

LESTER PRAIRIE ENGINE

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INTENT OF SPECIFICATIONS

It shall be the intent of these specifications to provide a complete apparatus equipped as hereinafter and as specified. With a view to obtaining the best results and the most acceptable apparatus for service in the Department, these specifications cover only the general requirements as to the type of construction and tests to which the apparatus must conform, together with certain details as to finish, equipment and appliances with which the successful bidder shall conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the contractor, who shall be solely responsible for the design and construction for all features. The manufacturer shall provide loose equipment only when specified by the customer. The National Fire Protection Association (NFPA) Standard 1901, current edition, unless otherwise specified as requested by the customer in these specifications, shall prevail.

The apparatus must meet all NFPA, DOT, ICC, AE, TRA, FMVSS and local state Motor Vehicle Requirements.

It is required that the apparatus be manufactured to current NFPA edition standards, all NFPA equipment (LOOSE EQUIPMENT) not specified in the specifications will not be provided by the contractor.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction that have been in business and construction for a minimum of twenty-five (25) years.

The bidder of the apparatus herein specified; shall be wholly owned (100%) and managed by a Company, Corporation, and/or Parent Company that is wholly based, and permanently resides in the United States of America.

The Company, Corporation, and/or Parent Company and all assets belonging to such; shall be wholly owned and managed (100%) by the entities specified above.

The bidder shall state the location of the manufacturing facility where the apparatus is to be built and the location of the parent company if a subsidiary of a manufacturer.

The bidder shall provide satisfactory evidence of their ability to construct the apparatus specified in the bidders manufacturing facilities.

The bidder's representation shall state the length of time representing the manufacturer of specified apparatus.

Due to the severe service requirements the department will impose on the apparatus as specified, each bidder shall provide a list of at least six (6) departments in which similar apparatus utilizing the brand of chassis proposed have been in service for over one year. This list shall include contact names and phone numbers.

The bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed description of the apparatus being furnished under this contract which conform. Computer runoff sheets are not acceptable as "Contractor's Specifications". Item compliance shall be indicated in the "Yes/No" column of each item by all

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Bidders. Note: Each bidder shall submit their bid in the same sequence as these specifications to allow the department to easily compare. {No Exceptions}

These specifications shall indicate size, type, model and make of all component parts and equipment. {No Exceptions}

QUALITY AND WORKMANSHIP

The design of the Apparatus shall embody the latest approved automotive engineering practices.

The workmanship must be of the highest quality in its respective field. Special consideration will be given to the following points: Accessibility of the various units, which require periodic maintenance, ease of operation (including both pumping and driving) and symmetrical proportions.

Construction shall be rugged and ample safety factors shall be provided to carry loads as specified and to meet both on and off road requirements and to speed conditions as set forth under "Performance tests and requirements".

Welding shall be employed in the assembly of the apparatus in a manner that will not prevent the ready removal of any component part for service or repair, with apparatus bodies of bolt together design not being acceptable.

All steel welding shall follow American Welding Society requirements for AWS D1.1:2012 Structural Welding Code for welding steel structural assemblies. All aluminum welding shall follow American Welding Society requirements for AWS D1.2/D1.2M:2003 Structural Welding Code for any type structure made from aluminum structural alloys. All sheet metal welding shall follow American Welding Society AWS D9.1M/D9.1:2006 Structural Welding code for Arc/Braze requirements of non-structural materials. All pressure pipe welding shall follow American Society of Mechanical Engineers ASME IX/ ASME B31:2010 requirements to the qualification of procedures in welding and brazing, in accordance with the ASME Boiler and Pressure Vessel Code and the ASME B31 Code for Pressure Piping. Flux core arc welding to use alloy rods, type 7000, American Welding Society AWS standards A5.20-E70T1. The manufacturer shall be required to have an American Welding Society certified welding inspector in plant during testing operations within working hours to monitor weld quality.

Employees classified as welders shall be tested and certified to meet American Welding Society and American Society of Mechanical Engineers welding codes.

DELIVERY

The bidder shall provide the number of calendar days from the date the bid is awarded to the delivery of the completed unit.

A qualified delivery engineer representing the contractor shall deliver the apparatus and instruct the Fire Department personnel in the proper operation, care and maintenance of the equipment delivered.

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PERFORMANCE TESTS AND REQUIREMENTS

A road test shall be conducted with the apparatus fully loaded to its estimated in-service weight and shall be capable of the following performance while on dry paved roads that are in good condition and for a continuous run of ten (10) miles or more, during which time the apparatus shall show no loss of power or overheating. The transmission drive shaft or shafts and rear axles shall run quietly and be free from abnormal vibration or noise throughout the operating range of the apparatus. The successful bidder shall furnish a Weight Certificate showing weights on front axle, rear axles and total weight for the completed apparatus at time of delivery.

- A. The apparatus shall be capable of accelerating to 35 MPH (55 km/hr) from a standing start within 25 seconds on a level concrete highway without exceeding the maximum governed RPM of the engine.
- B. The apparatus, fully loaded, shall be capable of obtaining a minimum top speed of 50 MPH (80 km/hr) on a level dry concrete highway with the engine not exceeding its governed RPM (fully loaded).
- C. The service brakes shall be capable of stopping a fully loaded vehicle in 35ft (10.7 m) at 20 mph (32.2 km/hr) on a level concrete highway. The air brake system shall conform to Federal Motor Vehicle Safety Standards (FMVSS) 121.
- D. The apparatus, when fully loaded, shall have not less than 25 percent or more than 50 percent of the weight on the front axle, and not less than 50 percent nor more than 75 percent on the rear axle.
- E. The contractor shall have the Underwriter's Laboratories Incorporated conduct the tests of the apparatus as in accordance with standard practices required by the Underwriter Laboratories Incorporated (Guide for the Certification of Fire Department Pumper latest edition). A copy of all tests shall accompany the Apparatus. (For apparatus sold within Canadian ULC S515 latest revision shall prevail).
- F. The contractor shall furnish copies of the Pump Manufacturer's Certification of hydrostatic test, the Engine Manufacturer current certified brake horsepower curve, and the Manufacturer's record of pumper construction details when delivered.

INFORMATION REQUIRED

The manufacturer shall supply at time of delivery, a complete operation and maintenance manual covering the completed apparatus as delivered.

A permanent plate shall be mounted in the driver's compartment to specify the quantity and type of the following fluids used in the vehicle: Engine oil, engine coolant, and chassis transmission fluid, pump transmission lubrication fluid, pump primer fluid (if used) and drive axle lubrication fluid.

The manufacture shall supply the final certification of GVWR and GAWR on a nameplate affixed to the vehicle.

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A permanent plate in the driver's compartment shall be installed, specifying the seating capacity of the enclosed cab.

Signs that state "OCCUPANTS MUST BE SEATED AND BELTED WHEN APPARATUS IS IN MOTION" shall be provided and will be visible from each seated position. An accident prevention sign shall be located at the rear step area of the apparatus. It shall warn all personnel that standing on the step while apparatus is in motion shall be prohibited.

A nameplate indicating the chassis transmission shift selector position to be used when pumping shall be provided in the driving compartment and located so that it can be easily read from the driver's position.

LIABILITY

The bidder, if their bid is accepted, shall defend any and all suits and assume all liability for the use of any patented device or article forming part of the apparatus or any appliance provided under the contract.

GENERAL CONSTRUCTION

The apparatus shall be designed with due consideration to distribution of load between the front and rear axles, so that all specified equipment, including filled water tank, a full complement of personnel and fire hose will be carried without injury to the apparatus. Weight balance and distribution shall be in accordance with the recommendations of the National Fire Protection Agency (NFPA) 1901 documentation.

The apparatus shall be designed so that all recommended daily maintenance checks can be performed easily by the operator without the need for hand tools. Apparatus components that interfere with repair or removal of other major components must be attached with fasteners (cap, screws, nuts, etc.) so that the components can be removed and installed with normal hand tools. These components must not be welded or otherwise permanently secured into place.

The GAWR and GVWR of the chassis shall be adequate to carry the fully equipped apparatus including all tanks filled, the specified hose load, unequipped personnel weight, ground ladders and a miscellaneous equipment allowance per NFPA criteria. It shall be the responsibility of the purchaser to provide the contractor with the weight of equipment to be carried if it is in excess of the allowance as set forth by NFPA.

The unequipped personnel weight shall be calculated at 250 lbs. per person times the maximum number of persons to ride on the apparatus.

The height of the fully loaded vehicle's center of gravity shall not exceed the chassis manufacturer's maximum limit.

The front to rear weight distribution of the fully loaded vehicle shall be within the limits set by the chassis manufacturer. The front axle loads shall not be less than the minimum axle loads specified by the chassis

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manufacturer, under full loads and all other loading conditions.

The difference in weight on the end of each axle, from side to side, when the vehicle is fully loaded and equipped shall not exceed 7 percent.

The apparatus shall be so designed that the various parts are readily accessible for lubrication, inspection, adjustment and repair.

Where special tools manufactured or designed by the contractor and are required to provide routine service on any component of the apparatus built or supplied by the contractor, such tools shall be provided with the apparatus.

EXCEPTIONS TO SPECIFICATIONS

The following specifications shall be strictly adhered to. Exceptions shall be allowed if they are equal to or superior to that as specified and providing they are listed and entirely explained on a separate page entitled "Exceptions to Specifications". The exceptions list to refer to specification page number and paragraph.

Proposals taking total exception to specifications or total exception to certain parts of the specifications such as Electrical Systems, Chassis, Body or Pump, will not be accepted.

Prototype units will not be acceptable. Apparatus shall be inspected upon completion for compliance with specifications.

Deviations will not be tolerated and will be cause for rejection of Apparatus unless they were originally listed in bidder's proposal and accepted in writing by the department.

If the bidder takes an exception, on the exception page, the bidder must state an option price to bring their specifications into full compliance with the Department specifications.

Failure to provide this information shall be cause to reject the proposal as being non-responsive. {No Exceptions}

Copied or run off sheets of these specifications shall be unacceptable and the bid will be rejected no exceptions.

PURCHASER'S RIGHTS

The Purchaser reserves the right to accept or reject any or all bids as it deemed in their best interests.

BID/PROPOSAL DRAWINGS

For purposes of evaluation, the bidder shall provide a drawing illustrating, but not limited to, the overall dimensions, wheelbase, and overall length of the proposed apparatus and other specified equipment, shall be

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required to be included with the bidder's proposal package.

The drawings shall be large "D" size (minimum 24.00 inches x 36.00 inches).

Smaller size drawings, "similar to" drawings or general sales drawings, shall not be acceptable.

Failure to provide a bid evaluation drawing in accordance with these specifications shall be cause for rejection of the bid proposal.

APPROVAL/PRE-CONSTRUCTION DRAWINGS

After the award of the bid, the contractor shall provide detailed colored engineering drawings including, but not limited to, the overall dimensions, wheelbase, and overall length of the proposed apparatus for use during the pre-construction conference.

The drawings shall include, but shall not be limited to the right, left, top, front and rear views of the apparatus.

In addition, a detailed engineering drawing of the pump operator's panel shall be provided following the pre-construction meeting.

The Fire Department will sign the final approval drawings.

SINGLE SOURCE MANUFACTURER

Bids shall only be accepted from a single source apparatus manufacturer.

The definition of single source manufacturer is company that designs and manufactures their products utilizing an approach that includes complete product integration, including the apparatus chassis, cab, and body modules being constructed, assembled, and tested on company premises only.

Warranties qualified to the chassis and body design construction (excluding vender component warranties such as engine, axles, transmission, and pumps, etc.) will be from a single source manufacturer and not separated between manufacturers (i.e. body and chassis). The bidder shall provide evidence of maintaining compliance to this requirement.

TAG-ON ORDERS-COOPERATIVE PURCHASING

Other fire departments, metropolitan regions, or municipalities, may purchase apparatus and equipment similar to the Apparatus and Equipment that is the subject of this Contract. The following terms shall apply to any such tag-on orders:

(a) Changes - Spartan Emergency Response's intention is to make available to others, tag-on orders utilizing the same specification as the Apparatus and Equipment that is the subject of this Contract in order to provide

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favorable pricing and lead-times to other buyers due to having such specification fully engineered. Spartan Emergency Response recognizes however that each additional buyer may have unique requirements that must be accommodated; and in this regard, limited changes will be permitted. Such changes will be captured in the pre-construction meeting and the price of any tag-on unit adjusted accordingly.

(b) Term – Tag-on orders may be placed for a term of one year after the Effective Date of this Contract.

(c) Escalation - Spartan Emergency Response reserves the right to adjust the price of any tag-on order if material costs escalate during the term of this Contract, changes in regulations become effective (for example EPA, NFPA or other), or the tag-on order would cross a model year.

(d) Acceptance – Spartan Emergency Response reserves the right to accept or reject any tag-on orders under this Contract.

FINITE ELEMENT ANALYSIS AND TESTING

Finite Element Analysis (FEA) shall be provided by the manufacturer.

Prototype bodies have been subjected to rigorous testing over varied terrains simulating different environmental conditions.

The purpose of such complex engineering methods of analysis shall be to ensure the longevity of the design by analyzing stress levels throughout the body and incorporating the structural supports wherever necessary.

There shall have been a minimum of three (3) different load cases (per DOT, FHWA, and TTMA recommended practice) applied and analyzed to properly display the different areas and levels of stresses that will be present under the various operating conditions of the apparatus.

In addition to the FEA analysis, the core product design shall be strain gauged instrumental to ensure validation of FEA results and “Real World” drive/apparatus driving conditions.

Analysis shall also have been conducted on the mounting system for the apparatus body and pump house. EXCEPTIONS TO THIS STATEMENT MAY BE CAUSE FOR IMMEDIATE REJECTION AND/OR BE CONSIDERED NON-COMPLIANT.

SUPPLIED INFORMATION & EXTRAS

The apparatus manufacturer shall supply two (2) copies of apparatus manuals with all manufactured apparatus.

The manuals shall include, but not be limited to: all component warranties, users’ manuals and information for supplied products, apparatus engineering information including drawings and build prints, and whatever other pertinent information the manufacturer can supply to its customer regarding the said apparatus.

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Included in the delivery of the unit, the manufacturer shall also include spare hardware and extra fasteners, paint for touch-up, information regarding washing and care procedures, as well as other recommendations for care and maintenance of the general apparatus.

The manufacturer shall also supply a manufacturer's record of apparatus construction details, including the following information:

- Owner name and address
- Apparatus manufacturer, model, and serial number
- Chassis make, model, and serial number
- GAWR of front and rear axles
- Front tire size and total rated capacity in pounds
- Rear tire size and total rated capacity in pounds
- Chassis weight distribution in pounds with water (if applicable) and manufacturer mounted equipment (front and rear)
- Engine make, model, serial number, rated horsepower, related speed and no load governed speed
- Type of fuel and fuel tank capacity
- Electrical system voltage and alternator output in amps
- Battery make and model, capacity in CCA
- Paint numbers
- Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall vehicle (with the water tank full (if applicable) but without personnel, equipment, and hose)
- Written load analysis and results of the electrical system performance tests
- Transmission make, model, and type
- Pump to drive through the transmission (yes or no)
- Engine to pump gear ratio and transmission gear ratio used
- Pump make and model, rated capacity in gallons per minute, serial number, and number of stages
- Pump manufacturer's certification of suction capability
- Pump manufacturer's certification of hydrostatic test
- Pump manufacturer's certification of inspection and test for the fire pump
- Copy of the apparatus manufacturer's approval for stationary pumping applications
- Pump transmission make, model and serial number
- Priming device type
- Type of pump pressure control system
- The engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum no load governed speed
- Certification of the water tank capacity

WARNING AND INFORMATION LABELS

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All warning and informational labels (non-vendor specific) shall be provided in appropriate locations to alert the operator of potential hazards and operating instructions.

ON-LINE CUSTOMER INTERACTION

The manufacture shall provide the capability for online access through the manufacture's website. The customer shall be able to view digital photos of their apparatus in the specified phases of construction. The following phases will be captured and displayed on the manufacture's website:

1. Chassis when available at manufacturing facility
2. Body – Prior to Paint
3. Body – Painted
4. Pump and Plumbing
5. Assembly – 80% Complete

Due to the complex nature of fire apparatus and the importance of communication between the manufacture and customer, this line item is considered a critical requirement.

LIABILITY INSURANCE COVERAGE

In order to protect the department and its personnel, the bidder shall show proof that it has no less than \$10 million in liability insurance in force. A certificate of coverage shall be included in the bid package. Failure to carry liability insurance of at least this amount or failure to include proof of coverage shall be cause to reject the bidder's proposal.

DEMONSTRATOR OR STOCK UNITS

These specifications were carefully researched and developed by the department to provide a unit to serve our unique requirements. Because of this, it is not desired that stock or demonstrator units be bid. Bidders are to bid units meeting our prepared specification only. Proposals for stock or demonstrator units will be rejected as being non-responsive.

GENERAL WARRANTY

The manufacturer shall provide a two (2) year warranty from the date of delivery.

In the case of a commercial chassis being used, the warranty on the chassis, engine, transmission, tires, storage batteries, generators, electrical lamps and other devices subject to deterioration is limited to the warranty of the manufacturer thereof and adjustments for the same are to be made directly with the manufacturer by the customer.

STRUCTURAL BODY WARRANTY

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A structural Stainless Steel body warranty shall be provided by the apparatus manufacturer for products of its manufacture to be free from defects in material and workmanship, under normal use and service, for a period of twenty (20) years.

PAINT WARRANTY

A Prorated Paint Warranty shall be provided by the apparatus manufacturer for products of its manufacture to be free from defects in material and workmanship, under normal use and service, for a period of ten (10) years.

PUMP WARRANTY

Waterous Co shall provide a limited manufacturer's pump warranty with total protection package (TTP-5) to be free from defects in material and workmanship, under normal use and service, for a period of five (5) years from the date placed into service.

PLUMBING WARRANTY

A Stainless Steel Plumbing/Piping warranty shall be provided by the apparatus manufacturer for products of its manufacture to be free from defects in material and workmanship, under normal use and service, for a period of ten (10) years from the date of delivery.

TANK WARRANTY

A lifetime tank warranty will be provided by the tank manufacturer, Pro Poly.

MULTI-PLEXED ELECTRICAL WARRANTY

A four (4) year limited (V-MUX) multiplex system warranty, of Weldon Technologies, Inc; shall be provided by the apparatus manufacture for parts and labor, while under normal use and service; against mechanical, electrical and physical defects from the date of installation.

The warranty shall exclude; sensors, shunt interface modules, serial or USB kits, transceivers, cameras, GPS, and electrical display screens, which shall be limited to a period of one a (1) year repair parts and labor from the date of installation.

PUMP CERTIFICATION AND TESTING

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

There shall be multiple tests performed by the contractor and Underwriter's Laboratories when the apparatus has been completed. The manufacturer shall provide the completed Test Certificate(s) to the purchaser at time of delivery. The inspection services of Underwriters Laboratories are available to all bidders on an equal basis;

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therefore, no third party certification of testing results shall be acceptable.

The fire pump shall be mounted on the apparatus and shall have a minimum rated capacity of 250 gpm (1000 L/min) at 150 psi (1000 kPa) net pump pressure.

Where the apparatus is designed for pump in-motion operations, the vehicle drive engine and drive train shall be arranged so that the pump can deliver at least 20 gpm (76 L/min) at a gage pressure of 80 psi (550 kPa), while the fire apparatus is moving.

If the pumping system provided is rated at 3000gpm (12,000 L/min) or less, the pump shall be capable of delivering the following:

- (1) One hundred percent of rated capacity at 150 psi (1000 kPa) net pump pressure
- (2) Seventy percent of rated capacity at 200 psi (1400 kPa) net pump pressure
- (3) Fifty percent of rated capacity at 250 psi (1700 kPa) net pump pressure

If the pumping system provided is rated at greater than 3000 gpm (12,000 L/min), the pump shall be capable of delivering the following:

- (1) One hundred percent of rated capacity at 100 psi (700 kPa) net pump pressure
- (2) Seventy percent of rated capacity at 150 psi (1000 kPa) net pump pressure
- (3) Fifty percent of rated capacity at 200 psi (1400 kPa) net pump pressure

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.

The tests 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.

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. The plate shall be completely stamped with all information at the factory and attached to the vehicle prior to shipping.

Pumping Test:

The test site shall be adjacent to a supply of clear water at least 4 ft. (1.2 m) deep, with the water level not more than 10 ft. (3 m) below the center of the pump intake, and close enough to allow the suction strainer to be

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submerged at least 2 ft. (0.6 m) below the surface of the water when connected to the pump by 20 ft. (6 m) of suction hose.

Tests shall be performed when conditions are as follows:

- (1) Air temperature: 0°F to 110°F (−18°C to 43°C)
- (2) Water temperature: 35°F to 90°F (2°C to 32°C)
- (3) Barometric pressure: 29 in. Hg (98.2 kPa), minimum (corrected to sea level)

Engine-driven accessories shall not be functionally disconnected or rendered inoperative during the tests.

The following devices shall be permitted to be turned off or not operating during the pump test:

- (1) Aerial hydraulic pump
- (2) Foam pump
- (3) Hydraulically driven equipment (other than hydraulically driven line voltage generator)
- (4) Winch
- (5) Windshield wipers
- (6) Four-way hazard flashers
- (7) Compressed air foam system (CAFS) compressor

All structural enclosures, such as floorboards, gratings, grilles, and heat shields, not provided with a means for opening them in service shall be kept in place during the tests.

All test gauges shall meet the requirements for Grade A gauges as defined in ASME B40.100, *Pressure Gauges and Gauge Attachments*, and shall be at least size 3 1/2 per ASME B40.100. The pump intake gauge shall have a range of 30 in. Hg (100 kPa) vacuum to zero for a vacuum gauge, or 30 in. Hg (100 kPa) vacuum to a gauge pressure of 150 psi (1000 kPa) for a compound gauge. The discharge pressure gauge shall have a gauge pressure range of 0 psi to 400 psi (0 kPa to 2800 kPa). All pilot gauges shall have a gauge pressure range of at least 0 psi to 160 psi (0 kPa to 1100 kPa). All gauges shall be calibrated in the month preceding the tests using a dead-weight gauge tester or a master gauge meeting the requirements for Grade 3A or 4A gauges, as defined in ASME B40.100, *Pressure Gauges and Gauge Attachments*, that has been calibrated within the preceding year.

The engine speed-measuring equipment shall consist of a nonadjustable tachometer supplied from the engine or transmission electronics, a revolution counter on a checking shaft outlet and a stop watch, or other engine speed-measuring means that is accurate to within ± 50 rpm of actual speed.

If the apparatus is equipped with a fire pump rated at 750 gpm (3000 L/min) or greater but not greater than 3000 gpm (12,000 L/min), the pump shall be subjected to a 3 hour pumping test from draft consisting of 2 hours of continuous pumping at rated capacity at a minimum of 150 psi (1000 kPa) net pump pressure, followed by 1/2

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hour of continuous pumping at 70 percent of rated capacity at a minimum of 200 psi (1400 kPa) net pump pressure and 1/2 hour of continuous pumping at 50 percent of rated capacity at a minimum of 250 psi (1700 kPa) net pump pressure and shall not be stopped until after the 2 hour test at rated capacity, unless it becomes necessary to clean the suction strainer.

If the apparatus is equipped with a fire pump rated at greater than 3000 gpm (12,000 L/min), the pump shall be subjected to a 3 hour pumping test from draft consisting of 2 hours of continuous pumping at rated capacity at 100 psi (700 kPa) net pump pressure, followed by 1/2 hour of continuous pumping at 70 percent of rated capacity at 150 psi (1000 kPa) net pump pressure and 1/2 hour of continuous pumping at 50 percent of rated capacity at 200 psi (1400 kPa) net pump pressure and shall not be stopped until after the 2 hour test at rated capacity, unless it becomes necessary to clean the suction strainer.

If the apparatus is equipped with a fire pump rated at less than 750 gpm (3000 L/min), the pump shall be subjected to a 50-minute pumping test from draft consisting of 30 minutes of continuous pumping at rated capacity at a minimum of 150 psi (1000 kPa) net pump pressure, followed by 10 minutes of continuous pumping at 70 percent of rated capacity at a minimum of 200 psi (1400 kPa) net pump pressure and 10 minutes of continuous pumping at 50 percent of rated capacity at a minimum of 250 psi (1700 kPa) net pump pressure and shall not be stopped until after the 30-minute test at rated capacity, unless it becomes necessary to clean the suction strainer.

Pumping Engine Overload Test:

If the pump has a rated capacity of 750 gpm (3000 L/min) or greater but not greater than 3000 gpm (12,000 L/min), the apparatus shall be subjected to an overload test consisting of pumping rated capacity at 165 psi (1100 kPa) net pump pressure for at least 10 minutes.

This test shall be performed immediately following the pumping test of rated capacity at 150 psi (1000 kPa).

The capacity, discharge pressure, intake pressure, and engine speed shall be recorded at least three times during the overload test.

Pressure Control System Test:

If the pump is rated at 3000 gpm (12,000 L/min) or less, the pressure control system on the pump shall be tested as follows:

- (1) The pump shall be operated at draft, delivering rated capacity at a discharge gauge pressure of 150 psi (1000 kPa).
- (2) The pressure control system shall be set in accordance with the manufacturer's instructions to maintain the discharge gauge pressure at 150 psi (1000 kPa) \pm 5 percent.

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- (3) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.
- (4) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.
- (5) The original conditions of pumping rated capacity at a discharge gauge pressure of 150 psi (1000 kPa) shall be reestablished.
- (6) The discharge pressure gauge shall be reduced to 90 psi (620 kPa) by throttling the engine fuel supply, with no change to the discharge valve settings, hose, or nozzles.
- (7) The pressure control system shall be set according to the manufacturer's instructions to maintain the discharge gauge pressure at 90 psi (620 kPa) \pm 5 percent.
- (8) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.
- (9) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.
- (10) The pump shall be operated at draft, pumping 50 percent of rated capacity at a discharge gauge pressure of 250 psi (1700 kPa).
- (11) The pressure control system shall be set in accordance with the manufacturer's instructions to maintain the discharge gauge pressure at 250 psi (1700 kPa) \pm 5 percent.

(12) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.

(13) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.

If the pump is rated at greater than 3000 gpm (12,000 L/min), the pressure control system on the pump shall be tested as follows:

- (1) The pump shall be operated at draft, delivering rated capacity at a discharge gauge pressure of 100 psi (700 kPa).
- (2) The pressure control system shall be set in accordance with the manufacturer's instructions to maintain the discharge gauge pressure at 100 psi (700 kPa) \pm 5 percent.
- (3) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.
- (4) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.

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(5) The original conditions of pumping rated capacity at a discharge gauge pressure of 150 psi (1000 kPa) shall be reestablished.

(6) The pump shall be operated at draft, pumping 50 percent of rated capacity at a discharge gauge pressure of 200 psi (1400 kPa).

(7) The pressure control system shall be set according to the manufacturer's instructions to maintain the discharge gauge pressure at 200 psi (1400 kPa) \pm 5 percent.

(8) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.

(9) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.

Priming System Tests:

With the apparatus set up for the pumping test, the primer shall be operated in accordance with the manufacturer's instructions until the pump has been primed and is discharging water. This test shall be permitted to be performed in connection with priming the pump for the pumping test.

The interval from the time the primer is started until the time the pump is discharging water shall be noted. The time required to prime the pump shall not exceed 30 seconds if the rated capacity is 1250 gpm (5000 L/min) or less. The time required to prime the pump shall not exceed 45 seconds if the rated capacity is 1500 gpm (6000 L/min) or more.

An additional 15 seconds shall be permitted in order to meet the requirements of 16.13.5.3 and 16.13.5.4 when the pump system includes an auxiliary 4 in. (100 mm) or larger intake pipe having a volume of 1 ft³ (0.03 m³) or more.

Vacuum Test:

The vacuum test shall consist of subjecting the interior of the pump, with all intake valves open, capped or plugged, and all discharge caps removed, to a vacuum of 22 in/Hg (75 kPa) by means of the pump priming system.

At altitudes above 2000 ft. (600 m), the vacuum attained shall be permitted to be less than 22 in/Hg (75 kPa) by 1 in/Hg (3.4 kPa) for each 1000 ft. (305 m) of altitude above 2000 ft. (610 m).

The vacuum shall not drop more than 10 in/Hg (34 kPa) in 5 minutes.

The primer shall not be used after the 5 minute test period has begun and the engine shall not be operated at any speed greater than the governed speed during this test.

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Water Tank-to-Pump Flow Test:

A water tank-to-pump flow test shall be conducted as follows:

- (1) The water tank shall be filled until it overflows.
- (2) All intakes to the pump shall be closed.
- (3) The tank fill line and bypass cooling line shall be closed.
- (4) Hose lines and nozzles for discharging water at the rated tank-to-pump flow rate shall be connected to one or more discharge outlets.
- (5) The tank-to-pump valve(s) and the discharge valves leading to the hose lines and nozzles shall be fully opened.
- (6) The engine throttle shall be adjusted until the required flow rate $-0/+5$ percent is established.
- (7) The discharge pressure shall be recorded.
- (8) The discharge valves shall be closed and the water tank refilled.
- (9) The bypass line shall be permitted to be opened temporarily, if needed, to keep the water temperature in the pump within acceptable limits.
- (10) The discharge valves shall be reopened fully and the time noted.
- (11) If necessary, the engine throttle shall be adjusted to maintain the discharge pressure recorded as noted in 16.13.7.1(7).
- (12) When the discharge pressure drops by 10 psi (70 kPa) or more, the time shall be noted and the elapsed time from the opening of the discharge valves shall be calculated and recorded.

Volume Discharge Calculation:

The volume discharged shall be calculated by multiplying the rate of discharge in gallons per minute (liters per minute) by the time in minutes elapsed from the opening of the discharge valves until the discharge pressure drops by at least 10 psi (70 kPa).

Other means shall be permitted to be used to determine the volume of water pumped from the tank such as a totalizing flowmeter, weighing the truck before and after, or refilling the tank using a totalizing flowmeter.

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The rated tank-to-pump flow rate shall be maintained until 80 percent of the rated capacity of the tank has been discharge.

Engine Speed Advancement Interlock Test

The engine speed advancement interlock system shall be tested to verify that engine speed cannot be increased at the pump operator's panel unless there is throttle-ready indication.

If the apparatus is equipped with a stationary pump driven through split-shaft PTO, the test shall verify that the engine speed control at pump operator's panel cannot be advanced when either of the following conditions exists:

- (6) The chassis transmission is in neutral, the parking brake is off, and the pump shift in the driving compartment is in the road position.
- (7) The chassis transmission has been placed in the position for pumping as indicated on the label provided in the driving compartment, the parking brake is on, and the pump shift in the driving compartment is in the road position.

If the apparatus is equipped with a stationary pump driven through a transmission mounted PTO, front-of-engine crankshaft PTO, or engine flywheel PTO, the test shall verify that the engine speed control on 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 other gear other than neutral, the parking brake is on, and the pump shift in the driving compartment is in the "Pump Engaged" position.

If the apparatus is equipped with a pump driven by the chassis engine designed for both stationary pumping and pump-in-motion, the test shall verify that the engine speed control at 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 on, and the pump shift status in the driving compartment is disengaged.
- (2) The chassis transmission is in any other 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 In-Motion" position.

If the apparatus is equipped with a stationary pump driven through transfer case PTO, the test shall verify that the engine speed control on the pump operator's panel cannot be advanced when either of the following conditions exists:

- (1) The chassis transmission is in neutral, the transfer case is in neutral, the parking brake is off, and the pump shift in the driving compartment is in the road position.

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- (2) The chassis transmission is in neutral, the transfer case is engaged, the parking brake is off, and the pump shift in the driving compartment is in the road position.
- (3) The chassis transmission has been placed in the position for pumping as indicated on the label provided in the driving compartment, the parking brake is on, and the pump shift in the driving compartment is in the road position.

LOW-VOLTAGE ELECTRICAL SYSTEM PERFORMANCE TESTING

The apparatus low-voltage electrical system will be tested and certified. Tests shall be performed when the air temperature is between 0°F and 110°F (–18°C and 43°C). The three tests defined in NFPA shall be performed in the order in which they appear. 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 10 minutes. Failure of any of these tests shall require a repeat of the sequence.

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 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.

Alternator Performance 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.

Alternator Performance 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 2 hours.

Activation of the load management system shall be permitted during this test.

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

Low Voltage Alarm Test:

Following the above test, a Low Voltage Alarm Test will be performed in the manner prescribed.

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 has not yet sounded 140 seconds after the voltage drops to 11.70V for a 12 V nominal system or 23.4 V for a 24 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.

FACTORY PRECONSTRUCTION CONFERENCE

The factory authorized Distributor shall be required, prior to manufacturing, to have a pre construction conference at the manufacturing facility with a factory representative present and individuals from the to finalize all construction details.

The factories authorized distributor shall, at his expense, provide transportation, lodging, and meals. Any distance greater than 200 miles shall be by commercial air travel.

MID-CONSTRUCTION INSPECTION CONFERENCE

The factory authorized Distributor shall be required, during manufacturing, to have a mid-construction conference at the site of the manufacturing facility with One (1) individuals from the to inspect the apparatus during construction.

The "Purchaser" shall designate the stage of construction at which the visit will be conducted.

The factories authorized distributor shall, at his expense, provide transportation, lodging, and meals. Any distance greater than 200 miles shall be by commercial air travel.

FINAL INSPECTION CONFERENCE

The factory authorized Distributor shall be required, during manufacturing, to have a final completion inspection conference at the site of the manufacturing facility with One (1) individuals from the to inspect the

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apparatus after construction.

The factories authorized distributor shall, at his expense, provide transportation, lodging, and meals. Any distance greater than 200 miles shall be by commercial air travel.

PUMP & APPARATUS TRAINING

The successful bidder shall provide a factory-trained technician to provide the following training:
A minimum ____hour structured training course for the fire apparatus mechanics of the department, covering the repair and maintenance of all components of the apparatus called for in the specifications.

The successful bidder shall provide a minimum ____ hour structured training course to be repeated three times to cover each of the _____ shifts of personnel assigned to operate the apparatus, covering nomenclature of components, proper operation of the apparatus, daily operational maintenance checks, and other information necessary for a firefighter/driver/engineer to properly operate and maintain the apparatus.

It is intended that this training be organized in such a manner that both the mechanics and fire personnel receive full benefit of the aforementioned structured training. The firefighter/operator training shall be conducted within one week after the vehicle is fully accepted and readied for service by the "Purchaser" or at a time mutually agreed upon by the "Purchaser" and "Supplier".

MAXIMUM OVERALL LENGTH REQUIREMENT

The apparatus specified shall be constructed as detailed and shall NOT exceed a maximum overall length of 428 inches

MAXIMUM OVERALL HEIGHT REQUIREMENT

The apparatus specified shall be constructed with no restrictions to the maximum overall height.

MAXIMUM OVERALL WIDTH OF NINETY-NINE (99) INCHES

The apparatus specified shall be constructed as detailed and shall NOT exceed a Maximum Overall Width of Ninety-nine (99") inches.

This dimension shall include the primary construction of the apparatus body and chassis cab. Any peripherals that are 'removable' shall not be incorporated into this measurement.

Items that are considered 'removable' are: Rub Rails, Fenderettes, Mirrors, Lights, Handrails, Front Bumpers, Etc.

MAXIMUM WHEEL BASE REQUIREMENT

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The apparatus specified shall be constructed with no restrictions to the maximum wheel base.

EXHAUST HEAT SHIELD

There shall be an exhaust heat shield added to the chassis provided exhaust. The shield shall run the full length of the exhaust system, terminate past the front compartment and shall incorporate a heavy duty spray on insulation under R1. With this shield the temperature of the front compartment shall not exceed the ambient temperature.

EMS STORAGE COMPARTMENT

There shall be one (1) EMS compartment, fabricated out of .125 inch (3.18 mm) smooth aluminum installed in the [Driver's side Forward facing seat position](#) in the chassis cab.

The compartment dimensions shall be approximately 20.00 inches (508 mm) wide by 20.00 inches (508 mm) deep. The interior of the compartment shall feature a natural aluminum finish.

Vertically mounted Unistrut shall be installed inside the EMS storage compartment to accommodate the installation of shelving.

The height of the EMS compartment shall be approximately 47.00 inches (1193.88 mm) tall, dependent on cab configuration.

EMS COMPARTMENT NETTING

A D&S Custom brand cargo netting, black in color, shall be provided and installed on the opening of the EMS compartment. The cargo net enclosure shall be secured along the lower edge. The net shall drop out of the way for easy cabinet access.

The cargo net covering the compartment shall include seat belt style fasteners along the top of the cabinet for ease of entry.

EMS COMPARTMENT LIGHTING

One (1) LED Tube light model #RX-15T16-5050 shall be installed in accordance with the compartment height to offer the best lighting in the EMS cabinet.

EMS COMPARTMENT LIGHTING ACTIVATION

The light(s) in each compartment shall be on a separate circuit, turning on only when the park brake is set.

EMS COMPARTMENT SHELF

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There shall be one (1) shelf in the cab EMS compartment. The shelf shall be fabricated of .188 inch (4.76 mm) thick aluminum sheet material with the outside and inside edges flanged up to prevent equipment from sliding off. The shelf shall be as wide as possible to allow proper attachment to unistrut channels and shall be adjustable up and down.

The shelf shall feature a natural finish.

EMS STORAGE COMPARTMENT

There shall be one (1) EMS compartment, fabricated out of .125 inch (3.18 mm) smooth aluminum installed in the [Officer's side forward facing seat position](#) in the chassis cab.

The compartment dimensions shall be approximately 20.00 inches (508 mm) wide by 20.00 inches (508 mm) deep. The interior of the compartment shall feature a natural aluminum finish.

Vertically mounted Unistrut shall be installed inside the EMS storage compartment to accommodate the installation of shelving.

The height of the EMS compartment shall be approximately 47.00 inches (1193.88 mm) tall, dependent on cab configuration.

EMS COMPARTMENT NETTING

A D&S Custom brand cargo netting, black in color, shall be provided and installed on the opening of the EMS compartment. The cargo net enclosure shall be secured along the lower edge. The net shall drop out of the way for easy cabinet access.

The cargo net covering the compartment shall include seat belt style fasteners along the top of the cabinet for ease of entry.

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The shelf shall feature a natural finish.

EMS COMPARTMENT EXTERIOR FINISH

The exterior of the EMS compartment shall feature a painted medium gray speedliner finish.

BUMPER EXTENSION

The chassis frame extension shall be provided by the chassis manufacture.

Front Bumper Compartment, Center (Chassis Provided)

CHASSIS REQUIRED LABELING

Signs that state "Occupants must be seated and belted when apparatus is in motion" shall be provided.

They shall be visible from each seating position.

There shall be a lubrication plate mounted inside the cab listing the type and grade of lubrication used in the following areas on the apparatus and chassis:

- Engine oil
- Engine Coolant
- Transmission Fluid
- Pump Transmission Lubrication Fluid
- Drive Axle Lubrication Fluid
- Generator Lubrication Fluid (where applicable)
- Tire Pressures

APPARATUS INFORMATION LABEL

There shall be a high-visibility label installed in a location clearly detectable to the driver while in the seated position.

The label shall indicate the following specified information.

- Overall Height (feet and inches)
- Overall Length (feet and inches)
- Overall GVWR (tons or metric tons)

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TIRE PRESSURE INDICATOR VOUCHER

A voucher will be provided with the chassis within the owner's manual for redemption by the customer.

To redeem the voucher, the customer will be required to supply the manufacturer with the SO# or VIN, mileage at time of call, and an accurate in-service weight for the front and rear axle on the apparatus. This will allow the manufacturer to provide a set of tire pressure indicators that accurately corresponds to the recommended pressure setting for that particular application.

The tire pressure and load indicated on the sidewall of a tire corresponds to the maximum permissible values based on the design of the tire. For optimal tire performance (including ride, handling, life, and fuel efficiency), actual tire pressure should be set according to the load that the axle will carry during in-service use. Tire manufacturers publish load / inflation tables for the purpose of determining the appropriate tire pressure for various axle loads based on tire and rim industry guidelines. These tables, along with the information provided by the customer, will be used by the chassis manufacturer to select the appropriate PSI settings for the indicators.

CAB TILT CONTROL

There shall be a cab tilt pendant control provided and installed on the right side of the apparatus. The pendant shall be located directly behind the lower auxiliary pump access panel, accessible through a small hinged door secured with a push button style latch.

A label shall be provided that states "CAB TILT CONTROL".

There shall also be a cab tilt instruction plate located as close as possible to the control pendant for ease of operation.

AIR TANK DRAIN CABLES (extended)

There shall be manual pull air tank drain cables provided with the apparatus. The air lines shall be extended to the outer edge of the apparatus to facilitate draining moisture from the chassis air tanks. A label shall be affixed indicating "Air Tank Drain".

HEAT EXCHANGER

The supplementary heat exchanger cooling system shall be provided and installed to the discharge side of the fire pump through to the engine compartment without intermixing, for absorption of excess heat.

The heat exchanger shall be adequate in size to maintain safe operating temperature of the coolant in the pump drive engine and not in excess of the engine manufacturer's temperature rating, under all pumping conditions. Appropriate drains shall be provided to allow draining the heat exchanger to prevent damage from freezing.

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UNDER BUMPER LIGHTS

There shall be one (1) perimeter light mounted centered under the front bumper to illuminate the ground area under the bumper.

The light shall be manufactured by Trucklite and be model kit # 44057C.

UNDER BUMPER LIGHTS ACTIVATION

The under bumper perimeter lights will be activated with activation of the chassis ground lights.

HELMET RESTRAINTS

All NFPA required helmet restraints will be supplied and installed by the Fire Department prior to the truck being placed into service.

MUD FLAPS

Heavy-duty rubber mud flaps shall be provided behind all wheels. The mud flaps shall be black rubber type and be bolted in place.

PUMP COMPARTMENT

The complete apparatus pump compartment shall be constructed of a combination of structural tubing and formed sheet metal. The same materials used in the body shall be utilized in the construction of the pump compartment. The structure shall be welded utilizing the same A.W.S. Certified welding procedure as used on the structural body module. These processes shall ensure the quality of structural stability of the pump compartment module.

The pump compartment module shall be separated from the apparatus body with a gap. This gap is necessary to accommodate the flexing of the chassis frame rails that is encountered while the vehicle is in transit so that harmful torsional forces are not transmitted into the structural framework.

The pump compartment module shall be approximately 74.00 inches (1.88 m) in width measured laterally across the apparatus.

VIBRA-TORQUE™ PUMP MODULE MOUNTING SYSTEM

The entire pump module assembly shall be mounted so that it “floats” above the chassis frame rails exclusively with Vibra-Torq™ torsion isolator assemblies to reduce the vibration and stress providing an extremely durable pump module mounting system.

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The pump module substructure shall be mounted above the frame to allow independent flexing to occur between the body and the chassis. Each assembly shall be mounted to the chassis frame rails with steel, gusseted mounting brackets. Each bracket shall be powder coated for corrosion resistance. Each pump compartment mount bracket shall be mounted to the side chassis frame flange with two 5/8"-UNC Grade 5 HHCS.

Each assembly shall have a two-part rubber vibration isolator. The isolator shall be of a specific durometer to carry the necessary loads of the pump module, apparatus body, equipment, tank, water, and hose. The quantity of mounts utilized shall correspond directly to the anticipated weight being supported. Certain assemblies shall also incorporate a torsion spring. Helical coil springs shall be incorporated into specific mounts in tandem with the rubber isolators to minimize the stress absorbed by the body caused from chassis frame rail flexing.

There shall be no welding to the chassis frame rail sides, web or flanges, or drilling of holes in the top or bottom frame flanges between axles. All pump module to chassis connections shall be bolted so that in the event of an accident, the body shall be easily removable from the truck chassis for repair or replacement.

Because of the constant vibration and twisting action that occurs in chassis frame rails and suspension, the torsion mounting system is required to minimize the possibility of premature pump module structural failures. The Vibra-Torque™ mounting system shall have a lifetime warranty.

PUMP COMPARTMENT HEATER

One (1) 30,000 BTU auxiliary heater shall be provided and installed inside the pump compartment. The heater shall be connected to the engine cooling system with gated valves located inside the engine compartment.

Dual 12 volt electric fans shall be installed and controlled with single toggle switch and a LED indicator light on the operator's pump control panel. The switch shall be of a weather resistant type.

The switch shall be labeled "PUMP HOUSE HEATER".

HEAT PAN

There shall be a heat pan enclosure provided and installed under the apparatus fire pump.

The heat pan assembly shall be fabricated of .188 inch aluminum. The top portion shall be bolted in place. The bottom trays shall be held in the place with mechanical style latch devices. The enclosure may include slide out tray(s) on either side of the apparatus for ease of service and maintenance.

The heat pan shall have one (1) 3.00 inch hole under the relief valve for drainage.

PUMP COMPARTMENT WORK LIGHT

One (1) LED 9.00 inch Tube light model #RX-15T16-5050-21CM shall be installed in the pump compartment

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module to illuminate the piping and plumbing components.

The light shall be activated by a weather resistant toggle switch.

OPERATORS PANEL

The operators panel shall be a "top mount", constructed on two incline surfaces. The lower panel shall be used to house all valve controls with the upper panel housing the discharge and other pump monitoring gauges. Valve control levers shall be immediately adjacent and instruments shall be neatly arranged for easy access and visible from the operator's location.

VALVE CONTROL – TOP MOUNT ASSEMBLY

Unless specified otherwise, the valves shall be controlled from a top mounted locking valve actuation control assembly that shall be installed on the specified discharge and suction. The Class 1 assembly shall have a round chrome plated handle with an ergonomically designed surface to allow for a secure grip to turn and lock the handle. The assembly shall have a name plate insertion recess area. A brass bushing and stainless steel rod shall never require lubrication. The valve operating mechanism will indicate the position of the valve at all times.

PANEL LIGHTS

There shall be adequate illumination provided at the top operator's panel and at the side pump panels.

For the top mount panel there shall be a brushed stainless steel shielded light assembly provided. The shield shall contain two (2) outboard 24.00 inch model #RX-15T16-5050-61CM and one (1) center mounted 9.00 inch LED Tube lights model #RX-15T16-5050-21CM.

At each side panel there shall be a brushed stainless steel shielded light assembly provided. Each shield shall contain the maximum number of lights permitted in the space available for 9.00 inch LED Tube lights model #RX-15T16-5020-21CM.

There shall also be one (1) LED directional light Grote style #60571 clear Surface Mount series installed on each side of the pump compartment to illuminate the plumbing components on the lower panels.

PUMP PANEL LIGHT ACTIVATION

One (1) pump panel light at the operator's panel shall be illuminated at the time the pump is ready to pump and it is "OK TO PUMP". The Pump shift has been completed and the chassis automatic transmission is engaged.

The remaining lights shall be activated by the setting of the park brake.

PUMP COMPARTMENT SERVICE ACCESS

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The front portion of the pump compartment structure shall be overlaid with aluminum diamond plate.

A removable aluminum diamond plate panel shall be provided at the front face of the pump compartment for access to the midship pump and plumbing. The panel shall be secured by two (2) push-button latches.

PUMP COMPARTMENT WIDTH

The width of the pump compartment (front to back) shall be 52.00 inches (1.32 m).

CAB TO PUMP COMPARTMENT SEAL

The gap between the cab and pump compartment shall be sealed with a rubber boot. This shall be a water and weather tight seal of neoprene or a similar material and shall be made replaceable. The painted cab area wear the boot may come in contact with shall be overlaid with brushed stainless steel to prevent the boot from wearing the paint off the cab.

BLACK LAMINOL TOP CONTROL PANEL

The surface of the operator's control and gauge panel shall be manufactured from heavy duty non-glare black "Laminol", aluminum that is capable of withstanding the effects of extreme weather and temperature.

RIGHT & LEFT SIDE PUMP PANELS

There shall be two (2) side pump panels on each side of the pump compartment, one (1) upper and one (1) lower. Each panel shall be accessible by quick-release type latches, closing against a door seal.

The lower panels on each side shall be easily removed for a large access to the pump for service.

The upper panels shall be vertically hinged on the rearward or body side of the panel with a gas shock hold open device installed. Each hinged panel shall be reinforced with hat channels installed on the backside of the panel to add stiffness.

RIGHT & LEFT SIDE BRUSHED STAINLESS STEEL FINISHING FOR PANELS AND OVERLAYS

All panels shall be made from 14 gauge "Brushed Stainless Steel" capable of withstanding the effects of extreme weather and temperature.

The tubular structure shall be overlaid on each side of the pump compartment underneath the access panels and shall be made of "Brushed Stainless Steel".

RUNNING BOARDS

The pump compartment running boards shall be made of a structural tubular framework. The tubular frame

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support all loads by transmitting the loads through the pump compartment structure directly to the chassis frame rails.

The running boards shall be independent of the apparatus body and shall be integrated to the pump compartment structure only, eliminating any pump compartment to body interference. This is essential in keeping a truly 'modular' configuration. Slip-resistant abrasive adhesive materials shall be applied to the top surface of the running board framework to provide a suitable stepping surface where applicable.

FLOATING HOSE WELLS

The side running board areas shall have a floating hose well with compartment matting and drain holes provided.

The hose wells shall be fabricated of .125 inch (3.18 mm) smooth aluminum and be formed so that it rests in the framework of the running board with no fasteners installed. The front and rear ends of the hose well shall be slightly tapered, to allow the well to float up instead of being damaged in cases where extreme break over angles or impact from road debris are encountered.

Each hose well shall be approximately 8.00 inches (203.20 mm) deep (measured from the top of the running board) and as wide and long as possible to fit in the framework of the running board.

HOSE WELL HOSE RESTRAINTS

There shall be two (2) Velcro straps provided at the top of the hose well. The straps shall be used to hold the hose in place during transit.

APPARATUS PLUMBING LABELING

The apparatus shall be descriptively tagged with color coded metal labels.

The labels shall be applied near the apparatus features that require a user function description. Wherever necessary, the labels shall be color coded to differentiate controls and their respective functions to simplify and clarify complex configurations.

BEZELS FOR VALVE CONTROL HANDLES

Mirrored stainless steel bezels shall be supplied around the openings in the pump panels for all valve control handles.

PRESSURE GOVERNOR

The Pressure Governing System provided with the chassis shall be installed on the pump operator's panel.

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PRESSURE RELIEF VALVE

A Task Force Tips model #A18XX pressure relief valve shall be provided. The valve shall have an easy to read adjustment range from 90 to 300 PSI with 90, 125, 150, 200, 250 and 300 PSI adjustment settings and an "OFF" position. Pressure adjustments shall be made utilizing a 1/4" hex key, 9/16" socket or 14mm socket.

For corrosion resistance the cast aluminum valve shall be a hardcoat anodized with a powder coat interior and exterior finish. The valve shall meet NFPA 1901 requirements for pump inlet relief valves. The unit shall be covered by a five year warranty.

For normal pumping operations, the relief valve shall not be capped and there shall be a placard stating "DO NOT CAP" installed.

INTAKE RELIEF VALVE TERMINATION

The Intake relief valve shall terminate on the right side of the pump house compartment. If the apparatus is equipped with a heat pan, the relief valve shall terminate outside of the heat pan.

TESTING PORTS

Test port connections for pressure and vacuum shall be provided at the pump operator's panel. One shall be connected to the intake side of the pump, and the other to the discharge manifold side of the pump. They shall have 0.25 in. standard pipe thread connections and be manufactured of non-corrosive polished stainless steel or brass plugs.

TANK LEVEL GAUGE

A Fire Research TankVision model WLA300-A00 tank indicator kit shall be installed at the pump operator's panel location. The kit shall include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The indicator shall show the volume of water in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of aluminum, and have a distinctive blue label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted from the outside of the water tank near the bottom. No probe shall be placed on the interior of the tank. Wiring shall be weather resistant and have automotive type plug-in connectors.

AIR HORN BUTTON

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There shall be an air horn activation red push button furnished and installed on the pump operator's gauge panel. The air horn button shall be of weather resistance type and labeled "AIR HORN".

PUMP COMPARTMENT TOP OVERLAY

The top of the pump compartment shall be overlaid with 1/8" embossed aluminum diamond plate, meeting the minimum NFPA standard requirements for slip resistance.

MIDSHIP PUMP

The pump shall have a capacity of 1500 gallons per minute, measured in U.S. Gallons. The pump shall be a Waterous model CSUC20, single stage midship pump.

The pumps impellers shall be bronze with double suction inlets, accurately balanced (mechanically and hydraulically), of mixed flow design with reverse-flow, labyrinth-type, wear rings that resist water bypass and loss of efficiency due to wear. The impeller shall have flame plated hub to assure maximum pump life and efficiency despite the presence of abrasive particles, such as fine sand, in the water being pumped. The wear rings shall be bronze and easily replaceable to restore original pump efficiency and eliminate the need for replacing the entire pump casing due to wear.

Pump casing shall be close grained gray iron, bronze fitted and horizontally split in two sections for easy removal of entire impeller assembly, including wear rings, without disturbing setting of pump in chassis or pump piping. The pump, for ease and rapid servicing in the future, shall have the separable impeller shaft which allows true separation of transmission or pump without disassembly or disturbing the other component. This shall be accomplished by using a two piece shaft. This feature will allow field service to accomplish in much less time since each component (pump or transmission) can be repaired independently. The impeller shaft shall be stainless steel, accurately ground to size and polished. Shaft shall be supported at each end by ball type oil grease lubricated bearings. Sleeve bearings or bushings will not be acceptable. The bearings shall be protected from water at each end of the impeller shaft.

The discharge manifold shall be cast as an integral part of the pump body assembly and shall provide at least three full 3 1/2" openings for ultimate flexibility in providing various discharge outlets for maximum efficiency, and shall be located as follows: one outlet on the right side of the pump body, one outlet on the left side of the pump body, and one outlet directly on top of the pump discharge manifold.

The entire pump shall be cast, manufactured and tested at the pump manufacturer's factory. The pump transmission housing shall be high strength aluminum, three pieces and horizontally split. Power transfer to the pump shall be through a Morse Hy-Vo drive chain. Chain shall be pressure lubricated through oil pump. Chain sprockets shall be cut from carbonized, hardened alloy steel. Spur gears will not be acceptable.

The drive shafts shall be 2.35" in diameter, made of hardened and ground alloy steel. All shafts shall be ball bearing supported. Case shall be designed to eliminate the need of water cooling.

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The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. A certificate documenting this test shall be provided with the completed apparatus. The pump shall be fully tested at the pump manufacturer's factory to the performance requirements as outlined by the latest NFPA 1901. Pump shall be free from objectionable pulsation and vibration.

The pump shall be the Class "A" type and shall deliver the percentage of rated discharge at pressures indicated below.

100% of rated capacity at 150 PSI net pump pressure.

100% of rated capacity at 165 PSI net pump pressure.

70% of rated capacity at 200 PSI net pump pressure.

50% of rated capacity at 250 PSI net pump pressure.

MASTER DRAIN VALVE

A manifold type drain valve shall be installed in the pump compartment. All pump drains shall be connected to the master drain valve. The drain valve shall be controlled from the left side lower pump house sill. The control shall be a hand wheel knob marked "open" and "closed".

The drain shall be located such that it shall not interfere with pumping operations or function such as soft suction hoses, etc. nor shall it protrude past the outer edge of the apparatus, to prevent damage to the valve.

In some cases, it is necessary to locate the master drain in a secondary location to ensure proper function, such as draining, or if no lower or vertical sill exists. In this event, the drain shall be located below the bottom outside edge of the hose body near the forward most corner on the driver's side hose body. The drain shall not protrude past the outer edge of the body, thus preventing damage to the valve.

PUMP 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 that they will remain functional enough to permit continued use of the pump in the unlikely event of a seal failure.

AUTOMATIC AIR PRIMER SYSTEM

The priming system shall be a Trident Emergency Products compressed air powered high efficiency, multi-stage, venturi based Automatic Air Prime System.

All wetted metallic parts of the priming system are to be of brass and stainless steel construction. The 12 volt primer control shall be an "automatic" type, with a pump panel three-way switch to operate an air solenoid valve. The maximum current draw shall not exceed 0.5amps during operation.

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The primer shall be mounted above the pump impeller so that the priming line will automatically drain back to the pump. The primer shall also automatically drain when the panel control actuator is not in operation. The inlet side of the primer shall include a brass 'wye' type strainer with removable stainless steel fine mesh strainer to prevent entry of debris into the primer body.

The automatic priming switch shall have three positions as follows:

- **“Prime”** – the lower position shall be a momentary “push to prime”.
- **“Off”** -- center position
- **“Auto-Prime”** – in the upper position, a “green” LED pilot light shall be illuminated when the switch is the auto-prime position. The “Auto-Prime” operates automatically when the pump pressure drops below 20 PSIG. The primer shuts “off” automatically when the pump pressure is re-established and exceeds 20 PSIG. The “Auto” mode only operates when the fire pump is engaged.

The system shall employ an 80 PSI (5.5 bar) pressure protection valve, located on the chassis auxiliary air tank.

The primer shall be covered by a five (5) year parts warranty.

PRIMER CONTROL

There shall be a push button control to actuate the primer control valve.

There shall be a primer control for each of the locations listed below:

PRIMER CONTROL

A priming valve shall be connected to prime the main pump body.

PRIMER CONTROL

A priming valve shall be connected to prime the left side intake, outboard of the intake valve.

PRIMER CONTROL

A priming valve shall be connected to prime the right side intake, outboard of the intake valve.

PRIMER CONTROL

A priming valve shall be connected to prime the rear intake, rearward of the intake valve. The plumbing shall include connections to all high points in the plumbing.

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MAIN PUMP INLET-LEFT SIDE

A 6.00 inch (150 mm) pump manifold inlet shall be provided on the left side of the pump. The shorter style inlet shall protrude less than 2.00 inches (50 mm) away from the side panel, allowing an external valve to be connected and not protrude past the apparatus body sides while maintaining a low connection height.

The main pump inlet shall have National Standard Threads and includes a removable screen designed to provide cathodic protection for reducing deterioration in the pump.

INTAKE WATERWAY VALVE

There shall be one (1) Akron 7960 6.00 inch (150 mm) electrically operated wafer valve mounted directly to the pump intake manifold and shall be located behind the pump panel.

The valve shall be mounted between the main pump body casting and the steamer inlet casting. A .25 inch (6.35 mm) quarter turn air bleeder valve shall be plumbed to the water supply side of the intake valve, by a .75 inch (19.05 mm) NPT port, to help evacuate air from the system and avoid cavitation of the pump.

VALVE CONTROLLER

The controller shall be an Akron Brass Style 9323 Navigator Pro™ Valve Controller. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open and close to operate the actuator. Two additional buttons shall be available to be used for preset selection, preset activation, and menu activation. The controller must have up to three preset locations that can be user set and easily recalled upon each use. The unit must provide position indication through a full color backlit LCD display. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

INTAKE RELIEF VALVE

A Task Force Tips model #A18 pressure relief valve with a range of adjustment from 90 to 300 PSI shall be installed inside pump compartment piped to the suction side of the pump.

The valve shall be preset at 125 PSI (860 kPa) suction inlet pressure. The valve shall be installed inside the pump compartment where it will be easily accessible for future adjustment. The excess water shall be plumbed to the atmosphere and shall dump on the opposite side of the pump operator.

For normal pumping operations, the relief valve shall not be capped and there shall be a placard installed stating "DO NOT CAP".

INTAKE RELIEF VALVE TERMINATION

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The Intake relief valve shall terminate below the pump house compartment. If the apparatus is equipped with a heat pan, the relief valve shall terminate within the heat pan.

5" STORZ ELBOW & CAP

The inlet shall include the following components:

One (1) 6.00 inch (150 mm) NST female swivel x 5.00 inch (125 mm) Storz cast aluminum elbow

One (1) 5.00 inch (125 mm) Storz cap

MAIN PUMP INLET-RIGHT SIDE

A 6.00 inch (150 mm) pump manifold inlet shall be provided on the right side of the pump. The shorter style inlet shall protrude less than 2.00 inches (50 mm) away from the side panel, allowing an external valve to be connected and not protrude past the apparatus body sides while maintaining a low connection height.

The main pump inlet shall have National Standard Threads and includes a removable screen designed to provide cathodic protection for reducing deterioration in the pump.

INTAKE WATERWAY VALVE

There shall be one (1) Akron 7960 6.00 inch (150 mm) electrically operated wafer valve mounted directly to the pump intake manifold and shall be located behind the pump panel.

The valve shall be mounted between the main pump body casting and the steamer inlet casting. A .25 inch (6.35 mm) quarter turn air bleeder valve shall be plumbed to the water supply side of the intake valve, by a .75 inch (19.05 mm) NPT port, to help evacuate air from the system and avoid cavitation of the pump.

VALVE CONTROLLER

The controller shall be an Akron Brass Style 9323 Navigator Pro™ Valve Controller. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open and close to operate the actuator. Two additional buttons shall be available to be used for preset selection, preset activation, and menu activation. The controller must have up to three preset locations that can be user set and easily recalled upon each use. The unit must provide position indication through a full color backlit LCD display. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

INTAKE RELIEF VALVE

A Task Force Tips model #A18 pressure relief valve with a range of adjustment from 90 to 300 PSI shall be installed inside pump compartment piped to the suction side of the pump.

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The valve shall be preset at 125 PSI (860 kPa) suction inlet pressure. The valve shall be installed inside the pump compartment where it will be easily accessible for future adjustment. The excess water shall be plumbed to the atmosphere and shall dump on the opposite side of the pump operator.

For normal pumping operations, the relief valve shall not be capped and there shall be a placard installed stating "DO NOT CAP".

INTAKE RELIEF VALVE TERMINATION

The Intake relief valve shall terminate below the pump house compartment. If the apparatus is equipped with a heat pan, the relief valve shall terminate within the heat pan.

INTAKE VALVE MANUAL OVER RIDE

One (1) manual over ride crank control(s) shall be installed at the pump panel to facilitate operation of the valve in case of a failure in the valve's electrical wiring and/or motor.

5" STORZ ELBOW & CAP

The inlet shall include the following components:

One (1) 6.00 inch (150 mm) NST female swivel x 5.00 inch (125 mm) Storz cast aluminum elbow

One (1) 5.00 inch (125 mm) Storz cap

OVER HEAT PROTECTION MANAGER

A Waterous Overheat Protection Manager (OPM) valve shall be installed to protect the pump from overheating. The OPM shall consist of a valve that opens when the water in the pump reaches 140° F (60° C) and a warning light on the pump panel that is triggered by a thermal switch when the water in the pump reaches 180° F (82° C). It shall be mechanical and not require constant operator monitoring.

The warning light shall act as an additional protection device if the temperature inside the pump keeps rising although the valve is open.

The relief valve shall discharge out below the running board.

PUMP COOLING LINE

There shall be a 3/8 inch (9.5 mm) line running from the pump to the water tank to assist in keeping the pump water from overheating. A valve shall be installed on the operator's panel.

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PLUMBING AIR BLOW OUT SYSTEM

An air "blowout" system shall be installed for the pump and plumbing, connected to the chassis air system. A check valve installed between the chassis air system and the air blow out system. A manual control valve shall be installed on the operator's panel with a sign indicating full operational instructions affixed directly adjacent to the valve.

PUMP ANODES

Two (2) pump anodes shall be installed in the plumping system, one (1) on the discharge side and one (1) on the suction side, to prevent damage from galvanic corrosion within the pump system.

STAINLESS STEEL PLUMBING

All auxiliary suction and discharge plumbing related fittings, and manifolds shall be fabricated with schedule 10 stainless steel pipe; brass or high pressure flexible piping with stainless steel couplings. Galvanized components and/or iron pipe shall NOT be accepted to ensure long life of the plumbing system without corrosion or deterioration of the waterway system. Where waterway transitions are critical (elbows, tees, etc.), no threaded fittings shall be allowed to promote the smooth transition of water flow to minimize friction loss and turbulence. All piping components and valves shall be non-painted, unless otherwise specified. All piping welds shall be wire brushed and cleaned for inspection and appearance.

The high pressure flexible piping shall be black SBR synthetic rubber hose with 300 PSI working pressure and 1200 PSI burst pressure for flexible piping sizes 1.5" through 4". Sizes 3/4", 1" and 5" are rated at 250 PSI working pressure and 1000 PSI burst pressure. All sizes are rated at 30 in HG vacuum. Reinforcement consists of two plies of high tensile strength tire cord for all sizes and helix wire installed in sizes 1" through 5" for maximum performance in tight bend applications. The material has a temperature rating of -40° F to +210° F.

The stainless steel full flow couplings are precision machined from high tensile strength stainless steel. All female couplings are brass. Mechanical grooved and male 3/4" and 1" couplings are brass. A high tensile strength stainless steel ferrule with serrations on the I. D. is utilized to assure maximum holding power when fastening couplings to hose.

PUMP HOUSE LINE PROTECTION

All drain lines for the discharges, suctions, ABS discharge gauge lines and any other appropriate connections in the pump house area shall have a protective cover provided on the lines in the required areas of the lines to prevent the lines from rubbing on any other components in the pump house area.

All drain lines, ABS lines, high pressure discharge lines and electrical wiring in the pump house area shall be properly and neatly routed, wire tied and rubber coated "P" clamped, to keep the items secured.

DRAIN VALVES

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All manual drains shall be Class One with ¾" J-style lift handle kit.

FOAMPRO 2002

The apparatus shall be equipped with an electronic, fully automatic, variable speed, direct injection, and 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. This compares values to ensure that the operator's preset is proportional to the amount of foam concentrate injected into the discharge side of the fire pump.

A paddlewheel-type flowmeter shall be installed in the discharge system specified to be "foam capable. The flow meter shall be mounted in a manifold providing accurate water flow readings from 30-1150 gpm and operate up to 1380 gpm.

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 10.0%, 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 5.0 gpm (18.9 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 56 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 ¾ hp (0.56 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.

When two types of foam concentrates are to be used, a dual tank switch over system will be installed to provide rapid changeover of foam concentrate reservoirs. The digital computer control display shall interface with the dual tank switch over system, provide dual foam calibration, and display separate totals for each foam

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concentrate used.

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

Components of the complete proportioning system shall include:

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

FOAM SYSTEM TESTING

The apparatus foam system shall be tested and the Water Flow meter shall be certified by the manufacturer prior to delivery.

FOAM SYSTEM SUPPLY

The system shall be supplied by a single foam tank that shall be monitored by the control display. The display shall flash a "low concentrate" warning for two minutes when the foam tank runs low. In the event that no additional concentrate is added to the tank, the foam concentrate pump shall be deactivated.

FOAM TANK

A 20 gallon foam tank with square hinged lid, equipped with a hold down device shall be installed and plumbed with non-corrosive piping to the foam system. The fill tower shall be approximately 10.00 inch by 10.00 inch.

A label shall be affixed to the foam tank fill indicating: "WARNING" Class A (or B) foam tank fill, do not mix brands or types of foam.

Each foam tank shall be integral with the booster water tank provided.

FOAM TANK DRAIN

There shall be a 1.00 inch (25.4 mm) quarter turn drain valve installed to drain the foam tank. The valve shall be installed in the pump house with a drain line extended to the side running board.

The drain line shall be labeled "FOAM DRAIN".

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FOAM TANK LEVEL GAUGE

Fire Research TankVision Pro model WLA360-A00 tank indicator kit shall be installed. The kit shall include an electronic indicator module, a pressure sensor, a 10' sensor cable and a tank vent. The indicator shall show the volume of Class A foam concentrate in the tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive green label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, six (6) programmable colored light patterns to display tank volume, adjustable brightness control levels and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted from the outside of the foam tank near the bottom. No probe shall be placed on the interior of the tank. Wiring shall be weather resistant and have automotive type plug-in connectors.

FOAM PRO POWER FILL

The apparatus shall be equipped with a FoamPro Power Fill foam system. The foam fill system shall be a FoamPro Power Fill with electronic, automatic, concentrate refill system, to increase safety of firefighter personnel. The system shall operate independently of the foam proportioner allowing simultaneous use. Refill operation shall not require apparatus or fire pump to be running. The system shall be capable of handling Class A or Class B foam concentrates, emulsifiers, gels and decontamination concentrates. The apparatus shall be plumbed from the externally accessed intake/flush ports to the concentrate cell. External fill and flush connections shall be quick-connect cam-lock type. Internal piping shall incorporate check valves to prevent back flow. Concentrate tank inlet shall be positioned to minimize agitation. The refill operation shall be based on direct measurement of concentrate level in tank. The system must be capable of automatically stopping when cell is full and include a manual override feature. The system shall be equipped with an electronic control suitable for installation on the pump panel. Incorporated within the control shall be a microprocessor that receives input from the system while controlling foam concentrate pump output. An all-bronze three-way valve shall be included to allow the operator to flush system after use. Valve control, intake and flush ports shall be located within corresponding panel plate.

The system shall enable the operator to perform the following control/operation functions and status indicators for the refill operation:

- a) Provide push-button start/stop control of foam refill
- b) Solid green light advises operator concentrate cell is full
- c) Flashing green indicates system is running
- d) Green light off, system off
- e) Allow override of "full tank" condition
- f) Provide a means to flush the pump and intake piping

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The system shall include a 12 or 24-volt electric motor driven, positive displacement concentrate pump. The pump(s) shall deliver minimum flow of 10 gpm (37.8 L/min) @ 20 psi with all concentrates currently utilized in fire apparatus. Pump body to be of all-bronze construction and other wetted components and piping to be constructed of non-corrosive materials. The system will draw a maximum of 38 amps @ 12 VDC or 19 amps @ 24 VDC. A pump/motor solenoid (mounted to the base of the pump) shall receive signals from the computer control display and power the 1/2 hp (0.4 Kw) electric motor directly coupled to the concentrate pump. The system(s) shall receive readings when the concentrate tank is full and stop operation to prevent overflow.

Components of the complete refill system shall include:

- a) Operator control and display with Weather-Pac connectors
- b) Refill/flush quick-connect cam-lock fittings and cap
- c) Check valves
- d) Pump/motor assembly and solenoid
- e) Strainer
- f) Tank level switch
- g) Three-way fill/flush valve
- h) Stainless steel pickup wand and 6 feet of reinforced suction hose, 1 inch in diameter to allow maximum flow
- i) Panel placards

REAR SUCTION

There shall be one (1) auxiliary steamer intake located on the rear of the apparatus. There shall be a drain control installed at the low point of the line. [Intake to be no more than 42" from ground level for drafting purposes.](#)

INTAKE VALVE

A 5.00 inch (125 mm) Akron Brass 7950 electrically actuated "Butterfly" valve with quarter turn air bleeder valve shall be plumbed to the water supply side of the intake valve (with a .75 inch NPT port) to help evacuate air from the system and avoid cavitation of the pump.

STYLE 9323 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9323 Navigator Pro™ Valve Controller. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Two additional buttons shall be available to be used for preset selection, preset activation, and menu activation. The controller must have up to three preset locations that can be user set and easily recalled upon each use. The unit must be capable of being used in conjunction with at least two additional displays to control

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one valve. The unit must provide position indication through a full color backlit LCD display. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

INTAKE RELIEF VALVE

A Task Force Tips model #A18 pressure relief valve with a range of adjustment from 90 to 300 PSI shall be installed inside pump compartment piped to the suction side of the pump.

The valve shall be preset at 125 PSI (860 kPa) suction inlet pressure. The valve shall be installed inside the pump compartment where it will be easily accessible for future adjustment. The excess water shall be plumbed to the atmosphere and shall dump on the opposite side of the pump operator.

For normal pumping operations, the relief valve shall not be capped and there shall be a placard installed stating "DO NOT CAP".

INTAKE RELIEF VALVE TERMINATION

The Intake relief valve shall terminate below the pump house compartment. If the apparatus is equipped with a heat pan, the relief valve shall terminate within the heat pan.

INTAKE PLUMBING

The plumbing shall consist of 5.00 inch (125 mm) piping.

The plumbing shall be designed to be as straight as possible to reduce friction loss and shall not waste excessive space in the rear side compartment or rear compartment, if specified. There shall be a fabricated cover, if applicable, provided over any exposed plumbing in a side compartment. The cover shall be of same finish as the compartment interior. A hinged service door, secured with a single push button latch, may be provided on the cover and labeled accordingly.

SUCTION/INTAKE TERMINATION

The termination shall include the following components:

One (1) 6.00 inch (150 mm) NST male adapter

One (1) 6.00 inch [Long handle swivle](#) (150 mm) NST [45 Degree Elbow 5"Storz Adapter with cap and chain](#).

DRAINS

The suction shall be plumbed with manually operated drains in the lowest point(s) of the piping.

INLET LOCATION

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The rear suction inlet shall be located on the right rear of the apparatus, below the hose bed.

Intake to be no more than 42" from ground level for drafting purposes.

RIGHT SIDE INLET

There shall be one (1) gated suction inlet with .75 inch (19mm) bleeder installed on the right side of the apparatus with the following specified components.

INTAKE VALVE

A 2.50 inch (65 mm) Akron Brass 8800 series swing-out valve with a stainless steel ball.

INTAKE VALVE CONTROL

The intake control valve shall be a 'swing out type' direct operation manual lever actuator at the valve.

INTAKE PLUMBING

The plumbing shall consist of 2.50 inch (65 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.

SUCTION/INTAKE TERMINATION

The termination shall include the following components:

One (1) 2.50 inch (65 mm) NST swivel female straight adapter with screen

One (1) 2.50 inch (65 mm) self-venting plug, secured by a chain

INLET LOCATION

The inlet shall be located on the pump panel in the forward position.

LEFT SIDE MASTER DISCHARGE

There shall be one (1) master discharge installed on the left side of the apparatus provided with the following specified components.

DISCHARGE VALVE

A 3.00 inch (77 mm) Akron Brass 8000 series 'electric valve' with stainless steel ball.

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STYLE 9325 NAVIGATOR PRO VALVE CONTROLLER

The controller shall be an Akron Brass Style 9325 Navigator Pro™ Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

The unit must be capable of being connected to a pressure sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication must be determined from true position feedback and indicate the exact position of the valve.

The unit must be able to be programmed to PSI, kPa, or Bar for pressure. The unit must be capable of turning on and off a solenoid used in a CAFS system (if provided). The only calibration required is to set the unit to the valve during the initial set up. No other calibration shall be required.

The display shall be a full color LCD display with a backlight. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

DISCHARGE PLUMBING

The plumbing shall consist of 4.00 inch (100 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.

DISCHARGE TERMINATION

The discharge termination shall include the following components:

One (1) 4.00 inch (100 mm) NST adapter

One (1) 4.00 inch (100 mm) NST female swivel by 5.00 inch (125 mm) Storz with 30 degree elbow

One (1) 5.00 inch (125 mm) Storz to 2.50 inch (65 mm) male NST adapter

One (1) 2.50 inch (65 mm) cap, secured by a chain

MASTER DISCHARGE

There shall be one (1) master discharge installed on the right side of the apparatus provided with the following specified components.

DISCHARGE VALVE

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A 3.00 inch (77 mm) Akron Brass 8000 series 'electric valve' with stainless steel ball.

STYLE 9325 NAVIGATOR PRO VALVE CONTROLLER

The controller shall be an Akron Brass Style 9325 Navigator Pro™ Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

The unit must be capable of being connected to a pressure sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication must be determined from true position feedback and indicate the exact position of the valve.

The unit must be able to be programmed to PSI, kPa, or Bar for pressure. The unit must be capable of turning on and off a solenoid used in a CAFS system (if provided). The only calibration required is to set the unit to the valve during the initial set up. No other calibration shall be required.

The display shall be a full color LCD display with a backlight. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

DISCHARGE PLUMBING

The plumbing shall consist of 4.00 inch (100 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.

DISCHARGE TERMINATION

The discharge termination shall include the following components:

One (1) 4.00 inch (100 mm) NST adapter

One (1) 4.00 inch (100 mm) NST female swivel by 5.00 inch (125 mm) Storz with 30 degree elbow

One (1) 5.00 inch (125 mm) Storz to 2.50 inch (65 mm) male NST adapter

One (1) 2.50 inch (65 mm) cap, secured by a chain

LEFT REAR DISCHARGE

There shall be one (1) gated discharge installed on the left rear of the apparatus with the following specified components.

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DISCHARGE VALVE

A 2.50 inch (65 mm) Akron Brass 8000 series 'electric valve' with stainless steel ball.

STYLE 9325 NAVIGATOR PRO VALVE CONTROLLER

The controller shall be an Akron Brass Style 9325 Navigator Pro™ Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

The unit must be capable of being connected to a pressure sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication must be determined from true position feedback and indicate the exact position of the valve.

The unit must be able to be programmed to PSI, kPa, or Bar for pressure. The unit must be capable of turning on and off a solenoid used in a CAFS system (if provided). The only calibration required is to set the unit to the valve during the initial set up. No other calibration shall be required.

The display shall be a full color LCD display with a backlight. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

DISCHARGE PLUMBING

The plumbing shall consist of 2.50 inch (65 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.

DISCHARGE TERMINATION

The discharge termination shall include the following components:

One (1) 2.50 inch (65 mm) Male NST adapter

One (1) 2.50 inch (65 mm) NST female by male swivel with 45 degree elbow

One (1) 2.50 inch (65 mm) female by 1.50 inch (38 mm) male reducer

One (1) 1.50 inch (38 mm) female self-venting cap, secured by a chain

LEFT HOSEBED PRECONNECT DISCHARGE

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There shall be one (1) gated discharge installed on the [left Forward bulk head of Hose bed](#) , with the following specified components.

DISCHARGE VALVE

A 2.50 inch (65 mm) Akron Brass 8000 series 'electric valve' with stainless steel ball.

STYLE 9325 NAVIGATOR PRO VALVE CONTROLLER

The controller shall be an Akron Brass Style 9325 Navigator Pro™ Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

The unit must be capable of being connected to a pressure sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication must be determined from true position feedback and indicate the exact position of the valve.

The unit must be able to be programmed to PSI, kPa, or Bar for pressure. The unit must be capable of turning on and off a solenoid used in a CAFS system (if provided). The only calibration required is to set the unit to the valve during the initial set up. No other calibration shall be required.

The display shall be a full color LCD display with a backlight. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

DISCHARGE PLUMBING

The plumbing shall consist of 2.50 inch (65 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.

DISCHARGE TERMINATION

The discharge termination shall include the following components:

One (1) 2.50 inch (65 mm) Male NST adapter

FOAM CAPABLE

The discharge shall be foam capable.

RIGHT REAR DISCHARGE

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There shall be one (1) gated discharge installed on the right rear of the apparatus with the following specified components.

DISCHARGE VALVE

A 2.50 inch (65 mm) Akron Brass 8000 series 'electric valve' with stainless steel ball.

STYLE 9325 NAVIGATOR PRO VALVE CONTROLLER

The controller shall be an Akron Brass Style 9325 Navigator Pro™ Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

The unit must be capable of being connected to a pressure sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication must be determined from true position feedback and indicate the exact position of the valve.

The unit must be able to be programmed to PSI, kPa, or Bar for pressure. The unit must be capable of turning on and off a solenoid used in a CAFS system (if provided). The only calibration required is to set the unit to the valve during the initial set up. No other calibration shall be required.

The display shall be a full color LCD display with a backlight. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

DISCHARGE PLUMBING

The plumbing shall consist of 2.50 inch (65 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.

DISCHARGE TERMINATION

The discharge termination shall include the following components:

One (1) 2.50 inch (65 mm) Male NST adapter

One (1) 2.50 inch (65 mm) NST female by male swivel with 45 degree elbow

One (1) 2.50 inch (65 mm) female by 1.50 inch (38 mm) male reducer

One (1) 1.50 inch (38 mm) female self-venting cap, secured by a chain

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FOAM CAPABLE

The discharge shall be foam capable.

DOUBLE STACK CROSSLAYS

The crosslay hose beds shall be located in the upper portion of the pump compartment. The crosslay area shall be constructed with a fifteen 15.00 inch (381mm) approximate depth for laying a double stack of each hose size as specified below.

The crosslay area shall be located at the rear of top control pump module. The crosslay area shall span the entire width of the apparatus pump module. Removable slotted aluminum flooring shall be provided for the hose bed area and for drainage.

Chicsan swivels shall be installed just below the floor of each crosslay bed, high enough for hose couplings to be accessed and tightened on to chicksans. Chicsan swivels shall swing from left to right to allow attached hose to be deployed from either side of the apparatus.

1 3/4" CROSSLAY

A crosslay with the following specified components shall be provided for up to 250 feet (76.2 m) of 1.75 inch (44.4 mm) hose.

There shall be a total of two (2) provided.

DISCHARGE VALVE

A 2.00 inch (50 mm) Akron Brass 8000 series 'electric valve' with stainless steel ball.

STYLE 9325 NAVIGATOR PRO VALVE CONTROLLER

The controller shall be an Akron Brass Style 9325 Navigator Pro™ Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

The unit must be capable of being connected to a pressure sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication must be determined from true position feedback and indicate the exact position of the valve.

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The unit must be able to be programmed to PSI, kPa, or Bar for pressure. The unit must be capable of turning on and off a solenoid used in a CAFS system (if provided). The only calibration required is to set the unit to the valve during the initial set up. No other calibration shall be required.

The display shall be a full color LCD display with a backlight. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

DISCHARGE PLUMBING

The plumbing shall consist of 2.00 inch (50 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access.

DISCHARGE TERMINATION

The discharge termination shall include the following components:

One (1) 2.00 inch (50 mm) NPT x 1.50 inch (38 mm) NST brass chicksan swivel

FOAM CAPABLE

The discharges shall be foam capable.

CROSSLAY TRIM

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

CROSSLAY COVER

The crosslay hose bed area shall have a vinyl cover installed on the top and sides of the crosslay area.

The top cover shall be held in place by an extrusion installed across the front edge of the crosslay hose bed and with Velcro across the rear edge. The sides of the crosslay cover shall be secured by means of elastic shock cord passing thru brass grommets. Hooks shall be installed at the lower corners to secure the cover to the apparatus.

CROSSLAY TOP OVER COLOR

The crosslay hose bed cover shall be black in color.

CROSSLAY ROLLERS

Stainless steel hose roller guides shall be installed at the bottom and side openings on each side of the crosslay hose bed area. The rollers shall aid in hose deployment and reduce the chaffing of the hose jacket on the edges

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of the bay area.

DECK GUN MONITOR WATERWAY

There shall be one (1) deck gun monitor waterway installed on the apparatus with the following components.

DISCHARGE VALVE

A 3.00 inch (77 mm) Akron Brass 8000 series 'electric valve' with stainless steel ball.

STYLE 9325 NAVIGATOR PRO VALVE CONTROLLER

The controller shall be an Akron Brass Style 9325 Navigator Pro™ Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

The unit must be capable of being connected to a pressure sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication must be determined from true position feedback and indicate the exact position of the valve.

The unit must be able to be programmed to PSI, kPa, or Bar for pressure. The unit must be capable of turning on and off a solenoid used in a CAFS system (if provided). The only calibration required is to set the unit to the valve during the initial set up. No other calibration shall be required.

The display shall be a full color LCD display with a backlight. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

DELUGE PLUMBING

The deluge waterway shall consist of 3.00 inch (77 mm) piping and shall be drained with an auto-drain located at the lowest point of the waterway plumbing if required.

DELUGE PIPE LOCATION

The deluge pipe shall be located up through the pump compartment, at the center location.

TELESCOPING MONITOR PIPE

Task Force Tips model # XG18VL-PL manually telescoping waterway shall be installed. The waterway shall be capable of being lowered to deck level (or into a monitor well) for storage and transportation and shall be capable of being raised to an extended height of 18.00 inch (457.2 mm) by lifting a quick release latch located

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at the base of the extension tube. This latching device shall be capable of locking the waterway in either the raised or lowered position while maintaining the ability to horizontally rotate the monitor device 360 degrees.

If the extend-a-gun is not properly stowed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the hazard light in the cab to alert the crew.

The aluminum riser shall have a 3.00 inch (77 mm) waterway; hardcoat anodized finish and be furnished with a 3.00 inch (77 mm) Victaulic inlet and a 3.00 inch (77 mm) male NPT outlet.

Deluge Pipe Termination to be recessed in pump house

FRONT BUMPER DISCHARGE OUTLET

One (1) front bumper discharge outlet shall be provided and installed in the location specified.

DISCHARGE VALVE

A 2.50 inch (65 mm) Akron Brass 8000 series 'electric valve' with stainless steel ball.

STYLE 9325 NAVIGATOR PRO VALVE CONTROLLER

The controller shall be an Akron Brass Style 9325 Navigator Pro™ Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Three additional buttons shall be available to be used for preset selection, preset activation, CAFS activation (if provided), and menu activation.

The unit must be capable of being connected to a pressure sensor and provide an LCD display showing pressure as well as valve position indication. Valve position indication must be determined from true position feedback and indicate the exact position of the valve.

The unit must be able to be programmed to PSI, kPa, or Bar for pressure. The unit must be capable of turning on and off a solenoid used in a CAFS system (if provided). The only calibration required is to set the unit to the valve during the initial set up. No other calibration shall be required.

The display shall be a full color LCD display with a backlight. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

DISCHARGE PLUMBING

The plumbing shall consist of 2.50 inch (65 mm) piping, and shall incorporate a manual drain control installed below the pump area for ease of access. Auto-drain (s) shall be installed in the discharge piping at lowest point of the plumbed system.

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DISCHARGE TERMINATION

The discharge termination shall include the following components:

One (1) 2.50 inch (65 mm) NPT x 2.50 inch (65 mm) NST SST chicksan swivel

FRONT BUMPER DISCHARGE LOCATION

The front bumper discharge shall be mounted on top of the gravel shield of the front bumper extension. The discharge shall be placed to the right of the hose well. The discharge shall terminate with a chicksan swivel to accommodate deployment of hose in different directions.

FRONT BUMPER DISCHARGE CHICKSAN GUARD

The front bumper discharge chicksan shall include a chicksan guard installed on the front bumper gravelshield to prevent the chicksan from hitting the cab. The guard shall be fabricated of aluminum diamond plate with a dual-action sanded finish on the opposite side of the diamonds. There shall be two (2) rubber bumper stops installed on the guard to protect the chrome chicksan.

FOAM CAPABLE

The discharge shall be foam capable.

TANK TO PUMP LINE

The connection between the tank and the pump shall be capable of the flow recommendations in compliance with NFPA 1901 requirements and shall be tested to those standards when the pump is being certified.

One (1) non-collapsible flexible hose and valve 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. Four (4) inch stainless steel schedule 10 or Poly-Vinyl Chloride schedule 40 piping may be used to complete the connection from the tank to pump valve to the water tank.

TANK TO PUMP CHECK VALVE

There shall be a tank to pump check valve, conforming to NFPA standard requirements to prevent water from back flowing at an excessive rate if the pump is being supplied from a pressurized source. The check valve shall be mounted as an integral part of the pump suction extension. A hole up to .25 inch (6.00 mm) is allowable in the check valve to release steam or other pressure buildup so that the void between the valve and check valve may drain of water that could be subject to freezing.

TANK TO PUMP VALVE

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A 3.00 inch (77 mm) Akron Brass 8000 series 'electric valve' with stainless steel ball.

STYLE 9323 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9323 Navigator Pro™ Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Two additional buttons shall be available to be used for preset selection, preset activation, and menu activation. The controller must have up to three preset locations that can be user set and easily recalled upon each use. The unit must be capable of being used in conjunction with at least two additional displays to control one valve. The unit must provide position indication through a full color backlit LCD display. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

TANK FILL LINE

One (1) 2.00 inch (50.80 mm) tank fill/recirculating line shall be installed from the pump directly to the booster tank.

TANK FILL VALVE

A 2.00 inch (50 mm) Akron Brass 8000 series 'electric valve' with stainless steel ball.

STYLE 9323 VALVE CONTROLLER

The controller shall be an Akron Brass Style 9323 Navigator Pro™ Valve Controller and shall be installed at the pump operator's panel location. The electric controls must be of true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well as an optional one touch full open feature to operate the actuator. Two additional buttons shall be available to be used for preset selection, preset activation, and menu activation. The controller must have up to three preset locations that can be user set and easily recalled upon each use. The unit must be capable of being used in conjunction with at least two additional displays to control one valve. The unit must provide position indication through a full color backlit LCD display. It shall have a manual adjustment of the brightness as well as an auto-dimming option.

TRI-MAX™ Space Frame Body- STAINLESS STEEL

The apparatus body shall be a Tri-Max™ **Space Frame** design, which serves as an incredibly durable, structural body framework. This framework acts as a series of beams and columns that support and protect the body and its contents. The space frame design provides maximum torsional resistance and load capabilities. The entire space frame structure shall be welded together utilizing an A.W.S. Certified welding procedure.

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The space frame design shall also be required because it provides energy absorbing impact zones in the structure, thus providing increased safety to the rest of the apparatus and personnel on board. Documented proof of this extra safety shall be required upon request.

The Tri-Max™ body structure shall consist entirely of closed section members, except where the body is mounted to the chassis. Closed section members (such as square, rectangular, triangular, or round tubes) are required because they provide maximum strength and torsion rigidity. This solid tubular structural style of design, ultimately adds longevity to the body structure by eliminating flex and twists in material, creating less stress and fatigue. Body designs that use independent sub-frames will not be acceptable.

BODY STRUCTURE MEMBERS

The space frame body shall have triangular shaped structural members in certain areas of the body. This shape is required to prevent loss of useable compartment space. Other body structure members shall be square or rectangular. Each structural member will have a nominal outside dimension of 2.50 inches (63.50 mm) in at least one direction. The body shall be designed for maximum strength to weight ratio, therefore the gauge of sheet metal and structural members varies from 14 gauge to 11 gauge throughout dependent on the design requirement.

BODY MATERIAL TYPE

All body structure and sheet material shall be premium grade Stainless Steel, Type 304L. This alloy is utilized because it provides an excellent balance of material strength, manufacturing properties, and corrosion resistance that is achieved through high levels of both chromium and nickel.

Absolutely no dissimilar metals shall be used in the body and its supporting substructure without being separated by Eck®, which prevents corrosion by providing a barrier between dissimilar metals, sealing out moisture and absorbing energy created by a dissimilar metal reaction.

FRONT BODY COMPARTMENT WALLS

The front compartment walls of both forward most compartments shall be sheet finished. No overlay material shall be visible from the interior of the compartments.

REAR BODY COMPARTMENT WALLS

The rear compartment walls of both rearward most compartments shall be sheet finished. No overlay material shall be visible from the interior of the compartments. Access panels from the rear walls shall be strategically placed to ensure access to the rear taillight clusters for any servicing that may be completed.

COMPARTMENT TOP

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The top of the compartments shall be an integral portion of the body. No overlay material shall be visible from the interior of the compartments.

COMPARTMENT FLOORS

The body compartments shall be enclosed with stainless steel sheet metal as specified above. The compartment floors shall have a 1.00 inch (25.40 mm) lip downward at the door opening side of the compartment. This lip shall integrate with a structural member on the bottom edge and form a "sweep-out" compartment. This design shall also allow for a structural flush fitting door frame and a complete door/weather seal.

COMPARTMENT LOAD CAPACITY

Each compartment shall have a minimum of one additional structural compartment floor support centered on the underside of the compartment floor. This additional member shall be integral with the rest of the body structure. Each compartment must be designed, and 3rd party analyzed to carry a working load of:

Full depth side compartment: 1,000 lbs (453.59 kg) per compartment

Half depth side compartment: 750 lbs (340.19 kg) per compartment

Rear center compartment: 1,500 lbs (680.39 kg)

NOTE: These values are for design purposes only for individual compartment construction and are not meant to be used as an actual overall weight rating for equipment load per compartment for the specified apparatus. The apparatus shall be engineered such that the completed unit, when loaded to its estimated in-service weight, shall comply with the gross axle weight ratings {GAWR}, the overall gross vehicle weight rating {GVWR}, and the chassis manufacturer's load balance guidelines per NFPA.

EXTERIOR HOSE BED WALLS

The exterior hose bed walls shall be an integral portion of the body. The wall shall give a smooth exterior look and finish with no vertical supports tubing visible from the exterior of the truck.

FASTENERS

All bolts and nuts used in the finish construction of the apparatus shall be coated stainless steel which helps prevent dissimilar metal electrolytic reaction and corrosion. Any bolt extending into a compartment or into the hose bed area shall have an acorn nut attached or be protected in such manner where sharp edges are avoided.

FINITE ELEMENT ANALYSIS

The proposed body design must have completed a review and analysis by a legitimate 3rd party engineering firm. At a minimum, the 3rd party must have conducted a computer model finite element analysis of the proposed design. The analysis is to include real world working load scenarios. Analysis to cover both static and

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dynamic situations must be completed. The purpose of the finite element analysis is to ensure proper design of the apparatus body, and that it is capable of carrying the typical fire apparatus loads and those specified by NFPA for equipment. The analysis process must conclude that the body structure is properly designed and manufactured to provide longevity under normal conditions. The 3rd party must also validate the manufacturing processes are consistent with the design and analysis performed. Proof of having completed this testing must be submitted with the bid.

PAINT SPECIFICATIONS

All bright metal fittings, if unavailable in stainless steel, shall be heavily chrome plated.

Critical body and sub-frame area which cannot be primed after assembly shall be pre-painted.

All welded metal surfaces shall be ground to a smooth surface prior to a degreasing and high pressure, high temperature phosphatizing process. The entire surface shall be sprayed with a non-chromate sealing compound to prevent formulation of stains or flash rust on previously phosphatized parts.

The paint applied to the apparatus shall be PPG Industries Delta® brand, applied throughout a multi-step process including at least two coats of each color and clear coat finish.

The coating shall be an infra-red, baked air dried. The coatings shall provide full gloss finished suitable for application by high-pressure airless or conventional low pressure air atomizing spray.

The coatings shall not contain lead, cadmium or arsenic. The polyisocyanate component shall consist of only aliphatic isocyanates, with no portion being aromatic isocyanates in character. The solvents used in all components and products shall not contain ethylene glycol mono-ethyl ethers or their acetates (commercially recognized as cello solves), nor shall they contain any chlorinated hydrocarbons. The products shall have no adverse effects on the health or nor present any unusual hazard to personnel when used according to manufacturer's recommendations for handling and proper protective safety equipment, and for its intended use.

The coating system, as supplied and recommended for application, shall meet all applicable federal, state and local laws and regulations now in force or at any time during the courses of the bid.

The manufacturer shall supply (upon request) for each product and component of the system, a properly complete OSHA "Safety Data Sheet".

The following documents of the issue in effect on the date of the invitation to quote form a part of this document to the extent specified herein:

Federal Standards: Number 141A and 141B paint, varnish, lacquer and related material: methods of inspection, sampling, and testing.

Military Standard: MIL-C 83486B Coating, Urethane, Aliphatic Isocyanates, for Aerospace applications.

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Industry Methods and Standards: ASTM Method of Analysis (American Society for testing and Materials). BMS 10-72A (Boeing Material Specifications).

The entire exterior body structure (excluding roll-up doors) shall receive the primer coats and the finish coats. The apparatus body, will be painted in a down draft type paint booth to reduce dust, dirt or impurities in the finish paint. The painted surfaces shall have a finish with no runs, sags, craters, pinholes or other defects. The coating will meet the following test performance properties as a minimum standard.

BODY PAINT COLOR

The apparatus body shall be painted PPG 73237 Red.

NATURAL COMPARTMENT FINISH

To prevent scratching of the paint finish and to provide the maximum reflectivity for the compartment lighting, the interior of the compartments shall have a natural finish. Absolutely no coatings will be allowed on the compartment interiors.

OVERLAYS

The entire front face of the apparatus body shall have brushed stainless steel plate overlays installed. The entire rear face of the apparatus body shall have brushed stainless steel overlays installed for the installation of chevron striping.

All overlay materials shall be coated with 3M adhesive sealant on the back portion to provide an insulating barrier between dissimilar metals.

The front of the apparatus body vertical wall overlays shall be installed with a 16 gauge brushed stainless steel 1.0" x 1.0" corner trim piece, for edge protection. The vertical edge trim piece shall extend from the top to bottom and shall be fastened at a minimum of three locations, top, middle, and bottom.

The rear face of the apparatus body, vertical wall overlays shall be installed with a 16 gauge brushed stainless steel 1.0" x 1.0" corner trim piece, for edge protection. The vertical edge trim piece shall extend from the top to bottom and shall be fastened at a minimum of three locations, top, middle, and bottom.

The vertical edge trim piece that is protecting the chevron striping surface or that is utilized for the purpose of striping, shall be secured utilizing fasteners only.

CATWALKS

The catwalks shall be constructed with materials of a non-slip .125 inch embossed aluminum diamond plate, meeting the minimum NFPA standard requirements for slip resistance.

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VIBRA-TORQUE™ BODY MOUNTING SYSTEM

The entire body module assembly shall be mounted so that it “floats” above the chassis frame rails exclusively with Vibra-Torq™ torsion isolator assemblies to reduce the vibration and stress providing an extremely durable body mounting system.

The body substructure shall be mounted above the frame to allow independent flexing to occur between the body and the chassis. Each assembly shall be mounted to the chassis frame rails with steel, gusseted mounting brackets. Each bracket shall be powder coated for corrosion resistance. Each body mount bracket shall be mounted to the side chassis frame flange with two 5/8”-UNC Grade 5 HHCS.

Each assembly shall have a two-part rubber vibration isolator. The isolator shall be of a specific durometer to carry the necessary loads of the apparatus body, equipment, tank, water, and hose. The quantity of mounts utilized shall correspond directly to the anticipated weight being supported. Certain assemblies shall also incorporate a torsion spring. Helical coil springs shall be incorporated into specific mounts in tandem with the rubber isolators to minimize the stress absorbed by the body caused from chassis frame rail flexing.

There shall be no welding to the chassis frame rail sides, web or flanges, or drilling of holes in the top or bottom frame flanges between axles. All body to chassis connections shall be bolted so that in the event of an accident, the body shall be easily removable from the truck chassis for repair or replacement.

Because of the constant vibration and twisting action that occurs in chassis frame rails and suspension, the torsion mounting system is required to minimize the possibility of premature body structural failures. The Vibra-Torque™ body mounting system shall have a lifetime warranty.

BODY STRUCTURE WIDTH

The width of the apparatus body from the outside of the left compartments to the outside of the right compartments shall be 99" excluding any attached peripherals such as rub rails, fenderettes, grab handles, etc.

COMPARTMENT VENTILATION

To allow for proper air circulation & flow, each compartment shall have a venting route. The venting locations shall be determined by best-fit for each body configuration. The vents will be chrome louvered plate and installed appropriately on the compartment interior walls.

COMPARTMENTATION

The following compartments shall be supplied on the apparatus:

Compartment "L1"

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There shall be one (1) full height compartment ahead of the rear wheels on the left side of the apparatus.

The approximate interior dimensions of this compartment shall be a minimum of 49.00 inches (1244.60 mm) wide by 74.00 inches (1879.60 mm) high with a lower depth of 25.50 inches

The framed opening shall measure 46.50 inches (1181.10 mm) wide by 70.00 inches (1778.00 mm) high.

Compartment "L2"

There shall be one (1) compartment located directly over the rear wheels on the left side of the apparatus.

The approximate interior dimensions of this compartment shall be a minimum of 62.00 inches (1574.80 mm) wide by 40.00 inches (1016.00 mm) high with a depth of 25.50 inches

The framed opening shall measure approximately 62.00 inches (1574.80 mm) wide by 36.00 inches (914.40 mm) high.

Compartment "L3"

There shall be one (1) full height compartment located behind the rear wheels on the left side of the apparatus.

The approximate interior dimensions of this compartment shall be a minimum of 49.00 inches (1244.60 mm) wide by 74.00 inches (1879.60 mm) high (317.50 mm) and the lower portion being transverse into the rear compartment, unless partitions are installed.

The framed opening shall measure approximately 46.50 inches (1181.10 mm) wide by 70.00 inches (1778.0 mm) high..

Compartment "R1"

There shall be one (1) full height compartment ahead of the rear wheels on the right side of the apparatus.

The approximate interior dimensions of this compartment shall be a minimum of 49.00 inches (1244.60 mm) wide by 74.00 inches (1879.60 mm) high with a lower depth of 25.50 inches (647.70 mm) and an upper depth of 12.50 inches (317.50 mm).

The framed opening shall measure 46.50 inches (1181.10 mm) wide by 70.00 inches (1778.00 mm) high

Compartment "R2"

There shall be one (1) compartment located directly over the rear wheels on the right side of the apparatus.

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The approximate interior dimensions of this compartment shall be a minimum of 38.00 inches (965.20 mm) wide by 40.00 inches (1016.00 mm) high with a depth of 12.50 inches (317.50 mm).

The framed opening shall measure approximately 35.50 inches (901.70 mm) wide by 36.00 inches (914.40 mm) high.

Compartment "R3"

There shall be one (1) full height compartment located behind the rear wheels on the right side of the apparatus.

The approximate interior dimensions of this compartment shall be a minimum of 49.00 inches (1244.60 mm) wide by 74.00 inches (1879.60 mm) high with an upper depth of 12.50 inches (317.50 mm) and the lower portion being transverse into the rear compartment, unless partitions are installed.

The framed opening shall measure approximately 46.50 inches (1181.10 mm) wide by 70.00 inches (1778.0 mm) high.

ROLL-UP DOOR CONSTRUCTION

All horizontal and vertical side compartment doors shall be roll-up style doors.

R.O.M ROLL-UP DOORS

R.O.M Corporation brand roll-up doors shall be provided and installed on the apparatus. The door slats shall be of a double wall box frame extrusion. Exterior surface shall be flat and the interior surface shall be concave to prevent loose equipment from jamming the door. The slats will be anodized to prevent oxidation and there shall be inner-locking end shoes on every slat, secured by a punch and dimple process. The slats shall have interlocking joints with a folding locking flange. There shall be a PVC/Vinyl inner seal between each slat to prevent metal to metal contact.

The track shall be of a one piece aluminum design with an attaching flange and finishing flange incorporated into its design to facilitate installation and provide a pleasing finished look without additional trim or caulking. The track shall have a replaceable side seal to resist water and dust intrusion into the compartment.

The drip rail shall be fabricated of aluminum and have a built in replaceable wiper seal. The Roll-up door shall have a 4" diameter counterbalance, to assist in lifting while eliminating the risk of accidental closing. The door shall be secured by a full width lift bar, operational by one hand with heavy gloves. The securing method will be of a positive latch device design.

SIDE COMPARTMENT DOORS/TRACK/TRIM/WET PAINTED

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The side compartment roll up doors, track and trim shall be wet finish painted to color match the apparatus body.

ROLL-UP DOOR PROTECTORS

There shall be a protective cover installed under each body side compartment door roll to protect the door in the rolled up position.

ROLL-UP DOOR PROTECTOR FINISH

The roll-up door protector shall be left natural finish.

DOOR ASSIST STRAPS

There shall be nylon straps installed on both the left and right body side 'high side' compartment doors to assist in closing the door. The strap shall be attached to each door and permanently mounted to the rearward wall with footman loops using nutzerts, half way between the top and bottom of the compartment.

DOOR OPEN INDICATOR

Each roll up door shall have an integral door open indicator magnet in the lift bar.

If the door is not properly closed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the "hazard light" in the cab to alert the crew.

REAR CENTER COMPARTMENT

There shall be one (1) compartment, "B1", located at the rear of the apparatus, below the hose bed access area.

The approximate interior dimensions of this compartment shall be 43.00 inches (1092.20 mm) wide and 47.00 inches (1193.80 mm) high or as high as possible determined by the hose bed height and rear configuration. The depth shall be determined by the length of the rear side compartments specified and maximized for the suspension specified for the chassis.

The side walls of the rear compartment are to be left open to the body side compartments for maximum storage area, unless partitions are specified.

The framed opening shall be approximately 38.00 inches (965.20 mm) wide and 41.00 inches (1041.10 mm) high.

REAR COMPARTMENT DOOR

A non-locking R.O.M Corporation brand roll-up door shall be provided and installed on the apparatus for the B-

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1 compartment.

The door slats shall be of a double wall box frame extrusion. Exterior surface shall be flat and the interior surface shall be concave to prevent loose equipment from jamming the door. The slats will be anodized to prevent oxidation and there shall be inner-locking end shoes on every slat, secured by a punch and dimple process. The slats shall have interlocking joints with a folding locking flange. There shall be a PVC/Vinyl inner seal between each slat to prevent metal to metal contact.

The track shall be of a one piece aluminum design with an attaching flange and finishing flange incorporated into its design to facilitate installation and provide a pleasing finished look without additional trim or caulking. The track shall have a replaceable side seal to resist water and dust intrusion into the compartment.

The drip rail shall be fabricated of aluminum and have a built in replaceable wiper seal. The Roll-up door shall have a 4.00 inch diameter counterbalance, to assist in lifting while eliminating the risk of accidental closing. The door shall be secured by a full width lift bar, operational by one hand with heavy gloves. The securing method will be of a positive latch device design.

REAR COMPARTMENT DOOR FINISH

The rear center compartment door shall be satin aluminum finish.

ROLL-UP DOOR PROTECTOR

There shall be a protective cover installed under the rear compartment door roll to protect the door in the rolled up position.

ROLL-UP DOOR PROTECTOR FINISH

The roll-up door protector shall be left natural finish.

DOOR OPEN INDICATOR

Each roll up door shall have an integral door open indicator magnet in the lift bar.

If the door is not properly closed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the “hazard light” in the cab to alert the crew.

LEFT REAR WALL REINFORCEMENT

The left rear vertical body panel shall be reinforced for installation of a TFT Blitzfire mount by the Dealership.

SILL PLATES

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Brushed stainless steel sill plates shall be installed at the bottom of each body compartment door opening.

COMPARTMENT LIGHTING

Two (2) LED Tube lights model #RX-15T16-5050 shall be installed in each body compartment. The tube lights shall be centered vertically along each side of the door framing and maximum length available to the opening.

The lights in each compartment shall be on a separate circuit, turning on only those lights that have open compartment doors.

REAR TAILBOARD

The rear of the apparatus body shall be vertical in design - otherwise known as a 'flat-back'.

The rear tailboard shall be fabricated of the same tubular materials as used in the apparatus body.

The tailboard shall be two (2) independent assemblies welded to the rear body structural framing to provide body protection and a solid rear stepping platform. The center section shall be framed for a slide out platform.

The rear step shall be designed to incorporate "crush zone" technology. This idea incorporates lighter materials in the tailboard than the body structure so the step will "crush" in a collision before the body structure.

On the rear body surface, a sign shall be attached that states: "DO NOT RIDE ON REAR STEP, DEATH OR SERIOUS INJURY MAY RESULT."

The rear tailboard and body shall be constructed such that the angle of departure shall be no less than 8 degrees at the rear of the apparatus when fully loaded (Per NFPA 1901).

TAILBOARD LENGTH

The rear tailboard shall be approximately 13.50 inches (342.90 mm) deep and shall incorporate a ventilated "Diamondback" material stepping surface bolted in place which spans the full width of the apparatus on non-recess designs, and as wide as possible on inset recess designs. The extruded stepping surface shall be completely enclosed by the supporting structural framework to minimize damage.

The ventilated "Diamondback" material shall be capable of being easily replaced if necessary, using only hand tools. The framework shall be covered with an adhesive tape providing an aggressive traction surface. Use of any aluminum diamond plate material on these areas shall not be acceptable.

SLIDE OUT PLATFORM

One (1) slide out platform, utilizing an OnScene Solutions brand slide shall be installed at the center of the rear tailboard, approximately 1.00 inch (25.4 mm) below the split outward tailboard sections.

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The platform shall be 41.00 inches wide and shall be approximately 20.00 inches deep when extended. The platform stepping surface shall be constructed of .188 inch (4.76 mm) embossed aluminum diamond plate material to meet the minimum NFPA standard requirements for slip resistance.

The platform shall lock into place while in the extended and stowed positions. There shall be a reinforcement channel on the back of the step.

If the slide out platform is not properly stowed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the hazard light in the cab to alert the crew.

WHEEL WELLS

Wheel wells shall have semicircular black polymer composite inner liners that are bolted to the wheel well panel and supported inboard by brackets that are connected to the body framework. Each wheel well shall be a continuous piece with no breaks or ledges where road grime or debris may accumulate. This liner shall be removable for access to suspension assembly for repairs. There shall be no exception to the bolted wheel well inner liner requirement.

WHEEL WELL MODULES

The body wheel well area shall be fabricated of same material type as the body and finish painted. There shall be “smart storage” compartmentation features incorporated on each side of the apparatus body wheel well modules to utilize and maximize storage space availability.

WHEEL WELL ROLL-OUT DRAWER

There shall be a roll-out drawer installed above the rear wheel on the left side of the body.

The drawer shall be as wide and as deep as allowed for the body configuration and shall have a 220 pound capacity.

The drawer shall have a face plate attached that shall be finished to match the lower module doors. The drawer shall be secured with two (2) round chrome latches.

If the drawer is not properly closed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the hazard light in the cab to alert the crew.

WHEEL WELL ROLL-OUT DRAWER

There shall be a roll-out drawer installed above the rear wheel on the right side of the body.

The drawer shall be as wide and as deep as allowed for the body configuration and shall have a 220 pound

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capacity.

The drawer shall have a face plate attached that shall be finished to match the lower module doors. The drawer shall be secured with two (2) round chrome latches.

If the drawer is not properly closed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the hazard light in the cab to alert the crew.

LEFT FRONT WHEEL WELL COMPARTMENT

There shall be a storage compartment in the wheel well on the left side in front of the axle.

FIRE EXTINGUISHER STORAGE COMPARTMENT

The compartment shall hold one (1) 2.5 gallon water extinguisher and one (1) 15 lb. CO2 fire extinguisher.

LEFT REAR WHEEL WELL COMPARTMENT

There shall be a storage compartment in the wheel well on the left side behind the axle.

INTEGRATED FLOOR DRY STORAGE MODULE

A floor dry storage module with pivoting re-fill access door shall be provided and installed in the apparatus wheel well area as specified.

The floor dry storage module shall be manufactured as large as possible to maximize the available space. The module shall be integrated into the wheel well area and be capable of storing up to approximately 40 pounds of all purpose floor dry absorbent compound material.

A manual drain shall be located at the bottom of the compartment for ease of dispensing the material.

The storage module shall be labeled "Floor Dry".

SMART STORAGE FUEL FILL ASSEMBLY

There shall be a fuel fill assembly located on the apparatus body accessing the chassis supplied fuel tank. The assembly shall be located in the rear Smart Storage module specified behind the rear axle.

There shall be a drain in the fuel fill assembly to allow over flow to drain on the back side of the apparatus body. The fuel fill cap shall be manufactured of plastic materials, green in color and equipped with a tether.

The fuel fill cap shall be labeled "DIESEL FUEL". The stainless steel fuel fill neck shall have a .375 inch inside diameter vent line installed from the top of the fuel tank to the fill tube.

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RIGHT FRONT WHEEL WELL COMPARTMENT

There shall be a storage compartment in the wheel well on the front side in front of the axle.

SCBA COMPARTMENT

The compartment shall hold three (3) 6.75 inch (171.45 mm) Diameter x 24.00 inch (609.60 mm) long SCBA bottles with 1.00 inch (25.40 mm) nylon safety loops installed.

RIGHT REAR WHEEL WELL COMPARTMENT

There shall be a storage compartment in the wheel well on the right side behind the axle.

SCBA COMPARTMENT

The compartment shall hold three (3) 6.75 inch (171.45 mm) Diameter x 24.00 inch (609.60 mm) long SCBA bottles with 1.00 inch (25.40 mm) nylon safety loops installed.

SMART STORAGE DOORS

The smart storage compartment doors shall be Brushed Stainless Steel. Where a module storage compartment is specified, a vertically hinged door shall be provided. Each compartment door shall be secured with a round chrome latch.

DOOR OPEN INDICATOR

There shall be a "plunger" style switch installed for each smart storage compartment door.

If the door is not properly closed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the "hazard light" in the cab to alert the crew.

FENDERETTES

Two (2) polished stainless steel fenderettes shall be provided and installed on body rear wheel well openings, one (1) each side. Rubber welting shall be provided between the body and the crown to seal the seam and restrict moisture from entering. A dielectric barrier shall be provided between the fender crown fasteners (screws) and the fender sheet metal to resist deterioration.

HOSE STORAGE

A hose bed shall be provided and installed with the minimum capacity as required by NFPA 1901.

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The hose bed shall have a slotted .25 inch (6.35 mm) aluminum flooring installed to allow drainage through the tank cavity to the ground below.

The aluminum flooring shall be manufactured in discrete sections to allow for ease of removal and stability. The area shall be free of sharp edges to protect the hose when loading and unloading.

HOSE BED AREA

The hose bed area of the apparatus shall be overlaid with brushed stainless steel material.

HOSE BED AREA TRIMMED W/ BRUSHED SST

The vertical corners at the back hose bed shall be trimmed with brushed stainless steel. The trim shall extend from the hose floor level up to the top edge of the body side.

The top rail on the hose bed side walls shall have a trim cap fabricated of 16 gauge brushed 304L stainless steel. The cap shall run the entire length of the hose bed side wall and shall provide a smooth surface with a highly finished appearance. It shall extend down at least 1" on each side of the hose bed side wall.

HOSE BED WALL HEIGHT

The walls of the hose bed shall be 85.00 inches (2.16 m) tall, measured from the bottom edge of the compartments to the top flange.

'A' FRAME HOSE BED COVER

There shall be a double door cover furnished and installed which overlays a tubular structure for the hose bed.

Each cover shall be capable of supporting 600 pounds (272 kg) while standing on the cover. Each cover shall be capable of being opened independently and rest on a tubular structure which runs down the middle of the hose bed with a truss support at the rear of the apparatus. The covers in the closed position shall be higher in the center of the hose bed than they are at the hinged end to create an 'A' frame appearance and to aid in water run off.

The front and rear of hose bed covers shall have vertical end caps that extend down to create a level line of diamond plate the width of the covers.

The doors shall be fabricated of .125 inch (3.18 mm) embossed aluminum diamond plate with full length two-piece stainless steel piano hinges.

The hose bed covers shall be wired to the hazard light in the chassis cab, with sensors at the hinges, to warn the crew when the cover is open when the transmission is placed into drive or reverse movement mode.

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To aid in opening and closing the cover, there shall be two (2) grab handles, one (1) for each cover, installed on the rear facing vertical end cap.

MANUAL RAISED COVERS

Each cover shall be raised independently and manually. There shall be a gas shock hold open device provided to hold each cover in the open position.

REAR HOSE BED RESTRAINT

There shall be a vinyl flap that extends down over the rear of the hose bed provided and installed with the apparatus. The cover shall be fastened by an elastic shock cord sewn into the tarp with brass grommets where the shock cord passes through the hose bed cover. Hooks shall be provided on the lower corners to provide a means of attaching the cover to the apparatus. The hooks shall be made of cast aluminum.

REAR FLAP COLOR

The rear flap shall be black.

LED HOSE BED COVER LIGHTING

There shall be four (4) Fire Research FireFly LED lights model #100-Q01 installed to the underside of each hose bed cover and evenly spaced from front to back. The lights shall have four (4) white LEDs each that generate a rated 650 lumens at 12 vdc/0.8amps or 24 vdc /0.4 amps.

The lights shall be on a circuit and turning on only when the cover is opened.

HOSE BED DUNNAGE AREA

A vertical bulkhead shall be provided and installed at the front of the hose bed area, just behind the water tank fill tower, forming a storage area that is separated from the hose bed.

The rear face of the bulkhead shall serve as a mounting surface for the hose bed dividers, resulting in the ability to move any hose bed divider across the entire width of the hose bed.

HOSE BED DIVIDER WITH HAND CUTOUT

There shall be a full height adjustable hose bed divider provided and installed in the hose bed area of the apparatus body.

The divider shall be fabricated of .25 inch (6.35 mm) thick aluminum plate with a double sided reinforcement and attached to the adjustable slide rails. The rear of the divider shall have a radius to provide a smooth corner and a hand cut out to aid in access to the hose bed area. Hose payout shall be unobstructed by the divider.

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There shall be a total of three (3) provided and installed in the hose bed.

HOSE LOAD

The hose bed shall accommodate the following hose loads:

BAY 1:

-250 feet of 2.50 inch hose Single stack preconnect for blitzfire.

BAY 2:

-750 feet of 3.00 inch hose

In the same bay, the following hose shall be stacked on top of the previously specified hose:

-300 feet of 1.75 inch hose

BAY 3:

-750 feet of 3.00 inch hose

BAY 4:

-750 feet of 5.00 inch hose

TANK CAPACITY

The tank shall be 1000 gallons (3785 liters) in capacity.

PRO POLY POLYPRENE TANK

The water tank shall be designed to utilize cavities that have commonly been wasted space. The water tank shall extend up and over the rear center compartment to just behind the rear body wall. The water tank shall fill the void between the main hose bed floor and the top of the rear center compartment. This tank design shall provide for a lower overall tank height, resulting in a lower overall main hose bed height. In addition, this design shall create a lower center of gravity of the vehicle, for improved vehicle handling.

TANK CONSTRUCTION

The booster tank shall be constructed of .50 inch (12.70 mm) thick polyprene sheet stock which is a non-corrosive stress relieved thermoplastic. It shall be designed to be completely independent of the body and

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compartments. All joints and seams are extrusion welded and/or contain the "Bent Edge" and tested for maximum strength and integrity. The top of the booster tank is fitted with lifting eyes designed with a 3 to 1 safety factor to facilitate tank removal.

COVER

The tank cover shall be constructed of .50 inch (12.70 mm) thick polypropylene and shall be recessed. A minimum of two lifting dowels shall be drilled and tapped .50 inch (12.70 mm) x 2.00 inch (50.00 mm) to accommodate the lifting eyes.

BAFFLES

The swash partitions shall be manufactured from .50 inch (12.70 mm) polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments to provide maximum water flow. All swash partitions interlock and are welded to one another as well as to the walls of the tank.

MOUNTING

The tank shall have a reinforced .75 inch (19.10 mm) floor for added strength and durability. The tank shall be isolated from the body substructure cross members with .50 inch (12.70 mm) x 2.50 inch (65.00 mm) rubber strips that are 60 durometer in hardness. The tank shall sit nested inside the center body substructure and shall be completely removable without disturbing the body side panels. Tank stops on all four sides will keep the tank from shifting front to back or side to side.

FILL TOWER

The fill tower opening shall be approximately 13.00 inches (330.20 mm) x 12.00 inches (304.80 mm).

The tower will have a .25 inch (6.40 mm) thick removable polypropylene screen and a polypropylene hinged type cover that will open if the tank is filled at an excess rate. There shall be a removable .25 inch (6.40 mm) thick polypropylene screen to prevent debris from falling into the tank.

The fill tower shall have a 4.00 inch (100.00 mm) overflow that will discharge underneath the tank, behind the rear wheels. The overflow shall terminate above the tank water level when filled to the rated capacity.

FILL TOWER LOCATION

The fill tower shall be located to the left side at the front of the hose bed.

SUMP

The sump will be constructed in an 8.00 inch (203.20 mm) x 16.00 inch (406.40 mm) x 3.00 inch (77.00 mm)

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deep area.

The construction material shall utilize .50 inch (12.70 mm) polyprene and be located in line with the tank suction valve. There shall be a 4.00 inch (100.00 mm) schedule 40 polyprene tube installed that will run from the suction outlet to the sump location. The tank will have an anti-swirl plate located approximately 2.00 inch (50.00 mm) above the sump.

SUMP PLUG

The sump shall have a 3.00 inch (77.00 mm) plug for use in draining and cleaning out the tank.

OUTLETS

In addition to the tank suction valve outlet located in the sump, there shall be an outlet provided for the tank fill valve. If there are any additional options selected (such as an extra tank suction or direct tank inlets), there shall be additional outlets provided to accommodate these items.

OVERHEAD LADDER RACK

There shall be a fold down ladder rack assembly provided and installed on the apparatus. The ladder rack shall be constructed with stainless steel and shall be painted to match the apparatus upper body paint color.

There shall be an automatic safety latch to hold the ladder rack in the stowed position.

The ladder rack shall be powered by a 12 volt electric over hydraulic actuated pivot assembly to fold the ladder rack down from overtop of the high side compartments to the side of the compartments. When the ladder rack is in the down position the bottom of the rack shall be approximately 48.00 inches from the ground when deployed.

There shall be a fold down hinged door provided and installed to open automatically when the ladder rack is lowered. The door will also provide access to the actuator and safety lock when service is required. The door shall be painted to match the body.

There shall be a spring loaded quarter turn latch provided to hold the ladders on the rack when it is in any position.

Flashing LED warning lights shall be provided at the front and rear of the ladder rack and shall automatically activate when the ladder rack is in the down position. When the ladder rack is in motion, the chassis backup alarm shall sound.

The ladder rack shall be rated to lift up to 500 pounds. When the apparatus is equipped with hinged doors, an interlock shall be installed in the ladder rack circuit to prevent ladder rack operation when any doors are not closed.

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If the ladder rack is not properly stowed and the transmission is placed into drive or reverse mode with the parking brake released, it shall activate the “hazard light” in the cab to alert the crew.

LADDER RACK LOCATION

The ladder rack shall be located on the right side of the apparatus body rearward of the overwheel compartment.

LADDER RACK ACTIVATION

The switch to operate the ladder rack shall be located on the rear panel of the apparatus, on the right side.

LADDER COMPLIMENT

The following ladders shall be supplied with the apparatus:

One (1) Duo-Safety 35 foot (10.0 m) three (3) section aluminum extension ladder(s), model 1225A.

One (1) Duo-Safety 24 foot (7.0 m) two (2) section aluminum extension ladder(s), model 900A.

One (1) Duo-Safety 14 foot (4.0 m) aluminum roof ladder(s) with folding hooks, model 775A.

One (1) Duo-Safety 10 foot (3.0 m) aluminum attic ladder(s), model 585A.

PIKE POLE STORAGE

There shall be two (2) aluminum tubes provided for storage of the pike poles installed with the ground ladder compliment.

The following pike poles shall be supplied with the apparatus:

One (1) Duo-Safety 12 foot (3.5 m) pike pole(s) with fiberglass handle

One (1) Duo-Safety 10 foot (3.0 m) pike pole(s) with fiberglass handle

SUCTION HOSE STORAGE

Suction hose shall be stored on a formed carrier rack. The rack shall have two (2) Velcro hold-down straps, one (1) at each end, which shall secure the suction hose to the tray.

A carrier rack sized to hold 6.00 inch x 10.00 foot hose constructed of anodized aluminum for a durable, long lasting finish shall be provided.

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One (1) carrier shall be mounted to the left side catwalk above the side compartments and one (1) carrier shall be mounted to the ladder rack on the right side.

SUCTION HOSE

The following suction hose shall be provided to be stored with the carriers.

HARD SUCTION HOSE

Two (2) 10 foot lengths of 6.00 inch clear PVC suction hose with lightweight couplings.

One (1) Kochek Model #LL60 strainer for drafting in low water conditions shall be provided. The strainer shall be constructed from aluminum with K-Coat finish and an internal screen and incorporated jet siphon.

COMPARTMENT UNISTRUT

Vertically mounted Unistrut shall be installed in all apparatus body compartments, in the upper and lower sections, to accommodate the installation of shelves, trays, and or other miscellaneous equipment.

OVER-WHEEL COMPARTMENT PARTITIONS (dual sides)

Compartment partitions, fabricated of the same material as the body, shall be welded in place in both left and right side over-wheel compartments flush to the forward and rearward frame openings.

These partitions shall aid in keeping loose equipment from falling into the fore and aft compartments.

SHELVING

The shelving shall be made out of .190 inch (4.83 mm) smooth aluminum sheet material with a formed 2 inch (50.80 mm) lip on the front and back.

The side mounting brackets shall be integral with the shelving to form the sides. The shelving shall be vertically adjustable.

The following shelving shall be provided:

UPPER FULL DEPTH SHELVING

A full width x full depth shelf shall be provided and installed in the upper area of the compartment as specified.

There shall be a total quantity of three (3) provided.

- One (1) located in the L-2 compartment.

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- Two (2) located in the L-3 compartment.

UPPER HALF DEPTH SHELVING

A full width x half depth shelf shall be provided and installed in the upper area of the compartment specified.

There shall be a total quantity of five (5) provided.

- Two (2) located in the R-1 compartment.
- One (1) located in the R-2 compartment.
- Two (2) located in the R-3 compartment.

REAR COMPARTMENT SHELF

An adjustable shelf installed in the rear center compartment, B-1, of the apparatus. Each shelf shall be as wide and deep as possible.

There shall be a total quantity of one (1) provided.

ROLL OUT TRAY(S)

Each tray shall be fabricated of .190 inch (4.83 mm) thick 3003 grade or higher aluminum sheet material with four (4) 3.00 inch (76.20 mm) side flanges, corner welded for maximum strength and shall be as wide and as deep as compartment allows.

The following shall be supplied:

ROLL-OUT ASSEMBLY/AUSTIN

The floor mounted tray shall be full width and shall be secured to an Austin Hardware 24.00 inch (609.60 mm) long ball bearing "heavy duty" slide assembly. The slide assemblies shall incorporate cadmium plated ball bearing roller slides and a lock-in, lock-out front drawer release system (FDR).

The tray shall have a 300# capacity and 100% extension.

There shall be a total quantity of four (4) provided.

- One (1) located in the L-3 compartment.
- One (1) located in the R-1 compartment.

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- One (1) located in the R-3 compartment.
- One (1) located in the rear center compartment.

ROLL OUT/TILT DOWN TRAY

The roll out/tilt mounted tray shall be full width and depth and shall be secured to a (Slide Master) roll-out system. The slide unit shall extend down 30-degrees and 90% extension with a 250# slide capacity. The slide assemblies shall incorporate cadmium plated ball bearing roller slides and a latching device to hold the tray in the stored position.

The tray shall have a 600# capacity and 100% extension.

There shall be a total quantity of two (2) provided.

Each slide shall be held in the locked position by a lever actuated twist lock.

Each Slide Master slide shall be wet painted {silver} in color.

- One (1) located in the L-2 compartment.
- One (1) located in the R-2 compartment.

SHELF AND ROLL OUT TRAY MATTING

Any shelf or tray provided shall have Turtle Tile floor tiles installed. The tiles shall be custom fitted for durability and a pleasing appearance.

MATTING COLOR

The matting shall be black in color.

PULL-OUT TOOL BOARD/ALUMINUM PEG BOARD

An aluminum peg board, pull-out tool board shall be installed in the compartment as specified. The tool board shall be attached to unistrut material mounted on the floor and ceiling of the compartment, extending perpendicular to the rear wall, allowing for horizontal adjustment from front to rear.

The tool board shall be mounted on ball bearing slides, top and bottom. A locking device shall be installed on the lower slide to keep the board in the stored and extended positions.

There shall be a total quantity of two (2).

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The pull-out/swing-out style tool board, shall have RED reflective striping installed making the perimeter of the tool board more readily visible.

- Two (2) located in the L-1 compartment.

SIDE RUB RAILS (ALUMINUM CHANNEL)

The lowest edge of the apparatus body side compartments shall be trimmed with brightly anodized aluminum channel rub rail material.

The rub rails shall be approximately 3.00 inches high with flanges turned outwards for increased rigidity, with each end chamfered to a 45 degree angle. The rub rails shall not be constructed as an integral part of the apparatus body structure, allowing each rub rail to be easily removed in the event of damage.

The rub rails shall be secured with stainless steel fasteners and spaced away from the apparatus body with .50 inch nylon spacers to help absorb moderate side impacts and prevent the collection of water and debris for easier cleaning.

FOLDING STEPS

Illuminated folding step(s) shall be installed that shall meet current NFPA in step height requirements.

The top of the stepping surface shall have a knurled finish and an LED light that illuminates the stepping surface with an additional light provided on the step mounting bracket to illuminate the area under the step.

Each surface of the folding step shall have grip material with a minimum of 42 sq. inches in size and shall be capable of sustaining a 500 lb. static load.

The steps shall be manufactured by Cast Products Inc. (CPI).

STEP LOCATION

Three (3) folding steps shall be installed on the right forward vertical wall of the front compartment.

One (1) 10" long x 1 1/4" diameter handrail constructed of extruded aluminum with a knurled grip, full length red reflective strip and full length illuminated white LED light strip shall be installed in a location above the forward step(s) and in accordance with the current edition of NFPA 1901 standard requirements. There shall be a 2" minimum clearance between the bracket and the body.

ILLUMINATED HANDRAIL LIGHTING ACTIVATION

The illuminated handrail light shall be activated when the park brake is set.

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LIGHTING ACTIVATION

Lighting shall be activated when the park brake is set.

STEP LOCATION

Three (3) folding steps shall be installed on the left forward vertical wall of the front compartment.

One (1) 10" long x 1 1/4" diameter handrail constructed of extruded aluminum with a knurled grip, full length red reflective strip and full length illuminated white LED light strip shall be installed in a location above the forward step(s) and in accordance with the current edition of NFPA 1901 standard requirements. There shall be a 2" minimum clearance between the bracket and the body.

ILLUMINATED HANDRAIL LIGHTING ACTIVATION

The illuminated handrail light shall be activated when the park brake is set.

LIGHTING ACTIVATION

Lighting shall be activated when the park brake is set.

STEP LOCATION

Three (3) folding steps shall be installed on the left rear vertical face of the body.

10" HANDRAIL

One (1) 10.00 inch long by 1.25 inch diameter handrail constructed of extruded aluminum with a knurled grip, full length red reflective strip and full length illuminated LED light strip shall be installed in a location above the rearward step(s) and in accordance with (NFPA) 1901, Standard for Automotive Fire Apparatus, standard requirements. There shall be a 2.00 inch minimum clearance between the bracket and the body.

Each handrail LED light strip specified shall be white/clear in color.

ILLUMINATED HANDRAIL LIGHTING ACTIVATION

The illuminated handrail light shall be activated when the park brake is set.

LIGHTING ACTIVATION

Step lighting shall be activated when the park brake is set.

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INTERMEDIATE REAR STEP

The rear step shall be 8.00 inches (203.20 mm) in depth and shall span the entire width of the rear center compartment area between the body sides.

The step shall be mounted on the flat back of the apparatus with gusset-type mounting to provide sufficient support for loading hose and gaining access to the hose bed area.

The platform stepping surface shall be constructed of .188 inch (4.76 mm) embossed aluminum diamond plate materials to meet the minimum NFPA 1901 standard requirements for slip resistance.

INTERMEDIATE REAR STEP LOCATION

The rear step shall be located just above the B-1 compartment door.

STEP LIGHTING

One (1) light shall be installed to illuminate the stepping areas as provided. The light shall be a LED Tube light model #RX-15T16-5050-21CM with an aluminum mounting bezel.

The light shall be directed towards and positioned above the stepping surfaces.

LIGHTING ACTIVATION

Lighting shall be activated when the park brake is set.

KNURLED ALUMINUM ILLUMINATED HANDRAILS

Handrails shall be 1.25" in diameter, constructed of extruded aluminum with a knurled grip, full length red reflective strip and full length illuminated white LED light strip.

There shall be a 2" minimum clearance between the handrail and the body. The light shall illuminate an area adjacent to the handrail and in accordance with the current edition of NFPA 1901 standard requirements.

The following handrails shall be installed at the approximate lengths noted:

Three (3) hand rails shall be installed on the rear of the apparatus. Each hand rail shall provide approximately 42 inches, or length permitted for design, of gripping area for personnel.

Two (2) vertical hand rails shall be installed, one on each side, just below the hose bed sides. The remaining hand rail shall be installed horizontally, just below the hose bed area.

ILLUMINATED HANDRAIL LIGHTING ACTIVATION

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The illuminated handrail light shall be activated when the park brake is set.

TOW EYES

There shall be two rear tow eyes installed to the frame rails, one each side, accessible below the rear center compartment. They shall be manufactured of 1.00 inch plate steel and each plate shall be bolted to the chassis frame rail with a minimum quantity of (6) grade 8 bolts. The two plates shall be anchored together with 1.00 inch steel tubing to prevent swaying of the frame rails during a towing operation. All steel components shall be painted black.

SIDE RECEIVERS

There shall be a rescue winch receiver tube located in line with the rear tow eyes below the body, behind the rear axle on the left and right side. Each receiver shall have a maximum straight line pull capacity equaling 9000 pounds (4080 kg) to either side.

Each receiver shall have a 2.00 inch (50.80 mm) square opening for the attachment of a portable rescue winch.

A receptacle shall be supplied adjacent to each rescue winch receiver tube and wired for a portable electric winch.

A label shall be permanently affixed on or near each winch receiver indicating the maximum straight line pull rating of the anchor.

RAMSEY PP 12000 WINCH

A Ramsey Patriot Low Profile winch with 5.5 HP motor operating with 12 Volt DC with a 12,000 pound (5440.00 kg) rated line pull shall be provided and shipped loose with the apparatus.

The winch shall be equipped with 125.00 feet (38.00 m) of .375 inch (9.53 mm) galvanized aircraft cable.

The winch shall be operated through a 12.00 foot (3.66 m) pendant remote and battery cable lead with connector, anti-theft locking pin attached and hawse fairlead.

The winch features a highly efficient three-stage planetary gear system with a 138:1 gear reduction ratio for line intake. A positive clutch allows free spooling for quick cable deployment. An automatic load holding brake is designed to hold the full rated capacity of the winch.

The winch shall be model PP 12000.

LOW-VOLTAGE ELECTRICAL SYSTEM

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The apparatus shall be equipped with a Logic Controlled, Low-Voltage (12v) Electrical System, compliant with the latest revision of the NFPA 1901 standard guidelines.

The system shall be capable of performing total load management, load management sequencing, and load shedding via continuous monitoring of the low-voltage electrical system. In addition, the system shall be capable of switching loads (similar to operating as an emergency warning lamp flasher) eliminating the dependency on many archaic electrical components such as conventional flasher modules. The system shall also incorporate provisions for future expansion or system modification.

The low-voltage electrical system shall be designed to distribute the placement of electrical system hardware throughout the apparatus thereby enabling a smaller, optimized wire harness. The programmable, logic controlled system shall eliminate redundant electrical hardware such as extra harnesses, circuit boards, relays, circuit breakers, and separate electrical or interlock subsystems and associated electronics for controlling various electrical loads and inputs.

As-built electrical system drawings and an apparatus-specific reference of I/O shall be furnished in the final delivery manuals. These drawings shall illustrate the electrical system broken down into separate functions, or small groups of related functions. Drawings shall depict circuit numbers, electrical components and connectors from beginning to end. **A single drawing for all electrical circuits installed by the apparatus manufacturer shall not be accepted.**

NODE

An electrical distribution node or relay shall be installed and located as high as possible on the interior of the most rearward compartments on each side of the apparatus body.

Full depth body compartmentation designs shall have the node mounted to the back wall and run parallel front to back of the apparatus.

Half depth compartment ion designs shall have the node mounted to the back wall and run parallel front to back of the apparatus.

A protective cover shall be installed to prevent damage to the node or electrical system during equipment installation and or removal. Node covers shall be approximately 16 to 22” in length and shall match the compartments interior finish. Node covers will not include any type of shelve mounting structure and shall limit the height of unistrut or shelf height within the compartments.

PERIMETER LIGHTS LOCATION

There shall be four (4) underbody perimeter lights installed on the apparatus positioned to provide illumination to the immediate ground area around the unit.

One (1) under each side of the pumphouse running boards and two (2) under the rear tailboard.

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LED PERIMETER LIGHTS

The underbody perimeter lights provided will be Trucklite LED lights and be model kit #44057C.

PERIMETER LIGHTS ACTIVATION

The perimeter lights under the body shall be activated with activation of the chassis ground lights.

UPPER LIGHTING PACKAGE

The following NFPA lighting package, manufactured by Whelen, shall be supplied and installed in the upper areas of the vehicle.

UPPER ZONE C:

There shall be two (2) Whelen beacons with 360 degree super LED lights, provided and installed at the rear upper outboard corners of the apparatus, one (1) each side.

The beacons shall be model B6MM**P with red lights and clear lenses

and

Two (2) 700 series LED [Left side to be red flashing lights with clear lenses](#) and [right side to be blue with clear lenses](#) surface mounted below the beacons.

CAST ALUMINUM LIGHT STANCHIONS

Two light stanchions shall be mounted in the upper rear corners of the body sides, one each side. Each shall be large enough to accommodate an upper zone C rotating beacon and a hose bed light if specified. The DOT lights specified elsewhere in the quote shall also be located one on the side and the other located on the rear of each stanchion.

LOWER LED WARNING LIGHTING

The following NFPA lighting package, manufactured by Whelen, shall be supplied and installed in the lower areas of the vehicle.

LOWER ZONE B&D:

There shall be four (4) Whelen model 600 series Super-LED lights with chrome bezels, two (2) each side, provided and installed with the apparatus.

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SIDE WARNING LIGHTS FLASH

The lower front lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

SIDE WARNING LIGHTS COLOR

The lower side warning lights mounted on the side positions shall be red with clear lenses.

SIDE WARNING LIGHTS LOCATION

The warning lights on the side of the apparatus shall be mounted at the pump panel location and at the rear tailboard location.

LOWER ZONES B&D CAST ALUMINUM LIGHT HOUSING

A cast aluminum light housing shall be used for the rearmost warning light in zones B&D to ensure the light is mounted as far rearward as possible.

SIDE WARNING SWITCH

The lower side warning lights shall be controlled through the master warning switch.

LOWER ZONE C:

There shall be two (2) Whelen model 600 series Super-LED lights with chrome bezels, one (1) each side, on provided and installed on the rear of the body.

REAR WARNING LIGHTS FLASH

The lower side lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

REAR WARNING LIGHTS COLOR

The lower rear warning lights mounted at the rear shall be red with clear lenses.

REAR WARNING SWITCH

The lower rear warning lights shall be controlled through the master warning switch.

LED REAR TAIL LIGHT ASSEMBLY

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There shall be Whelen model 600 series, 4 x 6, LED rear tail light assemblies provided and installed with the apparatus, one (1) each side at the rear

The following shall be installed in the order as specified from top to bottom:

One (1) red stop/tail light

One (1) amber turn signal light populated in the shape of an arrow

One (1) clear backup light

MOUNTING ASSEMBLY

There shall be Whelen 4-position vertical chrome plated housing provided for each tail light assembly.

The upper most open cavity shall be filled with the specified warning light for the rear of the apparatus.

BACKUP LIGHTS

The backup lights shall illuminate when the apparatus is placed in reverse.

LED DOT LIGHTING

There shall be seven (7) lights located on the rear of the apparatus. Three (3) of the lights shall be mounted on the rear of the apparatus center location, for use as identification lamps. Two (2) additional lights shall be located on the rear outboard locations, one (1) each side as high as possible. Two (2) lights shall be mounted on the sides facing the side at the rear corners, for use as clearance lamps.

The lights shall be Weldon brand 9186-1500 series LED red markers.

LED INTERMEDIATE TURN SIGNAL LIGHTING

There shall be two (2) amber intermediate turn signals and two (2) amber intermediate marker lights on the sides of the apparatus (one (1) each per side) between the front and rear axles.

The lights shall be Weldon brand 9186-1500 series LED amber markers.

INTERMEDIATE TURN SIGNALS

The intermediate turn signals will flash with the turn indicators.

REAR DIRECTIONAL LIGHTBAR

There shall be eight (8) rear directional lights provided and installed on the rear of the apparatus integrated to the rear face of hosebed cover vertical end cap.

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The lights shall be Whelen model #WIONSMCA LED ION amber lights with clear lenses and chrome bezels. and mounted equally spaced, four (4) lights on each end cap.

The back of the hose bed cap shall be boxed in to provide protection and strength for the lights. The back of the protection panel shall be angled to provide protection when hose is deployed in case of contact. This protection panel shall be constructed of embossed aluminum diamond plate.

The lights shall be controlled by a Whelen TACTLD1 control head. [Control Head to have power only when Master Warning switch is powered on.](#)

RDL CONTROL HEAD MOUNTING LOCATION

Rear Directional Lightbar control head shall be mounted on top of the center dash at the center location.

REAR VIEW CAMERA LOCATION

A camera shipped loose with the chassis shall be surface mounted at the center location on the rear of the apparatus body for maximum viewing capability. A protective shroud shall be installed over the system to protect against damage. [Camera to be viewed by flip down screen above pump operators panel, Reverse signal for the driver position screens.](#)

ACCESSORY POWER LOCATION

In the EMS cabinet, on the left side wall, there shall be accessory power.

There shall be a total of one (1) provided.

12 VOLT POWER

A set of power and ground studs shall be provided for the 12 volt power. The power and ground studs shall be circuit breaker protected. The studs shall be capable of carrying up to a 40 amp battery direct load.

12V Scene Lighting Options-Enclosed T/M-SELECT LOCATIONS

SIDE SCENE LIGHT LOCATION

There shall be four (4) scene lights installed on the body sides of the apparatus, two (2) on each side.

One (1) located at the front and one (1) located at the rear corner of the body side walls.

SCENE LIGHT MODEL

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Fire Research Spectra 900 LED scene lighting shall be surface mounted on the apparatus.

Each light shall be 6.75 inches high X 9.00 inches wide and have a profile of less than 1.75 inches beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the light.

Each lamp head shall have twenty-four (24) white LEDs that generate a rated 7000 lumens at 12 or 24 volts DC. The lens shall redirect the light along the vehicle and out onto the working area. The light housing shall be aluminum with chrome colored bezel.

BODY SIDE SCENE LIGHT ACTIVATION

The scene lighting shall be activated by two (2) virtual buttons on the Vista display and control screen and two (2) weather resistant push button switches at the pump operator's panel, one (1) for each light.

The switch shall be labeled as follows:

Left Scene

Right Scene

REAR SCENE LIGHT LOCATION

There shall be two (2) scene lights installed on the rear facing vertical surface of the body, one (1) on each side.

SCENE LIGHT MODEL

Fire Research Spectra 900 LED scene lighting shall be surface mounted on the apparatus.

Each light shall be 6.75 inches high X 9.00 inches wide and have a profile of less than 1.75 inches beyond the mounting surface. Wiring shall extend from a weatherproof strain relief at the rear of the light.

Each lamp head shall have twenty-four (24) white LEDs that generate a rated 7000 lumens at 12 or 24 volts DC. The lens shall redirect the light along the vehicle and out onto the working area. The light housing shall be aluminum with chrome colored bezel.

REAR SCENE LIGHT ACTIVATION

The rear scene lighting shall be activated when the apparatus transmission is shifted into reverse and by a virtual button on the Vista display and control screen in the cab and a weather resistant push button switch at the pump operator's panel.

The switch shall be labeled as follows:

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Rear Scene

SMART POWER HYDRAULIC 6,000 WATT GENERATOR

One (1) Smart Power Hydraulic Driven Generator rated at 6,000 watts.

UL TESTING 110/220-VOLT & GENERATOR

The apparatus electrical and generator system shall be tested and UL, LLC certified.

SMART POWER HYDRAULICALLY DRIVEN GENERATOR

Smart Power model HR 120/240VAC, 60Hz, 1-phase hydraulic generator shall be provided. The generator tray assembly, including reservoir, shall be delivered in a one-piece module with the cooler/fan assembly mounted such that the hot air is exhausted straight up through the walking grate.

The generator system shall come with a standard 6-year/1,000 hour fully transferable warranty from the manufacturer.

The unit shall come complete with: generator tray assembly (which includes the generator, hydraulic motor, cooler/fan assembly, electronics package, 10 micron spin-on fluid filter and reservoir), axial piston hydraulic pump with pressure compensated control, and Command and Control Center (CCC) display with all required wiring harnesses.

The CCC shall be an interactive operator control center, equipped with smart touch solid-state buttons, with displays for voltage, frequency, amperage, hour meter, service reminders, operator warnings, system faults and diagnostics. Standard electronics package shall include smart start engagement to reduce mechanical stress (enables generator startup at any RPM), precise voltage and frequency control to maintain frequency control within a 0.2 Hz range, cold start protection system, automatic load and temperature compensation, integrated diagnostics system, and other automated control features to protect system, vehicle and operator.

The generator shall be a commercial type with 2 heavy-duty bearings to ensure exact rotor alignment and of brush-less design to ensure low maintenance. The integrated reservoir shall be equipped with an oil level sight gauge, fill cap and electronic fluid level sensor, which will display a low oil level condition on the CCC display.

The hydraulic pump shall be driven by a chassis transmission mounted power take off (PTO). The system shall be capable of producing the full rated power when driven from the vehicle PTO from idle to maximum engine speed. Generator shall make full rated power while vehicle is stationary or in motion. The system shall be capable of normal operation using a commonly available ATF fluid, such as Dexron III or equivalent.

The system shall be designed and assembled by a company with no less than 10 years experience in the manufacture of hydraulic driven generators. The system shall be tested for a full 2 hours prior to shipping and be accompanied with a test report. The generator shall be tested at 500-1000 watt increments from no load to

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full load to ensure reliable power delivery at all load levels.

GENERATOR LOCATION

The unit shall be located in the hose bed dunnage area near the front of the apparatus above the water tank.

HOT SHIFT PTO

The hydraulic generator shall be driven by a "hot shift" PTO installed on the chassis transmission. The PTO shall remain 'engaged' to keep fluid circulating through the system.

A guarded switch, labeled "GENERATOR EMERGENCY STOP", shall be located on the cab dash or other operator accessible area in the cab. The switch shall be used to disconnect the PTO from the transmission in the event of hydraulic failure (broken hose, etc) during operation or while checking the transmission fluid level.

A second switch with an indicator light shall be provided to excite the generator. The switch shall be labeled "GENERATOR EXCITE".

GENERATOR EXCITE

The generator excite application shall be activated by a rocker switch located on the cab dash or other operator accessible area in the cab.

LOAD CENTER

An electrical load center shall be provided and installed in a protected environment on the apparatus. The load center shall have provisions for eight (8) 20 amp manual reset type circuit breakers.

LOAD CENTER L-1

The load center shall be surface mounted to the upper forward wall of the L-1 compartment.

RECEPTACLE BEHIND DRIVER & OFFICER

Two (2) receptacles shall be provided and installed inside the chassis cab, one (1) behind the driver's seat and one (1) behind the officer's seat.

RECEPTACLE TYPE

The receptacle(s) shall be type NEMA 5-15 120V/15A single receptacle with a cover.

RECEPTACLE POWER

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The previously described outlet(s) shall be powered by the shoreline connection and shall be live when the shoreline power is provided.

Two (2) PLUGLOCK-PFP circuit-breaker protected locking outlet strip provides enough wall spacing for five bulky transformers and can be safely mounted out of sight.

Secure clamping design "locks" your transformers and conventional plugs in place, ensuring you never get disconnected from your power source. Adjustable clamps accommodate transformers and plugs from 0.4" to 2.1" above outlet.

The sturdy, all steel construction and heavy-duty 5-foot (14 AWG) three-conductor cord provide ultimate durability and longevity.

RECEPTACLE INSIDE EMS COMPARTMENT

Two (2) receptacles shall be provided and installed inside each of the two (2) chassis cab EMS compartments. The receptacles shall be low on the back wall, one (1) to each corner, of each compartment.

RECEPTACLE TYPE

The receptacle(s) shall be type NEMA 5-15 120V/15A single receptacle with a cover.

RECEPTACLE POWER

The previously described outlet(s) shall be powered by the shoreline connection and shall be live when the shoreline power is provided.

Two (2) PLUGLOCK-PFP circuit-breaker protected locking outlet strip shall be provided. The power strip shall be equipped with a 3-prong grounded plug connected to the previously described receptacle.

The outlet strip provides enough wall spacing for five bulky transformers and can be safely mounted out of sight.

Secure clamping design "locks" your transformers and conventional plugs in place, ensuring you never get disconnected from your power source. Adjustable clamps accommodate transformers and plugs from 0.4" to 2.1" above outlet.

The sturdy, all steel construction and heavy-duty 5-foot (14 AWG) three-conductor cord provide ultimate durability and longevity.

CORD REEL

One (1) Hannay model #CR series cord reel shall be installed on the apparatus as specified.

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ELECTRICAL CORD

The reel shall come equipped with 200 feet of yellow 10-3 electrical cord. There shall also be a cord stop supplied with the reel.

DISTRIBUTION BOX

The cord shall be hardwired to a Circle D remote power distribution box with four (4) NEMA 5-20 single receptacles. The distribution box shall be stored in a mounting bracket when not in use. The box shall be equipped with a light to indicate when distribution box is energized.

The distribution box shall be equipped with the following receptacles:

- Position 1: NEMA 5-20 R
- Position 2: NEMA 5-20 R
- Position 3: NEMA 5-20 R
- Position 4: NEMA 5-20 R

REWIND ACTIVATION

A weather resistant push button switch to activate the reel rewind shall be located next to the reel specified.

The switch shall be labeled "CORD REEL".

REEL LOCATION

One (1) reel is to be located in the B-1 Rear Center Compartment.

The reel shall be placed to the left side of the above stated compartment.

REEL ROLLER EXTENSION ASSEMBLY

The reel rollers shall be secured to a slide out assembly using Austin Hardware heavy duty slides and a front lift bar to extend the rollers away from the reel and past the side of the body.

The slide assemblies shall incorporate cadmium plated ball bearing roller slides and a lock-in, lock-out lift bar front drawer release (FDR) system.

REFLECTIVE STRIPING

The reflective striping shall be supplied and installed by the Dealer.

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REAR RETRO-REFLECTIVE CHEVRON STRIPING

A minimum of 50 percent of the rear-facing vertical surface, visible from the rear of the apparatus, shall be equipped with Diamond Grade, retro-reflective striping in a chevron pattern, sloping downward and away from the centerline of the vehicle at an angle of 45-degrees.

The stripe shall be 6.00 inches (152.40 mm) wide alternating in colors in compliance with the current edition of NFPA 1901.

CHEVRON COLOR

The retro-reflective chevron striping shall be red and fluorescent yellow-green in color.

DEALER SUPPLIED LETTERING

The apparatus lettering shall be provided and installed by the Dealership before final delivery of the completed apparatus.

FIRE DEPARTMENT SUPPLIED DECALS

The apparatus decals shall be provided and installed by the Fire Department after final delivery of the completed apparatus.

LICENSE PLATE MOUNTING

No license plate bracket shall be installed on the apparatus.

MISCELLANEOUS EQUIPMENT

The following equipment list shall be provided with the completed apparatus.

WHEEL CHOCKS

One (1) set(s) of NFPA compliant Ziamatic folding wheel chocks model # SAC-44-E shall be supplied with the apparatus.

ZICO WHEEL CHOCK MOUNTING BRACKETS

One (1) set of Ziamatic folding wheel chock underbody horizontal mounts, model #SQCH-44-H, shall be installed on the apparatus under the body in front of the rear wheels on the left side.

GROUND LADDERS

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The following ground ladders shall be provided:

STRAINERS

FOLDING TANK

EXTINGUISHERS

All NFPA required fire extinguishers will be supplied and installed by the Fire Department before the apparatus is placed into service.

RECHARGEABLE FLASHLIGHTS

All NFPA required portable hand lights will be supplied and installed by the Fire Department before the truck is placed into service.

FLARES

All NFPA required flares will be supplied and installed by the Fire Department before the truck is placed into service.

TRAFFIC CONES

All NFPA required traffic cones will be supplied and installed by the Fire Department before the truck is placed into service.

TRAFFIC VEST

All NFPA required traffic vest will be supplied and installed by the Fire Department before the truck is placed into service.

AED (AUTOMATIC EXTERNAL DEFIBRILLATOR)

All NFPA required AED units will be supplied and installed by the Fire Department before the truck is placed into service.

FIRST AID KIT

All NFPA required First Aid Kits will be supplied and installed by the Fire Department before the truck is placed into service.

SALVAGE COVERS

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All NFPA required salvage covers will be supplied and installed by the Fire Department before the truck is placed into service.

AXES

All NFPA required Axes will be supplied and installed by the Fire Department before the truck is placed into service.

WRENCH SETS

Three (3) South Park ##WH76301A spanner wrench sets containing two (2) universal spanner wrenches and one (1) hydrant wrench with mounting bracket shall be supplied with the apparatus.

Three (3) wrench set(s) shall be mounted on the specified apparatus in the noted location(s).

The one (1) spanner wrench(s) shall be install in the left pump operator's panel.

The one (1) spanner wrench(s) shall be installed in the **right** pump operator's panel.

The one (1) spanner wrench(s) shall be installed in the left rear compartment face.

NOZZLES

All NFPA required nozzles will be supplied and installed by the Fire Department before the truck is placed into service.

HAND HELD TOOLS

CLAW TOOL

All NFPA required claw tools will be supplied and installed by the Fire Department before the truck is placed into service.

HALLIGAN TOOL

All NFPA required Halligan tools will be supplied and installed by the Fire Department before the truck is placed into service.

CROW BAR

All NFPA required crowbars will be supplied and installed by the Fire Department before the truck is placed into service.

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SLEDGE HAMMER

All NFPA required sledge hammers will be supplied and installed by the Fire Department before the truck is placed into service.

RUBBER MALLET

All NFPA required rubber mallets will be supplied and installed by the Fire Department before the truck is placed into service.

SHOVELS

All NFPA required shovels will be supplied and installed by the Fire Department before the truck is placed into service.

BOLT CUTTER

All NFPA required bolt cutters will be supplied and installed by the Fire Department before the truck is placed into service.

SUPPLY HOSE

All NFPA required fire hose will be supplied and installed by the Fire Department before the truck is placed into service.

ADAPTORS

All NFPA required Adaptors will be supplied and installed by the Fire Department before the truck is placed into service.

SCBA & CYLINDERS (air packs)

All NFPA required SCBA and Cylinders will be supplied and installed by the Fire Department before the truck is placed into service.