

Loveland Fire Rescue Authority
Loveland, CO
Rescue Pumper- SVI #1314
Production Specification



Customer Approval: _____

Date: _____

LIABILITY INSURANCE

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

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

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

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

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

All insurance policies must be;

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

INTERNET IN-PROCESS SITE

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

RESPONSIBILITY OF PURCHASER

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

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

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

RESPONSIBILITY OF CONTRACTOR

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

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

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

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

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

VEHICLE STABILITY

ROLLOVER STABILITY

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

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

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

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

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

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

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

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

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

FIRE APPARATUS PERFORMANCE

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

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

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

HIGHWAY PERFORMANCE

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

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

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

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

SERVICEABILITY

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

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

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

FIRE APPARATUS DOCUMENTATION

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

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

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

OPERATIONS AND SERVICE DOCUMENTATION

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

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

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

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

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

NFPA REQUIRED DOCUMENTATION FORMAT - Online @ SVI Trucks . com

The vehicle construction details and the operations and service documentation as required per NFPA 1900 latest edition shall be provided online. These manuals shall be divided into sections for ease of reference and will include two (2) QR codes installed on the apparatus for accessibility, with an additional 2 QR codes shipped loose.

FIRE APPARATUS SAFETY GUIDE

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

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

STATEMENT OF EXCEPTIONS

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

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

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

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

CARRYING CAPACITY

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

The estimated in-service weight shall include the following:

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

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

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

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

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

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

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

TESTING

ROAD TEST

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

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

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

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

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

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

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

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

TEST SEQUENCE

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

1. RESERVE CAPACITY TEST

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

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

2. ALTERNATOR PERFORMANCE TEST

TEST AT IDLE

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

TEST AT FULL LOAD

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

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

3. LOW VOLTAGE ALARM TEST

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

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

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

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

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

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

UL PUMP CERTIFICATION

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

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

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

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

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

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

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

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

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

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

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

FOAM SYSTEM TEST

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

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

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

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

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

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

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

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

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

Criteria for the following systems:

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

WARRANTY

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

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

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

GENERAL LIMITED WARRANTY - TWO (2) YEARS

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

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

LOW VOLTAGE ELECTRICAL WARRANTY - FIVE (5) YEARS

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

STRUCTURAL WARRANTY - TEN (10) YEARS

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

UNDERCOAT WARRANTY

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

PAINT LIMITED WARRANTY - TEN (10) YEARS

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

GRAPHICS LIMITED WARRANTY

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

WATEROUS SEVEN YEAR PUMP WARRANTY

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

STAINLESS STEEL PLUMBING WARRANTY

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

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

AKRON BRASS TEN YEAR VALVE WARRANTY

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

POLY WATER TANK WARRANTY

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

CONSTRUCTION PERIOD

The completed vehicle shall be delivered within seven hundred (700) days after pre-construction meeting and receipt and approval of any signed change orders from Loveland Fire Rescue Authority.

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 written notice to Loveland Fire Rescue Authority as to delays and to what extent these delays have in completing vehicle within the stated construction time period.

OVERALL HEIGHT REQUIREMENT

The overall height (OAH) of the vehicle shall be approximately 120" from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

OVERALL LENGTH

The overall length (OAL) of the vehicle shall be approximately 384".

ANGLE OF APPROACH

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

ANGLE OF DEPARTURE

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

PRE-CONSTRUCTION CONFERENCE

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

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

PRE-PAINT CONFERENCE

A pre-paint conference shall be required at the Contractor's factory for four (4) personnel from the Loveland Fire Rescue Authority to inspect the vehicle and construction details prior to the painting process.

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

FINAL INSPECTION CONFERENCE

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

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

DELIVERY AND DEMONSTRATION

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

The Delivery Engineer shall set delivery and instruction schedule with the person appointed by Loveland Fire Rescue Authority.

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

CAB TO AXLE DIMENSION

Cab to axle will be **130"**.

CAB/CHASSIS PREPAYMENT

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

FRONT BUMPER

The front bumper shall be provided by the cab/chassis manufacturer.

BUMPER GRAVELSHIELD

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

AIR HORN(S)

Air horn(s) if specified shall be supplied and installed by the cab/chassis manufacturer.

FRONT TOW PROVISIONS

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

- There shall be two (2) FireTech "Sub-Aqua", white LED ground light(s) shall be provided below the body. Light(s) shall be switchable but activated automatically when the park brake is set.

SIREN SPEAKER

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

AIR INTAKE SYSTEM

An air filter shall be provided in the engine's air intake system by the customer cab/chassis manufacturer.

Air inlet restrictions shall not exceed the engine manufacturer's recommendations.

The air inlet shall be equipped with a means of separating water and burning embers from the air intake system.

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

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

EXHAUST

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

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

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

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

PLYMOVENT EXHAUST ADAPTER

A Plymovent 6" exhaust adapter flange for a Plymovent magnetic systems shall be provided and installed on the chassis engine exhaust tailpipe/temperature mitigation device. The adapter will be sized to attach to the chassis supplied 6" outlet/4" inlet temperature mitigation device and terminates in a 9" diameter Flange.

- The tail pipe(s) shall terminate parallel to rear axle and flush with body.

ZONE A - FRONT WARNING LIGHTS, UPPER

The light bar shall be supplied and installed by the cab/chassis manufacturer.

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

HEADLIGHT (HALO) FLASHER - REPROGRAM

The Headlight (Halo) flasher as provided by Chassis will be reprogrammed to meet NFPA with an interlock with the Park Brake and also to match the operation of the programming on previous LFRA units. (See 1158/1159).

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

ZONE A - FRONT WARNING LIGHTS, LOWER

The warning lights shall be supplied and installed by the cab/chassis manufacturer. They shall be Whelen lights to complete an NFPA compliant lower level warning light system.

- Flash pattern shall be as supplied by the cab and chassis manufacturer.

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

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

The warning lights shall be supplied and installed by the cab/chassis manufacturer. They shall be Whelen lights to complete an NFPA compliant lower level warning light system.

- Flash pattern shall be as supplied by the cab and chassis manufacturer.

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

SEAT BELT COLOR

Section 14.1.3.3 of the NFPA 1901 Standards, requires all seat belt webbing in cab to be bright red or bright orange in color, and the buckle portion of the seat belt shall be mounted on a rigid or semi rigid stalk such that the buckle remains positioned in an accessible location.

SEAT BELT WEB LENGTH - CUSTOM CAB

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

The chassis seat belt web length as supplied by the 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.

TIRE PRESSURE VISUAL INDICATORS

Tire pressure visual indicators if specified shall be supplied by the cab and chassis manufacturer.

HELMET STORAGE, DRIVING AREA

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

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

HELMET STORAGE, DRIVING AREA - DETAILS

The officer's helmet storage bracket shall be installed on the overhead AC enclosure, locating the bracket over the officer's left shoulder and slightly behind him.



Photos of previous units are located in the Archive and/or Current Vehicle and Equipment folder(s)

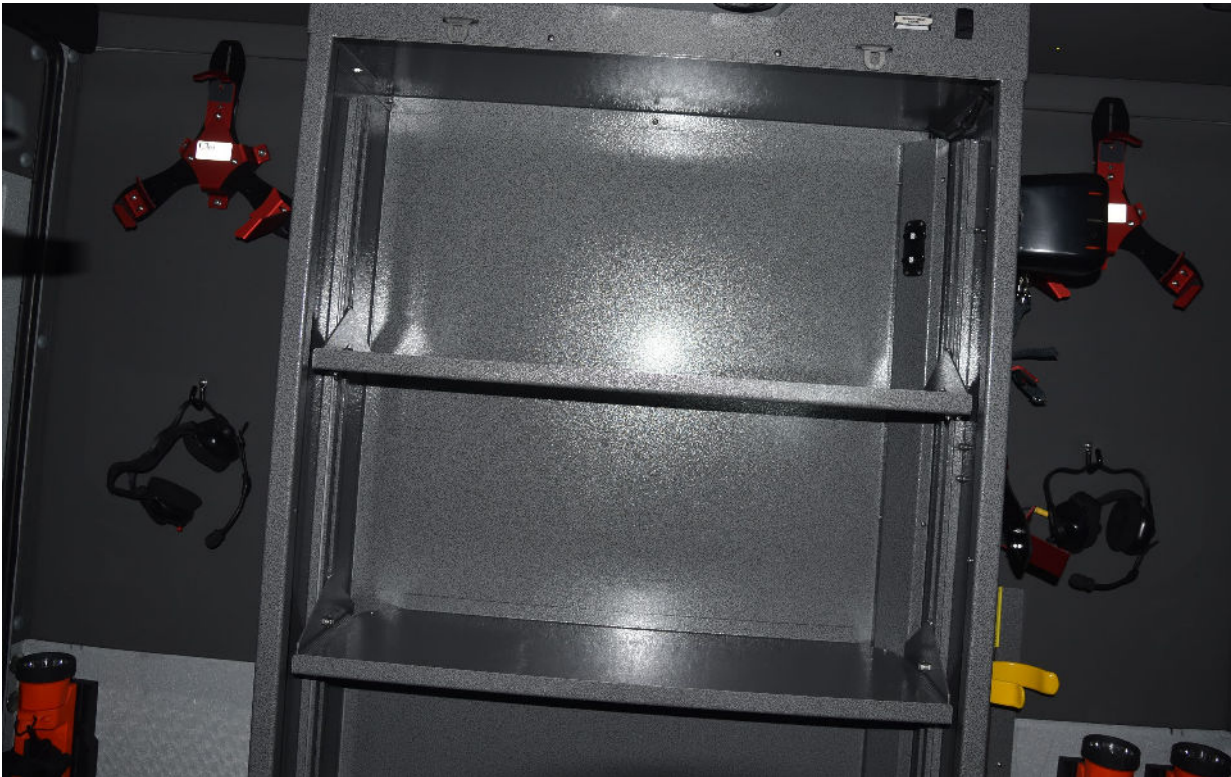
HELMET STORAGE, CREW AREA

Three (3) OnScene Solutions Talon model helmet storage bracket(s) shall be provided and installed in the rear crew area. The helmet mounting will comply with the 9G NFPA requirements. If cab is specified with air bags, the helmet bracket(s) will be mounted clear of the deployment area.

- Three (3) helmet bracket(s) shall be mounted on the side and rear wall areas adjacent to seating. Mounting shall not interfere with air bag systems, if specified.

HELMET STORAGE, CREW AREA - DETAILS

Two (2) of the helmet storage brackets shall be installed on the rear wall of the Cab, one (1) each side of the rear, forward facing Cabinet. The third will be on the streetside, outboard wall of the rear, forward facing Cabinet. Match previous units for LFRA.



Photos of previous unit(s) are located in either Archive and/or Current Vehicle and Equipment folder(s)

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 PAINT

The finish paint and color as provided from the cab/chassis manufacturer shall be provided. Cab shall not be repainted.

(Note: Most departments do NOT find that the fleet paint finish from a commercial cab/chassis manufacturer is acceptable. The Body Builder will NOT be responsible for paint quality and finish issues.)

CAB INTERIOR COMPONENT PAINT COLOR, OEM SUPPLIED

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

HUB AND NUT COVERS

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

MUDFLAPS

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

AIR BRAKE SYSTEM QUICK BUILD-UP

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

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

CHASSIS AIR TANK DRAINS

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

AUTOMATIC TIRE CHAINS

If specified chassis shall be provided with automatic tire chains, the final stage apparatus builder shall install the remaining components and make final adjustments per chain system manufacturers specifications.

ROAD EMERGENCY SAFETY KIT

The DOT required reflective triangles, warning flares, and fire extinguisher shall be provided by cab and chassis supplier.

FIRECOM INTERCOM SYSTEM

The following 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 Station, 5100D
- Wireless base station for up to five headsets.
- Radio interface for dual radio.

INTERCOM SYSTEM INSTALLATION

The above listed intercom system headset jacks shall be installed in the cab locations as follows;

- Driver's – Intercom & radio PTT provided at driver position.
 - Position provided with dual ear, flexible boom headset model UH-51
 - Intercom headset jack shall be located overhead right shoulder.
 - Headset hook provided overhead right shoulder.
- Officer's – Intercom & radio PTT provided at officer position.
 - Position provided with dual ear, flexible boom headset model UH-51
 - Intercom headset jack shall be located overhead left shoulder.
 - Headset hook provided overhead left shoulder.
- Crew rear facing – (2) Intercom(s) & radio PTT provided at rear facing crew position(s).
 - Position provided with dual ear, under helmet wireless headset model DW501
 - Headset hook provided overhead left shoulder.
- Rear Forward Facing – (2) Intercom & radio PTT provided at Rear facing crew position(s).
 - Position provided with dual ear, flexible boom headset model UH-51
 - Intercom headset jack shall be located overhead right shoulder.

FRONT CAB INTERIOR COMPONENTS

KNOX BOX KEY CONTROL

A Knox Box key control system shall be provided by Loveland Fire Rescue Authority & installed in cab by OEM.

MOBILE DATA TERMINAL SLIDE-OUT TRAY

There shall be a slide-out tray provided and installed on officer side dash area for a Loveland Fire Rescue Authority supplied mobile data terminal. The tray shall be fabricated from aluminum with a pair of 12" ball-bearing slides and an under-mounted gas strut to hold the tray in the full extended or full retracted positions.

Cradlepoint

There will be install of customer supplied cradle point. Will locate at Mid-inspection.

STREETSIDE FUEL FILL

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

CURBSIDE FUEL FILL

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

DEF FLUID FILL

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

BODY DESIGN

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

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

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

The fabrication of the body shall be formed sheet metal. Formed components shall allow the Loveland Fire Rescue Authority 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 Authority from such repair and shall NOT be used. All fabricated body components to be cut by a laser or water-jet for superior cut edge quality.

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

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

EXTERIOR ALUMINUM BODY

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

The body compartment floors and exterior panels shall be constructed with not less than 3/16" (.187) aluminum 3003H-14 smooth plate. Interior compartment dividing walls shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Lighter gauge sheet metal will not be acceptable in these areas, No Exceptions.

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

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

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

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

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

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

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

DRIP RAILS

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

BODY SUBFRAME

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

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

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

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

BODY MOUNTING

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

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

18" REAR STEP BUMPER

The 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.

NOTE: rear bumper will match previous truck, and will see if it can be sealed up more.

REAR TOW EYES

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

- There shall be two (2) FireTech "Sub-Aqua", white LED ground light(s) shall be provided below the body. Light(s) shall be switchable but activated automatically when the park brake is set.

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 FENDERETTES

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

Door will have proximity switch for door closer.

Note: These will be holding 45min bottles. (Reference to how it was fixed at the last final inspection.)

BODY PAINT SPECIFICATIONS

BODY PAINT PREPARATION

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

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

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

PAINT PROCESS

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

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

- 7) A PPG Delfleet® primer sealer with proper hardener and thinner shall be sprayed using a pressure pot spray gun and applying 1 full wet coat or 1.0-2.0 dry mils achieving full hiding and allow to flash off in spray booth for minimum of 60 minutes @ 70°F.
- 8) A PPG Delfleet® FBCH basecoat (color) with proper hardener and dry additive shall then be sprayed using a pressure pot set @ 45-60 PSI and achieving full hiding or 1.5-2.0 wet mils and allow to flash off in spray booth 45-60 minutes before applying clearcoat.
- 9) A PPG Delfleet® clearcoat with proper hardener and thinner shall be sprayed using a pressure pot spray gun and applying 2-3 full wet coats or 5.0 wet mils for a uniform gloss and allow to flash off in spray booth 10 minutes and bake for 120-140 minutes @ 125°F (surface temp.).
- 10) After cooling, DA sand heavy orange peel or runs using 1000 grit dry sand paper and final DA sand using 1500-2000 grit dry sand paper. Wipe off all surfaces to remove dust and debris. Buff unit as needed using 3M rubbing compound and a white wool pad and inspect until all sand scratches are removed.
- 11) Polish as needed using 3M Perfect-It-Polish and a black foam pad, repeat as necessary and inspect until all sand scratches are removed.

PAINT - ENVIRONMENTAL IMPACT

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

FASTENERS

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

ELECTROLYSIS CORROSION CONTROL

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

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

PAINT FINISH - SINGLE COLOR

The body shall be painted with a single color of PPG Delfleet® Evolution per Loveland Fire Rescue Authority approved paint spray out provided.

- Paint Color: Match cab/chassis supplied paint color.
- **SIKKENS FLNA 3024**
- **PPG 910784**

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 resist corrosion under the vehicle.

COMPARTMENT INTERIOR FINISH

The compartment interior paintable surfaces shall be prepared and DA sanded using 80-120 grit dry paper and cleaned with a wax and grease remover. A PPG Delfleet® primer topcoat of either a solids epoxy primer or an etch primer shall be applied.

A PPG Delfleet® color primer with proper hardener and thinner mix shall then be sprayed using a pressure pot spray gun and applying 2 wet coats achieving full hiding on entire compartment surface and allow to air dry for 30 minutes @ 70°F before applying texture coat.

A PPG Delfleet® F3985 White/F3986 Gray top coat/texture coat with proper hardener and dry additive shall then be sprayed using a pressure pot and reducing the atomizing air pressure and turn fan pattern all the way in on the gun. Apply the first color texture coat as needed and allow to air dry @ 70°F over night before assembly and 7 days before putting into full service.

REFLECTIVE STRIPE REQUIREMENTS

Material

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

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

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

Minimum Requirements

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

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

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

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

GRAPHICS PROOF (Will match signed approval)

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

REFLECTIVE STRIPE - CAB SIDE

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

- This reflective stripe shall be white in color.

There shall be a 1" Scotchlite 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 Scotchlite 680 series graphic film.

- This reflective stripe shall be white in color.

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

- This reflective stripe shall be blue in color.

CHEVRON STRIPE - CAB BUMPER

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

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

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

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

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

REFLECTIVE STRIPE - CAB DOOR INTERIOR

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

The inside of each cab and crew doors shall have 4" Chevron style diamond grade reflective striping. The colors shall be red and fluorescent yellow-green.

The Loveland Fire emblem will be provided in center of each door similar to rescue unit.

REFLECTIVE STRIPE - BODY SIDES

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

- This reflective stripe shall be white in color.

There shall be a 1" Scotchlite 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 front of cab to the rear body.

CHEVRON REFLECTIVE STRIPE - REAR SIDES PANELS

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

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

In addition, the front and rear sides of the ladder rack frame shall have chevron striping.

The stripe material shall be 3M Diamond Grade.

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

LETTERING

GRAPHICS PROOF

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

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

SIDE CAB DOOR LETTERING

There shall be fifty two (52) 4" high SuperGold letters furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

"LOVELAND"

"FIRE RESCUE"
"AUTHORITY"

Final design and layout shall be determined prior to construction.

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.

"Commitment, Compassion & Courage"

REAR BODY LETTERING

FRONT OF CAB LETTERING

There shall be one (1) 3" high SuperGold letters furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

"LOVELAND FIRE RESCUE AUTHORITY" on face of Bumper Preconnect Lid.

IDENTIFICATION PLACARDS

There shall be one (1) switchable placards provided and installed on unit as follows;

"41"

- Placard shall be located on either side of cab over the front axle.

There shall be six (6) 3" high reflective letters furnished and installed on the vehicle.

Provide details.

- This reflective lettering shall be white in color.

EXTERIOR COMPARTMENT DOORS

ROLL-UP DOOR CONSTRUCTION - AMDOR

The apparatus shall be equipped with Amdor brand exterior roll-up compartment doors. Amdor roll-up doors shall be complete with the following features;

- 1" aluminum double wall slats with continuous ball & socket hinge joint and recessed dual durometer slat seal
- Double wall reinforced bottom panel with stainless steel lift bar latching system
- Bottom panel flange with cut-outs for ease of access with gloved hands
- Reusable slat shoes with positive snap-in securement
- Smooth interior door curtain to prevent equipment hang-ups
- One-piece aluminum door track / side frame, top gutter with non-marring seal
- Non-marring recessed side seals with UV stabilizers to prevent warping
- Dual leg bottom seal, with all wear component material to be Type 6 Nylon
- The door shall be warranted for a period of 36 months from the date of delivery. AMDOR Inc. liability covers the replacement or repair of any component that fails due to defects in material and / or workmanship during the coverage period.

Each shutter door shall decrease the compartment door frame opening approximately 2.00" in width and approximately 5.50" in height for the bottom section of door assembly.

AMDOR EXTENDED SLAT SHOE

All exterior Amdor roll-up compartment door(s) shall have Amdor's exclusive Extended Slat Shoe (ESS) which acts as the wear surface, allowing for proper sealing while eliminating unsightly finish abrasion. This Amdor solution reduces long-term maintenance costs, improves the lifetime value of your investment, and maintains the visual integrity of your roll-up door's finish.

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

BODY HEIGHT MEASUREMENTS

The vertical pumper body dimensions shall be as follows:

AHEAD OF REAR AXLE

	<u>Description</u>	<u>Dimension</u>
A	Bottom of Subframe to Top of Body	51.0"
B	Bottom of Subframe to Bottom of Body	22.5"
C	Vertical Door Opening	
	-with roll-up door	54.3"
	-with hinged door	57.7"

ABOVE REAR AXLE

	<u>Description</u>	<u>Dimension</u>
D	Vertical Door Opening - Above Rear Wheel	
	-with roll-up door	20.7"
	-with hinged door	22.2"

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	51.5"
	-with hinged door	55.0"

GENERAL

	<u>Description</u>	<u>Dimension</u>
G	Bottom of Drip Rail to Top of Body	11.0" (min.)

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

BODY WIDTH DIMENSIONS

The body shall be 100.0" wide, and 102.0" wide at drip rails. Interior compartment depth dimensions shall be approximately:

<u>Area Description</u>	<u>Dimension</u>
Compartment depth above subframe	13.0" or 24.5" (Depending on water tank and/or ladder configuration.)
Compartment depth below subframe	24.5"

STREETSIDE COMPARTMENT - FRONT (S1)

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

- This compartment shall have an Amdor roll-up door.
- The compartment door opening shall be approximately 39.0" wide.
- The roll-up door slats and the door track components shall be painted to match the single tone exterior color. The painted roll-up doors shall be equipped with Extended Slat Shoe (ESS) feature which eliminates abrasion on the door finish.
- The Amdor door shall be equipped with an integral switch in the lower door handle retainer block to activate compartment lighting and door ajar signal in cab when door is opened.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door guard shall be provided below door roll area. Drip pan/door guard shall have thumb nuts making it easily removable without tools with a maintenance-free, un-painted finish. A plastic drain line shall be provided on each end of the drip pan to lower door threshold.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be two (2) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.

Note: Bottom shelf will be installed lip down.

- The above component(s) shall have a smooth un-painted finish.
- Reflective Scotchlite stripe shall be provided on the front face of the shelf(s).
- This reflective stripe shall be blue in color.
- The back wall of compartment shall be provided with a bolted 3/16" smooth aluminum panel spaced approximately 1" from compartment wall with spacers at mounting points.
- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.
- One (1) FireTech "Sub-Aqua", white LED ground light(s) shall be provided below the body. Light(s) shall be switchable but activated automatically when the park brake is set.

Note: will operate with park brake, and respective turn signal.

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

STREETSIDE COMPARTMENT - ABOVE REAR WHEELS (S2)

The interior useable compartment width shall be approximately 59.5" wide.

- This compartment shall have an Amdor roll-up door.
- The compartment door opening shall be approximately 53.0" wide.
- The roll-up door slats and the door track components shall be painted to match the single tone exterior color. The painted roll-up doors shall be equipped with Extended Slat Shoe (ESS) feature which eliminates abrasion on the door finish.
- The Amdor door shall be equipped with an integral switch in the lower door handle retainer block to activate compartment lighting and door ajar signal in cab when door is opened.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door guard shall be provided below door roll area. Drip pan/door guard shall have thumb nuts making it easily removable without tools with a maintenance-free, un-painted finish. A plastic drain line shall be provided on each end of the drip pan to lower door threshold.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
 - The above component(s) shall have a smooth un-painted finish.
- Reflective Scotchlite stripe shall be provided on the front face of the shelf(s).
- This reflective stripe shall be blue in color.
- The back wall of compartment shall be provided with a bolted 3/16" smooth aluminum panel spaced approximately 1" from compartment wall with spacers at mounting points.
- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.

STREETSIDE COMPARTMENT - REAR (S3)

The interior useable compartment width shall be approximately 49.5" wide.

- This compartment shall have an Amdor roll-up door.
- The compartment door opening shall be approximately 43.0" wide.
- The roll-up door slats and the door track components shall be painted to match the single tone exterior color. The painted roll-up doors shall be equipped with Extended Slat Shoe (ESS) feature which eliminates abrasion on the door finish.
- The Amdor door shall be equipped with an integral switch in the lower door handle retainer block to activate compartment lighting and door ajar signal in cab when door is opened.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door guard shall be provided below door roll area. Drip pan/door guard shall have thumb nuts making it easily removable without tools with a maintenance-free, un-painted finish. A plastic drain line shall be provided on each end of the drip pan to lower door threshold.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

COMPARTMENT LAYOUT

There shall be **horizontally mounted aluminum shelf trac on back wall for two (2) adj. hooks are to hang Hose Packs. Hooks will be one to the left and one centered of back wall. (Customer would like to clarify layout at Prepaint Inspection for the hooks, and see 3D also.)**

- There shall be three (3) OnScene Solutions cargo straps provided to secure the stored equipment.
One (1) Strap will be used for extendable ladder on the very right side of the compartment with hook to hang ladder, designed into the shelf trac. (ladder model number will be clarified at Prepaint) , and will layout out placement of the other two (2) at PrePaint inspection.

- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.
- One (1) FireTech "Sub-Aqua", white LED ground light(s) shall be provided below the body. Light(s) shall be switchable but activated automatically when the park brake is set.

Note: will operate with park brake, and respective turn signal.

CURBSIDE COMPARTMENT - FRONT (C1)

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

- This compartment shall have an Amdor roll-up door.
- The compartment door opening shall be approximately 39.0" wide.
- The roll-up door slats and the door track components shall be painted to match the single tone exterior color. The painted roll-up doors shall be equipped with Extended Slat Shoe (ESS) feature which eliminates abrasion on the door finish.
- The Amdor door shall be equipped with an integral switch in the lower door handle retainer block to activate compartment lighting and door ajar signal in cab when door is opened.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door guard shall be provided below door roll area. Drip pan/door guard shall have thumb nuts making it easily removable without tools with a maintenance-free, un-painted finish. A plastic drain line shall be provided on each end of the drip pan to lower door threshold.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be two (2) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
 - The above component(s) shall have a smooth un-painted finish.
- Reflective Scotchlite stripe shall be provided on the front face of the shelf(s).
- This reflective stripe shall be blue in color.
- The back wall of compartment shall be provided with a bolted 3/16" smooth aluminum panel spaced approximately 1" from compartment wall with spacers at mounting points.
- There shall be one (1) extinguisher storage module for single Loveland Fire Rescue Authority supplied extinguisher. The module shall be fabricated from 1/8" (.125) 3003H-14 aluminum alloy sheet. The module shall have a 2" slope, front to back to prevent cylinders from sliding out.

EXTINGUISHER MODULE - FLARE TRAY

Affixed to the top of the single extinguisher module shall be a divided tray for flares.

- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.
- One (1) FireTech "Sub-Aqua", white LED ground light(s) shall be provided below the body. Light(s) shall be switchable but activated automatically when the park brake is set.

Note: will operate with park brake, and respective turn signal.

CURBSIDE COMPARTMENT - ABOVE REAR WHEEL (C2)

The interior useable compartment width (not including side ladder rack space required) shall be approximately 41.0" wide.

- This compartment shall have an Amdor roll-up door.
- The compartment door opening shall be approximately 35.0" wide.
- The roll-up door slats and the door track components shall be painted to match the single tone exterior color. The painted roll-up doors shall be equipped with Extended Slat Shoe (ESS) feature which eliminates abrasion on the door finish.
- The Amdor door shall be equipped with an integral switch in the lower door handle retainer block to activate compartment lighting and door ajar signal in cab when door is opened.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door guard shall be provided below door roll area. Drip pan/door guard shall have thumb nuts making it easily removable without tools with a maintenance-free, un-painted finish. A plastic drain line shall be provided on each end of the drip pan to lower door threshold.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
 - The above component(s) shall have a smooth un-painted finish.
- Reflective Scotchlite stripe shall be provided on the front face of the shelf(s).
- This reflective stripe shall be blue in color.
- The back wall of compartment shall be provided with a bolted 3/16" smooth aluminum panel spaced approximately 1" from compartment wall with spacers at mounting points.
- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.

CURBSIDE COMPARTMENT - REAR (C3)

The interior useable compartment width shall be approximately 49.5" wide.

- This compartment shall have an Amdor roll-up door.
- The compartment door opening shall be approximately 43.0" wide.
- The roll-up door slats and the door track components shall be painted to match the single tone exterior color. The painted roll-up doors shall be equipped with Extended Slat Shoe (ESS) feature which eliminates abrasion on the door finish.
- The Amdor door shall be equipped with an integral switch in the lower door handle retainer block to activate compartment lighting and door ajar signal in cab when door is opened.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door guard shall be provided below door roll area. Drip pan/door guard shall have thumb nuts making it easily removable without tools with a maintenance-free, un-painted finish. A plastic drain line shall be provided on each end of the drip pan to lower door threshold.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
 - The above component(s) shall have a smooth un-painted finish.
- Reflective Scotchlite stripe shall be provided on the front face of the shelf(s).
- This reflective stripe shall be blue in color.
- There shall be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits. The tray top shall be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length. The tray assembly shall utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.
 - Equipment mounting on slide tray shall be:
TFT Combi Tool mount, same placement and model as last engine.

- The above component(s) shall have a smooth un-painted finish.
- Reflective Scotchlite 2" wide stripe shall be provided on the front face of the tray.
- This reflective stripe shall be blue in color.
- The back wall of compartment shall be provided with a bolted 3/16" smooth aluminum panel spaced approximately 1" from compartment wall with spacers at mounting points.
- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.
- There shall be one (1) Blue Sea Systems ST series blade type fuse block(s) with screw type terminals for both positive and negative buss with cover provided for distribution of up to six (6) 30 amp, 12 VDC circuits.
- The fuse block shall be protected by a 60 amp maxi fuse located at the source.
- Fuse block shall be wired battery direct.
- Fuse block shall be located in the top **high** left interior corner.
- There shall be two (2) 120 VAC outlet(s) located in compartment.
 - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).
 - Outlet(s) shall be powered through the on-board shore power system.
 - The outlet shall be located **top left by Fuse block**.
- One (1) FireTech "Sub-Aqua", white LED ground light(s) shall be provided below the body. Light(s) shall be switchable but activated automatically when the park brake is set.

Note: will operate with park brake, and respective turn signal.

REAR COMPARTMENT - CENTER (RC1)

The rear center compartment shall be located behind the chassis frame rails and depth up to the specified water tank and below the frame rails as much as possible without affecting the angle of departure.

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

- This compartment shall have an Amdor roll-up door.
- The compartment door opening shall be approximately 39.0" wide.
- The roll-up door slats and the door track components shall be painted to match the single tone exterior color. The painted roll-up doors shall be equipped with Extended Slat Shoe (ESS) feature which eliminates abrasion on the door finish.
- The Amdor door shall be equipped with an integral switch in the lower door handle retainer block to activate compartment lighting and door ajar signal in cab when door is opened.
- There shall be NO keyed lock on this roll-up compartment door.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits. The tray top shall be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length. The tray assembly shall utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.
 - The above component(s) shall have a smooth un-painted finish.
 - Reflective Scotchlite 2" wide stripe shall be provided on the front face of the tray.
- This reflective stripe shall be blue in color.
- Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.

UPPER BODY COMPARTMENT - TOP OF TANK

Above the booster Tank shall be a compartment fabricated from 3/16" 3003-H14 NFPA treadplate. Compartment shall be approximately 31.5"L x 49"W x 11"H. Access to compartment shall be through a lift up door equipped with two (2) pneumatic cylinders, one (1) 7" chrome handle, one (1) e-z switch door ajar/light activation switch and one (1) OnScene **Access Pro** Solutions LED light to match the remainder of the compartments.

The base of the compartment shall create a step platform and dunnage well around the tank fill towers.

PLASTIC FLOOR AND SHELF TILE

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

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

LADDER LIFT SYSTEM, CURBSIDE

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

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

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

LADDER LIFT INTERLOCK

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

Storage shall be provided for the following;

- Storage for One (1) 24' 2-section ladder(s). Manufacturer, model number of the ladder shall be provided in equipment section of specification, or at pre-construction meeting when provided by Loveland Fire Rescue Authority.
- Storage for One (1) 14' roof ladder(s). Manufacturer, model number of the ladder shall be provided in equipment section of specification, or at pre-construction meeting when provided by Loveland Fire Rescue Authority.
- Storage for One (1) 10' folding ladder(s). Manufacturer, model number of the ladder shall be provided in equipment section of specification, or at pre-construction meeting when provided by Loveland Fire Rescue Authority.

Note: will be mounted on the inboard position of rack.

- Storage for One (1) pike pole(s). Manufacturer, model number of the pike pole shall be provided in equipment section of specification, or at pre-construction meeting when provided by Loveland Fire Rescue Authority.

Note: will be mounted on the inboard position of rack

- Storage for One (1) 10' length of hard suction hose. Hard suction hose(s) shall be supplied by contractor with completed unit. See equipment section.

LOWER 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™ striping shall be provided in the rub rail. The striping shall be red in color.

FRONT PROTECTION PANELS - STAINLESS STEEL (ABOVE DRIP RAIL, FULL FACE)

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

REAR BODY HANDRAILS

There shall be two (2) vertical handrails on rear body. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions. The handrail on the streetside of the body shall have a special design that extends up to the top radius of the body then curves at a 90 degree bend towards the center of the body. The curbside handrail shall be a 24" straight handrail. Both hand rails shall be mounted so that the bottom stanchion is on the same horizontal plane.

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

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

- A pair of Flag mast receivers shall be installed under the vertically aligned handrail stations on the streetside to allow Loveland Fire Rescue Authority to display a flag. The upper receiver shall be a pass through tube and the lower shall have a cap on bottom.

PUMP MODULE HANDRAILS

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

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

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

ROOF ACCESS HANDRAIL

There shall be one (1) 24" horizontal handrail mounted on top of body to assist in roof access. Handrail shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

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

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

FOLDING STEP(S)

There shall be eight (8) Innovative Controls polished cast aluminum folding step(s) provided and installed on completed vehicle. Each step shall be heavy duty with stainless steel spring and textured step surface meeting NFPA standards. Each step shall include an LED light.

LOW VOLTAGE ELECTRICAL SYSTEM- 12 VDC

General

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

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

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

Wiring

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

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

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

Wiring and Wire Harness Construction

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

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

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

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

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

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

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

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

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

Power Supply

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

Minimum Continuous Electrical Load

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

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

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

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

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

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

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

Electromagnetic Interference

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

Wiring Diagram

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

Low Voltage Electrical System Performance Test

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

12 VOLT MULTIPLEX CONTROL CENTER - ES-KEY

The apparatus shall be equipped with a Class 1 ES-Key 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 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.

MULTIPLEX SYSTEM INTERFACE DISPLAY

The Class 1 ES-Key multiplex system interface display(s) shall be provided by the cab/chassis manufacturer.

BATTERY SYSTEM

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

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

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

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

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

One of the following master disconnect switches shall be provided:

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

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

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

A green “battery disconnect on” indicator light that is visible from the driver’s position shall be provided.

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

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

BATTERY SWITCH

One (1) battery disconnect switch shall be provided in cab located within easy reach of driver with green indicator light that is visible from the driver’s position. The switch and indicator 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.

SHORE POWER INLET

The shore power inlet for battery conditioner shall be supplied and installed by the cab chassis manufacturer.

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

ENGINE COMPARTMENT LIGHT

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

CAB HAZARD WARNING LIGHT

A red flashing or rotating light, located in the driving compartment. The light shall be furnished by the cab/chassis manufacturer. The light shall be illuminated automatically whenever the vehicles parking brake is not fully engaged and any of the following conditions exist:

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

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

- The volume is less than or equal to 4 ft³ (0.1 m³).

- The compartment has an opening less than or equal to 144 in.2 (92,900 mm2).
- The open door does not extend sideways beyond the mirrors or up above the top of the fire apparatus.
- All equipment in the compartment is restrained so that nothing can fall out if the door is open while the apparatus is moving.
- Manually raised pole lights with an extension of less than 5 ft (1.5 m).

The hazard light shall be labeled "DO NOT MOVE APPARATUS WHEN FLASHING".

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.

ROAD AND REAR RECORDING CAMERA SYSTEM

A SmartWitness CP4 shall be provided and installed on completed unit to monitor road and rear of vehicle. The CP4 is a 4 channel connected vehicle recorder, LTE enabled device which offers commercial vehicle owners an effective risk reducing means to aid in the investigation process, decrease collateral damages associated with accidents, encourage safe driving, monitor driving behaviors and location. System shall include the following;

The PC4 is a small and reliable 4 channel AHD mobile DVR with up to 4 camera inputs. Integrated GPS, 3 –Axis G-shock sensor, built-in Mic, two 12 VDC alarm input triggers, two 12 VDC alarm input triggers, one 5 VDC alarm output, remote control with emergency panic button, video-output cable for connecting LCD display. Wired external microphone included. PC Analysis Software. Includes 64GB SD card (80 hrs record time). Mounting bracket for secure installation of CP4 recorder.

Road facing camera is a 1.3M Pixel Sony Exmor CMOS Sensor with 720P Resolution, 145° wide-angle view, 9 pcs LEDs, windshield mounted with provided 3M VHB tape. 80.5 mm(W) x 50.5 mm(D) x 61.0 mm(H). Min. Illumination: 0.1 lux. Integrated microphone for audio recording (audio compatible with CRX DVR only). Dimensions 80.5mm(W) x 50.5mm(D) x 61.0mm(H) Includes 5M Extension Cable.

Rear facing camera is a 1.3M Pixel Sony Exmor CMOS Sensor with 720p Resolution, 120° wide-angle view, 12 pcs LEDs. Weather-proof Housing (IP69K). Versatile mounting options for side or interior views. Includes 15-meter extension cable for rear camera.

TAIL LIGHTS

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

- Two (2) Whelen M6 Series M6T amber LED turn lights
- Two (2) Whelen M6 Series M6BTT red LED stop/tail lights
- Two (2) Whelen M6 Series M6BUW clear LED back-up lights with clear lens

Each light shall have a chrome flange.

MIDSHIP MARKER/TURN SIGNAL

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

MARKER LIGHTS

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

LICENSE PLATE MOUNTING BRACKET

A license plate mounting bracket shall not be provided on completed unit.

ELECTRONIC SIREN

The siren control head shall be supplied and installed by the cab/chassis manufacturer, if required by Loveland Fire Rescue Authority. Siren power shall be wired through the master warning light switch.

The specified siren functions shall be configured by cab chassis manufacturer.

FRONT CAB MOUNTED SCENE LIGHT(S)

Floodlight(s) shall be provided on the front of the cab by the cab/chassis manufacturer.

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

SIDE LED SCENE LIGHTS

There shall be four (4) HiViz **semi**-recessed model FT-MB-2.18-FT-W-REC 24.53" flood/spot LED scene light(s) provided on the upper body. Light quantity shall be divided equally per side. The recessed series light shall have 13,305 useable lumens each. Each light shall have a white finish.

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

Repaint Recess Housing Job Color (red)

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

REAR LED SCENE LIGHTS

Two (2) HiViz Guardian Elite model FT-GESM, 9" x 7" surface mounted scene lights shall be provided on the upper rear body to light the work area immediately behind the vehicle. The Guardian series light shall have 12,290 useable lumens each. Each light shall have a chrome flange.

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

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

TRAFFIC ADVISOR LIGHTS

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

- Eight (8) Whelen Wide-angle ION series amber Super-LED lights with clear lens.
- Chrome flanges.
- The center pair of lights shall be split amber/red.
- The red lights shall be connected to the brake light circuit on vehicle.
- Lights shall be individually mounted and evenly distributed.

The outer light each side will work with respective turn signal

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

WARNING LIGHT PACKAGE

ALL WARNING LIGHTS WILL MATCH, MEANING ALL CAB AND BODY WILL HAVE THE SAME FLASH PATTERNS.

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

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

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

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

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

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

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

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

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

UPPER LEVEL OPTICAL WARNING DEVICES

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

ZONES B AND D - SIDE WARNING LIGHTS

UPPER REAR CORNER WARNING LIGHTS

There shall be two (2) Whelen M6 linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a chrome flange.

- Flash Pattern shall be (factory default) Action Scan.
- The Low Power option will be provided for the above lighting group.
 - Flash Pattern shall be DVI Single Flash 75 Lo Intensity all on (default)

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

UPPER FORWARD CORNER WARNING LIGHTS

There shall be two (2) Whelen M6 linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a chrome flange.

- Flash Pattern shall be (factory default) Action Scan.
- The Low Power option will be provided for the above lighting group.
 - Flash Pattern shall be DVI Single Flash 75 Lo Intensity all on (default)

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

ZONE C - REAR WARNING LIGHTS

There shall be two (2) Whelen M9 linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a chrome flange.

- Flash Pattern shall be (factory default) Action Scan.
- The Low Power option will be provided for the above lighting group.
 - Flash Pattern shall be DVI Single Flash 75 Lo Intensity all on (default)

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

LOWER LEVEL OPTICAL WARNING DEVICES

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

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

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

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

There shall be two (2) Whelen ION V-Series Super-LED surface mount lights (IONSV3RC) with combination 180° warning and puddle lights provided, one (1) each side. Puddle lights will be turned on with specified scene lighting. Each light shall have a clear lens and chrome die cast flange.

Light to be programmed with respective turn signal.

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

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

There shall be two (2) Whelen M6 V-series combination 180° red linear Super-LED warning lights with 45° perimeter scene lights (M6V2R) provided, one (1) each side. Perimeter scene lights will be turned on with specified scene lighting. Each light shall have a red lens over warning light and clear lens over perimeter light and chrome flange.

Light to be programmed with respective turn signal.

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

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen M6 linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a chrome flange.

- Flash Pattern shall be (factory default) Action Scan.
- The Low Power option will be provided for the above lighting group.
 - Flash Pattern shall be DVI Single Flash 75 Lo Intensity all on (default)

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

FIRE PUMP SYSTEM

SIDE MOUNT PUMP MODULE

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

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

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

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

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

PUMP MODULE SERVICE ACCESS

The front of pump module shall have two (2) removable service access doors. Each door shall be easily removable with chrome plated trigger latches and over-sized hand holes for ease in removal and replacement. Doors shall be fabricated from 1/8" aluminum treadplate.

PUMP MODULE DUNNAGE AREA

There shall be an open dunnage area located directly above the pump panels to store miscellaneous Loveland Fire Rescue Authority supplied equipment. The interior dunnage area side walls shall be fabricated from 1/8" aluminum treadplate, and the walking surface shall be fabricated from 3/16" aluminum NFPA compliant treadplate.

PUMP PANEL - SIDE MOUNT

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

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

PUMP MODULE SERVICE LIGHTS

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

STREETSIDE RUNNING BOARD - SIDE MOUNT PANEL

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

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

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

CURBSIDE RUNNING BOARD - SIDE MOUNT PANEL

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

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

The running board shall contain a hose well with a minimum of 9" width designed to carry a 25' of 5.0" soft suction hose with hold down provisions.

Two (2) OnScene Velcro style straps shall be provided to hold suction hose in place.

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

- One (1) OnScene 10" Access Pro white LED ground light(s) shall be provided below the body. Light(s) shall be switchable but activated automatically when the park brake is set.

Customer is aware that there is a different light (Fire-Tech) on Streetside as this is the request.

- The above specified hose well shall be of a floating design to minimize potential damage while driving over debris or other obstacles. This design will require adjustments to the lower pump panel mounted drains and controls.

PUMP MODULE COMPARTMENT - ABOVE CURBSIDE PUMP PANEL (30" DEEP)

There shall be a compartment located above the curbside pump panels. The compartment shall be approximately 30" deep with a floor and back wall fabricated from 1/8" (.125) smooth aluminum. The side walls of the compartment shall be formed by the exterior panels. The interior finish of this compartment will remain unpainted smooth aluminum. Compartment shall be as wide as the pump panels and approximately 22" tall.

There shall be one (1) horizontally hinged, lift-up style door located above the pump panels, painted to match upper pump module. Door shall include two (2) pneumatic cylinders, one (1) 7" chrome handle, two (2) chrome push to release latches and one (1) gas strut E-Z Switch.

In addition there shall be one (1) lift-up 3/16" NFPA treadplate door on top with two (2) pneumatic cylinders, one (1) 7" chrome handle and one (1) gas strut E-Z Switch.

- One (1) OnScene Access PRO white LED mounted at the top of the compartment toward the door opening. **full width.**

PUMP MODULE FINISH

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

PUMP COMPARTMENT HEATER

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

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

WATEROUS CU FIRE PUMP

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

WATEROUS PUMP ANODES

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

IMPELLERS

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

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

FLAME PLATED IMPELLER HUBS

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

IMPELLER WEAR RINGS

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

PUMP CASING

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

PUMP MANUAL

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

PUMP TEST RATING

The fire pump shall be tested at 1,500 GPM (6,000 LPM) @ 150 PSI (1,134 Kpa).

PAINT FINISH

The body builder shall re-paint the pump case to match the lower body color.

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.

An interlock system shall be provided to prevent the pump drive system from being shifted out of "pump engaged" pumping mode of operation when the chassis transmission is in pump gear per NFPA 1901 section 16.

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.

AIR OPERATED PUMP SHIFT

The pump shift controls shall be Cab/Chassis supplied.

PUMP SHIFT MANUAL OVERRIDE

No pump shift manual override system shall be provided.

PAINT FINISH

The body builder shall re-paint and match the lower body color choice.

PUMP DRIVELINE

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

MIDSHIP PUMP / GEARBOX

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

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.

TWO-STAGE FIRE PUMP

The pump shall be a Waterous CMUC20 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.

THERMAL PROTECTION

No thermal protection shall be provided on specified pump.

1/2" PUMP COOLER LINE

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

PUMP COOLER CHECK VALVE

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

FIRE PUMP TEST

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

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

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

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

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

FIRE PUMP TEST LABEL

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

SAFETY SIGN

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

ALTITUDE REQUIREMENT

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

PUMP DRAIN VALVE

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

AIR PRIMING PUMP CONTROL W/AUTO

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

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

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

PRESSURE GOVERNOR and ENGINE MONITORING DISPLAY

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

The following continuous displays shall be provided:

- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Check engine and stop engine warning LEDs
- Engine oil pressure; shown on a dual color (green/red) LED bar graph display
- Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
- Transmission Temperature; shown on a dual color (green/red) LED bar graph display
- Battery voltage; shown on a dual color (green/red) LED bar graph display
- Pressure and RPM operating mode LEDs
- Pressure / RPM setting; shown on a dot matrix message display
- Throttle ready LED.

A dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

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

• High Battery Voltage	• Low Engine Oil Pressure
• Low Battery Voltage (Engine Off)	• High Engine Coolant Temperature
• Low Battery Voltage (Engine Running)	• Out of Water (visual alarm only)
• High Transmission Temperature	• No Engine Response (visual alarm only).

The program features shall be accessed via push buttons located on the front of the control module. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.

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

ENGINE GAUGES

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

6" SUCTION INLET - STREETSIDE

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

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

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

SUCTION INTAKE VALVE, (6" / 150 mm)

An Akron Brass 7982 intake valve with 6" (150 mm) NHF thread and rocker lug on panel side shall be provided on suction intake. The intake valve shall be constructed of lightweight, corrosion resistant, hard-anodized aluminum and stainless steel. The valve shall have an adjustable (50-250 PSI) relief valve, 3/4" air bleeder that discharges at the same location as the pressure relief valve, 30° down angle inlet with adjustable rotational positions, a stainless ball sector, durable non-stick seat, and a minimum 4 1/2" diameter waterway. A position indicator shall be included to indicate position of ball. A 12.5" diameter hand wheel shall be included to operate valve open and close functions. The valve shall not exceed 7 PSI friction loss at 2,000 gpm and 14.875" depth and carry a 10 year warranty against corrosion and manufacturer defects.

- The intake shall be provided with a 5" Storz blind cap with hardcoat finish and retaining chain.
- Two (2) Harrington 5.0" Storz x 10' Flexlite PVC flexible suction hose(s) shall be provided with completed unit. The hose shall have Storz couplings.
 - The suction hose(s) shall be mounted on streetside above wheels in formed aluminum hard suction tray(s).

6" SUCTION INLET - CURBSIDE

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

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

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

WATEROUS 6" MONARCH ELECTRIC VALVE

There shall be one (1) Waterous model 82743 6" Monarch™ butterfly valve provided behind the panel on specified intake(s) of the pump. The valve shall be a 6" full flow valve with a 6" NST nipple.

Each valve shall be electrically operated from a solid state controller located on the pump panel. A seven light LED indicator shall show the position of the valve from fully closed to fully open. The valve shall meet current NFPA 1901 standards for opening and closing speed.

- The intake shall be provided with a 6" NHF swivel rocker lug x 5" Storz 30 degree down sweep elbow with hardcoat finish.

MIV INTAKE RELIEF VALVE

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

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

INTAKE RELIEF VALVE: DISCHARGE LOCATION

The above intake relief valve(s) shall be plumbed to discharge to the ground, below apparatus and away from the operators area terminating in a 2-1/2" NSTM connection. The discharge shall be labeled "DO NOT CAP".

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

HEAT EXCHANGER

A heat exchanger system shall not be provided for the pump driving engine.

INTAKE RELIEF VALVE

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

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

INTAKE RELIEF VALVE: DISCHARGE LOCATION

The above intake relief valve(s) shall be plumbed to discharge to the ground, below apparatus and away from the operators area terminating in a 2-1/2" NSTM connection. The discharge shall be labeled "DO NOT CAP".

HOSE THREADS

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

PLUMBING SPECIFICATIONS

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

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

STAINLESS STEEL INTAKE MANIFOLD

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

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

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

STAINLESS STEEL DISCHARGE MANIFOLD

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

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

The entire discharge piping system; valves; drain cocks; and outlet closures, excluding the tank fill line on the tank side of the valve and CAF system piping and components that include valves that permit isolation from discharge pressure, shall be capable of withstanding a hydrodynamic discharge pressure of 500 psi (3400 kPa) or 100 psi (700 kPa) over the maximum discharge pressure capability rating of the pump, whichever is greater.

PLUMBING SYSTEM FINISH

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

FOAM SYSTEM

The apparatus shall be equipped with a FoamPro 2001 electronic, fully automatic, variable speed, direct injection, discharge side foam proportioning system. The system shall be capable of handling Class A foam concentrates and most Class B foam concentrates. The foam proportioning operation shall be based on direct measurement of water flows, and remain consistent within the specified flows and pressures. System must be capable of delivering accuracy to within 5% of calibrated settings over the advertised operation range when installed according to factory standards. The system shall be equipped with a digital electronic control display suitable for installation on the pump panel. Incorporated within the control display shall be a microprocessor that receives input from the system flowmeter(s), while also monitoring foam concentrate pump output, comparing values to ensure that the operator preset proportional amount of foam concentrate is injected into the discharge side of the fire pump.

Paddlewheel-type flowmeter(s) shall be installed in the discharges specified to be "foam capable." When the use of more than one flowmeter is required, an interface electronics module will be provided to totalize these flows and send the flow total to the microprocessor in the computer control display.

The digital computer control display shall enable the pump operator to perform the following control and operation functions for the foam proportioning system:

- Provide push-button control of foam proportioning rates from 0.1% to 9.9%, in 0.1% increments
- Show current flow-per-minute of water

- Show total volume of water discharged during and after foam operations are completed
- Show total amount of foam concentrate consumed
- Simulate flow rates for manual operation
- Perform setup and diagnostic functions for the computer control microprocessor
- Flash a “low concentrate” warning when the foam concentrate tank(s) runs low
- Flash a “no concentrate” warning and shut the foam concentrate pump off, preventing damage to the pump, should the foam tank(s) empty

A 12-volt electric motor drive positive displacement foam concentrate pump, rated up to 2.5 gpm (9.5 L/min) @ 150 psi with operating pressures up to 400 psi (27.6 BAR), shall be installed in a suitable, accessible location. The system will draw a maximum of 40 amps @ 12 VDC. A pump motor electronic driver (mounted to the base of the pump) shall receive signals from the computer control display and power the 1/2 hp (0.40 kW) electric motor directly coupled to the concentrate pump in a variable speed duty cycle to ensure that the correct proportion of concentrate preset by the pump operator is injected into the water stream.

Full flow check valve shall be provided to prevent foam contamination of fire pump and water tank or water contamination of foam tank.

Components of the complete proportioning system shall include:

• Operator control module	• Low level tank switch
• Paddlewheel flowmeter	• Foam tank
• Pump and electric motor/motor driver	• Foam injection check valve
• Wiring harnesses	• Main waterway check valve

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

The system design shall have passed environmental testing which simulates heavy use on off-road mobile apparatus. Testing shall have been conducted in accordance to SAE standards.

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

Clarify: Foam system has a shut off valve at the tank.

REMOTE FOAM START/STOP

No remote foam system on/off control is required.

FOAM SYSTEM DRAIN

An Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve with lift type handle which can be opened under pressure, and color coded label shall be provided. Valve shall be located on lower pump panel and drain the lowest point in the foam system plumbing.

INTAKES

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

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

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

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

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

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

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

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

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

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

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

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

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

2-1/2" INTAKE, STREETSIDE

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

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

Color Code: PICK Color Code

- A discharge pressure gauge is not required with the remote valve control.
- Each intake shall have a 2-1/2" (65 mm) NSTF chrome swivel adapter with strainer provided.
 - The specified adapter shall be provided with a 2-1/2" (65 mm) NSTM chrome plated plug with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

2-1/2" INTAKE, CURBSIDE

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

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

Color Code: PICK Color Code

- A discharge pressure gauge is not required with the remote valve control.
- Each intake shall have a 2-1/2" (65 mm) NSTF chrome swivel adapter with strainer provided.
 - The specified adapter shall be provided with a 2-1/2" (65 mm) NSTM chrome plated plug with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

DIRECT TANK FILL

No direct tank fill will be provided. Tank will be filled through the pump and standard tank fill valve.

TANK TO PUMP CHECK VALVE

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

TANK TO PUMP VALVE

A 4" (100 mm) full flow ball valve shall be installed between the fire pump and the water tank. The connection between the tank and the pump shall be capable of the flow recommendations as set forth in the latest edition of NFPA 1901. A non collapsible flexible hose shall be incorporated into the tank to pump plumbing to allow movement in the line as the chassis flexes to avoid damage during normal road operation. The tank to pump valve shall be controlled from the pump operator's panel and labeled "TANK TO PUMP".

The tank to pump valve shall be as follows;

- Label: TANK TO PUMP
- One (1) Akron Brass 8800 series Gen II slow-operating, actuated type 4" (100 mm) valve(s), with bronze flat ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.

Color Code: BLACK.

- Valve(s) shall be controlled by an Akron 6" handwheel actuator with portrait layout panel and NFPA compliant valve position indicator located on the pump operator's panel.

Color Code: BLACK.

DISCHARGES

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

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

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

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

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

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

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

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

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

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

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

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

FRONT DISCHARGE

FRONT DISCHARGE (CENTER)

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

- Label: FRONT BUMPER DISCHARGE.
- One (1) of the discharge(s) shall flow water and foam.
- One (1) Akron Brass 8600 series Gen II, actuated type 2" (52 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Valve(s) shall be controlled by an Akron 4" handwheel actuator with portrait layout panel and NFPA compliant valve position indicator located on the pump operator's panel.
- Color Code: RED.
- One (1) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with red LED backlighting activated with pump engagement.
 - Gauge(s) shall have a white background with black text.
 - Gauge(s) shall have a range from 0 to 400 PSI.
 - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.
- There shall be a 2" (52 mm) VFC x 1-1/2" (38 mm) NSTM brass or chrome plated 90 degree swivel elbow provided for each discharge.
- One (1) Class 1, 3/4" brass automatic type drain valve(s) shall be provided for the above plumbing item. Drain valve(s) shall be located on lower pump panel. The normally open valve(s) shall close with 6 psi located at the lowest point of the plumbing.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

CURBSIDE DISCHARGE

CURBSIDE DISCHARGE #1

- Label: DISCHARGE #1.
- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8600 series Gen II, actuated type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Valve(s) shall be controlled by an Akron 4" handwheel actuator with portrait layout panel and NFPA compliant valve position indicator located on the pump operator's panel.

Color Code: BLACK.

- One (1) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with blue Nite-Glo LED backlighting activated with pump engagement.
 - Gauge(s) shall have a white background with black text.
 - Gauge(s) shall have a range from 0 to 400 PSI.
 - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.
- Discharge shall have a 2-1/2" (65 mm) NSTF x 2-1/2" (65 mm) NSTM chrome plated 30 degree downsweep elbow provided.
 - The specified elbow shall be provided with a 2-1/2" (65 mm) NSTF chrome plated cap with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

CURBSIDE DISCHARGE #2

- Label: DISCHARGE #2.
- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8600 series Gen II, actuated type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Valve(s) shall be controlled by an Akron 4" handwheel actuator with portrait layout panel and NFPA compliant valve position indicator located on the pump operator's panel.
- Color Code: PURPLE.
- One (1) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with blue Nite-Glo LED backlighting activated with pump engagement.
 - Gauge(s) shall have a white background with black text.
 - Gauge(s) shall have a range from 0 to 400 PSI.
 - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.
- Discharge shall have a 2-1/2" (65 mm) NSTF x 2-1/2" (65 mm) NSTM chrome plated 30 degree downsweep elbow provided.
 - The specified elbow shall be provided with a 2-1/2" (65 mm) NSTF chrome plated cap with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

CURBSIDE DISCHARGE #3

- Label: MASTER DISCHARGE.
- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8600 series Gen II slow-operating, actuated type 3" (75 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Valve(s) shall be controlled by an Akron 6" handwheel actuator with portrait layout panel and NFPA compliant valve position indicator located on the pump operator's panel.

Color Code: WHITE.

- One (1) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with blue Nite-Glo LED backlighting activated with pump engagement.
 - Gauge(s) shall have a white background with black text.
 - Gauge(s) shall have a range from 0 to 400 PSI.
 - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.
- Each discharge shall have a 3" (75 mm) rocker lug NSTF x 5" (125 mm) Storz hardcoat finish 30 degree downsweep elbow provided.
 - The specified elbow shall be provided with a 5" (125 mm) Storz cap hardcoat finish with chain.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

CURBSIDE DISCHARGE #4

- Label: DECON OUTLET.
- One (1) of the discharge(s) shall flow water only.

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

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

Color Code: BLACK.

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

REAR STREETSIDE DISCHARGE

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

2-1/2" DISCHARGE - 250 GPM

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

- Label: GREEN LINE-FOAM.
- Label: YELLOW LINE-FOAM.
- Two (2) of the discharge(s) shall flow water and foam.
- Two (2) Akron Brass 8600 series Gen II, actuated type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Valve(s) shall be controlled by an Akron 4" handwheel actuator with portrait layout panel and NFPA compliant valve position indicator located on the pump operator's panel.
- Color Code: GREEN.
- Color Code: YELLOW.
- Two (2) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with red LED backlighting activated with pump engagement.
 - Gauge(s) shall have a white background with black text.
 - Gauge(s) shall have a range from 0 to 400 PSI.

- The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.
- Discharge shall have a 2-1/2" (65 mm) NSTF x 2-1/2" (65 mm) NSTM chrome plated 30 degree downsweep elbow provided.
- There shall be a 2-1/2" (65 mm) NSTF x 1-1/2" (38 mm) NSTM chrome plated rigid adapter provided for discharge(s).
 - The specified elbow does not require a cap with chain.
- Two (2) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

REAR CURBSIDE DISCHARGE

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

2-1/2" DISCHARGE - 250 GPM

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

- Label: ALLEY LINE-FOAM.
- Label: BLITZ LINE.
(Water Only)
- One (1) of the discharge(s) shall flow water only.
- One (1) of the discharge(s) shall flow water and foam.
- Two (2) Akron Brass 8600 series Gen II, actuated type 2-1/2" (65 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Valve(s) shall be controlled by an Akron 4" handwheel actuator with portrait layout panel and NFPA compliant valve position indicator located on the pump operator's panel.
- Color Code: ORANGE.
- Color Code: BLUE.
- One (1) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with blue Nite-Glo LED backlighting activated with pump engagement.
 - Gauge(s) shall have a white background with black text.

- Gauge(s) shall have a range from 0 to 400 PSI.
- The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.
- Discharge shall have a 2-1/2" (65 mm) NSTF x 2-1/2" (65 mm) NSTM chrome plated 30 degree downsweep elbow provided.
 - The specified elbow does not require a cap with chain.
- Two (2) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

MISCELLANEOUS DISCHARGE

REAR BUMPER WITH PRE-CONNECTED HOSE LAY

The full width rear step bumper shall be constructed from 2" x 2" x 1/4" aluminum tubing and covered with 3/16" NFPA compliant aluminum tread plate. The bumper shall extend from the rear vertical body panel at least 14" with a minimum of 1/2" space at body for water drainage. Bumper structure shall be an extension of the body sub-frame for strength and not a bolted on assembly.

The rear step bumper cover shall be fabricated from 3/16" NFPA compliant aluminum tread plate. The cover shall be hinged on the body side to lift-up and the rear vertical panel shall be hinged to drop-down (with chain or cable to prevent full swing) to expose the pre-connected hose lay. This allows the main cover to be down and utilized as step while hose is extended and in use. The bumper shall store at least a 200' of 1-3/4" double jacketed hose and nozzle. The swivel type hose connection shall be located under cover in center of compartment and controlled at pump operator's panel.

The required hose and nozzle will be supplied by Loveland Fire Rescue Authority.

- Label: REAR BUMPER DISCHARGE.
- One (1) of the discharge(s) shall flow water and foam.
- One (1) Akron Brass 8600 series Gen II, actuated type 2" (52 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Valve(s) shall be controlled by an Akron 4" handwheel actuator with portrait layout panel and NFPA compliant valve position indicator located on the pump operator's panel.
- Color Code: MAGENTA.
- One (1) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with blue Nite-Glo LED backlighting activated with pump engagement.

- Gauge(s) shall have a white background with black text.
- Gauge(s) shall have a range from 0 to 400 PSI.
- The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.
- One (1) Class 1, 3/4" brass automatic type drain valve(s) shall be provided for the above plumbing item. Drain valve(s) shall be located on lower pump panel. The normally open valve(s) shall close with 6 psi located at the lowest point of the plumbing.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

3" DECK GUN DISCHARGE

There shall be one (1) 3" (75 mm) gated discharge located on the upper deck above the pump compartment. Piping shall rise high enough for a mounted deluge gun to be operated in a 360 degree circle to a lower angle of 15 degrees without being impeded by any part of the apparatus or equipment.

The discharge plumbing shall terminate as required by deck gun model. The discharge shall include:

- Label: DECK GUN.
- One (1) of the discharge(s) shall flow water only.
- Two (2) Akron Brass 8600 series Gen II slow-operating, actuated type 3" (75 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Valve(s) shall be controlled by an Akron 4" handwheel actuator with portrait layout panel and NFPA compliant valve position indicator located on the pump operator's panel.

Color Code: BROWN.

- One (1) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with blue Nite-Glo LED backlighting activated with pump engagement.
 - Gauge(s) shall have a white background with black text.
 - Gauge(s) shall have a range from 0 to 400 PSI.
 - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

DECK GUN MONITOR

An Akron Apollo model 3423 lift-off style deck monitor with 1,250 GPM capacity, manually controlled deck gun shall be provided with completed unit with following features;

- Vertical travel from 90° above to 15° below horizontal, with built-in 35° safety stop
- 3" waterway with cast-in turning vanes for efficient flow
- Direct mount - a combination 3" NPT female and 3" flange

TELESCOPING WATERWAY - MANUAL

The specified deck gun shall be mounted on a TFT model XG18VL-PL 18" manually telescopic waterway. For storage, it can be lowered to deck level, or raised to its extended position 18" (45.7 cm) by lifting the quick release and raising by hand until the non-rotating pipe locks into position, while maintaining the ability to horizontally rotate the monitor device 360 degrees. This gives greater clearance of other equipment on the apparatus, greater freedom of movement and allows a more comfortable operating position. The Extend-A-Gun offers a full 3" waterway (3" Victaulic inlet and a 3" male NPT outlet), hardcoat anodized finish, and built-in sensor for connection to "monitor raised" light or truck open compartment warning. The unit shall be covered by a five-year warranty.

MASTER STREAM TIP

The specified deck gun shall be provide with an Akron Akromatic model 5160 Pyrolite automatic, master stream tip capable of flowing 1,250 GPM.

STACKED TIPS

The specified deck gun shall be provide with an Akron model 2499 Pyrolite quad stacked deluge tips, and an Akron model 3488 Pyrolite, 3-1/2" F x 3" M cast discharge pipe.

Mounted in the dunnage area.

GROUND BASE

No ground base shall be provide with completed unit.

BOOSTER REEL DISCHARGE

There shall be one (1) Hannay SBEF series booster hose reel discharge(s) with polished aluminum finish, and electric rewind motor located as required, or per itemized compartment layout.

- Power rewind control(s) shall be in a position where the operator can observe the rewinding operation and not be more than 72 in. (1830 mm) above the operator's standing position, and shall be marked with a label indicating its function.
- Label: HOSE REEL.
- Each booster hose reel shall be equipped with a Hannay FH-3 hose guide rollers.
- Each booster reel shall be supplied with one (1) 100' x 1" of lightweight 100% polyester booster hose(s) with 1" NST Pyrolite couplings. Hose color shall be red.
- A TFT Ultimatic 125 series model BL-NGH (or equal) 1" pistol grip nozzle shall be provided with specified booster hose reel.

Mount on Stainless overlay, refer to engine43

- A 1/4 turn valve shall be provided at pump panel with label for booster reel blow-out.
- One (1) of the discharge(s) shall flow water and foam.
- One (1) Akron Brass 8600 series Gen II, actuated type 2" (52 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Valve(s) shall be controlled by an Akron 4" handwheel actuator with portrait layout panel and NFPA compliant valve position indicator located on the pump operator's panel.

Color Code: SILVER.

- One (1) Innovative Controls NoShok 2-1/2" liquid filled gauge(s) with red LED backlighting activated with pump engagement.
 - Gauge(s) shall have a white background with black text.
 - Gauge(s) shall have a range from 0 to 400 PSI.
 - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.
- One (1) Innovative Controls model 3003000, 3/4" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on lower pump panel and drain the lowest point in the plumbing.

TANK FILL VALVE

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

- Label: TANK FILL
- One (1) Akron Brass 8800 series Gen II, actuated type 2" (52 mm) valve(s), Stainless Steel ball with HydroMax technology. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
 - Akron valve(s) shall be controlled with a remote handwheel connected to the gear actuated valve.
 - Valve(s) shall be controlled by an Akron 4" handwheel actuator with portrait layout panel and NFPA compliant valve position indicator located on the pump operator's panel.

Color Code: BLACK.

PUMP PANEL

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

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

PUMP PANEL LOCATION

The pump control panel shall be side mounted.

The pump panel shall include the following items;

PUMP PANEL ACCESS

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

MASTER INTAKE/PRESSURE GAUGES

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

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

Both gauges shall have a die cast zinc, chrome plated bezel and color-coded. The left side (Pump Intake) bezel shall be color coded red, and the right side (Pump Discharge) bezel shall be colored black.

A test gauge port manifold shall be integrated into lower center bezel.

- Gauge(s) shall have a white background with black text.
- Gauge(s) shall have a range from -30" to 400 PSI.

PUMP SAFETY AND TEST LABELS

Safety, information, data, and instruction labels for apparatus shall be provided and installed at the operator's instrument panel.

The labels shall include rated capacities, pressure ratings, and engine speeds as determined by the certification tests. The no-load governed speed of the engine, as stated by the engine manufacturer, shall also be included.

The labels shall be provided with all information and be attached to the apparatus prior to delivery.

PUMP PANEL LIGHTING

All gauges and controls on the pump operator's panel shall be adequately illuminated by a full panel width shielded light assembly with full width OnScene Solutions LED light (each panel, if equipped). The light shall be activated by a weather-proof type switch on the pump operator's panel as well as automatically when pump is engaged. This switch shall also activate any area step lighting.

PUMP PANEL SWITCH PANEL

An Innovative Controls black back-lit switch panel shall be provided to control specified scene lighting or other control switching.

PUMP PANEL AIR HORN SWITCH

The pump operator's panel shall have an Innovative Controls switch panel to activate the cab/chassis air horn(s). Switch shall be constantly illuminated and labeled.

PUMP PANEL CAB TILT SWITCH

An Innovative Controls black back-lit switch panel shall be provided to control cab tilt function with indicator light and properly labeled.

FUEL LEVEL GAUGE

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

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PUMP PANEL - RADIO HEAD & SPEAKER MOUNTING

There shall be one (1) remote head for previously specified mobile radio, and one (1) speaker mounted on the gauge panel portion of the pump operators panel(s). The radio head and speaker shall be of a weather proof design as they will be mounted on face of the panel.

POLY WATER TANK

The water tank capacity shall be approximately 750 US gallon or 624 Imperial gallons. Certification of the tank capacity shall be recorded on the manufacturer's record of construction and shall be provided to the purchaser upon delivery of the apparatus.

CONSTRUCTION

The water tank shall be of a specific configuration and designed to be completely independent of the body and to incorporate the lowest possible Center of Gravity. The transverse and longitudinal baffles shall be manufactured of a minimum of 3/8" polypropylene. All baffles shall be properly vented to permit movement of air and water between compartments. All baffles shall interlock with one another and are completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with NFPA 1900. All exterior walls and interior baffles shall be welded to the floor of the tank. Tolerances in design allow for a maximum variation of 1/8" on all dimensions. All poly sheeting utilized in the construction of the tank shall be of a textured finish.

WATER FILL TOWER AND COVER

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" polypropylene sheet and shall have a minimum outside dimension of 8" (203mm) x 8" (203mm). The tower shall have a 1/4" thick removable polypropylene screen and a polypropylene hinged cover. The fill tower cover shall include a Label "WATER ONLY" that is blue in color with white letters indicating that it is a water-only fill tower. Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum I.D. of 4" that is designed to run through the tank and shall be piped to discharge water behind the rear wheels as required in NFPA 1900 so as too not interfere with rear tire traction. The discharge of the overflow/vent shall be threaded to allow for a fitting and hose to be installed and routed below the fuel tank or rear axle to prevent flooding.

SUMP

The sump shall be constructed of a minimum of 1/2" polypropylene. When a front suction is required, a 3" schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" N.P.T. threaded outlet on the bottom for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3" above the inside floor.

THREADED PORTS

There will be three (3) standard threaded Ports: one for the tank-to-pump suction Line, one for tank fill line and a one for a water level sensor. All threads shall be of National Pipe Taper specification unless otherwise specified.

MOUNTING AND SUPPORT

The tank shall be mounted to the sub-frame of the body with a barrier of 1/4" rubber between tank and any frame material. The rubber Isolator shall have a Rockwell rating of 60 durometer. The frame / cradle shall support the entire floor including the perimeter of the tank with a maximum unsupported area of 529 square inches (.341 sq m) for tanks equal to or less than 40" (1016 mm) tall and 400 square inches (.258 sq m) for tanks greater than 40" (1016 mm) tall.

BOOSTER TANK REFILL SYSTEM

A booster tank refill system shall not be provided.

WATER TANK LEVEL GAUGE

There shall be {qty} Innovative Controls Soft-Glo water tank level gauge(s) (3050869-XX) 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 set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.
- Above tank level display shall be located on main pump panel.

WATER TANK LEVEL INDICATOR

There shall be two (2) Innovative Controls Soft-Glo Mini Monster water tank level light(s) (3050854-01-G) for indicating water tank level. The tank level light shall indicate the liquid level on an easy to read display.

Each tank level gauge system shall include:

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- A 180 degree visible super bright LED bar graph display with a visual alarm at 1/4 of a tank. The display shall also provide an output to activate an audible alarm or secondary visual alarm at 1/4 of a tank.

A set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.

The red "1/4" level light shall flash when the tank level drops below "1/4" of the tank capacity. The light shall be installed in a vertical orientation and be de-activated whenever the parking brake is released.

- Above tank level display shall be located on streetside body side.
- Above tank level display shall be located on curbside body side.
- Water tank level indicators shall only be on with the Park Brake set.

POLY WATER TANK WARRANTY

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

FILL TOWER PROTECTION

The fill tower(s) shall be boxed in with an aluminum panel for protection from damage.

CLASS A POLYPROPYLENE FOAM CELL

There shall be one (1) 20 US gallon or 16.6 Imperial gallons polypropylene foam cell incorporated into the polypropylene water tank. This foam tank capacity shall be deducted from water tank size specified.

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

A minimum 1 in. (25 mm) inside diameter full flow drain valve and piping shall be provided at the lowest point of any foam concentrate tank. The drain shall be piped to drain directly to the surface beneath the apparatus without contacting other body or chassis components. Foam cell shall be drill and tapped for foam level gauge.

A label that reads "Foam Tank Fill" shall be placed at or near the foam concentrate tank fill opening.

A label that specifies the following shall be placed at or near any foam concentrate tank fill opening:

1. Type(s) of foam concentrate the system is designed to use.
2. Any restrictions on the type of foam concentrate that can be used with the system.
3. A FAMA 19 label that reads "Warning: Do Not Mix Brands and Types of Foam". In addition, label shall be in both English/French for units built for Canada; "*Avertissement : Ne pas mélanger les marques et les types d'émulseur*".

FOAM TANK LEVEL GAUGE

There shall be {qty} Innovative Controls Soft-Glo foam tank level gauge(s) (3050872-XX-G) for indicating foam 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 set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.
- Above tank level display shall be located on main pump panel.

HOSE BED STORAGE AREA

Hose bed storage area shall be located over water tank and body, and shall exit at the rear of the apparatus. The interior of storage area shall be free from all projections such as nuts, sharp angles, or brackets that may damage equipment.

ALUMINUM HOSE BED DECKING

The hose bed deck shall be constructed from 3" x 3/4" hollow aluminum extrusions welded into a one-piece grid to allow ventilation and water drainage. The extrusions shall have a radiused ribbed top surface. The deck will be completely removable for easy access to the booster tank. The booster tank fill tower shall be protected as necessary to prevent damage from equipment located in the storage area.

HOSE BED BAY #1

- Four (4) 50' lengths of 1-3/4" double jacket hose, flat lay.
- Loveland Fire Rescue Authority supplied fire hose shall be installed on completed unit after delivery.
 - A discharge connection at rear of body shall be provided for hose preconnect.

HOSE BED BAY #2

- Six (6) 50' lengths of 2" double jacket hose, flat lay.
- Loveland Fire Rescue Authority supplied fire hose shall be installed on completed unit after delivery.
- One (1) adjustable 3/16" smooth aluminum hose bed divider(s) shall be provided in the hose bed storage area. 1" round split aluminum tubing welded to the top and rear edges of divider. Hose pay-out shall be unobstructed by the divider.
 - A discharge connection at rear of body shall be provided for hose preconnect.

HOSE BED BAY #3

- Ten (10) 100' lengths of 5" rubber hose, flat lay.
- Loveland Fire Rescue Authority supplied fire hose shall be installed on completed unit after delivery.
- One (1) adjustable 3/16" smooth aluminum hose bed divider(s) shall be provided in the hose bed storage area. 1" round split aluminum tubing welded to the top and rear edges of divider. Hose pay-out shall be unobstructed by the divider.
 - Hosebed bay shall be for dry hose storage.

HOSE BED BAY #4

- Eight (8) 50' lengths of 2-1/2" double jacket hose, flat lay.
- Loveland Fire Rescue Authority supplied fire hose shall be installed on completed unit after delivery.
- One (1) adjustable 3/16" smooth aluminum hose bed divider(s) shall be provided in the hose bed storage area. 1" round split aluminum tubing welded to the top and rear edges of divider. Hose pay-out shall be unobstructed by the divider.
 - Hosebed bay shall be for dry hose storage.

HOSE BED BAY #5

- Six (6) 50' lengths of 3" double jacket hose, flat lay.
- Loveland Fire Rescue Authority supplied fire hose shall be installed on completed unit after delivery.
- One (1) adjustable 3/16" smooth aluminum hose bed divider(s) shall be provided in the hose bed storage area. 1" round split aluminum tubing welded to the top and rear edges of divider. Hose pay-out shall be unobstructed by the divider.
 - A discharge connection at rear of body shall be provided for hose preconnect.

HOSE BED BAY #6

- Four (4) 50' lengths of 3" double jacket hose, flat lay.
- Loveland Fire Rescue Authority supplied fire hose shall be installed on completed unit after delivery.
- One (1) adjustable 3/16" smooth aluminum hose bed divider(s) shall be provided in the hose bed storage area. 1" round split aluminum tubing welded to the top and rear edges of divider. Hose pay-out shall be unobstructed by the divider.
 - A discharge connection at rear of body shall be provided for hose preconnect.

ALUMINUM HOSE BED COVER

A two-section hose bed cover shall be provided. Each door shall be fabricated from 1/8" NFPA aluminum treadplate with formed hat sections for bracing. Doors shall be hinged along each side of the hose body using stainless steel piano hinge. The top surface of each section shall slant down with the highest point in the center of the hose bed area and shall be supported from underneath by at least one (1) adjustable hose bed divider. Each section shall be constructed to support the weight of a 300 lb. person.

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

There shall be one (1) 24" vertical handrail on each door to assist in raising and lowering hose bed door. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

Each door shall have a 36" OnScene LED light on the underside of the door that will be automatically activated when the door is opened.

HOSE BED END COVER

The opening at the end of hose bed shall have a 22 oz. marine grade vinyl attached to hose bed door(s) with yellow pulls with reflective bungee attached to each door and extend downward to bottom of hose bed to protect hose and equipment from weather and dust.

If two (2) doors are provided, the center where doors come together shall have a **magnetic** seam to join vinyl together. Bottom of each flap shall be weighted to help prevent flap from moving while truck is traveling.

End cover(s) shall be black with a 4" red horizontal stripe.

AIR ASSIST

Each hose bed door shall have a single air actuator located in the front of hose bed utilized to open and close the hose bed doors.

A switch shall be located at the rear of the unit in a convenient location allowing the operator to view the hose bed doors while operating. The switch shall be interlocked with the parking brake and is only operable when the parking brake is applied. The doors are connected to the open door warning system when in the open condition. An audible alarm is

located towards the front of the hosebed area designed to warn possible occupants of the hosebed area that door movement is occurring. The switch location shall be located no more than 72" off the ground level.

AIR VENT SCOOPS

Each hose bed door shall have a rectangular opening on top rear door with a bolt-on air deflector on surface to capture air and force air down through opening onto rear hose bed to provide aid in ventilation for drying hose.

HOSE BED FULL WIDTH EXTENSION

A full width, bolt-on type hose bed extension step shall be provided. Step shall be fabricated from 3/16" NFPA compliant treadplate aluminum with side gusset supports to body. The specified center rear marker lights shall be located on rear facing edge. The underside of step shall have a 36" OnScene LED light to light the bumper or compartment area below.

Clarify: The marker lights that are incorporated in this are the small round ones ILO the rectangle ones.

EQUIPMENT PAYLOAD WEIGHT ALLOWANCE

In compliance with NFPA 1901 standards, the pumper shall be designed for an equipment loading allowance of 2,000 lbs. of Loveland Fire Rescue Authority provided equipment based on the body having less than 250 cu. ft. of storage space.

EQUIPMENT

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

Note: equipment will/shall be mounted to match last unit.

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.
- There shall be two (2) Zico SAC-44-E NFPA approved folding aluminum wheel chocks provided for 44" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20 % grade, with the transmission in neutral, and the parking brake released.
 - The wheel chock(s) shall be mounted behind rear wheels, below body on streetside.
- One (1) Duo-Safety 900-A series 24' 2-section extension ladder(s) shall be provided with the completed unit.
 - The ladder(s) shall be mounted on specified ladder rack.
- One (1) Duo-Safety 775A series 14' aluminum roof ladder(s) shall be provided with the completed unit.
 - The ladder(s) shall be mounted on specified ladder rack.
- One (1) Duo-Safety 585-A 10' aluminum folding ladder(s) shall be provided with the completed unit.
 - The ladder(s) shall be located in specified ladder compartment.
- One (1) Fire Hooks Unlimited 8' Colorado Hook(s) shall be provided with the completed unit.

Will be installed on the back of cab like previous unit.

 - The pike pole(s) shall be mounted on the specified ladder rack.
- One (1) Leather Head Tools 10' Pro-Lite, yellow, American hook with butt handle shall be provided with completed apparatus.
- One (1) Super Vac Valor V16-BL-12-AC-SP, 16" Milwaukee battery electric variable speed ventilation fan(s) with two (2) 12 Ah batteries, two (2) battery chargers, and shore power inlet shall be provided with the completed unit.
 - The above specified ventilation fan(s) shall be installed on completed unit using mounting brackets and/or straps, location to be determined by the Loveland Fire Rescue Authority.
- Four (4) **Nightstick Integritas 82 including the 12v charger with mounting kit** shall be provided be provided. . The flashlight(s) shall be wired to battery direct unless otherwise specified by Loveland Fire Rescue Authority.
 - Four (4)The flashlight(s) shall be mounted in the cab in the following locations;

One (1)- mounted in step of officer footwell.
One (1)- mounted on the lower rear curbside wall accessible from ground.

Two (2)- mounted on the lower rear streetside wall accessible from ground.

- One (1) 5" barrel strainer(s) with foot valve shall be provided with completed unit. Barrell strainer hard suction end shall match provided hard suction(s).
- One (1) Task Force Tips 500 GPM manual Blitzfire monitor with Max Series automatic nozzle, 3- stacked tips, 2-1/2" inlet, and apparatus mount shall be provided with completed unit.
 - The above specified fire adapter/appliance shall be mounted on the completed unit, locations as per the Loveland Fire Rescue Authority.
- Loveland Fire Rescue Authority supplied NFPA required fire hose and nozzles shall be provided on completed unit before placing vehicle in service.
- Two (2) wrench holder(s) with two (2) combination spanner wrenches shall be provided with completed unit.
 - The above specified wrench holder(s) shall be mounted on the completed unit, locations as per the Loveland Fire Rescue Authority.
- Two (2) spanner wrench holder(s) with four (4) 4 - 5" Storz wrenches shall be provided with completed unit.
 - The above specified wrench holder(s) shall be mounted on the completed unit, locations as per the Loveland Fire Rescue Authority.

REMAINING NFPA MINOR EQUIPMENT BY PURCHASER

All other minor equipment not specified above, but required by NFPA 1901 for pumpers, section 5.9.4 shall be supplied and mounted by Loveland Fire Rescue Authority before the unit is placed in emergency service.