Electronics, Powercall, Model 6-Adam, 200-watt electronic siren with noise canceling microphone will be provided and installed in the upper control panel..

### **REAR ID/MARKER DOT LIGHTING**

The three (3) identification lights located at the rear will be installed per the following:

- As close as practical to the vertical Centerline.
- Centers spaced not less than six (6) inches or more than twelve (12) inches apart.
- Red in color.
- All at the same height.

The outside clearance lights located at the rear will be installed per the following:

- To indicate the overall width of the vehicle.
- At least one (1) each side of the vertical Centerline.
- All at the same height.
- As near the top as practical.
- To be visible from the rear and the side.

Per FMVSS 108 and CMVSS 108 requirements.

## **SPEAKER**

There will be two (2) speakers provided. Each speaker will be a Whelen, Model SA122FMA, cast aluminum, 100-watt, flange mount with natural aluminum finish. Each speaker will be connected to the siren amplifier.

## **"DO NOT MOVE APPARATUS" INDICATOR**

A flashing red indicator light, located in the driving compartment, will be illuminated automatically per the current NFPA requirements. The light will be labeled "Do Not Move Apparatus If Light Is On."

The same circuit that activates the Do Not Move Apparatus indicator will activate a pulsing alarm when the parking brake is released.

The speaker(s) will be recessed in the front bumper on the driver's side.

## **DO NOT MOVE TRUCK MESSAGES**

Messages will be displayed on the gauge panel LCD located forward of the steering wheel directly in front of the driver whenever the Do Not Move Truck light is active. The messages will designate the item or items not in the stowed for vehicle travel position (parking brake disengaged).

The following messages will be displayed (where applicable):

Do Not Move Truck

DS Cab Door Open (Driver Side Cab Door Open)

PS Cab Door Open (Passenger's Side Cab Door Open)

DS Crew Cab Door Open (Driver Side Crew Cab Door Open)

PS Crew Cab Door Open (Passenger's Side Crew Cab Door Open)

DS Body Door Open (Driver Side Body Door Open)

PS Body Door Open (Passenger's Side Body Door Open)

Rear Body Door Open

DS Ladder Rack Down (Driver Side Ladder Rack Down)

PS Ladder Rack Down (Passenger Side Ladder Rack Down)

Deck Gun Not Stowed

Lt Tower Not Stowed (Light Tower Not Stowed)

Hatch Door Open

Fold Tank Not Stowed (Fold-A-Tank Not Stowed)

Aerial Not Stowed (Aerial Device Not Stowed)

Stabilizer Not Stowed

Steps Not Stowed

Handrail Not Stowed

Any other device that is opened, extended, or deployed that creates a hazard or is likely to cause major damage to the apparatus if the apparatus is moved will be displayed as a caution message after the parking brake is disengaged.

### **COMPARTMENT LIGHTING**

There shall be seven (7) compartments with ROM LED compartment light strips. There shall be two (2) strip lights installed vertically in each compartment, one (1) each side of the compartment door opening. The lights shall be provided in compartments in all body compartments..

Two (2) strip lights will be installed vertically, one (1) each side of the compartment door opening.

The remaining compartments will include 6.00" diameter Truck-Lite, Model: 79384, lights in each enclosed compartment. Each light will have a number 1076 one filament, two wire bulb.

Opening the compartment door, will automatically turn the compartment lighting on.

### **PUMP COMPARTMENT LIGHT**

A compartment light will be provided inside the pump enclosure.

### **CAB PERIMETER SCENE LIGHTS**

There will be four (4) Truck-lite, Model 44308C, 4.00" white LED lights with Model 40700 grommets provided for the cab and crew cab doors.

These lights will be activated automatically when the battery switch is on and the exit doors are opened or by the same means as the body perimeter scene lights.

### **PERIMETER SCENE LIGHTS, BODY**

There will be four (4) Truck-Lite, Model 44308C, 4.00" white LED lights with Model 40700 grommets provided on the apparatus.

The lights will be mounted in the following locations:

- One (1) light will be provided under the left rear step area shining to the rear.
- One (1) light will be provided under the right rear step area shining to the rear.
- One (1) light will be provided under the left pump panel running board.
- One (1) light will be provided under the right pump panel running board.

The lights will be activated by a parking brake.

### **REAR SCENE LIGHTS**

There will be two (2) Whelen, Model 9SC0ENZR LED scene light(s) with chrome flange installed at the rear of the truck, Mount on the upper corners on the rear of the body..

A control for the light(s) selected above will be the following:

a switch at the driver's side switch panel

a switch at the driver's side switch panel

a switch at the pump operator's panel

no additional switch location

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

### **SIDE SCENE LIGHTS**

There will be two (2) Whelen, Model 9SC0ENZR LED scene light(s) with chrome flange installed on the side of the apparatus, Mount lights on the upper DS and PS of the Custom Cab..

A control for the light(s) selected above will be the following:

a switch at the driver's side switch panel

a switch at the passenger's side switch panel

a switch at the pump operator's panel

no additional switch location

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

### **12 VOLT LIGHTING**

There will be two (2) Havis, Model KR-SB-5PFP2, 12 volt DC, floodlight(s), with push up pole installed, on the DS and PS rear cab sides.. The light head(s) will be a Whelen, Model PFP2 LED floodlight.

A control for the light(s) selected above will be the following:

a switch at the driver's side switch panel .

a switch at the passenger's side switch panel .

a switch at the pump operator's panel .

no additional switch location .

The light(s) will be connected to the "Do Not Move Truck" indicator.

The light(s) may be load managed when the parking brake is set.

### **12 VOLT LIGHTING**

There will be two (2) Whelen Model PFP1, 12 volt LED floodlight(s) with Model PBAPED pedestal mounting bracket(s) provided on the rear side posts..

The light(s) selected above will be controlled by the following:

a switch at the driver's side switch panel

a switch at the passenger's side switch panel

a switch at the pump operator's panel

no additional switch location

These lights may be load managed when the parking brake is applied.

### **12 VOLT LIGHTING**

There will be one (1) Whelen Pioneer PFP2, 12 volt LED floodlight(s) provided on the front visor, centered.

The light will be controlled by the following:

a switch at the driver's side switch panel

a switch at the passenger's side switch panel

no additional switch location

These light(s) may be load managed when the parking brake is set.

### **WARNING LIGHTS (Cab Face)**

Four (4) Whelen Model M6\* LED flashing warning lights will 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 blue.

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

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

All four (4) lights will include a colored lens that is the same color of the LED's.

All four (4) lights will 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.

### **PORTABLE HAND LIGHTS, PROVIDED BY FIRE DEPARTMENT**

NFPA 1901, 2009 edition, section 5.8.3 requires two portable hand lights mounted in brackets fastened to the apparatus.

The hand lights are not on the apparatus as manufactured. The fire department will provide and mount these hand lights.

### **HAND HELD SPOTLIGHT**

Additional handlights will be provided. Each light will be a Streamlight, Model Survivor 12v LED flashlight. A charger will be provided with each light.

A total of six (6) lights will be provided.

The light(s) will be installed Each light and charger will be mounted at each seat location in the truck..

### **VIDEO SYSTEM, REAR CAMERA & 7.00" LCD DISPLAY**

A Safety Vision video system with color rear view camera with built in microphone, activated with the reverse signal, and 7.00" LCD display monitor with swivel mount located in view of the driver on the overhead panel will be provided.

The following components will be supplied:

- One (1) SV-CLCD70B 7" Color LCD
- One (1) SV-ILCB In-line control box
- One (1) SV-620A Color camera

All necessary cables

### **AIR HORN SYSTEM**

Two (2) Grover air horns will be provided and located, in the front bumper, recessed Outside the frame rails.. The horn system will be piped to the air brake system wet tank utilizing 0.38" tubing. A pressure protection valve will be installed in-line to prevent loss of air in the air brake system.

### **FRONT WARNING LIGHT**

One (1) Whelen 4500 series FFX4520, 20.00" LED lightbar will be provided on the front of the cab, centered beneath the cab windshield, on the lift up service hood.

This lightbar will include the following:

- Two (2) red 400 LINEAR12 LED modules facing forward, one each side.
- One (1) white 400 LINEAR12 LED module facing forward, in the center.
- Two (2) red LINZ6 LED angled corner warning light, one (1) on each end.

These lights will be activated with the front warning switch.

The flash pattern will be controlled by two (2) external Whelen ULF28 solid state flashers. The DS and the PS red forward facing LED will alternate with the DS and PS red corner LED and the white center LED.

The lens colors will be all clear.

To meet the NFPA requirements the colored warning lights may be load managed and the white lights will be disabled when the parking brake is applied.

### **AIR HORN CONTROL**

The air horns will be actuated by two (2) foot switches, one (1) located on the officer's side and one (1) on the driver's side.

### **SIDE ZONE LOWER LIGHTING**

Four (4) Whelen Model M6\* LED flashing warning lights with bezels will be located in the following positions:

Two (2) lights, one (1) each side on the bumper extension.

The side front lights to be red.

Two (2) lights, Mounted on the DS and PS wheel well area..

The side rear lights to be red.

All four (4) lights will include a lens that is the same color as the LED's.

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

### **SIDE WARNING LIGHTS**

There will be two (2) Whelen, Model M6\* LED flashing warning light(s) with bezel(s) provided on the DS and PS of the rear of the cab..

The color of the lights will be blue.

All of these lights will include a lens color that is the same as the LED's

These lights will be activated with the Side Zone Lower warning lights.

Electronic siren head will be recessed in the driver side and passenger side inside switch panels.

### **REAR ZONE LOWER LIGHTING**

Two (2) Whelen, Model M6\* LED flashing warning lights with bezels will be located at the rear of the apparatus.

The driver's side rear light to be red.

The passenger's side rear light to be red.

Both lights will include a lens that is the same color as the LED's.

Both lights will be controlled by a lighted switch on the switch panel.

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

### **MECHANICAL SIREN, (Auxiliary)**

A Federal Q2B siren will be furnished. A siren brake button will be installed on the switch panel.

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

The mechanical siren will be recessed in the front bumper in the center. The siren will be properly supported using the bumper framework.

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

### **LIGHTBAR**

There will be one (1) 88.00" Whelen Freedom, Model FN\*\*QLED, LED lightbar mounted on the cab roof.

The lightbar will include the following:

- Six (6) red flashing LED modules facing forward.
- Two (2) white flashing LED modules facing forward.
- Two (2) red flashing corner LED modules, one in each front corner.
- One (1) red flashing LED module facing the driver side.
- One (1) red flashing LED module facing the passenger side side.
- One (1) GTT Model 795 LED Opticom™, traffic light controller with National standard priority.

The color of the lenses will be clear.

There will be two (2) switches located on a cab switch panel to control this lightbar.

- One (1) switch will control all the warning lights.
- One (1) switch will control the traffic light controller.

The white warning lights and the traffic light controller will be disabled when the parking brake is set.

### **HEADLIGHT FLASHER**

The high beam headlights will flash alternately between the left and right side, with a control switch located on the cab instrument panel.

The flashing will automatically cancel when the headlight switch is activated or when the parking brake is set.

### **INTERIOR CAB DOOR WARNING LIGHTS**

Four (4) Whelen 500 LED flashing lights will be provided. One (1) light will be located inside of each cab and crew cab door pan. Each light will be activated by the door jam switch of the associated door. The color of the lights will be blue. The lights will alternately flash whenever the corresponding door is open. These lights will be mounted in a Whelen flange.

### **WARNING LIGHTS (Rear of Hose Bed)**

Two (2) Whelen model B6MM\*\*P Super LED beacon with lower Super LED flashing warning lights will be provided at the rear of the truck, one (1) each side.

Each light will include a Super LED flashing beacon and a model 70\*02F\*R Super LED flashing light, mounted in a polished aluminum housing.

The beacons will have red LEDs and be provided with both domes red.

The color of the LED flashing lights will be blue Super LED/blue lens.

A switch will be provided in the cab, on the switch panel to control the beacons. The lower Super 700 LEDs will be activated with the rear upper warning switch.

The rear warning lights will be mounted on top of the compartmentation with all wiring totally enclosed. The rear deck lights will be mounted on the beavertails high as possible.

### **TRAFFIC DIRECTING LIGHT**

There will be one (1) Whelen model TAM65, 36.00" long x 2.84" high x 2.24" deep, amber LED traffic directing light installed at the rear of the apparatus.

The Whelen model TACTLD1 control head will be included with this installation.

The auxillary warning mode will be activated with the control head only.

This traffic directing light will be surface mounted over the rear door, inside a treadplate box at the rear of the apparatus as high as practical.

The traffic directing light controller will be located within the overhead recessed console above the engine tunnel on the driver's side.

### **ELECTRICAL SYSTEM GENERAL DESIGN for ALTERNATING CURRENT**

The following guidelines will apply to the 120/240 VAC system installation:

#### **General**

Any fixed line voltage power source producing alternating current (ac) line voltage will produce electric power at 60 cycles plus or minus five (5) cycles.

Except where superseded by the requirements of NFPA 1901, all components, equipment and installation procedures will conform to NFPA 70, National Electrical Code (herein referred to as the NEC).

Line voltage electrical system equipment and materials included on the apparatus will be listed and installed in accordance with the manufacturer's instructions. All products will be used only in the manner for which they have been listed.

### Grounding

Grounding will be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems will not be used. Only stranded or braided copper conductors will be used for grounding and bonding.

An equipment grounding means will be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

The grounded current carrying conductor (neutral) will be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor will be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure will be bonded to the vehicle frame by a copper conductor. This conductor will have a minimum ampere rating of 115 percent of the nameplate current rating of the power source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor properly sized to meet the low voltage and line voltage requirements will be permitted to be used.

All power source system mechanical and electrical components will be sized to support the continuous duty nameplate rating of the power source.

### Operation

Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, will be permanently attached to the apparatus at any point where such operations can take place.

Provisions will be made for quickly and easily placing the power source into operation. The control will be marked to indicate when it is correctly positioned for power source operation. Any control device used in the drive train will be equipped with a means to prevent the unintentional movement of the control device from its set position.

A power source specification label will be permanently attached to the apparatus near the operator's control station. The label will provide the operator with the information detailed in Figure 19-4.10.

Direct drive (PTO) and portable generator installations will comply with Article 445 (Generators) of the NEC.

### Overcurrent protection

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device will not exceed 144 inches. (3658 mm) in length.

For fixed power supplies, all conductors in the power supply assembly will be type THHW, THW, or use stranded conductors enclosed in nonmetallic liquid tight flexible conduit rated for a minimum of 194 degrees Fahrenheit (90 degrees Celsius).

For portable power supplies, conductors located between the power source and the line side of the main overcurrent protection device will be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit (90 degrees Celsius).

### Wiring Methods

Fixed wiring systems will be limited to the following:

- Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit (90 degrees Celsius)

or

- Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit (90 degrees Celsius)

Electrical cord or conduit will not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring. In addition the wiring will be run as follows:

- Separated by a minimum of 12 inches (305 mm), or properly shielded, from exhaust piping

- Separated from fuel lines by a minimum of six (6) inches (152 mm) distance.

Electrical cord or conduit will be supported within six (6) inches (152 mm) of any junction box and at a minimum of every 24 inches (610 mm) of continuous run. Supports will be made of nonmetallic materials or corrosion protected metal. All supports will be of a design that does not cut or abrade the conduit or cable and will be mechanically fastened to the vehicle.

### Wiring Identification

All line voltage conductors located in the main panel board will be individually and permanently identified. The identification will reference the wiring schematic or indicate the final termination point. When prewiring for future power sources or devices, the unterminated ends will be labeled showing function and wire size.

### Wet Locations

All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, will be of the grounding type provided with a wet location cover and installed in accordance with Section 210-7 "Receptacles and Cord Connections" of the NEC.

All receptacles located in a wet location will be not less than 24 inches (610 mm) from the ground. Receptacles on off-road vehicles will be a minimum of 30 inches (762 mm) from the ground.

The face of any wet location receptacle will be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle will be installed in a face up position.

### Dry Locations

All receptacles located in a dry location will be of the grounding type. Receptacles will be not less than 30 inches (762 mm) above the interior floor height.

All receptacles will be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps. If the receptacles are direct current, or other than single phase, they will be so marked.

### Listing

All receptacles and electrical inlet devices will be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards. Receptacles used for direct current voltages will be rated for the appropriate service.

### Electrical System Testing

The wiring and associated equipment will be tested by the apparatus manufacturer or the installer of the line voltage system.

The wiring and permanently connected devices and equipment will be subjected to a dielectric voltage withstand test of 900 volts for one (1) minute. The test will be conducted between live parts and the neutral conductor, and between live parts and the vehicle frame with any switches in the circuit(s) closed. This test will be conducted after all body work has been completed.

Electrical polarity verification will be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

### Operational Test per Current NFPA 1901 Standards

The apparatus manufacturer will perform the following operation test and ensure that the power source and any devices that are attached to the line voltage electrical system are properly connected and in working order. The test will be witnessed and the results certified by Underwriters Laboratories.

The prime mover will be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

The power source will be operated at 100 percent of its nameplate voltage for a minimum of two (2) hours unless the system meets category certification as defined in the current NFPA 1901 standard.

Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in the current NFPA 1901 standard will be applied to the low voltage electrical system during the operational test.

## **GENERATOR**

There will be a Honda Model EM3800 SX, gas powered portable generator with a continuous rating of 3,000 watts provided.

Mounting will be portable.

Size will be 26.80" length x 20.90" width x 21.50" height.

Dry weight will be 192 pounds.

The generator will have its own 6.6 gallon fuel tank.

The muffler will be part of the generator.

There will be a natural airflow over the generator.

The generator will be designed to operate in outside air only.

The generator will shutdown if the oil level becomes low.

The operating voltage will be 120/240 volts AC

The generator will be a single phase generator.

The available amperage will be 25 amps @ 120 VAC or 12.5 amps @ 240 VAC

The cycles will be at 60 HZ

### Operating Criteria

The generator will be furnished with a carrying cage and quick release mounting for portable use. The generator must be mounted in a compartment on a slide out tray.

### GENERATOR

The generator will be mounted in the compartment R1 floor. on a sliding tray. The slides, used for the tray, will be ball bearing type with a capacity rating matched to the weight of the generator. Locking mechanisms will be provided for holding the generator in the extended and stored positions.

### GENERATOR START

The starting provision for the generator will be located on the generator itself.

### CIRCUIT BREAKER PANEL

A circuit breaker panel will be installed in the R1 compartment.. A directory for each breaker will be provided adjacent to the circuit breaker panel. Identification of circuits will be done in a durable manner that provides years of service.

### LOOSE EQUIPMENT

The following equipment will 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.

### NFPA REQUIRED LOOSE EQUIPMENT, PROVIDED BY FIRE DEPARTMENT

The following loose equipment as outlined in NFPA 1901, 2009 edition, section 5.8.2 and 5.8.3 will be provided by the fire department. All loose equipment will be installed on the apparatus before placed in emergency service, unless the fire department waives NFPA section 4.21.

- 800 ft (60 m) of 2½" (65 mm) or larger fire hose.
- 400 ft (120 m) of 1½" (38 mm), 1¾" (45 mm), or 2" (52 mm) fire hose.
- One (1) handline nozzle, 200 gpm (750 L/min) minimum.
- Two (2) handline nozzles, 95 gpm (360 L/min) minimum.
- One (1) playpipe with shutoff and 1" (25 mm), 1 1/8" (29 mm), and 1¼" (32 mm) tips.
- One (1) SCBA complying with NFPA 1981, *Standard on Open-Circuit Self-Contained*

*Breathing Apparatus for Fire and Emergency Services*, for each assigned seating position, but not fewer than four (4), mounted in brackets fastened to the apparatus or stored in containers supplied by the SCBA manufacturer.

- One (1) spare SCBA cylinder for each SCBA carried, each mounted in a bracket fastened to the apparatus or stored in a specially designed storage space(s).
- One (1) first aid kit.
- Four (4) combination spanner wrenches mounted in bracket(s) fastened to the apparatus.
- Two (2) hydrant wrenches mounted in brackets fastened to the apparatus.
- Four (4) ladder belts meeting the requirements of NFPA 1983, *Standard on Fire Service Life Safety Rope and System Components* (if equipped with an aerial device).
- One (1) double female 2½" (65 mm) adapter with National Hose threads, mounted in a bracket fastened to the apparatus.
- One (1) double male 2½" (65 mm) adapter with National Hose threads, mounted in a bracket fastened to the apparatus.
- One (1) rubber mallet, for use on suction hose connections, mounted in a bracket fastened to the apparatus.
- Two (2) salvage covers each a minimum size of 12 ft × 14 ft (3.7 m × 4.3 m).
- One (1) traffic vest for each seating position, each vest to comply with ANSI/ISEA 207, *Standard for High Visibility Public Safety Vests*, and have a five-point breakaway feature that includes two at the shoulders, two at the sides, and one at the front.
- Five (5) fluorescent orange traffic cones not less than 28" (711 mm) in height, each equipped with a 6" (152 mm) retro-reflective white band no more than 4" (152 mm) from the top of the cone, and an additional 4" (102 mm) retro-reflective white band 2" (51 mm) below the 6" (152 mm) band.
- Five (5) illuminated warning devices such as highway flares, unless the five (5) fluorescent orange traffic cones have illuminating capabilities.
- One automatic external defibrillator (AED).
- If the supply hose carried does not use sexless couplings, an additional double female adapter and double male adapter, sized to fit the supply hose carried, will be carried mounted in brackets fastened to the apparatus.
- If none of the pump intakes are valved, a hose appliance that is equipped with one or more gated intakes with female swivel connection(s) compatible with the supply hose used on one side and a swivel connection with pump intake threads on the other side will be carried. Any intake connection larger than 3 in. (75 mm) will include a pressure relief device that meets the requirements of 16.6.6.
- If the apparatus does not have a 2½" National Hose (NH) intake, an adapter from 2½" NH female to a pump intake will be carried, mounted in a bracket fastened to the apparatus if not already mounted directly to the intake.

- If the supply hose carried has other than 2½” National Hose (NH) threads, adapters will be carried to allow feeding the supply hose from a 2½” NH thread male discharge and to allow the hose to connect to a 2½” NH female intake, mounted in brackets fastened to the apparatus if not already mounted directly to the discharge or intake.

### **SOFT SUCTION HOSE**

There will be no soft suction hose provided.

- One (1)-6.00" National Standard hose thread barrel strainer, chrome plated

### **DRY CHEMICAL EXTINGUISHER**

There will be One (1) extinguisher, 20 pound, dry chemical extinguisher(s) provided.

### **WATER EXTINGUISHER**

There will be Two (2) extinguishers, 2.50 gallon pressurized water extinguisher(s).

- Two (2) Flathead Axes: Fiberglass handles and blade shields

- Two (2) pickhead axes: Fiberglass handles and pick covers

### **PAINT**

The exterior custom cab and body painting procedure will consist of a seven (7) step finishing process as follows:

1. Manual Surface Preparation - All exposed metal surfaces on the custom cab and body will be thoroughly cleaned and prepared for painting. Surfaces that will not be painted include all chrome plated, polished stainless steel, anodized aluminum and bright aluminum treadplate. Each imperfection on the exterior metal surface will be removed or filled and then sanded smooth for a smooth appearance. All seams will be sealed before painting.
2. Chemical Cleaning and Treatment - The metal surfaces will be properly cleaned using a high pressure and high temperature acid etching system. Surfaces are chemically cleaned to remove all dirt, oil, grease and metal oxides to ensure the subsequent coatings bond well. An ultra pure water final rinse will be applied to all metal surfaces, excluding undercarriage components, at the conclusion of the metal treatment process.
3. Primer/Surfacer Coats - A two (2) component urethane primer/surfacer will 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 will be lightly sanded to an ultra smooth finish.
5. Sealer Primer Coat - A two (2) component sealer primer coat will be applied over the sanded primer.
6. Topcoat Paint - Urethane base coat will be applied to opacity for correct color matching.
7. Clearcoat - Two (2) coats of an automotive grade two (2) component urethane will be applied. Lap style doors will be clear coated to match the body. Roll-up doors will not be clear coated and the standard roll-up door warranty will apply.

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

The cab will be two-tone, with the upper section and a shield design on the cab face painted #10 white. The remaining lower section of the cab and the body will be painted candy apple red.

### **PAINT - ENVIRONMENTAL IMPACT**

Contractor will meet or exceed all current State (his) regulations concerning paint operations. Pollution control will include measures to protect the atmosphere, water and soil. Controls will include the following conditions:

- Topcoats and primers will be chrome and lead free.
- Metal treatment chemicals will be chrome free. The wastewater generated in the metal treatment process will be treated on-site to remove any other heavy metals.
- Particulate emission collection from sanding operations will have a 99.99% efficiency factor.
- Particulate emissions from painting operations will be collected by a dry filter or water wash process. If the dry filter means is used, it will have an efficiency rating of 98.00%. Water wash systems will be 99.97% efficient.
- Water from water wash booths will be reused. Solids will be removed mechanically on a continual basis to keep the water clean.
- Paint wastes are disposed of in an environmentally safe manner. They are used as fuel in kilns used in the cement manufacturing process - thereby extracting energy from a waste material.
- Empty metal paint containers will be cleaned, crushed and recycled to recover the metal.
- Solvents used in cleanup operations will be collected, sent off-site for distillation and returned for reuse. Residue from the distillation operation will be used as fuel in off-site cement kilns.

Additionally, the finished apparatus will not be manufactured with or contain products that have ozone depleting substances. Contractor will, upon demand, present evidence that his manufacturing facility meets the above conditions and that it is in compliance with his State EPA rules and regulations.

### **PAINT CHASSIS FRAME ASSEMBLY**

The chassis frame assembly will 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 will be painted black are frame rails, cross members, axles, suspension, steering gear, fuel tank, body substructure supports, miscellaneous mounting brackets, etc.

### **PAINT, REAR WHEELS**

All wheel surfaces, inside and outside of inboard steel wheels only, will be provided with powder coat paint #101 black.

### **PAINT, COMPARTMENT INTERIOR**

The compartment interior will be painted with a gray spatter finish for ease of cleaning and to make it easier to touch up scratches and nicks.

### **REFLECTIVE BAND**

A 10.00" white reflective band will be provided across the front of the vehicle and along the sides of the body.

The reflective band provided on the cab face will be below the headlights on the fiberglass.

### **CHEVRON STRIPING, REAR**

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

The colors will be red and yellow diamond grade.

Each stripe will be 6.00" in width.

This will meet the requirements of NFPA 1901, 2009 edition, which states that 50% of the rear surface will be covered with chevron striping.

### **"Z" RIBBON IN REFLECTIVE STRIPE**

"Z" type ribbon(s) will be added to the reflective stripe on compartments D3 and P3.. Areas adjacent to the "Z" portion of the stripe will be shaded and highlighted with an air brush to give it a ribbon affect. There will be two (2) pair on the vehicle.

### **CHEVRON, INVERTED "V" STRIPING ON CAB AND CREW CAB DOORS**

There will be alternating chevron striping located on the inside of each cab and crew cab door.

The striping will consist of the following colors:

The first color will be yellow

The second color will be red (tomato red)

The size of the striping will be 4.00".

### **STRIPE, CAB FACE AND SIDES**

A gold leaf stripe will be provided on the paint break. The stripe will be on both sides of the cab and on the cab face.

### **LETTERING**

The lettering will be 22 karat gold vinyl.

### **LETTERING**

Sixty-one (21) to eighty (80) Sign Gold letters, 4.00" high with outline and shade, will be provided. Each letter will be imitation gold leaf totally encapsulated between two (2) layers of clear vinyl.

### **WEB SITE ADDRESS LETTERING, REFLECTIVE**

There will be a one (1) pair of web site addresses, in 1.00" to 2.00" reflective lettering, installed on compartments D1 and P1..

### **CAB GRILLE DESIGN**

An American flag design will be painted on the cab grille.

**ENGINE WARRANTY**

A five (5) year limited engine warranty will be provided. A limited warranty certificate, WA0180, is included with this proposal.

**FIFTY (50) YEAR STRUCTURAL INTEGRITY**

A custom chassis frame limited warranty certificate, WA0013, is included with this proposal.

**FIVE (5) YEAR MATERIAL AND WORKMANSHIP**

An electronics limited warranty certificate, WA0014, is included with this proposal.

**TRANSMISSION COOLER WARRANTY**

The Champ transmission cooler will carry a five (5) year parts and labor warranty (exclusive to the transmission cooler). In addition, a collateral damage warranty will also be in effect for the first three (3) years of the Champ warranty coverage and will not exceed \$10,000 per occurrence. A limited warranty certificate, WA0186, is included with this proposal.

**LIFETIME MATERIAL AND WORKMANSHIP**

A UPF poly water tank limited warranty certificate, WA0195, is included with this proposal.

**TEN (10) YEAR STRUCTURAL INTEGRITY**

An apparatus body limited warranty certificate, WA0009, is included with this proposal.

**ROLL UP DOOR MATERIAL AND WORKMANSHIP WARRANTY**

A Gortite roll-up door limited warranty will be provided. The mechanical components of the roll-up door will be warranted against defects in material and workmanship for the lifetime of the vehicle. A six (6) year limited warranty will be provided on painted and satin roll up doors.

The limited warranty certificate, WA0190, is included with this proposal.

**FIVE (5) YEAR MATERIAL AND WORKMANSHIP**

A Hale pump limited warranty certificate, WA0019, is included with this proposal.

**TEN (10) YEAR PRO-RATED PAINT AND CORROSION**

A limited pro-rated paint warranty certificate, WA0055, is included with this proposal.

**TEN (10) YEAR PRO-RATED PAINT AND CORROSION**

A body limited pro-rated paint warranty certificate, WA0057, is included with this proposal.

**ONE (1) YEAR MATERIAL AND WORKMANSHIP**

The graphics fading and deterioration limited warranty limited warranty certificate, WA0168, is included with this proposal.