

Loveland Fire / Rescue

Pumper

Production Specification

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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.

ROADABILITY

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

- 1) From a standing start, the apparatus shall be able to attain a speed of 35 mph (55 km/hr) within 25 seconds on a level road.
- 2) The apparatus shall be able to attain a minimum top speed of 50 mph (80 km/hr) on a level road.
- 3) The apparatus shall be able to maintain a speed of at least 20 mph (32 km/hr) on any grade up to and including 6 percent.

The maximum top speed of fire apparatus with a GVWR over 26,000 lb (11,800 kg) shall not exceed either 68 mph (105 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

If the combined water tank and foam agent tank capacities on the fire apparatus exceed 1250 gal (4732 L), or the GVWR of the vehicle is over 50,000 lb (22,680 kg), the maximum top speed of the apparatus shall not exceed either 60 mph (85 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

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SERVICEABILITY

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

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

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

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CONSTRUCTION DOCUMENTATION

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

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

- 1) Owner's name and address
- 2) Apparatus manufacturer, model, and serial number
- 3) Chassis make, model, and serial number
 - a) GAWR of front and rear axles and GVWR
 - b) Front tire size and total rated capacity in pounds (kilograms)
 - c) Rear tire size and total rated capacity in pounds (kilograms)
 - d) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
 - e) Engine make, model, serial number, rated horsepower and related speed, and governed speed; and if so equipped, engine transmission PTO(s) make, model, and gear ratio
 - f) Type of fuel and fuel tank capacity
 - g) Electrical system voltage and alternator output in amps
 - h) Battery make, model, and capacity in cold cranking amps (CCA)
 - i) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
- 4) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- 5) Pump transmission make, model, serial number, and gear ratio
- 6) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- 7) Water and Foam tank certified capacity in gallons or liters
- 8) Paint manufacturer and paint number(s)
- 9) Company name and signature of responsible company representative
- 10) If the apparatus is a mobile foam fire apparatus, the certification of foam tank capacity
- 11) Certification of compliance of the optical warning system
- 12) Siren manufacturer's certification of the siren
- 13) Written load analysis and results of the electrical system performance tests
- 14) Certification of slip resistance of all stepping, standing, and walking surfaces
- 15) If the apparatus has a fire pump, the pump manufacturer's certification of suction capability
- 16) If the apparatus is equipped with a fire pump and special conditions are specified by the purchaser, the pump manufacturer's certification of suction capacity under the special conditions
- 17) If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications
- 18) If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed
- 19) If the apparatus has a fire pump, the pump manufacturer's certification of the hydrostatic test
- 20) If the apparatus has a fire pump, the certification of inspection and test for the fire pump
- 21) If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test
- 22) When the apparatus is equipped with a water tank, the certification of water tank capacity
- 23) If the apparatus has an aerial device, the certification of inspection and test for the aerial device
- 24) If the apparatus has an aerial device, all the technical information required for inspections to comply with NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus
- 25) If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy and the final installer's certification the foam proportioning system meets this standard
- 26) If the system has a CAFS, the documentation of the manufacturer's pre delivery tests
- 27) If the apparatus has a line voltage power source, the certification of the test for the power source
- 28) If the apparatus is equipped with an air system, air tank certificates, the SCBA fill station certification, and the results of the testing of the air system installation
- 29) Any other required manufacturer test data or reports.

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OPERATIONS AND SERVICE DOCUMENTATION

The Contractor shall deliver with the fire apparatus at least two (2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted.

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

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

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

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

NFPA REQUIRED DOCUMENTATION FORMAT - CD-ROM

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

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STATEMENT OF EXCEPTIONS

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

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

- 1) A separate specification of the section of the applicable standard for which compliance is lacking
- 2) A description of the particular aspect of the apparatus that is not in compliance therewith or required equipment that is missing
- 3) A description of the further changes or modifications to the delivered apparatus that must be completed to achieve full compliance
- 4) Identification of the entity that will be responsible for making the necessary post delivery changes or modifications or for supplying and installing any missing required equipment to the apparatus to achieve full compliance with this standard

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

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

CARRYING CAPACITY

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

The estimated in-service weight shall include the following:

- 1) The chassis, body and tank(s)
- 2) Full fuel, lubricant, and other chassis or component fluid tanks or reservoirs
- 3) Full water and other agent tanks
- 4) *250 lb (114 kg) in each seating position
- 5) Fixed equipment such as pumps, aerial devices, generators, reels and air systems as installed
- 6) Ground ladders, suction hose, designed hose load in their hose beds and on their reels
- 7) An allowance for miscellaneous equipment that is the greatest of the values for type of vehicle per NFPA 1901, a Purchaser provided list of equipment to be carried with weights or a Purchaser specified miscellaneous equipment allowance.

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

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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.

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

TESTING

ROAD TEST

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

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

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

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

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

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

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

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

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

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TEST SEQUENCE

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

1. RESERVE CAPACITY TEST

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

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

2. ALTERNATOR PERFORMANCE TEST

TEST AT IDLE

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

TEST AT FULL LOAD

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

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

3. LOW VOLTAGE ALARM TEST

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

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

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

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

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LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

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

UL PUMP CERTIFICATION

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

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

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

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

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

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FOAM SYSTEM TEST

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

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

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

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

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

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

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

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

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

Criteria for the following systems:

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

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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 Loveland Fire & Rescue on all warranty work.

GENERAL LIMITED WARRANTY - THREE (3) YEARS

The vehicle shall be free of defects in material and workmanship for a period of three (3) years or 50,000 miles (or 80,467 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.

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 Loveland Fire & Rescue.

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.

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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.

OVERALL HEIGHT

The overall height (OAH) of the vehicle shall not exceed 120" (10' - 0") from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

OVERALL LENGTH

The overall length (OAL) of the vehicle {will/shall} be approximately 384" (32' - 0").

CONSTRUCTION PERIOD

The completed vehicle shall be delivered within three hundred sixty five (365) 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 Loveland Fire & Rescue as to delays and to what extent these delays have in completing vehicle within the stated construction time period.

APPARATUS DELIVERY

The Loveland Fire & Rescue shall pick up finished apparatus at Contractor's facility. The Contractor shall be responsible for notifying the Loveland Fire & Rescue a minimum of two (2) weeks prior to the completion of apparatus, so that the Loveland Fire & Rescue has sufficient time to schedule pickup.

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Production Specification

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 2012 model year.

COUNTRY OF SERVICE

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

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

APPARATUS TYPE

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

VEHICLE TYPE

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

AXLE CONFIGURATION

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

GROSS AXLE WEIGHT RATINGS FRONT

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

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

GROSS AXLE WEIGHT RATINGS REAR

The rear gross axle weight rating (GAWR) of the chassis shall be 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.

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PUMP PROVISION

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

CAB STYLE

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

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

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

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

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

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

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

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

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

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.

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

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

CAB FRONT FASCIA

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.125 of an inch thick, one hundred percent primary 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, 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.

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, the seams shall be sealed with SEM brand seam sealer and painted with two (2) to four (4) coats of an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene.

The cab shall then be painted with the specific color designated by the customer with a minimum thickness of 2.00 mils of paint, followed by a clear top coat not to exceed 2.00 mils.

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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 910784 red.

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

CAB ENTRY DOORS

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

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

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

CAB ENTRY DOOR TYPE

All cab entry doors shall be full length in design to fully enclose the lower cab steps.

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.

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CAB TEST INFORMATION

The cab shall have successfully achieved survival of the International crash test ECE-R29, Addendum 28, Revision 1 standards as indicated below. It shall also meet SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks and SAE J2422 Cab Roof Strength Quasi-Static Roof Load test requirements.

As part of testing, the frontal area of the cab is struck by a 3,700 pound pendulum weight. The weight is brought back to a sixty degree angle and then the weight is released and allowed to swing forward, imparting some 32,600 lbs/ft of force to the cab front face.

The cab shall be so constructed that after the test, there will be minimal intrusion of the cab structure into the passenger area. The doors shall remain usable for both entry and exit. Also, as part of the test the cab roof must withstand a static load bearing test. The cab shall withstand a weight of over 60,000 pounds without permanent damage or collapse.

The above tests shall be witnessed by and attested to by an independent third party. The test results shall be recorded on/by 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 on the officer side bulkhead below the dash which shall include eight (8) open circuits consisting of three (3) 20 amp, one (1) 30 amp, three (3) 10 amp, and one (1) 15 amp circuit, with relays and breakers with trigger wires which shall be routed to the rocker switch panel.

MULTIPLEX DISPLAY

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

The Vista III display shall measure approximately 10.38 inches wide X 7.50 inches overall. The display shall offer varying fonts and background colors. The display shall be fully programmable to the needs of the customer and shall offer virtually infinite flexibility for screen configuration options.

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DATA RECORDING SYSTEM

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

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

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

POWER & GROUND STUD

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 that shall be 0.38 inch diameter.

AUXILIARY POWER & GROUND STUD

An auxiliary set of power and ground studs shall be provided and installed behind the electrical center cover with a 40 amp breaker. The studs shall be 0.38 inch diameter and capable of carrying up to a 40 amp load switched with the master power switch.

EXTERIOR ELECTRICAL TERMINAL COATING

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

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Production Specification

ENGINE

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

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

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

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

CAB ENGINE TUNNEL

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

DIESEL PARTICULATE FILTER CONTROLS

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

ENGINE PROGRAMMING HIGH IDLE SPEED

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

ENGINE HIGH IDLE CONTROL

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

ENGINE PROGRAMMING ROAD SPEED GOVERNOR

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

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AUXILIARY ENGINE BRAKE

The engine shall utilize a variable geometry turbo (VGT). The VGT auxiliary engine brake shall be an integral part of the turbo and shall offer a variable rate of exhaust flow, which when activated shall slow the engine and in turn slow the vehicle.

The VGT shall actuate the vehicle's brake lights when engaged as an auxiliary brake. A cutout relay shall be installed to disable the VGT when in pump mode or when an ABS event occurs. The VGT engine brake shall activate at a 0% accelerator throttle position when in operation mode.

AUXILIARY ENGINE BRAKE CONTROL

An engine variable geometry turbo 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 variable geometry turbo brake shall be controlled via a virtual button on the Vista 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.

FLUID FILLS

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

ENGINE DRAIN PLUG

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

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.

ENGINE WARRANTY

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

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REMOTE THROTTLE HARNESS

An apparatus interface wiring harness for the engine shall be supplied with the chassis. The harness shall include a connector for connection to the chassis harness which shall terminate in the left frame rail behind the cab for reconnection by the apparatus builder. The harness shall contain connectors for a Class 1 pressure governor/ throttle system as well as a multiplexed gauge and the Enfo IV. 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 discreet wire remote throttle circuit will be turned on for use with a discreet wire based pump controller.

ENGINE PROGRAMMING IDLE SPEED

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

ENGINE FAN DRIVE

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

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

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ENGINE COOLING SYSTEM

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

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

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

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

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

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

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

ENGINE COOLING SYSTEM PROTECTION

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

ENGINE COOLANT

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

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

ELECTRONIC COOLANT LEVEL INDICATOR

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

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.

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Production Specification

COOLANT HOSES

The cooling systems hose shall be formed silicone hose and formed aluminized steel tubing and include stainless steel constant torque band clamps.

ENGINE AIR INTAKE

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

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

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

ENGINE EXHAUST SYSTEM

The exhaust system shall include a diesel particulate filter (DPF), a diesel oxidation catalyst, and a selective catalytic reduction catalyst (SCR) 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 0.065 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 under the frame with the DPF and the SCR canisters horizontally stacked with the SCR inboard of the DPF.

DIESEL EXHAUST FLUID TANK

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

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

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

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Production Specification

ENGINE EXHAUST ACCESSORIES

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

ENGINE EXHAUST WRAP

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

TRANSMISSION

The drive train shall include an Allison Gen IV-E model EVS 3000 torque converting, automatic transmission which shall include electronic controls and an output retarder. 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 Gen IV-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

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 select the fifth speed operation without the need to press the mode button.

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TRANSMISSION FEATURE PROGRAMMING

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

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

An eight (8) pin Delphi connector will be provided next to the steering column connector. This will contain the following input/output circuits to the transmission control module.

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

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 SHIFT SELECTOR

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

TRANSMISSION RETARDER CONTROL

The Allison transmission retarder shall be engaged with the first one-third at 0% throttle and the remaining two-thirds shall be modulated by brake pedal actuation. The system shall include a retarder on/off virtual button on the multiplex display. The engagement of the retarder shall activate the brake lights. The retarder shall be inactive during pump mode.

TRANSMISSION RETARDER CAPACITY LEVEL

The transmission retarder shall be programmed so the maximum retardation shall be at the high capacity level.

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.

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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

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[®].

MIDSHIP PUMP / GEARBOX

A pump and pump module as specified shall be supplied by the apparatus manufacturer and installed by the cab and chassis manufacturer.

MIDSHIP PUMP / GEARBOX MODEL

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

MIDSHIP PUMP RATIO

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

MIDSHIP PUMP GEARBOX DROP

The Waterous pump gearbox shall have a "D" (long) drop length.

MIDSHIP PUMP LOCATION C/L SUCTION

The pump driveline shall include a centerline of the rear axle to the center line of the suction dimension of 95.00 inches.

PUMP SHIFT CONTROLS

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

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

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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. Wire braid air lines shall complete the plumbing to the pump and the "Pump Engaged" switch shall be connected. The air supply shall be pressure protected from service brake system.

FUEL FILTER/WATER SEPARATOR

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

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

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

FUEL LINES

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

FUEL SHUTOFF VALVE

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

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

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 hanger strap assemblies. 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 right fill port located in the forward position and the left fill port located in the middle position of the fuel tank.

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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, two (2) spoke steering wheel located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding.

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.

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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 DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

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 WHEEL BEARING LUBRICATION

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.

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REAR SUSPENSION

The single rear axle shall feature a Hendrickson Fire-Maax™ air suspension. The suspension shall include two optimized air springs mounted to cast structural trailing arms, a transverse cross beam for increased roll stability and two heavy duty shock absorbers. Dual air height control valves shall be installed to ensure equal frame height on both sides of the vehicle regardless of the load. Axle alignment is maintained using two eccentric bushings at each frame bracket. Fire-Maax™ heavy-duty rear air ride suspension delivers the superb ride, stability, and handling required for fire and rescue vehicles.

The rear suspension capacity shall be rated at 24,000 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 385/65R22.5 "L" tubeless radial XFE regional tread.

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

The front tire US Fire Service Intermittent Usage load capacity shall be 20,000 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

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 capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

The rear tire US Fire Service Intermittent Usage load capacity shall be 24,820 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

REAR AXLE RATIO

The rear axle ratio shall be 4.10:1.

TIRE PRESSURE INDICATOR

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

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

FRONT WHEEL

The front wheels shall be Alcoa hub piloted, 22.50 inch X 12.25 inch LvL One™ polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall feature one-piece forged strength and a polished finish that lasts.

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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. The inner rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch aluminum wheels with LvL One™ bright machine finish. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

WHEEL TRIM

The front wheels shall include stainless steel lug nut covers and stainless steel baby moons shipped loose with the chassis for installation by the apparatus builder. The baby moons shall have cutouts for oil seal viewing when applicable.

The rear wheels shall include stainless steel lug nut covers and band mounted spring clip stainless steel high hats shipped loose with the chassis for installation by the apparatus builder.

The lug nut covers, baby moons, and high hats shall be RealWheels® brand constructed of 304L grade, non-corrosive stainless steel with a mirror finish. Each wheel trim component shall meet D.O.T. certification.

TIRE CHAINS

Onspot brand six (6) strand automatic ice chains shall be installed on the rear axle of the chassis to provide instant traction while traveling on ice and snow at speeds below 35 mph.

TIRE CHAINS ACTIVATION

The tire chain system shall be activated by a virtual button on the Vista display and control screen. The virtual button shall display "Active" when the tire chains are engaged. The tire chains shall be interlocked with the transmission and shall engage only if the vehicle is traveling 30 MPH or less. After traveling over 30 MPH, the vehicle must be reduced to a speed below 5 MPH for the tire chains to be engaged or re-engaged. The virtual button, once the vehicle reaches 35 MPH shall be reset to "Inactive". The vehicle must then reduce to a speed below 5 MPH to enable the tire chains virtual button.

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BRAKE SYSTEM

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

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

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

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

Additional handling capabilities shall include Roll Stability Control (RSC) which shall monitor the vehicles rollover threshold based on the lateral acceleration. The system shall activate a computerized device which shall slow the vehicle when the threshold is exceeded in either direction. Normal vehicle operation shall resume once the problematic conditions cease. The RSC system shall be integral with the ABS and ATC systems.

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" 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.

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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 left hand dash to the right of the steering column within easy reach of the driver.

REAR BRAKE SLACK ADJUSTERS

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

AIR DRYER

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

FRONT BRAKE CHAMBERS

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

REAR BRAKE CHAMBERS

The rear axle shall include a piston style MGM 30/30 long stroke brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn operates the foundational brake mechanism forcing the brake shoes against the brake drum.

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 cleaner bracket on the right frame rail behind the officer step.

MOISTURE EJECTORS

An automatic moisture ejector with a manual drain provision shall be installed on the wet tank of the air supply system. Manual pet-cock type drain valves shall be installed on all remaining reservoirs of the air supply system.

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AIR SUPPLY LINES

A dual air system plumbed with color coded reinforced nylon tubing air lines shall be installed on the chassis. 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 TANK SPACERS

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

REAR AIR TANK MOUNTING

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

WHEELBASE

The chassis wheelbase shall be 180.00 inches.

REAR OVERHANG

The chassis rear overhang shall be 54.00 inches.

FRAME

The frame shall consist of single 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, 10.25 inch web X 3.50 inches deep upper and lower flanges X 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each single rail shall be rated by a Resistance Bending Moment (RBM) minimum of 1,830,400 inch pounds and have a minimum section modulus of 16.64 cubic inches calculated by the radius method. The outside dimension frame shall measure 34.25 inches in width.

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 head bolts shall be flanged type with distorted threads, held in place by 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.

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.

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FRAME WARRANTY

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

FRAME CLEAR AREA

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

FRAME PAINT

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

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

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

FRONT BUMPER

The chassis shall be equipped with a severe duty front bumper constructed from structural steel channel. The bumper material shall be .38 thick ASTM A36 steel which shall measure 12.00 inches high with a 3.05 inch flange and shall be 99.00 inches wide with angled front corners.

The bumper shall be primed and painted as specified.

FRONT BUMPER EXTENSION LENGTH

The front bumper shall be extended approximately 18.00 inches ahead of the cab.

FRONT BUMPER EXTENSION FRAME WIDTH

The front bumper extension frame shall feature an overall width of 47.50 inches.

FRONT BUMPER PAINT

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

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

The siren shall be recess mounted on the left side of the front fascia of the bumper approximately in the center of the flat surface between the bumper radius and the frame rail.

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AIR HORN

The chassis shall include two (2) Hadley brand E-Tone air horns which shall measure 24.00 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 on the right side of the bumper in the inboard and outboard positions relative to the right hand frame rail.

AIR HORN RESERVOIR

One (1) air tank, with a 1200 cubic inch reservoir, 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 one (1) Cast Products Inc. model SA4301, 100 watt speaker which shall be recess mounted within the bumper fascia. The speaker shall include a flat mounting flange and be chrome in color.

ELECTRONIC SIREN SPEAKER LOCATION

The electronic siren speaker shall be located on the front bumper face in the center position between the frame rails.

FRONT BUMPER TOW EYES

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

CAB TILT SYSTEM

The entire cab shall be capable of tilting approximately 45-degrees to allow for easy maintenance of the engine and transmission.

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

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

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

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

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

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CAB TILT CONTROL RECEPTACLE

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.

GLASS TINT FRONT DOOR

The windows located in the left and right front doors shall have a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

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.

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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 officer's side behind the front and ahead of the crew doors which shall measure 16.00 inches wide X 26.00 inches high. This window shall be 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 driver's 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.

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 include a 57,500 BTU @ 425 CFM front overhead heater/defroster which shall be provided and installed above the windshield between the sun visors.

The cab shall also include a combination heater air-conditioning unit mounted on the engine tunnel. This unit shall offer eight (8) adjustable louvers, (4 forward facing, four rearward facing) a temperature control valve and two (2) blowers offering three (3) speeds which shall be capable of circulating 550 cubic feet of air per minute. The unit shall be rated for 42,500 BTU/Hr of cooling and 36,000 BTU/Hr of heating. The temperature and blower controls shall be located on the heater/air conditioning unit.

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 bend zinc coated steel fittings and Aero-quip GH 134 flexible hose with Aero-quip EZ clip fittings.

CLIMATE CONTROL DRAIN

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

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CLIMATE CONTROL ACTIVATION

The heating and defrosting controls shall be located on the front overhead climate control unit. There shall be additional heating and air conditioning controls located on the Vista screen, these controls shall be for the tunnel mounted climate control unit only.

A/C CONDENSER LOCATION

A roof mounted A/C condenser shall be installed centered on cab forward of 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 32000 BTU at 1500 engine RPMs. The compressor shall utilize R-134A refrigerant and PAG oil.

CAB CIRCULATION FANS FRONT

The cab shall include two (2) all metal 6.00 inch air circulation fans installed in the outer front cab corners. Each fan shall be controlled by an individual virtual button on the Vista control panel. The fans can be used to help defog the windshield or to increase air circulation for passenger comfort.

CAB INSULATION

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

UNDER CAB INSULATION

The underside of the cab tunnel surrounding the engine shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments.

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 .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 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.

The floor shall have an overlay of 3003-H22 aluminum embossed tread plate which is 0.084 inches thick. The tread plate shall be held down with screws and aluminum trim molding.

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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 include the header above the driver and officer positions which shall be constructed of vacuum formed ABS panel.

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.

TRIM CENTER DASH

The main center dash area shall be constructed of durable vacuum formed ABS composite.

TRIM LH DASH

The left hand dash shall be a one (1) piece durable vacuum formed ABS composite housing which shall be custom molded for a perfect fit around the instrument panel and the lower control panels to the left and right of the steering column.

TRIM RH DASH

The right hand dash trim shall consist of a vacuum formed ABS composite module, which contains a glove compartment with a hinged locking door and a Mobile Data Terminal (MDT) provision. The glove compartment size shall be 13.50 inches wide X 6.25 inches high X 5.50 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 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 REAR CREW

The cab interior shall include two (2) 12 volt cigarette lighter type receptacle located on the forward facing seat box in the crew area. The receptacle shall be connected to the batteries. This receptacle shall provide a power source for 12 volt electrical equipment.

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AUXILIARY POWER POINT COMPARTMENTS

The cab interior shall include two (2) 12 volt cigarette lighter type receptacles. One (1) shall be located in the glove compartment within the right side dash, and one (1) shall be located under the officer side seat inside the seat box riser. This receptacle shall provide a power source for 12 volt electrical equipment.

STEP TRIM

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of polished 5032 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 .084 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 doors of the cab shall include an aluminum plate the same weight and grade as the cab on the interior of the door. The aluminum shall be then painted.

DOOR TRIM KICKPLATE

The inner door panels shall include an aluminum 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.

CAB DOOR TRIM REFLECTIVE

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

INTERIOR GRAB HANDLE "A" PILLAR

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

INTERIOR GRAB HANDLE FRONT DOOR

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

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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 gray in color.

INTERIOR ABS TRIM COLOR

The cab interior vacuum formed ABS composite trim surfaces shall be gray in color.

INTERIOR FLOOR MAT COLOR

The cab interior floor mat shall be gray in color.

CAB PAINT INTERIOR DOOR TRIM

The inner door panel surfaces shall be painted with Zolatone #20-72 silver gray texture finish.

DASH PANEL GROUP

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

SWITCHES CENTER PANEL

The center dash panel shall include six (6) switch positions in the upper left portion of the panel.

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

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.

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SEAT BELT WARNING

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

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

SEAT MATERIAL

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

SEAT COLOR

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

SEAT BACK LOGO

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

SEAT DRIVER

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

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

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

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

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

SEAT BACK DRIVER

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

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SEAT OFFICER

The officer's seat shall be a H.O. Bostrom Firefighter series. The seat shall feature a tapered and padded seat, and cushion. The seat shall be a non-adjustable type seat.

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 this 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 OFFICER

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

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

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

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

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

POWER SEAT WIRING

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

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SEAT REAR FACING OUTER LOCATION

The crew area shall include two (2) rear facing crew seats, which include one (1) located directly behind the driver seat and one (1) located directly behind the officer 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 shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

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

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

SEAT BACK REAR FACING OUTER

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

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

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

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

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

SEAT MOUNTING REAR FACING OUTER

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

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

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

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

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

SEAT BACK FORWARD FACING CENTER

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

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

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

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

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

SEAT MOUNTING FORWARD FACING CENTER

The forward facing center seats shall be installed facing the front of the cab.

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SEAT FRAME FORWARD FACING

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

SEAT FRAME FORWARD FACING STORAGE ACCESS

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

CAB FRONT UNDERSEAT STORAGE ACCESS

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

SEAT COMPARTMENT DOOR FINISH

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

WINDSHIELD WIPER SYSTEM

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

ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR

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

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 a fiber reinforced plastic composite with a black matt 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

Each cab entry door shall include a manually operated door lock. The each door lock may be actuated from the inside of the cab by means of a red knob located on the paddle handle of the respective door or by using a TriMark key from the exterior. The door locks are designed to prevent accidental lock out.

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GRAB HANDLES

The cab shall include one (1) 18.00 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

Retrac Aerodynamic West Coast style single vision mirror heads model 613285 shall be provided and installed on each of the front cab doors.

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

The mirrors shall measure 8.00 inches wide X 19.00 inches high and shall include an 8.00 inch convex mirrors with a stainless steel back, model 980-4, installed below the flat glass to provide a wider field of vision. The flat mirrors shall be motorized with remote horizontal and vertical adjustment. The control switches shall be mounted within easy reach of the driver. The convex mirrors shall be manually adjustable. The flat mirror glass shall be heated for defrosting in severe cold weather conditions.

The mirror backs shall be constructed of vacuum formed chrome plated ABS plastic housings that are corrosion resistant and shall include an amber marker light. The mirrors shall be manufactured with the finest quality non-glare glass.

REARVIEW MIRROR HEAT SWITCH

The heat for the rearview mirrors shall be controlled through a virtual button on the multiplex display.

CAB FENDER

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

MUD FLAPS FRONT

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

CAB EXTERIOR FRONT & SIDE EMBLEMS

The cab shall include three (3) Spartan emblems. There shall be one (1) installed on the front air intake grille and one (1) installed on each side of the cab exterior above the wheel well.

CAB EXTERIOR MODEL NAMEPLATE

The cab shall include custom "Metro Star" nameplates on the front driver and officer side doors.

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IGNITION

A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a ¼ 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 (6) Harris BCI 31 950 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541. The cables shall have encapsulated ends with heat shrink and sealant.

BATTERY TRAY

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

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

BATTERY BOX COVER

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

BATTERY CABLE

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

BATTERY JUMPER STUD

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

ALTERNATOR

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

BATTERY CONDITIONER

A Kussmaul 1200 Pump Plus battery conditioner shall be supplied. The battery conditioner shall be mounted in the cab behind the driver's seat.

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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. The air compressor shall be plumbed to the air brake system to maintain air pressure.

ELECTRICAL INLET

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

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

Amp Draw Reference List:

Kussmaul 1000 Charger - 3.5 Amps

Kussmaul 1200 Charger - 10 Amps

Kussmaul 35/10 Charger - 10 Amps

1000W Engine Heater - 8.33 Amps

1500W Engine Heater - 12.5 Amps

120V Air Compressor - 4.2 Amps

ELECTRICAL INLET LOCATION

An electrical inlet shall be installed on the left hand side of cab over the wheel well.

ELECTRICAL INLET CONNECTION

The electrical inlet shall be connected to the battery conditioner.

ELECTRICAL INLET COLOR

The Kussmaul 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) Code 3 model 65 4.00 inch X 6.00 inch LED programmable amber turn signals which shall be installed in a chrome plastic bezel outboard of the front warning and head lamps.

HEADLIGHT LOCATION

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

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SIDE TURN/MARKER LIGHTS

The sides of the cab shall include (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) cab LED 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 shall be equipped with the "Daytime Running" light feature, which shall illuminate the headlights to 80% brilliance when the ignition switch is in the "On" position and the parking brake is released.

GROUND LIGHTS

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

STEP LIGHTS

The middle step located at each door shall include a 4.00 inch round incandescent 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

The cab shall include two (2) Fire Research model LED900-Q65 surface mount lights, one (1) each side. Each light shall be 6.75 inches high X 9.00 inches wide and have a profile of less than 1.75 inches beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the light.

Each lamp head shall have twenty-four (24) white LEDs that generate a rated 4400 lumens at 12 or 24 volts DC. The lens shall redirect the light along the vehicle and out onto the working area. The light housing shall be aluminum with a chrome colored bezel.

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.

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INTERIOR OVERHEAD LIGHTS

The cab shall include a two-section Weldon incandescent dome lamp with a red and clear lens located over each door. The dome lamps shall be rectangular in shape and shall measure approximately 9.50 inches in length X 5.00 inches in width with a black colored bezel. The clear portion of each lamp shall be activated by opening the respective door and via the multiplex display and both the red and clear portion can be activated by individual switches on each lamp.

An additional incandescent three (3) light module with dual map lights shall be located over the engine tunnel which can be activated by individual switches on the lamp.

MAP LIGHTS

A Federal Signal gooseneck style map light shall be provided. The light shall have a clear lens with a sliding red filter, shall be 18.00 inches tall, and shall have a rheostat control switch on the base. The light shall be located on the right hand side of the dash.

DO NOT MOVE APPARATUS LIGHT

The front headliner of the cab shall include a red Whelen 500 Series 5mm LED light, located in the center for greatest visibility. The light shall be 5.40 inches long X 1.70 inches wide X 0.90 inches high and shall be clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound when a door is open and the parking brake is released.

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

MASTER WARNING SWITCH

A master switch shall be included, as a button on the MUX display screen and be labeled "E Master" for identification. The switch 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.

HEADLIGHT FLASHER

An alternating high beam headlamp flashing system shall be installed into the high beam headlamp 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 dual Code 3 65 LED warning lights which shall offer multiple flash patterns. The lights shall be surface mounted to the front fascia of the cab within a chrome bezel in the inboard position.

INBOARD FRONT WARNING LIGHTS COLOR

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

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FRONT WARNING SWITCH

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

INTERSECTION WARNING LIGHTS

The chassis shall include two (2) Code 3 65BZ LED 4.00 inch X 6.00 inch intersection warning lights, one (1) each side, which shall offer multiple flash patterns.

INTERSECTION WARNING LIGHTS COLOR

The intersection lights shall be red.

INTERSECTION WARNING LIGHTS LOCATION

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

SIDE WARNING LIGHTS

The cab sides shall include a Code 3 65BZ LED 4.00 inch X 6.00 inch warning light, one (1) each side, which shall offer multiple flash patterns.

SIDE WARNING LIGHTS COLOR

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

SIDE WARNING LIGHTS LOCATION

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

SIDE AND INTERSECTION WARNING SWITCH

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

TANK LEVEL LIGHTS

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

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

SIREN CONTROL HEAD

A Federal PA4000 200 watt electronic amplifier siren head shall be provided and flush mounted in the in the switch panel with a location specific to the customer's needs. The siren shall feature the wail, radio broadcast, public address, yelp, priority tones and noise cancelling microphone.

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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 for the driver and a black 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 Linemaster model SP491-S81 foot switch mounted in the front section of the cab for use by the driver and a black push button in the switch panel on the dash. A red momentary siren brake rocker switch 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.

BACK-UP ALARM

An ECCO model 575 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. A virtual button shall be provided on the Vista display and control screen to disable the backup alarm.

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.

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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 data with a red indication zone on the gauge showing critical level of engine oil pressure. 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 coolant temperature. 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.

The instrument panel shall include a light bar that will contain the following LED indicator lights:

RED LAMPS

Low Primary Air Pressure (located in gauge)
Low Secondary Air Pressure (located in gauge)
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
Volts-indicates high or low system voltage (located in gauge)
Low Oil Pressure-indicates low engine oil pressure (located in gauge)
High Coolant Temperature-indicates excessive engine coolant temperature (located in gauge)
DEF Level Bar-DEF level is at critically low level (located in gauge)

AMBER LAMPS

MIL-indicates an engine emission control system fault
Check Engine-indicates engine fault
Check Trans-indicates transmission fault
High Transmission Temperature-indicates excessive transmission oil temperature
ABS-indicates anti-lock brake system fault
Wait to Start-indicates active engine air preheat cycle
HEST-indicates a high exhaust system temperature
Water in Fuel-indicates presence of water in fuel filter
DPF-indicates a restriction of the diesel particulate filter
Regen Inhibit-indicates regeneration has been postponed due to user interaction
Range Inhibit-indicates a transmission operation is prevented and requested shift request may not occur.
SRS-indicates a problem in the RollTek supplemental restraint system
Low Fuel-indicates low fuel, (located in gauge)
DEF-indicates a low level of DEF fluid (located in gauge)
DEF Level Bar-DEF level is at a low level (located in gauge)

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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

DEF Level Bar-indicates useable levels of DEF: 25%, 50%, 75%, 100% (located in gauge)

BLUE LAMPS

High Beam Indicator

CONSTANT AUDIBLE ALARMS FROM GAUGE PACKAGE

High Trans Temp

High or Low Voltage

Seatbelt

Check Engine

Check Transmission

Stop Engine

Low Air Pressure

Fuel Low

Water in Fuel

ESC

High Coolant Temperature

Low Engine Oil Pressure

Low Coolant Level

OSCILLATING AUDIBLE ALARMS FROM GAUGE PACKAGE

Air Filter

Extended Left and Right Turn remaining on

Cab Ajar

Door Ajar

Low Oil Level

BACKLIGHTING COLOR

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

CAB EXTERIOR PROTECTION

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

FIRE EXTINGUISHER

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

ROAD SAFETY KIT

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

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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 twelve (12) months, or the first 24,000 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.

OPERATION MANUAL

There shall be two (2) printed hard copies of the chassis operation manual provided with the chassis. Each manual shall include a parts list specific to the chassis model.

ENGINE AND TRANSMISSION OPERATION MANUALS

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

ENGINE SERVICE MANUALS

There shall be one (1) printed hard copy set of Cummins ISC/ISL engine service reference manuals which shall be provided with the chassis.

AS BUILT WIRING DIAGRAMS

The cab and chassis shall include one (1) complete hard copy set of wiring schematics and option wiring diagrams.

CAB TO AXLE DIMESION

Cab to axle will be 126".

CAB/CHASSIS PREPAYMENT

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

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CHASSIS MODIFICATIONS

LUBRICATION AND TIRE DATA PLATE

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

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

VEHICLE DATA PLATE

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

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

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.

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ACCIDENT PREVENTION

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

PERSONNEL CAPACITY

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

ACCIDENT PREVENTION

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

WEARING HELMET WARNING

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

FRONT BUMPER

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

BUMPER GRAVEL SHIELD

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

BUMPER HOSE WELL COMPARTMENT

The bumper shall include a hose well compartment in center of bumper extension. The hose well shall be as large as room allows and shall be capable of holding a minimum of 150' of 1-3/4" double jacketed structural firefighting hose with nozzle. The front of the compartment shall be designed to allow the hose load to be deployed without obstructions. The compartment door shall be 1/8" NFPA compliant aluminum tread plate with a stainless steel hinge and lift-type hold down latches. The compartment door shall have a gas shock type hold open device. This compartment shall not be watertight but shall include compartment drains.

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

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

AIR HORN(S)

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

FRONT TOW PROVISIONS

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

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EXHAUST

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

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

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

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

MDT MOUNTING/MDT WIRING PROVISIONS

There shall be one (1) sliding MDT mount provided and installed in the MDT mounting provision on the officers side dash area. The MDT mount shall be designed to slide forward and aft utilizing a gas strut to hold it in both positions.

There shall be one (1) Loveland Fire & Rescue supplied Havis Shields MDT dock installed on the specified MDT slide out tray. The MDT dock shall be installed per manufacturers' requirements and wired for battery direct clean 12 volt power and ground.

RADIO/ANTENNA INSTALLATION

There shall be two (2) Loveland Fire & Rescue supplied radio remote head(s) installed on the completed apparatus. One (1) remote radio head shall be located in the cab in the upper left hand quadrant of the officer side dash panel, and one (1) remote radio head shall be located on the upper hinged pump panel on the streetside of the apparatus. A brushed stainless steel hood shall be provided on the exterior radio mount to protect the remote radio head.

The radio transceiver shall be located on the cab floor behind the officers seat.

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

There shall be two (2) Loveland Fire & Rescue supplied communications antenna(s) installed on the cab roof. The antenna(s) shall be located one (1) on the upper raised roof section of the cab above the drivers position, and one (1) on the upper raised roof section of the cab above the officers position. Each antenna lead(s) shall be routed to the radio transceiver area located behind the officers seat.

GPS ANTENNA(S)

There shall be one (1) Loveland Fire & Rescue supplied GPS antenna(s) provided. The GPS antenna(s) shall be located on the upper raised roof section of the cab, centered between the specified radio communications antenna(s). Each GPS antenna lead shall be routed to the MDT provision area of the cab, forward of the officers position.

SCBA BRACKETS

There shall be one (1) Zico ULLH Walkaway type SCBA air pack bracket(s) with strap assembly and two (2) spring clips (model FH-5) designed to hold SCBA cylinders between 5.3" and 5.8" mounted on the rear streetside wall of the crew area of the cab.

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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.

KNOX BOX INSTALLATION

There shall be mounting and power provisions provided for one (1) Loveland Fire & Rescue supplied Knox Box. The Knox Box shall be located in the forward area inside of the officers under seat storage compartment. The Knox box shall be mounted on an angled bracket to allow for easy viewing of the control pad.

The Knox Box shall be installed per manufacturers' requirements and wired for proper master switched 12 volt power and ground.

BINDER STORAGE MODULE

A binder storage module shall be provided in the cab. The binder storage module shall be located directly under the officers seat, between the seat bottom and the under seat storage compartment. The module shall be designed to hold one (1) 3-ring binder measuring approximately 12.00 inches long by 11.50 inches wide by 4.00 inches tall. The module shall be constructed of smooth plate aluminum painted silver-gray Zolatone to match the cab interior.

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

MAP BOX

A map box shall be provided in the cab on the top of the center dash access cover. The map box shall be securely fastened to the cab interior per NFPA 1901 standards. The map box shall be designed to hold one (1) Loveland Fire & Rescue map book measuring approximately 18.50 inches long by 12.00 inches wide by 2.50 inches thick. The map box shall be constructed of smooth plate aluminum painted silver-gray Zolatone to match the cab interior.

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

MEDICAL GLOVE STORAGE MODULE(S)

There shall be two (2) storage boxes for medical gloves located on the lower rear curbside cab wall, adjacent to the forward facing rear seat. Each holder shall be designed to store one (1) box of medical gloves measuring approximately 10.00 inches long by 5.25 inches wide by 3.25 inches tall. The holders shall be constructed out of smooth plate aluminum painted silver-gray Zolatone to match the cab interior.

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HELMET STORAGE

Four (4) OnScene Solutions Talon model helmet storage bracket(s) shall be provided and installed in the cab driving or crew area. The helmet mounting will comply with the 9G NFPA requirements. Helmet brackets shall be mounted on the completed unit as follows:

- One (1) on the lower roof section of the forward area of the cab, justified to the officers side and positioned with the spring slide mounted towards the inside
- One (1) on the rear of the engine tunnel cover, justified to the streetside
- Two (2) on the upper rear wall of the crew area, one (1) per side

CAB CRASH TEST CERTIFICATION

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

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

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

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

CAB MIRRORS, DRIVER ADJUSTABLE

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

MUDFLAPS

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

AIR BRAKE SYSTEM QUICK BUILD-UP

There shall be one (1) cab/chassis supplied Milton male quick connector type air shoreline inlet to provide air to the chassis air tanks from an external source compressed air shoreline hookup in order to maintain full operating air pressure while the vehicle is not running. Air inlet shall be located near driver's door. The female end of the connector shall be supplied by the Loveland Fire & Rescue.

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) Cast Products fuel fill door located in the streetside exterior wheel well panel, behind the rear axle. The fill door shall have a spring-loaded hinged door and a permanent label with the text "DIESEL FUEL ONLY".

FUEL FILL

There shall be one (1) Cast Products fuel fill door located in the curbside exterior wheel well panel, behind the rear axle. The fill door shall have a spring-loaded hinged door and a permanent label with the text "DIESEL FUEL ONLY".

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Production Specification

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.

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

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

The fabrication of the body shall be formed sheet metal. Formed components shall allow the Loveland Fire & Rescue 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 Loveland Fire & Rescue 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.

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

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

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

DRIP RAILS

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

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 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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Production Specification

18" 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 18" 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

Two (2) OnScene Solutions 9" LED Nightstik ground lights shall be mounted below the bumper.

There shall be two (2) OnScene Solutions 9" LED NightStik light(s) installed below bumper capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting shall be switchable but activated automatically when headlights are activated and 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 two (2) SCBA cylinder storage compartments located, one (1) on the curbside, and one (1) on the streetside of rear wheel well area. Each compartment shall be capable of storing two (2) SCBA cylinders (60 min cylinders). Each compartment shall have a vertically hinged door with a positive catch latch installed and painted primary lower body color. Each compartment shall allow the storage of an SCBA cylinder up to 7-3/4" in diameter. The door shall activate the "Hazard Warning Light" in the cab when not in the closed position.

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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;

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

MACHINE POLISHED

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

PAINT - ENVIRONMENTAL IMPACT

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

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PAINT FINISH - SINGLE COLOR

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

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

Touch-up paint shall be provided with completed vehicle.

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

The painted body shall be finished with a clear coat of acrylic urethane for paint protection and maximum quality finish.

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.

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.

COMPARTMENT INTERIOR FINISH

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

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REFLECTIVE STRIPE REQUIREMENTS

Material

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

All retroreflective materials used that are colors not listed in ASTM D 4956, Section 6.1.1, shall have a minimum coefficient of retroreflection of 10 with observation angle of 0.2 degrees and entrance angle of -4 degrees.

Any printed or processed retroreflective film construction used shall conform to the standards required of an integral colored film as specified in ASTM D 4956, Section 6.1.1.

Minimum Requirements

A retroreflective stripe(s) shall be affixed to at least 50 percent of the cab and body length on each side, excluding the pump panel areas, and at least 25 percent of the width of the front of the apparatus.

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

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

REFLECTIVE STRIPE - CAB SIDE

The reflective stripe material shall be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be white in color.

There shall be a 1" Scotchcal reflective stripe located approx. 1" above the main stripe.

- This reflective stripe shall be blue in color.

REFLECTIVE STRIPE - CAB FRONT

The reflective stripe material shall be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be white in color.

There shall be a 1" Scotchcal reflective stripe located approx. 1" above the main stripe.

- This reflective stripe shall be blue in color.

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CHEVRON STRIPE - CAB BUMPER

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

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

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

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

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

REFLECTIVE STRIPE - BODY SIDES

The reflective stripe material shall be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be white in color.

There shall be a 1" Scotchcal reflective stripe located approx. 1" above the main stripe.

- This reflective stripe shall be blue in color.

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

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. Chevron panels shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panels shall have a minimum 10 year warranty for material failure, and colorfastness.

The stripe material shall be 3M Diamond Grade.

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

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LETTERING

The following lettering shall be furnished and installed on the completed unit:

SIDE CAB DOOR LETTERING

There shall be thirty six (36) 4" high SuperGold letters furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

The lettering shall state:

"LOVELAND"
"FIRE"
"RESCUE"

There shall be two (2) 10" high reflective letters furnished and installed on the vehicle.

The lettering shall state:

"X" (Unit number, located in cab mid windows)

- This reflective lettering shall be white in color.

UPPER BODY SIDE LETTERING

There shall be fifty eight (58) 7" high SuperGold letters furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

The lettering shall state:

"Commitment, Compassion & Courage"

CUSTOM DECAL LOGO - 12" -18"

Four (4) custom designed 12" - 18" Scotchcal type retroreflective logo shall be provided and located on the rear cab doors. The exact design and/or artwork shall be provided by the Loveland Fire & Rescue prior to construction.

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Production Specification

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

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

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

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Production Specification

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	56.0"
B	Bottom of Subframe to Bottom of Body	25.0"
C	Vertical Door Opening -with roll-up door	61"

ABOVE REAR AXLE

	<u>Description</u>	<u>Dimension</u>
D	Vertical Door Opening - Above Rear Wheel -with roll-up door	29.0"

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	57.0"

GENERAL

	<u>Description</u>	<u>Dimension</u>
G	Bottom of Drip Rail to Top of Body	13.5"

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

BODY WIDTH DIMENSIONS

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

<u>Area</u>	<u>Description</u>	<u>Dimension</u>
	Compartment Depth	
-	Above Frame	12" min.
-	Below Frame	22" min.

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Production Specification

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.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.

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

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- There shall be two (2) adjustable shelf/shelves approximately 12" deep.
 - Reflective Scotchcal stripe shall be provided on the front face of the shelf. The stripe shall be blue in color.
- A 0.190 inch smooth plate aluminum tool mounting board shall be provided on upper rear wall of the compartment. The tool mounting board shall be spaced ½" off the rear compartment wall to allow for mounting hardware to be used on the rear of the board.



There shall be one (1) fire extinguisher storage module provided in the lower compartment area. The module shall be fabricated from 3/16" (.188) 3003H-14 aluminum alloy sheet and be designed to hold the following extinguishers:

- One (1) 20 lbs. ABC Dry Chemical extinguisher
- One (1) 10 lbs. Carbon Dioxide extinguisher
- One (1) 2-1/2 gallon pressurized water extinguisher

- Two (2) OnScene Solutions 63" LED Nightstik compartment lights, vertically mounted.
- The controls for the specified light tower(s).



The 12 volt electrical distribution panel shall be located in the streetside front lower compartment.



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STREETSIDE COMPARTMENT - ABOVE REAR WHEELS (S2)

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

The compartment door opening shall be approximately 52.0" wide.

This compartment shall have a ROM roll-up door.

- The roll-up door slats and the door trim components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.

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

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- There shall be two (2) adjustable shelf/shelves approximately 12" deep.
 - Reflective Scotchcal stripe shall be provided on the front face of the shelf. The stripe shall be blue in color.
- A 0.190 inch smooth plate aluminum tool mounting board shall be provided on upper rear wall of the compartment. The tool mounting board shall be spaced ½" off the rear compartment wall to allow for mounting hardware to be used on the rear of the board.
- Two (2) OnScene Solutions 36" LED Nightstik compartment lights, vertically mounted.

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Production Specification

STREETSIDE COMPARTMENT - REAR (S3)

The interior useable compartment width shall be approximately 49.0" wide.

The compartment door opening shall be approximately 42.0" 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.
- There shall be NO keyed lock on this roll-up compartment door.

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

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- There shall be two (2) adjustable shelf/shelves approximately 12" deep.
 - Reflective Scotchcal stripe shall be provided on the front face of the shelf. The stripe shall be blue in color.
- A 0.190 inch smooth plate aluminum tool mounting board shall be provided on upper rear wall of the compartment. The tool mounting board shall be spaced 1/2" off the rear compartment wall to allow for mounting hardware to be used on the rear of the board.
- Two (2) OnScene Solutions 63" LED Nightstik compartment lights, vertically mounted.

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Production Specification

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.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.

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

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- There shall be two (2) adjustable shelf/shelves approximately 12" deep.
 - Reflective Scotchcal stripe shall be provided on the front face of the shelf. The stripe shall be blue in color.
- A 0.190 inch smooth plate aluminum tool mounting board shall be provided on upper rear wall of the compartment. The tool mounting board shall be spaced ½" off the rear compartment wall to allow for mounting hardware to be used on the rear of the board.
- Two (2) OnScene Solutions 63" LED Nightstik compartment lights, vertically mounted.



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Production Specification

CURBSIDE COMPARTMENT - ABOVE REAR WHEEL (C2)

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.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.

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

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum shelf-trac for specified component installation.
- There shall be two (2) adjustable shelf/shelves approximately 12" deep.
 - Reflective Scotchcal stripe shall be provided on the front face of the shelf. The stripe shall be blue in color.
- A 0.190 inch smooth plate aluminum tool mounting board shall be provided on upper rear wall of the compartment. The tool mounting board shall be spaced ½" off the rear compartment wall to allow for mounting hardware to be used on the rear of the board.
- Two (2) OnScene Solutions 36" LED Nightstik compartment lights, vertically mounted.

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Production Specification

CURBSIDE COMPARTMENT - REAR (C3)

The interior useable compartment width shall be approximately 49.0" wide.


The compartment door opening shall be approximately 42.0" 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.
- There shall be NO keyed lock on this roll-up compartment door.
- 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 12" deep.
 - Reflective Scotchcal stripe shall be provided on the front face of the shelf. The stripe shall be blue in color.
 - Mounting provisions for one (1) Loveland Fire & Rescue supplied Stihl chain saw(s) shall be provided using mounting straps and brackets to match the previous unit.
- A 0.190 inch smooth plate aluminum tool mounting board shall be provided on upper rear wall of the compartment. The tool mounting board shall be spaced ½" off the rear compartment wall to allow for mounting hardware to be used on the rear of the board.
- Mounts for one (1) Loveland Fire & Rescue supplied sledge hammer, one (1) Loveland Fire & Rescue supplied irons set, one (1) Loveland Fire & Rescue supplied pick head axe, and two (2) open mounts for personal tools.
- Two (2) OnScene Solutions 63" LED Nightstik compartment lights, vertically mounted. 

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REAR COMPARTMENT - CENTER (RC1)

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

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 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.
- There shall be NO keyed lock on this roll-up compartment door.
- 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) 400 lbs. slide-out tray(s) approximately 28" deep and as wide as the compartment layout or door opening permits. The tray top shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate 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.
 - Mounting provisions for one (1) Loveland Fire & Rescue supplied Holmatro gas powered hydraulic power unit(s).
 - Mounting provisions for one (1) Loveland Fire & Rescue supplied Holmatro hydraulic ram(s).
 - Mounting provisions for one (1) Loveland Fire & Rescue supplied Holmatro hydraulic combination tool(s).
 - Mounting provisions for one (1) Loveland Fire & Rescue supplied 50' section of Holmatro CORE hydraulic hose.
 - Reflective Scotchcal stripe shall be provided on the front face of the tray. The stripe shall be blue in color.
- Two (2) OnScene Solutions 63" LED Nightstik compartment lights, vertically mounted.



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Production Specification

PLASTIC FLOOR AND SHELF TILE

All compartment floors, shelves, and trays shall be covered with Dri-Dek plastic interlocking grating.

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

LADDER LIFT SYSTEM, CURBSIDE

A Ziamatic 12 volt DC, 60 amp, HLAS (Horizontal Ladder Access System, Part no. 3097-500-000) shall be provided above the exterior side body compartments, on the curbside.

The lift system shall be electro-hydraulic with built-in electric safety latches and warning alarm when in operation. Access shall still be provided to compartments with system in lowered position. Flashing lights on ends shall produce a visual signal when the system is out of the stored position.

The ladder control panel shall be located on curbside pump panel. The ladder lift system shall be designed to store the specified ladder complement specified.

Storage shall be provided for the following SVI supplied ladders and pike poles;

- One (1) Duo-Safety 900-A aluminum 24' 2-section ladder (14' 2 3/4" x 21 3/4" x 5 3/8")
- One (1) Duo-Safety 775-A aluminum 14' roof ladder (14' 2 1/2" x 19" x 2 3/4")
- One (1) Duo-Safety 585-A aluminum 10' folding ladder (11' 3 1/2" x 1 3/4" x 3 3/4")
- One (1) Duo-Safety 10 FP 10' pike pole
- One (1) Nupla 8' Trash/Arson hook with fiberglass handle

LADDER LIFT INTERLOCK

An interlock circuit shall be included on the ladder lift system to prevent the lift from raising if the curbside hose bed door is in the open position.

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 in color.

BODY PROTECTION PANELS

Body protection panels shall be fabricated of brushed stainless steel. The protection panels shall be installed on the upper body panel under the hard suction mounting provisions and wrap around the corners to the outside body edge on each side.

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Production Specification

REAR BODY HANDRAILS

There shall be two (2) vertical handrails on the rear of the body. Handrails shall be NFPA compliant 1-1/4" extruded aluminum tubing with chrome plated end stanchions.

HOSEBED ACCESS HANDRAIL

There shall be three (3) handrail(s) mounted on the body to assist in access to hose bed area and dunnage areas. Handrails shall be NFPA compliant 1-1/4" extruded aluminum tubing with chrome plated end stanchions.

- One (1) handrail approximately 48" long shall be located above the pump module storage compartment door opening.
- Two (2) handrails shall be located on the upper hose bed doors.



FOLDING STEP(S)

There shall be nine (9) NFPA approved folding step(s) furnished and installed. Three (3) steps shall be located on the front of the body on the streetside for use in accessing the upper dunnage area, and six (6) steps shall be located on the rear of the apparatus, three (3) per side, for use in accessing the hose bed area. Each step shall be cast aluminum with heavy duty stainless steel spring and textured step surface.

LOW VOLTAGE ELECTRICAL SYSTEM- 12 VDC

General

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

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

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

Wiring

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

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

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

Wiring and Wire Harness Construction

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

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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:

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

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

Power Supply

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

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Production Specification

Minimum Continuous Electrical Load

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

- 1) The propulsion engine and transmission
- 1) All legally required clearance and marker lights, headlights, and other electrical devices except windshield wipers and four-way hazard flashers
- 2) 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)
- 3) 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
- 4) The minimum optical warning system, where the apparatus is blocking the right-of way
- 5) The continuous electrical current required to simultaneously operate any fire pumps, aerial devices, and hydraulic pumps
- 6) 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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Production Specification

12 VOLT MULTIPLEX CONTROL CENTER

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

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

WELDON CERTIFICATION

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

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

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

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.

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Production Specification

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.

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.

REAR SCENE LIGHTS (BACK-UP LIGHTS)

There shall be a **switch on the left side rear** to convert backup lights and rear step lights to scene lights during night operations. The switch shall be of momentary style and shall be connected to a bi-stable relay, allowing multiple switching locations. The scene/reverse lights shall automatically shut off when the parking brake is disengaged.

CAB SPOTLIGHT

There shall be one (1) Golight Radioray 2021 motorized spotlight(s) that operates via a wired dash mount controller with joystick and on/off button located in the lower left quadrant of the officer side dash panel. 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 Radioray is mounted to the surface of vehicle via 4 screws and a rubber gasket for a quick, safe and secure attachment.

The Cr5 Pentabeam II technology combines a five-sided parabolic reflector with an axial filament Phillips H-9 bulb. This 5,000,000 Adjusted Retail Candle Power (400,000 Industrial Candlepower) configuration generates an extremely bright beam to penetrate dark spots, cast a broad spectral pattern and reach distances of 700 feet.

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Production Specification

CAB HAZARD WARNING LIGHT

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

- 7) Any passenger or compartment door is open
 - Equipment rack is not in stowed position
 - Light tower is extended

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

BACK-UP ALARM

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

TAIL LIGHTS

Rear body tail lights shall be vertically mounted per Federal Motor Vehicle Safety Standards. The following lights shall be furnished:

- Two (2) Code 3 amber LED 65STA turn signal lights
- Two (2) Code 3 red LED 65STR stop/tail lights
- Two (2) Code 3 clear LED 65RV back-up lights

Two (2) Code 3 65STK3, 3-light polished aluminum bezels shall be provided, one (1) each side vertically mounted on the rear of the apparatus body for the above tail lights.

RUNNING BOARD STEP LIGHT

One (1) OnScene Solutions 63" LED Night Stik lights provided under the hose bed walkway step. The light shall be wired to the ground light circuit of the chassis.

MIDSHIP MARKER/TURN SIGNAL

Two (2) Whelen LED midship body clearance marker/turn signal lights (T0A00MAR) shall be installed. There shall be one (1) light on each side of the body, in the wheel well, ahead of the rear axle. Both lights shall have an amber lens and operate with the chassis clearance marker and turn signals.

MARKER LIGHTS

The apparatus body shall be equipped with all necessary clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) 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.

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Production Specification

ELECTRONIC SIREN

The siren control head shall be supplied and installed by the cab/chassis manufacturer.

SIREN SPEAKER

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

BROW MOUNT LED FLOODLIGHT

One (1) Fire Research Focus model FCA800-Q14 contour roof mount light shall be provided on the forward cab roof. The mounting brackets shall attach to the bottom of the lamphead and be machined to conform to the roof radius. Wiring shall extend from a weatherproof strain relief at the rear of the lamphead.

The lamphead shall ten (10) ultra-bright white LEDs. It shall operate at 12/24 volts DC, draw 13/6.5 amps, and generate 14,000 lumens. The lamphead shall direct 50 percent of the light onto the action area while providing 50 percent to illuminate the working area. The lamphead shall incorporate heat-dissipating fins and be no more than 4" high by 11 1/2" wide. The lamphead and mounting arm shall be powder coated white.

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

REAR SCENE LIGHTS

Two (2) Code 3 88Z26 (9"x 7") recess mounted, 50 watt, halogen scene lights with a 26 degree lens and chrome flange shall be provided on the rear of the apparatus body.

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

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

Loveland Fire / Rescue

Pumper

Production Specification

COMMAND LIGHT – SHADOW - RT- LED

A Command Light, Shadow-RT, model SL442-RT-LED, light tower shall be provided for installation on the vehicle. The Command Light assembly shall be of aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

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 48" long x 30" wide x 8-1/2" high and weigh approximately 75 pounds.

The electrically controlled unit shall not require usage of the vehicle 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 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 as required by NFPA1901. 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 light tower shall be controlled with a hand-held 6 foot umbilical line remote control located in compartment per itemized compartment list. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature. The controls on the remote box shall be:

- Two (2) switches for each 2 light banks.
- One (1) switch for elevating /retracting the arm.
- One (1) switch for rotation of the light bank.
- One (1) switch to engage Auto-Park.
- One (1) light to indicate when light bank is out of roof nest position.
- One (1) light to indicate when light bank is rotated to proper nest position.

The Command Light shall be equipped with the following bank of floodlights:

Floodlight manufacturer:	Whelen Engineering	Total watts of light tower:	600 watts
Number of lamp heads:	Four (4) Pioneer Plus LED	Amperage per lamp head:	12.5 amps
Voltage:	12 volt	Total amperage of light tower:	50 amps
Watts of each lamp head:	150 watt	Total Lumens of light tower:	45,000 lumens

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 delivered apparatus.

There shall not be a strobe light mounted to the top of the upper lamp tree of the light tower.

The specified light tower(s) shall be mounted on the roof of the apparatus body, between the pump module and the hose bed.

Loveland Fire / Rescue

Pumper

Production Specification

TRAFFIC DIRECTIONAL LIGHT

A custom designed traffic directional light shall be provided in the rear edge of the hose bed doors. The directional light shall consist of eight (8) Code 3 model LXEX1F-A amber LED lights mounted four (4) per side. The traffic directional light control shall be located in the Vista display in the cab within easy reach of driver

- The traffic directional light shall be surface mounted to the rear edges of the hose bed doors on the upper rear body.

FIRECOM INTERCOM SYSTEM

The following Loveland Fire & Rescue supplied Firecom 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;

INTERCOM SYSTEM INSTALLATION

The above listed intercom system shall be installed in the following locations in the cab:

- Master Control Station – Mounted under the center dash cover.
- Radio Interface Module – Connected to the specified radio system.
- Remote Control Head – Mounted in the lower right hand quadrant of the officer side dash panel.
- Driver's – Mounted above the left shoulder position on the outside wall.
- Officer's – Mounted above the right shoulder position on the outside wall.
- Driver's side rear facing – above the right shoulder on the wall or ceiling.
- Officer's side rear facing – above the left shoulder on the wall or ceiling.
- Driver's side forward facing center – above the left shoulder on the rear wall or ceiling.
- Officer's side forward facing – above the left shoulder on the rear wall or ceiling.

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Pumper

Production Specification

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

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

Loveland Fire / Rescue

Pumper

Production Specification

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 LIGHT

There shall be one (1) Code 3 model 2169NFPA1, 69" long lightbar permanently mounted on cab roof.

Lightbar Configuration (streetside to curbside):

<u>Section</u>	<u>Components</u>	<u>Color</u>
1	(3) LED X Single Module with Directional Optics	Red LED/ Clear Lens
2	(1) LED X Single Module with Directional Optics	Red LED/ Clear Lens
3	(1) LED X Single Module with Wide Optics	Red LED/ Clear Lens
4	(1) LED X Single Module with Directional Optics	Red LED/ Clear Lens
5	(1) LED X Single Module with Wide Optics	Red LED/ Clear Lens
6	(1) LED X Single Module with Wide Optics	Red LED/ Clear Lens
7	(1) LED X Single Module with Wide Optics	Red LED/ Clear Lens
8	(1) LED X Single Module with Directional Optics	Red LED/ Clear Lens
9	(1) LED X Single Module with Wide Optics	Red LED/ Clear Lens
10	(1) LED X Single Module with Directional Optics	Red LED/ Clear Lens
11	(3) LED X Single Module with Directional Optics	Red LED/ Clear Lens

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

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

GTT OPTICOM

One (1) GTT Opticom emitter light shall be provided inside specified light bar. The Opticom shall be activated with light bar and de-activated when the park brake is set and the vehicle is in blocking mode.

ZONES B AND D - SIDE WARNING LIGHTS

UPPER REAR CORNER WARNING LIGHTS

ZONE C - REAR WARNING LIGHTS

Two (2) Code 3 model LS222 LED beacon lights shall be provided in the rear upper zone of the body. There shall be one (1) light mounted on each side, near the corners of the body. Each light shall have two (2) levels of LED light modules, and shall be programmed to a rotating flash pattern.

The beacon lens shall have an opaque covering applied in the front of the lens to prevent light from the beacon from shining into the drivers mirrors.

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

The beacons shall have red lens(es).

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Production Specification

LOWER LEVEL OPTICAL WARNING DEVICES

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

The optical center of the lower-level optical warning devices at the rear of the vehicle shall be mounted on or behind the rear axle centerline and as close to the rear corners of the apparatus as is practical. The optical center of any lower-level device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground for large apparatus, and 18 in. and 48 in. (460 mm and 1220 mm) above level ground for small apparatus.

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

ZONE A - FRONT WARNING LIGHTS

The warning lights shall be provided and installed before the cab chassis arrives at the manufacturing facility. They shall be Code 3 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 provided and installed before the cab chassis arrives at the manufacturing facility. They shall be Code 3 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) Code 3 model LXEX1F-R single head (5" x 2") surface mount LED X lights provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the 12 volt control panel in the cab.

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

There shall be two (2) Code 3 model 65BZR (6" x 4") surface mount LED lights provided, one (1) each side. Each light shall have a red lens and a chrome finished flange.

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

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Code 3 model 65BZR (6" x 4") surface mount LED lights provided, one (1) each side. Each light shall have a red lens and a chrome finished flange.

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

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Pumper

Production Specification

WATEROUS CMUCU20C 1500 GPM TWO STAGE FIRE PUMP

A mid-ship mounted Waterous Model CMUCU20C2 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 1500 GPM.

TWO STAGE FIRE PUMP

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

TWO STAGE TRANSFER VALVE

The transfer valve shall be of the latest ball type design. The valve shall be all bronze construction and incorporate a hydraulically balanced seal to minimize leakage around the ball and assure maximum pump efficiency. The transfer valve shall operate smoothly without sticking, even when it is exposed to sandy or dirty water.

The transfer valve shall be operated by an electric actuator that will be controlled by a switch on the pump operator's panel. There shall be two (2) indicator lights to show when the pump is operating in pressure or volume mode.

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

MECHANICAL SEALS

The pump shall be equipped with self-adjusting, maintenance free mechanical shaft seals that shall not require manual adjustment. These seals shall be designed in a manner such that they shall remain functional enough to permit continued use of the pump in the unlikely event of a seal failure.

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.

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Production Specification

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 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. 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.

PUMP MANUAL

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

FIRE PUMP PAINTING

The fire pump shall be painted the lower body color.

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 Loveland Fire & Rescue.

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.

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Production Specification

FIRE PUMP TEST LABEL

A fire pump performance and rating label shall be installed on the fire apparatus pump panel. The label shall denote levels of pump performance and testing completed at factory. These shall include GPM at net pump pressure, RPM at such level, and other pertinent data as required by applicable NFPA standards. In addition, the pressure control device, tank to pump flow tests, and other required testing shall be completed.

In addition, the entire pump, suction and discharge passages shall be hydrostatically tested to a pressure as required by applicable NFPA standards. The pump shall be fully tested at the pump manufacturer's factory to the performance specifications as outlined by applicable NFPA standards.

UL PUMP CERTIFICATION

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

- 100% of rated capacity at 150 psi, 1000 kPa net pressure.
- 70% of rated capacity at 200 psi, 1350 kPa net pressure.
- 50% of rated capacity at 250 psi, 1700 kPa net pressure.

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 500 PSI.

The pump shall be free from objectionable pulsation under all normal operating conditions.

ALTITUDE REQUIREMENT

The apparatus shall be designed to meet the specified rating at 7,000 feet altitude.

AIR OPERATED PUMP SHIFT

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

MANUAL OVERRIDE PUMP SHIFT

A manual override system shall be supplied for the pump shift 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. Full instructions shall be inscribed on a plate near the pump shift controls.

PUMP SHIFT INDICATING LIGHTS

There shall be two (2) green pump system shift indicator lights in the chassis cab. The first light shall become energized when the chassis parking brake has been set and the pump has completed its shift into pump gear and shall be labeled "Pump Engaged". The second light shall become energized and when the pump and the chassis transmissions have been shifted completely into the correct gears for pumping, this light shall be labeled "OK to Pump".

There shall be one (1) green pump system shift indicator light located on the operator's panel. This light shall only become engaged when the chassis parking brake has been set, and when the pump and the chassis transmissions have been completely shifted into the correct gears. The light shall be located adjacent to the throttle control and shall be labeled "Warning: Do Not Open Throttle Unless Light Is On"

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Pumper

Production Specification

MASTER DRAIN VALVE

There shall be one (1) Waterous manifold type drain valve(s) installed in the pump compartment. All pump drains shall be connected to the master drain valve. The drain valve shall be controlled adjacent to the pump panel. The control shall be a hand wheel knob marked "open" and "closed". Each drain port shall be completely independent where the master drain valve will not allow water or air flow between any two (2) inlet ports.

ELECTRIC PRIMING PUMP CONTROL AT PUMP PANEL

The Waterous priming system shall include an oil-free rotary vane priming pump rigidly attached to the pump transmission and activated by a vacuum-activated priming (VAP) valve with a single push-button switch. Valve actuation may be accomplished while the main pump is in operation, if necessary to assure a complete prime.

The priming system shall be controlled at the pump operator's panel. The control shall be provided in the form of a momentary push button that is easily actuated with a gloved hand.

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

PRIMER CONTROL

There primer shall be activated by an electric push button control valve.

6" STEAMER SUCTION INLET(S)

There shall be two (2) 6" male steamer inlet(s) provided with the pump. Each suction fitting shall include a removable die cast screen to provide cathodic protection for the pump thus reducing corrosion.

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Production Specification

6" MIV ELECTRIC VALVE - STREETSIDE

There shall be one (1) Akron 6" MIV valve mounted on the streetside of the pump.

The inlet valve shall be a full flow butterfly type valve designed to mount on the fire pump between the suction tube extension and suction tube behind the pump compartment panel. The valve shall not interfere with other suction or discharge openings on the fire pump or with pump operating controls when properly mounted.

Testing and rating of the valve shall be accomplished at the valve manufacturers factory. The valve, less relief valve, shall be hydrostatically tested to 600 PSIG. The valve shall then be vacuum tested to 26 inches Hg.

The inlet valve(s) shall be operated by a 12 VDC electric motor with remote capabilities or by a manual handwheel located next to the suction tube.

Each valve shall be provided with panel placards indicating control operation. The placards shall have status lights to indicate whether the valve is open, closed or traversing from one position to another.

Each valve shall be provided with a gear actuator that will cycle the valve from OPEN to CLOSED position in no less than 3 seconds. The gear actuators shall be sealed units designed to provide reliable service in the harsh pump compartment environment.

The 12 VDC motor on the electric operated valve shall be provided with an automatic resetting, thermally compensated, overcurrent protection circuit breaker to protect the 12 VDC motor and apparatus electrical system.

The electrical wiring for the valve shall be minimum 14 AWG, type SXL or GXL (SAE J1128) and shall be protected using 257 F minimum flame retardant, moisture resistant loom or braid. All electrical connections shall use sealed Packard Weather Pack connectors to provide extra protection from the harsh pump compartment environment to ensure long life and reliable operation.

The valve body shall have a ¾" female NPT threaded port on the top to allow installation of an NFPA compliant large diameter hose air bleeder valve. The air bleeder valve shall be mounted on the operator panel and be controllable by the pump operator. Air bleeder valve connections shall have a restriction no larger than ¾ inch to prevent water hammer when filling hose.

The valve body shall have a ¼" female NPT threaded port on the bottom to permit connection of an individual water drain valve.

A suction tube extension 7-¼" wide shall be used to allow for the additional length of the inlet valve. The shorter suction tube extension, along with a 4, 6 or 9" suction tube, will keep the suction tube threads within the apparatus running boards while maintaining clearance for adapters.

A panel mounted manual override shall be provided to permit operation of the electric remote control valve in the event of abnormal operating conditions. The manual override shall be designed to permit operation of the valve without the use of special tools or disassembly of the pump compartment panel or valve.

The valve shall be equipped with o-ring seals for the mounting flanges. The o-ring seal groove shall be sized for proper squeeze of the o-ring for pressures in excess of 600 PSIG.

- The intake shall be provided with a 6" NH x 5" Storz 30 degree down sweep elbow with hardcoat finish.
- The intake shall be provided with a 5" Storz blind cap with hardcoat finish and retaining chain.

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- One (1) 3/4" brass 90 degree ball type intake bleeder valve shall be provided for the above intake. There shall be a 1/4 turn control to manually open the bleeder valve when the line is under pressure located on pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.

6" MIV ELECTRIC VALVE - CURBSIDE

There shall be one (1) Akron 6" MIV valve mounted on the curbside of the pump.

The inlet valve shall be a full flow butterfly type valve designed to mount on the fire pump between the suction tube extension and suction tube behind the pump compartment panel. The valve shall not interfere with other suction or discharge openings on the fire pump or with pump operating controls when properly mounted.

Testing and rating of the valve shall be accomplished at the valve manufacturers factory. The valve, less relief valve, shall be hydrostatically tested to 600 PSIG. The valve shall then be vacuum tested to 26 inches Hg.

The inlet valve(s) shall be operated by a 12 VDC electric motor with remote capabilities or by a manual handwheel located next to the suction tube.

Each valve shall be provided with panel placards indicating control operation. The placards shall have status lights to indicate whether the valve is open, closed or traversing from one position to another.

Each valve shall be provided with a gear actuator that will cycle the valve from OPEN to CLOSED position in no less than 3 seconds. The gear actuators shall be sealed units designed to provide reliable service in the harsh pump compartment environment.

The 12 VDC motor on the electric operated valve shall be provided with an automatic resetting, thermally compensated, overcurrent protection circuit breaker to protect the 12 VDC motor and apparatus electrical system.

The electrical wiring for the valve shall be minimum 14 AWG, type SXL or GXL (SAE J1128) and shall be protected using 257 F minimum flame retardant, moisture resistant loom or braid. All electrical connections shall use sealed Packard Weather Pack connectors to provide extra protection from the harsh pump compartment environment to ensure long life and reliable operation.

The valve body shall have a 3/4" female NPT threaded port on the top to allow installation of an NFPA compliant large diameter hose air bleeder valve. The air bleeder valve shall be mounted on the operator panel and be controllable by the pump operator. Air bleeder valve connections shall have a restriction no larger than 3/4 inch to prevent water hammer when filling hose.

The valve body shall have a 1/4" female NPT threaded port on the bottom to permit connection of an individual water drain valve.

A suction tube extension 7-1/4" wide shall be used to allow for the additional length of the inlet valve. The shorter suction tube extension, along with a 4, 6 or 9" suction tube, will keep the suction tube threads within the apparatus running boards while maintaining clearance for adapters.

A panel mounted manual override shall be provided to permit operation of the electric remote control valve in the event of abnormal operating conditions. The manual override shall be designed to permit operation of the valve without the use of special tools or disassembly of the pump compartment panel or valve.

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The valve shall be equipped with o-ring seals for the mounting flanges. The o-ring seal groove shall be sized for proper squeeze of the o-ring for pressures in excess of 600 PSIG.

- The intake shall be provided with a 6" NH x 5" Storz 30 degree down sweep elbow with hardcoat finish.
- The intake shall be provided with a 5" Storz blind cap with hardcoat finish and retaining chain.



One (1) 3/4" brass 90 degree ball type intake bleeder valve shall be provided for the above intake. There shall be a 1/4 turn control to manually open the bleeder valve when the line is under pressure located on pump panel and plumbed to drain the lowest point in the plumbing.



One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.

HEAT EXCHANGER

A heat exchanger shall be provided on the pump driving engine cooling system that uses water from the discharge side of the pump to cool the engine coolant through the use of a closed heat exchanger. The water from the pump and the engine coolant shall not be intermixed. This cooling system shall be controlled by a valve on the pump operator's station.

1/2" PUMP COOLER LINE

There shall be one (1) 1/2" pump cooling/recirculation line from the pump that is connected directly into the booster tank. The cooler line shall be controlled with a quarter-turn ball valve on operator's panel, and it shall be labeled "Pump Cooler On/Off".

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.

INTAKE RELIEF VALVE

The intake relief valve shall be a pilot-operated intake relief valve and shall be provided by the pump manufacturer. The pilot valve shall allow adjustment from 50 psi to 250 psi. A pilot-operated intake relief valve will allow full opening of the relief valve with a very small rise in intake pressure above set pressure.

Such dumping shall be through a system of piping terminating in an area away from the operator's position. The discharge end of the piping shall have a 2-1/2" NH threaded connection and be labeled "DO NOT CAP".

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Production Specification

ADVANTUS 3 FOAM SYSTEM DETAILED SPECIFICATIONS

The apparatus shall be equipped with an automatic microprocessor controlled, conductivity based, direct injection, discharge side foam management system. The installed system shall be capable of accurately injecting all commercially available Class A foam concentrates and most Class B foam concentrates. The foam injection and mixing operation shall utilize electrical conductivity and temperature measurements of the clear water and foam solution as well as measured water flow to provide highly accurate and consistent mix ratios within the specified flows and pressures. The system must be accurate over the specified operational range when installed according to the instructions contained in the factory supplied installation manual.

Microprocessor Controller

A 16-bit mixed signal microcontroller with 60 kB flash memory, 2 kB RAM and 12-bit analog to digital converter shall be utilized to receive input from the incoming water conductivity probe, temperature sensor, flowmeter and foam solution conductivity probe, compare values and control the foam pump motor, providing accurate injection into the foam process manifold per the operator selected mix ratio. The controller and related electronics shall be located inside a sealed aluminum housing which is mounted to the motor/pump mounting base plate. All electrical components of the foam system shall be sealed to NEMA 4X standard or equivalent, suitable for mounting inside the apparatus pump compartment.

Operator Interface Terminal

The system shall be equipped with an operator interface terminal (OIT) which shall be mounted on the pump operator's panel. The OIT housing shall be constructed of aluminum with a chrome plated finish. A UV stable polycarbonate overlay with integral labeling shall be provided on the face of the OIT. The OIT shall be fastened to the pump panel with four stainless steel, swing-out, self adjusting compression latches which eliminate the use of screws, nuts or bolts in the attachment. The digital display shall consist of four .56" high digits, each with seven segment ultra-bright LED's and seven ultra-bright status LED's. Four flush mounted pushbutton controls shall be provided on the control face which are constructed of stainless steel and designed for millions of cycles in severe duty applications. The OIT shall enable the pump operator to perform the following functions for the foam system:

- Provide push-button control of foam ratios from 0.1% to 1%, in 0.1% increments; 3% and 6%
- 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 used
- Show which foam supply tank is in use
- Perform setup and calibrate functions for the microcontroller
- Flash a "low concentrate" warning when the foam concentrate tank(s) run(s) low
- Flash an "error" warning with associated code in the event of an electronic malfunction
- Provide a manual back-up mode, controlled by the operator
- Means shall be provided for pre-selection of measurement units: U.S. Gallons, Imperial Gallons or Liters

Remote Activation

The system can be activated from an external 12 or 24-volt electrical source, such as a pump-in-gear circuit or engine ignition power which can eliminate one step in the operational sequence.

Flowmeter

A paddlewheel-type flowmeter shall be installed in the process manifold upstream of the foam injection point and shall be connected to the microcontroller. A stainless steel paddlewheel with jewel bearings and carbide axle shall be utilized for improved accuracy and long life. The flowmeter shall have a 600 PSI (34 BAR) pressure rating per NFPA requirements. The flowmeter function on the OIT shall display the water rate of flow in real time as well as the total water used during and after foam operations.

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Pumper

Production Specification

Foam Pump

A 12 or 24-volt electric motor driven Hydra-Cell positive displacement foam concentrate pump, rated at 3 gpm (11.3 lpm) at 150 psi (10 BAR) and with operating pressures up to 450 psi (32 BAR), shall be installed in a suitable, serviceable location. The system shall draw a maximum electrical load of 40 amps @ 12 VDC or 21 amps @ 24 VDC. A pump motor electronic driver, located inside the controller housing shall receive signals from the microcontroller and power the 1/2 hp (.4 Kw) electric motor in a variable speed duty cycle to ensure that the correct amount of foam concentrate as set by the pump operator is injected into the water stream. The highly efficient Hydra-Cell Industrial diaphragm pump is a hydraulically balanced diaphragm pump offering many inherent advantages over other types of pumps for pumping foam concentrates.

The Hydra-Cell pump converts rotating motion into linear motion by means of a drive shaft assembly, sequentially moving hydraulic pistons which are filled with oil in a rearward and forward stroke. The oil held in the piston balances the back side of the diaphragm and causes them to flex forward and back providing the pumping action.

To provide long lasting, trouble-free diaphragm life, the Hydra-Cell hydraulically balances the diaphragm over the pump's entire pressure range, even at peak pump pressures. Each diaphragm has its own pumping chamber with its own suction and discharge valve assembly, so as each diaphragm strokes back, fluid enters the pump through the inlet and on the forward stroke the diaphragm forces the fluid through the discharge valve assembly into the outlet manifold and out of the pump. All of the diaphragms in the pump are equally spaced from one another while overlapping pumping strokes result in low discharge pulsation. Pump output flow shall be proportional to pump shaft speed (RPM) regardless of pressure, thus a linear flow relationship shall exist with increasing or decreasing pump RPM.

The pump shall be self priming and capable of drawing foam concentrate from reservoirs or containers which are located below the pump inlet. Lift time and distance will depend on product viscosity. Overboard foam sources may be utilized when the apparatus is equipped with the proper piping, connections and selector valve(s).

For reduced maintenance, the pump shall utilize no packing, cups or seals. All metal pump components which may come in contact with foam concentrate shall be brass or stainless steel, making the pump resistant to chemical and corrosive attack. It shall be capable of handling suspended abrasives without sustaining any damage. The pump shall also be capable of running dry for extended periods without sustaining damage.

Control Cables and Connectors

The cables for interconnection of the control unit, OIT, conductivity sensors and flowmeter shall be electrically shielded to prevent radio frequency or electro-mechanical interference.

Low Tank Level Switch

A low tank level float switch shall be installed in each foam concentrate tank and connected to the control unit to alert the operator to low foam supply conditions

Process Manifold – 2", 2.5" or 3" ID

The foam system process manifold shall be constructed of Schedule 10 316 stainless steel. Victaulic groove connections shall be provided at each end of the manifold for connection to the apparatus plumbing.

The process manifold shall include an incoming water conductivity probe with temperature sensor, paddlewheel flowmeter, foam injection check valve, Akron Brass waterway check valve and foam solution conductivity probe.

An Akron full-flow brass body check valve shall be provided in the foam process manifold waterway to prevent foam contamination of fire pump and water supply.

A check valve constructed of brass and stainless steel shall be provided in the foam concentrate line at the foam injection point to prevent water backflow into the foam supply reservoir(s).

Conductivity probes shall be constructed of 316 stainless steel and include gap spacers and a reverse polarity feature to prevent build-up of deposits on the probe surfaces.

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Production Specification

The process manifolds, with all associated components installed, shall have the following flow ratings at 150 PSI:

2" – 400 GPM
2.5" – 750 GPM
3" – 1250 GPM

System Components

Components of the complete foam system supplied by Waterous shall include:

Operator interface terminal
Pump module with electric motor/motor driver and microcontroller unit
Foam concentrate strainer
Shielded electrical cables for connection of all electronic components
Process manifold - 2" ID (standard) 2.5" or 3" ID (*optional*) - with flowmeter and associated components as specified
Low level tank switch (*optional*)
Electrically actuated dual tank valve (if more than one tank) with flush system and panel mounted control switch (*optional*)
System diagram and rating placards (per NFPA 1901) for pump panel mounting (*optional*)
Installation, operation and service manuals

An installation and operation manual shall be provided for the unit along with a copy of the warranty policy. The system must be installed and serviced by an authorized Waterous OEM or service center.

Installer Supplied Items

The Advantus 3 system includes the major components required for installation with the exception of the following which are to be supplied by the installer:

- Foam Concentrate Supply Line(s)

Hose(s) and fittings that run from the foam tank to the foam pump inlet should be a minimum of ¾" inside diameter, depending upon the viscosity of the foam concentrate(s) to be used. Hose and fittings must be rated for a minimum of 23 inches (584.2 mm) Hg of vacuum and 50 PSI (3 BAR) of pressure. The hose and fittings must be made of corrosion resistant material and be compatible with the foam concentrates to be used. Foam supply hose shall have a clear wall as required by NFPA to allow viewing of foam priming operations.

1. Foam Concentrate Discharge Line

Hose(s) and fittings that are routed from the foam pump to the foam injection check valve should be a minimum of ½" inside diameter and have a rated working pressure of at least 450 PSI (32 BAR). If the high pressure option is selected, the rated working pressure of the hose and fittings shall be at least 600 PSI (41 BAR). The foam discharge hose and fittings must be made of corrosion resistant material and be compatible with the foam concentrates to be used.

2. Foam Concentrate Tank(s)

Foam concentrate tank(s) shall be supplied that suit the application and needs of the end user. The foam concentrate tank(s) should meet the minimum requirements as published in the applicable NFPA apparatus standards.

3. Electrical Supply

Electrical wiring and circuit protection must be supplied and connected to the apparatus master electrical system as described in the installation manual.

Warranty

The system shall have a two-year limited manufacturer's warranty.

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Production Specification

Discharges

Foam shall be provided to the following discharges:

- Two (2) 1¾" Rear Hose Bed Pre-Connected Discharges
- One (1) Booster Reel Discharge
- One (1) Front Bumper 1¾" Discharge
- One (1) Rear Hose Bed 2½" Alley Pre-Connected Discharge

PLUMBING SPECIFICATIONS

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

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

STAINLESS STEEL INTAKE MANIFOLD

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

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

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.

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.

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Production Specification

INTAKES

The pump shall have a sufficient number and size of intakes to perform the apparatus pump system certification test. The intakes shall have male National Hose Threads (NST) if the apparatus is to be used in the United States.

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

A sign shall be provided on the pump operator's panel that states the following:

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

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

At least one valved intake shall be provided that can be controlled from the pump operator's position. The valve and piping shall be a minimum 2-1/2 in. (65 mm) nominal size.

If the intake is 2-1/2 in. (65 mm) nominal size, the intake shall be equipped with a female swivel coupling with NH threads. Any 3 in. (75 mm) or larger intake valve except the tank-to-pump intake valve shall be a slow-operating valve.

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

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);

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STREETSIDE INTAKE

There shall be one (1) 2-1/2" gated intake(s) located on the streetside of the apparatus. Each 2-1/2" intake shall terminate with a 2-1/2" NSTF chrome plated swivel adapter. There shall be one (1) 2-1/2" NSTM chrome plated plug and chain for each intake.

- One (1) Akron Brass 8000 series, 2-1/2" valve(s)
 - Valve(s) shall be controlled with a handle for direct valve operation through panel.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.

CURBSIDE INTAKE


There shall be one (1) 2-1/2" gated intake(s) located on the curbside of the apparatus. Each 2-1/2" intake shall terminate with a 2-1/2" NSTF chrome plated swivel adapter. There shall be one (1) 2-1/2" NSTM chrome plated plug and chain for each intake. Each 2-1/2" intake shall have a 3/4" drain valve.

- One (1) Akron Brass 8000 series, 2-1/2" valve(s)
 - Valve(s) shall be controlled with a handle for direct valve operation through panel.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.


TANK TO PUMP CHECK VALVE

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

TANK TO PUMP VALVE

 A 4" full flow ball valve shall be installed between the fire pump and the water tank. The connection between the tank and the pump shall be capable of the flow recommendations as set forth in the latest edition of NFPA 1901. The valve shall be flanged to bolt directly to the pump and shall incorporate a chromium plated bronze ball. The remaining internal moving parts shall be stainless steel for years of dependable service. A non collapsible flexible hose shall be incorporated into the tank to pump plumbing to allow movement in the line as the chassis flexes to avoid damage during normal road operation.

The tank to pump valve shall be controlled from the pump operator's panel.

 – Valve(s) shall be controlled with a hand wheel connected to the gear actuated valve. The hand wheel actuator with position indicator shall be located on the pump operator's panel.

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Production Specification

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 pre-connected 1-1/2 in. (38 mm), 1-3/4 in. (45 mm), or 2 in. (52 mm) hose line, including the piping to the pre-connected 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 pre-connected, shall be equipped with caps or closures capable of withstanding a hydrostatic gauge pressure of 100 psi (700 kPa) over the maximum pump close-off pressure or 500 psi (3400 kPa), whichever is greater.

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

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

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

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

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

All 1-1/2 in. (38 mm) or larger discharge outlets shall be equipped with a drain or bleeder valve having a minimum 3.4 in. (19 mm) pipe thread connection for draining or bleeding off pressure from a hose connected to the outlet.

Any 2 in. (52 mm) or larger discharge outlet that is located more than 42 in. (1070 mm) off the ground to which hose is to be connected and that is not in a hose storage area shall be supplied with a sweep elbow of at least 30degrees downward.


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

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Production Specification

CURBSIDE DISCHARGE

 There shall be one (1) 2-1/2" gated discharge(s) located in this area. Each discharge shall include:

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8000 series, 2-1/2" valve(s)
 - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.
- There shall be a 2-1/2" NSTF x 2-1/2" NSTM chrome plated 30 degree down sweep elbow provided.
 - There shall be a 2 1/2" NSTF x 1 1/2" NSTM chrome plated adapter with chain.
 - The specified elbow shall be provided with a 1-1/2" NSTM chrome plated cap with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls 2-1/2" liquid filled gauge(s)
 - This gauge(s) shall have a white background with black text.
 - The above gauge shall have a range from 0 to 400 psi.

There shall be one (1) 3-1/2" gated discharge(s) located in this area. Each discharge shall include:

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8000 series, 3-1/2" valve(s)
 - Valve(s) shall be controlled with a hand wheel connected to the gear actuated valve. The hand wheel actuator with position indicator shall be located on the pump operator's panel.

 There shall be a 3-1/2" NSTF x 5" NSTM chrome plated 30 degree down sweep elbow provided.


- The specified elbow shall be provided with a 5" NSTM x 5" Storz hard coated adapter.
- The specified elbow shall be provided with a 5" Storz hard coated cap with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls 2-1/2" liquid filled gauge(s)
 - This gauge(s) shall have a white background with black text.
 - The above gauge shall have a range from 0 to 400 psi.

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REAR DISCHARGE

 There shall be two (2) 2-1/2" gated discharge(s) located in this area. Each discharge shall include:


- Two (2) of the discharge(s) shall flow water and foam.
- Two (2) Akron Brass 8000 series, 2-1/2" valve(s)
 - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.



- There shall be a 2-1/2" NSTF x 2-1/2" NSTM chrome plated 30 degree down sweep elbow provided.
- Two (2) Class 1, 3/4" brass automatic type drain valve(s) shall be provided at the rear of the apparatus. Drain valve(s) shall be normally open valve which closes with 6 psi located at the lowest point of the plumbing.
- Two (2) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- Two (2) Innovative Controls 2-1/2" liquid filled gauge(s)
 - This gauge(s) shall have a white background with black text.
 - The above gauge shall have a range from 0 to 400 psi.



There shall be two (2) 3" gated discharge(s) located in this area. Each discharge shall include:

- Two (2) of the discharge(s) shall flow water only. 
- Two (2) Akron Brass 8000 series, 3" valve(s)
 - Valve(s) shall be controlled with a hand wheel connected to the gear actuated valve. The hand wheel actuator with position indicator shall be located on the pump operator's panel.
- There shall be a 3" NSTF x 2-1/2" NSTM chrome plated 30 degree down sweep elbow provided.
- Two (2) Class 1, 3/4" brass automatic type drain valve(s) shall be provided at the rear of the apparatus. Drain valve(s) shall be normally open valve which closes with 6 psi located at the lowest point of the plumbing.
- Two (2) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- Two (2) Innovative Controls 2-1/2" liquid filled gauge(s)
 - This gauge(s) shall have a white background with black text.
 - The above gauge shall have a range from 0 to 400 psi.

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FRONT DISCHARGE

There shall be one (1) 1-1/2" gated discharge(s) located in this area. Each discharge shall include:

- One (1) of the discharge(s) shall flow water and foam.
- One (1) Akron Brass 8000 series, 2" valve(s)
 - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.



There shall be a 1-1/2" NSTF x 1-1/2" NSTM chrome plated 30 degree down sweep elbow provided.

- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls 2-1/2" liquid filled gauge(s)
 - This gauge(s) shall have a white background with black text.
 - The above gauge shall have a range from 0 to 400 psi.

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MISCELLANEOUS DISCHARGE

DECK GUN

There shall be one (1) 3" gated discharge located on the upper deck above the pump compartment. Piping shall rise high enough for a mounted deluge gun to be operated in a 360 degree circle to a lower angle of 15 degrees without being impeded by any part of the apparatus or equipment. The discharge shall terminate with a 6-bolt flange with NSTM threads.

One (1) Akron #3431 single inlet 1,200 GPM manual deck gun with with Liftoff, Direct Mount, Ground Base, Pipe, Quad Stacked Tips and Style 5160 Nozzle shall be provided and mounted on the discharge piping.

The discharge shall include:

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8000 series, 3" valve(s)
 - Valve(s) shall be controlled with a hand wheel connected to the gear actuated valve. The hand wheel actuator with position indicator shall be located on the pump operator's panel.
- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.
- One (1) Innovative Controls 2-1/2" liquid filled gauge(s)
 - This gauge(s) shall have a white background with black text.
 - The above gauge shall have a range from 0 to 400 psi.

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BOOSTER REEL

There shall be one (1) Hannay SBEF24-23-24-12-RT (27.75" wide x 23" deep x 23.5" high) aluminum booster hose reel discharge with electric rewind motor located per itemized compartment layout. Booster reel shall have a capacity of 200' of 1" booster hose.

- The Hannay booster reel shall be equipped with one (1) set(s) of FH-3 hose guide rollers.
- Two (2) 100' x 1" section(s) of Neidner "ReelTex" booster hose coupled with 1" NST pyrolite coupling shall be provided.

No nozzle shall be provided with specified booster hose reel.

- One (1) of the discharge(s) shall flow water and foam.

One (1) Akron Brass 8000 series, 1-1/2" valve(s)

– Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.

- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift handle fitting and color coded labels shall be provided for the above plumbing item. The valve shall be able to manually open the drain valve when the line is under pressure and will be located on pump panel and plumbed to drain the lowest point in the plumbing.

- One (1) Innovative Controls 2-1/2" liquid filled gauge(s)

– This gauge(s) shall have a white background with black text.

– The above gauge shall have a range from 0 to 400 psi.

TANK REFILL

There shall be a 2" pump to tank fill line.

- One (1) Akron Brass 8000 series, 2" valve(s)

– Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.

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PUMP MODULE



The side mount pump enclosure shall be removable and supported from the chassis frame rails with spring type body mounts. This enclosure will 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.
- Pressure control device and throttle control.
- Fire pump and engine instruments.
- Pump intakes and discharge controls.
- Master intake and discharge gauges.
- Tank fill control.
- Tank suction control.
- Water tank level gauge.
- Pump panel lights.

PUMP MODULE COMPARTMENT

There shall be an enclosed compartment located above the pump module. The compartment shall be transverse to the pump module and include hinged doors with access from both sides to store long handled tools and equipment. The compartment sides shall be fabricated from smooth plate aluminum painted body color. The compartment top shall be fabricated from NFPA tread plate material to form a walking surface on the top exterior of the compartment.

PUMP MODULE DUNNAGE AREA

There shall be an open dunnage area located directly above the pump panel compartment. The Dunnage area shall extend upward from the pump panel compartment approximately 10.50" and be used to store miscellaneous Loveland Fire & Rescue supplied equipment. The dunnage area sides shall be constructed of smooth plate aluminum painted body color.

LEFT SIDE RUNNING BOARD - SIDE MOUNT PANEL

The left side mount pump panel shall be equipped with side running board. The running board will extend along the width of the pump enclosure from the forward end of the body module to behind the chassis cab.

The running board shall be constructed of aluminum tread plate, bolted in place with stainless steel fasteners. The step surfaces shall be in compliance to applicable sections of NFPA requirements.

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RIGHT SIDE RUNNING BOARD - SIDE MOUNT PANEL

The right side mount pump panel shall be equipped with side running board. The running board will extend along the width of the pump enclosure from the forward end of the body module to behind the chassis cab.

The running board shall be constructed of aluminum tread plate, bolted in place with stainless steel fasteners. The step surfaces shall be in compliance to applicable sections of NFPA requirements.

The running board shall contain a hose well a minimum of 9" wide designed to carry a minimum of 50' of 5" soft suction hose with hold down provisions.

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 powder coated black and be 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.

LEFT SIDE PUMP PANEL - BOLTED

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

RIGHT SIDE PUMP PANEL - BOLTED

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

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PRESSURE GOVERNOR and MONITORING DISPLAY

Fire Research PumpBoss model PBA100-A00 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 6 3/4" high by 4 5/8" wide by 1 3/4" deep. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

The following continuous displays shall be provided:

- CHECK ENGINE and STOP ENGINE warning LEDs
- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Engine OIL PRESSURE; shown on an LED bar graph display in 10 psi increments
- Engine TEMPERATURE; shown on an LED bar graph display in 10 degree increments
- BATTERY VOLTAGE; shown on an LED bar graph display in 0.5 volt increments
- PSI / RPM setting; shown on a dot matrix message display
- PSI and RPM mode LEDs
- THROTTLE READY LED

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

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

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

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A control knob that uses optical technology shall adjust pressure or RPM settings. It shall be 2" in diameter with no mechanical stops, a serrated grip, and have a red idle push button in the center.

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

The pressure governor and monitoring display shall be programmed to interface with a specific engine.

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Production Specification

MASTER DISCHARGE GAUGE

There shall be one (1) Innovative Controls 4" liquid filled gauge which shall display the Master Discharge Pressure.

MASTER INTAKE GAUGE

There shall be one (1) Innovative Controls 4" liquid filled gauge which shall display the Master Intake Pressure.

- This gauge(s) shall have a white background with black text.
- The above gauge(s) shall have a range from -30" to 600 psi.

AUXILIARY FUEL LEVEL GAUGE

There shall be one (1) auxiliary fuel gauge mounted to the left side pump operators panel to display the chassis fuel level.

COLOR CODED LABELS

The completed unit shall have color coded labels for each discharge, intake, master gauge, and drain. Labels shall be manufactured from an acrylic poly material with the text of each label engraved in the top surface.

PUMP PANEL LIGHTING

All gauges and controls on the pump operators' panel shall be adequately illuminated by a shielded light assembly with OnScene Solutions LED type lights. The lights shall be activated by a weather-proof type switch on the pump operators' panel. This switch shall also activate any area step lighting.

TEST TAPS

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

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Production Specification

UPF POLY WATER TANK

The water tank capacity shall be approximately 750 U.S. 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.

The UPF Poly-Tank ® IIE shall be constructed of 1/2" thick PT2E™ polypropylene sheet stock. This material shall be a noncorrosive stress relieved thermoplastic, natural in color, and U.V. stabilized for maximum protection.

The booster tank shall be of a specific configuration and shall be so designed to be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. The top of the booster tank shall be fitted with removable lifting eyes designed with a 3 to 1 safety factor to facilitate easy removal.

The transverse swash partitions shall be manufactured of 3/8" PT2E™ polypropylene (natural in color) and extend from approximately 4" off the floor to just under the cover. The longitudinal swash partitions shall be constructed of 3/8" PT2E polypropylene (natural in color) and extend to the floor of the tank through the cover to allow for positive welding and maximum integrity. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions shall interlock with one another and be welded to each other as well as to the walls of the tank.

There shall be one (1) sump in the bottom of the water tank. The sump shall be constructed of 1/2" polypropylene and shall be located in the left front quarter of the tank. On all tanks that require a front suction, a 4" 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 be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 2" above the sump to pre-vent air from being entrained in the water while pumping.

All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and shall be capable of withstanding sustained fill rates of up to 1,000 GPM.

The tank lid shall be constructed of 1/2" thick PT2E™ polypropylene to incorporate a multi three-piece locking design that allows for individual removal and inspection if necessary. The tank lid shall be recessed 3/8" from the top of the tank and shall be welded to both sides and longitudinal partitions for maximum integrity. Each one of the lids shall have hold downs consisting of 2" polypropylene dowels spaced a maximum of 30" apart. These dowels shall extend through the covers and shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall be drilled and tapped 1/2" x 13" to accommodate the lifting eyes.

The UPF Poly-Tank IIE shall rest on the body cross members in conjunction with such additional cross members, as required by the tank manufacturer.

The tank shall be isolated from the cross members through the use of hard rubber strips with, a minimum Rockwell Hardness of 60 durometer. Additionally, the tank shall be supported around the entire perimeter and captured both the front and rear as well as side to side to prevent the tank from shifting during vehicle operation.

Although the tank shall be designed on a free floating suspension principle, it shall be required that the tank have adequate hold down restraints to minimize movement during vehicle operation.

The tank shall be completely removable without disturbing or dismantling the apparatus structure.

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Production Specification

TANK FILL / VENT

The tank shall have a combination vent and manual fill tower marked "Water Fill." The fill tower shall be constructed of 1/2" PT2E polypropylene and shall be a minimum dimension of 8" x 8" at the outer perimeter.

The tower shall be located in the left front corner of the tank. The tower shall have a 1/4" thick removable polypropylene screen and a PT2E polypropylene hinged-type cover. Inside the fill tower, approximately 4" down from the top shall be fastened a combination vent overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe that is designed to run through the tank, and shall be piped behind the rear wheels so as to obtain maximum traction.

There shall be an auxiliary tank vent piped to the rear of the tank to void trapped air and allow filling the tank to the maximum when filling on un level surfaces.

UPF TANK OVERFLOW

The tank shall be equipped with an overflow / air vent pipe suitable to the tank capacity. The pipe shall be installed in the fill tower and extend through the tank and dump to the rear of the rear axle.

WATER TANK LEVEL GAUGE

There shall be one (1) Innovative Controls 10-LED water tank level gauge(s) for indicating water tank level. The tank level gauge shall indicate the liquid level on an easy to read display.

Each tank level gauge system shall include:

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- A super bright LED bar graph display with a visual alarm at 1/4 of a tank. The display shall also provide an output to activate an audible alarm or secondary visual alarm at 1/4 of a tank.
- A set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.

CLASS A POLYPROPYLENE FOAM CELL

There shall be one (1) 20 U.S. gallon polypropylene foam cell(s) incorporated into the polypropylene water tank.

There shall be one (1) pressure/vacuum vent installed on the foam tank.

There shall be one (1) drain hose connected to the foam cell. The drain shall have a 1/4 turn valve installed inside the pump house and it shall drain below the frame rail of the chassis.

FOAM TANK LEVEL GAUGE

There shall be one (1) Innovative Controls 10-LED foam tank level gauge(s) for indicating foam tank level. The gauge shall indicate the liquid level on an easy to read display.

Each tank level gauge system shall include:

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- A super bright LED bar graph display with a visual alarm at 1/4 of a tank. The display shall also provide an output to activate an audible alarm or secondary visual alarm at 1/4 of a tank.
- A set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.

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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 68" 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;

- Far Left Side: 200' of 1 ¾" Pre-Connect
- Left Side: 300' of 2" Pre-Connect
- Left Center/Center: 1000' of 5" LDH Dead Load
- Right Center: 400' of 2 ½" Dead loaded
- Right Side: 250' of 3" Pre-Connect with 100' of 2" to lay on top for alley line.
- Right Side: Backboard storage
- Far Right: 300' of 3" Pre-connect, with space available for mounting a Blitz Fire Monitor

Additional hose storage will be as follows:

- Front Bumper: 200' of 1 ¾" in a flat or triple flat load
- Booster line reel: 200' of 1" hose will be mounted above the pump panel on the driver's side
- Right Side Pump: 50' of 5" soft suction hose

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.

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.

Each light shall be mounted in a ball burnished cast aluminum housing to protect against damage from personnel or equipment.

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

HOSE BED DIVIDER(S)

Five (5) adjustable aluminum hose bed partition(s) shall be provided in the hose storage area. The partition(s) shall be constructed from 3/16" smooth plate aluminum with split aluminum tubing welded to the top and rear edges. Hand holes shall be provided along the outer edge to assist with movement in the hose bed area.

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

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ALUMINUM HOSE BED COVER



A two-section hose bed cover shall be provided. Each door shall be fabricated from 1/8" NFPA aluminum treadplate with formed hat sections for bracing. Doors shall be hinged along each side of the hose body using stainless steel piano hinge. The top surface of each section shall slant down with the highest point in the center of the hose bed area and shall be supported from underneath by at least one (1) adjustable hose bed divider.

Each section shall be constructed to support the weight of a person (300 lbs).

Each section shall utilize pneumatic cylinders to assist with opening and closing. There shall be a chrome grab handle on each section at the rear of the hose body.

Each compartment shall have a horizontally mounted LED light stick on the underside of the door that will be automatically activated when the door is opened and wired to the compartment door ajar warning light provided in cab.

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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 Loveland Fire & Rescue provided loose equipment based on the pumper body having more than 250 cu. ft. of storage space.

Loveland Fire & Rescue 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;

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.
- There shall be two (2) NFPA approved folding aluminum wheel chocks provided for 44" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20 % grade, with the transmission in neutral, and the parking brake released.
 - The wheel chock(s) shall be mounted behind rear wheels, below body on streetside.
- One (1) Duo-Safety 900-A series 24' 2-section extension ladder(s) shall be provided with the completed unit.
 - The ladder(s) shall be mounted on the specified ladder rack.
- One (1) Duo-Safety 775A series 14' aluminum roof ladder(s) shall be provided with the completed unit.
 - The ladder(s) shall be mounted on the specified ladder rack.
- One (1) Duo-Safety 585-A 10' aluminum folding ladder(s) shall be provided with the completed unit.
 - The ladder(s) shall be mounted on the specified ladder rack.
- One (1) 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 the specified ladder rack.
- One (1) Akron UT-10 10' fiberglass pike pole(s) shall be provided with the completed unit.
 - The above specified pike pole will not have a D handle attached
 - The pike pole(s) shall be mounted on the specified ladder rack.
- One (1) Super Vac 716G4-H, 16" Honda gas powered ventilation fan(s) shall be provided with the completed unit.
 - The above specified ventilation fan(s) shall be installed in compartment C3 using mounting brackets and straps to match previous unit.
- One (1) Honda EU2000i portable generator shall be provided.
 - The above specified portable generator(s) shall be installed in compartment C3 using mounting brackets and straps to match previous unit.

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- Four (4) Bright Star Lighthawk flashlight(s) shall be provided. Each flashlight shall be orange in color. Each flashlight shall have a 12 volt DC charger and vehicle mount kit. Each flashlight shall have a 12 watt xenon style bulb and reflector. The flashlights shall be wired to battery direct unless otherwise specified by the customer.
 - The flashlight(s) shall be mounted in the cab of the completed unit as follows:
 - One (1) in the upper area of the officers side step well, justified as far to the rear of the step area as possible
 - One (1) on the rear curbside of the top of the engine tunnel cover
 - One (1) on the lower rear streetside wall of the cab, accessible from the ground
 - One (1) on the lower rear curbside wall of the cab, accessible from the ground
- Two (2) 5" x 10' clear PVC suction hose with Storz fittings shall be provided with completed unit.
- One (1) 5" NST barrel strainers with foot valve to match hard suction hose provided shall be provided with completed unit.
 - The suction hose(s) shall be mounted on streetside above wheels in formed aluminum hard suction tray(s).
- Loveland Fire & Rescue supplied NFPA required fire hose and nozzles shall be provided on completed unit before placing vehicle in service.

REMAINING NFPA MINOR EQUIPMENT BY PURCHASER

All other minor equipment not specified above, but required by NFPA 1901 before the unit is placed in service shall be supplied and mounted by Loveland Fire & Rescue.