

Galeton Fire Protection District  
Eaton, CO  
Type 3 Wildland (Urban Interface)  
SVI#1222  
Production Specification



## **LIABILITY INSURANCE**

The manufacturer shall furnish with the bid a certificate of insurance for;

Workman's Compensation and Employer's Liability Insurance covering for all employees.

General Liability (each occurrence) of \$1,000,000.00. General Aggregate coverage of \$2,000,000.00. Products Completed / Operations Aggregate coverage of \$2,000,000.00. Medical Expense coverage of \$5,000 (any one person). Personal Injury of \$1,000,000.00.

Automobile liability of \$1,000,000.00 combined single limit (each accident), including any auto, all owned autos, scheduled autos, hired autos, non-owned autos, and garage liability.

Excess Umbrella Liability coverage of \$6,000,000.00 each occurrence, Aggregate of \$6,000,000.00. Garage Keepers Liability coverage of \$6,000,000.00 combined limit.

All insurance policies must be;

- Maintained for the life of the contract,
- Must provide ten (10) days notice before cancellation,
- Must cover all operations of the contractor, or anyone employed by them.

## **INTERNET IN-PROCESS SITE**

The manufacturer shall post and maintain a website where the Galeton Fire Protection District will be able to view digital images of their apparatus as its being built. The digital images shall be posted once a week starting when the body begins production or when the cab/chassis arrives and shall continue until the final completion of unit.

## **ENGINEERING DRAWINGS**

The evaluation of bids shall also be based on design, engineering reliability, and completeness of drawings. No Bidder's proposal shall be considered unless complete engineering drawings to these specifications are submitted with the request for proposal package. Failure to submit factory prepared blueprints with bid shall result in automatic rejection. Submission of "bid drawings" are in addition to "production drawings" which must be submitted for Galeton Fire Protection District approval prior to construction. Bid drawings shall allow the Galeton Fire Protection District the ability to fully evaluate required product.

The engineering drawings shall be produced on computer aided design (CAD) equipment to assure critical tolerance and detail only available with CAD equipment. The drawings shall be on "B" size paper, 17" x 11" in size, and views must be 1/4" = 1' - 0" scale. This shall allow the Galeton Fire Protection District the ability to compare drawings of all manufacturers on an "equal" basis. The drawings shall be completed only by the body manufacturer, and must be exactly to Galeton Fire Protection District specifications. Submission of "similar to" drawings or "statements referring to later submission of drawings after award of contract" shall be automatically rejected.

Since the request for proposal package will require extensive evaluation by Galeton Fire Protection District, all Bidders must submit exactly the same engineering drawings at the same scale, on the same size paper. For easy comparison of drawings, they must be on a 17" x 11" sheet as follows:

- All bid drawings will be stamped BID DRAWING.
- All items shown on the drawing will be pre-designed with regards to layout and functionality prior to the completion of the BID DRAWING.

- Two (2) 17" x 11" color drawings will be supplied with the bid proposal. Black and white or blue line drawings will not be accepted.
- There shall be five (5) views of the truck with the doors closed (Top, Left, Right, Front, Rear), four (4) views of the truck with the doors open (Top, Left, Right, Rear) and four (4) views of any walk-in area (Top, Left, Right, Rear).
- All compartment door openings and usable space shall be clearly shown in inches.
- The trucks overall length, height, width, wheelbase and cab-to-axle dimensions shall be clearly shown.
- The angles of approach and departure shall be shown in the maximum loaded condition to the nearest degree.
- All lighting packages will be clearly shown on the drawing and verified accurate per the most current NFPA standards (when applicable).
- The exterior view shall show all scene lights, marker lights, speakers, horns, exhaust, tow points, exterior outlets, windows, winch receivers, tow hitches, exterior ladders and any other item important to the function of the vehicle.
- The open view shall show all trays, shelves, air system components, hydraulic components, tool boards, storage modules and any other items important to the function of the vehicle.
- The interior view for all walk-in areas shall show all seating positions, desks, cabinets, windows, tech equipment, radio locations and any other item important to the function of the vehicle.
- Any changes to the BID drawing will require a revision which will be clearly annotated in the upper right hand side of the drawing showing the revision number, reason for the revision, date and who made the changes.

Text Block Items;

- Purchaser's name.
- Body size and material type.
- Chassis manufacturer and model number.
- Unit description.
- Wheelbase (WB) , Cab-to-axle (CA) distance.
- Overall length (OAL), Overall width, (OAW), Overall height (OAH).
- Scale, date, drawn by, drawing number and sheet number.

**RESPONSIBILITY OF PURCHASER**

It shall be the responsibility of the purchaser to specify the details of the apparatus in addition to the requirements in NFPA 1901 needed by the manufacturer to build the apparatus, including:

- 1) Requirements not uniquely specified in NFPA 1901, such as the type of apparatus desired.
- 2) Any features of the apparatus desired in addition to, or in excess of, the requirements in NFPA 1901.

After acceptance of the fire apparatus, the purchaser shall be responsible for ongoing training of personnel to develop and maintain proficiency regarding the proper and safe use of the apparatus and the associated equipment.

**RESPONSIBILITY OF CONTRACTOR**

The Contractor shall provide a detailed description of the apparatus, a list of equipment to be furnished, and other construction and performance details to which the apparatus shall conform. The detailed description of the apparatus shall include, but shall not be limited to,

1. Estimated In-Service Weight,
2. Wheelbase, Turning Clearance Radius,
3. Principal dimensions, Angle of Approach, Angle of Departure,
4. Transmission, Axle Ratios.

The Contractor's detailed description shall include a statement specifically describing each aspect of the delivered apparatus that will not be fully compliant with the requirements of this standard.

The purpose of these Contractor specifications shall be to define what the contractor intends to furnish and deliver to the purchaser.

Responsibility for the apparatus and equipment shall remain with the contractor until they are accepted by the purchaser.

## **VEHICLE STABILITY**

### **ROLLOVER STABILITY**

The apparatus shall meet the criteria defined below, or it shall be equipped with a stability control system defined below.

The apparatus shall meet the criteria defined in either of the following:

- 1) The apparatus shall remain stable to 26.5 degrees in both directions when tested on a tilt table in accordance with SAE J2180, *A Tilt Table Procedure for Measuring the Static Rollover Threshold for Heavy Trucks*.
- 2) The calculated or measured center of gravity (CG) shall be no higher than 80 percent of the rear axle track width.

Compliance shall be certified by testing, calculating, or measuring the apparatus or by comparing the apparatus to a compliant, substantially similar example apparatus and the certification shall be delivered with the fire apparatus.

The example apparatus shall be considered substantially similar if it includes a chassis with the same or higher CG height, the same or narrower rear axle track width, the same or greater water tank size and CG height, the same type of front and rear suspension and the same type and size of aerial device.

The apparatus shall be loaded with fuel, fire-fighting agents, hose, ladders, a weight of 250 lb in each seating position and weight equivalent to the Miscellaneous Equipment Allowance as defined in Table 12.1.2.

If the apparatus is designed to meet a specified higher equipment loading or larger hose bed capacity or to carry additional ground ladders, these greater loads shall be included in the testing, calculating or measuring.

The weight added to the fire apparatus for the purpose of test, calculation or measurement shall be distributed to approximate typical in-service use of the fire apparatus while not exceeding the manufacturer's published individual compartment weight ratings.

If the apparatus is equipped with a stability control system, the system shall have, at a minimum, a steering wheel position sensor, a vehicle yaw sensor, a lateral accelerometer and individual wheel brake controls.

### **FIRE APPARATUS PERFORMANCE**

The fire apparatus shall meet the requirements of this standard at elevations of 2000 ft (600 m) above sea level.

The fire apparatus shall meet all the requirements of this standard while stationary on a grade of 6 percent in any direction.

The fire apparatus shall meet the requirements of this standard in ambient temperature conditions between 32°F (0°C) and 110°F (43°C).

## **HIGHWAY PERFORMANCE**

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

- 1) Accelerating from 0 to 35 mph (55 km/hr) within 25 seconds on a 0 percent grade
- 2) Attaining a speed of 50 mph (80 km/hr) on a 0 percent grade
- 3) Maintaining a speed of at least 20 mph (32 km/hr) on any grade up to and including 6 percent

The maximum top speed of fire apparatus with a GVWR over 26,000 lb (11,800 kg) shall not exceed either 68 mph (109 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

If the combined water tank and foam agent tank capacities on the fire apparatus exceed 1250 gal (4732 L), or the GVWR of the vehicle is over 50,000 lb (22,680 kg), the maximum top speed of the apparatus shall not exceed either 60 mph (95 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

## **SERVICEABILITY**

The fire apparatus shall be designed to allow the manufacturer's recommended routine maintenance checks of lubricant and fluid levels to be performed by the operator without lifting the cab of a tilt-cab apparatus or without the need for hand tools.

Where special tools are required for routine service on any component of the apparatus, such tools shall be provided with the apparatus.

Apparatus components that interfere with repair or removal of other major components shall be attached with fasteners, such as cap screws and nuts, so that the components can be removed and installed with ordinary hand tools. These components shall not be welded or otherwise permanently secured into place.

## **FIRE APPARATUS DOCUMENTATION**

The contractor shall supply, at the time of delivery, at least one (1) copy of the following documents:

- 1) The manufacturer's record of apparatus construction details, including the following documents:
  - a) Owner's name and address
  - b) Apparatus manufacturer, model, and serial number
  - c) Chassis make, model, and serial number
  - d) GAWR of front and rear axles and GVWR
  - e) Front tire size and total rated capacity in pounds (kilograms)
  - f) Rear tire size and total rated capacity in pounds (kilograms)
  - g) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
  - h) Engine make, model, serial number, rated horsepower and related speed, and governed speed; and if so equipped, engine transmission PTO(s) make, model, and gear ratio
  - i) Type of fuel and fuel tank capacity
  - j) Electrical system voltage and alternator output in amps
  - k) Battery make, model, and capacity in cold cranking amps (CCA)
  - l) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio

- m) Ratios of all driving axles
  - n) Maximum governed road speed
  - o) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), maximum discharge pressure capability rating, and serial number
  - p) Pump transmission make, model, serial number, and gear ratio
  - q) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
  - r) Water tank certified capacity in gallons or liters
  - s) Foam tank (if provided) certified capacity in gallons (liters)
  - t) Aerial device type, rated vertical height in feet (meters), rated horizontal reach in feet (meters), and rated capacity in pounds (kilograms)
  - u) Paint manufacturer and paint number(s)
  - v) Company name and signature of responsible company representative
  - w) Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose)
- 2) Certification of compliance of the optical warning system (*see 13.8.16*)
  - 3) Siren manufacturer's certification of the siren (*see 13.9.1.1*)
  - 4) Written load analysis and results of the electrical system performance tests (*see 13.14.1 and Section 13.15*)
  - 5) Certification of slip resistance of all stepping, standing, and walking surfaces (*see 15.7.4.5*)
  - 6) If the apparatus has a fire pump, the pump manufacturer's certification of suction capability (*see 16.2.4.1*)
  - 7) If the apparatus is equipped with a fire pump and special conditions are specified by the purchaser, the pump manufacturer's certification of suction capacity under the special conditions (*see 16.2.4.2*)
  - 8) If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications (*see 16.3.1*)
  - 9) If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed (*see 16.3.2.2*)
  - 10) If the apparatus has a fire pump, the pump manufacturer's certification of the hydrostatic test (*see 16.5.2.2*)
  - 11) If the apparatus has a fire pump with a maximum discharge pressure capability rating that exceeds the hydrostatic test pressure of 16.5.2.1, the pump manufacturer's certification of the hydrodynamic test
  - 12) If the apparatus has a fire pump, the certification of inspection and test for the fire pump (*see 16.13.1.1.5 or 16.13.1.2.4 as applicable*)
  - 13) If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test (*see Section 17.13*)
  - 14) When the apparatus is equipped with a water tank, the certification of water tank capacity (*see Section 18.6*)
  - 15) If the apparatus has an aerial device, the certification of inspection and test for the aerial device (*see Section 19.24*)
  - 16) If the apparatus has an aerial device, all the technical information required for inspections to comply with NFPA 1911
  - 17) If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy (*see 20.10.4.2*) and the final installer's certification the foam proportioning system meets this standard (*see 20.11.2*)
  - 18) If the system has a CAFS, the documentation of the manufacturer's pre delivery tests (*see Section 21.9*)
  - 19) If the apparatus has a line voltage power source, the certification of the test for the power source (*see 22.15.7.2*)
  - 20) If the apparatus is equipped with an air system, air tank certificates (*see 24.5.1.2*), the SCBA fill station certification (*see 24.9.6*), and the results of the testing of the air system installation (*see 24.14.5 and 24.15.4*)
  - 21) Any other required manufacturer test data or reports

## **OPERATIONS AND SERVICE DOCUMENTATION**

The contractor shall deliver with the fire apparatus complete operation and service documentation covering the completed apparatus as delivered and accepted.

The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof.

The contractor shall also deliver with the fire apparatus the following documentation for the entire apparatus and each major operating system or major component of the apparatus:

- 1) Manufacturer's name and address
- 2) Country of manufacture
- 3) Source for service and technical information
- 4) Parts replacement information
- 5) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable)
- 6) Wiring diagrams for low voltage and line voltage systems to include the following information:
  - a) Pictorial representations of circuit logic for all electrical components and wiring
  - b) Circuit identification
  - c) Connector pin identification
  - d) Zone location of electrical components
  - e) Safety interlocks
  - f) Alternator–battery power distribution circuits
  - g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
- 7) Lubrication charts
- 8) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
- 9) Precautions related to multiple configurations of aerial devices, if applicable
- 10) Instructions regarding the frequency and procedure for recommended maintenance
- 11) Overall apparatus operating instructions
- 12) Safety considerations
- 13) Limitations of use
- 14) Inspection procedures
- 15) Recommended service procedures
- 16) Troubleshooting guide
- 17) Apparatus body, chassis and other component manufacturer's warranties
- 18) Special data required by this standard
- 19) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

The contractor shall deliver with the apparatus all manufacturer's operations and service documents supplied with components and equipment that are installed or supplied by the contractor.

## **NFPA REQUIRED DOCUMENTATION FORMAT - USB FLASH DRIVE**

The vehicle construction details and the operations and service documentation as required per NFPA 1901 latest edition shall be provided on a USB Flash Drive. These manuals shall be divided into sections for ease of reference. There shall be two (2) USB flash drives provided with the completed vehicle.

## **FIRE APPARATUS SAFETY GUIDE**

A Fire Apparatus Safety Guide published by Fire Apparatus manufacturer's Association shall be provided with delivered vehicle. This manual includes essential safety information for fire fighters, fire chiefs, apparatus mechanics, and fire

department safety officers. The guide is applicable to municipal, wildland, and airport fire fighting apparatus manufactured on either custom or commercial chassis.

### **STATEMENT OF EXCEPTIONS**

The final-stage manufacturer shall deliver with the fire apparatus either a certification that the apparatus fully complies with all requirements of this standard or alternatively, a Statement of Exceptions specifically describing each aspect of the completed apparatus that is not fully compliant with the requirements of this standard at the time of delivery.

The Statement of Exceptions shall contain, for each noncompliant aspect of the apparatus or missing required item, the following information:

- 1) A separate specification of the section of the applicable standard for which compliance is lacking
- 2) A description of the particular aspect of the apparatus that is not in compliance therewith or required equipment that is missing
- 3) A description of the further changes or modifications to the delivered apparatus that must be completed to achieve full compliance
- 4) Identification of the entity that will be responsible for making the necessary post delivery changes or modifications or for supplying and installing any missing required equipment to the apparatus to achieve full compliance with this 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 final assembly of the apparatus and by an authorized agent of the purchasing entity, indicating mutual understanding and agreement between the parties regarding the substance thereof.

### **CARRYING CAPACITY**

The GAWR and the GCWR or GVWR of the chassis shall be adequate to carry the weight of the completed vehicle when loaded to its estimated in-service weight. The manufacturer shall establish the estimated in service weight during the design of the vehicle.

The estimated in-service weight shall include the following:

1. The chassis, body and tank(s)
2. Full fuel, lubricant, and other chassis or component fluid tanks or reservoirs
3. Full water and other agent tanks
4. \*250 lb (114 kg) in each seating position
5. Fixed equipment such as pumps, aerial devices, generators, reels and air systems as installed
6. Ground ladders, suction hose, designed hose load in their hose beds and on their reels
7. An allowance for miscellaneous equipment that is the greatest of the following:
  - a) The values shown for items 1 - 7
  - b) A purchaser-provided list of equipment to be carried with weights
  - c) A purchaser-specified miscellaneous equipment allowance

The manufacturer shall engineer and design the fire apparatus such that the completed apparatus, when loaded to its estimated in-service weight, with all movable weights distributed as close as is practical to their intended in-service configuration, does not exceed the GVWR.

A final manufacturer's certification of the GVWR or GCWR, along with a certification of each GAWR, shall be supplied on a label affixed to the vehicle.



The fire apparatus manufacturer shall permanently affix a high-visibility label in a location visible to the driver while seated.

The label shall show the height of the completed unequipped fire apparatus in feet and inches (meters), the length of the completed fire apparatus in feet and inches (meters), and the GVWR in tons (metric tons).

Wording on the label shall indicate that the information shown was current when the apparatus was manufactured and that, if the overall height changes while the vehicle is in service, the fire department must revise that dimension on the plate.

Apparatus Type	Storage Areas	Apparatus Size	Equipment Allowance	
			lb.	kg.
Pumper Fire Apparatus	Equip. minimum of 40 cu ft (1.1 cu mt) of enclosed compartmentation.	Less than 250 cu ft ( 7 cu mt) compartment space	2,000	910
	Hose minimum of 30 cu ft (0.8 cu mt) for 2 1/2" (65 mm) or larger fire hose.	250 cu ft (7 cu mt) or more of compartment space	2,500	1,135
	(2) areas for pre-connects each minimum of 3.5 cu.ft. (0.1 cu.mt.) for 1 1/2" (38 mm) or larger fire hose.			
Compartment space for pumpers is calculated based on the inside dimensions of the enclosed compartment.				

**TESTING**

**ROAD TEST**

Each apparatus shall be tested by the manufacturer before delivery to verify that it meets the following criteria;

Tests shall be conducted at a location and in a manner that does not violate local, state or provincial, or federal traffic laws. Tests shall be conducted on a dry, level, paved surface that is free of loose material, oil, or grease. Tests shall be conducted with the water and foam tanks full (water or product).

The apparatus shall accelerate from 0 to 35 mph (55 km/hr) within 25 seconds. The apparatus shall attain a speed of 50 mph (80 km/ hr).

The auxiliary braking system, if so equipped, shall function as intended by the auxiliary braking system manufacturer.

The air service brakes shall bring the apparatus to a complete stop from a speed of 20 mph (32.2 km/hr) in a distance not exceeding 35 ft (10.7 m).

The hydraulic service brakes shall bring the apparatus to a complete stop from a speed of 30 mph (48.2 km/hr) in a distance not exceeding 88 ft (26.8 m).

## **LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST**

The vehicles low voltage electrical system shall be tested and certified by the manufacturer. The certified test results shall be delivered with the completed vehicle. Tests shall be performed when the air temperature is between 0°F and 110°F (-18°C and 43°C).

### **TEST SEQUENCE**

The following three (3) tests shall be performed in the order in which they appear below. Before each test, the batteries shall be fully charged until the voltage stabilizes at the voltage regulator set point and the lowest charge current is maintained for ten (10) minutes. Failure of any of these tests shall require a repeat of the sequence.

#### **1. RESERVE CAPACITY TEST**

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes.

All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test failure of the battery system.

#### **2. ALTERNATOR PERFORMANCE TEST**

##### **TEST AT IDLE**

The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating temperature. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

##### **TEST AT FULL LOAD**

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during this test.

An alarm sounded by excessive battery discharge, as detected by the warning system required in 13.3.4, or a system voltage of less than 11.8 V dc for a 12 V nominal system, 23.6 V dc for a 24 V nominal system, or 35.4 V dc for a 42 V nominal system for more than 120 seconds shall be considered a test failure.

#### **3. LOW VOLTAGE ALARM TEST**

The following test shall be started with the engine off and the battery voltage at or above 12 V for a 12 V nominal system, 24 V for a 24 V nominal system or 36 V for a 42 V nominal system.

With the engine shut off, the total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals.

The test shall be considered a failure if the alarm does not sound in less than 140 seconds after the voltage drops to 11.70 V for a 12 V nominal system, 23.4 V dc for a 24 V nominal system, or 35.1 V for a 42 V nominal system.

The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

## **LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST**

### **DOCUMENTATION**

The manufacturer shall deliver the following with the fire apparatus:

- 1) Documentation of the electrical system performance tests
- 2) A written electrical load analysis, including the following:
  - a) The nameplate rating of the alternator
  - b) The alternator rating
  - c) Each of the component loads specified that make up the minimum continuous electrical load
  - d) Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load
  - e) Each individual intermittent electrical load

### **UL PUMP CERTIFICATION**

The apparatus upon completion shall be tested and certified by Underwriters Laboratories, Inc. (UL). The certification tests shall follow the guide lines outlined in NFPA 1901 "Standard for Fire Apparatus".

If the fire pump has a rated capacity of 750 gpm (3000 L/min) or greater, the pump shall be tested after the pump and all its associated piping and equipment have been installed on the apparatus.

A three (3) hour pumping test from draft shall be completed and certified to perform as listed below;

- 100% of rated capacity at 150 psi (1,000 kPa) net pressure, 2 hours
- 70% of rated capacity at 200 psi (1,400 kPa) net pressure, 1/2 hour
- 50% of rated capacity at 250 psi (1,700 kPa) net pressure, 1/2 hour

The test shall include at least the pumping test, the pumping engine overload test, the pressure control system test, the priming device tests, and the vacuum test.

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 500 psi (3,400 kPa).

The pump shall comply with the applicable requirements of "Standard for Fire Apparatus 1901, latest edition.

The pump shall be capable of producing fire streams that are free from objectionable pulsation under all normal operating conditions.

If the apparatus is equipped with a pump driven by the chassis engine designed for both stationary pumping and pump-and-roll, the test shall verify that the engine speed control at the pump operator's panel cannot be advanced when either of the following conditions exists:

- (1) The chassis transmission is in neutral, the parking brake is off, and the pump shift status in the driving compartment is disengaged.
- (2) The chassis transmission is in any gear other than neutral, the parking brake is on, and the pump shift in the driving compartment is in the "Pump Engaged" or the "OK to Pump-and-Roll" position.

A test plate shall be provided at the pump operator's panel that gives the rated discharges and pressures together with the speed of the engine as determined by the certification test for each unit, the position of the parallel/series pump as used, and the governed speed of the engine as stated by the engine manufacturer on a certified brake horsepower curve.

## **FOAM SYSTEM TEST**

The apparatus foam system shall be tested and certified by the manufacturer. The certification shall be delivered to the customer with the apparatus.

The test shall be performed with the air temperature between 0 degrees F and 100 degrees F.

The foam system will be tested to comply with requirements of NFPA 1901. The basis for the test is as follows:

A base calibration range is established using water and foam concentrate from the system to be tested. Two (2) standard solutions are made, a minimum allowable foam percent and a maximum allowable foam percent solution for each foam proportioning system foam percent setting to be tested. The minimum allowable and maximum allowable foam percent solution are determined using the criteria given in NFPA 1901, "Foam Proportioning System Accuracy".

After the standard foam solutions are thoroughly mixed the conductivity (a measure of a substances ability to conduct electricity) of each solution is measured. The conductivity of a solution is directly proportional to the percentage of foam in the solution. The reading is recorded on the certificate by the Testing Official. From these two (2) readings a range is established for that particular foam proportioning system's foam percent setting.

The foam system is then operated at the corresponding foam percent setting, flow rate, and pressure as recommended by the foam proportioning system manufacturer. A test sample is the collected at an adequate distance downstream from the foam proportioner being tested. When the test sample has been collected its conductivity is measured and recorded by the Testing Official. The Testing Official then compares the conductivity reading of the test sample to the minimum and maximum allowable conductivity readings taken from the two (2) standard solutions. If it is greater than the minimum allowable conductivity, but less than the maximum allowable conductivity, the foam proportioning system is determined to be accurate at that foam percent setting.

The above procedure is performed at three foam proportioning system foam percent settings. The foam percent settings are:

- 1) The minimum foam percent setting available.
- 2) A mid-range foam percent setting, if available.
- 3) The maximum foam percent setting available.

The foam proportioning system is certified to be accurate if all three foam percent settings produce conductivity, measurements in the range of conductivity' as determined by' the standard solutions for each foam percent setting. The Testing Official makes the final determination of the foam proportioning system accuracy as installed by' the apparatus manufacturer.

Criteria for the following systems:

- Class A foam - .1%, .5%, and 1 .0% settings if available.
- Class B foam - 1.0%. 3.0%, and 6.0% settings if available.
- Class A and Class B foam - .1% and 1.0% using Class A foam and at 3.0% using Class B foam or at .1% using Class A foam and 3.0% and 6.0% using Class B foam.

## **WARRANTY**

A full statement shall be provided of the warranties for the vehicle(s) being bid. Warranties should clearly describe the terms under which the vehicle manufacturer accepts responsibility for the cost to repair defects caused by faulty design, quality of work or material and for the applicable period of time after delivery.

Cost of repairs refers to all costs related thereto including, but not limited to, the cost of materials and the cost of labor.

The Body Manufacturer shall warrant all materials and accessories used on the vehicle(s), whether fabricated by manufacturer or purchased from an outside source and will deal directly with the Galeton Fire Protection District on all warranty work.

### **GENERAL LIMITED WARRANTY - TWO (2) YEARS**

The vehicle shall be free of defects in material and workmanship for a period of two (2) years or 36,000 miles (or 57,936 kilometers), whichever occurs first starting thirty (30) days after the original invoice date.

The Contractor must be the "single source" coordinator of all warranties on the vehicle.

### **LOW VOLTAGE ELECTRICAL WARRANTY - FIVE (5) YEARS**

The vehicle low voltage electrical system shall be free of defects in material and workmanship for a period of five (5) years or 60,000 miles (or 96,561 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

### **STRUCTURAL WARRANTY - TEN (10) YEARS**

The body shall be free of structural or design failure or workmanship for a period of ten (10) years, or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

### **UNDERCOAT WARRANTY**

The body undercoating shall have a warranty provided by the manufacturer for the lifetime of the vehicle or twenty (20) years, whichever occurs first. The warranty shall be transferable between vehicle owners. Should the undercoating material applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

### **PAINT LIMITED WARRANTY - TEN (10) YEARS**

The body shall be free of bubbling or peeling as a result of a defect in the method of manufacture for a period of ten (10) years or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date. **Pro-rated warranties will not be acceptable.**

### **GRAPHICS LIMITED WARRANTY**

The 3M graphics installation shall be warranted for a period of two (2) years. The 3M materials installed on completed vehicle shall be warranted for seven (7) years. The 3M Diamond grade film (if specified) shall be warranted for ten (10) years.

**WATEROUS SEVEN YEAR PUMP WARRANTY**

The fire pump shall be warranted by Waterous for a period of seven (7) years from the date of delivery to the Galeton Fire Protection District.

**STAINLESS STEEL PLUMBING WARRANTY**

The stainless steel plumbing shall be free of defects in material and workmanship for a period of ten (10) years, or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

The contractor shall supply details of their warranty information with their bid submission.

**AKRON BRASS TEN YEAR VALVE WARRANTY**

The Akron Brass valves shall be warranted by Akron Brass for a period of ten (10) years from the date of delivery to the Galeton Fire Protection District. The warranty for electronics shall be warranted by Akron Brass for a period of five (5) years from date of delivery to the Galeton Fire Protection District.

**POLY WATER TANK WARRANTY**

The poly water tank shall be provided with a lifetime material and workmanship limited warranty. The manufacturer shall supply details of their warranty information with their bid submission.

**OVERALL HEIGHT REQUIREMENT**

There is no overall height (OAH) restriction for this vehicle.

**OVERALL LENGTH REQUIREMENT**

There is no overall length (OAL) restriction for this vehicle.

**ANGLE OF APPROACH**

The angle of approach for this vehicle shall not be less than eight (8) degrees when it is loaded to the estimated in-service weight as specified by the current edition of NFPA 1901.

**ANGLE OF DEPARTURE**

The angle of departure for this vehicle shall not be less than eight (8) degrees when it is loaded to the estimated in-service weight as specified by the current edition of NFPA 1901.

**PRE-CONSTRUCTION CONFERENCE**

A pre-construction conference shall be required at the Contractor's factory for four (4) personnel from the Galeton Fire Protection District to finalize all construction details prior to manufacturing.

The Contractor shall at his/her expense, provide transportation, lodging, rental car and meal expenses during the pre-construction conference. Any travel distance greater than 250 miles shall be by non-stop commercial air travel.

### **FINAL INSPECTION CONFERENCE**

A final inspection conference shall be required at the Contractor's factory for four (4) personnel from the Galeton Fire Protection District to inspect the vehicle and construction details prior to shipment of the completed vehicle. This inspection shall take place after any specified striping and lettering is installed.

The Contractor shall at his/her expense, provide transportation, lodging, rental car and meal expenses during the final inspection conference. Any travel distance greater than 250 miles shall be by non-stop commercial air travel.

### **DELIVERY AND DEMONSTRATION**

The Contractor shall be responsible for the delivery of the completed unit to the Galeton Fire Protection District's location. On initial delivery of the apparatus, the Contractor shall supply a qualified representative to demonstrate the apparatus and provide initial instruction to representatives of the Galeton Fire Protection District regarding the operation, care and maintenance of the apparatus and equipment supplied at Galeton Fire Protection District location.

The Delivery Engineer shall set delivery and instruction schedule with the person appointed by Galeton Fire Protection District.

After delivery of the apparatus, the Galeton Fire Protection District shall be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the apparatus and associated equipment.

## **CAB CHASSIS SPECIFICATION**

# **FREIGHTLINER SPECIFICATION PROPOSAL**

### **Vehicle Configuration**

108SD CONVENTIONAL CHASSIS  
2022 MODEL YEAR SPECIFIED  
SET BACK AXLE - TRUCK **4 x 4**

### **General Service**

FIRE/EMERGENCY SERVICE  
FREIGHTLINER LEVEL II WARRANTY  
EXPECTED FRONT AXLE LOAD: 16000 lbs  
EXPECTED REAR DRIVE AXLE LOAD: 30000 lbs  
EXPECTED GROSS VEHICLE CAPACITY: 46000 lbs

### **Engine**

CUM L9 400EV HP @ 2200 RPM; 2200 GOV RPM, 1250 LB/FT @ 1200 RPM, FIRE/EMERGENCY

### **Engine Equipment**

2016-2019 ONBOARD DIAGNOSTICS/2010 EPA/CARB/GHG21  
NFPA COMPLIANT EMBER SCREEN AND FIRE RETARDANT  
DONALDSON AIR CLEANER  
AUTOMATIC ENGINE INTAKE SHUTOFF VALVE AND CONTROLS  
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  
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  
1115 SQUARE INCH ALUMINUM RADIATOR WITH AUXILIARY  
COOLING  
ANTIFREEZE TO -34F, ETHYLENE GLYCOL PRE-CHARGED SCA  
HEAVY DUTY 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 WITH DUAL PTO PROVISIONS

### **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  
MERITOR MTC-4210 TRANSFER CASE & OIL COOLER  
TRANSMISSION OIL CHECK AND FILL WITH ELECTRONIC OIL LEVEL CHECK  
TRANSFER CASE SHIFT CONTROLS WITH TRANSFER CASE PTO ON/OFF SWITCH WHEN APPLICABLE  
SYNTHETIC TRANSMISSION FLUID (TES-295 COMPLIANT)

### **Front Axle and Equipment**

MX-16-120 16,000# 1790MM KPI SINGLE FRONT DRIVE AXLE  
MERITOR 16.5X6 Q+ MX DRIVE AXLE CAST SPIDER CAM FRONT BRAKES  
FIRE AND EMERGENCY SEVERE SERVICE, NON-ASBESTOS FRONT LINING  
FRONT BRAKE DUST SHIELDS  
FRONT GREASE SEAL  
MERITOR AUTOMATIC FRONT SLACK ADJUSTERS  
TRW TAS-85 POWER STEERING  
SYNTHETIC 75W-90 FRONT AXLE LUBE

### **Front Suspension**

16,000# TAPERLEAF FRONT SUSPENSION  
MAINTENANCE FREE RUBBER BUSHINGS  
FRONT SHOCK ABSORBERS

### **Rear Axle and Equipment**

30,000 lb FIRE/EMERGENCY SERVICE SINGLE REAR AXLE  
IRON REAR AXLE CARRIER WITH STANDARD AXLE HOUSING  
DRIVER CONTROLLED TRACTION DIFFERENTIAL  
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 BRAKE DUST SHIELDS  
REAR OIL SEALS  
HALDEX AUTOMATIC REAR SLACK ADJUSTERS

SYNTHETIC 75W-90 REAR AXLE LUBE

### Rear Suspension

30,000# FLAT LEAF SPRING REAR SUSPENSION WITH HELPER  
AND RADIUS ROD FOR FIRE/EMERGENCY  
FORE/AFT CONTROL RODS

### Brake System

WABCO 4S/4M ABS WITH TRACTION CONTROL & ESC  
STANDARD AIR SYSTEM PRESSURE PROTECTION  
BW AD-9 BRAKE LINE AIR DRYER WITH HEATER  
CUSTOM STEEL AIR BRAKE RESERVOIRS  
BW DV-2 AUTO DRAIN VALVE WITH HEATER - WET TANK  
UPGRADED CHASSIS MULTIPLEXING UNIT

### Wheelbase & Frame

(197 INCH) WHEELBASE / (84 INCH) CA  
11/32X3-1/2X10-15/16 INCH STEEL FRAME 120KSI  
(75 INCH) REAR FRAME OVERHANG

### Chassis Equipment

CUSTOMER INSTALLED CUSTOM FRONT BUMPER  
24 INCH INTEGRAL FRONT FRAME EXTENSION  
FRONT TOW HOOKS - FRAME MOUNTED  
GRADE 8 THREADED HEX HEADED FRAME FASTENERS

### Fuel Tanks

50 GALLON RECTANGULAR ALUMINUM FUEL TANK - LH  
6 GALLON DIESEL EXHAUST FLUID TANK  
FUEL/WATER SEPARATOR WITH WATER IN FUEL SENSOR, HAND  
PRIMER AND 12 VOLT PREHEATER

### Tires

MICHELIN X WORKS XDY 315/80R22.5 20 PLY RADIAL FRONT TIRES  
MICHELIN X WORKS XDY 315/80R22.5 20 PLY RADIAL REAR TIRES

### Hubs

MERITOR IRON FRONT HUBS  
WEBB IRON REAR HUBS

### Wheels

22.5X9.00 10-HUB PILOT POLISHED ALUMINUM FRONT WHEELS  
22.5X9.00 10-HUB PILOT POLISHED ALUMINUM REAR WHEELS

### Cab Exterior

156 INCH BBC HIGH-ROOF ALUMINUM CONVENTIONAL AIR RIDE  
CREW CAB  
BOLT-ON MOLDED FLEXIBLE FENDER EXTENSIONS  
NFPA COMPLIANT LH AND RH EXTERIOR GRAB HANDLES  
STATIONARY BLACK GRILLE WITH BRIGHT ACCENTS  
FIBERGLASS HOOD & FIREWALL INSULATION

DUAL 25 INCH ROUND STUTTER TONE HOOD MOUNTED AIR HORNS WITH LH/RH FOOT SWITCHES  
DUAL ELECTRIC HORNS  
HALOGEN COMPOSITE HEADLAMPS WITH BRIGHT BEZELS  
LED AERODYNAMIC MARKER LIGHTS  
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  
NO REAR WINDOW  
TINTED DOOR GLASS LH AND RH WITH TINTED NON-OPERATING WING WINDOWS  
RH / LH ELECTRIC PWR WINDOWS AND DOOR LOCKS  
TINTED WINDSHIELD  
8 LITER WINDSHIELD WASHER RESERVOIR, CAB MOUNTED, WITHOUT FLUID LEVEL INDICATOR

## Cab Interior

OPAL GRAY VINYL INTERIOR  
MOLDED PLASTIC DOOR PANELS WITH ALUMINUM KICKPLATES LOWER DOORS  
BLACK MATS WITH PREMIUM INSULATION  
WOODGRAIN INSTRUMENT PANELS  
FORWARD ROOF MOUNTED CONSOLE WITH UPPER STORAGE COMPARTMENTS WITHOUT NETTING  
IN DASH STORAGE BIN  
AM/FM/WB DASH MTD RADIO WITH AUXILIARY INPUT, J1939  
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  
OVERHEAD INSTRUMENT PANELS  
DOOR ACTIVATED DOME/RED MAP LIGHTS, FORWARD LH AND RH AND REAR LH, RH AND CENTER  
(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  
SEATS INC 911 HIGH BACK SCBA NON SUSPENSION LH AND RH REAR PASSENGER SEATS WITH UNDER SEAT 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

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  
CUSTOM 97 DB BACKUP ALARM  
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

TWO COLOR CUSTOM BASE/CLEAR COAT CAB PAINT  
BLACK, HIGH SOLIDS POLYURETHANE CHASSIS PAINT

## CAB TO AXLE DIMENSION

Cab to axle will be 84".

## **CHASSIS MODIFICATIONS**

### **LUBRICATION AND TIRE DATA PLATE**

A permanent label in the driving compartment shall specify the quantity and type of the following fluids used in the vehicle and tire information:

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

### **VEHICLE DATA PLATE**

A permanent label in the driving compartment which indicates the following:

- Filter part numbers for the;
  - Engine
  - Transmission
  - Air
  - Fuel
- Serial numbers for the;
  - Engine
  - Transmission
- Delivered Weights of the Front and Rear Axles
- Paint Brand and Code(s)
- Sales Order Number

## **OVERALL HEIGHT, LENGTH DATA PLATE (US)**

The fire apparatus manufacturer shall permanently affix a high-visibility label in a location visible to the driver while seated.

The label shall show the height of the completed unequipped vehicle in feet and inches (meters), the length of the completed vehicle in feet and inches (meters to nearest 1/10th), and the GVWR in tons (metric tons).

Wording on the label shall indicate that; "The information shown was current when the apparatus was manufactured. If the overall height changes while the vehicle is in service, the fire department must revise that dimension on the plate".

## **PERSONNEL CAPACITY**

A label that states the number of personnel the vehicle is designed to carry shall be located in an area visible to the driver.

## **SEAT BELT WARNING - FAMA06/07**

A safety sign FAMA06 shall be visible from each seat that is not equipped with occupant restraint and therefore not intended to be occupied while the vehicle is in motion.

A safety sign FAMA07, which warns of the importance of seat belt use, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

## **EQUIPMENT MOUNTING FAMA10**

A safety sign FAMA10, which warns of the need to secure items in the cab, shall be visible inside the cab.

## **FIRE SERVICE TIRES - FAMA12**

A safety sign FAMA12, which warns of the special requirements for fire service-rated tires, shall be visible to the driver entering the cab of any apparatus so equipped.

## **HELMET WARNING - FAMA15**

A safety sign FAMA15, which warns not to wear helmets while the vehicle is in motion, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

## **CLIMBING METHOD - FAMA23**

A safety sign FAMA23, which warns of the proper climbing method, shall be visible to personnel entering the cab and at each designated climbing location on the body.

## **REAR STEP CROSSWALK WARNING - FAMA24**

A safety sign FAMA24, which warns personnel not to ride on the vehicle, shall be located at the rear step areas and at any cross walkways.

## **FINAL STAGE MANUFACTURER VEHICLE CERTIFICATION**

A final stage manufacturer vehicle certification label shall be provided and installed in the driver cab door jamb area.

## **FRONT BUMPER**

The cab/chassis supplied bumper shall be removed and replaced with a 12" high formed 10 gauge stainless steel swept-back style bumper. The bumper shall come with openings for front bumper discharge(s), if specified and painted lower cab color choice.

## **FRONT BUMPER EXTENSION**

The front bumper of the chassis shall be extended approximately 20" ahead of the cab using structural steel channel.

The bumper mounting plate shall be welded to the structural steel channel for mounting of the chassis bumper. After fabrication of the bumper extension, the panels shall be removed and the unit shall be primed and painted black.

## **BUMPER GRAVEL SHIELD**

The front bumper extension shall have a 3/16" NFPA compliant aluminum tread plate gravel shield. The gravel shield shall cover the full width of the front bumper to the front of the cab and the full height of the bumper on each end.

## **BUMPER HOSEWELL**

There shall be a full width hosewell storage in the front extended bumper with open sides. Hosewell shall be constructed of .125" smooth aluminum and contain drain holes approximately 92.00" long x 6.75" deep x 10" wide, depending on recessed bumper components. This hosewell shall be equipped with vinyl cover with positive latching side flaps.

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at each hose storage area.

AIR HORNS - BUMPER MOUNTED

## **AIR HORN(S)**

The air horn(s) shall be supplied and installed by the cab/chassis manufacturer.

## **SIREN SPEAKER**

One (1) Whelen model SA314A 100 watt aluminum, 6.4" x 6.1" x 3.1" deep siren speaker shall be provided and located behind grill or front bumper with natural aluminum finish.

The solid state siren speaker shall be vibration resistant. The SA314A shall comply with California Title XIII, Class A, and SAE J1849 requirements and with OSHA 1910.95 Guidelines regarding "Permissible Noise Exposure". All mounting hardware shall be stainless steel and covered by a two year factory warranty.

The siren speaker shall be located on the streetside of front bumper.

## **FRONT TOW PROVISIONS**

The front tow provisions shall be supplied and installed by the cab/chassis manufacturer.

## **AIR INTAKE SYSTEM**

An air filter shall be provided in the engine's air intake system by the commercial cab/chassis manufacturer. Air inlet restrictions shall not exceed the engine manufacturer's recommendations. The air inlet shall be equipped with a means of separating water and burning embers from the air intake system.

In addition to the engine's air intake, the cab fresh air intake and/or outside cab vent shall be equipped with a means of separating water and burning embers from the air intake system

This requirement shall be permitted to be achieved by either of the following methods:

1. Provision of a device such that burning particulate matter larger than 0.039 in. (1.0 mm) in diameter cannot reach the air filter element.
2. Provision of a multi screen ember separator capable of meeting the test requirements defined in the Parker Hannafin, Racor Division, publication LF 1093-90, *Ember Separation Test Procedure*, or an equivalent test.

## **AIR RESTRICTION INDICATOR**

An air restriction indicator shall be re-mounted or provided in the driving compartment and visible to the driver.

## **EXHAUST**

The existing exhaust tailpipe shall be extended to ahead of the rear axle on the curbside.

The exhaust piping and discharge outlet shall be located or shielded so as not to expose any portion of the apparatus or equipment to excessive heating.

Exhaust pipe discharge shall be directed away from any operator's position.

Where parts of the exhaust system are exposed so that they are likely to cause injury to operating personnel, protective guards shall be provided.

- The tail pipe(s) shall terminate in a standard straight cut pipe.
- The tail pipe(s) shall terminate parallel to rear axle and flush with body.

## **CELL PHONE BOOSTER**

There shall be one (1) Willson Electronics model 470154 cell phone booster supplied and installed on completed unit.

## **COMMUNICATION RADIO/ANTENNA INSTALLATION**

There shall be one (1) mobile communication radio(s) with antenna installed in the cab. The location of radio shall be determined by the Galeton Fire Protection District at the pre-construction meeting. All required radio programming shall be responsibility of Galeton Fire Protection District. Radio(s) may not be fully tested if no radio program is provided with radio and will be responsibility of Galeton Fire Protection District after delivery.

Radio shall be installed per Manufacturer's requirements and wired for proper 12 volt power and ground.



## **SEAT SCBA BRACKETS**

There shall be three (3) Zico ULLH Load & Lock walkaway type SCBA bracket(s) with ejector spring that meets NFPA 1901 standards mounted in specified SCBA seats. The standard Load & Lock can handle 30 and 45-minute cylinders. To load simply place the SCBA against the seat with the valve resting on the footplate, then wrap the strap around the SCBA and lock it tightly into place. Releasing the SCBA is done by pulling the lanyard straight out, then leaning forward and standing up.

## **SEAT BELT COLOR**

Section 14.1.3.4 of the NFPA 1901 Standards, requires all seat belt webbing in cab to be bright red or bright orange in color, and the buckle portion of the seat belt shall be mounted on a rigid or semi rigid stalk such that the buckle remains positioned in an accessible location.

## **SEAT BELT WEB LENGTH - COMMERCIAL CAB**

Sections 14.1.3.2 and 14.1.3.3 of the NFPA 1901 standards, require the effective seat belt web length for a Type 1 lap belt for pelvic restraint to be a minimum of 60", and a Type 2 pelvic and upper torso restraint-style seat belt assembly to be a minimum of 110".

The chassis seat belt web length as supplied by the commercial chassis manufacturer shall be compliant to NFPA Standards 14.1.3.2 and 14.1.3.3.

## **SEAT BELT MONITORING AND VEHICLE DATA RECORDER (VDR) SYSTEMS**

### **SEAT BELT MONITORING**

A Weldon 6204 series Occupant Restraint Indicator (ORI) display shall be provided and installed to allow the driver to know if all persons seated in the vehicle are secured with seat belts before moving the vehicle. Built-in smart seating logic shall detect if the correct sit and buckle sequence is not followed for all seats. System shall also provide an output for an external alarm. Weldon diagnostic port will be located under dash on driver side. System shall include the following features;

### **VEHICLE DATA RECORDER (VDR)**

The vehicle data recorder shall have the following features;

- Recorded Data Includes: Vehicle Speed, Acceleration, Deceleration, Engine Speed, Engine Throttle Position, ABS Event, Seat Occupied Status, Seat Belt Status, Master Optical Warning Switch, Park Brake, Service Brake, Time, Date and Engine Hours.
- Password Protected by the customer
- Six (6) seat position inputs for occupied and belts buckled. Additional six (6) seat expansion module available.
- Easily interfaces with traditional wiring, or optional V-MUX™ or other multiplexing systems
- Data is extracted by a standard, mini USB cable
- Use in conjunction with the Occupant Restraint Indicator or optional V-MUX™ multiplex system

## **OCCUPANT RESTRAINT INDICATOR**

The occupant restraint indicator shall have the following features;

- Supports commercial and custom cab seating layouts; up to 12 seats
- Built-in audible alarm
- Use in conjunction with Vehicle Data Recorder (VDR)

## **SIX (6) – LED TIRE PRESSURE VISUAL INDICATORS**

Each tire valve stem shall be equipped with an LED Tire Alert (or equal), heavy duty valve cap LED indicator that indicates proper tire pressure. The LED Tire Alert valve cap is self-calibrating. When the cap is mounted on the valve stem the first time, it will memorize that tire pressure, and can be set to recognize a drop in pressure as little as 6 psi. It can be checked for functionality and battery condition by simply unscrewing the cap. If it is in working condition, it will immediately start blinking.

## **HELMET STORAGE, DRIVING AREA**

One (1) OnScene Solutions Talon model helmet storage bracket(s) shall be provided and installed in the cab driving area. The helmet mounting will comply with the 9G NFPA requirements. If cab is specified with air bags, the helmet bracket(s) will be mounted clear of the deployment area.

- One (1) helmet bracket(s) shall be mounted overhead on the driver and officer sides of the raised roof slope of the cab.

## **HELMET STORAGE, CREW AREA**

Two (2) OnScene Solutions Talon model helmet storage bracket(s) shall be provided and installed in the rear crew area. The helmet mounting will comply with the 9G NFPA requirements. If cab is specified with air bags, the helmet bracket(s) will be mounted clear of the deployment area.

- Two (2) helmet bracket(s) shall be mounted on the side wall areas adjacent to seating. Mounting shall not interfere with air bag systems, if specified.

## **CAB CRASH TEST CERTIFICATION**

A cab crash test certification from the fire apparatus manufacturer shall be provided with the equipment. A copy of this certification shall be included with the bid.

NOTE: There shall be no exception to any portion of the cab integrity certification requirements. Nonconformance shall lead to immediate rejection of bid.

The certification shall state that the cab does meet or exceed the requirements below:

- 1) European Occupant Protection Standard ECE Regulation No. 29.
- 2) SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.

## **CAB MIRRORS, DRIVER ADJUSTABLE**

Section 14.3.5 of the NFPA 1901 Standards, 2009 edition, requires all primary rear view mirrors used by the driver to be adjustable from the driver's position.

### **ADD UPPER SECOND COLOR**

The cab exterior (door jambs not painted unless specified otherwise) shall be re-painted with a second color over the main cab color from the bottom of the glass up over cab roof with PPG Delfleet Evolution paint.

Color: **Flat Black**

Paint Number:

### **PAINT DOOR JAMBS JOB COLOR**

One (1) chassis door jambs will be painted to match the exterior color of the chassis.

### **CHASSIS PAINT WARRANTY**

The portion of the cab re-painted shall be provided with a ten (10) year, non-prorated paint warranty to the original owner. The warranty shall be provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle.

### **CAB INTERIOR COMPONENT PAINT COLOR**

Powder coat shall be hammertone silver/grey. Cardinal T064-GR05

### **CAB STEP COVERS AND HOSE REEL COMPARTMENT**

The stock cab upper and lower entry steps shall be overlaid with 1/8" NFPA compliant aluminum treadplate.

The maximum stepping height shall not exceed 18", with the exception of the ground to first step, which shall not exceed 24" when the vehicle is loaded to its estimated in-service weight. All steps shall have a minimum area of 35 sq in and shall be of such a shape that a 5" diameter disk does not overlap any side when placed on the step, and shall be arranged to provide a t least 8" of clearance between the leading edge of the step and any obstruction. All platforms shall have a minimum depth of 8" from the leading edge of the platform to any obstruction.

There shall be aluminum compartment mounted beneath the crew doors on curbside of cab. The compartment shall be large enough to hold specified booster hose reel.

No door is provided over booster hose reel location. 4-way hose rollers are provided to prevent damage to booster hose. Booster hose valve control will be located on front vertical surface step cover.

The following options will be cut into the step cover:

### **BATTERY CHARGING RECEPTACLE LOCATION**

The specified battery charging receptacle and/or display panel shall be located on front face of specified cab step cover.

### **WHEEL HUB AND NUT COVERS**

Wheel hub and nut covers shall not be provided on completed unit.

## **MUDFLAPS**

There shall be 1/4" rubber mudflaps with logo provided and installed behind each set of tires to prevent throwing road debris and lower road spray.

## **AIR BRAKE SYSTEM QUICK BUILD-UP - STYLE 'M' / INDUSTRIAL INLET CONNECTION**

There shall be one (1) male, quick connect type inlet to provide air to the chassis air tanks from a station/external compressed air shoreline in order to maintain full operating air pressure while the vehicle is not running. The system shall include a one-way check valve to prevent accidental release of chassis air pressure and be labeled "AIR INLET".

- Air inlet shall be located near driver's door.
- The fitting will be of style 'M' / Industrial design.

The inlet shall eliminate the need for a quick build up system and the 60 second buildup time.

The female end of the connector shall be supplied by the Galeton Fire Protection District.

## **CHASSIS AIR TANK DRAINS**

The cab/chassis air brake system tank drains shall remain as provided by cab/ chassis manufacturer.

## **CHASSIS ENGINE COOLING SYSTEM DRAIN VALVES**

Readily accessible drain valves shall be installed at the lowest point of the cooling system and at such other points as are necessary to permit complete removal of the coolant from the system.

Drain valves shall be designed or positioned such that they will not open accidentally.

## **ROAD EMERGENCY SAFETY KIT**

The completed unit shall be supplied with one (1) set of three (3) dual faced reflective triangles, and three (3) warning flares complete with storage case per DOT requirements.

One (1) 2.5 lb. ABC type vehicle fire extinguisher with bracket per DOT requirements shall be provided and mounted inside cab area.

### **CAB INTERIOR CABINET - CENTER REAR WALL**

There shall be one (1) storage cabinet provided in rear cab area. The cabinet shall be fabricated from 1/8" smooth aluminum and will extend from the back of the center console to the back wall of the chassis. ~~The cabinet will be open on both sides.~~ **Cabinet will be on the top of the console (see Aspen 1080). Cabinet will be 16" Deep.**

Final layout will be determined at the pre-construction meeting.

- There shall be one (1) 120 VAC outlet(s) located inside cabinet against the back wall.
- There shall be one (1) approximate 2' long 120 VAC outlet strip(s) with straight blade household type outlets provided.
  - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).
  - Outlet(s) shall be powered through the on-board shore power system.

### **CAB, CAB DESK, CABINET - VDC COMPONENTS**

- Two (2) 12 VDC USB dual charger port(s) shall be provided in cabinet with dust cover.
- Power port shall be wired battery direct.
- Power port shall be located in the top left interior corner.
- Cabinet(s) shall be provided with vertically mounted shallow aluminum Shelf-Trac for specified component installation.
- There shall be one (1) adjustable shelf/shelves in the above cabinet(s). Each shelf shall have a 1.25" vertical lip at front to contain items while vehicle is in motion.
- Two (2) OnScene Access white LED, full height compartment lights, vertically mounted.
- Cargo netting of 1" - 2" nylon webbing shall be provided over cabinet opening with automotive seatbelt style latches.
- The compartment light(s) shall be controlled by a latching, black rocker switch with amber indicator light. The switch shall be labeled as "COMPARTMENT LIGHTS" with a black and chrome label bezel.

### **DEF FLUID FILL**

The DEF fluid fill shall be as supplied by commercial cab/chassis manufacturer.

## **BODY DESIGN**

The importance of public safety associated with emergency vehicles requires that the construction of this vehicle meet the following specifications. These specifications are written to establish the minimum level of quality and design. All Bidders shall be required to meet these minimum requirements.

It is the intent of these specifications to fully describe the requirements for a custom built emergency type vehicle. In order to extend the expected service life of this vehicle, the body module shall be removable from the chassis frame and be capable of being installed on a new chassis.

The sheet metal material requirements, including alloy and material thickness, throughout the specifications are considered to be a minimum. Since such materials are available to all Manufacturers, the material specifications shall be strictly adhered to.

The fabrication of the body shall be formed sheet metal. Formed components shall allow the Galeton Fire Protection District to have the body repaired locally in the case where any object has struck the body and caused damage. The use of proprietary extrusions will prevent the Galeton Fire Protection District from such repair and shall NOT be used. All fabricated body components to be cut by a laser or water-jet for superior cut edge quality.

Following construction of the subframe, which supports the apparatus body, the sheet metal portion of the body shall be built directly on the subframe. The joining of the subframe and body shall be of a welded integral construction.

The sheet metal fabrication of the body shall be performed using inert gas continuous feed welders only. The entire body shall be welded construction. The use of pop rivets in any portion of structural construction may allow premature failure of the body structure. Therefore, pop rivets shall NOT be used in the construction of the structural portions of the body. This includes side body sheets, inner panels of compartment doors, and any other structural portions of the body.

## **EXTERIOR ALUMINUM BODY**

The fabrication of the body shall be constructed from aluminum 3003H-14 alloy smooth plate. This shall include compartment front panel, vertical side sheets, side upper rollover panels, rear panels and compartment door frames.

The body compartment floors and exterior panels shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Interior compartment dividing walls shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Lighter gauge sheet metal will not be acceptable in these areas, No Exceptions.

The front and rear corners of body shall be formed as part of the front or rear body panels. This provides a stronger body corner and finished appearance. The use of extruded corners, or caps will not be acceptable, No Exceptions.

The door side frame openings shall be formed "C" channel design. An electrical wiring conduit raceway running the full length of exterior compartments shall be provided. This raceway shall contain all 12 volt wiring running to the rear of the apparatus, permitting easy accessibility to wiring.

Individual compartment modules, with dead air space voids between compartments, will not be an acceptable method of compartment construction.

The compartments shall be an integral part of the body construction. Compartment floors from front of body to ahead of rear axle, also from rear axle to rear of body shall be single one-piece sections. Compartment floors shall be preformed, then positioned in body and welded into final position.

Compartment floors shall have a "sweep-out" design with door opening threshold positioned lower than compartment floor, permitting easy cleaning of compartments. Angles, lips, or door moldings are not acceptable in the base of compartment door opening. One-way rubber drain valves shall be provided in compartment floors so that a water hose may be used to flush-out compartment area.

All exterior seams in sheet metal below frame, and around the rear wheel well area shall be welded and caulked to prevent moisture from entering the compartments. All other interior seams and corners shall be sealed with silicone based caulk prior to painting.

Only stainless steel bolts, nuts, and sheet metal screws shall be used in mounting exterior trim, hardware and equipment.

### **DRIP RAILS**

The body shall have drip rails over the side full height compartments. The drip rails shall be formed into the upper body panels providing a ridged lower panel and a flat upper body panel surface. The use of mechanically fastened, taped or glued on drip rails will not be acceptable, No Exceptions.

### **ROOF CONSTRUCTION**

The roof shall be integral with the body and shall be all welded construction. The roof of the body shall be not less than 1/8" aluminum 3003H-14 alloy smooth plate.

All seams in the roof area shall be welded prior to paint to prevent entry of moisture.

A square edge shall be provided along the body sides to allow for bolt-on compartments, if specified.

### **BODY SUBFRAME**

The chassis frame rails shall be fitted with 1/4" custom extruded UHMW polyethylene rail cap to isolate the body frame members from direct contact with chassis frame rails.

The body subframe shall be constructed from 6061T6 aluminum alloy tubing. Subframe shall consist of two (2) 2" x 4" x 1/4" aluminum tubes minimum, the same width as the chassis frame rails. Welded to this tubing shall be cross members of 2" x 4" x 1/4" aluminum. Smaller dimension, lighter gauge tubing or angle material subframe shall not be accepted.

These cross members shall extend the full width of the body to support the compartments. Cross members shall be located at front and rear of the body, below compartment divider walls, and in front and rear of wheel well opening. Additional aluminum cross members shall be located on 16" centers, or as necessary to support walkway or heavy equipment.

To form the frame, the tubing shall be beveled and welded at each joint using 5356 aluminum alloy welding wire.

## **BODY MOUNTING**

The body subframe shall be fastened to the chassis frame with four (4) spring loaded body mounts. Each mount shall be configured using a two-piece encapsulated slide bracket. The two (2) brackets shall be fabricated of heavy duty 1/4" thick steel and shall have a powder coat finish to prevent any corrosion. Each mounting assembly shall utilize two (2) 3/4" diameter x 6" long grade 8 bolts and two (2) heavy duty springs. The assembly design shall allow the body and subframe to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall eliminate any stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strains due to load and chassis movement.

Body mountings that do not allow relief from chassis movement will not be acceptable.

## **12" REAR STEP BUMPER**

The full width rear bumper shall be constructed from 2" x 2" x 1/4" **Steel** tubing frame and covered with 3/16" NFPA compliant aluminum tread plate. The bumper shall extend from the rear vertical body panel 12" and provide a rear step with a minimum of 1/2" space at body for water drainage.

## **REAR TOW EYES**

There shall be two (2) heavy duty rear mounted tow eyes securely attached to the body subframe, below body. The tow eyes shall be fabricated from 3/4" thick steel plate with a 3" diameter opening. Tow eyes shall have a black powder coat finish.

## **GROUND LIGHTS**

There shall be two (2) OnScene 8" Access white LED lights installed below bumper capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting shall be switchable but activated automatically when the vehicle park brake is set.

## **WHEEL WELL EXTERIOR PANEL**

The exterior panel of the body wheel well enclosure shall be constructed from 1/8" smooth aluminum panels.

## **RUBBER BODY FENDERETTES**

The body wheel well openings shall be provided with round radius, rubber fenderettes. The fenderettes shall be bolted and easily replaceable if damaged. The fenderettes shall be installed using stainless steel fasteners with plastic isolators to help prevent corrosion.

## **WHEEL WELL LINERS**

The wheel wells shall be provided with an easily removable polymer, circular inner fender liner. The inner liner shall be bolted to the wheel well with stainless steel bolts and spaced away from the wheel well so the liner will not accumulate dirt or water.



## **ANGLED BODY PANEL BELOW SIDE REAR COMPARTMENTS**

The area below the rear side compartments shall be angled upward from rear wheel well panel to rear of body.

## **SCBA CYLINDER COMPARTMENTS**

There shall be four (4) SCBA cylinder storage compartments located, two (2) on each side of body in the rear wheel well area. Each compartment shall be capable of storing two (2) SCBA (60 min.) cylinders. Each compartment shall have a vertically hinged aluminum door with 14ga stainless steel hinge, a positive catch latch and painted primary lower body color. Each compartment shall allow the storage of an SCBA cylinder or a fire extinguisher up to 7-3/4" in diameter x 24" deep. The door shall activate the "Hazard Warning Light" in the cab when not in the closed position.

## **BODY PAINT SPECIFICATIONS**

### **BODY PAINT PREPARATION**

After the body and components have been fabricated they shall be disassembled so when vehicle is complete there shall be finish paint beneath the removable components. The body shall be removed from chassis during the paint process to insure proper paint coverage. The body and components shall be metal finished as follows to provide a superior substrate for painting.

The exterior (and interior, if painted) body shall undergo a thorough cleaning process starting with a biodegradable phosphoric acid solution to begin the etching process followed by a complete clear water rinse. The next step shall consist of a chemical conversion coating applied to seal the metal substrate and become part of the metal surface for greater film adhesion.

All bright metal fittings, if unavailable in stainless steel or polished aluminum, shall be chrome plated. Iron fittings shall be copper under plated prior to chrome plating.

### **PAINT PROCESS**

The paint process shall follow the strict standards set forth by PPG Industries guidelines. Painters applying PPG products will be PPG Certified Commercial Technicians, and re-certified every two (2) years. The body shall go through the following paint process;

- 1) Clean bare metal with a wax and grease remover using low lint rags.
- 2) Inspect, straighten, and hammer high points, grind all seams, sharp edges, and welds. DA sand entire paintable surfaces using 24-180 grit dry paper. Plastic fill all low spots and DA sand fill areas using 36-180 grit dry paper. Apply pinhole filler and DA sand areas using 80-180 grit dry paper.
- 3) Re-clean bare metal using a wax and grease remover and low lint rags.
- 4) Within 24 hours, a PPG Delfleet® epoxy color primer with proper hardener for corrosion resistance using a pressure pot spray gun and applying 2-5 full wet coats or 1.5-8.0 dry mils max. achieving full hiding and allow to air dry 60 minutes @ 70°F or bake for 45 minutes @ 140°F degree.
- 5) Inspect, putty fill, and dry guild coat entire body surface and DA sand using 180-400 grit dry paper.
- 6) Re-clean bare metal using a wax and grease remover using low lint rags.
- 7) A PPG Delfleet® primer sealer with proper hardener and thinner shall be sprayed using a pressure pot spray gun and applying 1 full wet coat or 1.0-2.0 dry mils achieving full hiding and allow to flash off in spray booth for minimum of 60 minutes @ 70°F.
- 8) A PPG Delfleet® FBCH basecoat (color) with proper hardener and dry additive shall then be sprayed using a pressure pot set @ 45-60 PSI and achieving full hiding or 1.5-2.0 wet mils and allow to flash off in spray booth 45-60 minutes before applying clearcoat.

- 9) A PPG Delfleet® clearcoat with proper hardener and thinner shall be sprayed using a pressure pot spray gun and applying 2-3 full wet coats or 5.0 wet mils for a uniform gloss and allow to flash off in spray booth 10 minutes and bake for 120-140 minutes @ 125°F (surface temp.).
- 10) After cooling, DA sand heavy orange peel or runs using 1000 grit dry sand paper and final DA sand using 1500-2000 grit dry sand paper. Wipe off all surfaces to remove dust and debris. Buff unit as needed using 3M rubbing compound and a white wool pad and inspect until all sand scratches are removed.
- 11) Polish as needed using 3M Perfect-It-Polish and a black foam pad, repeat as necessary and inspect until all sand scratches are removed.

### **PAINT - ENVIRONMENTAL IMPACT**

The contractor shall meet or exceed their current State regulations concerning paint operations pollution control and shall include measures to protect the atmosphere, water and soil. PPG Delfleet® Evolution paint shall be free of all heavy metal (lead & chromate) components. Paint emissions from sanding and painting shall be filtered and collected. All paint wastes shall be disposed of in an environmentally safe manner. Solvents used in cleanup operations shall be collected, sent off-site for distillation and returned for reuse.

### **FASTENERS**

Prior to the assembly and reinstallation of exterior components; i.e. warning and DOT lights, handrails, steps, door hardware, and miscellaneous items, a Mylar isolation tape, or gasket shall be used to prevent damage to the finish painted surface. These components shall be fastened to body using either a plastic insert into body metal with stainless steel screws or zinc coated nut-surts into body surface using stainless steel bolts to prevent corrosion from dissimilar metals.

### **ELECTROLYSIS CORROSION CONTROL**

The vehicle shall be assembled using ECK brand or similar corrosion control compound on all high corrosion potential areas.

ECK protects aluminum and stainless steel against electrolytic reaction, isolates dissimilar metals and gives bedding protection for hardware and fasteners. ECK contains anti-seizing lubricant for threads. ECK is dielectric and perfect for use with electrical connectors.

### **PAINT FINISH - SINGLE COLOR**

The body shall be painted with a single color of PPG Delfleet® Evolution per Galetton Fire Protection District approved paint spray out provided.

- Paint Color: Match cab/chassis supplied paint color.  
**Pierce #90 Red**

### **BODY UNDERCOATING**

The entire underside of body shall be sprayed with black automotive undercoating. Undercoating shall cover all areas underside of body and wheel well area to help prevent corrosion under the vehicle.

## **UNDERCOAT WARRANTY**

The body undercoating shall have a warranty provided by the manufacturer for the lifetime of the vehicle or twenty (20) years, whichever occurs first. The warranty shall be transferable between vehicle owners. Should the undercoating material applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

## **PAINT WARRANTY**

The vehicle shall be provided with a ten (10) year non-prorated warranty to the original owner. Warranty is provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle. **Pro-rated warranties will not be acceptable.**

## **COMPARTMENT INTERIOR FINISH**

The interior of all exterior body compartments shall be a "Maintenance Free" smooth unpainted finish. All body seams shall be finished with a caulk sealant for both appearance and moisture protection.

## **REFLECTIVE STRIPE REQUIREMENTS**

### Material

All retroreflective materials shall conform to the requirements of ASTM D4956, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

All retroreflective materials used that are colors not listed in ASTM D4956, Section 6.1.1, shall have a minimum coefficient of retro-reflection of 10 with observation angle of 0.2 degrees and entrance angle of -4 degrees.

Any printed or processed retroreflective film construction used shall conform to the standards required of an integral colored film as specified in ASTM D4956, Section 6.1.1.

### Minimum Requirements

A retroreflective stripe(s) shall be affixed to at least 50 percent of the cab and body length on each side, excluding the pump panel areas, and at least 25 percent of the width of the front of the vehicle, not including mirrors or other protrusions.

The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width.

The 4 in. (100 mm) wide stripe or combination of stripes shall be permitted to be interrupted by objects (i.e., receptacles, cracks between slats in roll up doors) provided the full stripe is seen as conspicuous when approaching the apparatus.

A graphic design shall be permitted to replace all or part of the required striping material if the design or combination thereof covers at least the same perimeter length(s).

## **GRAPHICS PROOF (Reference Signed Approval)**

A color graphics proof of the reflective striping layout shall be provided for approval by Galeton Fire Protection District prior to installation. The graphics proof shall be submitted to Galeton Fire Protection District on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet shall be provided showing all details. **Note:** The graphics color proof may not reflect the correct paint break lines on the chassis and body please refer to the paint section of your specifications for correct paint break lines.

## **REFLECTIVE STRIPE - CAB SIDE**

The reflective stripe material shall be 4" wide, 3M Scotchlite 680 series graphic film.

- This reflective stripe shall be black in color.

There shall be a 1" Scotchlite reflective stripe located approx. 1" below the main stripe.

- This reflective stripe shall be gold in color.

## **CHEVRON STRIPE - CAB BUMPER**

A reflective stripe shall be affixed to the front of cab. The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width.

The approximate 10" wide Chevron retroreflective stripe shall be affixed to at least 25 percent of the width of the front of the apparatus with retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees. Each stripe shall be 6" width. Chevron panels shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panels shall have a minimum 10 year warranty for material failure, and colorfastness.

- The stripe material shall be 3M Scotchlite Diamond Grade.

All retroreflective materials required shall conform to the requirements of ASTM D 4956, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

This reflective chevron stripe shall alternate red and fluorescent yellow-green in color.

## **REFLECTIVE STRIPE - CAB DOOR INTERIOR**

Any door of the apparatus designed to allow persons to enter or exit the apparatus shall have at least 96 in.2 (62,000 mm2) of retroreflective material affixed to the inside of the door.

The stripe material shall be 3M Scotchlite 680 series graphic film.

- This reflective stripe shall be white in color.

### **REFLECTIVE STRIPE - BODY SIDES**

The reflective stripe material shall be 4" wide, 3M Scotchlite 680 series graphic film.

- This reflective stripe shall be black in color.

There shall be a 1" Scotchlite reflective stripe located approx. 1" below the main stripe.

- This reflective stripe shall be gold in color.

The stripe shall remain in a straight line from the front of the front of cab to the rear body.

### **CHEVRON REFLECTIVE STRIPE - REAR SIDES PANELS**

At least 50 percent of the rear-facing vertical surfaces, visible from the rear of the apparatus, excluding any pump panel areas not covered by a door, shall be equipped with retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees. Each stripe shall be 6" width.

The rear side panels of the body on each side of a rear stairway or compartment shall have a chevron style reflective stripe, extending from bumper height up to side compartment drip rail height. Each chevron panel shall be a full sheet and shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panel shall have a minimum 10 year warranty for material failure, and colorfastness.

The stripe material shall be 3M Diamond Grade.

This reflective chevron stripe shall alternate red and fluorescent yellow-green in color.

## **LETTERING**

### **GRAPHICS PROOF**

A color graphics proof of the lettering layout shall be provided for approval by Galeton Fire Protection District prior to installation. The graphics proof shall be submitted to Galeton Fire Protection District on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet shall be provided showing all details.

The following lettering shall be provided and installed on the completed unit as follows;

### **SIDE CAB DOOR LETTERING**

There shall be fourteen (14) 4" high reflective letters furnished and installed on the vehicle.

"GALETON" shall be located on the front cab doors.

- This reflective lettering shall be gold in color.

There shall be forty four (44) 3" high reflective letters furnished and installed on the vehicle.

"FIRE PROTECTION DISTRICT" shall be located on the cab front doors.

- This reflective lettering shall be gold in color.

There shall be eight (8) 6" high reflective letters furnished and installed on the vehicle.

Truck Number on cab rear doors.

- This reflective lettering shall be gold in color.

### **UPPER BODY SIDE LETTERING**

### **REAR BODY LETTERING**

There shall be eleven (11) 6" high reflective letters furnished and installed on the vehicle.

"GALETON 2703" on RC1 rollup door.

- This reflective lettering shall be gold in color.

### **FRONT OF BUMPER LETTERING**

"FIRE 2703"

There shall be one (1) 6" high reflective letters furnished and installed on the vehicle.

- This reflective lettering shall be gold in color.

## **EXTERIOR COMPARTMENT DOORS**

### **ROLL-UP DOOR CONSTRUCTION - ROBINSON (ROM)**

The vehicle shall be equipped with R•O•M Series IV roll-up exterior compartment doors. The R•O•M roll-up doors shall be complete with the following features;

Each shutter slat, track, bottom rail, and drip rail shall be constructed from anodized 6063 T6 aluminum. Shutter slats shall feature a double wall extrusion 0.315" thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats shall feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slat must have interlocking joints with an inverted locking flange. Slat inner seal shall be a one piece PVC extrusion; seal design will be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.

Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double "V" seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece "D" shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125". Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.

Shutter door shall have an enclosed counter balance system. Counter balance system shall be 4" in diameter and held in place by two (2) heavy duty 18 gauge zinc plated plates. Counter balance system shall have two (2) over-molded rubber guide wheels to provide a smooth transition from vertical track to counter balance system; no foam material of any kind shall be permitted or used in this area.

The R•O•M Series IV roll-up compartment doors shall be free of manufacturing defects for a period of up to 7 years from date of purchase provided doors are used under conditions of normal use, regular periodic maintenance and service is performed, and doors were installed in accordance with R•O•M's instructions.

### **ROM DOOR BOTTOM RAIL**

All exterior compartment doors shall have the standard 3.0" tall bottom rail extrusion for easy one (1) hand opening and closing.

The specified retroreflective stripe material shall be applied on the roll-up compartment doors. The stripe shall be precision machine cut for each door slat of the roll-up doors. Under no circumstance will the stripe material be cut on roll-up door surface.

**FLUSH FITTING HINGED DOOR CONSTRUCTION**

The exterior compartment doors shall be a flush style, custom manufactured and built for each compartment. The compartment doors must be able to withstand years of rugged service and wear. For this reason, the compartment door design, metal thickness, and attachments must be strictly adhered to.

The compartment doors shall be all aluminum 3003H-14 alloy construction. The exterior panel shall be of 1/8" thickness smooth plate aluminum and the interior panel shall be of 1/8" thickness smooth plate aluminum. Lighter gauge material will NOT BE ACCEPTABLE in these areas. The double panel doors shall be 1-3/4" thick to completely enclose the door latching assembly. Doors shall have drain hole openings for drainage and ventilation.

The doors shall be flush mounted so that the outer surface is in line with the side body surface. Lap or bevel type constructed doors, doors framed with extrusions, or doors requiring rubber bumpers to prevent unnecessary contact are NOT ACCEPTABLE.

Compartment door openings shall be sealed with closed cell automotive type rubber molding to provide a weather resistant seal around door. In addition, rubber molding shall be provided along hinge to prevent moisture entry. Open cell foam type rubber moldings are NOT ACCEPTABLE.

Hinged compartment doors shall have 14 gauge stainless steel hinge, with 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary.

Drip rails shall be installed above all compartment door openings. Drip rails shall be completely removable for easy replacement if necessary.

Each door shall be capable of being opened or closed without unlatching. Door checks shall be bolted to the upper compartment door header and the box pan of the door. Door checks that require unlatching by hand will NOT BE ACCEPTABLE.

Vertically hinged door openings up to 32" wide shall be single door construction. Door openings over 32" shall be double door construction with the forward first opening door overlapping the second opening door.

**BODY HEIGHT MEASUREMENTS**

Hose bed shall be 66" wide x 16" high located center of body.

The vertical body dimensions shall be as follows:

**AHEAD OF REAR AXLE**

	<u>Description</u>	<u>Dimension</u>
A	Bottom of Subframe to Top of Body	62.0"
B	Bottom of Subframe to Bottom of Body	24.0"
C	Vertical Door Opening -with hinged door	66.0"

**ABOVE REAR AXLE**

	<u>Description</u>	<u>Dimension</u>
D	Vertical Door Opening -with roll-up door -with hinged door	31.5" 34.5"



**BEHIND REAR AXLE**

	<u>Description</u>	<u>Dimension</u>
D	Bottom of Subframe to Bottom of Body	16.0"
E	Vertical Door Opening	
	-with roll-up door	55.5"
	-with hinged door	58.5"

**GENERAL**

	<u>Description</u>	<u>Dimension</u>
F	Bottom of Drip Rail to Top of Body	13.0"
G	Hose Bed Height	16.0"

(Dimensions are approximate and subject to change during construction or design process.)

**BODY WIDTH DIMENSIONS**

The wildland body shall be 98.0" wide, and 100.0" wide at drip rails. Interior compartment depth dimensions shall be approximately:

<u>Area Description</u>	<u>Dimension</u>
Compartment depth above subframe:	12.5"
Compartment depth below subframe:	21.0"

## **STREETSIDE COMPARTMENT - FRONT (S1)**

The interior useable compartment width shall be approximately 15.5" wide.

The compartment door opening shall be approximately 10" wide.

- This compartment shall have flush fitting vertically hinged compartment door. The door exterior shall be painted job color.
- The interior door panel shall have a smooth un-painted aluminum panel.
- The hinged door(s) shall have a stainless steel 6" offset bent D-ring locking handle. A gasket shall be placed between handle and door. Door latch shall be a single point latch flush mounted to exterior door panel.
- The hinged door(s) shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the compartment door header and the box pan of the door.
- The door ajar switch shall be provided with specified hinged door and pneumatic cylinder switch assembly to activate compartment lighting and door ajar signal in cab when door is opened.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be fabricated from brushed 304 stainless steel sheet metal.

## **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
- There shall be one (1) removable plastic tool box(s) with hand holes for carrying. Each tool box shall be fabricated from 1/2" (.50) textured finish polypropylene sheet.
- One (1) OnScene Access PRO white LED, full height compartment light, vertically mounted.
- One (1) OnScene Solutions Rough-Service 9" white LED light(s) shall be provided below the body. Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment. Light(s) shall be switchable but activated automatically when the park brake is set.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

## **STREETSIDE COMPARTMENT - ABOVE REAR WHEELS (S2)**

The interior useable compartment width shall be approximately 54.0" wide.

The compartment door opening shall be approximately 49.5" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior door track to activate compartment lighting and door ajar signal in cab when door is opened.
- A keyed 1250 cylinder lock shall be provided on bottom rail of the roll-up door.
- The roll-up doors shall be manually operated with a key.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- One (1) aluminum drip pan/door guard shall be provided below door roll area. Drip pan/door guard shall have thumb nuts making it easily removable without tools with a maintenance-free, un-painted finish. A plastic drain line shall be provided on each end of the drip pan to lower door threshold.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.

## **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be two (2) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - The above component(s) shall have a smooth un-painted finish.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf(s). The striping shall be red/white in color.
- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.

### **STREETSIDE COMPARTMENT - REAR (S3)**

The interior useable compartment width shall be approximately 47.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior door track to activate compartment lighting and door ajar signal in cab when door is opened.
- A keyed 1250 cylinder lock shall be provided on bottom rail of the roll-up door.
- The roll-up doors shall be manually operated with a key.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- One (1) aluminum drip pan/door guard shall be provided below door roll area. Drip pan/door guard shall have thumb nuts making it easily removable without tools with a maintenance-free, un-painted finish. A plastic drain line shall be provided on each end of the drip pan to lower door threshold.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.

### **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be two (2) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - The above component(s) shall have a smooth un-painted finish.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf(s). The striping shall be red/white in color.
- There shall be one (1) 400 lbs. slide-out tray(s) approximately 20" deep and as wide as the compartment layout or door opening permits. The tray top shall be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length. The tray assembly shall utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.
  - The above component(s) shall have a smooth un-painted finish.

- 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.
- One (1) OnScene Solutions Rough-Service 9" white LED light(s) shall be provided below the body. Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment. Light(s) shall be switchable but activated automatically when the park brake is set.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

## **CURBSIDE COMPARTMENT - FRONT (C1)**

The interior useable compartment width shall be approximately 15.5" wide.

The compartment door opening shall be approximately 10" wide.

- This compartment shall have flush fitting vertically hinged compartment door. The door exterior shall be painted job color.
- The interior door panel shall have a smooth un-painted aluminum panel.
- The hinged door(s) shall have a stainless steel 6" offset bent D-ring locking handle. A gasket shall be placed between handle and door. Door latch shall be a single point latch flush mounted to exterior door panel.
- The hinged door(s) shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the compartment door header and the box pan of the door.
- The door ajar switch shall be provided with specified hinged door and pneumatic cylinder switch assembly to activate compartment lighting and door ajar signal in cab when door is opened.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be fabricated from brushed 304 stainless steel sheet metal.

## **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- One (1) OnScene Access PRO white LED, full height compartment light, vertically mounted.
- One (1) OnScene Solutions Rough-Service 9" white LED light(s) shall be provided below the body. Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment. Light(s) shall be switchable but activated automatically when the park brake is set.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

## **CURBSIDE COMPARTMENT - ABOVE REAR WHEELS (C2)**

The interior useable compartment width shall be approximately 36.5" wide.

The compartment door opening shall be approximately 31.2" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior door track to activate compartment lighting and door ajar signal in cab when door is opened.
- A keyed 1250 cylinder lock shall be provided on bottom rail of the roll-up door.
- The roll-up doors shall be manually operated with a key.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- One (1) aluminum drip pan/door guard shall be provided below door roll area. Drip pan/door guard shall have thumb nuts making it easily removable without tools with a maintenance-free, un-painted finish. A plastic drain line shall be provided on each end of the drip pan to lower door threshold.

## **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be two (2) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - The above component(s) shall have a smooth un-painted finish.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf(s). The striping shall be red/white in color.
- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.

### **CURBSIDE COMPARTMENT - REAR (C3)**

The interior useable compartment width shall be approximately 47.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior door track to activate compartment lighting and door ajar signal in cab when door is opened.
- A keyed 1250 cylinder lock shall be provided on bottom rail of the roll-up door.
- The roll-up doors shall be manually operated with a key.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- One (1) aluminum drip pan/door guard shall be provided below door roll area. Drip pan/door guard shall have thumb nuts making it easily removable without tools with a maintenance-free, un-painted finish. A plastic drain line shall be provided on each end of the drip pan to lower door threshold.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.

### **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be two (2) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - The above component(s) shall have a smooth un-painted finish.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf(s). The striping shall be red/white in color.
- There shall be one (1) Austin Front Drawer Release (FDR) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits. Each tray shall be vertically adjustable. The FDR on front of tray will deduct 1.5" from specified depth. The tray top shall be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length.
- There shall be one (1) slide-out smooth aluminum vertical tool board(s) approximately 18" deep. Each tool board(s) vertical exterior edge shall have a double 90 degree formed edge to provide an easy grip handle. The top and bottom



of tool board(s) shall be provided with Accuride 9300 series slide tracks. Each board shall be rated for a maximum 200 lbs. evenly distributed load. Each tool board shall utilize a pneumatic cylinder to hold the tool board in both the opened and closed positions.

- The vertical tool board material shall be 3/16" (.188) 3003H-14 aluminum alloy sheet.
- The above component(s) shall have a smooth un-painted finish.
- Each tool board will be bolted to compartment floor.
- There shall be one (1) vertical compartment partition(s) provided dividing the compartment into fore and aft sides. The vertical partition(s) shall be 3/16" (.188) 3003H-14 alloy smooth aluminum sheet.
  - Partition shall be bolted in position at base and top of partition.
  - The above component(s) shall have a smooth un-painted finish.
- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.
- There shall be one (1) 120 VAC outlet(s) located in compartment on the forward wall.
  - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).
- There shall be one (1) approximate 2' long 120 VAC outlet strip(s) with straight blade household type outlets provided.
  - Outlet(s) shall be powered through the on-board shore power system.
- Mounts will be supplied and installed for one (1) Galeton Fire Protection District supplied combination tool(s).  
**Hurst Edraulic SC758E2**
- One (1) OnScene Solutions Rough-Service 9" white LED light(s) shall be provided below the body. Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment. Light(s) shall be switchable but activated automatically when the park brake is set.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

## **REAR COMPARTMENT - CENTER (RC1)**

The rear center compartment shall start at the top of the body sub-frame and be as high as the side compartments, unless specified otherwise.

The interior useable compartment width shall be approximately 50.0" wide.

The compartment door opening shall be approximately 31.0" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior door track to activate compartment lighting and door ajar signal in cab when door is opened.
- A keyed 1250 cylinder lock shall be provided on bottom rail of the roll-up door.
- The roll-up doors shall be manually operated with a key.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.

## **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be two (2) adjustable shelf/shelves approximately 24" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edge.
  - The above component(s) shall have a smooth un-painted finish.
- I-Zone brackets shall be provided to lace fire hose between when moving from house to house during structure fire protection operations. Two (2) aluminum brackets shall be mounted on rear body panel to accept two (2) aluminum tubing sections. Brackets shall be designed to hold the tubing in position with a quick pin to hold in place for operation. The tubing sections shall be stored in brackets in a convenient compartment near rear of truck when not in use.
- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.
- There shall be one (1) 120 VAC outlet(s) located in compartment.
  - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).
  - Outlet(s) shall be powered through the on-board shore power system.

- The outlet shall be located on forward wall, upper right area.

**BODY OPTIONS AND UPGRADES**

**PLASTIC FLOOR AND SHELF TILE**

Dri-Dek 12" x 12" x 9/16", self-draining plastic inter-locking material shall be cut to size and cover all compartment floors, shelves, and trays.

- The plastic floor tile shall be black.
- The plastic edge trim shall be black.

**ROPE ANCHOR OR PORTABLE WINCH RECEIVERS**

The completed unit shall have an integrated receiver or anchor system for use with removable rope anchor point and/or a portable electric winch, when specified.

Receivers or anchors installed at any location on the apparatus for use as removable winch anchors shall be designed and affixed to provide at least a 2.0 to 1 straight line pull no-yield safety factor over the load rating of the removable winch.

Receivers or anchors installed at any location on the apparatus for use with rope operations shall be designed and affixed to the apparatus to provide at least a 9,000 lbf (40,000 N) no-yield condition with a straight line pull.

A safety sign FAMA28 shall be located on or near each receiver or anchor stating the maximum straight line pull rating.

Side receiver(s) (if specified) shall have the following load rating:

	<u>STRAIGHT PULL</u>	<u>SAFETY FACTOR</u>
Rope Tie Off:	600 Lbs.	15:1
Winch:	5,000 Lbs.	2:1

Front and/or rear receiver(s) (if specified) shall have the following load rating:

	<u>STRAIGHT PULL</u>	<u>SAFETY FACTOR</u>
Rope Tie Off:	600 Lbs.	15:1
Winch:	Winch Load Rating (9,000 Lbs. Max)	2:1

The following items shall be provided to accomplish rope rescue and/or portable winch operation;

A portable winch shall not be provided with completed unit.

## **REAR BUMPER**

- There shall be three (3) 2" x 2" x 1/4" wall steel receiver tube(s) with black hammertone powder coat paint finish located at the rear bumper for use with removable rope anchor point and/or a portable electric winch (when specified).
  - The receiver(s) shall have three (3) rubber cover(s) provided.

## **LADDER LIFT SYSTEM, CURBSIDE**

A Ziamatic 12 VDC, 60 amp, HLAS (Horizontal Ladder Access System), model HLAS-975 shall be provided above the exterior side body compartments, on the curbside.

The lift system shall be electro-hydraulic with built-in electric safety latches and warning alarm when in operation. Access shall still be provided to compartments with system in lowered position. Flashing lights on ends shall produce a visual signal when the system is out of the stored position. A flashing warning light signal shall be provided indicating when a ladder rack is not in a stowed position as required by NFPA 1901. The outward ends of the equipment rack that protrude beyond the body of the apparatus shall have retroreflective material to indicate a hazard or an obstruction.

The ladder control panel shall be located on curbside pump panel. The ladder lift system shall be designed to store the specified ladders and equipment. The side of ladder storage area shall be enclosed with an aluminum panel and painted the same color as body.

## **LADDER LIFT INTERLOCK**

An interlock circuit shall be included on the ladder lift system to prevent the lift from raising if a specified hose bed or compartment doors are in the open position.

Storage shall be provided for the following;

- One (1) 24' 2-section ladder(s). Manufacturer, model number of the ladder shall be provided in equipment section of specification, or at pre-construction meeting when provided by Galeton Fire Protection District.
- One (1) 14' roof ladder(s). Manufacturer, model number of the ladder shall be provided in equipment section of specification, or at pre-construction meeting when provided by Galeton Fire Protection District.
- One (1) 10' folding ladder(s). Manufacturer, model number of the ladder shall be provided in equipment section of specification, or at pre-construction meeting when provided by Galeton Fire Protection District.
- One (1) pike pole(s). Manufacturer, model number of the pike pole shall be provided in equipment section of specification, or at pre-construction meeting when provided by Galeton Fire Protection District.
- One (1) 10' length of hard suction hose. Hard suction hose(s) shall be supplied by contractor with completed unit. See equipment section.

## **FRONT PROTECTION PANELS - STAINLESS STEEL (BELOW DRIP RAIL)**

To protect areas subject to intensive wear, scuffing or abuse, protection panels shall be installed on the front vertical body panels and wrapped around corners 1.5" and cover the face of the body front panels from the just below the drip rail to the bottom of the body. The protection panels shall be fabricated from 20 gauge brushed stainless steel.

## **ROOF ACCESS LADDER**

The top of the body shall be accessible from the ground by a folding style ladder. The ladder design shall have a main pivoting ladder section with a fixed bolt-on upper hand rail section that extends just above top surface. The lower step section of ladder shall fold-out creating an angled ladder that brings the first step closer to ground for easier step height access and a comfortable climbing angle. The ladder shall fold-up and store in vertical position for better angle of departure.

Each cast aluminum step shall be 4-1/2" deep x 16" wide. Hand railing shall be 2-1/8" oval shaped aluminum tubing with a ribbed gripping surface.

The ladder shall be wired to the door ajar warning light in cab to warn the driver that the ladder is in the down position. Ladder shall be mounted to body with stainless steel bolts.

Ladder shall be located on rear streetside of the body.

## **WALKWAY/STEP LIGHTS**

There shall be two (2) OnScene Solutions Rough-Service 9" LED lights provided to illuminate the walkway or step area.

Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment.

Lighting shall provide illumination at a minimum level of 2 fc (20 lx) on all work surfaces, steps, and walkways. Lighting shall be switchable but activated automatically when the vehicle park brake is set.

## **PUMP MODULE HANDRAILS**

There shall be two (2) 24" handrails, one (1) each side of pump module for access to upper dunnage area. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

A safety sign FAMA23, which warns of the proper climbing method, shall be visible to personnel entering the cab and at each designated climbing location on the body.

A safety sign FAMA24, which warns personnel not to ride on the vehicle, shall be located at the rear step areas and at any cross walkways.

## **REAR BODY HANDRAIL**

There shall be one (1) 24" vertical handrail on rear of body. Handrail shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

A safety sign FAMA23, which warns of the proper climbing method, shall be visible to personnel entering the cab and at each designated climbing location on the body.

A safety sign FAMA24, which warns personnel not to ride on the vehicle, shall be located at the rear step areas and at any cross walkways.

## **FOLDING STEP(S)**      Streetside front of body (1103/1104 Campbell County)

There shall be four (4) Innovative Controls polished cast aluminum folding step(s) provided and installed on completed vehicle. Each step shall be heavy duty with stainless steel spring and textured step surface meeting NFPA standards. Each step shall include an LED light.

## **LOW VOLTAGE ELECTRICAL SYSTEM- 12 VDC**

### **General**

Any low voltage electrical systems or warning devices installed on the fire apparatus shall be appropriate for the mounting location and intended electrical load.

Where wire passes through sheet metal, grommets shall be used to protect wire and wire looms. Electrical connections shall be with double crimp water-tight heat shrink connectors.

All 12 VDC wiring running from front to back of vehicle body shall be run in full length electrical wiring raceway down each side of body.

### **Wiring**

All electrical circuit feeder wiring supplied and installed by the fire apparatus manufacturer shall meet the requirements of NFPA Chapter 13.

The circuit feeder wire shall be stranded copper or copper alloy conductors of a gauge rated to carry 125% of the maximum current for which the circuit is protected. Voltage drops in all wiring from the power source to the using device shall not exceed 10%. The use of star washers for circuit ground connections shall not be permitted.

All circuits shall otherwise be wired in conformance with SAE J1292, *Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach Wiring*.

### **Wiring and Wire Harness Construction**

All insulated wire and cable shall conform to SAE J1127, *Low Voltage Battery Cable*, or SAE J1128, *Low Voltage Primary Cable*, type SXL, GXL, or TXL.

All conductors shall be constructed in accordance with SAE J1127 or SAE J1128, except where good engineering practice dictates special strand construction. Conductor materials and stranding, other than copper, shall be permitted if all applicable requirements for physical, electrical, and environmental conditions are met as dictated by the end application. Physical and dimensional values of conductor insulation shall be in conformance with the requirements of SAE J1127 or SAE J1128, except where good engineering practice dictates special conductor insulation. The overall covering of conductors shall be moisture-resistant loom or braid that has a minimum continuous rating of 194°F (90°C) except where good engineering practice dictates special consideration for loom installations exposed to higher temperatures. The overall covering of jacketed cables shall be moisture resistant and have a minimum continuous temperature rating of 194°F (90°C), except where good engineering practice dictates special consideration for cable installations exposed to higher temperatures.

All wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection. The wiring connections and terminations shall be installed in accordance with the device manufacturer's instructions. All ungrounded electrical terminals shall have protective covers or be in enclosures. Wire nut, insulation displacement, and insulation piercing connections shall not be used.

Wiring shall be restrained to prevent damage caused by chafing or ice buildup and protected against heat, liquid contaminants, or other environmental factors.

Wiring shall be uniquely identified at least every 2 ft (0.6 m) by color coding or permanent marking with a circuit function code. The identification shall reference a wiring diagram.

Circuits shall be provided with properly rated low voltage over-current protective devices. Such devices shall be readily accessible and protected against heat in excess of the over-current device's design range, mechanical damage, and water spray. Circuit protection shall be accomplished by utilizing fuses, circuit breakers, fusible links, or solid state equivalent devices.

If a mechanical-type device is used, it shall conform to one of the following SAE standards:

- 1) SAE J156, *Fusible Links*
- 2) SAE J553, *Circuit Breakers*
- 3) SAE J554, *Electric Fuses (Cartridge Type)*
- 4) SAE J1888, *High Current Time Lag Electric Fuses*
- 5) SAE J2077, *Miniature Blade Type Electrical Fuses*

Switches, relays, terminals, and connectors shall have a direct current (dc) rating of 125% of maximum current for which the circuit is protected.

#### Power Supply

A 12 V or greater electrical alternator shall be provided. The alternator shall have a minimum output at idle to meet the minimum continuous electrical load of the vehicle, at 200°F (93°C) ambient temperature within the engine compartment, and shall be provided with full automatic regulation.

#### Minimum Continuous Electrical Load

The minimum continuous electrical load shall consist of the total amperage required to simultaneously operate the following in a stationary mode during emergency operations:

- 1) The propulsion engine and transmission
- 2) All legally required clearance and marker lights, headlights, and other electrical devices except windshield wipers and four-way hazard flashers
- 3) The radio(s) at a duty cycle of 10 percent transmit and 90% receive (for calculation and testing purposes, a default value of 5 A continuous)
- 4) The lighting necessary to produce 2 fc (20 lx) of illumination on all walking surfaces on the apparatus and on the ground at all egress points onto and off the apparatus, 5 fc (50 lx) of illumination on all control and instrument panels, and 50 percent of the total compartment lighting loads
- 5) The minimum optical warning system, where the apparatus is blocking the right-of way
- 6) The continuous electrical current required to simultaneously operate any fire pumps, aerial devices, and hydraulic pumps
- 7) Other warning devices and electrical loads defined by the purchaser as critical to the mission of the apparatus

If the apparatus is equipped to tow a trailer, an additional 45 A shall be added to the minimum continuous electrical load to provide electrical power for the federally required clearance and marker lighting and the optical warning devices mounted on the trailer.

The condition of the low voltage electrical system shall be monitored by a warning system that provides both an audible and a visual signal to persons on, in, or near the apparatus of an impending electrical system failure caused by the excessive discharge of the battery set.

The charge status of the battery shall be determined either by direct measurement of the battery charge or indirectly by monitoring the electrical system voltage.

If electrical system voltage is monitored, the alarm shall sound if the system voltage at the battery or at the master load disconnect switch drops below 11.8 V for 12 V nominal systems, 23.6 V for 24 V nominal systems, or 35.4 V for 42 V nominal systems for more than 120 seconds.

A voltmeter shall be mounted on the driver's instrument panel to allow direct observation of the system voltage.

#### Electromagnetic Interference

Electromagnetic interference suppression shall be provided, as required, to satisfy the radiation limits specified in SAE J551/1, *Performance Levels and Methods of Measurement of Electromagnetic Compatibility of Vehicles, Boats (up to 15 m), and Machines (16.6 Hz to 18 GHz)*.

#### Wiring Diagram

A complete electrical wiring schematic of actual system shall be provided with finished apparatus. Similar or generic type electrical schematics shall NOT BE ACCEPTABLE.

#### Low Voltage Electrical System Performance Test

A low voltage electrical system test certification shall be provided with delivered apparatus.

### **12 VOLT DIAGNOSTIC RELAY CONTROL CENTER**

The 12 volt power distribution shall be conveniently located with easy access for service. All relays and circuit breakers shall be plug-in type allowing for removal for repairs without necessitating soldering or tools. The sockets mounts for both the relays and circuit breakers shall be of a design that permits the use of standard automotive type components.

The 12 volt distribution panel shall utilize printed circuit boards mounted in high strength enclosure. Each printed circuit board shall be provided with twelve (12) heavy duty independent switching relays. Each relay shall have the ability to be configured either normally open or normally closed and be protected by a 20 amp automatic reset breaker. Each circuit will be provided with a LED for visual diagnostic.

Power distribution panel shall be located in apparatus body within a protected enclosure with removable or hinged cover.

#### **CAB CONSOLE, POSITIONS**

#### **CAB CONSOLE**

A center cab console shall be provided between the Driver's and Officer's seats extending to rear wall of cab. Console shall be as large as possible and fabricated of 1/8" smooth aluminum. A textured powder coat paint finish shall be provided for durability and finished appearance.

Console shall include;

- Forward section of cab console shall include;



## **ROCKER SWITCH PANEL**

The control of the 12 volt equipment installed on chassis and body shall be centrally located in the cab. The individual rocker style switches shall be located on a separate electrical panel, complete with backlit name tags describing function of each individual switch. The back lighting shall have two (2) levels of intensity, low level lights activated when the vehicle lights or ignition switch is turned "On", and high level lights activated when individual switch is turned "On". An internally lighted rocker switch shall be furnished to the left of specified emergency lighting switches, and identified as "MASTER EMERGENCY SWITCH".

Switch circuitry shall be on a printed circuit board. The lights shall be solid state type and have a 100,000 hour life span.

- Forward section, driver side of cab console shall include;
  - No components provided at this position.
- Forward section, officer side of cab console shall include;
  - No components provided at this position.
- Cab console, panel position forward shall include;
- There shall be one (1) communications radio and/or siren 3" filler plate(s) with black powdercoat paint finish provided for future radio/siren location in specified console.
- Cab console, panel position center shall include;

## **RADIO INSTALLATION**

There shall be one (1) Galeton Fire Protection District supplied radio(s) installed in the cab center console within easy reach of driver and/or officer. The final location of radio shall be determined by the Galeton Fire Protection District at the pre-construction meeting.

All required radio programming shall be responsibility of Galeton Fire Protection District. Radio(s) may not be fully tested if no radio program is provided with radio and will be responsibility of Galeton Fire Protection District after delivery.

Radio shall be installed per Manufacturer's requirements and wired for proper 12 volt power and ground.

- There shall be one (1) communications radio and/or siren 3" recess mount(s) with black powdercoat paint finish in specified console.
- Cab console, panel position rearward shall include;

## **ELECTRONIC SIREN**

One (1) Whelen model 295SLSA1 electronic siren control with selectable 100 or 200 watt output, hands-free operation, user selectable siren tones, park kill, and standard hard wired microphone shall be provided and installed in cab within easy reach of Driver. Siren power shall be wired through the master warning light switch.

- There shall be one (1) communications radio and/or siren 3" recess mount(s) with black powdercoat paint finish in specified console.

The specified siren functions shall be controlled by siren mounted switches.

- Cab console, rear position shall include;
  - No components provided at this position.
- Cab console, rear extension position shall include;
- Cab console area **rear will be laid out the same as 1103/04 Campbell County.**
  - One (1) 12 VDC cigarette style power port(s) shall be provided in cabinet with dust cover.
- Power port shall be wired battery direct.
  - Four (4) 12 VDC USB dual charger port(s) shall be provided in console with dust cover.
- Power port shall be wired battery direct.

## **ELECTRICAL SYSTEM MANAGER**

### **LOAD MANAGEMENT**

If the total continuous electrical load exceeds the minimum continuous electrical output rating of the installed alternator(s), an Innovative Controls automatic electrical load management system shall be required. The minimum continuous electrical loads shall not be subject to automatic load management.

The apparatus 12 volt electrical system shall be provided with a system manager for:

- Monitoring chassis battery voltage
- Shedding pre-determined electrical circuits
- Sequencing pre-determined electrical circuits
- Automatically controlling chassis engine fast-idle
- Monitor master switch and parking brake applications
- Automatically control warning light modes ("Calling-For" and "Blocking Right of Way")
- Provide low voltage alarm
- Programmable control circuits
- Remote system status indicator panel

System manager shall perform all electrical functions required by current NFPA 1901 Standards.

### **BATTERY MONITORING**

The system manager shall monitor the vehicle battery voltage. When electrical loads exceed the alternator output and the voltage drops, the load manager shall start shutting down electrical outputs. The system shall shut down only as many outputs required to maintain the system voltage. A special indicator to show different states of the electrical system by flashing at rate proportional to the battery discharge.

### **LOAD SEQUENCING AND SHEDDING**

The system shall be capable of sequentially switching and shedding 12 volt loads. The Master light switch starts the sequential switch when it is turned "On". Likewise turning the Master Switch "Off" will sequentially de-energize the loads.

### **BATTERY SYSTEM**

The battery connectors shall be heavy duty type with cables terminating in heat shrink loom. Heavy duty battery cables shall provide maximum power to the electrical system. Where required, the cables shall be shielded from exhaust tubing and the muffler. Large rubber grommets shall be provided where cables enter the battery compartment.

Batteries shall be of the high-cycle type. With the engine off, the battery system shall be able to provide the minimum continuous electrical load for 10 minutes without discharging more than 50 percent of the reserve capacity and then to restart the engine. The battery system cold cranking amps (CCA) rating shall meet or exceed the minimum CCA recommendations of the engine manufacturer. The batteries shall be mounted to prevent movement during fire apparatus operation and shall be protected against accumulations of road spray, snow, and road debris. The batteries shall be readily accessible for examination, testing, and maintenance.

A means shall be provided for jump-starting the engine if the batteries are not accessible without lifting the cab of a tilt-cab apparatus.

Where an enclosed battery compartment is provided, it shall be ventilated to the exterior to prevent the buildup of heat and explosive fumes. The batteries shall be protected against vibration and temperatures that exceed the battery manufacturer's recommendation.

An onboard battery conditioner or charger or a polarized inlet shall be provided for charging all batteries. Where an onboard conditioner or charger is supplied, the associated line voltage electrical power system shall be installed in accordance with Chapter 22.

One of the following master disconnect switches shall be provided:

- 1) A master body disconnect switch that disconnects all electrical loads not provided by the chassis manufacturer
- 2) A master load disconnect switch that disconnects all electrical loads on the apparatus except the starter

Electronic control systems and similar devices shall be permitted to be otherwise connected if so specified by their manufacturer.

The alternator shall be wired directly to the batteries through the ammeter shunt(s), if one is provided, and not through the master load disconnect switch.

A green "battery disconnect on" indicator light that is visible from the driver's position shall be provided.

Rechargeable hand lights, radios, and other similar devices shall be permitted to be connected to the electrical system ahead of the master disconnect switch.

A sequential switching device shall be permitted to energize the optical warning devices and other high current devices required in minimum continuous electrical load, provided the switching device shall first energize the electrical devices required in minimum continuous electrical load within 5 seconds.

### **BATTERY SWITCH**

One (1) battery "On/Off" switch shall be provided and located in cab within easy reach of Driver. A green "BATTERY ON" pilot light shall be visible from the driver's position.

### **BATTERY SOLENOID**

Battery switch shall consist of a minimum 200 ampere, constant duty solenoid to feed from positive side of battery.

### **BATTERY CONDITIONER**

One (1) Kussmaul model Auto Charge LPC 40 single battery conditioner, with 120 VAC input and 40 amp, 12 volt output shall be provided. This system shall monitor the condition of batteries and provide an electrical current at variable rates to overcome battery failure.

### **BATTERY CHARGE INDICATOR**

A Kussmaul 091-94-12 charge indicator display shall be provided and located near drivers' door area. This single battery system indicator is a suppressed zero bar graph voltage display which may be installed in any 12 volt system.

## **SHORE POWER INLET**

One (1) Kussmaul 120 VAC, 20 amp Super Auto-Eject shore power inlet(s) shall be provided. The shore power connection shall automatically disengage from vehicle when chassis ignition is engaged.

The protective ground from the shoreline inlet shall be bonded to the vehicle frame.

- The outlet cover shall be red.
- The shore power plug shall be located near the Driver door area.

## **ENGINE COMPARTMENT LIGHT**

Per current NFPA 1901 Standards there shall be an LED engine compartment light installed by the commercial chassis manufacturer or by the body manufacturer.

## **CAB HAZARD WARNING LIGHT**

A Truck-Lite red LED flashing light shall be provided and located in the driving compartment and be illuminated automatically whenever the vehicles parking brake is not fully engaged and any of the following conditions exist:

- Any passenger or equipment compartment door is not closed.
- Any ladder or equipment rack is not in the stowed position.
- Stabilizer system is not in its stowed position.
- Powered light tower is not stowed.
- Any other device permanently attached to the apparatus is open, extended, or deployed in a manner that is likely to cause damage to the apparatus if the apparatus is moved.

Compartments and equipment meeting all of the following conditions shall be permitted to be exempt from being wired to the hazard light:

- The volume is less than or equal to 4 ft<sup>3</sup> (0.1 m<sup>3</sup>).
- The compartment has an opening less than or equal to 144 in.<sup>2</sup> (92,900 mm<sup>2</sup>).
- The open door does not extend sideways beyond the mirrors or up above the top of the fire apparatus.
- All equipment in the compartment is restrained so that nothing can fall out if the door is open while the apparatus is moving.
- Manually raised pole lights with an extension of less than 5 ft (1.5 m).

The hazard light shall be labeled; "Do not move apparatus when light is on."

In addition, label shall be in both English/French for units built for Canada; "*Ne pas déplacer l'engin lorsque la lumière est allumée.*"

An audible alarm shall be provided for the door ajar light.

## **BACK-UP ALARM**

The body manufacturer shall furnish and install one (1) 107 dB(A) electronic back-up alarm. Back-up alarm to actuate automatically when the transmission gear selector is placed in reverse.

## **REAR VIEW CAMERA**

There shall be one (1) ASA Voyager rear observation camera system provided and installed on completed unit. The system shall include one (1) model VCMS155 high resolution box style camera with white housing installed on rear of body.

- The camera image shall be displayed on a Voyager AOM718 or latest model, 7" color flat panel display (up to 3 camera inputs) located within the driver's range of view.

## **TAIL LIGHTS**

Rear body tail lights shall be vertically mounted and located per Federal Motor Vehicle Safety Standards, FMVSS and Canadian Motor Vehicle Safety Standards CMVSS. The following lights shall be provided;

- Two (2) Whelen C6T amber LED sequential arrow turn signal lights, amber lens
- Two (2) Whelen C6BTT red LED brake and tail lights, red lens
- Two (2) Whelen C6LCC white LED back-up lights, clear lens

Each light shall have a black flange.

## **MIDSHIP MARKER/TURN SIGNAL**

Two (2) Whelen model T0A00MAR 2" round amber LED midship body clearance marker/turn signal lights shall be provided and installed, one (1) light on each side of the body, in forward wheel well of rear axle. Midship marker/turn lights shall be wired to the headlight circuit of the chassis.

## **MARKER LIGHTS**

The body shall be equipped with all necessary side and rear clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) and Canadian Motor Vehicle Safety Standards (CMVSS). Clearance lights on body shall be connected to the clearance light circuit of the chassis.

## **CAB STEP LIGHTS / GROUND LIGHTS**

There shall be two (2) OnScene 8" Access white LED light(s) installed on the vehicle capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting designed to provide illumination on areas under the driver and crew riding area exits shall be switchable but activated automatically when the exit doors are opened.

## **LICENSE PLATE LIGHT**

One (1) Arrow #437 chrome plated LED license plate light shall be installed on the rear of the body. License plate light shall be wired to the headlight circuit of chassis. A fastener system shall be provided for license plate installation.

## **FRONT LED FLOODLIGHT**

One (1) Rigid Industries E-Series model 130313, 30" combination spot/flood LED light(s) with black housing color and cradle mount brackets shall be provided on front of vehicle. The E-Series 30" LED light(s) shall have 32,000 lumen output each.

Each light shall be wired directly to the 12 VDC electrical system with stranded copper wire. The floodlights shall be protected with circuit breakers rated at the proper amperage and wire size.

The Lights shall be controlled at the Switch Panel in Cab.

## **SIDE SCENE LIGHTS**

There shall be four (4) Whelen model C6SL Super-LED® , 6" x 4" surface mounted scene lights provided on the upper body. Light quantity shall be divided equally per side. The C6SL configuration shall consist of 12 white Super-LEDs and a clear non optic polycarbonate lens with metalized SurfaceMax reflector with integrated optic collimators for maximum output. The C69SL scene light shall have 6,500 useable lumens each. The scene light is covered by a five year factory warranty.

Two (2) switches shall be provided, one (1) for the streetside scene lights, and one (1) for the curbside scene lights.

Each light shall have a black flange.

The Lights shall be controlled at the Switch Panel in Cab.

## **REAR LED SCENE LIGHTS**

Two (2) Whelen C6 Series Super-LED® Scene Lights provided on the upper rear body. The C6 series light configuration shall consist of 12 clear Super-LEDs and a clear polycarbonate lens. The scene light is covered by a five year factory warranty.

The above scene lights shall light to a level of at least 3 fc (30 lx), measured at 25 equally spaced points on a 2.5 ft (750 mm) grid with in a 10 ft x 10 ft (3 m x 3m) square to the rear of vehicle.

Each light shall have a black flange.

The Lights shall be controlled at the Switch Panel in Cab.

The rear scene lights shall also be activated when the apparatus is in reverse.

## **TRAFFIC ADVISOR LIGHTS**

A traffic advisor system shall be provided on rear of vehicle using;

- Six (6) Whelen Wide-angle ION series amber Super-LED lights with clear lens.
- Black flanges.
- Lights shall be individually mounted and evenly distributed.

The lights shall be controlled by the multiplexing system and provide; Left Arrow, Right Arrow, Center Out, and Wig-Wag patterns. The wig-wag light pattern shall be activated with the E-Master and can be switched to the other patterns at any time through the "TRAFFIC ADVISOR" menu on the Multiplex display.

## **WARNING LIGHT PACKAGE**

Each apparatus shall have a system of optical warning devices that meets or exceeds the requirements of this section.

The optical warning system shall consist of an upper and a lower warning level. The requirements for each level shall be met by the warning devices in that particular level without consideration of the warning devices in the other level.

For the purposes of defining and measuring the required optical performance, the upper and lower warning levels shall be divided into four (4) warning zones. The four zones shall be determined by lines drawn through the geometric center of the apparatus at 45 degrees to a line drawn lengthwise through the geometric center of the apparatus. The four (4) zones shall be designated A, B, C, and D in a clockwise direction, with zone A to the front of the apparatus.

Each optical warning device shall be installed on the apparatus and connected to the apparatus's electrical system in accordance with the requirements of this standard and the requirements of the manufacturer of the device.

A master optical warning system switch that energizes all the optical warning devices shall be provided.

The optical warning system on the fire apparatus shall be capable of two (2) separate signaling modes during emergency operations. One (1) mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way. One (1) mode shall signal that the apparatus is stopped and is blocking the right-of-way. The use of some or all of the same warning lights shall be permitted for both modes provided the other requirements of this chapter are met.

A switching system shall be provided that senses the position of the parking brake or the park position of an automatic transmission. When the master optical warning system switch is closed and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for the right-of-way shall be energized. When the master optical warning system switch is closed and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the right-of-way shall be energized. The system shall be permitted to have a method of modifying the two (2) signaling modes.

The optical warning devices shall be constructed or arranged so as to avoid the projection of light, either directly or through mirrors, into any driving or crew compartment(s). The front optical warning devices shall be placed so as to maintain the maximum possible separation from the headlights.

Steadily burning, non flashing optical sources shall be permitted to be used.



**UPPER LEVEL OPTICAL WARNING DEVICES**

The upper-level optical warning devices shall be mounted as high and as close to the corner points of the apparatus as is practical to define the clearance lines of the apparatus. The upper-level optical warning devices shall not be mounted above the maximum height, specified by the device manufacturer.

**ZONE A - FRONT WARNING LIGHTS**

There shall be one (1) Whelen Freedom F4N0QLED LED 60" lightbar permanently mounted to the cab roof.

The lightbar configuration (streetside to curbside) shall be:

<u>SECTION</u>	<u>INTERNAL COMPONENTS</u>	<u>LENS COLOR</u>
1	Red Side LED	Clear
2	Red Front Corner LED	Clear
3	White Super Long-LED	Clear
4	White Super Long-LED	Clear
5	Red Super Long-LED	Clear
6	Red Super Long-LED	Clear
7	White Super Long-LED (Opticom if specified)	Clear
8	White Super Long-LED (Opticom if specified)	Clear
9	Red Super Long-LED	Clear
10	Red Super Long-LED	Clear
11	White Super Long-Led	Clear
12	White Super Long-LED	Clear
13	Red Front Corner LED	Clear
14	Red Side LED	Clear

All clear lights shall shut down when the parking brake is set to comply with "Blocking" mode requirements as outlined in NFPA 1901.

The lightbar(s) shall be separately controlled at switch panel in the cab.

## ZONES B AND D - SIDE WARNING LIGHTS

### UPPER REAR CORNER WARNING LIGHTS

There shall be two (2) Whelen C6 SurfaceMax, linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities. Component shall be covered by a five year Whelen factory warranty.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a black flange.

- Flash Pattern shall be Whelen Action Scan (Factory Default)

The Lights shall be controlled at the Switch Panel in Cab.

### UPPER FORWARD CORNER WARNING LIGHTS

There shall be two (2) Whelen C6 SurfaceMax, linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities. Component shall be covered by a five year Whelen factory warranty.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a black flange.

- Flash Pattern shall be Whelen Action Scan (Factory Default)

The Lights shall be controlled at the Switch Panel in Cab.

## ZONE C - REAR WARNING LIGHTS

There shall be two (2) Whelen C6 SurfaceMax, linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities. Component shall be covered by a five year Whelen factory warranty.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a black flange.

- Flash Pattern shall be Whelen Action Scan (Factory Default)

The Lights shall be controlled at the Switch Panel in Cab.

## **LOWER LEVEL OPTICAL WARNING DEVICES**

To define the clearance lines of the apparatus, the optical center of the lower-level optical warning devices in the front of the vehicle shall be mounted on or forward of the front axle centerline and as close to the front corner points of the apparatus as is practical.

The optical center of the lower-level optical warning devices at the rear of the vehicle shall be mounted on or behind the rear axle centerline and as close to the rear corners of the apparatus as is practical. The optical center of any lower-level device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground for large apparatus, and 18 in. and 48 in. (460 mm and 1600 mm) above level ground.

A midship optical warning device shall be mounted right and the left sides of the apparatus if the distance between the front and rear lower-level optical devices exceeds 25 ft (7.6 m) at the optical center. Additional midship optical warning devices shall be required, where necessary, to maintain a horizontal distance between the centers of adjacent lower-level optical warning devices of 25 ft (7.6 m) or less. The optical center of any midship mounted optical warning device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground.

### **ZONE A - FRONT WARNING LIGHTS**

There shall be two (2) Whelen C6 SurfaceMax, linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities. Component shall be covered by a five year Whelen factory warranty.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a black flange.

- Flash Pattern shall be Whelen Action Scan (Factory Default)

The Lights shall be controlled at the Switch Panel in Cab.

### **ZONES B AND D - CAB INTERSECTOR LIGHT (CAB FRONT CORNERS)**

There shall be two (2) Whelen C6 SurfaceMax, linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities. Component shall be covered by a five year Whelen factory warranty.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a black flange.

- Flash Pattern shall be Whelen Action Scan (Factory Default)

The Lights shall be controlled at the Switch Panel in Cab.

#### ZONES B AND D - BODY LIGHT (BODY WHEELWELL AREA)

There shall be two (2) Whelen surface mount ION Series LED light(s) with wide angle optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns.

Each light shall have:

- Red LEDs
- Clear Lens
- Black Flange

The lights shall be controlled at the multiplex display(s) in the cab.

#### ZONES B AND D - BODY INTERSECTOR LIGHT (BODY REAR CORNERS)

There shall be two (2) Whelen surface mount ION Series LED light(s) with wide angle optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns.

Each light shall have:

- Red LEDs
- Clear Lens
- Black Flange

The lights shall be controlled at the multiplex display(s) in the cab.

#### ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen C6 SurfaceMax, linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities. Component shall be covered by a five year Whelen factory warranty.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a black flange.

- Flash Pattern shall be Whelen Action Scan (Factory Default)

The Lights shall be controlled at the Switch Panel in Cab.

## **WILDLAND SIDE CONTROL, PUMP MODULE**

The 74" (measured laterally across vehicle width) x 29" wide side control pump enclosure shall be removable and supported from the chassis frame rails with spring type body mounts. This enclosure shall allow independent flexing of the pump enclosure from the body and allow for quick removal. The support structure shall be constructed of extruded aluminum tubing and angle.

All pump suction and discharge controls are to be mounted on the driver side pump operator's panel so as to permit operation of the pump from a central location. The fire pump, valves and controls shall be accessible for service and maintenance as required by applicable sections of NFPA standards.

The Master Pump gauges shall be mounted on a full pump compartment width hinged gauge panel, allowing access to the backside of all gauges and gauge lines. The individual gauges shall be mounted inline with the control handle or adjacent to the control handle. Panel is to include a stainless steel piano hinge, flush mounted chrome plated trigger latch, and stainless steel cable end stops. Electrical wiring and all gauge lines shall be properly tie wrapped to prevent kinking or cutting of the lines when the panel is opened.

The following controls and equipment shall be provided on the pump panel or within the pump enclosure:

- Primer system.
- Pump and plumbing area LED service light(s).
- Pressure control device and/or throttle control.
- Fire pump and engine instruments.
- Pump intakes and discharge controls.
- Master intake and discharge gauges.
- Tank fill control.
- Tank suction control.
- Water tank level gauge.
- Pump panel LED light(s).

## **PUMP COMPARTMENT SERVICE ACCESS**

The front panel of the pump module (directly behind the cab) shall not be fully enclosed to provide an opening for access to the midship fire pump from front.

## **PUMP PANEL - SIDE MOUNT**

The pump operator's panel, along with the lower streetside and curbside pump panels shall be constructed of smooth plate aluminum with powder coated paint finish, fastened to the pump enclosure with 1/4" stainless steel bolts.

The instrument area shall have a stainless steel continuous hinge that shall swing towards the front of the module for easy access to gauges.

## **STREETSIDE PUMP PANEL - BOLTED**

The streetside pump panel shall be fastened to the pump enclosure with 1/4" stainless steel bolts and nutserts.

## **LOWER CURBSIDE PUMP PANEL - BOLTED**

The curbside pump panel shall be fastened to the pump enclosure with 1/4" stainless steel bolts and nutserts.

### **PUMP MODULE EQUIPMENT STORAGE COMPARTMENT**

There shall be one (1) equipment compartment located on the upper curbside of the pump module. It shall have dimensions of 22" wide x 26" high. The clear door compartment dimensions shall be 20.5" wide x 23" high x 12" deep with the door closed. An OnScene LED light shall illuminate the interior of the compartment when the door is open.

The equipment compartment shall be provided with a flush style hinged door. The doors shall be provided with a high quality, continuous double seal type weather stripping to prevent moisture and dust from entering the exterior compartment. The door shall be double pan design with the outer door material being 1/8" aluminum door with a 1/8" aluminum removable inner liner that shall have a natural finish to provide reflective qualities during night operations. The vertically hinged door shall have a gas shock and polished stainless steel 1/4" piano hinge.

The door latch shall be an Eberhard locking slam latch, with a chrome "D" ring with a 5-degree bend for easier grasping of each door handle with gloved hands. The door shall be provided with a keyed lock.

The exterior of the door shall be painted to match the lower job color. The interior shall be painted to match the compartment interior paint specified.

There shall be two (2) large removable panels provided on the inside of the compartment. These panels shall provide an opening for service access to the right side of the interior of the pump module and to the bottom side of the diesel pump.

### **PUMP COMPARTMENT TOP OVERLAY**

The top of the pump compartment shall be overlaid with materials of a non slip 1/8" NFPA compliant aluminum treadplate.

### **DUNNAGE AREA**

A single wall 3/16" aluminum diamond plate dunnage area shall be provided above the pump house compartment for equipment mounting and storage space. The dunnage area shall be as wide as possible from side to side, and as deep as allowed with the available space.

### **PUMP MODULE SERVICE LIGHTS**

Two (2) On Scene LED work lights shall be provided in the pump enclosure, and controlled by on/off switch on each light.

### **STREETSIDE RUNNING BOARD - SIDE MOUNT PANEL**

The streetside pump panel shall be equipped with a side running board. The running board shall extend along the width of the pump module.

The running board stepping surface shall be constructed of aluminum NFPA compliant tread plate, bolted in place with stainless steel fasteners.

- One (1) OnScene 8" Access white LED ground light(s) shall be provided below the body. Light(s) shall be switchable but activated automatically when the park brake is set.

### **CURBSIDE RUNNING BOARD - SIDE MOUNT PANEL**

The curbside pump panel shall be equipped with a side running board. The running board shall extend along the width of the pump module.

The running board stepping surface shall be constructed of aluminum NFPA compliant tread plate, bolted in place with stainless steel fasteners.

- One (1) OnScene 8" Access white LED ground light(s) shall be provided below the body. Light(s) shall be switchable but activated automatically when the park brake is set.

### **PUMP MODULE FINISH**

The pump module framework shall be painted to match body single color choice.

### **PUMP COMPARTMENT HEATER**

The pump compartment shall be provided with one (1) Red Dot 35,000 BTU hot water type heater(s). The heater(s) shall be connected to the chassis engine cooling system and have three-speed, 12 volt blower. The cooling system lines shall be insulated and be provided with 1/4 turn shut-off valves to isolate system, if required.

The pump operator's panel shall have an Innovative Controls switch panel for heat control switch with indicator light. Switch shall be constantly illuminated and labeled.

### **CROSS LAY**

The specified pump module shall have three (3) cross lay(s). The cross lay hose bed(s) shall be located in the upper portion of the pump module.

The cross lay area shall be located at the front of side control pump module and at the rear of top control module. The cross lay area shall span the entire width of the pump module.

### **CROSS LAY TRIM**

Brushed stainless steel trim shall be installed at the openings on each side of the cross lay hose bed area. The trim shall reduce the chaffing of the hose jacket on the edges of the bay area.

If divider(s) are required between the hose bed areas they shall be fabricated from 3/16" smooth aluminum and mounted in a channel on each end for adjustability.

Removable slotted aluminum flooring shall be provided for the hose bed area.

Each end of hose bed shall have a 2" black nylon covered with black 14 oz. vinyl style webbing covers. The covers will be mechanically fastened at the sides of the hose bed and secured using yellow pulls with reflective bungees and shoulder bolts.

Safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at each side of hose storage area.

## **HOSE STORAGE LIGHTS**

No lights shall be provided in the hose storage area.

## **WATEROUS CX 1,250 GPM FIRE PUMP**

A Waterous Model CX fire pump shall be midship mounted and shall comply with all applicable requirements of the latest standards for automotive fire apparatus of the National Fire Protection Association, NFPA 1901.

The CX is capable of supplying volumes up to 1,500 GPM (6000 L/min) @ 150 psi (10.3 bar). When installed in vehicle, complete with proper intake piping.

### Casing:

Two-piece, vertically-split, high-tensile, close grained gray iron.

### Impeller:

Bronze impeller specifically designed for the fire service, double hubbed to eliminate axial thrust, and accurately balanced for vibration-free running. Impellers with flame-plated hubs for extreme wear resistance are optional.

### Wear Rings:

Replaceable bronze wear rings to increase pump life and keep maintenance costs at a minimum.

### Impeller Shaft:

Stainless steel, heat treated, precisely ground to size, and polished under shaft seal. Supported by oil-lubricated ball bearings.

### Shaft Seal:

Face-type, self-adjusting, corrosion and wear resistance mechanical seal is standard

### Intake Connection:

Victaulic Intake CXV 6" or optional Dual Intake CXS 6"

### Bearings:

All bearings are oil or grease lubricated, ball-type, located outside the pump casting to accurately align and support the impeller shaft assembly. Ball bearings are deep groove type designed to carry both radial and axial thrust.

### PA Series:

PA Series transmission is normally used when a truck transmission mounted power take-off is selected as the pump drive. Designed for use with Allison transmissions with 10-bolt PTO.

Housing: High-strength aluminum

Chain: Morse HV®, high-strength involute chain

### Pump Anodes:

There shall be two (2) anodes provided to protect the components that come in contact with the water system from corrosion and deterioration. One (1) anode shall be installed in the inlet (suction) side of system, and one (1) shall be installed in the pressure (outlet) side of the PTO pump.

## **PUMP TEST RATING**

The fire pump shall be tested at 1,250 GPM (5,000 LPM) @ 150 PSI (1,134 Kpa).



## **PAINT FINISH**

The pump shall be provided with a black finish color in lieu of the standard red.

## **PUMP DRIVE SYSTEM - PUMP AND ROLL**

The water pump system shall be driven by a Chelsea "Hot-Shift" transmission PTO and mounted directly to the transmission of the chassis. The drive line shall be hollow tube type, with heavy duty universals and splined shaft to allow movement of the chassis components and pump.

Where the pump is driven by the chassis engine, a label indicating the chassis transmission shift selector position to be used for pumping shall be provided in the driving compartment and located so that it can be read from the driver's position.

Where the pump is driven by the chassis engine and automatic transmission through a split shaft PTO, an interlock system shall be provided to prevent the pump drive system from being shifted out of the "pump engaged" pumping mode of operation when the chassis transmission is in pump gear.

Where the water pump is driven by the chassis engine, an interlock system shall be provided to ensure that the pump drive system components are engaged in the pumping mode of operation so that the pumping system can be operated from the pump operator's position, with indicators to inform the operators of the status of the controls.

Apparatus shall have "Pump Engaged", "OK to Pump" and "OK to Pump & Roll" indicators in the driver compartment.

All apparatus shall have "Throttle Ready" and "OK to Pump" indicators on the pump operator's panel.

A "Pump Engaged" indicator shall be provided in the driving compartment to indicate the pump shift has been successfully completed.

An "OK to Pump" indicator shall be provided in the driving compartment and on the pump operator's panel to indicate that all of the following conditions have been met to safely operate the pump in stationary mode:

1. The pump shift is engaged.
2. The parking brake is engaged.
3. If the pump is driven from a transfer case PTO or auxiliary transmission PTO, the drive to the wheels is in neutral.
4. If the apparatus is equipped with an automatic transmission, the chassis transmission is in the correct pump gear as follows:
  - x. If the pump is driven by a PTO after the chassis transmission gearing (e.g., split shaft PTO, transfercase PTO, etc.) the transmission is in the correct forward drive gear.
  - y. If the pump is driven by a PTO ahead of the chassis transmission gearing (e.g., flywheel PTO, crankshaft PTO, etc.) the transmission is in neutral.
5. If the apparatus is equipped with a manual transmission, any gear, including neutral, will allow an "OK to Pump" indicator to come on provided all other conditions are met.

As this Apparatus is designed to be used in both stationary pumping mode and "pump-and roll" pumping mode, an "OK to Pump-and-Roll" indicator shall be provided in the driving compartment to indicate that all of the following conditions have been met to safely operate the pump in pump-and-roll mode:

1. The pump shift is engaged.
2. The parking brake is released.

A "Throttle Ready" indicator shall be provided on the pump operator's panel. The "Throttle Ready" indicator shall indicate when the pump is in "OK to Pump" mode. The "Throttle Ready" indicator at the pump operator's panel shall indicate when the parking brake is engaged, pump is engaged and, if the apparatus is equipped with an automatic Transmission, when the Transmission is in the appropriate Gear.

Model part number shall be Chelsea 859 series.

### **1/2" PUMP COOLER LINE**

There shall be a 1/2" line installed from the discharge side of the pump to the water tank. The line shall be used to cool the pump during long periods of pumping when water is not being discharged. The pump cooler shall be controlled with a quarter-turn ball valve on main pump panel, and shall be clearly labeled "Pump Cooler".

### **PUMP COOLER CHECK VALVE**

There shall be a check valve installed in the pump cooler line to prevent tank water from back flowing into the pump when it is not in use.

### **WATEROUS SEVEN YEAR PUMP WARRANTY**

The fire pump shall be warranted by Waterous for a period of seven (7) years from the date of delivery to the Galeton Fire Protection District.

### **FIRE PUMP TEST**

The pump shall undergo a fire pump test per applicable sections of NFPA 1901 or 1906 standards, prior to delivery of the completed apparatus.

The test shall include at least the pumping test, the pumping engine overload test, the pressure control system test, the priming device tests, and a vacuum test.

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 500 psi (3400 kPa) for a minimum for 10 min.

The pump shall be capable of producing fire streams that are free from objectionable pulsation under all normal operating conditions.

The results of this test shall be furnished with the vehicle on delivery.

### **FIRE PUMP TEST LABEL**

A test plate shall be provided at the pump operator's panel that gives the rated discharges and pressures together with the speed of the engine as determined by the certification test for each unit, the position of the parallel/series pump as used, and the governed speed of the engine as stated by the engine manufacturer on a certified brake horsepower curve

### **SAFETY SIGN**

A safety sign FAMA25, which warns of the need for training prior to operating the apparatus, shall be located on the pump operators panel.

**ALTITUDE REQUIREMENT**

The apparatus shall be designed to meet the specified rating at 5,000 feet (1,525 meters) altitude.

**PUMP DRAIN VALVE**

The pump drain shall be controlled at the pump operator's panel and identified as "Pump Drain". The control shall be a Waterous push-pull type control that is easily actuated with a gloved hand.

**AIR PRIMING PUMP CONTROL - MANUAL CONTROL**

The priming pump shall be a Trident Emergency Products compressed air powered, high efficiency, multi-stage venturi based AirPrime System.

The AirPrime is more efficient and reliable than the conventional electric motor driven primers, and virtually eliminates the impact load on the vehicles electrical system improving the reliability of the vehicle. AirPrime also improves performance in the elapsed time for establishing water supply resulting in improved fire ground operations and safety.

The primer shall be capable of priming the pump through a 20' section of suction hose with a 10' lift within 30 seconds for pumps less than 1,500 gpm, and 45 seconds for pumps 1,500 gpm and larger.

**PRESSURE GOVERNOR and ENGINE MONITORING DISPLAY**

A Fire Research PumpBoss series PBA401-D00 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 6 3/4" high by 4 5/8". The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored engine information and outputs for engine control shall be on the J1939 databus. Inputs from the pump discharge and intake pressure sensors shall be electrical.

The following continuous displays shall be provided:

- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Check engine and stop engine warning LEDs
- Engine oil pressure; shown on a dual color (green/red) LED bar graph display
- Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
- Transmission Temperature: shown on a dual color (green/red) LED bar graph display
- Battery voltage; shown on a dual color (green/red) LED bar graph display
- Pressure and RPM operating mode LEDs
- Pressure / RPM setting; shown on a dot matrix message display
- 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. All LED intensity shall be automatically adjusted for day and night time operation.

The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

• High Battery Voltage	• Low Engine Oil Pressure
• Low Battery Voltage (Engine Off)	• High Engine Coolant Temperature
• Low Battery Voltage (Engine Running)	• Out of Water (visual alarm only)

• High Transmission Temperature	• No Engine Response (visual alarm only).
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The program features shall be accessed via push buttons located on the front of the control module. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.

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 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.

**ENGINE GAUGES**

The cab/chassis engine gauges shall be provided with the specified pump pressure governor system.

**6" SUCTION INLET - STREETSIDE**

One (1) 6" (150 mm) suction intake shall be installed on the streetside pump panel to supply the fire pump from an external water supply. The intake threads shall be 6" NHM threads.

The suction fittings shall include a removable die-cast screen to provide cathodic protection for the pump thus reducing corrosion.

A short steamer barrel may be required to accommodate an intake valve without exceeding the legal overall body width.

**SUCTION CAP**

The suction inlet shall be equipped with a 6" NH chrome plated, long handled, aluminum, cap capable of withstanding 500 psi.

- Two (2) Harrington 6.0" NST/NH x 6.0" Hose x 10' Flexlite PVC flexible suction hose(s) shall be provided with completed unit. The hose shall have NHM rocker lug x NHF long handle couplings.
  - The suction hose(s) shall be mounted on streetside above wheels in formed aluminum hard suction tray(s).
- One (1) 6" barrel strainer(s) with foot valve shall be provided with completed unit. Barrell strainer hard suction end shall match provided hard suction(s).

**6" SUCTION INLET - CURBSIDE**

One (1) 6" (150 mm) suction intake shall be installed on the curbside pump panel to supply the fire pump from an external water supply. The intake threads shall be 6" NHM threads.

The suction fittings shall include a removable die-cast screen to provide cathodic protection for the pump thus reducing corrosion.

A short steamer barrel may be required to accommodate an intake valve without exceeding the legal overall body width.

### **BALL INTAKE VALVE (BIV)**

Task Force Tips model #AXD8NX-NX-T manually operated lightweight aluminum high flow ball intake valve shall be provided. The unit shall be equipped with an adjustable pressure relief valve located on the right side with visual pressure settings. An eight-position adjustable inlet elbow shall be located on the bottom of the valve. The valve shall be controlled with an NFPA compliant slow-close crank gear operator facing the top of the valve located on the left side. A 3/4" bleeder valve shall be provided to exhaust excess air or water from the valve and hoseline. A position indicator shall be provided to allow for quick visualization of the status of the valve in the open, closed or partial positions. For maximum corrosion protection the aluminum casting shall be hardcoat anodized, with a powder coat internal and external finish. All components facing the wet side of the valve shall be constructed from hardcoat anodized aluminum alloy with corrosion resistant coating.

The connections shall be: 6" male NH rigid with 30 degree swiveling detent elbow and a 6" female NH swivel long handle connection and include polymer bearing strips for prevention of galvanic corrosion. The unit shall have a unique serial number. The valve shall be covered by a 10-year warranty against manufacturing defects and corrosion that affect the valve's operational performance.

### **SUCTION CAP**

The suction inlet shall be equipped with a 6" NH chrome plated, long handled, aluminum, cap capable of withstanding 500 psi.

### **HEAT EXCHANGER**

A heat exchanger shall be provided on the pump driving engine cooling system that permits water from the discharge side of the pump to cool the coolant circulating through the engine cooling system without intermixing. The heat exchanger should maintain the temperature of the coolant in the pump drive engine not in excess of the engine manufacturer's temperature rating under all pumping conditions.

To prevent damage from freezing, a drain(s) shall be provided to allow draining of the heat exchanger.

The cooling system shall be controlled by a 1/4 turn valve on the pump operator's panel.

### **INTAKE RELIEF VALVE**

An Akron Brass model 53 intake pressure relief valve shall be provided. The intake pressure relief valve shall have a flange to allow mounting to a 4-bolt pump intake flange. The unit shall be adjustable from 50 to 250 psi and be factory set at 125 psi. Provisions for adjusting or servicing the valve {will/shall} be provided.

The relief outlet shall be directed below the pump with the discharge terminating in a 2-1/2" NSTM connection. The discharge shall be away from the pump operator and labeled "DO NOT CAP".

### **INTAKE RELIEF VALVE: DISCHARGE LOCATION**

The above intake relief valve(s) shall be plumbed to discharge to the ground, below apparatus and away from the operators area.

**FOAM SYSTEMS**

There shall be a FoamPro 1601 foam system with a 12 VDC, 1/3 hp electric motor driven positive displacement piston type foam concentrate pump with a rated capacity of .01 to 1.0 gpm @ 200 psi, with operating pressures up to 400 psi. The system will draw a maximum of 30 amps @ 12 VDC.

The apparatus shall be equipped with an electronic, fully automatic, variable speed, direct injection, discharge side foam proportioning system. The system shall be capable of handling Class A foam concentrate. The foam proportioning operation shall be based on direct measurement of water flows, and remain consistent within the specified flows and pressures. System must be capable of delivering accuracy to within 5% of calibrated settings over the advertised operation range when installed according to factory standards. 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 operator preset proportional amount of foam concentrate is injected into the discharge side of the fire pump.

A paddlewheel-type flowmeter shall be installed in the discharge system specified to be “foam capable.” A simulated flow feature shall be incorporated into the motor driver to simulate an approximate flow value of 100 gpm. This feature is to be engaged or disengaged with a momentary switch and will automatically disengage when the main system switch is turned off.

The control module shall enable the pump operator to:

<ul style="list-style-type: none"> <li>• Activate the foam proportioning system</li> <li>• Select proportioning rates from 0.1% to 1.0%</li> </ul>	<ul style="list-style-type: none"> <li>• See a “low concentrate” warning light flash when the foam tank runs low and in two minutes, if foam concentrate is not added to the tank, shut the foam concentrate pump down</li> </ul>
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A 12 VDC electric motor driven positive displacement plunger pump shall be provided. The pump capacity shall be from 0.1 gpm (0.38 L/min) to 1.0 gpm (3.8 L/min) at 200 psi (13.8 BAR) with a maximum operating pressure up to 400 psi (27.6 BAR). The pump shall have the capability to draw 3 foot of lift. The system will draw a maximum of 30 amps @ 12 VDC. The motor shall be controlled by the microprocessor (mounted to the base of the pump). It shall receive signals from the control module and power the 1/3 hp (.25 kW) 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 of fire pump and water tank. A 12 psi (.83 BAR) opening pressure check valve shall be provided in concentrate line.

Components of the complete proportioning system as described above shall include:

<ul style="list-style-type: none"> <li>• Operator control module</li> <li>• Paddlewheel flowmeter</li> <li>• Pump and electric motor/motor driver</li> <li>• Wiring harnesses</li> </ul>	<ul style="list-style-type: none"> <li>• Low level tank switch</li> <li>• Foam tank</li> <li>• Foam injection check valve</li> <li>• Main waterway check valve</li> </ul>
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An installation and operation manual shall be provided for the unit, along with a one-year limited warranty by the manufacturer. The system must be installed and calibrated by a Certified FoamPro Dealer. The system design shall have passed environmental testing which simulates heavy use on off-road mobile apparatus. Testing shall have been conducted in accordance to SAE standards.

A means shall be provided to prevent water back flow into the foam proportioning system and the foam concentrate storage tank.

## **REMOTE FOAM START/STOP**

A remote start/stop feature shall be available to be incorporated into the 1600 series proportioners. This option shall allow the operator to start and/or stop the operation of the proportioner from more than one location on the apparatus. Included in this option are a special control module, a local start/stop switch with LED lamp for mounting near the control module, a remote start/stop switch with LED lamp for remote mounting, and the 20 foot interface cable.

## **FOAM SYSTEM DRAIN**

An Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve with lift type handle which can be opened under pressure, and color coded label shall be provided. Valve shall be located on lower pump panel and drain the lowest point in the foam system plumbing.

## **HOSE THREADS**

Hose threads shall be National Standard (NST) on all base threads on the apparatus intakes and discharges, unless otherwise specified. (NST and NH are the same thread)

## **PLUMBING SPECIFICATIONS**

The fire pump plumbing system shall be fabricated with rigid stainless steel and or flexible piping with stainless steel fittings. Victaulic couplings shall be installed to permit flexing of the plumbing system and allow for quick removal of piping or valves for service. Flexible hose couplings shall be threaded stainless steel or Victaulic connections.

The fire pump and plumbing shall be hydrostatically tested in compliance to applicable sections of NFPA standards, with test results submit with the delivery documentation.

## **STAINLESS STEEL INTAKE MANIFOLD**

The suction manifold assembly shall be fabricated with Schedule 10 type 304 stainless steel. All threaded fittings shall be a minimum of Schedule 10 stainless steel. The suction manifold assembly shall have radiused sweep elbows to minimize water turbulence into the suction volute.

The suction manifold shall be welded and pressure tested prior to installation. The stainless steel manifold assembly shall be attached to the pump intake volute with a heavy-duty, flexible Victaulic coupling.

The entire intake piping system, valves, bleeder valves, and intake closures, excluding the tank-to-pump line on the tank side of the valve, shall be capable of withstanding a hydrostatic pressure of 250 psi (1700 kPa).

## **STAINLESS STEEL DISCHARGE MANIFOLD**

The discharge manifold assembly shall be fabricated with Schedule #10 type 304 stainless steel. All threaded fittings shall be a minimum of Schedule 10 stainless steel. The discharge manifold assembly shall have radiused sweep elbows to minimize water turbulence into the discharge header.

The manifold shall be welded and pressure tested prior to installation. The stainless steel manifold assembly shall be attached to the pump intake volute with a heavy-duty, flexible Victaulic coupling.

The entire discharge piping system; valves; drain cocks; and outlet closures, excluding the tank fill line on the tank side of the valve and CAF system piping and components that include valves that permit isolation from discharge pressure, shall

be capable of withstanding a hydrodynamic discharge pressure of 500 psi (3400 kPa) or 100 psi (700 kPa) over the maximum discharge pressure capability rating of the pump, whichever is greater.

### **PLUMBING SYSTEM FINISH**

The plumbing system shall not be painted. The piping and valves shall remain natural color.

### **STAINLESS STEEL PLUMBING WARRANTY**

The stainless steel plumbing shall be free of defects in material and workmanship for a period of ten (10) years, or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

The contractor shall supply details of their warranty information with their bid submission.

### **INTAKES**

The pump shall have a sufficient number and size of intakes to perform the apparatus pump system certification test.

If the couplings on the suction hose carried on the apparatus are of a different size from that of the pump intake(s) or have means of hose attachment other than that provided on the intake(s), an adapter(s) shall be provided to allow connection of the suction hose to the pump intake(s).

Safety sign FAMA25, which warns of the need for training prior to operating the apparatus, shall be located on pump operator's panel. Label shall be in both English/French for units built for Canada;

**WARNING:** Death or serious injury might occur if proper operating procedures are not followed. The pump operator as well as individuals connecting supply or discharge hoses to the apparatus must be familiar with water hydraulics hazards and component limitations.

**AVERTISSEMENT:** La mort et de graves blessures peuvent survenir si la marche à suivre pour l'utilisation adéquate n'est pas effectuée. L'opérateur de la pompe, ainsi que les personnes qui raccordent les tuyaux d'alimentation et de refoulement à l'engin, doivent être familières avec le manuel de l'opérateur, les dangers liés à l'hydraulique et les restrictions relatives aux composantes.

Each intake shall have a removable or accessible strainer inside the connection. The strainer(s) shall restrict spherical debris that is too large to pass through the pump.

At least one (1) valved intake shall be provided that can be controlled from the pump operator's position. The valve and piping shall be a minimum 2-1/2 in. (65 mm) nominal size. If the intake is 2-1/2 in. (65 mm) nominal size, the intake shall be equipped with a female swivel coupling with NH threads.

Any 3 in. (75 mm) or larger intake valve except the tank-to-pump intake valve shall be a slow-operating valve.

Each valved intake shall be equipped with a bleeder valve having a minimum 3/4 in. (19 mm) pipe thread connection to bleed off air or water. The bleeder valve shall be operational without the operator having to get under the apparatus. If a valved appliance is attached to an intake, it shall be equipped with a 3/4 in. (19 mm) bleeder valve on each intake. Bleeder valves for valved intakes 4 in. (100 mm) and larger not located at the pump operator's panel shall be located where the bleeder valve controls are visible and operationally functional while the operator remains stationary at the valved intake position.



Each valved intake having a connection size larger than 3 in. (75 mm) shall be equipped with an adjustable automatic pressure relief device installed on the supply side of the valve to bleed off pressure from a hose connected to the valved intake. The automatic pressure relief device shall be adjustable from a minimum of 90 psi (620 kPa) to at least 185 psi (1275 kPa). The pressure relief device, when preset at 125 psi (860 kPa), shall not allow a pressure rise greater than 60 psi (400 kPa) at the device inlet while flowing a minimum of 150 gpm (570 L/min). The pressure relief device shall discharge to atmosphere.

All intakes shall be provided with caps or closures capable of withstanding a hydrostatic gauge pressure of 500 psi (3400 kPa). Intakes having male threads shall be equipped with caps. Intakes having female threads shall be equipped with plugs. Where adapters for special threads or other means for hose attachment are provided on the intakes, closures shall be provided for the adapters in lieu of caps or plugs. Caps, plugs, or closures for 3-1/2 in. (90 mm) and smaller intakes shall remain secured to the apparatus when removed from the intakes.

If the suction inlets are to be equipped with a valve, Siamese, or adapter that will remain in place while the apparatus is in motion, that valve, Siamese, or adapter shall not project beyond the apparatus running board. The purchaser shall specify if any valve, Siamese, or adapter is to be permanently installed on an intake and identify the brand and model of such item.

The completed apparatus shall have the following intake(s);

### **2-1/2" INTAKE, STREETSIDE**

There shall be one (1) 2-1/2" (65 mm) gated intake(s) located on pump panel. Each intake shall include:

- One (1) Akron Brass 8800 series Gen II, manual type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a chrome handle directly connected to valve.
- Each intake shall have a 2-1/2" (65 mm) NSTF chrome swivel adapter with strainer provided.
  - The specified adapter shall be provided with a 2-1/2" (65 mm) NSTM chrome plated plug with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

### **2-1/2" INTAKE, CURBSIDE**

There shall be one (1) 2-1/2" (65 mm) gated intake(s) located on pump panel. Each intake shall include:

- One (1) Akron Brass 8800 series Gen II, manual type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a chrome handle directly connected to valve.
- Each intake shall have a 2-1/2" (65 mm) NSTF chrome swivel adapter with strainer provided.

- The specified adapter shall be provided with a 2-1/2" (65 mm) NSTM chrome plated plug with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

### **2-1/2" DIRECT TANK FILL**

One (1) 2-1/2" (65 mm) direct tank fill(s) shall be located on rear body panel with check valve.

- One (1) Akron Brass 8800 series Gen II, manual type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a chrome handle directly connected to valve.
- Each intake shall have a 2-1/2" (65 mm) NSTF chrome swivel adapter with strainer provided.
  - The specified adapter shall be provided with a 2-1/2" (65 mm) NSTM chrome plated plug with chain.

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

There shall be a check valve between the pump suction and the booster tank valve. The check valve shall eliminate back flow into the water tank when the pump is connected to a pressurized source.

### **TANK TO PUMP VALVE**

A 3" (75 mm) full flow valve shall be installed between the fire pump and the water tank. The connection between the tank and the pump shall be capable of the flow recommendations as set forth in the latest edition of NFPA 1901. A non collapsible flexible hose shall be incorporated into the tank to pump plumbing to allow movement in the line as the chassis flexes to avoid damage during normal road operation. The tank to pump valve shall be controlled from the pump operator's panel and labeled "TANK TO PUMP".

The tank to pump valve shall be as follows;

- An Akron Brass 8830 Gen II slow-operating, actuated type 3" (75 mm), stainless steel ball with HydroMax technology tank to pump valve shall be provided. Valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side.
  - The specified Akron valve(s) shall be configured for 12 VDC electric actuation.
- An Akron 9333 Navigator Pro electric valve position controller and wire harness with full color LCD display visible from all angles, true position feedback, user programmable presets, % open text shown on valve bar graph, and VMUX capable integration shall be located on the pump operator's panel.
- An Akron 9333 Navigator Pro electric valve position controller and wire harness with full color LCD display visible from all angles, true position feedback, user programmable presets, % open text shown on valve bar graph, and VMUX capable integration shall be located on the pump operator's panel.

## **DISCHARGES**

A minimum of three (3) 2-1/2 in. (65 mm) outlets shall be provided on any pump rated at 750 gpm (3000 L/min) or greater, and a minimum of one (1) 2-1/2 in. (65 mm) outlet shall be provided on any pump rated at less than 750 gpm (3000 L/min).

The piping and valves supplying any preconnected 1-1/2 in. (38 mm), 1-3/4 in. (45 mm), or 2 in. (52 mm) hose line, including the piping to the preconnected hose storage areas shall be at least 2 in. (52 mm) in size.

All discharge outlet connections, except connections to which a hose will be preconnected, shall be equipped with caps or closures capable of withstanding a hydrostatic gauge pressure of 100 psi (700 kPa) over the maximum pump close-off pressure or 500 psi (3400 kPa), whichever is greater.

Where adapters are provided on the discharge outlet connections, the closures shall fit on the adapters.

Caps or closures for outlet connections smaller than 4 in. (100 mm) shall remain secured to the apparatus when removed from the connection.

Each discharge outlet shall be equipped with a valve that can be opened and closed smoothly at pump discharge gauge pressures of 250 psi (1700 kPa).

The flow-regulating element of each valve shall not change its position under any condition of operation that involves discharge pressures to the maximum pressure of the pump.

The means to prevent a change in position shall be incorporated in the operating mechanism and shall be permitted to be manually or automatically controlled.

Any 3 in. (75 mm) or larger discharge valve shall be a slow-operating valve.

All 1-1/2 in. (38 mm) or larger discharge outlets shall be equipped with a drain or bleeder valve having a minimum 3/4 in. (19 mm) pipe thread connection for draining or bleeding off pressure from a hose connected to the outlet.

Any 2-1/2 in. (65 mm) or larger discharge outlet that is located more than 42 in. (1070 mm) above the ground and to which a hose is to be connected, but that is not in a hose storage area, shall be equipped with a sweep elbow of at least 30 degrees downward.

The completed apparatus shall have the following discharge(s);

## **FRONT DISCHARGE**

### **FRONT DISCHARGE (CURBSIDE)**

A front bumper discharge shall be provided with swivel elbow mounted atop front bumper apron.

- Label: FRONT BUMPER DISCHARGE.
  
- One (1) of the discharge(s) shall flow water and foam.
  
- One (1) Akron Brass 8600 series Gen II, actuated type 2" (52 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - An Akron 9335 Navigator Pro electric valve position controller and wire harness with full color LCD display visible from all angles, true position feedback, user programmable presets, % open text shown on valve bar graph, and VMUX capable integration shall be located on the pump operator's panel.
  
  - Pressure meter (PSI or KPa). A pressure sensor shall be provided in discharge plumbing.

Color Code: WHITE.

- There shall be a 2" (52 mm) VFC x 1-1/2" (38 mm) NSTM brass or chrome plated 90 degree swivel elbow provided for each discharge.
  
- Two (2) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

### **FRONT BUMPER GROUND SWEEP NOZZLES**

The front bumper shall be provided with 1/2" ground sweep nozzles with 145 degree spray angle (approx. 16 GPM @ 100 PSI) with spray overlap. Two (2) Bete 1/2" NPT brass fan type nozzles with vertical adjustable brass nozzle joints shall be provided and mounted, one (1) each corner of bumper and plumbed to valve using high pressure flexible 1/2" hose.

- One (1) of the discharge(s) shall flow water and foam.
  
- Two (2) KZ 84 series 1/2" (12 mm) valves with EH3 series 12 VDC electric on/off control shall be provided to control the front ground sweep nozzles. 84 Series valves have bronze body with stainless steel ball and stem. Each valve shall be individually controlled with 12 VDC on/off switches located in cab near driver, and labeled "Front Spray Bar - Left / Right".
  
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

## **REMOTE CONTROL MONITOR**

An Akron model 3462, 300 GPM rated monitor with all electric single waterway constructed of lightweight Pyrolite shall be provided on completed unit. The monitor shall have cast-in turning vanes in each elbow, and fully enclosed motors and gears with manual overrides for both horizontal and vertical rotation and may be operated simultaneously.

This compact forestry monitor features a fully sealed integrated electrical control system with waterproof locking connectors from all motors, power and control connections to withstand harsh environments often seen in Wildland fire fighting conditions. The high speed motors of this monitor provide proportional speed control for pinpoint stream positioning and accuracy and ideal for use in water, foam and CAFS applications.

Standard Features:

- CAN proportional speed joystick control
- Lightweight Pyrolite construction, 23 lbs. without nozzle
- Integrated and sealed electronics
- Waterproof (IP 67 rated) locking connectors
- Simple "plug and play" installation
- 320° maximum rotation range with stops at ± 90°
- 135° maximum elevation range with stops at ± 45° and -20°
- Style 3293 low flow adjustable electric fog nozzle with flush 30-60-95-125 gpm (115-230-360-475 lpm)

The control system electronics shall be integrated with the monitor wiring harness. The control system shall use sealed, locking connectors for the monitor and nozzle motors. Two additional sealed, locking connectors shall be supplied for input power/electric valve control and J1939 CAN bus interface. A sealed USB connector shall be provided for updating control system firmware. All electrical connectors shall be minimum IP65 rated.

The operator interface shall be located in cab easily accessible to driver and consist of a CAN bus compatible joystick which will provide up, down, right, left, fog, and stream control of the monitor. The joystick shall have a trigger switch to control an optional electric discharge valve. The monitor shall include a 5' long power/valve harness and 20' long CAN joystick harness.

Monitor to be mounted on quick connect mount for quick removal, if necessary.

A Class 1 high pressure flexible hose with stainless steel Victaulic couplers shall connect the discharge valve and monitor. Hose shall be secured to body and chassis frame with bolted "P" style clamps and protected from abrasion, sharp edges, or high heat.

- One (1) of the discharge(s) shall flow water and foam.
- Specified deck gun shall be controlled by an Akron Brass 8800 series Gen II, 12 VDC electric actuated type 2" (52 mm) valve(s), Stainless Steel ball with HydroMax technology. Valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.
- A discharge pressure gauge is not required with the remote valve control.

- The specified deck gun/bumper monitor shall have a position indicator connected and located next to the Joystick or control.

## **STREETSIDE DISCHARGE**

### **2-1/2" DISCHARGE - 250 GPM**

There shall be one (1) 2-1/2" (65 mm) gated discharge(s) with control located on pump panel. Each discharge shall include:

- Label: DRIVER SIDE DISCHARGE.
- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8800 series Gen II, manual type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle connected to the valve located at pump panel. Valve control shall have a ICI chrome bezel with incorporated analog pressure gauge.
- Color Code: GREEN.
- One (1) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with blue LED backlighting activated with pump engagement.
  - Gauge(s) shall have a white background with black text.
  - Gauge(s) shall have a range from 0 to 400 PSI.
- Discharge shall have a 2-1/2" (65 mm) NSTF x 2-1/2" (65 mm) NSTM chrome plated 30 degree downsweep elbow provided.
  - The specified elbow shall be provided with a 2-1/2" (65 mm) NSTF chrome plated cap with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

## **CURBSIDE DISCHARGE**

### **CURBSIDE DISCHARGE #1**

- Label: PASSENGER SIDE DISCHARGE.
- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8800 series Gen II, manual type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle connected to the valve located at pump panel. Valve control shall have a ICI chrome bezel with incorporated analog pressure gauge.
- Color Code: PURPLE.
- One (1) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with blue LED backlighting activated with pump engagement.
  - Gauge(s) shall have a white background with black text.
  - Gauge(s) shall have a range from 0 to 400 PSI.
- Discharge shall have a 2-1/2" (65 mm) NSTF x 2-1/2" (65 mm) NSTM chrome plated 30 degree downsweep elbow provided.
  - The specified elbow shall be provided with a 2-1/2" (65 mm) NSTF chrome plated cap with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

## **CURBSIDE DISCHARGE #2**

- Label: NO. 2 PASSENGER SIDE DISCHARGE.
- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8800 series Gen II, manual type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle connected to the valve located at pump panel. Valve control shall have a ICI chrome bezel with incorporated analog pressure gauge.
- Color Code: GRAPHITE.
- One (1) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with blue LED backlighting activated with pump engagement.
  - Gauge(s) shall have a white background with black text.
  - Gauge(s) shall have a range from 0 to 400 PSI.
- Discharge shall have a 2-1/2" (65 mm) NSTF x 2-1/2" (65 mm) NSTM chrome plated 30 degree downsweep elbow provided.
  - The specified elbow shall be provided with a 2-1/2" (65 mm) NSTF chrome plated cap with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.



**STREETSIDE DISCHARGE #3**

**Discharge will be for Decon shower and shall include a shower head. (1103/04)**

- Label: 1" DISCHARGE.

One (1) manual 1/4 turn 1" (25 mm) in-line brass ball valve(s) shall be provided. Valve shall be equipped with chromed 1/4 turn control knob to manually open and close the valve(s).

- Valve(s) shall be controlled with a chrome handle directly connected to valve.

Color Code: BLACK.

- A discharge pressure gauge is not required with the remote valve control.

## **REAR CURBSIDE DISCHARGE**

Each discharge(s) shall have a stainless steel trim ring.

### **DISCHARGE REAR CURBSIDE (INBOARD)**

- Label: 2-1/2" REAR DISCHARGE.
  
- One (1) of the discharge(s) shall flow water only.
  
- One (1) Akron Brass 8600 series Gen II, actuated type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - An Akron 9335 Navigator Pro electric valve position controller and wire harness with full color LCD display visible from all angles, true position feedback, user programmable presets, % open text shown on valve bar graph, and VMUX capable integration shall be located on the pump operator's panel.
  
  - Pressure meter (PSI or KPa). A pressure sensor shall be provided in discharge plumbing.
  
- Color Code: BROWN.
  
- Discharge shall have a 2-1/2" (65 mm) NSTF x 2-1/2" (65 mm) NSTM chrome plated 30 degree downsweep elbow provided.
  - The specified elbow shall be provided with a 2-1/2" (65 mm) NSTF chrome plated cap with chain.
  
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

## **DISCHARGE, CROSSLAY #1**

There shall be a 2" [52mm] hose crosslay located on pump module. The crosslay shall be transverse of the pump module or body with access from either side. A swivel elbow discharge shall be located below crosslay, outboard as far as possible.

- Hose capacity shall be 200' of 1-3/4" hose.
- Label: CROSSLAY #1.
- One (1) of the discharge(s) shall flow water and foam.
- One (1) Akron Brass 8600 series Gen II, actuated type 2" (52 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - An Akron 9335 Navigator Pro electric valve position controller and wire harness with full color LCD display visible from all angles, true position feedback, user programmable presets, % open text shown on valve bar graph, and VMUX capable integration shall be located on the pump operator's panel.
  - Pressure meter (PSI or KPa). A pressure sensor shall be provided in discharge plumbing.
- Color Code: RED.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

## **DISCHARGE, CROSSLAY #2**

There shall be a 2" [52mm] hose crosslay located on pump module. The crosslay shall be transverse of the pump module or body with access from either side. A swivel elbow discharge shall be located below crosslay, outboard as far as possible.

- Hose capacity shall be 200' of 1-3/4" hose.
- Label: CROSSLAY #2.
- One (1) of the discharge(s) shall flow water and foam.
- One (1) Akron Brass 8600 series Gen II, actuated type 2" (52 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - An Akron 9335 Navigator Pro electric valve position controller and wire harness with full color LCD display visible from all angles, true position feedback, user programmable presets, % open text shown on valve bar graph, and VMUX capable integration shall be located on the pump operator's panel.
  - Pressure meter (PSI or KPa). A pressure sensor shall be provided in discharge plumbing.
- Color Code: BLUE.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

### **DISCHARGE, CROSSLAY #3**

There shall be a 2-1/2" [63mm] hose crosslay located on pump module. The crosslay shall be transverse of the pump module or body with access from either side. A swivel elbow discharge shall be located below crosslay, outboard as far as possible.

- Hose capacity shall be 200' [61m] of 3" [76mm] double jacket hose with 2-1/2" [65mm] couplings.
- Label: CROSSLAY #1.
- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8600 series Gen II, actuated type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - An Akron 9335 Navigator Pro electric valve position controller and wire harness with full color LCD display visible from all angles, true position feedback, user programmable presets, % open text shown on valve bar graph, and VMUX capable integration shall be located on the pump operator's panel.
  - Pressure meter (PSI or KPa). A pressure sensor shall be provided in discharge plumbing.
- Color Code: BEIGE.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

## **DISCHARGE, BOOSTER REEL #1**

- Label: BOOSTER REEL.

There shall be a Hannay SBEF series booster hose reel discharge(s) with polished aluminum finish, and electric rewind motor located as required, or per itemized compartment layout.

- Power rewind control(s) shall be in a position where the operator can observe the rewinding operation and not be more than 72 in. (1830 mm) above the operator's standing position, and shall be marked with a label indicating its function.
- Booster hose reel shall be equipped with a captive style hose roller guides.
- Each booster reel shall be supplied with one (1) 100' x 1" of lightweight 100% polyester booster hose(s) with 1" NST Pyrolite couplings. Hose color shall be red.
- Specified booster reel shall be located in **curbside rear cab step**.
- No nozzle is required with specified booster hose reel(s).
- One (1) of the discharge(s) shall flow water and foam.
- One (1) Akron Brass 8600 series Gen II, actuated type 2" (52 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
- An Akron 9333 Navigator Pro electric valve position controller and wire harness with full color LCD display visible from all angles, true position feedback, user programmable presets, % open text shown on valve bar graph, and VMUX capable integration shall be located on the pump operator's panel.
- Color Code: ORANGE.

## **TANK FILL VALVE**

There shall be one (1) 2" (52 mm) tank fill valve plumbed with 2" plumbing from the pump to the tank. Installation shall be completed with 2" rubber hose and stainless steel hose couplings. The tank fill valve shall be controlled from the operator's control panel and labeled "TANK FILL".

- One (1) Akron Brass 8800 series Gen II, actuated type 2" (52 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - The specified Akron valve(s) shall be configured for 12 VDC electric actuation.
  - An Akron 9333 Navigator Pro electric valve position controller and wire harness with full color LCD display visible from all angles, true position feedback, user programmable presets, % open text shown on valve bar graph, and VMUX capable integration shall be located on the pump operator's panel.
  - An Akron 9333 Navigator Pro electric valve position controller and wire harness with full color LCD display visible from all angles, true position feedback, user programmable presets, % open text shown on valve bar graph, and VMUX capable integration shall be located on the pump operator's panel.

## **PUMP PANEL**

The side mount pump control panel shall be hinged, or bolted in place allowing it to be easily removed to gain access to plumbing components.

The pump controls shall be mounted on an aluminum control panel with a black powdercoat painted finish.

## **PUMP PANEL LOCATION**

The pump control panel shall be side mounted.

The pump panel shall include the following items;

## **PUMP PANEL ACCESS**

The pump panel shall be open to the side of the truck. The Pump Operator shall NOT be required to open a compartment door to access the pump control panel.

## **MASTER INTAKE/PRESSURE GAUGES**

There shall be one (1) Innovative Controls/NoShok 4" liquid filled gauge to display the Master Intake Pressure, and labeled "PUMP INTAKE".

There shall be one (1) Innovative Controls/NoShok 4" liquid filled gauge to display the Master Discharge Pressure. Gauge shall be labeled "PUMP DISCHARGE".

Both gauges shall have a die cast zinc, chrome plated bezel and color-coded. The left side (Pump Intake) bezel shall be color coded red, and the right side (Pump Discharge) bezel shall be colored black.

A test gauge port manifold shall be integrated into lower center bezel.

- Gauge(s) shall have a white background with black text.
- Gauge(s) shall have a range from -30" to 400 PSI.

## **PUMP SAFETY AND TEST LABELS**

Safety, information, data, and instruction labels for apparatus shall be provided and installed at the operator's instrument panel.

The labels shall include rated capacities, pressure ratings, and engine speeds as determined by the certification tests. The no-load governed speed of the engine, as stated by the engine manufacturer, shall also be included.

The labels shall be provided with all information and be attached to the apparatus prior to delivery.

## **PUMP PANEL LIGHTING**

All gauges and controls on the pump operator's panel shall be adequately illuminated by a full panel width shielded light assembly with full width OnScene Solutions LED light (each panel, if equipped). The light shall be activated by a weather-proof type switch on the pump operator's panel as well as automatically when pump is engaged. This switch shall also activate any area step lighting.

## **PUMP PANEL AIR HORN SWITCH**

The pump operator's panel shall have an Innovative Controls switch panel to activate the cab/chassis air horn(s). Switch shall be constantly illuminated and labeled.

## **POLY WATER TANK**

The water tank capacity shall be approximately 750 US gallon or 624 Imperial gallons. Certification of the tank capacity shall be recorded on the manufacturer's record of construction and shall be provided to the purchaser upon delivery of the apparatus.



## **CONSTRUCTION**

The water tank shall be of a specific configuration and designed to be completely independent of the body and to incorporate the lowest possible Center of Gravity. The transverse and longitudinal baffles shall be manufactured of a minimum of 3/8" polypropylene. All baffles shall be properly vented to permit movement of air and water between compartments. All baffles shall interlock with one another and are completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with NFPA 1901. All exterior walls and interior baffles shall be welded to the floor of the tank. Tolerances in design allow for a maximum variation of 1/8" on all dimensions. All poly sheeting utilized in the construction of the tank shall be of a textured finish.

## **WATER FILL TOWER AND COVER**

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" polypropylene sheet and shall have a minimum outside dimension of 8" (203mm) x 8" (203mm). The tower shall have a 1/4" thick removable polypropylene screen and a polypropylene hinged cover. The fill tower cover shall include a Label "WATER ONLY" that is blue in color with white letters indicating that it is a water-only fill tower. Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum I.D. of 4" that is designed to run through the tank and shall be piped to discharge water behind the rear wheels as required in NFPA 1901 so as to not interfere with rear tire traction. The discharge of the overflow/vent shall be threaded to allow for a fitting and hose to be installed and routed below the fuel tank or rear axle to prevent flooding.

## **SUMP**

The sump shall be constructed of a minimum of 1/2" polypropylene. When a front suction is required, a 3" schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" N.P.T. threaded outlet on the bottom for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3" above the inside floor.

## **THREADED PORTS**

There will be three (3) standard threaded Ports: one for the tank-to-pump suction Line, one for tank fill line and a one for a water level sensor. All threads shall be of National Pipe Taper specification unless otherwise specified.

## **MOUNTING AND SUPPORT**

The tank shall be mounted to the sub-frame of the body with a barrier of 1/4" rubber between tank and any frame material. The rubber Isolator shall have a Rockwell rating of 60 durometer. The frame / cradle shall support the entire floor including the perimeter of the tank with a maximum unsupported area of 529 square inches (.341 sq m) for tanks equal to or less than 40" (1016 mm) tall and 400 square inches (.258 sq m) for tanks greater than 40" (1016 mm) tall.

## **WATER TANK LEVEL GAUGE**

There shall be one (1) Innovative Controls SL series 10-LED water tank level gauge(s) for indicating water tank level. The tank level gauge shall indicate the liquid level on an easy to read display.

Each tank level gauge system shall include:

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- A super bright LED bar graph display with a visual alarm at 1/4 of a tank. The display shall also provide an output to activate an audible alarm or secondary visual alarm at 1/4 of a tank.
- A set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.

### **CAB MOUNTED WATER TANK INDICATOR**

There shall be one (1) Innovative Controls SL Mini 4-light, remote tank level gauge for indicating water level installed in cab. The tank level gauge shall indicate the liquid level or volume on an easy to read blue LED display and show increments of 1/4 of a tank.

The Mini remote gauge will receive data from the same source as the Master Display. No additional transducers shall be required.

### **CAB MOUNTED WATER TANK INDICATOR**

There shall be one (1) Innovative Controls SL Mini 4-light, remote tank level gauge for indicating foam level installed in cab. The tank level gauge shall indicate the liquid level or volume on an easy to read red LED display and show increments of 1/4 of a tank.

The Mini remote gauge will receive data from the same source as the Master Display. No additional transducers shall be required.

### **WATER TANK LEVEL INDICATOR**

There shall be three (3) Innovative Controls Monster SL Plus series 180 degree visible 20-LED water tank level light(s) for indicating water tank level. The tank level light shall indicate the liquid level on an easy to read display.

Each tank level gauge system shall include:

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- A 180 degree visible super bright LED bar graph display with a visual alarm at 1/4 of a tank. The display shall also provide an output to activate an audible alarm or secondary visual alarm at 1/4 of a tank.

A set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.

The red "1/4" level light shall flash when the tank level drops below "1/4" of the tank capacity. The light shall be installed in a vertical orientation and be de-activated whenever the parking brake is released.

- Water tank level indicators shall only be on with the pump engaged.

### **POLY WATER TANK WARRANTY**

The poly water tank shall be provided with a lifetime material and workmanship limited warranty. The manufacturer shall supply details of their warranty information with their bid submission.

### **FILL TOWER PROTECTION**

The fill tower(s) shall be boxed in with an aluminum panel for protection from damage.

## **CLASS A POLYPROPYLENE FOAM CELL**

There shall be one (1) 30 US gallon or 24.6 Imperial gallons polypropylene foam cell incorporated into the polypropylene water tank. This foam tank capacity shall be deducted from water tank size specified.

There shall be one (1) pressure/vacuum vent installed on the foam tank.

A minimum 1 in. (25 mm) inside diameter full flow drain valve and piping shall be provided at the lowest point of any foam concentrate tank. The drain shall be piped to drain directly to the surface beneath the apparatus without contacting other body or chassis components. Foam cell shall be drill and tapped for foam level gauge.

A label that reads "Foam Tank Fill" shall be placed at or near the foam concentrate tank fill opening.

A label that specifies the following shall be placed at or near any foam concentrate tank fill opening:

1. Type(s) of foam concentrate the system is designed to use.
2. Any restrictions on the type of foam concentrate that can be used with the system.
3. A FAMA 19 label that reads "Warning: Do Not Mix Brands and Types of Foam". In addition, label shall be in both English/French for units built for Canada; "*Avertissement : Ne pas mélanger les marques et les types d'émulseur*".

## **FOAM TANK LEVEL GAUGE**

There shall be one (1) Innovative Controls SL series 10-LED foam tank level gauge(s) for indicating foam tank level. The gauge shall indicate the liquid level on an easy to read display.

Each tank level gauge system shall include:

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- A super bright LED bar graph display with a visual alarm at 1/4 of a tank. The display shall also provide an output to activate an audible alarm or secondary visual alarm at 1/4 of a tank.
- A set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.

## **HOSE BED STORAGE AREA**

Hose bed storage area shall be located over water tank and body, and shall exit at the rear of the apparatus. The interior of storage area shall be free from all projections such as nuts, sharp angles, or brackets that may damage equipment.

## **ALUMINUM HOSE BED DECKING**

The hose bed deck shall be constructed from 3" x 3/4" hollow aluminum extrusions welded into a one-piece grid to allow ventilation and water drainage. The extrusions shall have a radiused ribbed top surface. The deck will be completely removable for easy access to the booster tank. The booster tank fill tower shall be protected as necessary to prevent damage from equipment located in the storage area.

### **WALKWAY/STEP LIGHTS**

There shall be four (4) OnScene Solutions Rough-Service 9" LED lights provided to illuminate the walkway or step area.

Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment.

Lighting shall provide illumination at a minimum level of 2 fc (20 lx) on all work surfaces, steps, and walkways. Lighting shall be switchable but activated automatically when the vehicle park brake is set.

### **HOSE BED STORAGE**

The following fire hose shall be stored in hose bed storage area;

- Twenty (20) 50' lengths of 3" double jacket hose, flat lay.

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

Two (2) adjustable aluminum hose bed divider(s) shall be provided in the hose bed storage area. The dividers(s) shall be fabricated from 3/16" smooth aluminum with 1" round split aluminum tubing welded to the top and rear edges. A radiused hand-hold opening shall be provided on rear of divider to assist in access to hose bed area. Hose pay-out shall be unobstructed by the divider.

### **ALUMINUM HOSE BED COVER**

A two-section hose bed cover shall be provided. Each door shall be fabricated from 1/8" NFPA aluminum treadplate with formed hat sections for bracing. Doors shall be hinged along each side of the hose body using stainless steel piano hinge. The top surface of each section shall slant down with the highest point in the center of the hose bed area and shall be supported from underneath by at least one (1) adjustable hose bed divider. Each section shall be constructed to support the weight of a 300 lb. person.

A flashing warning light signal shall be provided indicating when a hose bed door is not in a closed position as required by NFPA 1901.

There shall be one (1) 24" vertical handrail on each door to assist in raising and lowering hose bed door. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

Each door shall have a 36" OnScene LED light on the underside of the door that will be automatically activated when the door is opened.

### **HOSE BED END COVER**

The opening at the end of the hosebed shall be covered with a black nylon style webbing to hold hose and equipment in place. Webbing shall be secured in place with yellow pulls with reflective bungee style cords and cast aluminum cleats.

Additional cast aluminum cleats shall be provided on each door to hold webbing out of the way during hose loading.

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at rear of hose storage area.

**MANUAL ASSIST**

Each hose bed door section shall utilize a manual type pneumatic cylinder to assist with opening and closing.

**AIR VENT SCOOPS**

Each hose bed door shall have a rectangular opening on top rear door with a bolt-on air deflector on surface to capture air and force air down through opening onto rear hose bed to provide aide in ventilation for drying hose.

## **EQUIPMENT PAYLOAD WEIGHT ALLOWANCE**

In compliance with NFPA 1901 standards, the vehicle shall be designed for an equipment loading allowance of 2,000 lbs. of Galeton Fire Protection District provided equipment based on a 20,001 pound and up gross vehicle weight rating.

## **EQUIPMENT**

The following equipment shall be furnished with the completed initial attack vehicle;

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.
- There shall be two (2) Zico SAC-44-E NFPA approved folding aluminum wheel chocks provided for 44" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20 % grade, with the transmission in neutral, and the parking brake released.
  - The wheel chock(s) shall be mounted behind rear wheels, below body on streetside.
- One (1) Duo-Safety 900-A series 24' 2-section extension ladder(s) shall be provided with the completed unit.
  - The ladder(s) shall be mounted on specified ladder rack.
- One (1) Duo-Safety 775A series 14' aluminum roof ladder(s) shall be provided with the completed unit.
  - The ladder(s) shall be mounted on specified ladder rack.
- One (1) Duo-Safety 585-A 10' aluminum folding ladder(s) shall be provided with the completed unit.
  - The ladder(s) shall be mounted on specified ladder rack.
- One (1) Duo-Safety 8' fiberglass pike pole(s) shall be provided with the completed unit.
  - The above specified pike pole will not have a D handle attached
  - The pike pole(s) shall be mounted on the specified ladder rack.
- One (1) Fire Hooks Unlimited 6' fiberglass arson trash hook(s) shall be provided with the completed unit.
  - The above specified pike pole will not have a D handle attached
  - The pike pole(s) shall be mounted on vehicle, per itemized compartment list.
- Galeton Fire Protection District supplied NFPA required fire hose and nozzles shall be provided on completed unit before placing vehicle in service.

## **REMAINING NFPA MINOR EQUIPMENT BY PURCHASER**

All other minor equipment not specified above, but required by NFPA 1901 for initial attack vehicles, section 6.9.4 shall be supplied and mounted by Galeton Fire Protection District before the unit is placed in emergency service.