

# EVERY COUNTY/FRANK VFD

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## **INFORMATION FOR CONTRACTORS**

Sealed proposals are desired from reputable manufacturers of Automotive Fire/Rescue Apparatus in accordance with these attached specifications for the apparatus as briefly described below: **1500 GPM PUMPER/TANKER**

## **SUBMISSION OF BID PROPOSALS**

All bids shall be clearly typed and readable. Any bid that is deemed unreadable or is handwritten will be immediately rejected.

All bids shall be submitted in a large sealed envelope or packet clearly marked "SEALED BID ON FIRE APPARATUS".

Bids will be accepted up to the hour of 1:00 pm on Sept. 30<sup>th</sup> 2020.

Any bid received after this time will be rejected and returned to the bidder unopened. It will be the bidder's responsibility to ensure that the bid is received on time.

All bids shall be mailed, shipped, or hand delivered to the following address:

## **OPENING OF BID PROPOSALS**

All bids shall be opened and read aloud at the hour of 7:00pm on Oct. 8<sup>th</sup> 2020.

The bids shall be opened and read aloud at the following address:

## **GENERAL REQUIREMENTS**

Each bid must be accompanied by bidders accurate written and detailed specifications covering the apparatus and related items which the bidder is proposing to furnish and to which the apparatus furnished under contract must conform. It is the intent of these specifications to cover the furnishing to the purchaser a complete apparatus constructed and equipped exactly as specified in the attached specifications. Any details of construction, materials, or equipment not specified are left to the discretion of the Contractor, whom will be responsible for all construction and manufacturing techniques

involved in the assembly of the apparatus.

All aspects of the apparatus shall conform to any applicable rules/regulations imposed to such vehicles by any of the following Governing Agencies:

- National Fire Protection Association (not including recommended equipment).
- Occupational Safety Health Administration.
- Federal Motor Vehicle Safety Standards.
- Department of Transportation.
- Underwriter's Laboratories.

### **RELIABILITY OF CONTRACTOR/BIDDER**

The contractor/bidder shall furnish evidence that he has the ability to design, engineer and construct the apparatus specified and shall clearly state the location of the facility used to manufacture and test the equipment when completed. Manufacturer must have a minimum of a twenty year track record in the manufacturing of fire/rescue apparatus.

The contractor/bidder shall be capable of performing all of the following items at their manufacturing facility. Under no circumstance shall any of these items be sub-contracted to other manufacturers or fabricators:

1. All pump mounting and related plumbing.
2. Complete fabrication of the apparatus body and components.
3. All 12 volt and 110 volt electrical wiring.
4. All painting and finish work.

Any contractor/bidder that does not perform all of the above items shall be rendered un-responsive and their bid proposal shall be eliminated from the bid evaluation procedure causing rejection of bid.

At the request of the Purchaser, the contractor/bidder shall allow a trip to the manufacturing facility for at least four officials of the Purchaser prior to award of contract. During this facility inspection trip, the Purchaser must be given full access to all production areas in the facility. Areas that will be inspected shall include, but not limited to, pump mounting, sheet metal fabrication, body assembly, electrical, painting, final

assembly and engineering.

This trip is necessary to insure that the contractor/bidder has adequate facilities to manufacture the apparatus to the specifications attached. It should be clearly understood by the contractor/bidder that this inspection trip does not constitute acceptance of bid.

Along with the inspection trip, the contractor/bidder shall provide a list of a minimum of 5 similar apparatus constructed within the last two years. The name and contact person, along with telephone number, shall be provided with this. Also a list of a minimum of 5 apparatus that have been constructed over ten years ago shall also be provided. The name and contact person, along with telephone number shall be provided.

### **EXCEPTIONS TO SPECIFICATIONS**

It is the intent of the Purchaser to purchase a fire/rescue apparatus that has a proven record of dependability and reliability in the fire/rescue service. Experimental manufacturing techniques or materials are not acceptable and will be immediately rejected. Exceptions to the attached specifications will be considered provided they are of equal or superior quality and/or value of what has been specified. All bidders shall provide supporting documentation with proposal that may prove the 'equal to' or 'superior' quality or value. The Purchaser shall be solely responsible for determining 'equal to' or 'superior' status. The Purchaser's decision regarding these items will be final and conclusive.

Any area(s) of the attached specification that contain statements such as 'no exceptions' or similar statements with the same general meaning shall be strictly adhered to. The Purchaser has deemed these items to be extremely important to achieve the final delivered product that the Purchaser wishes to purchase. Any exceptions to these areas will result in immediate rejection of that bidder's proposal regardless of bid price.

All exceptions, no matter how minor, or seemingly un-important, must be detailed fully with supporting documentation submitted with proposal. Failure to submit exceptions and supporting documentation will cause immediate rejection of bidder's proposal.

All bidders shall be aware that the attached specifications shall be made part of the Purchase Contract between the Purchaser and the contractor/bidder. The successful

bidder will be required to meet all construction, fabrication, and material requirements as called for in these specifications. Any deviations from these specifications must be specifically listed, explained, and submitted with the bid proposal. Failure to submit the detailed exceptions will indicate to the Purchaser that an exception is not taken and the bidder will provide the construction, fabrication, and material requirements as desired by the Purchaser and detailed in the attached specifications. Submission of list of exceptions does not indicate acceptance/approval of exceptions by the Purchaser.

In the unlikely event that the contractor/bidder fails to construct the apparatus as requested in the attached specifications, the Purchaser retains the right to reject the entire apparatus and invoice the contractor/bidder for any costs or losses that the Purchaser may have incurred due to the contractor/bidder failing to meet specifications described in the purchase contract.

#### **"BRAND NAME" CLAUSE**

It is the intent of the Purchaser to purchase components that have a proven record of Fire Department use and satisfaction. All bidders should be aware that where brand names are listed in these specifications, comparable products from different manufacturers may be acceptable. The bidder shall simply provide the Department with a listing of brands that they intend to provide in lieu of the originally requested brand.

The Fire Department will evaluate the proposed brand name to determine if the brand is equal to or superior to the originally requested brand.

#### **CONTRACTOR'S SPECIFICATIONS**

All contractor's or bidder's shall submit a detailed specification as to how the apparatus being proposed will be constructed. The attached specifications, copies, or re-typed versions of these specifications shall not be submitted as contractors specifications, (this will not pertain to the contractor whose specifications these are based on). Any manufacturer doing so will be rejected immediately on the following grounds:

*"Contractor/bidder did not provide sufficient supporting data describing the contractors/bidders manufacturing and fabrication processes implemented in the construction of the proposed apparatus versus what was requested in the Purchaser's*

*original specifications."*

The contractors/bidders specification shall describe, in detail, all manufacturing and fabrication processes as well as material used in the construction of the apparatus. Other items that must be clearly listed in the contractors/bidders specifications shall include all compartment and door dimensions, cubic feet of usable storage space per compartment, and all other items specifically called for in the attached specifications.

### **CORPORATE OWNERSHIP OF MANUFACTURER**

The manufacturer of the apparatus must be fully owned and managed by a Parent Company, Corporation, or Individual(s) that is 100% held by United States of America based Company, Corporation, or United States citizen(s).

Proposals from any manufacturer that is fully or partially owned and/or operated by a foreign company, Corporation or Individual(s) under any type of ownership, partnership, or any similar type of agreement will be immediately rejected.

### **CORPORATE CONTACT INFORMATION**

The purchaser shall be provided with the following information to allow them to contact the President/CEO of the manufacturing company (not dealer) when deemed necessary:

- Name of Company President.
- Office address.
- Office telephone number.
- Email address.
- 24/7 Cellular telephone number.

If the manufacturing company is a subsidiary of, division of, or owned by a different Company, the above information shall also be provided on the 'Parent' Company.

There will be no exception to this requirement.

### **AWARD OF CONTRACT**

The bid shall be awarded to the contractor or bidder that most closely meets all requirements set forth in the attached specifications. All contractor's or bidder's shall be aware that exceptions taken will not affect the award of bid provided that all exceptions are determined to be 'equal to' or 'superior to' the attached specifications. The Purchaser shall be solely responsible to determine this.

The purchase contract shall list the manufacturer of the apparatus as the Contractor and shall not include a sales representative or company as the Contractor unless these are one in the same. The purchase contract shall be presented to the Purchaser within 15 days of notification of bid award to the contractor/bidder.

All contractor's or bidder's shall be aware that it is not the intention of the Purchaser to award the contract to the apparent low bidder. The Purchaser reserves the right to reject any or all bids and to accept the bid that the Purchaser feels is in the best interest of the Purchaser both now and in the future.

### **24/7 FACTORY SUPPORT**

The manufacturer (not dealer) of the apparatus shall maintain a 24 hours per day, 7 days per week, 365 days per year factory support contact system to allow the purchaser to contact the manufacturer in case of emergency. The system shall be activated by a telephone call to the manufacturing facility.

### **INTENT OF SPECIFICATIONS**

It shall be the intent of these specifications to provide a complete apparatus equipped as hereinafter specified. With a view to obtaining the best results and the most acceptable apparatus for service in the Department, these specifications cover only the general requirements as to the type of construction and tests to which the apparatus must conform, together with certain details as to finish, equipment and appliances with which the successful bidder must conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the contractor, who shall be solely responsible for the design and construction for all features. The National Fire Protection association Standard 1901, 2016 edition, unless otherwise specified in these

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specifications, shall prevail.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction and have been in continuous business for a minimum of thirty-five (35) years. A written chronological history of the bidder shall be included in the bid response package.

Each bidder shall furnish satisfactory evidence of their ability to construct the apparatus specified, and shall state the location of the factory where the apparatus is to be built. They shall also show that they are in a position to render prompt service and to furnish replacement parts for said apparatus.

Because of the severe service requirements the department will impose on this apparatus, each bidder shall provide a reference list of at least eight (8) departments in which similar apparatus utilizing the brand of chassis proposed have been in service for over one (1) year. This list shall include contact names and phone numbers. To properly evaluate the builder's performance, at least one (1) of these departments shall serve populations of over 200,000, and the apparatus in this department shall have been in service over seven (7) years. This reference list shall be included in the bidder's response package.

No experimental, prototype or recently introduced products without a verifiable, minimum four (4) year service record on the combination of the chassis and fire equipment proposed will be acceptable. For bid evaluation purposes, this information, including photographs and drawings of units previously constructed, shall be included in the bid response package.

Each bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed description of the apparatus being furnished under this contract which conform. Computer runoff sheets are not acceptable as "Contractor's Specifications". Note: Each bidder shall submit their bid in the same sequence as these specifications to allow the department to easily compare bid. There shall be no exception to this requirement.

These specifications shall indicate size, type, model and make of all component parts and equipment.

### QUALITY AND WORKMANSHIP:

The design of the Apparatus must embody the latest approved automotive engineering practices.

The workmanship must be of the highest quality in its respective field. Special consideration will be given to the following points: Accessibility of the various units that require periodic maintenance operations, ease of operation (including both pumping and driving) and symmetrical proportions.

Construction shall be rugged and ample safety factors shall be provided to carry loads as specified and to meet both on and off road requirements and to speed conditions as set forth under "Performance tests and requirements".

Welding shall be employed in the assembly of the apparatus in a manner that will not prevent the ready removal of any component part for service or repair.

### DELIVERY:

Apparatus, to insure proper break-in of all components while still under warranty, shall be delivered under its own power. A qualified delivery engineer representing the contractor shall instruct the Fire Department Personnel in the proper operation, care and maintenance of the equipment delivered.

### HIGHWAY PERFORMANCE

With the apparatus loaded to its estimated in-service weight, the front to rear weight distribution shall be within limits set by the chassis manufacturer. The apparatus shall comply with all GAWR and GVWR ratings of the chassis.

While loaded to its estimated in-service weights, the apparatus shall be capable of the following performance while on dry paved roads that are in good condition:

1. The apparatus shall be capable of accelerating from 0 to 35 MPH from a standing start within 25 seconds on a 0 % grade.

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2. Attaining a speed of 50 MPH on a 0 % grade.
3. Maintaining a speed of at least 20 MPH on any grade up to and including 6 %.

### LIABILITY:

The bidder, if their bid is accepted, shall defend any and all suits and assume all liability for the use of any patented device or article forming part of the apparatus or any appliance furnished under the contract.

### GENERAL CONSTRUCTION:

The apparatus shall be designed with due consideration to distribution of load between the front and rear axles, so that all specified equipment, including filled water tank, a full complement of personnel and fire hose will be carried without injury to the apparatus. Weight balance and distribution shall be in accordance with the recommendations of NFPA #1901.

The apparatus shall be designed so that all recommended daily maintenance checks can be performed easily by the operator, without the need for hand tools. Apparatus components that interfere with repair or removal of other major components must be attached with fasteners (cap, screws, nuts, etc.) so that the components can be removed and installed with normal hand tools. These components must not be welded or otherwise permanently secured into place.

The GAWR and GVWR of the chassis shall be adequate to carry the fully equipped apparatus including all tanks filled, the specified hose load, unequipped personnel weight, ground ladders and a miscellaneous equipment allowance of 2000 lbs. It shall be the responsibility of the purchaser to provide the contractor with the weight of equipment to be carried if it is in excess of the allowance of 2,000 lbs.

The unequipped personnel weight shall be calculated at 200 lbs. per person, times the maximum number of persons to ride on the apparatus.

The height of the fully loaded vehicle's center of gravity shall not exceed the chassis manufacturer's maximum limit.

The front to rear weight distribution of the fully loaded vehicle shall be within the limits set by the chassis manufacturer. The front axle loads shall not be less than the minimum axle loads specified by the chassis manufacturer, under full loads and all other loading conditions.

The difference in weight on the end of each axle, from side to side, when the vehicle is fully loaded and equipped shall not exceed 7 percent.

The apparatus shall be so designed that the various parts are readily accessible for lubrication, inspection, adjustment and repair.

Where special tools manufactured or designed by the contractor and are required to provide routine service on any component of the apparatus built or supplied by the contractor, such tools shall be provided with the apparatus.

### **EXCEPTIONS OR CLARIFICATIONS TO SPECIFICATIONS**

These specifications have been carefully prepared by the Department, taking into consideration, among other items, performance of our previous apparatus. In order to provide a unit that we know will give outstanding performance in our particular operating environment, the following Chassis, Pump and Body specifications shall be strictly adhered to. Exceptions or Clarifications shall be allowed if they are judged by the department to be equal to or superior to those items specified, and will be given careful consideration provided they are listed and fully explained on a separate page entitled "Exceptions or Clarifications to Specifications". This list must refer to our specification page number and paragraph. Proposals taking total exception to specifications or total exception to certain parts of the specifications such as Electrical Systems, Body or Pump, will not be accepted. Apparatus shall be inspected upon delivery for compliance with specifications. Deviations will not be tolerated and will be cause for rejection of Apparatus unless they were originally listed in bidder's proposal and accepted in writing by the department.

If the bidder takes an exception, on the exception page, the bidder must state an option price to bring their specifications into full compliance with the Department specifications. Failure to provide this information shall be cause to reject the proposal as being non-responsive.

### **PURCHASER'S RIGHTS**

The Purchaser reserves the right to accept or reject any or all bids as it deems to be of their best interest to do so.

### **CHASSIS STORAGE**

The chassis on which this apparatus will be constructed, shall not be stored where it will be exposed to the sun, rain, snow, hail or other elements. The chassis shall be stored in an enclosed, protected environment until construction is begun. For evaluation purposes, photographs and a detailed description of the chassis storage provisions shall be included in the bid response package. There shall be no exception to these protected chassis storage provisions.

### **BLUEPRINT DRAWINGS**

Il bidder's must submit with their proposal two (2) blueprint drawing(s) of the exact apparatus being proposed. Drawing(s) of similar units **will not** be acceptable. Blueprint(s) must be submitted on minimum 24" x 36" paper to allow for an accurate, easy to read, visual interpretation of the apparatus proposed by the manufacturer.

The drawing(s) shall show the complete left side view of the apparatus, including the chassis as well as right side and rear body views showing all compartment dimensions, door opening sizes, compartment depths, and total cubic feet of usable compartment space per compartment.

Any proposal received without the required drawing(s) will be immediately rejected.

### **APPROVAL DRAWINGS**

After award of the bid, the contractor shall provide detailed, "D" size engineering drawings for use at the pre-construction conference. These drawings shall include, but not limited to, the overall dimensions, wheelbase, and overall length of the proposed apparatus shall be required with the bid. The drawing shall include right, left, top and rear views of the apparatus. These drawings shall be updated and sent back to the department if any changes are made at the pre-construction conference.

The successful contractor shall also provide a detailed pump panel layout drawing for department evaluation and approval before construction of the apparatus is begun. It is required that the pump and plumbing be designed and engineered in the builder's engineering department before construction. Plumbing assembled "on the floor" without engineering drawings, shall not be acceptable.

For evaluation purposes, samples of the as-built electrical system schematics, engineered plumbing drawings and pump panel layout approval drawings, shall be included in the bid proposal package.

### **PRODUCT LIABILITY INSURANCE**

To adequately protect the Department, and its members, the manufacturer shall provide a minimum of \$10,000,000.00 of liability insurance. A copy of the insurance certificate shall be included in the bidder's response package.

### **DELIVERY**

The unit shall be delivered under its own power, by a factory-trained representative. Bids that do not include delivery to the purchaser, shall not be acceptable. The unit will remain insured by the apparatus manufacturer until the department accepts the unit.

### **FIRE STATION PRE-CONSTRUCTION CONFERENCE**

The factory authorized distributor shall perform a pre-construction conference at the fire station to finalize all construction details.

### **PRE-DELIVERY INSPECTION**

The contractor shall provide a pre-delivery inspection at the factory in which the apparatus will be constructed. All travel expenses incurred by the purchaser for up to four (4) officials shall be paid by the contractor. Commercial air fare, overnight expenses and all meals shall be included. The bidder shall indicate in their proposal that this inspection will be provided.

**WEB BASED CUSTOMER INTERACTION**

The manufacturer shall provide web based access to construction photographs while the apparatus is being built. This access shall be provided through a secured area on the manufacturer's website and shall be accessible only by individuals authorized by the Department.

The following photos, at minimum, shall be available:

1. Chassis (front, left, right and rear).
2. Body prior to pre-paint (front, left, right and rear).
3. Body painted (front, left, right and rear).
5. Pump module, if applicable, (front, left, right and rear).
6. Final assembly (front, right, left and rear).

This web based interaction will enhance the communication process during the construction of the apparatus and will provide the Department remote access to the apparatus during construction process.

Due to the complexity of apparatus, this interaction will provide the Department a method of checking specification compliance. Because this interaction is considered critical to the construction process, no exception will be allowed to this requirement.

**SERVICE CENTER**

The bidder shall provide service information on the apparatus. The bidder shall list the nearest service center in relationship to the purchaser's location and the distance from the purchaser shall also be listed. This service center must be capable of performing all maintenance and repairs on the apparatus in a timely manner.

**BID VALIDITY PERIOD**

In order to allow sufficient time to allow the purchaser, or designated officials thereof, sufficient time to evaluate all bid proposals received all bids must remain valid for a period not less than 30 calendar days from date of bid opening. All prices must remain firm for the entire period.

During the evaluation period, bidders may be asked to further clarify their proposals or answer questions that may arise during the evaluation of bid. It is the responsibility of the bidder to make clarifications, **in writing**, on the fire apparatus manufacturer's letterhead and signed by the President and/or General Manager of the manufacturing company. These written clarifications must be received within 72 hours of when they were requested by the purchaser. Failure to respond within the allowed time period will deem the bid proposal unresponsive and it will be rejected.

All information that is requested in the original bid packet must be included in the sealed bid proposal. Bidders will not be allowed to submit required documents after opening of bids. Failure to include required information with bid will result in rejection of bid proposal.

### **CERTIFICATION OF NFPA 1901-2016 COMPLIANCE**

As per NFPA 1901, the Purchaser shall assume the responsibility of determining, prior to the purchase of the apparatus, who will be responsible for ensuring that all aspects of NFPA 1901 are met. The manufacturer shall be responsible for providing or performing only the items requested by the purchaser in the documents provided to the manufacturer by the purchaser.

Written certification shall be provided by the manufacturer stating that the delivered apparatus complies with the NFPA 1901 Standard. If the purchaser has elected to provide, perform, outsource and/or contract with a third party or waive any item required by NFPA 1901, the manufacturer shall provide, upon delivery, a "Statement of Exceptions" per Chapter 4 of NFPA 1901 4.21.

The "Statement of Exceptions" shall include:

- A separate specification of the section of the NFPA Standard for which the apparatus is lacking compliance.
- A description of the particular aspect of the apparatus that is not compliant therewith or required equipment that is missing.
- A description of the further changes or modifications to the delivered apparatus which must be completed to achieve full compliance.
- An identification of the entity that will be responsible for making the necessary

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post-delivery changes or modifications or for supplying and installing any missing required equipment to the apparatus to achieve full compliance to the standard.

Prior to, or at the time of, delivery of the apparatus, the Statement of Exceptions shall be signed by an authorized agent of the entity responsible for the final assembly of the apparatus and by an authorized agent of the purchasing entity, indicating a mutual understanding and agreement between the parties regarding the substance thereof.

The purchaser shall not place the apparatus into active emergency service until fully compliant with NFPA 1901.

### **NFPA REQUIRED EQUIPMENT**

The end user of this apparatus shall provide all other equipment and accessories that are required by NFPA 1901 but not specifically listed in these specifications.

### **MAXIMUM TOP SPEED**

The maximum top speed of this apparatus shall be determined using the following NFPA 1901 Chapter 4 criteria:

- Apparatus with 1250 gallon combined water tank capacity shall not exceed 60 MPH.
- Apparatus with GVWR of over 50,000 lbs. shall not exceed 60 MPH.
- Apparatus weighing over 26,000 lbs. shall not exceed 68 MPH.

**HALE MODEL Q-MAX-XS 1500 GPM SINGLE STAGE PUMP**

The fire pump shall be a Hale Fire Pump Company Q-MAX-XS that complies with all applicable requirements of the latest edition of the "Standard for Automotive Fire Apparatus" published by the National Fire Protection Association and printed in Pamphlet 1901.

**PUMP WARRANTY**

The pump shall be covered by the Hale Pro-Tech 5-year pump warranty against workmanship and materials. Both parts and labor shall be covered for the first 2 years and years 3-5 shall have parts only coverage.

**UNDERWRITER'S LABORATORY CERTIFICATION**

The completed apparatus shall be tested and approved by the independent testing company Underwriter's Laboratories, Inc. The manufacturer of the apparatus shall be responsible for all costs involved in this test. The certification of inspection and approval shall be presented to the Fire Chief of the Department upon delivery of the completed apparatus.

**PUMP PERFORMANCE - 1,500 U.S. GPM.**

The pump shall be a single stage centrifugal with a class "A" rated capacity of 1,500 United States gallons per minute. The pump shall deliver the percentage of rated discharge pressures as indicated below:

- 100 percent of rated capacity at 150 pounds net pressure.
- 70 percent of rated capacity at 200 pounds net pressure.
- 50 percent of rated capacity at 250 pounds net pressure.
- 100 percent of rated capacity at 165 pounds net pressure.

**PUMP CONSTRUCTION**

The entire pump shall be manufactured and tested at the pump manufacturer's factory.

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The pump shall be driven by a drive line from the truck transmission. The pump shall be free from objectionable pulsation and vibration under all normal operating conditions. The engine shall provide sufficient horsepower and revolutions per minute to allow the pump to meet or exceed its rated performance.

The entire pump including both suction and discharge passages, shall be hydrostatically tested to a pressure of 500 psi. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by NFPA 1901.

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

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

The pump shaft shall be rigidly supported by three (3) bearings for minimum deflection. The bearings shall be heavy-duty, deep groove style bearings in the gearbox and they shall be splash lubricated.

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

The pump shaft shall be fabricated of heat-treated, electric furnace, corrosion resistant stainless steel, and shall be super finished under the shaft seal. The pump shaft must be sealed with double lip oil seal to keep road dirt and water out of gearbox.

### **GEAR BOX**

The gear box shall be completely manufactured and tested at the pump manufacturer's factory.

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

The gearbox drive shafts shall be of heat-treated chrome nickel steel and shall be a minimum of 2.75 inches in diameter, on both the input and the output drives shafts. The gearbox shall withstand the full torque of the engine in both road and pump operating conditions.

All gears both drive and pump, shall be of highest quality electric furnace chrome nickel steel. Bores shall be ground to size and the gear teeth shall be crown shaven, and hardened for smooth, quiet running, and a higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrust.

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

### **NFPA 2016 INTERLOCK MODULE**

An interlock module shall be provided on the pump shift to comply with NFPA shift safety requirements.

### **GEARCASE COOLING LINE**

A cooling line shall be provided in the pump gear case. A line shall be routed from the discharge side of the pump to the gear case, through the gear case then back into the intake side of the pump.

### **MECHANICAL SEAL**

The pump shaft shall be equipped with a single mechanical type seal on the suction (inboard) side of the pump. The mechanical seal shall be a minimum of two inches in diameter and shall be spring loaded, maintenance free and self-adjusting. The mechanical seal shall be constructed of a carbon sealing ring, stainless steel coil spring, Viton rubber cup, and a tungsten carbide seat with Teflon backup seal.

**FRP PUMP BOSS PRESSURE GOVERNOR SYSTEM**

Fire Research Pump Boss pressure governor and monitoring display kit shall be installed. The kit shall include a control module, pressure sensor, and cables.

The following continuous displays shall be provided:

- Check engine/stop engine warning lights
- Engine rpm shown with four daylight bright LED digits more than 1/2" high
- Engine oil pressure; shown on an LED bar graph display in 10 psi increments
- Engine temperature shown on an LED bar graph display in 10 degree increments
- Battery voltage shown on an LED bar graph display in 0.5 volt increments
- PSI / RPM setting; shown on a dot matrix message display
- PSI and RPM mode LEDs
- Throttle ready LED.

A dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator.

The program shall store the accumulated operating hours for the pump and engine, previous incident hours, and current incident hours in a non-volatile memory. Stored elapsed hours shall be displayed at the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

- High Engine RPM
- Pump Overheat
- High Transmission Temperature
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Battery Voltage
- Low Engine Oil Pressure
- High Engine Coolant Temperature

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A control

knob that uses optical technology shall adjust pressure or RPM settings. It shall be 2" in diameter with no mechanical stops, a serrated grip, and have a red idle push button in the center.

A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.

### **TFT A-18 INTAKE RELIEF VALVE**

A TFT model A-18 intake relief/dump valve shall be provided on the intake side of the pump to relieve excess incoming pressure. The system shall be designed to automatically restore to a non-relieving position when excessive pressure is no longer present. The pressure adjustment range shall be from 50 psi to 200 psi. The relief system shall be adjustable with a common type box end wrench.

The intake relief valve shall be pre-set to 125 psi.

### **PUMP SHIFT MECHANISM -AIR/ELECTRIC**

The pump shall be shifted from road to pump by means of a cab mounted air over electric pump shift switch. The switch shall have a built in positive locking mechanism to prevent accidental movement of the switch. The locking mechanism shall require the operator to manually lift up on the switch lever to disengage the lock.

The switch shall have three positions:

- Position 1 = road position
- Position 2 = neutral position
- Position 3 = pump position

A green indicator light shall be provided in the driving compartment and shall be energized when the pump shift has been completed. This light shall be labeled "PUMP ENGAGED".

When the apparatus is equipped with an automatic transmission, a green indicator light shall be provided in the driver's compartment. It shall be energized when both the pump shift has been completed and the chassis transmission is in pump gear. This light shall be labeled "OK TO PUMP".

### **MANUAL PUMP SHIFT OVERRIDE- REMOTE CABLE ACTUATION**

A manual pump shift override shall be provided on the apparatus. The shift shall be remote cable actuated. The remote cable shall have a "T" handle control which shall be positioned just inside the pump compartment on the driver's side. The control shall be easily accessed through the side panel hinged access door. The control shall be clearly labeled "MANUAL PUMP SHIFT".

### **TRIDENT PRIMING SYSTEM**

A Trident air priming system shall be provided.

### **MANIFOLD DRAIN VALVE**

The pump shall have a manifold type drain valve assembly consisting of a stainless steel plunger in a bronze body with multiple ports. The control for the valve shall be on the left side along the bottom of the panel and above the side running board. The valve shall be a rotary type with a large easy to grip handle. The valve shall be labeled "PUMP DRAIN".

### **ICI "LEVER LIFT" BLEEDER/DRAIN VALVES**

ICI 3/4" quarter turn ball type bleeder/drain valve shall be provided for each discharge and auxiliary intake. A hose shall be connected to the valve that will direct water below the apparatus and away from the immediate pump operator's location.

The control handle shall be "lever lift" style for easy actuation. The handle for the control shall have a recessed area for the color coded identification label.

**LOW POINT AUTO-DRAINS**

Automatic drains shall be provided in low points of any discharge piping. The drain shall drain to the ground below its location. This drain shall be a supplementary drain and will not be considered the required 3/4" bleeder drain.

**6" LEFT (DRIVER) SIDE MASTER INTAKE**

A 6" master intake shall be provided on the left (driver) side of the apparatus. The intake shall have a 6" male NST connection. The intake shall have a removable screen to prevent the entry of large objects into the pump. The screen shall be constructed of a material that will provide cathodic protection to the pump. A label shall be provided above the intake that states "DRIVER SIDE MASTER INTAKE". The label shall be color coded burgundy.

**LEFT SIDE MASTER INTAKE CAP**

A 6" FNST LH chrome cap shall be provided on the left side master intake.

**6" RIGHT (PASSENGER) SIDE MASTER INTAKE**

A 6" master intake shall be provided on the right (passenger) side of the apparatus. The intake shall have a 6" male NST connection. The intake shall have a removable screen to prevent the entry of large objects into the pump. The screen shall be constructed of a material that will provide cathodic protection to the pump. A label shall be provided above the intake that states "PASSENGER SIDE MASTER INTAKE". The label shall be color coded burgundy.

**RIGHT SIDE "FREE-FLOATING" SUCTION HOSE WELL**

A soft suction hose well shall be provided on the right side of the pump compartment. The hose well shall be of the "sunken" type below the running board.

The floor shall be covered with Turtle Tile flooring.

The hose well shall be a "free-floating" type with the front lower corner angled. A restraint device shall be provided that will prohibit the hose well from complete

separation with the apparatus.

**RIGHT SIDE SUCTION HOSE WELL CAPACITY**

The right side hose well shall hold up to 25' of 5" hose.

**HOSE WELL RETENTION STRAPS - RH**

Two (2) heavy duty straps made of black webbing material shall be provided to secure the hose in the right side hose well.

**RIGHT SIDE MASTER INTAKE CAP**

A 6" FNST LH chrome cap shall be provided on the right side master intake.

**6" REAR INTAKE**

A 6" rear intake shall be provided and located on the right side of the rear face extended through the rear compartment. (Intake may affect rear compartment dimensions listed elsewhere in these specifications.)

The intake shall have a Southpark IL35S32AC chrome plated MNST hose connection with screen insert.

All piping in the rear intake shall be 5" suction pipe. Victaulic couplings shall be used throughout the piping assembly to allow for easy disassembly if necessary. All elbows used in the piping shall be smooth radius type to allow maximum flow and minimum pressure loss.

Bleeder/drain valves shall be installed in all low points in the piping.

**HALE MIV-E MASTER INTAKE VALVE FOR REAR INTAKE**

The rear intake shall be equipped with a Hale model MIV-E electrically operated intake valve. The valve shall be a full flow butterfly type valve designed to mount on the fire pump between the suction tube extension and the suction tube behind the pump panel.

The valve shall not interfere with other suction or discharge openings on the fire pump or with the operating control properly mounted.

The entire valve shall be cast, manufactured, and tested at the pump manufacturer's factory. The valve body and related components that are in contact with water shall be fine grained corrosion resistant bronze. The butterfly disc shall be manufactured of 80,000 psi minimum yield strength heat treated cast steel then coated with a durable nitrile rubber to provide a positive seal when the valve is closed. The valve shall be hydrostatically tested to 600 psig and vacuum tested to 26" hg.

A pressure relief valve shall be provided that is factory set at 125 psi and field adjustable from 75 to 250 psi. The pressure relief valve shall provide overpressure protection for the soft suction hose even when the intake valve is closed.

The inlet valve shall be operated by a 12 VDC electric motor with the control on the pump panel. The valve shall be provided with panel placards indicating control operation. The placards shall have status lights to indicate whether the valve is open, closed, or traversing from one position to the other. The valve shall have a gear operator that will open/close the valve in no less than 3 seconds. The gear actuators shall be sealed to provide reliable service in the hard pump compartment environment. The ratio of the actuator will be such that the hand wheel will close the valve in no more than 10 complete turns.

A label stating the following will be provided near the intake: "WARNING-SERIOUS INJURY OR DEATH COULD OCCUR IF INLET IS SUPPLIED BY A PRESSURIZED SOURCE WHEN THE VALVE IS CLOSED.

### **MANUAL MIV "BACKUP" CONTROL - REAR INTAKE**

A manually operated "backup" hand wheel control shall be provided for the rear intake valve and located in an accessible location. Because the backup control moves when the electric control is activated, the backup control shall not be located in any location that firefighting personnel may come into contact with the control during normal operations.

### **REAR MIV VALVE DRAIN**

A 3/4" drain shall be provided on the valve body to allow draining of the outer side of the

valve.

**REAR MIV BLEEDER VALVE**

A 1/4" bleeder valve shall be provided on valve body to bleed off air on the outer side of the valve.

**REAR INTAKE PIPING - STAINLESS STEEL**

The rear intake piping shall be 304 stainless steel.

**REAR MASTER INTAKE CAP**

A 6" female NST long handle chrome cap shall be provided on the rear master intake.

**3/8" PUMP COOLING/BYPASS LINE**

A 3/8" pump cooling/bypass line shall be provided from the pump discharge manifold directly into the tank.

This discharge shall implement an all brass ball type 1/4 turn valve with chrome plated handle control located on the pump panel.

The valve control handle shall indicate the open/closed position of the valve. The handle shall have a recessed area for mounting of the identification label which shall clearly state "PUMP COOLER".

**TANK REFILL/RECIRCULATION DISCHARGE**

A discharge shall be provided from the pump discharge manifold to allow pump cooling when necessary as well as to refill the booster tank.

The water tank fill gauge shall be directly in line with this discharge control.

The valve and piping shall be 2".

The refill/recirculation discharge shall be manually controlled on the pump panel.

### **STAINLESS STEEL PIPING**

All piping for discharges shall be stainless steel using stainless steel fittings. High pressure helix wire reinforced flexible piping with a minimum burst pressure of 1200 psi may be used in some areas to minimize friction losses. All flexible piping couplings shall be high tensile strength stainless steel.

All piping shall be properly supported and braced to prevent movement of piping other than what is allowed by the flexible couplings to compensate for apparatus flexing.

Any discharge manifolds provided on the apparatus must be fabricated of a minimum of schedule 10 304 marine grade piping. Use of any welded light gauge (less than Schedule 10) manifolding or plumbing will not be acceptable.

The stainless steel piping shall be warranted to be free from corrosion perforation for a period of 10 years following the delivery of the apparatus.

### **VICTAULIC COUPLINGS**

Victaulic style couplings shall be used in the assembly of the pump piping system. The couplings shall allow flex in the piping and provide for a disassembly point for maintenance and repairs.

### **VENTED LUG CAPS AND PLUGS**

All intake and discharge plugs and caps and plugs shall be vented lug type designed to relieve trapped pressure and help reduce possible operator injuries.

### **AKRON HD-8800 SERIES VALVES**

All discharge and small diameter auxiliary intakes shall have heavy duty Akron 8800 series brass ball valves with stainless steel ball. This shall include the tank to pump and tank fill valve.

**RIGHT SIDE FORWARD AUXILIARY INTAKE**

An auxiliary intake shall be provided on the right side of the pump compartment in the forward position.

The valve control shall be manually controlled at the intake location.

The intake shall have a 2 1/2" chrome plated female NST swivel connection with screen and a male NST chrome plated intake plug and chain.

A 3/4" bleeder/drain valve shall be provided.

**LEFT SIDE FORWARD AUXILIARY INTAKE**

An auxiliary intake shall be provided on the left side of the pump compartment in the forward position.

The intake valve and piping shall be 2 1/2".

The valve shall be manually controlled from the pump operator's position.

The intake shall have a 2 1/2" chrome plated female NST swivel connection with screen and a male NST chrome plated intake plug and chain.

A 3/4" bleeder/drain valve shall be provided.

**FOAM PRO 1600 CLASS A FOAM SYSTEM**

A Foam Pro model 1600 Class A foam system shall be provided and properly installed on the apparatus.

The system shall be an electronic, fully automatic, variable speed direct injection discharge side foam proportioning system. The foam proportioning operation shall be based in direct measurement of water flows and pressures.

The system shall be equipped with a control module, suitable for installation on the pump

panel. Incorporated within the motor driver shall be a microprocessor that receives input from the system flowmeter, while also monitoring foam concentrate pump output, comparing values to ensure that the operators preset proportional amount of foam concentrate is injected into the discharge side of the pump.

The control module shall enable the pump operator to 1) activate the foam proportioning system and 2) select the foam proportioning rates from 0.1% to 1.0%.

A 12 volt electric motor driven, positive displacement plunger pump shall be provided. The pump capacity shall be 1.7 GPM at 200 psi with a maximum operating pressure up to 400 psi. The motor shall be controlled by a microprocessor which is mounted in the base of the pump. It shall receive signals from the control module, and power the 1/3 horsepower electric motor in a variable speed duty cycle to ensure that the correct proportion of concentrate is injected into the water stream.

A full flow check valve shall be provided in the discharge piping to prevent foam contamination in the fire pump and water tank. A 5 psi opening pressure check valve shall be provided in the concentrate line.

An installation and operation manual shall be provided for the system.

### **FOAM FLOW RATING**

The foam system shall be capable of the following flow rates at given foam %:

- 1,700 GPM @ 0.1%
- 850 GPM @ 0.2%
- 340 GPM @ 0.5%
- 170 GPM @ 1%

### **CLASS A "LOW FOAM IN TANK" INDICATOR**

There shall be a Foam Pro low tank level indicator provided and vertically mounted in the wall of the foam tank. The indicator shall provide "low foam concentrate" indication to the pump operator.

**FOAM SYSTEM SCHEMATIC PLACARD**

There shall be a single tank foam system layout placard provided and located in close proximity to the pump operator's position as required by NFPA 1901.

**FOAM SYSTEM RATING PLACARD**

There shall be a foam system rating placard provided in close proximity to the pump operator's position as required by NFPA 1901.

**RIGHT SIDE DISCHARGES**

One 2 1/2" discharge and one 3" discharge shall be provided on the right side pump panel. The 3" discharge shall be located forward of the intake and the 2 1/2" shall be located rear of the intake.

**One (1) right side 2 1/2" discharge(s):**

The right side 2 1/2" discharge shall be manually controlled on the pump panel.

The discharge shall be equipped with a chrome plated brass or bright finish stainless steel discharge elbow with 2 1/2" MNST thread.

A 2 1/2" chrome plated NST cap and chain shall be provided.

**One (1) right side 3" discharge(s):**

The right side 3" discharge shall be manually controlled on the pump panel. The control shall have an integrated slow closing mechanism to comply with NFPA 1901.

The discharge shall extend straight out of the apparatus with no elbow.

A Kochek model SKE4T3R 3" FNST x 4" locking swivel storz elbow adapter with ZCC407 blind cap and chain shall be provided.

**RIGHT SIDE RUNNING BOARD DISCHARGE**

One (1) 1- 3/4" discharge pre-connect shall be provided on the apparatus in the right side pump compartment running board area.

The valve shall be manually controlled on the pump panel.

The running board discharge shall have a 1 1/2" male NST thread connection.

**LEFT SIDE DISCHARGES**

Two (2) 2 1/2" discharges shall be provided on the left side pump panel. The discharges shall be located one forward of the intake and one located rear of the intake.

Two (2) left side 2 1/2" discharge(s):

The left side 2 1/2" discharge shall be manually controlled on the pump panel.

The discharge shall be equipped with a chrome plated brass or bright finish stainless steel discharge elbow with MNST thread.

A 2 1/2" chrome plated NST cap and chain shall be provided.

**LEFT REAR 2 1/2" DISCHARGE**

One (1) 2 1/2" discharge shall be provided on the left rear of the apparatus.

The valve shall be manually controlled on the pump panel.

A chrome discharge elbow shall be provided with 2 1/2" NST threads.

The discharge shall be used as a pre-connected line and shall not require any cap or chain.

**1 3/4" UPPER MOUNT CROSSLAY PRECONNECTS**

Two (2) 1 3/4" pre-connected cross lays shall be provided and located behind the top

mount pump panel.

The cross lay compartment shall be constructed of 5052 smooth aluminum sheet material with a random brushed finish applied after fabrication. Each cross lay shall be piped using 2" piping or high pressure hose incorporating a 2" valve with the control on the top mount pump operator's panel.

The #1 - hand line cross lay shall have the capacity to hold 200 feet of 1 3/4" or 2" fire hose and nozzle.

The #2 - hand line cross lay shall have the capacity to hold 200 feet of 1 3/4" or 2" fire hose and nozzle.

The valve(s) shall be manually controlled on the pump panel.

There shall be two (2) 2" swivel elbows with 1 1/2" male NST hose thread connections provided on the cross lay hose beds. The swivels shall be mounted in a position to prevent hose "pinching" at the hose thread connection.

3/4" manual drain valves shall be provided for all 1 3/4" cross lays. The valves shall have an all brass body with heavy duty neoprene seal.

The #1 hand line cross lay shall be foam capable.

The #2 hand line cross lay shall be foam capable.

### **CROSSLAY COMPARTMENT ENDS - BLACK WEBBING**

The cross lay compartment shall be enclosed on each end using a heavy duty webbing to prevent hose from accidentally unloading. The webbing shall be black.

A yellow nozzle strap shall be provided for each cross lay. The strap shall be designed to loop through the nozzle handle and secured to the apparatus to keep nozzle from coming out of the cross lay compartment without manually disconnecting the nozzle strap.

### **HINGED ALUMINUM TREADBRITE CROSSLAY COVER**

An aluminum treadbrite hinged cover shall be provided to cover the cross lay compartment. The cover shall have a full length polished stainless steel hinge. A chrome plated lift handle shall be provided on each end of the cover. Rubber protection blocks shall be provided in any area where the cover may come into contact with a painted surface.

### **3" MONITOR DISCHARGE**

A 3" monitor discharge shall be provided above the pump compartment. The discharge piping shall extend above the pump compartment a sufficient distance to allow use of the deck gun.

The valve shall be manually controlled on the pump panel. The control shall have an integrated slow closing mechanism to comply with NFPA 1901.

### **PUMP COMPARTMENT**

A modular pump compartment with top mounted pump operator's panel shall be provided. The modular design of the pump compartment shall allow the compartment to be fully independent of the apparatus body. A 1" flex joint shall be provided between the pump compartment and the apparatus body.

The modular design of the pump compartment shall allow the entire pump system, including the pump itself, to be removed from the apparatus in a one-piece assembly while leaving the body intact and without having to cut any sheet metal or welds.

### **STAINLESS STEEL PUMP COMPARTMENT CONSTRUCTION**

The entire pump compartment shall be constructed using only 304 marine grade stainless steel fabricated sheeting with a #4 annealed and polished finish on all exterior surfaces. The pump compartment shall not require any finish painting. Due to the extreme twisting and flexing that all fire apparatus are subjected to, aluminum shall not be used in any portion of the pump compartment structural support. The use of any type of enclosed tubing that requires the use of self-tapping or any other type of machine screw shall not

be acceptable.

**TOP MOUNT PUMP OPERATOR'S WALKWAY**

An 18" wide (front to rear) pump operator's walkway shall be provided between the pump compartment and the chassis cab. A 1" minimum space shall be provided between the walkway edges, pump compartment and rear wall of the chassis.

**TOP MOUNT WALKWAY LIGHTING - LED**

Two (2) teardrop style LED lights shall be provided to illuminate the top mount walkway area.

**WALKWAY COMPARTMENT - DRIVER'S SIDE**

A compartment shall be incorporated into the walkway assembly on the driver's side of the apparatus. The compartment shall have a minimum depth of 22", and shall be a minimum of 12" wide x 18" high in the rear 13" and no less than 6" high in the forward section.

The entire step and running board assembly shall be horizontally hinged to allow complete access to the compartment. A pneumatic spring hold-open device shall be provided to hold the integrated step/door assembly open.

**WALKWAY COMPARTMENT - OFFICER'S SIDE**

A compartment shall be incorporated into the walkway assembly on the officer's side of the apparatus. The compartment shall have a minimum depth of 22", and shall be a minimum of 12" wide x 18" high in the rear 13" and no less than 6" high in the forward section.

The entire step and running board assembly shall be horizontally hinged to allow complete access to the compartment. A pneumatic spring hold-open device shall be provided to hold the integrated step/door assembly open.

(The right side walkway compartment dimensions may be affected by the chassis exhaust system design.)

### **WALKWAY COMPARTMENT FLOOR**

The walkway compartment floors shall have Turtle Tile floor tiles.

### **WALKWAY COMPARTMENT LIGHTING - LED**

An LED strip light shall be provided in the under walkway compartment(s). The light(s) shall be activated by the pump panel light switch.

### **TOP MOUNT PUMP OPERATOR'S WALKWAY MATERIAL**

The entire pump operator's walkway assembly shall be constructed of NFPA compliant slip resistant aluminum treadbrite on all stepping surfaces.

### **PUMP COMPARTMENT RUNNING BOARDS**

The pump compartment side running boards shall be constructed of NFPA compliant slip resistant aluminum treadbrite.

### **PUMP COMPARTMENT FRONT WALL**

The front wall of the pump compartment shall be constructed of aluminum treadbrite which is bolted to the pump compartment assembly and removable.

### **PUMP COMPARTMENT SIDE ACCESS DOORS - TOP MOUNT**

A brushed stainless steel hinged access door shall be provided on each side of the pump compartment. The doors shall have pneumatic hold open devices and push button type flush latches. The doors shall be a minimum of 30" wide x 20" high.

### **TOP MOUNT PUMP PANEL - BLACK VINYL**

A rear facing top mounted pump panel shall be provided to allow simple, efficient operation of all pump functions necessary during normal operations.

A dual level inclined pump panel shall be provided for convenient user friendly layout of the panel to simplify the operation of the apparatus. Both levels of the panel shall be sloped to provide an angled view of the panel so that the operator may read all identification labels easily.

All controls for the pump shall be identified using permanently engraved identification labels properly secured to the panel. All discharge and intake identification labels shall be color coded to NFPA 1901 recommendations with labels at the control, intake/discharge location and drain port location.

The front incline panel shall be constructed of 1/8" smooth aluminum with black vinyl covering shall begin at the lower edge of the front panel just behind the control levers and continue back to the area which the second incline level begins.

The rear incline panel shall be constructed of black vinyl textured aluminum and shall begin just above the pressure gauge mounting area and continue up to the top of the pump compartment. The panel shall have a full width stainless steel hinge at the bottom to allow the panel to hinge forward for access to the back of the panel. A latch shall be provided on each end to secure the panel in the closed position. A full pump panel width brushed stainless steel light shield shall be provided at the top of the gauge panel.

### **LED PUMP PANEL LIGHTS**

The top mount pump panel shall be illuminated using a track type LED light assembly.

The light shall be constructed of an unbreakable type clear poly flexible material housed in an aluminum extrusion mounted behind a brushed stainless steel light shield shall be provided across the top of the gauge panel.

### **LED SIDE DISCHARGE/INTAKE PANEL LIGHTS**

The right and left side discharge and intake panels shall be illuminated using a track type LED light assembly on each side.

The lights shall be constructed of an unbreakable type clear poly flexible material housed

in an aluminum extrusion mounted behind a brushed stainless steel light shield provided across the top of the gauge panel.

### **AUTOMATIC PUMP PANEL LIGHT ACTIVATION**

The pump panel lights above the pump control panel shall function automatically with the pump shift activation.

### **INNOVATIVE CONTROLS TOP MOUNT CONTROL HANDLES**

All top mount valve control handles shall be Innovative Controls 'locking' lever type with "T" handles. The "T" handles shall be chrome plated zinc and shall have a recessed area for the color coded identification label.

### **VALVE CONTROL LINKAGES**

All manual valve controls requiring remote actuation shall have control rod linkages constructed of 1/2" galvanized pipe and shall implement heavy ball swivel joints and clevises for smooth valve operation.

### **ICI MASTER PUMP DISCHARGE PRESSURE GAUGE**

An ICI 4" diameter master pressure gauge shall be provided to indicate the main pump discharge pressure. The gauge shall read from 30" hg vacuum to 400 psi and shall be accurate within +/- 1%. The gauge shall be glycerin filled (-40F to +150F) and have a high impact resistant clear acrylic lens.

### **ICI MASTER PUMP INTAKE PRESSURE GAUGE**

An ICI 4" diameter master pressure gauge shall be provided to indicate the pump intake pressure. The gauge shall read from 30" hg vacuum to 400 psi and shall be accurate within +/- 1%. The gauge shall be glycerin filled (-40F to +150F), read up to 400 psi, be accurate within +/- 1% and have a high impact resistant clear acrylic lens.

The master intake and discharge gauges shall have bright finish stainless steel bezels.

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The master gauge dials shall be white with black markings. The needle shall match the color of the markings.

The master intake gauge shall be clearly labeled "PUMP INTAKE" and shall be located to the left of the master discharge pressure gauge. The label shall be burgundy color.

The master discharge gauge shall be clearly labeled "PUMP DISCHARGE" and shall be located to the right of the intake pressure gauge. The label shall be black color.

The master intake/discharge pressure gauges shall have a lifetime non-yellowing and freeze warranty. The gauges shall also be warrantied for 4 years for defects in materials and workmanship, including fluid leakage. The warranty will not cover labor costs and/or transportation costs.

### **PRESSURE/VACUUM TEST PLUGS**

Underwriter's test plug adapters shall be provided for connection of pump test gauges.

### **INNOVATIVE CONTROLS SL PLUS TANK GAUGE - PUMP PANEL**

An Innovative Controls model SL Plus tank gauge shall be provided on the pump panel. The gauge shall feature a 180 degree highly visible wide view ultra-bright LED display showing the level of the booster tank.

### **INNOVATIVE CONTROLS SL PLUS TANK GAUGE - REAR**

An Innovative Controls model SL Plus tank gauge shall be provided on the rear of the apparatus. The gauge shall feature a 180 degree highly visible wide view ultra-bright LED display showing the level of the booster tank.

### **INNOVATIVE CONTROLS SL MINI TANK GAUGE - CAB**

An Innovative Controls model SL MINI tank gauge shall be provided on or near the cab control panel in clear view from the driver's and officer's position.

The gauge shall have ultra-bright LED lights displaying the level of the booster tank.

### **TANK GAUGE PARK BRAKE DISABLE**

The tank gauge(s) shall be disabled when the park brake is released so that the lights are not a distraction when the vehicle is in motion.

### **INNOVATIVE CONTROLS SL PLUS FOAM TANK GAUGE - CLASS A FOAM**

An Innovative Controls model SL Plus class A foam tank gauge shall be provided on the pump panel. The gauge shall feature a 180 degree highly visible wide view ultra-bright LED display showing the level of the booster tank.

### **ICI DISCHARGE PRESSURE GAUGES**

Unless otherwise specified, each 1 1/2" or larger discharge shall have an ICI pressure gauge. The gauge shall be glycerin filled (-40F to +150F), read from 0 - 400 psi, be accurate within +/- 1% and have a high impact resistant clear acrylic lens.

The individual discharge pressure gauges shall have a 2 3/4" diameter.

The discharge pressure gauge dials shall be white with black markings. The needle shall match the color of the markings.

The pressure gauge shall be directly in line with or adjacent to the discharge control handle for the discharge that they provide pressure readout for. **For ease of operation, this requirement must be strictly adhered to. There shall be no exception to this requirement.**

The gauges shall be clearly labeled with permanent color coded labels.

The discharge pressure gauges shall have a lifetime non-yellowing and freeze warranty. The gauge shall also be warranted for four years for defects in materials and workmanship including fluid leakage. Warranty will not cover labor costs and/or transportation costs.

**PUMP PANEL AIR HORN BUTTON**

A momentary push button shall be provided on the pump panel to activate air horns.

**RADIO COMPARTMENT**

An aluminum treadbrite radio compartment shall be provided and mounted above and behind the top mount hinged gauge panel. The compartment shall not be mounted on the panel itself. The compartment shall be 10" wide x 10" high x 6" depth and shall have a brushed stainless steel hinged door with latch. The door shall be weather stripped to help prevent water from entering the compartment.

**IDENTIFICATION LABELS FOR PUMP PANEL**

Innovative Controls verbiage label bezels shall be installed. The bezel assemblies will be used to identify apparatus components. These labels shall be designed and manufactured to withstand the specified apparatus service environment.

Where required, the verbiage label bezel assemblies shall include a chrome plated panel mount bezel with durable easy to read UV resistant polycarbonate inserts featuring the specified verbiage and color coding. The UV resistant polycarbonate verbiage and color inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. Both the insert labels and bezel shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

The color scheme for the discharge and intake labels shall be per NFPA A.16.9.1

**BOOSTER TANK- UNITED PLASTIC FABRICATING, INC. 1250 GALLONS**

The tank shall have a LIFETIME warranty provided by United Plastic Fabricating, Inc.

The tank exterior shell shall be constructed of minimum 1/2" thick PT3 polypropylene sheet stock. This material shall be non-corrosive stress relieved thermoplastic which is U.V. stabilized for maximum protection. The booster tank shall be of a specific configuration and is designed to be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum

strength and integrity. The tank construction shall include Poly Pro Seal technology. A sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise.

The transverse swash partitions shall be manufactured of 3/8" PT3 polypropylene material. The longitudinal swash partitions shall be constructed of 3/8" PT3 polypropylene and extend through the cover to allow for positive welding and maximum integrity. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions shall interlock with one another and are welded to each other as well as to the walls of the tank. All partition spacing shall be compliant with NFPA 1091 recommendations.

The top of the booster tank shall be fitted with removable lifting eyes.

The tank cradle assembly shall be designed to provide support to the tank. The assembly shall be approved by the manufacturer of the tank.

#### **BOOSTER TANK CAPACITY 1,250 GALLONS**

The poly booster tank shall have a capacity of 1,250 U.S. gallons.

#### **BOOSTER TANK FILL TOWER - LEFT SIDE FRONT**

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" polypropylene and shall be a minimum of **10" x 10"** outer dimension. The tower shall be located in the left front corner of the hose bed. The tower shall have a 1/4" thick removable polypropylene screen and polypropylene hinged type cover.

#### **4" TANK OVERFLOW**

A 4" diameter tank vent/overflow shall be provided and integrated into the tank. The piping shall be a minimum of schedule 40 polypropylene designed to run through the tank and discharge behind the rear wheels.

### **1" TANK SUMP DRAIN**

A 1" drain shall be provided in the bottom of the tank sump to fully drain the tank. The drain shall use 1" stainless steel piping with a 1" valve. The control for the valve shall be remoted to the driver's side of the apparatus just under and behind the side rub rail. The drain control handle shall be labeled "TANK DRAIN".

### **3" TANK SUMP CLEAN OUT PLUG**

A 3" tank sump clean out plug shall be provided in the bottom of the tank sump.

### **25 GALLON CLASS A FOAM TANK**

A 25 gallon Class A foam tank shall be provided. The tank shall have all connections necessary to connect to the foam system and shall also have a 1/4 turn drain valve with hose attached to allow the tank to be drained.

The tank shall have an **8" x 8"** fill tower with hinged type lid with latch. A vent shall be provided in the lid.

A label shall be provided on the lid that reads "CLASS A FOAM TANK FILL" and "WARNING: DO NOT MIX BRANDS OR TYPES OF FOAM".

### **CLASS A FOAM TANK/BOOSTER TANK INTEGRATION**

The class A foam tank shall be integrated into the apparatus booster tank. The foam tank shall not be separate from the booster tank.

### **NEWTON 10" DUMP VALVE WITH SWIVELING TELESCOPIC CHUTE**

A Newton model 1050-34-44-14 10" stainless steel dump valve shall be provided on the rear of the apparatus.

A Newton model 6012SW-34 stainless steel swivel adapter shall be provided to allow use to either side or the rear.

A Newton model 4036-34-8x12 stainless steel 36" telescoping extension chute shall be provided.

NOTE: The swivel portion and the extension must be nested while the unit is in motion.

### **ELECTRIC DUMP VALVE CONTROL - DRIVER REAR**

The valve portion of the Newton swivel system valve shall be electrically operated on the rear of the apparatus.

The switch shall be located on the driver's side rear face of the apparatus.

### **SWIVEL/EXTENSION NESTED**

A permanent label shall be provided on the rear of the apparatus stating that the swivel and extension must be nested and secured while the apparatus is in motion. The label shall also state that the tank or the dump system may be damaged if not properly secured while in motion.

### **DUMP VALVE NOT STORED INDICATION**

The swivel dump valve shall have a warning system that activates when the park brake is released providing warning to the driver that the dump valve is not properly stored.

### **SWIVEL DUMP VALVE MOUNTING**

The swivel dump valve shall be mounted to the rear surface of the tank. The tank mounting flange shall not be recessed into the rear face of the tank.

### **2 1/2" RIGHT REAR TANK FILL**

One 2 1/2" rear tank fill shall be provided on the rear of the apparatus adjacent to the dump valve.

The fill valve shall be connected to the tank with 2-1/2" stainless steel threaded pipe with

the hose connection on the exterior of the apparatus supplied with a 2 1/2" FNST swivel connection, 30-degree elbow with a chrome plated plug and chain.

An Akron 8825 series valve with TSC handle shall be utilized on the tank fill.

### **3" TANK TO PUMP**

One 3" tank to pump line(s) and valve(s) shall be provided between the tank and the pump. The piping from the sump to the valve shall be 4".

The tank to pump valve shall be manually controlled on the pump panel.

### **TANK TO PUMP CHECK VALVE**

A check valve assembly shall be provided on the pump. The valve shall prevent unintentional back filling of the tank through the tank to pump line. Connection from the valve to the tank shall be made by using a non-collapsible flexible rubber hose.

### **HOT DIPPED GALVANIZED SUB FRAME**

The tank cradle and body substructure shall be constructed of high strength ASTM A-36 structural steel with 36,000 psi minimum yield strength. The entire substructure shall be framed and jig welded together to insure a truly square assembly. The substructure shall be fastened to the chassis rails so that it may be easily removed from the chassis for repair, replacement or mounting to a new chassis.

After complete assembly of the tank cradle substructure, the entire assembly shall be hot dipped galvanized for superior corrosion protection.

Due to the extreme duty that this apparatus will experience during its intended service life and to prevent rusting and corrosion from shortening the service life of this apparatus, sub frames fabricated of painted/undercoated steel or aluminum tubing shall not be acceptable.

### **20 YEAR SUB-STRUCTURE WARRANTY**

The tank cradle and body substructure shall have a 20 warranty covering failure due to corrosion perforation or structural design error.

This warranty shall be in effect for 20 years after delivery of the apparatus to the customer. **NO EXCEPTION.**

### **HYPER-FLEX BODY MOUNTING**

The body module assembly shall be mounted to the chassis frame rails with "*Hyper-Flex*" vibration and shock isolators using a forward mounting system. Flexible neoprene pads, or U-springs especially developed for the expected weight and torsional flexing of the apparatus body, shall be incorporated into the system to eliminate chassis frame rail flex from transmitting harmful loads and twisting onto the body.

### **100" BODY WIDTH**

The apparatus body shall be 100" wide from side to side measuring from the rub rail mounting surface.

### **APPARATUS BODY MATERIAL**

The entire apparatus body shall be constructed of, 304 marine grade stainless steel with a #4 annealed and polished finish. The interior of the apparatus body shall not require any finish painting. The compartment interiors must be a #4 finish. Mill finish or DA sanded finish will not be acceptable.

### **APPARATUS BODY CONSTRUCTION**

The entire apparatus body shall be formed by sheering and bending the sheet metal. Metal tubular structures or extrusions shall not be used in the construction of the apparatus body. All edges of the sheared metal shall be sanded to remove any sharp shearing edges prior to bending the metal. After sheering and bending, the body shall be assembled on a jig table that is designed to hold all parts securely in place to insure an accurately built apparatus body.

**APPARATUS BODY ASSEMBLY METHOD**

The entire apparatus body shall be assembled using only bolted type construction. All apparatus body parts shall be able to be unbolted without the need to cut welds, etc. No exceptions to this requirement as all apparatus manufacturers have the capability to manufacture apparatus bodies in this manner.

**COMPARTMENT FLOORS**

All compartment floors shall be constructed of, 304 marine grade stainless steel with a # 4 annealed and polished finish on the interior surface. The drain ports shall be designed to prevent road spray from entering the compartment. The front edge shall consist of a minimum of two bends to provide additional strength in the compartment floor and shall then form the lower door jamb.

All compartment floors shall be sweep out design. This shall include the lower side compartments, any compartments above the wheel well, any transverse compartments, and the rear face compartment(s). Any exception to this requirement will cause immediate rejection of bid.

**COMPARTMENT WEIGHT RATING**

Each compartment shall be designed to carry 1,000 lbs. of equipment distributed throughout the compartment.

**INTERIOR COMPARTMENT SURFACES**

All visible interior compartment surfaces shall be, 304 marine grade stainless steel with a # 4 annealed and polished finish. Surfaces that are painted or coated in any manner, raw material or any surface with any type sanded finish are not acceptable.

**FRONT COMPARTMENT CORNERS**

The apparatus body front compartment corners and vertical faces on both sides shall be constructed of, 304 marine grade stainless steel with a # 4 annealed and polished finish. The corners shall be a one-piece fabrication from top to bottom and from the inner body

panel to the outer face of the compartment to provide maximum strength. Corners using structural support channels or extrusions that require two or more pieces shall not be implemented.

The # 4 finish corner shall wrap around the side of the apparatus body and form the front compartment door jamb providing front corner protection.

### **REAR COMPARTMENT CORNERS - BRUSHED**

The apparatus body rear compartment corners and vertical faces on both sides shall be constructed of, 304 marine grade stainless steel with a # 4 annealed and polished finish. The corners shall be a one- piece fabrication from top to bottom and from the inner body panel to the outer face of the compartment to provide maximum strength. Corners using structural support channels or extrusions that require two or more pieces shall not be implemented.

The # 4 finish corner shall wrap around the side of the apparatus body and form the rear compartment door jamb providing front corner protection.

### **COMPARTMENT TOPS/CEILINGS**

The apparatus body compartment tops shall be constructed of, 304 marine grade stainless steel with a # 4 annealed and polished finish on the interior surface.

### **COMPARTMENT TOP OVERLAY**

The compartment top shall be overlaid with 1/8 aluminum treadbrite. The aluminum treadbrite shall be an overlay only and shall not form any structural part of the apparatus body or shall the bottom side of the treadbrite be visible when looking into the compartment.

### **PAINTED FENDERWELLS**

The left and right side rear fender wells shall be constructed of stainless sheet steel. The fender wells shall be radius cut and shall have a full circular inner liner to prevent rust pockets and for ease of cleaning. A 1" gap shall be provided on the bottom of each side of

the circular liner to allow drainage of water and for easy cleanout. Sufficient clearance shall be provided for tire chains. Before the booster tank is installed, the fender wells shall be thoroughly cleaned and all seams sealed to prevent corrosion in the fender well area.

### **PAINTED FENDERWELLS**

The fender wells shall be finish painted the primary exterior color of the apparatus.

### **UPPER DOOR POSTS - PAINTED**

The upper door post to the front and rear of the compartment door above the rear wheels shall be constructed of ultra-smooth 304 marine grade stainless sheet steel with a minimum tensile strength of 90,000 psi.

The outer surface of these door posts shall be finished painted.

### **REMOVABLE INNER FENDER LINER**

The fender wells shall be radius cut and shall have a circular inner liner to prevent corrosion pockets and for ease of cleaning. The inner liner shall be constructed of high impact polypropylene material and shall be fully removable for chassis suspension access.

To prevent the accumulation of potential corrosive materials in the fender well area, there shall be no exception to the removable inner fender liner.

### **STAINLESS STEEL FENDERETTE**

The fender wells shall be trimmed with a polished stainless steel fenderette. The stainless steel fenderette shall be secured into place with stainless steel fasteners and shall be easily removable for replacement. A black rubber fender welting shall be provided between the fenderette and the inner liner surface. The fenderettes shall protrude from the apparatus body a maximum of 1".

**REPLACEABLE FENDERETTE**

The stainless steel fenderette shall be secured to the apparatus body with stainless steel fasteners and shall be easily removable for replacement.

Fenderettes that are welded to the apparatus body are not acceptable.

**OUTER BODY SIDES**

The outer left and right side body panels above the compartment tops shall be constructed out of, 304 2B marine grade stainless steel with a # 4 brushed finish and shall not require any finish paint.

**COMPARTMENT VENTILATION**

Each compartment shall have a removable metal ventilation plate to allow for air movement in the compartment. A cleanable filter material shall be provided behind the plate.

Plastic cover plates will not be acceptable.

**COMPARTMENT DOORS - STAINLESS STEEL**

All side compartment doors shall be double paneled and designed to fit flush with the side of the apparatus body. Lap style or beveled style doors shall not be acceptable.

The exterior panel of the door shall be pan formed, shall be a minimum of 1 5/8" thick, and shall be constructed of fire apparatus quality stainless steel sheet material. The outer pan shall be double flanged, in and down, to provide full perimeter support for the interior panel.

All compartments that have double doors shall have the interior panel offset on the interior of the second door to allow the first door to shut tightly against the offset portion. Any compartments with double doors shall not require a center door jamb allowing full unobstructed access to the compartment.

**INNER DOOR PANEL - ALUMINUM TREADBRITE**

The interior panel of the door shall be constructed of aluminum treadbrite and shall be removable for access to the interior of the door and to allow mounting equipment to interior door panel. Interior door panels that are permanently welded or glued into place shall not be acceptable.

**COMPARTMENT DOOR HINGES**

All compartment doors shall have full length polished stainless steel hinge. The hinge shall have a minimum pin diameter of 1/4". The hinge shall be fastened to the door and to the apparatus body with stainless steel fasteners.

Fasteners used to secure the hinge shall not be visible on the exterior of the apparatus body. A dielectric isolation barrier shall be provided between the hinge and the door as well as between the hinge and the apparatus body. The hinge must be removed from both the apparatus body and compartment door during the paint process.

**COMPARTMENT DOOR LATCHES**

All compartment door latches shall be a single point center latch with double catch. The latch shall be a 'slam' type latch. Use of pin type latches shall not be acceptable. The entire latch mechanism must be located inside the double pan door to prevent any possible fouling or damage to the latch in the event equipment stored in the compartment shifts. The latches shall be activated by a non-directional stainless steel D ring handles. The handle shall be bent slightly to allow for easy grasp of the handle.

**DOUBLE DOOR SECOND DOOR LATCH - CABLE OPERATED**

A latch shall be provided on the interior of the second door on all double door compartments. A pull cable shall be provided on the interior of the second door of all high compartment doors to activate the latch with a gloved hand.

**VERTICALLY HINGED COMPARTMENT DOOR RETENTION DEVICE**

Hansen 5EZ enclosed stainless steel door retention devices shall be provided on all

vertically hinged compartment doors. The device shall be bolted to the door and to the apparatus with stainless steel fasteners. These fasteners shall not be visible on the exterior of the apparatus body. The adjustable spring mechanism shall hold the door firm, but not rigid, in either the open or closed position. The use of chain, cable or devices that are required to be manually unlatched to close shall not be acceptable.

#### **HORIZONTALLY HINGED COMPARTMENT DOOR RETENTION DEVICE**

All horizontally hinged doors shall be provided with pneumatic lift devices of adequate rating to hold the door in the open position. The device shall be bolted to the apparatus body and the interior door liner and shall be provided with 5 position adjustment brackets to allow the open height of the door to be easily adjusted.

#### **COMPARTMENT DOOR SOUND DEADENING**

After the compartment door has been painted, polystyrene insulation panels shall be placed on the interior of the door between the outer skin and the removable inner liner. These panels shall provide for a more solid sounding door when closing the door. Use of sprayed on material for sound deadening will not be permitted.

#### **COMPARTMENT DOOR WEATHER STRIPPING**

All compartment doors shall be weather stripped the entire perimeter of the compartment door opening. All weather stripping shall be heavy duty automotive hollow core type. Sponge type materials shall not be acceptable. All weather stripping must be applied to a metal backing. Clip on type weather stripping shall not be used on the perimeter of the compartment. All double door compartments shall have a metal crimp type weather strip applied to the offset interior panel.

#### **COMPARTMENT DOOR RUBBER BUMPERS**

Rubber bumpers shall be provided on the exterior of any hinged door that may come into contact with another door when opened.

## **HINGED COMPARTMENT DOOR PAINTING PROCEDURE**

All hinged compartment doors that are to be finish painted must be fitted on the apparatus body prior to painting, removed and fully disassembled for painting. All hinges, latches, handles and inner liners must be removed for the paint process to insure proper paint coverage.

## **STAINLESS STEEL COATED FASTENERS**

All fasteners used in the finish construction of the apparatus body shall be marine grade stainless steel. Fasteners that pass through a dissimilar metal panel shall be Magna-Gard, or equal, coated to help prevent metal reaction and corrosion.

As the Magna-Gard, or equal, coating is a "baked on" type coating providing for excellent adhesion to the fastener, spray on type coatings may be used in conjunction with the Magna-Gard, or equal, but not in place of it.

Because dissimilar metal corrosion is a common occurrence on all apparatus and the Magna-Gard (or similar "baked on" coatings) fasteners are commercially available to all manufacturers and is not a proprietary product, there shall be no exception to this requirement.

## **D-1, DRIVER'S SIDE COMPARTMENT IN FRONT OF THE REAR WHEELS**

A compartment shall be provided in front of the rear wheels. The compartment interior dimensions shall be 67" high x 47.75" wide x 26" usable depth.

The compartment shall have double vertically hinged doors.

## **D-2, DRIVER'S SIDE ABOVE WHEEL COMPARTMENT**

A compartment shall be provided above the rear wheels. The compartment interior dimensions shall be 37" high x 63.75" wide x 26" usable depth.

The compartment shall have a horizontally hinged, raise up door.

**D-3, DRIVER'S SIDE COMPARTMENT BEHIND REAR WHEELS**

A compartment shall be provided behind the rear wheels. The compartment interior dimensions shall be 67" high x 44" wide x 26" usable depth.

The compartment shall have double vertically hinged doors.

**P-1, PASSENGER'S SIDE LOW COMPARTMENT IN FRONT OF THE REAR WHEELS**

A low compartment shall be provided in front of the rear wheels. The compartment interior dimensions shall be 36.5" high x 47.75" wide with the lower 28" of the compartment being 26" usable depth and the remaining upper section being 14" usable depth.

The compartment shall have double vertically hinged doors.

**P-3, PASSENGER'S SIDE LOW COMPARTMENT BEHIND THE REAR WHEELS**

A low compartment shall be provided behind the rear wheels. The compartment interior dimensions shall be 36.5" high x 44" wide x 26" useable depth in a portion of the lower section and the remaining upper section being 14" usable depth.

The compartment shall have double vertically hinged doors.

**DUAL COMPARTMENT SHELF TRACKS - ALUMINUM**

Four (4) sets consisting of heavy duty aluminum adjustable tracks shall be provided in specified compartments, two for each end of shelf.

The tracks shall not be welded to the apparatus body.

**FULL DEPTH COMPARTMENT SHELVING**

There shall be six (6) full depth shelves provided. The shelves shall be constructed of 1/8" smooth aluminum with a 2" upward bend on the front and rear edges.

2 in D-1, 2 in D-3, 1 in P-1 and 1 in P-3

The shelves shall have a random orbit sanded finish.

**ROLL OUT TRAYS**

There shall be four (4) roll out tray(s) provided. The tray shall be constructed of 3/16" aluminum. The tray shall have a 2" upward bent lip on all four sides of the tray.

250 lb. total capacity heavy duty ball bearing type telescoping slides shall be provided.

A positive latching mechanism shall be provided to hold the tray in either the fully open or fully closed position.

1 in D-1, 1 in D-3, 1 in P-1 and 1 in P-3

**ADJUSTABLE TRACK FOR SCBA BRACKETS**

One (1) set(s) consisting of two heavy-duty horizontally mounted adjustable tracks shall be provided in specified compartments. The tracks shall allow SCBA brackets to be mounted to the compartment wall and be adjustable.

D-2 compartment

The tracks shall be removable and shall not be welded to the apparatus body.

**SELF CONTAINED BREATHING APPARATUS BRACKET(S)**

There shall be four (4) Superior Flamefighter SCBA bracket(s) provided. The cylinder clips shall be spring steel for greater durability and long life. A model 39002 restraint strap shall be provided for each bracket.

**REAR STEP MATERIAL - NFPA ALUMINUM TREADBRITE**

The rear step shall be constructed of NFPA complaint bright finish aluminum treadbrite.

**26" REAR TAILBOARD STEP**

The outer rear edge of the rear step shall be positioned 26" from the rear face of the apparatus. This shall include an approximate 3/4" wash out gap at the rear face of body.

**FRAME RAIL TOW EYES - CHROME PLATED**

Two (2) 3/4" chrome plated steel tow eyes shall be attached direct to the end of the frame rails on the rear of the apparatus. The eyes shall have a minimum of a 3" diameter pass through. Each eye shall be attached to the frame rail with a minimum of four 3/4" hardened steel bolts with locking nuts.

**RUBRAILS - BRIGHT ANODIZED ALUMINUM**

Extruded aluminum rub rails shall be provided on the apparatus body sides. The rub rails shall have a bright finish with anodized coating to protect the finish. The rub rails shall be spaced from the apparatus body a minimum of 1/4" with poly spacers.

The rub rails must be bolted on to the apparatus body to allow easy replacement if damaged. Rub rails that are permanently fastened to the apparatus body by welding or any other permanent method will not be acceptable. **NO EXCEPTION WILL BE ALLOWED TO THIS REQUIREMENT.**

**RUB RAIL ENDS**

The rub rail ends shall be 'capped' with a high impact resistant black EPDM contoured block.

**HOSE BED FLOORING**

The floor of the hose bed shall be constructed of fiber reinforced Dura-Dek, or equal, material.

The top portion of each "T" cross section shall measure 1 5/8" wide x 3/16" thick with beaded ends. The vertical portion shall be 3/16" thick tapering out at the bottom to a thickness of 1/2" and have an overall height of 1". The "T" sections shall be spaced 3/4" apart to allow for drainage and ventilation.

The flooring shall then be protected with a polyurethane coating to screen out ultraviolet rays. The gray colored coating shall be baked on and include a slip resistant material.

### **HOSE BED - 56" WIDE**

The hose bed shall be 56" wide from side to side.

### **HOSE BED CAPACITY**

The hose bed shall have the capacity to carry the following hose load:

1,000' of 4"  
350' of 2 1/2"

### **HOSE BED DIVIDER(S)**

There shall be one (1) hose bed divider(s) to partition off hose. The divider(s) shall be constructed of 3/16" thick aluminum plate material. The lower edge of the divider(s) shall have a two inch 90-degree bend toward one side and a 2" x 2" x 3/16" aluminum angle welded to the other side.

The divider(s) shall be adjustable by sliding in tracks which are recessed flush into the hose bed flooring, one on front and one on rear. The divider shall be held in place by two bolts on each end.

The upper rear corner of the divider(s) shall have a minimum of a 3" radius cut with a 1" aluminum rub plate.

**HOSE BED BULKHEAD**

A bulkhead divider shall be provided in the front area of the hose bed separating the hose bed from the tank fill tower(s).

**HOSE BED COVER WITH VELCRO FASTENERS**

A heavy duty vinyl coated nylon hose bed cover shall be provided to protect the hose load from the weather. The cover shall extend from the front of the hose bed to the rear and then extend downward to cover the exposed rear of the bed.

The cover shall have a double reinforced area where the cover comes into contact with the upper rear corners of the hose bed dividers. The cover shall be secured to the apparatus using Velcro on the sides and lift dots on front.

The rear of the cover shall be secured to the apparatus using positive mechanical latches.

**HOSE BED COVER - RED**

The hose bed cover shall be red.

**RIGHT SIDE LADDER BRACKETS WITH VERTICAL ADJUSTMENT**

The ground ladders shall be mounted on the right side of the apparatus above the low side compartments. The ladder brackets shall include spring loaded quick release bright finish handles that are designed to hold all ladders securely in place. The latches shall also be designed to hold remaining ladders in place if one ladder is removed. The brackets shall be vertically adjustable.

To prevent ladder wear, the brackets shall be lined with a high impact plastic material at any location where the ladder may come into contact with the bracket or any latching hardware.

**DUO SAFETY 24' 2-SECTION ALUMINUM LADDER**

One (1) Duo Safety 900A 24' NFPA compliant two section aluminum extension ladder

provided and mounted.

**DUO SAFETY 14' ALUMINUM ROOF LADDER**

One (1) Duo Safety model 775A 14' NFPA compliant aluminum roof ladder with folding hooks shall be provided and mounted.

**DUO SAFETY 10' ALUMINUM FOLDING ATTIC LADDER**

One (1) Duo Safety 585A 10' NFPA compliant aluminum folding attic ladder shall be provided and mounted.

**HARD SUCTION MOUNTINGS**

Hard suction hose troughs shall be provided and mounted below ladders on the right side. The troughs shall be constructed of 1/8" 5052 smooth aluminum sheeting material with a brushed finish.

**HARD SUCTION SECURING STRAPS**

The hard suction shall be held in the troughs using Velcro straps on both ends.

**6" x 10' HARD SUCTION HOSES (2)**

Two (2) sections of 6" diameter x 10' length clear lightweight PVC hard suction hose shall be provided.

The hard suction shall be coupled long handle female NST x rocker lug male NST.

The hard suction shall be Kocheck brand.

**ENCLOSED PORTABLE TANK COMPARTMENT**

A 32" high x 10" wide compartment shall be provided on the right side of the apparatus with access door on the rear. The compartment shall be located below the hose bed level and shall not be located above the booster tank. The compartment shall be located

between the booster tank and the right side compartments.

The compartment shall be constructed of 5052 1/8" aluminum with a brushed finish. The slide shall have Rodex slip blocks with tapered front and rear edges permanently attached to them to allow easier loading/unloading of the portable tank.

The compartment shall have an LED light just inside the door with an automatic door switch. The light shall be incorporated into the door ajar warning system in the cab.

### **PORTABLE TANK COMPARTMENT DOOR**

A smooth aluminum vertically hinged door with a slam-type latch shall be provided on the compartment. The latch shall be activated by a large "D" ring control. The use of lift-and-turn or small snap type latches on this door shall not be acceptable.

The door shall be covered with Chevron material.

### **SYNTEX 2100 PORTABLE TANK**

There shall be one (1) Syntex Industries model 2100 folding tank with 1" steel square tube frame and 22 ounce vinyl coated nylon 2,100 gallon liner provided. A large, 10" diameter, folding discharge tube shall be provided for quick emptying. When set up, the tank shall measure 11'3" x 11'3" x 30" high.

### **PORTABLE TANK LINER - YELLOW**

The portable tank liner shall be high visibility yellow.

### **PORTABLE TANK DRAIN ASSIST HANDLES**

The portable tank shall be equipped with a set of three grab handles that will aid in the drainage of the tank liner. These shall be webbing type handles that are attached to the liner.

**DRIVER FRONT WHEELWELL COMPARTMENT**

There shall be a compartment located in the driver's side wheel area ahead of the rear axle to hold one set of wheel chocks.

A safety chain shall be provided across the door opening. The safety chain shall be designed to prevent the chocks from sliding out of the compartment if the door is not latched or fails.

**ZIAMATIC AC-2 ALUMINUM WHEEL CHOCKS**

One set of two Zico AC-2 wheel chocks shall be provided. The chocks shall be mounted in the wheel well compartment.

**DRIVER'S SIDE REAR OF WHEELWELL SPARE CYLINDER COMPARTMENT**

A compartment shall be provided in the wheel area behind the rear axle on the driver's side to hold a total of three (3) spare SCBA cylinders.

The compartment shall be injection molded high strength polyethylene designed specifically for the SCBA cylinder storage. The compartment shall be slanted towards the rear and have a drain port at the low point of the compartment.

**PASSENGER'S SIDE FRONT OF WHEELWELL SPARE CYLINDER COMPARTMENT**

A compartment shall be provided in the wheel area in front of the rear axle on the passenger's side to hold a total of three (3) spare SCBA cylinders.

The compartment shall have a drain port at the low point of the compartment.

**PASSENGER'S SIDE REAR OF WHEELWELL SPARE CYLINDER COMPARTMENT**

A compartment shall be provided in the wheel area behind the rear axle on the passenger's side to hold a total of three fire extinguishers.

The compartment shall be injection molded high strength polyethylene designed

specifically for the SCBA cylinder storage. The compartment shall be slanted towards the rear and have a drain port at the low point of the compartment.

**WHEELWELL STORAGE COMPARTMENT DOORS - BRUSHED FINISH STAINLESS**

Brushed finish stainless steel access doors shall be provided on each wheel well storage compartment in the wheel well.

**WHEELWELL SCBA CYLINDER COMPARTMENT RETENTION STRAPS**

One 1" wide loop of high visibility yellow webbing shall be installed in each wheel well spare cylinder compartment for each cylinder to be stored in the compartment. The loop(s) shall be designed to loop around the cylinder valve and help prevent the cylinder from sliding out of the compartment if the door is not latched or fails.

**FOLDING ACCESS STEPS - LIGHTED**

Austin Hardware MBH-1132-A01-CHR folding access steps shall be provided in areas listed in these specifications. All access steps provided on the apparatus shall support a minimum static load of 500 lbs. and be mounted in accordance to recommended mounting procedures as outlined by NFPA 1901. The steps shall be attached to the apparatus using stainless steel bolts with locking type nuts.

The steps shall each have an LED light above the step area. The lights shall be activated by the park brake.

Any step that is mounted on a non-permanent surface will not be lighted. Two (2) NFPA compliant folding steps shall be provided on the right side front compartment face.

Four (4) NFPA compliant folding steps shall be provided on the left side front compartment face.

**REAR ACCESS LADDER**

An access ladder shall be provided on the rear of the apparatus to access the upper area of the apparatus. A minimum of 8" of clearance shall be provided between the rung and the body or any obstruction.

**ACCESS LADDER LEFT SIDE MOUNTING**

The rear access ladder shall be mounted on the left (driver) side of the apparatus.

**8" DEPTH REAR INTERMEDIATE STEP**

An 8" depth aluminum treadbrite step shall be provided on the rear face of the apparatus. The step assembly shall be bolted into place using stainless steel fasteners.

**NFPA KNURLED FINISH HANDRAILS**

All handrails shall be 1 1/4" diameter extruded aluminum "knurled finish" with chrome plated stanchions. Rubber gaskets shall be provided between the stanchions and any painted surfaces.

**LEFT REAR VERTICAL HAND RAILS**

An NFPA compliant handrail shall be provided on the left rear of the apparatus for boarding the rear step and using the left rear hose bed access steps.

**RIGHT REAR VERTICAL HAND RAILS**

An NFPA compliant handrail shall be provided on the right rear of the apparatus for boarding the rear step and using the right rear hose bed access steps.

**RIGHT FRONT HOSEBED GRAB RAIL**

A 12" NFPA compliant horizontal handrail shall be provided on the upper right front of the apparatus towards the front of the hose bed.

**LEFT FRONT HOSEBED GRAB RAIL**

A 12" NFPA compliant horizontal handrail shall be provided on the upper left front of the apparatus towards the front of the hose bed.

**LEFT REAR GRAB RAIL**

A 12" NFPA compliant horizontal handrail shall be provided on the left rear of the apparatus towards the rear of the hose bed.

**INTERMEDIATE REAR HORIZONTAL HAND RAIL**

An intermediate horizontal handrail shall be provided on the rear of the apparatus.

**NFPA 1901 CERTIFIED 12 VOLT ELECTRICAL SYSTEM**

The 12-volt apparatus body electrical system shall be provided and shall be in compliance with NFPA 1901 testing and certification procedures as follows:

**NFPA MINIMUM ELECTRICAL LOAD DEFINITION**

The NFPA 1901 defined minimum electrical load shall consist of the total amperage required to simultaneously operate the following in a stationary mode:

- Propulsion engine and transmission.
- The clearance and marker lights.
- Communication equipment (5 amp default).
- Illumination of all walking surfaces, the ground at all egress points, control and instrumentation panels and 50% of total compartment lighting.
- Minimum warning lights required for "blocking right of way" mode.
- The current to simultaneously operate and fire pump and all specified electrical devices.
- Anything defined by the purchaser, in the advertised specifications, to be critical to the mission of the apparatus.

### **RESERVE CAPACITY TEST**

The first electrical test to be performed will be the Reserve Capacity Test. All items listed in NFPA Minimum Load Definition shall be activated with the engine shut off. After 10 minutes of operation, those items shall be deactivated. After deactivation, the battery system shall have ample reserve to start the engine.

### **ALTERNATOR PERFORMANCE TEST AT IDLE**

An "alternator performance at idle" test shall be completed. The minimum continuous electrical load shall be activated with the engine running at idle speed. When the engine temperature has been stabilized at idle speed, the battery system shall be tested to detect any battery discharge current.

### **ALTERNATOR PERFORMANCE TEST AT FULL LOAD**

An "alternator performance test at full load" test shall be completed. The minimum continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed for a 2 hour period.

### **TEST CONDITIONS**

All electrical testing shall be performed with the engine compartment at approximately 200 degrees.

### **12-VOLT WIRING SYSTEM**

All 12-volt electrical wiring shall be SXL cross link rated to carry 125% of the maximum current for which the circuit is protected. The wire shall be of sufficient size so that voltage drop in any electrical device does not exceed 10%. All wiring shall be color, number, and function coded with the number and function being printed every 3" along the entire length of all apparatus body wires (as required by NFPA 1901). All wiring shall be routed through heavy duty PVC split loom securely attached and protected against heat, oil, and physical damage. All locations where the wire passes through a body panel shall be protected with electrical grommets.

All connections shall be made using mechanical connectors and be screwed to terminal or junction box with machine screws. Wire nut, insulation displacement, or piercing connections shall not be used.

All circuits shall be provided with properly rated low voltage over current protective devices of the automatic reset type.

Removable access panels shall be provided to provide access to the wire and electrical components.

### **MULTI-PLEXED ELECTRICAL SYSTEM**

The apparatus body electrical system shall incorporate a Multiplexed Electrical System. The multiplex system shall consist of all solid-state components contained inside aluminum extrusions referred to as nodes. Each node shall consist of (24) output channels and (24) input channels. All inputs and outputs will be configured into an electrical harness utilizing Deutsch connectors. The nodes must be waterproof and not require special mounting requirements.

The system, at a minimum, shall be capable of performing the following functions: load management sequencing, switch loads, receive digital and analog signals, perform and report diagnostics, continuously report vehicle status and the system is expandable.

Placement of nodes throughout the apparatus enables a reduction in wire harness bundles, elimination of redundant harnesses and separate circuit boards, relay and circuit breakers, electrical hardware, separate electrical or interlock subsystems and associated electronics for controlling various electrical loads and inputs. The multiplex system shall be field re-programmable and re-configurable by any authorized dealer or service center. This complete system shall eliminate the need for the following separate components or devices: load manager, load sequencer, warning lamp flasher, door open notification system, interlock modules, separate volt meter and ammeter.

The Base System Shall Include:

- Total Load Management
- Load Shedding Capabilities

- Load Sequencing Capabilities
- “On-Board” Diagnostics Readout
- Very Reliable, Solid-State Hardware
- Error Reporting
- Continuous system monitoring and reporting
- Emergency warning lamp flasher
- Door Ajar System
- Field Configurable
- Expandability Capabilities
- Advanced PC Diagnostics

As-built wiring harness drawings and a master circuit list of electrical circuits that the apparatus builder installs shall be furnished in the delivery manuals. These schematics must show the electrical system broken down into separate functions, or small groups of related functions. Schematics shall depict circuit numbers, electrical components, harnesses, and connectors from beginning to end. **A single drawing for all electrical circuits installed by the apparatus builder shall not be accepted.**

### **V-MUX VFD DISPLAY PANEL**

An interface display shall be provided on the cab control console to report and display “Real Time” data.

### **DIGITAL 'DOOR OPEN' INDICATOR**

The VFD display shall indicate which individual door or doors are open using alpha-numeric symbols (letters and numbers). For example, if the driver front compartment door is open, the display shall read "DRIVER FRONT COMPARTMENT DOOR".

Any system that does not indicate individual open doors and/or provides 'door open' indication using a single visual or audible alarm to represent all apparatus doors will not be acceptable.

### **VMUX WARRANTY**

The VMUX multiplexed electrical system shall be warranted, under normal use and

service, for a period of four years. One year parts and labor and the remaining three years parts only.

**AUTOMATIC HIGH IDLE FUNCTION**

An automatic high idle system shall be installed and will activate whenever the system voltage drops below a determined voltage. The high idle will remain on until adequate voltage is achieved.

**MASTER BATTERY DISCONNECT**

A Cole Hersee master battery disconnect switch shall be provided and mounted within easy reach of the driver when entering the apparatus.

A green 'battery on' indicator light shall be provided in clear view of the driver. The light shall be mounted in a manner that will not impair the driver's vision.

**REAR LICENSE PLATE LIGHT/BRACKET**

A chrome plated LED license plate light shall be provided on the rear of the apparatus.

A license plate mounting bracket shall be provided that spaces the license plate away from the apparatus body.

**CLEARANCE LIGHTS/REFLECTORS**

All apparatus body clearance lights shall be LED style. All lower clearance lights and reflectors shall be mounted in a manner that provides protection from damage, and shall comply with FMVSS-108 regulations.

**MID-MOUNTED SIDE TURN SIGNAL - LED**

An amber LED side turn signal shall be provided in the mid-section area of the apparatus on both sides.

### **LED PUMP COMPARTMENT LIGHTS (2)**

Two (2) LED compartment lights shall be provided to illuminate the pump compartment. The lights shall function with the pump operators gauge panel lights.

### **ENGINE COMPARTMENT LIGHT - LED**

An LED light shall be provided and mounted over the engine on the engine compartment wall. An on/off switch shall be provided on the light to activate it.

### **DUAL TRACK TYPE LED COMPARTMENT LIGHTING**

Each apparatus body compartment shall have two (2) track type LED lights vertically mounted in the compartment. The lights shall be constructed of an unbreakable type clear poly type flexible material housed in an aluminum extrusion.

A compartment that is considered a 'full height' compartment shall each have two 48" long light sections and a 'low height' or above wheel compartment shall each have two 18" long sections.

The lights shall function automatically and independently of other compartments when the compartment door is opened. **Compartment lighting systems that are controlled by a single, dash mounted switch are not acceptable.**

### **COMPARTMENT LIGHT SWITCHES**

Each hinged apparatus body door compartment shall have a magnetic style reed indicator switch.

The compartment lights shall function automatically when the door is opened. A master compartment light switch shall not be acceptable.

### **DOOR AJAR INDICATOR - LED**

A red LED flashing light shall be provided on the cab dash area in clear view of the driver to warn of an open compartment or personnel door.

A label shall be provided that states "Do Not Move Apparatus When Light Is On".

**DOOR AJAR INDICATOR PARK BRAKE DISABLE**

All apparatus body door ajar indicators shall be disabled when the park brake is set.

**PERIMETER GROUND LIGHTING five (5)**

There shall be five (5) 4" diameter underbody LED perimeter lights furnished and installed. The lights shall have an unbreakable polycarbonate lens and housing. The lights shall be sealed to help prevent moisture entry.

The ground lights shall be activated with the parking brake.

**LED APPARATUS BODY STEP LIGHTING**

All apparatus steps and running boards shall be illuminated using chrome plated or stainless steel LED lights. The lights shall function automatically with the park brake.

**GROUND/STEP LIGHTING CUTOFF SWITCH**

A ground/step light cut off switch shall be provided in the cab to allow the driver to disable the ground lights and other lights that activate when the parking brake is set. The switch shall automatically re-set itself when the parking brake is released.

**KUSSMAUL LPC40 BATTERY CHARGER**

A Kussmaul LPC40 fully automatic battery charger with 40 amp output shall be installed on the apparatus. Remote voltage sensing shall be provided to compensate the charger output for the voltage drop in the charging wires.

A 15 amp DC auxiliary output circuit shall be provided on the charger.

**KUSSMAUL AUTO-PUMP AIR COMPRESSOR**

A Kussmaul Auto-Pump 120-volt air compressor shall be provided on the apparatus. The compressor shall have a .76 cfm open flow with a maximum pressure of 100 psi. The pressure switch shall be pre-set at 70 psi cut in and 90 psi cut out.

**AUTO-EJECT SHORELINE CONNECTION - BAR GRAPH DISPLAY**

A Kussmaul 20 amp 120-volt Super Auto-Eject with bar graph charge display shall be provided. The unit shall automatically eject the connecting plug when the engine is cranked.

**AUTO-EJECT COVER - YELLOW**

The Auto-Eject shall have a spring loaded cover yellow in color.

**AUTO-EJECT MATING PLUG**

A NEMA 5-15P mating female cord end shall be shipped loose with the apparatus to allow the Fire Department to connect the cord end to a Fire Department provided charging cord.

**120 VOLT SHORELINE CONNECTION LOCATION**

The 120 volt shoreline connection shall be located under the driver's door.

**WHELEN C6 TRI-CLUSTER TAILLIGHTS - LED**

Whelen C6BTT LED taillights, C6T LED turn signals and a C6BU clear LED backup lights shall be provided.

A PLASC3V chrome plated trim housing shall be provided, one each side for mounting the tail lights, turn signal lights, and backup lights.

**BACKUP LIGHTS PARK FUNCTION**

The backup lights shall automatically activate when the park brake is set to provide work lighting at the rear of the apparatus.

**BACKUP ALARM**

One (1) 97db backup alarm(s) shall be provided and shall automatically activate when the apparatus transmission is placed into reverse.

The backup alarm(s) shall exceed all NFPA1901 and SAE J994 Type D requirements and testing.

**CONSOLE MOUNTED CONTROL PANEL**

A control console shall be provided between the driver's and officer's seats for all warning/auxiliary light controls and pump shift.

**WARNING LIGHT SWITCH - SINGLE**

A single master optical warning device switch shall be provided that will activate all minimum optical warning lighting through a single switch. Individual switches shall not be provided for any minimum optical warning lighting to insure total compliance to the warning lighting requirements defined in NFPA 1901. All lighting controlled by this switch shall not be subject to load management.

Any warning lights that are installed on the apparatus that are not required to meet the minimum optical warning lighting requirements shall be subjected to load management and shall have individual switches to activate/de-activate the warning light.

All switches shall be clearly labeled as to their function.

**CENTER CONSOLE MAP POCKET**

A storage pocket shall be provided on the rear of the console for storing books, maps, etc.

**CENTER CONSOLE CONSTRUCTION MATERIAL**

The console shall be constructed of aluminum treadbrite.

**CENTER CONSOLE PANEL MATERIAL**

The console panel shall be constructed of brushed stainless steel.

**ZONE A UPPER WARNING LIGHTING**

A Whelen F4N0QLED light bar shall be mounted on the top of the cab roof. The light bar shall be 60" in length and mounted with low profile stainless steel brackets.

Each side of the light bar shall have one red end LED, one red corner LED and two front linear LED's (one red and one white).

The lenses on the Officer's and Driver's shall be clear.

**ZONE C UPPER REAR WARNING LIGHTING**

Two (2) Whelen model RB6 Series beacons shall be provided one on each side on the rear of the apparatus. One shall be a RB6TAP amber and one shall be a RB6TRP red.

The Driver's side light shall be red and the Passenger's side shall be amber.

**WHELEN C6LR SUPER MAX LED LOWER ZONE A WARNING LIGHTING**

Two (2) Whelen Model C6LR Super Max red LED light heads shall be mounted in the grille area on the apparatus. A C6FC chrome bezel shall be provided around the lights.

**INTERSECTION WARNING LIGHT - SIDES**

One Whelen LINZ6 red LED light shall be provided on each side as low and far forward as possible on the apparatus. A chrome bezel shall be provided around the lights.

**MID-SECTION WARNING LIGHTS - SIDES**

One Whelen LINZ6 red LED light shall be provided on each side in the mid-section of the apparatus. A chrome bezel shall be provided around the lights.

**SIDE FACING LOWER REAR WARNING LIGHTS**

One Whelen LINZ6 red LED light shall be provided shall be provided on each side of the apparatus as low and as far rearward as possible on the apparatus. A chrome bezel shall be provided around the lights.

**WHELEN C6LR SUPER MAX LED LOWER REAR WARNING LIGHTS**

Two (2) Whelen Model, C6LR Super Max red LED light heads, shall be mounted on the rear of the apparatus in a low position. A C6FC chrome bezel shall be provided around the lights.

**WHELEN TAL65 TRAFFIC ADVISOR**

A Whelen TAL65 36" 6 lamp LED directional traffic advisor shall be provided and mounted on the rear of the apparatus. The advisor shall be subject to load management shedding to comply with NFPA 1901.

**DIRECTIONAL LIGHT MOUNTING - INTERMEDIATE STEP**

The arrowstick/advisor shall be either recessed into or mounted under the rear intermediate step.

**CODE 3 V-CON 3672 SIREN**

A Code 3 model 3672 V-Con siren shall be provided and mounted in the cab.

The siren shall have wail, yelp, hyper-yelp, and air horn tones as well as public address (PA) and shall be capable of radio rebroadcast. A hard-wired microphone shall be provided.

**100 WATT SPEAKER**

A 100 watt speaker shall be provided and recessed into the front bumper. The model of speaker installed shall be designed to fit bumper type.

**FRC SPA900-Q70 SCENE LIGHTS (2)**

Two (2) FRC SPA900-Q70 scene lights shall be provided and mounted one on each side on the rear. The lights shall be 12VDC and create up to 7,000 lumens each.

Chrome trim housings shall be provided.

**12 VOLT SCENE LIGHT ACTIVATION SWITCH (1)**

A single switch shall be located on the cab control console to activate the 12 volt scene light(s).

**UNITY AG-C DECK/HOSE BED LIGHTS**

Two Unity model AG-C chrome plated lights shall be provided and mounted on the rear of the apparatus, one each side. The lights shall be controlled by light head mounted switches and shall be capable of 360 degrees of rotation and 90 degrees above and below horizontal tilt.

The lights shall be subject to load management shedding to comply with NFPA 1901.

**FRC SPECTRA LED TELESCOPING LIGHT - 12 VOLT**

Two (2) Fire Research model SPA540-Q15 top raising telescoping light(s) shall be mounted on the apparatus. The light head shall be 12 volt LED and shall draw a maximum of 13.9 amps creating 15,000 lumens.

The telescoping pole shall be constructed of heavy wall anodized tube. The pole shall be secured in any raised position with a non-directional advanced twist lock locking device. The twist lock mechanism shall have a knurled positive grip.

The light(s) shall be electrically tested so that they are safe for their intended use. The light(s) shall be certified by Underwriters Laboratories (UL) and shall meet/exceed NFPA 1901.

The telescoping light(s) shall be equipped with a FRC "ON" switch on the light head(s).

The telescoping light(s) shall be equipped with a FRC "TW" retractile coil cord out of the light head.

The telescoping light(s) shall be mounted at the pump panel.

### **6 KW ONAN HYDRAULIC GENERATOR SET**

An Onan CMHG Series model 6RBAA-4781 hydraulic driven generator set shall be installed on the apparatus. The generator shall be rated at 6,000 watts at 120/240 volts. The current frequency shall be stable at 60 hertz.

The power generating unit shall be modular unit, housed in stainless steel with an acoustical material added for maximum sound dampening. The module shall consist of the hydraulic motor, generator, blower, cooler, and all other necessary components.

For ease of maintenance, the only part of the system that shall require accessibility shall be the oil reservoir which shall be located as to facilitate periodic checks and the adding of hydraulic fluids.

### **ONAN WARRANTY**

Provided the generator is operated and maintained in accordance with Onan's written instructions, Onan shall warrant that the CMHG hydraulic generator will be free from defects in material and workmanship for a period of five (5) years or 1000 hours, whichever comes first, from the date of delivery to the first purchaser.

Repair or replacement parts shall be warranted for 90 days from date of purchase, excluding labor and travel expenses. Any part repaired or replaced during the warranty period assumes the remainder of the warranty or 90 days, whichever is greater.

Onan shall pay for the parts and labor, including diagnostic labor, to repair the generator. When necessary, Onan shall also pay reasonable labor expenses associated with the removal and reinstallation of the generator into the customer's equipment, up to the maximum time of 2 hours. For the first two years of coverage, Onan shall pay travel time up to 2 1/2 hours and mileage costs up to 100 miles if such work is done by an authorized service provider.

#### **HYDRAULIC GENERATOR START SWITCH - CAB CONSOLE**

The hydraulic generator start/stop control shall be located on the cab console. The activation switch shall include an integrated indicator light that illuminates when the generator is running.

#### **HYDRAULIC GENERATOR PTO - "HOT SHIFT" TYPE**

The generator shall be powered by a Chelsea or Muncie "Hot Shift" type PTO. A lighted and guarded switch shall be provided on the control console that electrically engages/disengages the PTO.

#### **HYDRAULIC GENERATOR MOUNTING**

The generator shall be mounted in the forward area of the hose bed properly protected and ventilated to prevent overheat. A front hose bed bulkhead shall also be provided.

#### **GROUNDING**

Grounding shall be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems shall not be used. Only stranded or braided copper conductors shall be used for grounding and bonding. An equipment grounding means shall be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC. The grounded current carrying conductor (neutral) shall be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor shall be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and

driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor. This conductor shall have a minimum amperage rating of 115 percent of the nameplate current rating of the source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor properly sized to meet the low voltage and line voltage requirements shall be permitted to be used.

### **MAIN OVERCURRENT PROTECTION DEVICE**

A main overcurrent protection device shall be provided on the generator. The device shall be factory installed by the generator manufacturer.

### **WIRING METHODS**

All fixed wiring systems shall be either metallic or nonmetallic liquid tight conduit or shall be type SO or SEO with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit.

Electrical cord or conduit shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components or low voltage wiring.

All wiring shall be separated by a minimum of 12", or properly shielded, from exhaust piping and shall be separated from any fuel lines by a minimum of 6".

Electrical cord or conduit shall be supported within 6" of any junction box and at a minimum of every 24" of continuous run. Supports shall be made of nonmetallic materials or corrosion protected metal. All supports shall be of a design that does not cut or abrade the conduit or cable and shall be mechanically fastened to the vehicle.

### **BREAKER PANEL BOARD**

Each individual circuit that is to be powered by the generator shall have a branch circuit overcurrent protection device (circuit breaker). The device shall be sized at not less than 15 amps in accordance with Section 240-3 (Protection of Conductors) of the NEC. If more than 6 individual branch circuits are required on the apparatus, the panel board shall have a main breaker. The panel board shall be readily visible and located so that there is

unimpeded access to the panel board controls.

All line voltage conductors located in the main panel board shall be individually and permanently identified. The identification shall reference the wiring schematic or indicate the final termination point. When pre-wiring for future power sources or devices, the unterminated ends shall be labeled showing its function and wire size.

A hinged access door shall be provided on the panel board.

### **LOAD BALANCING**

The breaker panel shall be load balanced to allow the most efficient distribution of the AC load as possible.

### **BREAKER PANEL LOCATION**

The breaker panel shall be located on the lower front wall of the driver's side compartment ahead of the rear wheels.

### **FROG DISPLAY**

There shall be a FROG D provided with the generator. The FROG D shall automatically sense a generator signal and begin displaying information. The digital meter display shall constantly monitor and display voltage, frequency (accurate to within 1 decimal point) and current draw on two separate lines. The display shall be capable of displaying total accumulated run time hours when the MODE button is pressed.

The FROG meter shall be located adjacent to or below the breaker panel.

### **120 VOLT RECEPTACLES**

All 120 volt receptacles shall be installed to current NFPA 1901 recommendations and NEC guidelines.

Receptacles installed in a wet location shall be of the grounding type with a wet location cover and installed not less than 24" from the ground. Receptacles on off-road vehicles

shall be a minimum of 30" from the ground. The face of any wet location receptacles shall be installed in a plane from vertical to not more than 45 degrees off vertical.

Receptacles installed in a dry location shall be of the grounding type and installed not less than 12" from the ground or be installed in a face up position.

All wiring for both wet and dry locations shall be routed through liquid tight flexible conduit rated at not less than 194 degrees. Each receptacle shall be wired to the panel board which shall have separate adequately sized breakers for each receptacle.

Receptacles shall be provided in the following locations:

There shall be one (1) L5-20R twist-lock receptacle(s) provided on the passenger's side pump panel.

There shall be one (1) L5-20R twist-lock receptacle(s) provided on the driver's side pump panel.

### **PAINT PROCEDURE - PPG DELFLEET BASE COAT/CLEAR COAT**

All interior compartment surfaces shall remain # brushed stainless steel. There shall be no paint or any other type of coating on the interior compartment surfaces. Standard mill finish, DA finish or swirled finish shall not be accepted.

Any exterior surfaces that are to be painted shall be individually listed in the apparatus body portion of this specification.

All seams or flanges on the apparatus body shall be caulked or properly sealed to prevent moisture accumulation in flanged areas.

### **PAINT PROCESS:**

The apparatus body paint procedure shall consist of an eight (8) step finishing process as follows:

1. Surface Preparation: All exposed metal surfaces on the apparatus exterior shall

be thoroughly cleaned as per SSPC-SP1. All imperfections on the exterior metal surface shall be removed or filled prior to the priming process. All exposed metal shall be thoroughly abraded using a dual orbital air power sander as per SSPC-SP3.

2. **Cleaning and Treatment:** All surfaces shall be chemically cleaned using PPG DX436 wash and grease remover cleaning agent to remove all dirt, oil, grease and metal oxides to ensure proper adhesion as per SSPC-SP1.
3. **Primer Application:** PPG F3993 primer shall be applied to the bare metal as per bulletin DFT-041.
4. **Primer/Surfacer Application:** PPG F3975 primer/surfacer shall be applied to the primer.
5. **Dual Orbital Sanding:** The primer/surfacer shall be thoroughly sanded to a superior smooth surface.
6. **Cleaning:** After sanding in step #5, all surfaces shall be chemically cleaned again using PPG DX394 wash and grease remover to remove all oil and dirt. The surface to be painted shall be clean of all oil, grease, and dirt to ensure proper adhesion as per SSPC-SP1.
7. **Primer Sealer Application:** PPG Delfleet F3975 two component urethane primer sealer shall be applied over the thoroughly sanded and cleaned primer/surfacer as per bulletin DFT-054.
8. **Topcoat Application:** Two coats of PPG Delfleet FBCH basecoat color two component polyurethane paint shall be applied to the primer sealer as per bulletin DFT-001. The base color shall be followed by two coats of PPG Delfleet F3906 two component polyurethane clear coat finish as per bulletin DFT-055.

### **DRY FILM PAINT TESTS**

The apparatus manufacturer shall perform dry film readings on the painted apparatus to insure adequate paint thickness. The total dry film readings shall be a minimum of 6.4

mils average. These readings must be measured with an ETG ferrous/nonferrous digital dry film thickness measurement instrument. Readings must be taken from a minimum of 12 separate locations on the apparatus body. The apparatus manufacturer shall record these tests and make them available to the purchaser upon request.

**PAINT PROCESS SYSTEM AUDIT**

The apparatus manufacturer shall strictly follow the documented paint application procedure as provided by the paint manufacturer. The paint manufacturer shall also perform an annual audit of the paint process.

**PPG CERTIFIED 10 YEAR LIMITED PAINT WARRANTY**

The apparatus body exterior finish paint shall have a 10 year limited warranty. The warranty shall be certified by the manufacturer of the paint. Documentation of this shall be provided to the end user. Any warranty that is extended by the apparatus manufacturer and not backed by the paint manufacturer will not be acceptable.

**PPG Commercial OEM Product Warranty Coverage:**

Warranty Inclusions:

- Delamination of the topcoat and/or other layers of paint.
- Cracking or checking due to failure of the product.
- Excessive loss of gloss caused by cracking, checking and hazing.

Warranty Exclusions:

- Paint deterioration caused by blisters, bubbles, flaking or other degradation due to rust or corrosion originating from the substrate.
- Hazing, chalking or loss of gloss caused by improper care, abrasive polishes, cleaning agents, heavy-duty pressure washing, or aggressive mechanical wash systems.
- Paint deterioration caused by abuse, scratches, chips, gloss reduction, accidents, acid rain, chemical fallout, road treatment materials/chemicals or acts of nature.
- Any paint that was not applied by the Manufacturer.

- Claims presented without proper Warranty documentation.
- Failure on finishes performed by Non-PPG Commercial Certified Technicians.
- Failure on finishes due to inadequate film builds.
- Failures due to improper cleaning or surface preparation or failure to follow the product use instructions.

THESE ARE THE ONLY WARRANTIES THAT PPG MAKES, AND ALL OTHER EXPRESSED OR IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATIONS, ANY WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR USE, ARE DISCLAIMED BY PPG.

### **ELECTROLYSIS CORROSION CONTROL**

The apparatus shall be assembled using ECK or electrolysis corrosion control, on all high corrosion potential areas, such as door latches, door hinges, trim plates, fenderettes, etc. This coating is a high zinc compound that shall act as a sacrificial barrier to help minimize electrolysis and corrosion between dissimilar metals. This shall be in addition to any other barrier material that may be used.

### **SINGLE COLOR APPARATUS BODY PAINT**

The apparatus body shall have a single color scheme.

### **APPARATUS BODY UNDERCOATING**

The apparatus body shall be undercoated after assembly is completed. A bituminous based automotive type undercoat shall be used. Care shall be taken to avoid undercoat application to items that would hinder normal maintenance.

### **COMPARTMENT INTERIORS - BRUSHED STAINLESS FINISH**

The compartment interiors shall be brushed stainless steel # 4 finish. The brushed finish shall be as provided by the manufacturer of the material.

Interiors with any type of paint, sprayed-on coatings, DA finish, or standard "mill finish" will not be acceptable.

**GOLD LEAF MYLAR LETTERING**

A maximum of sixty (60) 4" maximum height gold leaf Mylar self-adhesive letters with black outline and drop shadow shall be applied to both sides of the chassis cab.

The exact type style, wording and placement of the lettering will be provided to the successful bidder at the pre-construction conference.

**1"-4"-1" NFPA REFLECTIVE STRIPE**

A 4" reflective stripe shall be applied to the apparatus.

A 1" gap shall be provided on both the top and bottom of the 4" stripe followed by a 1" reflective stripe above and below the upper and lower gap.

A single 6" stripe shall be applied to the front if space does not permit for the 3 stripe pattern.

The striping shall be applied to a minimum of 50% of the length of the apparatus on each side and 25% across the front of the apparatus. The stripe shall comply with NFPA 1901 requirements.

**PRIMARY REFLECTIVE STRIPE COLOR - WHITE**

The primary reflective stripe shall be 680-10 white.

**SECONDARY UPPER REFLECTIVE STRIPE COLOR - WHITE**

The secondary upper reflective stripe shall be 680-10 white.

**SECONDARY LOWER REFLECTIVE STRIPE COLOR - WHITE**

The secondary lower reflective stripe shall be 680-10 white.

**REFLECTIVE STRIPE - HORIZONTAL**

The reflective stripe shall be applied in a straight horizontal line from front to rear. The height of the stripe on the chassis cab and the body shall be as close as possible.

**INNER CAB DOOR REFLECTIVE STRIPING - 2 DOOR**

A minimum of 100 square inches of reflective material shall be provided on the inner door liner of each cab door.

**REAR CHEVRON STRIPING**

A minimum of 50 percent of the rear vertical surface of the apparatus shall be covered with 6 inch alternating red and fluorescent yellow green retro-reflective striping. The striping shall slope downward away from the centerline of the apparatus at a 45-degree angle.

The retro-reflective material shall conform to the requirements of ASTM D 4956 "Standard Specification for Retro-Reflective Sheeting for Traffic Control", Type I or better.

**CHASSIS RELATED ITEMS TO BE COMPLETED BY THE MANUFACTURER**

**ENGINE HORIZONTAL EXHAUST**

Shielding shall be provided between the apparatus body and the exhaust pipe if necessary to deflect heat away from the body. The exhaust system shall be designed and installed to comply with EPA equipment requirements and shall not be modified.

**CAB ENTRY STEP COVER**

The OEM provided cab entry step on the side opposite the fuel tank shall be removed from the chassis provided brackets and replaced with a fabricated aluminum treadbrite step assembly.

**FUEL TANK/STEP COVER**

The OEM provided cab entry step on the same side as the fuel tank shall be removed from the chassis provided brackets and replaced with a fabricated aluminum treadbrite step assembly.

**FRONT MUD FLAPS**

Heavy duty black rubber mud flaps shall be provided on the front wheels. The mud flaps shall be attached to the apparatus in the wheel well area using heavy duty stainless steel retention straps that are secured into place using stainless steel fasteners.

**REAR MUD FLAPS**

Heavy duty black rubber mud flaps shall be provided on the rear wheels. The mud flaps shall be attached to the apparatus in the rear wheel well area using heavy duty stainless steel retention straps that are secured into place using stainless steel fasteners.

**FRONT/REAR AXLE NUT COVERS AND HUB COVERS**

The front and rear axles shall have stainless steel nut covers and hub covers.

**12 VOLT RADIO POWER FEED**

One (1) 12 volt power feed wire(s) shall be provided in the cab for customer supplied and installed radio equipment.

**RADIO ANTENNA MOUNT**

One (1) radio antenna mount shall be mounted for customer installation of radio equipment. Mount on roof of cab.

**CAMERA OBSERVATION SYSTEM DISPLAY**

An ASA Voyager observation system shall be provided on the apparatus. The system shall include a model AOM711 7" flat panel color display. The display shall have 300 nits

brightness with a contrast ratio of 150:1. Viewing angles shall be 55 degrees left to right and 25 to 40 degrees top to bottom. The display shall have a water resistant housing, built-in audio speaker with volume control, 12 volt audio enable and power on (standby) trigger inputs, on screen display picture controls, day/night mode, backlit controls and detachable sunshield. A 72704 mounting bracket shall also be included. The display shall be 7 3/4" wide x 5 1/4" high x 1 3/16" depth.

**OBSERVATION SYSTEM CAMERAS (2)**

Two (2) ASA Voyager model VCCS130 color cameras shall be provided and properly connected to the flat panel display. One (1) for rear view and one (1) for right side view. The cameras shall feature a built-in microphone, enhanced low-light performance (LED assisted), image orientation selector switch and a locking waterproof cable connector with CEC50 camera extension cables.

**HANGLIGHTS**

There shall be four (4) Nightstick XPR5580R dual-light, rechargeable hand lanterns provided and mounted. Exact mounting locations shall be determined at the pre-construction conference.

**F R E I G H T L I N E R   S P E C I F I C A T I O N   P R O P O S A L**

**Vehicle Configuration**

M2 112 CONVENTIONAL CHASSIS

2021 MODEL YEAR SPECIFIED

SET BACK AXLE - TRUCK

**General Service**

FIRE/EMERGENCY SERVICE

FREIGHTLINER LEVEL II WARRANTY

EXPECTED FRONT AXLE LOAD: 14000  
lbs.

EXPECTED REAR DRIVE AXLE LOAD:  
27000 lbs.

EXPECTED GROSS VEHICLE  
CAPACITY: 41000 lbs.

**Engine**

CUM L9 400EV HP @ 2100 RPM; 2200  
GOV RPM, 1250 LB/FT @ 1400 RPM,  
FIRE/EMERGENCY

**Engine Equipment**

2016-2019 ONBOARD  
DIAGNOSTICS/2010  
EPA/CARB/GHG17

NFPA COMPLIANT EMBER SCREEN  
AND FIRE RETARDANT DONALDSON  
AIR CLEANER

DR 12V 275 AMP 40-SI BRUSHLESS  
PAD ALTERNATOR WITH REMOTE  
BATTERY VOLTAGE SENSE

(2) DTNA GENUINE, FLOODED  
STARTING, MIN 2000CCA, 370RC,  
THREADED STUD BATTERIES WITH  
POSITIVE JUMP START POST

BATTERY BOX FRAME MOUNTED

WIRE GROUND RETURN FOR  
BATTERY CABLES WITH ADDITIONAL  
FRAME GROUND RETURN

POSITIVE LOAD DISCONNECT WITH  
CAB MOUNTED CONTROL SWITCH  
MOUNTED OUTBOARD DRIVER SEAT

CUMMINS TURBOCHARGED 18.7 CFM  
AIR COMPRESSOR WITH INTERNAL  
SAFETY VALVE

C-BRAKE BY JACOBS WITH  
LOW/OFF/HIGH BRAKING DASH  
SWITCH

RH MTD HORIZONTAL  
AFTERTREATMENT SYSTEM  
ASSEMBLY WITH RH HORIZONTAL  
TAILPIPE

HORTON DRIVEMASTER ADVANTAGE  
ON/OFF FAN DRIVE

AUTOMATIC FAN CONTROL NON  
ENGINE MOUNTED

CUMMINS SPIN ON FUEL FILTER

COMBINATION FULL FLOW/BYPASS  
OIL FILTER

1300 SQUARE INCH ALUMINUM  
RADIATOR WITH AUXILIARY  
COOLING

ANTIFREEZE TO -34F, OAT (NITRITE  
AND SILICATE FREE) EXTENDED LIFE  
COOLANT

GATES BLUE STRIPE COOLANT  
HOSES OR EQUIVALENT

CONSTANT TENSION HOSE CLAMPS  
FOR COOLANT HOSES

ELECTRIC GRID AIR INTAKE  
WARMER

DELCO 12V 38MT HD STARTER WITH  
INTEGRATED MAGNETIC SWITCH

### **Transmission**

ALLISON 3000 EVS 5 SPD  
AUTOMATIC TRANSMISSION

### **Transmission Equipment**

MAGNETIC PLUGS, ENGINE DRAIN,  
TRANSMISSION DRAIN, AXLE(S) FILL  
AND DRAIN

PUSH BUTTON ELECTRONIC SHIFT  
CONTROL, DASH MOUNTED

TRANSMISSION PROGNOSTICS -  
ENABLED 2013

WATER TO OIL TRANSMISSION  
COOLER

TRANSMISSION OIL CHECK AND FILL  
WITH ELECTRONIC OIL LEVEL CHECK

SYNTHETIC TRANSMISSION FLUID  
(TES-295 COMPLIANT)

### **Fire Pump**

CUSTOM DRIVELINE SPACER FOR FIRE  
PUMP

### **Front Axle and Equipment**

DETROIT DA-F-14.7-3 14,700# FF1  
71.5 KPI/3.74 DROP SINGLE FRONT  
AXLE

MERITOR 16.5X5 Q+ CAST SPIDER  
CAM FRONT BRAKES, DOUBLE  
ANCHOR, FABRICATED SHOES

FIRE AND EMERGENCY SEVERE  
SERVICE, NON-ASBESTOS FRONT  
LINING

FRONT OIL SEALS

BENDIX VERSAJUST AUTOMATIC  
FRONT SLACK ADJUSTERS

TRW TAS-85 POWER STEERING

### **Front Suspension**

14,600# TAPERLEAF FRONT  
SUSPENSION

MAINTENANCE FREE RUBBER  
BUSHINGS

FRONT SHOCK ABSORBERS

### **Rear Axle and Equipment**

27,000 LB FIRE/EMERGENCY  
SERVICE SINGLE REAR AXLE

IRON REAR AXLE CARRIER WITH  
STANDARD AXLE HOUSING

MXL 17T MERITOR EXTENDED LUBE  
MAIN DRIVELINE WITH HALF ROUND  
YOKES

MERITOR 16.5X7 P CAST SPIDER CAM  
REAR BRAKES, DOUBLE ANCHOR,  
CAST SHOES

FIRE AND EMERGENCY SEVERE  
SERVICE NON-ASBESTOS REAR  
BRAKE LINING

REAR OIL SEALS

BENDIX VERSAJUST AUTOMATIC  
REAR SLACK ADJUSTERS

### **Rear Suspension**

27,000# FLAT LEAF SPRING REAR  
SUSPENSION WITH HELPER AND  
RADIUS ROD FOR FIRE/EMERGENCY

FORE/AFT CONTROL RODS

### **Brake System**

AIR BRAKE PACKAGE

WABCO 4S/4M ABS WITH TRACTION  
CONTROL WITH ESC

STANDARD AIR SYSTEM PRESSURE  
PROTECTION SYSTEM

BW AD-9 BRAKE LINE AIR DRYER  
WITH HEATER

CUSTOM STEEL AIR BRAKE  
RESERVOIRS

BW DV-2 AUTO DRAIN VALVE - WET  
TANK

### **Electrical Connections**

UPGRADED CHASSIS MULTIPLEXING  
UNIT

UPGRADED BULKHEAD  
MULTIPLEXING UNIT

### **Wheelbase & Frame**

(222 INCH) WHEELBASE / (156  
INCH) CA

11/32X3-1/2X10-15/16 INCH STEEL  
FRAME 120KSI

(47 INCH) REAR FRAME OVERHANG

### **Chassis Equipment**

THREE-PIECE 14 INCH CHROME  
STEEL BUMPER WITH COLLAPSIBLE  
ENDS AND CUTOUT FOR SPEAKER

REMOVABLE FRONT TOW HOOKS -  
FRAME MOUNTED

FENDER & FRONT OF HOOD  
MOUNTED FRONT MUDFLAPS

GRADE 8 THREADED HEX HEADED  
FRAME FASTENERS

### **Fuel Tanks**

50 GALLON RECTANGULAR  
ALUMINUM FUEL TANK - LH

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6 GALLON DIESEL EXHAUST FLUID  
TANK

FUEL/WATER SEPARATOR WITH  
WATER IN FUEL SENSOR

### Tires

MICHELIN XZE 12R22.5 16 PLY  
RADIAL FRONT TIRES

MICHELIN X WORKS Z 12R22.5 16  
PLY RADIAL REAR TIRES

### Hubs

CONMET PRESET PLUS PREMIUM  
IRON FRONT HUBS

CONMET PRESET PLUS PREMIUM  
IRON REAR HUBS

### Wheels

22.5X8.25 10-HUB PILOT ALUMINUM  
DISC FRONT WHEELS

22.5X8.25 10-HUB PILOT ALUMINUM  
DISC REAR OUTER WHEELS

### Cab Exterior

112 INCH BBC FLAT ROOF  
ALUMINUM CONVENTIONAL AIR  
RIDE CAB

NFPA COMPLIANT EXTERIOR GRAB  
HANDLES

HOOD MOUNTED CHROMED PLASTIC  
GRILLES

BOLT-ON MOLDED FLEXIBLE  
FENDER EXTENSIONS

FIBERGLASS HOOD & FIREWALL  
INSULATION

DUAL ELECTRIC HORNS

DUAL 25 INCH ROUND STUTTER  
TONE HOOD MOUNTED AIR HORNS  
WITH RH FOOT SWITCH

INTEGRAL HEADLIGHT/MARKER  
ASSEMBLY WITH CHROME BEZELS &  
DAYTIME RUNNING LIGHTS

LED AERODYNAMIC MARKER LIGHTS

STANDARD FRONT TURN SIGNAL  
LAMPS

DUAL 102" WEST COAST BRIGHT  
FINISH HEATED MIRRORS WITH LH  
AND RH REMOTE

LH AND RH 8 INCH BRIGHT FINISH  
CONVEX MIRRORS MOUNTED UNDER  
PRIMARY MIRRORS

REAR WINDOW DELETE

TINTED DOOR GLASS LH AND RH  
WITH TINTED NON-OPERATING  
WING WINDOWS

MANUAL DOOR WINDOW  
REGULATORS

TINTED WINDSHIELD

2 GALLON WINDSHIELD WASHER  
RESERVOIR WITHOUT FLUID LEVEL  
INDICATOR, FRAME MOUNTED

### **Cab Interior**

OPAL GRAY VINYL INTERIOR

MOLDED PLASTIC DOOR PANELS  
WITH ALUMINUM KICKPLATES  
LOWER DOORS

BLACK MATS WITH PREMIUM  
INSULATION

FORWARD ROOF MOUNTED  
CONSOLE WITH UPPER STORAGE  
COMPARTMENTS WITHOUT  
NETTING

IN DASH STORAGE BIN

USB CHARGERS (2) IN DASH

(2) CUP HOLDERS LH AND RH DASH

HEATER, DEFROSTER AND AIR  
CONDITIONER

MAIN HVAC CONTROLS WITH  
RECIRCULATION SWITCH

SOLID-STATE CIRCUIT PROTECTION  
AND FUSES

12V NEGATIVE GROUND ELECTRICAL  
SYSTEM

DOME LIGHT WITH 3-WAY SWITCH  
ACTIVATED BY LH AND RH DOORS

CAB DOOR LATCHES WITH MANUAL  
DOOR LOCKS

(1) 12V POWER SUPPLY IN DASH

SEATS INC 911 UNIVERSAL SERIES  
HIGH BACK AIR SUSPENSION DRIVER  
SEAT NFPA COMPLIANT

SEATS INC 911 UNIVERSAL SERIES  
HIGH BACK NON SUSPENSION  
PASSENGER SEAT WITH UNDERSEAT  
STORAGE NFPA COMPLIANT

GRAY VINYL SEAT COVERS WITH  
GRAY CORDURA CLOTH BOLSTERS  
AND HEADRESTS

NFPA 1901-2009 HIGH VISIBILITY  
ORANGE SEAT BELTS

ADJUSTABLE TILT AND  
TELESCOPING STEERING COLUMN

4-SPOKE 18 INCH STEERING WHEEL

DRIVER AND PASSENGER INTERIOR  
SUN VISORS

### **Instruments & Controls**

GRAY DRIVER INSTRUMENT PANEL

BLACK GAUGE BEZELS

LOW AIR PRESSURE INDICATOR  
LIGHT AND AUDIBLE ALARM

2 IN PRIMARY AND SECONDARY AIR  
PRESSURE GAUGES

2 INCH ELECTRIC FUEL GAUGE

2 INCH TRANSMISSION OIL  
TEMPERATURE GAUGE

ENGINE COMPARTMENT MOUNTED  
AIR RESTRICTION INDICATOR WITH  
GRADUATIONS

ELECTRONIC CRUISE CONTROL WITH  
SWITCHES IN LH SWITCH PANEL

ICU3S, 132X48 DISPLAY WITH  
DIAGNOSTICS, 28 LED WARNING  
LAMPS AND DATA LINKED

FIRE AND EMERGENCY SERVICE  
VEHICLES ENGINE WARNING

ELECTRICAL ENGINE COOLANT  
TEMPERATURE GAUGE

ENGINE AND TRIP HOUR METERS  
INTEGRAL WITHIN DRIVER DISPLAY

ELECTRIC ENGINE OIL PRESSURE  
GAUGE

ELECTRONIC MPH SPEEDOMETER  
WITH SECONDARY KPH SCALE

ELECTRONIC 3000 RPM  
TACHOMETER

IGNITION SWITCH CONTROLLED  
ENGINE STOP

DIGITAL VOLTAGE DISPLAY  
INTEGRAL WITH DRIVER DISPLAY

SINGLE ELECTRIC WINDSHIELD  
WIPER MOTOR WITH DELAY

MARKER LIGHT SWITCH INTEGRAL  
WITH HEADLIGHT SWITCH

ONE VALVE PARKING BRAKE SYSTEM  
WITH DASH VALVE CONTROL

SELF CANCELING TURN SIGNAL  
SWITCH WITH DIMMER,  
WASHER/WIPER AND HAZARD IN  
HANDLE

INTEGRAL ELECTRONIC TURN  
SIGNAL FLASHER WITH HAZARD  
LAMPS OVERRIDING STOP LAMPS

### Paint Design

ONE SOLID CUSTOM BASE/CLEAR  
COAT CAB COLOR

RED, HIGH SOLIDS POLYURETHANE  
CHASSIS PAINT

### **THE FOLLOWING WARRANTIES SHALL BE PROVIDED AND INCLUDED IN BID PROPOSALS**

Two (2) year bumper-to bumper warranty

Twenty (20) year body sub-structure warranty

Twenty (20) year stainless steel body warranty

Ten (10) year NON pro-rated paint warranty

Ten (10) year plumbing warranty

***NFPA AND FAMA LABELS***

**BATTERY DANGERS LABEL - FAMA01**

A permanent label shall be provided near the battery location that warns of potential injury or death that could be caused by the batteries. The label shall also state precautions that should be taken while working on or around the batteries.

**ROTATING SHAFTS DANGER LABEL - FAMA02**

A permanent label shall be provided on each side of the frame rail and in any other location(s) where rotating shaft hazards are apparent. The label shall warn of potential injury or death that could be caused by the movement of the shaft(s) as well as precautions that should be taken while working on or around them.

**HOT SURFACE DANGERS LABEL - FAMA03**

A permanent label shall be provided near any hot surface that warns of potential injury or death that could be caused by contact with the surface. The label shall also state precautions that should be taken while working on or around the surface.

**HOT EXHAUST DANGERS LABEL - FAMA04**

A permanent label shall be provided near any hot exhaust surface that warns of potential injury or death that could be caused by contact with the surface. The label shall also state precautions that should be taken while working on or around the surface.

**SPINNING ENGINE FAN DANGER LABEL - FAMA05**

A permanent label shall be provided on both sides of the engine fan. The label shall warn of potential injury or death that could be caused by the movement of the fan as well as precautions that should be taken while working on or around them.

**SEATED AND BELTED WARNING LABEL - FAMA07**

A permanent label shall be provided that is visible to all occupants that states that they

should be seated and belted while the apparatus is in motion. The label shall also state potential injuries or death that could be caused if the safety belts are not used properly.

**AIR CONDITIONING REFRIGERANT WARNING LABEL - FAMA09**

If the apparatus is equipped with any type of air conditioning system, a permanent label shall be provided that is located in an area that would be visible to service personnel. The label shall state that the system contains R134A, the necessary precautions that should be taken and the dangers of working on or around the system.

**CAB INTERIOR EQUIPMENT MOUNTING DANGER LABEL - FAMA10**

A permanent label shall be provided inside of the cab warning of the dangers of unsecured equipment inside the cab. The label shall state that all equipment shall be properly secured and also warn of potential injury or death that could be caused by failing to do so.

**FIRE SERVICE TIRE RATING LABEL - FAMA12**

A permanent label shall be provided inside of the cab in view of the driver while entering the cab warning of the dangers of improper use of the tires on the apparatus. The label shall also warn of potential injury or death that could be caused by improper tire use or condition.

**ELECTRONIC STABILITY CONTROL LABEL - FAMA13**

If the apparatus is equipped with an electronic stability control system, a permanent label shall be provided inside of the cab in view of the driver warning of the dangers of improper operation of the apparatus and the importance of safe driving. The label shall also warn of potential injury or death that could be caused by improper operation of the apparatus.

**MAXIMUM OCCUPANCY LABEL - FAMA14**

A permanent label shall be provided inside of the cab in view of the driver stating the maximum number of personnel that can ride in the apparatus. The label shall also warn of potential injury or death that could be caused by exceeding the stated capacity.

**DO NOT WEAR HELMET LABEL - FAMA15**

A permanent label shall be provided inside of the cab in view of all seated positions stating that helmets should not be worn in cab. The label shall also warn of potential injury or death that could be caused by wearing helmet in cab.

**VEHICLE BACKING LABEL - FAMA17**

A permanent label shall be provided inside of the cab in view of the driver advising of proper procedures to following when the apparatus is in reverse motion. The label shall also warn of potential injury or death that be caused by failing to follow proper procedures.

**INTAKE/DISCHARGE CAP PRESSURE LABEL - FAMA18**

A permanent label shall be provided in all areas that intakes and discharges are capped. The label shall give instruction on how to properly remove the cap. The label shall also warn of potential dangers, injury or death that be caused by failing to follow proper cap removal procedures.

**DO NOT MIX BRAND/TYPES OF FOAM LABEL - FAMA19**

A permanent label shall be provided near the foam controls warning operator not to mix brands and types of foam. The label shall also warn of potential dangers, equipment failures or injury or death as a result of poor conditions.

**HOSE RESTRAINT LABEL - FAMA22**

A permanent label shall be provided near any hose storage area. The label shall instruct the operator to insure that all hose is properly secured prior to placing the apparatus in motion and to provide warning of potential dangers, including injury or death, in failing to do so.

**RH HOSEWELL HOSE RESTRAINT LABEL - FAMA22**

A permanent label shall be provided near the right side running board hose well. The label shall instruct the operator to insure that all hose is properly secured prior to placing the apparatus in motion and to provide warning of potential dangers, including injury or death, in failing to do so.

**ACCESS STEPS/LADDER LABEL - FAMA23**

A permanent label shall be provided at any area of the apparatus where personnel will be boarding or exiting the apparatus. The label shall instruct the operator in the proper method of climbing into or onto the apparatus as well as exiting and provide indication of potential injury or death that could occur in failing to do so.

**DO NOT RIDE ON REAR STEP WARNING LABEL - FAMA24**

A permanent label shall be provided at the rear step area stating that riding in this area while the vehicle is in motion is prohibited and shall warn of the potential dangers, including injury or death, in doing so.

**DO NOT RIDE IN WALKWAY WARNING LABEL - FAMA24**

A permanent label shall be provided in the walkway/crosswalk stating that riding in this area while the vehicle is in motion is prohibited and shall warn of the potential dangers, including injury or death, in doing so.

**TRAINED OPERATOR ONLY LABEL - FAMA25**

A permanent label shall be provided on the pump panel that states that only properly trained personnel should operate the apparatus and shall indicate that injury or death could occur as a result.

**NOT A STEP WARNING LABEL - FAMA26**

A permanent label shall be provided in any horizontal location that a firefighter may feel tempted to use as a step but is not designed, constructed or intended to be a stepping,

standing or walking surface. The label shall state that the surface is not intended for this purpose and indicate potential injury or death in doing so.

**COMPARTMENT TOP WARNING LABEL - FAMA26**

A permanent label shall be provided on the front and rear of the compartment tops on both sides warning that the area is not designed, constructed or intended to be a stepping, standing or walking surface. The label shall state that the surface is not intended for this purpose and indicate potential injury or death in doing so.

**BREAKER PANEL WARNING LABEL - FAMA27**

A permanent label shall be provided on the breaker panel. The label shall warn of electrical shock hazards, proper service procedures and indicate potential injury or death due to improper use and service.

**SIREN NOISE WARNING LABEL - FAMA42**

A permanent label shall be provided inside the driver's door warning of potential injury that could be received from the noise of the siren. The label shall also state safety precautions that should be taken when the siren is in use.

**TANK FILL RATE LABEL**

A permanent label shall be provided near any tank fill location clearly stating the following tank fill limitations and procedures:

- Do not exceed 100 psi when filling tank.
- Fill rate in GPM = tank size capacity.
- For tanks over 1000 gallons, do not exceed maximum fill rate of 1,000 GPM.
- Gate back fill when water reaches top of the tank.

The label shall also state that failure to follow procedure could result in over-pressurization, premature tank failure and possibly void tank warranty.

**FLUID CAPACITY LABEL**

A permanent plate shall be mounted in the driver's compartment specifying the quantity and type of the following fluids used in the apparatus (if applicable) for normal maintenance:

- Engine oil.
- Engine coolant.
- Chassis transmission fluid.
- Pump transmission fluid.
- Pump primer fluid.
- Drive axle fluid.
- Air conditioning refrigerant.
- Air conditioning lubrication oil.
- Power steering fluid.
- Cab-tilt mechanism fluid (if applicable).
- Transfer case fluid.
- Equipment rack fluid.
- CAFS compressor system lubricant.
- Generator system lubricant.
- Front tire cold pressure.
- Rear tire cold pressure.
- Maximum tire speed ratings.

**LENGTH, HEIGHT, WEIGHT LABEL**

A permanent plate or label shall be provided in the cab stating the overall length, height and the gross vehicle weight rating (GVWR), in tons, of the completed apparatus.

The wording on this label shall indicate that the information on the plate/label was current at the time of manufacture and if the overall height of the apparatus changes while the vehicle is in service, the purchaser shall revise the height dimension on the plate.

**FOAM SYSTEM PERFORMANCE SPECIFICATION LABEL - NFPA**

A label shall be permanently attached to the apparatus near the operator's control panel.

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The label shall state the following information pertaining to the performance operating specifications of the foam system:

- Foam classification type.
- Maximum and minimum proportioning rates (%).
- Maximum and minimum water flow (GPM).
- Maximum and minimum operating pressures.
- The statement "Use only concentrates that are compatible with this foam proportioning system. Refer to the foam proportioning system manufacturer's operating manual".

### **POWER SOURCE SPECIFICATION LABEL - NFPA**

A label shall be permanently attached to the apparatus near the operator's control panel. The label shall provide the operator with the following information:

Operational Category	Continuous Duty Rating
Rated voltage(s) and type (ac or dc)	In watts
Phase	Single or three
Rated frequency (at rated voltage(s))	Hertz
Rated amperage	Amps
Continuous rated watts	Watts
Power source engine speed	RPM

### **POWER SOURCE INSTRUCTIONAL LABEL - NFPA**

A label shall be permanently attached at any location on the apparatus that the AC power source may be activated. The label shall provide the operator with essential power source operating instructions including the power-up and power-down sequence.

### **PUMP CERTIFICATIONS**

Where applicable, the following documents shall be provided with the completed apparatus:

- Pump manufacturer's certification of suction capability.
- Special condition certifications, if any.
- Pump manufacturer's approval for stationary pumping.
- Engine manufacturer's certified brake horsepower curve showing maximum governed speed.
- Pump manufacturer's certification of hydrostatic test.
- Pump manufacturer's certification of hydrodynamic test, if required. Certification of inspection and tests for the fire pump.

### **FOAM SYSTEM TEST/CERTIFICATION**

The foam system shall be properly installed, tested and certified to NFPA 1901 20.11. The system manufacturer's certification of accuracy and the installer's certification shall be provided with the completed apparatus.

### **OPTICAL WARNING LIGHT CERTIFICATION**

The emergency warning light system shall be certified using one of the available methods provided for in NFPA 1901 13.8.16.

### **SIREN CERTIFICATION**

The siren manufacturer shall certify the siren to NFPA 1901 13.9.1.1.

### **ELECTRICAL SYSTEM PERFORMANCE CERTIFICATION**

A written load analysis and the results of the electrical system performance test shall be provided with the completed apparatus. The load analysis shall include the following:

- Nameplate rating of the alternator.
- The alternator rating under the conditions specified in NFPA 1901 13.3.2.
- Each of the component loads specified in NFPA 1901 13.3.3 that make up the minimum continuous electrical load.
- Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load.
- Each individual intermittent electrical load.

### **BOOSTER TANK CAPACITY CERTIFICATION**

The manufacturer shall certify the capacity of the booster tank. Certification shall be documented on the Manufacturer's Record of Construction document.

### **CLASS A FOAM TANK CERTIFICATION**

Certification of class A foam tank capacity shall be provided.

### **NFPA SLIP RESISTANCE CERTIFICATION**

Any materials used as a stepping, standing or walking surface shall be certified to be compliant with NFPA 1901 15.7.4. Documentation shall be provided with the completed apparatus.

### **NFPA GENERATOR SYSTEM TESTING**

The generator and related electrical components shall be tested to NFPA 1901 22.15 requirements. Documentation of the tests shall be provided with the completed apparatus.

### **120/240 VOLT ELECTRICAL EQUIPMENT INSTALLATION**

All 120/240 volt electrical equipment shall be installed by the apparatus manufacturer. This shall include any item related to the system, including, but not limited to the following:

- Generator.
- All scene lighting accessories.
- All outlets, and cord reels (where applicable)
- Breaker panel.

To maintain the integrity of the entire apparatus electrical system, all 120/240 volt equipment must be installed by the apparatus manufacturer. Installation by the apparatus manufacturer will also allow the electrical system to be NFPA tested during the

U.L. pump certification testing procedure.

Installation of any portion of the 120/240 volt system by a dealer or service center will not be acceptable. There shall be no exception to this requirement.

### **WEIGHT CERTIFICATION**

Documents from a certified scale showing actual loading on the front, rear and overall apparatus shall be provided. The apparatus shall be scaled with the water tank full but without personnel, equipment and hose.

### **VEHICLE ROLLOVER STABILITY**

The apparatus chassis shall be equipped with a stability control system and shall be certified to NFPA 1901 Rollover Stability requirements.

### **UNDERWRITER'S LABORATORIES TESTING**

The apparatus shall undergo an Underwriter's Laboratories Certification Test to insure that the completed apparatus meets the requirements of NFPA 1901. The certificate shall be provided to the purchaser upon completion. Underwriter's Laboratories shall also perform the required testing on the entire installed electrical system. Self-certification by the apparatus manufacturer will not be acceptable.

### **MANUFACTURER'S RECORD OF APPARATUS CONSTRUCTION**

All information required to comply with NFPA 1901 4.20.1 shall be provided with the completed apparatus.

### **OPERATIONS AND SERVICE DOCUMENTATION**

The apparatus shall be complete with all operation and service documentation covering the apparatus as delivered and accepted. The documentation shall address the inspection, service and operations of the apparatus and all major components as required in NFPA 1901 4.20.2.

**"AS BUILT" APPARATUS BODY OWNERS MANUALS (2)**

Two (2) "as built" apparatus body owner's manual USB drives shall be provided with the apparatus. All apparatus body electrical schematics shall be provided as well as all instructional and maintenance manuals on components provided and permanently mounted on the apparatus. A copy of the final apparatus body build specifications shall also be included on the drive. The USB shall be "read only" and shall not allow modification.

To eliminate component confusion, generic documentation with equipment that is not provided on the apparatus body shall not be acceptable.

**FAMA FIRE APPARATUS SAFETY GUIDE**

One (1) FAMA Fire Apparatus Safety Guide(s) shall be provided with the completed apparatus.

**STATEMENT OF EXCEPTION - NFPA MISCELLANEOUS REQUIRED EQUIPMENT**

The customer shall be responsible for providing all NFPA required miscellaneous equipment that is not contained within these specifications. All required equipment must be properly installed on the apparatus and in working condition prior to the apparatus being placed into service.

**FAMILIARIZATION AND DEMONSTRATION**

Upon completion of the new apparatus, an authorized properly trained representative of the manufacturer shall perform a "Familiarization and Demonstration" overview of the apparatus and related components.

The Department shall provide the representative with a written list, by full proper names, of the individual(s) that are to receive the overview. Upon completion of the overview, each person in attendance will be required to acknowledge, by signature, that they understand the operation of the apparatus and all related components.

### **CHASSIS FAMILIARIZATION**

Familiarization of the apparatus shall include the following:

- How to locate gauges or indicators and check all fluid levels and operational use of the apparatus.
- How to tilt the chassis cab or hood assembly for access to the engine, fire pump (if applicable), or aerial control (if applicable), or any other device to allow access to fluids or for required maintenance.
- Interior cab controls, instruments, mirrors, safety devices or alarms, brake operations, transmission control, pump controls (if applicable) exhaust regeneration (if applicable), seat adjustments, warning light engagement and other operational equipment.

### **FIRE PUMP FAMILIARIZATION**

Familiarization of the apparatus shall include the following items related to the fire pump system:

- Setting the parking brake, proper transmission gear and the fire pump engagement operations.
- Throttle control.
- Primer and tank-to-pump operation.
- Use of pressure control device.
- Tank refilling operations.
- Proper operation of discharge controls.
- Proper shutdown and draining of the system.

### **120/240 GENERATOR FAMILIARIZATION**

Familiarization of the apparatus shall include the following items related to the generator system:

- Proper engagement (if driven by the chassis).
- Start up, operation and shut down of the generator.
- Monitoring of controls and instruments.

**FOAM SYSTEM FAMILIARIZATION**

Familiarization of the apparatus shall include the following items related to the foam system:

- Start up, operation and shut down of the foam system.
- Setting of foam percentages and other operational settings.
- Proper flushing and draining of the system.

**POST ACCEPTANCE TRAINING REQUIREMENTS**

After apparatus acceptance, the Department shall be responsible for ongoing training of personnel. The Department shall not allow untrained or undertrained personnel to operate the apparatus or any included feature of the apparatus.