

SVI Trucks

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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.

WEIGHT DISTRIBUTION

When the fire apparatus is loaded to its estimated in-service weight, the front-to-rear weight distribution shall be within the limits set by the chassis manufacturer.

The front axle loads shall not be less than the minimum axle loads specified by the chassis manufacturer under full load and all other loading conditions.

LOAD DISTRIBUTION

The apparatus manufacturer shall calculate the load distribution for the apparatus, and that load distribution plan shall be delivered with the fire apparatus.

The manufacturer shall engineer the fire apparatus to comply with the gross axle weight ratings (GAWR), the overall gross vehicle weight rating (GVWR), and the chassis manufacturer's load balance guidelines.

The fire apparatus, when loaded to its estimated in service weight, shall have a side-to-side tire load variation of no more than 7 percent of the total tire load for that axle.

Each tire shall be equipped with a visual indicator or monitoring system that indicates tire pressure.

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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.

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:

- 4) Owner's name and address
- 5) Apparatus manufacturer, model, and serial number
- 6) 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)

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- i) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
- 7) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- 8) Pump transmission make, model, serial number, and gear ratio
- 9) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- 10) Water and Foam tank certified capacity in gallons or liters
- 11) Paint manufacturer and paint number(s)
- 12) Company name and signature of responsible company representative
- 13) If the apparatus is a mobile foam fire apparatus, the certification of foam tank capacity
- 14) Certification of compliance of the optical warning system
- 15) Siren manufacturer's certification of the siren
- 16) Written load analysis and results of the electrical system performance tests
- 17) Certification of slip resistance of all stepping, standing, and walking surfaces
- 18) If the apparatus has a fire pump, the pump manufacturer's certification of suction capability
- 19) 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
- 20) If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications
- 21) If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed
- 22) If the apparatus has a fire pump, the pump manufacturer's certification of the hydrostatic test
- 23) If the apparatus has a fire pump, the certification of inspection and test for the fire pump
- 24) If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test
- 25) When the apparatus is equipped with a water tank, the certification of water tank capacity
- 26) 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
- 27) If the system has a CAFS, the documentation of the manufacturer's pre delivery tests
- 28) If the apparatus has a line voltage power source, the certification of the test for the power source
- 29) 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
- 30) 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:

- 31) Manufacturer's name and address
- 32) Country of manufacture
- 33) Source for service and technical information
- 34) Parts replacement information
- 35) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable)
- 36) Wiring diagrams for low voltage and line voltage systems to include the following information:
 - j) Pictorial representations of circuit logic for all electrical components and wiring
 - k) Circuit identification
 - l) Connector pin identification

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- m) Zone location of electrical components
- n) Safety interlocks
- o) Alternator–battery power distribution circuits
- p) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
- 37) Lubrication charts
- 38) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
- 39) Precautions related to multiple configurations of aerial devices, if applicable
- 40) Instructions regarding the frequency and procedure for recommended maintenance
- 41) Overall apparatus operating instructions
- 42) Safety considerations
- 43) Limitations of use
- 44) Inspection procedures
- 45) Recommended service procedures
- 46) Troubleshooting guide
- 47) Apparatus body, chassis and other component manufacturer's warranties
- 48) Special data required by this standard
- 49) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

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

NFPA REQUIRED DOCUMENTATION FORMAT - USB FLASH DRIVE

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

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:

- 50) A separate specification of the section of the applicable standard for which compliance is lacking
- 51) A description of the particular aspect of the apparatus that is not in compliance therewith or required equipment that is missing
- 52) A description of the further changes or modifications to the delivered apparatus that must be completed to achieve full compliance
- 53) 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

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this standard.

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:

- 54) The chassis, body and tank(s)
- 55) Full fuel, lubricant, and other chassis or component fluid tanks or reservoirs
- 56) Full water and other agent tanks
- 57) *250 lb (114 kg) in each seating position
- 58) Fixed equipment such as pumps, aerial devices, generators, reels and air systems as installed
- 59) Ground ladders, suction hose, designed hose load in their hose beds and on their reels
- 60) 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.

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

TESTING

ROAD TEST

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

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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.

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.

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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:

- 61) Documentation of the electrical system performance tests
- 62) A written electrical load analysis, including the following:
 - q) The nameplate rating of the alternator
 - r) The alternator rating
 - s) Each of the component loads specified that make up the minimum continuous electrical load
 - t) Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load
 - u) Each individual intermittent electrical load

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.

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

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:

- 63) The minimum foam percent setting available.
- 64) A mid-range foam percent setting, if available.
- 65) 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.

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WARRANTY

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

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

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

GENERAL LIMITED WARRANTY - TWO (2) YEARS

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

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

LOW VOLTAGE ELECTRICAL WARRANTY - FIVE (5) YEARS

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

STRUCTURAL WARRANTY - TEN (10) YEARS

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

PAINT LIMITED WARRANTY - TEN (10) YEARS

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

GRAPHICS LIMITED WARRANTY

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

WATEROUS 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 Surprise Fire Department.

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.

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

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.

CONSTRUCTION PERIOD

The completed vehicle shall be delivered within three hundred (300) days after receipt of a purchase order or contract.

Contractor shall not be held liable for delays of chassis delivery due to accidents, strikes, floods or other events not subject to their control. Contractor shall provide immediate written notice to Surprise Fire Department as to delays and to what extent these delays have in completing vehicle within the stated construction time period.

OVERALL HEIGHT

The overall height (OAH) of the vehicle shall not exceed 131" (10' - 11") 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 (deck gun).

OVERALL LENGTH

The overall length (OAL) of the vehicle shall be approximately 394" (32' - 10").

ANGLE OF APPROACH

The angle of approach for this vehicle shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.

ANGLE OF DEPARTURE

The angle of departure for this vehicle shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.

PRE-CONSTRUCTION CONFERENCE

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

CAB CHASSIS FINAL CONFERENCE

A cab chassis manufacturer final inspection conference shall be required at manufacturer's factory for two (2) personnel from the Surprise Fire Department to inspect the cab chassis and construction details prior to shipment of the completed vehicle to Contractor.

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

EQUIPMENT MOUNTING CONFERENCE

An equipment mounting conference shall be required at Contractor's factory for two (2) personnel from the Surprise Fire Department to layout and locate all equipment to be mounted on unit prior to shipment of the completed vehicle to Surprise Fire Department.

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

FINAL INSPECTION CONFERENCE

A final inspection conference shall be required, at the Contractor's factory for four (4) personnel from the Surprise 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 Surprise 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 Surprise Fire Department regarding the operation, care and maintenance of the apparatus and equipment supplied at Surprise Fire Department location.

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

After delivery of the apparatus, the Surprise 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.

CAB CHASSIS SPECIFICATION

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 2014 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

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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 24,000 pounds.

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

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.

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CAB STYLE

The cab shall be a custom, fully enclosed, LFD 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 ten (10) 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 144.60 inches with 67.50 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 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 63.38 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.

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 10.25 inches deep X 31.13 inches wide. The intermediate step shall measure approximately 8.38 inches deep X 32.13 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.

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The first step for the crew area shall measure approximately 10.38 inches deep X 20.44 inches wide. The intermediate step shall measure approximately 10.20 inches deep X 21.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.80 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 fascia shall include a box style, 304 stainless steel front grille 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches. The upper portion of the grille shall be hinged to provide service access behind the grille.

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.

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 followed by sealing the seams with SEM brand seam sealer.

The cab shall then be painted the specific color designated by the customer with 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 paint shall have a minimum thickness of 2.00 mils, 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.

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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 71663 red.

CAB PAINT SECONDARY/UPPER COLOR

The secondary/upper paint color shall be PPG FBCH 911645 white.

CAB PAINT EXTERIOR BREAKLINE

The upper and lower paint shall meet at a breakline on the cab which shall be located approximately 1.00 inch below the door windows on each side of the cab. The breakline shall curve down at the front cab corners to approximately 5.00 inches below the windshields on the front of the cab.

CAB PAINT PINSTRIPE

A 0.50 inch wide gold reflective tape with black borders shall be applied on the break line between the two different colored surfaces.

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 #20-06 black-black 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.

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 INSULATION

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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.

LH EXTERIOR REAR COMPARTMENT

The cab shall offer an exterior compartment on the left side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 21.19 inches high. The compartment size shall be 11.34 inches wide X 21.19 inches high X 21.19 inches deep. The compartment shall have a 10.63 inch wide, 32.00 inch high and 1.50 inch thick hinged box pan style flush mount door with a bright aluminum tread plate inner panel and a bent D-ring slam latch. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

LEFT HAND EXTERIOR REAR COMPARTMENT LIGHTING

There shall be one (1) SoundOff Signal brand LED strip light installed to illuminate the exterior rear compartment on the left side of the cab. The strip light shall be 10.00 inches long and shall include three (3) bright white Gen3 LEDs.

LH EXTERIOR COMPARTMENT INTERIOR FINISH

The interior of the left hand exterior compartment shall have a DA sanded finish.

RH EXTERIOR REAR COMPARTMENT

The cab shall offer an exterior compartment on the right side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 21.19 inches high. The compartment size shall be 11.34 inches wide X 21.19 inches high X 21.19 inches deep. The compartment shall have a 10.63 inch wide, 32.00 inch high and 1.50 inch thick hinged box pan style flush mount door with a bright aluminum tread plate inner panel and a bent D-ring slam latch. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

RIGHT HAND EXTERIOR REAR COMPARTMENT LIGHTING

There shall be one (1) SoundOff Signal brand LED strip light installed to illuminate the exterior rear compartment on the right side of the cab. The strip light shall be 10.00 inches long and shall include three (3) bright white Gen3 LEDs.

RH EXTERIOR COMPARTMENT INTERIOR FINISH

The interior of the right hand exterior compartment shall have a DA sanded finish.

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

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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 two (2) Weldon Vista IV Touchscreen displays which shall be located one (1) on the left side dash in the switch panel and one (1) on the right side of the dash in the switch panel. The Touchscreen displays shall feature full color LCD display screens. The display shall include a message bar displaying the time of day, and important messages requiring acknowledgement by the user. There shall be virtual controls for the on-board diagnostics. The display screens shall be video ready for back- up cameras, thermal cameras, and DVD. A DIN type input connector ready for GPS interfacing shall be incorporated into the back of the display.

The Touchscreen displays shall measure approximately 6.25 inches wide x 3.38 inches in height. The displays 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.

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

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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.

EXTERIOR ELECTRICAL TERMINAL COATING

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

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 liters) 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 2013 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

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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.

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.

DELETED! added telma retarder.

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 via an off/low/medium/high virtual button on the Vista display and control screen. The multiplex system shall remember and default to the last engine brake control setting when the vehicle is shut off and re-started.

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 front of the chassis shall accommodate fluid fill for the engine oil through the grille. This area shall also accommodate a check for the engine oil. The transmission, power steering, and coolant fluid fills and checks shall be 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.

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ENGINE WARRANTY

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

REMOTE THROTTLE HARNESS

An apparatus interface wiring harness for the engine shall be supplied with the chassis. The midship 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 midship harness shall contain connectors for a Class 1 Total 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) discreet wire remote throttle circuit shall be turned off for use with a J1939 based pump controller or when the discreet 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.

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.

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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.

ENGINE COOLANT FILTER

An engine coolant filter with a shut-off valve for the inlet and outlet shall be installed on the chassis. The location of the filter shall allow for easy maintenance.

Proposals offering engines equipped with coolant filters shall be supplied with standard non-chemical type particulate filters.

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.

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 systems coolant hoses shall be silicone heater hose and shall include silicone hoses for all radiator coolant plumbing including the surge tank hoses. The radiator coolant hoses shall be formed silicone with formed aluminized steel

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tubing. All radiator silicone coolant hose and tubing, heater hose, and surge tank plumbing shall be secured with stainless steel constant torque band clamps.

ENGINE COOLANT OVERFLOW BOTTLE

A remote engine coolant overflow bottle shall be provided in the case of over filling the coolant system. The overflow bottle shall capture the expansion fluid or overfill rather than allow the fluid to drain on the ground. The overflow bottle provided on the cooling system shall only be a catch bottle and shall not return excess coolant back into the surge tank.

ENGINE AIR INTAKE FILTER AND RESTRICTION W/REPLACEABLE ELEMENT

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 system shall utilize a replaceable dry type filter which ensures dust and debris remains safely contained inside the housing during operation via leak-tight seals. The service cover shall be located on the bottom of the housing, eliminating the chance of contaminating the air intake system during air filter service.

The air flow distribution and dust loading shall be uniform throughout the high-performance filter element, which shall result in pressure differential for improved horsepower and fuel economy. The air intake ember separator 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 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. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.

The exhaust system shall be mounted below the frame in the outboard position with the SCR canister in line rearward of the DPF.

DIESEL EXHAUST FLUID TANK

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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

Two (2) exhaust temperature mitigation devices shall be shipped loose for installation by the body manufacturer on the vehicle. The temperature mitigation devices 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.

TRANSMISSION FEATURE PROGRAMMING

The Allison Gen V-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.

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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.

A transmission interface connector shall be provided in the cab. This package shall contain the following input/output circuits to the transmission control module. The Gen V-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

<u>Function ID</u>	<u>Description</u>	<u>Wire assignment</u>
Inputs		
C	PTO Request	142
J	Fire Truck Pump Mode (4th Lockup)	122 / 123
Outputs		
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 have a graphical Vacuum Florescent Display (VFD) capable of displaying two lines of text. The shift selector shall provide mode indication and a prognostic indicator (wrench symbol) on the digital display. The prognostics monitor various operating parameters 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.

TRANSMISSION WARRANTY

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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.

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®.

CUSTOMER HAS ADDED THE TELMA FOCAL MOUNT RETARDER.

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.

MIDSHIP PUMP GEARBOX DROP

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

MIDSHIP PUMP RATIO

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

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) pump shift control panel shall be mounted on the upper left section of the center dash panel. 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. One (1) label indicating pump instructions and 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.

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FUEL FILTER/WATER SEPARATOR

The fuel system shall have a Racor S3201T fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve and a see through cover to allow visual inspection of fuel and filter condition.

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

An instrument panel lamp and audible alarm which indicates when water is present in the fuel-water separator shall also be included.

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.

FUEL SHUTOFF VALVE

A 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 COOLER

An aluminum cross flow air to fuel cooler shall be provided to lower fuel temperature allowing the vehicle to operate at higher ambient temperatures. The fuel cooler shall be located above the fuel tank.

FUEL TANK

The fuel tank shall have a capacity of sixty-eight (68) gallons and shall measure 35.00 inches in width X 20.00 inches in height X 24.00 inches in length. The increased height and reduced length allows for the use of a shorter rear frame overhang on the chassis. 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 offset with the left fill port located in the rearward position and the right fill port located in the middle position on the fuel tank.

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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.

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 steering wheel located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding.

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

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-24-160 single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a rated capacity of 24,000 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 0.50 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

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The rear axle wheel bearings shall be lubricated with oil.

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 suspension shall feature a Neway AD-127 air suspension. The suspension shall include optimized air springs mounted to the equalizing beams and integral transverse beam. An adjustable torque rod and adjustable track bar shall also be included.

Dual air height control valves shall be installed to ensure equal frame height on both sides of the vehicle regardless of the load. The rear suspension is run flat capable at reduced speeds.

The rear suspension capacity shall be rated at 24,000 to 27,000 pounds.

REAR SHOCK ABSORBERS

Shock absorbers shall be supplied by the suspension manufacturer and installed on the rear axle suspension.

FRONT TIRE

The front tires shall be Michelin 365/70R-22.5 20PR "L" tubeless radial XZA highway tread.

The front tire stamped load capacity shall be 21,000 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 125 pounds per square inch.

The Michelin Tire Intermittent Service Rating load capacity shall be 22,500 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 130 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 11R-22.5 16PR "H" tubeless radial XDN2 all-weather tread designed for exceptional traction and mileage.

The rear tire stamped load capacity shall be 24,020 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 24,820 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.

CUSTOMER WOULD LIKE TO DELETE THE TPI IF POSSIBLE.

FRONT WHEEL

The front wheels shall be Alcoa hub piloted, 22.50 inch X 10.50 inch 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.

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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 lose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

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 7.00 inch S-cam drum type.

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.

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 below the pump shift control within easy access to the driver's position.

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 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 mounted behind the battery box on the left hand side.

FRONT BRAKE CHAMBERS

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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® 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 located on the air dryer bracket on the left frame rail behind the battery box.

MOISTURE EJECTORS

Automatic moisture ejectors with a manual pet-cock type 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 INLET CONNECTION

An air connection for the shoreline air inlet shall be supplied.

AIR INLET LOCATION

The air inlet shall be installed in the left hand side lower front step in the forward position.

PLUMBING AIR INLET CONNECTION

The air inlet connector shall be plumbed to the air system with a check valve to prevent air from escaping through the inlet connector.

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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.

WHEELBASE

The chassis wheelbase shall be 193.50 inches.

REAR OVERHANG

The chassis rear overhang shall be 54.00 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.

FRAME WARRANTY

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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

A one piece, two (2) rib wrap-around style, polished stainless steel front bumper shall be provided. The material shall be 10 gauge 304 stainless steel, 12.00 inches high and 99.00 inches wide.

FRONT BUMPER EXTENSION LENGTH

The front bumper shall be extended approximately 21.00 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 APRON

The 21.00 inch extended front bumper shall include an apron constructed of 0.19 inch thick embossed aluminum tread plate.

The apron shall be installed between the bumper and the front face of the cab affixed using stainless steel bolts attaching the apron to the top bumper flange.

MECHANICAL SIREN

The front bumper shall include an electro mechanical Federal Q2B™ siren, which shall be streamlined, chrome-plated and shall produce 123 decibels of sound at 10.00 feet. The Q2B™ siren produces a distinctive warning sound that is recognizable at long distances. A unique clutch design provides a longer coast down sound while reducing the amp draw to 100 amps. The siren shall measure 10.50 inches wide X 10.00 inches high X 14.00 inches deep.

MECHANICAL SIREN LOCATION

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The siren shall be pedestal mounted on the bumper apron on the furthest outboard section of the bumper on the driver side.

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 outboard position relative to the right hand frame rail and one (1) on the left side of the bumper in the outboard 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.

ELECTRONIC SIREN SPEAKER

The bumper shall include two (2) Cast Products Inc. model SA4301, 100 watt speakers which shall be recess mounted within the bumper fascia. Each speaker shall measure 6.20 inches tall X 7.36 inches wide X 3.06 inches deep. Each speaker shall include a flat mounting flange which shall be polished aluminum.

ELECTRONIC SIREN SPEAKER LOCATION

The two (2) electronic siren speakers shall be located on the front bumper face outboard of the frame rails with one (1) on the right side and one (1) on the left side in the inboard positions.

FRONT BUMPER TOW HOOKS

Two (2) heavy duty tow hooks, painted to match the chassis frame, shall be installed in a rearward position out of the approach angle area, bolted directly to the side of the chassis frame with grade 8 bolts.

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.

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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.

CAB TILT LIMIT SWITCH

A cab tilt limit switch shall be installed. The switch will effectively limit the travel of the cab when being tilted. The limit adjustment of the switch shall be preset by the chassis manufacturer to prevent damage to the cab or any bumper mounted option mounted in the cab tilt arc. Further adjustment to the limit by the apparatus manufacturer shall be available to accommodate additional equipment.

CAB TILT CONTROL RECEPTACLE

The cab tilt control cable shall include a receptacle which shall be temporarily located on the right hand chassis rail rear of the cab to provide a place to plug in the cab tilt remote control pendant. The tilt pump shall include 8.00 feet of cable with a six (6) pin Deutsch receptacle with a cap.

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 manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

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.

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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 door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

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.

GLASS REAR DOOR LH

The rear left hand side door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

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 door which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this 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 door and above the wheel well which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

SVI Trucks

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.

CLIMATE CONTROL

The cab shall be equipped with a Bus-Air brand 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 venturi pump for water management. The venturi pump drain shall remove condensation from the air conditioning system.

CLIMATE CONTROL ACTIVATION

The heating, defrosting and air conditioning controls shall be on the dash next to driver panel, 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 #20-06 black-black 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.

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.

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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/ft² 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.

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.

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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 two (2) 12 volt cigarette lighter type receptacles in the dash to provide a power source for 12 volt electrical equipment. The receptacles shall be wired battery direct.

AUXILIARY POWER POINT ENGINE TUNNEL

The cab interior shall include two (2) 12 volt cigarette lighter type receptacles to provide power sources for 12 volt electrical equipment. The receptacles shall be connected directly to the batteries. The receptacles shall be located on the rear of the engine tunnel near the top, one (1) near the left corner and one (1) near the right corner.

STEP TRIM

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of polished 5052 H32 aluminum Grip Strut® grating with angled outer corners. The grating shall allow water and other debris to flow through rather than becoming trapped within the stepping surface. 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.

UNDER CAB ACCESS DOOR

The cab shall include an aluminum access door in the left crew step riser painted to match the cab interior paint with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.

INTERIOR DOOR TRIM

The interior trim on the doors of the cab shall consist of an aluminum panel constructed of Marine Grade 5052-H32 0.13 of an inch thick aluminum plate. The door panels shall include a painted finish.

DOOR TRIM KICKPLATE

The inner door panels shall include an aluminum embossed tread kick plate which shall be fastened to the lower portion of the door panels.

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.

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CAB DOOR TRIM REFLECTIVE

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

INTERIOR GRAB HANDLE "A" PILLAR

Customer Deleted at Pre-con.

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.

INTERIOR TRIM VINYL COLOR

The cab interior vinyl trim surfaces shall be black 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.

CAB PAINT INTERIOR DOOR TRIM

The inner door panel surfaces shall be painted with Zolatone #20-06 black/black texture finish.

HEADER TRIM INTERIOR PAINT

The metal surfaces in the header area shall be coated with Zolatone #20-06 black/black texture finish.

TRIM CENTER DASH INTERIOR PAINT

The entire center dash shall be coated with Zolatone #20-06 black/black texture finish. Any accessory pods attached to the dash shall also be painted this color.

TRIM LEFT HAND DASH INTERIOR PAINT

The left hand dash shall be painted with Zolatone #20-06 black/black texture finish.

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TRIM RIGHT HAND DASH INTERIOR PAINT

The right hand dash shall be painted with Zolatone #20-06 black/black 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 no rocker switches or legends.

SWITCHES LEFT PANEL

The left dash panel shall include one (1) windshield wiper/washer control switch located in the left hand side of the panel. The switch 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 1800.

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 Surprise Fire Department, Arizona. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

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SEAT DRIVER

The driver's seat shall be an H.O. Bostrom Sierra model seat with air suspension. The four-way seat shall feature 3.00 inch vertical travel air suspension and manual fore and aft adjustment with 5.00 inches of travel. The suspension control shall be located on the seat below the left front corner of the bottom cushion. The seat shall also feature integral springs to isolate shock.

The seat position shall include a three-point shoulder harness with lap belt and an automatic retractor attached to the cab. The buckle portion of the seat belt shall be mounted on a semi-rigid stalk extending from the seat base within easy reach of the occupant.

The seat shall not include the (ABTS) style of safety restraint.

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 feature a two (2) way adjustable lumbar support and offer an infinite fully reclining adjustable titling seat back. The seat back shall also 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 Sierra model seat with air suspension. The four-way seat shall feature 3.00 inch vertical travel air suspension and manual fore and aft adjustment with 5.00 inches of travel. The suspension control shall be located on the seat below the left front corner of the bottom cushion. The seat shall also feature integral springs to isolate shock.

The seat position shall include a three-point shoulder harness with lap belt and an automatic retractor attached to the cab. The buckle portion of the seat belt shall be mounted on a semi-rigid stalk extending from the seat base within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 37.00 inches measured with the seat suspension height adjusted to the upper limit of its travel.

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.

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SEAT BACK OFFICER

The officer's seat shall feature a two (2) way adjustable lumbar support and offer an infinite fully reclining adjustable titling seat back. The seat back shall also feature a contoured head rest.

SEAT MOUNTING OFFICER

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

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.

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 outer seat(s) 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 REAR FACING OUTER

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

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.

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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 forward facing center seat shall be an H.O. Bostrom Firefighter model seat. The seat shall feature eight-way electric positioning. The eight (8) positions shall include up and down, fore and aft and front and rear tilt. 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 measured with the seat height adjusted to the lowest position of travel.

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.

SEAT BACK FORWARD FACING CENTER

The seat back in the rear facing center position shall be comprised of a standard seat back. The seat back shall feature an all belts to seat (ABTS) style safety restraint. The ABTS feature shall include a red, 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 seat back shall feature a contoured, adjustable head rest.

ARMREST FOWARD FACING CENTER

All forward facing center crew seat positions shall include armrests on the inboard and outboard side of each seat. Each armrest shall be covered with black urethane material and shall be an integral part of the seat.

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 48.00 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 the same color as the remaining interior.

SEAT FRAME FORWARD FACING STORAGE ACCESS

There shall be two (2) access points to the storage area one (1) each side of the seat frame. Each access point shall be covered by a hinged door which measures 18.00 inches wide X 8.63 inches high to allow access for storage in the seat box. The access door hinges shall be at the rear edge of the doors.

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SEAT MOUNTING FORWARD FACING CENTER

The forward facing center seats shall offer a **special mounting**. The seats shall be installed **9.5"** inches apart offering the most available room for each occupant. The seats shall also include a custom mounting support on the face of the seat frame to mount forward and allow maximum fore/aft travel.

NOTE: Match previous job #856.

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 #20-06 black/black texture finish.

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.

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

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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.

DOOR LOCK LH REAR CAB COMPARTMENT

The left hand side rear compartment shall feature a power door lock actuator.

DOOR LOCK RH REAR CAB COMPARTMENT

The right hand side rear compartment shall feature a power door lock actuator.

POWER DOOR LOCK COMPARTMENT ACTIVATION

The power door lock feature shall include activation for exterior compartment door locks through the key fob, keypads and through a virtual switch on the multiplex display.

GRAB HANDLES

The cab shall include one (1) 24.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The grab handle shall be made of 14 gauge 304- stainless steel and be 1.25 inch diameter to enable non-slip assistance with a gloved hand.

REARVIEW MIRRORS

Ramco model 6015-CCR bus style mirrors shall be provided. The mirror heads shall be polished cast aluminum and shall measure 9.75 inches wide X 13.00 inches high. The mirrors shall be mounted one (1) on each front cab corner radius below the windshield with 15.00 inch long polished cast aluminum arms.

The mirrors shall feature an upper remote controlled flat glass and a lower remote adjustable convex glass. The mirror control switches shall be located within easy reach of the driver. The mirrors shall be manufactured using the finest quality non-glare glass and shall feature a rigid mounting thereby reducing vibration. The mirrors shall be corrosion free under all weather conditions

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.

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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

All cab exterior nameplates shall be "SHIPPED LOOSE" to SVI.

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.

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

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The starting system shall include battery jumper studs. These studs shall be located rear face of the left hand battery tray. 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 1200 Pump Plus battery conditioner shall be supplied. The battery conditioner shall be mounted in the cab in the LH rear facing outer seating position.

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.

AUXILIARY AIR COMPRESSOR

A Kussmaul Pump 12V air compressor shall be supplied. **The air compressor shall be installed behind the driver's seat on a temp mount by Spartan, and SVI shall re-locate it to the inside cab wall behind the drivers 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 and centered **over the wheel well to match the previous job.**

ELECTRICAL INLET CONNECTION

The electrical inlet shall be connected to the battery conditioner.

ELECTRICAL INLET COLOR

SVI Trucks

The electrical inlet connection shall include a red cover.

HEADLIGHTS

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

FRONT TURN SIGNALS

The front fascia shall include two (2) Whelen model 600 4.00 inch X 6.00 inch programmable LED amber turn signals which shall be installed in a chrome bezel outboard of the front warning and headlamps.

HEADLIGHT LOCATION

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

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.

GROUND LIGHTS

Each door shall include one (1) On-Scene brand Night Axe LED strip model ground light mounted to the underside of the cab step below each door. The ground light shall be mounted in a polished aluminum bezel. The ground lighting shall be activated by the opening of the respective side door, respective side turn signal, when the parking brake is set, as well as being activated 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.

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.

SIDE SCENE LIGHTS

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The side of the cab shall include two (2) Whelen model 810 scene lights, one (1) each side which shall be surface mounted. The Whelen lights shall offer halogen lighting with 8 to 32-degree internal optics.

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.

MAP LIGHTS

A Sunnex swivel map light shall be provided. The light shall have a clear lens and a control switch on the base. The light shall be mounted on the overhead HVAC cover on the right hand side.

CAB SPOTLIGHTS

DELETED. REPLACED BY SVI GO-LIGHT.

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.

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HEADLIGHT FLASHER

An alternating high beam headlight flashing system shall be installed into the high beam headlight circuit which shall allow the high beams to flash alternately from left to right.

Deliberate operator selection of high beams will override the flashing function until low beams are again selected. Per NFPA, these clear flashing lights will also be disabled "On Scene" when the park brake is applied.

HEADLIGHT FLASHER SWITCH

The flashing headlights shall be activated through a virtual button on the Vista display and control screen.

INBOARD FRONT WARNING LIGHTS

The cab front fascia shall include two (2) Whelen 600 series Super LED front warning lights in the left and right inboard positions. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. 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 blue on the left and red on the right side.

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) Whelen 600 series Super LED intersection warning lights, one (1) each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

INTERSECTION WARNING LIGHTS COLOR

The intersection lights shall be red/blue vertical split with a clear lens. The intersection lights located on the left side shall be red forward and the intersection lights on the right side shall be blue forward.

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) Whelen 900 series Super LED warning lights, one (1) on each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the sides of the cab within a chrome bezel.

SIDE WARNING LIGHTS COLOR

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The warning lights located on the side of the cab shall be blue/blue on the left side and red/red on the right side.

SIDE WARNING LIGHTS LOCATION

The warning lights on the side of the cab shall be mounted above the “B” pillar in the highest available position.

AUXILIARY SIDE WARNING LIGHTS

The cab side shall include an auxiliary set of Whelen 600 series 4.00 inch tall X 6.00 inch wide Super LED warning lights, one (1) each side, which shall feature fourteen (14) flash patterns plus a steady burn for solid colors and twenty (20) flash patterns plus a steady burn for split colors. The lights shall be surface mounted within a chrome bezel.

AUXILIARY SIDE WARNING LIGHTS COLOR

The auxiliary warning lights located on the left hand side of the cab shall be red and the auxiliary warning lights located on the right hand side of the cab shall be blue.

AUXILIARY SIDE WARNING LIGHTS LOCATION

The auxiliary warning lights on the side of the cab shall be mounted over the front wheel well, above the electrical inlet, and directly over the center of the front axle

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.

HORN BUTTON SELECTOR SWITCH

A virtual button on the Vista display and control screen shall be provided to allow control of either the electric horn or the air horn from the steering wheel horn button. The electric horn shall sound by default when the selector switch is in either position to meet FMCSA requirements.

AIR HORN ACTIVATION

The air horn activation shall be accomplished by the steering wheel horn button and a left hand side Linemaster model SP491-S81 foot switch for the driver and a black momentary push button on the switch panel. 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 a black push button in the switch panel on the dash. A black push button siren brake control shall be provided in the switch panel on the dash.

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

ELECTRONIC SIREN AUXILIARY ACTIVATION

The electronic siren shall include pre-wiring for activation by a left hand side foot switch outboard of the air horn foot controller.

BACK-UP ALARM

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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.

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
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 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 The 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 LAMP

High Beam Indicator

WHITE LAMP

Wait to Start-indicates active engine air preheat cycle

AUDIBLE ALARMS FROM GAUGE PACKAGE

High Trans Temp
High or Low Voltage
Check Engine
Check Transmission
Stop Engine
Low Air Pressure
Fuel Low
Water in Fuel

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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
Seatbelt Indicator

EXTERNAL AUDIBLE ALARM

Air Filter
Cab Ajar
Door Ajar
Check Engine
Stop Engine
Low Air Pressure
Water in Fuel
*Low DEF
ABS System Fault
Seatbelt Indicator

*Items marked with an asterisk are provided only in applicable configurations.

BACKLIGHTING COLOR

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

RADIO

A Panasonic radio with weather band, AM/FM stereo receiver, compact disc player, with and (4) speakers shall be installed in the cab wired battery direct. The radio shall be installed above the officer 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.

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 and officer a clear view of the rear to the vehicle and two (2) teardrop shaped cameras with a chrome plated plastic housing shall be mounted one (1) on the drivers side, and one (1) on the officer side of the cab below windshield ahead of the front door at approximately the same level as the cab door handle.

The cameras shall be wired to dual Weldon Vista displays which shall be located on the driver and officer sides of the dash. The rear camera shall activate when the transmission is placed in reverse and the right camera shall activate with the right side turn signal. Each camera shall also be activated by a button on the Vista displays.

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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. The rear wall shall also include a removable plastic film installed on the exterior surface of the cab to protect the finish during transport.

FIRE EXTINGUISHER

A 2.50 pound D.O.T approved fire extinguisher with BC rating shall be installed by SVI with the cab.

ROAD SAFETY KIT

The cab and chassis shall include one (1) emergency road safety triangle kit.

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

The following manuals specific to the engine and transmission models ordered will be included with the chassis in the ship loose items:

- (1) Digital copy of the Engine Owner's manual
- (1) Digital copy of the Transmission Operator's manual
- (1) Hard copy of the Engine Operation and Maintenance manual with CD

CAB/CHASSIS AS BUILT WIRING DIAGRAMS

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

FRONT BUMPER

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

BUMPER GRAVELSHIELD

The bumper extension gravel shield shall be provided by the cab/chassis manufacturer.

BUMPER PRE-CONNECT COMPARTMENT

The bumper extension shall have one (1) flat lid fire hose pre-connect compartment in center. 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 stainless steel **LOCKING** D-ring handle. The fire hose swivel connection shall be located inside compartment. 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. There shall be one (1) 9" OnScene LED type ground light mounted inside the bumper.

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

AIR HORN(S)

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

EXHAUST DIVERTER

An exhaust diverter valve shall be located in-line of exhaust tubing and controlled from driver's position to re-route exhaust discharge. Exhaust diverter valve shall be constructed from 14 gauge stainless steel material with air actuated control.

As a default, the exhaust shall always discharge to streetside just ahead of rear wheels without movement of the diverter when the ignition is turned on, and when the pump is engaged the exhaust shall discharge to curbside just ahead of rear wheels.

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

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

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

DOCKING STATION INSTALLATION

There shall be two (2) Surprise Fire Department supplied Havis #LPS-101 docking stations mounted on backside of the engine tunnel.

Docking stations shall be installed per manufacturer's requirements and wired battery direct for proper 12 volt power and ground. Antennas shall be labeled and wired to cab roof per antenna layout.

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Two (2) power supplies and cellular antennas shall be provided and installed for above docking stations.

12 VDC FUSE BLOCK

There shall be two (2) 100 amp Blue Sea Systems ST Series blade type fuse block with screw type terminals for both positive and negative buss with cover provided for distribution of up to six (6) 30 amp, 12 VDC circuits. Fuse block shall be located per required circuits and be protected from damage.

The terminal blocks will be located on the rear edge of the engine tunnel under the mounting platform and under the rear forward facing seat box located in such a manner that is it easy to access.

FIVE (5) POSITION ANTENNA RAIL

Two (2) 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 10' 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 labeled and routed to radio mounting locations, or as determined by the Surprise Fire Department.

Antenna rail shall be powder coated white.

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

Locations as follows;

Rail #1

- #1. MCT-AVL Puck (to be routed down street-side "B" pillar to behind driver's seat)
- #2. MCT-Antenna (to be routed down street-side "B" pillar to behind driver's seat)
- #3. Mobile 800 (to be terminated at the center cab dash) **Tied to David Clark System**
- #4. Mobile 150 (to be terminated at the center cab dash) **Tied to David Clark System**
- #5. **To terminate under dash marked "spare".**

NOTE: SVI to install both the 800 and the 150 radios.

Rail #2

- #6. AVL-Antenna (to be routed down curb-side "B" pillar to behind officer's seat)
- #7. AVL Puck (to be routed down curb-side "B" pillar to behind officer's seat) *F.D. to provide the two (2) AVL Puck Antennas.
- #8. **Terminate behind the curbside "B" post. Mark "spare".**
- #9. **Route to the docking station #1. Terminate at the "B" pillar behind driver's seat.**
- #10. **Route to the docking station #2. Terminate at the "B" pillar behind driver's seat.**

DOOR LOCK PROGRAMMING

The Spartan supplied cab door locks shall be programmed with **"7601"** prior to delivery.

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.

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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.

ENGINE TUNNEL ACCESSORY PLATFORM

There will be a 3/16" smooth aluminum deck painted gray with a hammer tone finish located on top of the engine tunnel. The platform will extend from the bottom edge of the center switch panel to the map box of the engine tunnel. The platform will be mounted to that it provides a level surface for FD supplied items.

The platform will feature two (2) cup holders, one each side within easy reach of the of the front seats and match the last fire engine.

Install radios #3 and #4 (800 and 150) here and in rail #1.

MAP BOX

A map box shall be provided in the cab with an open top and as deep as possible. 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 gray textured powder coat paint finish for durability and finished appearance.

The map box shall be designed to match previous fire engine #856.

The mapbox will feature two (2) cup holders one each side and and small stoage bin between the cup holders.

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

CUP HOLDERS

There will be two (2) cup holder located at the rear cab corners about 18" from floor for the forward facing crew seats, one (1) each side within easy reach while seated.

CREW STORAGE BINS

There will be two (2) storage bins located on the back wall of the cab, one (1) each side of the rear forward facing seats. The bottom of the bin will be even with the bottom of the rear wall vinyl cover.

The bins will be approximately 4" x 8" x 4". Each bin will be equally divided in two sections.

The bins will be fabricated from smooth aluminum and will be powder coated gray with a hammer tone finish.

SVI Trucks

TRASH CAN HOLDER

A trash can holder shall be provided and located behind driver seat full width of area. The trash can holder shall be fabricated from smooth aluminum and will be powder coated gray with a hammer tone finish.

EMS MASK HOLDER

An EMS mask holder shall be provided and located between the crew forward face seats. The EMS mask holder shall be fabricated from smooth aluminum and will be powder coated gray with a hammer tone finish.

VEST HOLDERS/GEAR HOOKS

Vest holders shall be provided on front cab doors and total of ten (10) gear hooks shall be provided inside cab (same as #856).

REAR CREW AIR CONDITIONING

A Bus-Air model BA-BALP60-2BKIT, 12 VDC ceiling mount evaporator shall be provided and installed fully connected and charged with refrigerant. The air conditioner lines shall be a mixture of custom bent zinc coated steel fittings and Bus-Air Goodyear hose with Attco or Burgaflex EZ-Clip fittings.

The system will be controlled from the rear crew area of the cab. Additional vents shall be added into the Spartan provided A/C plenum at the driver and officer positions.

A/C cover shall be painted Zolatone Black.

SIX (6) – LED TIRE PRESSURE VISUAL INDICATORS

Each tire shall be equipped with a VECSAFE heavy duty valve cap (or equal) LED indicator that indicates proper tire pressure.

HELMET STORAGE

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

CAB WINDOW TINT

The cab side windows shall be provided with an after market "limo" tint.

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:

66) European Occupant Protection Standard ECE Regulation No. 29.

67) SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.

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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.

TOE KICK TRIM PROTECTION

Brushed stainless steel toe kick protection shall be provided in the following locations;

Six (6) total, one (1) at each Zolatone painted foot well at each cab door
One (1) on the face of the rear cab forward facing seat box
One (1) on all the surface area below and to the right of the officer's glove box
Four (4) panels and a 1" x 1" angle on the top of the glove box
Two (2) at bottom of the rear facing seats (SVI install).

HUB AND NUT COVERS

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

SHOP NOTES

List: \$233,923.00

Discount: 11% (+2% Additional Don A.)

Cost: \$204,614.00 (2013 unit \$198,634.00)

F. Axle Weight: 15,177

R. Axle Weight: 5,317

CAB TO AXLE DIMESION

Cab to axle will be 126".

CAB/CHASSIS PREPAYMENT

The specified cab/chassis shall be prepaid by Surprise Fire Department within 30 days of invoice. Surprise Fire Department understands that if payment is made after 30 days, additional interest charges may apply.

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

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- Air conditioning refrigerant . . (if applicable)
- Air conditioning lubrication oil . . (if applicable)
- Power steering fluid
- Cab tilt mechanism fluid . . (if applicable)
- Transfer case fluid . . (if applicable)
- Equipment rack fluid (if applicable)
- CAFS air compressor system lubricant . . (if applicable)
- Generator system lubricant . . (if applicable)
- Front tire cold pressure
- Rear tire cold pressure
- Maximum tire speed ratings

VEHICLE DATA PLATE

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

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

OVERALL HEIGHT, LENGTH DATA PLATE (US)

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

The label shall show the height of the completed 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

SVI Trucks

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.

FINAL STAGE MANUFACTURER VEHICLE CERTIFICATION

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

FRONT BUMPER

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

BUMPER GRAVELSHIELD

The bumper extension gravel shield shall be provided by the cab/chassis manufacturer.

BUMPER PRE-CONNECT COMPARTMENT

The bumper extension shall have one (1) flat lid fire hose pre-connect compartment in center. The compartment shall be as large as room allows. Compartment door shall be 1/8" NFPA compliant aluminum tread plate with a stainless steel hinge wrapped with vinyl and a stainless steel **LOCKING** D-ring handle. The fire hose swivel connection shall be located inside compartment. 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. There shall be one (1) 9" OnScene LED type ground light mounted inside the bumper.

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

AIR HORN(S)

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

EXHAUST DIVERTER

An exhaust diverter valve shall be located in-line of exhaust tubing and controlled from driver's position to re-route exhaust discharge. Exhaust diverter valve shall be constructed from 14 gauge stainless steel material with air actuated control.

As a default, the exhaust shall always discharge to streetside just ahead of rear wheels without movement of the diverter when the ignition is turned on, and when the pump is engaged the exhaust shall discharge to curbside just ahead of rear wheels.

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

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

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

SHOP NOTES

Diverter to route exhaust to curb side when pump is engaged. When in normal driving operations exhaust will be routed to the street side

DOCKING STATION INSTALLATION

There shall be two (2) Surprise Fire Department supplied Havis #LPS-101 docking stations mounted on backside of the engine tunnel.

Docking stations shall be installed per manufacturer's requirements and wired battery direct for proper 12 volt power and ground. Antennas shall be labeled and wired to cab roof per antenna layout.

Two (2) power supplies and cellular antennas shall be provided and installed for above docking stations.

12 VDC FUSE BLOCK

There shall be two (2) 100 amp Blue Sea Systems ST Series blade type fuse block with screw type terminals for both positive and negative buss with cover provided for distribution of up to six (6) 30 amp, 12 VDC circuits. Fuse block shall be located per required circuits and be protected from damage.

The terminal blocks will be located on the rear edge of the engine tunnel under the mounting platform and under the rear forward facing seat box located in such a manner that is it easy to access.

Spartan will temporarily mount the Kussmaul Pump Plus inside the cab. SVI to permanent mount behind the drivers seat on the inside cab wall.

~~FIVE (5) POSITION ANTENNA RAIL~~

~~Two (2) 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 10' 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 labled and routed to radio mounting locations, or as determined by the Surprise Fire Department.~~

Antenna rails shall be installed outboard of the light shroud.

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

~~Locations as follows;~~

~~Rail #1~~

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- ~~#1. MCT-AVL Puck (to be routed down street-side "B" pillar to behind driver's seat)~~
- ~~#2. MCT-Antenna (to be routed down street-side "B" pillar to behind driver's seat)~~
- ~~#3. Mobile 800 (to be terminated at the center cab dash)~~
- ~~#4. Mobile 150 (to be terminated at the center cab dash)~~
- ~~#5. To be determined.~~

Rail #2

- ~~#6. AVL-Antenna (to be routed down curb-side "B" pillar to behind officer's seat)~~
- ~~#7. AVL Puck (to be routed down curb-side "B" pillar to behind officer's seat) *F.D. to provide the two (2) AVL Puck Antennas.~~
- ~~#8. To be determined.~~
- ~~#9. To be determined.~~
- ~~#10. To be determined.~~

SHOP NOTES

~~Antenna Rails will be powder coated black for trucks that are any color other than white. If the truck is white the antenna rail will be powder coated white. The rails can be custom wet painted by picking that option.~~

DOOR LOCK PROGRAMMING

The Spartan supplied cab door locks shall be programmed with "07601" prior to delivery.
The authorization code is: "14250".

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.

SHOP NOTES

Available on Custom cab/chassis and only IH cab/chassis at this time. Must select an SVI installed system to meet NFPA, if available.

ENGINE TUNNEL ACCESSORY PLATFORM

There will be a 3/16" smooth aluminum deck painted gray with a hammer tone finish located on top of the engine tunnel. The platform will extend from the bottom edge of the center switch panel to the map box of the engine tunnel. The platform will be mounted to that it provides a level surface for FD supplied items.

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The platform will feature two (2) cup holders, one each side within easy reach of the of the front seats and match the last fire engine.

MAP BOX

A map box shall be provided in the cab with an open top and as deep as possible. 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 gray textured powder coat paint finish for durability and finished appearance.

The map box shall be designed to match previous fire engine #856.

The mapbox will feature two (2) cup holders one each side and and small stoage bin between the cup holders.

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

CUP HOLDERS

There will be two (2) cup holder located at the rear cab corners about 18" from floor for the forward facing crew seats, one (1) each side within easy reach while seated.

CREW STORAGE BINS

There will be two (2) storage bins located on the back wall of the cab, one (1) each side of the rear forward facing seats. The bottom of the bin will be even with the bottom of the rear wall vinyl cover.

The bins will be approximately 4" x 8" x 4". Each bin will be equally divided in two sections.

The bins will be fabricated from smooth aluminum and will be powder coated gray with a hammer tone finish.

TRASH CAN HOLDER

A trash can holder shall be provided and located behind driver seat full width of area. The trash can holder shall be fabricated from smooth aluminum and will be powder coated gray with a hammer tone finish.

EMS MASK HOLDER

An EMS mask holder shall be provided and located between the crew forward face seats. The EMS mask holder shall be fabricated from smooth aluminum and will be powder coated gray with a hammer tone finish.

VEST HOLDERS/GEAR HOOKS

Vest holders shall be provided on front cab doors and total of ten (10) gear hooks shall be provided inside cab (same as #856).

Protective material shall be wrapped around the knuckle guard of the steering shaft under the steering wheel to protect any item of clothing from getting caught in it.

A protective kickplate shall be installed in front of the windshield washer reservoir in cab step area to prevent any damage from kicking it.

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REAR CREW AIR CONDITIONING

A Bus-Air model BA-BALP60-2BKIT, 12 VDC ceiling mount evaporator shall be provided and installed fully connected and charged with refrigerant. The system will be controlled from the rear crew area of the cab.

SPARTAN OVERHEAD MODIFICATION

Additional vents shall be added into the Spartan provided A/C plenum at the driver and officer positions.

SHOP NOTES

Contact Tony at Bus Air for components and to arrange for them to come and install the unit.

SIX (6) – LED TIRE PRESSURE VISUAL INDICATORS

Each tire shall be equipped with a VECSAFE heavy duty valve cap (or equal) LED indicator that indicates proper tire pressure.

HELMET STORAGE

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

CAB WINDOW TINT

The cab side windows shall be provided with an after market "limo" tint.

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:

68) European Occupant Protection Standard ECE Regulation No. 29.

69) 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.

SVI to be sure to check all the air hose intake clamps to be certain that they are all tightened securely.

TOE KICK TRIM PROTECTION

Brushed stainless steel toe kick protection shall be provided in the following locations;

Six (6) total, one (1) at each Zolatone painted foot well at each cab door

One (1) on the face of the rear cab forward facing seat box

SVI Trucks

One (1) on all the surface area below and to the right of the officer's glove box

Four (4) panels and a 1" x 1" angle on the top of the glove box

Two (2) on the rearward facing crewcab seat box, and (2) additional ones shall be "shipped loose" for SFD to install on the rearward facing crew cab seat boxes.

HUB AND NUT COVERS

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

STEP CAB KICKPLATES

There shall be aluminum treadplate kickplates installed on the cab step risers to protect the painted finish. (SVI to install if Spartan does not install). Will need to confirm after delivery of chassis.

MUDFLAPS

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

AIR BRAKE SYSTEM QUICK BUILD-UP

The air brake quick build-up system shall be supplied from the cab/chassis manufacturer.

The quick buildup system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the 60-second buildup time.

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.

FUEL FILL

There shall be one (1) fuel fill door located in the curbside 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.

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.

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The fabrication of the body shall be formed sheet metal. Formed components shall allow the Surprise 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 Surprise 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.

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

SVI Trucks

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

ROOF CONSTRUCTION

The roof shall be integral with the body and shall be all welded construction. The roof of the body shall not be less than 3/16" aluminum 3003H-14 alloy NFPA nonskid compliant 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.

BODY SUBFRAME

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

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

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

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

BODY MOUNTING

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

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

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14" REAR STEP BUMPER

The full width rear bumper 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 14" and provide a rear step with a minimum of 1/2" space at body for water drainage.

REAR TOW EYES

There shall be two (2) heavy duty rear mounted tow eyes securely attached to the body subframe, below 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" Night Axe LED lights installed below bumper capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

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

WHEEL WELL EXTERIOR PANEL

The exterior panel of the body wheel well enclosure shall be constructed from 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.

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 four (4) SCBA cylinder storage compartments located, two (2) on each side of body in the rear wheel well area. Each compartment shall be capable of storing two (2) SCBA cylinders (60 min cylinders). Each tube shall allow the storage of an SCBA cylinder up to 7-1/2" in diameter. Each compartment shall have a vertically hinged door with a positive catch latch installed and painted primary lower body color. The door shall activate the "Hazard Warning Light" in the cab when not in the closed position. Bottles are MSA H45 Low Profile model # 10127945

SHOP NOTES

Bottles are MSA H45 Low Profile # 10127945

SVI to modify all the drawer stops to match the previous unit.

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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.

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;

- 70) Clean bare metal using a solvent base wax & grease remover.
- 71) Finish all exterior body seams as necessary, followed by a thorough sanding of all bare metal to be painted.
- 72) Re-clean bare metal using a solvent base wax & grease remover.
- 73) 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.
- 74) Primer Filler Coat - PPG Delfleet® Evolution urethane build primer to achieve total thickness of 3.0-6.0 mills DFT after sanding.
- 75) 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.
- 76) 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.
- 77) 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

SVI Trucks

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 nuts 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.

BODY UNDERCOATING

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

UNDERCOAT WARRANTY

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

PAINT WARRANTY

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

COMPARTMENT INTERIOR FINISH

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

REFLECTIVE STRIPE REQUIREMENTS

Material

All retroreflective materials shall conform to the requirements of ASTM 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.

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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.

GRAPHICS PROOF

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

REFLECTIVE STRIPE - CAB SIDE

The reflective stripe material shall be 6" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be white in color.

REFLECTIVE STRIPE - BODY SIDES

The reflective stripe material shall be 6" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be white in color.

The stripe shall extend straight from front of cab, then ahead of the rear wheels, it shall form an "S" shape and extend straight back to the rear of the body. The "S" portion of the stripe shall remain a solid color.

CHEVRON REFLECTIVE STRIPE - REAR SIDES PANELS

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

The rear side panels only of the body shall have a Chevron style reflective stripe layout, and cover as much of the rear side panels as possible. Each chevron panel shall be a full sheet and shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panel shall have a minimum 10 year warranty for material failure, and colorfastness.

The stripe material shall be 3M Diamond Grade.

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

LETTERING

GRAPHICS PROOF

SVI Trucks

A color graphics proof of the lettering layout shall be provided for approval by Surprise Fire Department prior to installation. The graphics proof shall be submitted to Surprise 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.

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

SIDE CAB DOOR LETTERING

There shall be eight (8) 9" high reflective letters furnished and installed on the rear cab doors.

"E303"

- This reflective lettering shall be gold in color.

UPPER BODY SIDE LETTERING

There shall be thirty four (34) 8" high reflective letters furnished and installed on the vehicle.

"SURPRISE FIRE DEPT."

- This reflective lettering shall be gold in color.

There shall be forty two (42) 5" high reflective letters furnished and installed on the rear side roll-up doors.

"Always There
Always Ready"

- This reflective lettering shall be white in color.

REAR BODY LETTERING

There shall be four (4) 6" high reflective letters furnished and installed on curbside of vehicle.

E
3
0
3

- This reflective lettering shall be gold in color.

FRONT OF CAB LETTERING

There shall be four (4) 6" high reflective letters furnished and installed on center of bumper.

"E303"

- This reflective lettering shall be gold in color.

There shall be sixteen (16) 3" high reflective letters furnished and installed on the vehicle.

SVI Trucks

"SURPRISE FIRE DEPT." - Above grille.

- This reflective lettering shall be gold in color.

CAB ROOF LETTERING

There shall be four (4) 22" high reflective letters furnished and installed on the cab roof.

"E303"

- This reflective lettering shall be black in color.

DECAL LOGO - 12"

Four (4) custom decals shall be provided and installed on the front cab doors. The decals will match the Surprise Fire Department design.

PARAMEDIC STAR OF LIFE DECAL

Four (4) reflective star of life decals shall be provided and install on S2/C2 roll-up doors. The decal will have the lettering of "PARAMEDIC" within the center of the decal. The layout will match the current Fire Department units.

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

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- 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.

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)

FOUR (4) UPPER BODY COMPARTMENTS (INDIVIDUAL)

There shall be four (4) compartments parallel to the sides of the body, two (2) on each side. Each of these compartments shall be 79.0" long x 23.0" wide x 18.5" deep. The side compartments shall be open under each door sill to allow for long equipment. Each compartment shall be integral with the body construction, and will not be bolted or add-on modules. The outside walls of each compartment will be double walled to prevent equipment from denting the outside painted surface.

Each compartment shall have a lift-up type compartment door hinged on the outboard side. Each door shall be fabricated from 3/16" aluminum tread plate. Each door shall have two (2) pneumatic type cylinders, one (1) at each end, attached to cast aluminum brackets mounted to the interior surface of the door to hold the door in both the opened and closed

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positions. Each door shall be mounted using 16" long, equally spaced, 14 gauge stainless steel hinges, with 1/4" stainless steel pin. A polyester barrier film gasket shall be placed between stainless steel hinge and the body mounting surface as necessary to prevent corrosion caused by dissimilar metals.

Each compartment door shall overlap a 2" vertical lip on the body roof to prevent entry of moisture and sealed with automotive type rubber molding to provide a weather resistant seal.

Each compartment shall have a 13/16" drain hole located in floor of compartment with a 1" flexible drain tube that terminates below body.

Each compartment shall have a horizontally mounted OnScene Solutions LED Night Stik on the underside of the door. The light and NFPA Door Ajar System shall be automatically activated by an individual switch per compartment.

Each compartment will have a locking D-handle on the top face of the door.

SHOP NOTES

Each compartment will have a locking D-handle on the top face of the door near the 7" chrome handle.

Each door will have a manual keyed style lock. They will be keyed to lock #1250.

BODY WIDTH DIMENSIONS

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

<u>Area Description</u>	<u>Dimension</u>
Compartment Depth	
• Above Frame	30" min. streetside, 12" min. curbside
– Below Frame	22" min.

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.
- The roll-up doors shall be equipped with an electric power lock system. All doors shall be locked or unlocked with activation from a single switch located in the cab.
- 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.

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COMPARTMENT LAYOUT

- There will be horizontally mounted aluminum shelf-trac on the right side of vertical partition gear area to hold hooks for the gear. This trac will be a approximately 12" from the top of the compartment.
- 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.
- 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 panel shall have 1/4" holes on a 1" grid for mounting of tool brackets.
 - Each tool board will be bolted to compartment floor.
- There shall be one (1) bolt-in vertical compartment partition(s) dividing the compartment into left and right sides.
- There shall be three (3) headset style "J" hook(s) for hanging gear.
- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.
- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.
- There shall be one (1) 100 amp Blue Sea Systems ST Series blade type fuse block with screw type terminals for both positive and negative buss with cover provided for distribution of up to six (6) 30 amp, 12 VDC circuits. Fuse block shall be located in upper compartment just inside the door opening and be protected from damage.

SHOP NOTES

Locate on forward wall

- The controls for the specified light tower will be mounted on the forward wall below the Streamlight Litebox.

SHOP NOTES

Mounted on forward wall below the LiteBox

- The Streamlight LightBox will be mounted on the forward wall above the Command Light controller and accessible from the ground.

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.

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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.
- The roll-up doors shall be equipped with an electric power lock system. All doors shall be locked or unlocked with activation from a single switch located in the cab.
- 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) 150 lbs. slide out and down tray(s) 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". Note: Adjust stops on trays.

SHOP NOTES

24"D

- The lower tray shall have two (2) Zico KD-UN-6SFPHS walkaway type SCBA air pack brackets with "V" type clip and strap assembly to hold SCBA in place. Brackets need to bolt onto tray at 7-1/4" and 14-3/4" to fit properly. SFD to provide the correct spring clip location at PCM.

SHOP NOTES

KD-UN-6SFPHS "V" clip mounted in lower out/down tray evenly spaced

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

STREETSIDE COMPARTMENT - REAR (S3)

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.

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- The roll-up doors shall be equipped with an electric power lock system. All doors shall be locked or unlocked with activation from a single switch located in the cab.
- 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 three (3) adjustable shelf/shelves approximately 22" deep on left side of vertical partition. 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 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 on the sides and rear to provide a 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 Lista Tool Cabinet will be mounted to the tray.

SHOP NOTES

Lista tool box mounted to tray. No front lip

- There shall be two (2) 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 panel shall have a 1/4" holes on a 1" grid for mounting of tool brackets.
 - 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.
- One (1) Lista drawer cabinet, model NS450 series shall be provided in compartment. The Lista cabinet shall be 16-7/8" wide x 16" high x 22-1/2" deep. Cabinet shall have four (4) individual locking drawers as follows; one (1) 2", one (1) 3" with dividers, one (1) 4" with dividers, and one (1) 5". The cabinet shall be red in color with light gray drawers.
- The top surface of the toolbox shall be covered to create a work surface to match previous job #856.

SHOP NOTES

CL300 No base 16"h x 22.5"w x 22.5"d

(1) CL-RT Retainer Top with Mat

(1) CL75H Drawer

(1) CL100N Drawer

(1) CL125 Drawer

Color Red with Gray Drawers

IDL Drawer Locks

(1) CLDR206-75 Divider Sets

Same as #856, per/ Bob Bruehl
Lista part# NS-0450-RT

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(1) CLDR316-100 Divider Set

- 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 64" Access LED compartment lights, vertically mounted.

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.
- The roll-up doors shall be equipped with an electric power lock system. All doors shall be locked or unlocked with activation from a single switch located in the cab.
- 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 horizontally mounted aluminum Shelf-Trac 1" thick for specified component installation above frame. The vertically mounted aluminum Shelf-Trac below the frame rail is to be bolted in to place for easy removal.
- One (1) 14" x 14" mount plate shall be provided for SFD supplied TIC charger located in upper compartment on back wall and rearward of SCBA mount on adjustable horizontal Trac.
- There shall be one (1) adjustable shelf 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 with the front lip facing down. Rubber Maid jug shall be located on shelf and not interfere with axe and SCBA mounting.
- 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 edge. Adjusting brackets need to mount to the topside of this shelf to allow for SFD supplied Medi-Redi drug cooler on bottom side.
- There shall be one (1) Zico KD-UN-6SFPHS walkaway type SCBA air pack bracket(s) with high cycle coated spring clips and angled foot plate with strap. SFD to provide the correct spring clip location at PCM.
- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).

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- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.
- There shall be one (1) 100 amp Blue Sea Systems ST Series blade type fuse block with screw type terminals for both positive and negative buss with cover provided for distribution of up to six (6) 30 amp, 12 VDC circuits. Fuse block shall be located on the C1/C2 wall above the 14" D fixed shelf and protected from damage.

SHOP NOTES

Locate on C1/C2 wall above the fixed 14"D shelf

- There will be room for a Surprise Fire Department supplied and installed Medi-Reday drug cooler located in the lower portion of the compartment.

SHOP NOTES

There will be room for two (2) Fire Department supplied and installed Medi-Reday drug coolers to be installed. The coolers will be located in the lower portion of the compartment.

CURBSIDE COMPARTMENT - ABOVE REAR WHEEL (C2)

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.
- The roll-up doors shall be equipped with an electric power lock system. All doors shall be locked or unlocked with activation from a single switch located in the cab.
- 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 horizontally mounted aluminum Shelf-Trac 1" thick for specified component installation.

SHOP NOTES

1" thick mount horizontally on back wall for Zico SCBA brackets

- There shall be two (2) Zico KD-UN-6SFPHS walkaway type SCBA air pack brackets with "V" type clip and strap assembly to hold SCBA in place. SFD to provide the correct spring clip location at PCM.

SHOP NOTES

Ziamatic KD-UN-6SFPHS with "V" clip and strap

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- There will be one (1) Streamlight LiteBox mounted on the forward wall, mid height.

SHOP NOTES

Mounted on C2/C1 wall

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

CURBSIDE COMPARTMENT - REAR (C3)

The interior useable compartment width shall be approximately 59.0" wide. **Provide 1" additional depth in lower compartment to properly stow SFD supplied equipment.**

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.
- The roll-up doors shall be equipped with an electric power lock system. All doors shall be locked or unlocked with activation from a single switch located in the cab. The roll-up doors shall be equipped with an electric power lock system. All doors shall be locked or unlocked with activation from a single switch located in the cab on curbside rear wall below the storage bins. The lock will be programmed to lock automatically at all times. The switch shall unlock compartment C3 for ten (10) seconds then re-lock automatically.
- 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 14" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 1" vertical flange along the front and rear edges.
- There shall be two (2) adjustable shelf/shelves approximately 24" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 1" vertical flange along the front and rear edge.
- 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 64" Access LED compartment lights, vertically mounted.

REAR COMPARTMENT - CENTER (RC1)

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

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The rear center compartment shall start at the bottom of the body and extend up to bottom of hose bed, and extend as deep as possible up to fuel tank allowing for body mounts.

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 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.
- The roll-up doors shall be equipped with an electric power lock system. All doors shall be locked or unlocked with activation from a single switch located in the cab.
- 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 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) 400 lbs. slide-out tray(s) approximately 30" deep and as wide as the compartment layout or door opening permits. The tray top shall be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length. The tray assembly shall utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions

The tray to hold a FD supplied ventilation fan, and three (3) PVC tubes for FD supplied fire extinguishers. The PVC tube will be a minimum 7.5" in diameter and 8" tall.

SHOP NOTES

Tray to have a 1" lip to divider for storage of FD ventilation fan.

there will be three (3) PVC tubes min 7.5" diameter to hold extinguishers

- Two (2) backboards will be stored in the upper portion of the compartment towards the streetside with a Velcro strap to hold in place. They will extended partially in to the water tank area. The backboards are NAJO Redi-Hold model #NB1100.

SHOP NOTES

Upper street side of compartment

Make: NAJO Redi-Hold Model NB1100

- Two (2) OnScene 42" Access LED compartment lights, vertically mounted.

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LADDER STORAGE, CURBSIDE REAR

There will be a ladder storage compartment located on the curbside rear of the apparatus. The compartment will be located behind the upper portion of the curb side compartments.

Access to the compartment shall be from a rear facing inboard vertically hinged compartment door. The door shall be fabricated from 3/16" smooth aluminum with full length 14 gauge stainless steel hinge, with 1/4" stainless steel pin, a 6" stainless steel LOCKING "D" ring handle keyed to #1250. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary to prevent corrosion. Door shall overlap body surface to prevent entry of moisture and sealed with automotive type rubber molding to provide a weather resistant seal.

Compartment shall have a flush mounted light near door opening that will be automatically activated when door is opened, and wired to compartment door ajar warning light provided in cab.

Devices to secure equipment, compartment dividers, or UHMW plastic angles, or sheeting will be used for storage of specified equipment as required to prevent damage to equipment.

Retaining straps shall be installed to hold the ladders in place.

Provide a footman loop between ladder door and RC1 door to secure LDH hose.

The compartment will be designed to store the following equipment **and labeled** accordingly;

SHOP NOTES

Ladders are to be stored on edge. Door is vertically hinged towards the inboard. There does not need to be any gas struts or door stays.

6" locking stainless steel locking "D" ring handle keyed to #1250.

- One (1) Nupla 8' trash/arson hook(s) and proper mount to hold without hitting door. Pike pole(s) shall be supplied by contractor with completed unit. See equipment section.
- 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) Akron pike poles, one (1) 6', and one (1) 8'. Pike poles shall be supplied by contractor with completed unit. See equipment section.

SHOP NOTES

One (1) Akron UT-6 and one (1) Akron UT-8.

SVI to be certain that all the bins for ladder and equipment storage are properly labeled before final inspection.

PLASTIC FLOOR AND SHELF TILE

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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.

NO Plastic Floor Tile installed in Compt C3

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.

3M™ Diamond Grade™ Conspicuity striping shall be provided in the rub rail. The striping shall be red/white in color.

There shall be OSS style rub rails installed onto the runningboards on both sides of the pumphouse.

ROOF ACCESS LADDER

The ladder shall be weld constructed of vertical aluminum extrusion tubing and aluminum grip surface ladder rungs with slip resistant tread grip pattern. It shall be set off from body 8 inches and mounted to body with chrome plated end stanchions bolted to the body with stainless steel bolts. The ladder shall NOT extend above the body roof.

The location shall be on the rear streetside of the apparatus body. There will be a clear area of 17" from the tailboard to the bottom part of the ladder to allow for the hose clamp.

SHOP NOTES

Ladder rails can not extended down to the rear tailboard. Must have 18" of clear area form tailboard to ladder for FD supplied hose clamp that will be mounted under the ladder.

HANDRAILS

There shall be two (2) vertical handrails located, one (1) each side of the front of crosslay, and one (1) vertical handrail located on the curbside rear of the body and centered between the ladder compartment and the Engine Company ID decal. Middle of the handle to be centered with the middle of the door latch. The handrails shall be NFPA compliant 1-1/4" 304 knurled stainless steel with welded end stanchions. The handrail shall be centered with the D-handle of the ladder compartment.

SHOP NOTES

One located on curb side between ladder compartment and RC1

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HOSEBED ACCESS HANDRAIL

There shall be two (2) handrail(s) mounted on the body to assist in access to hose bed area and dunnage areas. The handrail shall be NFPA compliant 1-1/4" 304 knurled stainless steel with welded end stanchions.

- Two (2) handrails shall be located on the upper hose bed doors.

SHOP NOTES

The handrail shall be NFPA compliant 1-1/4" 304 knurled stainless steel with welded end stanchions.

FOLDING STEP(S)

There shall be one (1) Cast Products polished cast aluminum folding step(s) provided and installed on completed vehicle. Each step shall be heavy duty with stainless steel spring and textured step surface meeting NFPA standards. Each step will include integrated upper and lower LED lights.

CAST STEP(S)

One (1) Cast Products SP2014-1B 11" x 14" polished aluminum step(s) with hand hold shall provided and installed on completed vehicle. Step(s) shall have an LED lighting area below step be wired to the headlight circuit of the chassis. Step(s) shall have a textured stepping surface meeting NFPA standards. There shall be a clear opening left under the step to accommodate the Humat water valve and mount. The step shall not interfere with the deployment of the valve.

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.

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*.

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Wiring and Wire Harness Construction

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

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

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

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

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

Circuits shall be provided with properly rated low voltage 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*
- 78) SAE J554, *Electric Fuses (Cartridge Type)*
- 79) SAE J1888, *High Current Time Lag Electric Fuses*
- 80) 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

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

- 81) The propulsion engine and transmission
- 82) All legally required clearance and marker lights, headlights, and other electrical devices except windshield wipers and four-way hazard flashers
 - 1) 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)
 - 2) 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
 - 3) The minimum optical warning system, where the apparatus is blocking the right-of way
 - 4) The continuous electrical current required to simultaneously operate any fire pumps, aerial devices, and hydraulic pumps
 - 5) Other warning devices and electrical loads defined by the purchaser as critical to the mission of the apparatus

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

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

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

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

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

Electromagnetic Interference

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

Wiring Diagram

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

Low Voltage Electrical System Performance Test

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

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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.

The main 12-volt electrical components will be located above the pump panel on the streetside of the apparatus with a removable access panel. There will be a label on the outside of the panel stating "12-VOLT ELECTRICAL DISTRIBUTION"

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.

CUSTOM PROGRAMMING

The programming will match the template of the previous Surprise Fire Department unit #856 with SFD logo on main screen.

Light controls from both Vista screens as follows:

Position #1 All amber lights only

Position #2 All colored lights including position #1 lights

Position #3 All warning lights (Unitrol 480K electronic siren, Q2B siren, and clear lights wired to parking brake switch.)

Items controlled by the officers side Vista Display shall be:

The MPH of chassis

The Command Light control.

SVI Trucks

SHOP NOTES

Located on the streetside above the pump. Will be located behind a panel that is either bolted or screwed in to place. There will be a label on the outside station "12-VOLT ELECTRICAL DISTRIBUTION"

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.

BATTERY SOLENOID

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

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BATTERY CONDITIONER

The battery conditioner shall be supplied and installed by the cab chassis manufacturer.

ENGINE COMPARTMENT LIGHT

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

SCENE LIGHT SWITCH

There shall be a switch on the streetside rear body panel to turn on scene lights during night operations. The switch shall be of momentary style and shall be connected to a bi-stable relay, allowing the light to also be switched from the cab V-Mux screen. The scene/reverse lights shall automatically shut off when the parking brake is disengaged.

SHOP NOTES

Momentary switch for rear scene lights in addition to the V-Mux display

CAB SPOTLIGHT

There shall be one (1) GoLight LED 20204 motorized, white, 12 VDC, 3 Amp, spotlight(s) that operates via a wired dash mount controller with joystick and on/off button. The joystick controls the motorized 135 degree tilt of the spotlight and the motorized rotation of the light a full 370 degrees. The light continues to move while the joystick is pressed. Once any button is released, the spotlight remains locked in that position until the joystick is moved again. The dash controller also turns the light on and off, so no additional switches are required. The dash mounted remote control allows for fingertip operation and is hard wired to the searchlight.

The Golight is mounted to the surface of vehicle using (4) stainless steel screws and a rubber gasket for a quick, safe and secure attachment. Light shall have a 3 year limited warranty.

SHOP NOTES

Model 20204 is white.

CAB HAZARD WARNING LIGHT

A red flashing or rotating light, located in the driving compartment, shall be illuminated automatically whenever the vehicles parking brake is not fully engaged and any of the following conditions exist:

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

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

- The volume is less than or equal to 4 ft³ (0.1 m³).
- The compartment has an opening less than or equal to 144 in.² (92,900 mm²).
- The open door does not extend sideways beyond the mirrors or up above the top of the fire apparatus.

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- All equipment in the compartment is restrained so that nothing can fall out if the door is open while the apparatus is moving.
- Manually raised pole lights with an extension of less than 5 ft (1.5 m).

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

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.

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) Whelen amber LED 600 Series 60A00TAR turn signal lights
- Two (2) Whelen red LED 600 Series 60BTT stop/tail lights
- Two (2) Whelen LED 600 Series 60C00WCR maximum intensity back-up lights with clear lens

Each of the lights above shall be mounted in a 6EFLANGE, 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.

NOTE: All marker lights shall be installed into the aluminum rubrails.

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.

REAR STEP LIGHT

There will be one (1) OnScene 36" Access series light located under the hosebed step to illuminate the rear tailboard. The light will activate when the park break is set.

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SHOP NOTES

There will be one (1) OnScene 36" Access series light located under the hosebed step to illuminate the rear tailboard. The light will activate when the park break is set.

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.

ELECTRONIC SIREN

One (1) Federal/Unitrol U480K-15 electronic siren with sliding light control switch (60 amps maximum) shall be provided in the cab. Power shall be provided through the VMUXsystem "Master" warning lights. The VMUX menu provides selection of Position 1, 2, or 3 programming. Siren shall be wired as follows:

- Position 0 - Blocked
- Position 1 - Blocked
- Position 2 - Blocked
- Position 3 - All Lights and siren.

The siren shall be wired to the radio auxiliary speaker for the outside radio speaker in the "radio" mode.

A Unitrol model UMNCT-B, noise canceling type microphone shall be provided for the PA system.

SIREN SPEAKER

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

SIDE SCENE LIGHTS

There shall be four (4) Whelen 810 series (10" x 8") surface mounted Opti-Scene halogen lights (810CA0ZR) provided on the upper body. Light quantity shall be divided equally per side. Each light will have an 8-32 degree 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.

LIGHT TOWER

One (1) Command Light Shadow, SL 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.

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The light tower shall extend 49 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 48" long x 24" wide x 9" high and weigh approximately 75 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.

The light tower shall be tested to in wind conditions of 90 mph (150 kph) minimum. Other type floodlights that have not been tested to these conditions are not acceptable.

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 for the safety of emergency personnel in high traffic conditions. Any tower that is only capable of rotations at the top of a pole is not an acceptable alternative to the specified tower.

Light Tower Electrical System

The light tower shall be a single-stage device with a lighting capable of 355 degree rotation. The light shall be elevated by an electric linear actuators, the actuator shall adjust the light bank angle from 0 to 110 degrees.

The tower base shall have a light that illuminates the envelope of motion during any movement of the light tower mast per NFPA 1901.

Light Tower Floodlights

The Command Light model SL442D-RT-LED shall be equipped with the following bank of floodlights:

Floodlight manufacturer:	Whelen Engineering
Number of lamp heads:	Four (4) Pioneer Plus DC LED
Voltage:	12 volts
Watts of each lamp head:	150 watt
Total watts of light tower:	600 watts
Total lumens of light tower:	60,000
Configuration:	The light heads shall be mounted with two (2) on each side of the light tower, giving two (2) vertical lines of two (2) when the lights are in the upright position.

Light Tower Paint

The light tower shall be electrostatically powder coated with a hammer tone gray color.

Light Tower Controls: Wired Hand-held and Multiplex

The light tower(s) shall be controlled by both the specified Weldon multiplex Vista displays in cab and with a hand-held 15-foot umbilical line remote control. The Vista display shall have a button programmed to take control from the wired controller. The program shall have five (5) different programmed quadrants to raise and face light tower too; Left Front -

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Center - Right Front - Left Rear - Right Rear. System shall require a Weldon Node to control light tower system. The wired hand-held storage station shall have a switch to take control from the Vista display in cab.

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 pair of lights.

One (1) switch for light bank rotation.

One (1) switch for elevating lower stage.

One (1) switch for elevating upper stage.

One (1) switch for optional light bank rotation. (REMOVE SWITCH FROM CONTROLLER)

One (1) switch for the optional strobe. (REMOVE SWITCH FROM CONTROLLER)

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 light tower shall be mounted to roof of the custom cab which shall be reinforced as necessary to support weight of the light tower.

LIGHT TOWER TREE LIMB GUARD

A three sided tree limb guard shall be provided fabricated from 1/8" aluminum and painted to match the upper paint color to provide protection to the specified light tower from small tree branches.

REAR SCENE LIGHTS

Two (2) Whelen 600 series (6" x 4") recess mounted Opti-Scene halogen lights (60K000XR) 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 a 26 degree lens and chrome flange.

- The lights shall be switched at the Vista display in the cab and with a switch located on the streetside rear body panel between the rear warning light and taillights.

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

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 - Mater station

Two (2) U3815 - Radio interface/headset station

One (1) U3806 - Dual headset intercom station

One (1) U3805 - Radio cord junction module

Three (3) C3812 - Jumper cord 12'

Two (2) C3821 - Radio interface cord 21'

One (1) C3820 - Power cord 20'

Six (6) H3442 - Headsets Behind-the-Head style

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Two (2) 18352G-07 - MS Connector - 5 pin for remote PTT
Two (2) 18352G-17 – MS connector 6 socket for radio cords

NOTE: the system shall be wired thru both the 800mhz and the 150mhz radios with a PTT button on engine tunnel.

SHOP NOTES

David Clark 3800 series system

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 inboard shoulder position on the AC cover.
- Officer's – Mounted above the inboard shoulder position on the AC cover.

Rear Crew Area

- Driver's side rear facing – Above the right shoulder on the wall.
- Officer's side rear facing – Above the left shoulder on the wall.
- Forward facing center – Above the inboard shoulder on the front center face of the Bus Air AC housing.

SHOP NOTES

Not headset jack locations in spec

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

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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.

SHOP NOTES

Light controls are as follows: Position #1 All amber lights only, Position #2 All colored lights including position #1 lights, position #3 all warning lights any white lights tied to parking brake per NFPA.

UPPER LEVEL OPTICAL WARNING DEVICES

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

ZONE A - FRONT WARNING LIGHTS

There shall be one (1) Whelen Edge FN72QLEDCUSTOM LED 72" lightbar permanently mounted to the cab roof.

The lightbar configuration (streetside to curbside) shall be:

<u>SECTION</u>	<u>INTERNAL COMPONENTS</u>	<u>LENS COLOR</u>
1	Red Linear LED - Side Facing	Clear
2	Red Corner LED	Clear
3	Blue Linear LED	Clear
4	Red Linear LED	Clear
5	Blue Liner LED	Clear
6	Red Linear LED	Clear
7	Opti-Com GTT795H	Clear
8	Opti-Com GTT795H	Clear
9	Blue Linear LED	Clear
10	Red Linear LED	Clear
11	Blue Linear LED	Clear
12	Red Linear LED	Clear
13	Blue Corner LED	Clear
14	Blue Linear LED - Side Facing	Clear

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

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SHOP NOTES

Add MK8H lightbar mount on Wecad program if there is a brow light on cab

The lightbar shall be separately switched at the vista display in the cab.

ZONES B AND D - SIDE WARNING LIGHTS

UPPER REAR CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") Linear Super-LED lights provided, one (1) each side. The driver side will be red with a red lens the officer side will be blue with a blue lens. Each light shall have a chrome flange.

SHOP NOTES

Driver side red officer side blue

The lights shall be switched at the Vista display in the cab.

UPPER FORWARD CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") Linear Super-LED lights provided, one (1) each side. The driver side will be blue with a blue lens the officer side will be red with a red lens. Each light shall have a chrome flange.

SHOP NOTES

Driver side blue officer side red

The lights shall be switched at the Vista display in the cab.

There shall be two (2) Whelen 500 series (5" x 2") amber Linear Super-LED lights (50A02ZCR) provided, one (1) each side of upper rear corners of cab. Each light shall be mounted in a white painted 45 degree bezel facing rear of vehicle. Each light shall have a clear lens and chrome flange.

Lights shall be mounted vertically to match previous job.

The lights shall be switched at the Vista display in the cab.

ZONE C - REAR WARNING LIGHTS

There shall be four (4) Whelen 600 series (6" x 4") red Linear Super-LED lights provided, two (2) each side. The upper two (2) lights above the scene lights will be amber with amber lens. The other two (2) lights below the scene lights with the driver side blue with a blue lens and the officer side red with a red lens. Each light shall have a chrome flange.

The lights shall be switched at the Vista display in the cab.

SHOP NOTES

Above scene lights amber with amber lens below scene light driver side blue with blue lens officer side red with red lens

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.

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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 warning lights shall be supplied and installed by the cab/chassis manufacturer. They shall be Whelen 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 warning lights shall be supplied and installed by the cab/chassis manufacturer. They shall be Whelen 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) Whelen 500 series (5" x 2") Linear Super-LED lights provided, one (1) each side. The driver side will be blue with a blue lens and the officer side will be red with a red lens. Each light shall have a chrome flange.

SHOP NOTES

Driver side blue officer side red

The lights shall be switched at the Vista display in the cab.

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

There shall be two (2) Whelen 500 series (5" x 2") Linear Super-LED lights provided, one (1) each side. The driver side will be blue with a blue lens the officer side will be red with a red lens. Each light shall have a chrome flange.

SHOP NOTES

Must order 5V series for vertical mounting

Driver side blue officer side red

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) Whelen 600 series (6" x 4") Linear Super-LED lights provided, one (1) each side. The street side light will be red with a red lens. The curb side light will be blue with a blue lens. Each light shall have a chrome flange.

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SHOP NOTES

Street side red with red lens. Curb side blue with blue lens

The lights shall be switched at the Vista display in the cab.

PUMP MODULE

The side mount pump enclosure shall be removable and supported from the chassis frame rails with spring type body mounts. This enclosure shall allow independent flexing of the pump enclosure from the body and allow for quick removal. The support structure shall be constructed of extruded aluminum tubing and angle.

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

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

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

- Electric primer.
- Pump and plumbing area service lights.
- 8) Pressure control device and throttle control.
- 9) Fire pump and engine instruments.
- 10) Pump intakes and discharge controls.
- 11) Master intake and discharge gauges.
- 12) Tank fill control.
- 13) Tank suction control.
- 14) Water tank level gauge.
- 15) Pump panel lights.

PUMP MODULE DUNNAGE AREA

There shall be an open dunnage area located directly above the pump panels to store miscellaneous Surprise Fire Department supplied equipment. The interior dunnage area side walls shall be fabricated from 1/8" aluminum tread plate, and the walking surface shall be fabricated from 3/16" aluminum NFPA compliant tread plate. The exterior sides shall be constructed of 1/8" smooth plate aluminum and painted body color.

STREETSIDE RUNNING BOARD - SIDE MOUNT PANEL

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

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

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CURBSIDE RUNNING BOARD - SIDE MOUNT PANEL

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

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

PUMP PANEL - SIDE MOUNT

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

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

STREETSIDE PUMP PANEL - BOLTED

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

CURBSIDE PUMP PANEL - BOLTED

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

FRONT PUMP MODULE ACCESS

The front of the pump module will have removable access cover panel. The panel will be painted to match the body.

STREETSIDE 12 VDC DISTRIBUTION

There will be a 12-Volt electrical compartment located above the pump operator master control/gauge panel on the streetside. The compartment will be used to house the 12-volt electrical distribution components. The compartment will have a mechanically fastened access panel on the outside. The panel will have a label stating "12-VOLT ELECTRICAL DISTRIBUTION".

There will be a vertically hinged door with a locking push button latch or locking "D" handle keyed to 1250. The door will be hinged towards the front. The compartment will have one (1) LED light and open door sensor.

The door and frame will be painted to match the body.

CURBSIDE STORAGE

There will be a storage compartment located above the pump operator master control/gauge panel. The compartment will be approximately 21" wide x 11" high x 24" deep.

There will be a vertically hinged door with a locking push button latch or locking "D" handle keyed to 1250. The door will be hinged towards the front. The compartment will have one (1) LED light and open door sensor.

The door and frame will be painted to match the body.

The compartment will contain two (2) 7.5" PVC SCBA storage tubes, and one (1) shelf above SCBA storage.

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WATEROUS CU FIRE PUMP

A mid-ship mounted Waterous CU series full body fire pump shall be provided. The pump shall comply with all applicable requirements of the latest standards for automotive fire apparatus of the National Fire Protection Association, NFPA 1901, and shall have a rated capacity of 1,500 GPM (6,000 LPM) to 2,250 GPM (9,000 LPM) depending on final configuration.

WATEROUS PUMP ANODES

There shall be two (2) anodes provided with the fire pump. One (1) anode shall be installed in the left steamer port and one (1) shall be installed in the right steamer port.

IMPELLERS

The pump impellers shall be bronze, specifically designed for the fire service and accurately balanced for vibration free running. The stripping edges shall be located on opposite sides of the impellers to reduce shaft deflection.

The impeller shaft shall be stainless steel, accurately ground to size and supported at each end by oil or grease lubricated anti-friction ball bearings for rigid, precise support. The bearings used on the impeller shaft shall be automotive type bearings, easily cross-referenced and readily available at normal parts or bearing stores.

FLAME PLATED IMPELLER HUBS

The impeller hubs shall be flame plated with tungsten carbide to a hardness approximately twice that of tool steel to assure maximum pump life and efficiency. During the flame plating process the base metal shall not be allowed to exceed a temperature of 300 degrees Fahrenheit to prevent altering the metallurgical properties of the impeller material.

IMPELLER WEAR RINGS

The pump shall be equipped with replaceable bronze wear rings for increased pump life and minimum maintenance cost. The wear rings shall be designed to fit into a groove in the face of the impeller hubs forming a labyrinth that, as the clearance increases with age, directs water from the discharge side in several directions eventually exiting outward, away from the eye of the impeller hub.

PUMP CASING

The pump casing shall be cast as two (2) horizontally split pieces. The casing shall be made of high tensile, close-grained gray iron with a minimum tensile strength of 40,000 PSI.

PUMP MANUAL

Two (2) Pump Operation & Maintenance manual(s) shall be supplied at the time of delivery.

PAINT FINISH

The paint finish shall match lower body color choice.

PUMP TRANSMISSION

The pump transmission shall be of the latest design, incorporating a high strength involute tooth-form Morse Hy-Vo chain capable of operating at high speeds while providing smooth and quiet transmission of power. Drive and driven sprockets shall be made of alloy steel with teeth of an involute form. Driveline shafts shall be made from alloy steel forgings, hardened and ground to size. Deep groove, anti-friction ball bearings shall be used throughout the pump transmission.

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The pump shift engagement shall be accomplished by a free sliding collar that uses an internal locking mechanism to insure that the collar will stay in road or pump position.

Primary lubrication for the pump transmission bearings, sprockets and chain shall be provided by a splash system. A supplementary pressure system shall also be employed which shall include a strainer, an oil circulation pump driven by the impeller shaft, and a spray bar inside the case to apply oil to the inside of the chain just before it engages the driven sprocket.

The pump and transmission shall be easily separable. A two-piece shaft shall be splined allowing for individual repair of either the pump or transmission, to keep down time to a minimum.

All driveline components shall have a torque rating equal to or greater than the final net engine torque.

PUMP LUBRICATION

Grease zerk(s) shall be installed in a convenient location and connected to the pump lubrication points by copper tubing.

AIR OPERATED PUMP SHIFT

The pump shift actuating mechanism shall be air operated from a valve provided by cab/chassis manufacturer in cab identified as "PUMP SHIFT". Full instructions for shifting the pump shall be inscribed on the valve plate.

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".

PUMP SHIFT MANUAL OVERRIDE

A manual pump shift override system shall be provided should a problem develop in the chassis air brake system. Controls for the override shall be located at the lower right hand corner of the left side pump panel. A "MANUAL PUMP SHIFT" label shall be provided near the pump shift controls.

PAINT FINISH

The paint finish shall match the lower body color choice.

PUMP DRIVELINE

The pump transmission driveline shall be supplied with 1710 series yokes and bearings to match the cab chassis driveline.

SVI to use P-clamps for securing the air operated pump shift control. Zip ties not acceptable.

PUMP PACKINGS

The stuffing boxes shall be equipped with two-piece adjustable Grafoil packing glands.

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SINGLE STAGE FIRE PUMP

The pump shall be a single stage centrifugal class "A" rated fire pump, designed specifically for the fire service

1/2" PUMP COOLER LINE

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

PUMP COOLER CHECK VALVE

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

WATEROUS 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 Surprise 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.

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:

- 16) 100% of rated capacity at 150 psi, 1000 kPa net pressure.
- 17) 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.

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ALTITUDE REQUIREMENT

The apparatus shall be designed to meet the specified rating at 7,000 feet (2,135 meters) altitude.

PUMP DRAIN VALVE

A manifold drain valve assembly shall be supplied. This drain shall provide the capability to drain the entire pump by pulling a single control. The valve assembly shall consist of a stainless steel plunger in a bronze body with multiple ports. The drain valve control shall be mounted on the left side pump panel and identified as "Pump Drain".

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.

PRIMER CONTROL

The primer shall be activated by a pull "T" handle control.

DISCHARGE RELIEF VALVE

The discharge pressure relief shall be controlled by the electronic engine controlled device as specified.

6" SUCTION INLET - STREETSIDE

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

The intake shall be provided with a removable screen.

LONG SUCTION TUBE

The specified pump intake shall be provided with a long suction tube. Suction tube shall have built-in zinc anode protection and multiple suction flanges per pump configuration.

BALL INTAKE VALVE (BIV)

Master discharge shall be provided with a Task Force Tips model #AB7NN-NX manually operated lightweight aluminum ball intake valve. Valve shall be equipped with an adjustable pressure relief valve under the main valve body with an eight position adjustable inlet elbow. The valve shall be controlled with an NFPA compliant slow-close crank handle gear operator located on the top of the gear box. A 3/4" bleeder valve shall be provided to exhaust excess air or water from the valve and hoseline. A position indicator shall be provided to allow for quick visualization of the status of the valve in the open, closed or partial positions. For maximum corrosion protection the aluminum casting shall be hardcoat anodized,

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with a powder coat internal and external finish and all components facing the wet side of the valve shall be constructed from stainless steel.

The connections shall be a 3-1/2" female NH swivel rocker lug with 30 degree swiveling detent elbow and a 6" female NH swivel long handle connection and include polymer bearing strips for prevention of galvanic corrosion. The unit shall be covered by a five-year warranty.

- The specified adapter shall be provided with a 3-1/2" (89 mm) NSTM chrome plated plug with chain.

6" SUCTION INLET - CURBSIDE

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

The intake shall be provided with a removable screen.

LONG SUCTION TUBE

The specified pump intake shall be provided with a long suction tube. Suction tube shall have built-in zinc anode protection and multiple suction flanges per pump configuration.

BALL INTAKE VALVE (BIV)

Master discharge shall be provided with a Task Force Tips model #AB7NN-NX manually operated lightweight aluminum ball intake valve. Valve shall be equipped with an adjustable pressure relief valve under the main valve body with an eight position adjustable inlet elbow. The valve shall be controlled with an NFPA compliant slow-close crank handle gear operator located on the top of the gear box. A 3/4" bleeder valve shall be provided to exhaust excess air or water from the valve and hoseline. A position indicator shall be provided to allow for quick visualization of the status of the valve in the open, closed or partial positions. For maximum corrosion protection the aluminum casting shall be hardcoat anodized, with a powder coat internal and external finish and all components facing the wet side of the valve shall be constructed from stainless steel.

The connections shall be a 3-1/2" female NH swivel rocker lug with 30 degree swiveling detent elbow and a 6" female NH swivel long handle connection and include polymer bearing strips for prevention of galvanic corrosion. The unit shall be covered by a five-year warranty.

- The specified adapter shall be provided with a 3-1/2" (89 mm) NSTM chrome plated plug with 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 1/4 turn valve on the pump operator's panel.

INTAKE RELIEF VALVE

There shall be an Akron model 59 intake relief valve factory set to 125 PSI installed on the suction side of the pump. The system shall be controlled by an adjustable valve and designed to prevent vibration from altering the setting of the valve. Provisions for adjusting or servicing the valve {will/shall} be provided. The relief outlet shall be directed below the pump with the discharge terminating in a 2-1/2" NSTM connection. The discharge shall be away from the pump operator and labeled "DO NOT CAP".

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FOAM SYSTEM

The apparatus shall be equipped with a FoamPro 2001 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.

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

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An installation and operation manual shall be provided for the unit, along with a one-year limited warranty by the manufacturer. The system must be installed and calibrated by a Certified FoamPro Dealer.

The system design shall have passed environmental testing which simulates heavy use on off-road mobile apparatus.

Testing shall have been conducted in accordance to SAE standards.

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.

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).

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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.

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 - 3-1/2"

There shall be one (1) 3-1/2" (89 mm) gated intake(s) located on pump panel. Each intake shall include:

- One (1) Akron Brass 8600 series slow-operating, manual type 3-1/2" (89 mm) valve(s). Each valve shall be equipped with a brass type valve adapter on inlet side, and discharge side with drain port.
 - Valve(s) shall be controlled with a handle for direct valve operation through panel.
- Each intake shall have a 3-1/2" (89 mm) NSTF chrome swivel adapter with strainer provided.

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- The specified adapter shall be provided with a 3-1/2" (89 mm) NSTM chrome plated plug with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valves shall be located on bottom of pump panel and plumbed to drain the lowest point in the plumbing.

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" (100 mm) 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.

- Akron valve(s) shall be controlled with a remote switch connected to the air actuated valve.
- A dual position air control switch 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).

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The flow-regulating element of each valve shall not change its position under any condition of operation that involves discharge pressures to the maximum pressure of the pump; the means to prevent a change in position shall be incorporated in the operating mechanism and shall be permitted to be manually or automatically controlled.

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

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

Any 2 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 30 degrees downward.

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

STREETSIDE DISCHARGE

There shall be one (1) 3/4" (19 mm) garden hose thread with chrome cap and chain located on pump panel. Each discharge shall include:

NOTE: Be sure this discharge is labeled, "WASHDOWN" as it will be used only for a garden hose to wash the vehicle.

- One (1) of the discharge(s) shall flow water only.
- One (1) manual type 3/4" (19 mm) valve(s). Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port labeled "WASH DOWN".
 - Valve(s) shall be controlled with a 1/4 turn "T" handle connected to the valve. The control handle shall be located adjacent to the plumbing connection, and labeled "WASH DOWN"

CURBSIDE DISCHARGE

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

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8600 series, actuated type 2-1/2" (65 mm) valve(s). Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Akron valve(s) shall be controlled with a remote handwheel connected to the gear actuated valve.
 - An Akron portrait layout handwheel actuator with NFPA compliant valve position indicator shall be located on the pump operator's panel.
- Each discharge shall have a 3" (75 mm) NSTF x 3" (75 mm) NSTM chrome plated 30 degree downsweep elbow provided.
 - The specified elbow shall be provided with a 1-1/2" (38 mm) NSTF chrome plated cap with chain.

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- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valves shall be located on bottom of pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls/NoShok 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 -30" to 400 PSI.

There shall be two (2) 3-1/2" (89 mm) gated discharge(s) located on pump panel. Each discharge shall include:

- Two (2) of the discharge(s) shall flow water only.
- Two (2) Akron Brass 8600 series slow-operating, actuated type 3-1/2" (89 mm) valve(s). Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Akron valve(s) shall be controlled with a remote handwheel connected to the gear actuated valve.
 - An Akron portrait layout handwheel actuator with NFPA compliant valve position indicator shall be located on the pump operator's panel.
- Each discharge shall have a 3-1/2" (89 mm) NSTF x 3-1/2" (89 mm) NSTM chrome plated 30 degree downsweep elbow provided.
 - The specified elbow shall be provided with a 3-1/2" (89 mm) NSTF chrome plated cap with chain.
- Two (2) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valves shall be located on bottom of pump panel and plumbed to drain the lowest point in the plumbing.
- Two (2) Innovative Controls/NoShok 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 -30" to 400 PSI.

FRONT DISCHARGE

There shall be one (1) 2" (52 mm) gated discharge(s) located on pump panel. Each discharge shall include:

- One (1) of the discharge(s) shall flow water and foam. The foam discharge labels will be red with a white border and labeled "FRONT JUMP".
- One (1) Akron Brass 8600 series, actuated type 2" (52 mm) valve(s). Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Akron valve(s) shall be controlled with a remote handwheel connected to the gear actuated valve.
 - An Akron portrait layout handwheel actuator with NFPA compliant valve position indicator shall be located on the pump operator's panel.

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- There shall be a 2" (52 mm) VFC x 1-1/2" (38 mm) NSTM 90 degree swivel elbow provided for each discharge.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valves shall be located on bottom of pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls/NoShok 2-1/2" liquid filled gauge(s)
 - This gauge(s) shall have a white background with black text. Foam Discharge to have Red text and red back light.
 - The above gauge shall have a range from -30" to 400 PSI.

HOSE BED DISCHARGE(S)

There shall be two (2) 2-1/2" (65 mm) gated discharge(s) located in the hose bed area, one (1) on streetside, and one (1) on curbside. Each discharge shall include:

- Two (2) of the discharge(s) shall flow water only.
- Two (2) Akron Brass 8600 series, actuated type 2-1/2" (65 mm) valve(s). Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Akron valve(s) shall be controlled with a remote handwheel connected to the gear actuated valve.
 - An Akron portrait layout handwheel actuator with NFPA compliant valve position indicator shall be located on the pump operator's panel.
- There shall be a 2-1/2" (65 mm) NSTF x 2-1/2" (65 mm) NSTM chrome plated long adapter provided for hose bed discharge(s).
- Two (2) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valves shall be located on bottom of pump panel and plumbed to drain the lowest point in the plumbing.
- Two (2) Innovative Controls/NoShok 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 -30" to 400 PSI.

2" CROSSLAY(S)

There shall be two (2) 2" speedlay(s) located per the itemized compartment list. The crosslay(s) shall be transverse of the apparatus body with access from either side.

Each crosslay shall have a minimum storage capacity of 200' of 1-3/4" double jacket hose and nozzle.

The crosslays will have a hinged aluminum diamondplate cover over the top. The aluminum cover will be hinged towards the front (cab). Two (2) OnScene 9" LED lights shall be provided, one (1) each end to light the interior speedlay area.

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There will be rubber bumpers on the edge of the cover to prevent damage to the cab when in the raised position.

Each end having a black nylon webbing style covers. All pull tabs on webbing shall have reflective material sewn into them. The covers will be mechanically fastened at the top of the aluminum cover and the bottom edges will be secured using elastic cord and shoulder bolts.

- Two (2) of the discharge(s) shall flow water and foam. The foam discharge labels will be red with a white border.
- Two (2) Akron Brass 8600 series, actuated type 2" (52 mm) valve(s). Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Akron valve(s) shall be controlled with a remote handwheel connected to the gear actuated valve.
 - An Akron portrait layout handwheel actuator with NFPA compliant valve position indicator shall be located on the pump operator's panel.
- There shall be a 2" (52 mm) NSTF x 1-1/2" (38 mm) NSTM cast brass 90 degree swivel elbow provided for each discharge.
- Two (2) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valves shall be located on bottom of pump panel and plumbed to drain the lowest point in the plumbing.
- Two (2) Innovative Controls/NoShok 2-1/2" liquid filled gauge(s)
 - This gauge(s) shall have a white background with black text. Foam Discharge to have Red text and red back light.
 - The above gauge shall have a range from -30" to 400 PSI.

DECK GUN

There shall be one (1) 3" (75 mm) 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 plumbing shall terminate as required by deck gun model. The discharge shall include:

- One (1) of the discharge(s) shall flow water and foam. The foam discharge labels will be red with a white border.
- Two (2) Akron Brass 8600 series slow-operating, actuated type 3" (75 mm) valve(s). Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Akron valve(s) shall be controlled with a remote handwheel connected to the gear actuated valve, one (1) at the pump panel, and one (1) on front side of deckgun. The handwheel actuator with portrait layout position indicator shall be provided at each location.
 - An Akron portrait layout handwheel actuator with NFPA compliant valve position indicator shall be located on the pump operator's panel and deck gun location.

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- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valves shall be located on bottom of pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls/NoShok 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 -30" to 400 PSI.

DECK GUN MONITOR

An Elkhart Stinger model 8297-35, 3-1/2" inlet, dual purpose break-apart monitor with 1,250 GPM capacity shall be provided for use as a deck gun or portable base, constructed of durable, lightweight Elk-O-Lite® with a 3.0" waterway, easily detached from (top mount adapter, 8297-98) (topmount fixture, 8297-99), shall be provided with completed unit with following features;

- Hand-wheel driven worm gear (fully enclosed) for vertical movement from 80° above to 30° below horizontal
- Full 360° horizontal movement with positive twist-lock mechanism capable of flowing up to 1250 gpm
 - 200 psi liquid-filled gauge
 - 3" NPT flange base, 8298P
 - Red urethane enamel finish
 - Shall not exceed 19.5", (8297-98) in height; shall not exceed 14 lbs., excluding stream shaper, tips and top mount adapter/fixture.

TELESCOPING WATERWAY - ELECTRIC

The specified deck gun shall be mounted on an Akron High Riser 3406 12" electric riser.

The High Riser offers a full 3" waterway, hardcoat anodized finish, and built-in sensor for connection to "monitor raised" light or truck open compartment warning.

- 3" waterway
- 12" extension
- With unique three-piece design, the extremely compact device is only 18 1/2" (470 mm) when nested
- Electrically actuated 12 VDC
- Durable lightweight Pyrolite construction
- Manual override
- 5 year warranty
- Inlet option: 3" (75 mm) victaulic or NPT
- Outlet options 3" (75 mm) or 4" (100 mm) flange

MASTER STREAM TIP

The specified deck gun shall be provide with an Elkhart model SM-1250-X-Stream automatic, master stream tip capable of flowing 1,250 GPM.

STACKED TIPS

The specified deck gun shall be provided with an Elkhart model ST0194 quad stacked deluge tips, and an Elkhart model 282-A stream shaper.

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TANK FILL VALVE

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

- One (1) Akron Brass 8600 series, actuated type 2" (52 mm) valve(s). Each valve shall be equipped with a brass type valve adapter on inlet side, and discharge side with drain port.
 - Akron valve(s) shall be controlled with a remote handwheel connected to the gear actuated valve.
 - An Akron portrait layout handwheel actuator with NFPA compliant valve position indicator shall be located on the pump operator's panel.

NOTE: All foam discharge gauges shall have a white background with red text, and red backlight per specs.

PUMP PANEL

The pump controls shall be mounted on an aluminum control panel which shall have a hammer tone gray powdercoat painted finish. The panel shall be hinged, or bolted in place allowing it to be easily removed to gain access to plumbing components.

PUMP PANEL LOCATION

The pump control panel shall be side mounted. All beauty rings to be installed with set screws on all intakes and discharges.

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

The apparatus shall be equipped with the Class 1 Total Pressure Governor (TPG) connected to the Engine Control Module (ECM) mounted on the engine. The "TPG" will operate as a pressure sensor (regulating) governor (PSG) utilizing the engine's J1939 data for optimal resolution and response when supported by the engine manufacturer. If J-1939 engine control is not supported, then analog remote throttle control shall be provided by the "TPG" with the following features;

- Audible alarm output
- Easy set-up and configuration
- Large, easy to read alpha-numeric display
- Improved ergonomic tactile feedback buttons
- Totally integrated instruments including battery voltage, temperature, oil pressure, and RPM
- Controls engine speed directly over the J1939 CAN bus for improved resolution and response
- Integrated engine information reduces required pump panel space

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- Programmable presets

MASTER DISCHARGE GAUGE

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

MASTER INTAKE GAUGE

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

- 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 pump panel shall have Innovative Controls Inc. color coded die cast zinc, chrome plated bezels with plastic labels inserts for each intake, discharge, master gauges, and drain. Labels shall be UV and scratch resistant and meet SAE standards where applicable.

PUMP PANEL LIGHTING

All gauges and controls on the pump operator's panel shall be adequately illuminated by three (3) 9" OSS shielded LED light assemblies (each panel, if equipped). There shall be one (1) light that shall activate when pump is engaged, and two (2) lights shall activate when the parking brake is applied.

The lights shall also be activated by a weather-proof type switch on the pump operator's panel. This switch shall also activate any area step lighting.

LOW PRESSURE AIR OUTLET

There shall be one (1) air outlet connection to supply low pressure air for general maintenance. The outlet shall terminate in a 1/4" NPT threaded port. Air outlet shall be located on lower pump operator's panel. The connector shall be supplied by the Surprise Fire Department.

SHOP NOTES

The outlet will be located in the lower rearward corner of the pump operators panel.

FUEL LEVEL GAUGE

An auxiliary fuel gauge shall be provided and located on pump operators panel with other specified gauges to display the chassis fuel level.

CAB TILT CONTROL

A stainless steel door match fuel fill doors shall be provided on curbside pump panel with cab tilt controls plugged into a waterproof harness and stored behind it.

SVI Trucks

TEST TAPS

Test taps for pump intake and pump pressure shall be provided on the pump instrument panel and be properly labeled.

SCUFFPLATES ON VERTICAL SURFACE OF PUMPHOUSE

There shall be a pair of brushed stainless steel scuffplates installed onto the outer vertical corners of the dunnage area of the pumphouse, (1) each side from the top edge of the pumphouse, down to the gauge panel.

POLY WATER TANK

The water tank capacity shall be approximately 500 US gallon or 416 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.

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.

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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.

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.

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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.

WATER TANK LEVEL GAUGE

There shall be one (1) Class1 "ITL-40B" tank level gauge for indicating water level. The tank level gauge shall indicate the liquid level or volume on an easy to read blue LED display and show increments of 1/8 of a tank. **Wired to dim setting.**

Each tank level gauge system shall include;

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area. Sealed foam tanks will require zero pressure vacuum vents.
- A super bright LED display viewable from 180 degrees with a visual indication at nine accurate levels.
- A set of weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power.
- The system shall include the ability to display "text messages"
- The system shall include built-in diagnostic capabilities.

Additional (slave) displays (if requested) are to be easily integrated and will receive data from the same source as the Master Display. No additional transducers shall be required.

CLASS A POLYPROPYLENE FOAM CELL

There shall be one (1) 20 US gallon or 16.6 Imperial gallons 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) Class1 "ITL-40R" tank level gauge for indicating foam level. The tank level gauge shall indicate the liquid level or volume on an easy to read red LED display and show increments of 1/8 of a tank. **Wired to dimm setting.**

Each tank level gauge system shall include;

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area. Sealed foam tanks will require zero pressure vacuum vents.
- A super bright LED display viewable from 180 degrees with a visual indication at nine accurate levels.
- A set of weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power.
- The system shall include the ability to display "text messages"
- The system shall include built-in diagnostic capabilities.

Additional (slave) displays (if requested) are to be easily integrated and will receive data from the same source as the Master Display. No additional transducers shall be required.

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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.

Length of hose bed shall be approximately 96" deep. The bottom of hose bed shall be no more than 67" above the tailboard or 88" above road surface. All pre-connected hose line discharges shall be accessible just below the hose bed on the rear of the apparatus.

Hose bed shall be laid out as follows;

- Left Side: 200' of 2½" Double Jacket Structure Hose Pre-Connected
- Middle: 1,200' of 4" Rubber Jacket Supply Line
- Far Right: 200' of 2½" Double Jacket Structure Hose Pre-Connected

Additional hose storage will be as follows:

- Front Bumper: 100' of 1¾" in a flat or triple flat load
- Cross Lay #1: 150' of 1½" in a flat load
- Cross Lay #2: 150' of 1½" in a flat load

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 an anodized 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.

INTERMEDIATE STEP

There will be a stepping area located even with the bottom of the hose bed. The step will be made out of NFPA aluminum treadplate and will span the width of the hosebed.

The step will have a slot to allow for a single folded section of supply hose to pass-thru on edge

HOSE BED LIGHTS

There shall be four (4) OnScene Solutions 9" LED NightStik lights provided to illuminate the hose bed area. The lights shall be activated when the parking brake is set.

Lights shall be mounted, two (2) on underside of each hose bed door.

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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 headlights are activated and vehicle park brake is set.

HOSE BED DIVIDER(S)

Two (2) adjustable aluminum hose bed partition(s) shall be provided in the hose storage area. The partition(s) shall be 3/16" smooth aluminum with split aluminum tubing welded to the top and rear edges.

Hose bed dividers shall be designed only tall enough to contain the expected load to allow for easier loading of the hose.

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 door shall have a horizontally mounted On Scene LED light 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 opening at the end of the hosebed will be covered with a black nylon style webbing. All pull tabs on webbing shall have reflective material sewn into them. It will be secured in place with bungee style cord on shoulder bolts.

EQUIPMENT PAYLOAD WEIGHT ALLOWANCE

In compliance with NFPA 1901 standards, the pumper shall be designed for an equipment loading allowance of 2,500 lbs. of Surprise Fire Department provided loose equipment based on the pumper body having more than 250 cu. ft. of storage space.

Surprise Fire Department has specified equipment weight of 4,500 pounds not inc. hose and ladders.

EQUIPMENT

The following equipment shall be furnished with the completed pumper vehicle;

EQUIPMENT MOUNTING

The Surprise Fire Department supplied equipment shall be mounted at direction of Surprise Fire Department including all necessary PAC or equivalent mounting brackets (see photos in file).

SVI to install all SFD shipped loose equipment before delivery.

- 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.

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- One (1) air bag holder fabricated from 3/16" aluminum 7" W x 3 3/8" D x 4" H and powder coated hammer tone gray, with mounting and drain holes (see drawings). Air bag holders will be located on slide-out tool board in S1.
 - One (1) "U" shaped sharp holder fabricated from un-painted 1/8" aluminum 11" W x 3-3/8" D. x 4" front and 5" back, with 1/4" mounting holes 1/2" down & inset 2". O.D on 5" leg (see drawings). Sharps holder to be mounted per Surprise Fire Department.
 - One (1) pieces of 1/4" aluminum angle 4" X 4" x 5-1/2". Mounted per Surprise Fire Department.
 - One (1) Big Easy tool holders 9" W x 10" H x 2 1/4" D fabricated from 3/16" aluminum and powder coated hammer tone gray, with mounting & drain holes (see drawings). Holders mounted per Surprise Fire Department.
 - One (1) K Tool holders 6 1/2" W x 4" H x 3 1/4" D fabricated from 3/16" aluminum and powder coated hammer tone gray, with mounting & drain holes (see drawings). Holders mounted per Surprise Fire Department.
 - Two (2) Big Easy tools shall be provided by the SFD.
 - Two (2) K Tools shall be provided by the SFD.
 - One (1) Rubbermaid water jug model #1683, **SVI to furnish and install and shall mount in Compt. C1.**
 - There shall be two (2) Zico SAC-44-E NFPA approved folding aluminum wheel chocks provided for 44" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20 % grade, with the transmission in neutral, and the parking brake released.
 - The wheel chock(s) shall be mounted behind rear wheels, below body on streetside.
 - One (1) Duo-Safety 900-A series 24' 2-section extension ladder(s) shall be provided with the completed unit.
 - The ladder(s) shall be mounted on vehicle, per itemized compartment list.
 - 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 vehicle, per itemized compartment list.
 - 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 vehicle, per itemized compartment list.
- One (1) Nupla 8' Trash/Arson hook with fiberglass handle shall be provided with the completed unit.
- The above specified pike pole will have a D handle attached
 - The pike pole(s) shall be mounted on vehicle, per itemized compartment list.
 - Two (2) Akron UT fiberglass pike poles, one (1) 6', and one (1) 8' shall be provided with the completed unit.
 - The above specified pike pole will not have a D handle attached
 - The pike pole(s) shall be mounted on vehicle, per itemized compartment list.

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- One (1) Super Vac 720G4-H, 20" Honda gas powered ventilation fan(s) shall be provided with the completed unit.
 - The above specified ventilation fan(s) shall be installed in Compt. R1 slide-out tray, left side using mounting brackets and/or straps.
- Two (2) Streamlight FireBox LED flashlight(s) model #45865 shall be provided. Each flashlight shall be orange in color and have a 12 volt DC charger and vehicle mount kit. Each flashlight shall have a LED spotlight style bulbs and reflectors with 2 ultra-bright LED taillights. **The flashlight(s) shall be wired to battery direct unless otherwise specified by Surprise Fire Department.**

SHOP NOTES

Model 45865

- The flashlight(s) shall be mounted on the completed unit, one (1) on upper front wall of S1, and one (1) on upper front wall of C2.
- Four (4) Streamlight Survivor, LED flashlight(s) model #90503 shall be provided. Each flashlight shall be orange in color and have a 12 volt DC charger and vehicle mount kit. Each flashlight shall have an LED spotlight style bulbs and reflectors. The flashlight(s) shall be wired to battery direct unless otherwise specified by Surprise Fire Department.

SHOP NOTES

#90503

- The flashlight(s) shall be mounted on the completed as follows;
 - One (1) drivers mid-step area (battery direct)
 - One (1) officer's mid-step area (battery direct)
 - One (1) rear streetside crew area in the back corner
 - One (1) rear curbside crew area in back corner
- Surprise Fire Department supplied NFPA required suction hose(s) shall be provided on completed unit before placing vehicle in service.
- Surprise Fire Department supplied NFPA required fire hose and nozzles shall be provided on completed unit before placing vehicle in service.
- One (1) Surprise Fire Department supplied hose clamp shall be provided with completed unit.
 - The above specified fire hose clamp(s) shall be mounted on rear streetside tailboard 1-1/2" from edge with smooth aluminum under hose clamp, same shape as hose clamp.
- Mount Surprise Fire Department supplied Humat 4-way hydrant valve on curbside rear tailboard.