

# ST. HELENA FIRE DEPARTMENT PUMPER PRODUCTION SPECIFICATION

SVI #858

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# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

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#### **LIABILITY INSURANCE**

Bidder 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 \$4,000,000.00 each occurrence, Aggregate of \$4,000,000.00.  
Garage Keepers Liability coverage of \$4,500,000.00 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 Bidder shall post and maintain a website where the St. Helena Fire Department will be able to view digital images of their apparatus as its being manufactured. 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 the apparatus.

#### **VEHICLE STABILITY SUPPLIED WITH CAB/CHASSIS**

The cab/chassis shall be 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.

#### **ROADABILITY**

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. From a standing start, the apparatus shall be able to attain a speed of 35 mph (55 km/hr) within 25 seconds on a level road.
2. The apparatus shall be able to attain a minimum top speed of 50 mph (80 km/hr) on a level road.
3. The apparatus shall be able to maintain 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 (105 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 (85 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

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#### **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.

#### **CONSTRUCTION DOCUMENTATION**

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

The manufacturers record of apparatus construction details, including the following information:

1. Owner's name and address
2. Apparatus manufacturer, model, and serial number
3. Chassis make, model, and serial number
  - a. GAWR of front and rear axles and GVWR
  - b. Front tire size and total rated capacity in pounds (kilograms)
  - c. Rear tire size and total rated capacity in pounds (kilograms)
  - d. Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
  - e. 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
  - f. Type of fuel and fuel tank capacity
  - g. Electrical system voltage and alternator output in amps
  - h. Battery make, model, and capacity in cold cranking amps (CCA)
  - i. Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
4. Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
5. Pump transmission make, model, serial number, and gear ratio
6. Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
7. Water and Foam tank certified capacity in gallons or liters
8. Paint manufacturer and paint number(s)
9. Company name and signature of responsible company representative
10. If the apparatus is a mobile foam fire apparatus, the certification of foam tank capacity
11. Certification of compliance of the optical warning system
12. Siren manufacturer's certification of the siren
13. Written load analysis and results of the electrical system performance tests
14. Certification of slip resistance of all stepping, standing, and walking surfaces
15. If the apparatus has a fire pump, the pump manufacturer's certification of suction capability
16. 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
17. If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications

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18. If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed
19. If the apparatus has a fire pump, the pump manufacturer's certification of the hydrostatic test
20. If the apparatus has a fire pump, the certification of inspection and test for the fire pump
21. If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test
22. When the apparatus is equipped with a water tank, the certification of water tank capacity
23. If the apparatus has an aerial device, the certification of inspection and test for the aerial device
24. If the apparatus has an aerial device, all the technical information required for inspections to comply with NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus
25. If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy and the final installer's certification the foam proportioning system meets this standard
26. If the system has a CAFS, the documentation of the manufacturer's pre delivery tests
27. If the apparatus has a line voltage power source, the certification of the test for the power source
28. If the apparatus is equipped with an air system, air tank certificates, the SCBA fill station certification, and the results of the testing of the air system installation
29. Any other required manufacturer test data or reports.

### **OPERATIONS AND SERVICE DOCUMENTATION**

The Contractor shall deliver with the fire apparatus at least two (2) sets of 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

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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 - CD-ROM**

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

#### **STATEMENT OF EXCEPTIONS**

The Contractor 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.

An apparatus that is delivered subject to a Statement of Exceptions other than a certification of full compliance shall not be placed in emergency service until the apparatus has been modified as necessary to accomplish full compliance with this standard.

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**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 Body 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 values for type of vehicle per NFPA 1901, a Purchaser provided list of equipment to be carried with weights or a Purchaser specified miscellaneous equipment allowance.

The Body Manufacturer shall engineer and design the vehicle such that the completed unit, 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 Body 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.

				<b>Equipment Allowance</b>	
<b>Apparatus Type</b>	<b>Storage Areas</b>	<b>Apparatus Size</b>	<b>lb.</b>	<b>kg.</b>	
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.					



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#### **TESTING**

#### **ROAD TEST**

Road test shall be conducted in accordance with this section to verify that the completed apparatus is capable of compliance with Roadability Section.

The tests shall be conducted at a location and in a manner that does not violate local, state or provincial or federal traffic laws.

The tests shall be conducted on dry, level, paved roads that are in good condition. The apparatus shall be loaded to its estimated in service weight.

The engine shall not operate in excess of the maximum governed speed. Acceleration tests shall consist of two runs in opposite directions over the same route. The fire apparatus shall attain a speed of 35 mph (55 km/hr) from a standing start within 25 seconds. The fire apparatus shall attain a minimum top speed of 50 mph (80 km/hr).

If the apparatus is equipped with an auxiliary braking system, the Body Manufacturer shall road test the system to confirm that the system is functioning as intended by the auxiliary braking system manufacturer.

If the apparatus is equipped with an air brake system, the service brakes shall bring the apparatus, when loaded to its GVWR, to a complete stop from an initial speed of 20 mph (32.2 km/hr) in a distance not exceeding 35 ft (10.7 m) by actual measurement on a paved, level, dry surface road that is free of loose material, oil or grease.

If the apparatus is equipped with a hydraulic brake system, the service brakes shall bring the apparatus, when loaded to its GVWR, to a complete stop from an initial speed of 30 mph (48.2 km/hr) in a distance not exceeding 88 ft (26.8 m) by actual measurement on a paved, level, dry surface road that is free of loose material, oil or grease.

#### **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.

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### **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

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#### UL 120/240 VAC CERTIFICATION

The 120/240 volt electrical system shall be third-party, independent, audit-certified through Underwriters Laboratory (UL) to the current edition of NFPA 1901 to perform as listed below;

The prime mover shall be started from a cold start condition, and the unloaded voltage and frequency shall be recorded.

The line voltage electrical system shall be loaded to at least 100% of the continuous rated wattage stated on the power source specification label. Testing with a resistive load bank shall be permitted.

The power source shall be operated in the manner specified by the apparatus manufacturer as documented on instruction plates or in operation manuals. The power source shall be operated at a minimum of 100% of the continuous rated wattage as stated on the power source specification label for a minimum of two (2) hours.

The load shall be adjusted to maintain the output wattage at or above the continuous rated wattage during the entire 2-hour test.

The following conditions shall be recorded at least every 1/2 hour during the test:

1. The power source output voltage, frequency and amperes
2. The prime mover's oil pressure, water temperature and transmission temperature, if applicable
3. The power source hydraulic fluid temperature, if applicable
4. The ambient temperature and power source air inlet temperature

The following conditions shall be recorded once during the test for power sources driven by dedicated auxiliary internal combustion engines:

1. Altitude
2. Barometric pressure
3. Relative humidity

If the generator is driven by the chassis engine and the generator allows for operation at variable speeds, the chassis engine speed shall be reduced to the lowest rpm allowed for generator operation and the voltage and frequency shall be recorded.

The load shall be removed and the unloaded voltage and frequency shall be recorded.

Voltage shall be maintained within  $\pm 10\%$  of the voltage stated on the power source specification label during the entire test. Frequency shall be maintained within  $\pm 3$  Hz of the frequency stated on the power source specification label during the entire test.

The total continuous electrical loads, excluding those loads associated with the equipment defined in NFPA 22.15.7.3.11.2, shall be applied during the testing unless an auxiliary engine drives the power source.

If the apparatus is equipped with a fire pump, the 2-hour certification test of the power source shall be completed with the fire pump pumping at 100% capacity at 150 psi (1000 kPa) net pump pressure. The test shall be permitted to be run concurrently with the pump certification test.

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#### **DOCUMENTATION**

The Body Manufacturer shall deliver the following with the fire apparatus:

The results of each test shall be recorded on an appropriate form and provided with the delivery of the fire apparatus.

#### **DIELECTRIC VOLTAGE WITHSTAND TEST**

The line voltage wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900 volts for one (1) minute. The testing shall be performed after all body work has been completed.

The test shall be conducted as follows:

1. Isolate the power source from the panel board and disconnect any solid state low voltage components
2. Connect one lead of the dielectric tester to all the hot and neutral buses tied together
3. Connect the other lead to the fire apparatus frame or body
4. Close any switches and circuit breakers in the circuit(s)
5. Apply the dielectric voltage for one (1) minute in accordance with the testing equipment manufacturer's instructions

The electrical polarity of all permanently wired equipment, cord reels and receptacles shall be tested to verify that wiring connections have been properly made.

Electrical continuity shall be verified from the chassis or body to all line voltage electrical enclosures, light housings, motor housings, light poles, switch boxes and receptacle ground connections that are accessible to fire fighters in normal operations.

If the apparatus is equipped with a transfer switch, it shall be tested to verify operation and that all non grounded conductors are switched.

Electrical light towers, floodlights, motors, fixed appliances and portable generators shall be operated at their full rating or capacity for 30 minutes to ensure proper operation.

#### **UL PUMP CERTIFICATION**

The fire pump shall be tested and certified by Underwriters Laboratories, to perform as listed below;

- 100% of rated capacity at 150 psi (1,000 kPa) net pressure
- 70% of rated capacity at 200 psi (1,400 kPa) net pressure
- 50% of rated capacity at 250 psi (1700 kPa) net pressure

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 Automotive 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.

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#### **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 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.

# ST. HELENA FIRE DEPARTMENT

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### **PERFORMANCE BOND**

The successful Bidder will be required to provide a 100% performance bond in the amount equivalent to the total amount of its bid including any additional options that may have been given. Performance bond shall be provided within two (2) weeks after notice of award.

If the Bidder to whom the contract is awarded, refuses or neglects to execute or fails to furnish the required 100% performance bond within two (2) weeks after notice, the amount of his deposit may be forfeited and retained by the St. Helena Fire Department as liquidated damages.

The terms of the performance bond shall continue one (1) year after completion and delivery of the apparatus. The balance of any warranty, if greater than 12 months, shall continue to be guaranteed solely by Contractor.

### **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.

### **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.

### **OVERALL HEIGHT**

The overall height (OAH) of the vehicle shall be approximately 124" (10' - 04") from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

### **OVERALL LENGTH**

The overall length (OAL) of the vehicle shall be approximately 378" (31' - 6").

# ST. HELENA FIRE DEPARTMENT PUMPER PRODUCTION SPECIFICATION SVI #858

## **OVERALL WIDTH**

The overall width (OAW) of the body at drip rails shall be 102" (8' - 6"), and body shall be 100" (8' - 4").

## **PRE-CONSTRUCTION CONFERENCE**

A pre-construction conference shall be required, at the Contractor's factory for three (3) personnel from the St. Helena Fire Department 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.

## **PRE-PAINT CONFERENCE**

A pre-paint conference shall be required, at the Contractor's factory for three (3) personnel from the St. Helena Fire Department to inspect the vehicle and construction details prior to the painting process.

The Contractor shall at his/her expense, provide transportation, lodging, rental car and meal expenses during the pre-paint 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 three (3) personnel from the St. Helena Fire Department 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 St. Helena Fire Department'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 St. Helena Fire Department regarding the operation, care and maintenance of the apparatus and equipment supplied at St. Helena Fire Department location.

The Delivery Engineer shall set delivery and instruction schedule with the person appointed by St. Helena Fire Department.

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

# ST. HELENA FIRE DEPARTMENT

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#### **MODEL**

The chassis shall be a Metro Star model. The cab and chassis shall include design considerations for multiple emergency vehicle applications, rapid transit and maneuverability. The chassis shall be manufactured for heavy duty service with the strength and capacity to support a fully laden apparatus, one hundred (100) percent of the time.

#### **MODEL YEAR**

The chassis shall have a vehicle identification number that reflects a 2013 model year.

#### **COUNTRY OF SERVICE**

The chassis shall be put in service in the country of United States of America (USA).

The chassis will meet applicable U.S.A. federal motor vehicle safety standards per CFR Title 49 Chapter V Part 571 as clarified in the incomplete vehicle book per CFR Title 49 Chapter V Part 568 Section 4 which accompanies each chassis. Spartan Chassis is not responsible for compliance to state, regional, or local regulations. Dealers should identify those regulations and order any necessary optional equipment from Spartan Chassis or their OEM needed to be in compliance with those regulations.

#### **APPARATUS TYPE**

The apparatus shall be a pumper vehicle designed for emergency service use which shall be equipped with a permanently mounted fire pump which has a minimum rated capacity of 750 gallons per minute (3000 L/min). The apparatus shall include a water tank and hose body whose primary purpose is to combat structural and associated fires.

#### **VEHICLE TYPE**

The chassis shall be manufactured for use as a straight truck type vehicle and designed for the installation of a permanently mounted apparatus behind the cab. The apparatus of the vehicle shall be supplied and installed by the apparatus manufacturer.

#### **AXLE CONFIGURATION**

The chassis shall feature a 4 x 2 axle configuration consisting of a single rear drive axle with a single front steer axle.

#### **GROSS AXLE WEIGHT RATINGS FRONT**

The front gross axle weight rating (GAWR) of the chassis shall be 20,000 pounds.

This front gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

#### **GROSS AXLE WEIGHT RATINGS REAR**

The rear gross axle weight rating (GAWR) of the chassis shall be 27,000 pounds.

This rear gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.



# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **PUMP PROVISION**

The chassis shall include provisions to mount a drive line pump in the middle of the chassis, behind the cab, more commonly known as the midship location.

#### **CAB STYLE**

The cab shall be a custom, fully enclosed, MFD model with a 10.00 inch raised roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to eight (8) seating positions.

The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side wall panels shall be assembled using a combination of welds and proven industrial adhesives designed specifically for aluminum fabrication for construction.

The cab shall be constructed using multiple aluminum extrusions in conjunction with aluminum plate, which shall provide proven strength and the truest, flattest body surfaces ensuring less expensive paint repairs if needed. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

All interior and exterior seams shall be sealed for optimum noise reduction and to provide the most favorable efficiency for heating and cooling retention.

The cab shall be constructed of 5052-H32 corrosion resistant aluminum plate. The cab shall incorporate tongue and groove fitted 6061-T6 0.13 & 0.19 inch thick aluminum extrusions for extreme duty situations. A single formed, one (1) piece extrusion shall be used for the "A" pillar, adding strength and rigidity to the cab as well as additional roll-over protection. The cab side walls and lower roof skin shall be 0.13 inch thick; the rear wall and raised roof skins shall be 0.09 inch thick; the front cab structure shall be 0.19 inch thick.

The exterior width of the cab shall be 94.00 inches wide with a minimum interior width of 88.00 inches. The overall cab length shall be 131.10 inches with 54.00 inches from the centerline of the front of the axle to the back of the cab.

The cab interior shall be designed to afford the maximum usable interior space and attention to ergonomics with hip and legroom while seated which exceeds industry standards. The crew cab floor shall be flat across the entire walking area for ease of movement inside the cab.

The cab shall offer an interior height of 57.50 inches from the front floor to the headliner in the non-raised roof area and a rear floor to headliner height of 65.00 inches in the raised roof area, at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 49.88 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

The cab shall include a driver and officer area with two (2) cab doors large enough for personnel in full firefighting gear. The front doors shall offer a clear opening of 40.25 inches wide X 53.50 inches high, from the cab floor to the top of the door opening. The cab shall also include a crew area with up to two (2) cab doors, also large enough for personnel in full firefighting gear. The rear doors shall offer a clear opening of 32.25 inches wide X 61.00 inches high, from the cab floor to the top of the door opening.

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The cab shall incorporate a progressive two (2) step configuration from the ground to the cab floor at each door opening. The progressive steps are vertically staggered and extend the full width of each step well allowing personnel in full firefighting gear to enter and exit the cab easily and safely.

The first step for the driver and officer area shall measure approximately 11.50 inches deep X 31.50 inches wide. The intermediate step shall measure approximately 8.50 inches deep X 33.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure approximately 11.50 inches deep X 21.50 inches wide. The intermediate step shall measure approximately 10.25 inches deep X 22.50 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.50 inches.

#### **CAB FRONT FASCIA**

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate which shall be an integral part of the cab.

The cab fascia will encompass the entire front of the aluminum cab structure from the bottom of the windshield to the bottom of the cab and shall be the "Classic" design.

The front cab fascia shall include two (2) molded plastic modules on each side accommodating a total of up to four (4) Hi/Low beam headlights and two (2) turn signal lights or up to four (4) warning lights. A chrome plated molded plastic bezel shall be provided on each side around each set of four lamps.

#### **FRONT GRILLE**

The front cab fascia shall include a classic box style, 304 stainless steel front grille with a Spartan logo. The grille shall measure 44.45 inches wide at the top tapering to 39.30 inches wide at the bottom X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 632.90 square inches.

#### **CAB UNDERCOAT**

There shall be a rubberized undercoating applied to the underside of the cab that provides abrasion protection, sound deadening and corrosion protection.

#### **CAB SIDE DRIP RAIL**

There shall be a drip rail along the top radius of each cab side. The drip rails shall help prevent water from the cab roof running down the cab side.

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#### **CAB PAINT EXTERIOR**

The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.

All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.

The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper, the seams shall be sealed with SEM brand seam sealer and painted with two (2) to four (4) coats of an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene.

The cab shall then be painted with the specific color designated by the customer with a minimum thickness of 2.00 mils of paint, followed by a clear top coat not to exceed 2.00 mils. The entire cab shall then be baked at 180 degrees for one (1) hour to speed the curing process of the coatings.

#### **CAB PAINT MANUFACTURER**

The cab shall be painted with PPG Industries paint.

#### **CAB PAINT PRIMARY/LOWER COLOR**

The primary/lower paint color shall be PPG FBCH 2185 White.

#### **CAB PAINT WARRANTY**

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten (10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first.

#### **CAB PAINT INTERIOR**

The visible interior cab structure surfaces shall be painted with a Zolatone #20-72 silver gray texture finish.

#### **CAB ENTRY DOORS**

The cab shall include four (4) entry doors, two (2) front doors and two (2) crew doors designed for ease of entering and egress when outfitted with an SCBA. The doors shall be constructed of extruded aluminum with a nominal thickness of 0.13 inch. The exterior skins shall be constructed of 0.13 inch aluminum plate.

The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a weather tight fit.

All door hinges shall be hidden within flush mounted cab doors for a pleasing smooth appearance and perfect fit along each side of the cab. Each door hinge shall be piano style with a 0.38 inch pin and shall be constructed of stainless steel.

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#### **CAB ENTRY DOOR TYPE**

All cab entry doors shall be barrier clear design resulting in exposed lower cab steps. The doors shall provide approximately 32.00 inches of clearance from the ground to the bottom of the door so cab doors may be opened unhindered by most obstacles encountered, such as guard rails along interstate highways.

#### **CAB STRUCTURAL WARRANTY**

The cab structure shall be warranted for a period of ten (10) years or one hundred thousand (100,000) miles which ever may occur first. Warranty conditions may apply and shall be listed in the detailed warranty document that shall be provided upon request.

#### **CAB TEST INFORMATION**

The cab shall have successfully completed the preload side impact, static roof load application and frontal impact without encroachment to the occupant survival space when tested in accordance with Section 4 of SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks, Section 5 of SAE J2422 Cab Roof Strength Evaluation Quasi –Static Loading Heavy Trucks and ECE R29 Uniform Provisions Concerning the Approval of Vehicles with regard to the Protection of the Occupants of the Cab of a Commercial Vehicles Annex 3 Paragraph 5.

The above tests have been witnessed by and attested to by an independent third party. The test results were recorded using cameras, high speed imagers, accelerometers and strain gauges. Documentation of the testing shall be provided upon request.

#### **ELECTRICAL SYSTEM**

The chassis shall include a single starting electrical system which shall include a 12 volt direct current Weldon brand of multiplexing system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275 degree Fahrenheit minimum high temperature flame retardant loom. All nodes and sealed Deutsch connectors shall be waterproof.

#### **APPARATUS WIRING PROVISION**

An apparatus wiring panel shall be installed in the center dash area behind the rocker switch panel which shall include eight (8) open circuits consisting of three (3) 20 amp, one (1) 30 amp, three (3) 10 amp, and one (1) 15 amp circuit, with relays and breakers with trigger wires which shall be routed to the rocker switch panel.

#### **MULTIPLEX DISPLAY**

The multiplex electrical system shall include a Weldon Vista IV display with interactive touchscreen. The display shall be located on the left side of the dash in the switch panel. The Vista IV shall feature a full color LCD display screen which includes a message bar displaying the time of day and important messages requiring acknowledgement by the user which shall all be displayed on the top of the screen in the order they are received. There shall be eight (8) push button virtual controls, four (4) on each side of the display for the on-board diagnostics. The display screen shall be video ready for back-up cameras, thermal cameras, and DVD.

The Vista IV display shall offer varying fonts and background colors. The display shall be fully programmable to the needs of the customer and shall offer virtually infinite flexibility for screen configuration options.

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#### **DATA RECORDING SYSTEM**

The chassis shall have a Weldon Vehicle Data Recorder (VDR) system installed. The system shall be designed to meet NFPA 1901 and shall be integrated with the Weldon Multiplex electrical system. The following information shall be recorded:

- Vehicle Speed
- Acceleration
- Deceleration
- Engine Speed
- Engine Throttle Position
- ABS Event
- Seat Occupied Status
- Seat Belt Status
- Master Optical Warning Device Switch Position
- Time
- Date

Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system.

#### **ACCESSORY POWER**

The electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load. One (1) power stud shall be capable of carrying up to a 15 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud.

#### **AUXILIARY ACCESSORY POWER**

An auxiliary set of power and ground studs shall be provided and installed behind the officer seat and shall be wired to a 40 amp breaker. The studs shall be 0.38 inch diameter and capable of carrying up to a 40 amp battery direct load.

#### **EXTERIOR ELECTRICAL TERMINAL COATING**

All terminals exposed to the elements will be sprayed with a high visibility protective rubberized coating to prevent corrosion.

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#### **ENGINE**

The chassis engine shall be a Cummins ISL9 engine. The ISL9 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 450 horse power at 2100 RPM and shall be governed at 2200 RPM. The torque rating shall feature 1250 foot pounds of torque at 1400 RPM with 543 cubic inches (8.9 liter) of displacement.

The ISL9 engine shall feature a VGT™ Turbocharger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2010 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.

The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.

#### **CAB ENGINE TUNNEL**

The cab interior shall include an integrated engine tunnel constructed of 5052-H32 Marine Grade, 0.19 of an inch thick aluminum. The tunnel shall be a maximum of 41.50 inches wide X 25.50 inches high.

#### **DIESEL PARTICULATE FILTER CONTROLS**

There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one (1) control shall be for regeneration inhibit.

#### **ENGINE PROGRAMMING HIGH IDLE SPEED**

The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.

#### **ENGINE HIGH IDLE CONTROL**

The vehicle shall be equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output. This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. The device shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear, and shall be available to manually or automatically re-engage when the brake is released, or when the transmission is placed in neutral. There shall be an indicator on the Vista display and control screen for the high idle speed control.

#### **ENGINE PROGRAMMING ROAD SPEED GOVERNOR**

The engine shall include programming which will govern the top speed of the vehicle.

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#### **AUXILIARY ENGINE BRAKE**

A compression brake, for the six (6) cylinder engine shall be provided. A cutout relay shall be installed to disable the compression brake when in pump mode or when an ABS event occurs. The engine compression brake shall activate upon 0% accelerator when in operation mode and actuate the vehicle's brake lights.

The engine shall utilize a variable geometry turbo (VGT) as an integrated auxiliary engine brake to offer a variable rate of exhaust flow, which when activated in conjunction with the compression brake shall enhance the engine's compression braking capabilities.

#### **AUXILIARY ENGINE BRAKE CONTROL**

An engine compression brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected:

- A valid gear ratio is detected.
- The driver has requested or enabled engine compression brake operation.
- The throttle is at a minimum engine speed position.
- The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift.

The compression brake shall be controlled through an on/off switch and individual low/medium/high selector switches on the SmartWheel™ steering wheel. The engine brake status shall be displayed through indicator lights on the dash panel in view of the driver.

#### **ELECTRONIC ENGINE OIL LEVEL INDICATOR**

The engine oil shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal. The warning shall activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.

#### **FLUID FILLS**

The engine oil, coolant, transmission, and power steering fluid fills shall be located under the cab. The windshield washer fill shall be accessible through the front left side mid step.

#### **ENGINE DRAIN PLUG**

The engine shall include an original equipment manufacturer installed oil drain plug.

#### **ENGINE WARRANTY**

The Cummins engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.

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#### **REMOTE THROTTLE CONTROL**

A Fire Research In Control 400 pressure sensor governor shall be provided for the electronic engine. It shall include a remote mountable control head.

The In Control shall regulate the pump pressure and monitor all essential engine parameters.

LED readouts shall display RPM, PSI, pump discharge and intake pressure, engine oil pressure, engine temperature, transmission temperature and battery voltage. An audible alarm output shall also be part of the system.

The rpm increase and decrease will be controlled by control knob on the face of the In Control 400.

#### **REMOTE THROTTLE HARNESS**

An apparatus interface wiring harness for the engine shall be supplied with the chassis. The harness shall include a connector for connection to the chassis harness which shall terminate in the left frame rail behind the cab for reconnection by the apparatus builder. The harness shall contain connectors for a Fire Research In Control 300/400 pressure governor and a multiplexed gauge. Separate circuits shall be included for pump controls, "Pump Engaged" and "OK to Pump" indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, customer ignition, air horn solenoid switch, high idle switch and high idle indication light. The harness shall be designed for a side mount pump panel.

An apparatus interface wiring harness shall also be included which shall be wired to the cab harness interface connectors and shall incorporate circuits with relays to control pump functions. This harness shall control the inputs for the transmission lock up circuits, governor/hand throttle controls and dash display which shall incorporate "Pump Engaged" and "OK to Pump" indicator lights. The harness shall contain circuits for the apparatus builder to wire in a pump switch.

#### **ENGINE PROGRAMMING REMOTE THROTTLE**

The engine ECM (Electronic Control Module) discrete wire remote throttle circuit shall be turned off for use with a J1939 based pump controller or when the discrete wire remote throttle controls are not required.

#### **ENGINE PROGRAMMING IDLE SPEED**

The engine low idle speed will be programmed at 700 rpm.

#### **ENGINE FAN DRIVE**

The engine cooling system fan shall incorporate a thermostatically controlled, Horton clutched type fan drive.

When the clutched fan is disengaged it shall facilitate improved vehicle performance, cab heating in cold climates, and fuel economy. The fan clutch design shall be fail safe so that if the clutch drive fails the fan shall engage to prevent engine overheating due to the fan clutch failure.



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#### **ENGINE COOLING SYSTEM**

There shall be a heavy-duty aluminum cooling system designed to meet the demands of the emergency response industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.

The cooling system shall utilize a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, an air to air charge air cooler bolted to the front of the radiator, recirculation shields, a shroud, a fan, and required tubing.

The radiator shall be a down-flow design constructed with aluminum cores, plastic end tanks, and a steel frame. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

The cooling system shall include a one piece injection molded polymer eleven (11) blade fan with a fiberglass fan shroud.

The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements, and allows for expansion and recovery of coolant into a separate integral expansion chamber.

All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.

The charge air cooler shall be a cross-flow design constructed completely of aluminum with cast tanks. All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel "constant torque" style clamps meeting the engine manufacturer's requirements.

#### **ENGINE COOLING SYSTEM PROTECTION**

The engine cooling system shall include a recirculation shield designed to act as a light duty skid plate below the radiator to provide additional protection for the engine cooling system from light impacts, stones, and road debris.

#### **ENGINE COOLANT**

The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees Fahrenheit.

Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.

#### **ELECTRONIC COOLANT LEVEL INDICATOR**

The instrument panel shall feature a low engine coolant indicator light which shall be located in the center of the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.

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#### **ENGINE PUMP HEAT EXCHANGER**

A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. The heat exchanger shall be designed to prohibit water from the pump from coming in contact with the engine coolant. This shall allow the use of water from the discharge side of the pump to assist in cooling the engine.

#### **COOLANT HOSES**

The cooling system hoses shall be silicone heater hose with rubber hoses in the cab interior. The radiator hoses shall be formed silicone coolant hoses with formed aluminized steel tubing. All heater hose, silicone coolant hose, and tubing shall be secured with stainless steel constant torque band clamps.

#### **ENGINE AIR INTAKE**

The engine air intake system shall include an ember separator air intake filter which shall be located in the front of the cab behind the right hand side fascia. This filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a corrosion resistant steel frame. This multilayered screen shall be designed to trap embers or allow them to burn out before passing through the pack, while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.

The engine shall also include an air intake filter which shall be bolted to the frame and located under the front of the cab on the right hand side. The dry type filter shall ensure dust and debris safely contained inside the disposable housing, eliminating the chance of contaminating the air intake system during air filter service via a leak-tight seal.

The air flow distribution and dust loading shall be uniform throughout the high-performance filter cone pack, which shall result in pressure differential for improved horsepower and fuel economy. The air intake shall be mounted within easy access via a hinged panel behind the right hand side headlight module. The air intake system shall include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.

#### **AIR INTAKE PROTECTION**

A light duty skid plate shall be supplied for the engine air intake system below the right front side of the cab. The skid plate shall provide protection for the air intake system from light impacts, stones, and road debris.

#### **ENGINE EXHAUST SYSTEM**

The exhaust system shall be mounted below the frame in the outboard position with the SCR canister in line rearward of the DPF. The exhaust system shall utilize a 90-degree bend in the exhaust tubing from the turbo into a side inlet DPF canister that allows the entire system to be pulled forward. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.

The exhaust system shall include a diesel particulate filter (DPF), a diesel oxidation catalyst, and a selective catalytic reduction (SCR) catalyst to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be injected into the system through the decomposition tube between the DPF and SCR. The system shall utilize 0.07 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF. The DPF, the decomposition tube, and the SCR canister through the end of the tailpipe shall be connected with zero leak clamps.

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### **DIESEL EXHAUST FLUID TANK**

The exhaust system shall include a molded cross linked polyethylene tank for Diesel Exhaust Fluid (DEF). The tank shall have a capacity of six (6) usable gallons and shall be mounted on the left hand side of the chassis frame behind the batteries below the frame.

The DEF tank shall be designed with capacity for expansion in case of fluid freezing. Engine coolant, which shall be thermostatically controlled, shall be run through lines in the tank to help prevent the DEF from freezing and to provide a means of thawing the fluid if it should become frozen.

The tank fill tube shall be routed under the rear of the cab with the fill neck and splash guard accessible in the top rear step.

### **ENGINE EXHAUST ACCESSORIES**

An exhaust temperature mitigation device shall be shipped loose for installation by the body manufacturer on the vehicle. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

### **ENGINE EXHAUST WRAP**

The exhaust tubing between the engine turbo and the diesel particulate filter (DPF) shall be wrapped with a thermal cover in order to retain the necessary heat for DPF regeneration. The exhaust wrap shall also help protect surrounding components from radiant heat which can be transferred from the exhaust.

### **TRANSMISSION**

The drive train shall include an Allison model EVS 3000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

The transmission shall include two (2) internal oil filters and Castrol TranSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

The transmission gear ratios shall be:

1st	3.49:1
2nd	1.86:1
3rd	1.41:1
4th	1.00:1
5th	0.75:1
6th	0.65:1 (if applicable)
Rev	5.03:1

### **TRANSMISSION MODE PROGRAMMING**

The transmission, upon start-up, will automatically select a four (4) speed operation. The fifth speed over drive shall be available with the activation of the mode button on the shifting pad.

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#### **TRANSMISSION FEATURE PROGRAMMING**

The Allison Gen IV-E transmission EVS group package number 127 shall contain the 198 vocational package in consideration of the duty of this apparatus as a pumper. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override.

This package shall be coupled with the use of a split shaft PTO and incorporate pumping circuits. These circuits shall be used allowing the vehicle to operate in the fourth range lockup while operating the pump mode due to the 1 to 1 ratio through the transmission, therefore the output speed of the engine is the input speed to the pump. The pump output can be easily calculated by using this input speed and the drive ratio of the pump itself to rate the gallons of water the pump can provide.

An eight (8) pin Delphi connector will be provided next to the steering column connector. This will contain the following input/output circuits to the transmission control module. The Gen IV-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

Function ID	Description	Wire assignment
C	PTO Request	142
J	Fire Truck Pump Mode (4th Lockup)	122 / 123
C	Range Indicator	145 (4th)
G	PTO Enable Output	130
	Signal Return	103

#### **TRANSMISSION SHIFT SELECTOR**

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall provide a prognostic indicator (wrench symbol) on the digital display between the selected and attained indicators. The prognostics monitor various operating parameters to determine and shall alert you when a specific maintenance function is required.

#### **ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR**

The transmission fluid shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal.

#### **TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE**

When the auxiliary brake is engaged, the transmission shall automatically shift to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle.

#### **TRANSMISSION COOLING SYSTEM**

The transmission shall include a water to oil cooler system located in the cooling loop between the radiator and the engine. The transmission cooling system shall meet all transmission manufacturer requirements. The transmission cooling system shall feature continuous flow of engine bypass water to maintain uninterrupted transmission cooling.

#### **TRANSMISSION DRAIN PLUG**

The transmission shall include an original equipment manufacturer installed oil drain plug.

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#### **TRANSMISSION WARRANTY**

The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.

#### **LH PTO**

A Spartan supplied ten (10) bolt standard duty clutched drive PTO shall be installed on the transmission. Installation shall include mounting of the PTO and wiring the unit with a control switch.

#### **LH PTO MODEL**

A ten (10) bolt Chelsea model 277-XMFJP-B5XD heavy duty transmission driven PTO shall be installed. The clutched shifted PTO is designed specifically for the Allison world transmission and provides torque ranges from 250 to 335 lb. ft.

#### **PTO LOCATION**

The transmission driven power take off (PTO) shall be mounted in the 9:00 o'clock position.

#### **PTO CONTROL**

The left hand power take off shall be controlled by the transmission. It will use a virtual button on the Vista display and control screen with text messages. Disable is displayed when switch is off. Enable is displayed when the switch is turned on. Active is displayed when the switch is on with positive engagement of the power take off. An additional rocker switch shall be included in the rocker switch panel which shall change the current state of the switch on the Vista display and control screen. The rocker switch shall be a momentary rocker type.

Required operating conditions for enabling this function are:

- Throttle position is low
- Engine speed is within customer modifiable constant limits
- Output speed is within customer modifiable constant limits
- Park brake set

#### **DRIVELINE**

All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat<sup>®</sup>.

#### **MIDSHIP PUMP / GEARBOX**

A temporary jackshaft driveline shall be installed by the chassis manufacturer to accommodate the mid-ship split shaft pump as specified by the apparatus manufacturer.

#### **MIDSHIP PUMP / GEARBOX MODEL**

The midship pump/gearbox provisions shall be for a Waterous CSUC20 pump.

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### **MIDSHIP PUMP RATIO**

The ratio for the midship pump shall be 2.27:1.

### **MIDSHIP PUMP GEARBOX DROP**

The Waterous pump gearbox shall have a "C" (medium length) drop length.

### **MIDSHIP PUMP LOCATION C/L SUCTION TO C/L REAR AXLE**

The midship pump shall be located so the dimension from the centerline of the suction to the centerline of the rear axle is 95.00 inches.

### **PUMP SHIFT CONTROLS**

One (1) electric over air pump shift control panel shall be located in the left hand side knee area below the dash. The following shall be provided on the panel: a three (3) position locking toggle switch; an engraved PUMP ENGAGED identification light; and an engraved OK TO PUMP identification light. The pump shift control panel shall be black with a yellow border outline and shall include pump instructions. An instruction plate describing the transmission shift selector position used for pumping shall be provided and located so it can be read from the driver's position per NFPA **16.10.1.3**. The road mode shall be selected when the switch is in the up position and pump mode shall be selected when the switch is in the down position.

The center switch position shall exhaust air from both pump and road sides of the pump gear box shift cylinder.

### **PUMP SHIFT CONTROL PLUMBING**

Air connections shall be provided from the air supply tank to the pump shift control valve and from the pump shift control valve to the frame mounted bracket. The frame mounted bracket shall include labeling identifying the pump and road connection points with threaded 0.25 inch NPT fittings on the solenoid for attaching the customer installed pump. The air supply shall be pressure protected from service brake system.

### **FUEL FILTER/WATER SEPARATOR**

The fuel system shall have a Fleetguard FS1003 fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.

A water in fuel sensor shall be provided and wired to an instrument panel lamp and audible alarm to indicate when water is present in the fuel/water separator.

A secondary fuel filter shall be included as approved by the engine manufacturer.

### **FUEL LINES**

The fuel system supply and return lines installed from the fuel tank to the engine shall be reinforced nylon tubing rated for diesel fuel. The fuel lines shall be brown in color and connected with brass fittings.

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## PUMPER PRODUCTION SPECIFICATION

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#### **FUEL SHUTOFF VALVE**

A fuel shutoff valve shall be installed in the fuel draw line at the primary fuel filter to allow the fuel filter to be changed without loss of fuel to the fuel pump.

A second fuel shutoff valve shall be installed in the fuel draw line, near the fuel tank to allow maintenance to be performed with minimal loss of fuel.

#### **ELECTRIC FUEL PRIMER**

Integral to the engine assembly is an electric lift pump that serves the purpose of pre-filter fuel priming.

#### **FUEL TANK**

The fuel tank shall have a capacity of sixty-eight (68) gallons and shall measure 35.00 inches in width X 17.00 inches in height X 29.00 inches in length. The baffled tank shall be made of 14 gauge aluminized steel. The exterior of the tank shall be painted with a PRP Corsol™ black anti-corrosive exterior metal treatment finish. This results in a tank which offers the internal and external corrosion resistance.

The tank shall have a vent port to facilitate venting to the top of the fill neck for rapid filling without "blow-back" and a roll over ball check vent for temperature related fuel expansion and draw.

The tank is designed with dual draw tubes and sender flanges. The tank shall have 2.00 inch NPT fill ports for right or left hand fill. A 0.50 inch NPT drain plug shall be centered in the bottom of the tank.

The fuel tank shall be mounted below the frame, behind the rear axle. Two (2) three-piece strap hanger assemblies with "U" straps bolted midway on the fuel tank front and rear shall be utilized to allow the tank to be easily lowered and removed for service purposes. Rubber isolating pads shall be provided between the tank and the upper tank mounting brackets. Strap mounting studs through the rail, hidden behind the body shall not be acceptable.

#### **FUEL TANK FILL PORT**

The fuel tank fill ports shall be provided with two (2) left fill ports located one (1) in the forward position and one (1) in the middle position and the right fill port located in the middle position of the fuel tank.

#### **FUEL TANK SERVICEABILITY PROVISIONS**

The chassis fuel lines shall have additional length provided so the tank can be easily lowered and removed for service purposes. The additional 8.00 feet of length shall be located above the fuel tank and shall be coiled and secured. The fuel line fittings shall be pointed towards the right side (curbside) of the chassis.

#### **FRONT AXLE**

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-20. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle.

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#### **FRONT AXLE WARRANTY**

The front axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

#### **FRONT WHEEL BEARING LUBRICATION**

The front axle wheel bearings shall be lubricated with oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.

#### **FRONT SHOCK ABSORBERS**

Two (2) Bilstein inert, nitrogen gas filled shock absorbers shall be provided and installed as part of the front suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.

The ride afforded through the use of a gas shock is more consistent and shall not deteriorate with heat, the same way a conventional oil filled hydraulic shock would.

The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort without compromise. The working piston design shall feature fewer parts than most conventional twin tube and "road sensing" shock designs and shall contribute to the durability and long life of the Bilstein shock absorbers.

Proposals offering the use of conventional twin tube or "road sensing" designed shocks shall not be considered.

#### **FRONT SUSPENSION**

The front suspension shall include a nine (9) leaf spring pack in which the longest leaf measures 54.00 inch long and 4.00 inches wide and shall include a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 21,500 pounds.

#### **STEERING COLUMN/ WHEEL**

The cab shall include a Douglas Autotech steering column which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18.00 inch, four (4) spoke VIP SmartWheel steering wheel located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding. The spoke area shall contain two (2) switch pods offering ten (10) programmed buttons for vehicle specific activations and controls.

The steering column shall contain a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

The left hand SmartWheel switch pod shall contain primary controls for fog lights, wiper variable, wiper off, wiper wash, and wiper high/low.

The right hand SmartWheel switch pod shall contain primary controls for air horn, engine brake off, engine brake low, engine brake medium, and engine brake high.



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### **POWER STEERING PUMP**

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type.

### **ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR**

The power steering fluid shall be monitored electronically and shall send a signal to activate an audible alarm and visual warning in the instrument panel when fluid level falls below normal.

### **FRONT AXLE CRAMP ANGLE**

The chassis shall have a front axle cramp angle of 48-degrees to the left and 44-degrees to the right.

### **POWER STEERING GEAR**

The power steering gear shall be a TRW model TAS 65 with an assist cylinder.

### **CHASSIS ALIGNMENT**

The chassis frame rails shall be measured to insure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall be aligned and toe-in set on the front tires by the chassis manufacturer.

### **REAR AXLE**

The rear axle shall be a Meritor model RS-25-160 single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a fire service rated capacity of 27,000 pounds.

The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industry's demands. The axle shall include rectangular shaped, hot-formed housing with a standard wall thickness of 0.63 of an inch for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance.

The axle shall have heavy-duty Hypoid gearing for longer life, greater strength and quieter operation. Industry-standard wheel ends for compatibility with both disc and drum brakes, and unitized oil seal technology to keep lubricant in and help prevent contaminant damage will be used.

### **REAR AXLE WARRANTY**

The rear axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

### **REAR AXLE DIFFERENTIAL LUBRICATION**

The rear axle differential shall be lubricated with oil.

### **REAR WHEEL BEARING LUBRICATION**

The rear axle wheel bearings shall be lubricated with oil.

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#### **REAR AXLE DIFFERENTIAL CONTROL**

A driver controlled differential lock shall be installed on the rear axle. This feature shall allow the main differential to be locked and unlocked when encountering poor road or highway conditions, where maximum traction is needed, for use at speeds no greater than 25 MPH. The differential lock shall be controlled by a locking rocker switch on the switch panel. The light on the switch shall illuminate with positive engagement of the differential control.

#### **VEHICLE TOP SPEED**

The top speed of the vehicle shall be approximately 68 MPH +/-2 MPH at governed engine RPM.

#### **REAR SUSPENSION**

The single rear axle shall feature a Reyco 79KB vari-rate, self-leveling captive slipper type conventional multi-leaf spring suspension, with 57.50 inch X 3.00 inch springs. One (1) adjustable and one (1) fixed torque rod shall be provided.

The rear suspension capacity shall be rated from 21,000 to 31,500 pounds.

#### **FRONT TIRE**

The front tires shall be Michelin 385/65R22.5 "L" tubeless radial XFE regional tread.

The front tire stamped load capacity shall be 19,840 pounds per axle with a speed rating of 65 miles per hour when properly inflated to 130 pounds per square inch.

The Michelin Tire Intermittent Service Rating load capacity shall be 20,000 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch. The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to one (1) hour of loaded travel with a one (1) hour cool down prior to another loaded run.

#### **REAR TIRE**

The rear tires shall be Michelin 12R-22.5 16PR "H" tubeless radial XDN2 all-weather tread.

The rear tire stamped load capacity shall be 27,120 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Tire Intermittent Service Rating load capacity shall be 28,880 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch. The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to one (1) hour of loaded travel with a one (1) hour cool down prior to another loaded run.

#### **REAR AXLE RATIO**

The rear axle ratio shall be 5.13:1.

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#### **TIRE PRESSURE INDICATOR**

There shall be a voucher provided with the chassis for a pop up style tire pressure indicator at each tire valve stem. The indicator shall provide visual indication of pressure in the specific tire.

The tire pressure indicators shall be redeemed upon the vehicle manufacturer's receipt of the voucher for installation by the customer.

#### **FRONT WHEEL**

The front wheels shall be Alcoa hub piloted, 22.50 inch X 12.25 inch LvL One™ polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall feature one-piece forged strength and shall include Alcoa's Dura-Bright® finish with XBR technology as an integral part of the wheel surface. Alcoa Dura-Bright® wheels keep their shine without polishing. Brake dust, grime and road debris are easily removed by simply cleaning the wheels with soap and water.

#### **REAR WHEEL**

The outer rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch LvL One™ aluminum wheels with a polished outer surface and Alcoa Dura-Bright® wheel treatment with XBR® technology as an integral part of the wheel. The inner rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch aluminum wheels with a LvL One™ bright machine finish. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

#### **BALANCE WHEELS AND TIRES**

All of the wheels and tires, including any spare wheels and tire assemblies, shall be dynamically balanced.

#### **BRAKE SYSTEM**

A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a service brake application in the unlikely event of primary air supply loss. All air reservoirs provided on the chassis shall be labeled for identification.

The rear axle spring brakes shall automatically apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.

A four (4) sensor, four (4) modulator Anti-lock Braking System (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

Additional safety shall be accommodated through Automatic Traction Control (ATC) which shall be installed on the single rear axle. The ATC system shall apply the ABS when the drive wheels loose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

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A virtual style switch shall be provided and properly labeled "mud/snow". When the switch is pressed once, the system shall allow a momentary wheel slip to obtain traction under extreme mud and snow conditions. During this condition the ATC light shall blink continuously notifying the driver of activation. Pressing the switch again shall deactivate the mud/snow feature.

The Electronic Stability Control (ESC) unit is a functional extension of the electronic braking system. It is able to detect any skidding of the vehicle about its vertical axis as well as any rollover tendency. The control unit comprises an angular-speed sensor that measures the vehicle's motion about the vertical axis, caused, for instance, by cornering or by skidding on a slippery road surface. An acceleration sensor measures the vehicle's lateral acceleration. The Controller Area Network (CAN) bus provides information on the steering angle. On the basis of lateral acceleration and steering angle, an integrated microcontroller calculates a theoretical angular speed for the stable vehicle condition.

#### **FRONT BRAKES**

The front brakes shall be Meritor EX225 Disc Plus disc brakes with 17.00 inch vented rotors.

#### **REAR BRAKES**

The rear brakes shall be Meritor 16.50 inch X 8.63 inch S-cam drum type. The brakes shall feature a cast iron shoe.

#### **PARK BRAKE**

Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements.

In addition to the mechanical rear brake engagement, the front service brakes will also engage via air pressure, providing additional braking capability.

#### **PARK BRAKE CONTROL**

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake system. The control shall be yellow in color.

The parking brake actuation valve shall be mounted on the center of the tunnel within easy access of both the driver and officer positions.

#### **REAR BRAKE SLACK ADJUSTERS**

The rear brakes shall include Meritor automatic slack adjusters installed on the axle which features a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

#### **AIR DRYER**

The brake system shall include a Wabco System Saver 1200 air dryer with an integral 100 watt heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be located on the right hand frame rail forward of the front wheel behind the right hand cab step.

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#### **FRONT BRAKE CHAMBERS**

The front brakes shall be provided with MGM type 24 long stroke brake chambers.

#### **REAR BRAKE CHAMBERS**

The rear axle shall include TSE 30/30 H.O.T. (High Output Technology) brake chambers shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE 30/30 H.O.T. chambers are designed to provide the same performance as 30/36 chambers in a smaller package.

#### **AIR COMPRESSOR**

The air compressor provided for the engine shall be a Wabco<sup>®</sup> SS318 single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increasing the system component life.

#### **AIR GOVERNOR**

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be mounted to the right frame rail.

#### **MOISTURE EJECTORS**

Automatic moisture ejectors with a manual drain provision shall be installed on all reservoirs of the air supply system.

#### **AIR SUPPLY LINES**

The air system on the chassis shall be plumbed with color coded reinforced nylon tubing air lines. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) will be blue.

Brass compression type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.

#### **AIR OUTLET CONNECTION**

A quick release air outlet female connector shall be installed in the left lower cab step towards the front of the cab for the use of auxiliary air tools. The air outlet connector shall be compatible with a Milton 787, Parker Hannifin B13 or Meyers 54-410 connector.

#### **PLUMBING AIR OUTLET CONNECTION**

The cab mounted air outlet connection shall be plumbed to the chassis auxiliary air system reservoir.

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#### **AIR INLET/ OUTLET FITTING TYPE**

The air connector supplied shall be a 0.25 inch size Tru-Flate Interchange style manual connection which is compatible with Milton 'T' style, Myers 0.25 inch Automotive style and Parker 0.25 inch 10 Series connectors.

#### **AIR TANK SPACERS**

There shall be spacers included with the air tank mounting. The spacers shall move the air tanks 1.50 inches inward towards the center of the chassis. This shall provide clearance between the air tanks and the frame for body U-bolt clearance.

#### **REAR AIR TANK MOUNTING**

If a combination of wheel base, air tank quantity, or other requirements necessitate the location of one or more air tanks to be mounted rear of the fuel tank, these tank(s) will be mounted perpendicular to frame.

#### **WHEELBASE**

The chassis wheelbase shall be 180.00 inches.

#### **REAR OVERHANG**

The chassis rear overhang shall be 55.00 inches.

#### **FRAME**

The frame shall consist of double rails running parallel to each other with cross members forming a ladder style frame. The frame rails shall be formed in the shape of a "C" channel, with the outer rail measuring 10.25 inches high X 3.50 inches deep upper and lower flanges X 0.38 inches thick with an inner channel of 9.44 inches high X 3.13 inches deep and 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each double rail section shall be rated by a Resistance Bending Moment (RBM) minimum of 3,213,100 inch pounds and have a minimum section modulus of 29.21 cubic inches. The frame shall measure 35.00 inches in width.

Proposals calculating the frame strength using the "box method" shall not be considered.

Proposals including heat treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

A minimum of seven (7) fully gusseted 0.25 inch thick cross members shall be installed. The inclusion of the body mounting, or bumper mounting shall not be considered as a cross member. The cross members shall be attached using zinc coated grade 8 fasteners. The bolt heads shall be flanged type, held in place by distorted thread flanged lock nuts. Each cross member shall be mounted to the frame rails utilizing a minimum of 0.25 inch thick gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.

Any proposals not including additional reinforcement for each cross member shall not be considered.

All relief areas shall be cut in with a minimum 2.00 inch radius at intersection points with the edges ground to a smooth finish to prevent a stress concentration point.

The frame and cross members shall carry a lifetime warranty to the original purchaser. A copy of the frame warranty shall be made available upon request.

Proposals offering warranties for frames not including cross members shall not be considered.

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#### **FRAME WARRANTY**

The frame and cross members shall carry a limited lifetime warranty to the original purchaser. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

#### **FRAME CLEAR AREA**

The chassis frame shall be left clear of chassis mounted components inside or outside the frame rails within the first 30.00 inches behind the cab to allow space for OEM installed components. Cross members may be installed in the clear area if required for proper frame or driveline configuration.

#### **FRAME PAINT**

The frame shall be powder coated black prior to any attachment of components.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-cured pencil hardness of H-2H. The direct impact resistance test per ASTM D2794 shall have an impact resistance of 120.00 inches per pound at 2 mils.

Any proposals offering painted frame with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.

#### **FRONT BUMPER**

The chassis shall include a special approach style steel front bumper. The bumper shall be constructed of 0.19 inch thick ASTM A-36 formed steel which shall be painted. The bumper shall be 98.63 inches in width with angled corners. The bottom flange of the bumper shall be designed with a 20-degree angle to allow for an increased angle of approach for the vehicle.

#### **FRONT BUMPER EXTENSION LENGTH**

The front bumper shall be extended approximately 12.50 inches ahead of the cab.

#### **FRONT BUMPER EXTENSION FRAME WIDTH**

The front bumper extension frame shall feature an overall width of 48.25 inches.

#### **FRONT BUMPER PAINT**

The front bumper shall be painted the same as the lower cab color.

#### **FRONT BUMPER APRON**

The front bumper extension shall include a bumper apron which shall be constructed of 0.19 inch thick ASTM A-36 steel and shall be designed for an exact fit between the bumper and the cab fascia. The apron shall be an integral part of the bumper assembly and shall be painted the same color as the bumper.

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#### **MECHANICAL SIREN**

A Federal Q2B™ siren shall be provided and installed by the customer.

#### **AIR HORN**

The front bumper shall include two (2) Hadley brand E-Tone air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.

#### **AIR HORN LOCATION**

The air horns shall be recess mounted in the front bumper face, one (1) on the right side of the bumper in the inboard position relative to the right hand frame rail and one (1) on the left side of the bumper in the inboard position relative to the left hand frame rail.

#### **AIR HORN RESERVOIR**

One (1) air reservoir, with a 2084 cubic inch capacity, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

#### **FRONT BUMPER TOW EYES**

The bumper shall include two (2) chrome plated tow eyes shall be installed through the front bumper. The eyes shall be fabricated from 0.75 inch thick #1020 ASTM-A36 hot rolled steel. The inside diameter of the eye shall be 2.00 inches and include a chamfered edge.

#### **CAB TILT SYSTEM**

The entire cab shall be capable of tilting approximately 45-degrees to allow for easy maintenance of the engine and transmission. The cab tilt pump assembly shall be located on the right side of the chassis above the battery box.

The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the "Down" button to indicate safe road operation.

It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.

Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once the hold-down hooks are set in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.

Two (2) cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab tilt pivots shall be 1.90 inch ball and be anchored to frame brackets with 1.25 inch diameter studs.

A steel safety channel assembly, painted safety yellow shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.



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#### **CAB TILT CONTROL RECEPTACLE**

A six (6) pin Deutsch receptacle that includes a cap shall be installed in the right hand side lower front step in the rear position to provide a place to plug in the cab tilt remote control pendant.

The remote control pendant shall include 20.00 feet of cable with a mating Deutsch connector. The remote control pendant shall be shipped loose with the chassis.

#### **CAB WINDSHIELD**

The cab windshield shall have a surface area of 2825.00 square inches and be of a two (2) piece wraparound design for maximum visibility.

The glass utilized for the windshield shall include standard automotive tint. The left and right windshield shall be fully interchangeable thereby minimizing stocking and replacement costs.

Each windshield shall be installed using black self locking window rubber.

#### **GLASS FRONT DOOR**

The front cab doors shall include a window which is 27.00 inches in width X 26.00 inches in height. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished using electric actuation. The left and right front door windows shall be controlled using a switch on each respective side inner door panel. The driver's door shall include a switch for each powered door window in the cab.

There shall be an irregular shaped fixed window which shall measure 2.50 inches wide at the top, 8.00 inches wide at the bottom X 26.00 inches in height, more commonly known as "cozy glass" ahead of the front door roll down windows.

The windows shall be mounted within the frame of the front doors trimmed with a black anodized ring on the exterior.

#### **GLASS TINT FRONT DOOR**

The windows located in the left and right front doors shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

#### **GLASS REAR DOOR RH**

The rear right hand side crew door shall include a window which is 27.00 inches in width X 26.00 inches in height. The window shall be a powered type and shall be controlled by a switch on the inner door panel and on the driver's control panel.

#### **GLASS TINT REAR DOOR RIGHT HAND**

The window located in the right hand side rear window shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

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## PUMPER PRODUCTION SPECIFICATION

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#### **GLASS REAR DOOR LH**

The rear left hand side crew door shall include a window which is 27.00 inches in width X 26.00 inches in height. The window shall be a powered type and shall be controlled by a switch on the inner door panel and on the driver's control panel.

#### **GLASS TINT REAR DOOR LEFT HAND**

The window located in the left hand side rear door shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

#### **GLASS SIDE MID RH**

The cab shall include a window on the right side behind the front and ahead of the crew doors which shall measure 16.00 inches wide X 26.00 inches high. This window shall be capable of sliding vertically within this space and shall be rectangular in shape. The window shall be mounted in a black anodized aluminum frame with lower drain slots. The glass utilized for the window shall include a green automotive tint unless otherwise noted.

#### **GLASS TINT SIDE MID RIGHT HAND**

The window located on the right hand side of the cab between the front and rear doors shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

#### **GLASS SIDE MID LH**

The cab shall include a window on the left side behind the front door and ahead of the crew doors and above the wheel well which shall measure 16.00 inches wide X 26.00 inches high. This window shall be capable of sliding vertically within this space and shall be rectangular in shape. The window shall be mounted in a black anodized aluminum frame with lower drain slots. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

#### **GLASS TINT SIDE MID LEFT HAND**

The window located on the left hand side of the cab between the front and rear doors shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **CLIMATE CONTROL**

The cab shall be equipped with a ceiling mounted combination defrost / heating and air-conditioning system mounted above the engine tunnel in a central location.

The system shall offer sixteen (16) adjustable louvers. Six (6) of the louvers shall face forward towards the windshield, offering 45,000 BTU of heat at 320 CFM for defrosting. The system shall include six (6) rearward facing louvers to direct air for the crew area and four (4) for driver and officer comfort. The HVAC system shall be designed to produce 60,000 BTU of heat and 32,000 BTU of cooling. The HVAC cover shall be made of aluminum which shall be coated with a customer specified interior paint, or protective coating.

All defrost/heating systems shall be plumbed with one (1) seasonal shut-off valve at the front corner on the right side of the cab.

The air conditioner lines shall be a mixture of custom bent zinc coated steel fittings and Aero-quip GH 134 flexible hose with Aero-Quip EZ-Clip fittings.

#### **CLIMATE CONTROL DRAIN**

The climate control system shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance.

#### **CLIMATE CONTROL ACTIVATION**

The heating, defrosting and air conditioning controls shall be located on the center dash panel in the lower left hand side, in a position which is easily accessible to the driver. The climate control shall be activated by a rotary switch.

#### **HVAC OVERHEAD COVER PAINT**

The overhead HVAC cover shall be painted with a Zolatone #20-72 silver gray texture finish.

#### **A/C CONDENSER LOCATION**

A roof mounted A/C condenser shall be installed centered on the cab forward of the raised roof against the slope rise.

#### **A/C COMPRESSOR**

The air-conditioning compressor shall be a belt driven, engine mounted, open type compressor that shall be capable of producing a minimum of 32,000 BTU at 1500 engine RPMs. The compressor shall utilize R-134A refrigerant and PAG oil.

#### **CAB INSULATION**

The cab ceiling and walls shall include 1.00 inch thick foam insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **UNDER CAB INSULATION**

The underside of the cab tunnel surrounding the engine and the underside of the entire cab floor shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments. In addition the insulation shall have an expanded aluminum overlay installed to assist in retaining the insulation tight against the engine tunnel surfaces and the underside of the cab floor.

The insulation shall act as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations. As an additional benefit, the insulation shall assist in sustaining the desired temperature within the cab interior.

The engine tunnel insulation shall measure approximately 0.75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft<sup>2</sup> PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

The cab floor insulation shall measure 0.56 inch thick including a 1.0#/sf PVC barrier and a moisture and heat reflective foil facing, reinforced with fiberglass strands. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by 3 mils of acrylic pressure sensitive adhesive and aluminum pins with hard hat, hold in place fastening heads.

#### **INTERIOR TRIM FLOOR**

The floor of the cab shall be covered with a multi-layer mat consisting of 0.25 inch thick sound absorbing closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive and aluminum trim molding. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.

#### **INTERIOR TRIM VINYL**

The cab interior shall include trim on the front ceiling, rear crew ceiling, and the cab walls. It shall be easily removable to assist in maintenance. The trim shall be constructed of insulated vinyl over a hard board backing.

#### **REAR WALL INTERIOR TRIM**

The rear wall of the cab shall be trimmed with vinyl.

#### **HEADER TRIM**

The cab interior shall feature header trim over the driver and officer dash constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum.

#### **TRIM CENTER DASH**

The main center dash area shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate. There shall be four (4) holes located on the top of the dash near each outer edge of the electrical access cover for ventilation. The dash shall include cup holders and storage bins.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

SVI #858

### **TRIM LH DASH**

The left hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate for a perfect fit around the instrument panel. For increased occupant protection the extreme duty left hand dash utilizes patent pending break away technology to reduce rigidity in the event of a frontal crash. The left hand dash shall offer lower vertical surface area to the left and right of the steering column to accommodate control panels.

### **TRIM RH DASH**

The right hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate and shall include a glove compartment with a hinged door and a Mobile Data Terminal (MDT) provision. The glove compartment size will measure 14.00 inches wide X 6.38 inches high X 5.88 inches deep. The MDT provision shall be provided above the glove compartment.

### **ENGINE TUNNEL TRIM**

The cab engine tunnel shall be covered with a multi-layer mat consisting of 0.25 inch closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The mat shall be held in place by pressure sensitive adhesive. The engine tunnel mat shall be trimmed with anodized aluminum stair nosing trim for an aesthetically pleasing appearance.

### **POWER POINT DASH MOUNT**

The cab shall include four (4) 12 volt cigarette lighter type receptacles in the cab dash to provide a power source for 12 volt electrical equipment. The receptacles shall be wired battery direct.

### **AUXILIARY POWER POINT REAR CREW**

The cab interior shall include two (2) 12 volt cigarette lighter type receptacles located on the top of the forward facing seat box in the crew area behind the left and right hand seating positions. The receptacles shall be connected to the batteries. This receptacles shall provide a power source for 12 volt electrical equipment.

### **STEP TRIM**

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of 14 gauge 304 stainless steel with indented perforations. The perforations shall allow water and other debris to flow through rather than becoming trapped within the stepping surface. The stainless steel material shall have a number 7 mirror finish. The lower step shall be mounted to a frame which is integral with the construction of the cab for rigidity and strength. The middle step shall be integral with the cab construction and shall be trimmed in 0.08 inch thick 3003-H22 embossed aluminum tread plate.

### **STEP TRIM KICKPLATE**

The cab steps shall include a kick plate in the rise of each step. The risers shall be trimmed in 3003-H22 bright aluminum tread-plate which is 0.07 inch thick.

### **UNDER CAB ACCESS DOOR**

The cab shall include an access door in the left crew step riser constructed of embossed aluminum tread plate with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **INTERIOR DOOR TRIM**

The interior trim on the doors of the cab shall consist of a two (2) piece panel constructed of 14-gauge 304 stainless steel. The stainless steel shall have a brushed finish.

#### **DOOR TRIM KICKPLATE**

The inner door panels shall include a brushed stainless steel kick plate which shall be fastened to the lower portion of the door panels on each door.

#### **DOOR TRIM SCUFF PLATE**

There shall be stainless steel scuff plate along the door jam to protect the painted surface from damage should the seat belt buckle come in contact with the door jam.

In addition, the painted surface rear of the front door windows on the inside of the door shall include a stainless steel scuff plate to protect the painted surface from damage caused by the seat belt buckle.

#### **DOOR TRIM CUSTOMER NAMEPLATE**

The interior door trim on the front doors shall include a customer nameplate which states the vehicle was custom built for their Department.

#### **CAB DOOR TRIM REFLECTIVE**

The interior of each door shall include high visibility reflective tape. A white reflective tape 1.00 inch in width shall be provided vertically along the outer rear edge of the door. The lowest portion of each door skin shall include a reflective tape chevron with red and white stripes. The chevron tape shall measure 6.00 inches in height.

#### **INTERIOR GRAB HANDLE "A" PILLAR**

There shall be two (2) rubber covered 11.00 inch grab handles installed inside the cab, one on each "A" post at the left and right door openings. The left handle shall be located 7.88 inches above the bottom of the door window opening and the right handle shall be located 2.88 inches above the bottom of the door window opening. The handles shall assist personnel in entering and exiting the cab.

#### **INTERIOR GRAB HANDLE FRONT DOOR**

Each front door shall include one (1) ergonomically contoured 9.00 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish to assist personnel entering and exiting the cab.

#### **INTERIOR GRAB HANDLE REAR DOOR**

A black powder coated cast aluminum assist handle shall be provided on the inside of each rear crew door. A 30.00 inch long handle shall extend horizontally the width of the window just above the window sill. The handle shall assist personnel in exiting and entering the cab.

# ST. HELENA FIRE DEPARTMENT PUMPER PRODUCTION SPECIFICATION SVI #858

## **INTERIOR TRIM VINYL COLOR**

The cab interior vinyl trim surfaces shall be gray in color.

## **INTERIOR TRIM SUNVISOR**

The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield. Each sun visor shall be constructed of Masonite and covered with padded vinyl trim.

## **INTERIOR FLOOR MAT COLOR**

The cab interior floor mat shall be black in color.

## **HEADER TRIM INTERIOR PAINT**

The metal surfaces in the header area shall be coated with Zolatone #20-72 silver gray texture finish.

## **TRIM CENTER DASH INTERIOR PAINT**

The entire center dash shall be coated with Zolatone #20-72 silver gray texture finish. Any accessory pods attached to the dash shall also be painted this color.

## **TRIM LH DASH INTERIOR PAINT**

The left hand dash shall be painted with a Zolatone #20-72 silver gray texture finish.

## **TRIM RIGHT HAND DASH INTERIOR PAINT**

The right hand dash shall be painted with Zolatone #20-72 silver gray texture finish.

## **DASH PANEL GROUP**

The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer.

## **SWITCHES CENTER PANEL**

The center dash panel shall include three (3) rocker switch positions in a single row configuration in the lower right portion of the panel.

A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **SWITCHES LEFT PANEL**

The left dash panel shall include two (2) rocker switches located in the left hand side of the panel.

A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-designated switch shall be a two-position, black switch with a green indicator light. The blank switch legend can be custom engraved by the body manufacturer. The switch legend shall have backlighting provided.

#### **SWITCHES RIGHT PANEL**

The right dash panel shall include no rocker switches or legends.

#### **SEAT BELT WARNING**

A Weldon seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall provide a visual warning indicator in the Vista display and control screen(s), an indicator light in the instrument panel, and an audible alarm.

The warning system shall activate when any seat is occupied with a minimum of 60 pounds, the corresponding seat belt remains unfastened, and the park brake is released. The warning system shall also activate when any seat is occupied, the corresponding seat belt was fastened in an incorrect sequence, and the park brake is released. Once activated, the visual indicators and audible alarm shall remain active until all occupied seats have the seat belts fastened.

#### **SEAT MATERIAL**

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids. Common trade names for this material are Imperial 1200 and Durawear.

#### **SEAT COLOR**

All seats supplied with the chassis shall be black in color. All seats shall include red seat belts.

#### **SEAT BACK LOGO**

The seat backs shall include the logo for the OEM body manufacturer. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.



# ST. HELENA FIRE DEPARTMENT

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### SVI #858

#### **SEAT DRIVER**

The driver's seat shall be an H.O. Bostrom Firefighter Sierra model seat. The seat shall feature eight-way electric positioning. The eight positions shall include up and down, fore and aft with 8.00 inches of travel, back angle adjustment and seat rake adjustment. The seat shall feature integral springs to isolate shock.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches measured with the seat height adjusted to the lowest position of travel.

This model of seat shall have successfully completed the static load tests set forth by FMVSS 207, 209, and 210 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity.

The materials used in construction of the seat shall also have successfully completed testing with regard to the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which dictates the allowable burning rate of materials in the occupant compartments of motor vehicles.

#### **SEAT BACK DRIVER**

The driver's seat shall include a standard seat back incorporating the all belts to seat feature (ABTS). The seat back shall feature a contoured head rest.

#### **SEAT MOUNTING DRIVER**

The driver's seat shall be installed in an ergonomic position in relation to the cab dash.

#### **SEAT OFFICER**

The officer's seat shall be an H.O. Bostrom Firefighter model seat. The seat shall feature two-way manual adjustment and shall include a tapered and padded seat cushion. The seat shall also feature integral springs to isolate shock.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207, 209, 210 and 302 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **SEAT BACK OFFICER**

The officer's seat shall feature a SecureAll™ SCBA locking system which shall be one bracket model and store most U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

#### **SEAT MOUNTING OFFICER**

The officer's seat shall be installed in an ergonomic position in relation to the cab dash.

#### **SCBA MASK POUCH OFFICER**

The officer's seat shall feature a pouch designed specifically to contain the mask attached to self contained breathing apparatus. This pouch shall keep the mask safe from scratches and abrasions while the breathing apparatus is contained within the seat back.

#### **POWER SEAT WIRING**

The power seat or seats installed in the cab shall be wired directly to battery power.

#### **SEAT REAR FACING OUTER LOCATION**

The crew area shall include two (2) rear facing crew seats, which include one (1) located directly behind the left side front seat and one (1) located directly behind the right side front seat.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **SEAT CREW REAR FACING OUTER**

The crew area shall include a seat in the rear facing outboard position which shall be a H.O. Bostrom Firefighter series. The seat shall feature a tapered and padded seat, and cushion. The seat and cushion shall be spring load hinged and compact in design for additional room and shall remain in the stored position until occupied.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

#### **SEAT BACK REAR FACING OUTER**

The rear facing outboard seat shall feature a Bostrom SecureAll™ self contained breathing apparatus (SCBA) locking system which shall store most U.S. and International SCBA brands and bottle sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.

The bracket system shall be free of straps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ shall include a release handle which shall be integrated into the center of the bottom seat cushion for easy access and to eliminate hooking the release handle with clothing or other equipment.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

#### **SEAT MOUNTING REAR FACING OUTER**

The rear facing outer seat shall be mounted facing the rear of the cab.

#### **SCBA MASK POUCH REAR FACING OUTER**

The rear facing outer seat(s) shall feature a pouch designed specifically to contain the mask attached to self contained breathing apparatus. This pouch shall keep the mask safe from scratches and abrasions while the breathing apparatus is contained within the seat back.

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## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **SEAT BELT ORIENTATION CREW**

The crew position seat belts shall follow the standard orientation which extends from the outboard shoulder extending to the inboard hip.

#### **SEAT FORWARD FACING CENTER LOCATION**

The crew area shall include two (2) forward facing center crew seats with both located at the center of the rear wall.

#### **SEAT CREW FORWARD FACING CENTER**

The crew area shall include a seat in the forward facing center position which shall be a H.O. Bostrom Firefighter series. The seat shall feature a tapered and padded seat, and cushion. The seat and cushion shall be hinged and compact in design for additional room and shall remain in the stored position until occupied.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

#### **SEAT BACK FORWARD FACING CENTER**

The forward facing center seat shall feature a SecureAll™ self contained breathing apparatus (SCBA) locking system which shall be one bracket model and store most U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

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#### **SEAT MOUNTING FORWARD FACING CENTER**

The forward facing center seats shall offer a special mounting. The seats shall be installed 2.25 inches apart offering the most available room for each occupant.

#### **SCBA MASK POUCH FORWARD FACING CENTER**

The forward facing center seat(s) shall feature a pouch designed specifically to contain the mask attached to self contained breathing apparatus. This pouch shall keep the mask safe from scratches and abrasions while the breathing apparatus is contained within the seat back.

#### **SEAT FRAME FORWARD FACING**

The forward facing center seating positions shall include an enclosed seat frame located and installed on the rear wall. The seat frame shall measure 42.38 inches wide X 12.38 inches high X 22.00 inches deep. The seat frame shall be constructed of Marine Grade 5052-H32 0.19 inch thick aluminum plate. The seat box shall be painted with the same color as the remaining interior.

#### **SEAT FRAME FORWARD FACING STORAGE ACCESS**

There shall be two (2) access points to the seat frame storage area, one (1) on each side of the seat frame. Each access point shall be covered by a hinged door which measures 15.00 inches in width X 10.63 inches in height.

#### **CAB FRONT UNDERSEAT STORAGE ACCESS**

The left and right under seat storage areas shall have a solid aluminum hinged door with non-locking latch.

#### **SEAT COMPARTMENT DOOR FINISH**

All underseat storage compartment access doors shall have a Zolatone #20-72 silver gray texture.

#### **WINDSHIELD WIPER SYSTEM**

The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers which shall be affixed to a radial wet arm. The system shall include a single motor which shall initiate the arm in which both the left hand and right hand windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.

#### **ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR**

The windshield washer fluid level shall be monitored electronically. When the washer fluid level becomes low the yellow "Check Message Center" indicator light on the instrument panel shall illuminate and the message center in the dual air pressure gauge shall display a "Check Washer Fluid Level" message.

# ST. HELENA FIRE DEPARTMENT

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#### **CAB DOOR HARDWARE**

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be made of aluminum with a chrome plated finish.

The interior exit door handles shall be flush paddle type with a black finish, which are incorporated into the upper door panel.

All cab entry doors shall include locks which are keyed alike. The door locks shall be designed to prevent accidental lockout.

The exterior pull handles shall include a scuff plate behind the handle constructed of polished stainless steel to help protect the cab finish.

#### **DOOR LOCKS**

The doors shall include a Controller Area Network (CAN) based electronic door lock system which shall include two (2) external keypads, one (1) located on the left side next to the front grab handle and one (1) on the right side next to the front grab handle. There shall be one (1) red rocker switch provided on the inside of each front cab entry door to actuate the door locks. The rear cab entry doors shall be provided with a red manual knob on the interior paddle handle to actuate the door lock on the respective door. The electronic door lock system shall include four (4) key fobs for actuation with buttons for cab entry door locks and for compartment door locks.

When the doors are unlocked using the external keypad or the key fobs the interior dome lights shall illuminate and remain on for a period of twenty (20) seconds.

Wiring shall also be provided for up to four (4) exterior cab compartments and up to four (4) body compartments.

#### **POWER DOOR LOCK COMPARTMENT ACTIVATION**

The power door lock feature shall include activation for exterior compartment door locks through the key fob and keypads.

#### **GRAB HANDLES**

The cab shall include one (1) 18.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The assist handle shall be made of 14 gauge 304- stainless steel and be 1.25 inch diameter to enable easy grabbing with the gloved hand. Each assist handle shall include a stainless steel plate which saves the cab from scuffs through continued use of the handle.

#### **REARVIEW MIRRORS**

Retrac Aerodynamic West Coast style dual vision mirror heads model 613305 shall be provided and installed on each of the front cab doors.

The mirrors shall be mounted via 1.00 inch diameter tubular stainless steel arms to provide a rigid mounting to reduce mirror vibration.

The mirrors shall measure 8.00 inches wide X 19.00 inches high and shall include an integral convex mirrors installed in the mirror head below the flat glass to provide a wider field of vision. The flat and convex mirrors shall be motorized with remote horizontal and vertical adjustment. The control switches shall be mounted within easy reach of the driver. The flat and convex mirrors shall be heated for defrosting in severe cold weather conditions.

The mirrors shall be constructed of a vacuum formed chrome plated ABS plastic housing that is corrosion resistant and shall include the finest quality non-glare glass.

# ST. HELENA FIRE DEPARTMENT PUMPER PRODUCTION SPECIFICATION

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## **REARVIEW MIRROR HEAT SWITCH**

The heat for the rearview mirrors shall be controlled through a virtual button on the Vista display and control screen.

## **TRIM FRONT**

A polished stainless steel band shall be installed on the front of the cab and wrap around the cab radius, encompassing the headlamp and warning lamp bezels. The band shall extend from front door hinge to front door hinge with trim molding on the top and bottom edges.

## **TRIM LOWER SIDE FRONT**

A stainless steel trim band, 10.00 inches high, with upper and lower black and chrome trim moldings, shall be installed on the lower exterior sides of the cab between the front bumper and the front doors. The trim shall be installed so that the top edge is approximately 1.00 inch below the top of the front bumper, and shall be affixed without holes and fasteners.

## **EXTERIOR TRIM REAR CORNER**

There shall be mirror finish stainless steel scuff plates on the outside corners at the back of the cab. The stainless steel plate shall be affixed to the cab using two sided adhesive tape.

## **CAB FENDER**

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. Each two-piece liner shall consist of an inner liner 16.00 inches wide made of vacuum formed ABS composite and an outer fenderette 3.50 inches wide made of 14 gauge 304 polished stainless steel.

## **MUD FLAPS FRONT**

The front wheel wells shall have mud flaps installed on them.

## **CAB EXTERIOR FRONT & SIDE EMBLEMS**

The cab shall include three (3) Spartan Chassis emblems. There shall be one (1) installed on the front air intake grille and one (1) emblem with an integrated model nameplate installed on the exterior of the cab on the lower forward portion of the front driver and officer side doors.

## **CAB EXTERIOR MODEL NAMEPLATE**

The cab shall include custom "Metro Star" nameplates integrated into the side emblem.

## **IGNITION**

A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a one-quarter turn Cole Hersee switch, both of which shall be mounted to the left of the steering wheel on the dash. A chrome push type starter button shall be provided adjacent to the master battery and ignition switches.

Each switch shall illuminate a green LED indicator light on the dash when the respective switch is placed in the "ON" position.

The starter button shall only operate when both the master battery and ignition switches are in the "ON" position.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **BATTERY**

The single start electrical system shall include six (6) Harris BCI 31 950 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541. The cables shall have encapsulated ends with heat shrink and sealant.

#### **BATTERY TRAY**

The batteries shall be installed within two (2) steel battery trays located on the left side and right side of the chassis, securely bolted to the frame rails. The battery trays shall be coated with the same material as the frame.

The battery trays shall include drain holes in the bottom for sufficient drainage of water. A durable, non-conducting, interlocking mat made by Dri-Dek shall be installed in the bottom of the trays to allow for air flow and help prevent moisture build up. The batteries shall be held in place by non-conducting phenolic resin hold down boards.

#### **BATTERY BOX COVER**

Each battery box shall include a steel cover which protects the top of the batteries. Each cover shall include flush latches which shall keep the cover secure as well as a black powder coated handle for convenience when opening.

#### **BATTERY CABLE**

The starting system shall include cables which shall be protected by 275 degree F. minimum high temperature flame retardant loom, sealed and encapsulated at the ends with heat shrink and sealant.

#### **BATTERY JUMPER STUD**

The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

#### **ALTERNATOR**

The charging system shall include a 320 amp Leece-Neville 12 volt alternator. The alternator shall include a self-exciting integral regulator.

#### **BATTERY CONDITIONER**

A Kussmaul 35/10 battery conditioner shall be supplied. The battery conditioner shall provide a 35 amp output for the chassis batteries and a 10 amp battery saver output. The battery conditioner shall be mounted in the cab behind the driver's seat.

#### **BATTERY CONDITIONER DISPLAY**

A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in the cab, viewable through the cab mid side window behind the left front door.



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### **AUXILIARY AIR COMPRESSOR**

A Kussmaul Auto Pump 120V air compressor shall be supplied. The air compressor shall be installed behind the officer's seat. The air compressor shall be plumbed to the air brake system to maintain air pressure.

### **ELECTRICAL INLET**

A Kussmaul 20 amp super auto-eject electrical receptacle shall be supplied. It shall automatically eject the plug when the starter button is depressed.

A single item or an addition of multiple items must not exceed the rating of the electric inlet that it's connected to.

#### *Amp Draw Reference List:*

*Kussmaul 1000 Charger - 3.5 Amps*

*Kussmaul 1200 Charger - 10 Amps*

*Kussmaul 35/10 Charger - 10 Amps*

*1000W Engine Heater - 8.33 Amps*

*1500W Engine Heater - 12.5 Amps*

*120V Air Compressor - 4.2 Amps*

### **ELECTRICAL INLET LOCATION**

An electrical inlet shall be installed on the left hand side of cab over the wheel well in the forward position 6.88" lower than the standard position.

### **ELECTRICAL INLET CONNECTION**

The electrical inlet shall be connected to the battery conditioner and the air pump.

### **ELECTRICAL INLET COLOR**

The electrical inlet connection shall include a white cover.

### **HEADLIGHTS**

The cab front shall include four (4) rectangular LED headlamps with separate high and low beams mounted in bright chrome bezels.

### **FRONT TURN SIGNALS**

The front fascia shall include two (2) Federal Signal Quadra Flare 4.00 inch X 6.00 inch programmable LED amber light heads which shall be installed outboard in polished aluminum castings above the outer warning lamps and headlights, below the windshield to act as turn signals.

### **HEADLIGHT LOCATION**

The headlights shall be located on the front fascia of the cab directly below the front warning lights.

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#### **SIDE TURN/MARKER LIGHTS**

The sides of the cab shall include two (2) LED round side marker lights which shall be provided just behind the front cab radius corners.

#### **MARKER AND ICC LIGHTS**

In accordance with FMVSS, there shall be five (5) LED cab marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.

#### **HEADLIGHT AND MARKER LIGHT ACTIVATION**

The headlights and marker lights shall be controlled via a virtual button on the Vista display. There shall be a virtual dimmer control on the Vista display to adjust the brightness of the dash lights. The headlamps and markers lamps shall illuminate to 100% brilliance when the ignition switch is in the "On" position and the parking brake is released. The headlights and marker lights shall turn off when the park brake is engaged.

#### **FOG LIGHTS**

The chassis shall include two (2) Peterson model 534 Nightwatcher® Dual ION fog/driving lights. The lights shall feature 55 watt lights, clear lenses, and black metal housings. These lights shall be controlled by a switch module on the SmartWheel steering wheel.

#### **FOG LIGHT LOCATION**

The fog lights shall be mounted under the bumper on the left and right side in the inboard positions.

#### **GROUND LIGHTS**

Each door shall include an NFPA compliant LED ground light mounted to the underside of the cab step below each door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life. The ground lighting shall be activated by the opening of the door on the respective cab side, when the parking brake is set and through a virtual button on the Vista display and control screen.

#### **STEP LIGHTS**

The middle step located at each door shall include a recess mounted 4.00 inch round LED light which shall activate with the opening of the respective door.

#### **UNDER BUMPER LIGHTS**

There shall be two (2) 4.00 inch round LED NFPA compliant ground lights mounted under the bumper. The lights shall include a polycarbonate lens, a housing which is vibration welded, and LEDs which shall be shock mounted for extended life. The under bumper ground lighting shall be interlocked with the park brake and the marker light activation.

#### **ENGINE COMPARTMENT LIGHT**

There shall be an incandescent NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The light shall activate automatically when the cab is tilted.

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### **FRONT SCENE LIGHTS**

The front of the cab shall include a Whelen Pioneer model PCP2 contour roof mount scene light installed on the brow of the cab.

Each lamp head shall have two (2) 12 volt high intensity LED panels. One side of each lamp head shall include a flood light and the other side shall include an 8-degree spotlight. Each lamp head shall draw 12.0 amps and generate 14,000 lumens total. Each lamp head shall measure 4.25 inches in height X 14.00 inches in width. The lamp heads and brackets shall be powder coated white.

### **FRONT SCENE LIGHT LOCATION**

There shall be one (1) scene light mounted center on the front brow of the cab.

### **FRONT SCENE LIGHTS ACTIVATION**

The front scene lighting shall be activated by a virtual button on the Vista display and control screen and a rocker switch on the dash.

### **SIDE SCENE LIGHTS**

The side of the cab shall include two (2) Whelen 900 series 9SCOENZR model scene lights, one (1) each side which shall be surface mounted with a chrome bezel. The Whelen lights shall offer LED lighting at a gradient 32-degree angle.

### **SIDE SCENE LIGHT LOCATION**

The scene lighting located on the left and right sides of the cab shall be mounted rearward of the cab "B" pillar in the 10.00 inch raised roof portion of the cab between the front and rear crew doors.

### **SIDE SCENE ACTIVATION**

The scene lights shall be activated by two (2) virtual buttons on the Vista display and control screen(s), one (1) for each light, and by opening the respective side cab doors.

### **INTERIOR OVERHEAD LIGHTS**

The cab shall include a two-section, red and clear Whelen LED dome lamp located over each door. The dome lamps shall be rectangular in shape and shall measure approximately 7.00 inches in length X 3.00 inches in width with a black colored bezel. The clear portion of each lamp shall be activated by opening the respective door and both the red and clear portion can be activated by individual switches on each lamp.

An additional two-section, red and clear Whelen LED dome lamp shall be provided over the engine tunnel which can be activated by individual switches on the lamp.

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#### **AUXILIARY DOME LIGHT MID CREW**

The cab shall include two (2) Whelen brand 3.00 inch X 7.00 inch LED auxiliary dome lights within the headliner within the middle of the crew area. The lights shall include a red and clear split lens. The lights shall be located one (1) each side 18.00 inches either side of the center line of the cab. The clear portion of each light shall be activated by the rear doors as well as push button activation on each light. The red portion of each light shall be activated by push button only.

#### **MAP LIGHTS**

A Federal Signal gooseneck style map light shall be provided. The light shall have a clear lens with a sliding red filter, shall be 18.00 inches tall and shall have a rheostat control switch on the base. The light shall be located high on the right hand side cab "A" pillar above the above the grab handle in a location that does not interfere with entering or exiting the cab.

#### **DO NOT MOVE APPARATUS LIGHT**

The front headliner of the cab shall include a flashing red Whelen 500 Series 5mm LED light clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound while the light is activated.

The flashing red light shall be 5.40 inches long X 1.70 inches wide X 0.90 inches high and shall be located centered left to right for greatest visibility.

The light and alarm shall be interlocked for activation when either a cab door is not firmly closed or an apparatus compartment door is not closed, and the parking brake is released.

#### **MASTER WARNING SWITCH**

A master switch shall be included, as a virtual button on the Vista display and control screen which shall be labeled "E Master" for identification. The button shall feature control over all devices wired through it. Any warning device switches left in the "ON" position when the master switch is activated shall automatically power up.

#### **INBOARD FRONT WARNING LIGHTS**

The cab front fascia shall include two (2) Federal Signal Quadra Flare LED front warning lights in the left and right inboard positions. The lights shall feature advanced Solaris technology and include a built in flasher capable of multiple flash patterns. The lights shall be mounted to the front fascia of the cab within a chrome bezel.

#### **INBOARD FRONT WARNING LIGHTS COLOR**

The warning lights mounted on the cab front fascia in the inboard positions shall be red.

#### **OUTBOARD FRONT WARNING LIGHTS**

The cab front fascia shall include two (2) Federal Signal Quadra Flare LED front warning lights in the left and right outboard positions. The lights shall feature advanced Solaris technology and include a built in flasher capable of multiple flash patterns. The lights shall be mounted to the front fascia of the cab within a chrome bezel.

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### **OUTBOARD FRONT WARNING LIGHTS COLOR**

The warning lights mounted on the cab front fascia in the outboard position shall be red.

### **FRONT WARNING SWITCH**

The front warning lights shall be controlled through a virtual control on the Vista display and control screen. This switch shall be clearly labeled for identification.

### **INTERSECTION WARNING LIGHTS**

The chassis shall include two (2) Federal Signal Quadra Flare 6x4 LED intersection warning lights, one (1) each side. The lights shall feature advanced Solaris technology and a built in flasher with multiple flash patterns including steady burn.

### **INTERSECTION WARNING LIGHTS COLOR**

The intersection lights shall be red.

### **INTERSECTION WARNING LIGHTS LOCATION**

The intersection lights shall be mounted on the side of the bumper.

### **SIDE WARNING LIGHTS**

The cab sides shall include two (2) Federal Signal Quadra Flare LED warning lights, one (1) on each side. The lights shall feature advanced Solaris technology and include a built in flasher capable of multiple flash patterns. The lights shall be mounted to the sides of the cab within a chrome bezel.

### **SIDE WARNING LIGHTS COLOR**

The warning lights located on the side of the cab shall be red.

### **SIDE WARNING LIGHTS LOCATION**

The warning lights on the side of the cab shall be mounted over the front wheel well directly over the center of the front axle.

### **AUXILIARY SIDE WARNING LIGHTS**

The sides of the cab shall include an auxiliary set of Federal Signal Quadra Flare LED 7.20 inch tall X 9.20 inch wide warning lights, one (1) each side, which shall feature advanced Solaris technology, a built in flasher with five (5) selectable patterns. The lights shall be surface mounted within a chrome bezel.

### **AUXILIARY SIDE WARNING LIGHTS COLOR**

The auxiliary warning lights located on the side of the cab shall be red.

### **AUXILIARY SIDE WARNING LIGHTS LOCATION**

The auxiliary warning lights on the side of the cab shall be mounted on the "B" pillar in the flat roof position.

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### **SIDE AND INTERSECTION WARNING SWITCH**

The side warning lights shall be controlled through a virtual button on the Vista display and control screen. This button shall be clearly labeled for identification.

### **TANK LEVEL LIGHTS**

There shall be two (2) Whelen PSTANK water level light strips surface mounted vertically, one (1) on each side of the cab behind the rear cab doors.

The light strips shall feature four (4) colors of LED lights to indicate the fluid level of a tank. The colors from top to bottom shall be green, blue, amber, and red.

### **INTERIOR DOOR OPEN WARNING LIGHTS**

The interior of each door shall include one (1) red Whelen 500 Series TIR6™ Super-LED® warning light located on the door panel. Each light shall activate with a flashing pattern when the door is in the open position to serve as a warning to oncoming traffic.

### **AIR HORN ACTIVATION**

The air horn activation shall be accomplished by the steering wheel horn button for the driver and two (2) Linemaster model SP491-S81 foot switches, one (1) on the left hand side accessible to the driver and one (1) on the right hand side accessible to the officer. The right hand foot switch shall be mounted in the farthest right position possible inboard of the siren switch. The air horn system shall only be active when the master warning switch is on and the park brake has been released. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

### **MECHANICAL SIREN ACTIVATION**

The mechanical siren shall be actuated by two (2) Linemaster model SP491-S81 foot switches mounted in the front section of the cab for use by the driver and officer. Two (2) siren brake controls shall be provided, one (1) on the Vista display and one (1) push button type in the switch panel on the dash.

The siren shall only be active when master warning switch is on to prevent accidental engagement.

### **BACK-UP ALARM**

A Preco-Matic model 270 backup alarm shall be installed at the rear of the chassis with an output level of 107 dB. The alarm shall automatically activate when the transmission is placed in reverse.

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#### INSTRUMENTATION

An ergonomically designed instrument panel shall be provided. Each gauge shall be backlit with LED lamps. Stepper motor movements shall drive all gauges. The instrumentation system shall be multiplexed and shall receive ABS, engine, and transmission information over the J1939 data bus to reduce redundant sensors and wiring.

The instrument panel shall contain the following gauges:

One (1) electronic speedometer shall be included. The primary scale on the speedometer shall read from 0 to 100 MPH, and the secondary scale on the speedometer shall read from 0 to 160 KM/H.

One (1) electronic tachometer shall be included. The scale on the tachometer shall read from 0 to 3000 RPM.

One (1) two-movement gauge displaying primary system, and secondary system air volumes and integral LCD odometer/trip odometer shall be included on the lower portion of the LCD. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI). The air pressure scales shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate a low air pressure, as well as a message on the LCD screen. The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD shall display Transmission Temperature in degrees Fahrenheit on the upper portion of the LCD. The LCD screen shall also be capable of displaying certain diagnostic functions.

One (1) four-movement gauge displaying engine oil pressure, coolant temperature, fuel level, voltmeter, and an indicator bar displaying Diesel Exhaust Fluid (DEF) LED bar shall be included. The scale on the engine oil pressure gauge shall read from 0 to 120 pounds per square inch (PSI). The engine oil pressure scale shall be linear to operate with an accuracy of 1 degree of the measured. A red indicator light in the gauge shall indicate a low engine oil pressure, as well as a message on the LCD screen. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (F). The coolant temperature scale shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate high coolant temperature, as well as a message on the LCD screen. The scale on the fuel level gauge shall read from empty to full as a percentage of fuel remaining. An amber indicator light shall indicate low fuel at 25% tank level. The scale on the voltmeter shall read from 10 to 16 volts with a red indication zone on the gauge showing critical levels of battery voltage. A red indicator light shall indicate high or low system voltage, as well as a message on the LCD screen. The scale on the DEF LED bar will consist of four (4) LEDs displaying levels in increments of 25% of useable DEF in green. Upon decreasing levels, the indicator bar will change colors to notify the driver of decreasing levels of DEF and action will be required. An amber indicator light shall indicate low levels of DEF, as well as a message on the LCD screen and an audible alarm.

The instrument panel shall include a light bar that contains the following LED indicator lights and produce the following audible alarms in applicable configurations:

#### RED LAMPS

Stop Engine-indicates critical engine fault

Air Filter Restricted-indicates excessive engine air intake restriction

Park Brake-indicates parking brake is set

Seat Belt Indicator-indicates when a seat is occupied and corresponding seat belt remains unfastened

Low Coolant-indicates engine coolant is required

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## AMBER LAMPS

MIL-indicates an engine emission control system fault  
Check Engine-indicates engine fault  
Check Trans-indicates transmission fault  
High Transmission Temperature-indicates excessive transmission oil temperature  
ABS-indicates anti-lock brake system fault  
Wait to Start-indicates active engine air preheat cycle  
HEST-indicates a high exhaust system temperature  
Water in Fuel-indicates presence of water in fuel filter  
DPF-indicates a restriction of the diesel particulate filter  
Regen Inhibit-indicates regeneration has been postponed due to user interaction  
Range Inhibit-indicates a transmission operation is prevented and requested shift request may not occur.  
SRS-indicates a problem in the RollTek supplemental restraint system  
Check Message-Turn Signal On  
Check Message-Door Ajar  
Check Message-Cab Ajar  
Check Message-ESC Active  
Check Message-DPF Regen Active  
Check Message-No Engine Data  
Check Message-No Transmission Data  
Check Message-No ABS Data  
Check Message-No Data All Communication With Vehicle Systems Has Been Lost  
Check Message-Check Engine Oil Level  
Check Message-Check Washer Fluid Level  
Check Message-Check Power Steering Fluid Level  
Check Message-Low Transmission Fluid Level  
Check Message-Check Coolant Level

## GREEN LAMPS

Left and Right turn signal indicators  
ATC-indicates low wheel traction for automatic traction control equipped vehicles, also indicates mud/snow mode is active for ATC system  
High Idle-indicates engine high idle is active.  
Cruise Control-indicates cruise control is active  
OK to Pump-indicates the pump engage conditions have been met  
Pump Engaged-indicates the pump is currently in use  
Auxiliary Brake-indicates secondary braking device is active

## BLUE LAMPS

High Beam Indicator



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## CONSTANT AUDIBLE ALARMS FROM GAUGE PACKAGE

High Trans Temp  
High or Low Voltage  
Seatbelt  
Check Engine  
Check Transmission  
Stop Engine  
Low Air Pressure  
Fuel Low  
Water in Fuel  
ESC  
High Coolant Temperature  
Low Engine Oil Pressure  
Low Coolant Level  
Low DEF Level  
Air Filter Restricted  
Extended Left and Right Turn Remaining On  
Cab Ajar  
Door Ajar  
ABS System Fault  
SRS (Supplemental Restraint System) Fault

## EXTERNAL AUDIBLE ALARMS

Air Filter  
Cab Ajar  
Door Ajar  
Seatbelt  
Check Engine  
Stop Engine  
Low Air Pressure  
Water in Fuel  
Low DEF  
ABS System Fault  
SRS (Supplemental Restraint System) Fault  
High or Low Voltage

## BACKLIGHTING COLOR

The instrumentation gauges and the switch panel legends shall be backlit using red LED backlighting.

## RADIO

A Jensen radio with weather band, AM/FM stereo receiver, compact disc (CD) player, rear iPod input pigtail connector, satellite radio capability, a front panel mini stereo input jack, and four (4) speakers shall be installed in the cab. The CD player shall be compatible with CD-R, CD-RW and MP3 format discs. The radio shall be installed in the right hand overhead position. The speakers shall be installed inside the cab with two (2) speakers recessed within the headliner of the front of the cab just behind the windshield and two (2) speakers on the upper rear wall of the cab. The receiver shall also have an auxiliary RCA input jack in the center dash panel, and an iLink input cable prewired behind the center panel for an iPod connection.

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#### **AM/FM ANTENNA**

A small antenna shall be located on the right hand side of the cab roof for AM/FM and weather band reception.

#### **CAMERA**

An Audiovox Voyager heavy duty rearview camera system shall be supplied. The system shall include one (1) box shaped camera shall be shipped loose for OEM installation in the body to afford the driver a clear view to the rear of the vehicle.

The camera shall be wired to a single Weldon Vista display. The rear camera display shall activate when the vehicle's transmission is placed in reverse. The camera system display can also be activated through the Vista display panel.

#### **CAB EXTERIOR PROTECTION**

The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.

#### **FIRE EXTINGUISHER**

A 2.50 pound D.O.T approved fire extinguisher with BC rating shall be shipped loose with the cab.

#### **DOOR KEYS**

The cab and chassis shall include a total of four (4) door keys for the manual door locks.

#### **WARRANTY**

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab and chassis for a period of twenty-four (24) months, or the first 36,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

#### **CHASSIS OPERATION MANUAL**

There shall be two (2) digital copies of the chassis operation manual provided with the chassis. The digital data shall include a parts list specific to the chassis model.

#### **ENGINE AND TRANSMISSION OPERATION MANUALS**

There shall be two (2) digital copies of the engine operation manual and two (2) digital copies of the transmission operation manual specific to the model ordered included with the chassis in the ship loose items.

#### **CAB/CHASSIS AS BUILT WIRING DIAGRAMS**

The cab and chassis shall include two (2) digital copies of wiring schematics and option wiring diagrams.

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### 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

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#### **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 fire apparatus in feet and inches, the length of the completed fire apparatus in feet and inches and the GVWR in pounds.

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.

#### **ACCIDENT PREVENTION**

There shall be a placard in the cab seating area which reads, "ALL OCCUPANTS MUST BE SEATED AND BELTED WHEN THE APPARATUS IS IN MOTION".

#### **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.

#### **ACCIDENT PREVENTION**

If the rear bumper is 8" deep or more, there shall be a placard on the rear face of the body, in clear sight from the ground, which reads, "WARNING - DO NOT RIDE ON STEPS OR DECK AREAS WHILE THE APPARATUS IS IN MOTION. DEATH OR SERIOUS INJURY MAY RESULT".

#### **WEARING HELMET WARNING**

A label stating "DO NOT WEAR HELMET WHILE SEATED" shall be visible from each seating location.

#### **FRONT BUMPER**

The front bumper shall be as provided by the cab/chassis manufacturer. No other alteration or modifications are required.

#### **BUMPER HOSEWELL COMPARTMENT**

The bumper extension shall have one (1) hosewell compartment in center of bumper extension. The compartment shall be as large as room allows. Compartment door shall be 1/8" NFPA compliant aluminum tread plate with stainless steel hinge wrapped with vinyl and chrome push release type latches. The compartment door shall have a gas shock type hold open device. This compartment shall not be watertight but shall include a compartment drain.

If the bumper compartment is greater than 4 cu.ft. in volume and has an opening greater than 144 sq.in. it shall have sufficient compartment lighting to provide a minimum of 2 fc (20 lx) at any location on the floor of the compartment without any equipment in the compartment. If light is required, light shall be an OnScene LED type light.

A flashing warning light signal shall be provided indicating when a compartment door is not in a closed position as required by NFPA 1901.

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#### **AIR HORN(S)**

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

#### **MOTOR DRIVEN SIREN**

There shall be a motor driven, streamlined, rotary siren with chrome plated grill and housing recess mounted in the extended front bumper. The siren shall be properly wired with heavy copper cable for minimum voltage drop. Make: Federal, Model: Q2B.

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

There shall be a siren brake supplied with the chassis.

#### **SHOP NOTES**

Supplied on chassis

The Q2 siren activation shall be supplied with the chassis.

#### **SHOP NOTES**

Supplied with chassis

#### **FRONT TOW PROVISIONS**

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

#### **EXHAUST**

The exhaust system shall be as provided by cab/chassis manufacturer. The tailpipe may require some modifications for proper ground clearances and fit with body.

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

Exhaust pipe discharge shall be directed away from any operator's position or entry doors on body.

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

#### **RADIO/ANTENNA INSTALLATION**

There shall be two (2) St. Helena Fire Department supplied radios installed in the cab. The location of radio shall be determined by the St. Helena Fire Department at the mid-construction meeting.

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

#### **SHOP NOTES**

Radios shall be Kenwood with remote heads

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

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#### **FIVE (5) POSITION ANTENNA RAIL**

One (1) radio antenna rail(s) shall be provided and installed on roof of vehicle. Each rail be constructed of aluminum, forming a two piece box design. The top section shall be removable for easy access to the individual antenna wiring. Five (5) antenna bases shall be provided and installed in each rail. Each antenna base shall include enough cable to reach radio location plus a service loop of at least 3' of LMR195 flexible communications cable. The antenna wiring shall enter the vehicle roof at a single point under the end of the rail. The end of each radio antenna shall be routed to as follows: two (2) driver side "B" pillar, two (2) officer side "B" pillar and one (1) center dash.

Due to the various configurations of antenna whips, the contractor shall provide the antenna base only, and St. Helena Fire Department shall provide the antenna whip.

#### **SHOP NOTES**

Terminate two (2) driver side, two (2) officer side and one (1) center

#### **SEAT BELT COLOR**

Section 14.1.3.4 of the NFPA 1901 Standards, 2009 edition, 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 - CUSTOM CAB**

Sections 14.1.3.2 and 14.1.3.3 of the NFPA 1901 standards, 2009 edition, 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 custom chassis manufacturer shall be compliant to NFPA Standards 14.1.3.2 and 14.1.3.3.

#### **SEAT BELT / VDR SYSTEM - CUSTOM CAB**

The seat belt warning and vehicle data recorder systems shall be provided by the cab/chassis manufacturer.

#### **MAP BOX**

A map box shall be provided in the cab with an open top. The map box shall be securely fastened to the cab interior per NFPA 1901 standards. It shall be fabricated of 1/8" smooth aluminum and painted with a black or gray textured powder coat paint finish for durability and finished appearance.

The map box shall be designed to hold four (4) 1-1/2" 3-ring binders.

The design and location of map box shall be determined by the St. Helena Fire Department at the pre-construction meeting.

- There shall be one (1) OnScene Solutions cargo straps provided to secure the stored equipment.

#### **HELMET STORAGE**

No helmet storage is required in the in the cab driving or crew area.

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#### **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:

- European Occupant Protection Standard ECE Regulation No. 29.
- 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.

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

Front and rear wheels shall be provided with stainless steel hub caps and wheel nut covers.

#### **MUDFLAPS**

There shall be rubber mudflaps furnished and installed behind each set of tires.

#### **ROAD EMERGENCY SAFETY KIT**

One (1) set of three (3) dual faced triangular warning flares with fold away base complete with storage case per DOT requirements shall be provided with the completed apparatus.

One (1) 2.5 lb. ABC type vehicle fire extinguisher with bracket per DOT requirements shall be provided with the completed apparatus.

#### **FUEL FILL**

There shall be one (1) fuel fill door located in the streetside exterior wheel well panel, behind the rear axle. The fill door shall be fabricated from brushed stainless steel. There shall be a permanent label with the text "DIESEL FUEL ONLY" located adjacent to the fuel fill access.

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#### **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 St. Helena Fire Department 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 St. Helena Fire Department from such repair and shall NOT be used.

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 3/16" (.187) 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.



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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.

Exterior compartments shall have louvers in lower back wall of compartment for ventilation.

#### **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.

#### **COMPARTMENT ROOF CONSTRUCTION**

The compartments roof shall be integral with the body and shall be all welded construction. The roof of the body shall not be less than 3/16" aluminum 3003H-14 alloy tread plate, fully and continuously welded. The roof shall be reinforced with 2" x 2" x 1/4" aluminum tubing running the full width of the body.

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

A 2" formed radius shall be provided along the body sides. The use of extruded radius will not be acceptable, No Exceptions.

#### **SHOP NOTES**

**Tops of compartments**

#### **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.

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#### **BODY MOUNTING**

The body subframe shall be fastened to the chassis frame with a minimum of six (6) 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.

#### **18" REAR STEP BUMPER**

The rear tailboard shall be constructed from 2" x 2" x 1/4" aluminum tubing frame and covered with 3/16" NFPA compliant aluminum tread plate. The bumper shall extend from the rear vertical body panel 18" and provide a rear step with a minimum of 1/2" space at body for water drainage.

The rear step bumper will be hinged to allow it to lift-up / breakaway increasing the angle of departure.

#### **SHOP NOTES**

Tailboard is to be hinged so that it will lift-up if going through steep angle of departure.

#### **REAR TOW EYES**

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

#### **GROUND LIGHTS**

There shall be two (2) OnScene 9" Premium LED light(s) 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 3/16" smooth aluminum panels.

#### **STAINLESS STEEL BODY FENDERS**

The body wheel well openings shall be provided with round radius, polished stainless steel fenderettes. The fenderettes shall be bolted and easily replaceable if damaged. The fenderettes shall be installed using a rubber gasket to reduce buildup of moisture and/or debris.

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#### **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.

#### **SCBA CYLINDER COMPARTMENTS**

There shall be three (3) SCBA cylinder storage compartments located, two (2) on the curbside, and one (1) on the streetside of rear wheel well area. Each compartment shall be capable of storing three (3) SCBA cylinders (30 min cylinders). Each compartment shall have a vertically hinged door with a positive catch latch installed and painted primary lower body color. Each compartment shall allow the storage of an SCBA cylinder up to 5-3/4" in diameter. The door shall activate the "Hazard Warning Light" in the cab when not in the closed position.

#### **FENDER SIDE / BACK-UP LIGHTS**

Two (2) Innovative Lighting LED curb lights with stainless steel housing shall be provided in rear fender panels, one (1) each side facing the rear of vehicle.

The light on the side will activate with the corresponding turn signal.

#### **SHOP NOTES**

In stock at SVI see Rodney

Also to activate with turn signal (respective side)

#### **BODY PAINT SPECIFICATIONS**

#### **BODY PAINT PREPARATION**

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

The exterior 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. If the compartment interior is to be painted the interior shall be acid etched as described above then primed with an epoxy primer and all seams caulked.

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.

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## **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 an eight-stage paint process;

1. Clean bare metal using a solvent base wax & grease remover.
2. Finish all exterior body seams as necessary, followed by a thorough sanding of all bare metal to be painted.
3. Re-clean bare metal using a solvent base wax & grease remover.
4. Bare Metal Epoxy Primer Coat - PPG Delfleet® Evolution corrosion resistance epoxy primer to be applied at 1.0-2.0 mills DFT over clean abraded bare metal.
5. Primer Filler Coat - PPG Delfleet® Evolution urethane build primer to achieve total thickness of 3.0-6.0 mills DFT after sanding.
6. Base coat (Color) - PPG Delfleet® Evolution High Solids Polyurethane Base coat. Apply 1.0-3.0 mills DFT of base coat color to achieve full hiding.
7. Clear coat PPG Delfleet® Evolution polyurethane premium quality clear coat with improved mar resistant finish. The clear coat shall be applied to achieve a total dry film thickness of 2.0-3.0 mills.
8. Curing process of the painted body shall go through a force dry/bake cycle process. The painted components shall be baked 180 degrees for 2 hours to achieve a complete coating cure on the finished product.

## **MACHINE POLISHED**

After the force dry/bake cycle and ample cool down time, the coated surface shall be sanded using 1,000, 1,500, and or 3,000 grit sandpaper to remove surface defects. In the final step, the surface shall be buffed then polished to an extra high gloss smooth finish. Total dry film thickness of paint will average between 8.0-12.0 mills.

## **PAINT - ENVIRONMENTAL IMPACT**

The contractor shall meet or exceed all current State (his) regulations concerning paint operations. Pollution control 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.

## **PAINT FINISH - SINGLE COLOR**

The body shall be painted with a single color of PPG Delfleet® Evolution paint per approved customer sprayout.

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

Touch-up paint shall be provided with completed vehicle.

- Paint Color: Match cab/chassis supplied paint color.

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#### **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 compartment interiors shall be treated with phosphoric acid and then sprayed with an epoxy primer applied 1.0 mil thick. All body seams will be caulked with urethane seam sealer and painted with two (2) coats of textured Zolatone paint. Zolatone catalysts will be added to the Zolatone to help in resisting moisture and provide a more durable finish. Paint color shall be gray.

#### **REFLECTIVE STRIPE REQUIREMENTS**

##### Material

All retroreflective materials 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.

All retroreflective materials used that are colors not listed in ASTM D 4956, Section 6.1.1, shall have a minimum coefficient of retroreflection 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 D 4956, 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 apparatus.

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.

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### **GRAPHICS PROOF**

A color graphics proof of the reflective striping layout shall be provided for approval by St. Helena Fire Department prior to installation. The graphics proof shall be submitted to St. Helena Fire Department 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.

### **CHEVRON REFLECTIVE STRIPE - CENTER REAR**

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 center portion only of the body shall have a Chevron style reflective stripe layout that covers the rear center body panel, or roll-up door (if specified). 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 Diamond Grade.

This reflective chevron stripe shall alternate red and white in color.

### **LETTERING**

No lettering shall be provided on the completed unit.

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### EXTERIOR COMPARTMENT DOORS

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

The apparatus shall be equipped with Robinson ROM Series III roll-up exterior compartment doors. Robinson roll-up doors shall be complete with the following features;

- Doors shall be front roll with drum positioned at upper front portion of compartment to afford maximum clearances and head room for mounting equipment to ceiling of compartment
- There shall be a non-abrasive side brush seals
- Every slat must have interlocking end shoes to prevent slat from moving side-to-side and binding the door
- Between each slat must be a co-extruded PVC inner seal to prevent metal-to-metal contact and to repel moisture. This inner seal is not visible to detract from appearance of door
- Slat are to have interlocking joints with a folding locking flange to provide security and prevent penetration by sharp objects
- Slat to be double-wall extrusion 1.366" high by .315" thick. Exterior surface to be flat and interior surface to be concave to prevent loose equipment from interfering with door operation
- Latch system to be a full width one piece lift bar operable by one (1) hand
- A 2" wide finger pull integrated into the bottom rail extrusion for easy one (1) hand opening and closing
- Clip system that connects the curtain slats to the operator drum which allows for easy tension adjustment without tools
- Each roll-up door shall have a 4" diameter counterbalance operator drum to assist in lifting the door.
- Track shall be one-piece aluminum that has an attaching flange and finishing flange incorporated into its design
- Drip rail will have specially designed seal that prevents the seal from scratching the door
- Bottom rail extrusion must have smooth back to prevent loose equipment from jamming the door
- Bottom rail to have "V" shaped double seal to prevent water and debris from entering the compartment
- Standard replacement parts to be shipped from the United States and available in as little as 48 hours
- Will be free from manufacturing defects for a period of up to 7 years from date of purchase provided that the Product is used under conditions of normal use, that regular periodic maintenance and service is performed and that the product was installed in accordance with R•O•M's instructions.

Each shutter door shall decrease the compartment door frame opening approximately 2.00" in width and approximately 4.50" in height for the bottom section of door assembly.

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.

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## **BODY HEIGHT MEASUREMENTS**

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	74.0"
B	Bottom of Subframe to Bottom of Body	22.5"
C	Vertical Door Opening	
	-with roll-up door	67.5"
	-with hinged door	71.5"

### **ABOVE REAR AXLE**

	<u>Description</u>	<u>Dimension</u>
D	Vertical Door Opening - Above Rear Wheel	
	-with roll-up door	34.0"
	-with hinged door	37.0"

### **BEHIND REAR AXLE**

	<u>Description</u>	<u>Dimension</u>
E	Bottom of Subframe to Bottom of Body	20.0"
F	Vertical Door Opening	
	-with roll-up door	62.0"
	-with hinged door	66.0"

### **GENERAL**

	<u>Description</u>	<u>Dimension</u>
G	Bottom of Drip Rail to Top of Body	23.5"

(Dimensions are generic and subject to change during the actual design process)

## **BODY WIDTH DIMENSIONS**

The body shall be 100.0" wide, not including drip rail or non-permanent fixtures. Interior compartment depth dimensions shall be approximately:

<u>Area Description</u>	<u>Dimension</u>
Transverse Area above Subframe	95.0"
Compartment Depth below Subframe	24.5"



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

The interior useable compartment width shall be approximately 41.0" wide.

The compartment door opening shall be approximately 34.0" wide.

This compartment shall have a ROM roll-up door.

- The roll-up door slats and the door trim components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.

A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

#### **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- 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 edges
- There shall be one (1) 400 lbs. slide-out tray(s) approximately 24" 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.
- There shall be one (1) 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. Each 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 floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) OnScene 63" Premium LED compartment lights, vertically mounted.

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- One (1) 12 volt terminal block(s) installed to provide 12 VDC power for equipment supplied by the St. Helena Fire Department. Exact location will be high on the forward wall of the compartment not to interfere with the adjustable trays but easy to access in the future.
- The controls for the specified light tower(s).

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## STREETSIDE COMPARTMENT - ABOVE REAR WHEELS (S2)

The interior useable compartment width shall be approximately 59.0" wide.

The compartment door opening shall be approximately 52.0" wide.

This compartment shall have a ROM roll-up door.

- The roll-up door slats and the door trim components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.

A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

## COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- There shall be one (1) pan on the floor approximately 24" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 1" vertical flange along all edge.
  - The pan shall be held down with pins and shall be designed to hold two (2) F.D. supplied chainsaws with fuel cans.
- There shall be four (4) OnScene Solutions cargo straps provided to secure the stored equipment.
- There shall be one (1) 150 lbs. slide out and down tray with an OnScene Solutions base approximately 24" deep and as wide as the compartment layout or door opening permits. It shall be located above the level of the chassis frame rails and shall be vertically adjustable in height. Each slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release) which will hold the tray in the closed position. Each tray shall be fabricated from 3/16" 3003 aluminum sheet and have welded corners to form a box type tray surface with an internal depth of approximately 3 ½".

### SHOP NOTES Approx 24"D

- Two (2) OnScene 36" Premium LED compartment lights, vertically mounted.

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

The interior useable compartment width shall be approximately 56.0" wide.

The compartment door opening shall be approximately 49.0" wide.

This compartment shall have a ROM roll-up door.

- The roll-up door slats and the door trim components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.

A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

### **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- There shall be one (1) 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 edges
- There shall be one (1) slide-out smooth aluminum vertical tool board(s) approximately 24" 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.
- Each tool board shall be horizontally adjustable; mounted on aluminum shelf trac on compartment floor.
- There shall be one (1) bolt-in vertical compartment partition(s) dividing the compartment into left and right sides.
- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) OnScene 63" Premium LED compartment lights, vertically mounted.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

SVI #858

### CURBSIDE COMPARTMENT - FRONT (C1)

The interior useable compartment width shall be approximately 41.0" wide.

The compartment door opening shall be approximately 34.0" wide.

This compartment shall have a ROM roll-up door.

- The roll-up door slats and the door trim components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.

A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

### COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- 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 edges
- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) OnScene 63" Premium LED compartment lights, vertically mounted.
- One (1) 12 volt terminal block(s) installed to provide 12 VDC power for equipment supplied by the St. Helena Fire Department. Exact location will be high on the forward wall of the compartment not to interfere with the adjustable trays but easy to access in the future.

# ST. HELENA FIRE DEPARTMENT PUMPER PRODUCTION SPECIFICATION SVI #858

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

The interior useable compartment width shall be approximately 39.0" wide.

The compartment door opening shall be approximately 32.0" wide.

This compartment shall have a ROM roll-up door.

- The roll-up door slats and the door trim components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.

A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

## **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- 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 edges
- Two (2) OnScene 36" Premium LED compartment lights, vertically mounted.

# ST. HELENA FIRE DEPARTMENT PUMPER PRODUCTION SPECIFICATION SVI #858

## CURBSIDE COMPARTMENT - REAR (C3)

The interior useable compartment width shall be approximately 56.0" wide.

The compartment door opening shall be approximately 49.0" wide.

This compartment shall have a ROM roll-up door.

- The roll-up door slats and the door trim components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.

A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

## COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- 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 edges
- There shall be one (1) 400 lbs. slide-out tray(s) approximately 24" 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.

### **SHOP NOTES**

**F.D. supplied K-12 Saw and an 18" Fan may be stored in this tray.**

- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) OnScene 63" Premium LED compartment lights, vertically mounted.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### REAR COMPARTMENT - CENTER (RC1)

The rear center compartment shall be closed to both side rear compartments.

The rear center compartment shall start at the bottom of the body and shall be as high as the body permits. The frame shall extend at least 20" into the Rear Center Compartment to allow for the spring mounts.

The interior useable compartment width shall be approximately 45.0" wide.

The compartment door opening shall be approximately 38.0" wide.

This compartment shall have a ROM 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 lower door track.
- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.

A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

#### COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- There shall be one (1) adjustable shelf/shelves approximately 30" 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) 1,000 lbs. slide-out tray(s) with an OnScene Solutions base approximately 30" deep and as wide as the compartment layout or door opening permits located above the level of the chassis frame rails. Each slide base shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release) which will lock the tray in the closed and full extension positions. Each tray shall be fabricated from 3/16" 3003 aluminum sheet and shall have welded corners to form a box type tray surface with an internal depth of approximately 3 1/2".

#### **SHOP NOTES**

**F.D. supplied cribbing (29 3/4"x12 3/4"x5 3/4") may be stored in this tray**



# ST. HELENA FIRE DEPARTMENT PUMPER PRODUCTION SPECIFICATION SVI #858

- One (1) Hannay ECR1618-17-18 electric cable reel(s) capable of storing 200' of 10/3 electric cable. Reel(s) shall be designed to hold 110% of the capacity of cord length, with fully enclosed 45 amp, three (3) conductor collector rings. Reel(s) shall be mounted to channel structure that allows for side-to-side adjustment of reel position.
  - 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.
  - A label shall be provided in a visible location adjacent to reel with following information: Current rating, Current type, Phase, Voltage, and Total cord length.
  - The cable reel shall equipped with 200' of 10/3 SEOW yellow cable, a molded plastic ball clamp, and a single heavy duty L5-30 twist-lock female plug at the end.
- One (1) Akron model EJB series, cast aluminum electrical power distribution box with yellow powder coat painted finish shall be provided. The power distribution box shall meet all requirements described in NFPA 1901. The power distribution box shall include the following outlets;
  - A 12" pigtail that terminates in an L5-30 configuration to match the cable on the cord reel. The outlet configuration shall include:
    - One (1) L5-15 dual twist lock receptacles
    - One (1) L5-15 dual twist lock receptacles
    - One (1) L5-15 dual twist lock receptacles
    - One (1) L5-15 dual twist lock receptacles
- One (1) Akron EJB treadplate vertical apparatus mounting bracket shall be provided.
- The fairlead roller shall be mounted directly to the reel.
- Two (2) OnScene 63" Premium LED compartment lights, vertically mounted.
- One (1) St. Helena Fire Department supplied gas powered hydraulic power unit(s).  
**SHOP NOTES**  
Holmatro DPU31
- Mounts will be supplied and installed for one (1) St. Helena Fire Department supplied hydraulic cutter(s).  
**SHOP NOTES**  
Make: Holmatro Model: 4050NC
- Mounts will be supplied and installed for one (1) St. Helena Fire Department supplied hydraulic spreader(s).  
**SHOP NOTES**  
Make: Holmatro Model: 4240UL

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

SVI #858

### UPPER REAR BODY COMPARTMENT - CURBSIDE

On the rear exterior curbside below the hosebed shall be an upper body compartment for storage of long equipment. The compartment shall be integral with the body construction, and will not be bolted or added on modules. The compartment shall be approximately 15"w x 15" h.

Access to the compartment shall be from a rear vertical hinged door. The compartment shall have a brushed SST door assembly with a positive catch latch.

The door shall activate the "Hazard Warning Light" in the cab when not in the closed position.

The compartment will be designed to store the following equipment:

#### SHOP NOTES

Stainless Steel door with latch. Same make as SCBA wheel well doors.

- Two (2) pike pole(s). Manufacturer, model number and size of the pike pole(s) shall be provided in equipment section of specification or at pre-construction meeting.

#### SHOP NOTES

10' & 8'

### STEP LIGHTS

There shall be three (3) OnScene Solutions 9" LED NightStik lights provided to illuminate the step area on the driverside front body face. The lights shall be activated when the parking brake is set.

There shall be three (3) OnScene Solutions 9" LED NightStik lights provided to illuminate the step area on the driverside rear body face. The lights shall be activated when the parking brake is set.

Each light shall be mounted in a ball burnished cast 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.

#### SHOP NOTES

Locate on 3 street side front face of body to illuminate steps. Locate 3 on rear body face for folding steps

### PLASTIC FLOOR AND SHELF TILE

All compartment floors, shelves, and trays shall be covered with Turtle Tile plastic interlocking grating.

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

# ST. HELENA FIRE DEPARTMENT PUMPER PRODUCTION SPECIFICATION SVI #858

## ROPE TIE-OFF OR PORTABLE WINCH RECEIVERS

The completed unit shall have an integrated receiver system for use with rope tie-off accessory components, when specified.

Each side receiver shall have the following load rating:

	<u>STRAIGHT PULL</u>	<u>SAFETY FACTOR</u>
Rope Tie Off:	600 LBS.	15:1

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

- Two (2) rope tie off anchor accessories shall be provided with the completed vehicle. Each anchor accessory shall include a hitch pin to lock it in place. The tie off anchor accessories shall have an eyelet for use with a rope rescue carabineer. A mounting bracket shall be provided to store each rope tie off accessory in a body compartment as close to receiver as possible.
- There shall be two (2) 2" receiver tube(s) located at the front bumper for use with rope tie-off accessory and/or a portable electric winch.
- The receiver(s) shall have two (2) rubber cover(s) provided.
- There shall be one (1) 2" receiver tube located on the streetside of the body in the forward portion of the wheel well panel for use with rope tie-off accessory.
  - There shall be one (1) rubber cover / plug for the receiver.
- There shall be one (1) 2" receiver tube located on the curbside of the body in the forward portion of the wheel well panel for use with rope tie-off accessory.
  - There shall be one (1) rubber cover / plug for the receiver.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **LADDER LIFT SYSTEM, CURBSIDE**

A Ziamatic 12 volt DC, 60 amp, HLAS (Horizontal Ladder Access System, Part no. 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 ladder control panel shall be located on curbside pump panel. The ladder lift system shall be designed to store the specified ladder compliment specified. The side of ladder storage area shall be enclosed with aluminum and painted the same color as body.

Storage shall be provided for the following;

- One (1) Duo-Safety 900-A aluminum 24' 2-section ladder (14' - 2-3/4" x 21-3/4" x 5-3/8", 72 lbs). Ladder shall be supplied by contractor with completed unit. See equipment section.
- One (1) Duo-Safety 775-A aluminum 14' roof ladder (14' - 2-1/4" x 19" x 2-3/4", 25 lbs.). Ladder shall be supplied by contractor with completed unit. See equipment section.
- One (1) Duo-Safety 585-A aluminum 10' folding ladder(s) (11' - 1/4" x 1-3/4" x 4-1/4", 16 lbs.). Ladder shall be supplied by contractor with completed unit. See equipment section.
- Two (2) pike pole(s). Manufacturer, model number and size of the pike pole(s) shall be provided in equipment section of specification or at pre-construction meeting.

#### **SHOP NOTES**

"D" handle rubbish hooks. 6'

#### **SIDE BODY PROTECTION - RUB RAIL**

OnScene Solutions rub rails shall be provided below the compartment door openings on both the streetside and curbside.

The rub rail shall be fabricated from 6063 extruded aluminum, measuring approximately 2-3/4" high x 1-3/8" thick with tapered aluminum end caps. The rub rail shall be bolted to the body using stainless steel bolts and 1-1/2" diameter x 5/8" thick rubber mount isolators to prevent damage to the body.

The rails shall incorporate LED clearance marker lighting recessed into the rail fascia to avoid damage to the light in case of impact. The rub rail shall have an accessory mounting track integrated into the backside of the rail to allow mounting of accessories such as ground lighting.

#### **FRONT PROTECTION PANELS**

Body protection panels shall be provided, fabricated from .100 thick aluminum treadplate. To protect areas subject to intensive wear, scuffing or abuse, the protection panels shall be installed on the entire front vertical body panels of the apparatus, wrapped around to the front compartment door opening.

# ST. HELENA FIRE DEPARTMENT PUMPER PRODUCTION SPECIFICATION SVI #858

## **REAR BODY HANDRAILS**

There shall be two (2) vertical handrails on the rear of the body. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

## **ROOF ACCESS HANDRAIL**

There shall be two (2) handrail mounted on top of body to assist in roof access. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

One curbside front body top one curbside rear body top.

### **SHOP NOTES**

Located on top of the curbside body, one front one rear.

## **FOLDING STEP(S)**

There shall be six (6) NFPA approved folding step(s) furnished and installed. Each step shall be cast aluminum with heavy duty stainless steel spring and textured step surface.

### **SHOP NOTES**

Three (3) on the street side front face of body. Three (3) on street side rear.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### 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.

# ST. HELENA FIRE DEPARTMENT

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Circuits shall be provided with properly rated low voltage overcurrent protective devices. Such devices shall be readily accessible and protected against heat in excess of the overcurrent 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:

- SAE J156, *Fusible Links*
- SAE J553, *Circuit Breakers*
- SAE J554, *Electric Fuses (Cartridge Type)*
- SAE J1888, *High Current Time Lag Electric Fuses*
- 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.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

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 MULTIPLEX CONTROL CENTER**

The apparatus shall be equipped with a Weldon V-MUX multiplexed 12 volt electrical system that will provide complete diagnostic capability, No Exception. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The system shall be node based to maximize stability so that failure of one node does not affect the operation of the other nodes. The system shall use shielded twisted-pair wire for transmission of system function signals. The shielded wire shall provide protection against EMI and RFI noise interruptions.

The multiplex system shall be responsible for providing power management functions as well as load shedding. The warning light system shall be controlled by the multiplex system. The system shall be capable of displaying text and/or graphic messages on a display module. The system shall be based on solid-state technology and shall include self-contained diagnostic indicators.

#### **WELDON CERTIFICATION**

A letter shall be provided with bid submittal that the Contractor has successfully completed the Weldon training requirements for Level 1 of the V-MUX Certified Supplier Program and is authorized to design, build, and service V-MUX electrical systems.

The apparatus shall be equipped with a Weldon V-MUX multiplexed 12 volt electrical system that will provide complete diagnostic capability, No Exception. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The system shall be node based to maximize stability so that failure of one node does not affect the operation of the other nodes. The system shall use shielded twisted-pair wire for transmission of system function signals. The shielded wire shall provide protection against EMI and RFI noise interruptions.

The multiplex system shall be responsible for providing power management functions as well as load shedding. The warning light system shall be controlled by the multiplex system. The system shall be capable of displaying text and/or graphic messages on a display module. The system shall be based on solid-state technology and shall include self-contained diagnostic indicators.



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#### **ELECTRICAL PANEL LOCATION**

The main electrical distribution node location will be inside the upper portion of the pump panel on the curbside. The components will be located in a separate compartment with a removable side access panel.

There will be a label located on the exterior of the access panel stating "12-VOLT ELECTRICAL DISTRIBUTION".

#### **SHOP NOTES**

12V electrical panel located on curbside over pump panel

#### **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.

A master load disconnect switch shall be provided between the starter solenoid(s) and the remainder of the electrical loads on the apparatus. The starter solenoids shall be connected directly to the batteries.

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 on" pilot light that is visible from the driver's position shall be provided.

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 five (5) seconds.

#### **BATTERY SWITCH**

One (1) battery "On/Off" switch in cab located within easy reach of Driver with green "BATTERY ON" pilot light that is visible from the driver's position shall be provided. The switch and pilot light shall be supplied and installed by the cab/chassis manufacturer.

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#### **BATTERY SOLENOID**

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

#### **ENGINE COMPARTMENT LIGHT**

Engine compartment light(s) shall be supplied and installed by the cab chassis manufacturer.

#### **CAB HAZARD WARNING LIGHT**

A red "HAZARD" warning light shall be supplied and installed by the cab/chassis manufacturer. Light shall illuminate automatically to warn the Driver of the following when the apparatus parking brake is not fully engaged:

1. Any passenger or compartment door is open
2. Equipment rack is not in stowed position
3. Light tower is extended

The light shall be labeled "DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

#### **BACK-UP ALARM**

An electronic back-up alarm shall be supplied and installed by the cab/chassis manufacturer. The back-up alarm shall actuate automatically when the transmission gear selector is placed in reverse.

#### **REAR VIEW CAMERA**

The cab chassis provided rear view camera shall be installed on the rear of the body.

#### **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 furnished;

- Two (2) Federal amber LED QL64Z-ARROW turn signal lights
- Two (2) Federal red LED QL64Z-BTT stop/tail lights
- Two (2) Federal white LED QL64Z-BACKUP back-up lights

Each of the lights above shall be mounted in a QL64MC, chrome finish bezel.

#### **MIDSHIP MARKER/TURN SIGNAL**

Two (2) Whelen model T0A00MAR 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.

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#### **MARKER LIGHTS**

The body shall be equipped with all necessary clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) and Canadian Motor Vehicle Safety Standards (CMVSS) regulations. All body clearance lights shall be Truck-Lite Model 18 LED to reduce the need for maintenance and lower the amp draw. Clearance lights shall be wired to the headlight circuit of the chassis.

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

The step lights and/or ground lights shall be supplied and installed by the cab/chassis manufacturer. Light(s) shall be 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 MOUNTING BRACKET**

There shall be one (1) Cast Products aluminum license plate mounting with chrome shielded license plate light mounted on the rear of the body.

#### **SIDE SCENE LIGHTS**

There shall be four (4) Whelen Super LED 900 series (9" x 7") recess mounted scene lights (9SC0ENZR) provided on the upper body. Light quantity shall be divided equally per side. Each light will have twenty-four LED diodes that draw a total of 4.0 amps, with 3,000 lumens. The light shall be an 8-32 degree gradient lens and chrome flange.

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

The lights shall be switched at the Vista display in the cab.

#### **REAR SCENE LIGHTS**

Two (2) Whelen Super LED 900 series (9" x 7") recess mounted scene lights (90C0ELZR) shall be provided on the upper rear body to light the work area immediately behind the vehicle to a level of at least 3 fc (30 lx) within a 10 ft x 10 ft (3 m x 3 m) square. Each light will have twelve LED diodes. The light shall be an 8-32 degree gradient lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

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

#### **TRAFFIC ADVISOR**

There will/shall be a traffic advisor provided on the rear of the body just below the hosebed step. The traffic advisor shall consist of eight (8) individual Federal Signal 3600 Amber LED lights.

The traffic advisor shall be controlled via the V-Mux screen.

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#### **DAVID CLARK INTERCOM SYSTEM**

The following David Clark intercom system shall be provided and installed to improve the safety of firefighters and rescue professionals through enhanced communication and hearing protection. System shall have the following major components as minimum;

- One (1) U3800 Master station
- One (1) U3805 Radio junction module
- One (1) U3801 Remote headset station
- One (1) U3811 Radio interface module
- One (1) U3815 Radio interface module
- Three (3) C3821 radio cables
- One (1) C3825 cable
- One (1) C3812 cable
- One (1) C3402 cable
- One (1) C3820 power cable
- Six (6) H3442 headsets
- One (1) radio interface module. Fire Department to supply radio make and model at pre-construction.

#### **INTERCOM SYSTEM INSTALLATION**

The above listed intercom system shall be installed in the cab locations as follows;

##### Front of Cab

- Driver's – Mounted above the left shoulder position on the outside wall.
- Officer's – Mounted above the right shoulder position on the outside wall.

##### Rear Crew Area

- Driver's side forward facing – Above the right shoulder on the rear wall or ceiling.
- Officer's side forward facing – Above the left shoulder on the rear wall or ceiling.
- Driver's side rear facing – Mounted above the right shoulder position on the outside wall.
- Officer's side rear facing - Mounted above the left shoulder position on the outside wall.

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#### **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.

#### **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) Federal Signal Corporation Legend Series 70" lightbar permanently mounted to the cab roof with LED lights. The lightbar shall include (16) LED lights. There will be (13) red two of the red lights will be a steady burn. There will be (3) clear flashing LED lights.

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

#### **SHOP NOTES**

See saved lightbar quote on server

The lightbar shall be separately switched at the vista display in the cab.

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#### ZONE B & D - SIDE WARNING LIGHTS

There shall be four (4) Federal Signal QuadraFlare (9" x 7") LED lights (QL97SF-RR) provided, two (2) on each side of the apparatus in the upper corners. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

#### ZONE C - REAR WARNING LIGHTS

There shall be two (2) Federal Signal QuadraFlare (9" x 7") LED lights (QL97SF-RR) provided, one (1) on each side of the apparatus in the upper corners. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the 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 1220 mm) above level ground for small apparatus.

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

The front lower warning lights shall be supplied and installed by the cab/chassis manufacturer. They shall be Federal lights to complete an NFPA compliant lower level warning light system.

The lights shall be switched at the Vista display in the cab.

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

The front lower warning lights shall be supplied and installed by the cab/chassis manufacturer. They shall be Federal lights to complete an NFPA compliant lower level warning light system.

The lights shall be switched at the Vista display in the cab.

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

There shall be two (2) Federal Signal 3600 series LED lights (360501-04) provided, one (1) on each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

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

There shall be two (2) Federal Signal 3600 series LED lights (360501-04) provided, one (1) on each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

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

There shall be two (2) Federal Signal QuadraFlare (6" x 4") LED lights (QL64XF-R) provided, one (1) on each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

#### LINE VOLTAGE ELECTRICAL SYSTEM

##### ONAN HYDRAULIC GENERATOR

An Onan model CMHG 10000, hydraulic driven generator set shall be installed on the vehicle. The generator shall be rated at 10,000 watts at 120/240 VAC, 83/42 amps, single phase. Current frequency shall be stable at 60 hertz.

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

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

A means shall be provided to activate the hydraulic generator system.

If the hydraulic generator system is not capable of output as stated on the power source specification label at all engine speeds, an automatic engine speed control system shall be provided.

If the vehicle is equipped with a fire pump driven by the chassis engine, the generator shall be capable of output as stated on the power source specification label with the engine at idle.

##### GENERATOR MONITORING PANEL

To properly monitor the generator performance and load demand during operation, the generator installation shall be equipped with a full instrument monitor panel.

This generator output display shall consolidate five (5) generator monitoring instruments into one device. The display case shall be waterproof and have dimensions not to exceed 4 1/4" high by 4 1/4" wide by 3 1/4" deep.

The following continuous displays shall be provided with super bright LED digits more than 1/2" high:

- Generator frequency in hertz
  - Line 1 current in amperes
  - Line 2 current in amperes
- Generator voltage in volts

The program shall support the accumulation of elapsed generator hours.

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#### WARRANTY PERIOD

Provided such goods are operated and maintained in accordance with Onan's written instructions, Onan warrants that the CMHG SERIES Hydraulic Generators shall be free from defects in material and workmanship for a period of five (5) years or one thousand (1,000) hours, whichever comes first, from the date of delivery to the first purchaser.

#### HYDRAULIC COMPONENTS

A hydraulic system filter and strainer shall be provided and shall be located in a readily accessible area.

Hydraulic hose shall meet the hydraulic pump manufacturer's recommendations for pressure, size, vacuum, and abrasion resistance. Hydraulic fittings shall meet the hydraulic pump manufacturer's recommendations for pressure, size, and the type of hose used.

Where the hydraulic hose comes into contact with other surfaces, the hose shall be protected from chafing.

#### GENERATOR MOUNTING

The generator shall be mounted in an upper roof compartment on rubber vibration isolators. The compartment shall be reinforced where necessary to hold weight of generator. A valve shall be provided on the generator oil drain outlet and piped to underside of generator compartment with flexible hose and plug. The drain shall be located where easily accessible for generator service.

#### **SHOP NOTES**

Generator shall be mounted in the dunnage area.

#### MANUALS AND SCHEMATICS

Two (2) complete manuals on parts list, maintenance, wiring schematics, hydraulic schematics, circuit boards, voltage regulator board and other components shall be provided on delivery.

#### POWER-TAKE-OFF GENERATOR DRIVE

There shall be a "Hot Shift" power-take-off (PTO) installed on the transmission PTO by the cab chassis manufacturer. The "Hot Shift" PTO is provided to allow the engagement of the PTO at higher engine RPM speeds. The PTO output shall be connected to the generator through hollow tube type driveline with heavy duty universals.

The engagement of the PTO shall be in the chassis cab with a rocker switch and red pilot light to note engagement of the PTO.

The power supply to the PTO engagement control shall be wired to the parking brake and a neutral position transmission switch to prevent engagement unless the vehicle is stopped and transmission has been placed in neutral.

#### LOADCENTER

The loadcenter shall be a Cutler Hammer, BR Series, specifically designed for protection and distribution of 120/240 volt AC, such as lighting and small motor branch circuits. The loadcenter enclosure shall be made of 16 gauge galvanized sheet steel. The galvanized coating provides corrosion protection and as such does not require paint. All trims used on the BR Loadcenter shall be chromate sealed and finished with electro disposition epoxy paint (ASA61) which exceeds requirements for outdoor and indoor applications. A combination surface/flush cover with integral door shall be supplied. The loadcenter shall be UL/CSA listed, **NO EXCEPTIONS** will be allowed.



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### **GENERATOR MONITORING PANEL**

To properly monitor the generator performance and load demand during operation, the generator installation shall be equipped with a full instrument monitor panel.

- Generator frequency in hertz
- Line 1 current in amperes
- Line 2 current in amperes
- Generator voltage in volts

The program shall support the accumulation of elapsed generator hours. Generator hours shall be displayed.

### **SHORE POWER INLET - BATTERY CHARGER**

The above mentioned shore power inlet, and battery conditioner shall be specified in the 12 volt section.

### **OUTLETS AND CIRCUITS**

The generator and or shore power shall supply the 120/240 volt electrical equipment and outlets outlined below. Proper circuit protection shall be installed as noted:

Two (2) 120 volt exterior outlets, one (1) each side near rear wheel well area.

- The outlet receptacle(s) shall be 15 amp, twist-lock (NEMA L5-15R).

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#### LINE VOLTAGE ELECTRICAL SYSTEM

##### GENERAL REQUIREMENTS

###### Stability

Any fixed line voltage power source producing alternating current (ac) shall produce electric power at 60 Hz,  $\pm 3$  Hz when producing power at all levels between no load and full rated power. Any fixed line voltage power source shall produce electric power at the rated voltage  $\pm 10$  percent when producing power at all levels between no load and full rated power.

The maximum voltage supplied to portable equipment shall not exceed 275 volts to ground. Higher voltage shall be permitted only when used to operate fixed wired, permanently mounted equipment on the apparatus.

###### Conformance with National Electrical Code

All components, equipment, and installation procedures shall conform to *NFPA 70, National Electrical Code*, except where superseded by the requirements of this chapter. Where the requirements of this chapter differ from those in *NFPA 70*, the requirements in this chapter shall apply.

Where available, line voltage electrical system equipment and materials included on the apparatus shall be listed and used only in the manner for which they have been listed. All equipment and materials shall be installed in accordance with the manufacturer's instructions.

###### Location Ratings

Any equipment used in a dry location shall be listed for dry locations. Any equipment used in a wet location shall be listed for wet locations.

Any equipment, except a PTO-driven generator, used in an underbody or under chassis location that is subject to road spray shall be either listed as Type 4 or mounted in an enclosure that is listed as Type 4.

If a PTO-driven generator is located in an underbody or under chassis location, the installation shall include a shield to prevent road spray from splashing directly on the generator.

###### Grounding

Grounding shall be in accordance with 250.34(A) and 250.34(B) of *NFPA 70*. Ungrounded systems shall not be used.

Only stranded or braided copper conductors shall be used for grounding and bonding.

The grounded current-carrying conductor (neutral) shall be insulated from the equipment-grounding conductors and from the equipment enclosures and other grounded parts.

The neutral conductor shall be colored white or gray in accordance with 200.6, "Means of Identifying Grounded Conductors," of *NFPA 70*.

Any bonding screws, straps, or buses in the distribution panel board or in other system components between the neutral and equipment-grounding conductor shall be removed and discarded.

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#### Bonding

The neutral conductor of the power source shall be bonded to the vehicle frame. The neutral bonding connection shall occur only at the power source. In addition to the bonding required for the low voltage return current, each body and each driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor.

The conductor shall have a minimum ampere rating, as defined in 310.15, "Ampacities for Conductors Rated 0–2000 Volts," of *NFPA 70*, of 115 percent of the rated ampere on the power source specification label.

A single conductor that is sized to meet the low voltage and line voltage requirements shall be permitted to be used.

#### Ground Fault Circuit Interrupters

In special service vehicles incorporating a lavatory, sink, toilet, shower, or tub, 120 V, 15 or 20 A receptacles within 6 ft (1.8 m) of these fixtures shall have ground fault circuit interrupter (GFCI) protection. GFCIs integrated into outlets or circuit breakers or as stand-alone devices shall be permitted to be used in situations.

#### Power Source General Requirements

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

The power source shall be shielded from contamination that would prevent the power source from operating within its design specifications.

#### Power Source Rating

For power sources of 8 kW or larger, the power source manufacturer shall declare the continuous duty rating that the power source can provide when installed on fire apparatus according to the manufacturer's instructions and run at 120°F (49°C) air intake temperature at 2000 ft (600 m) above sea level.

The rating on the power source specification label shall not exceed the declared rating from the power source manufacturer.

Access shall be provided to permit both routine maintenance and removal of the power source for major servicing. The power source shall be located such that neither it nor its mounting brackets interfere with the routine maintenance of the fire apparatus.

#### Instrumentation

If the power source is rated at less than 3 kW, a "Power On" indicator shall be provided. If the power source is rated at 3 kW or more but less than 8 kW, a voltmeter shall be provided.

If the power source is rated at 8 kW or more, the following instrumentation shall be provided at an operator's panel:

- Voltmeter
- Current meters for each ungrounded leg
- Frequency (Hz) meter
  - Power source hour meter

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The instrumentation shall be permanently mounted at an operator's panel. The instruments shall be located in a plane facing the operator. Gauges, switches, or other instruments on this panel shall each have a label to indicate their function.

The instruments and other line voltage equipment and controls shall be protected from mechanical damage and not obstructed by tool mounting or equipment storage.

An instruction plate(s) that provides the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

#### Operation

Provisions shall be made for placing the generator drive system in operation using controls and switches that are identified and within convenient reach of the operator.

Where the generator is driven by the chassis engine and engine compression brakes or engine exhaust brakes are furnished, they shall be automatically disengaged for generator operations.

Any control device used in the generator system power train between the engine and the generator shall be equipped with a means to prevent unintentional movement of the control device from its set position in the power generation mode.

If there is permanent wiring on the apparatus that is designed to be connected to the power source, a power source specification label that is permanently attached to the apparatus at the operator's control station shall provide the operator with the information required.

The power source, at any load, shall not produce a noise level that exceeds 90 dBA in any driving compartment, crew compartment, or onboard command area with windows and doors closed or at any operator's station on the apparatus.

#### Power Supply Assembly

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 12 ft (4 m) in length.

All power supply assembly conductors, including neutral and grounding conductors, shall have an equivalent amperage rating and shall be sized to carry not less than 115 percent of the amperage of the nameplate current rating of the power source.

If the power supply assembly connects to the vibrating part of a generator (not a connection on the base), the conductors shall be flexible cord or other fine-stranded conductors enclosed in metallic or nonmetallic liquid tight flexible conduit rated for wet locations and temperatures not less than 194°F (90°C).

#### Overcurrent Protection

Manually resettable over current devices shall be installed to protect the line voltage electrical system components.

#### Power Source Protection

A main over current protection device shall be provided that is either incorporated in the power source or connected to the power source by a power supply assembly.

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The size of the main over current protection device shall not exceed 100 percent of the rated amperage stated on the power source specification label or the rating of the next larger available size over current protection device, where so recommended by the power source manufacturer.

If the main over current protection device is subject to road spray, the unit shall be housed in a Type 4-rated enclosure.

#### Branch Circuit Overcurrent Protection

Over current protection devices shall be provided for each individual circuit and shall be sized at not less than 15 amps in accordance with 240.4, "Protection of Conductors," of *NFPA 70*.

Any panel board shall have a main breaker where the panel has six or more individual branch circuits or the power source is rated 8 kW or larger.

Each over current protection device shall be marked with a label to identify the function of the circuit it protects.

Dedicated circuits shall be provided for any large appliance or device (air conditioning units, large motors, etc.) that requires 60 percent or more of the rated capacity of the circuit to which it is connected, and that circuit shall serve no other purpose.

#### Panelboards

All fixed power sources shall be hardwired to a permanently mounted panel board unless one of the following conditions exists:

- All line voltage power connections are made through receptacles on the power source and the receptacles are protected by integrated over current devices.
- Only one circuit is hardwired to the power source, which is protected by an integrated over current device.

The panel shall be visible and located so that there is unimpeded access to the panel board controls. All panel boards shall be designed for use in their intended location. The panel(s) shall be protected from mechanical damage, tool mounting, and equipment storage.

Where the power source is 120/240 V and 120 V loads are connected, the apparatus manufacturer or line voltage system installer shall consider load balancing to the extent that it is possible.

#### Wiring Methods

Fixed wiring systems shall be limited to the following:

- Metallic or nonmetallic liquid tight flexible conduit rated at temperatures not less than 194°F (90°C) with stranded copper wire rated for wet locations and temperatures not less than 194°F (90°C)
- Type SOW, SOOW, SEOW, or SEOOW flexible cord rated at 600 V and at temperatures not less than 194°F (90°C)

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

- Separated by a minimum distance of 12 in. (300 mm) from exhaust piping or shielded from such piping
- Separated from fuel lines by a minimum distance of 6 in. (150 mm)

A means shall be provided to allow “flexing” between the driving and crew compartment, the body, and other areas or equipment whose movement would stress the wiring.

Electrical cord or conduit shall be supported within 6 in. (150 mm) of any junction box and at a minimum of every 24 in. (600 mm) of run.

Supports shall be made of nonmetallic materials or of corrosion-resistant or corrosion-protected metal. All supports shall be of a design that does not cut or abrade the conduit or cord and shall be mechanically fastened to the apparatus.

Only fittings and components listed for the type of cord or conduit being installed shall be used.

Splices shall be made only in a listed junction box.

#### Additional Requirements for Flexible Cord Installations

Where flexible cord is used in any location where it could be damaged, it shall be protected by installation in conduit, enclosures, or guards.

Where flexible cord penetrates a metal surface, rubber or plastic grommets or bushings shall be installed.

#### Wiring Identification

Each line voltage circuit originating from the main panel board shall be identified.

The wire or circuit identification either shall reference a wiring diagram or wire list or shall indicate the final termination point of the circuit.

Where pre-wiring for future power sources or devices exists, the un-terminated ends shall be marked with a label showing their wire size and intended function.

#### Wiring System Components

Only stranded copper conductors with an insulation rated for temperatures of at least 194°F (90°C) and wet locations shall be used. Conductors in flexible cord shall be sized in accordance with Table 400.5(A) of *NFPA 70*. Conductors used in conduit shall be sized in accordance with 310.15, “Ampacities for Conductors Rated 0–2000 Volts,” of *NFPA 70*. Aluminum or copper-clad aluminum conductors shall not be used.

All boxes shall conform to and be mounted in accordance with Article 314, “Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; Fittings; and Manholes,” of *NFPA 70*. All boxes shall be accessible using ordinary hand tools. Boxes shall not be permitted behind welded or pop-riveted panels.

The maximum number of conductors permitted in any box shall be in accordance with 314.16, “Number of Conductors in Outlet, Device, and Junction Boxes, and Conduit Bodies,” of *NFPA 70*.

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All wiring connections and terminations shall provide a positive mechanical and electrical connection. Connectors shall be installed in accordance with the manufacturer's instructions. Wire nuts or insulation displacement and insulation piercing connectors shall not be used.

Each switch shall indicate the position of its contact points (i.e., open or closed) and shall be rated for the continuous operation of the load being controlled. All switches shall be marked with a label indicating the function of the switch. Circuit breakers used as switches shall be "switch rated" (SWD) or better. Switches shall simultaneously open all associated line voltage conductors. Switching of the neutral conductor alone shall not be permitted.

Line voltage circuits controlled by low voltage circuits shall be wired through properly rated relays in listed enclosures that control all non-grounded current-carrying conductors.

#### Receptacles and Inlet Devices

##### Wet and Dry Locations

All wet location receptacle outlets and inlet devices, including those on hardwired, remote power distribution boxes, shall be of the grounding type, provided with a wet location cover, and installed in accordance with Section 406.8, "Receptacles in Damp or Wet Locations," of *NFPA 70*.

All receptacles located in a wet location shall be not less than 24 in. (600 mm) from the ground. Receptacles on off road fire apparatus shall be a minimum of 30 in. (750 mm) from the ground. All receptacles located in a dry location shall be of the grounding type and shall be at least 12 in. (300 mm) above the interior floor height. No receptacle shall be installed in a face-up position.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical.

##### Receptacle Label

Each receptacle shall be marked with a label indicating the nominal line voltage (120 volts or 240 volts) and the current rating in amps of the circuit. If the receptacle is DC or other than single phase, that information shall also be marked on the label.

All receptacles and electrical inlet devices shall be listed to UL 498, *Standard for Safety Attachment Plugs and Receptacles*, or other recognized performance standards.

Receptacles used for DC voltages shall be rated for DC service.

##### Wiring Schematics

An "As-Built" Wiring diagrams for line voltage systems shall be provided to include the following information;

- Pictorial representations of circuit logic for all electrical components and wiring
- Circuit identification
- Connector pin identification
- Zone location of electrical components
- Safety interlocks
- Alternator-battery power distribution circuits
- Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems

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### 120/240 VAC SCENE LIGHTING

#### LIGHT TOWER

One (1) Command Light Knight 2, KL Series light tower(s) shall be provided and installed on the completed unit. A flashing warning light shall be provided in cab, indicating when a light tower is not in nested position as required by NFPA 1901.

The Command Light shall be covered by a five (5) year limited warranty from defects in materials and workmanship. An operation, maintenance, and parts manual shall be provided with the completed unit.

The light tower shall extend 87-1/2" above the mounting surface and shall extend to full upright position in less than 15 seconds. The overall size of nested light tower shall be approximately 23" wide x 47" long x 11-1/4" high and weigh approximately 136 pounds.

#### Light Tower Construction and Design

The Command Light assembly shall be of aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

The electrically controlled unit shall not require usage of the vehicle's air supply for operation, thereby eliminating the chance for air leaks in the vehicle braking system. Hydraulic or pneumatic type floodlights are not acceptable alternatives to the specified all electric light tower.

#### Light Tower Electrical System

The light tower shall be a two-stage articulating device with a lighting bank on top of the second stage capable of continuous 360 degree rotation. The light shall be elevated by electric linear actuators, one (1) actuator shall elevate the light bank and one (1) actuator shall adjust the light bank angle from 0 to 110 degrees. Power for the light bank shall be supplied through power collecting rings thus allowing continuous 360 degree rotation in either direction.

The tower base shall have a light that illuminates the envelope of motion during any movement of the light tower mast per NFPA 1901.

The light tower shall be capable of overhanging the side or back of the vehicle to provide maximum illumination to the vicinity adjacent to the vehicle.



# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### Light Tower Floodlights

The Command Light KL475 shall be equipped with the following bank of floodlights:

Floodlight manufacturer:	Command Light
Number of lamp heads:	Six (6)
Voltage:	120/240 volts
Watts of each lamp head:	750 watt
Total watts of light tower:	4,500 watts

Configuration: The light heads shall be mounted with three (3) on each side of the light tower, giving two (2) vertical lines of three (3) when the lights are in the upright position.

#### **SHOP NOTES** **Model KL475**

#### Light Tower Backlight Option

A backlight option shall be provided on the light tower. The lower pair of light heads shall be capable of being rotated about a horizontal axis 180 degree, providing light down on the vehicle or to the opposite side of the vehicle while allowing the fixed lights to remain pointed at the scene.

The hand-held remote control shall have an additional switch supplied for the backlight rotation option.

#### Light Tower Paint

The light tower shall be electrostatically powder coated with a hammer tone gray color.

#### Light Tower Controls

The light tower shall be operated with a hand-held 12-foot umbilical line remote control. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature. The remote control shall be located per the itemized compartment list and include;

- Three (3) switches, one (1) for each light bank.
- One (1) light bank rotation switch.
- One (1) switch for elevating lower and upper stage.
- One (1) indicator light to indicate when light bank is out of the roof nesting position.
- One (1) indicator light to indicate when light bank is rotated to proper nesting position.

#### Light Tower Mounting

The specified light tower(s) shall be mounted on the roof of the apparatus body.

#### **SHOP NOTES** **Light to be mounted on the roof, forward of the hosebed.**

Pump Type: Side Mount Pump

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

SVI #858

### WATEROUS CSU 1500GPM PUMP

#### **A. Pump**

The pump shall be of single stage construction and shall comply with all applicable requirements of the latest standards for automotive fire apparatus of the National Fire Protection Association, NFPA No. 1901, and shall have a rated capacity of 1500 GPM. The Pump shall be free from objectionable pulsation and vibration under all normal operating conditions.

##### **1. Pump Body**

The pump body shall be close-grained, gray iron and must be horizontally split in two sections for easy removal of the entire impeller shaft assembly, and designed for complete servicing from the bottom of the truck without disturbing setting of the pump in the chassis or apparatus piping which is connected to the pump. Pump body halves shall be bolted together on a single horizontal face to minimize leakage and facilitate reassembly.

##### **2. Discharge Manifold**

The discharge manifold shall be cast as an integral part of the pump body assembly and shall provide at least three full 3-1/2 inch openings for ultimate flexibility in providing various discharge outlets for maximum efficiency, and shall be located as follows:

- (a) One outlet on the right side of the pump body
- (b) One outlet on the left side of the pump body
- (c) One outlet directly on top of the pump discharge manifold

##### **3. Impeller**

The impeller shall be bronze with double suction inlets, accurately balanced (mechanically and hydraulically), of mixed flow design with reverse flow, labyrinth type, wear rings that resist water bypass and loss of efficiency due to wear.

##### **4. Wear Rings**

The wear rings shall be bronze, and shall be easily replaceable to restore original pump efficiency and eliminate the need for replacing the entire pump casing due to wear.

##### **5. Impeller Shaft**

The impeller shaft shall be stainless steel, accurately ground to size. The impeller shaft shall be of two-piece construction separable between the pump and pump transmission to allow true separation of the transmission from the pump without disassembly of either component.

##### **6. Anti-Friction Bearings**

The impeller shaft shall be supported at each end by oil or grease lubricated anti-friction ball bearings for rigid and precise support. Bearings shall be protected from water and sediment by suitable seal housings, flinger rings, and oil seals. No sleeve type bearings shall be used.

##### **7. Seal Housings**

The seal housings shall be equipped with two-piece glands to permit adjustment or replacement of packing without disturbing pump. Lantern rings shall be located at inner ends of seal housings so that all rings of packing can be removed without removal of the lantern rings. Water shall be fed into seal housing lantern rings for proper lubrication and cooling when the pump is operating.

##### **8. Pump Transmission**

The pump transmission shall be rigidly attached to the pump body assembly and be of latest design incorporating a high strength, involute tooth form Morse™ HV chain drive capable of operating at high speeds to provide smooth, quiet transfer of power. The shift engagement shall be accomplished by a free-sliding collar and shall incorporate an internal locking mechanism to insure that collar will be maintained in ROAD or PUMP position.

### PAINT FINISH

The paint finish will be lower body color choice.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

Pump Drive: Waterous C20, Drivelne

#### **PUMP CONTROLS**

The engagement of the PTO shall be in the chassis cab with a rocker switch and red pilot light to note engagement of the PTO.

The power supply to the PTO engagement control shall be wired to a neutral position transmission switch to prevent engagement unless the vehicle is in neutral with the parking brake set.

Two (2) green indicator lights shall be supplied in the chassis cab. One (1) light shall be energized when the chassis transmission is in neutral and shall be labeled "OK TO PUMP", the second light shall engage when the pump drive (PTO) has been engaged and shall be labeled "PUMP ENGAGED".

One (1) green indicator light shall be supplied at the Pump Operator's panel adjacent to the engine hand throttle. The green light shall be energized when both the chassis transmission is in neutral and the pump drive (PTO) has been engaged. Green light shall be labeled "OK TO PUMP".

#### **PAINT FINISH**

The paint finish will be lower body color choice.

#### **PUMP DRIVELINE**

The pump transmission driveline shall be supplied with 1710 series yokes and bearings to match the cab chass driveline.

#### **PUMP PACKINGS**

The stuffing boxes shall be equipped with two-piece adjustable Grafoil packing glands.

#### **SINGLE STAGE FIRE PUMP**

The pump shall be a single stage centrifugal class "A" rated fire pump, designed specifically for the fire service

#### **WATEROUS FIVE YEAR PUMP WARRANTY**

The fire pump shall be warranted by Waterous for a period of five (5) years from the date of delivery to the St. Helena Fire Department.

#### **UNDERWRITERS LABORATORIES FIRE PUMP TEST**

The pump shall undergo an Underwriters Laboratories Incorporated test per applicable sections of NFPA standards, prior to delivery of the completed apparatus.

The UL acceptance certificate shall be furnished with the apparatus on delivery.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **FIRE PUMP TEST LABEL**

A fire pump performance and rating label shall be installed on the fire apparatus pump panel. The label shall denote levels of pump performance and testing completed at factory. These shall include GPM at net pump pressure, RPM at such level, and other pertinent data as required by applicable NFPA standards. In addition, the pressure control device, tank to pump flow tests, and other required testing shall be completed.

In addition, the entire pump, suction and discharge passages shall be hydrostatically tested to a pressure as required by applicable NFPA standards. The pump shall be fully tested at the pump manufacturer's factory to the performance specifications as outlined by applicable NFPA standards.

#### **UL PUMP CERTIFICATION**

The fire pump shall be tested and certified by Underwriters Laboratories, to perform as listed below:

- 100% of rated capacity at 150 psi, 1000 kPa net pressure.
- 70% of rated capacity at 200 psi, 1350 kPa net pressure.
- 50% of rated capacity at 250 psi, 1700 kPa net pressure.

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 500 PSI.

The pump shall be free from objectionable pulsation under all normal operating conditions.

#### **MASTER DRAIN VALVE**

There shall be one (1) Class 1 manifold type drain valve(s) installed in the pump compartment. All pump drains shall be connected to the master drain valve. The drain valve shall be controlled adjacent to the pump panel. The control shall be a hand wheel knob marked "open" and "closed". Each drain port shall be completely independent where the master drain valve will not allow water or air flow between any two (2) inlet ports.

#### **ELECTRIC PRIMING PUMP CONTROL AT PUMP PANEL**

The Waterous priming system shall include an oil-free rotary vane priming pump rigidly attached to the pump transmission and activated by a vacuum-activated priming (VAP) valve with a single push-button switch. Valve actuation may be accomplished while the main pump is in operation, if necessary to assure a complete prime.

The priming system shall be controlled at the pump operator's panel. The control shall be provided in the form of a momentary push button that is easily actuated with a gloved hand.

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.

#### **SHOP NOTES**

Priced with pump

#### **PRIMER CONTROL**

There primer shall be activated by an electric push button control valve.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

#### **6" STEAMER SUCTION INLET(S)**

There shall be two (2) 6" male steamer inlet(s) provided with the pump. The suction fittings shall include a removable die cast screen to provide cathodic protection for the pump thus reducing corrosion.

#### **6" MIV ELECTRIC VALVE - STREETSIDE**

There shall be one (1) Waterous 6" MIV valve provided on the streetside of the pump.

The inlet valve shall be a full flow butterfly type valve designed to mount on the fire pump between the suction tube extension and suction tube behind the pump compartment panel. The valve shall not interfere with other suction or discharge openings on the fire pump or with pump operating controls when properly mounted.

The entire valve shall be manufactured and tested at the pump manufacturers factory.

When the valve is installed in the fire pump suction the fire pump shall be capable of achieving an NFPA / UL test rating of 1,500 GPM through a single 6 inch NST suction hose. When two valves are installed on the fire pump, the pump shall be capable of achieving an NFPA/UL test rating of 2,000 GPM using dual 6" NST suction hoses.

The valve body and related components that are in contact with water shall be manufactured of fine grained corrosion resistant bronze.

The butterfly disc shall be manufactured from 80,000 PSI minimum yield strength heat treated cast steel then coated with a durable nitrile rubber to provide a positive seal when the valve is closed.

Testing and rating of the valve shall be accomplished at the valve manufacturers factory. The valve, less relief valve, shall be hydrostatically tested to 600 PSIG. The valve shall then be vacuum tested to 26 inches Hg.

A pressure relief valve shall be provided that is factory set to 125 PSI and field adjustable from 75 to 250 PSI . The pressure relief valve shall provide overpressure protection for the suction hose even when the intake valve is closed. An integral relief valve mounting pad shall be provided on the valve body.

This mounting pad shall provide a Hale type 115 4-3/8" bolt circle flange for normal installation.

The mounting pad shall have 2-½" female NPT threads to permit remote mounting of the relief valve without special adapters. The outlet of the pressure relief valve shall have 2-½ inch NPT threads to allow directing the discharge flow away from the pump operator position.

The inlet valve(s) shall be operated by a 12 VDC electric motor with remote capabilities or by a manual handwheel located next to the suction tube.

Each valve shall be provided with panel placards indicating control operation. The placards shall have status lights to indicate whether the valve is open, closed or traversing from one position to another.

Each valve shall be provided with a gear actuator that will cycle the valve from OPEN to CLOSED position in no less than 3 seconds. The gear actuators shall be sealed units designed to provide reliable service in the harsh pump compartment environment. The ratio of the gear actuator shall be such that the handwheel will close the valve in no more than 10 complete turns.

The 12 VDC motor on the electric operated valve shall be provided with an automatic resetting, thermally compensated, overcurrent protection circuit breaker to protect the 12 VDC motor and apparatus electrical system.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

The electrical wiring for the valve shall be minimum 14 AWG, type SXL or GXL (SAE J1128) and shall be protected using 257 F minimum flame retardant, moisture resistant loom or braid. All electrical connections shall use sealed Packard Weather Pack connectors to provide extra protection from the harsh pump compartment environment to ensure long life and reliable operation.

The valve body shall have a  $\frac{3}{4}$ " female NPT threaded port on the top to allow installation of an NFPA compliant large diameter hose air bleeder valve. The air bleeder valve shall be mounted on the operator panel and be controllable by the pump operator. Air bleeder valve connections shall have a restriction no larger than  $\frac{3}{4}$  inch to prevent water hammer when filling hose.

The valve body shall have a  $\frac{1}{4}$ " female NPT threaded port on the bottom to permit connection of an individual water drain valve.

A suction tube extension 7- $\frac{1}{4}$ " wide shall be used to allow for the additional length of the inlet valve. The shorter suction tube extension, along with a 4, 6 or 9" suction tube, will keep the suction tube threads within the apparatus running boards while maintaining clearance for adapters.

A panel mounted manual override shall be provided to permit operation of the electric remote control valve in the event of abnormal operating conditions. The manual override shall be designed to permit operation of the valve without the use of special tools or disassembly of the pump compartment panel or valve.

The valve shall be equipped with o-ring seals for the mounting flanges. The o-ring seal groove shall be sized for proper squeeze of the o-ring for pressures in excess of 600 PSIG.

- The intake shall be provided with a 6" NH x 5" Storz 30 degree down sweep elbow with hardcoat finish.
- The intake shall be provided with a 5" Storz blind cap with hardcoat finish and retaining chain.

#### **6" MIV ELECTRIC VALVE - CURBSIDE**

There shall be one (1) Waterous 6" MIV valve provided on the curbside of the pump.

The inlet valve shall be a full flow butterfly type valve designed to mount on the fire pump between the suction tube extension and suction tube behind the pump compartment panel. The valve shall not interfere with other suction or discharge openings on the fire pump or with pump operating controls when properly mounted.

The entire valve shall be manufactured and tested at the pump manufacturers factory.

When the valve is installed in the fire pump suction the fire pump shall be capable of achieving an NFPA / UL test rating of 1,500 GPM through a single 6 inch NST suction hose. When two valves are installed on the fire pump, the pump shall be capable of achieving an NFPA/UL test rating of 2,000 GPM using dual 6" NST suction hoses.

The valve body and related components that are in contact with water shall be manufactured of fine grained corrosion resistant bronze.

The butterfly disc shall be manufactured from 80,000 PSI minimum yield strength heat treated cast steel then coated with a durable nitrile rubber to provide a positive seal when the valve is closed.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

Testing and rating of the valve shall be accomplished at the valve manufacturers factory. The valve, less relief valve, shall be hydrostatically tested to 600 PSIG. The valve shall then be vacuum tested to 26 inches Hg.

A pressure relief valve shall be provided that is factory set to 125 PSI and field adjustable from 75 to 250 PSI . The pressure relief valve shall provide overpressure protection for the suction hose even when the intake valve is closed. An integral relief valve mounting pad shall be provided on the valve body.

This mounting pad shall provide a Hale type 115 4-3/8" bolt circle flange for normal installation.

The mounting pad shall have 2-1/2" female NPT threads to permit remote mounting of the relief valve without special adapters. The outlet of the pressure relief valve shall have 2-1/2 inch NPT threads to allow directing the discharge flow away from the pump operator position.

The inlet valve(s) shall be operated by a 12 VDC electric motor with remote capabilities or by a manual handwheel located next to the suction tube.

Each valve shall be provided with panel placards indicating control operation. The placards shall have status lights to indicate whether the valve is open, closed or traversing from one position to another.

Each valve shall be provided with a gear actuator that will cycle the valve from OPEN to CLOSED position in no less than 3 seconds. The gear actuators shall be sealed units designed to provide reliable service in the harsh pump compartment environment. The ratio of the gear actuator shall be such that the handwheel will close the valve in no more than 10 complete turns.

The 12 VDC motor on the electric operated valve shall be provided with an automatic resetting, thermally compensated, overcurrent protection circuit breaker to protect the 12 VDC motor and apparatus electrical system.

The electrical wiring for the valve shall be minimum 14 AWG, type SXL or GXL (SAE J1128) and shall be protected using 257 F minimum flame retardant, moisture resistant loom or braid. All electrical connections shall use sealed Packard Weather Pack connectors to provide extra protection from the harsh pump compartment environment to ensure long life and reliable operation.

The valve body shall have a 3/4" female NPT threaded port on the top to allow installation of an NFPA compliant large diameter hose air bleeder valve. The air bleeder valve shall be mounted on the operator panel and be controllable by the pump operator. Air bleeder valve connections shall have a restriction no larger than 3/4 inch to prevent water hammer when filling hose.

The valve body shall have a 1/4" female NPT threaded port on the bottom to permit connection of an individual water drain valve.

A suction tube extension 7-1/4" wide shall be used to allow for the additional length of the inlet valve. The shorter suction tube extension, along with a 4, 6 or 9" suction tube, will keep the suction tube threads within the apparatus running boards while maintaining clearance for adapters.

A panel mounted manual override shall be provided to permit operation of the electric remote control valve in the event of abnormal operating conditions. The manual override shall be designed to permit operation of the valve without the use of special tools or disassembly of the pump compartment panel or valve.

The valve shall be equipped with o-ring seals for the mounting flanges. The o-ring seal groove shall be sized for proper squeeze of the o-ring for pressures in excess of 600 PSIG.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

- The intake shall be provided with a 6" NH x 5" Storz 30 degree down sweep elbow with hardcoat finish.
- The intake shall be provided with a 5" Storz blind cap with hardcoat finish and retaining chain.

#### **HEAT EXCHANGER**

A heat exchanger shall be provided on the pump driving engine cooling system that uses water from the discharge side of the pump to cool the engine coolant through the use of a closed heat exchanger. The water from the pump and the engine coolant shall not be intermixed. This cooling system shall be controlled by a valve on the pump operator's station.

#### **FOAM SYSTEM**

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 concentrates and most Class B foam concentrates. 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 3% of calibrated settings over the advertised operation range when installed according to factory standards. The system shall be equipped with a digital electronic control display suitable for installation on the pump panel. Incorporated within the control display shall be a microprocessor that receives input from the system flowmeter(s), 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.

Paddlewheel-type flowmeter(s) shall be installed in the discharges specified to be "foam capable." When the use of more than one flowmeter is required, an interface electronics module will be provided to totalize these flows and send the flow total to the microprocessor in the computer control display.

The digital computer control display shall enable the pump operator to perform the following control and operation functions for the foam proportioning system:

- Provide push-button control of foam proportioning rates from 0.1% to 9.9%, in 0.1% increments
- Show current flow-per-minute of water
- Show total volume of water discharged during and after foam operations are completed
- Show total amount of foam concentrate consumed
- Simulate flow rates for manual operation
- Perform setup and diagnostic functions for the computer control microprocessor
- Flash a "low concentrate" warning when the foam concentrate tank(s) runs low
- Flash a "no concentrate" warning and shut the foam concentrate pump off, preventing damage to the pump, should the foam tank(s) empty

A 12-volt electric motor drive positive displacement foam concentrate pump, rated up to 2.5 gpm (9.5 L/min) @ 150 psi with operating pressures up to 400 psi (27.6 BAR), shall be installed in a suitable, accessible location. The system will draw a maximum of 40 amps @ 12 VDC or 21 amps @ 24 VDC. A pump motor electronic driver (mounted to the base of the pump) shall receive signals from the computer control display and power the 1/2 hp (0.40 Kw) electric motor directly coupled to the concentrate pump in a variable speed duty cycle to ensure that the correct proportion of concentrate preset by the pump operator is injected into the water stream.

Full flow check valve shall be provided to prevent foam contamination of fire pump and water tank or water contamination of foam tank.



# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

### SVI #858

Components of the complete proportioning system shall include:

- Operator control and display
- Paddlewheel flowmeter(s)
- Pump and electric motor/motor driver
- Wiring harnesses
- Low level tank switch
- Foam injection check valve
- Main waterway check valve

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.

The following discharges will be plumbed to the foam system:

- Two (2) crosslays
- Front bumper
- Rear 2.5" pre-connect

#### SHOP NOTES

The following discharges shall have foam capabilities: two (2) crosslay discharges, front bumper discharge, and the rear 2 1/2" preconnected discharge.

### **PLUMBING SPECIFICATIONS**

The fire pump plumbing system shall be of rigid 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.

# ST. HELENA FIRE DEPARTMENT

## PUMPER PRODUCTION SPECIFICATION

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#### **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.

#### **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. The intakes shall have male National Hose Threads (NST) if the apparatus is to be used in the United States.

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).

A sign shall be provided on the pump operator's panel that states the following:

**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.

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 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.

# ST. HELENA FIRE DEPARTMENT

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### SVI #858

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.

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

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);

#### **STREETSIDE INTAKE**

There shall be one (1) 2-1/2" gated intake(s) located on the streetside of the apparatus. Each 2-1/2" intake shall terminate with a 2-1/2" NSTF chrome plated swivel adapter. There shall be one (1) 2-1/2" NSTM chrome plated plug and chain for each intake.

- One (1) Akron Brass 8000 series, 2-1/2" valve(s)
- Valve(s) shall be controlled with a handle for direct valve operation through panel.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.

#### **CURBSIDE INTAKE**

There shall be one (1) 2-1/2" gated intake(s) located on the curbside of the apparatus. Each 2-1/2" intake shall terminate with a 2-1/2" NSTF chrome plated swivel adapter. There shall be one (1) 2-1/2" NSTM chrome plated plug and chain for each intake. Each 2-1/2" intake shall have a 3/4" drain valve.

- One (1) Akron Brass 8000 series, 2-1/2" valve(s)
  - Valve(s) shall be controlled with a handle for direct valve operation through panel.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.

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## PUMPER PRODUCTION SPECIFICATION

SVI #858

### 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 4" full flow ball 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. The valve shall be flanged to bolt directly to the pump and shall incorporate a chromium plated bronze ball. The remaining internal moving parts shall be stainless steel for years of dependable service. 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.

- Valve(s) shall be controlled with a 12 VDC electric actuator connected to the valve. The electronic control(s) shall be located on the pump operator's panel.

### DISCHARGES

A minimum of two 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 2-1/2 in. (65 mm) outlet shall be provided on any pump rated at less than 750 gpm (3000 L/min).

All 1-1/2" (65 mm) or larger discharge outlet connections shall be equipped with male National Hose Threads (NST). Adapters with special threads or other means for hose attachment shall be permitted to be attached to any outlets.

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.

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(19 mm) pipe thread connection for draining or bleeding off pressure from a hose connected to the outlet. Any 2 in. (52 mm) or larger discharge outlet that is located more than 42 in. (1070 mm) off the ground to which hose is to be connected and that is not in a hose storage area shall be supplied with a sweep elbow of at least 30degrees downward.

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

#### **STREETSIDE DISCHARGE**

There shall be one (1) 2-1/2" gated discharge(s) located in this area. Each discharge shall include:

#### **SHOP NOTES**

SVI to provide and supply a chrome 2 1/2" to 1 1/2" reducer.

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8000 series, 2-1/2" valve(s)
  - Valve(s) shall be controlled with a 12 VDC electric actuator connected to the valve. The electronic control(s) shall be located on the pump operator's panel.
- There shall be a 2-1/2" NSTF x 2-1/2" NSTM chrome plated 30 degree downsweep elbow provided.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls 2-1/2" liquid filled gauge(s)
  - This gauge(s) shall have a white background with black text.
- The above gauge shall have a range from 0 to 400 psi.

#### **CURBSIDE DISCHARGE**

There shall be two (2) 2-1/2" gated discharge(s) located in this area. Each discharge shall include:

- Two (2) of the discharge(s) shall flow water only.
- Two (2) Akron Brass 8000 series, 2-1/2" valve(s)
- Valve(s) shall be controlled with a 12 VDC electric actuator connected to the valve. The electronic control(s) shall be located on the pump operator's panel.
- There shall be a 2-1/2" NSTF x 2-1/2" NSTM chrome plated 30 degree downsweep elbow provided.
- Two (2) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.

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- Two (2) Innovative Controls 2-1/2" liquid filled gauge(s)
  - This gauge(s) shall have a white background with black text.
- The above gauge shall have a range from 0 to 400 psi.

There shall be one (1) 4" gated discharge(s) located in this area. Each discharge shall include:

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 7800 series, 4" valve(s)
- Valve(s) shall be controlled with a 12 VDC electric actuator connected to the valve. The electronic control(s) shall be located on the pump operator's panel.
- There shall be a 4" NSTF x 5" 30 degree downsweep elbow with 5" Storz cap with hardcoat finish and chain provided.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls 2-1/2" liquid filled gauge(s)
  - This gauge(s) shall have a white background with black text.
- The above gauge shall have a range from 0 to 400 psi.

#### **REAR DISCHARGE**

There shall be one (1) 2-1/2" gated discharge(s) located in this area. Each discharge shall include:

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8000 series, 2-1/2" valve(s)
- Valve(s) shall be controlled with a 12 VDC electric actuator connected to the valve. The electronic control(s) shall be located on the pump operator's panel.
- There shall be a 2-1/2" NSTF x 2-1/2" NSTM chrome plated 30 degree downsweep elbow provided.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls 2-1/2" liquid filled gauge(s)

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- This gauge(s) shall have a white background with black text.
- The above gauge shall have a range from 0 to 400 psi.

#### **FRONT DISCHARGE**

There shall be one (1) 1-1/2" gated discharge(s) located in this area. Each discharge shall include:

- One (1) of the discharge(s) shall flow water and foam.
- One (1) Akron Brass 8000 series, 1-1/2" valve(s)
- Valve(s) shall be controlled with a 12 VDC electric actuator connected to the valve. The electronic control(s) shall be located on the pump operator's panel.
- There shall be a 1-1/2" NSTF x 1-1/2" NSTM chrome plated chicksan swivel elbow provided above the front bumper gravel shield.

#### **SHOP NOTES**

Discharge shall be a chicksan swivel on top of gravel shield.

- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls 2-1/2" liquid filled gauge(s)
- This gauge(s) shall have a white background with black text.
  - The above gauge shall have a range from 0 to 400 psi.

#### **MISCELLANEOUS DISCHARGE**

#### **HOSE BED DISCHARGES**

#### **SHOP NOTES**

One streetside and one curbside

There shall be one (1) 2-1/2" gated discharges located in this area. There will be one (1) located on the streetside front hosebed and one (2) curbside front hosebed.

Each discharge shall include:

One (1) of the discharge(s) shall flow water and foam.

- One (1) Akron Brass 8000 series, 2-1/2" valve(s)
- Valve(s) shall be controlled with a 12 VDC electric actuator connected to the valve. The electronic control(s) shall be located on the pump operator's panel.

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- There shall be a 2-1/2" NSTF x 2-1/2" NSTM chrome plated 30 degree downsweep elbow provided.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls 2-1/2" liquid filled gauge(s)
- This gauge(s) shall have a white background with black text.
- The above gauge shall have a range from 0 to 400 psi.

#### **1-1/2" CROSSLAYS**

There shall be two (2) 1-1/2" cross lays located per the itemized compartment list. The cross lays shall be transverse of the apparatus body with access from either side.

Each cross lay shall have a storage capacity of 150' of 1-3/4" double jacket hose and nozzle.

There will be a vinyl type cover over the top and side opening of the crosslays per NFPA. The cover will be help in place with Velcro on the top and elastic cord on the ends.

#### SHOP NOTES

Vinyl cover per NFPA

Two (2) of the discharge(s) shall flow water and foam.

- Two (2) Akron Brass 8000 series, 2" valve(s)
- Valve(s) shall be controlled with a 12 VDC electric actuator connected to the valve. The electronic control(s) shall be located on the pump operator's panel.
  - There shall be a 2" NSTF x 1-1/2" NSTM chrome plated 90 degree swivel elbow provided.
  - Two (2) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
  - Two (2) Innovative Controls 2-1/2" liquid filled gauge(s)
  - This gauge(s) shall have a white background with black text.
- The above gauge shall have a range from 0 to 400 psi.



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### DECK GUN

There shall be one (1) 3" gated discharge located on the upper deck above the pump compartment. Piping shall rise high enough for a mounted deluge gun to be operated in a 360 degree circle to a lower angle of 15 degrees without being impeded by any part of the apparatus or equipment.

The discharge shall terminate with a 6-bolt flange with NSTM threads. The discharge shall include:

- Task Force Tips 18" Extenda-Gun will be installed for the deckgun discharge.

**SHOP NOTES**

18" victaulic

Extenda gun part of the XFC62 monitor package below.

One (1) of the discharge(s) shall flow water only.

- One (1) Akron Brass 8000 series, 3" valve(s)
  - Valve(s) shall be controlled with a 12 VDC electric actuator connected to the valve. The electronic control(s) shall be located on the pump operator's panel.
  - One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls 2-1/2" liquid filled gauge(s)
  - This gauge(s) shall have a white background with black text.
  - The above gauge shall have a range from 0 to 400 psi.

### DECKGUN

Supplied with the apparatus will be a Task Force Tips Crossfire monitor package #XFC-62. The package will consist of the following items.

One (1) Crossfire 1250GPM monitor

One (1) MST-4NJ-2.5" quad stack tips

One (1) M-R1250SNJ - 2.5" automatic nozzle 1250GPM

One (1) XFH-1NP Safe-Tax base with 4"NH inlet

### PUMP PANEL

The pump controls shall be mounted on an stainless steel control panel which shall have a brushed finish. The panel shall be hinged, or bolted in place allowing it to be easily removed to gain access to plumbing components.

**SHOP NOTES**

Brushed stainless steel

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### **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.

### **PRESSURE GOVERNOR and MONITORING DISPLAY**

Install chassis supplied Fire Research InControl 400.

#### **SHOP NOTES**

Verify the pressure governor is a knob style controller.

### **MASTER DISCHARGE GAUGE**

There shall be one (1) Innovative Controls 4" liquid filled gauge which shall display the Master Discharge Pressure.

### **MASTER INTAKE GAUGE**

There shall be one (1) Innovative Controls 4" liquid filled gauge which shall display the Master Intake Pressure.

- This gauge(s) shall have a white background with black text.
- The above gauge(s) shall have a range from -30" to 600 psi.

### **COLOR CODED LABELS**

The completed unit shall have color coded labels for each discharge, intake, master gauge, and drain. Labels shall be manufactured from an acrylic poly material with the text of each label engraved in the top surface.

### **PUMP PANEL LIGHTING BOTH SIDES**

All gauges and controls on the pump panel shall be adequately illuminated by a shielded aluminum NFPA diamondplate light assembly with OnScene Solutions LED type lights. The lights shall be activated by a weather-proof type switch on the pump operators' panel. This switch shall also activate any area step lighting.

In addition to the switch the at least one light at the pump operators panel will activate when the pump is engaged.

#### **SHOP NOTES**

Light assembly will be fabricated form aluminum NFPA diamondplate. Will be gusseted to allow it to be used as a step surface.

Light to come on automatically when pump is engaged

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#### **TEST TAPS**

Test taps for pump intake and pump pressure shall be provided on the pump instrument panel and be properly labeled.

#### **RADIO SPEAKER**

There will be one (1) Fire Department supplied radio speaker installed at the pump operators panel.

#### **HOSE TROUGHS**

There will be hose troughs located in each side running board. The troughs will be designed to hold Fire Department supply hoses. Each trough will be as wide as possible but will not extend in to the area directly below the crosslays.

There will be one (1) On Scene Solutions strap installed with each trough to secure the hose in place.

#### **SHOP NOTES**

One each side of running boards. The trough will not extend to the area under the crosslays.

#### **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 tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2008 certified. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

The water tank shall be of a specific configuration and designed to be completely independent of the body and compartments. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include PolyProSeal™ technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal. The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" PT3™ polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions 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. The walls shall be welded to the floor of the tank providing maximum strength as part of the tank's unique Full Floor Design™. Tolerances in design allow for a maximum variation of 1/8" on all dimensions.

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#### **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" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall be located in the left front corner of the tank unless otherwise specified by the tank manufacturer to the purchaser. The tower shall have a 1/4" thick removable polypropylene screen and a PT3™ polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid. 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 tank cover shall be constructed of 1/2" thick PT3™ polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank cover(s) shall be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2" minimum polypropylene dowels spaced a maximum of 40" apart. These dowels shall extend through the covers and will assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall accommodate the necessary lifting hardware.

#### **SUMP**

There shall be one (1) sump standard per tank. The sump shall be constructed of a minimum of 1/2" PT3™ polypropylene and be located in the left front quarter of the tank, unless specified otherwise. On all tanks that require a front suction, 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.

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#### **OUTLETS**

There will be two (2) standard tank outlets: one for the tank-to-pump suction line, which shall be sized to provide adequate water flow to the pump; and, one for tank fill line, which shall be sized according to the NFPA minimum size chart for booster tanks. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates of up to 1000 G.P.M. The addition of rear suction fittings, nurse valve fittings, dump valve fittings, and through-the-tank sleeves to accommodate rear discharge piping must be specified. All auxiliary outlets and inlets must meet all NFPA guidelines in effect at the time of manufacture.

#### **MOUNTING**

The tank shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40 inches, cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area.

The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of 1/4" x 1" and a Shore A Hardness of approximately 60 durometer. The rubber must be installed so it will not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to prevent tank from shifting during vehicle operation.

A picture frame type cradle mount with a minimum of 2" x 2" x 1/4" mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4" x 4" x 1/4" by 6" high are permitted for the purpose of capturing the tank.

Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3" x 3" x 1/4" and shall be approximately 6" to 12" long. These brackets must incorporate rubber isolating pads with a minimum thickness of 1/4" inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank. Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the Poly-Tank® III for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

#### **CENTER OF GRAVITY**

A center of gravity calculation shall be determined for each tank and provided as requested in order to provide the apparatus manufacturer with the necessary data to design and certify the apparatus with respect to the NFPA requirements regarding rollover stability.

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#### **WATER TANK LEVEL GAUGE**

There shall be one (1) Innovative Controls 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.

#### **CLASS A POLYPROPYLENE FOAM CELL**

There shall be one (1) 15 US gallon or 12.4 Imperial gallon polypropylene foam cell incorporated into the polypropylene water tank.

There shall be one (1) pressure/vacuum vent installed on the foam tank.

There shall be one (1) drain hose connected to the foam cell. The drain shall have a 1/4 turn valve installed inside the pump house and it shall drain below the frame rail of the chassis.

#### **FOAM TANK LEVEL GAUGE**

There shall be one (1) Innovative Controls 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.

#### **UPF POLY WATER TANK WARRANTY**

The UPF 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.

#### **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.

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#### **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.

Two (2) adjustable aluminum hose bed partitions shall be provided in the hose storage area. The partition shall be 3/16" smooth aluminum with split aluminum tubing welded to the top and rear edges.

One (1) partition will be designed in a manner to hold one FD supplied backboard. It will have vertically hinged door with a positive latch. Backboard dimensions are 72"x16"x2".

#### **SHOP NOTES**

**One divider will be designed to hold one FD supplied backboard (72"x16"x2")**

#### **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 person (300 lbs).

Each section shall utilize pneumatic cylinders to assist with opening and closing. There shall be a chrome grab handle on each section at the rear of the hose body.

Each compartment shall have a horizontally mounted LED light stick on the underside of the door that will be automatically activated when the door is opened and wired to the compartment door ajar warning light provided in cab.

The rear opening will have a black vinyl cover mechanically fastened to the aluminum hose bed cover at the top and with five (5) OnScene style straps to secure the lower edge.

#### **SHOP NOTES**

**The rear opening will have a black vinyl cover mechanically fastened to the aluminum hose bed cover at the top and with five (5) OnScene style straps to secure the lower edge.**

#### **EQUIPMENT PAYLOAD WEIGHT ALLOWANCE**

In compliance with NFPA 1901 standards, the special service vehicle shall be designed for an equipment loading allowance of 4,000 lbs. of St. Helena Fire Department provided loose equipment based on a 30,001 - 40,000 pound gross vehicle weight rating.

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#### EQUIPMENT

The following equipment shall be furnished with the completed special service 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) 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 the 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 the 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 the specified ladder rack.
- One (1) Super Vac 718VR2, 18" electric variable speed ventilation fan(s) shall be provided with the completed unit.
  - The above specified ventilation fan(s) shall be shipped loose with the completed unit.
- Six (6) Streamlight LiteBox Vehicle Mounting Systems shall be provided. Each flashlight shall be yellow in color. Each flashlight shall have a 12 volt DC charger and vehicle mount kit. Each flashlight shall have a 20 watt spotlight style bulb and reflector. The flashlights shall be wired to battery direct unless otherwise specified by the customer.
  - Two (2) lights will be mounted on the rear sloped area of the engine tunnel one near each rear facing seats. Four (4) lights will be mounted on the rear wall of the crew area, two (2) each side near the rear crew doors.

#### **SHOP NOTES**

**Yellow. The exact locations shall be two (2) flashlights on the rear wall inside each rear door for a total of four (4) lights on the rear wall and two (2) flashlights on the engine tunnel, one (1) on each side.**

#### REMAINING NFPA MINOR EQUIPMENT BY PURCHASER

All other minor equipment not specified above, but required by NFPA 1901, section 10.5.1 shall be supplied and mounted by St. Helena Fire Department before the unit is placed in emergency service.

Mount FD supplied equipment      \$5,000.00 allowance