

## PROPOSAL FOR COUNTY OF SPOTSYLVANIA, VIRGINIA

Atlantic Emergency Solutions is pleased to submit a proposal to County of Spotsylvania, Virginia for a **Pierce® triple combination pumper** per your request for quotation. The following paragraphs will describe in detail the apparatus, construction methods, and equipment proposed. This proposal will indicate size, type, model and make of components parts and equipment, providing proof of compliance with each and every item (except where noted) in the departments advertised specifications.

PIERCE MANUFACTURING was founded in 1913. Since then we have been building bodies with one philosophy, "BUILD THE FINEST". Our skilled craftsmen take pride in their work, which is reflected, in the final product. We have been building fire apparatus since the early "forties" giving Pierce Manufacturing over 60 years of experience in the fire apparatus market. Pierce Manufacturing has built and put into service more than 51,000 apparatus, including more than 27,000 on Pierce custom chassis designed and built specifically for fire and emergency applications. Our Appleton, Wisconsin facility has over 757,000 total square feet of floor space situated on approximately 97 acres of land. Our Bradenton, Florida facility has 300,000 square feet of floor space situated on approximately 38 acres of land.

Our beliefs in high ethical standards are carried through in all of our commitments and to everyone with whom we do business. Honesty, Integrity, Accountability and Citizenship are global tenets by which we all live and work. Consequently, we neither engage in, nor have we ever been convicted of price fixing, bid rigging, or collusion in any domestic or international fire apparatus market.

Pierce has only one brand of fire apparatus "Pierce", ensuring you are receiving top of the line product that meets your specification.

In accordance with the current edition of NFPA 1901 standards, this proposal will specify whether the fire department, manufacturer, or apparatus dealership will provide required loose equipment.

Images and illustrative material in this proposal are as accurate as known at the time of publication, but are subject to change without notice. Images and illustrative material is for reference only, and may include optional equipment and accessories and may not include all standard equipment.

### **GENERAL DESIGN AND CONSTRUCTION**

To control quality, ensure compatibility, and provide a single source for service and warranty, the custom cab, chassis, pump module and body will be entirely designed, assembled/welded and painted in Pierce owned manufacturing facilities. This includes, but not limited to the cab weldment, the pumphouse module assembly, the chassis assembly, the body and the electrical system.

### **QUALITY AND WORKMANSHIP**

Pierce has set the pace for quality and workmanship in the fire apparatus field. Our tradition of building the highest quality units with craftsmen second to none has been the rule right from the beginning and we demonstrate that ongoing commitment by: Ensuring all steel welding follows American Welding Society D1.1-2004 recommendations for structural steel welding. All aluminum welding follows American Welding society and ANSI D1.2-2003 requirements for structural welding of aluminum. All sheet metal welding follows American welding Society B2.1-2000 requirements for structural welding of sheet metal. Our flux core arc welding uses alloy rods, type 7000 and is performed to American Welding Society standards A5.20-E70T1. Furthermore, all employees classified as welders are tested

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and certified to meet the American welding Society codes upon hire and every three (3) years thereafter. Pierce also employs an American Welding Society certified welding inspector in plant during working hours to monitor weld quality.

Pierce Manufacturing operates 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 are established by the manufacturer for design, manufacture, installation and service. A copy of the certificate of compliance is included with this proposal.

In addition to the Quality Management system, we also employ a Quality Achievement Supplier program to insure the vendors and suppliers that we utilize meet the high standards we demand. That is just part of our overall "Quality at the Source" program at Pierce.

To demonstrate the quality of our products and services, a list of at least five (5) fire departments/municipalities that have purchased vehicles for a second time is 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. A qualified delivery representative shall deliver the apparatus and remain for a sufficient length of time to instruct personnel in proper operation, care and maintenance of the equipment delivered.

### **MANUAL AND SERVICE 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 Pierce will also provide one (1) 39-minute, 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, aerial 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 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. The apparatus will meet NFPA 1901 acceleration and braking requirements.

### **SERVICE AND WARRANTY SUPPORT**

Pierce dealership support will be provided by Atlantic Emergency Solutions by operating a Pierce authorized service center. The service center will have factory-trained mechanics on staff versed in Pierce fire apparatus. The service facility will be located within seventy five (75) miles of the fire department.

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In addition to the dealership, Pierce has service facilities located in both, Weyauwega, Wisconsin and Bradenton, Florida. Pierce also maintains a dedicated parts facility of over 100,000 square feet in Appleton, Wisconsin. The parts facility stocks in excess of \$5,000,000 in parts dedicated to service and replacement parts. The parts facility employs a staff dedicated solely for the distribution and shipment of service and replacement parts.

Service parts for the apparatus being proposed can be found via [Pierceparts.com](http://Pierceparts.com) which, is an interactive online tool that delivers information regarding your specific apparatus as well as the opportunity to register for training classes.

As a Pierce customer you have the ability to view the complete bill of materials for your specific apparatus, including assembly drawings, piece part drawings, and beneficial parts notations. You will also have the ability to search the complete Pierce item master through a parts search function which offers all Pierce SKU's and descriptions offered on all Pierce apparatus. Published component catalogs, which include proprietary systems along with an extensive operators manual library is available for easy reference.

Pierce Manufacturing maintains a dedicated service and warranty staff of over 35 personnel, dedicated to customer support, which also maintains a 24 hour 7 day a week toll free hot line, four (4) on staff EVTs, and offers hands-on repair and maintenance training classes multiple times a year.

### **COMMERCIAL GENERAL LIABILITY INSURANCE**

Certification of insurance coverage will be enclosed.

### **SINGLE SOURCE MANUFACTURER**

Pierce Manufacturing, Inc. provides an integrated approach to the design and manufacture of our products that delivers superior apparatus and a dedicated support team. From our facilities, the chassis, cab weldment, cab, pumphouse (including the sheet metal enclosure, valve controls, piping and operators panel) and body will be entirely designed, tested, and hand assembled to the customer's exact specifications. The electrical system either hardwired or multiplexed, will be both designed and integrated by Pierce Manufacturing. The warranties relative to these major components (excluding component warranties such as engine, transmission, axles, pump, etc.) will be provided by Pierce as a single source manufacturer. Pierce's single source solution adds value by providing a fully engineered product that offers durability, reliability, maintainability, performance, and a high level of quality.

Your apparatus will be manufactured in Appleton, Wisconsin.

### **NFPA 2016 STANDARDS**

This unit will comply with the NFPA standards effective January 1, 2016, 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.

All horizontal surfaces designated as a standing or walking surface that are greater than 48.00" above the ground must be defined by a 1.00" wide line along its outside perimeter. Perimeter markings and designated access paths to destination points will be identified on the customer approval print and are

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shown as approximate. Actual location(s) will be determined based on materials used and actual conditions at final build. Access paths may pass through hose storage areas and opening or removal of covers or restraints may be required. Access paths may require the operation of devices and equipment such as the aerial device or ladder rack.

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 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".

### **VEHICLE INSPECTION PROGRAM CERTIFICATION**

To assure the vehicle is built to current NFPA standards, the apparatus, in its entirety, will be third-party, audit-certified through Underwriters Laboratory (UL) that it is built and complies to all applicable standards in the current edition of NFPA 1901. The certification will include: all design, production, operational, and performance testing of not only the apparatus, but those components that are installed on the apparatus.

A placard will be affixed in the driver's side area stating the third party agency, the date, the standard and the certificate number of the whole vehicle audit.

### **PUMP TEST**

Underwriters Laboratory (UL) will test, approve, and certify the pump. The test results and the pump manufacturer's certification of hydrostatic test; the engine manufacturer's certified brake horsepower curve; and the pump manufacturer's record of pump construction details will be forwarded to the Fire Department.

### **GENERATOR TEST**

If the unit has a generator, Underwriters Laboratory (UL) will test, approve, and certify the generator. The test results will be provided to the Fire Department at the time of delivery.

### **BREATHING AIR TEST**

If the unit has breathing air, Pierce Manufacturing will draw an air sample from the air system and have the sample certified that the air quality meets the requirements of NFPA 1989, *Standard on Breathing Air Quality for Fire and Emergency Services Respiratory Protection*.

### **AFTERMARKET SUPPORT WEBSITE**

Pierceparts.com will provide Pierce authorized dealer access to comprehensive information pertaining to the maintenance and service of their customer's apparatus. This tool will provide the Pierce

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authorized dealer the ability to service and support their customers to the best of their ability with factory support at their fingertips.

Pierceparts.com is also accessible to the end user through the guest login. Limited access is available and vehicle specific parts information accessible by entering a specific VIN number. All end users should see their local authorized Pierce dealer for additional support and service.

The website will consist of the following screens at the dealer level:

### **My Fleet Screen**

The My Fleet screen will provide access to truck detail information on the major components of the vehicle, warranty information, available vehicle photographs, vehicle drawings, sales options, applicable vehicle software downloads, etc.

### **Parts Screens**

The Parts screens will provide parts look-up capability of Pierce Manufacturing sourced items, with the aid of digital photographs, part drawings and assembly drawings. The parts search application will permit the searching of parts by item description or function group (major system category). The parts application will provide the ability to submit electronically a parts order, parts quote, or parts return request directly to Pierce Manufacturing for processing.

### **Warranty Screen**

The Warranty screens will provide dealers the ability to submit electronically warranty claims directly to Pierce Manufacturing for reimbursement.

### **My Reports Screens**

The My Reports screens will provide access to multiple dealer reports to allow the dealership to maintain communication with the customer on the status of orders, claims, and phone contacts.

### **Technical Support Screens**

The Technical Support screens will provide access to all currently published Operation and Maintenance and Service Publications. Access to Pierce Manufacturing Service Bulletins and Work Instructions, containing information on current service topics and recommendations will be provided.

### **Training**

The Training screens will provide access to upcoming training classes offered by Pierce Manufacturing along with interactive electronic learning modules (Operators Guides) covering the operation of major vehicle components will be provided. Access to training manuals used in Pierce Manufacturing training classes will be provided.

### **About Pierce**

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Access to customer service articles, corporate news, quarterly newsletters, and key contacts within the Customer Service Department will be provided. The current Customer Service Policy and Procedure Manual, detailing the operation of the Customer Service group will also be accessible.

### **BID BOND NOT REQUESTED**

A bid bond will not be included. If requested, the following will apply:

All bidders will provide a bid bond as security for the bid in the form of a 5% bid bond to accompany their bid. 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 NOT REQUESTED**

A performance bond will not be included. If requested at a later date, one will be provided to you for an additional cost and the following will apply:

The successful bidder will furnish a Performance and Payment bond (Bond) equal to 100 percent of the total contract amount within 30 days of the notice of award. Such Bond will be in a form acceptable to the Owner and issued by a surety company included within the Department of Treasury's Listing of Approved Sureties (Department Circular 570) with a minimum A.M. Best Financial Strength Rating of A and Size Category of XV. In the event of a bond issued by a surety of a lesser Size Category, a minimum Financial Strength rating of A+ is required.

Bidder and Bidder's surety agree that the Bond issued hereunder, whether expressly stated or not, also includes the surety's guarantee of the vehicle manufacturer's Bumper to Bumper warranty period included within this proposal. Owner agrees that the penal amount of this bond will be simultaneously amended to 25 percent of the total contract amount upon satisfactory acceptance and delivery of the vehicle(s) included herein. Notwithstanding anything contained within this contract to the contrary, the surety's liability for any warranties of any type will not exceed three (3) years from the date of such satisfactory acceptance and delivery, or the actual Bumper to Bumper warranty period, whichever is shorter.

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### **APPROVAL DRAWING**

A drawing of the proposed apparatus will be prepared and provided to the purchaser for approval before construction begins. The Pierce sales representative will also be provided with a copy of the same drawing. The finalized and approved drawing will become part of the contract documents. This drawing will indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc.

A "revised" approval drawing of the apparatus will be prepared and submitted by Pierce to the purchaser showing any changes made to the approval drawing.

### **ELECTRICAL WIRING DIAGRAMS**

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

### **ENFORCER CHASSIS**

The Pierce Enforcer™ is the custom chassis developed exclusively for the fire service. 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, 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.

### **WHEELBASE**

The wheelbase of the vehicle will be appx 208.5".

### **GVW RATING**

The gross vehicle weight rating will be 50,000.

### **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 be heat-treated steel measuring 10.25" x 3.50" x .375".

Each rail will have a section modulus of 16.00 cubic inches, yield strength of 120,000 psi, and a resisting bending moment (rbm) of 1,921,069 inch-pounds.

### **FRAME REINFORCEMENT**

A full-length mainframe "C" liner will be provided.

The liner will be an internal "C" design, heat-treated steel measuring 9.38" x 3.13" x 0.25". Each reinforcement member will have a section modulus of 3.90 cubic inches, yield strength of 120,000 psi and resisting bending moment (rbm) of 938,762 in-lb.

### **FRONT NON DRIVE AXLE**

The Oshkosh TAK-4® front axle will be of the independent suspension design with a ground rating of 19,500 lb.

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

The center cross members and side plates will be constructed out of 80,000-psi yield strength steel.

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

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

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

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

The ball joint bearing will be of low friction design and be maintenance free.

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

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

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

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

### **FRONT SUSPENSION**

Front Oshkosh TAK-4™ independent suspension will be provided with a minimum ground rating of 19,500 lb.

The independent suspension system will be designed to provide maximum ride comfort. The design will allow the vehicle to travel at highway speeds over improved road surfaces and at moderate speeds over rough terrain with minimal transfer of road shock and vibration to the vehicle's crew compartment.

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

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

The torsion bar anchor lock system allows for simple lean adjustments, without the use of shims. One can adjust for a lean within 15 minutes per side. Anchor adjustment design is such that it allows for ride height adjustment on each side.

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The independent suspension was put through a durability test that simulated 140,000 miles of inner city driving.

### **FRONT SHOCK ABSORBERS**

KONI heavy-duty telescoping shock absorbers will be provided on the front suspension.

### **FRONT OIL SEALS**

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

### **FRONT TIRES**

Front tires will be Goodyear® 425/65R22.50 radials, 20 ply G296 MSA tread, rated for 22,800 lb maximum axle load and 68 mph maximum speed.

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

### **REAR AXLE**

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

### **TOP SPEED OF VEHICLE**

A rear axle ratio will be furnished to allow the vehicle to reach a top speed of 68 mph.

### **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.

### **REAR OIL SEALS**

Oil seals will be provided on the rear axle(s).

### **REAR TIRES**

Rear tires will be four (4) Goodyear 315/80R22.50 radials, 18 ply "all season" Regional RHD II HCT tread, rated for 29,560 lb maximum axle load and 75 mph maximum speed.

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

### **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.

**TIRE PRESSURE MANAGEMENT**

There will be a RealWheels LED AirSecure™ tire alert pressure management system provided, that will monitor each tire's pressure. A 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 10 and 200 psi. The sensor will activate an integral battery operated LED when the pressure of that tire drops 5 to 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 to flash.

**FRONT HUB COVERS**

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

**REAR HUB COVERS**

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 locking switch on cab instrument panel. System may be engaged at speeds up to 25 mph and operated at speeds up to 35 mph.

**CHROME LUG NUT COVERS**

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

**MUD FLAP**

A full width mud flap will be installed behind the rear wheels of the apparatus. The mud flap will be black with TBD at approval logo. The mud flap will measure 96.00" x 15.00".

**MUD FLAPS**

Mud flaps with a Pierce logo will be installed behind the front and rear wheels.

**WHEEL CHOCKS**

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

**WHEEL CHOCK BRACKETS**

There will be one (1) pair of Zico, Model SQCH-44-H, horizontal mounting wheel chock brackets provided for the Ziamatic, Model SAC-44-E, folding wheel chocks. The brackets will be made of aluminum and consist of a quick release spring loaded rod to hold the wheel chocks in place. The brackets will be mounted one (1) forward and one (1) rearward of the left side rear tire.

**ELECTRONIC STABILITY CONTROL**

A vehicle control system will be provided as an integral part of the ABS brake system from Meritor Wabco.

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The system will monitor and update the lateral acceleration of the vehicle and compare it to a critical threshold where a side roll event may occur. If the critical threshold is met, the vehicle control system will automatically reduce engine RPM, engage the engine retarder (if equipped), and selectively apply brakes to the individual wheel ends of the front and rear axles to reduce the possibility of a side roll event.

The system will monitor directional stability through a lateral accelerometer, steer angle sensor and yaw rate sensor. If spinout or drift out is detected, the vehicle control system will selectively apply brakes to the individual wheel ends of the front and rear axles to bring the vehicle back to its intended direction.

### **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 wheel begins to lockup, a signal will be sent to the control unit. This control unit will then 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.

### **AUTOMATIC TRACTION CONTROL**

An anti-slip feature will be included with the ABS. The Automatic Traction Control will be used for traction in poor road and weather conditions. The Automatic Traction Control will act as an electronic differential lock that will not allow a driving wheel to spin, thereby supplying traction at all times. The ABS electronic control unit (ECU) will work with the engine ECU, sharing information concerning wheel slip. Engine ECU will use information to control engine speed, allowing only as much throttle application as required for the available traction, regardless of how much the driver is asking for. A "mud/snow" switch will be provided on the instrument panel. Activation of the switch will allow additional tire slip to let the truck climb out and get on top of deep snow or mud.

### **BRAKES**

The service brake system will be full air type.

The front brake calipers will be Meritor® DiscPlus™ EX225 air disc type. The brake rotors will be 17.00" ventilated.

The rear brakes will be Meritor™ 16.50" x 8.63" cam operated with automatic slack adjusters. Dust shields cannot be provided.

### **BRAKE SYSTEM AIR COMPRESSOR**

The air compressor will be a Cummins/WABCO with 18.7 cubic feet per minute output.

### **BRAKE SYSTEM**

The brake system will include:

- Brake treadle valve
- Heated automatic moisture ejector on air dryer
- Total air system minimum capacity of 5,376 cubic inches

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- Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
- Spring set parking brake system
- Parking brake operated by a push-pull style control valve
- A parking "brake on" indicator light on instrument panel
- Park brake relay/inversion and anti-compounding valve, in conjunction with a double check valve system, with an automatic spring brake application at 40 psi
- A pressure protection valve to prevent all air operated accessories from drawing air from the air system when the system pressure drops below 80 psi (550 kPa)
- 1/4 turn drain valves on each air tank

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.

### **BRAKE SYSTEM AIR DRYER**

The air dryer will be a WABCO System Saver 1200 with spin-on coalescing filter cartridge and 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.

High pressure, wire braid reinforced air lines will be provided from the frame to each brake chamber.

The brake lines will not be painted.

### **AIR INLET/OUTLET**

One (1) air inlet/outlet will be installed with the female coupling located on the driver side pump panel. This system will tie into the "wet" tank of the brake system and include a check valve in the inlet line and an 85 psi pressure protection valve in the outlet line. The air outlet will be controlled by a needle valve.

A mating male fitting will be provided with the loose equipment.

The air inlet will allow a shoreline air hose to be connected to the vehicle. This will allow station air to be supplied to the brake system of the vehicle to insure constant air pressure.

### **AIR HOSE**

There will be one (1) 25' length(s) of air hose furnished with fittings.

An air chuck will be provided with the air hose. The air chuck will fit the valve stems that are provided on the tires.

### **ADDITIONAL AIR TANK**

An additional air tank with 1,454 cubic inch displacement will be provided to increase the capacity of the air system. This tank will be dedicated for air horn use.

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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.

The output flow of the engine air compressor varies with engine rpm. Full compressor output is only achieved at governed engine speed. Engine speed may be limited by generators, pumps and other PTO driven options.

### **AIR COMPRESSOR WITH AUTO DRAIN - BRAKE SYSTEM MAINTENANCE**

A Kussmaul, model 091-9B-1-AD, air compressor will be provided with Auto Drain feature. It will be driven by the 120-volt shoreline electrical system and will be located behind the driver's seat. The compressor will maintain the air pressure in the chassis air brake system while the vehicle is not in use. A pressure switch will sense when the system pressure drops and automatically start the compressor, which then will run until pressure is restored.

### **AUTOMATIC MOISTURE EJECTOR(S)**

Four (4) automatic moisture ejectors, Bendix®, Model DV-2, will be installed in the brake system.

Each moisture ejector will be equipped with a 12-volt heater, controlled by thermostat and ignition switch.

The moisture ejector(s) will be provided on the wet tank, primary and secondary tank and additional tank reservoirs(s).

### **COMPRESSION FITTINGS ONLY**

Any nylon tube on the apparatus that is pneumatic will be plumbed with compression type fittings where applicable.

### **ENGINE**

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

Make:	Cummins
Model:	L9
Power:	450 hp at 2100 rpm
Torque:	1250 lb-ft at 1400 rpm
Governed Speed:	2200 rpm
Emissions Level:	EPA 2017
Fuel:	Diesel
Cylinders:	Six (6)
Displacement:	543 cubic inches (8.9L)
Starter:	Delco 39MT™
Fuel Filters:	Spin-on style primary filter with water separator and water-in-fuel sensor. Secondary spin-on style filter.

The engine will include On-board diagnostics (OBD), which provides self diagnostic and reporting. The system will give the owner or repair technician access to state of health information for various vehicle

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sub systems. The system will monitor vehicle systems, engine and after treatment. The system will illuminate a malfunction indicator light on the dash console if a problem is detected.

### **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."

### **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 activate when the system is on and the throttle is released.

The high setting of the brake application will activate and work simultaneously with the variable geometry turbo (VGT) provided on the engine.

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.

### **CLUTCH FAN**

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

### **ENGINE AIR INTAKE**

The engine air intake will be located above the engine cooling package. It will draw fresh air from the front of the apparatus through the radiator grille.

A stainless steel metal screen will be installed at the inlet of the air intake system that will meet NFPA 1901 requirements.

The air cleaner and stainless steel screen will be easily accessible by tilting the cab.

### **EXHAUST SYSTEM**

The exhaust system will be stainless steel from the turbo to the engine's aftertreatment device, and will be 4.00" in diameter. The exhaust system will include a single module aftertreatment device to meet current EPA standards. An insulation wrap will be provided on all exhaust pipes between the turbo and aftertreatment device to minimize the heat loss to the aftertreatment device. The exhaust will terminate horizontally ahead of the right side rear wheels. A tailpipe diffuser will be provided to reduce

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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 diffuser will be 6.00". 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.

### **EXHAUST MODIFICATION**

The exhaust pipe will be 90 degrees to the body.

The diffuser will be reduced to 4.00" in the center to accommodate the fire department's air recovery system. The 4.00" extension pipe coming out of the end of the diffuser will be flush with the body rub rail. There will be a minimum of 4.00" clearance between the top of the 4.00" extension and the bottom of the body.

There will be a minimum of 2.50" from the exhaust pipe to the under side of the body heat shield. The last 7.00" of the exhaust will be free of hangers and/or clamps.

### **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 radiator core will consist of aluminum fins, having a serpentine design, brazed to aluminum tubes. No solder joints or leaded material of any kind will be acceptable in the core assembly.

The radiator core will have a minimum front area of 1060 square inches.

Supply tank will be made of heavy duty glass-reinforced nylon and the return tank will be made of aluminum. Both tanks will be crimped onto the core assembly using header tabs and a compression gasket to complete the radiator core assembly. There will be a full steel frame around the inserts to enhance cooling system durability and reliability.

The radiator will be compatible with commercial antifreeze solutions.

The radiator assembly will be isolated from the chassis frame rails with rubber isolators to prevent the development of leaks caused by twisting or straining when the apparatus operates over uneven terrain.

The radiator will include a de-aeration/expansion 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.

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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.

Shields or baffles will be provided to prevent recirculation of hot air to the inlet side of the radiator.

### **COOLANT LINES**

Gates, or Goodyear, rubber hose will be used for all engine coolant lines installed by Pierce Manufacturing.

Hose clamps will be stainless steel constant torque type to prevent coolant leakage. They will expand and contract according to coolant system temperature thereby keeping a constant clamping pressure on the hose.

### **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 0.75" drain plug will be located in a low point of the tank for drainage.

A fill inlet will be located on the left hand 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 0.50" 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.

### **DIESEL EXHAUST FLUID TANK**

A 4.5 gallon diesel exhaust fluid (DEF) tank will be provided and mounted in the driver's side body rearward of the rear axle.

A 0.50" drain plug will be provided in a low point of the tank for drainage.

A fill inlet will be provided and marked "Diesel Exhaust Fluid Only". The fill inlet will be located adjacent to the air bottle storage behind a common door on the driver side of the vehicle.

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.

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### **TRANSMISSION**

An Allison 5th generation, Model EVS 3000P, 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 both sides of converter housing (positions 4 o'clock and 8 o'clock) as viewed from the rear.

A transmission temperature gauge with red light and audible alarm will be installed on the cab dash.

### **TRANSMISSION SHIFTER**

A five (5)-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	3.49 to 1.00
2nd	1.86 to 1.00
3rd	1.41 to 1.00
4th	1.00 to 1.00
5th	0.75 to 1.00
R	5.03 to 1.00

### **TRANSMISSION COOLER**

A Modine plate and fin transmission oil cooler will be provided using engine coolant to control the transmission oil temperature.

### **TRANSMISSION FLUID**

The transmission will be provided with TranSynd, or other Allison approved TES-295 heavy duty synthetic transmission fluid.

### **DRIVELINE**

Drivelines will be a heavy-duty metal tube and be equipped with Spicer® 1710 universal joints.

The shafts will be dynamically balanced before installation.

A splined slip joint will be provided in each driveshaft where the driveline design requires it. The slip joint will be coated with Glidecoat® or equivalent.

### **STEERING**

Dual Sheppard, Model M110, steering gears, with integral heavy-duty power steering, will be provided. For reduced system temperatures, the power steering will incorporate an air to oil cooler and an Eaton, Model VN20, hydraulic pump with integral pressure and flow control. All power steering lines will have wire braded lines with crimped fittings.

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

### **STEERING WHEEL**

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

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

The dash panel will have an emblem containing the Pierce 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: ----

The second row of text will be: SPOTSYLVANIA

The third row of text will be: COUNTY F&R

### **WINCH WITH SYNTHETIC ROPE**

A Warn, model XD9000i multi-mount, 9,000 pound portable 12V electric winch will be provided.

The winch will mount to the vehicle receiver hitch and be held in place with a locking hardened pin. A heavy gauge wire and electrical plug will be provided for quick connection to the vehicle electrical system.

The winch will be provided with 100 feet of Warn nylon reinforced synthetic rope with a replaceable clevis hook.

Winch will have a minimum of a 30' remote control cable.

### **BUMPER**

A one (1) piece bumper manufactured from .25" formed steel with a .38" bend radius will be provided. The bumper will be a minimum of 10.00" high with a 1.50" top and bottom flange, and will extend 22.00" from the face of the cab. The bumper will be 95.28" wide with 45 degree corners and side plates. The bumper will be metal finished and painted job color.

To provide adequate support strength, the bumper will be mounted directly to the front of the C channel frame. The frame will be a bolted modular extension frame constructed of 50,000 psi tensile steel.

### **GRAVEL PAN**

A gravel pan, constructed of bright aluminum treadplate, will be furnished between the bumper and the cab face. The pan will be properly supported from the underside to prevent flexing and vibration.

### **LEFT SIDE HOSE TRAY**

A hose tray will be placed in the left side of the extended bumper.

The tray will have a capacity of requesting max width and length and 13" depth for tool storage

Black rubber grating will be provided at the bottom of the tray. Drain holes will be provided.

**LEFT SIDE HOSE TRAY COVER**

A bright aluminum treadplate cover will be provided over the left side hose tray.

The cover will be attached with a stainless steel hinge.

There will be one (1) D-ring latch provided to secure the cover in the closed position and a pneumatic stay arm will hold the cover in the open position.

**RIGHT SIDE HOSE TRAY**

A hose tray will be placed in the right side of the extended bumper.

The tray will have a capacity of 30' of 5.00" double jacket cotton-polyester hose.

Black rubber grating will be provided at the bottom of the tray. Drain holes will be provided.

**BUMPER HOSE RESTRAINT**

There will be one (1) pair hose tray restraint straps over the right side hose tray.

The restraints will be a pair of 2.00" wide black nylon straps with Velcro fasteners provided. The strap(s) will be used to secure the hose in the tray.

**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.

**TOW EYES**

Two (2) painted steel tow eyes will be installed under the bumper and attached to the front frame members. The inner and outer edges of the tow eyes will have a 0.25 radius.

The tow eyes will extend down to contact the road surface before the bottom edge of the bumper.

The tow eyes will be designed and positioned to allow up to a 6,000 lb straight horizontal pull in line with the centerline of the vehicle. The tow eyes will not be used for lifting of the apparatus.

**PORTABLE WINCH STORAGE WITH HINGED CENTER SECTION**

A tray for a portable winch, constructed of aluminum, will be placed in the center of the bumper extension.

The tray will be enclosed to protect the winch from weather. A raised aluminum treadplate cover will be made as high as necessary to enclose the winch. The lower section of winch compartment will be enclosed, to prevent road salt, snow, and ice from entering the winch compartment.

Drain holes will be provided.

The center section of the bumper will be hinged at the bottom to allow access to the winch. Two (2) flush pawl latches will hold the center section in the closed position.

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A portable winch receiver will be installed in the back of the tray. The winch receiver will be constructed of heavy steel tubing and reinforced to the bumper extension framework for the receiving portion. The receiver will have a 2.00" inside dimension, with a maximum weight rating of 9,000 pounds.

The assembly will be designed to allow the winch to be stored and used from the tray.

### **SIDE ZONE LIGHT MOUNTING**

The front lower warning lights on each side will be recessed into the side of the bumper extension to protect the light from damage.

The recessed bracket will be made of painted smooth aluminum.

### **SIDE ZONE LIGHT MOUNTING**

The front warning lights on each side will be recessed into the angled portion of the bumper extension to protect the light from damage.

The recessed bracket will be made of painted smooth aluminum.

### **BUMPER TRIM**

There will be bright aluminum treadplate trim provided on the top flange of the bumper.

### **CAB**

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

The cab will be built by the apparatus manufacturer in a facility located on the manufacturer's premises.

For reasons of structural integrity and enhanced occupant protection, the cab will be a heavy duty design, constructed to the following minimal standards.

The cab will have 12 main vertical structural members located in the A-pillar (front cab corner posts), B-pillar (side center posts), C-pillar (rear corner posts), and rear wall areas. The A-pillar will be constructed of solid A356-T5 aluminum castings. The B-pillar and C-pillar will be constructed from 0.13" wall extrusions. The rear wall will be constructed of two (2) 2.00" x 2.00" outer aluminum extrusions and two (2) 2.00" x 1.00" inner aluminum extrusions. All main vertical structural members will run from the floor to 4.625" x 3.864" x 0.090" thick roof extrusions to provide a cage-like structure with the A-pillar and roof extrusions being welded into a 0.25" thick corner casting at each of the front corners of the roof assembly.

The front of the cab will be constructed of a 0.13" firewall plate, covered with a 0.090" front skin (for a total thickness of 0.22"), and reinforced with a full width x 0.50" thick cross-cab support located just below the windshield and fully welded to the engine tunnel. The cross-cab support will run the full width of the cab and weld to each A-pillar, the 0.13" firewall plate, and the front skin.

The cab floors will be constructed of 0.125" thick aluminum plate and reinforced at the firewall with an additional 0.25" thick cross-floor support providing a total thickness of 0.375" of structural material at the front floor area. The front floor area will also be supported with two (2) triangular 0.30" wall extrusions that also provides the mounting point for the cab lift. This tubing will run from the floor

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wireway of the cab to the engine tunnel side plates, creating the structure to support the forces created when lifting the cab.

The cab will be 96.00" wide (outside door skin to outside door skin) to maintain maximum maneuverability.

The forward cab section will have an overall height (from the cab roof to the ground) of approximately 99.00". The crew cab section will have a 10.00" raised roof, with an overall cab height of approximately 109.00". The overall height listed will be calculated based on a truck configuration with the lowest suspension weight rating, 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 floor to ceiling height inside the crew cab will be 64.50" in the center and outboard positions.

The crew cab floor will measure 46.00" from the rear wall to the back side of the rear facing seat risers.

The medium block engine tunnel, at the rearward highest point (knee level), will measure 61.50" to the rear wall. The big block engine tunnel will measure 51.50" to the rear wall.

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 cab will be a full tilt cab style.

A 3-point cab mount system with rubber isolators will improve ride quality by isolating chassis vibrations from the cab.

### **CAB ROOF DRIP RAIL**

For enhanced protection from inclement weather, a drip rail will be furnished on the sides of the cab. The drip rail will be painted to match the cab roof, and bonded to the sides of the cab. The drip rail will extend the full length of the cab roof.

### **INTERIOR CAB INSULATION**

The cab will include 1.00" insulation in the ceiling, 1.50" insulation in the side walls, and 2.00" insulation in the rear wall to maximize acoustic absorption and thermal insulation.

### **FENDER LINERS**

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

### **PANORAMIC WINDSHIELD**

A one (1)-piece safety glass windshield will be provided with over 2,775 square inches of clear viewing area. The windshield will be full width and will provide the occupants with a panoramic view. The windshield will consist of three (3) layers: outer light, middle safety laminate, and inner light. The 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

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using a urethane adhesive. A custom frit pattern will be applied on the outside perimeter of the windshield for a finished automotive appearance.

### **WINDSHIELD WIPERS**

Three (3) electric windshield wipers with washer will be provided that meet FMVSS and SAE requirements.

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

### **ENGINE TUNNEL**

Engine hood side walls will be constructed of 0.375" aluminum. The top will be constructed of 0.125" aluminum and will be tapered at the top to allow for more driver and passenger elbow room.

The engine hood will be insulated for protection from heat and sound. The noise insulation keeps the dBA level within the limits stated in the current NFPA 1901 standards.

The engine tunnel will be no higher than 17.00" off the crew cab floor.

### **CAB REAR WALL EXTERIOR COVERING**

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

### **CAB LIFT**

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

Hydraulic pump will have a manual override for backup in the event of electrical failure.

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

The cab will be capable of tilting 43 degrees to accommodate engine maintenance and removal.

The cab will be locked down by a 2-point normally closed spring loaded hook type latch that fully engages after the cab has been lowered. The system will be hydraulically actuated to release the normally closed locks when the cab lift control is in the raised position and cab lift system is under pressure. When the cab is completely lowered and system pressure has been relieved, the spring loaded latch mechanisms will return to the normally closed and locked position.

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

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

**Cab Lift Interlock**

The cab lift 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.

**GRILLE**

A bright finished aluminum mesh grille screen, inserted behind a bright finished grille surround, will be provided on the front center of the cab.

**DOOR JAMB SCUFFPLATES**

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

**MIRRORS**

Ramco, Model 6001FFHR-750HR, polished aluminum 9.25" wide x 13.50" high mirrors, with full flat glass section, will be mounted on each side of the front cab corner. A convex section will be bolted to the top of each mirror.

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

The convex section in each mirror will be heated and adjustable with remote controls.

**FRONT CROSS VIEW MIRROR**

There will be one (1) 8.00" diameter eyeball mirror provided on the passenger side front corner of the cab. It will be mounted high, above the windshield. The mirror will provide the driver with a view of the front bumper and the front of the truck.

The mirror housing, tubing, clamps and hardware will be constructed of corrosion resistant stainless steel.

Mirror head will be K-10, EB50S-S, 8.00" stainless steel housing with three (3) arms.

**DOORS**

To enhance entry and egress to the cab, the forward cab doors will be a minimum of 37.50" wide x 75.50" high. The crew cab doors will be located on the sides of the cab and will be constructed in the same manner as the forward cab doors. The crew cab door openings will be a minimum of 34.30" wide x 85.50" high.

The forward cab and crew cab doors will be constructed of extruded aluminum with a nominal material thickness of 0.093". The exterior door skins will be constructed from 0.090" aluminum.

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.

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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 keys will be Model 1041. 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 0.38" 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.

A chrome grab handle will be provided on the inside of each cab door for ease of entry.

The cab steps at each cab door location will be located inside the cab doors to protect the steps from weather elements.

### **DOOR PANELS**

The inner cab door panels will be constructed out of brushed stainless steel.

### **ELECTRIC OPERATED CAB DOOR WINDOWS**

All four (4) cab doors will be equipped with electric operated windows with one (1) flush mounted automotive style switch on each door. The driver's door will have four (4) switches, one (1) to control each door window.

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 second.

### **ELECTRIC CAB DOOR LOCKS**

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

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

There will be one (1) concealed switch located inside D3 near the breaker panel.

### **CAB STEPS**

The forward cab and crew cab access steps will be a full size two (2) step design to provide largest possible stepping surfaces for safe ingress and egress. The bottom steps will be designed with a grip pattern punched into bright aluminum treadplate material to provide support, slip resistance, and drainage. The bottom steps will be a bolt-in design to minimize repair costs should they need to be replaced. The forward cab steps will be a minimum 25.00" wide, and the crew cab steps will be 21.65" wide with a 10.00" minimum depth. The inside cab steps will not exceed 16.50" in height. A slip-resistant handrail will be provided adjacent to each cab door opening to assist during cab ingress and egress.

The vertical surfaces of the step well will be aluminum treadplate.

### **STEP LIGHTS**

There shall be six (6) white LED step lights installed for cab and crew cab access steps.

- One (1) light for the driver's access steps.
- Two (2) lights for the driver's side crew cab access steps.
- Two (2) lights for the passenger's side crew cab access steps.
- One (1) light for the passenger's side access step.

In order to ensure exceptional illumination, each light shall provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light.

The lights shall be activated when the battery switch is on and the adjacent door is opened.

### **FENDER CROWNS**

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

### **HANDRAILS BELOW CAB WINDSHIELD**

A 10.00" long x 1.25" diameter handrail will be mounted below the front cab windshield, one (1) on each side. The handrails will be extruded aluminum with a ribbed design to provide a positive gripping surface.

### **INTERIOR CREW CAB DOOR HANDRAIL**

A handrail will be provided on each interior crew cab door pan. The handrails will be mounted at a 45 degree angle. These are in addition to the standard crew cab door handle.

### **CREW CAB WINDOWS**

One (1) fixed window with tinted glass will be provided on each side of the cab, to the rear of the front cab door. The windows will be sized to enhance light penetration into the cab interior. The windows will measure 18.70" wide x 23.75" high.

#### **Window Tint**

The rollup window in the left side crew cab door will be tinted privacy dark gray.

#### **Window Tint**

The upper window in the right side crew cab door will be tinted privacy dark gray.

#### **Window Tint**

The rollup window in the right side crew cab door will be tinted privacy dark gray.

#### **Window Tint**

The upper window in the left side crew cab door will be tinted privacy dark gray.

#### **Window Tint**

The window behind the right side front cab door will be tinted privacy dark gray.

#### **Window Tint**

The window behind the left side front cab door will be tinted privacy dark gray.

**SCREEN BELOW GRILLE LETTERING**

There will be lettering provided within the stainless steel screen below the front grille. The lettering will be cut in Helvetica style with a water jet process. The lettering will be centered in the screen. The lettering will read SPOTSYLVANIA.

**MOUNTING PLATE ON ENGINE TUNNEL**

Equipment installation provisions will be installed on the engine tunnel.

A .25" smooth aluminum plate will be bolted to the top surface of the engine tunnel. The plate will follow the contour of the engine tunnel and will run the entire length of the engine tunnel. The plate will be spaced off the engine tunnel .75" to allow for wire routing below the plate.

The front of the plate will be cut to a curve to provide room for the driver's elbow. The mounting plate will be installed within 2.00" of the drivers side control panel. There will be a 1.00" lip that stops at the drivers side control panel area of the dash and starts again at the officer seat back; the front of the mounting plate will not include the lip.

The mounting surface will be painted to match the cab interior.

**CAB INTERIOR**

The cab interior will be constructed of primarily metal (painted aluminum) to withstand the severe duty cycles of the fire service.

The officer side dash will be a flat faced design to provide easy maintenance and will be constructed out of painted aluminum.

The instrument cluster will be surrounded with a high impact ABS plastic contoured to the same shape of the instrument cluster.

The engine tunnel will be padded and covered, on the top and sides, with black Turnout Tuff fabric.

For durability and ease of maintenance, the cab interior side walls will be painted aluminum. The rear wall will be painted aluminum.

The headliner will be installed in both forward and rear cab sections. Headliner material will be Turnout Tuff fabric. A sound barrier will be part of its composition. Material will be installed on an aluminum sheet and securely fastened to interior cab ceiling.

The forward portion of the cab headliner will permit easy access for service of electrical wiring or other maintenance needs.

All wiring will be placed in metal raceways.

**CAB INTERIOR UPHOLSTERY**

The cab interior upholstery will be black.

**CAB INTERIOR PAINT**

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

### **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 0.25" thick closed cell foam (no water absorption) which offers a sound dampening material for reducing sound levels.

### **CAB DEFROSTER**

To provide maximum defrost and heating performance, a 43,500 BTU heater-defroster unit with 350 CFM of air flow will be provided inside the cab. The defroster unit will be strategically located under the center forward portion of the vacuum formed instrument panel. For easy access, a removable vacuum formed 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 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 0 degrees Fahrenheit for 10 hours, and a 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 requirements.

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

Two (2) 44,180 BTU auxiliary heaters with 276 CFM (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.

### **AIR CONDITIONING**

A high performance, customized air conditioning system will be furnished inside the cab and crew cab.

The air conditioning system will be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 75 degrees Fahrenheit within 30 minutes at 50 percent relative humidity. 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 radiator mounted condenser with a 59,644 BTU output that meets and exceed the performance specification will be installed.

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One (1) evaporator unit will be installed in the center roof with two (2) cores, one (1) for the cab and one (1) for the crew cab. The evaporator unit will have an adequate BTU rating to meet the performance specifications.

Adjustable air outlets will be strategically located on the evaporator cover per the following:

- Four (4) will be directed towards the driver's location
- Four (4) will be directed towards the officer's location
- Seven (7) will be directed towards the 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 electronic control panel. 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.

### **SUN VISORS**

Two (2) smoked Lexan™ sun visors provided. The sun visors will be located above the windshield with one (1) mounted on each side of the cab.

There will be a black plastic thumb latch provided to help secure each sun visor in the stowed position.

### **GRAB HANDLES**

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

### **ENGINE COMPARTMENT LIGHTS**

There will be one (1) Whelen, Model 3SC0CDCR, 12 volt DC, 3.00" white LED light(s) with Whelen, Model 3FLANGEC, chrome flange kit(s) installed under the cab to be used as engine compartment illumination.

These light(s) will be activated automatically when the cab is raised.

### **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 engine oil dipstick will allow for checking only. The transmission dipstick will allow for both checking and filling.

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

### **STORAGE BOX**

There will be three (3) storage box(es) designed to hold and dispense boxes of latex gloves provided. Each box will have four (4) sides. One (1) side will be hinged with a latch so the latex gloves box can be changed when empty.

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Each box will be constructed of aluminum and located on the PS rear crew cab wall high above the FF outboard seat.

Each storage box will be 10.00" wide x 5.00" deep x 3.50" high and painted to match the cab interior. A slot will be provided on the top of each box to dispense the gloves.

### **MAP BOX**

A map box with four (4) bins, open from top, will be installed mount at final. The map box will be divided into four (4) bins, three (3) being 12.50" wide x 3.00" high x 12.00" deep and one (1) bottom tray being 12.50" wide x 4.00" high x 12.00" deep. Each bin will slant 30 degrees from horizontal. The map box will be constructed of .125" aluminum and will be painted to match the cab interior.

### **CAB SAFETY SYSTEM**

The cab will be provided with a safety system designed to protect occupants in the event of a side roll or frontal impact, 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 side roll or frontal impact event.
- A slave SRS sensor will be installed in the cab to provide capacity for eight (8) crew cab seating positions.
- 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 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 3-point seat belt.
- Air curtains will be provided in the outboard bolster of outboard seat backs to provide a cushion between occupant and the cab wall.
- Suspension seats will be provided with devices to retract them to the lowest travel position during a side roll or frontal impact event.
- Seat belts will be provided with pre-tensioners to remove slack from the seat belt during a side roll or frontal impact event.

### **FRONTAL IMPACT PROTECTION**

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

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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
- Air curtains mounted in the outboard bolster of outboard seat backs
- Suspension seats will be retracted to the lowest travel position
- Seat belts will be pre-tensioned to firmly hold the occupant in place

### **SIDE ROLL PROTECTION**

The SRS system will provide protection during a fast or slow 90 degree roll to the side, in which the vehicle comes to rest on its side. The system will analyze the vehicle's angle and rate of roll to determine the optimal activation of the advanced occupant restraints.

The SRS system will deploy the following components in the event of a side roll:

- Air curtains mounted in the outboard bolster of outboard seat backs
- Suspension seats will be retracted to the lowest travel position
- Seat belts will be pre-tensioned to firmly hold the occupant in place

### **SEATING CAPACITY**

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

### **DRIVER SEAT**

A H.O. Bostrom, Sierra, air suspension seat will be provided in the cab for the driver. For increased convenience, the seat will include a manual control to adjust the horizontal position (5.50" travel). To provide flexibility for multiple driver configurations, the seat will have a reclining back, adjustable from 15 degrees back to 45 degrees forward.

The seat will include the following features incorporated into the side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A suspension seat safety system will be included. When activated in the event of a side roll, this system will pretension the seat belt and retract the seat to its lowest travel position.

The seat will be furnished with a 3-point, shoulder type seat belt.

### **OFFICER SEAT**

A H.O. Bostrom, Tanker 450, SCBA fixed seat will be provided in the cab for the officer. For optimal comfort, the seat will be provided with 17.00" deep cushion.

The seat back will be an SCBA back style with a 5 degree fixed recline angle. The SCBA cavity will be adjustable from front to rear in 1.50" increments, to accommodate different sized SCBA cylinders.

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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 side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt.

The seat will be furnished with a 3-point, shoulder type seat belt.

### **RADIO COMPARTMENT**

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

The inside compartment dimensions will be 16.00" wide x 7.50" high x 15.00" deep, with the back of the compartment angled up to match the cab structure.

A drop-down 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.

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

There will be one (1) rear facing, HO Bostrom Tanker 450, SCBA seat provided at the driver side outboard position in the crew cab. For optimal comfort, the seat will be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat back will be an SCBA back style with 5 degree fixed recline angle. 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 side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt.

The seat will be furnished with a 3-point, shoulder type seat belt.

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

There will be one (1) rear facing, HO Bostrom Tanker 450 seat provided at the passenger side outboard position in the crew cab. For optimal comfort, the seat will be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat back will be an SCBA back style with 5 degree fixed recline angle. 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.

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The seat will include the following features incorporated into the side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt.

The seat will be furnished with a 3-point, shoulder type seat belt.

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

There will be one (1) forward facing, HO Bostrom Tanker 400CT foldup SCBA seat provided at the driver side outboard position in the crew cab. For optimal comfort, and to maximize accessibility to the crew cab, the seat will be provided with 15.00" deep cushion.

The seat back will be an SCBA back style with a 0 degree fixed recline angle. The SCBA cavity will be adjustable from front to rear in 1.50" 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 side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt.

The seat will be furnished with a 3-point, shoulder type seat belt.

### **FORWARD FACING CENTER CABINET**

A forward facing cabinet will be provided in the crew cab at the center position.

The cabinet will be 42.00" wide x 54.00" high x 28.00" deep. The cabinet will be divided into upper and lower storage areas. The top rear portion of the cabinet will be notched to clear the wire raceway cover at the ceiling. The front corners will be chamfered at 45 degrees.

The upper cabinet will be 42.00" wide x 15.50" high x 28.00" deep. The interior door will be a lift up door opening into the crew cab. The door will include two (2) paddle latches and a gas strut to hold the door in the open position. The clear door opening of the cabinet will be 33.50" wide x 13.00" high.

The lower cabinet will be 42.00" wide x 38.50" high x 28.00" deep. The interior door will be web netting. The netting is to be made with 2.00" wide nylon material with 2.00" openings. Seat belt fasteners will be used to fasten the top of the opening. The net will be permanently fastened at the bottom. The male section of the seat belt will be attached to the webbing and the female section to the cabinet. A bar will connect the female sections with a single web strap in the center for releasing the female buckles at the same time. The clear door opening of the cabinet will be 33.50" wide x 35.00" high.

The lower cabinet will include two (2) infinitely adjustable shelves with a 0.75" up-turned lip constructed of 0.090" aluminumpainted to match the cab interior.

The lower cabinet will include no louvers.

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

### **Cabinet Light**

There will be one (1) white Amdor LED strip light installed on the right side of the interior cabinet door opening, one (1) white Amdor LED strip light installed on the left side of the interior cabinet door opening and one (1) white Amdor LED strip light installed horizontally above the interior cabinet door opening. The lower lights will be controlled by two (2) rocker switches, one (1) on each side of the opening on the chamfered edge. The upper light will be controlled by an automatic door switch.

The cabinet lights will be wired battery direct.

### **FORWARD FACING PASSENGER SIDE OUTBOARD SEAT**

There will be one (1) forward facing, HO Bostrom Tanker 400CT foldup SCBA seat provided at the passenger side outboard position in the crew cab. For optimal comfort, and to maximize accessibility to the crew cab, the seat will be provided with 15.00" deep cushion.

The seat back will be an SCBA back style with a 0 degree fixed recline angle. The SCBA cavity will be adjustable from front to rear in 1.50" 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 side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt.

The seat will be furnished with a 3-point, shoulder type seat belt.

### **STORAGE COMPARTMENT ON TOP OF ENGINE TUNNEL**

A storage compartment will be provided on the top rear of the engine tunnel. The compartment will be approximately 34.00" wide x 7.50" high x 18.00" deep.

The compartment will face the rear of the cab and be even with the rear edge of the engine tunnel. A door will not be provided to cover the compartment opening.

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

NFPA 1901, 2016 edition, section 14.1.10.2 requires all equipment not required to be used during an emergency response, with the exception of SCBA units, will not be mounted in a driving or crew area unless it is contained in a fully enclosed and latched compartment capable of containing the contents when a 9G force is applied in the longitudinal axis of the vehicle or a 3G force is applied in any other direction, or the equipment is mounted in a bracket(s) that can contain the equipment when the equipment is subjected to those same forces.

A storage compartment without a door or restraint can not contain the equipment when it is subjected to 9a G or 3G force. Per fire department specification and request for this style compartment, this apparatus will be non-compliant to NFPA 1901 standards effective at time of contract execution.

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### **Compartment Light**

A light will not be provided for this compartment.

### **SEAT UPHOLSTERY**

All seat upholstery will be black Dura-Wear, waterproof fabric.

### **AIR BOTTLE HOLDERS**

There will be five (5) SCBA type seats in the cab with Bostrom SecureAll SCBA locking holder brackets installed directly into the Bostrom seats. The brackets will be compliant with NFPA 1901 Section 14.1.10.1.

### **SEAT EMBROIDERY**

The seats in the cab and crew cab will be provided with custom embroidery. The Fire Department will determine what the embroidery will be by providing pictures at the time of order.

The seats will be provided with embroidery as follows:

driver seat, DS outboard rear facing, and DS forward facing outboard will be with Spotsylvania Vol Fire Dept logo and officer seat, PS outboard rear facing, and PS forward facing outboard will be with Spotsylvania Fire, Rescue, and Emergency Mgmt logo

The embroidery will be provided on six (6) seats.

### **SEAT BELTS**

All cab and tiller cab (if applicable) seating positions will have red seat belts. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length will meet or exceed the current edition of NFPA 1901 and CAN/ULC - S515 standards.

The 3-point shoulder type seat belts will include height adjustment. This adjustment will optimize the belts effectiveness and comfort for the seated firefighter. The 3-point shoulder type seat belts will be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

The 3-point shoulder type belts will also include the ReadyReach D-loop assembly to the shoulder belt system. The ReadyReach feature adds an extender arm to the D-loop location placing the D-loop in a closer, easier to reach location.

To ensure safe operation, the seats will be equipped with seat belt sensors in the seat cushion and belt receptacle that shall activate an alarm indicating a seat is occupied but not buckled.

### **HELMET STORAGE**

Helmet storage will be located in a body compartment.

### **CAB DOME LIGHTS**

There will be four (4) dual LED dome lights with black bezels provided. Two (2) lights will be mounted above the inside shoulder of the driver and officer and two (2) on each side of the crew cab located over the rear facing outboard seat.

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The color of the LED's will be red and white.

The white LED's will be controlled by the door switches and the lens switch.

The color LED's will be controlled by the lens switch.

In order to ensure exceptional illumination, each white LED dome light will provide a minimum of 10.1 foot-candles (fc) covering an entire 20.00" x 20.00" square seating position when mounted 40.00" above the seat.

### **ADDITIONAL DOME LIGHTS**

There will be two (2) dual LED dome lights with black bezel(s) mounted in the cab and/or crew cab located over the forward facing crew cab seats.

The color of the LED's will be red and white.

- The white LED(s) will be controlled by the door switches and the lens switch.
- The color LED(s) will be controlled by the lens switch.

In order to ensure exceptional illumination, each white LED dome light will provide a minimum of 10.1 foot-candles (fc) covering an entire 20.00" x 20.00" square seating position when mounted 40.00" above the seat.

The light(s) may be load managed when the parking brake is applied.

### **ADDITIONAL OVERHEAD MAP LIGHT**

There will be two (2) additional white round adjustable map light(s) installed in the cab and located over the right shoulder of the driver and over the left shoulder of the officer.

Each light will include a switch on the light housing.

The light switch(es) will be connected directly to the battery switched power.

### **HAND HELD LIGHT**

There will be four (4) Streamlight, Fire Vulcan, Model #44451, hand lights provided with a vehicle mount with 12VDC direct wire charging rack and quick release buckle strap mounted at pickup.

Each light housing will be orange in color and be provided with a C4, LED and two (2) "ultra bright blue tail light LEDs" The tail light LEDs will have a dual mode of blinking or steady.

### **ADDITIONAL HAND HELD LIGHT**

There will be two (2) additional 12v Streamlight, Model #44451, Fire Vulcan LED light(s) will be provided and mounted at pick-up. Each light will be provided with a 12 volt direct wire vehicle mounting rack.

Each light housing will be orange in color and be provided with a single C4 LED bulb and two (2) "ultra bright blue tail-light LEDs". The tail-light LEDs will have a dual mode of blinking or steady.

### **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 mount at pick-up.

### **CAB INSTRUMENTATION**

The cab instrument panel will be a molded ABS panel and include gauges, an LCD display, telltale indicator lamps, control switches, alarms, and a diagnostic panel. The function of the 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, forward of the driver. The gauge assembly and switch panels are designed to be removable for ease of service and low cost of ownership.

### **GAUGES**

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

- Voltmeter gauge (volts):
  - Low volts (11.8 VDC)
    - Amber caution indicator on the information center with intermittent alarm
    - Amber caution light on gauge assembly
  - High volts (15.5 VDC)
    - Amber caution indicator on the information center with intermittent alarm
    - Amber caution light on gauge assembly
  - Very low volts (11.3 VDC)
    - Red warning indicator on the information center with a steady alarm
    - Amber caution light on gauge assembly
  - Very high volts (16.0 VDC)
    - Red warning indicator on the information center with a steady alarm
    - Amber caution light on gauge assembly
- Engine Tachometer (RPM)
- Speedometer MPH (Major Scale), KM/H (Minor Scale)
- Fuel level gauge (Empty - Full in fractions):
  - Low fuel (1/8 full)
    - Amber caution indicator on the information center with intermittent alarm
    - Amber caution light on gauge assembly
  - Very low fuel (1/32 full)
    - Red caution indicator on the information center with steady alarm
    - Amber caution light on gauge assembly
- Engine Oil pressure Gauge (PSI):
  - Low oil pressure to activate engine warning lights and alarms

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- Red caution indicator on the information center with steady alarm
  - Amber caution light on gauge assembly
- Front Air Pressure Gauges (PSI):
  - Low air pressure to activate warning lights and alarm
    - Red warning indicator on the information center with a steady alarm
    - Amber caution light on gauge assembly
- Rear Air Pressure Gauges (PSI):
  - Low air pressure to activate warning lights and alarm
    - Red warning indicator on the information center with a steady alarm
    - Amber caution light on gauge assembly
- Transmission Oil Temperature Gauge (Fahrenheit):
  - High transmission oil temperature activates warning lights and alarm
    - Amber caution indicator on the information center with intermittent alarm
    - Amber caution light on gauge assembly
- Engine Coolant Temperature Gauge (Fahrenheit):
  - High engine temperature activates an engine warning light and alarms
    - Amber caution indicator on the information center with intermittent alarm
    - Amber caution light on gauge assembly
- Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions):
  - Low fluid (1/8 full)
    - Amber indicator light in gauge dial

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

### **INDICATOR LAMPS**

To promote safety, the following telltale indicator lamps will be located on the instrument panel in clear view of the driver. 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 engin
- 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)

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- MIL (engine emissions system malfunction indicator lamp) (where applicable)
- Side roll fault (where applicable)
- Front air bag fault (where applicable)

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**

A system will be provided which automatically tests telltale indicator lights and alarms located on the cab instrument panel. 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. All switches will have backlit labels for low light applications.

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

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Panel back lighting intensity control switch: A three (3)-position momentary rocker switch will be provided. Pressing the top half of the switch, "Panel Up" increases the panel back lighting intensity and pressing the bottom half of the switch, "Panel Down" decreases the panel back lighting intensity. Pressing the half or bottom half of the switch several times will allow back lighting intensity to be gradually varied from minimum to maximum intensity level for ease of use.

Ignition switch: A three (3)-position maintained/momentary rocker switch will be provided. The first switch position will turn off and deactivate vehicle ignition. The second switch position will activate vehicle ignition and will perform prove-out on the telltale indicators and alarms for 3 to 5 seconds after the switch is turned on. A green indicator lamp is activated with vehicle ignition. The third momentary position will temporarily silence all active cab alarms. An alarm "chirp" may continue as long as alarm condition exists. Switching ignition to off position will terminate the alarm silence feature and reset function of cab alarm system.

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.

Hazard switch will be provided on the instrument panel or on the steering column.

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.

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

High idle engagement switch: A momentary rocker switch with integral indicator lamp will be provided. The switch will activate and deactivate the high idle function. The "OK To Engage High Idle" indicator lamp must be active for the high idle function to engage. A green indicator lamp integral to the high idle engagement switch 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.

Emergency switching will be controlled by multiple individual warning light switches for various groups or areas of emergency warning lights. An Emergency Master switch provided on the instrument panel that enables or disables all individual warning light switches is included.

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An additional "Emergency Master" button will be provided on the lower left hand corner of the gauge panel to allow convenient control of the "Emergency Master" system from inside the driver's door when standing on the ground.

### **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 lower instrument console and up to six (6) switch panels in the overhead visor console. All switches have backlit labels for low light conditions.

### **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 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
- Roll sensor diagnostic port
- Command Zone USB diagnostic port
- 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 the following, 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 shall be provided.

### **"DO NOT MOVE APPARATUS" INDICATOR**

A Whelen, Model M2R flashing red indicator light with a chrome bezel, 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 steady tone alarm when the parking brake is released.

### **DO NOT MOVE TRUCK MESSAGES**

Messages will be displayed on the Command Zone™, color display located within sight 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)
- 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.

### **SWITCH PANELS**

The built-in switch panels will be located in the lower console or overhead console of the cab.

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

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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.

### **WIPER CONTROL**

Wiper control will consist of a two (2)-speed windshield wiper control with intermittent feature and windshield washer controls.

The wipers will be interlocked to the parking brake. The wipers will terminate operation when the parking brake is set.

### **SPARE CIRCUIT**

There will be three (3) dual USB fast charge socket mounts installed on the apparatus.

The above wires will have the following features:

- The positive wire will be connected directly to the battery power.
- The negative wire will be connected to ground.
- Wires will be protected to 4.8 amps at 12 volts DC.
- The USB socket mount will be one (1) in the rear crew cab recessed to the right of the fluid access panel, one (1) at the officer side of the instrument panel, and one (1) in the bottom of the EMS compartment.
- Termination will be a Blue Sea Systems part number 1045 dual USB charger socket.
- Wires will be sized to 125% of the protection.

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

### **SPARE CIRCUIT**

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

The above wires will have the following features:

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

The negative wire will be connected to ground.

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

Power and ground will terminate coiled up with 6' of slack in the top of D3.

Termination will be with heat shrinkable butt splicing.

Wires will be sized to 125% of the protection.

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

### **SPARE CIRCUIT**

There will be two (2) pair of wires, including a positive and a negative, installed on the apparatus.

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The above wires will have the following features:

- The positive wire will be connected directly to the battery power
- The negative wire will be connected to ground
- Wires will be protected to 20 amps at 12 volts DC
- Power and ground will terminate behind officer seat and behind the drivers seat
- Termination will be with heat shrinkable butt splicing
- Wires will be sized to 125% of the protection

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

### **SPARE CIRCUIT**

There will be three (3) pair of wires, including a positive and a negative, installed on the apparatus.

The above wires will have the following features:

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

The negative wire will be connected to ground.

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

Power and ground will terminate one (1) in the rear crew cab recessed to the right of the fluid access panel, one (1) at the officer side of the instrument palen, and one (1) in the bottom of the EMS compt.

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

Wires will be sized to 125 percent of the protection.

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

### **SPARE CIRCUIT**

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

The above wires will have the following features:

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

The negative wire will be connected to ground.

Wires will be protected to 40 amps at 12 volts DC.

Power and ground will terminate radio compt below the officer's seat.

Termination will be with heat shrinkable butt splicing.

Wires will be sized to 125% of the protection.

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

### **INSTRUMENT PANEL LAYOUT**

The instrument panel layout will match [Fill in Blank] per the customer.

### **INFORMATION CENTER**

An information center employing a 7.00" diagonal touch screen color LCD display will be encased in an ABS plastic housing.

The information center will have the following specifications:

- Operate in temperatures from -40 to 185 degrees Fahrenheit
- An Optical Gel will be placed between the LCD and protective lens
- Five weather resistant user interface switches
- Grey with black accents
- Sunlight Readable
- Linux operating system
- Minimum of 1000nits rated display
- Display can be changed to an available foreign language
- A LCD display integral to the cab gauge panel will be included as outlined in the cab instrumentation area.
- Programmed to read US Customary

### **GENERAL SCREEN DESIGN**

Where possible, background colors will be used to provide "At a Glance" vehicle information. If information provided on a screen is within acceptable limits, a green background will be used.

If a caution or warning situation arises the following will occur:

- An amber background/text color will indicate a caution condition
- A red background/text color will indicate a warning condition
- The information center will utilize an "Alert Center" to display text messages for audible alarm tones. The text messages will be written to identify the item(s) causing the audible alarm to sound. If more than one (1) text message occurs, the messages will cycle every second until the problem(s) have been resolved. The background color for the "Alert Center" will change to indicate the severity of the "warning" message. If a warning and a caution condition occur simultaneously, the red background color will be shown for all alert center messages.
- A label for each button will exist. The label will indicate the function for each active button for each screen. Buttons that are not utilized on specific screens will have a button label with no text or symbol.

### **HOME/TRANSIT SCREEN**

This screen will display the following:

- Vehicle Mitigation (if equipped)
- Water Level (if equipped)
- Foam Level (if equipped)
- Seat Belt Monitoring Screen

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- Tire Pressure Monitoring (if equipped)
- Digital Speedometer
- Active Alarms

### **ON SCENE SCREEN**

This screen will display the following and will be auto activated with pump engaged (if equipped):

- Battery Voltage
- Fuel
- Oil Pressure
- Coolant Temperature
- RPM
- Water Level (if equipped)
- Foam Level (if equipped)
- Foam Concentration (if equipped)
- Water Flow Rate (if equipped)
- Water Used (if equipped)
- Active Alarms

### **VIRTUAL BUTTONS**

There will be four (4) virtual switch panel screens that match the overhead and lower lighting and HVAC switch panels.

### **PAGE SCREEN**

The page screen will display the following and allow the user to progress into other screens for further functionality:

- Diagnostics
  - Faults
    - Listed by order of occurrence
    - Allows to sort by system
  - Interlock
    - Throttle Interlocks
    - Pump Interlocks (if equipped)
    - Aerial Interlocks (if equipped)
    - PTO Interlocks (if equipped)
  - Load Manager
    - A list of items to be load managed will be provided. The list will provide a description of the load.
    - The lower the priority numbers the earlier the device will be shed should a low voltage condition occur.
    - The screen will indicate if a load has been shed (disabled) or not shed.
    - "At a glance" color features are utilized on this screen.
  - Systems
    - Command Zone

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- Module type and ID number
    - Module Version
    - Input or output number
    - Circuit number connected to that input or output
    - Status of the input or output
    - Power and Constant Current module diagnostic information
  - Foam (if equipped)
  - Pressure Controller (if equipped)
  - Generator Frequency (if equipped)
- Live Data
  - General Truck Data
- Maintenance
  - Engine oil and filter
  - Transmission oil and filter
  - Pump oil (if equipped)
  - Foam (if equipped)
  - Aerial (if equipped)
- Setup
  - Clock Setup
  - Date & Time
    - 12 or 24 hour format
    - Set time and date
  - Backlight
    - Daytime
    - Night time
    - Sensitivity
  - Unit Selection
  - Home Screen
  - Virtual Button Setup
  - On Scene Screen Setup
  - Configure Video Mode
    - Set Video Contrast
    - Set Video Color
    - Set Video Tint
- Do Not Move
  - The screen will indicate the approximate location and type of item that is open or is not stowed for travel. The actual status of the following devices will be indicate
    - Driver Side Cab Door
    - Passenger's Side Cab Door
    - Driver Side Crew Cab Door
    - Passenger's Side Crew Cab Door
    - Driver Side Body Doors
    - Passenger's Side Body Doors
    - Rear Body Door(s)

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- Ladder Rack (if applicable)
  - Deck Gun (if applicable)
  - Light Tower (if applicable)
  - Hatch Door (if applicable)
  - Stabilizers (if applicable)
  - Steps (if applicable)
- Notifications
  - View Active Alarms
    - Shows a list of all active alarms including date and time of the occurrence is shown with each alarm
    - Silence Alarms - All alarms are silenced
- Timer Screen
- HVAC (if equipped)
- Tire Information (if equipped)
- Ascendant Set Up Confirmation (if equipped)

Button functions and button labels may change with each screen.

### **VEHICLE DATA RECORDER**

There will be a vehicle data recorder (VDR) capable of reading and storing vehicle information provided.

The information stored on the VDR can be downloaded through a USB port mounted in a convenient location determined by cab model. A USB cable can be used to connect the VDR to a laptop to retrieve required information. The program to download the information from the VDR will be available to download on-line.

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
- Seat Belt Buckled Status - Yes/No by Position
- Master Optical Warning Device Switch - On/Off
- Time - 24 Hour Time
- Date - Year/Month/Day

### **Seat Belt Monitoring System**

A seat belt monitoring system (SBMS) will be provided on the Command Zone™ color display and in the center overhead of the cab instrument panel. The SBMS will be capable of monitoring up to 10 seating positions indicating the status of each seat position per the following:

- Seat Occupied & Buckled = Green LED indicator illuminated
- Seat Occupied & Unbuckled = Red LED indicator with audible alarm
- No Occupant & Buckled = Red LED indicator with audible alarm
- No Occupant & Unbuckled = No indicator and no alarm

The seat belt monitoring screen will become active on the Command Zone color display when:

- The home screen is active:
  - and there is any occupant seated but not buckled or any belt buckled with an occupant.
  - and there are no other Do Not Move Apparatus conditions present. As soon as all Do Not Move Apparatus conditions are cleared, the SBMS will be activated.

The SBMS will include an audible alarm that will warn that an unbuckled occupant condition exists and the parking brake is released, or the transmission is not in park.

### **INTERCOM SYSTEM**

A six (6) position David Clark, Model U3800, intercom system with single radio interface capability at the driver and officer positions will be provided. The driver and officer will have a remote push-to-transmit buttons located driver and officer positions per the IP layout. Four (4) outboard crew cab seating positions will have intercom only.

The following components will be supplied with this system:

- One (1) U3805 Radio Cord Junction Module
- Two (2) U3815 Radio Interface Modules (Driver, Officer)
- Two (2) Remote PTT
- One (1) U3800 Intercom Unit (1 Crew)
- Two (2) U3802 Single Intercom Headset Stations (2 Crew)
- One (1) U3801 Single Intercom Headset Station (1 Crew)
- One (1) C3820 Power Cable
- All necessary interconnect cables and connectors

### **RADIO / INTERCOM INTERFACE INCLUDED**

All radio interfaced stations will have universal radio interfaces installed. The interface wiring will be routed within the cab to emergency radio .

### **UNDER THE HELMET HEADSET**

There will be six (6) under the helmet, headset(s) provided all seating positions.

Each David Clark, Model H3442, headset will feature:

- 5' Coiled cord

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- Noise cancelling electric microphone
- Flexible microphone boom rotates 200 degrees for left or right dress
- Microphone on/off button
- Comfort Gel Earseals
- 23 dB noise reduction

### **HEADSET HANGERS**

There will be six (6) headset hanger(s) installed driver's seat, officer's seat, driver's side outboard forward facing seat, driver's side outboard rear facing seat, passenger's side outboard forward facing seat and passenger's side outboard rear facing seat. The hanger(s) will meet NFPA 1901, Section 14.1.11, requirement for equipment mounting.

### **TWO WAY RADIO SPEAKER INSTALLATION**

There will be two (2) customer supplied two way radio speakers sent to the apparatus manufacturers preferred third party installer to be installed one on the pump panel at the top and forward of the master gauges and one in the cab per the IP layout.

Specific shipping requirements will be followed.

### **TWO WAY RADIO INSTALLATION**

There will be two (2) customer supplied two way radio(s) sent to the apparatus manufacturers preferred radio installer to be installed one on the pump panel at the top and forward of the master gauges and one in the cab per the IP layout per the shipping document.

No antenna mount or whip will be included in this option.

Specific radio shipping requirements will be followed.

### **ANTENNA ONLY, GPS**

There will be one (1) Laird/Antenex, Model GPSU15M, low profile 3-5 volt GPS antenna with active ceramic antenna element housed in durable ABS plastic installed onto the NMO mount located center of the crew cab roof. The cable will be routed to: routed to the cab console.

### **RADIO ANTENNA MOUNT**

There will be two (2) standard 1.125", 18 thread antenna-mounting base(s) installed passenger side top of cab behind lightbar and passenger side top of crew cab (as space permits) on the cab roof with high efficiency, low loss, coaxial cable(s) routed to the radio box. A weatherproof cap will be installed on the mount.

### **RADIO ANTENNA MOUNT**

There will be two (2) standard 1.125", 18 thread antenna-mounting base(s) installed driver side top of cab behind lightbar and driver side top of crew cab (as space permits) on the cab roof with high efficiency, low loss, coaxial cable(s) routed to the instrument panel area. A weatherproof cap will be installed on the mount.

### **RADIO ANTENNA MOUNT**

There will be one (1) Larson, model NMOKHFUDTHK, 0-6000MHz NMO style antenna mounting base(s) with weatherproof cap(s) and 17 feet of RG58A/U dual shield coax located on the cab roof center of the crew cab roof. The cable(s) will be routed instrument panel.

### **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

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- Customized control software to the vehicle's configuration
- Factory and field re programmable 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 indication with intermittent alarm
- Red warning indication with steady tone alarm

### **PROGNOSTICS**

A software based vehicle tool will be provided to predict remaining life of the vehicles critical fluid and events.

The system will send automatic indications to the Command Zone, color display and/or wireless enabled device to proactively alert of upcoming service intervals.

Prognostics will include:

- Engine oil and filter

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- Transmission oil and filter
- Pump oil (if equipped)
- Foam oil (if equipped)
- Aerial oil and filter (if equipped)

### **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 a Windows-based computer or wireless enabled device.

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

### **TECH MODULE WITH WIFI**

An in cab module will provide WiFi wireless interface and data logging capability. The WiFi interface will comply with IEEE 802.11 b/g/n capabilities while communicating at 2.4 Gigahertz. The module will provide an external antenna connection allowing a line of site communication range of up to 300 feet with a roof mounted antenna.

The module will transmit a password protected web page to a WiFi enabled device (i.e. most smart phones, tablets or laptops) allowing two levels of user interaction. The firefighter level will allow vehicle monitoring of the vehicle and firefighting systems on the apparatus. The technician level will allow diagnostic access to inputs and outputs installed on the Command Zone, control and information system.

The data logging capability will record faults from the engine, transmission, ABS and Command Zone, control and information systems as they occur. No other data will be recorded at the time the fault occurs. The data logger will provide up to 2 Gigabytes of data storage.

A USB connection will be provided on the Tech Module. It will provide a means to download data logger information and update software in the device.

### **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.

### **POWER AND GROUND STUDS**

Spare circuits will be provided in the primary distribution center for two-way radio equipment.

The spare circuits will consist of the following:

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- One (1) 12-volt DC, 30 amp battery direct spare
- One (1) 12-volt DC ground and un-fused switched battery 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.

### **ELECTRICAL**

All 12-volt electrical equipment installed by the apparatus manufacturer will conform to modern automotive practices. All wiring will be high temperature crosslink type. Wiring will be run, in loom or conduit, where exposed and have grommets where wire passes through sheet metal. Automatic reset circuit breakers will be provided which conform to SAE Standards. Wiring will be color, function and number coded. Function and number codes will be continuously imprinted on all wiring harness

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conductors at 2.00" intervals. 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 holes made in the roof will be caulked with silicon, rope caulk is not acceptable. Large fender washers, liberally caulked, will be used when fastening equipment to the underside of the cab roof.
2. 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.
3. Electrical components designed to be removed for maintenance will not be fastened with nuts and bolts. Metal screws will be used in mounting these devices. Also a coil of wire will be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.
4. Corrosion preventative compound will be applied to all terminal plugs 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).
5. All lights that have their sockets in a weather exposed area will have corrosion preventative compound added to the socket terminal area.
6. All electrical terminals in exposed areas will have silicon (1890) applied completely over the metal portion of the terminal.

All lights and reflectors, required to comply with Federal Motor Vehicle Safety Standard #108, will be furnished. Rear identification lights will be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads will be protected from damage by installing a false bulkhead inside the rear compartments.

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.

### **BATTERY SYSTEM**

There will be six (6) 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 5700 CCA at 0 degrees Fahrenheit
- -140 minutes of reserve capacity
- Threaded stainless steel studs

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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**

There will be a single starting system with an ignition switch and starter button provided and located on the cab instrument panel.

### **MASTER BATTERY SWITCH**

There will be a master battery switch provided within the cab within easy reach of the driver to activate the battery system.

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

### **BATTERY COMPARTMENTS**

Batteries will be placed on non-corrosive mats and stored in well ventilated compartments located under the cab.

Heavy-duty, 2/0 gauge, color coded battery cables will be provided. Battery terminal connections will be coated with anti-corrosion compound.

Battery solenoid terminal connections will be encapsulated with semi-permanent rubberized compound.

### **JUMPER STUDS**

One (1) set of battery jumper studs with plastic color-coded covers will be included on the battery compartments.

### **BATTERY CHARGER**

There will be a Kussmaul 1200, Model 091-187-12-Remote, battery charger provided. A Kussmaul, Model 091-194-IND-WT-\*\*, water tight auto charge status center indicating the state of charge will be included. The color of the charge indicator will be red.

The charger will have a maximum output of 40 amps and a fully automatic regulation.

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

The battery charger will be located on the left side of the cab, just to the rear of the driver seat.

There will be a stainless steel cover with proper ventilation installed to protect the battery charger.

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

### **AUTO EJECT FOR SHORELINE**

There will be one (1) Kussmaul™, Model 091-55-20-120, 20 amp 120 volt AC shoreline inlet(s) provided to operate the dedicated 120 volt AC circuits on the apparatus.

The shoreline inlet(s) will include red weatherproof flip up cover(s).

There will be a release solenoid wired to the vehicle's starter to eject the AC connector when the engine is starting.

The shoreline(s) will be connected to the battery charger, the AC compressor, and any shoreline powered receptacles.

There will be a mating connector body supplied with the loose equipment.

There will be a label installed near the inlet(s) that state the following:

- Line Voltage
- Current Rating (amps)
- Phase
- Frequency

The shoreline receptacle will be located on the driver side of cab, above wheel.

### **ELECTRIC POWER FOR WINCH**

Electric power provisions will be furnished for the portable winch from the chassis battery system.

The receiver plug will be located under D1, P1, in the center front bumper tray, and under the rear bumper in the center.

A total quantity of four (4) receptacles will be provided.

### **ALTERNATOR**

A Delco Remy®, Model 40SI, alternator will be provided. It will have a rated output current of 320 amps, as measured by SAE method J56. The alternator will feature an integral regulator and rectifier system that has been tested and qualified to an ambient temperature of 257 degrees Fahrenheit (125 degrees Celsius). The alternator will be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

### **OVERRIDE SWITCH**

A switch will be provided to override the parking brake interlock for the windshield wiper controls. The switch will allow the windshield wipers to operate with the parking brake set.

The switch will be located per the IP layout.

### **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

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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, where applicable, 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:

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

### **HEADLIGHTS**

There will be four (4) JW Speaker®, rectangular LED lights mounted in the front quad style, chrome housing on each side of the cab grille:

- the outside light on each side will contain a part number 055\*\*\*1 low beam module
- the inside light on each side will contain a part number 055\*\*\*1 high beam module
- the headlight to include chrome bezels

The low beam lights will be activated when the headlight switch is on.

The high beam and low beam lights will be activated when the headlight switch and the high beam switch is activated.

### **DIRECTIONAL LIGHTS**

There will be two (2) Whelen 600 series, LED combination directional/marker lights provided. The lights will be located on the outside cab corners, next to the headlights.

The color of the lenses will be clear.

### **INTERMEDIATE LIGHT**

There will be two (2) Weldon, Model 9186-8580-29, amber LED turn signal marker lights furnished, one (1) each side, in the rear fender panel. The light will double as a turn signal and marker light.

### **CAB CLEARANCE/MARKER/ID LIGHTS**

The front identification and clearance lights will be included in the front visor scene light.

### **FRONT CAB SIDE DIRECTIONAL/MARKER LIGHTS**

There will be two (2) Truck-Lite®, Model 19036Y, amber LED lights installed to the outside of the chrome wrap around bezel, one (1) on each side of the cab.

The lights will activate as marker lights with the headlight switch and directional lights with the corresponding directional circuit.

### **REAR CLEARANCE/MARKER/ID LIGHTING**

There will be three (3) Truck-Lite®, Model 33050R, LED lights used as identification lights recessed and located at the rear of the apparatus per the following:

- As close as practical to the vertical centerline
- Centers spaced not less than 6.00" or more than 12.00" apart
- Red in color
- All at the same height

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There will be two (2) Truck-Lite, Model 33050R, LED lights recessed at the rear of the apparatus used as clearance lights located at the rear of the apparatus per the following:

- To indicate the overall width of the vehicle
- One (1) each side of the vertical centerline
- As near the top as practical
- Red in color
- To be visible from the rear
- All at the same height

There will be two (2) Truck-Lite, Model 33050R, LED lights recessed on the side of the apparatus as marker lights as close to the rear as practical per the following:

- To indicate the overall length of the vehicle
- One (1) each side of the vertical centerline
- As near the top as practical
- Red in color
- To be visible from the side
- All at the same height

There will be two (2) red reflectors located on the rear of the truck facing to the rear. One (1) each side, as far to the outside as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

There will be two (2) red reflectors located on the side of the truck facing to the side. One (1) each side, as far to the rear as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

Per FMVSS 108 and CMVSS 108 requirements.

### **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

The lights shall be provided with clear lenses.

The lights will be mounted in a polished combination housing.

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

### **LICENSE PLATE BRACKET**

There will be one (1) license plate bracket mounted on the rear of the body.

A white LED light 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.

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### **LIGHTING BEZEL**

There will be two (2) Whelen, Model M6FCV4P, four (4) place chromed ABS housings with Pierce logos provided for the rear M6 series stop/tail, directional, back up, scene lights or warning lights.

### **TAIL LIGHT MOUNTING INFORMATION**

The following lights will be installed in the following order from the top down:

The top lights will be brake tail lights.

The second lights from the top will be the directional lights.

The third lights from the top will be back up lights.

The bottom light will be the warning lights.

### **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.

### **CAB PERIMETER SCENE LIGHTS**

There will be four (4) Amdor LumaBar H2O, Model AY-9500-020, 20.00" white LED strip lights provided, one (1) for each cab door.

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.

### **PUMP HOUSE PERIMETER LIGHTS**

There will be two (2) Amdor LumaBar H2O, Model AY-9500-020, 20.00" LED weatherproof strip lights with brackets provided under the pump panel running boards, one (1) each side.

The lights will be controlled by the same means as the body perimeter lights.

### **BODY PERIMETER SCENE LIGHTS**

There will be two (2) Amdor LumaBar H2O™, Model AY-9500-020, 20.00" 12 volt DC LED strip lights provided at the rear step area of the body, one (1) each side shining to the rear.

The perimeter scene lights will be activated when the parking brake is applied.

### **ADDITIONAL PERIMETER LIGHTS**

There will be six (6) lights Amdor® Luma Bar® H2O, Model AY-9500-020, 20.00" LED perimeter light sticks provided one (1) light under compartment D1, one (1) light under compartment D3, one (1) light under compartment P1, one (1) light under compartment P3, one (1) light under the front bumper, left side and one (1) light under the front bumper, right side.

The lights will be activated by the same means as the body perimeter lights.

### **STEP LIGHTS**

There will be four (4) white LED, step lights 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.

In order to ensure exceptional illumination, each light will provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light.

These step lights will be actuated when the ignition switch is on and the parking brake is set.

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

### **ADDITIONAL STEP LIGHT**

There will be one (1) Amdor part number AY-9502-020, 20.00" strip light(s) with red LEDs and 45 degree angled aluminum bracket provided under the grille/bumper for the purpose of backlighting the SPOTSYLVANIA laser cut vanity panel.

The additional step light(s) will be activated when the parking brake is applied.

The light(s) may be load managed when the parking brake is applied.

### **12 VOLT LIGHTING**

There will be three (3) Whelen, Model PCPSM2\*, 12 volt surface mounted LED combination spot/flood light(s) located PS, one (1) above crew cab window, one (1) on the body high at the front and one (1) on the body high at the rear. The lights will be mounted with chrome flange(s).

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 driver's side pump panel
- a switch at the rear of apparatus on the passenger's side

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

### **12 VOLT LIGHTING**

There will be three (3) Whelen, Model PCPSM2\*, 12 volt surface mounted LED combination spot/flood light(s) located DS, one (1) above crew cab window, one (1) on the body high at the front and one (1) on the body high at the rear. The lights will be mounted with chrome flange(s).

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 driver's side pump panel
- a switch at the rear of apparatus on the driver's side

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

### **12 VOLT LIGHTING**

There will be two (2) Whelen, Model PCPSM2\*, 12 volt surface mounted LED combination spot/flood light(s) located one each side of the rear body bulkhead high. The lights will be mounted with chrome flange(s).

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
- a switch at the rear of apparatus on the driver's side

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

### **WALKING SURFACE LIGHTS**

There will be Two (2) Amdor Model LumaBar, white 12 volt DC LED strip light provided in the cargo area to illuminate the interior surface of the cargo area. Light(s) will be located under the top flange of the cargo area.

The light will be activated when the body step lights are on.

### **12 VOLT LIGHTING**

There will be a Whelen® Model S86M\*\*, 86.00" long 38,880 lumens DC powered light provided on the front cab roof as far forward as practical. The painted parts of this light assembly to be black.

The light will include white scene LEDs, two (2) amber LED modules as clearance lights, three (3) amber LED modules as identification lights and four (4) additional LED modules.

The additional modules will include the following:

- the left side, outside position to include a white steady burning spot LED module
- the left side, inside position to include a white steady burning spot LED module
- the right side, inside position to include a white steady burning spot LED module
- the right side, outside position to include a white steady burning spot LED module

The clearance and identification LEDs will be activated with the headlight switch.

The scene LEDs will be activated when the battery switch is on and by a switch at the driver's side switch panel, by a switch at the driver's side pump panel and by a switch at the passenger's side switch panel.

There will be a switch in the cab on the switch panel to control the flashing or spot LED modules.

The white scene and flashing LED modules may be load managed when the parking brake is applied.

### **HOSE BED LIGHTS**

There will be white 12 volt DC LED light strips with stainless steel protective cover, provided to light the hose bed area. Hose Bed lights will meet the photometric levels listed in NFPA 1901 for Hose Bed lighting requirements.

- Light strip(s) will be installed along the upper edge of the left side of the hose bed.
- Light strip(s) will be installed along the upper edge of the right side of the hose bed.

The lights will be activated by a cup switch at the rear of the apparatus no more than 62.00" from the ground.

### **WATER TANK**

Booster tank will have a water capacity of 750 gallons.

Tank will be constructed of polypropylene plastic by United Plastic Fabricating, Incorporated.

Tank will have a rectangular shape.

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 flat bar or rectangular tubing.

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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.

The top of the taller portion of the water tank will be provided with an aluminum treadplate floor. The floor will provide a raised structure that is supported by cross tubing and allows mounting of items in this area.

Two (2) sleeves will be provided in the water tank for a 3.00" pipe to the rear.

### **WATER TANK RESTRAINT**

A heavy-duty water tank restraint will be provided.

### **HOSE BED**

External body height is a variable that will be determined by the specified hose load and whether or not optional hatch compartments are selected.

The hose bed will be as low as practical.

Hose bed will be a minimum of 45.00" wide.

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

Flooring of the hose bed will be removable aluminum corrugated grating. Grating slats will be 0.50" x 4.50" with spacing between the slats to aid in hose aeration.

A cross divider will be provided at the front of the hose bed before the tank transitions from the lower section to the upper section. The divider will run from the top of the side sheet down below the hose bed grating.

The hose bed capacity will be L to R: 400' of 3" DJ ~ 1200' of 4" DJ ~ 300' of 1.88" DJ in a single stack ~ 400' of 1.88" DJ in a double stack.

### **HOSE BED DIVIDER**

Three (3) adjustable hosebed dividers will be furnished for separating hose.

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

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

The rear of the divider will be supplied with a 45 degree angle from the top of the divider. An oval opening running parallel to the 45 degree angle will be provided at the rear of the divider to be used as a hand hold and aid in accessing the hose bed.

Divider will be held in place by tightening two (2) bolts, one (1) 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.

### **CROSS TUBE REINFORCEMENT, HOSE BED**

There will be one (1) 2.00" x 3.00" square cross tube mounted rear of hose bed for the purpose of securing the rear hose bed netting above the hosebed. Reinforcement for the cross tube will be provided on each side sheet to support the tube.

### **HOSEBED RESTRAINT REAR**

The hose in the hosebed will be restrained by 2.00" black nylon webbing with a 2.00" x 2.00" box pattern. The webbing will be attached to the top hosebed frame with four (4) seat belt fasteners. The seat belt fasteners will be mounted with the receiver portion on a bracket at the top, two each side. Web straps will loop through the footman loops located on the rear body sheet below the hosebed. The straps will be connected permanently at the bottom.

### **PULL BAR AND STRAP**

A quantity of two (2) pull bar(s) with a 1.00" wide red pull strap will be provided rear hose bed restraint. A pull bar will be provided to connect each outboard paddle buckle allowing one strap to release multiple latches. The strap will be 36.00" long in length.

A cross-divider will be provided just behind the fill tower. The divider will be bolted to the side sheet.

### **PLATFORM/WIND DEFLECTOR**

A bright aluminum treadplate platform will be provided at the front of the hose bed. The platform will be approximately 24.00" deep x the width of the hose bed and will be hinged at the front. The deflector will be held in the open position with two (2) gas struts. A flush mount style latch will be provided at each side to secure the platform. This platform will be properly reinforced to support the weight of firefighters.

### **RUNNING BOARDS**

Running boards will be fabricated of .125" bright aluminum treadplate.

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 14.75" deep and spaced .50" away from the pump panel. The front outside corner of the running board will be finished with a 45 degree corner where it lines up with the body.

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A splash guard will be provided above the running board treadplate.

### **TAILBOARD**

The tailboard will also be constructed of .125" bright aluminum treadplate and spaced .50" from the body, as well as supported by a structural steel assembly.

The tailboard area will be 14.00" deep and full width of the body.

The center section of the tailboard will be hinged for increased access to a receiver tube. The hinged section will be 28.00" wide.

The outboard sides of the tailboard will be angled at 45 degrees beginning at the point where the body meets the tailboard at the forward outboard edge angling rearward to the rear edge of the tailboard.

The exterior side will be flanged down and in for increased rigidity of tailboard structure.

### **REAR WALL, SMOOTH ALUMINUM/BODY MATERIAL**

The rear facing surfaces of the center rear wall will be smooth aluminum.

The bulkheads, the surface to the rear of the side body compartments, will be smooth and the same material as the body.

### **TOW BARS**

Two (2) tow bars will be installed under the tailboard.

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

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

Tow bar assemblies 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.

### **HITCH RECEIVER**

A hitch receiver will be installed at the rear and the sides of the apparatus. The side receivers will be located to the rear of the wheels, under the rear platform. The side hitch receivers will be capable of retaining a 9,000 lb portable winch.

The hitch receivers will be constructed of heavy steel tubing and reinforced to the truck framework, for the receiving portion.

Slide-in portion will be held in place by one (1) safety pin with clip.

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### **LABEL**

A label will be provided near each receiver explaining that a trailer is neither rated nor approved to be attached to the receiver.

### **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 Two (2) hose trays located one (1) in each side running board. The straps will be mounted mount at final.

### **HOSE TRAY**

Two (2) hose trays will be made free floating one (1) in each side running board.

The tray(s) will be flanged and drop in from the top. The ends will be tapered at the front and rear towards the center. No fasteners will be used to secure the tray(s).

Capacity of the tray will be 30' of 4".

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.

Maximum overall width of the body, which includes the outside surface of the doors (lap or roll type) will be 102.00". This measurement will not include rear view mirrors, emergency lights, hand holds, splash and spray suppressant devices, door hardware, toe holds, retractable steps and load induced tire bulge.

Minimum length of the body will be 184.00".

Body compartmentation will be separate from the pump compartment.

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.

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, formed bright aluminum treadplate or polished stainless steel.

Top of the compartment will be covered with bright aluminum treadplate 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.

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Front facing compartment walls will be covered with bright aluminum treadplate.

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

All body compartments will have a minimum of one (1) set of louvers stamped into a wall to provide the proper airflow inside the compartment.

### **LOUVERS**

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

### **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.

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 gusseted and welded to the vertical members, extending 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 will result in a 6,000 lb equipment support rating.

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.

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.

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.

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

#### **Forward Compartment**

A full height, roll-up door compartment ahead of the rear wheels will be provided.

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Interior dimensions of this compartment will be 58.50" wide x 66.63" high x 25.75" deep in the lower 57.25" of the compartment, and 15.63" deep in the remaining upper portion. Depth of the compartment will be calculated with the compartment door closed.

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.

Clear door opening of this compartment will be 52.75" wide x 57.25" high.

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

### Over-the-Wheels Compartment

A roll-up door compartment over the rear wheels will be provided.

Interior dimensions of this compartment will be 66.50" wide x 32.88" high x 25.75" deep in the lower 25.38" of the compartment, and 15.63" deep in the remaining upper portion. Depth of the compartment will be calculated with the compartment door closed.

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.

### Rear Compartment

A full height, roll-up door compartment behind the rear wheels will be provided.

Interior dimensions of this compartment will be 58.50" wide x 67.63" high x 25.75" deep in the lower 58.25" of the compartment, and 15.63" deep in the remaining upper portion. Depth of the compartment will be calculated with the compartment door closed.

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.

Clear door opening of this compartment will be 52.75" 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.

## **PASSENGER'S SIDE COMPARTMENTATION**

### Forward Compartment

A full height, roll-up door compartment ahead of the rear wheels will be provided.

Interior dimensions of this compartment will be 58.50" wide x 67.63" high x 25.75" deep in the lower 58.25" of the compartment, and 15.63" deep in the remaining upper portion. Depth of the compartment will be calculated with the compartment door closed.

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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.

Clear door opening of this compartment will be 52.75" 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.

### Over-the-Wheels Compartment

A roll-up door compartment over the rear wheels will be provided.

Interior dimensions of this compartment will be 66.50" wide x 32.88" high x 25.75" deep in the lower 25.38" of the compartment, and 15.63" deep in the remaining upper portion. Depth of the compartment will be calculated with the compartment door closed.

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.

### Rear Compartment

A full height, roll-up door compartment behind the rear wheels will be provided.

Interior dimensions of this compartment will be 58.50" wide x 67.63" high x 25.75" deep in the lower 58.25" of the compartment, and 15.63" deep in the remaining upper portion. Depth of the compartment will be calculated with the compartment door closed.

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.

Clear door opening of this compartment will be 52.75" 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.

### **ROLLUP DOOR, SIDE COMPARTMENTS**

There will be six (6) compartment doors installed on the side compartments, double faced, aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by AMDOR™ brand rollup doors.

Door(s) will be constructed using 1.00" extruded double wall aluminum slats which will feature a flat smooth interior surface to provide maximum protection against equipment hang-up. The slats will be connected with a structural driven ball and socket hinge designed to provide maximum curtain diaphragm strength. Mounting and adjusting the curtain will be done with a clip system that connects the curtain to the balancer drum allowing for easy tension adjustment without tools. The slats will be mounted in reusable slat shoes with positive snap-lock securement.

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Each slat will incorporate weather tight recessed dual durometer seals. One (1) fin will be designed to locate the seal within the extrusion. The second will serve as a wiping seal which will also allow for compression to prevent water ingress.

The doors will be mounted in a one (1)-piece aluminum side frame with recessed side seals to minimize seal damage during equipment deployment. All seals including side frames, top gutters and bottom panel are to be manufactured utilizing non-marring materials.

Bottom panel flange of rollup door will be equipped with two (2) cut-outs to allow for easier access with gloved hands.

A polished stainless steel lift bar to be provided for each roll-up door. The lift bar will be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers will include support beneath the stainless steel lift bar to prevent door curtain bounce, improve bottom seal life expectancy and to avoid false door ajar signals.

All injection molded rollup door wear components will be constructed of Type 6 nylon.

Each rollup door will have a 3.00 inch diameter balancer/tensioner drum to assist in lifting the door.

The header for the rollup 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 rollup door compartment flush with the rear body will be provided.

Interior dimensions of this compartment will be 44.50" wide x 31.63" high x 25.88" deep. Depth of the compartment will be calculated with the compartment door closed.

Clear door opening of this compartment will be 38.25" wide x 22.75" high.

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

### **ROLLUP DOOR, REAR COMPARTMENT**

The rear compartment will have a rollup door.

The door will be double faced, aluminum construction, satin aluminum and manufactured by AMDOR™ brand rollup doors.

The door will be constructed using 1.00" extruded double wall aluminum slats which will feature a flat smooth interior surface to provide maximum protection against equipment hang-up. The slats will be connected with a structural driven ball and socket hinge designed to provide maximum curtain diaphragm strength. Mounting and adjusting the curtain will be done with a clip system that connects the curtain to the balancer drum allowing for easy tension adjustment without tools. The slats will be mounted in reusable slat shoes with positive snap-lock securement.

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Each slat will incorporate weather tight recessed dual durometer seals. One (1) fin will be designed to locate the seal within the extrusion. The second will serve as a wiping seal which will also allow for compression to prevent water ingress.

The door will be mounted in a one (1)-piece aluminum side frame with recessed side seals to minimize seal damage during equipment deployment. All seals including side frames, top gutters and bottom panel are to be manufactured utilizing non-marring materials.

Bottom panel flange of rollup door will be equipped with two (2) cut-outs to allow for easier access with gloved hands.

A polished stainless steel lift bar to be provided for each roll-up door. The lift bar will be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers will include support beneath the stainless steel lift bar to prevent door curtain bounce, improve bottom seal life expectancy and to avoid false door ajar signals.

All injection molded rollup door wear components will be constructed of Type 6 Nylon.

The door will have a 3.00 inch diameter balancer/tensioner drum to assist in lifting the door.

The header for the rollup door assembly will not exceed 4.00".

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

### **COMPARTMENT LIGHTING**

There will be seven (7) compartments with Amdor, Model AY-9250, red LED compartment light strips. The strips will be centered vertically along each side of the door framing. The compartments with these strip lights will be located each body comp. The lights will be mounted with mechanical fasteners.

Any remaining compartments will include 6.00" diameter Truck-Lite, Model: 79384, lights in each enclosed compartment. Each light will have a number 1076 single filament, dual wire bulb.

Opening the compartment door will automatically turn the compartment lighting on.

### **COMPARTMENT LIGHTING**

Metal clamps will be used to retain the strip lighting in all body compartments.

### **DRIVERS SIDE HATCH COMPARTMENT**

A hatch compartment that is full length of the body compartmentation x 23.75" wide x 22.00" maximum depth will be provided with top opening hatch doors.

Two (2) hatch doors, 80.00" long x 21.63" wide, will be provided.

Doors will have hinges on the outboard side and will be held open with gas cylinder struts.

Each compartment will drain to an area below the hose bed.

One (1) socket and plunger type latch will be provided to hold each hatch door closed.

**PASSENGERS SIDE HATCH COMPARTMENT**

A hatch compartment that is full length of the body compartmentation x 23.75" wide x 22.00" maximum depth will be provided with top opening hatch doors.

Two (2) hatch doors, 80.00" long x 21.63" wide, will be provided.

Doors will have hinges on the outboard side and will be held open with gas cylinder struts.

Each compartment will drain to an area below the hose bed.

One (1) socket and plunger type latch will be provided to hold each hatch door closed.

**HATCH COMPARTMENT LIGHTING**

There will be an Amdor Luma Bar™, Model AY-9250-40, 42.00" red LED strip lights mounted on the interior, hinged side of each door. The lights will be mounted with mechanical fasteners.

Opening the hatch compartment door will automatically turn this hatch compartment lighting on.

**MOUNTING TRACKS**

There will be seven (7) sets of tracks for mounting shelf(s) in D3, D2, D1, R1, P1, P2 and P3. These tracks will be installed vertically to support the adjustable shelf(s), and will be full height of the compartment. The tracks will be painted to match the compartment interior.

**ADJUSTABLE SHELVES**

There will be ten (10) shelves with a capacity of 500 lb provided.

The shelf construction will consist of .188" aluminum painted spatter gray 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(s) will be determined at a later date.

**SLIDE-OUT ADJUSTABLE HEIGHT TRAY**

There will be two (2) slide-out trays provided.

Each tray will have 2.00" high sides and a minimum capacity rating of 250 lb in the extended position.

Each tray will be constructed of aluminum painted spatter gray.

Each tray will be mounted on a pair of side mounted slides. The slide mechanisms will have ball bearings for ease of operation and years of dependable service. The slides will be mounted to shelf tracks to allow the tray to be adjustable up and down within the designated mounting location.

An automatic lock will be provided for both the in and out tray positions. The lock trip mechanism will be located at the front of the tray and will be easily operated with a gloved hand.

The location(s) will be determined at a later date

**SLIDE-OUT/TILT-DOWN TRAY**

There will be one (1) slide-out tray provided.

The bottom of each tray will be constructed of 0.188" thick aluminum painted spatter gray while special aluminum extrusions will be utilized for the tray sides, ends, and tracks. The corners will be welded to form a rigid unit.

A spring loaded lock will be provided on each side at the front of the tray. Releasing the locks will allow the tray to slide out approximately two-thirds (2/3) of its length from the stowed position and tip 30 degrees down from horizontal. The tray will be equipped with ball bearing rollers for smooth operation.

Rubber padded stops will be provided for the tray in the extended position.

The capacity rating of the tray will be a minimum of 215 lb in the extended position.

The vertical position of the tray within the compartment will be adjustable.

The location(s) will be in D2 centered between the floor and ceiling.

**SLIDE-OUT FLOOR MOUNTED TRAY**

There will be three (3) floor mounted slide-out tray(s) provided.

Each tray will have 2.00" high sides and a minimum capacity rating of 500 lb in the extended position.

Each tray will be constructed of aluminum painted spatter gray

There will be two undermount-roller bearing type slides rated at 250lb each provided. The pair of slides will have a safety factor rating of 2.

To ensure years of dependable service, the slides will be coated with a finish that is tested to withstand a minimum of 1,000 hours of salt spray per ASTM B117.

To ensure years of easy operation, the slides will require no more than a 50lb force for push-in or pull-out movement when fully loaded after having been subjected to a 40 hour vibration (shaker) test under full load. The vibration drive file will have been generated from accelerometer data collected from a heavy truck chassis driven over rough gravel roads in an unloaded condition. Proof of compliance will be provided upon request.

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

The location(s) will be D1, P1 and D3.

**SLIDE-OUT FLOOR MOUNTED TRAY**

There will be one (1) floor mounted slide-out tray(s) provided 12" wide in the P1 rear for a toolboard to mount to. Each tray will be rated for up to 500lb in the extended position. The tray(s) will be constructed of a minimum .13" aluminum with welded corners. The finish will be painted to match compartment interior.

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The side height of the tray(s) will be as follows:

- Front: 2.00" high
- Rear: 2.00" high
- Left and Right Sides: 2.00" high

There will be two undermount-roller bearing type slides rated at 250lb each provided. The pair of slides will have a safety factor rating of 2.

To ensure years of dependable service, the slides will be coated with a finish that is tested to withstand a minimum of 1,000 hours of salt spray per ASTM B117.

To ensure years of easy operation, the slides will require no more than a 50lb force for push-in or pull-out movement when fully loaded after having been subjected to a 40 hour vibration (shaker) test under full load. The vibration drive file will have been generated from accelerometer data collected from a heavy truck chassis driven over rough gravel roads in an unloaded condition. Proof of compliance will be provided upon request.

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

### **TOOL BOARD**

An aluminum tool board will be provided.

It will be a minimum of .188" thick.

A 1.00" x 1.00" aluminum tube frame will be welded to the edge of the board.

The board will be installed on adjustable tracks on a slide out tray. The tracks will allow side to side adjustment. The board will be as high as space permits and full length of the tray. The tray is not included in this option.

There will be One (1) toolboard(s) provided, spatter gray painted , and installed P1 rear.

### **ACCESS DOOR**

A separate liftup, bright aluminum treadplate door will be provided on the top of the hatch compartment for access the oil dry hopper only. The door will have a lever handle with a slam style latch to hold the doors in the closed position.

The double pan door will have lipped edges with a rubber seal for weather resistance.

The door will be hinged on the outboard side and will be held open with pneumatic stay arms.

### **PAINTED BODY TRIM PIECE**

Painted trim will be provided on the compartment horizontal body seam in three (3) compartments. The locations will be both sides and rear IPO the standard trim. The trim will be made of a material and painted to match the body material as practical.

The trim piece will be bonded to the painted surface with a high viscosity adhesive.

### **DRAWER ASSEMBLY**

A slideout drawer assembly will be installed D3 TBD at approval.

The clear dimensions of the first drawer starting at the top will be 3.25" with a face plate that is 4.00" high x 21.00" deep. The clear dimensions of the second drawer will be 3.75" with a face plate that is 4.00" high x 21.00" deep. The clear dimensions of the third drawer will be 3.75" with a face plate that is 4.00" high x 21.00" deep. Each drawer will be the same width and not exceed 24.00".

The drawers will have a capacity of 250 pounds.

The drawers will be mounted in a cabinet housing constructed of light gray powder coated aluminum with anodized aluminum frames. The housing will be 24.00" deep, and completely enclose the drawer.

A full-length aluminum extruded rail will be provided at the top edge of each drawer. This rail will act as the latching mechanism as well as the handle for each drawer.

There will be a total of one (1) provided.

### **TOOL BOX**

A tool box will be furnished.

The tool box will be black in color.

The size will be 12"H x 12"W x Length determined by full depth of the shelf.

Construction will be of .50" polypropylene plastic with joints and seams nitrogen welded. A cut out carrying handle will be provided on each end.

There will be four (4) provided. It will be located TBD at approval.

### **COMPARTMENT DUST FILTERS**

A total of seven (7) body compartment louvers will have a removable dust filter installed to restrict road dirt from easily entering the compartment and will be installed all body compts.

### **OIL DRY HOPPER**

A portion of the roof hatch compartment will be sectioned off to provide a storage bin for clay-based oil absorbent material.

The hopper discharge tube will be routed through the compartment below the hatch compartment with as little interference into this compartment as possible. The valve to control discharge will be located in the front/forward of the P3 compartment close to the roll-up door in this compartment. The absorbent material will be discharged through a PVC tube through the floor of this compartment allowing a bucket to be placed under the truck and filled..

This hopper will have an approximate capacity for 100 lbs or 16.9 gallons (3900 cu in.) of clay-based absorbent material.

The hopper will be located hatch above D3 forward.

**PARTITION, TRANSVERSE REAR COMPARTMENT**

Two (2) partitions will be bolted in place to separate driver and passenger side rear compartments from the rear tailboard compartment.

**VERTICAL COMPARTMENT PARTITION**

One (1) partition will be bolted in P3. Each partition will be the full height vertical height of the compartment. Each partition will be painted spatter gray to match compartment interior.

**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**

Polished stainless steel fender crowns will be provided around the rear wheel openings with a dielectric barrier will be provided between the fender crown and the fender sheet metal to prevent corrosion.

The fender crowns will be held in place with stainless steel screws that thread directly into a composite nut and not directly into the parent body sheet metal to eliminate dissimilar metals contact and greatly reduce the chance for corrosion.

**BODY FENDER LINER**

A painted fender liner will be provided. The liners will be removable to aid in the maintenance of rear suspension components.

**HARD SUCTION HOSE PROVIDED BY DEALER**

NFPA 1901, 2016 edition, section 5.8.2 requires a minimum of 20 ft of suction hose or 15 ft of supply hose.

Hose is not on the apparatus as manufactured. The dealer will provide suction or supply hose.

There will be Two (2) lengths of 10' long x6.00" diameter hose provided and equipped with a rocker lug male and long handle female couplings provided on the ends. The brand will be All American.

**HOSE TROUGHS**

Two (2) stainless steel hard suction hose troughs will be provided in the hatch compartment on the driver side.

The troughs will be installed side by side with an smooth aluminum door at the rear.

A floor will be provided above the hard suction hose inside the hatch compartment to allow storage of addition equipment in the compartment.

**HANDRAILS**

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

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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.

Handrails will be provided to meet NFPA 1901 section 15.8 requirements. The handrails will be installed as noted on the sales drawing.

### **HANDRAILS**

One (1) vertical handrail, not less than 29.00" long, will be located on each rear beavertail.

One (1) horizontal knurled handrail will be provided above the hose bed at the rear of the apparatus on the rear of the crosstube between the netting buckles .

### **EXTINGUISHER/AIR BOTTLE/ STORAGE (TRIANGULAR)**

A total of one (1) extinguisher/air bottle/storage compartments will be provided PS rear. The triangular shaped compartment will be sized to fit a 8.00" diameter extinguisher in the lower area and a 8.00" diameter extinguisher in the upper area. The compartment will be approximately 25.50" deep. A partition will be provided to separate the compartment. Also inside the compartment, black rubber matting will be provided. The compartment will be furnished with a drain hole. A polished stainless steel, triangular shaped door with a chrome plated flush lift & turn 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.

### **AIR BOTTLE COMPARTMENT STRAP**

A strap will be provided in the air bottle compartment(s) to help contain the bottles when the vehicle is parked on an incline. The strap will wrap around the neck and attach to the wall of the compartment.

### **AIR BOTTLE STORAGE (TRIPLE)**

A quantity of two (2) air bottle compartments designed to hold (3) air bottles up to 7.25" in diameter x 26.00" deep will be provided on the driver side forward of the rear wheels and on the passenger side forward of the rear wheels. A polished stainless steel door with a chrome plated flush lift & turn 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.

Inside the compartment, black rubber matting will be provided.

### **AIR BOTTLE COMPARTMENT STRAP**

A strap will be provided in the air bottle compartment(s) to help contain the air bottles when the vehicle is parked on an incline. The strap will wrap around the neck and attach to the wall of the compartment.

### **AIR BOTTLE STORAGE (SINGLE)**

A quantity of one air bottle compartment, approximately 7.50" wide x 7.50" tall x 26.00" deep, will be provided on the driver side rearward of the rear wheels. The triangular door will cover the air bottle opening, the DEF tank access, and fuel fill. The compartment will be square with angled corners. A polished stainless steel door with a chrome plated flush lift & turn latch will be provided to contain the

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air bottle. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

Inside the compartment, black rubber matting will be provided.

### **AIR BOTTLE COMPARTMENT STRAP**

A strap will be provided in the air bottle compartment to help contain the air bottle when the vehicle is parked on an incline. The strap will wrap around the neck and attach to the wall of the compartment.

### **EXTENSION LADDER**

There will be a 24' two-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.

### **FOLDING LADDER**

One (1) 10.00' aluminum, Series 585-A, Duo-Safety folding ladder will be installed in the poly ladder storage below hose bed.

### **PIKE POLE PROVIDED BY FIRE DEPARTMENT**

NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) 8 ft or longer pike pole mounted in a bracket fastened to the apparatus.

The pike pole is not on the apparatus as manufactured. The fire department will provide and mount the pike pole.

The pike pole(s) will be a Fire Hooks Unlimited 10' all purpose hook model APH-10.

### **6' PIKE POLE PROVIDED BY FIRE DEPARTMENT**

NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) 6' pike pole or plaster hook mounted in a bracket fastened to the apparatus.

The pike pole is not on the apparatus as manufactured. The fire department will provide and mount the pike pole.

The pike pole(s) will be a Fire Hooks Unlimited 6 foot roof hook.

### **PIKE POLE STORAGE**

Aluminum tubing will be used for the storage of one (1) pike pole and will be located in DS hatch with HSH storage to remove from rear bulkhead door as room permits . If the head of a pike pole can come in contact with a painted surface, a stainless steel scuffplate will be provided. The pike pole tube will be notched to allow a New York style pike pole to fit into the tube.

### **PIKE POLE STORAGE**

Poly tubing will be used for the storage of two (2) pike poles and will be located equipment deck DS storage area. If the head of a pike pole can come in contact with a painted surface, a stainless steel scuffplate will be provided.

### **EQUIPMENT DECK**

An equipment deck shall be provided below the hose bed floor with the ladders going thru one side of the water tank.

There shall be a(n) aluminum treadplatelift up door with two (2) stay arms door with a D-handle latch and two (2) gas struts provided at the rear.

Storage area shall be configured to accommodate a minimum of:

- On the DS: two (2) 4"x6"x10' long timbers, two (2) pike pole tubes 10' long, and an attic ladder tube. On the PS, one (1) 14' DuoSafety roof ladder and one (1) 24' DuoSafety extension ladder.

The forward section of the equipment deck on the drivers side shall provide space for the water tank fill dome and the optional foam cell fill dome.

The equipment deck shall be designed to allow any trapped water to drain toward the front or the rear of the storage area.

### **FOLDING STEPS FRONT OF BODY**

Folding steps will be provided full height on the left side and right side body compartments to provide access to the cargo bed. The quantity installed as noted on the sales drawing.

The Trident steps will be bright finished, non-skid with a luminescent coating that is rechargeable from any light source and can hold a charge for up to 24 hours.

The step will incorporate an LED light to illuminate the stepping surface.

The steps can be used as a hand hold with two openings wide enough for a gloved hand.

### **REAR FOLDING STEPS**

Bright finished, non-skid folding steps with a luminescent coating that is rechargeable from any light source and can hold a charge for up to 24 hours will be provided at the rear. Each step will incorporate an LED light to illuminate the stepping surface. The steps can be used as a hand hold with two openings wide enough for a gloved hand.

Four (4) additional folding steps will be located two on each side of the body. The step(s) will be bright finished, non-skid, with a luminescent coating. The luminescent coating is rechargeable from any light source and can hold a charge for up to 24 hours. Each step will incorporate an LED light to illuminate the stepping surface. The step(s) can be used as a hand hold with two openings wide enough for a gloved hand.

### **PUMP**

Pump will be a Waterous CSU, 1500 gpm single (1) stage midship mounted centrifugal type.

Pump will be the class "A" type.

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

- 100% of rated capacity at 150 psi net pump pressure.

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-70% of rated capacity at 200 psi net pump pressure.

-50% of rated capacity at 250 psi net pump pressure.

Pump body will be close-grained gray iron, bronze fitted, and horizontally split in two (2) sections for easy removal of the entire impeller shaft assembly (including wear rings).

Pump will be designed for complete servicing from the bottom of the truck, without disturbing the pump setting or apparatus piping.

Pump case halves will be bolted together on a single horizontal face to minimize chance of leakage and facilitate ease of reassembly. No end flanges will be used.

Discharge manifold of the pump will be cast as an integral part of the pump body assembly and will provide a minimum of three (3) 3.50" openings for flexibility in providing various discharge outlets for maximum efficiency.

The three (3) 3.50" openings will be located as follows: one (1) outlet to the right of the pump, one (1) outlet to the left of the pump, and one (1) outlet directly on top of the discharge manifold.

Impeller shaft will be stainless steel, accurately ground to size. It will be supported at each end by sealed, anti-friction ball bearings for rigid precise support. Impeller will have flame plated hubs assuring maximum pump life and efficiency despite any presence of abrasive matter in the water supply.

Bearings will be protected from water and sediment by suitable stuffing boxes, flinger rings, and oil seals. No special or sleeve type bearings will be used.

Pump will be equipped with a self-adjusting, maintenance-free, mechanical shaft seal.

The mechanical seal will consist of a flat, highly polished, spring fed carbon ring that rotates with the impeller shaft. The carbon ring will press against a highly polished stainless steel stationary ring that is sealed within the pump body.

In addition, a throttling ring will be pressed into the steel chamber cover, providing a very small clearance around the rotating shaft in the event of a mechanical seal failure. The pump performance will not deteriorate, nor will the pump lose prime, while drafting if the seal fails during pump operation.

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

### **PUMP TRANSMISSION**

The pump transmission will be made of a three (3) piece, aluminum, horizontally split casing. Power transfer to pump will be through a high strength Morse HY-VO silent drive chain. By the use of a chain rather than gears, 50% of the sprocket will be accepting or transmitting torque, compared to two (2) or three (3) teeth doing all the work.

Drive shafts will be 2.35" diameter hardened and ground alloy steel and supported by ball bearings. The case will be designed to eliminate the need for water cooling.

### **PUMPING MODE**

An interlock system will be provided to ensure that the pump drive system components are properly engaged so that the apparatus can be safely operated. The interlock system will be designed to allow stationary pumping only.

### **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 left 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 that 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 indicator light will be labeled "Warning: Do not open throttle unless light is on".

The pump shift will be interlocked to prevent the pump from being shifted out of gear when the chassis transmission is in gear to meet NFPA requirements.

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.

### **INTAKE RELIEF VALVE - PUMP**

An Elkhart Style 40 relief valve will be installed on the suction side of the pump preset at 125 psig.

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

The outlet will terminate below the frame rails with a 2.50" National Standard hose thread adapter and will have a "do not cap" warning tag.

The relief valve pressure control will be located behind an access door at the right side pump panel.

### **PRESSURE CONTROLLER**

A Fire Research Pump Boss Model PBA400 pressure governor will be provided.

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A pressure transducer will be installed in the water discharge manifold on the pump.

The display panel will be located at the pump operator's panel.

### **PRIMING PUMP**

The priming pump will be a Trident Emergency Products compressed air powered, high efficiency, multi-stage venturi based AirPrime System, conforming to standards outlined in NFPA pamphlet #1901.

All wetted metallic parts of the priming system are to be of brass and stainless steel construction.

One (1) priming control will open the priming valve and start the pump primer.

A second priming valve will be plumbed to the the front suction piping. The second push button control will be located at the pump operator's panel.

### **THERMAL RELIEF VALVE**

A Watrous Overheat Protection Manager (OPM) will be included on the pump that monitors pump water temperature and opens to relieve water to cool the pump when the temperature of the pump water exceeds 140 Degrees F (60 C) and a red warning light that is triggered when the water in the pump reaches 180 F (82 C).

The warning light will act as an additional protection device if the temperature in the pump keeps rising after the valve opens. The warning light and alarm with a test switch will be mounted on the pump operator panel.

The discharge line will be plumbed to ground.

### **PUMP MANUALS**

There will be a total of two (2) pump manuals provided by the pump manufacturer and furnished with the apparatus. The manuals will be provided by the pump manufacturer in the form of two (2) electronic copies. Each manual will cover pump operation, maintenance, and parts.

### **PLUMBING, STAINLESS STEEL AND HOSE**

All inlet and outlet lines will be plumbed with either stainless steel pipe, flexible polypropylene tubing or synthetic rubber hose reinforced with hi-tensile polyester braid. All hose's will be equipped with brass or stainless steel couplings. All stainless steel hard plumbing will be a minimum of a schedule 10 wall thickness.

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 piping lines are to be drained through a master drain valve or will be equipped with individual drain valves. All drain lines will be extended with a hose to drain below the chassis frame.

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

All piping, hose and fittings will have a minimum of a 500 PSI hydrodynamic pressure rating.

### **PLUMBING, FOAM SYSTEM**

All piping that is in contact with the foam concentrate or foam/water solution will be stainless steel. The fittings will be stainless steel or brass. Cast iron pump manifolds will be allowed.

### **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.

### **MAIN PUMP INLET CAP**

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

The cap will be the Pierce VLH, which incorporates an exclusive thread design to automatically relieve stored pressure in the line when disconnected.

### **INLET BUTTERFLY VALVE**

One (1) butterfly valve will be provided on the driver's side main pump inlet.

The 6.00" inlet valve will be provided with a built-in, adjustable pressure relief valve and a 3/4" bleeder valve will be provided on the inlet side of the valve.

The valve will be electrically operated with an Elkhart U2F electric valve actuator. An Elkhart UBEC1 valve controller with LED indicator lights will be provided at the pump operator's panel.

The electric actuator will be furnished with a manual over ride, accessible from the pump panel. A wrench will be provide to manually open or close the valve.

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### **INLET BUTTERFLY VALVE**

One (1) butterfly valve will be provided on the passenger's side main pump inlet.

The 6.00" inlet valve will be provided with a built-in, adjustable pressure relief valve and a 3/4" bleeder valve will be provided on the inlet side of the valve.

The valve will be electrically operated with an Elkhart E1F electric valve actuator. An Elkhart UBEC1 valve controller with LED indicator lights will be provided at the pump operator's panel.

The electric actuator will be furnished with a manual over ride, accessible from the pump panel. A wrench will be provide to manually open or close the valve.

### **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.

**RIGHT SIDE INLET**

There will be one (1) auxiliary inlet with a 2.50" valve at the right side pump panel, terminating with a 2.50" (F) National Standard hose thread adapter.

The auxiliary inlet will be provided with a strainer, chrome swivel and plug.

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

**ANODE, INLET**

A pair of sacrificial zinc anodes will be provided in the water pump to protect the pump from corrosion. Two (2) will be placed in the inlet side of the pump and the other in the discharge side of the pump.

**ELBOW, STORZ INLET**

Two (2) adapters for the inlets aluminum 6.00" FNST long handle x 4.00" Storz 30 degree elbow with blind cap will be provided on the side inlet.

**INLET CONTROL**

The side auxiliary inlet(s) will incorporate a quarter-turn ball valve with the control located at the inlet valve. The valve operating mechanism will indicate the position of the valve.

**FRONT INLET**

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 swing handle.

A bleeder valve will be located at the threaded connection.

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

**FRONT INLET CONTROL**

The front inlet will be gated with the control located at the pump operator's panel. The valve operating mechanism will indicate the position of the valve or an indicator will be provided to show when the valve is closed.

There will be an Elkhart model UBEC1 electric valve controller provided. The controller unit will provide position feedback with a 10 LED display that indicates closed to fully open status. The controller will be completely sealed with two (2) button open and close valve position.

A manual override will be provided on the valve. A stainless steel door located on the passenger side pump panel will be provided for access to the manual override.

A maintain switch will be provided behind the stainless steel access door near the manual override. The switch will cut off power to the valve to allow for manual valve actuation.

**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.

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Outlet will terminate below the frame rails.

### **FRONT INLET CAP**

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

The cap will incorporate a thread design to automatically relieve stored pressure in the line when disconnected.

The cap will be fabricated from brass material.

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 smooth surface chrome finish.

### **6.00" FNST X 4.00" STORZ ADAPTER**

There will be a 6.00" FNST long handle x 4.00" Storz rigid adapter with a Storz blind cap, provided on the front inlet plumbing.

### **INTERLOCK**

There will be an interlock system provided that will prevent the cab from being raised unless the front intake swivel is in the correct location so the cab is not damaged.

### **INLET BLEEDER VALVE**

A 0.75" 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 4.00" 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 will run straight (no elbows) from the pump into the front face of the water tank and angle down into the tank sump. A rubber coupling will be included in this line to prevent damage from vibration or chassis flexing.

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

### **TANK REFILL**

A 2.00" 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.

### **LEFT SIDE DISCHARGE OUTLETS**

There will be one (1) discharge outlet with a 2.50" valve on the left side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

### **RIGHT SIDE DISCHARGE OUTLETS**

There will be one (1) discharge outlet with a 2.50" valve on the right side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

### **LARGE DIAMETER DISCHARGE OUTLET**

There will be a 4.00" discharge outlet with a 4.00" Akron valve installed on the right side of the apparatus, terminating with a 4.00" (M) National Standard hose thread adapter. This discharge outlet will be actuated with a handwheel control at the pump operator's control panel.

An indicator will be provided to show when the valve is in the closed position.

### **FRONT OF HOSE BED DISCHARGE OUTLET**

There will be two (2) discharge outlets discharge(s) piped to the front of the hose bed and located two on the PS . 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" (M) National Standard hose thread adapter.

### **DISCHARGE CAPS**

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

The caps will be the Pierce VLH, which incorporates an exclusive thread design to automatically relieve stored pressure in the line when disconnected.

### **OUTLET BLEEDER VALVE**

A 0.75" 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.

### **LEFT SIDE OUTLET ELBOWS**

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.

The elbow will be Pierce VLH, which incorporates an exclusive thread design to automatically relieve stored pressure in the line when disconnected.

### **RIGHT SIDE OUTLET ELBOWS**

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.

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The elbow will be Pierce VLH, which incorporates an exclusive thread design to automatically relieve stored pressure in the line when disconnected.

### **LARGE DIAMETER OUTLET ELBOWS**

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

### **ADAPTERS**

There will be two (2) adapters with 2.50" FNST x 1.50" MNST threads installed on front of HB discharges.

### **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 stainless steel handwheel with a dial position indicator built in to the center of the handwheel.

### **DELUGE RISER, W/DUAL CONTROL**

Three (3) inch deluge riser plumbing shall be installed and routed above the pump in such a manner that a monitor can be mounted and used effectively.

The riser plumbing shall be gated and controlled at the pump operator's panel by a handwheel control with position indicator.

A second handwheel control without position indicator shall be provided above the pump adjacent to the outlet.

Plumbing shall consist of 3.00" piping and a 3.00" valve.

Piping shall be installed securely so no movement develops when the line is charged.

### **MONITOR**

An Akron Model 3431 Apollo Hi-Riser monitor will be properly installed on the deluge riser.

Included will be a fixed mounting base.

The monitor will be painted to match the body.

### **NOZZLE, DELUGE**

Akron model 5160 Akromatic manual pattern, control fog nozzle will be provided. The nozzle will be rated for 250 to 1250 gallons per minute of flow.

Also included is an Akron model 2499 quad stacked pyrolite, deluge tips and an Akron 3488 pyrolite stream shaper .

The tip sizes will be 1.375", 1.50", 1.75", and 2.00".

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

**CROSSLAY HOSE BEDS, 1.50"**

Two (2) crosslays with 1.50" outlets will be provided. Each bed to be capable of carrying 1.88" hose for two single stacks with 200' each and will be plumbed with 2.00" i.d. pipe and gated with a 2.00" quarter turn ball valve.

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

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

The center crosslay dividers will be fabricated of .25" aluminum and will provide adjustment from side to side. The divider will be unpainted with a brushed finish.

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

Crosslay bed flooring will consist of removable perforated brushed aluminum.

**CROSSLAY HOSE BEDS**

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

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

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

The center crosslay 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 crosslay bed will be painted job color.

Stainless steel vertical scuffplates 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 scuffplate.

Crosslay bed flooring will consist of removable perforated brushed aluminum..

**CROSSLAY HOSE RESTRAINT**

A 2.00" black nylon webbing design restraint will be provided across the top and ends of three (3) crosslay(s) to secure the hose during travel. The webbing assembly is to be attached at the bottom of the crosslays with footman loops with a permanent attachment and is to attach at the top outside corners with seat belt buckles. The male end of the seat buckle will be permanently attached to the footman loop at the top of the opening. A nylon strap will be attached to the seat belt buckle for releasing the buckle on the webbing. Velcro® will be attached to the top of the crosslay opening to secure restraint during travel.

**CROSSLAY 8.00" LOWER THAN STANDARD**

The crosslays will be lowered 8.00" from standard.

### **BOOSTER HOSE REEL**

A Hannay electric rewind aluminum booster hose with polished discs will be installed in the rear compartment.

Compartment floor will be covered with bright aluminum treadplate.

Roll-up door for this compartment will not interfere with the hose reel.

A polished stainless steel roller and guide assembly will be provided at the rear on each side so the booster hose does not rub against a painted surface.

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 an automatic reset circuit breaker.

One (1) foot actuated, stirrup type, electric rewind control (switch) will be installed under the rear step near the tow bar

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 hosereel will be 200' of ReelTex booster hose.

### **SLIDE-OUT ROLLER ASSEMBLY**

There will be one (1) slide-out style booster reel style roller/s.

Each roller assembly will be mounted to a set of side mounted slides. The slides will be provided and equipped with ball bearings for ease of operation and years of dependable service. Automatic locks will be provided for both the "in" and "out" positions with the trip mechanism for the lock located at the front of each slide. The locks will be easily be used with a gloved hand.

Each roller assembly will be located R1 .

An additional polished stainless steel roller and guide assembly will be mounted on the each rear body bulkhead outboard of the rear lower warning bezels on both sides. This roller assembly will be provided to help protect the rear painted surface.

### **ADDITIONAL, SWITCH, REEL**

There will be one (1) additional switch/es, provided for the booster hose reel/s. The additional switch/es will be inside the R1 compartment on the captive roller face.

### **FOAM PROPORTIONER**

A Pierce Husky™ 12 foam proportioning system will be provided that is an on demand, automatic proportioning, single point, direct injection system suitable for all types of Class A and B foam concentrates, including the high viscosity (6000 cps), alcohol resistant Class B foams. Operation will be based on direct measurement of water flow, and remain consistent within the specified flows and

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pressures. The system will automatically balance and proportion foam solution at rates from .1 percent to 9.9 percent regardless of variations in water pressure and flow, up to the maximum rated capacity of the foam concentrate pump.

The design of the system will allow operation from draft, hydrant, or relay operation. This will provide a versatile system to meet the demands at a fire scene.

### **SYSTEM CAPACITY**

The system will have the ability to deliver the following minimum foam solution flow rates that meet or exceed NFPA requirements at a pump rating of 250 psi.

200 gpm @ 6 percent

400 gpm @ 3 percent

1200 gpm @ 1 percent

The foam concentrate setting may be adjusted in .1 percent increments from .1 percent to 9.9 percent. Typical settings are .3 percent, .5 percent and 1.0 percent (The maximum capacity will be limited to the plumbing and water pump capacity).

### **CONTROL SYSTEM**

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

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

In order to minimize the use of abbreviations and interpretations, system information will be displayed on the panel by way of .50 tall LEDs that total 14 characters (two (2) lines of seven (7) each). System on and foam pump on indicator lights will also be included. Information displayed will include mode of operation (automatic, manual, draft, calibration, or flush), foam supply selected (Class A or Class B), water total, foam total, foam percentage, remaining gallons, and time remaining.

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

### **LOW LEVEL FOAM TANK**

The control head will display a warning message when the foam tank in use is below a quarter tank.

### **HYDRAULIC DRIVE SYSTEM**

The foam concentrate pump will be powered by a hydraulic drive system, which is automatically activated, whenever the vehicle water pump is engaged. A large parasitic electric load used to power the foam pump can cause an overload of the chassis electrical system.

Hydraulic oil cooler will be provided to automatically prevent overheating of the hydraulic oil, which is detrimental to system components. The oil/water cooler will be designed to allow continuous system operation without allowing hydraulic oil temperature to exceed the oil specifications.

The hydraulic oil reservoir will be of four (4) gallons minimum capacity and will also be of sufficient size to minimize foaming and be located to facilitate checking oil level or adding oil without spillage or the need to remove access panels.

### **FOAM CONCENTRATE PUMP**

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

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

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

### **EXTERNAL FOAM CONCENTRATE CONNECTION**

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

### **PANEL MOUNTED STRAINER / EXTERNAL PICK-UP CONNECTION**

A bronze body strainer / connector unit will be provided. The unit will be mounted to the pump panel. The external foam pick-up will be one (1) 1.00" male connection with chrome-plated cap integrated to a 2.00" strainer cleanout cap. A check valve will be installed in the pick-up portion of the cleanout cap. A basket style stainless steel screen will be installed in the body of the strainer / connector unit. Removal of the 2.00" cleanout cap will be all that is required to gain access to and remove the stainless steel basket screen. The strainer / connector unit will be ahead of the foam concentrate pump inlet port to insure that all agents reaching the foam pump has been strained.

### **PICK-UP HOSE**

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

### **DISCHARGES**

The foam system will be plumbed to five (5) discharges. The discharges capable of dispensing foam will be all three crosslays, and both hosebed discharges.

### **SYSTEM ELECTRICAL LOAD**

The foam proportioning will not impose an electrical load on the vehicle electrical system any greater than five (5) amps at 12VDC.

### **FOAM SUPPLY VALVE**

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

### **MAINTENANCE MESSAGE**

A message will be displayed on the control head to advise when system maintenance needs to be performed. The message will display interval for cleaning the foam strainer, cleaning for the water strainers, and changing the hydraulic oil.

### **FLUSH SYSTEM**

The system will be designed such that a flush mode will be provided to allow the system to flush all foam concentrate with clear water. The flush circuit control logic will ensure the foam tank supply valve is closed prior to opening the flush valve. The flush valve will be operated at the foam system control head for ease of operation. The valve will be electrically controlled and located as close to the foam tank supply valve as possible. A manual flush drain valve will be labeled and located under the driver's side running board.

### **SINGLE FOAM TANK REFILL**

The foam system's proportioning pump will be used to fill the Class A foam tank. This will allow use of the auxiliary foam pick-up to pump the foam from pails or a drum on the ground into the foam tank. A foam shut-off switch will be installed in the fill dome of the tank to shut the system down when the tank is full. The fill operation will be controlled by a mode in the foam system controller stating TANK FILL. While the proportioner pump is filling the tank, the controller will display FILL TANK. When the tank is full, as determined by the float switch in the tank dome, the pump will stop and the controller will display TANK FULL.

### **FOAM TANK**

The foam tank will be an integral portion of the polypropylene water tank. The cell will have a capacity of 30 gallons of foam with the intended use of Class A foam. The brand of foam stored in this tank will be FireAide. The foam cell will not 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**

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

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

### **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 supports both the fire pump and the side running boards.

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

Pump compartment, pump, plumbing and gauge panels will be removable from the chassis in 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.

### **LEFT SIDE PUMP CONTROL PANELS**

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

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

The pump operator's control panel will be removable in two (2) main sections for ease of maintenance:

The upper section will contain sub panels for the mounting of the pump pressure control device, engine monitoring gauges, electrical switches, and foam controls (if applicable). Sub panels will be removable from the face of the pump panel for ease of maintenance. Below the sub panels will be located all valve controls and line pressure gauges.

The lower section of the panel will contain all inlets, outlets, and drains.

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

### **IDENTIFICATION TAGS**

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

All discharge outlets will have color coded identification tags, with each discharge having its own unique color. Color coding will include the labeling of the outlet and the drain for each corresponding discharge.

All line pressure gauges will be mounted directly above the corresponding discharge control tee handles and recessed within the same chrome plated casting as the rod guide for quick identification. The gauge and rod guide casting will be removable from the face of the pump panel for ease of maintenance. The casting will be color coded to correspond with the discharge identification tag.

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

The pump panel on the right (passenger's) side will be removable with lift and turn type fasteners.

Trim rings will be installed around all inlets and outlets.

The trim rings for the side discharge outlets will be color coded and labeled to correspond with the discharge identification tag.

### **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 aluminum with a painted FormCoat black finish. A polished aluminum trim molding will be provided around each panel.

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

### **PUMP COMPARTMENT LIGHT**

There will be one (1) Whelen®, Model 3SC0CDCR, 3.00" white 12 volt DC LED light(s) with Whelen, Model 3FLANGEC, flange(s) installed in the pump compartment.

There will be a switch accessible through a door on the pump panel included with this installation.

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

Also provided at the pump panel will be the following:

- Master Pump Drain Control

### **AIR HORN BUTTON**

An air horn control button will be provided at the pump operator's control panel. This button will be red in color and properly labeled "Evacuation".

### **HINGED GAUGE PANEL**

The pump gauge panel will be hinged at the bottom with quarter turn lift and turn latches for access.

**ANGLED GAUGE PANEL**

The pump master gauge panel will be mounted at an angle downward to improve visibility of the gauges.

**SPECIAL LABEL**

There will be two (2) special label/s provided and installed driver rear preconnect and passenger rear preconnect. Each label will be worded as follows, driver rear preconnect and passenger rear preconnect. The color scheme on the label/s will be yellow and dark green.

**COLOR CODED NAME TAGS**

There will be eight (8) outlet discharges with special color coded name tags. These tags will be used for labeling the discharge pressure gauges, controls, outlets and drains. Crosslay 1 - Red Crosslay 2 - White Crosslay 3 - Blue 2.5" DS Panel - Tan PS LDH - Purple 2.5" PS Panel - Brown Deluge - Burgundy Booster Reel - Slate.

**VACUUM AND PRESSURE GAUGES**

The pump vacuum and pressure gauges will be liquid filled and manufactured by Class 1 Incorporated ©.

The gauges will be a minimum of 6.00" in diameter and will have white faces with black lettering, with a pressure range of 30.00"-0-600#.

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 polished stainless steel plugs. They will be marked with a label.

**PRESSURE GAUGES**

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

They will be a minimum of 2.50" in diameter and will have white faces with black lettering.

Gauges will be compound type with a vacuum/pressure range of 30.00"-0-400#.

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

**WATER LEVEL GAUGE**

A Fire Research TankVision Pro model WLA300-A00 water tank indicator gauge will be installed on the pump operators panel. The gauge kit will include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The gauge will show the volume of water in the tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs will provide for a viewing angle of 180 degrees. The gauge case will be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive blue label.

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The program features will be accessed from the front of the indicator module. The program will support self-diagnostics capabilities, self-calibration, six (6) programmable colored light patterns to display tank volume, adjustable brightness control levels and a data link to connect remote indicators. Low water warnings will include flashing LEDs at 1/4 tank and down chasing LEDs when the tank is almost empty.

The gauge will receive an input signal from an electronic pressure sensor. The sensor will be mounted from the outside of the water tank near the bottom. No probe will be placed on the interior of the tank. Wiring will be weather resistant and have automotive type plug-in connectors.

### **MINI SLAVE UNIT**

A Fire Research TankVision model WLA205-A00 miniature tank indicator gauge will be installed in the cab. The indicator gauge will show the volume of water in the tank on five (5) easy to see super bright LEDs. A wide view lens over the LEDs will provide for a viewing angle of 180 degrees. The indicator gauge case will be manufactured of Polycarbonate material with an integrated lens and have a distinctive blue label.

### **CLASS "A" FOAM LEVEL GAUGE**

A Fire Research TankVision Pro model WLA360-A00 cell/tank level indicator kit shall be installed on the pump operators panel. The kit will include an electronic indicator module, a pressure sensor, a 10' sensor cable and a tank vent. The indicator will show the volume of Class "A" foam concentrate in the cell/tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs will provide for a viewing angle of 180 degrees. The indicator case will be waterproof, manufactured of Polycarbonate/Nylon material and have a distinctive green label.

The program features will be accessed from the front of the indicator module. The program will support self-diagnostics capabilities, self-calibration, six (6) programmable colored light patterns to display cell/tank volume, adjustable brightness control levels and a data link to connect remote indicators. Low foam level warnings will include flashing LEDs at 1/4 cell/tank and down chasing LEDs when the cell/tank is almost empty.

The indicator will receive an input signal from an electronic pressure sensor. The sensor will be mounted from the outside of the foam cell/tank near the bottom. No probe will be placed on the interior of the cell/tank. Wiring will be weather resistant and have automotive type plug-in connectors.

### **STEP/LIGHT SHIELD**

There will be an aluminum treadplate stepping surface no less than 8.00" deep and properly reinforced to support a man's weight, installed over the pump operators panel.

There will be 12 volt DC white LED lights installed under the step to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus. These lights shall be activated when the parking brake is set. Additional lights will be included every 18.00" depending on the size of the pump house. One (1) pump panel light will come on when the pump is in ok to pump mode.

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- There will be a light activated 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.

There will be a green pump engaged indicator light activated on at the operator's panel when the pump is shifted into gear from inside the cab.

There will be one (1) white LED, step light provided above this step. In order to ensure exceptional illumination, each step light will provide a minimum of 25 foot-candles (fc) covering an entire 15.00" x 15.00" square placed 10.00" below the light and a minimum of 1.5 fc covering an entire 30.00" x 30.00" square at the same 10.00" distance below the light.

### **AIR HORN SYSTEM**

There will be two (2) Grover air horns recessed in the front bumper. 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.

### **Air Horn Location**

The air horns will be located on each side of the bumper, just outside of the frame rails.

### **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.

### **ELECTRONIC SIREN**

A Whelen, Model: 295SLSC1, electronic siren with detachable noise canceling microphone will be provided.

This siren to be active when the battery switch is on and that emergency master switch is on.

Electronic siren head will be recessed in the passenger side center switch panel.

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

### **SPEAKER**

There will be one (1) Whelen®, Model SA315P, black nylon composite, 100-watt, speaker with through bumper mounting brackets and polished stainless steel grille provided. The speaker will be connected to the siren amplifier.

The speaker will be recessed in the right side of the front bumper, towards the outside.

### **AUXILIARY MECHANICAL SIREN**

There will be one (1) Federal, Model Q2B, mechanical siren 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 and will be interlocked to the parking brake so that the siren cannot be accidentally activated when the parking brake is applied.

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The mechanical siren will be mounted on the bumper deck plate. It will be mounted on the left side. A reinforcement plate will be furnished to support the siren.

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.

A second siren brake switch will be installed on the passenger side.

### **FRONT ZONE UPPER WARNING LIGHTS**

There will be one (1) 81.00" Whelen Freedom IV LED lightbar mounted on the cab roof.

The lightbar will include the following:

- One (1) red flashing LED module in the driver's side end position.
- One (1) red flashing LED module in the driver's side front corner position.
- One (1) red flashing LED module in the driver's side first front position.
- One (1) red flashing LED module in the driver's side second front position.
- One (1) red flashing LED module in the driver's side third front position.
- One (1) red flashing LED module in the driver's side fourth front position.
- One (1) red flashing LED module in the driver's side fifth front position.
- One (1) red flashing LED module in the driver's side sixth front position.
- One (1) 795 LED traffic light controller set to national standard high priority in the center positions.
- One (1) red flashing LED module in the passenger's side sixth front position.
- One (1) red flashing LED module in the passenger's side fifth front position.
- One (1) red flashing LED module in the passenger's side fourth front position.
- One (1) red flashing LED module in the passenger's side third front position.
- One (1) red flashing LED module in the passenger's side second front position.
- One (1) red flashing LED module in the passenger's side first front position.
- One (1) red flashing LED module in the passenger's side front corner position.
- One (1) red flashing LED module in the passenger's side end position.

There will be clear lenses included on the lightbar.

The following switches may be installed in the cab on the switch panel to control the lightbar:

- a switch to control the flashing LED modules.
- the traffic light controller by a cab switch with emergency master control.
- no momentary switch to activate the traffic light controller.

The traffic light controller will be disabled when the parking brake is applied.

The 12 red flashing LED modules in the front positions may be load managed when the parking brake is applied.

### **OPTICOM GPS PRIORITY CONTROL DEVICE**

There will be a Global Traffic Technologies, Model 76-1000-1155-0, GPS preemption vehicle kit provided. This GPS preemption vehicle kit is set for high priority. This system is designed to use satellite communications with a receiver board at an intersection to control the traffic lights.

The system will be activated when the battery switch is on and the emergency master switch is on.

The system will be deactivated when the parking brake is applied.

The kit will include:

- Radio/GPS unit containing a GPS receiver and transceiver
- Radio/GPS antenna on the cab roof.
- A controller, which also provides an interface point between the radio/GPS unit the vehicle wiring, and an external PC used for configuration, diagnostics, and downloading log information. The location of this controller will be behind the passenger's side seat.

### **FRONT ZONE LOWER LIGHTS**

There will be two (2) pair of Whelen, Model M6\*\*, LED lights installed on the cab face above the headlights, in a common bezel matching the one for the headlamps.

- The driver's side front outside warning light to be red
- The driver's side front inside warning light to be red
- The passenger's side front inside warning light to be red
- The passenger's side front outside warning light to be red
- The color of the lenses will be clear

There will be a switch located in the cab on the switch panel to control the lights.

### **ROTO RAY LIGHT**

There will be one (1) Roto Ray, Model 4000W rotating warning light provided on the front of the cab through the top section of the front grille.

This warning light will include the following:

- First light to be a PAR46 red LED with clear lens.
- Second light to be PAR46 red LED with clear lens.
- Third light to be PAR46 red LED with clear lens.

There will be a switch located in the cab on the switch panel to control the light.

There will be a parking brake activated circuit added to the rotating warning light. When the battery switch is on, the emergency master switch is on and the parking brake is set, the LED lights will change from steady burn to flashing.

This light will stop rotating when the parking brake is applied.

The flashing lights may be load managed when the parking brake is applied.

### **FRONT WARNING LIGHT**

There will be two (2) Whelen, Model M6\*, LED flashing light(s) with chrome trim provided angled recess in the front bumper.

The color of the light(s) will be red.

The color of the lens will be clear.

The light(s) will be activated with the front warning switch.

These light may be load managed if colored or disabled if white when the parking brake is applied.

Any white light will be disabled and any amber light activated when the parking brake is applied.

### **SIDE ZONE LOWER LIGHTING**

There will be six (6) Whelen®, Model M6\*C, flashing LED warning lights with chrome trim installed per the following:

- Two (2) lights, one (1) each side on the bumper extension. The side front lights to be red.
- Two (2) lights, one (1) each side above the front wheels. The side middle lights to be red.
- Two (2) lights, one (1) each side above rear wheels. The side rear lights to be red.
- The lights will include clear lenses.

There will be a switch in the cab on the switch panel to control the lights.

### **INTERIOR CAB DOOR WARNING LIGHTS**

There will be four (4) Whelen, Model M2\*, LED flashing warning lights with Whelen, Model M2FC, chrome flange provided, one (1) on each cab and crew cab door pan.

The color will be amber.

Each light will include a lens color that is clear.

Each light will be activated by the door jam switch of the associated door.

### **SIDE WARNING LIGHTS**

There will be four (4) Whelen, Model WION\* wide angle flashing LED warning lights with Whelen, Model IONK1B black bail mounts provided:

- One (1) recessed in the driver's side cab step on the front, vertical surface, below bottom of door.
- One (1) recessed in the driver's side crew cab step on the front, vertical surface, below bottom of door.
- One (1) recessed in the passenger's side crew cab on the front, vertical surface, below bottom of door.
- One (1) recessed in the passenger's side cab step on the front, vertical surface, below bottom of door.

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The color of the lights will be red.

These lights will be activated with the side warning switch.

These lights may be load managed when the parking brake is applied.

### **SIDE WARNING LIGHTS**

There will be two (2) Whelen, Model M6\*C LED flashing warning light(s) with bezel(s) provided rear of crew cab doors each side, in height alignment with lights over the front wheels.

The color of the lights will be red.

All of these lights will include a clear lens.

These lights will be activated with the Side Zone Lower warning lights.

### **SIDE WARNING LIGHTS**

There will be two (2) Whelen, Model M9\*C LED flashing warning light(s) with bezel(s) provided front of the body high, each side.

The color of the lights will be red.

All of these lights will include a clear lens.

These lights will be activated with the Side Zone Lower warning lights.

### **SIDE WARNING LIGHTS**

There will be two (2) Whelen, Model WIONSM\*, 1.68" high x 5.93" long x 1.12" deep flashing LED light(s) recessed into the running board flange each side centered.

The color of the LEDs will be red LED with a clear lens.

There will be a switch in the cab on the switch panel to control the light(s).

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

### **SIDE WARNING LIGHTS**

There will be four (4) Whelen, Model WIONSMC\* LED light(s) provided and located in the body rub rails centered under D1, D3, P1, P3. The lights will NOT be mounted with the rubber gasket behind the light which will allow the light(s) to fit in the rub rails.

The color of each light will be red LED with a clear lens.

Each light will be provided with a chrome plated ABS flange.

The light(s) will be activated with the side warning switch.

### **REAR ZONE LOWER LIGHTING**

There shall be two (2) Whelen®, Model M6\*C, LED flashing warning lights located at the rear of the apparatus.

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- 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 clear.

There will be a switch located in the cab on the switch panel to control the lights.

### **REAR BODY WARNING LIGHTS**

There will be two (2) Whelen, Model M6\*C, LED flashing warning light(s) with Whelen, Model M6FC, chrome bezel(s) provided inboard of the rear zone M6 lights on the rear of the body as high as possible.

The color of these light(s) will be red.

These light(s) will be controlled with the rear upper warning switch.

These light(s) will include a lens that is clear.

The light(s) may be load managed when the parking brake is applied.

### **REAR WARNING LIGHTS**

There will be two (2) Whelen®, Model M6\*C, LED flashing warning light(s) with bezel(s) provided above the taillights.

The color of these light(s) will be amber.

These light(s) will be controlled with the rear lower warning switch.

These light(s) will include a lens that is clear.

### **REAR AND SIDE ZONE UPPER WARNING LIGHTS**

There will be two (2) Whelen, Model M6\* LED warning lights provided at the rear of the apparatus, facing the rear, one (1) light provided on each side with Whelen, Model M6FC chrome flanges.

- The rear upper light(s) on the passenger's side to be red.
- The rear upper light(s) on the driver's side to be red.

There will be one (1) Whelen, Model M9\* LED warning light provided on the driver side of the vehicle, located at the rear and facing the side, mounted high with Whelen, Model M9FC chrome flanges.

- The side rear upper light(s) on the driver's side to be red.

There will be one (1) Whelen, Model M9\* LED warning light provided on the passenger side of the vehicle, located at the rear and facing the side, mounted high Whelen, Model M9FC chrome flanges.

- The side rear upper light(s) on the passenger's side to be red.

The color of the lenses will be clear.

There will be a switch located in the cab on the switch panel to control the lights.

**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 3 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.

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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 following information:

- Rated voltage(s) and type (ac or dc)
- Phase
- Rated frequency
- Rated amperage
- Continuous rated watts
- Power source engine speed

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 144.00" (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 degree 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 12.00" (305 mm), or properly shielded, from exhaust piping
- Separated from fuel lines by a minimum of 6.00" (152 mm) distance

Electrical cord or conduit will be supported within 6.00" (152 mm) of any junction box and at a minimum of every 24.00" (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 24.00" (610 mm) from the ground. Receptacles on off-road vehicles will be a minimum of 30.00" (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 30.00" (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 Standard**

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 an independent third-party certification organization.

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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**

The apparatus will be equipped with a complete electrical power system. The generator will be a Harrison Model MCR Stealth 6.0 kW Hydraulic unit. The wiring and generator installation will conform to the present National Electrical Codes Standards of the National Fire Protection Association. The installation will be designed for continuous operation without overheating and undue stress on components.

#### **Generator Performance**

- Nominal Rating: 6,000 watts
- Continuous Duty Rating: 6,000 watts
- Nominal Volts: 120/240
- Amperage: 50 @ 120volts, 25 @ 240 volts
- Phase: Single
- Cycles: 60 hertz
- Engine Speed at Engagement: Idle

The generator will be driven by a transmission power take off unit, through a hydraulic pump and motor.

The generator will include an electrical control inside the cab. The hydraulic engagement supply will be operational only after the chassis parking brake is applied.

An electric/hydraulic valve will supply hydraulic fluid to the clutch engagement unit provided on the chassis PTO drive.

The generator hydraulic circuit will include a soft start valve to protect the generator components during PTO engagement.

#### **Generator Instruments and Controls**

To properly monitor the generator performance a digital meter panel will be furnished and mounted next to the circuit breaker panel. The meter will indicate the following items:

- Voltage

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- Amperage for both lines
- Frequency
- Generator run hours
- Over current indication
- Over temperature indication
- "Power On" indication
- Two (2) fuse holders with two (2) amp fuses (for indicator light protection)

The gauges and controls will be installed near eye level in the compartment. Instruments will be flush mounted in an appropriate sized weatherproof electrical enclosure. All instruments used will be accurate within +/- two (2) percent. The load center will have a circuit breaker to assure overload protection. The breaker furnished will be properly sized to the generator output.

### Generator Wiring

The system will be installed by highly qualified electrical technicians to assure the required level of safety and protection to the fire apparatus operators. The wiring, electrical fixtures and components will be to the highest industry quality standards available on the domestic market. The equipment will be the type as designed for mobile type installations subject to vibration, moisture and severe continuous usage. The following electrical components will be the minimum acceptable quality standards for this apparatus:

### Wiring:

All electrical wiring will be fine stranded copper type. The wire will be sized to the load and circuit breaker rating; ten (10) gauge on 30 amp circuits, 12 gauge on 20 amp circuits and 14 gauge on 15 amp circuits. The cable will be run in corner areas and extruded aluminum pathways built into the body for easy access.

### Load Center:

The main load center will be Cutler-Hammer with circuit breakers rated to load demand.

### Circuit Breakers:

Individual breakers will be provided for all on-line equipment to isolate a tripped breaker from affecting any other on-line equipment.

### **GENERATOR LOCATION**

The generator will be mounted on top of the water tank, at the front of the body, at the over the tank per engineering print. The water tank in this area will be either reinforced, or constructed, in such a manner, that it will handle the additional weight of the generator.

### **GENERATOR START**

There will be a switch provided on the cab instrument panel to engage the generator.

### **GENERATOR REMOTE START**

There will be one (1) remote start switch provided on the pump panel to engage the hydraulic generator PTO and field. A light at each switch location will be provided to indicate that the generator is running.

### **CIRCUIT BREAKER PANEL**

The circuit breaker panel will be located high on the forward wall of compartment D3.

### **ELECTRIC CORD REEL**

Furnished with the 120 volt AC electrical system will be a Hannay, Series 1600, cord reel. The reel will be provided with a 12-volt electric rewind switch, that is guarded to prevent accidental operation and labeled for its intended use. The switch will be protected with a fuse and installed at a height not to exceed 72.00" above the operators standing position.

The exterior finish of the reel(s) will be painted #269 gray from the reel manufacturer.

A captive roller assembly to be provided to aid in the payout and loading of the reel. A ball stop will be provided to prevent the cord from being wound on the reel.

A label will be provided in a readily visible location adjacent to the reel. The label will indicate current rating, current type, phase, voltage and total cable length.

A total of one (1) cord reel will be provided one (1) forward in the passenger's side hatch compartment.

The cord reel will be configured with three (3) conductors.

### **CORD**

Provided for electric distribution will be one (1) length installed on the reel of 200 feet of yellow 10/3 electrical cord, weather resistant 105 degree Celsius to -50 degree Celsius, 600 volt jacketed SOOW cord. A Hubbell L5-20, 20 amp, 120 volt, twist lock connector body will be installed on the end of the cord.

### **POWER OUTLET STRIP**

There will be one (1) receptacle strip(s) with six (6) 15 amp 120 volt AC straight blade receptacles provided lower EMS cabinet.

The strip(s) selected will be powered from the shoreline inlet through a receptacle located adjacent to the strip(s).

There will be a label installed near the strip(s) that state the following:

- Line Voltage
- Current Rating (amps)
- Phase
- Frequency
- Power Source

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### **120 VOLT RECEPTACLE**

There will be one (1), 15/20 amp 120 volt AC three (3) wire straight blade duplex receptacle(s) with an interior stainless steel wall plate, installed TBD at approval. The NEMA configuration for the receptacle(s) will be 5-20R.

The receptacle(s) will be powered from the shoreline inlet.

There will be a label installed near the receptacle(s) that state the following:

- Line Voltage
- Current Rating (amps)
- Phase
- Frequency
- Power Source

### **120 VOLT RECEPTACLE**

There will be one (1), 20 amp 120 volt AC three (3) wire twist lock receptacle(s) with waterproof flip up cover(s) installed PS pump panel. The NEMA configuration for the receptacles will be L5-20R.

The receptacle(s) will be powered from the on board generator.

There will be a label installed near the receptacle(s) that state the following:

- Line Voltage
- Current Rating (amps)
- Phase
- Frequency
- Power Source

### **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, 2016 edition, section 5.9.3 and 5.9.4 will be provided by the fire department.

- 800 ft (60 m) of 2.50" (65 mm) or larger fire hose.
- 400 ft (120 m) of 1.50" (38 mm), 1.75" (45 mm), or 2.00" (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) smoothbore or combination nozzle with 2.50" shutoff that flows a minimum of 250 gpm.
- One (1) SCBA complying with NFPA 1981 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.

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- 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.
- Two (2) hydrant wrenches.
- One (1) double female 2.50" (65 mm) adapter with National Hose threads.
- One (1) double male 2.50" (65 mm) adapter with National Hose threads.
- One (1) rubber mallet, for use on suction hose connections.
- Two (2) salvage covers each a minimum size of 12 ft x 14 ft (3.7 m x 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 (2) at the shoulders, two (2) at the sides, and one (1) at the front.
- Five (5) fluorescent orange traffic cones not less than 28.00" (711 mm) in height, each equipped with a 6.00" (152 mm) retro-reflective white band no more than 4.00" (152 mm) from the top of the cone, and an additional 4.00" (102 mm) retro-reflective white band 2.00" (51 mm) below the 6.00" (152 mm) band.
- Five (5) illuminated warning devices such as highway flares, unless the five (5) fluorescent orange traffic cones have illuminating capabilities.
- One (1) automatic external defibrillator (AED).
- 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).
- 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 3.00" (75 mm) will include a pressure relief device that meets the requirements of 16.6.6.
- If the apparatus does not have a 2.50" National Hose (NH) intake, an adapter from 2.50" 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 2.50" National Hose (NH) threads, adapters will be carried to allow feeding the supply hose from a 2.50" NH thread male discharge and to allow the hose to connect to a 2.50" 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.

### **STRAINER PROVIDED BY FIRE DEPARTMENT**

NFPA 1901, 2016 edition, section 5.8.2.1.1 requires a suction strainer when suction hose is provided.

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The strainer is not on the apparatus as manufactured. The fire department will provide the suction strainer.

### **DRY CHEMICAL EXTINGUISHER PROVIDED BY FIRE DEPARTMENT**

NFPA 1901, 2016 edition, section 5.9.4 requires one (1) approved dry chemical portable fire extinguisher with a minimum 80-B:C rating mounted in a bracket fastened to the apparatus.

The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

### **WATER EXTINGUISHER PROVIDED BY FIRE DEPARTMENT**

NFPA 1901, 2016 edition, section 5.9.4 requires one (1) 2.5 gallon or larger water extinguisher mounted in a bracket fastened to the apparatus.

The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

### **FLATHEAD AXE PROVIDED BY FIRE DEPARTMENT**

NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) flathead axe mounted in a bracket fastened to the apparatus.

The axe is not on the apparatus as manufactured. The fire department will provide and mount the axe.

### **PICKHEAD AXE PROVIDED BY FIRE DEPARTMENT**

NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) pickhead axe mounted in a bracket fastened to the apparatus.

The axe is not on the apparatus as manufactured. The fire department will provide and mount the axe.

### **PAINT - BODY PAINTED TO MATCH CAB**

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. Imperfections on the exterior surfaces will be removed and sanded to a smooth finish. Exterior seams will be sealed before painting. Exterior surfaces that will not be painted include; chrome plating, polished stainless steel, anodized aluminum and bright aluminum treadplate.
2. Chemical Cleaning and Pretreatment - All surfaces will be chemically cleaned to remove dirt, oil, grease, and metal oxides to ensure the subsequent coatings bond well. The aluminum surfaces will be properly cleaned and treated using a high pressure, high temperature 4 step Acid Etch process. The steel and stainless surfaces will be properly cleaned and treated using a high temperature 3 step process specifically designed for steel or stainless. The chemical treatment converts the metal surface to a passive condition to help prevent corrosion. A final pure water rinse will be applied to all metal surfaces.
3. Surfacer Primer - The Surfacer Primer will be applied to a chemically treated metal surface to provide a strong corrosion protective basecoat. A minimum thickness of 2 mils of Surfacer

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Primer is applied to surfaces that require a Critical aesthetic finish. The Surfacer Primer is a two-component high solids urethane that has excellent sanding properties and an extra smooth finish when sanded.

4. Finish Sanding - The Surfacer Primer will be sanded with a fine grit abrasive to achieve an ultra-smooth finish. This sanding process is critical to produce the smooth mirror like finish in the topcoat.
5. Sealer Primer - The Sealer Primer is applied prior to the Basecoat in all areas that have not been previously primed with the Surfacer Primer. The Sealer Primer is a two-component high solids urethane that goes on smooth and provides excellent gloss hold out when topcoated.
6. Basecoat Paint - Two coats of a high performance, two component high solids polyurethane basecoat will be applied. The Basecoat will be applied to a thickness that will achieve the proper color match. The Basecoat will be used in conjunction with a urethane clear coat to provide protection from the environment.
7. Clear Coat - Two (2) coats of Clear Coat will be applied over the Basecoat color. The Clear Coat is a two-component high solids urethane that provides superior gloss and durability to the exterior surfaces. Lap style and roll-up doors will be Clear Coated to match the body. Paint warranty for the roll-up doors will be provided by the roll-up door manufacture.

Each batch of basecoat color is checked for a proper match before painting of the cab and the body. After the cab and body are painted, the color is verified again to make sure that it matches the color standard. Electronic color measuring equipment is used to compare the color sample to the color standard entered into the computer. Color specifications are used to determine the color match. A Delta E reading is used to determine a good color match within each family color.

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

Pierce Manufacturing paint finish quality levels for critical areas of the apparatus (cab front and sides, body sides and doors, and boom lettering panels) meet or exceed the Cadillac/General Motors GMW15777 global paint requirements. Orange peel levels meet or exceed the #6 A.C.T. standard in critical areas. These requirements are met in order for the exterior paint finish to be considered acceptable. The Pierce Manufacturing written paint standards will be available upon request.

The cab and the body will be painted #268 red.

### **PAINT - ENVIRONMENTAL IMPACT**

Contractor will meet or exceed all current State 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.

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- Particulate emissions from painting operations will be collected by a dry filter or water wash process. If the dry filter 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 on a continual basis to keep the water clean.
- Paint wastes are disposed of in an environmentally safe manner.
- Empty metal paint containers will be to recover the metal.
- Solvents used in clean-up operations will be recycled on-site or sent off-site for distillation and returned for reuse.

Additionally, the finished apparatus will not be manufactured with or contain products that have ozone depleting substances. Contractor will, upon demand, present evidence that the 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 to match the lower job color before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc.

Components that are included with the chassis frame assembly that will be painted are:

- Frame rails
- Frame liners
- Cross members
- Axles
- Suspensions
- Steering gear
- Battery boxes
- Bumper extension weldment
- Frame extensions
- Body mounting angles
- Rear Body support substructure (front and rear)
- Pump house substructure
- Air tanks
- Fuel tank
- Castings
- Individual piece parts used in chassis and body assembly

Components treated with epoxy E-coat protection prior to paint:

- Two (2) C-channel frame rails
- Two (2) frame liners

The E-coat process will meet the technical properties shown.

**COMPARTMENT INTERIOR PAINT**

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 STRIPES**

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

The reflective band provided on the cab face will be at the headlight level.

**REAR CHEVRON STRIPING**

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 fluorescent yellow green diamond grade.

Each stripe will be 6.00" in width.

This will meet the requirements of the current edition of NFPA 1901, which states that 50% of the rear surface will be covered with chevron striping.

**JOG(S) IN REFLECTIVE BAND**

The reflective band located on each side of the apparatus body will contain one (1) jog(s) and will be angled at approximately a 45 degrees when installed.

**REFLECTIVE STRIPE OUTLINE**

There will be a 1.00" ruby red stripe applied between the gaps in the reflective band located on the body only.

**REFLECTIVE STRIPE INSIDE RUBRAILS**

A reflective stripe will be provided inside the extruded aluminum rubrails. The reflective material will be white. There will be a quantity of four (4) rubrails striped.

**CHEVRON STRIPING ON THE FRONT BUMPER**

There will be alternating chevron striping located on the front bumper.

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

The size of the striping will be 6.00".

**INVERTED "V" CHEVRON 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 fluorescent yellow green diamond grade

The second color will be red diamond grade

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The size of the striping will be 4.00".

### **LETTERING**

The lettering will be 22 karat gold vinyl.

### **LETTERING**

One (1) to twenty (20) Sign Gold lettering, 4.00" high, with outline and shade will be provided.

### **LETTERING**

One (1) to twenty (20) reflective lettering, 3.00" high, with outline and shade will be provided.

### **LETTERING**

There will be sign gold lettering, 4.00" high, with outline and shade provided. There will be two (2) letters provided.

### **LETTERING**

Twenty-one (21) to forty (40) Sign Gold lettering, 6.00" high, with outline and shade will be provided.

### **LETTERING**

There will be reflective lettering, 7.00" high, with outline and shade provided. There will be six (6) letters provided.

### **LETTERING**

One (1) to twenty (20) Sign Gold lettering, 7.00" high, with outline and shade will be provided.

### **LETTERING**

There will be reflective lettering, 12.00" high, with no outline or shade provided. There will be two (2) letters provided.

### **LETTERING**

There will be reflective lettering, 18.00" high, with no outline or shade provided. There will be one (1) letter provided.

### **REFLECTIVE LETTERING, "DIAL 911 EMERGENCY"**

A pair of 6.00" high white, reflective decal "Dial 911 EMERGENCY" will be installed at D1 and P1 per print from 29490.

### **LETTERING, SCRIPT**

Script lettering shall be provided on the rear body compartment door. The lettering will state "Everyone Comes Home".

### **SMOOTH ALUMINUM PLATE(S) FOR LETTERING**

There will be one (1) smooth aluminum plate(s) provided for department lettering. They will be mounted cover front vertical portion of raised center winch cover and shall be appx 6" x 30" in size.

### **SIGN KIT FOR LETTERING/NUMERALS**

two (2) painted stainless steel plate(s) and holder(s) will be provided for department lettering. They will be mounted center of front bumper and rear of body and 9" x 16" in size.

**CAB GRILLE DESIGN**

An American flag design will be painted on the cab grille.

**EMBLEM**

There will be four (4) reflective emblem(s), approximately 16.00" - 18.00" in size, installed each cab/crew cab door. the emblem will be modeled after the department submitted information (art, patch, etc).

**FIRE APPARATUS PARTS CD MANUAL**

There will be two (2) custom parts manuals for the complete fire apparatus provided in CD format with the completed unit.

The manuals 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 parts

The manuals 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 these manuals are 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.

**CHASSIS SERVICE CD MANUALS**

There will be two (2) CD format chassis service manuals containing parts and service information on major components 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

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- 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.

### **CHASSIS OPERATION CD MANUALS**

There will be two (2) CD format chassis operation manuals provided.

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

A Pierce basic apparatus limited warranty certificate, WA0008, is included with this proposal.

### **ENGINE WARRANTY**

A Cummins **five (5) year** limited engine warranty will be provided. A limited warranty certificate, WA0181, is included with this proposal.

### **STEERING GEAR WARRANTY**

A Sheppard **three (3) year** limited steering gear warranty shall be provided. A copy of the warranty certificate shall be submitted with the bid package.

### **FIFTY (50) YEAR STRUCTURAL INTEGRITY**

The Pierce custom chassis frame limited warranty certificate, WA0013, is included with this proposal.

### **FRONT AXLE THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY**

The Pierce TAK-4 suspension limited warranty certificate, WA0050, is included with this proposal.

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

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

### **ABS BRAKE SYSTEM THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY**

A Meritor Wabco™ ABS brake system limited warranty certificate, WA0232, is included with this proposal.

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

The Pierce custom cab limited warranty certificate, WA0012, is included with this proposal.

### **TEN (10) YEAR PRO-RATED PAINT AND CORROSION**

A Pierce cab limited pro-rated paint warranty certificate, WA0055, is included with this proposal.

### **FIVE (5) YEAR MATERIAL AND WORKMANSHIP**

The Pierce Command Zone electronics limited warranty certificate, WA0014, is included with this proposal.

### **COMPARTMENT LIGHT WARRANTY**

The compartment lights will not offer an extended warranty.

**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.

**TRANSMISSION COOLER WARRANTY**

The 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 warranty coverage and will not exceed \$10,000 per occurrence. A copy of the warranty certificate will be submitted with the bid package.

**WATER TANK WARRANTY**

A UPF poly water tank limited warranty certificate, WA0195, is included with this proposal.

**TEN (10) YEAR STRUCTURAL INTEGRITY**

The Pierce apparatus body limited warranty certificate, WA0009, is included with this proposal.

**ROLL UP DOOR MATERIAL AND WORKMANSHIP WARRANTY**

An AMDOR roll-up door limited warranty will be provided. The roll-up door will be warranted against manufacturing defects for a period of **ten (10) years**. A **five (5) year** limited warranty will be provided on painted roll up doors.

The limited warranty certificate, WA0185, is included with this proposal.

**PUMP WARRANTY**

A Waterous pump limited warranty certificate, WA0225, is included with this proposal.

**TEN (10) YEAR PUMP PLUMBING WARRANTY**

The Pierce apparatus plumbing limited warranty certificate, WA0035, is included with this proposal.

**FOAM SYSTEM WARRANTY**

The Husky 12 foam system limited warranty certificate, WA0231, is included with this proposal.

**SIX (6) YEAR GENERATOR MATERIAL AND WORKMANSHIP WARRANTY**

A Harrison Hydra-Gen limited warranty certificate, WA0285, is included with this proposal.

**TEN (10) YEAR PRO-RATED PAINT AND CORROSION**

A Pierce body limited pro-rated paint warranty certificate, WA0057, is included with this proposal.

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

The Pierce graphics fading and deterioration limited warranty limited warranty certificate, WA0168, is included with this proposal.

**VEHICLE STABILITY CERTIFICATION**

The fire apparatus manufacturer will provide a certification stating the apparatus complies with NFPA 1901, current edition, section 4.13, Vehicle Stability. The certification will be provided at the time of bid.

**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.

**POWER STEERING CERTIFICATION**

The fire apparatus manufacturer will provide a certification stating the power steering system as installed meets the requirements of the component supplier. The certification will be provided at the time of bid.

**CAB INTEGRITY CERTIFICATION**

The fire apparatus manufacturer will provide a cab crash test certification with this proposal. The certification will state that a specimen representing the substantial structural configuration of 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 22,500 lb. This value meets the ECE 29 criteria, and is equivalent to the front axle rating up to a maximum of ten (10) metric tons.

- Side Impact

The same cab will be subjected to dynamic preload where a 13,275-lb moving barrier is slammed into the side of the cab at 5.50 mph, striking with an impact of 13,000 ft-lb of force. 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-lb 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-lb of force using a moving barrier. (Twice the force required by SAE J2420)

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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.

### **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.

### **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.

### **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, at time of delivery, that each seat mount and cab structure design was pull tested to the required force and met the appropriate criteria.

### **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 77 degrees Fahrenheit from a cold-soak, within 30 minutes when tested using the coolant supply methods found in SAE J381.

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The bidder will certify, at time of delivery, that a substantially similar cab has been tested and has met these criteria.

### **CAB AIR CONDITIONING PERFORMANCE CERTIFICATION**

Good cab air conditioning temperature and air flow performance keeps occupants comfortable, reduces humidity, and provides a climate for recuperation while at the scene. The cab air conditioning system will cool the cab from a heat-soaked condition at 100 degrees Fahrenheit to an average of 78 degrees Fahrenheit in 30 minutes. The bidder will certify that a substantially similar cab has been tested and has met these criteria.

### **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:

- Documentation of the electrical system performance tests.
- A written load analysis, which will include the following:
  - The nameplate rating of the alternator.
  - The alternator rating under the conditions specified per:
    - Applicable NFPA 1901 or 1906 (Current Edition).
  - The minimum continuous load of each component that is specified per:
    - Applicable NFPA 1901 or 1906 (Current Edition).
  - Additional loads that, when added to the minimum continuous load, determine the total connected load.
  - 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).