



Pierce Manufacturing, Inc. is pleased to submit a proposal to Parsippany Troy Hills Fire District #1 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.

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 and certified to meet the American welding Society codes upon hire and every three (3) years thereafter. Pierce also employs and 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 ten (10) 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. Delivery training will be at a mutually agreeable time and place.

### **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 Fire and Safety Services 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 fifty (50) miles of the fire department.



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.

### **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 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, approved, 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.

### **PERFORMANCE BOND, 1 YEAR**

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 Basic One (1) Year Limited 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 one (1) year from the date of such satisfactory acceptance and delivery, or the actual Basic One (1) Year Limited Warranty period, whichever is shorter.

### **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 220.5 inches.

### **GVW RATING**

The gross vehicle weight rating will be 42,000 pounds.

### **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 AXLE**

The front axle will be a reverse "I" beam type with inclined king pins. It will be a Dana axle, Model D-2000F, with a rated capacity of 20,000 lb.

### **FRONT SUSPENSION**

The front springs will be a Standens, three (3)-leaf, taper leaf design, 54.00" long x 4.00" wide, with a ground rating of 20,000 lb.

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

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

### **SHOCK ABSORBERS**

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

### **FRONT OIL SEALS**

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

### **FRONT TIRES**

Front tires will be Goodyear 385/65R22.5 radials, 18 ply G296 MSA tread, rated for 20,050 lb maximum axle load and 68 mph maximum speed.

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

### **REAR AXLE**

The rear axle will be a Dana, Model S26-190, with a capacity of 27,000 lb.

### **TOP SPEED OF VEHICLE**

A rear axle ratio will be furnished to allow the vehicle to reach a top speed of 65 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 27,000 lb. 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® 12R22.50 radials, 16 ply all season G622 RSD tread, rated for 27,120 lb maximum axle load and 75 mph maximum speed.

The outside tires will be mounted on Alcoa© 22.50" x 8.25" polished aluminum, with Dura-Bright® finish, disc wheels with a ten (10) stud, 11.25" bolt circle.

The inside tires will be mounted on 22.50" x 8.25" steel disc wheels with a ten (10) stud, 11.25" bolt circle.

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

### **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 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 Worden Safety Products, Model HWGY-SB, wheel chocks provided.

Heavy Duty, large molded aluminum wheel chock with solid bottom, yellow powder coat finish.

### **WHEEL CHOCK BRACKETS**

There shall be one (1) pair of Worden Safety model U815T mounting wheel chock brackets provided. The brackets shall be mounted one each front and rear of the left rear wheels.

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

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

### **BRAKES**

The service brake system will be full air type by Bendix®.

Front brakes will be Model ADB22X™, disc type with automatic pad wear adjustment and 17.00" rotors for improved stopping distance.

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

### **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:

- Bendix® brake treadle valve with vinyl covered foot surface
- Heated automatic moisture ejector on air dryer
- Total air system minimum capacity of 4,272 cubic inches
- Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
- 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 IWT, with internal wet tank, 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.

## **AIR INLET**

One (1) air inlet with 3D series male coupling will be provided. It will allow station air to be supplied to the apparatus brake system through a shoreline hose. The inlet will be located forward in the driver side lower step well of cab. A check valve will be provided to prevent reverse flow of air. The inlet will discharge into the "wet" tank of the brake system. A mating female fitting will also be provided with the loose equipment.

## **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.



### **COMPRESSION FITTINGS ONLY**

Any nylon tube on the apparatus that is pneumatic will be plumbed with compression type fittings where applicable. Push lock fittings will not be acceptable for any pneumatic nylon tube plumbing.

### **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 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 engine's aftertreatment device, and will be 4.00" in diameter. The exhaust system will include a Single Module™ 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 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 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.

The diffuser and extension pipe will be chrome.



## **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.

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.

### **FUEL SHUTOFF**

A shutoff valve will be installed in the fuel line, near the filter.

### **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.

### **DOWNSHIFT MODE (W/ENGINE BRAKE)**

The transmission will be provided with an aggressive downshift mode.

This will provide earlier transmission downshifts to 3rd gear, resulting in improved engine braking performance.

### **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, slip joint will be coated with Glidecoat® or equivalent.

### **STEERING**

Dual steering gear, with integral heavy-duty power steering, will be provided. For reduced system temperatures, the power steering will incorporate an air to oil cooler and Vickers® V20NF hydraulic pump with integral pressure and flow control. All power steering lines will have wire braided lines with crimped fittings.

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 2-spoke design.

### **LOGO AND CUSTOMER DESIGNATION ON HORN BUTTON**

The steering wheel 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: Mt. Tabor

The second row of text will be: Vol.

The third row of text will be: Fire Dept.

### **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.

### **HOSE TRAY**

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

The tray will have a capacity of 150' of 1.75" double jacket cotton-polyester hose.

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

### **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 20' 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.

### **CENTER HOSE TRAY RESTRAINT**

There will be one (1) pair of hose tray restraint straps located over the center mounted 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.





### **RUBBER BUMPERS**

one (1) pair dock style rubber bumpers mounted vertically will be installed on the front of the bumper.

They will be located at the frame extensions.

### **FRONT BUMPER NOTCH**

The front bumper will be notched for recessing of the Q2B siren. The notch will be designed so that the bumper is one continuous piece. The notch will be welded in place for strength with a continuous top and bottom flange. All welds will be metal finished for appearance. The siren will be located driver's side of the bumper.

### **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 polished stainless steel.

### **PROTECTIVE COATING ON BUMPER GRAVEL PAN**

A protective Line-X® spray-on polyurethane/polyurea coating will be applied to top surface of the bumper gravel pan.

The coating will be black in color.

The coating will be properly installed by an authorized Line-X dealer.

### **FRONT BUMPER LINE-X COATING**

Protective black Line-X® coating will be provided on the outside exterior of the top front bumper flange. It will not be sprayed on the underside of the flange.

The lining will be properly installed by an authorized Line-X dealer.

### **TOW HOOKS**

Two (2) chromed steel tow hooks will be installed under the bumper and attached to the front frame members. The tow hooks 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 hooks will not be used for lifting of the apparatus.

### **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 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 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 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.

### **INTERIOR CREW CAB REAR WALL ADJUSTABLE SEATING (PATENT PENDING)**

The interior rear wall of the crew cab will have mounting holes every 2.75" to allow for adjustability of the forward facing crew cab seating along the rear wall. Seats will be adjustable with use of simple hand



tools allowing departments flexibility of their seating arrangement should their department needs change.

### **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.



### **SIDE OF CAB MOLDING**

Chrome molding will be provided on both sides of cab.

### **MIRRORS**

A Retrac, Model 613423, dual vision, motorized, west coast style mirror, with chrome finish, will be mounted on each side of the front cab door with spring loaded retractable arms. The flat glass and convex glass will be heated and adjustable with remote control within reach of the driver.

### **FRONT CROSS VIEW MIRROR**

An 8.00" diameter convex mirror will be provided over the officer's side front corner of the cab. The mirror will provide the driver with a view of the front bumper and the area several feet in front of the truck.

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

### **DOORS**

To enhance entry and egress to the cab, the forward cab door openings will be a minimum of 37.50" wide x 63.37" 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 73.25" 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.

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 751. 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 bottom cab step at each cab door location will be located below the cab doors and will be exposed to the exterior of the cab.

### **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.

### **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 sprayed with black Line-X polyurethane/polyurea elastomer abrasive resistant material.

### **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.

### **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.

### **STORAGE COMPARTMENTS**

Provided on each side of the cab, to the rear of the crew cab access doors, will be a storage compartment. The compartments will be approximately 12.75" wide x 24.00" high x 15.00" deep.

The doors will be painted aluminum, double pan construction with one (1) D-ring slam latch. A rubber-covered bumper will be used as a doorstop.

The compartment interior will be painted spatter gray.

### **Compartment Light**

There will be two (2) white LED strip lights provided, one (1) each hinged side of compartment door openings.

### **SCUFFPLATE**

A full-height polished stainless steel scuffplate will be installed on the inside of each of the extended cab compartment door pan.

### **PIKE POLE STORAGE**

There will be two (2) set(s) of holders for mounting of pike pole(s). The holders will be mounted vertically one each side outboard, cab exterior rear wall for a Firehooks APH-6. The head of the pole will be held in place with a Handlelok, part number 1004, adjustable mounting bracket and the base in a cup holder.

### **MOUNTING SYSTEM**

There will be six (6) section(s) of Pac Trac equipment mounting systems located Back and rear side walls of crew cab, both sides.

Pac Trac mounts will be certified by Pac Trac to meet the latest NFPA requirements for mounting of equipment inside the cab.

### **EQUIPMENT MOUNTING SHELF**

There will be a shelf for permanent mounting of equipment provided. A quantity of two (2) will be located above the rear facing seats in the crew cab.





Each shelf will have a 1.50" lip around edge.

Each shelf will be fabricated from aluminum and will be painted to match the cab interior.

Tray not intended for storage of loose equipment. Items stored on tray will be permanently attached to meet NFPA requirements.

### **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 1.00" to allow for wire routing below the plate.

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 painted aluminum to match the cab interior.

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

Forward portion of 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. Mounting the condenser below the cab or body would reduce the performance of the system and will not be acceptable.

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**

There will be two (2) vinyl covered 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 HANDLE**

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 handle will be securely mounted to the post area between the door and windshield.

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

### **ENGINE COMPARTMENT LIGHT**

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

### **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.

### **MAP BOX**

There will be a map box with two (2) bins, open at top, provided. The map box will be located as directed. The map box will be divided into two (2) bins, each being 12.50" wide x 3.00" 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.

### **SEATING CAPACITY**

The seating capacity in the cab will be seven (7).

### **DRIVER SEAT**

A seat will be provided in the cab for the driver. The seat design will be a cam action type, with air suspension. For increased convenience, the seat will include a manual control to adjust the horizontal position (6.00" travel). The manual horizontal control will be a towel-bar style located below the forward part of the seat cushion. To provide flexibility for multiple driver configurations, the seat will have an adjustable reclining back. The seat back will be a high back style with side bolster pads for maximum support. For optimal comfort, the seat will be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

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

### **OFFICER SEAT**

A seat will be provided in the cab for the passenger. The seat will be a fixed type with no suspension. 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 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 OUTBOARD SEATS**

There will be two (2) rear facing seat provided one each side outboard positions in the crew cab. For optimal comfort, the seat will be provided with 15.00" 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 be furnished with a 3-point, shoulder type seat belt.

### **FORWARD FACING CENTER SEATS**

There will be three (3) forward facing seats provided at the center position in the crew cab. For optimal comfort, the seats will be provided with 15.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seats will be evenly spaced on a seat riser approximately 72.00" wide. The riser will be constructed from aluminum treadplate.

The seat backs will be an SCBA style with 90 degree back. The SCBA cavity will be adjustable from front to rear in 1.00" increments to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

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

### **ACCESS DOORS**

An access door will be provided on both sides of the forward facing seat riser in crew cab. Doors will be constructed out of same material as seat riser with one (1) 1/4 turn flush latch on each door.

### **SEAT UPHOLSTERY**

All seat upholstery will be black Turnout Tuff material.

### **AIR BOTTLE HOLDERS**

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

There will be a quantity of six (6) SCBA brackets.



### **SEAT BELTS**

All 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.

### **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) lights will be installed and located, one (1) on each side of the crew cab.

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.

### **HAND HELD LIGHT**

There will be four (4) Streamlight E-Spot FireBox Vehicle Mount Systems, Model 45865, LED hand held flashlights with an orange thermoplastic body provided.

The location will be two each side upper crew cab, outboard.

The system will include the handlight, a charger and the vehicle mount system.

### **HAND HELD LIGHT**

There will be one (1) light Streamlight E-Spot, FireBox Vehicle Mount Systems, Model 45865 LED hand held flashlights with an orange thermoplastic body provided.



The location will be inboard and rearward of the officer's seat on the mounting plate.

The system will include the hand light, a 12 VDC charger and the vehicle mount system.

### **CAB INSTRUMENTATION**

The cab instrument panel will be a molded ABS panel and include gauges, 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) black faced gauges with black bezels to monitor vehicle performance:

- Voltmeter gauge (volts):
  - Low volts (11.8 VDC)
    - Amber telltale light on indicator light display with steady tone alarm
  - High volts (15.5 VDC)
    - Amber telltale light on indicator light display with steady tone alarm
- Engine Tachometer (RPM)
- Speedometer MPH (Major Scale), KM/H (Minor Scale)
- Fuel level gauge (Empty - Full in fractions):
  - Low fuel (1/8 full)
    - Amber indicator light in gauge dial with steady tone alarm
- Engine Oil pressure Gauge (PSI):
  - Low oil pressure to activate engine warning lights and alarms
    - Red indicator light in gauge dial with steady tone alarm
- Front Air Pressure Gauges (PSI):
  - Low air pressure to activate warning lights and alarm
    - Red indicator light in gauge dial with steady tone alarm
- Rear Air Pressure Gauges (PSI):
  - Low air pressure to activate warning lights and alarm
    - Red indicator light in gauge dial with steady tone alarm
- Transmission Oil Temperature Gauge (Fahrenheit):
  - High transmission oil temperature activates warning lights and alarm
    - Amber indicator light in gauge dial with steady tone alarm
- Engine Coolant Temperature Gauge (Fahrenheit):
  - High engine temperature activates an engine warning light and alarms





- Red indicator light in gauge dial with steady tone alarm
- Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions):
  - Low fluid (1/8 full)
    - Amber indicator light in gauge dial

### **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
- Check engine
- Check trans (check transmission)
- Air rest (air restriction)
- DPF (engine diesel particulate filter regeneration)
- ABS (antilock brake system)
- MIL (engine emissions system malfunction indicator lamp) (where applicable)
- Regen inhibit (engine emissions regeneration inhibit) (where applicable)
- The following red telltale lamps will be present:
  - Ladder rack down
  - Parking brake
  - Stop engine
- The following green telltale lamps will be present:
  - Left turn
  - Right turn
  - Battery on
  - Ignition
- The following blue telltale lamps will be present:
  - High beam

### **ALARMS**

Audible steady tone warning alarm: A steady audible tone alarm will be provided whenever a warning condition is active.

### **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 for 3 to 5 seconds when the ignition switch is moved to the on position with the battery switch on.



## **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.

**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 and defroster controls.

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

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

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

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

**High idle engagement switch:** A maintained 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..

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 provided and accessible while standing on the ground. The panel will be 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/TRANSMISSION/ABS J1939 Diagnostic Port
- ABS Diagnostic Switch and Indicator - The switch and amber indicator will allow access to diagnostic mode and display of standard ABS system fault blink codes that may be generated by the ABS system
- DPF REGEN (Diesel Particulate Filter Regeneration Switch) (where applicable) will be provided to request regeneration of the engine emission system. An amber indicator will be provided on top of the switch that will illuminate in a "CHECK ENGINE" condition
- REGEN INHIBIT (Diesel Particulate Filter Regeneration Inhibit Switch) (where applicable) will be provided that will request that regeneration be temporarily prevented. A green indicator will be provided on top of the Regen Inhibit switch that will illuminate when the Regen Inhibit feature is active. Regen Inhibit will be disabled upon cycling of the ignition switch to the off state.

### **AIR RESTRICTION INDICATOR**

A high air restriction warning indicator light (electronic) will be provided.



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

A flashing red indicator light, located in the driving compartment, will be illuminated automatically per the current NFPA requirements. The light will be labeled "Do Not Move Apparatus If Light Is On."

The same circuit that activates the Do Not Move Apparatus indicator will activate a steady tone alarm when the parking brake is released.

### **SWITCH PANELS**

The built-in switch panels will be located in the lower console or overhead console of the cab. Switches will be rocker type with an indicator light, of which is an integral part of the switch.

### **WIPER CONTROL**

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

### **SPARE CIRCUIT**

There will be two (2) 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 on the officer's side of the engine tunnel
- Termination will be with 15 amp, power point plug with rubber cover
- Wires will be sized to 125 percent of the protection

The 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 15 amps at 12 volts DC.

Power and ground will terminate behind the officer's seat.

Termination will be with a 10-place bus bar with screws and removable cover.

Wires will be sized to 125% of the protection.



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

### **SWITCH MOUNTING BRACKET**

There will be a housing provided to the left of the officer, forward for the mounting of the six (6) horizontally mounted rocker switches with backlit labeling.

The housing will be fabricated from smooth aluminum and painted to match the cab interior.

### **DUAL USB SOCKET**

There will be two (2) Blue Sea, Model 1016, dual USB type A charger sockets installed officer's side dash and rear of the engine tunnel, below the mounting plate . The socket will be powered directly to the battery power .

### **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. 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 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.

### **RADIO ANTENNA MOUNT**

There will be four (4) standard 1.125", 18 thread antenna-mounting base(s) installed 2 each side 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.

### **VEHICLE CAMERA SYSTEM**

There will be a color vehicle camera system provided with the following:

- One (1) camera located at the rear of the apparatus, pointing rearward, displayed automatically with the vehicle in reverse
- One (1) camera located on the passenger side of the apparatus, pointing rearward, displayed automatically with the passenger side turn signal

The camera images will be displayed on a 7.00" LCD display located centered between the sunvisors on a panavise mount. The display will include manual camera activation capability and audio from the rear camera only.

The following components will be included:

- One (1) MO700136DC Display
- One (1) SV-CW134639CAI Rear camera
- One (1) CS134404CI Side camera
- All necessary cables

### **RECESS REAR CAMERA**

A rear camera recess will be provided in the center at the rear.

### **ELECTRICAL POWER CONTROL SYSTEM**

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

Serviceable components will be readily accessible.

Circuit protection devices, which conform to SAE standard, will be utilized to protect each circuit. All circuit protection devices will be sized to prevent wire and component damage when subjected to



extreme current overload. General protection circuit breakers will be Type-I automatic reset (continuously resetting) and conform to SAE J553 or J258. When required, automotive type fuses conforming to SAE J554, J1284, J1888 or J2077 will be utilized to protect electronic equipment.

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

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

### **VOLTAGE MONITOR SYSTEM**

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

### **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:

- 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

### **EMI/RFI PROTECTION**

The electrical system proposed will include means to control undesired electromagnetic and radio frequency emissions. State of the art electrical system design and components will be used to ensure radiated and conducted EMI (electromagnetic interference) and RFI (radio frequency interference) emissions are suppressed at their source.

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

EMI/RFI susceptibility will be controlled by applying immune circuit designs, shielding, twisted pair wiring and filtering. 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 Pierce Manufacturing 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 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. 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 have 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

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**

A Charging Systems International, Dual Pro Charger, dual bank 20 amp battery charger will be provided.

This charging system will include the single remote indicator.



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

The battery charger will be located in the left body compartment mounted on the back wall as high as possible.

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

### **KUSSMAUL AUTO EJECT FOR SHORELINE**

There will be two (2) Kussmaul Model 091-55-15-120, 15 amp 120 volt AC shoreline inlet(s) provided to operate the dedicated 120 volt AC circuits on the apparatus without the use of the generator.

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 battery charger and shoreline outlets.

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 and passenger side of cab, above wheel.

### **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.

### **ELECTRONIC LOAD MANAGEMENT**

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

The ELM will monitor the vehicle's voltage while at the scene (parking brake applied). It will sequentially shut down individual electrical loads when the system voltage drops below a preset value.



Two (2) separate electrical loads will be controlled by the load manager. The ELM will sequentially re-energize electrical loads as the system voltage recovers.

### **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 Model 8800-12V - DOT/ECE LB LED, low beam module.
- The inside light on each side will contain a Model 8800 -12V - DOT/ECE HB LED, high beam module.

### **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 the same color as the LED's.

### **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**

There will be five (5) Truck-Lite, Model 35200Y, amber LED lights provided to indicate the presence and overall width of the vehicle in the following locations:

- Three (3) amber LED identification lights will be installed in the center of the cab above the windshield.
- Two (2) amber LED clearance lights will be installed, one (1) on each outboard side of the cab above the windshield.

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

There will be a three (3) LED light bar used as identification lights 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

There will be two (2) LED lights installed 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) LED lights installed on the side of the apparatus used 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.

#### **FRONT CAB SIDE CLEARANCE/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 additional directional lights with the corresponding directional circuit.

#### **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.

### **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.

### **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.

### **SYNCHRONIZE WARNING LIGHTS**

The sync wires to the following six (6) lights located side warning lights on the apparatus will be connected together to maintain the flash patterns of the lights.

The lights located front and rear sides will remain on phase 1 or flash together.

The lights located middle side will be changed to phase 2 or flash opposite the lights selected above.

### **AUXILIARY SIDE MARKER LIGHTS**

A set of two (2) LED marker lights will be installed on each side of the vehicle body under walkway step and at the rear. All marker lights will be actuated with the headlight switch.

### **ADDITIONAL EMERGENCY LIGHT MASTER SWITCH**

A second master switch, for the emergency lights, will be provided. This switch will be located in the overhead position within easy reach of the officer.

### **CAB PERIMETER SCENE LIGHTS**

There will be four (4) Amdor LumaBar H2O white LED strip lights provided, one (1) for each cab door and crew cab door.

- Two (2) Amdor LumaBar H2O, Model AY-9500-020, 20.00" LED strip lights, one (1) for each cab door.
- Two (2) Amdor LumaBar H2O, Model AY-9500-012, 12.00" LED strip lights, one (1) for each crew 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 four (4) Amdor, Model AY-9500-0\*\*, white LED light strips provided.

The lights will be mounted in the following locations:



- One (1) Model AY-9500-012, 12.00" LED light will be provided under the driver's side top mount pump panel access step
- One (1) Model AY-9500-020, 20.00" LED light will be provided under the driver's side pump panel running board
- One (1) Model AY-9500-020, 20.00" LEDlight will be provided under the passenger's side pump panel running board
- One (1) Model AY-9500-012, 12.00" LED light will be provided under the passenger's side top mount pump panel access step

### **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 and the reverse signal activated, activating all the side facing perimeter lights.

### **ADDITIONAL PERIMETER LIGHTS**

There will be six (6) lights Amdor® Luma Bar® H2O, Model AY-9500-012 12.00" white LED perimeter light(s) 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 and one (1) light under each side of the front bumper spaced evenly.

These lights will be activated the same as the body perimeter lights.

### **STEP LIGHTS**

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

In order to ensure exceptional illumination, each 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.

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

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

### **SCENE LIGHTS**

There will be one (1) Fire Research, Model SPA900-Q70 scene light(s) with chrome flange(s) installed on the side of the apparatus, driver's side upper cab.

A control for the light(s) selected above will be the following:

from the driver's side body scene light option control





opening the driver's side cab or crew cab doors

### **SCENE LIGHTS**

There will be one (1) Fire Research, Model SPA900-Q70 scene light(s) with chrome flange(s) installed on the side of the apparatus, passenger side upper cab .

A control for the light(s) selected above will be the following:

from the passenger's side body scene light option control

opening the passenger's side cab or crew cab doors

### **12 VOLT LIGHTING**

There will be one (1) Fire Research Spectra MAX, Model SPA510-Q28, 12 volt DC LED scene light(s) provided on top mount, pull up pole(s), located driver's side pump compartment.

The painted parts of this light assembly to be black with a black bezel.

The light(s) will be controlled in the following way:

- 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

### **12 VOLT LIGHTING**

There will be one (1) Fire Research Spectra MAX, Model SPA510-Q28, 12 volt DC LED scene light(s) provided on top mount, pull up pole(s), located passenger side pump compartment.

The painted parts of this light assembly to be black with a black bezel.

The light(s) will be controlled in the following way:

- 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

### **12 VOLT LIGHTING**

There will be one (1) Fire Research Spectra Max, Model SPA100-Q28-\*, 12 volt DC LED light(s) provided on the front visor, centered.

The painted parts of this light assembly to be black with a black bezel.

The light(s) will be steady burning with the selected switch features.

The light(s) will be controlled by the following:



- a switch at the driver's side switch panel and a switch at the passenger's side switch panel
- a switch at the pump operator's panel

### **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.

- One (1) light strip will be installed the entire length of the driver's side of the hose bed.
- One (1) light strip will be installed the entire length of the passenger's 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.

### **ADDITIONAL HOSE BED LIGHTS**

There will be one (1) 63.00" white 12 volt DC LED light strip(s) provided on the front of the hose bed.

The light(s) will be activated with the other hosebed lights.

### **WALKING SURFACE LIGHT**

There will be Model FRP, 4" round black 12 volt DC LED floodlight with bolt mount provided to illuminate the entire designated walking surface on top of the body.

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

### **WATER TANK**

Booster tank will have a capacity of 750 gallons and be constructed of polypropylene plastic by United Plastic Fabricating, Incorporated.

The tank will be stepped in design to allow for a low hosebed.

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

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

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

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

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

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



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

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

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

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

Sump will include a drain plug and the tank outlet.

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

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

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

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

Mounting system will be approved by the tank manufacturer.

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

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

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

The top of the taller portion of the water tank will be covered with aluminum treadplate.

### **TANK CRADLE**

The water tank will be installed in a fabricated cradle assembly constructed of stainless steel.

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

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.



### **DIRECT TANK FILL**

A total of one (1) 2.50" gated direct tank fill will be installed and integrated into the front inlet plumbing. The tank fill connection will be located in the plumbing on the hose connection side of the front inlet valve, allowing the tank fill to operate when the front inlet valve closed.

The fill inlet will have electrically actuated ball valve connected to the water level indicator. When the water level falls to the 3/4 full mark, the tank fill(s) will automatically open and return the tank to the full level.

The fill will have both an automatic and a manual control mode with those controls mounted on the operator's panel. An indicator light will also be provided.

### **HOSE BED**

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

The hose bed will be as low as practical.

Standard hose bed width will be 68.00" inside.

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

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 grating with the top surface corrugated to aid in hose aeration. The grating slats will be a minimum of 0.50" x 4.50" with spacing between slats for hose ventilation.

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.

Hose bed will accommodate 300' of 2.50"; 300' of 3.00"; 300' of 1.75"; 1000' of 5.00".

### **HOSE BED DIVIDER**

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

Each divider will be constructed of a .25" brushed aluminum sheet. Flat surfaces will be sanded for uniform appearance, or constructed of brushed aluminum.

An oval opening will be provided near the rear of the divider to be used as a hand hold and aid in accessing the hose bed.

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



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

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

### **REINFORCEMENT, HOSEBED DIVIDERS**

The two (2) hosebed divider(s) will be reinforced by attaching them to the rear upper crossbar with adjustable stanchions. The crossbar will have a shelf track attached to the underside of it to allow adjustable hose bed dividers to be moved from side to side.

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

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

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

A cross-divider will be provided at the very front of the hose bed area. The divider will be bolted to the side sheet and painted

### **CUTOUT, HANDHOLD**

A cutout with radiused corners will be provided at the rear of the two (2) hose bed divider(s).

There will be one (1) additional hose bed dividers furnished.

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

Partition will be permanently installed and located approximately 16" from the left side of the hosebed, to support the shelf to its left.

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.

There will be one (1) vertically hinged, brushed stainless steel door(s) provided at the rear of the to the left of the permanent divider, below the shelf storage area in the hose bed. The door will be equipped with a lift and turn latch .

### **SHELF, IN HOSE BED**

A permanent shelf will be provided for hose storage inside the hose bed to the left of the permanent divider, approx. 20" wide and 12" from the hosebed floor. The shelf will be mounted between two (2) hose bed dividers.

### **HOSE BED COVER**

A roller shutter style hose bed cover will be supplied.



The cover will be the full length and width of the hose bed area with a gray vinyl flap at the rear. The vinyl flap will be attached to the cover with 2.00" side release at the top and spring clip and hook at the bottom.

The cover will be constructed of stainless steel with aluminum support channels bonded and mechanically fastened to the bottom. There will be a non-slip coating applied to the top surface.

A lift bar will be located at the rear of door and have latches on the outer extrusion of the door frame to hold the door in the closed position.

A cross divider will be provided at the front of the hose bed forward of any domes to section off the door roll area.

### **LETTERING, HOSEBED COVER**

Installed on rear flap of the hosebed cover, white reflective lettering will be provided. There will be seven (7) letters provided. The reflective lettering will be approximately 10.00" high. The lettering designation on the cover will be MT TABOR.

### **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 and rear outside corner of the running board will be finished with a 45 degree corner where it lines up with the body.

A splashguard 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 24.00" deep in the center area and 8.00" deep to the rear of the side compartments. The tailboard will be T-shaped. The outboard sides of the tailboard will be angled at 45 degrees beginning at the point where the body meets the tailboard at the 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.

### **TOW BAR**

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



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

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

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

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

### **WRAP**

A 4.00" high aluminum wrap will be provided on the tailboard. The wrap will be painted job color.

### **SAFE-STRIDE® COATING - TAILBOARD**

Protective black Safe-Stride® non-slip surface treatment shall be provided on the outside exterior of the top tailboard corner. It shall not be applied on the underside of the flange.

### **RUNNING BOARD HOSE RESTRAINT**

A pair of 2.00" wide black nylon straps with 2.00" cam buckle 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.

### **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 20.00' of 5.00" soft suction hose.

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

### **RUNNING BOARD / TAILBOARD EDGE TREATMENT**

The side running board and rear tailboard will incorporate a punching design to create an aggressive tread at the outside edge of the running board and tailboard.

### **WALKWAY / TAILBOARD TREAD**

The rear tailboard will incorporate the octagonal punching design to create an aggressive tread on the tailboard surfaces. The out side edge of the top mount walkway and intermediate step will be punched at the outside edge with a raised tread to match the cab steps.

### **COMPARTMENTATION**

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





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

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

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

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

Drip protection will be provided above the doors by means of bright aluminum extrusion, formed bright aluminum treadplate or polished stainless steel.

The 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.

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.

### **UNDERBODY SUPPORT SYSTEM**

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

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

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

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

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

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

Isolators will have a broad load range, proven viability in vehicular applications, be of a fail safe design and allow for all necessary movement in three (3) transitional and rotational modes.



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

### **AGGRESSIVE WALKING SURFACE**

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

### **LOUVERS**

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

### **TESTING OF BODY DESIGN**

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

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

The criteria used during the testing procedure will include:

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

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

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

A full height and full depth, vertically hinged, single door compartment ahead of the rear wheels will be provided. The interior dimensions of this compartment will be 34.50" wide x 66.63" high x 25.88" deep. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment will be 30.00" wide x 62.00" high.

A positive door holder will be furnished with this compartment.

A horizontally hinged, single lift-up door compartment over the rear wheels will be provided. The interior dimensions of this compartment will be 66.50" wide x 32.88" high x 12.00" deep. The depth of



the compartment will be calculated with the compartment door closed. The clear door opening of this compartment will be 59.50" wide x 28.25" high.

The lift-up door will be furnished with two (2) gas-charged cylinders to assist in the opening of the door and to maintain the door in an open position. There will be a field adjustable, three-position bracket mounted on the vertical side door opening that will allow the door to be held open at 87°, 90°, or 93°.

Closing of the door will not require releasing, unlocking, or unlatching any mechanism.

A full height, vertically hinged, double door compartment behind the rear wheels will be provided. The interior dimensions of this compartment will be 47.50" wide x 67.63" high x 25.88" deep in the lower 26.00" of height and 12.00" deep in the remaining height of the compartment. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment will be 46.00" wide x 63.00" high.

Positive door holders will be furnished with this compartment.

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

A full height, vertically hinged, single door compartment ahead of the rear wheels will be provided. The interior dimensions of this compartment will be 34.50" wide x 66.63" high x 25.88" deep in the lower 25.00" of the compartment and 12.00" deep in the remaining upper portion. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment will be 30.00" wide x 62.00" high.

A positive door holder will be furnished with this compartment.

A horizontally hinged, single lift-up door compartment over the rear wheels will be provided.. The interior dimensions of this compartment will be 66.50" wide x 32.88" high x 12.00" deep. The depth of the compartment will be calculated with the compartment door closed. The clear door opening of this compartment will be 59.50" wide x 28.25" high.

The lift-up door will be furnished with two (2) gas-charged cylinders to assist in the opening of the door and to maintain the door in an open position. There will be a field adjustable, three-position bracket mounted on the vertical side door opening that will allow the door to be held open at 87°, 90°, or 93°. Closing of the door will not require releasing, unlocking, or unlatching any mechanism.

A full height, vertically hinged, double door compartment behind the rear wheels will be provided. The interior dimensions of this compartment will be 47.50" wide x 67.63" high x 12.00" deep. A section of this compartment will be 25.88" deep x 47.50" wide x 26.00" high directly behind the rear wheels. The



depth of the compartment will be calculated with the compartment door closed. The compartment interior will be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment will be 46.00" wide x 63.00" high.

A positive door holder will be furnished with this compartment.

### **DOORS, SIDE COMPARTMENT**

All hinged compartment doors will be lap style with double panel construction and will be a minimum of 1.50" thick. To provide additional door strength a "C" section reinforcement will be installed between the outer and interior panels.

Doors will be provided with a closed cell rubber gasket around the surface that laps onto the body. A second heavy-duty automotive rubber molding with a hollow core will be installed on the door framing that seals onto the interior panel, to ensure a weather resisting compartment.

All compartment doors will have polished stainless steel continuous hinge with a pin diameter of .25" that is bolted or screwed on with stainless steel fasteners.

All door locking mechanisms will be fully enclosed within the door panels to prevent fouling of the lock in the event equipment inside shifts into the lock area.

Doors will be latched with recessed, polished stainless steel "D" ring handles and FMVSS approved door locking mechanisms.

To prevent corrosion caused by dissimilar metals, compartment door handles will not be attached to outer door panel with screws. A rubber gasket will be provided between the "D" ring handle and the door.

### **COMPARTMENTATION, REAR**

A rollup door compartment above the rear tailboard will be provided.

Interior dimensions of this compartment will be 40.00" wide x 33.63" high x 25.88" deep in the lower 26.00" of height and 15.75" deep in the remaining upper portion. Depth of the compartment will be calculated with the compartment door closed.

For a chassis with a rear mounted fuel tank, a louvered removable access panel will be furnished on the back wall of the compartment.

Rear compartment will be open into the rear side compartments.

Clear door opening of this compartment will be 33.25" wide x 26.00" 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, painted one (1) color to match the lower portion of the body 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.

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.

### **SCUFFPLATE**

A polished stainless steel scuffplate will be furnished on the rear outside corners of the body. The stainless steel will have a 90 degree angle and will overlap the sides of the body approximately 1.00".

The scuffplate will be full height and/or cover the available amount of vertical surface.



### **DOOR GUARD**

one (1) compartment door will include an L-shaped guard designed to protect the bottom and interior side of the roll-up door from damage when in the retracted position and contain any water spray while the door is being opened. The guard will be fabricated from stainless steel and installed Compartment R1.

### **REVERSE HINGED DOOR**

The one (1) compartment door, located driver's side front, will have the hinge at the rear of the door.

### **DOOR FRAME SCUFFPLATE**

Six (6) scuffplates will be provided for the lower door frame of all side compartments. Each scuffplate will be polished stainless steel with a .38" lip down.

### **SCUFFPLATE ON INTERIOR OF COMPARTMENT DOOR(S)**

The eight (8) compartment doors will include a polished stainless steel scuffplate to cover the entire width and height on the inside panel of each door pan.

Scuffplate will be located all side compartment doors.

### **COMPARTMENT LIGHTING**

There will be seven (7) compartment(s) with two (2) white 12 volt DC LED compartment light strips. The dual light strips will be centered vertically along each side of the door framing. There will be two (2) light strips per compartment. The dual light strips will be in all body compartment(s).

Any remaining compartments without light strips will have a 6.00" diameter Truck-Lite, Model: 79384 light. Each light will have a number 1076 one filament, two wire bulb.

Opening the compartment door will automatically turn the 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 with a brushed finish 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 in D1 at the transition point, in D3 at the transition point, in P1 at the transition point and in P3 at the transition point.

#### **SLIDE-OUT ADJUSTABLE HEIGHT TRAY**

There will be one (1) slide-out tray 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 with a brushed finish.

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 FLOOR MOUNTED TRAY**

There will be four (4) floor mounted slide-out tray(s) with 2.00" sides provided Compartments D1, R1, P1,P2. 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 brushed aluminum.

The tray(s) will be designed for maximum compartment width and depth.

Slides will be equipped with ball bearings for ease of operation and years of dependable service. The slides will be located on the sides of the tray so that the tray can be located as close to the compartment floor as possible.

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.

#### **SLIDE OUT TOOLBOARD**

A slide out aluminum toolboard will be provided.

It will be a minimum of .188" thick with .20" diameter holes in a pegboard pattern with 1.00" centers between holes.

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

The board will be mounted on an undermount - roller bearing type slide rated at 250lbs with a 100% safety factor.





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 also be able to operated smoothly without bumps or sticky spots after a 40 hour vibrations test (reference MIL-STD 810E section 514.4 basic transportation vibration category 1) while fully loaded. Proof of compliance will be provided upon request.

The slide will be mounted mounted stationary within the compartment.

The board will have positive lock in the stowed and extended position.

There will be Two (2) toolboard(s) provided. The toolboard(s) will be spatter gray painted and installed driver's side front compartment.

A 10.00" wide tray will be centered above the slide and under the toolboard as a catch for anything that may fall off the toolboard.

### **SWING OUT TOOLBOARD**

A swing out aluminum toolboard will be provided.

It will be a minimum of .188" thick with .20" diameter holes in a pegboard pattern with 1.00" centers between holes.

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

The board will be mounted on a pivoting device at the front of the compartment on the top and bottom to allow easy movement in and out of the compartment. The maximum tool load will be 400 pounds.

The board will have positive lock in the stowed and extended position.

The board will be mounted on adjustable tracks from front to back within the compartment.

There will be One (1) toolboard(s) provided. The toolboard(s) will be painted spatter gray to match compartment interior and installed D2.

### **MOUNTING PLATE**

A quantity of one (1) stainless steel mounting plate(s) will be provided. The plate(s) will be brushed. The plate(s) will be 14" wide x 24" tall in size and mounted left rear lower body bulkhead .

### **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.



### **ALUMINUM PEGBOARD**

Two (2) horizontally installed tracks, with 0.19" aluminum pegboard will be installed on the back wall of one (1) compartments. The holes will be .203" diameter , punched 1.00" on center. The pegboard will be spatter gray painted. The pegboard(s) will be located in D2.

Retainers will be used to mount the pegboard to the tracks.

### **SPLASH GUARDS**

The rear wheel well liners will be extended inward and will have a black rubber splash guard attached to prevent mud and dirt from spraying between the water tank and body panels. This guard will be notched to clear the rear springs if required.

### **RUB RAIL**

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

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

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

### **BODY FENDER CROWNS**

Stainless steel fender crowns will be provided around the rear wheel openings.

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

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

### **HARD SUCTION HOSE**

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

### **HOSE TROUGHS**

Hard suction hose will be carried in two (2) V-shaped troughs, one (1) each side, and held in place by Velcro fasteners.

Troughs will be constructed of unpainted aluminum with a DA finish.

### **HANDRAILS**

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



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

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

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 black rubber-covered handrail will be provided above the hose bed at the rear of the apparatus. The hose bed dividers shall be tied to the upper handrail or cross bar in order to provide sufficient reinforcement.

- Four (4) handrails will be provided mounted as needed.

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

A total of two (2) extinguisher/air bottle/storage compartments will be provided passenger side fender panel. 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 Dura-Surf friction reducing material 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 PACK STORAGE**

A total of one (1) air pack compartment(s) will be provided and located driver's side body wheelwell, forward. The air pack compartment(s) will be tapered to match the profile of the space available in the fender. The compartment(s) will be approximately 15.50" wide at the top and 5.00" wide at the bottom for the wheel cutout. The compartment(s) will be 15.50" tall at the body side compartment and 6.00" tall at the wheel cutout. The compartment(s) will be 26.00" deep and have a drain hole.

Inside the compartment, black rubber matting will be provided.

A polished stainless steel hinged door with a pair of flush lift & turn latches will be provided to contain the air pack. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

### **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 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.

#### **AIR BOTTLE STORAGE BIN**

A storage bin will be provided for storage of nine (9) air bottles. This storage bin will be installed compartment D3, to the right side. Each separate air bottle storage compartment will be 5.9" square x 22.50" deep in 1 wide x 9 tall. The storage bin will be formed out of aluminum.

#### **EXTENSION LADDER**

There will be a 28', two (2)-section, aluminum, Duo-Safety, Series 1200-A extension ladder provided.

#### **ROOF LADDER**

There will be one (1) 16' aluminum, Duo-Safety, Series 875-DR roof ladder(s) provided. The ladder(s) will have hooks on both ends.

#### **FOLDING LADDER**

One (1) 10.00' aluminum, Series 585-A, Duo-Safety folding ladder will be installed in the passenger side pike pole/folding ladder compartment.

#### **HYDRAULIC LADDER RACK**

Ground ladders will be mounted above the right side of the hose body in a specially designed swing-down cradle. This cradle will be electric/hydraulic operated. The system design will have been life cycle tested for at least 14 years of dependable service.

An independent hydraulic pump powered by a 12-volt electric motor will operate the hydraulics. Operation of the hydraulic system for the ladder rack by an engine-powered pump will be totally unacceptable. The hydraulic pump and reservoir will be accessible from the ground through a stainless steel inspection door.

The ladder rack will incorporate two hydraulic rotary actuators, one each located inside the front compartment and the rear compartment. The actuators will be completely enclosed within each compartment to eliminate any pinch points while operating the ladder rack. Lifting arms will be attached outside the compartment body to the front and rear actuator. A center-lifting arm built into the compartment space is unnecessary and is unacceptable.



The rack can be designed in certain situations to provide lifting capabilities up to 500lbs.

The maximum height of the rack from the ground in the lowered position will be no more than 47.00".

The electric control panel will have a master switch on/off switch, an actuation switch, an operation indicator light and operation instructions. The electric controls will be located in such a manner to allow the operator full view of the area into which the ladders will be lowered.

Two (2) air operated safety locks will be furnished to securely maintain the ladder bracket assembly in the travel position. These air operated safety locks will be controlled from the ladder rack control panel.

A polished stainless steel enclosure shall be provided over the hydraulic ladder rack lock at the rear on the passenger side to cover the ladder rack lock (1) and provide mounting for any rear warning lights.

Ladders will be secured to the brackets with two (2) locks retaining the roof ladder and the extension ladder. The locks will be such that when the roof ladder is removed, the clamps can be moved a half turn to hold the extension ladder in place.

#### **LADDER RACK INTERLOCK AND NOT STOWED INDICATOR LIGHT**

An interlock will be provided to prevent operation of the ladder rack unless the apparatus parking brake has been activated.

A steady red indicator light will be located on the cab instrument panel and illuminated when the hydraulic ladder rack is not in the stowed position. The light will be labeled "Ladder Rack". In addition, the "Do Not Move Apparatus" light located in the cab will be activated when the hydraulic ladder rack is not in the stowed position.

#### **LIGHTS, FLASHING LED, HYDRAULIC LADDER RACK**

Flashing amber LED lights facing the front and rear will be provided on the ladder rack and activated whenever the rack is in the down position.

The rear ladder rack arm will have an offset to not block the rear upper zone warning lights.

#### **LADDER LOCK COVER**

A pair of polished stainless steel covers will be provided over the hydraulic ladder rack air locks.

#### **LADDER RACK WARNING LIGHTS**

There will be two (2) Whelen, Model 50\*2Z\*R, LED flashing warning lights with chrome flange installed, one (1) on each end of the hydraulic ladder rack.

The color of the lights will be amber LED/amber lens .

The lights will activate whenever the rack is lowered.



### **HYDRAULIC LADDER RACK PUMP LOCATION**

The hydraulic pump for the ladder rack will be located next to the rear compartment, below the hosebed. An access door will be provided to fill the pump.

### **10' PIKE POLE**

One (1) pike pole Fire Hooks Unlimited, Model RH-10, 10' long roof hook with a steel handle will be provided and located on the ladder rack.

### **PIKE POLE STORAGE**

Aluminum tubing will be used for the storage of two (2) pike poles and will be located ladder compartment. 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.

### **8' PIKE POLE**

There will be two (2) Fire Hooks Unlimited, New York Hook , 8' long roof hook with steel shaft and chisel (pry) end provided. The poles will be located passenger side pike pole compartment.

### **6 FT PIKE POLE**

There will be two (2) Fire Hooks Unlimited NY roof hook RH-6, 6 foot pike pole(s) with steel handles and pry end provided one each side back of the cab.

### **PIKE POLE/FOLDING LADDER COMPARTMENT**

One (1) pike pole compartment will be provided, recessed below the water tank tee in the rear of body on the passenger's side of the tailboard compartment. The compartment will be equipped with two (2) pvc tubes to hold two (2) pike poles and a stainless steel trough for the folding ladder. The door will be made of stainless steel and have a lift and turn latch.

### **REAR FOLDING STEPS**

Bright finished, non-skid folding steps with a black coating 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.

Three (3) additional folding steps will be located one (1) on the driver side front bulkhead, one (1) on the passenger side front bulkhead and one (1) on the passenger side rear bulkhead. The step(s) will be bright finished, non-skid with a black coating. 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, 2000 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.
- 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 a 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 PACKING**

Stuffing boxes will be of the conventional two (2) piece, split-gland type, to permit adjustment or replacement of Grafoil packing without disturbing the pump. Water will be fed into stuffing box lantern rings for proper lubrication and cooling when the pump is operating.

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

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**

A Trident Air Max intake relief valve will be installed on the suction side of the pump preset at 125 psig.

Relief valve will have a working range of 50 psig to 350 psig.

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.

An adjustable air regulator and pressure indicating gauge will be located at the pump operator's panel.

### **PRESSURE CONTROLLER**

A Pierce Pressure Governor will be provided. An electric pressure governor will be provided which is capable of automatically maintaining a desired preset discharge pressure in the water pump. When operating in the pressure control mode, the system will automatically maintain the discharge pressure set by the operator (within the discharge capabilities of the pump and water supply) regardless of flow, within the discharge capacities of the water pump and water supply.

A pressure transducer will be installed in the water discharge of the pump. The transducer continuously monitors pump pressure sending a signal to the Electronic Control Module (ECM).

The governor can be used in two (2) modes of operation, RPM mode and pressure modes.

In the RPM mode, the governor can be activated after vehicle parking brake has been set. When in this mode, the governor will maintain the set engine speed, regardless of engine load (within engine operation capabilities).

In the pressure mode, the governor system can only operate after the fire pump has been engaged and the vehicle parking brake has been set. When in the pressure mode, the pressure controller monitors the pump pressure and varies engine speed to maintain a precise pump pressure. The pressure controller will use a quicker reacting J1939 database for engine control.

A preset feature allows a predetermined pressure or rpm to be set.

A pump cavitation protection feature is also provided which will return the engine to idle should the pump cavitate. Cavitation is sensed by the combination of pump pressure below 30 psi and engine speed above 2000 rpm for more than five (5) seconds.

The throttle will be a vernier style control, with a large control knob for use with a gloved hand. A throttle ready light will be provided adjacent to the throttle control. A large 0.75" RPM display will be provided to be visible at a glance.

Check engine, and stop engine indicator lights will be provided for easy viewing.



Large 0.75" push buttons will be provided for menu, mode, preset, and silence selections.

The water tank level indicator will be incorporated in the pressure governor.

A fuel level indicator will be incorporated in the pressure controller.

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

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

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

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

### **PRIMING PUMP**

The priming pump will be a Trident Emergency Products compressed air powered, high efficiency, multistage venturi based AirPrime System, conforming to standards outlined in the current edition of NFPA 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.

### **AIR BLOWOUT VALVE**

A blowout will be furnished to blow out any remaining water from the front discharge line.

Blowout will be piped from the wet tank of the brake system, and will be controlled at the pump operator's panel.

### **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) CDs. 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.

### **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.

### **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.

### **LEFT SIDE INLET**

There will be one (1) auxiliary inlet with a 2.50" valve at the left 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.

### **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.



Inlet valve location will be behind the pump panel.

### **ANODE, INLET**

A pair of replaceable sacrificial .75" magnesium anodes will be provided in the water pump to protect the pump from corrosion. One (1) will be placed in the inlet side of the pump and the other in the discharge side of the pump.

### **INLET CONTROL**

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

There will be two (2) inlets.

### **FRONT INLET**

A 6.00" inlet front inlet with die cast zinc screens will be provided using 5.00" welded black iron 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 air control located on the pump panel.

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 Akron 9323 electric valve controller provided. The controller unit will be of true position feedback design, requiring no clutches in the motor or current limiting. The controller will be completely sealed with two (2) button open and close valve position capability and a full color LCD display with backlight.

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.



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 rough smooth chrome finish.

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

### **LEFT SIDE DISCHARGE OUTLETS**

There will be two (2) discharge outlets 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 DISCHARGE OUTLET**

There will be one (1) 2.50" discharge outlet piped to the front of the apparatus and located on the top of the left side of the front bumper.

Plumbing will consist of 2.50" piping and flexible hose with a 2.50" full flow valve with control at the pump operator's panel. A fabricated weldment made of stainless steel pipe will be used in the plumbing where appropriate. The piping will terminate with a 2.50" NST with 90 degree stainless steel swivel.

There will be Class 1 quarter turn t-handle drains provided at all low points of the piping.

### **REAR DISCHARGE OUTLET**

There will be two (2) discharge outlets piped to the rear of the hose bed, driver's side, installed so proper clearance is provided for spanner wrenches or adapters. Plumbing will consist of 2.50" piping along with a 2.50" full flow ball valve with the control from the pump operator's panel.

### **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.

### **2.50" OUTLET ELBOWS**

The 2.50" discharge outlets 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 elbows 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 x 5.00" Storz elbow. A 5.00" Storz x 2.5" (M)NST rigid adapter with cap and chain will be provided with the elbow.

### **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**

A 3.00" deluge riser will be installed above the pump in such a manner that a monitor can be mounted and used effectively. Piping will be rigidly braced and installed securely so no movement develops when the line is charged. The riser will be gated and controlled at the pump operator's panel.

### **MONITOR**

An Akron Model 3431 Apollo Hi-Riser monitor will be properly installed on the deluge riser.

Included will be a fixed mounting base.

### **NOZZLE, DELUGE**

Akron model #2499 Quad Stacked pyrolite deluge tips will be provided.

The tip sizes will be 1.375", 1.50", 1.75", and 2.00".

This will include an Akron 3488 pyrolite stream shaper.

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

### **SPEEDLAYS**

Ahead of the pump enclosure will be two (2)-1.75" speedlay hose beds. Each bed will have a 2.00" preconnect line with a 2.00" quarter-turn ball valve and terminate with a 1.50" National Standard hose thread 90 degree swivel. The swivel will be located at the bottom of the speedlay compartment to allow easy removal of the hose in either direction.

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

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

Scuffplates will be provided at the sides and bottom of each opening on both sides.



### **CROSSLAY/DEADLAY HOSE RESTRAINT**

A black 1.00" nylon webbing design with 2.00" box pattern will be provided across each end of two (2) crosslay/deadlay(s) to secure the hose during travel. The webbing will be permanently attached at the bottom of the crosslay/deadlay opening(s). 1.00" web straps will loop through footman loops located at the opposite end of the permanently attached webbing. The straps will attach with a pair of spring clip and hook fasteners.

### **CROSSLAY COVER**

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

A red vinyl cover permanently attached to the aluminum treadplate cover will be provided over each end of the crosslay hose beds. The cover will have bungee cords attached at each lower corner. The bottom of the flaps will be weighted with a chain.

### **CROSSLAYS UNPAINTED**

The walls of the crosslays and the crosslay divider will be unpainted with a DA finish.

### **DEADLAY HOSE BED**

One (1) deadlay bed without plumbing, will be provided above the pump compartment capable of carrying (2) 200', 1.75" hi-rise packs.

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

Location shall be above the pump compartment

Deadlay bed flooring will consist of removable perforated brushed aluminum.

### **HUSKY 3 FOAM PROPORTIONER**

A Pierce Husky® 3 foam proportioning system will be provided. The Husky 3 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 pressures. The system will automatically proportion foam solution at rates from .1 percent to 3.0 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.



### **SYSTEM CAPACITY**

The system will have the ability to deliver the following minimum foam solution flow rates at accuracies that meet or exceed NFPA requirements at a pump rating of 150 psi.

100 gpm @ 3 percent

300 gpm @ 1 percent

600 gpm @ 0.5 percent

Class A foam setting in .1 percent increments from .1 percent to 1 percent. Typical settings of 1 percent, .5 percent and .3 percent (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, and to set the operation modes.

The percent of injection will have a preset. This preset 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.

Three (3) .50 tall LEDs will display the foam percentage in numeric characters. Three (3) indicator LEDs will also be included, one (1) green, one (1) red, and one (1) yellow. The LEDs will indicate various system operation or error states.

The indications will be:

Solid Green - System On

Solid Red - Valve Position Error

Solid Yellow - Priming System

Flashing Green - Injecting Foam

Flashing Red - Low Tank Level

Flashing Yellow - Refilling Tank

The control display will house 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.



### **HYDRAULIC DRIVE SYSTEM**

The foam concentrate pump will be powered by an electric over hydraulic drive system. The hydraulic system and motor will be integrated into one (1) unit.

### **FOAM CONCENTRATE PUMP**

The foam concentrate pump will be of positive displacement, self-priming; linear actuated design, driven by the hydraulic system. 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 3 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, or the use of foam different than the foam in the foam tank.

### **PANEL MOUNTED EXTERNAL PICK-UP CONNECTION / VALVE**

A bronze three (3)-way valve will be provided. The unit will be mounted to the pump panel. The valve unit will function as the foam system tank to pump valve and external suction valve. The external foam pick-up will be one (1) .75" male connection GHT (garden hose thread) with a cap.

### **PICK-UP HOSE**

A .75" flexible hose with an end for insertion into foam containers will be provided. The hose will be supplied with a .75" female swivel GHT (garden hose thread) swivel connector. The hose will be shipped loose.

### **DISCHARGES**

The foam system will be plumbed to the 2nd left side rear discharge, center of front bumper, left rear outlet, lower speedlay and upper speedlay.



### **SYSTEM ELECTRICAL LOAD**

The maximum current draw of the electric motor and system will be no more than 55 amperes at 12 VDC.

### **FOAM GENERATING SYSTEM, CAF**

A Pierce Hercules® system rated to provide 200 cfm capacity for generating compressed air foam will be provided. The system will supply five (5) discharges with compressed air foam. It will be capable of providing foam solution or compressed air foam from any of the specified CAFS discharges simultaneously. In addition, the consistency of the compressed air foam (wet to dry) from each discharge will be adjustable. All CAF capable discharges will have the discharge valve control, air injection control, and discharge pressure gauge mounted in a group on the operator's panel. Each CAF capable discharge will feature a wafer type check valve to prevent reverse flows of compressed air foam that is integrated into the discharge valve. The wafer check valve will be a type and design approved by the manufacturer of the discharge valve.

### **DISCHARGES TO CAF CAPABLE**

The the two speedlays, front bumper discharge and both 2.50" rear body discharges discharges will be capable of discharging compressed air foam.

### **AIR COMPRESSOR**

A Pierce Hercules® oil flooded rotary screw compressor rated at 200 cfm @ 150 psig will be provided. The compressor will be mounted between the chassis frame rails. The compressor will be driven by the vehicle transmission through a clutch type PTO. All components of the system will be sized and rated for the system to deliver compressed air, uninterrupted, for up to two (2) hours at a time without undue stresses, vibrations, or overheating. The air compressor will be capable of delivering the rated capacity of the compressor when the fire pump is delivering 400 gpm @150 psi from tank or draft.

All components of the air compressor system will be readily available on the domestic air compressor market (USA). The compressor will be designed and assembled by Pierce Manufacturing using standard components available to air compressor OEM's.

The PTO will be a 10 bolt SAE type mounted to the PTO opening of the vehicle's Allison transmission. The PTO will be rated for at least 20 percent more torque throughput than the air compressor will demand.

The air/oil separator for the compressor system will be easily serviced. The separator will be inside the air/oil receiver tank. The separator will consist of two stages. The first stage being a centrifuge arrangement engineered into the tank. The second stage will be a dual cartridge arrangement featuring an inside to outside flow of the air through the cartridges. The separation system will be capable of a 250 SCFM flow at 40 psi tank pressure. The allowable oil carry over will be no more than 10 parts per million oil in air.



A steel air/oil receiver tank will be provided. The tank will be constructed and tested to the applicable standards as addressed by NFPA 1901 for CAF system air compressor tanks. The tank will be mounted in a manner that allows easy access to the fill opening and the level sight gauges. The tank will be of the vertical type with the minimum pressure valve of the compressor system integrated into the top of the tank. The minimum pressure valve will be rotatable to facilitate different discharge arrangements from the tank.

The compressor lubricant will be filtered by cartridge type filter. The filter will have a 25 micron rating and a safety bypass valve. The filter assembly will be mounted and located in a manner that allows easy service. A thermostat valve will be integrated into the oil filter assembly's housing. The thermostat will route lubricant to the oil cooler to maintain the compressors temperature between minimum and maximum limits.

A water/oil cooler will be provided to cool the compressor. The cooler will be sized to meet the duty cycle requirements as specified. The oil cooler will use water from the vehicle fire pump as the cooling medium and will be protected from freezing by adequate drains and other means.

A heavy duty, automotive type, dry element air cleaner will be provided. The air cleaner will be mounted in such a manner as to be easily serviced. The air cleaner will be mounted, or the inlet of the filter routed, in such a manner that the air cleaner intakes fresh air from outside the vehicle body.

The system will have the following safety or monitoring devices.

Minimum pressure valve

Compressor lube temperature gauge

Compressor system pressure gauge

Air flow meter

Compressor lube temperature warnings, audible and visible

High pressure relief valve on receiver tank

Applicable warning and information decals

The compressors PTO controls will be installed in such a manner as to render the PTO inoperative if the fire pump is not engaged. Further, the air compressor's PTO engagement will be prevented at compressor pressures above 10 psi at compressor re-start. The air compressor will be controlled by a modulating inlet valve mounted on the air compressors inlet port. A controller will be provided that senses air pressure and controls the delivery volume of the air compressor while maintaining a constant pressure. The controller will feature an automatic balancing system to maintain the air pressure within



plus or minus 5 percent of the discharge pressure of the fire pump, throughout a pressure range of 60 psi to 175 psi.

The compressor system will have operators controls at the pump panel for the following functions.

Automatic pressure regulation, to match the compressor discharge pressure to the pump discharge pressure

Fixed pressure regulation, to set the air pressure at on pressure for the use of air tools, etc.

PTO engagement switch

PTO engaged indicator light

### **AIR TOOL OUTLET**

A 1.00" air outlet supplied by the CAFS compressor shall be provided on the pump operators panel for a side mount pumphouse and on the left pump panel for a top mount pumphouse. This outlet will have a chrome plated 1.00" FNST swivel fitting at the panel and a valve behind the pump panel. The outlet will be capable of supplying the capacity of the compressor. A mating 1.00" MNST x 1.00" NPT fitting will be supplied with loose equipment.

### **SINGLE FOAM TANK REFILL**

The foam system's proportioning pump will be used to fill the 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. While the proportioner pump is filling the tank, the controller will display a flashing yellow LED to indicate that the tank is filling. When the tank is full, as determined by the float switch in the tank dome, the pump will stop and the controller will shut the yellow LED off. If it attempted to use tank fill and the refill valve and suction valve are in the wrong position(s), then a red LED will illuminate to indicate the improper valve position(s). When the valves are positioned properly, then filling will commence.

### **FOAM SYSTEM AND CAFS DEMONSTRATION**

The fire department will order the fire apparatus with a foam system and CAFS. A demonstration will be provided at the manufacturer, on the operation of the foam system and CAFS.

This demonstration will include:

- A hands on foam system and CAFS start-up and discharge session.
- The demonstration will be done with foam to simulate real conditions.





### **FOAM TANK**

The foam tank will be an integral portion of the polypropylene water tank. The cell will have a capacity of 25 gallons of foam with the intended use of Class A foam. 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 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 support both the fire pump and the side running boards.

Compartment will be mounted on chassis frame rails with rubber biscuits in a four (4) point pattern to allow for chassis frame twist.

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

### **PUMP MOUNTING**

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

### **PUMP CONTROL PANELS (TOP MOUNT)**

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

The control panel will be in two planes.

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



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

The side pump panels will be 52.00" wide.

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

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

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

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

### **WALKWAY**

A 19.00" wide walkway will be provided for access to the top control panel. The walkway will be constructed of bright aluminum treadplate and properly reinforced.

There will be six (6) white LED lights provided to illuminate the walkway. The lights will come on with the body perimeter lights.

### **WALKWAY TOOL COMPARTMENT**

A tool compartment will be provided on each side of the walkway. Each compartment will have an aluminum treadplate door and will be equipped with two (2) white LED lights with chrome bezels, one (1) in each compartment .

### **PUMP AND GAUGE PANEL**

The side control panels will be constructed of aluminum with a black vinyl finish. A polished aluminum trim molding will be provided around each panel.

The gauge and top mount control panels will be constructed of aluminum with a black vinyl finish. A polished aluminum trim molding will be provided around each panel.

The gauge panel will be hinged at the bottom with a full length stainless steel hinge. The fasteners that hold the panel in the up right position will be quarter-turn style. Vinyl covered chains will be used to hold the panel in the dropped position.

The driver's and passenger's side pump panels 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 SWITCH**

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

### **PUMP OVERHEAT INDICATOR**

A pump overheat indicator, manufactured by M.C. Products, will be installed at the pump operator's panel.

This indicator will be both a visual and audible type.

### **COLOR CODED GARNISH RINGS**

A color coded garnish ring will be furnished around each driver side, passenger side, rear and front discharge outlet. The color of the ring will match the color on the discharge control and will consist of a vinyl overlay on the stainless steel garnish ring.

### **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 4.50" 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 Class 1© interlube filled.

They will be 2.50" in diameter and have white faces with black lettering.

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

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



### **WATER LEVEL GAUGE**

An electric water level gauge will be incorporated in the pressure controller that registers water level by means of 9 LEDs. They will be at 1/8 level increments with a tank empty LED. The LEDs will be a bright type that is readable in sunlight, and have a full 180-degree of clear viewing.

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

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

### **WATER LEVEL GAUGE**

There will be three (3) additional water level indicator, Whelen®, Model PSTANK, LED module installed one (1) each side rearward of the crew cab doors and one (1) at the rear.

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

- First green module indicates a full water level
- Second blue module indicates a water level above 3/4 full
- Third amber module indicates a water level above 1/2 full
- Last red module indicates a water level above 1/4 full and empty
  - Above 1/4 this light will be steady burning
  - At empty this light will be flashing

This module will be activated when the parking brake is applied.

### **FOAM LEVEL GAUGE**

An electronic foam level gauge will be provided on the operator's panel that registers foam level by means of five (5) colored LED lights. The lights will be durable, ultra-bright five (5) LED design viewable through 180 degrees. The foam level indicators will be as follows:

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

The light will flash when the level drops below the given level indicator to provide an eighth of a tank indication. To further alert the pump operator, the lights will flash sequentially when the foam tank is empty.

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



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

#### **ADDITIONAL FOAM LEVEL GAUGE**

There will be two (2) additional foam level gauge system provided cab sides that include Whelen® LED lights with clear lenses and chrome trim per the following:

- one (1) RSG03ZCR 1.12" high x 3.50" long x 1.25" deep light with green LEDs activated when foam tank is full
- one (1) RSA03ZCR 1.12" high x 3.50" long x 1.25" deep light with amber LEDs activated when foam tank is 3/4 full
- one (1) RSA03ZCR 1.12" high x 3.50" long x 1.25" deep light with amber LEDs activated when foam tank is 1/2 full
- one (1) RSA03ZCR 1.12" high x 3.50" long x 1.25" deep light with amber LEDs activated when foam tank is 1/4 full
- one (1) RSR03ZCR 1.12" high x 3.50" long x 1.25" deep light with red LEDs activated when foam tank is empty

The lights operation will mimic the water level gauge at the pump operators panel.

#### **LIGHT SHIELDS**

Illumination will be provided by LED strip lights at the pump control panel for controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus and the equipment provided on it.

Lights will be installed under a stainless steel shield.

A light will come on above the pump panel light switch when the parking brake is set. This is to afford the operator some illumination when first approaching the control panel.

A green pump engaged indicator will come on at the operator's panel when the pump is in OK to Pump mode.

The remaining lights to be actuated from a switch located on the pump panel.

#### **ADDITIONAL STEP/LIGHT SHIELD**

There will be an additional aluminum treadplate stepping surface no less than 8.00" deep and properly reinforced to support a man's weight, installed over the passenger's side pump 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 will be activated by the pump panel light switch. Additional lights will be included every 18.00" depending on the size of the pump house.

There will be one (1) white LED, step light provided above the 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. The step light will be activated by the pump panel light switch.

#### **ADDITIONAL STEP/LIGHT SHIELD**

There will be an additional aluminum treadplate stepping surface no less than 8.00" deep and properly reinforced to support a man's weight, installed over the driver's side pump 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 will be activated by the pump panel light switch. Additional lights will be included every 18.00" depending on the size of the pump house.

There will be one (1) white LED, step light provided above the step. In order to ensure exceptional illumination, each step 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. The step light will be activated by the pump panel light switch.

#### **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, inside of the frame rails.

#### **AIR HORN CONTROL**

Two (2) lanyard rope pull controls will be provided, one (1) within reach of the driver and one (1) within reach of the officer.

#### **ELECTRONIC SIREN**

A Whelen®, Model 295SLSA1, electronic siren with noise canceling microphone will be provided.

This siren to be active when the battery switch is on and that emergency master switch is on.



### **PROGRAMMING ELECTRONIC SIREN**

The Whelen®, Model 295SLSA1 or 295SL101, electronic siren will be programmed as follows:

- T1 - Wail
- T2 - Warble
- T3 - Yelp.

Electronic siren head will be located in the center console.

The electronic siren will be actuated by a rocker switch located on the officer's side instrument panel and by the horn button in the steering wheel.

The driver will have the option to control the siren or the chassis horns from the horn button by means of a selector switch located on the instrument panel.

### **SPEAKERS**

There will be two (2) Whelen, Model SA315P, black nylon composite, 100-watt, speakers with through bumper mounting brackets provided. Each speaker will be connected to the siren amplifier.

The speaker(s) will be located behind the front bumper on the passenger and driver's side.

### **SIREN AMPLIFIER**

One (1) amplifier will be provided installed with the Whelen Howler system to be used in conjunction with the vehicle's primary electronic siren.

### **AUXILIARY SPEAKERS**

Two (2) auxiliary speakers will be provided with the Whelen Howler system.

These speakers will be installed behind the front bumper or cab, driver's side.

### **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.

The mechanical siren will be recessed in the front bumper on the left side. The siren will be properly supported using the bumper framework.

### **SWITCHES, MECHANICAL SIREN**

The mechanical siren will be actuated by one (1) foot switch located on the driver's side and a momentary rocker on the officer's side of cab.





### **SIREN BRAKE SWITCH**

A mechanical siren brake switch will be installed officer auxiliary switch panel. This switch will be a red momentary rocker switch.

### **FRONT ZONE UPPER WARNING LIGHTS**

There will be three (3) Whelen Freedom IV LED lightbars mounted on the cab roof.

The driver's side lightbar will be a 21.50" lightbar installed at a 30 degree angle from the front of the cab with the following:

- One (1) red flashing LED module in the outside end position.
- One (1) red flashing LED module in the outside front corner position.
- One (1) red flashing LED module in the outside front position.
- One (1) white flashing LED module in the inside front position.
- One (1) red flashing LED module in the inside front corner position.

The center lightbar will be a 44.00" lightbar installed parallel to the front of the cab will include the following:

- 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 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.

The passenger's side lightbar will be a 21.50" lightbar installed at a 30 degree angle from the front of the cab with the following:

- One (1) red flashing LED module in the inside front corner position.
- One (1) white flashing LED module in the inside front position.
- One (1) red flashing LED module in the outside front position.
- One (1) red flashing LED module in the outside front corner position.
- One (1) red flashing LED module in the outside end position.

There will be clear lenses included on the lightbar.

There will be a switch in the cab on the switch panel to control the lightbars.

The white flashing LEDs will be disabled when the parking brake is applied.



The red flashing LED modules facing forward in the center lightbar may be load managed when the parking brake is applied.

### **FRONT ZONE LOWER LIGHTS**

There will be two (2) pair of Whelen, Model M6\*C LED lights installed on the cab face above the headlights, in a common bezel matching the one for the headlamps.

The outer LED lights will be the required lights.

- The color of these lights will be both outside lights red.

The inner LED lights will be additional lights.

- The color of these lights will be both inside lights red.

These lights will have a clear lens.

There will be a switch located in the cab on the switch panel to control the lights.

### **FRONT WARNING LIGHT**

There will be two (2) Whelen, Model M6\*, LED flashing light(s) with chrome trim provided one each side on front bumper angle.

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.

### **FLASH PATTERN**

The four (4) warning lights installed on the front of the apparatus located front inner and outer warning lights will have the sync wires connected together to facilitate patterning of the warning lights.

### **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 of cab rearward of crew cab doors. 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) Weldon, Model 8401-0000-20, amber 12 volt DC LED flashing strip lights provided.

- One (1) light on the driver's side cab door over the window.
- One (1) light on the passenger's side cab door over the window.
- One (1) light on the passenger's side crew cab door over the window.
- One (1) light on the driver's side crew cab door over the window.

Each light will be activated when the battery switch is on and the adjacent door is opened.

Each light will be installed so the flash pattern directs traffic away from the doors.

### **REAR ZONE LOWER LIGHTING**

There shall be two (2) Whelen®, Model M6\*C, LED flashing warning lights located at the rear of the apparatus.

- The driver's side rear light to be red
- The passenger's side rear light to be red

Both lights will include a lens that is clear.

There will be a switch located in the cab on the switch panel to control the lights.

### **WARNING LIGHTS (REAR)**

There will be two (2) Whelen Model M9V2\*\*, 6.50" high x 10.35" long x 2.63" deep LED flashing warning and scene light(s) with chrome trim provided one each side rear upper body bulkheads.

The color of the warning light LED's will be red.

The lens color will be clear.

The warning light(s) will be controlled with the rear upper warning switch.

The scene lights will be activated with a switch in the cab and at the rear of the apparatus.

The warning LED's and scene LED's may be load managed when the parking brake is applied.

### **FLASH PATTERN**

The six (6) warning lights installed on the rear of the apparatus located upper rear and lower rear lights will have the sync wires connected together to facilitate patterning of the warning lights.



### **MOUNTING, RECESS LIGHT**

There will be two (2) pairs of upper rear warning lights, on the rear bulkheads, recessed into the body. The lights will be flush to the compartment sheet and will be installed one each side upper rear body bulkhead.

### **WARNING LIGHTS (REAR AND SIDE UPPER ZONES)**

Four (4) Whelen, model M9\*C LED flashing warning lights will be provided at the rear of the apparatus.

The side rear upper light(s) on the driver's side to be red.

The rear upper light(s) on the driver's side to be red.

The rear upper light(s) on the passenger's side to be red.

The side rear upper light(s) on the passenger's side to be red.

These 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 LIGHT MOUNTING**

The rear warning lights will be mounted on the rear side sheet flange and rear bulkhead of the body as high as possible with all wiring totally enclosed.

### **TRAFFIC DIRECTING LIGHT**

There will be one (1) Whelen®, Model TAL65, 36.00" long x 2.87" high x 2.25" deep, amber LED traffic directing light installed at the rear of the apparatus.

The Whelen, Model TACTL5, control head will be included with this installation.

The controller will be energized when the battery switch is on.

This traffic directing light will be recessed with a stainless steel trim plate at the rear of the apparatus as high as practical.

The traffic directing light control head will be located in the driver side overhead switch panel in the right panel position.

### **120 VOLT RECEPTACLE**

There will be three (3), 15 amp 120 volt AC three (3) wire straight blade duplex receptacle(s) with interior cover plate(s) installed one each low rear wall compartments D1,P1, R1. The NEMA configuration for the receptacles will be 5-15R.

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

### **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.
- 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.

#### **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 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 will be three-tone, with the roof section painted red #181, below rain gutter down to cab trim, including a shield design on the cab face painted silver gray and the lower section of the cab and body painted red #181.

#### **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.





- 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/SEAL CHASSIS FRAME ASSEMBLY**

The following components will be treated with epoxy E-coat protection prior to finish paint:

- Two (2) C-channel frame rails
- Two (2) frame liners

The E-coat process will meet the technical properties shown.

Before the frame rails are finish painted, all areas will be sealed with a 3M 2084 metal sealant after the components are torqued to the frame rails:

- The joint between the main frame and the liner
- The joint between all crossmembers and the frame
- The joint between all spring hangers and the frame.

The chassis frame assembly will be finish painted black before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc.

Components that are included with the chassis frame assembly that will be finish painted are:

- Frame rails
- Frame liners
- Cross members

FILM TECHNICAL PROPERTIES		
PROPERTY	TEST METHOD	PERFORMANCE
Color	-	Black
Film Thickness	-	0.5 - 1.5 Mils
Gloss - 60 Degree	ASTM D523	65 - 85
Pencil Hardness	ASTM D3363	2H Minimum
Direct Impact	ASTM D2794	100 in. - lbs. Minimum
Reverse Impact	ASTM D2794	60 in. - lbs. Minimum
Crosshatch Adhesion	ASTM D3359	4B - 5B
Humidity	ASTM D1735	1000 Hours Minimum
Water Immersion	ASTM D870	250 Hours Minimum
Gravelometer	GM9508P	6 Minimum
Throwpower	GM9535P	12 - 15 in.
<small>Cold rolled steel lab panels, Zinc Phosphate pretreatment, 0.6 mils average film thickness, cured 20 minutes @ 350°F.</small>		
PROPERTY	SUBSTRATE PRETREATMENT	SALT SPRAY* 1000 HOURS
Corrosion Resistance	CRS / Zinc Phos / Non-Chrome	1 - 2 mm.
<small>*Salt Spray - ASTM B117; cold rolled steel lab panels cured 20 minutes @ 350°F. (Average Total Scribe Creep)</small>		



- 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

After the chassis frame assembly is finish painted, the following non-torqued joints will be sealed with a SG-510A rust-proofing compound:

-All bolted on chassis components that could be vulnerable to rust, i.e. body mounting angles, air tanks, etc.

To summarize, all metal to metal contact components that are prone to rust, will be protected.

### **PAINT, REAR WHEELS**

All wheel surfaces, inside and outside of inboard steel wheels only, will be provided with powder coat paint aluminum.

### **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.

#### **CAB DOOR REFLECTIVE STRIPE**

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

This stripe will meet the NFPA 1901 requirement.

#### **BODY STRIPE**

There will be a genuine gold leaf stripe provided on each side of the body, located along the top of the side compartmentation.

#### **BODY STRIPE**

There will be a genuine gold leaf stripe provided on each side of the body, low and over the fender along the bottom of the compartment doors.

#### **CAB STRIPE**

There will be a genuine gold leaf stripe on each side of the cab, low and over the fender.

#### **LETTERING**

The lettering will be totally encapsulated between two (2) layers of clear vinyl.

#### **LETTERING**

Up to one hundred (100) genuine gold leaf lettering, 3.00" high, with outline and shade will be provided.

#### **WEB SITE ADDRESS LETTERING, REFLECTIVE**

There will be a one (1) pair of web site addresses, in 1.00" to 2.00" reflective lettering, installed rear side compartment doors.

#### **LETTERING**

There will be reflective lettering, 12.00" high, with outline and shade provided. There will be three (3) letters provided.

#### **EMBLEMS**

An American flag emblem, 7.00" high x 11.00" wide, will be installed one each side of the cab above the middle window. The flag will appear to be moving in the wind.

#### **MALTESE CROSS INSTALLATION**

There will be one (1) pair of maltese crosses, comprised of genuine gold leaf material, provided and installed cab doors.



### **RUSTPROOFING/UNDERCOATING**

The apparatus cab will be properly treated by an authorized Ziebart dealer.

The rust proofing material will be a transparent coating of an organic based corrosion inhibitor for long-term protection against corrosion.

The rust proofing material utilized will be formulated to resist corrosion.

Coating texture will be waxy and pliable after drying so it will not chip, crack, or peel off during normal vehicle operations. Minimum dry film thickness will be in the range of 3.00 to 4.00 mils.

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

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

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

The material will be applied to the following areas:

Interior of all double panel style body doors.

Body and cab wheel well fender liners, on the back side only.

Underside of body and cab sheet metal, and structural components.

Underside and vertical sides of all sheet metal compartmentation, including support angles.

Structural support members under running boards, rear platforms, battery boxes, walkways, etc.

### **FIRE APPARATUS PARTS MANUAL**

One (1) custom parts manuals for the complete fire apparatus will be provided in hard copy with the completed unit.

One (1) compact disc (CD) will also be provided that will include all of the information from the above manual.

The manual will contain the following:

- Job number
- Part numbers with full descriptions
- Table of contents



- Parts section sorted in functional groups reflecting a major system, component, or assembly
- Parts section sorted in Alphabetical order
- Instructions on how to locate parts

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

### **SERVICE PARTS INTERNET SITE**

The service parts information included in this manual is also available on the Pierce 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 MANUALS**

One (1) chassis service manuals containing parts and service information on major components will be provided with the completed unit.

One (1) compact disk (CD) will also be provided that will include all of the information from the above manual.

The manuals will contain the following sections:

- Job number
- Table of contents
- Troubleshooting
- Front Axle/Suspension
- Brakes
- Engine
- Tires
- Wheels
- Cab
- Electrical, DC
- Air Systems



- Plumbing
- Appendix

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

### **MANUALS, CHASSIS OPERATION**

One (1) chassis operation manual will be provided.

One (1) compact disk (CD) will also be provided that will include all of the information from the above manual.

### **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 TRW **one (1) year** limited steering gear warranty will be provided. A copy of the warranty certificate will 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 WARRANTY**

A Eaton **five (5)-year/100,000 mile** parts and labor warranty will be provided.

### **REAR AXLE WARRANTY**

A Eaton **five (5)-year/100,000 mile** parts and labor warranty will be provided.

### **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.

### **CAMERA SYSTEM WARRANTY**

A Pierce fifty four (54) month warranty will be provided for the camera system.



### **COMPARTMENT LIGHT WARRANTY**

The Pierce 12 volt DC LED strip lights limited warranty certificate, WA0203, is included with this proposal.

### **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 3 foam system limited warranty certificate, WA0231, 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.





### **THREE (3) YEAR MATERIAL AND WORKMANSHIP**

The Pierce Goldstar gold leaf lamination limited warranty limited warranty certificate, WA0018, 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 delivery.

### **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)

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. 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).